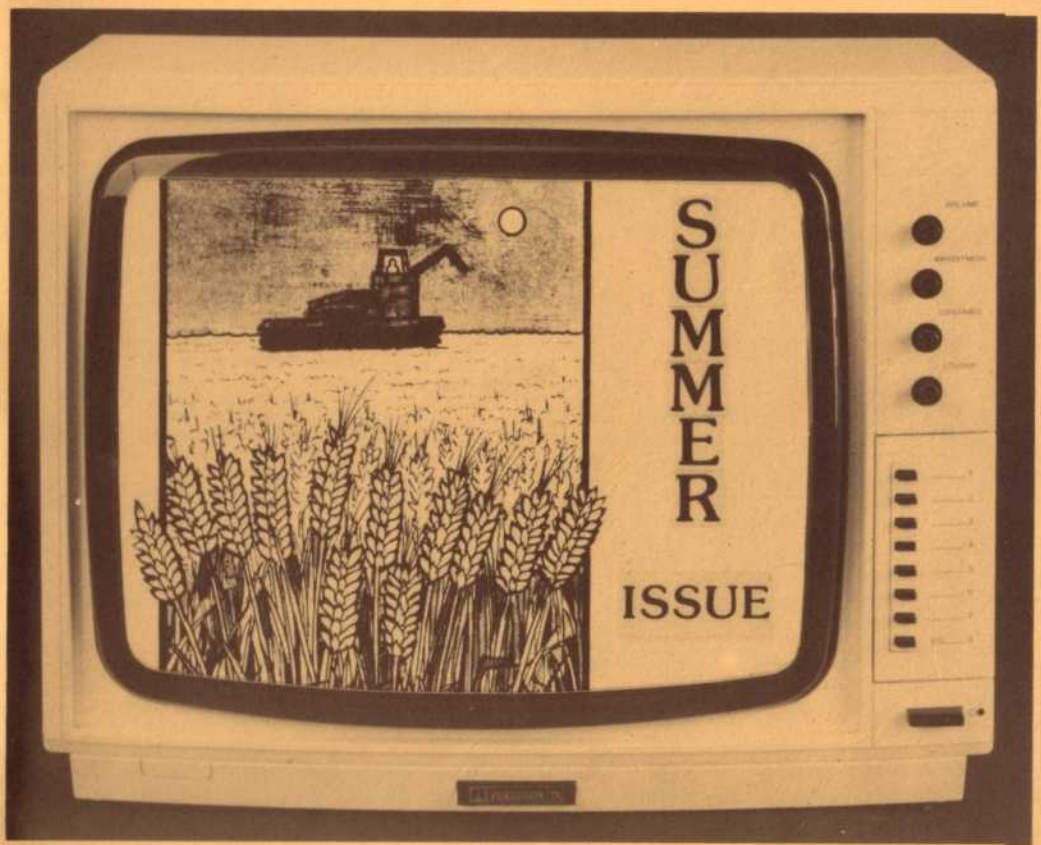
CQ-TV MAGAZINE No. 131

BRITISH AMATEUR TELEVISION CLUB

AUGUST 1985



TURN YOUR TX-90 INTO A MONITOR

Full details inside.....

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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. (£5 from Jan. 1986). All subscriptions fall due on the first of January.
OVERSEAS MEMBERS are asked to send cheques bearing the name of the bankers London agent. Postage stamps are not acceptable as payment.

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

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

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CLOSE FOR PRESS DATE FOR THE NOVEMBER ISSUE.....20th September 1985

EDITORS POSTBAG

Dear Ed,

Are there any software "whiz-kids" out there in the great 'yonder who might be able to help us?
My son has recently acquired an Acorn Electron and we were under the impression that the language was the same as the BBC. However, when attempting to put in any BBC program you have published, all we get is a clear screen.
We are particularly interested in the Test Card in CQ-TV125 and the 3-pictures program in CQ-TV129. Any assistance in this direction would be greatly appreciated.

John Oliver G8ARS,
3 Park Road,
Swan Meadow,
Much Wenlock,
TF13 6JH,
Shropshire.

(After a letter from me (Ed) the following was received:-)
Many thanks for your reply and suggestions. I have found that deleting lines 10 and 30 of the 3-picture program enables it to run on the Electron. No luck with the other prog so far.

J.O.

Dear Ed,

Could I, through the pages of CQ-TV, ask members whether anyone has done any modifications to the DL2RZ slow-to-fast scan converter?
I'm interested in any mod's to give different frame speeds (only 8 second at the moment), also has anyone tried using the unit for FAX or satellite weather pictures with suitable mod's?

P.W Lee G4GEW.
190 Chaldon Way,
Coulsdon,
Surrey,
CR3 1DH

Dear Ed,

You may be interested in the fact that, at my place of work, we have recently fitted one of our BBC micro's with the Electrocraft type 284 genlock board as advertised on the back cover of CQ-TV. Fitting the board took about 90 minutes and it worked first time!. You do need a fine-tipped soldering iron, though.
As one probably couldn't make a board for much less than £75, (always assuming you had the design in the first place), I think it is very good value indeed - highly recommended.

John Goode

Dear Ed,

Just a few lines to show that ATV is active in Leicestershire and to pass on one or two items that others may find of interest.
First let me congratulate the members who ae the BATCraly suc a sucess this yar. It was a well rganised event wi lots to ee plenty of people to see it.
Our monday night SSTV group is still going well, and our most recent 'celebrity' was G3WW from Cambridge. Anyone wishing to join us has only to give a call on 144.50MHz around 8.30pm on mondays.
Now rather a sour note. I was very disappointed with recent service from Scarab Systems. My SSTV program failed, and after two months and numerous 'phone calls they returned a second-rate copy of the tape which didn't work either. Such poor treatment of such good software.
There seems to be a lot going on in ATV circles about the Spectrum computer, so members may be interested in my experiences so far with the new Rotronics Waferdrive unit. I must say that I am very pleased with the product. The wafers are about twice the size of microdrive cartridges and are available in sizes from 16 to 128k. The drive itself simply plugs in via

a ribbon to the expansion port at the rear of the Spectrum. The twin drive system costs around £129 and for this you get the drive, four wafers and an excellent manual. Allowance is made for the expansion port to be chained through and there is an RS232 port at up to 19200 bauds, RTS, CT/S lines, RX and TX and a Centronics interface output which can double as an output port. The drive uses 2k of user RAM for the operating system which uses an extended basic. The unit can be switched off and then becomes transparent to the Spectrum.
In short; good value for money, good technical backup and a cheap alternative to disc drives. It should find many uses in the ATV shack.

Christopher Lewis G6ACL

Dear Ed,
Thanks again for a fantastic magazine. I finally got my callsign - G1LTI, took a long time!.
The Crawley repeater is going great guns, including static lightening strikes!.
Can you put anything in the mag. on wavemeters for 70 and 24cm (keep us legal); any articles on old VTR's would always be welcome ie: 1/2", 1" and 2" not forgetting U-matics. How about something on the Post Office tower? What's it all about? what earials do they use etc?

Peter Smith G1LTI

(What about those subjects fellers? any offers? - Ed)

Dear Ed,
I was pleased to see the first copy of CQ-TV magazine arrive so quickly. I plan to distribute it to our club members to give them a good idea of how good CQ-TV magazine really is. It is by far the best publication on amateur television that I have ever seen. 'A5' Magazine here in the U.S.A. has changed their logo to 'Spec-Com' and, in spite of this change, could never compete with your magazine from the viewpoint of the quality of your published articles.
I have recently moved from the New York City area to Florida, and I kind of miss the ATV repeater on top of the Empire State Building. In one weekend I think I was able to see at least 40 ATV'ers.
There is very little ATV activity in this town (Gainesville, Florida) but this will change shortly! The Gainesville Radio Society has tentative plans to put an ATV repeater on the air some time within the next year or so. There are only two of us on the air now but hopefully others will catch the fever too.

George Russell W2SJU.

Dear Ed,
I feel there were several inaccuracies in CQ-TV 130 both regarding Robot SSTV and indeed Colour SSTV in general. I also felt the final comments from Peter Asquith G4ENA in his letter in the postbag were unkind. The comments were basically inaccurate anyway as the Robot Colour system, being the only one which is truly black and white compatible, will be an assistance to the majority of slow scanners receiving the space shuttle pictures.
The "SSTV standards", particularly where colour is concerned, are quite naturally heavily biased towards Wrasse, which is of course what you would expect bearing in mind that he published the standards. To say on the one hand that they are adopted around the world and on the other that he has a "new" colour sync system is of course a ridiculous contradiction. Equally the Robot system is not an "American system" any more than Wrasse is a "German system" and is of course also in use around the world. The reference to "With an optional single frame colour system" does not make sense at all. The Robot Time Multiplex component colour system is a single frame colour system, (it's not an option) but optionally the Robot models can be used in the frame

sequential colour mode so as to be able to exchange colour pictures with any other colour stations regardless of standard. The Robot system has always been immune to colour change from strong interference and it has been demonstrated without question that the 12-second single frame Robot picture has a higher resolution than 24-second line sequential colour.

A Robot enthusiast.

NEWS ROUNDUP

ATTENTION TVRO ENTHUSIASTS

We are aware that an ever-increasing number of our members are also satellite TV enthusiasts. Although some technical articles in CQ-TV also relate to that subject it would be nice if some specific ones could be included as well.
Anyone wishing to contribute to the magazine on matters TVRO should please contact the Editor.

NEW LICENCES FOR TVRO

At last the D.T.I. has brought out a licence for those wishing to receive satellite TV transmissions in their homes. The licence, which costs £10, is valid indefinitely and covers the use of TVRO equipment only; it does not give permission to receive the broadcasts; such consent should be obtained from the programme originators. Anyone setting up a TVRO dish in their garden must also comply with any local planning regulations.
Form BR39 - "Application for a Licence for Television Receive Only Satellite Receiving Equipment (TVRO)" is available from the Department of Trade and Industry, Radio Regulatory Division, 24-26 Newport Road, Cardiff CF2 1SY.

AMATEUR TV HISTORY

Several issues ago I asked for members who had old letters, documents, magazines, photographs or reminiscences (on paper or audio tape) etc., concerned with the development of ATV to send it to me (assuming it was not wanted) as I intend, in the future, to correlate all the material and, hopefully, produce a book so that ATV history doesn't disappear into antiquity. Many of you have been very kind and I have a considerable amount of material. However, talking to one or two "old timers" at the Rally this year, it seems that some of you still have some material which you might be prepared to donate. If this is so I would be very glad to receive it (address on inside front cover). All paperwork will eventually be passed to the BATC library to be preserved as archive material.
John Wood (Ed)

MONEY, MONEY, MONEY!

The Treasurer would like to remind overseas members that ANY payments to the BATC including Publications and Members Services MUST be by a method redeemable in the UK, ie: Bank cheque bearing the name of its UK agent or International Money order. It is not possible to accept foreign cheques.

CQ-TV COPY

Here it is almost closing date again and, once more, I find myself in the happy predicament of having more articles that I can cram into one issue. The problem as always is what to leave out, however something has to give way so, if your contribution is not in this issue please don't think it is not wanted; it most certainly is and it will be used as soon as an opportunity presents itself.
Meanwhile a big "thank you" to all those who have sent in material, and PLEASE KEEP IT COMING. Oh yes! it still concerns me that articles of

70cm interest have dried up recently. 70cm is, after all, our main band and we hope that it will forever remain so. Let's not forget that there are new members joining all the time, each one a potential seventy-sentimentalist and that's besides the hundreds of members who already use 70 exclusively, so please get the thinking caps on and send in some material.
What about DX-TV? It is known that many of you are DX-TV enthusiasts as well as TV amateurs, so how about sending in any items of interest to the magazine. News and "on-air" matters should go to Andy Emmerson for 'TV On The Air'.

PUBLICITY MANAGER DEPARTS

Norrie Macdonald, GM4BVU, after a relatively short reign has been forced by circumstances to give up the job.
Norrie has done a great deal in furthering the cause of amateur television by handling all the club's display advertising, by sending material etc to magazines columns and news pages and by communicating with anyone who he thought could give us a publicity. It is largely due to Norries efforts that BATC membership figures continue to rise.
The Committee would like to express its grateful thanks for all the work that has gone into what must be the best publicity campaign of the BATC's life.

Now there is a vacancy! Anyone who may be interested in taking on the job of publicity manager - now that the groundwork has been done there shouldn't be a great deal to it - would they please contact the Editor, whose address is on the inside front cover of this issue to find out more about it.

NEW CONTEST MANAGER

After many years Graham Shirville, G3VZV, has passed on the job of Contest Manager to Mike Wooding, G6IQM. Over the years Graham has done stalwart work in promoting, organising and administering ATV contests. Not always a smooth path, Graham has given a lot to ATV contests and is responsible for the general rules format and for taking the contest popularity out of the doldrums and into the (almost) big time!
Thanks Graham for all your hard work and we trust that now you will have even more time to devote to the political and administrative side of the BATC, which, we know, takes up a considerable amount of spare time.
The Committee would like to welcome G6IQM to the fold (or is it clutches?) and hope to have him at the contest helm for many years to come.
Members wishing to contact the new contest manager will find the necessary details in 'Contest News' elsewhere in this issue and on the inside front cover.

NEWS SERVICE PROBLEMS

As you will be aware both the telephone hotline and Prestel services have proved disastrous, both being plagued with problems. The main setback now is the fact that Paul Elliott, who had been operating both services has, due to business commitments, had to relinquish both posts.
The telephone service has been discontinued indefinately since no suitable volunteer can at present be found to operate it. The committee is prepared to re-examine the service if such a volunteer comes forward in the future. However there is better news on the Prestel front:
Dave Lawton (Membership Secretary) has offered to add this service to his already long list of jobs. Dave is well versed in the Prestel system although a delay is probable as, to become an Editor, a one-day course has to be attended. The committee

is also taking the precaution of sending two or three other committee members on the same course, in that way all is not dependant on one man alone.
Members are assured that the full Clubspot BATC service will become operational as soon as these preliminaries can be ironed out and it is hoped that pages will be updated regularly, thus providing a useful service to members.
Full details will of course be contained in this magazine as, and when, they become available.

SUBSCRIPTIONS ARE GOING UP

Many of you will be aware that the £4 BATC subscription charge has been held constant for several years, this has been made possible by increases in revenue from sales of Members Services and Publications items. Nevertheless the committee had been aware of continually rising production and administration costs in recent years, and at the last General Meeting a mandate from those members present empowered the committee to raise subscriptions to £5 at their discretion. This was not found to be necessary for 1985 but, things have now caught up with us, and the rise will take effect from the first of January 1986.
Members who have already paid in advance for 1986 (or beyond), are asked please to send sufficient funds to cover the increase to Mr. D.Lawton, "Grenehurst", Pinewood Road, High Wycombe, HP12 4DD, with an accompanying note clearly stating what the money is for and giving your name, callsign and address.
The new rate will of course be shown on the membership renewal form which will accompany CQ-TV132 - due out in November.

REPEATER NEWS

GB3TV has a new transmitter. Arthur G4CPE has pensioned off the old, tripled 70 cm, design and come up with a new one. Current output is 5 watts but this should increase to eight, and the transmitter is now in beacon mode most of the time. The homebrew Alford slot antenna system is currently sleeved in plastic drainpipe: fibreglass will now be tried to see if this improves radiation.

ENDANGERED CHANNEL?

The French magazine "Megahertz" printed the current French bandplans in its April/May issue. Against 144.75 it says 'On account of the small number of ATV talkback users the VHF Committee recommends the use of 144.500 or 144.510 for ATV talkback. At the next meeting of the VHF-IARU the call will be made to displace SSTV to 144.550 and to officialise ATV talkback on 144.500 in place of 144.750." The BATC considers it unlikely the other European countries will see the logic of this decision.

EUROPEAN ATV WORKING GROUP

Although each European country has representation on the XXXX committee, there is no guarantee that the country representatives are especially knowledgable on ATV nor yet 'sympathetic' to the special requirements of ATV operators. As a result there has been no coordinated lobby for ATV interests up to now and ATV has in fact fared poorly as a result of some representatives' indifference. This should now change, following the formation of the European ATV Working Group at the 1985 German ATV Convention (see report in this issue).

MONITOR CONVERSION FOR THE THORN TX90

By Alan S.Warne. AMIERE. FSERT. G4EZO.

The following article describes a conversion to allow a domestic television set to be used as a video monitor or as a normal off-air receiver at the push of a button.

Television receivers which can be used as monitors having facilities for video and sound input and output are few and far between and are normally expensive to buy. It was therefore considered reasonable to convert a reliable, inexpensive receiver for this purpose. One of the more popular colour TV's found in the high street dealers and discount stores, and which is British made and reliable, is the Ferguson Model 37140 which retails at less than £170. It has a 14" screen and the option for battery operation. The type of chasis used is the TX90.

CIRCUIT OPERATION

It is good practice to provide video and sound inputs and outputs at standard levels on a monitor, therefore this conversion has been designed with this in mind. Button-8 on the channel selector switch is used to change from normal TV to monitor. In the monitor mode off air signals are disabled and external video and sound signals are sourced from the input sockets. Whichever signal is selected is also made available at the video and sound output sockets for distribution to line, e.g. for recording or connecting to other monitors etc.

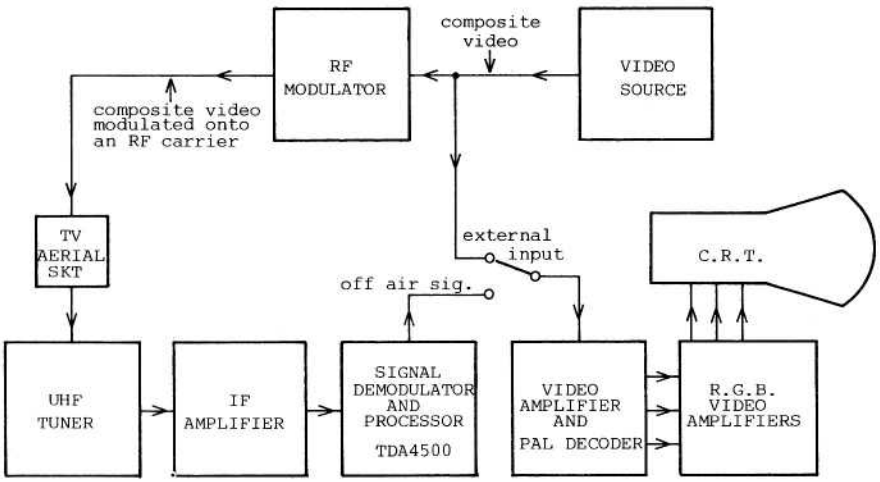


Fig.1 SIGNAL PATH OF COMPOSITE VIDEO OR RF SIGNAL

In the TX90, sound and vision signals are derived from the small signal combination IC type TDA4500. Video signals are then connected to the luma/chroma processing IC UPC1365 and sound is fed to the audio amplifier, (see Fig.2). The path of the video and sound signals must be broken to allow external inputs when in monitor mode, and this is achieved by C-MOS switching, which offers low insertion loss and simple changeover control.

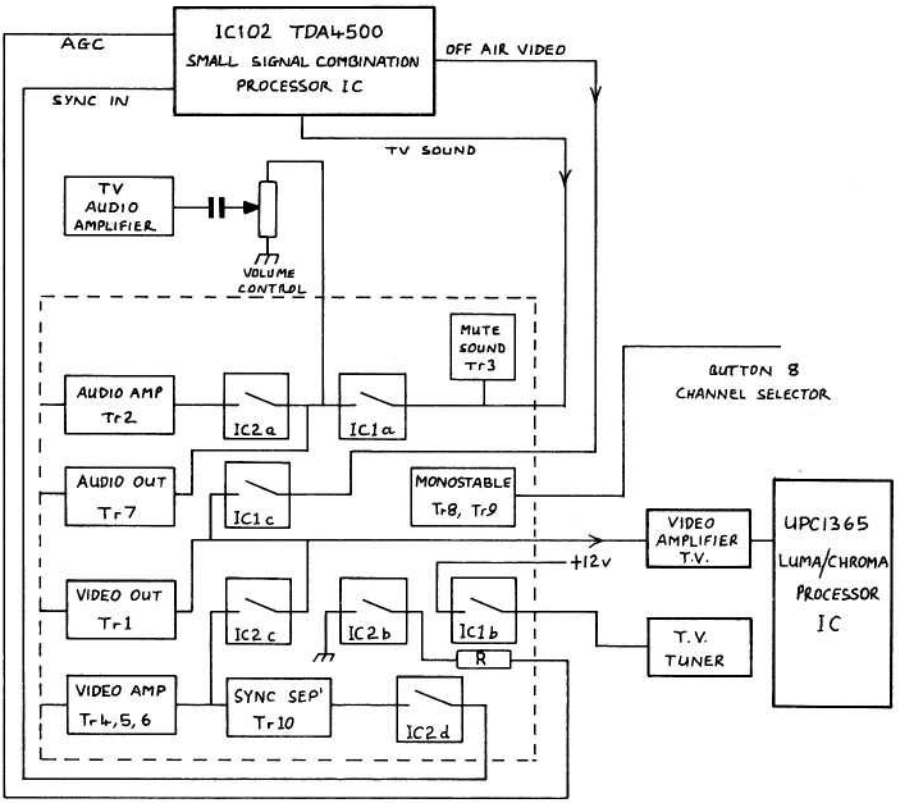


Fig.2 CIRCUIT OPERATION

When switched to TV mode, video signals, after processing by the TDA4500, are fed via switch IC1(c) to the video amplifier in the television, (see Fig.2), and at the same time to the video output socket via Tr1 at the standard level of 1-volt peak-to-peak. Sound signals are also processed in the TDA4500, audio amplitude being controlled by an internal voltage attenuator network prior to leaving the IC. Using this method of volume control prevents the audio signals not controlled by the volume control from being extracted for external output , it is therefore necessary for the audio output signal to be of a standard level and removed prior to the volume control, which means a small modification to the receiver. This is done by disconnecting the volume control potentiometer from the DC control pin of the voltage controlled

attenuator within the TDA4500. Attenuator action is now prevented and maximum audio is available at the output of the IC. External audio signals are now available and are amplified by Tr7 and fed to line. The original volume control is now connected in a conventional manner after first AC coupling from the IC output, (see Fig.3).

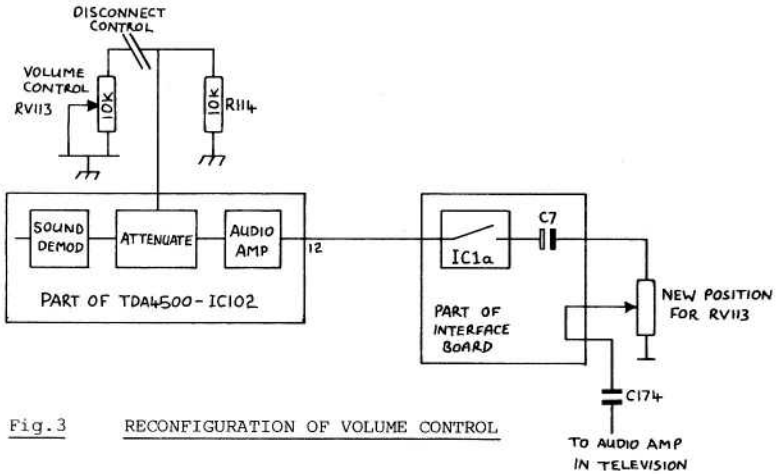


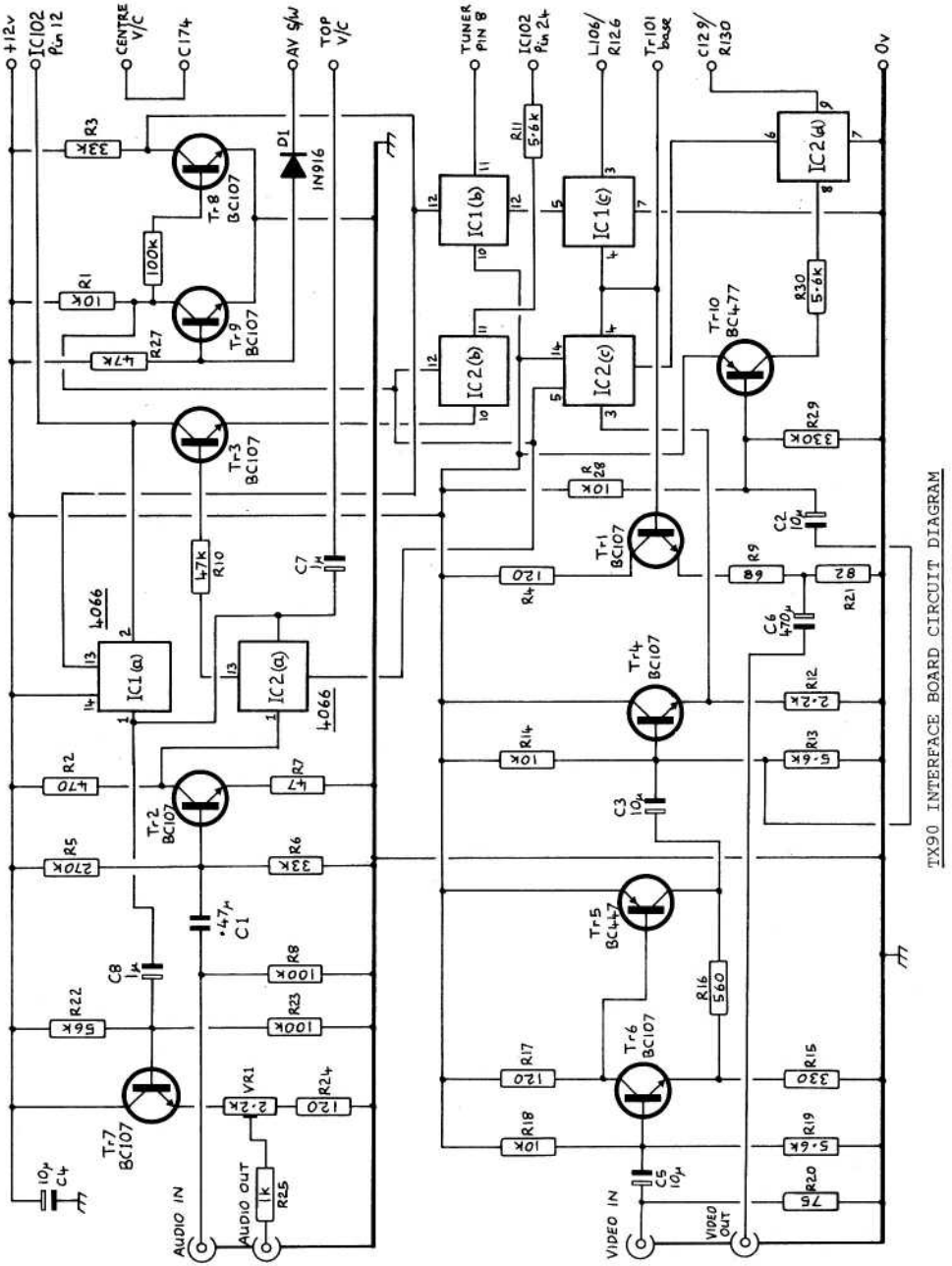
Fig.3 RECONFIGURATION OF VOLUME CONTROL

When switching to monitor, video input signals must be amplified and switched into the TV's existing video circuit, and simultaneously off air video signals disabled using further C-MOS switching. Sound signals are treated in a similar manner. The action of these switches is controlled by the AV (Audio/Visual) sync time constant switch which is automatically operated when button-8 on the channel selector switch is pressed.

CIRCUIT DESCRIPTION

External video signals are terminated by R20 and then AC coupled via C5 to a non-inverting amplifier consisting of Tr5, Tr6 and associated components. Tr4 is connected as an emitter follower which allows the video signal to be applied to the main board via IC2(c). Tr10 is also fed with a video signal and is used to separate syncs and invert field and line pulses, which are then interfaced via IC2(d) to the receiver sync circuits. Tr1 is used as a video level corrector and supplies a composite video output signal. Its base derives video signals from off air transmissions when IC1(c) is closed and normal television is displayed on the screen, or alternatively, when IC1(c) is open, video input signals are displayed on screen and also fed to video out.

External audio is AC coupled via C1 and amplified by Tr2. When IC2(a) is closed the signal is AC coupled to the volume control via C7 and through the receiver audio amplifier to the loudspeaker. When IC2(a) is open, IC1(a) is closed which allows normal TV sound through from the TV detector circuit to C7 and the volume control. C8 is connected to the centre point of these two switches allowing either of the selected audio signals to be amplified by Tr7 and fed to line out. Tr3 acts as a switch to mute television sound when using external audio inputs. IC1(b) switches the tuner unit DC supply off when in monitor mode to prevent any signal breakthrough, and IC2(b) switches R11 into circuit for resetting the AGC level.



TX90 INTERFACE BOARD CIRCUIT DIAGRAM

Tr8 and Tr9 are connected to form a monostable circuit. When Tr9's base is high its collector is low and Tr8 collector is high. IC2 has its enable line connected to Tr9 collector and IC1 has its enable connected to Tr8 collector. In this condition IC1 is on, giving normal TV operation, and IC2 is off. When button-8 is selected the cathode of D1 goes low grounding the base of Tr9. Its collector then goes high and Tr8 collector subsequently low. IC1 then switches off and IC2 switches on turning the monitor circuit on.

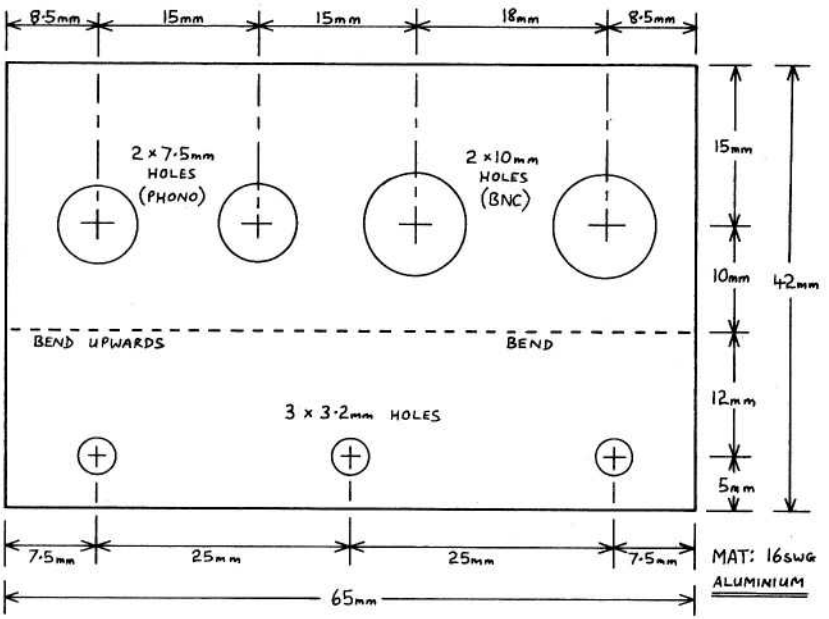


Fig.4 DETAILS OF EXTERNAL SOCKETS MOUNTING BRACKET

CONSTRUCTION

Mount components on the printed circuit board taking care to observe polarity of electrolytic capacitors and the diode. Fit wire links where indicated and fit two IC sockets. Construct an aluminium bracket as detailed in Fig.4 and fit two BNC sockets for video in/out and two phone sockets for audio. The bracket is fitted to the PCB using three M3 screws and nuts. Different sockets may of course be used.

Connections to the main board of the TV are located along the rear edge of the interface board. Twelve single cables, preferably of different colours for ease of identification, should be fitted using multistrand 16/0.2mm or similar. They should initially be cut to about 24" long and trimmed accordingly when connected to the main board. It is advisable to tie the cables together into a neat wiring loom.

INSTALLATION

First release the main printed board from the set by undoing the self-tapping screw holding the control panel to the cabinet front. The board will then slide back. Two different types of printed board have been used during production of the TX90. The modification can be fitted to either version; however connection details are not the same for both types. This means that the board must be identified correctly from the outset.

The original board is coded PC1130 and the number is printed on the copper side of the main board. If the receiver is of more recent manufacture, it will be fitted with board type PC1140. Carry out the simple modifications to the main board by following the appropriate instructions relating to your version.

PC1130 CONVERSION

1. Interchange C129 (68n) with R130 (820R) (hole spacing is the same). This modification updates the sync circuit to that of the PC1140.

2. Cut track to pin 8 of the tuner (see Fig.5), this breaks the DC supply.

3. Remove C173 (470n), located near the rear edge of the PCB.

4. Remove wire link marked LK142, located below IC103.

5. Remove wire link marked LK102, located above volume control.

6. Remove R114 (10k) and replace with a wire link, located behind the volume control.

7. Cut the copper track around the top and middle connections of the volume control to isolate them (see Fig.6).

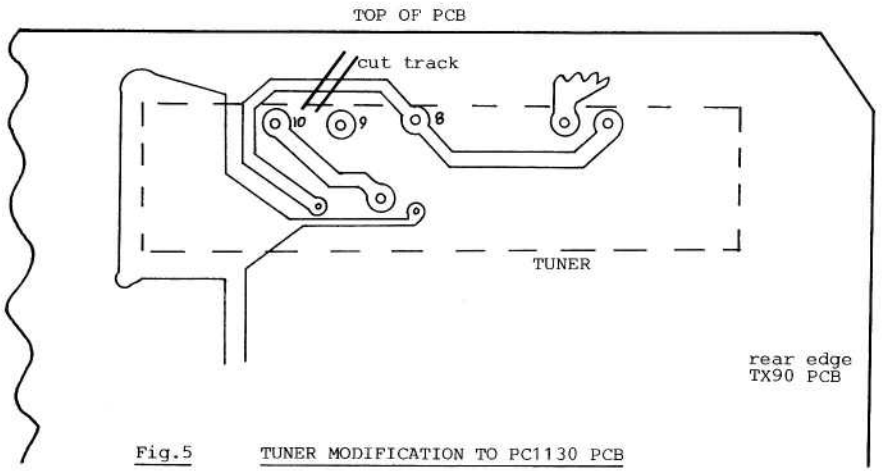


Fig.5 TUNER MODIFICATION TO PC1130 PCB

PC1140 CONVERSION

1. Remove wire link marked LK110, top of board above tuner.
2. Remove wire link marked LK133, below tuner.
3. Remove C174 (470n), located in audio stage at the rear edge of the PCB.
4. Remove R158 (270R), below IC103.
5. Remove R114 (10k), located behind volume control.

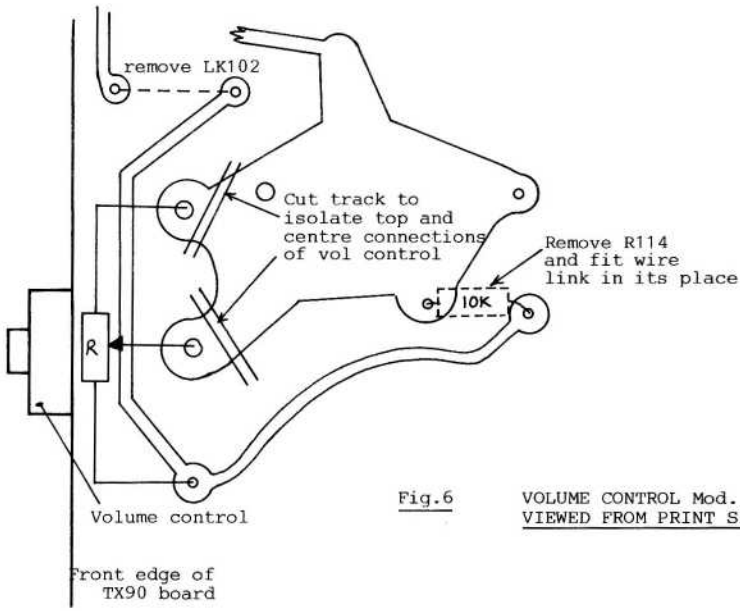


Fig.6 VOLUME CONTROL Mod. PC1130 VIEWED FROM PRINT SIDE.

Now slide the new interface board into the ready-made plastic guides in the centre of the cabinet base. Route the wiring loom from this board along the cabinet base and then upwards to the top of the main receiver PCB and come over the top near the volume control onto the copper track side, fanning out the leads to the appropriate connection points as shown in Fig.7. The photograph of the TX90 PCB shows the method used but has been exaggerated to easily identify the connections. Keeping the wiring loom close to the front of the cabinet will prevent any stray pick-up from the line output transformer. Refit the main board into the cabinet making sure the wiring loom sits neatly above the volume control. Drill two 3.2mm holes in the cabinet base to line up with the two 3mm ones on the front edge of the interface board. Fit 3mm screws and nuts to secure the board.

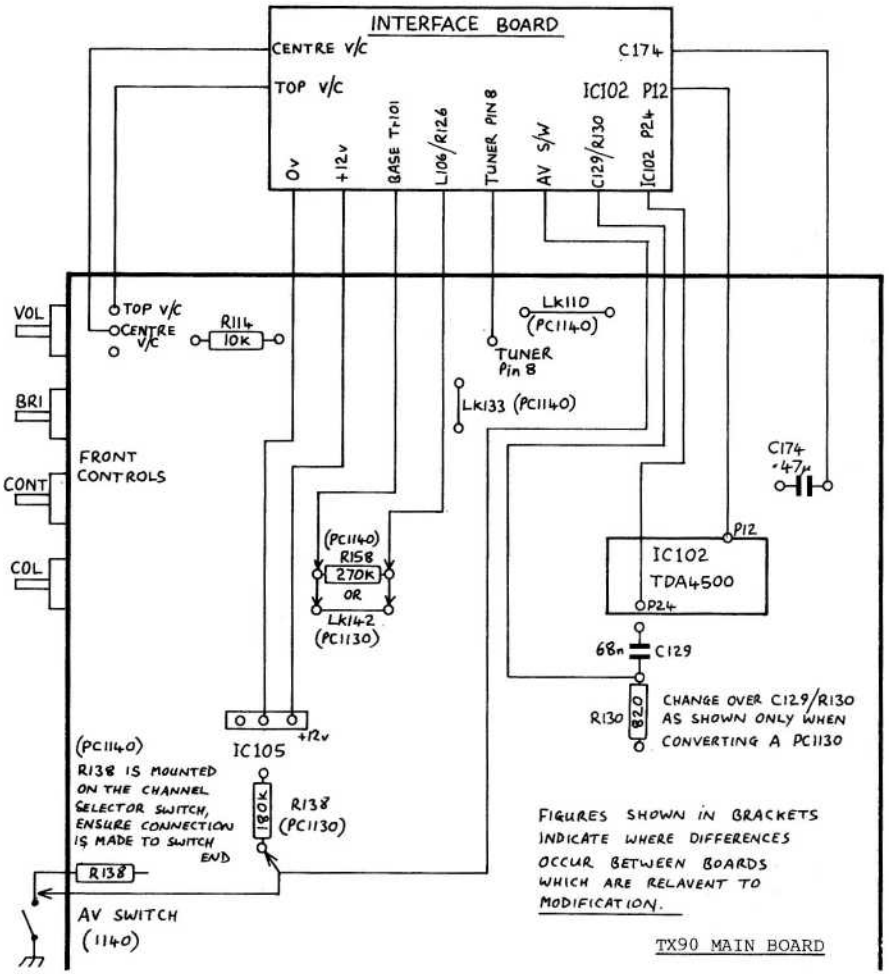
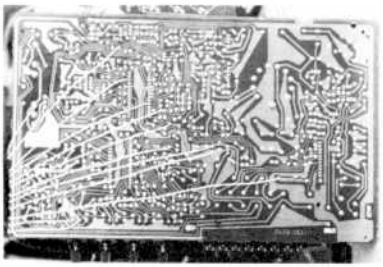


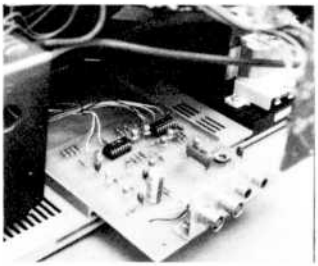
Fig.7 DETAILS OF CONNECTIONS BETWEEN INTERFACE AND TX90 BOARD

TESTING

Switch on the receiver, select a normal TV channel and check that the volume control operates normally. Select button-8 and apply video and sound signals to the appropriate input sockets. Connect another monitor or an oscilloscope to the video and sound output sockets and make sure that external inputs are routed to the output sockets when in monitor mode, and that when switching over to normal TV signals appear at the output sockets. RV1 should be set for the required audio line level which is normally around halfway. Cut a hole in the receiver rear to line up with the sockets, and the modification is complete.



DETAIL OF WIRING TO TX90 MAIN BOARD



PROTOTYPE INTERFACE BOARD FITTED IN CABINET

CONCLUSION

The prototype monitor has operated reliably for over six months and has been used with both BBC and Commodore-64 computers. It has also been used for amateur television to record off air signals and to display camera outputs and gives consistently good results.

Footnotes:

It should be noted that this conversion cannot be used with TX90 televisions using remote control.

A service manual for the television may be purchased from Thorn EMI, Ferguson Service Division, Lea Valley Trading Estate, Angel Road, London N18 3BP.

A printed circuit board for this modification is available price £6.00 or a complete kit of parts at £25.00, both inclusive of post and packing (UK) from: A.S.Warne. 113 Queens Road, Vicars Cross, Chester, Cheshire, CH3 5HF. Please make cheques payable to: A.S.Warne.

Cambridgeshire Repeater Group

The Cambridgeshire Repeater Group's newsletter (No.7) contains an ever increasing amount of information connected with their proposed ATV repeater GB3PV. Details of the actual proposal are published including the specification. Block diagrams provide a useful insight into the electronics which go to make up a repeater and include separate diagrams for both transmitter and receiver. The mode of operation is to be FM only.

The Newsletter also includes a useful article by G4XHM on how to modify a domestic TV aerial to operate as a wide-band aerial in the 1.3GHz band. Details of the new dimensions are given as is a summary of results acheived. G4XHM also describes a 4-way splitter/combiner for use at 1.3GHz.

Also included in the 28-page magazine are other technical articles, news, events and advertisements. All in all a very workmanlike publications.

A 1.3GHZ POWER AMP'

By Zbigniew Pokusinski G4JQU

This simple project, which can easily be built in 20 minutes or so, gives a typical power gain of between 6 and 8dB at 1.3GHz yet costs less than £6 to build. The circuit requires no special printed board and no special components. The transistor used is an MRF511 available cheaply on the surplus market (1) and is believed to be capable of delivering around one Watt or so at 1.3GHz.

CIRCUIT

Fig 1 shows the circuit diagram. Drive is fed to the unit in a rather unorthodox way as the first component is a variable capacitor to ground (C1). C2 couples the signal to L1 and is set for optimum power transfer. L1 and L2 are formed from the actual transistor leads themselves, (more on that later). A conventional amplifier circuit has its base bias set by a potential divider consisting of R1 and R2 whilst RFC1 prevents RF from getting onto the power rail. 13.8v is applied to the collector (via RFC2) and L2, C3 and C4 provides the low-Q output tuned circuit. It is recommended that a reverse supply protection diode be fitted in the interests of protecting the transistor.

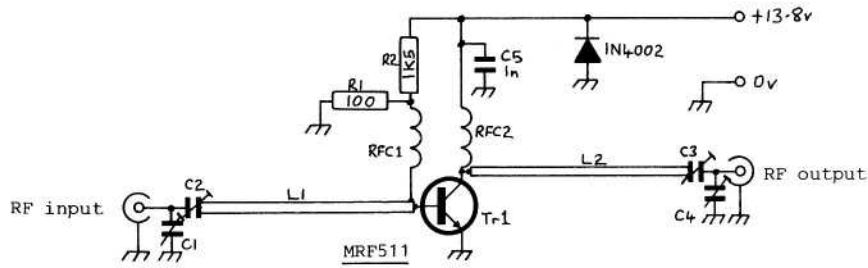
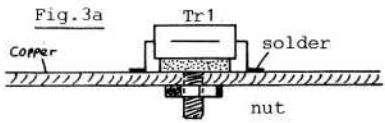


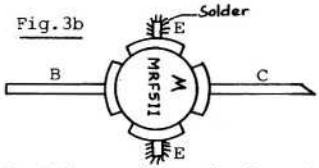
Fig.1 CIRCUIT DIAGRAM

CONSTRUCTION

Construction is very straightforward, and reference to Fig 2 should be made for the details and parts placement. A piece of good quality double sided PC board material measuring approximately 8 x 4cm has been used in all the units built so far but, since the copper surface is used purely as a ground plane, single sided board should also be suitable.

A 4mm hole is drilled in the centre of the board to accomodate the transistor which should be installed as detailed in Fig 3a, the two emitter leads being soldered to the ground plane as shown using the shortest lead length possible. The base and collector leads should be spread out as indicated in Fig.3b and should rest about 3mm above the board.





Bend down emitter leads and solder to ground as short as possible.

C1 should be soldered between the base lead and ground - its body being 9mm from the transistor (see Fig.2). C2 is then soldered as shown and should be positioned as close to C1 as possible. C3 and C4 are fitted in similar fashion however C3 should have one of its earthy legs removed before fitting, the remaining legs being bent as required. The other components may now be fitted according to Fig 2 and short pieces of good quality miniature coax (I used UR43), complete with connectors, installed at the input and output points.

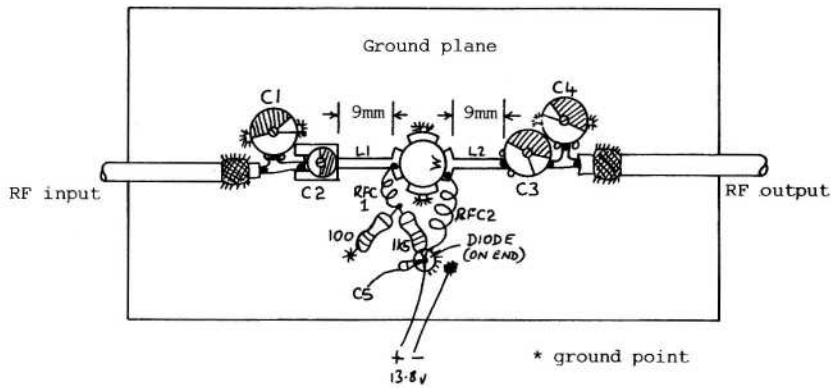


Fig.2 COMPONENT LAYOUT

ADJUSTMENT

Before switching on set C1 to 5° mesh, C2 to 25°, C3 to 50° and C4 to 25°. Apply power and, without drive, check that +13.8v appears at the collector and that +0.76v is at the base. Apply drive (100 - 500mW) and tune all variable capacitors for maximum RF output.

RESULTS

When used with the Solent Scientific 200mW FM-ATV transmitter, an improvement of well over a picture grade is easily achieved without, of course, degrading the picture in any way.

Further power gain may be obtained by adding a second amplifier module. In my case this brought a weak grade 3 picture up to a cracking P5. Even with the second amplifier obviously dissipating more power I found extra heat-sinking unneccesary.

The output of these modules should be consistant over long periods of operation and overall stability was found to be excellent, however long-term stability can be assured by more rigidly fixing the tuning capacitors to the ground plane, perhaps by gluing nylon spacers to the base and collector leads.

EDITOR's NOTES

The author kindly loaned me one of his units in order that I might try it out using laboratory test equipment, the results of which are detailed below:

(Test frequency 1280MHz)
Power gain with a 11v supply - 1.5dB
" " " 12v " - 5dB
" " " 13v " - 7dB
" " " 14v " - 8dB
" " " 15v " - 8dB
Bandwidth measured at the 1dB down points - +25MHz and -70MHz from the test frequency.

The test equipment used was a Hewlett Packard 8558B spectrum amalyser, Hewlett Packard 8614A signal generator and a Kingshill T60V2 variable power supply. Tests were made into a resistive 50-ohm load.

Adjustment was found to be unconditionally stable and pleasantly non-critical - just the job for those without a spectrum analyser! Unfortunately a variable power source with sufficient output was not available at the time of testing, therefore I was unable to ascertain the amplifier's maximum output level before compression. However, looking at the transistor (having no specification either) I should think that well in excess of 1W should be achievable, especially if a heatsink is fitted.

I must say that this little circuit is probably the nicest unit to come my way for some considerable time. It is difficult to understand why some manufacturers seem to have such difficulty in generating this order of power using, as they invariably do, fancy PC boards, separate bias systems, microwave chip capacitors and the like. This circuit is, for wideband ATV work, absolutely ideal since it is capable of such wide bandwidth and useful gain.

For those members who are perhaps not too experienced in power amplification at these frequencies, yet would like to experiment with various RF transistors, there are one or two conclusions which may be drawn from this design and applied to others: The most likely reason that power gain can be kept high is that use is NOT made of potentially lossy PC board materials, the tuned 'lines' being suspended in free air. Bandwidth, as we know, is increased as the Q of a tuned circuit is reduced. There is little doubt that in this unit, the Q of the lines must be somewhat less than many similar amplifiers.

I should be most interested to hear from others doing similar work in this field and look forward to perhaps publishing a higher powered version in the future.

COMPONENTS

C1, C3, C4	- 1-5pF grey plastic trimmer.
C2	- 0.5 - 1pF Mullard glass dielectric (2)
C5	- 1n fixed ceramic.
Tr1	- Motorola MRF511 (1)
R1	- 100-ohm ¼W
R2	- 1.5k ¼W
RFC1	- 2.5 turns of standard resistor lead, 2mm i.d. 4mm long
RFC2	- 2.5 turns of 20swg copper wire 3mm i.d. 10mm long

References: (1) J Birkett, 25 The Strait, Lincoln LN2 1JF
(2) Solent Scientific Ltd., 75 Chalk Hill, Southampton, Hants.
(Please either phone for details or enclose a stamped, addressed envelope with any enquiries).

Modify that Ferguson

It seems that some Ferguson colour TV sets have colour killers which are somewhat insensitive and intolerant of "below par" bursts. A modification to the Ferguson MC01 to make the killer more sensitive was carried out by G4CPE and passed to CQ-TV by G3VZV:

The mod. is very straightforward and involves simply changing the value of R156 from 39k to 27k. R156 is located on the main PC board, just to the rear of the colour control.

I (Ed) have done a similar mod to my TX-9 chassis; I changed R88 from 15k to 4.7k. It is possible that R87, which forms the other part of a potential divider, may need increasing to compensate although I have not done this and it works fine. R88 is located at the left hand end of IC52 (the largest chip on the board), just forward of centre on the main PCB.

Another modification from G4CPE/G3VZV to the MC01 is concerned with overriding the automatic sync detector time constant switching.

When using channel 8 (also used for direct video (AV) use), the sync detector time constant is automatically switched to make it more suitable for signals from VCR's. This can result in impaired performance when receiving weak, off-air signals. To make this time constant manually switchable cut the print leading to R138 (120k) and connect two wires across the print break. Take these to a small switch on the back cover. R138 is located on the main PCB near the tuner button assembly.

With these modifications in place the MC01, with its RF/video and RGB inputs is a very useful set for the shack and can be highly recommended.

UNDER NEW MANAGEMENT

CONTEST NEWS

What's this? A new Contest Manager? Quite right - read on McDuff.....!

First, just a couple of lines to introduce myself to those of you who are fortunate enough not to know me. I have been licensed for 3 years (the XYL reckons that it must be at least a lifetime) and have spent much of that time constructing and operating on 70cm ATV, with the recent progression (or is it regression?) to 24cm, receive only at present.

Before we get into the business of the Winter Cumulatives I would like to propose a vote of thanks to Graham Shirville, for all his work over the past few years as resident contest Manager.

1985 WINTER CUMULATIVES

Many thanks for all the letters sent in with the logs; to mention a few of the salient points: I have it in print from our worthy Editor why CQ-TV got it wrong about the locator - and he signed the letter! Don't forget though that only the Maidenhead system should be used in the future, (I bet he edits this!) (*Me got heap thick skin.....Ed*).

G8MMF - I know how you feel - keep trying.

G8GKQ and G4CRJ both ask if the operating times could be extended - 1930-2330 is suggested - any comments?

G3YQC would like a quick cure for the flue for next time.

And why has the South East got a monopoly on SSTV? Only one entry was received from a non-southerner and guess where all his contacts were? Anyway it's nice to hear from you all and yes G6CZE, provided the interest is there SSTV will be kept in in future contests.

Finally, congratulations to the "A"T/V team - G8LIR/P, not only for winning the 70cm section but also for braving the elements to work 1500ft up from "Hailstorm Hill" (asking for trouble with a name like that!) with all its attendant problems. The team consisted of: Andy G8LIR, Fred G4GCO, Ron G4SHC and Ken G4CAI. Congratulations also to G4CRJ for coming first on 24cm and to G6CZE for winning the SSTV section.

Please remember to send all future corespondence regarding contests to: Mike Wooding G6IQM, 3 Perkins Grove, Rugby CV21 4HU. Tel: 0788

1985 WINTER CUMULATIVE CONTEST RESULTS

70cm SECTION

CALL	POINTS	QSO's	LOCATOR	POWER	AERIAL	BEST DX
G8LIR/P	8397	61	YN29C	100	21el Tonna	G8MNY - 297km
G6CUQ	5408	37	ZM51F	100	88el	G4VTD - 164km
G4CRJ	4630	40	ZL37H	180	88el	G8LIR/P-125km
G8MNY	3928	39	ZL60A	250	19el Tonna	G8LIR/P-155km
G6HMS	3579	35	ZN67C	100	2x48el	G8LES - 200km
G3YQC	2830	30	ZM54B	12	21el Tonna	G8LIR/P-163km
G6SKO	2601	56	ZN74H	50	48el	G4NAC - 91km
G6RAF	1952	19	ZM27E	20	21el Tonna	G4RNA - 107km
G4NAC	1877	21	ZM47E	100	19el Tonna	G3NNG - 102km
G1COI/P	1648	17	ZK18J	50	24el	G4CRJ - 95km
G4WGZ	941	22	ZL50D	10	48el	G3NNG - 110km
G8MMF	154	9	ZL50E	8	19el	G4CRJ - 57km

24cm SECTION

G4CRJ	1336	5	ZL37H			G8LES - 50km
G1COI/P	342	3	ZK20A	8	20t Helix	G8KOE - 29km
G3YQC	291	6	ZM54B	35	20t Helix	G4EUF - 37km
G8MMF	4	1	IO91XJ			G4VTD - 2km

SSTV SECTION

G6CZE	1346	6	ZM57J	10	9el Tonna	G3CDK - 122km
G3LUI	1238	15	AL23H	10	6el Quad	G6CZE - 120km
G1BTF	924	12	AL24E	10	4el Quad	G6CZE - 112km
G8UUL	739	13	AL24F	16	9el Tonna	G4RRX - 115km

Contest log and cover sheets are available upon receipt of a large SAE from the contest manager. It is hoped that members will use these sheets for sending in their entries as the resulting uniformity will result in easier and more accurate processing of the logs.

SPOTTED AT THIS YEARS BATC RALLY:

Andy Emmerson G8PTH clutches a particularly rare Monoscope tube, obviously having done a good deal judging by his smile!

A TROUGHLINE FOR 24CM

By W.E Foulds G8MTF

Having experienced problems with breakthrough from commercial TV stations on my 24cm converter, I looked at the ubiquitous interdigital bandpass filter as a solution, but decided that it was too difficult for me to construct with my limited facilities. I have however been able to construct a rather simpler design using a straightforward trough-line. Although this technique seems to have gone out of fashion these days, such troughs were widely used in ATV converters and amplifiers some years ago. The unit works so well and has several other applications as well that I present it here in the hope that it will help others.

DESIGN

The basic design consists of a half-wave line, tuned at the centre and mounted in a 1" x 1" x 4" i.d. trough made from double-sided PC board material. Input and output coupling is by 1/2" long pieces of copper tube positioned as shown in the figures. The characteristic impedance of the filter is nominally 50-ohms.

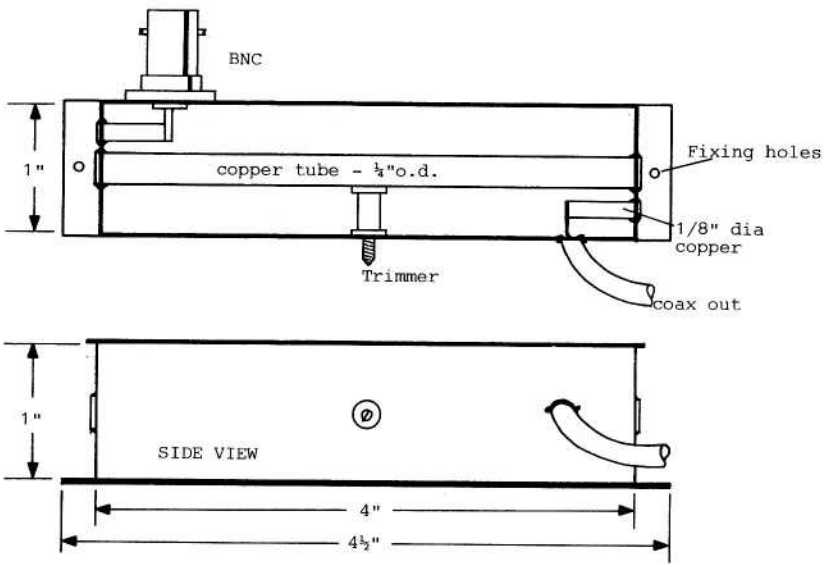


Fig.1 GENERAL CONSTRUCTION OF THE FILTER

CONSTRUCTION

Pieces of good quality double-sided copperclad board should be cut and well cleaned and soldered along all inside seams to form a trough measuring 1" x 4" inside. The bottom should be slightly wider than 1" to allow it to be soldered to both the inside and outside of the trough, it should be made around 5" in length in order to accomodate a couple of fixing holes. The top should also be slightly larger to allow for soldering.

¼" holes should be drilled centrally in each end and the ¼" copper tube (cut slightly longer than 4" in order that it just protrudes through the trough) soldered both inside and out. 1/8" holes should then be drilled for the coupling loops, which again should be slightly longer than the required 1/2", and fitted as before. A small value (around 3pF) piston trimmer is fitted exactly half way along the line in the position shown and soldered carefully in place. A square flange type BNC socket is best and may be fitted using countersunk screws from the inside, these are soldered in place and filed down after the socket has been fitted. The braiding of the output coax is split into two and passed through suitable holes in the side, they should then be soldered both inside and out.

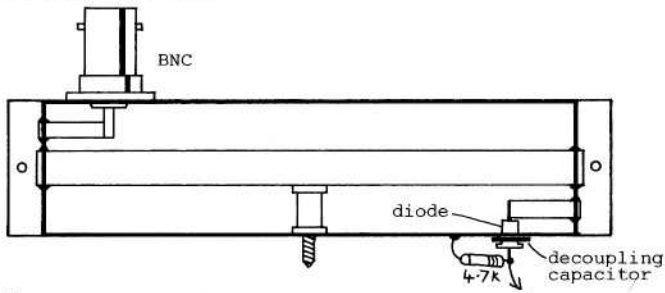


Fig.2 A WAVEMETER

RESULTS AND VARIATIONS

I have so far made five of these units which all worked very well. Another application is that of a wavemeter (see Fig.2). If a diode is fitted in place of the output coax (I used a microwave cartridge type) and a suitable resistor fitted as shown, a DC voltage is obtained which can be connected to a meter. Feed the output of a transmitter (low power!) to the input, or for higher power use a couple of aerials such as the one in CQ-TV 128, and alter the transmitter frequency, a maximum DC voltage will be indicated on the meter when the transmitter reaches the same frequency as the wavemeter. Using this technique an idea of power output can also be obtained.

Troughs such as these can also be used to form the tuned circuits in a 24cm amplifier. If a double trough is constructed the transistor can be fitted through a small hole cut between the two, the base through one side, collector through the other and the emitter soldered directly to the inside of the trough.

The only criticism I have is that of hand capacity effects whilst tuning. Doubtless if the trimmer were replaced with a varicap diode arrangement, then remote tuning could be affected.

1985 NBTV CONVENTION

Doug Pitt

This year's Convention marked the first decade of the NBTVA's existance. To celebrate, an especially large room was hired although fate conspired to leave it half-empty. The April newsletters containing invitations and Convention details were immobilised at the Nottingham sorting office as the result of an industrial dispute and were eventually delivered very late.

The resulting poor attendance was offset by more than the usual enthusiasm. Highlights of the meeting were undoubtedly Jeremy Jago's carrier-based recordings and the demonstrations of 2-metre NBTV transmission and reception.

The recording method, using a 10.2KHz AM signal, showed clear advantages over the ordinary base-frequency method and gave convincing reproduction with a cheap cassette recorder. The LF response was especially good.

Two-metre transmissions provided by Dave G3PVH, using a Nipkow disc plus photomultiplier camera, were received and displayed by Jeremy Jago. By one of those inexplicable quirks, reception of the FM signals were achieved better by slope-detection on an AM receiver than by a normal discriminator!

Stan Kujawinski, the Club's Treasurer since its foundation, retired from this post after more than nine years service, and was succeeded by Norman Reynolds G8YXL - an active 2-metre band operator.

1984-5 showed the first significant decline in the Club's membership figures but interest in this TV mode continues to expand.

HOME COUNTIES GROUP

The Home Counties Amateur TV Group was formed in the early 1980's in an attempt to assist a large number of stations operating in the area, who, at that stage had no local club to join, and to further enhance the amount of TV activity by spreading the word about amateur television.

The group has gone from strength to strength, and in so doing has gained a name for itself. In the early days the then Chairman John, G4HMG, was featured on Thames News and in fact got a full 10 minute slot during early evening viewing time, only to be described by the presenter as "CB TV'ers"!

The group currently meets on the fourth wednesday in each month and the meetings cover a wide range of topics varying from video recorder repairs through all methods of picture transmission to video repeater design. The current club project is designing and installing a new repeater to be located at High Wycombe which, when operational, will cover a wide area of the Thames Valley. The proposed call is GB3HV and the application is currently in the hands of the repeater working committee awaiting submission to the DTI later this year.

Meetings are held at: The Beaconsfield Arms, West End Road, Southall, Middlesex., and further information can be obtained from Paul Hancock, 5a The Broadway, Southall, Middlesex, UB1 1JR.

The HCATV Group produce their own magazine called 'Lineout'. The latest issue contains many items of interest such as: reports on local events and rallies, computer programs, historical items, a test card, technical items plus lots of other useful bits and pieces. A very creditable production indeed.

G3WCY SSTV SCAN CONVERTER -AN UPDATE

By John Brown G3LPB

I received a fair bit of correspondence following the publication of my earlier notes on the G3WCY slow-to-fast scan converter, and although all correspondents have received individual replies, the interest shown has prompted me to submit the following distillation of ideas and suggestions:

COMPONENTS

Some readers have commented on the expense of the RadioSpares components suggested together with the difficulty in obtaining them by constructors not associated with the trade. Obviously there are many alternative and cheaper sources of supply, but by quoting RS types, specifications may be readily compared. The important factor is that good quality components should be used, especially, for example, in the case of the preset pots. I have successfully used secondhand ex-computer 4116 memories purchased from a BATC member who advertised recently in CQ-TV, at a considerable saving.

CONSTRUCTION

Before beginning construction, it is essential that all PC boards be thoroughly cleaned and de-greased, as the slightest contamination or finger mark may cause dry joints, and the print is very fine. Naturally, after cleaning, it is important to handle the boards with care, to avoid re-contamination. Use a fine-tipped soldering iron and small guage solder (22swg). Good soldering technique is a must, otherwise dry joints and solder bridges may occur, which will be difficult to fault-find on these intricate boards.

It is best to start construction by fitting all the links to the boards - a good tip here is to rest the p.c.b. on a sheet of polystyrene, and insert all the links from the top of the board. When all the links have been inserted, a piece of stiff card cut to the same size as the board is placed on top and secured with elastic bands, the board can then be turned over and, after removing the polystyrene, all the links can be soldered without falling out. The next step is to fit terminal pins for all the input and output connections and the front panel controls - S202 Run/Hold, RV202 Width and RV203 Horizontal Centering. RV201 (vertical centering) and RV102 (fast-scan master sync frequency) are internal presets only. The passive components may now be fitted.

At this point it is useful to test both the boards for the correct power rails. Assuming i.c. sockets have been used (which is strongly advised), it is easy to make a little tester, using a scrap i.c. as a carrier, with a 470-ohm resistor and a small l.e.d. soldered in series on top across the power supply pins (pin 14 +5v, pin 7 0v for a standard 14-pin TTL i.c.). It is also worth making up alternative versions for the other i.c's, e.g. 7493, which have different pin connections. Such testers are invaluable to anyone who

does a lot of construction using TTL circuits. By applying the 5-volt logic rail and ground to the PCB's, the presence of the correct power rail at each i.c. socket can be swiftly established. A test meter can, of course, be used instead. The +12v and -5v rails may also be tested in similar fashion. Although the foregoing may seem a little tedious and over-cautious, it saves the potential risk of ruining a whole batch of i.c's, and fault finding is much easier if methodical checking has been carried out at every stage.

If all is well, the i.c's may now be fitted, initially to the analogue board only, and power applied. With an SSTV signal input, it should be possible with a 'scope to see outputs on the A, B, C and D video data outputs. After switching off, the i.c's can be fitted to the digital board, with the exception of the 4116 memories. Take care to observe the correct orientation of the i.c's - on this board they all face the same way. With a monitor connected to the fast-scan video output, a raster should be seen, which can be adjusted for lock with RV102. With the power off again, the first 4116 can be fitted and tried out - with the SSTV grey-scale input, some sort of picture should appear on the monitor. There should be some disturbance as the scan moves from top to bottom, with masses of black and white lines. All being well, the remaining memory i.c's can be fitted.

SETTING UP

The original "Radio Communication" article (February/March 1983) contained little in the way of setting-up instructions. Dave Cowie ZL1LH in his original design gave directions for setting-up RV101 and RV103 by viewing the outputs of the 74148 i.c's (i.c's 7 and 8) on a 'scope, and adjusting for a change of state. In the absence of a 'scope, RV101 and RV103 can be adjusted by feeding the 5-step grey-scale to the input and viewing the output on a monitor. Although the controls interact, and hence are a little tricky to adjust, it is possible with a little patience to correctly resolve the grey-scale. By adjustment of the front panel controls, it should be possible to set up a correctly centred square slow-scan picture area within the fast-scan raster.

TROUBLESHOOTING

If no fast-scan raster appears (no syncs), check the fast-scan vertical and horizontal sync outputs on the analogue board, at pins 6 and 12 respectively of IC17 (7410). If the syncs are present at this point, check the wiring between the two boards - the amplified pulses also appear on the digital board at IC41 pin 1 (74LS175). The slow-scan sync pulses can be checked on the analogue board at IC11 pin 12 (H) and pin 6 (V), then on the digital board at the output of IC26, the 7493 divider (pin 11), which feeds IC's 19, 29 and 32.

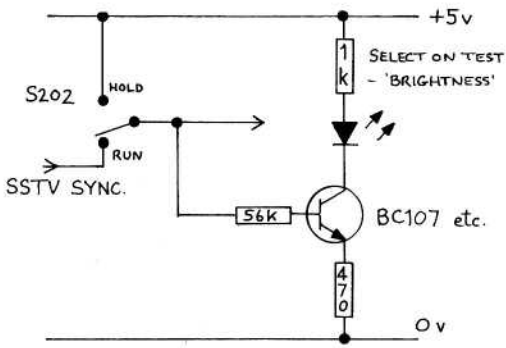


Fig.1. SSTV TUNING INDICATOR

Apart from the slow-scan pulses, most of the other signals on the digital board are fast pulses which will only be visible on a fast 'scope (more than 10MHz bandwidth).

MODIFICATIONS

The author's converter incorporates three simple additions which are useful and easy to construct. An l.e.d. tuning indicator (see Fig.1) flashes on received line syncs., and lights continuously in 'Hold'. This makes tuning of the received slow-scan signal easier, as it is only necessary to tune for strongest syncs, when the picture signal should take care of itself.

A 'Clear Screen' facility is often useful, and consists of a normally-closed switch in series with the input signal - when opened, the screen will be cleared as the slow-scan progresses.

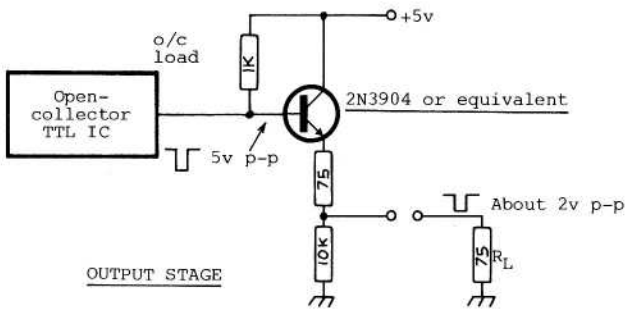
The third addition is an input switch, which selects between, for example, off-air receive, pattern generator, tape recorder output and camera converter. A simple single-pole, multiway switch wired up to additional input sockets is all that is required, and saves a lot of re-patching during QSO's. Another useful and easily incorporated mod which I am keen to try out is Peter Delaney G8KZG's one for stripe blanking removal (CQ-TV 127 pp.9).

Thanks to Graham ZL2RP, I have a copy of the data on the ZL1LH converter, which I am willing to loan to other members for copying, on the understanding that it is returned promptly. (Perhaps a copy could be lodged with the BATC Librarian? -Ed.).

Drive pulses from TTL

This interesting little circuit from John Goode suggests how 2v p-p drive pulses may be easily obtained from TTL I/C's.

By using open-collector TTL chips it is possible to obtain 5v pulses, which when buffered and terminated correctly, should deliver around 2.1v p-p across 75-ohms. The circuit must be terminated in order to work correctly.



GB3VR - THE WORTHING ATV REPEATER

by Roy Humphreys G4WTV and Geoff Mather G8DHE

The GB3VR ATV repeater has been on the air since March 1984 from its present location at the QTH of Robin G8XEU (Repeater Group Treasurer). The following is a summary of the present situation, and some ideas for the future:

The Grid Reference for the repeater is TQ 124 066, which is approximately 3km NW of Worthing town centre, and it is situated at a height of 90m above mean sea level. The service area covers the towns of Brighton and Worthing, and the coastal strip in between.

Most of the hardware was either purchased new or built from scratch by group members. The transmit and receive aerials are Alford slots, the design for which can be found in the BATC Handbook 2 (pp 77 - 83). We didn't want to accept any compromises with the aerial feeder cable, so we decided to use Andrews 'Heliax'. The two 12m lengths cost £115, including connectors! The transmitter is almost all Wood & Douglas, with some modification by G8KOE. The line-up consists of a frequency-locked Wood & Douglas oscillator, followed by a buffer, 3W linear amplifier and a 10W power amplifier. The final output is fed into a home-brew varactor multiplier. The video pre-emphasis network and the 6MHz sound modulator are also home-brew.

Filtering between transmit and receive was not found to be a problem, as the separation between input and output frequencies is nearly 70MHz. For this reason, it was possible to use two of the interdigital filters to the design published in CQ-TV 120 (pp 34-35), one each in the transmit and receive paths - their performance has been excellent.

The receiver is, again, partly homebrew and partly Wood & Douglas. The converter from 1249 MHz to IF is the 1250DC50 supplied by Wood & Douglas, as is the video IF. When the repeater first came on the air, the transmitter and receiver were both homebrew, but in the end the commercial equivalent has proved to be better! The de-emphasis and audio board are still homebrew, however. The receiver performs well, and it has been found that provided the incoming signal is within a few MHz of nominal, the PLL will lock onto it. The rest of the hardware, such as power supplies and cabinets, was obtained from our local 'glory hole' - GWM Radio in Worthing. The excellent test card came from Cropready Electronics, and was advertised in CQ-TV 123.

On the 24th March 1985, GB3VR received its first French amateur TV pictures, from Jean-Francois F1EDM in LeHavre, a distance of some 150km. Although F1EDM could be seen direct, pictures via the repeater were better. Even though he was radiating on 1255MHz, the repeater's PLL still managed to lock quite well.

That then is the current situation at GB3VR. We are presently negotiating the relocation of the repeater to Brighton, a site which, at 135m asl, should give an increased service area. Tests already carried out indicate that coverage could be extended to serve Brighton, Worthing, Chichester and Havant, which is some 72km distant. This will be achieved by using the Worthing colinear aerial design (CQ-TV 127, pp 15-17), with the aerial inclined at an azimuth of 270%, and raising the transmitter power to 25W e.r.p.

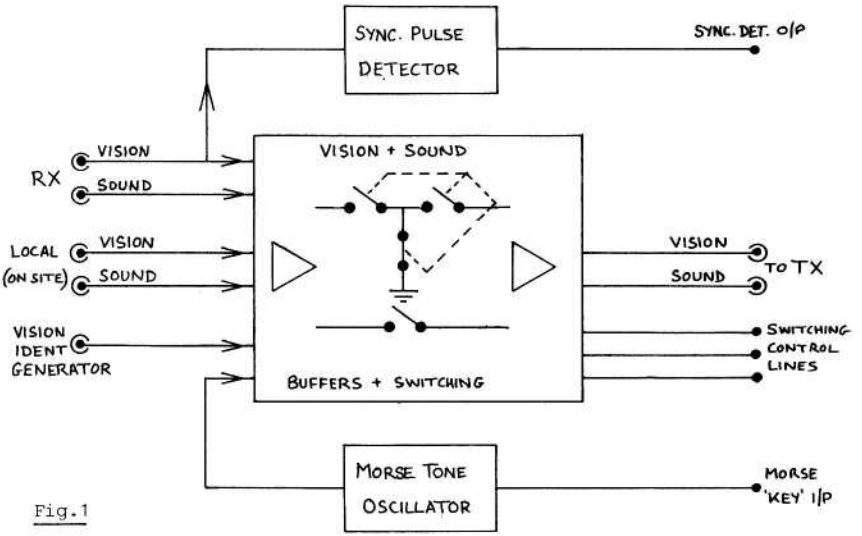


Fig.1

REPEATER CONTROL SYSTEM

After reception at the repeater's input, the incoming video signal must be routed to the transmitter, together with the various signals that can be generated by the repeater itself. This routing is carried out in what is effectively a 2-pole, 3-way switch. The actual switching is carried out by 4066 CMOS analogue switches configured into a 'T' for the video path; the remaining switch in each quad package carries the associated sound signal for each video source. The 'T' configuration has been used to reduce the leakage of HF signals to an acceptable level, and separate CMOS switches are used for each channel to eliminate crosstalk between them. Both the inputs to the switches and the final output stages are buffered using discrete components. Allowance has been made within the screened case housing for possible expansion of the switch and also further signal processing should the need arise.

The video detection circuit, Morse tone generator and power supplies for the computer and associated circuits are housed in the same case as the switch so as to minimise the number of interconnections required. The video detector circuit itself is considerably simplified from the original concept, yet seems to work exceedingly well. The circuit consists of a DC restorer and sync. pulse clamp to remove the video content on stronger signals, utilising a dual op-amp (1458) to perform these functions. The resulting sync. signal is then passed to an NE567 tone decoder set to detect 15625Hz with a bandwidth of about 5.5% and a settling time of approximately 6ms, to eliminate short noise bursts. The output from the 567 is buffered via a single transistor. The software contains additional procedures to check the validity and duration of received sync. signals prior to entering repeat mode. The Morse tone generator is a humble NE555 followed by heavy filtering to provide a reasonably rounded 'sine wave'!

The computer controlling the entire installation is based on a board from an old cash-register which was the subject of a series of articles in Practical Electronics. The board is based around a 68A00 micro-processor with 1k of battery-backed RAM, four Parallel Interface Adaptors (PIA's), providing a total of 80 control lines, a 'watch dog' timer and up to 8k of ROM, although only a single 2k EPROM is currently used. The board and its associated switch-mode power supply needed only minor modifications to carry out their new tasks. Software for the repeater has been prepared on a separate machine and is tested on the standby board, which is used in case of failures (of which there have been none so far) or when hardware modifications need to be carried out. Details of the software and the hardware mod's are available for those who are interested.

The software currently operating provides the following facilities:- repeat mode, beacon mode, morse ident, video and sound source switching, transmitter control, dynamic 'dropout' delay and self-diagnostic testing.

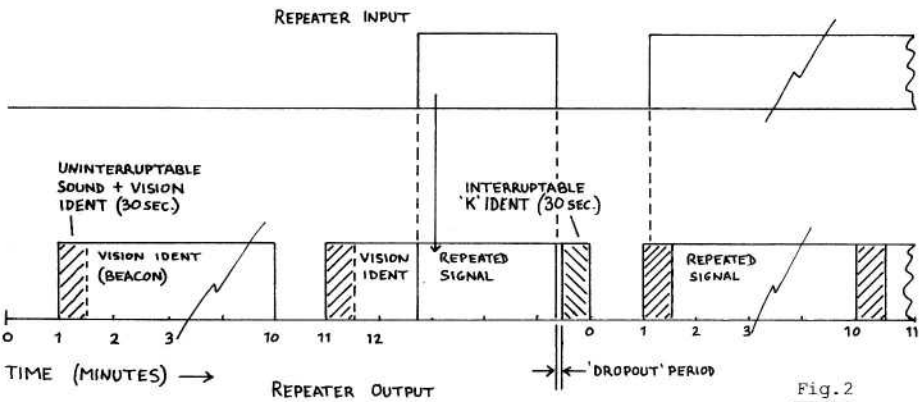


Fig.2

In operation, the overall timing of the various functions is controlled by a 20ms interrupt, generated at present from the mains supply, but eventually to be derived from the Vision Ident Generator (VIG), which in turn will be locked to the incoming video signal, when one is present. This ensures that switching between the various sources is carried out during the field sync. period. The timing chart of the repeater is shown in figure 2 - to enable the beacon timing and various 'delay' periods to be readily modified, the software contains a set of parameter tables where all the various periods are stored - until recently, the subject of frequent modification. The dynamic dropout facility is the method used to vary the period between loss of sync. pulses and the start of the 'K' ident. It was found that with weak signals on which there was QSB, or with some computers, the frequent dropping-out of the signal and the resulting 'K' ident on both sound and vision became annoying. The software now compensates in that if a 'dropout' occurs, the period before the 'K' is sent is increased upon the return of the signal. This increase then slowly returns to the standard period for each complete frame received. The overall effect is that if the signal is weak or suffering rapid QSB up to 5 seconds will be allowed before a 'K' is sent, otherwise for strong signals, a 'K' will result within 200ms.

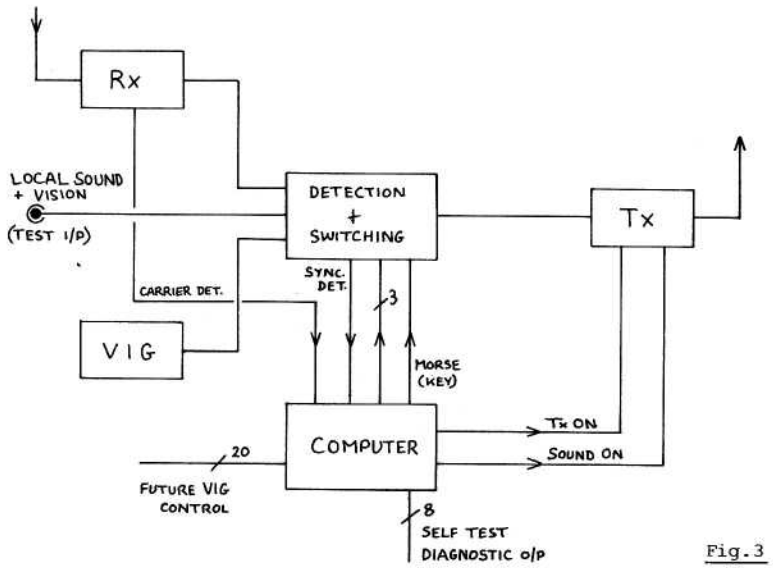


Fig.3

For the future, it is hoped to provide an improved VIG which will supply 8 separate 'pages' of test cards or information, some of which it may be possible to upload remotely, thus providing a source of information on propagation conditions or changes to the repeater. This VIG would be locked to the incoming signal when present thus preventing loss of sync. during changes in the source of vision being sent to the transmitter.

CONCLUSIONS

Ignoring development costs, the total cost of the repeater has been around £350, a figure which could be reduced considerably if a repeater group were prepared to make certain compromises.

Any group seeking more information on GB3VR, for example, advice on filling in the various forms and questionnaires, getting site permission, circuit diagrams, hardware details etc., are invited to send a LARGE stamped, addressed envelope to:

WORTHING & DISTRICT REPEATER GROUP (G6WOR)
106 Willow Crescent,
Worthing,
West Sussex,
BN13 2SY.

COLOUR ON A ZNA234

By Trevor Brown G8CJS

The ZNA234 single-chip pattern and sync generator was originally designed for black and white use only. However, now that colour is reasonably easy to generate by us amateurs, being able to add a colour facility to this chip would increase its usefulness around the shack as a sync generator, it being somewhat cheaper than the ZNA134J.

The main consideration is that of deriving the two colour pulses - burst gate and PAL square-wave or axis switch. Burst gate can be derived by using the leading edge of mixed blanking to trigger a burst position monostable, which in turn triggers a second monostable to give the required burst gate signal. The 74LS221 is a dual monostable chip and thus it can be used to achieve both tasks an a single package.

To generate PAL square-wave the negative-going edge of mixed sync is used to drive a monostable whose unstable period is greater than half a line, the resulting waveform is a continuous chain of pulses which are wider than line drive, but that are continuous throughout the vertical interval. The positive-going edge of these pulses is timed with the leading edge of sync, and when divided by two in a positive, edge-triggered D-type flip-flop, then a waveform which can be used for PAL square-wave will result.

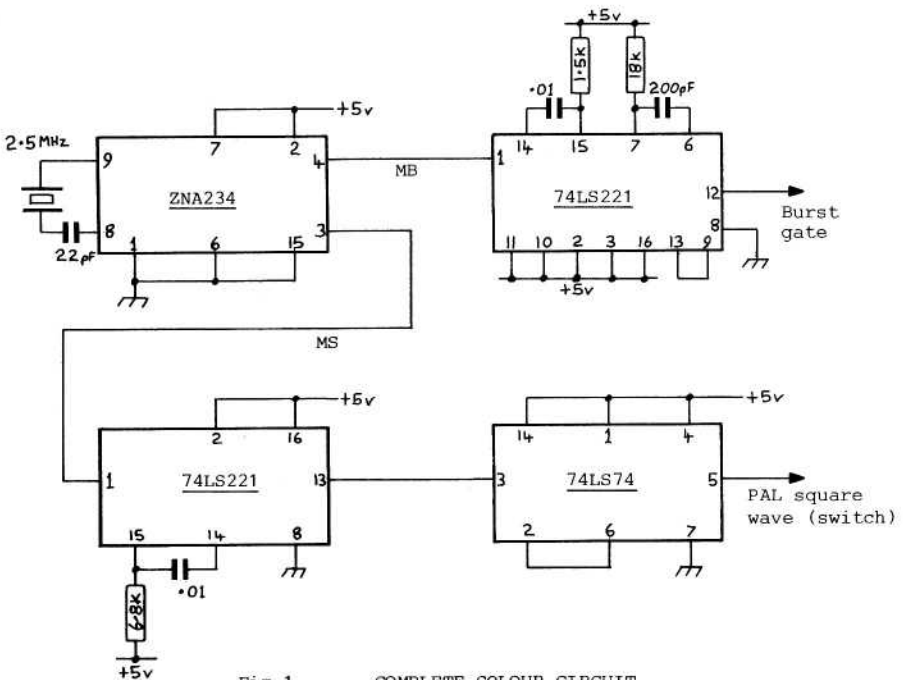


Fig.1 COMPLETE COLOUR CIRCUIT

The circuit of a sync generator is shown in Fig.1 whilst Fig.2 gives a buffer circuit to convert the TTL pulses into standard 2v p-p ones (when terminated in 75-ohms). Four of these will be required for a complete sync generator - mixed syncs, mixed blanking, burst gate and PAL square-wave.

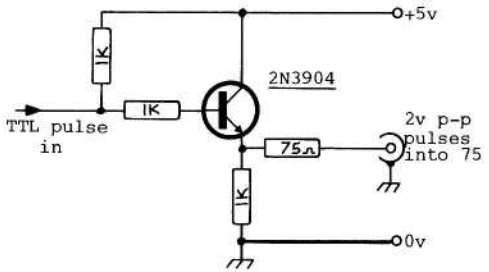


Fig.2 PULSE OUTPUT AMPLIFIER

THE 1985 BATC RALLY

03 MAY 1985/1322

ZCZC CBM118 ZGX0763 DP3111K458

GBXX CO DPDO 020

DORTMUND/32 20 3 1200

ANDY EMMERSON

71 FALCUTT WAY

NORTHAMPTON NN2 8PH

THE TOP TEAM OF AGAF/DARAC SENDS BEST WISHES TO THE BATC CONVENTION VY 73 DC6MR

By John Wood G3YQC

It's Sunday June 23rd - three days after magazine closing date, and, unfortunately, our volunteer reporter John Hirons G6TGJ has not managed to get any copy to me for this report. As I have no notes at all to work from I must write from memory and try to remember as much as I can. If you exhibited and are not mentioned here, please forgive me but, hopefully, you may find yourself on one of G3XKX's photographs.

A nice touch to start the day off right was the receipt of a greetings message from our oposite number in West Germany - the AGAF, and we thank their 'Top Team' for the nice thought.

Fortunately the weather on the day managed to stay fine and this served to relieve the pressures on the various exhibition rooms, since many bring-and-buyers were able to set up outside. There were a lot of people there this year; it is difficult to estimate since they were coming and going all the time but a conservative estimate puts the figure at something over one thousand. Indeed for much of the day all Hotel car parking space - which is considerable - was taken up and cars were parked all the way down the drive (several hundred yards long) and for some distance along the grass verges at the roadside as well. Inside the Club had taken over all the hotels rooms and facilities and it was still a bit crowded at times. I guess the rally was easily the best attended yet.

LMW ELECTRONICS brought along their UHF and microwave products and BONEX Ltd. put on their usual excellent display of modules, components and the like - much sought after by members clutching component lists - and they have a particularly good range of those sometimes hard to get Toko inductors. BARENCO was a new and welcome face this time displaying a bewildering array of metalwork associated with the aerial side of amateur TV, it seems that they can supply just about everything in that line from a split pin to a lattice tower.

RICH ELECTRONICS had an interesting array of surplus type equipment as did PLM COMMUNICATIONS - who specialise in ex-surveillance TV equipment - much sought after by the bargain hunters these.

Our old friends from WOOD & DOUGLAS had a super display of their ATV modules for 70 and 24cm together with a valuable stock of components. In similar vein were FORTOP Ltd who had some interesting products on view as well as 'something new coming soon' to whet the appetite. SOLENT SCIENTIFIC, with his nice range of kits for 24cm, also had a 'walk round' camera which sent pictures (via 24cm) back to the stand. It was fascinating to see how good the received pictures were even when the roving transmitter was far away in other rooms.

SSTV was well represented this time with DAVTREND Ltd representing the trade. Their excellent slow scan equipment was on display and I believe that business at the stand was brisk. G4ENA had a super display of live colour SSTV using modules from his articles in recent CQ-TV's, the pictures had to be seen to be appreciated, especially by those of us who remember peering at a 5FP7 tube in a darkened room several years ago! HARRY HOLMES G3MSB gave a most impressive demonstration of colour SSTV, the quality of those pictures too were super and several people were seen to stop in their tracks as they were passing. Let's not forget GRANT DIXON G8CGK who put on a fine display of computer aided SSTV equipment. There were demonstrations and many examples of pictures being printed out on a fairly ordinary matrix printer. Grant has certainly got that technique down to a fine art.

Representing the NARROW BAND TELEVISION ASSOCIATION were, among others, Doug Pitt and Jeremy Jago. This exhibit always holds a certain

And the queues went on for miles!

The WOOD & DOUGLAS team.

FORTOP Ltd with L to R: Steve G8JMJ, Mike Austin and G4VDB.

fascination for me; to see those live images being produced from a largely mechanical piece of apparatus is enthralling. A live picture (reproduced here) was taken of BATC committee member Cyril Chivers using Jeremy Jago's Nipkow Disc camera fitted with a silicon solar cell light sensor. There is obviously much interest in this 'revival' branch of ATV and current work includes mirror screw construction, recording techniques and amateur band transmissions.

Another first timer was HS PUBLICATIONS. They are DX-TV specialists and had an excellent display of things DX-TV including books, magazines, equipment, video recordings as well as their own magazine 'TELERADIO NEWS' which is published six times a year. According to Keith Hamer and Garry Smith they were so busy that they couldn't get away to look at the other exhibits or even get any lunch! There was a stand next to the DX-TV one who had such a good day that he had completely sold out of everything by one O-clock and packed up and went home!

Then of course there was the BATC's own stand, ably manned by (among others?) Chairman Mike Crampton, Publications Ian Pawson, Members Services Peter Delaney, Records and admin Dave lawton and Tom Mitchell.

Lets not forget the members displays without which such shows would not take place: THE DUNSTABLE REPEATER GROUP had a display staffed by members ever-willing to talk about ATV repeaters, there was also the excellent demonstration of weather satellite pictures which caused much interest (and not a little congestion at times, it being close to a main entrance!). The received pictures from the equipment were super. The WORTHING ATV REPEATER GROUP had a nice stand as ever and, apart from demonstrating their repeater and its facilities, they were doing a brisk trade in ATV

SSTV by Harry Holmes G3MSB.

Grant Dixon's computerised SSTV stand.

Yvonne Latham with Solents roving OB unit.

Cyril Chivers via NBTV

software and 24cm Co-linear aerial kits, (rumour has it that they are making so much money they are thinking of sending up an ATV satellite!!). DAVE WILSON had an impressive demo of a 3-camera vidio mixing unit which had lots of people diving for their textbooks so that they too could build one!

Outside were a largish number of members who just brought along a few things to sell. Always very welcome these occasional traders seemed to be cooking some good deals and it was evident that large quantities of gear changed hands throughout the day. Also outside were the dedicated enthusiasts who brought along outside broadcast vehicles. There was BRIAN SUMMERS with his ex-broadcast vehicle that spewed out great lengths of cable to every corner, each one terminated by a huge broadcast camera. BOB ROBSON GW8AGI brought along his completely home-brew OB caravan which must rate as one of the best home construction projects ever seen at these shows. The cameras wern't of the large broadcast kind but nevertheless produced exceedingly good quality pictures. Together with all the control and display gear the vehicle was something not to be missed. Then there was PAUL MARSHALL's static display of ex-broadcast gear, unfortunately it was not possible to accomodate it inside this time so it was shown off from Paul's van.

Dave Wilson demonstrates his effects unit to Trevor Williams and Chris Glass.

Dunstable Downs RC. Seated in front of the weather satellite display are G3REH (Chairman), and (front) G8XTW, Hon. Sec.

Unfortunately I wasn't able to get to the lectures and so am unable to comment in detail. I understand that the talk by G4CRJ on 24cm ATV and radar interference was particularly good, a shortened version of which is published elsewhere in this issue.

CREDITS

Where would the club be without Trevor Brown G8CJS who had to take on responsibility for the actual organisation of the show. It is largely due to Trevor's efforts that the shows get better every time. Some assistance was given by Mike Cox G8HUA and the publicity was handled largely by Norrie Macdonald GM4BVU. Thanks to all those others who pitched in to help and especially to Deryk Wills G3XKX for these beautiful photographs without which this report would hold little meaning for those who couldn't make it.
What a super day. Many people have commented that it was the best show yet and it certainly promises to be even better next year! See you there.

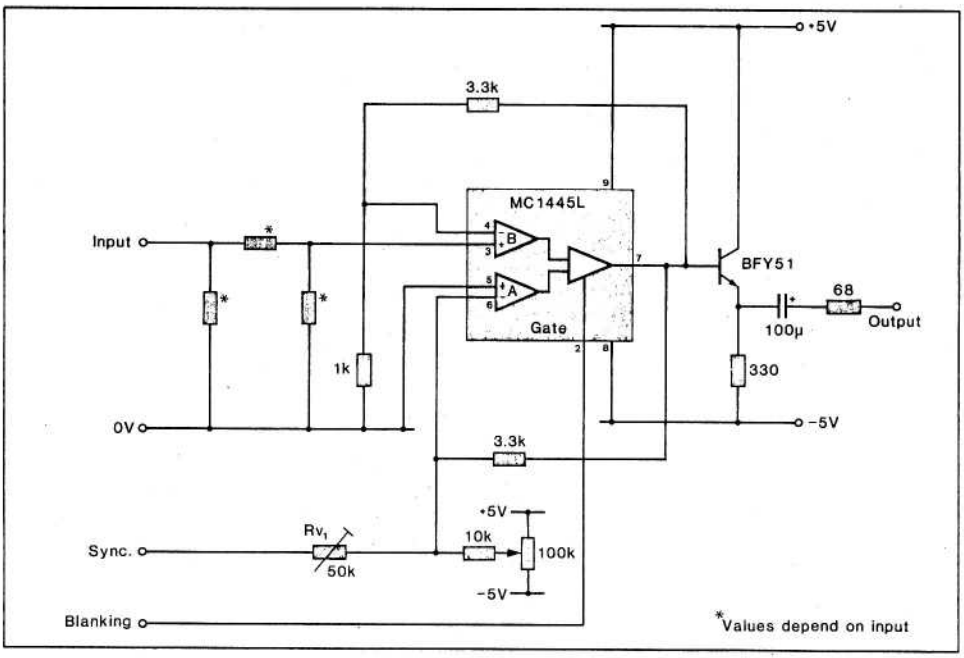
CIRCUIT NOTEBOOK

No.43

by John Lawrence GW3JGA

This circuit by M.A.Priestley appeared in the Design Ideas section of Electronic Product Design, March 1985. The circuit was designed to combine a radar video signal with synchronising signals prior to transmission over a microwave link. It could also be used as a television video-sync processor (combiner) where its wideband performance would make it particularly suitable for digitally generated signals.

It makes use of the dual wideband amplifier MC1445, connected in a mode not described by the manufacturer. This device contains two separate differential input amplifiers connected to a common output stage via a control gate, which enables the output to be selected from either input.



In this application the incoming video signal is first attenuated to a suitable level (try 100R in each position) and then applied to the non-inverting input of amplifier 'B'. The synchronising signal, generated separately in a suitable logic circuit, is applied to the inverting input of amplifier 'A' and the blanking signal is applied to the control terminal. When this voltage is low, the main video signal appears at the output, but a logic high at this point switches the output over to the A amplifier, thus

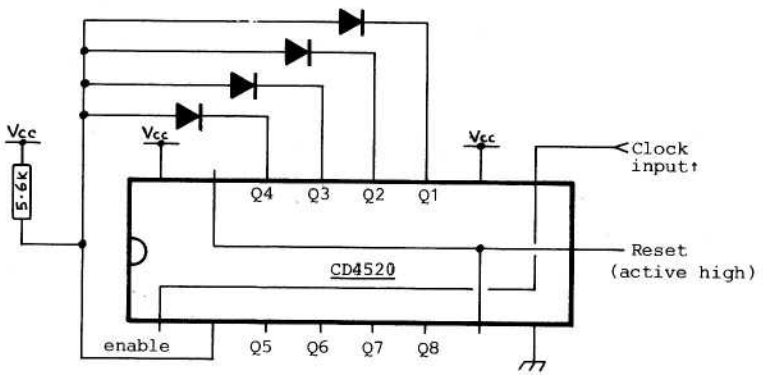
blanking the video. When a synchronising pulse appears, it will be inverted and appear as a negative-going pulse at the output. Negative feedback is used around both amplifiers to reduce gain and preserve a flat bandwidth of over 10 MHz, while the output buffer enables a 75-ohm load to be driven. RV1 enables the sync output level to be set (normal levels 0.7v video, 0.3v sync) and RV2 is used to set the blanking level by removing any residual offset error. (Note that both the sync and blanking inputs require positive going pulses).

Using the CD4520 as a single 8-bit synchronous counter

By Trevor Brown G8CJS

Synchronous counters such as 74193 (as opposed to ripple counters like 7493) have the advantage that all their 'changing' Q outputs change in unison when clocked. This is not the case with ripple counters however where momentary glitches and invalid counts often occur.

In C-MOS the CD4040 is a ripple counter but the CD4520 is synchronous. It is a dual 4-bit counter but to use it as a single 8-bit device it may be wired as follows:-



Both counters are clocked but the 'B' half is disabled by the four diodes. When the 'A' part is full it enables the 'B' half for one clock pulse, then it overflows to zero and removes the enable. In this way a "synchronous cascade" of both halves produces a single 8-bit counter.

AGAF CONVENTION - 1985

(Arbeitsgemeinschaft Amateurfunkfernsehen)

Andy Emmerson G8PTH

Not many people have the luck (or stamina?) to attend two national ATV conventions in the space of three weeks but that was the fate this year of your roving ambassadors Trevor Brown G8CJS and myself. For the second year running the German ATV club, AGAF, extended an invitation to visit their event and we naturally took up their offer.

West Germany is one of the more motivated countries of Europe when it comes to ATV: you need only consider that they have more than two dozen TV repeaters in operation or in the making. Activity is spread across the country, possibly more evenly than in the UK, and their convention tends to be held in a different location each year. This time we travelled to Bottrop, one of the smaller towns in the Ruhr industrial district. The location itself was a modern community centre/sports hall/restaurant complex set in an attractive park, and two rooms were set aside for displaying the static exhibits and the lecture programme.

CONVENTION HALL - AGAF 1985

I am emphasising both the similarities and the contrasts with our convention, as I think this is instructive. Like our event it is basically a one-day (Sunday) event, though many people meet up the night before for a social get-together. Visitors are from all Germany plus a healthy Dutch contingent, but sadly no representation from other European countries. An all-day lecture programme is laid on, with three talks before lunch and three afterwards. Subjects covered this year included awards and diplomas, FM-ATV, antenna coupling and satellite TV. In addition yours truly had to earn his keep and give a talk "zur aktuellen Situation des Amateurfunk-Fernsehens in Grossbritannien" (on the current state of ATV in the UK). The Worthing and Dunstable repeater demo tapes helped illustrate this theme, even if the commentaries were not understood by many of the audience. The reception was favourable, anyway.

All the proceedings were televised (going out live on the local TV repeater) and recorded on tape. This year the BATC was presented with edited tapes of last year's proceedings, so presumably next year I shall relive my attempts at 'O'level German! The cameras (nearly all colour) picked up the speakers and the audio-visual exhibits: an army of amateurs manned the cameras and cascaded Sony camera switchers (which had been modified to give wipes).

Next door was the static exhibit and flea-market room. The German convention is not a commercial affair and the only traders were a few members with a bring and buy stall. Members' constructions were impressive if not many: there was a smart Meteosat receiving system and an impressive single board colour

testcard generator using ZNA234, LM1889 and an EPROM (I am attempting to get hold of the circuit). Some vintage ATV constructions were on show, also a Commodore computer producing a very convincing replica of the PM5544 test pattern (written entirely in BASIC).

LECTURES IN PROGRESS

Perhaps the most impressive - and most significant - exhibit was a repeater control timer. Because of the higher amateur activity level in Germany there is more pressure on 70cm than here. Peaceful coexistence between TVers and OSCAR enthusiasts has been difficult to achieve hitherto, and there was strong pressure to shift all ATV operation off 70cm to higher frequencies. As many of the TV repeaters have 70cm outputs there is a conflict, probably more theoretical than actual, but to avoid the grief the AGAF has devised a clever timer which switches off the repeaters during AMSAT Mode L: the plan is to equip each repeater with one of these marvels. The timer itself consists of three simple devices: a receiver for DCF77 (a standard time transmitter like our Rugby affair) with ferrite rod aerial (cost about £60), a ZX-81 computer and 16K RAM (£25) and interface consisting of Z80 PIO and two TTL chips (£7).

PAUL VELDKAMP GETTING SOME MATERIAL ON TAPE FOR VERON.

Given that 70cm is well populated you might think this would lead to considerable activity at 24cm, and indeed there is, mainly through repeaters. We spent a fascinating evening at the home of AGAF leader DC6MR and witnessed typical ATV, German-style. We rapidly saw that the level of radar interference is, however, generally much worse than in most parts of the UK (up to 30dB stronger than the ATV signals) and thus 24cm is not the total solution. Hopefully this is not entirely a foretaste of conditions to come in the UK. Commercial ATV equipment is most uncommon in Germany and nearly everybody builds their own transmitter to the DC6MR or DJ4LB designs - incidentally, our remarks about the 'difficult' DJ4LB transmitter were met with surprise, so perhaps German amateurs do belong to a master race after all!

Another example of the different approach is to omni-directional aerials for repeaters (23 and 13cm). The Alford Slot is unknown there, instead they use either the 'nesting box' or 'butterfly' designs. The former is a piece of slotted waveguide: square profile aluminium has 16 vertical slits back and front and this gives omni-directional coverage with horizontal polarisation and excellent matching. This antenna is pretty large at 13cm, even larger at 23, where the butterfly design is used. This is more familiar as the Super

Turnstile, popular for broadcast TV in the USA, and we hope to have dimensional details soon.

The AGM part of the convention followed the lectures in late afternoon, where the main topic was the threat to ATV on 70cm. ATV was apparently not allowed on 70 in the Scandinavian countries, and there was no representation anyway. In Belgium it looked likely that 430-434MHz was to be ceded to Syledis and narrow-band modes moved up to 434, which looked ominous for ATV. There was no ATV organisation in Belgium, nor in France, and only a sub-group of VERON in Holland, so what hope was there of protecting ATV interests in those countries? Only Germany and the UK had ATV user groups, so what was to be done?

THE GOOD OLD DAYS!
A TV CAMERA FROM 1958.

The problem was in fact worse. Although the IARU VHF committee was in charge of our destiny most of its members were not well informed about ATV nor necessarily sympathetic to the mode. Although each country was represented on the committee this did not guarantee even one pro-ATV member, so something had to be done. Obviously any action must be within the existing organisational framework, so it was decided to set up a European ATV Working Group. This would link (initially) the BATC, AGAF and VERON, with a view to contacting each national radio club and influencing and educating the IARU VHF committee. Within the working group we would collate all papers on bandplans, contests and licence regulations, also brief our national representative on the VHF committee. A noble and worthwhile aim and we shall see how it progresses.

All too soon we had to return, after thanking our hosts for their generous hospitality. This time we extracted a promise that the German Top-Team (that's German for committee) would come over to our convention next year, so we shall then have the opportunity to repay their kindness.

CONTROL SYSTEM FOR AMSAT MODE-L

Heinz Venhaus DC6MR (L) and Diethelm Wunderlich DB1QZ (R) talk to G8PTH.

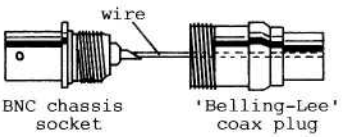
A COAX' ADAPTOR

By José Robat ON7TP

BNC connectors are widely used these days on such items as converters, computers, transmitters and the like but, on domestic TV sets we still find the old 'Belling-Lee' style coax socket. These connectors really are a relic from the old VHF TV days but it is doubtful whether manufacturers will change now.

The problem in an ATV shack is that one often needs to connect a BNC plug to the aerial input of the shack TV set. Obviously one can have special cables laying about but it would be much more convenient if an adapter were available, (unless of course you change the socket on the TV).

Since BNC/Belling-Lee adaptors are not readily available I decided to make my own. I took a standard BNC chassis female socket and a Belling-Lee plug (the type made from metal to which you can solder - not aluminium) and simply soldered the two together as shown in the illustration, after of course first connecting the two centre pins with a short piece of wire.



CONSTRUCTION

Remove the fixing nut, washer and any rubber insulator which might be fitted from the BNC socket. Remove the nut and braid clamp from the plug. Solder a short length of bare wire to the BNC socket centre pin (as illustrated). Slide the coax plug centre pin over the wire and push the outer sleeve up to fit against the BNC flange. Solder the bodies together and then solder the wire into the coax plug centre pin. Trim off the excess.

Purists will no doubt say that several dB's of signal will be lost. No objections here, if I lose two or three dB's the TV set will compensate, especially since signal levels from converters and suchlike invariably leave plenty of signal in hand.

Aerial Stockist

For anyone interested in DX-TV and amateur radio a useful address to have is; Weston Developments of 33 Cherville Street, Romsey, Hampshire SO5 8FB (Tel: 0794 517497). This small company specialises in DX-TV aerials covering continental VHF bands as well as UHF. FM radio aerials are also available as are several VHF/UHF amateur band ones including a 47-470MHz discone. A special aerial is also available for the reception of UOSAT signals in the 2m band as well as one for 136 - 138MHz weather satellites.

Other items include a receiving aerial transformer, inductive combining filters and a stub filter. A special "one-off" aerial mamufacturing service is also available

A product leaflet and price list are available on receipt of a large stamped, addressed envelope.

TUNING THE '1043

By Mike Wooding G6IQM

If you are using the ubiquitous ELC1043 varicap tuner as a tunable IF for an amateur TV receive system, be it 70, 24 or whatever, It is probably possible to derive the tuning voltage from the shack 13.8v power supply, thus eliminating the need for that awkward 30 volt tuning supply.

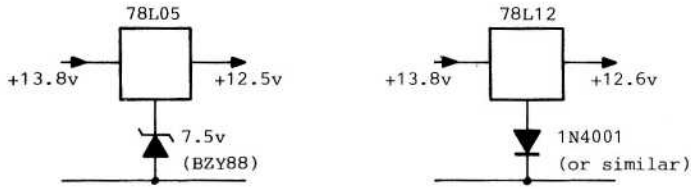


Fig.1

Fig.1 shows two methods of deriving a regulated 12.5 volts - using either a 5 or 12v 3-terminal regulator - which will allow tuning to an approximate maximum of 760MHz, thus, with the BATC 24cm converter using a local oscillator at around 580MHz, virtually the whole of the 1.3GHz band may be covered. If however only the lower portion of the band is required, then a compromise between the maximum regulated tuning supply and the local oscillator frequency may be made. For example: If only 1240 - 1300MHz is required then a tuning supply of 11.5v and a local oscillator frequency of 580MHz; or conversely a supply of 13.2v with a LO of 530MHz is needed. The table shows the relationship between voltage and frequency on a typical unmodified tuner; a simple calculation will allow you to change any one of the variables.

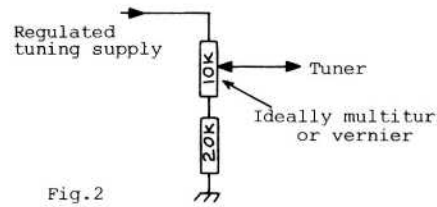


Fig.2

Fig.2 shows a tuning control to allow only the 1.3GHz band to be covered, thus eliminating one of the problems which we all encounter, getting lost on the TV!

SHF Freq. MHz	UHF Freq. MHz	Tuning Volts	Closest Band IV Channel No.
1340	760	12.95	57
1330	750	12.49	56
1320	740	12.09	55
1310	730	11.65	53
1300	720	11.24	52
1290	710	10.84	51
1280	700	10.44	50
1270	690	10.07	48
1260	680	9.69	47
1250	670	9.31	46
1240	660	8.93	45

PUBLICATIONS

QTY	PUBLICATION	PRICE EACH	UK P&P	TOTAL inc.P&P
.....	The revised AMATEUR TELEVISION HANDBOOK by T Brown G8CJS (155gm)	£2.00	0.40	.....
.....	TV FOR AMATEURS by J.Wood G3YQC (85gm)	£1.50	0.25	.....
.....	MICRO & TELEVISION PROJECTS by T.Brown G8CJS (140gm)	£3.00	0.50	.....
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.....	100,117,126,128,129,130..... *Please estimate appropriate postage (approx 90gm per copy)	£1.00	*	.....
.....	RE-PRINTS. Photocopies of any article from past issues of CQ-TV are available	0.20 sheet	0.20	.....
.....	INDEX. All main articles in past issues of CQ-TV and 5 Handbooks. Inc. page count, (essential for ordering re-prints). (40gm)	£1.00	nil	.....
		TOTAL		£ .....
		ANY EXTRA POSTAGE		£ .....
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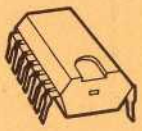
MICRO AND TELEVISION PROJECTS

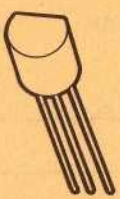
BY TREVOR BROWN



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

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

CONTENTS INCLUDE:



Test pattern and sync generator.
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Home computers.
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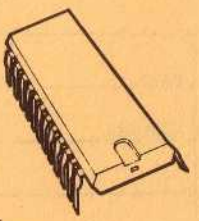
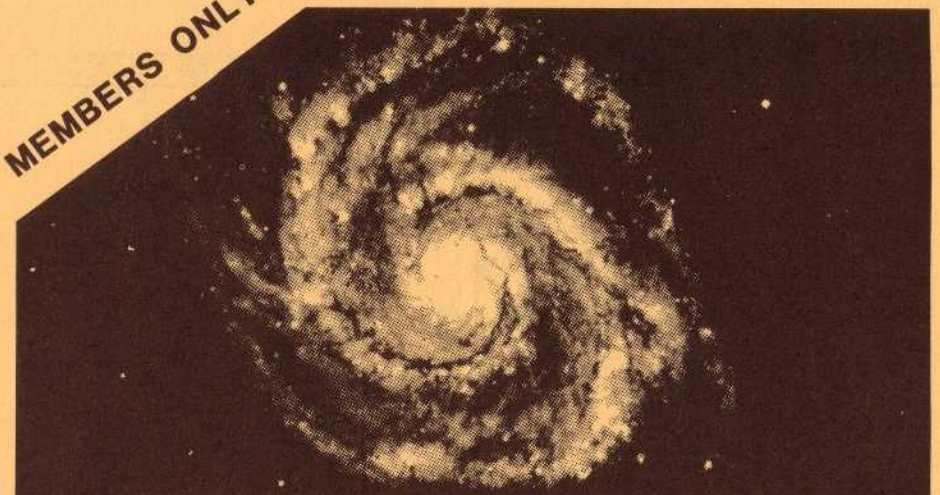
Computer controlling character generators.
Spectrum E-Prom programmer.
RS232 E-Prom programmer.
Spectrum freezer.
Teletron.
Teletron VDU.
Ham text.



ANOTHER WORTHY ADDITION TO YOUR SHACK COLLECTION.

MEMBERS ONLY



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.....	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	0.17	.....
.....	Vidicon camera tubes - see below	-	-	
.....	TV camera lens mounts - 'C' type	£1.00	0.24	.....
.....	Image Orthicon camera tubes type 9565 **	£10.00	+	.....
.....	Photomultiplier tube type 9656A **	£2.00	0.60	.....
.....	Photomultiplier tube type 6097F **	£2.00	0.60	.....

(+ Buyer to arrange transport).

TOTAL THIS PAGE £.....

A variety of camera tubes can be obtained from Thorn-EMI and English Electric Valve Co. Members with special requests should contact Members Services at the address given below. 1" and 2/3" Vidicons can be obtained at a cost of £25 each, including post and packing etc. 1" tubes are available in different heater ratings (95 and 300mA) - 6" long, and also a 95mA 5" long version; (EMI types 9677, 9728, 9706 and EEV types P849 and P8031). 2/3" tubes have 95mA heaters (EMI type 9831, EEV type P8037). All tubes are of separate mesh construction. Both Leddicon and Ebitron tubes are also available. Members requesting information on different types of tube or equivalents for other manufacturers are asked to send a stamped, addressed envelope for their reply.

QTY	PRINTED CIRCUIT BOARDS	EACH	P&P	TOTAL
	BATC BOOK PROJECTS HB1 = ATV Handbook - blue. HB2 = ATV Handbook vol.2. TVA = TV for Amateurs. MTP = Micro & Television Projects			
.....	Amateur television receiver (HB1)	£1.50	0.30	.....
.....	Electronic character generator (HB1)	£3.00	0.30	.....
.....	Colour test card (set of 3-double-sided)	£15.00	0.60	.....
.....	Horizontal aperture corrector (HB1) **	£3.00	0.30	.....
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.....	Sync pulse generator (HB2)	£3.00	0.30	.....
.....	Vision switcher matrix (HB2)	£4.00	0.30	.....
.....	Vision switcher logic (HB2)	£4.00	0.30	.....
.....	Vision mixer (HB2)	£4.00	0.30	.....
.....	70cm VSB transmitter-7 boards (HB2)	£15.00	0.40	.....
.....	SSTV pattern/sync generator (HB2)	£3.00	0.30	.....
.....	Character colourizer,(printed legends HB2)	£5.00	0.30	.....
.....	70cm TV transmitter (TVA and CQ-TV122)	£3.00	0.30	.....
.....	ATV up-converter (TVA and CQ-TV112)	£2.25	0.30	.....
.....	Spectrum user port (MTP)	£3.00	0.30	.....
.....	Spectrum PROM blower (MTP)	£3.00	0.30	.....
.....	Teletron (MTP)	£3.00	0.30	.....

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Please order publications on the separate order form in this issue.

Items from these lists can only be supplied to current members of the BATC.
These lists supercede all previous ones.
Please note that components for club projects are not available from Members Services unless contained within these lists.

Items marked thus: ** are available only until present stocks are exhausted.

QTY	CQ-TV & MISCELLANEOUS	EACH	P&P	TOTAL
.....	'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)	£3.00	0.30	.....
.....	Video filter (TVA and CQ-TV122)	£1.00	0.17	.....
.....	SPG, greyscale, char gen (Ham Radio Today)	£4.set	0.60	.....
.....	Keyboard add-on (for above char. gen)	£2.25	0.25	.....
.....	Sync processor (CQ-TV129)	£3.00	0.30	.....
	SLOW-SCAN TV			
.....	G3WCY SSTV to FSTV RX converter & reprint (Radio Communication - Feb.1983)	£10.set	0.60	.....
.....	G4ENA modifications for above CQ-TV127 - set of 4	£5.set	0.30	.....
.....	G4ENA SSTV transmit board (CQ-TV129) (Add-on to G3WCY converter) NB: Incorporates LSC and width circuit as in G4ENA SSTV mods. PCB set (above).	£6.00	0.30	.....
.....	G4ENA SSTV aux board (CQ-TV130)	£2.00	0.20	.....
.....	G8CGK SSTV pattern generator - inc. notes	£3.00	0.30	.....
	STATIONERY, ACCESSORIES AND COMPONENTS			
.....	BATC test card - with data sheet	0.50	0.24	.....
.....	BATC reporting chart (illustrated)	0.12	0.20	.....
.....	BATC lapel badge - diamond - button hole	0.40	0.17	.....
.....	BATC lapel badge - round - pin fastening**	0.50	0.17	.....
.....	BATC key fob	0.60	0.17	.....
.....	BATC equipment stickers - 1" round	0.15	0.17	.....
.....	BATC windscreen stickers - 2.5" round	0.10	0.17	.....
.....	Surplus delay lines (not KT-3) **	0.40	0.20	.....

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QTY	STATIONERY, ACCESSORIES & COMPONENTS (cont)	EACH	P&P	TOTAL
.....	13.14MHz TV TX crystal (HB2)	£5.00	0.17	.....
.....	108.875MHz TV TX crystal (TVA)	£7.00	0.17	.....
.....	5MHz SPG crystal for P100 (CQ-TV 100)	£2.75	0.17	.....
.....	4.433618MHz PAL colour subcarrier crystal HC18-U (wire leads)	£2.75	0.17	.....
.....	TBP28L22 PROM. Pre-programed for colour test card circle. (eqt.74S471)	£10.00	0.25	.....
.....	2732 E-PROM. SSTV program (HB2)	£12.00	0.17	.....
.....	2716 E-PROM - programed as a substitute for 74S262 (see mod. in CQ-TV131)	£5.00	0.17	.....

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Do components make you MAD?

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

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

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

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

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

The first two firms advertise from time to time in "Television" and the second two in "Wireless World".

These firms are not necessarily the only or cheapest suppliers, but all will supply in small quantities or "one-off's". The information given is offered for guidance only and is believed to be correct at the time of printing. The BATC does not necessarily recommend any company and it is the members responsibility to check prices etc. before ordering.

CQ-TV AWARD

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

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

TRANSMITTING AWARD

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

RECEIVING AWARD

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

POINTS

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

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

CONTACTS

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

THE AWARD

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

APPLICATIONS

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

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

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

BATC ACCOUNTS – 1984

BATC INCOME & EXPENDITURE ACCOUNT YEAR ENDING 31 Dec. 1984

Expenditure	1983	1984	Income	1983	1984
CQ-TV Printing	3033.78	4172.57			
CQ-TV Postage	2115.24	2625.39	Subscriptions	6897.25	6859.27
General Office exp.		591.22	Advertising	223.00	271.50
General Post	417.49	1038.81	Interest	420.94	825.11
RSGB Aff. Fee	8.70	8.70	Miscellaneous		17.33
Comm. Expenses	95.10	247.56	Members Services	1561.03	1829.73
Exhibition expenses	635.19	1676.63	Publications	3164.96	1848.61
Insurance	214.88	169.99	Postage received		647.25
Depreciation	1945.15	827.22	Donations		216.00
Sundries	79.71	38.87			
Prestell & Hot Line		99.49			
	8545.24	11496.97		12467.18	12512.80
Surplus	3921.94	1015.83			
	12467.18	12512.80		12467.18	12512.80

BATC BALANCE SHEET at 31 DEC. 1984

Liabilities	1983	1984	Assets	1983	1984
Accumulated fund	9575.21	13897.15	Stocks M. S.	2048.94	2164.01
Add surplus	3921.94	1015.83	Stocks Publications	1373.57	1771.40
	13897.15	14912.98	Debtors	22.00	485.00
			Office Machines	1945.15	827.22
Current Liabilities			Depreciation	-1945.15	-827.22
			Investments	12278.99	11583.30
Creditors	250.00		Cash at Bank	2504.22	3824.27
Subs In Advance	4087.50	4914.00			
	18234.65	19826.98		18134.65	19826.98

B. Summers G8GQS
Hon Treasurer BATC
B Summers 14.6.85

Ross ATV Goes Walkabout

By Ray Hill G6TSL

On Saturday June 15th on the occasion of the Ross Cottage Hospital fete, a few local ATV'ers got together to set up a receive station in the hospital day room and mens ward. Manned by myself, Neal G4XCS and SWL Russell, as well as John G1DIV who loaned some equipment, we established a remote 70cm transmit station in the town library, operated by Mervyn G1MDD and Keith who was cameraman for most of the day. The equipment used at the station was a Sony HVC3000 camera and F1 VCR feeding a Wood & Douglas ATV-1. We used a home-brew 5-el aerial made by Grant Dixon G8CGK.

Pictures were transmitted from the inside of the library, as well as the busy market which was in progress at the time. The town cryer was seen a few times and all the while the patients were enjoying excellent colour pictures. Two local radio amateurs happened by the library whilst we were in full swing and, finding out what was going on, were keen to have a go. Ron G3FED and G0BUQ (a white-stick operator) later went on to the fete and took over the talkback for a while.

Meanwhile, Peter G8WGD, Mike G1EDP and Alan G4RRT were busy setting up a mobile station. They sent pictures, also from a Sony 3000 and F1 and a home-brew 5W transmitter. Later in the afternoon the mobile station moved close to the parish church, where a horse and carriage was waiting to take a bride and groom to their wedding reception; this caused great interest at the hospital and little nursing was done for a while!

Grant G8CGK was due to be with us but unfortunately he went down with the flu, however he was able to send a "live TV from Peterstow" caption to us.

The day proved most interesting and entertaining, the ATV being enjoyed by both spectators and operators and we hope to do it again soon.

SOFTWARE NOTEBOOK

4 - BATC LOGO BBC-B

By Steve Berry G4LRT
& Mike Crampton G8DLX

This program for the BBC model-B was developed using the Computer Concepts 'Graphics' ROM and this chip must therefore be fitted to your machine before the program will run.

The program was developed on an early version Graphics ROM which, on switch-on, defaulted to the 'on' condition (*FX240). However users of the later version ROM need to switch it on using *FX162 This command may be appended to the start of the program or typed in by hand. The "off" commands are: for the early ROM *FX240,128 and the later one: *FX162,128.

```
 10 MODE 1
 20 VDU 19,3,2,0,0,0
 30 VDU 19,1,4,0,0,0
 40 VDU23;8202;0;0;0
 50 GCOL 0,2
 60 *CIRCLE 640,512,500
 70 *CIRCLE 640,512,400
 80 MOVE 640,912
 85 REM Draw Triangle.
 90 DRAW 940,512
100 DRAW 640,112
110 DRAW 340,512
120 DRAW 640,912
130 MOVE 640,860
135 REM Draw Aerial.
140 DRAW 640,710
150 MOVE 640,750
160 DRAW 580,810
170 MOVE 640,750
180 DRAW 700,810
190 MOVE 540,710
195 REM Draw Tube.
200 DRAW 610,530
210 DRAW 610,250
220 DRAW 670,250
230 DRAW 670,530
240 DRAW 740,710
250 DRAW 540,710
260 MOVE 640,250
265 REM Draw Earth.
270 DRAW 640,230
280 MOVE 570,230
290 DRAW 710,230
300 MOVE 590,210
310 DRAW 690,210
320 MOVE 610,190
330 DRAW 670,190
340 MOVE 630,170
350 DRAW 650,170
360 *FILL 300,200,2
370 GCOL 0,1
380 *ROTATE 270,640,512
390 *PRINT *,615,920,6,8
400 *ROTATE 286,640,512
410 *PRINT T,615,920,6,8
420 *ROTATE 294,640,512
430 *PRINT H,615,920,6,8
440 *ROTATE 302,640,512
450 *PRINT E,615,920,6,8
460 *ROTATE 314,640,512
470 *PRINT B,615,920,6,8
480 *ROTATE 322,640,512
490 *PRINT R,615,920,6,8
500 *ROTATE 329,640,512
510 *PRINT I,615,920,6,8
520 *ROTATE 336,640,512
530 *PRINT T,615,920,6,8
540 *ROTATE 344,640,512
550 *PRINT I,615,920,6,8
560 *ROTATE 352,640,512
570 *PRINT S,615,920,6,8
580 *ROTATE
590 *PRINT H,615,920,6,8
600 *ROTATE  16,640,512
610 *PRINT A,615,920,8,8
620 *ROTATE  24,640,512
630 *PRINT M,615,920,10,8
640 *ROTATE  36,640,512
650 *PRINT A,615,920,8,8
660 *ROTATE  46,640,512
670 *PRINT T,615,920,6,8
680 *ROTATE  54,640,512
690 *PRINT E,615,920,6,8
700 *ROTATE  62,640,512
710 *PRINT U,615,920,6,8
720 *ROTATE  70,640,512
730 *PRINT R,615,920,6,8
740 *ROTATE  90,640,512
750 *PRINT *,615,920,6,8
760 *ROTATE  128,640,512
770 *PRINT B,640,990,-6,-8
780 *ROTATE  136,640,512
790 *PRINT U,640,990,-6,-8
800 *ROTATE  144,640,512
810 *PRINT L,640,990,-6,-8
820 *ROTATE  152,640,512
830 *PRINT C,640,990,-6,-8
840 *ROTATE  168,640,512
850 *PRINT N,640,990,-6,-8
860 *ROTATE  176,640,512
870 *PRINT O,640,990,-6,-8
880 *ROTATE  184,640,512
890 *PRINT I,640,990,-6,-8
900 *ROTATE  192,640,512
910 *PRINT S,640,990,-6,-8
920 *ROTATE  200,640,512
930 *PRINT I,640,990,-6,-8
940 *ROTATE  208,640,512
950 *PRINT V,640,990,-6,-8
960 *ROTATE  216,640,512
970 *PRINT E,630,990,-6,-8
980 *ROTATE  224,640,512
990 *PRINT L,630,990,-6,-8
1000 *ROTATE  232,640,512
1010 *PRINT E,630,990,-6,-8
1020 *ROTATE  240,640,512
1030 *PRINT T,630,990,-6,-8
1040 *ROTATE
1050 *FILL 900,400,1
1060 *FILL 300,400,1
1070 *FILL 200,100,3
1080 VDU23;8202;0;0;0
1090 END
```

IN RETROSPECT

A GaAsFET PRE-AMPLIFIER FOR THE 23/24cm TV BAND - CQ-TV129

G6IQM reports that if a GAT-4 or GAT-5 device is used in place of the MGF1402, then the 68-ohm resistor in the source bias chain should be changed to 20-ohms, and that chip ceramic capacitors of 360pF seem most suitable at S1 and S2.

G4LXC reports that, although the design works well the 68-ohm source resistor may be reduced to 47-ohms in order to increase the gain. The amplifier will also work at 934MHz and, with C1,2 and 3 substituted for 5-20pF it will cover 70cm as well!

It also seems that the address given in the article for obtaining devices from the RSGB seems to be incorrect - despite being taken from a 'Radio Communication' magazine! Anyone wishing to obtain MGF series GaAsFETS may like to try the importers: Aspen Electronics, 2 Kildare Close, Ruislip, Middlesex (not forgetting a SAE).

SYNC PROCESSOR - CQ-TV129

Although no problems have been reported, I have found by my own experience that in some circuits it is not possible to lock IC1 (monitoring TP1) to the incoming signal. The trouble is that VR3 runs out of range, but by reducing the value of the 10k fixed resistor, in series with the slider, to around 1k - or even short it out - the control range is altered sufficiently for locking to take place.

'YET ANOTHER' GREY-SCALE GENERATOR - CQ-TV128

Brian Dandy G8MGH reports a couple of errors in the circuit diagram on page 61: The 1uF capacitor at MS input should be reversed and pins 3 and 4 of IC3 should be connected to 0v.

The following points may also be helpful: The IC's are run from +5v and 0v. Best results are obtained when the resistors in the summing network, between IC2 and RV3/Tr2 are selected. Brian used 5 10k resistors selected from stock using an Avo. The absolute value is not important, but getting them all EQUAL is value adds the final touch.

SPECTRUM BATC LOGO CQ-TV130

'Been having a spot of trouble with our "8s" and "Bs" lately, seems they have been jumping about in the Spectrum program listing. The B at the end of line 10 should be an 8, the B at the end of line 40 should be an 8 and the B after the <> in line 70 should also be an 8.

Don't ask me how they got in! Thanks to G4EUF for spotting those.

ATV UP-CONVERTER - CQ-TV112 and "TV FOR AMATEURS".

Tom Telfer found that his oscillator would not go until the 270-ohm source resistor was replaced by a pot and the correct value found. The actual value seems to be a bit critical.

SSTV PATTERN GENERATOR - MEMBERS SERVICES.

Not strictly from CQ-TV this one but nevertheless important. Again from Tom Telfer (aided and abetted by GW4WFM) it seems that the PCB is not correct as pins 6,7 and 8 all require grounding, (shown as 5,6,8 on the circuit diagram).

SIMPLE GENLOCK UNIT - CQ-TV 130

Brian Dandy G4YPB has notified some ammendments and corrections to his article:

1. Page 68, the last line on the page should read ".....and the bar drifts downwards".
2. Fig.1, the 100k resistor from IC1 pin 14 to +12v is not necessary - it is a relic left from a previous version.
3. Page 70, (CONSTRUCTION); the board is SINGLE sided.
4. Fig.2, the legend by the upper gate of the latch should say ADD 1 line (or 2 x half-line).
5. Page 71, (RESULTS); the second paragraph should read "Line trigger can usually directly replace the L/C oscillator. Field trigger can usually be fed...."

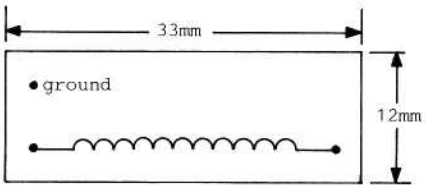
NOTE: Using this circuit gives full interface at all times, whether locked to mixed syncs or local (line) oscillator.

CQ-TV129 THREE PICTURES FOR THE BBC - NOW ON THE ELECTRON

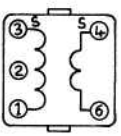
G8ARS has found that the program in CQ-TV129 for the BEEB computer can also be made to run on the Acorn Electron. It seems that deleting lines 10 and 30 from the original listing is all that is required!

A 'SINGLE-CHIP' COLOUR ENCODER - CQ-TV130

Messrs BONEX Ltd., of 102 Churchfield Road, Acton, London W3 6DH (tel: 01 992 7748) have advised that a Toko 200nS delay line for this project (part No. 157DLC451-182.D) is available from them at £1.40 each as is the Chroma filter coil (part No. 166NNF 102646 AG) which is specified by the manufacturers (see data sheet in CQ-TV126) at 0.42p. It is not clear whether VAT is included in those prices but I would think it unlikely. Please don't forget to add adequate postage when ordering.



200nS DELAY 157DLC451-182.D



(pin views)

166NNF 102646 AG

CQ-TV118 CALLSIGN GENERATOR AND HANDBOOK-1 TESTCARD

It must be some time since Tom Mitchell last penned a column called Feedback, but this has not stopped folk building BATC projects. Clive Reynolds G8EQZ has been playing with coders and callsign generators and offers the following useful comments:

Many people who built the BATC colour test pattern generator (BATC Handbook-1) must look at the complexity of some linear PAL coders with dismay, though with the number of 'single chip' coders coming out now (e.g. MC1377 as described in CQ-TV130) this is not so much of a problem. What they may not realise is that the pattern generator can be tricked into working with some digital coders, even though the composite 'circle' pattern gives an analogue output. An example is the coder described in "Wireless World" (October 1978) where digital R, G and B signals are split to form separate luminance and chrominance channels. The luminance signals are summed ready for the output, while the digital RGB chroma signals gate appropriate phases of subcarrier, which is added to the summed luminance.

On board 3 of the pattern generator pin 8 of IC41 goes low on monochrome signals: it is also low during the non-coloured portions of the composite circle pattern. So this signal can be used to enable or disable the chroma portion of the colour coder (the G1 pin of IC3 on the Wireless World coder). To obtain a 'digital' output from the BATC pattern generator take your Red channel from IC38, pin 3; Green from IC39, pin 6; and Blue from IC40, pin 8.

So much for colour generation, now for the callsign insert first described by G3YQC in CQ-TV 118. If you tried to build this project and experienced some difficulty now is the time to retrieve it! Although three callsign generators were constructed to the design published - before it went to press - with no problems, it seems that in some cases problems have arisen.

In many cases the PROM needs pullup resistors and there is a timing problem which can cause "wings" to appear out of the lower letterbox.

First of all, the pullups. Pins 1 to 7, and pin 9 of the PROM need to be taken to +5V via 10K resistors. Secondly; equivalents. There are many PROMs which act the same as the 74188 - once blown! For example 74S188, 8223, 82S23, 82S123, TBP18S030, TBP18SA030. Some of these are open collector, others are tri-state; some have their outputs held high during programming, others held low. So it's best to stick to what you know!

If the letterbox grows wings remove the ground from pin 7 of IC5, 74LS151. Now take the Letterbox signal, invert it in a 74LS04 and feed this to pin 7 of IC5. Programming any location in the 'top row' of the PROM is likely to cause problems of timing and appear outside the letterbox. In the example shown the top lines of the characters G3YQC could cause problems. As most people will use a 7 dots by 5 character matrix it is better to drop the characters one row and have them sitting on the bottom of the letterbox. Clive says if you must program in the top row then you should invert the H1 signal to IC1 and IC3 (use a spare gate in the new 74LS04 and put a small pullup resistor on the 74LS04's output - try 470 ohms). Of course, if you built the circuit previously and had no problems ignore all this - you were lucky!

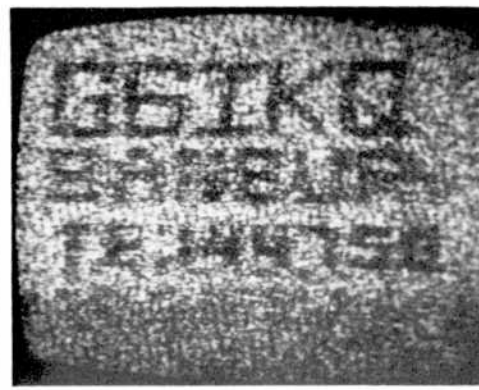
TV ON THE AIR

Andy Emmerson G8PTH

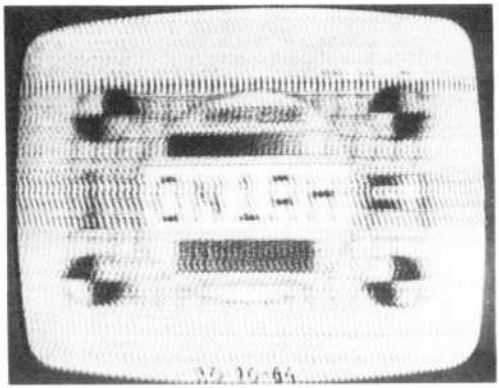
Another three months past and loads of letters, for which I thank you. No major openings (as far as I'm aware) though, so it's all down to the normal type of ATV activity, i.e. patient experimentation and local contacts - and what's wrong with that?! Anyway, down to business and pull some letters out of the file, starting with 70 centimetres. Les Gibson G3RCX who hails from Thorpe Bay, near Southend in Essex writes that he is at last on the air. Video QSOs include Robin G4DVJ, Jim G6CVB and others. Les has a Microwave Modules transmitter and wants to get up to 50 or 100 watts. What, he asks, is the best compromise between watts out and power supply amps in? Would a 100W solid state PA offer much advantage over a 50W one? My answer to question 1 is £££ and to question 2 a resounding no - the extra power will barely add one P point to your report! Experience sadly relates that solid state PAs are a disappointment for many people: they tend to require expensive power supplies and then their owners do not monitor the output signal with a 'scope. The nett result is a signal composed of all video and no syncs. Furthermore these PAs are not linear when run flat out, so you MUST reckon on derating them by at least a third to pass video linearly. The best bet by far is to look for a secondhand EDL-432P (£50-75) or some similar device using a 2C39 valve: this will be guaranteed linear and will pass a full bandwidth TV signal. With a nice built-in high voltage power supply, it won't require a second mortgage for a 20 amp 12V PSU, either.

Monday night is ATV night in the Edinburgh and Fife area, writes Alastair Downs GM6NEI. He says he has a half watt/half not transmitter - sounds fun! Moving down to Bristol, ATV is on the list of sideshows for the celebrations marking the 150th anniversary of the founding of God's Wonderful Railway. By the time you read this GB2GWR should have transmitted colour pix from Temple Meads station, helped by Matthew G60CV, Phil G6SPA and Peter G8WAX.

"I am Mervyn the eyewig" writes the now licenced G1MDD from Upton Bishop near Ross-on-Wye. Mervyn visited Dave ZL1LH in New Zealand and came away with a set of PCBs for SSTV as well as seeing his collection of old radios and gramophones. Back home Mervyn has devised an interesting gadget in his shack. This uses a convex shop security mirror, about 2 feet in diameter. Placed at one end of the shack he is able to point the camera at it and with the aid of zoom give an excellent view of the proceedings, without a wide angle lens and with everything in focus.



Barry G6IKQ (aerials 700ft a.s.l. at Shennington near Banbury).



ON1AH (that Spectrum program gets everywhere - get yours from G8XEU).

From Albany, Auckland M.J. Sheffield ZL1ABS writes of his first two-way contact with Wayne ZL1TVW. He also operated in the NX VHF-UHF contest with Ian ZL1TOQ under the call ZL1TVW: in this contest there is a 100km minimum contact rule, which made things more difficult and restricted them to one hookup. M.J. appreciates John Goode's articles in CQ-TV and hopes to recruit more members for BATC - well done!

Jeff G8PX writes again from Oxford and informs us that G3UMF, G8PQG and he are on the air with TV most weekends. G6AQC is QRT pending aerial repairs and G0AFY, G1AAU and G6YTW have receive converters. G8SIN is also assembling a station, so there is enough activity for a local atv group thinks Jeff.

Activity through GB3TV is on the increase and Dave G4FRE claims to have heard "that 23cm thing from Dunstable" at Felixstowe. Indeed, rumour has it that both TV and VR were visible simultaneously one night in London, so perhaps there was a lift after all. Mentioning GB3VR reminds me that Roy G4WTV claims the first foreign TV contact through a repeater. No prizes for guessing the repeater, nor for that matter the call of the contact (yes, F1EDM ...) Date not recorded but early 1985. On the 2nd March Nick G4WHO (Wimborne) had a full duplex vision QSO with Garry G4CRJ (High Wycombe). Nick sent 10 watts of 70 cm vision to an 18 el. Parabeam plus 50mW audio on SU8 into a Slim Jim. Garry had just half a watt of sound and vision on 23 cm but this was sufficient for P4 pictures (perhaps there was a lift then). Nick has a good location and finds he can regularly work Garry on 24 cm: he can also see Mike G8LES from his new Hampshire eyrie under flat conditions and that's 60 miles.

In Bristol Shaun G8VPG has been working Chris "Ancient Modulation" G8GLQ over a 13km obstructed path: Chris was slope detecting. GB3UT is in this part of the world and I am informed the aerials, receiver and video procesing are now complete and the rest is progressing nicely. Feedback from Peter G4LXC on his GaAsFET preamp design published in CQ-TV129: the 68R source resistor can be changed to 47R for more gain. It will work at 934MHz and with C1,2,3 substituted by 5-20pF it will cover 70cm as well.

Ron G6GHP leading the 24cm revolution in east Kent.

A spot of keyboard trouble at G8FBO? (shouldn't it be G8MNY?)

In Kent several of the east Kent gang have built this preamp and seem well satisfied with it. Ron G6GHP finds the performance of the BATC FM demodulator can be improved with a preamp. He uses the 26dB gain two-stage tunable one published in Roger Bunney's DX-TV paperback (G3YQC has found that the Wood & Douglas IF board also benefits from an IF preamp.) Latest Kent viewer is Roy G6OKB at Minster-in-Thanet, reports Ron. Ron has also had a P3 report from John G3OGX over the water in Essex: he was able to give John a P2 for his 100mW! Current roster down there is G4AYT (200mW, 1250MHz), G6XYY (1.25W, 1255MHz), G6GHP (6W, 1245MHz) all FM into 20-turn helical antennas.

In Atherstone (Warwickshire) John G6EHJ has a 500ft. a.s.l. site from which he gets a P5 FM picture over the 20 miles to G3DFL. Transmitter is a Fortop (2 watts) and antenna is JVL ("very narrow beamwidth"). Geoff transmits back from Smethwick on 70cm, giving full duplex QSOs. Some lonely lads in Norfolk are looking for 24cm TV contacts outside their locality: they are Laurence G6DPL and Malcolm G8ZLT, both in King's Lynn. In Oxford G8PX has built a 24cm TV transmitter and is currently browbeating Alan G3UMF to get on 24cm - I'll second that!

Final microwave letter is from Peter G3PYB in Thorner, Yorks. From his home about 4 miles south of Wetherby he has established a path to Peter G4RNA at Bradfield near Sheffield. The 50km path is not optical but even with modest antennas (15/15 J-Beam and narrow-band Tonna) the pictures are promising. Radar is no problem to me, says 'PYB but 'RNA's elevated site (1200 ft) does give him trouble at times. Power at the PYB end is 20W on 1280MHz with a W&D receive system and often a sub-1dB NF GaAsFET preamp. Intercarrier sound is planned as well as wide deviation audio on the vision frequency, when TV is not in use, for duplex working.

G4RNA has 40 to 50W output and plans to mount the PA at masthead, which should help. Aerials are long helical and a 4ft. grid dish. They have both relayed from 24cm to 70cm, without too many problems. 'PYB has a high-ERP 10GHz tx and a suitable rx system (FM of course): he hopes to go out portable with a 4ft dish, assuming he can find some contacts, but there is considerable interest in 10GHz in Yorkshire and Lincolnshire.

SSTV now. Chris Lewis G6ACL writes from Loughborough in Leicestershire that he has been experimenting with the Scarab Systems SSTV program for the Sinclair Spectrum. This, he finds, will resolve a 32 second frame. The program will scroll down the page and when full will start at the top again. When this occurs Chris stops the

tape and prints the first screen, then runs the pre-recorded tape and allows the program to fill another screen and output to the Spectrum printer. Chris sent a print to prove it, though it is not really suitable for reproduction here. He says the program tracks the slower scan frequencies perfectly and recommends it highly. Chris also reminds us that 144.500 is the SSTV calling frequency and not the RTTY or ATV talkback channel, nor the Worked all England Squares Contest channel, nor even "I'll see you one meg down [from S20]". No other SSTV news and I can only print what I receive.

The pictures are of course chosen for their interest value, not in terms of visual quality! All were taken in Holland by Ryn Muntjewerff.

It's interesting how I seem to get letters from different parts of the country each time, though it does strike me I don't get many (any!) from Ireland these days. What's happening with ATV and other visual communication there? All contributions welcome, full anonymity guaranteed if desired. Many thanks to all those who wrote or gave me their news at the various exhbitions the BATC attends.

I'm always grateful for contributions, so don't keep your news to yourself. And if you think I'm ignoring your interests let me have some news for next time and address it to Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH. Or dictate your 60 seconds on 0604-844130 if you're too busy to write!

Late flash!

Ron G6GHP rings that the Kent boys had an exceptional weekend starting Friday 31st May. Highlights as follows, all contacts by G6GHP (1250Mhz) unless noted. PE1HZR (25W) received P4 on 1252MHz AM ... German repeaters DB0DP Bremen (1285.5 AM) and DB0NC Bad Zwischenahn (1278.5 AM, 3W) both received P4 colour ... ray G4RKP managed to get into the Bremen repeater on 70cm and was seen on the 23cm output ... June 2nd: two way with G4IMO (1260MHz FM), P5 both directions ... two way with PE1HZR P4.5 ... PA3BJC received P2.5 running 200mW 1252MHz AM ... PE1HLR gave Ron P5 on FM ... PE1DWA on 1263MHz AM received by Ron and G4AYT, retransmitted back on 70 cm ...

Not bad for a weekend's work! Some of these contacts were 400km plus and it just shows what you can do on this band.

INTERNATIONAL ATV CALLING

144.750 MHZ

REVIEW

JVL 1.3GHZ LOOPQUAD

By John L.Wood G3YQC

24cm is a funny band. The trouble is it's so darned big; not that we're complaining of course, it's just that when it comes to aerials it presents a bit of a problem. How many aerials (available to amateurs) are capable of delivering the goods over some 85MHz of band? The simple answer is "not a lot"!

Some conventional aerials are better than others; the Quad loop Yagi is quite wide as is the corner reflector, the 15/15 Jaybeam, despite having rather a narrow specification, in fact performs surprisingly well over much of the allocation, and the Tonna is supposed to cover the lower end of the band as well. Although these designs will work reasonably well there is no doubt that if the full bandwidth could be obtained, together with a realistic gain figure in a single array then that is the system for us, after all, when working say the RMT-2 TV repeater channel whose input is at 1249MHz whilst its output is way up at 1318.5MHz, if 'conventional' aerials are to be used then you would certainly require two - one each for transmit and receive, optimised for their respective frequencies. All a bit impractical.

Until fairly recently the only aerial which we could lay hands on to do the job in one was the helix or helical array. This has a fairly flat response over a frequency range approximating around 10% of its design frequency, coupled with its non-critical construction and relatively high gain it has been the mainstay for TV amateurs at 1.3GHz. Now there is another commercial aerial which will also work over the band in question; I refer of course to the subject of this article: the JVL Electronics 1.3GHz Loopquad 28-element beam.

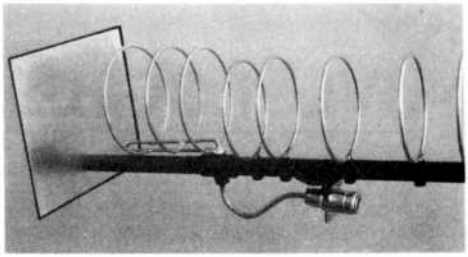
G3JVL is well known in microwave circles and has done a great deal of work on microwave aerials in general. The 'conventional' Quad Loop Yagi as described in various RSGB publications was due to G3JVL as are certain Alford Slot aerials at present in use at more than one ATV repeater site.

28 el. 1.3GHz Loopquad (ATV) SPECIFICATION

Number of elements - 28
Overall length - 82"
Forward gain - Approximately 20dBi over the whole 1.3GHz allocation
VSWR - <2:1 from 1200 - 1240 and <1.5:1 up to 1320MHz
Feed impedance - 50-ohms

The aerial comes in self-assembly kit form. The boom is made of 0.5" aluminium and the elements are of braized steel having an attractive bright zinc finish for long-term protection, they are round in construction, as opposed to the flat strip elements in published designs, making them less susceptible to damage by birds. The photograph shows the special wideband feed arrangement supplied with this unit and those familiar with the 'ordinary' QLY will instantly see the difference. The coupling between aerial and coax cable is 50-ohm N-type and this joint needs to be made waterproof before erection.

TESTING



Owing to the fact that an aerial testing range with its special equipment was not available, the tests carried out were done under 'ordinary' amateur conditions. A 20-turn helix was used as a reference and comparisons were made between the two.

Two methods of determining the difference in signal levels were employed - one to verify the readings of the other. A crystal detector was connected into the video IF line and the resulting voltage was displayed on a meter. A precision signal generator was then used to calibrate the scale which was marked off in 3dB segments. The other system was simply to connect a precision variable attenuator in the signal path, and the difference between the two aerials measured by reading off the attenuation in circuit.

At 1249MHz the aerial under test had 2dB gain over the helix, at 1295MHz the increase was slightly better than 3dB and at 1318.5MHz the difference was slightly less than 3dB. It was not possible to accurately measure VSWR but, with the aid of a Bird Thruline power meter, I was able to ascertain that the VSWR was probably close to that specified.

An attempt to judge the polar pattern was attempted: A constant signal was fortunately available from GB3GV ATV repeater and the aerial was simply rotated through 360 degrees whilst observing the repeater signal. I have to say that there were no major side-lobes at all, other than those normally expected on this type of aerial, in fact the variation in signal strength as the beam went round was surprisingly constant, the signal increasing slightly off the back and decreasing slightly off each side. In this respect the aerial is a joy to use and you can be sure that when you beam-up for best signal on a station, you are on the correct heading and not a spurious lobe.

CONCLUSION

Highly recommended. This aerial in my opinion represents a really first class addition to the rather limited range so far available for ATV use. It is light and quite sturdy, it has a useful gain over the entire allocation and a good VSWR ensures optimum power transfer between equipment and aerial. The excellent directional properties make it a joy to use and it is aesthetically pleasing and unobtrusive.
I was a little unhappy about the suggested mounting arrangement. A simple tubular "tee" piece is included with the kit which slides over the boom before the elements are fitted, this is intended to slide into a ¾" stub mast. I did not in fact use this arrangement since I considered it a little flimsy (although it is considered adequate by the manufacturers). I made a wide 'U' or 'trombone' which not only provided two securing places along the boom but made is easier to mount the aerial so that it extended above the top of the stub mast. I understand that a more robust mounting is now available as an extra.

Price £55 from Mike Walters, JVL Electronics, 26 Fernhurst Close, Hayling Island, Hampshire PO11 0DT. Tel: 0705 464482.

HOW TO AVOID SPOTS BEFORE YOUR EYES

By G.Shipton G4CRJ

INTRODUCTION

The following is a summary of my talk given at the BATC rally this year and describes the problems we face in the Home Counties ATV Group area in trying to get a 24cm ATV repeater on the air.

Consideration of the 1.3GHz band for TV was a logical development as there appeared to be vast expanses of frequency where we would be able to exchange interference free pictures. However, a new source of interference was rapidly discovered more powerful than anything encountered before. 1.3GHz is allocated to us on a secondary basis and is shared with Radar. Thus it was soon found that most of the band was unusable in this area and simplex operation became established around 1285MHz, which was the least badly affected.

The group had talked for some time about putting on a 24cm TV repeater to encourage activity by allowing simple, low-cost equipment to be used. The repeater should try to cover as many club members as possible and our proposal was submitted to the Repeater Management Group on the 13th of January 1985. It asked for FM with input on 1260MHz and output on 1311MHz. RMT2 was considered unusable due to radar interference but the RMG decided they needed more information to justify a change in the frequencies to the D.T.I. Thus a series of tests and measurements were carried out to provide that justification.

ON-AIR TESTS

G8LES, G6HVQ and myself have performed sweeps of the band observing the radar pulse interference on different frequencies. Dots or lines appear on the picture varying from below sync tip to above peak white depending on frequency. When these pulses are within the receiver passband, they can be seen continuously, whichever way the radar is pointing, even on a grade-5 picture. Early tests using a G8LES down-converter and BATC FM demodulator board were not very encouraging, with severe interference on most frequencies, but some where pulses were only seen when the radar pointed towards me. A Solent Scientific FM board was tried for a day with much better results and indicated that 1249MHz was not too bad, although not entirely clear of pulses. Narrow black pulses appeared on the picture using negative modulation so with positive modulation (as recommended for repeaters) these would be white and therefore far more objectionable. 1318MHz was covered in white narrow pulses and very unpleasant to watch. 1311MHz was better as the spots turned black here and 1305MHz even better with only intermittent white lines. So, from these tests it was concluded that the repeater output frequency should be somewhere around 1305MHz; below the top pair of radar frequencies and above the narrow-band section. It is interesting to note that the clearest part of the band is around 1296MHz which is probably no coincidence! The on-air tests showed that there were four frequencies occuring in two pairs and repeated

tests were found to give inconsistant results. The frequencies of worst interference seemed to change on different occasions and it was concluded that the frequencies probably vary by a few MHz.

SPECTRUM ANALYSER MEASUREMENTS

These allowed the centre frequencies to be pin-pointed as well as the signal bandwidth and power. G3OSS, having all the necessary equipment, was pleased to offer his services. Using his Hewlett Packard HP8558B spectrum analyser connected to four 23el Tonnas, we were able to sweep the band and locate the radar. Some difficulties were experienced in carrying out the measurements: the Tonnas had a very narrow beamwidth so beaming up on the continuously varying signal (due to the rotation of the radar) was difficult. Once this had been done however, there was interaction between the analyser scanning and the pulse repitition rate of the radar and it was concluded that manual scan would have to be used to see the peak signal. The strongest pulses were at -10dBm or 200mV p-p into 50-ohms. Taking account of losses and the fact that the aerials were being used well away from 1296MHz, it was estimated that the received power was about 1 milliwatt! To put this into perspective; G8LES receives about a P4 from me on 10mW over a 40km path. G3OSS is about 30km from Heathrow airport so, assuming a line of sight path, the transmitted e.r.p. would need to be 1.6MW (Mega-Watts). He is probably not quite line of sight and the radar beam will be elevated so the e.r.p. is likely to be higher than this. It is believed to be about 1GW (1,000,000,000 Watts)!

SOME POWER CALCULATIONS

My location at High Wycombe is virtually line of sight to Heathrow. Suppose the radar e.r.p. towards me is 100MW then this would result in 180mV p-p at the end of the coax. With a 1dB noise figure for the pre-amp and a receiver bandwidth of 16MHz, the receiver noise power would be -101dBm. Peak received radar pulse power would be +4dBm and therefore a pulse-to-noise ratio of 105dB. If this power is equally shared between the four frequencies then this drops by 6dB to 99dB. If a P5 signal on FM requires a carrier-to-noise ratio of 35dB then radar pulse to P5 picture ratio is 64dB!

I can transmit 500mW of FM-TV on 24cm. On a radar frequency with the receiver 2-feet from the transmitter, I can still see radar pulses on my local off-air signal. I still receive pulses with the aerial unplugged and the receiver in a screened box. Also looking at the demodulated pulses on the 'scope with the aerial connected, I can see pulse reflections from hills and buildings. If I had a radar display I'd probably get a map of south east England on it!

SIGNAL PROCESSING

Clearly something has to be done in this (and some other) areas to reduce the radar interference otherwise the main incentive for using 1.3GHz is lost. Even using frequencies away from the radar centre frequencies still results in some interference when the radar is pointing at the receiving station. Good receiver filtering is essential plus very good large signal handling, but only so much can be done without excessive cost.

Signal processing may offer some relief by blanking out or substituting for radar pulses. The technique involves detection of a radar pulse in the

receiver and then switching to grey level for example or substituting video stored from the previous line or lines. The latter technique is used in video recorders for dropout compensation. A dropout is detected when the FM carrier from the tape disappears or falls below a pre-determined threshold. A quartz delay line stores one line of video and can be switched to during the dropout period. The problem with PAL is that the V axis phase of the subcarrier is different on the previous line so domestic recorders only store the luminance information, therefore colour is lost for the duration of the dropout. Usually dropouts occur randomly and infrequently so this is of little consequence.

With radar interference however the situation is somewhat different. The detection process differs in that there is always a carrier in the IF. It is just that the wanted carrier is flattened by an unwanted carrier, therefore a carrier amplitude detector can be used but now has to exceed a certain threshold. Slow acting AGC is required on the receiver so that the threshold is always just above the required constant carrier level but a fast radar pulse doesn't affect the AGC. However, the radar amplitude is constantly varying as it rotates and on-the-air experience indicates that the radar sidelobes are comparable to a P5 picture. This makes detection difficult and radar pulses some 3dB or more below the wanted carrier level (depending on receiver capture ratio) will still cause interference. Also, the radar pulses are frequent and not random so the substitutions may become visible. It has been suggested that the inter-carrier sound could be monitored for loss of carrier but this requires inter-carrier sound to be transmitted - not always feasable. Also, the relatively narrow bandwidth of the sound channel would impede the detection of narrow (3.5uS) pulses. I do not believe that quartz delay lines can handle the full luminance bandwidth, only about 2MHz is required for the colour subcarrier which they normally handle (or maybe 2MHz luminance bandwidth of a domestic video recorder). In going to 24cm we are trying to achieve good broadcast quality (whatever that is) pictures and would like the full bandwidth. This could be achieved with CCD delay lines but would be complex and expensive.

An alternative scheme which has been tried is similar in principle to the noise blanker: When a radar pulse is detected in the IF, a gate is operated which turns off the signal to the phase locked loop. The loop, (if of a suitable design) then free-runs at whatever the frequency was at the instant of disconnection, until the signal returns. The effect of this on the picture is for the grey level at disconnection to be retained until the picture returns. The inertia of the loop is therefore used as a form of video memory. Thus, where a pulse occurs in the background of a picture with little detail to change in grey level, the concealment should be good. Detail gets lost but is less objectionable than a large white or black line or spot. When carefully set up, the technique works fairly well but seems to depend on frequency and signal-to-noise. On strong pictures detection becomes more difficult and errors more visible. When the detection threshold is near to that of the carrier level another problem encountered is that of frequency-to-amplitude conversion in the receiver due to non-optimum filtering. The circuit of an experimental radar pulse gate is shown in Fig.1.

Any signal processing technique will add to the cost and complexity of the receiver and so act as a disincentive to using 1.3GHz. It is, however, possible to invoke signal processing in the receiver of a repeater as this only has to be done once. Therefore, the best compromise would be to try to get the repeater output frequency clear of radar at the expense of the input frequency.

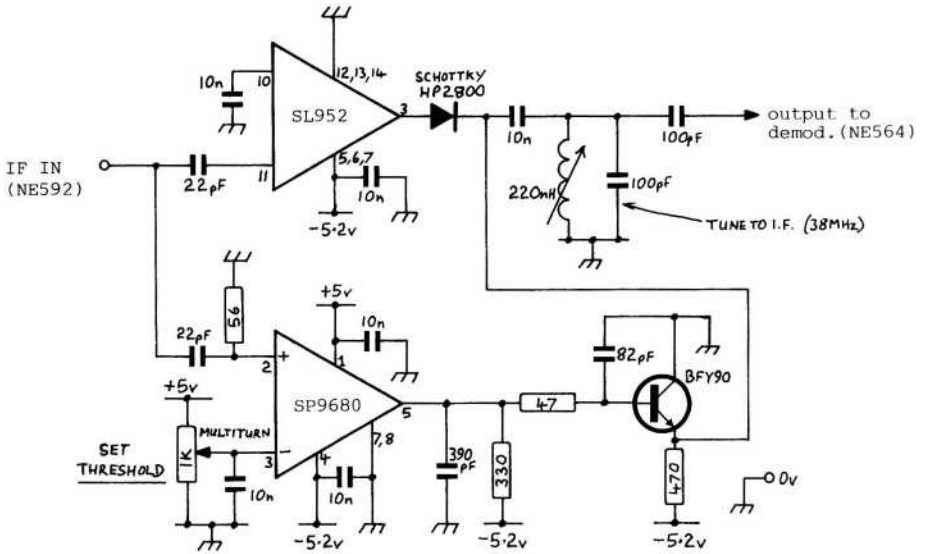


Fig.1 EXPERIMENTAL RADAR PULSE GATE

CONCLUSIONS

Priority must be given to the repeater output frequency as it is essential to get this clear of radar so that a simple receiver can be used. Also, the restrictive 25-Watt e.r.p. limit on repeater outputs doesn't help. Signal processing can be employed at the repeater receiver as this only has to be done once.

It is interesting to note that the German, French and Dutch ATV simplex frequencies are very close to our radar frequencies. Having heard that radar interference is a severe problem in Germany as well this would seem to indicate that the radar frequencies of those countries are interleaved with ours to reduce mutual interference. This must also be the case with different parts of this country, which implies that ATV repeater frequency planning must be on a regional basis to fit in with local radar.

The best compromise for a repeater in the Home Counties area is input on 1248MHz (or lower if better lower sideband filtering can be achieved without undue waveform distortion) and 1308MHz output. Again the output is a compromise between radar interference on the upper sideband and interference from high power stations in the narrowband section. This still leaves room for an FM simplex frequency of 1286MHz which has become established in the Home Counties area as such.

The unfortunate experience of GB3GV proves the need for sensible frequency allocation and flexibility.

The Home Counties ATV Group submitted their findings and recommendations to the RMG on the 13th of May 1985 and eagerly await the outcome. We hope to obtain the callsign GB3HV and it is intended to temporarily locate the repeater at my own QTH in High Wycombe which should give good coverage to the

THE PERILS OF GB3GV

Since GB3GV ATV repeater (Leicester) moved to its new site early in May, it has unfortunately had rather a torrid time.

The first problem was with the AM output: Quite frankly it was not up to scratch and, after some experimenting, it was decided that major work on the transmitter system would be required in order to iron out all the bugs. As an experiment FM was tried for a brief period; the results were astounding, suddenly the signal strength shot up, picture quality was superb and synchronisation perfect. All the stations involved with the initial testing at that time appealed for a change to FM only operation.

Shortly afterwards it was discovered that the repeater was causing interference to an air traffic radar station....the following communique, sent by the BATC to John Nelson, General Manager of the RSGB picks up the story:-

85-05-16 10:34
Msg 779 Title: DRAFT GPS

FOR JOHN NELSON

THANKS FOR YOUR HELP RE GB3GV - SUGGEST NEWS RELEASE BASED ON INFORMATION BELOW.

GB3GV THE UK'S FIRST AMATEUR TV REPEATER FIRST LICENSED AND OPERATIONAL FROM LEICESTER SINCE FEBRUARY LAST YEAR (1984) WAS MOVED TO A NEW SITE NEAR MARKFIELD, AT THE BEGINNING OF THIS MONTH (MAY).

ALTHOUGH THIS MOVE HAD BEEN SANCTIONED BY THE DTI UNFORSEEN DIFFICULTIES OCCURED WITH INTERFERENCE BEING CAUSED TO AN AIR TRAFFIC RADAR INSTALLATION IN THE WEST MIDLANDS.

AS SOON AS THIS WAS DISCOVERED, AND AT THE REQUEST OF THE C.A.A. AND DTI RADIO INTERFERENCE SERVICE, GB3GV WAS IMMEDIATELY CLOSED DOWN. DISCUSSIONS THEN TOOK PLACE AND IT WAS AGREED THAT A SERIES OF TESTS BE CARRIED OUT TO SEE IF A SOLUTION COULD BE FOUND. THE FULL CO-OPERATION OF THE C.A.A. ENABLED THE RSGB TO APPROACH THE LICENSING AUTHORITIES TO APPROVE A FREQUENCY CHANGE TO CHANNEL RMT2 (1249 IN - 1318.5 OUT) AS THIS, TOGETHER WITH A CHANGE IN ANTENNAS, HAD BEEN FOUND TO CLEAR THE INTERFERENCE.

THIS APROVAL WAS RECEIVED ON TUESDAY, MAY 14, AND GB3GV WILL BE FULLY OPERATIONAL USING FM IN AND FM OUT ON CHANNEL RMT 2 BY MAY 18TH.

REGARDS
GRAHAM SHIRVILLE G3VZV.

This message was read out in the RSGB news broadcasts the following Sunday.

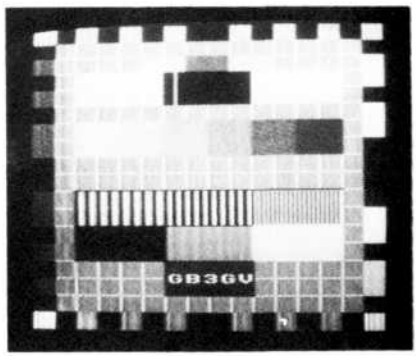
GB3GV was back on the air after a scare that sent a shudder through those groups operating or proposing an ATV repeater and a great sigh of relief was expelled by all concerned when the trouble was resolved.

Since then the machine has continued to work quite well (although trouble is being experienced with a less-than-ideal receive aerial) except for a transmitter breakdown caused during a storm at the beginning of the bank holiday weekend. Being a valve PA and not yet fitted with protection circuitry, when a power cut was restored full drive and anode volts were applied before the heaters had time to come on....the valve didn't like that one bit! Anyway after a valve change (and some other repairs) the PA was re-installed and a receive pre-amplifier added at the same time. To date the repeater is working well and has excellent coverage although a programme of improvements and alterations are planned in order to bring it up to full specification.

The repeater is being seen and worked in Birmingham, Rugby, Nottingham plus a number of other areas including a report from Northampton. At the time of writing good tropospheric propogation conditions have not yet been experienced, when this happens it is expected to liven up considerably!

Well done to Paul Elliott G4MQS and George Mayo G4EUF for their 'on site' work and to all those stations who help with the numerous tests and experiments being conducted in the interests of ATV.

G3XKX celebrated VE day in true "old comrade" fashion (via GB3GV)



GB3GV's original test card taken off screen in Rugby over a 33km path shortly after switch-on.

IN THE STUDIO

Part 4 - DIGITAL TECHNIQUES

By John Goode.

It would be necessary to write a complete text book if all aspects of digital television were to be covered in any detail, and so I shall only be able to give some sort of overview in this article. Most of the techniques involved in fast-scan television are presently beyond the reach of amateurs, but they are rapidly assuming such importance in modern studio equipment, that any studio-based article must mention them.

The first consideration is "Why digital signals? - what advantages do they have?" To answer that, it is important to think about the problems that affect "normal" or "analogue" signals, where continuously variable values of sound or light are described by continuously varying voltages and currents.

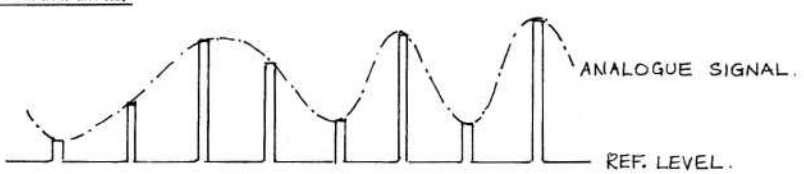
It is well known that analogue signals are prone to distortions in transmission chains, due to:-

(a) insufficient bandwidth;
(b) non-linearity;
(c) poor signal-to-noise ratio.

All these problems can be eliminated if the signal parameters can be converted into a coded stream of binary pulses, where at any time a receiver only has to be able to recognise the presence or absence of a pulse, thus making complete signal regeneration possible. The price, (there always is one of course), is the increased complexity of signal processing.

The advantages mentioned above are not the only ones to be gained from having the signal in digital form. A binary signal is computer-compatible, allowing manipulation of the signal in ways that are either untenable or impossible with analogue technology. Although this article is entitled "Digital Television", it will be realised that the term "analogue signal" covers audio (and other) signals as well as television, and some reference to audio will occasionally be made. For instance, the advantages of digital transmission have been applied to audio signals for some time, whereas in video digital techniques have mainly been applied to signal manipulation. However, this is an area that is moving rapidly, and the above generalisation will probably appear very shortsighted in the near future!

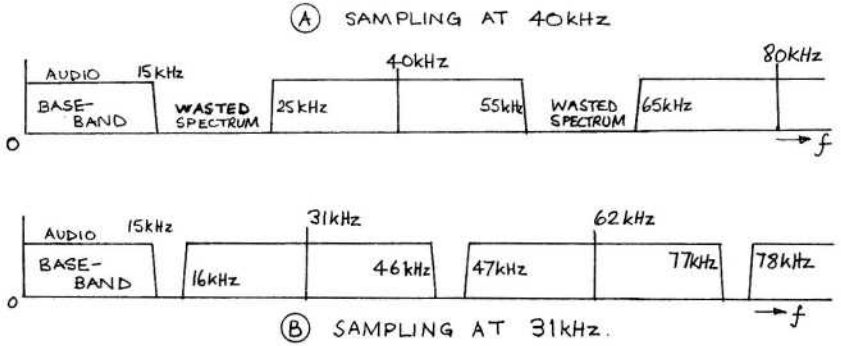
FIG 1 SAMPLING



PRINCIPLE OF ANALOGUE TO DIGITAL CONVERSION

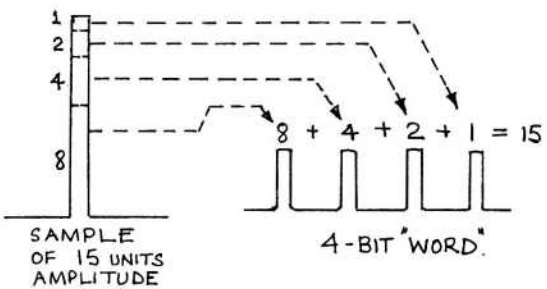
The first step in A/D conversion is that of sampling, see Fig.1.(I have not used a video signal in this explanation as the general principle applies to all forms of analogue signal). The sampling rate for any signal should be at least double the highest analogue frequency it is required to resolve. This is known as Nyquist's Law. More advanced experimental digital systems have used "Sub-Nyquist" sampling, but as a general principle sampling at Nyquist frequency is used. The output of the sampling process can be regarded as a series of amplitude-modulated pulses. Fig.2 shows the spectrum of a sampled audio signal for two sampling frequencies; this illustrates Nyquist's Law.

FIG 2 SAMPLING SPECTRA (AUDIO SIGNAL)



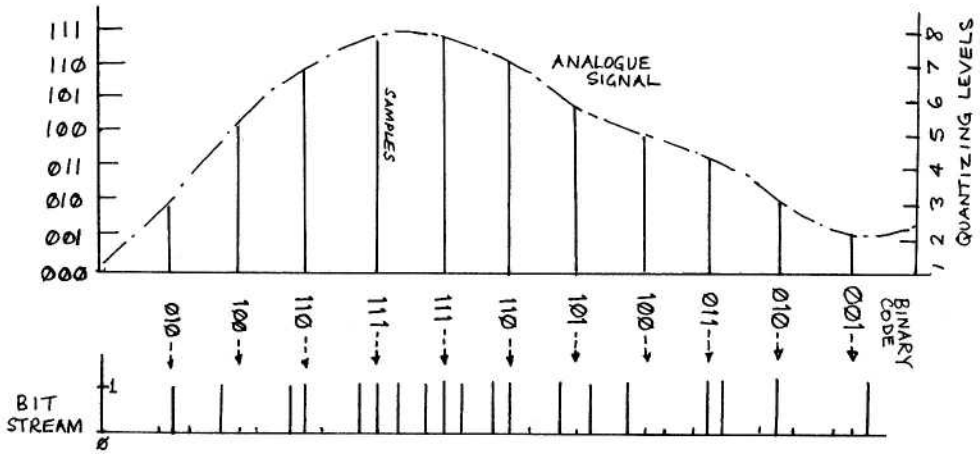
The next stage in the A/D process is to describe the amplitude of each of the samples as a binary number; this number can then be represented by a train of "binary-digits" or "bits" in transmission. Fig.3 is a sample of 15 'units' amplitude together with its descriptive 'bit-stream'. For the purposes of this article, we shall take it that in digital signals binary-1 is represented by the presence of a pulse, and 0 by no pulse.

FIG 3 BINARY-CODING THE SAMPLES



In order to describe the samples digitally, their amplitude (effectively that of the original signal) must be divided into a number of discrete levels so that the binary system can send numbers corresponding to them. This process is known as QUANTIZING. The more levels that are used, the more accurately the original signal can be described. However, the greater the number of quantising levels, the greater the number of 'bits' required to transmit them. For each type of analogue signal, there is an optimum number of levels, and therefore bits, necessary to give a "transparent" signal. The number of bits used in any system determines its resolution of levels, and is known as an "n-bit system". Fig.4 shows a 3-bit system which only has 8 quantising levels. The bit-stream shown below forms a series of 3-bit "words", each describing a sample.

FIG 4. 3-BIT SYSTEM

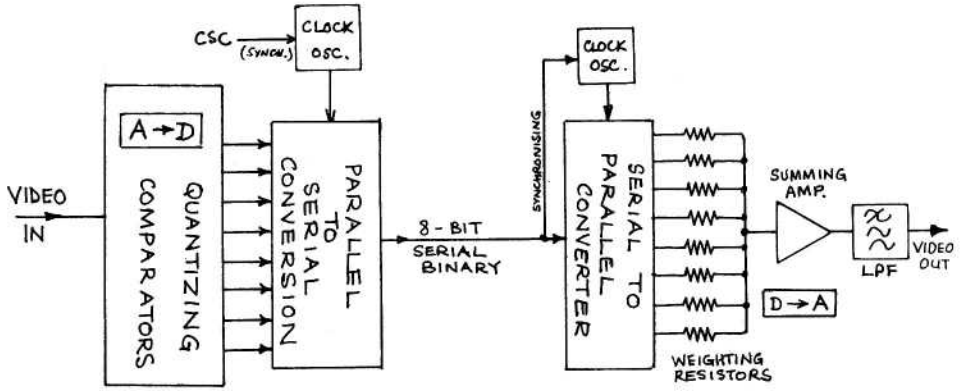


In practice, quantizing is carried out using a precision voltage ladder to define the levels, each "rung" feeding one input of a comparator; the other inputs are commonly fed from the input signal. This generates parallel binary, which is subsequently converted to serial form. These functions are carried out using LSI chips. The classic method of reversing the above process (D/A conversion), first requires the serial bit-stream to be changed to parallel form; all the lines are then summed via weighting resistors whose value is in inverse proportion to the bit's significance. See Fig.5.

Surprisingly, it turns out that the number of bits required to describe video signals accurately is considerably less than is necessary for high-quality audio. An 8-bit system (256 levels) provides transparent video coding, whereas audio requires at least 11-bits (2048 levels), and even then it is desirable to incorporate companding of the analogue signal. This is because of the great dynamic range encountered in audio signals. What is the effect of insufficient quantizing levels on the decoded signals? With audio it is manifested as a hissing background noise (quantizing noise), whereas low level signals will suffer from non-linear distortion as there are insufficient levels to describe their subtleties accurately - companding helps here by boosting the low levels. Under-quantized video has a cartoon-like appearance,

as all subtlety in grey-scale is lost. In fact, this effect is deliberately provided on digital effects units - it is known as "posterisation". In Fig.6 I have shown the proposed IBA quantizing levels for 8-bit video.

FIG 5. A→D & D→A CONVERSION



BIT-RATES

With digital signals, bandwidth does not have quite the same significance as it does with analogue signals, as it is possible to allow a bit-stream to suffer high-frequency attenuation to a degree that would be quite unacceptable in conventional signals. So long as the bit-stream can be recovered without error, its distorted shape is of no consequence. See Fig.7. It is therefore normal to speak of bit-rates rather than bandwidth, although the two are related, of course. Calculating the maximum bit-rate of a digital system is fairly straightforward. Take an 11-bit audio system, as suggested above;

Max. analogue frequency = 15kHz
Therefore sampling frequency = 31kHz
Each sample could take 11 bits to describe it, so,
Max. bit-rate = 11 x 31 = 341kilobits/sec.(kb/s).

This calculation slightly simplifies matters, as it assumes that the bit-stream is transmitted at the maximum rate continuously, which of course does not happen in practice. However, steps are taken to even out the data-rate, and also additional bits may be transmitted for error checking, so the figure above is a reasonable guide. Carrying out the same calculation for an 8-bit video system is complicated by one additonal factor - the presence in composite video of the colour subcarrier. When sampling encoded colour video it is necessary to choose a sampling frequency that is an integer multiple of the subcarrier, or severe interference with the colour dot-pattern will occur. If the full 5.5MHz video bandwidth is required, the sampling frequency must be 3 x Fsc, as 2 x Fsc will give sub-Nyquist sampling. Making the calculation:

3 x 4.433619MHz = 13.3MHz;
bit-rate (8-bit system) = 13.3 x 8
= 106.4 Megabits/sec(Mb/s).

So any equipment designed to handle broadcast-standard digital video had

better be well designed and layed out, as it has to handle bit rates equivalent to frequencies in VHF Band II! In fact the bit rates can be as high as 140Mb/s in some apparatus that uses 4Fsc sampling, this giving better resolution of the subcarrier, and less interference ("aliasing") than 3Fsc.

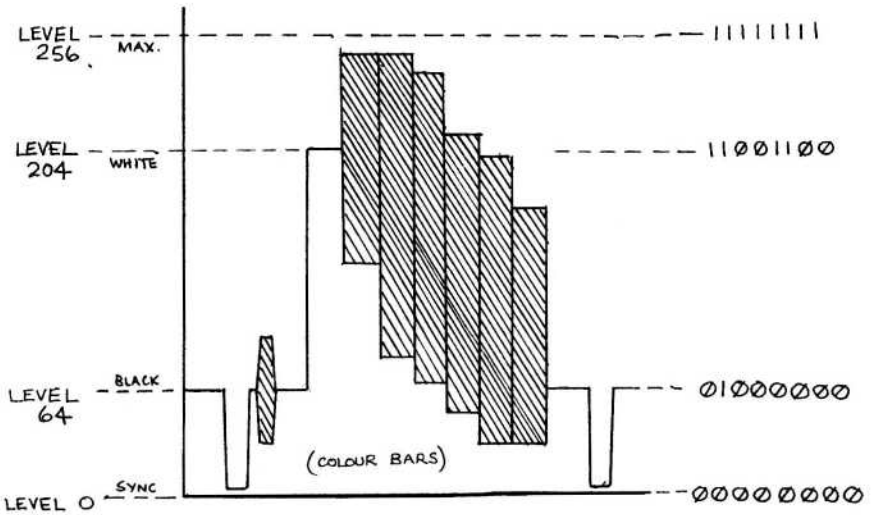


FIG 6: PROPOSED IBA QUANTIZING LEVELS

Because of the design problems caused by these high bit rates an alternative method that may be adopted in the future is "component coding"; that is, the colour signal is digitised in its Y,U,V form. Since the U & V signals are of narrow bandwidth they could be sampled at (say) half the rate of Y, the luminance; as there is no subcarrier, the Y sampling rate could be lower than that required for composite video. These lower rates would only obtain so long as Y,U & V were kept separated; if the bit streams were multiplexed together, no advantage in bit rate is gained.

THE "DIGITAL PROMISE"

Having given an outline of how it is possible to encode an analogue signal as a stream of pulses, it is worthwhile to look and see where this is leading us, the "ultimate goal", if you like. As was suggested at the beginning of this article, once the signal is in digital form it can undergo all sorts of operations and manipulations with NO loss of quality; if the pulse train begins to get degraded it can always be regenerated, provided that the binary code is still detectable. What does cause degredation, however, is the A/D and D/A conversion processes themselves.

What tends to happen in TV studios at present is that there are "islands" of digital operation, where pieces of equipment have been acquired in order to do a job that can only be done digitally (more of that later). Each apparatus has its own A/D & D/A conversion, all introducing unecessary degredation. The

ideal studio of the future, therefore is one where any signals that can't be generated digitally are A/D converted as early as possible in the chain, and then corrected, cut, mixed, wiped, manipulated, and finally recorded in digital form. Editing and post-production using digital recorders holds the theoretical promise of multi-generation copying with absolutely no loss of signal quality!

So what stops this ideal being achieved? Well, at the moment there is no ageed digital standard for all equipment, and that is necessary if the signal is to remain in the digital domain throughout its studio life. Digital VTRs have been experimentally produced, but they are not yet near the production stage. Also, the longer it takes to get a viable DVTR, the more refined (and practical) analogue VTRs get. If you show a producer a 1" VTR that can be carried and operated by one man, and then show him a DVTR comprising an armchair-size console plus 3 19" racks of equipment, he will not be particularly impressed by the claim that the DVTR gives better pictures; this is because the AVTR gives very good results, and even though the DVTR may be better, on the average picture it will not be THAT much better.

So, will the ideal ever come? Well in electronics one should never say "never"! I will make one prediction here - if it doesn't come, it will be for commercial or political rather than technical reasons. The difficulties of agreeing standards internationally should not be underestimated, and without such agreements the necessary projects will not be undertaken.

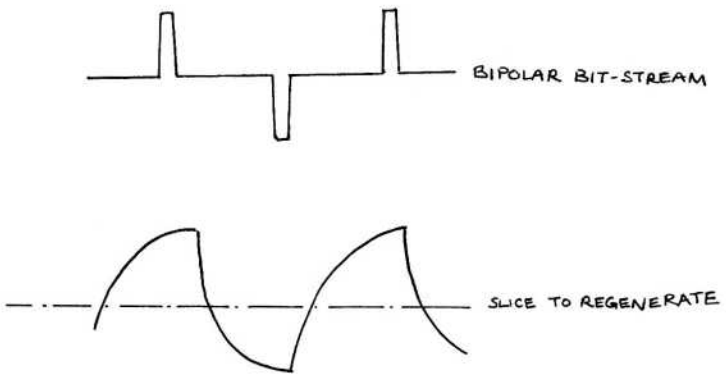


FIG 7. BIPOLAR BIT-STREAM DISTORTED IN TRANSMISSION.

DIGITAL STUDIO EQUIPMENT

The first piece of studio equipment to 'go digital' was the VTR Timebase Corrector, because of the availability of digital delays (initially in the form of shift registers). Prior to this timebase correction had only been available for the small errors exhibited by 2" quadruplex VTRs, using voltage-controlled analogue delays (up to about 30uS). By using digital storage, errors of up to 5H could be corrected, making possible the timebase correction of the better helical-scan VTRs.

With a TBC that has a limited correction window (DTBCs vary from about 2H to 16H, according to price), it is only possible to obtain a station-synchronous output from VTRs with a capstan-servo, as these machines can be made to run in vertical-synchronism with station-syncs. The TBC provides a locking output known as "early sync" for the VTR to lock to - the field sync on this signal is advanced by half the delay of the TBC store, bringing the corrected output into full station-lock.

As the cost of storage has fallen, the TBC has developed into the Digital Frame-Store - this can be thought of as a TBC with a 625H store. However, having one (or more) complete frames of storage confers a number of advantages, as well as forming the basis for a whole range of more advanced devices. Obviously, with a complete frame of storage, it is not necessary to vertically synchronise the VTR. It therefore follows that the frame-store can be used to make any incoming video synchronous, regardless of its original timing. Also, because at any time a complete TV picture is in store, the write process can be stopped and a perfect freeze-frame can be "grabbed".

Another application of the frame store is that of noise reduction. Because statistically there is very little difference between successive fields in any TV transmission, the two fields held in store can be compared pixel by pixel; changes that are randomly occuring are detected as noise, and their elimination can reduce noise by up to 6dB.

DIGITAL EFFECTS UNITS

These devices incorporate at least two frame stores, so that at any one time, two pictures are available for manipulation; some may hold 4 pictures in store so that effects such as quad-split can be achieved. Effects that are unique to digital operation include picture compression and geometrical distortions, slide, posterisation & mosaic; also picture spin and tumble are possible.

As a general outline, these effects units can be thought of as "electronic painting-by-numbers". Once a TV picture is in store, each pixel can be read out in almost any order desired, providing we have a fast enough computer to do it. This means that theoretically there is no limit to the number of ways the pictures in store can be manipulated and combined. Indeed, any demonstration of the current products from Quantel, GML or IVCC will illustrate this. In fact, it is hard to stop some programme makers going over the top with some of these effects - they are only a tool, after all.

The other area where the frame-store is used is in television standards-conversion. This is rather a specialised application, where frame rates must be changed (30 to 25Hz & vice-versa). This involves a process called "movement interpolation", where movement between frames must be revised as the frame-rate is changed, or unnatural image movement will result. Lately the cost of these devices has dropped with the fall in cost of both memory capacity and computing power.

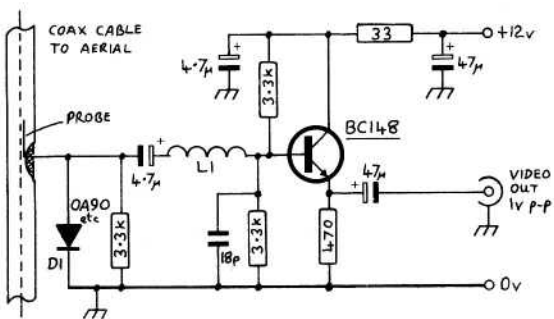
There is no doubt that other applications for digital techniques will emerge in the future. In this article I have outlined some of the video applications; in audio these systems are used widely to provide delay-based special effects - also, in audio the digital recorder is a reality, and in growing use. This will become increasingly necessary if justice is to be done to the quality potential of the digital compact-disc.

A 70CM RF PROBE

Operating an amplitude modulated transmitter can, if special care is not taken, be fraught with problems; results sometimes being somewhat disappointing from those expected. Ideally the video picture, which provides the transmitter modulating signal, should be received as an exact replica of the original. Unfortunately there are many ways that the TV signal can become distorted along the way, however it is possible to minimise this distortion by paying particular attention to the outgoing transmission as it is being sent.

The most common cause of distortion in an amateur system is caused by high power RF amplifiers not being truly linear, the most common effect of this is 'sync crushing'. Sync crushing occurs when the transmitter is being driven too hard, usually in an attempt to get just that little bit more power output and can be caused either by over-driving the modulated amplifiers or by mal-adjustment of the video modulator, either way the effect on the screen may be anything from ragged verticals and jittering to frame roll or a complete failure to lock the picture.

Most TV modulators have two controls: 'video gain' and 'bias'. On many commercial transmitters these controls are brought out to the front panel to facilitate their adjustment. To a certain extent the two controls are inter-dependent however, once set, you should find that the bias control will not need re-adjustment at all, variations in video signals presented to the modulator being controlled by the video gain. In order to set these controls you need a reliable method of receiving your radiated picture. It is not good enough to receive it using a TV in the shack and relying on stray RF fields to provide the signal; such fields can themselves cause distortion. Neither is it always convenient to ask a friend to receive your picture and 'talk' you through the setup procedure. What is needed is to be able to sample the RF directly from the aerial coax, demodulate it, and display the picture on a monitor screen. In this way you will get a fairly accurate idea of what the outgoing picture will look like when it is received.



L1: 10t enam' wire wound on 3/16" former. self supporting.

AN RF PROBE

A circuit for such a 'probe' is shown in the figure. As you see it is quite straightforward and is small enough to fit on the back of a transmitter or even hang on the coax cable. The circuit may be built on 'Vero' board or something similar and needs little adjustment to get it working.

To install the probe, cut a small hole in the outer sheath of the aerial coax to reveal the braiding. Using a thin screwdriver or similar implement push it under the braiding for about one inch. Into this 'hole' insert a thin piece of INSULATED wire; connect the end of this, in the shortest possible way, to the input of the circuit, (less than an inch if you can). The coax and circuit board should be firmly fixed at this point to ensure that the probe does not pull out.

ADJUSTMENT

Connect the probe output to an oscilloscope (terminated in 75-ohms) or a TV monitor, connect +12v, switch on and tune up the transmitter for maximum modulated output and what you hope is a good picture. Adjust the length of the pickup probe by either pushing it further underneath the coax braiding or withdrawing it a little until a video signal of around 1v p-p is displayed on the 'scope or until a normal contrast picture is displayed on the monitor. That's all there is to it! Now when you adjust your transmitter you will instantly see whether there are any faults on the picture.

A word of warning though: If the probe is coupled too tightly to the RF signal the circuit will itself be over driven and will certainly introduce its own distortion to the picture.

COMPONENTS

The components shown in the diagram should, where possible, be used. However, other diodes in the 'OA' series could be substituted for D1. The transistor could be any similar n-p-n device such as: BC108, 2N1613, 2N3904 etc. It is difficult to specify the actual length of the probe wire inserted into the aerial coax. If you are using low power, say a Watt or less, you may need as much as a couple of centimetres, however, if you are using 50 Watts or so you may well need only a few millimetres.

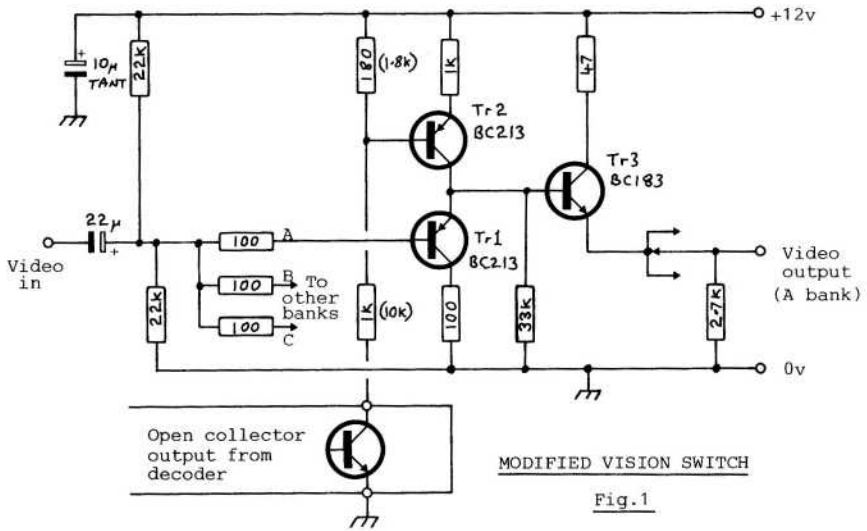
Ref: ATV-Kontroll-Demodulator. Der TV Amateur magazine 1976.

(Well it fills an empty space!!)

VARIATIONS ON A VISION SWITCHER

By B.J Dandy G4YPB

Whilst in the process of building a vision switcher based on the electronic switch element from the BATC 'ATV Handbook' Vol.2, I thought that readers might be interested in the circuitry which I am using and have found to work very well.



MODIFIED VISION SWITCH

Fig.1

The selected output from a decoder is usually low, and since the original switch element requires an open circuit, necessitating the use of an inverter, I have modified it to suit my application: By re-arranging the circuit, mainly by interchanging transistor types and power rails, the switch can be directly driven from a decoder (with open-collector outputs).

The designer of the original circuit - G8FNR - points out that switching will be slowed down somewhat but, in use, I have found no problems at all. I have however reduced Tr2 bias resistors by a factor of 10, the original values being shown on the circuit in Fig.1 in brackets; this should eliminate any significant delay. I have fed all banks on each video source from a common bias network, thus saving a few more components. Suitable decoders are 74LS145 (10 outputs) and 74LS159 (16 outputs) and they can be used to drive tally lights as well.

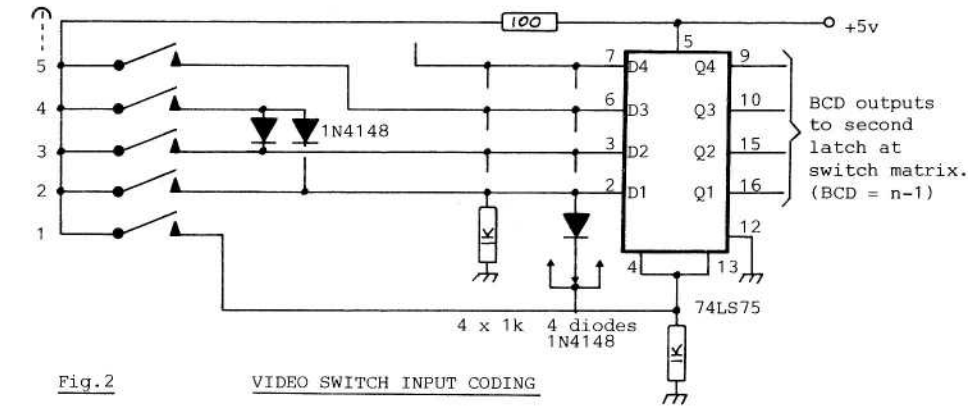


Fig.2 VIDEO SWITCH INPUT CODING

For input coding I have dispensed with the 74LS148 encoder used in the original article. I have moved the first 74LS75 quad latch to the remote panel and coded via diodes, as shown in Fig.2. Remember that BCD output = n-1.

Also used in my new system is a particularly good pulse distribution amplifier, the circuit of which I have shown in Fig.3. This works very well producing, as it does, standard level pulse outputs into a 75-ohm load.

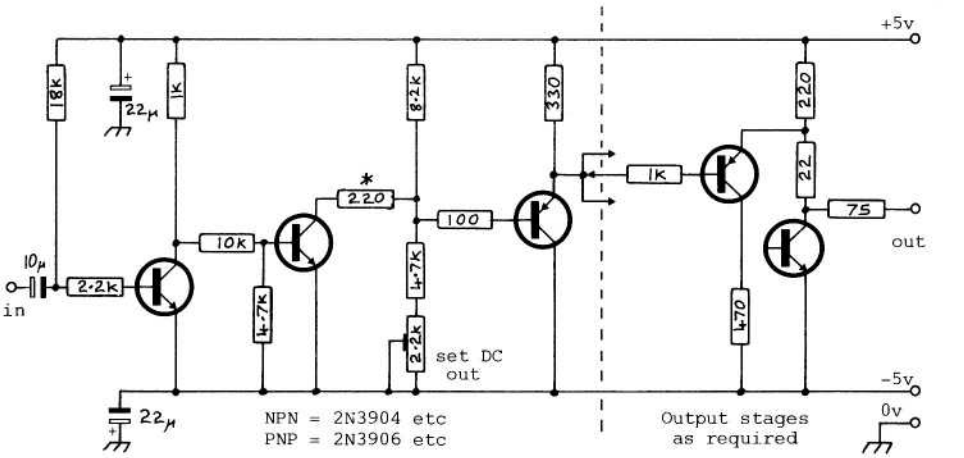


Fig.3 PULSE DISTRIBUTION AMPLIFIER

*A.O.T. or replace with 100-ohm fixed and 220-ohm preset to enable precise setting of the 2v output level.

PRE-EMPHASIS FOR FM-TV

In common with other European organisations - both amateur and commercial - we in the UK have adopted the CCIR recommendation for our emphasis circuits in FM television systems. Without going into details (which are adequately covered in RSGB textbooks), pre-emphasis is used in a transmit system to increase the level of the modulating signal above a certain frequency, whilst de-emphasis - used in the receiver - restores the signal levels to their original value. The basic reason for going to this trouble is that of noise performance, and to achieve a reduction in differential gain and differential phase distortion which is particularly advantageous where the transmission of colour television signals is concerned.

Now that there is a minor explosion in ATV circles in that large numbers of stations are equipping for FM television on 24cm and higher bands, it is becoming increasingly important for us all to comply with common standards. Listening on the air one often hears stations trying the effect of using emphasis circuits and quite often coming to the conclusion that they are best switched out! The reason of course is that the emphasis circuits being used (if any) are probably not compatible with each other. Now that there are more commercial receivers becoming available most of them, hopefully, will comply with the CCIR de-emphasis standard, it can be assumed that the majority of problems occur in home-brew transmitters.

CCIR recommendation 405-1 unanimously recommends that:

1. The use of pre-emphasis is preferred for the transmission of television signals by radio-relay systems;

2. A minimum phase shift network should be used for pre-emphasis;

3. The idealized preferred pre-emphasis characteristic be given by the expression:

$$\text{relative deviation (dB)} = 10 \log [(1 + Cf^2)/(1 + Bf^2)] - A,$$

where:

A is the attenuation (dB) at a low frequency (<0.01 MHz),
B and C are constants which determine the shape of the pre-emphasis characteristic,
f is the frequency (MHz).

The preferred values of A, B and C for the 625-line system is shown in table 1. The shape of the characteristic is shown in Fig.1.

Table 1
Value of coefficients of pre-emphasis characteristics for 625-line systems

A.....	11.0
B.....	0.4083
C.....	10.21
Cross-over frequency (MHz).....	1.512
Deviations (peak-to-peak) at low frequencies (MHz)	2.255

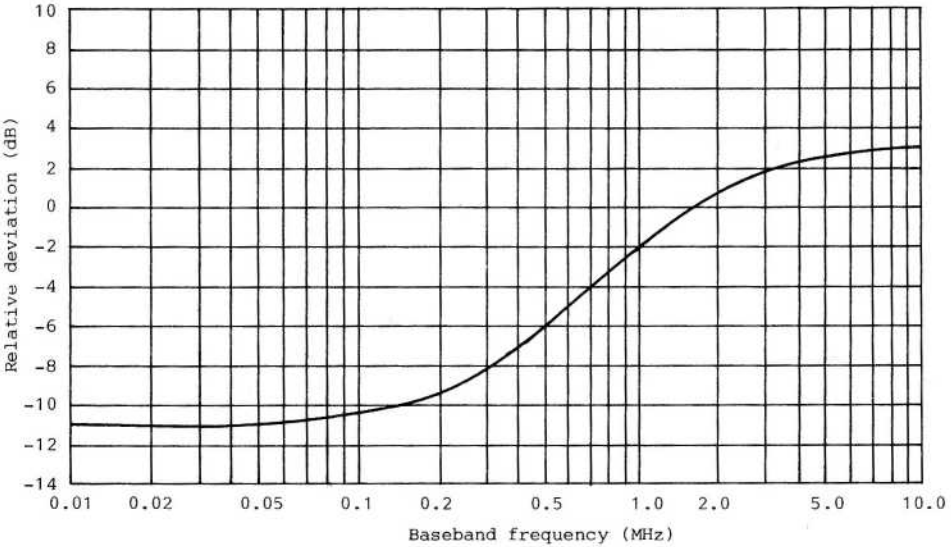


Fig.1 PRE-EMPHASIS CHARACTERISTIC FOR TELEVISION ON 625-LINES

A CIRCUIT

A pre-emphasis circuit suitable for transmission purposes is shown in Fig.2. As you see it is a passive circuit which may be easily constructed and will fit-in almost anywhere. The circuit shown has some rather unusual values; these are the absolute values calculated for the CCIR standard, however, it will be close enough if standard, preferred value components are used. Fig.3 shows a typical application of the pre-emphasis circuit using more readily obtainable components. As with any filter type circuit it is important that both its input and output be terminated in the correct impedance - in this case 75-ohms.

The 'T' pad attenuator shown at the video input serves not only to reduce the video signal by 3dB (this in order not to overload the amplifier), but also to terminate the video and pre-emphasis network in 75-ohms. If the attenuator is not needed a single 75-ohm resistor from the input to ground may of course be used. A single resistor is used at the circuit's output which is a.c. coupled to a conventional IC amplifier of the type often used in amateur projects these days.

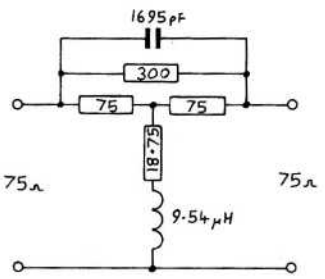


Fig.2 PRE-EMPHASIS NETWORK

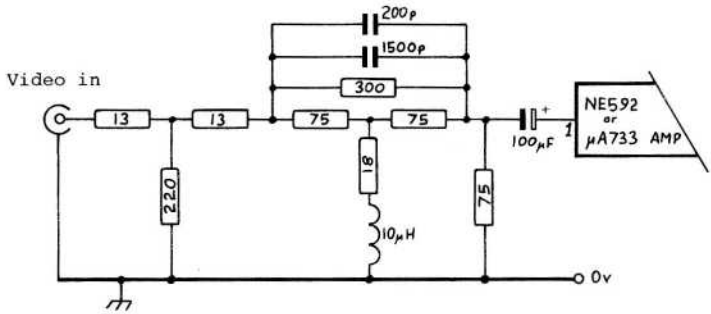


Fig.3 TYPICAL APPLICATION

If you already have an FM-TV transmitter and have either no pre-amphasis at all, or you suspect that your original circuit may not beto the required standard, then this circuit may be built separately and connected to the video input of your transmitter. If this is done you may find it necessary to increase the video level in order to overcome the losses through the new circuit.

Fig 4 shows a de-emphasis network - also to the CCIR standard, which is for use in a receiver. The circuit again shows the calculated values which, in a practical circuit, should be made-up as close as possible. Again the network is inserted in the receivers' baseband video path and correctly terminated in 75-ohms.

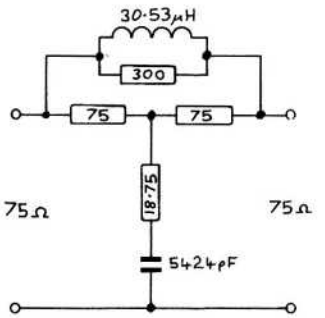


Fig.4 DE-EMPHASIS NETWORK

Some commercial equipment at present on the amateur market does not use the CCIR standard pre-emphasis circuitry. Indeed one or two pieces do not appear to use any emphasis at all so it is worth asking, when you intend making a purchase, whether or not the correct standard is included. If everyone demands such a standard and uses it properly the advantages will soon become apparent; and we shall all be on the same wavelength.

REFERENCE:

Recommendations and Reports of the CCIR. Volume IX - part 1. Geneva 1982

SYNCHRONISING MICRO'S AND VTR'S

By John Goode.

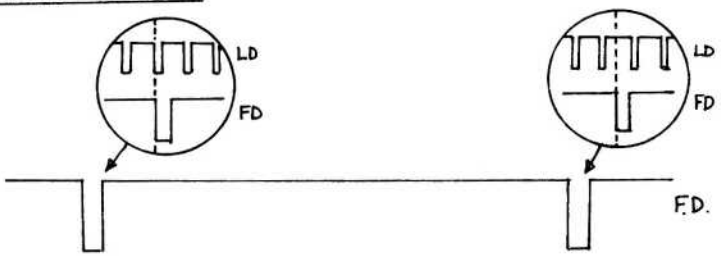
This article has been prompted by a letter I received from the Editor referring to the recurrent problem of using microcomputers and videotape recorders as picture sources in the shack. In it I shall attempt to spell out just what can and can't be done in the way of integrating these two sources with the other sources that may be available in an "average" amateur set-up. I shall assume that internal modification of the micro or VTR is not desirable, the user wishing to leave these expensive items in their standard state. For those of you with micros who are prepared to lift the lid and "have a go", I refer you to Andy Emmerson's excellent column in the April 1985 issue of R.& E.W.

MICROCOMPUTERS.

The first problem with the domestic type micro is getting a colour video output. Most are designed to interface to a colour receiver, and consequently provide a UHF rather than a baseband output. In the case of the BBC Micro a mono video output is provided, and fortunately it is very simple to modify this to give composite colour - this has been covered previously in CQTV. Of the other popular micros, I only have any experience of the Sinclair Spectrum, which has no video out. There are two approaches here - one is to pick off the video at the input to the modulator, and buffer it - how practical this is I cannot say as I do not own a Spectrum; - the other approach is to feed the UHF output to a domestic VTR, and then take the demodulated video from the VTR's video out socket. This way would obviously work for any micro that only offered an RF output.

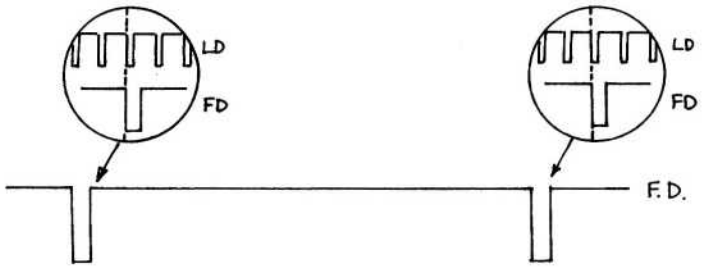
Having got a video output signal, we come to the thorny problem of scanning standards. As most of you will be aware, the European TV standard is 625 lines per picture, 25 pictures per second, each picture being composed of two INTERLACED 312.5 line fields. This is illustrated in Fig.1. Unfortunately, microcomputer video outputs do not always use this scanning standard - the Spectrum doesn't. The BBC normally does, although it is possible to turn the interlace off, and some software does this, as it can marginally reduce

FIG 1 2:1 INTERLACED SCANNING



vertical jitter on monitors. As for the other popular home computers, I just don't know. I think that the majority of them go for sequential, rather than interlaced scanning - this is a 312 line, 50Hz system. See Fig.2. It's even possible that some machines of U.S. origin may have 60Hz field-rates, although this is usually confined to up-market models that are supplied with built-in monitors. It's difficult to get information of this kind by ringing manufacturers or their agents - when I tried the chaps at the other end didn't seem to know what I was on about; they may have been brilliant at software, but as far as TV was concerned, they were clueless!

FIG 2. SEQUENTIAL SCANNING



We have established that with most home micros there is every chance that the scanning mode of the TV signal will be non-standard. So what? Well, as far as amateur tv goes, it probably won't matter at all, so long as you realise that you ARE radiating a non-standard signal. Nevertheless, let us look a bit more closely at the implications of this. It would seem to me that it would be an attractive thing to base the whole video set-up in a shack around the micro. Ideally this means synchronising the micro's output to the station SPG, but this is not possible without pretty extensive modification to the computer (see Andy Emmerson, R.& E.W. above). Supposing, then, we decide to lock the rest of the system to the micro video, by means of a genlock SPG. If you have a micro that has a 'funny' video output you will almost certainly find that it won't work! This is because most genlock SPGs achieve field lock by resetting the 625 count-down chain - if your micro has 624 or some other wierd number of lines per picture, the SPG will fail to field-lock.

Let's try another approach. Suppose we can construct a direct-locking unit, that does not use field-counters. This unit separates the sync from the micro output, and from it derives the six standard SPG pulses, together with a subcarrier locked to the micro's burst signal. If no connection is made between the line oscillator and the field-sync separator, (as in most TV receivers), this unit should lock to any signal it is fed with. Any apparatus within the shack that can be driven by SPG pulses and CSC could then be synchronised to the micro - albeit with the micro's scanning standard. However, because of the unit's universality, it would not be practical to generate equalising pulses and half-line serrations in the field sync - a single broad-pulse would have to suffice. (With a sequential or random scanning system half-line pulses would be meaningless, anyway).

Suppose then, that we have a 'funny' computer output driving our Universal Sync-Unit. What can be locked to it, and what can't? Well, as stated above, any unit that is pulse and subcarrier driven should be O.K. Test Cards, Pretty Colour Generators, Caption Colourisers - in a nutshell RGB sources that drive

PAL Encoders. Monochrome cameras usually only require line and field drives, and so shouldn't be a problem. However, if you are rich enough to own a genlockable colour-camera you will probably have trouble - the count-down problem again. VTRs are not synchronisable of course - more of this in the next section.

Summarising then, it seems that so long as the limitations of working with a micro that has wierd scanning are realised, a fair amount can be done towards integrating it with other sources in the shack. I am afraid, however, that the only way to be able to treat the micro like any other source is to modify it to genlock to standard 2:1 interlaced signals - even then it is only possible to mono genlock, and for colour working an RGB output must be fed to an external coder, as has been demonstrated with the BBC Micro. This may well be untenable with other popular machines.

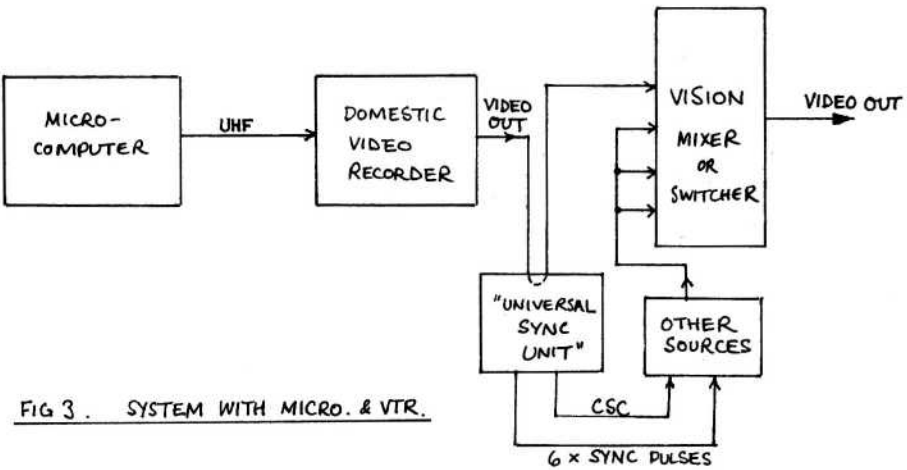


FIG 3. SYSTEM WITH MICRO. & VTR.

VIDEO TAPE RECORDERS.

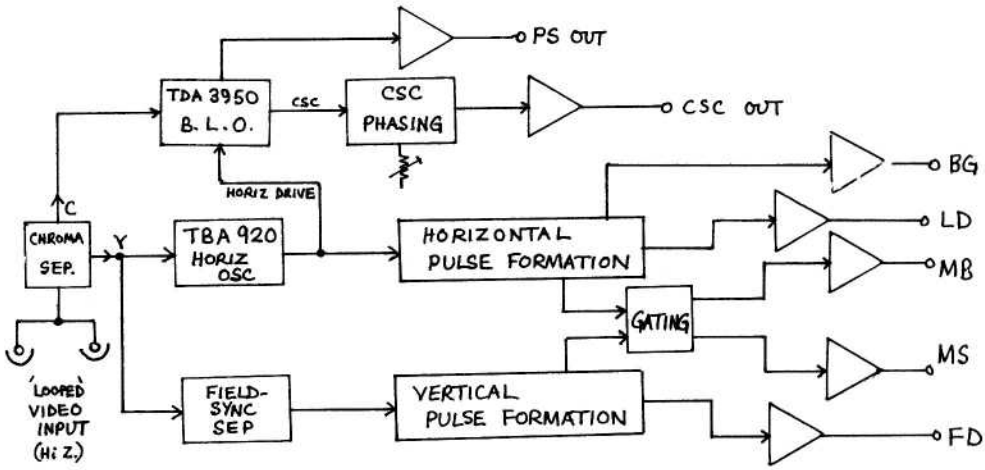
As I mentioned above, domestic VTRs are not capable of being synchronised to external sources. The kind of scanning a VTR gives depends on what was recorded, of course. A word of warning here - if you go up market, and try to record a non-standard signal on some U-Matic machines you may have trouble, as most of the current models have "framing" servos that look for odd and even fields in the incoming video - only 2:1 interlaced video has odd and even fields! However, you should be O.K. on most VHS and Beta machines (except the Panasonic Industrial Editing VTRs - they have "framing" servos).

A way of incorporating a domestic VTR and a micro-computer into a shack would be to make use of the suggestion made at the beginning of this article - making a virtue of necessity! I suggested using the tuner in the VTR to demodulate the UHF output of computers such as the Spectrum that have no video out. If the VTR video out is then used to feed the Universal Sync Unit, we

have a convenient method of locking the remainder of the system to either the micro or the VTR. When the tape is not running, the micro video is passed through; as soon as the tape is played, its output becomes the master source for the system. see Fig.3.

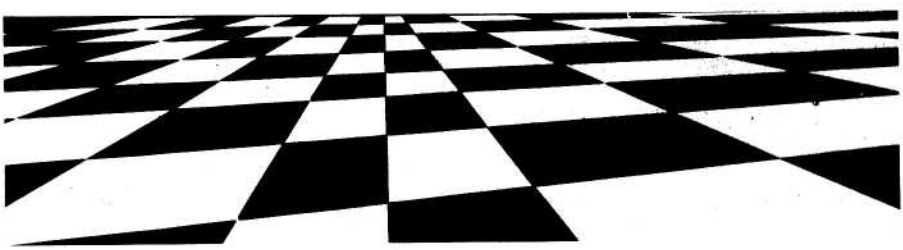
THE "UNIVERSAL SYNC UNIT"

So what of this "universal sync unit"? At the time of writing a circuit has been designed, based on designs that have been previously published in CQTV. However, a prototype has yet to be built and evaluated, as both the Editor and I feel it would be premature to publish an untried design. However, a block diagram of the unit is given in Fig.4, and as soon as is possible the full details will be published.



(NB:- THIS UNIT IS NOT AN SPG & WILL NOT FUNCTION WITHOUT A VIDEO INPUT).

FIG 4. "UNIVERSAL SYNC UNIT"



DBØDP TO DBØTT

By Trevor Brown G8CJS

As amateur TV repeaters evolve and improve many different design features become apparent. Last year I visited the German repeater DBODP at Bremen, the most outstanding feature of which was the use of four different receive aerials comprising short Yagis - all positioned at right-angles to each other. The repeater was then equipped with the necessary logic to scan each of the aerials in turn and select the one receiving the strongest signal. The difference that a short Yagi makes over an omni-directional aerial is something which we are all familiar with, the improvement being very worthwhile indeed and such a system may well be worth investigating over here.

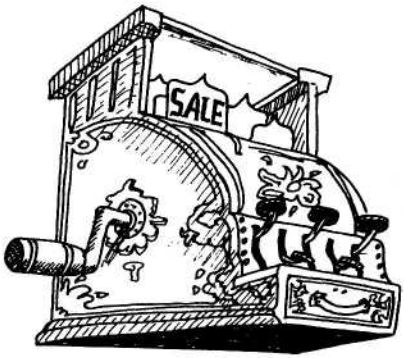
The use of omni-directional aerials for repeaters is probably a hang over from sound repeaters where the user is often on the move, this however is unlikely to be the case with ATV repeaters!

G8PTH (R) in DC6MR's SHACK - 1985

This year I visited Dortmund and spent a pleasant evening at DC6MR's shack watching his local ATV repeater in operation. This machine resides on a commercial communications tower and has just undergone a complete rebuild in order to condense it into a smaller space. Unlike the Bremen repeater this one uses omni-directional aerials. The output is on 432.45MHz AM with 5.5MHz inter-carrier sound, whilst the input is on 24cm. An AM receiver is tuned to 1252.5 and an FM receiver to 1275MHz, again both equipped for 5.5MHz sound. The logic was designed to operate on the "first come first served" principle - irrespective of the input used. The interesting point about this though is that, once a signal has accessed the repeater, it locks out any other signals trying to get in, BUT, this is only so for the vision signal. Both sound channels are mixed together to provide a single output allowing others to chip in with the odd comment. The system seemed to work very well and the technique was: wait until someone accesses the repeater and then fire up your own station on the other input and answer in sound, in this way duplex QSO's were possible - much better than PTT!

All the stations using the machine throughout the evening were P5 but at times the 1275MHz input suffered from radar interference, however QSO's could often be routed the other way round thus avoiding the problem. There were certainly plenty of stations on during my visit.

The evening was most pleasant and thanks are extended to my host Heinz Venhaus DC6MR for his kind hospitality.



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1/2" REEL TO REEL VTR (helical scan) plus miles of tape, goes well...£20. o.n.o.
Andy Smith G6LTZ Tel: 0908 562057

* SOLENT SCIENTIFIC 24cm FM TV receiver, 24cm in, video and audio out. Built to full spec for magazine review, with S-meter and tunable audio, smartly cased and lettered, aligned and tested by Solent. Sold at cost of parts only...£130. * FERRANTI ZNA134 SPG chip, new unused...£20 - save £££!
Please phone to confirm availability before sending money! Carriage extra.
Andy Emmerson G8PTH, Northampton (0604) 844130.

- WANTED & FREE -

SERVICE MANUALS for the following Sony equipment: Portable video recorder type DV-2400CE and portable video camera type VCK-2400ACE, also mains transformer for Solartron oscilloscope type CD1014.2. Would consider a scrap chassis if transformer is OK.
George Mayo G4EUF, "Carlton House", Broad Lane, Markfield, Leicester LE6 0TB. Tel: 0530 242378

INFORMATION on Prowest monitor type PM17-19A - colour. Your price paid. J.K Warrington G3JKW, 12 Granville Street, Peterborough, Cambs. Tel: 0733 53005

PAIR OF HEADS (vid60) for Sony CV2100ACE VTR. Aparently these are no longer available from Sony so does anyone have a set to sell please? P.C Martin G6OPP, 13 Sheriden Court, Temple Hill, Dartford, Kent DA1 5NF. Tel: 0322 79814

McMICHAEL televisions or radios wanted, (pre 1955 only) for company museum. Any information would be much appreciated. Servicing details for above are available free by contacting David Cochrane G8IHF, c/o McMichael Ltd., Wexham Road, Slough, SL2 5EL. Tel: 0753 27111 ext.99

SECAM COLOUR DECODER wanted for Rigonda. Also spare parts, prefer good working condition or new. Please forward details to: S.Tharian, 5 Harrington IV Avenue, Chetput, Madras - 600 031, INDIA

HELP. CIRCUITS, information, kits or modules wanted on payment for 2.5GHz Low Noise Amplifiers and down-converters, for satellite television reception from Insat 1B and Arabsat.
T.A Jilani, P.O.Box 717, Rawalpindi, Pakistan.

ANYONE with a Sony HVC series colour camera for sale? If so please phone Peter Delaney on 073 522 3121

BINATONE 12" B/W portable TV service sheet or information wanted. Short loan or whatever.
Doug Pitt, 1 Burnwood Drive, Wollaton, Nottingham Tel: 0602 282896

VIDEO MIXER/WIPING unit wanted. Good price offered, what have you?
J.Stadon G4TFN, 47 Stonesby Avenue, Leicester LE2 6TX Tel: 0533 832717

PHILIPS 1" scan coils for LDH01 or LDK-2 colour camera wanted; (these coils have a DIN connector). Also ICE BLOCK for same. Did I see a stand with these items on at the BATC show in May this year?
Dave Thomas, 26 Portland Road, Edgbaston, Birmingham B16 9HU Tel: 021 455 6829

REWIND MOTOR and gearing to fit a Philips N1500 video recorder, and workshop manual for same. Also INFORMATION and circuit diagrams for Cossor Oscillograph model 1039M.
Andy Durham G6OHM, 5 King Street, Wimblington, March, Cambridgeshire PE15 0QF
Tel: March 740660

FREE: Box of transformers for Pye Mk3 camera, must be collected by July 28th. Also quantity of 19" rack frames and misc. metalwork.
Brian Summers G8GQS, Tel: 0427 3940 Saturdays between 9 and 11pm. (Number not valid after July 28th).

16mm BELL & HOWELL (G.S.A.P.) gun camera (cine), auto-load, 50' Kodak magazine, 24v dc operation, die-cast case with black crackle finish - made for U.S.N. Bur. of Ordinance or A.S.A. Air Force. (American type only required), circa 1942/43, size 6" x 3" x 3", in any condition. ALSO REQUIRED American surplus 'N9' 16mm 100' and 200' coaxial load cine cameras, similar appearance to above.
John Sims, (Melksham) Tel: 0225 706795

MAINS TRANSFORMER with 240v primary for Marconi V6114 monitor. SONY HVS2000 effects generator urgently wanted. ANY ONE want to swap (with cash adjustment) a VHS or Beta portable VCR for a Pye 22VRZ0 2000 format portable with tuner and battery in as new condition?
Ray Hill G6TSL, 7 Willowbrook, Greytree, Ross-on-Wye, Herefordshire, HR9 7JS

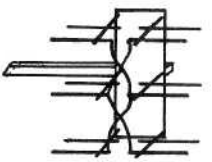
THE WORTHING AND DISTRICT VIDEO REPEATER GROUP PRESENTS

THE NEW ATV PROGRAM

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

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

THE WORTHING 24CMS AERIAL KIT

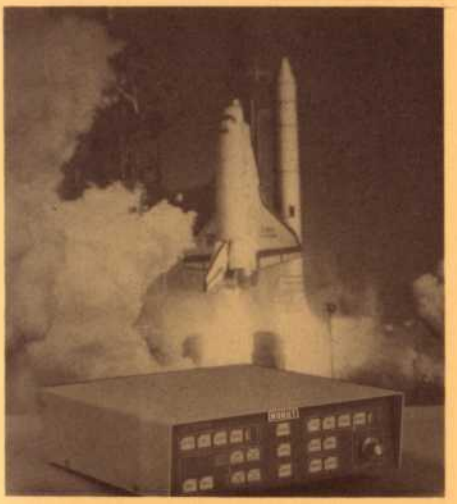


The Worthing aerial is now available in kit form, with the tricky bits pre-drilled and is the ideal aerial for ATV repeaters as it covers the whole of the 24cms band and has been used by the repeater Group members for over two years now and will be used on the repeater GB3VR when it moves to it's new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

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

If more details required please send a stamped addressed envelope.

SHUTTLE FLIGHT 51-F WILL BE TRANSMITTING ROBOT COLOUR SSTV



Will you be Receiving?

Fortunately Robot's sensational Single Frame Multiplexed Component Colour System is black and white compatible so all SSTV stations will be able to copy the transmissions. Of course to receive them at their world beating best you will need a Robot Colour Converter. Why not send us a s.a.e., or just a stamp, for full details of the new Robot '450C' and '1200C' (Shuttle) Colour Converters, Robot Colour Conversion for the '400' and our second-hand list.

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The professional approach for the amateur

Horizontal Picture Crispener & Video Distribution Amplifier
Type HPC-82

The Electrocraft Picture Crispener is a professional approach to provide a compact, low-cost picture detail enhancer giving sharper PAL video pictures from Off-Air, Cameras, Video Tape Recorders etc. The Unit is particularly useful for "U-Matic" VCR's, both Low-Band and High-Band (BVU, HBU.)

Dynamic Noise Reducer
Type DNR-81

The Electrocraft Dynamic Noise Reducer is designed basically for use with Video Tape Recorders to improve the quality of sound on playback, but is suitable for any audio system requiring a reduction of background noise.

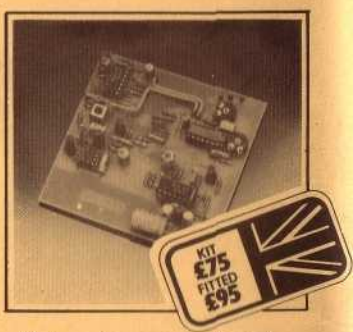
For example, the unit has been used on outside broadcast operations to reduce the level of wind noise and other background noises before recording. An ideal noise reducing unit for "U-Matic, VHC, Betamax, etc, VTRS.

Compact Vision Mixers
Type VMC-81

The Electrocraft compact mixer VMC-81 is a professional approach to providing a versatile mixer for the small 2 camera television unit such as the home user, amateur theatre groups, compact educational unit and so on.

Gen-Lock PCB for BBC Computer
Type 284

The Electrocraft PCB Type 284 has been designed to synchronise the circuits of the BBC Computer to an external reference signal, which can be of either Mixed Syncs or Composite Video. The PCB is mounted inside the computer,



with the minimum number of connections to the computer PCB and without the need to cut PCB Tracks. The power supply requirement taken from the computer's own circuitry requires only 30mA from the ±5V. rails, so does not inhibit the use of computer peripherals.

Send for details:

ELECTROCRAFT

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