

# CQ ~ TV

No 111

August 1980



The Journal of the British Amateur Television Club

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### WHO TO WRITE TO

Subscriptions and changes of address should be sent to the Treasurer.

Membership enquiries should be sent to the Membership Secretary.

Advertisements and articles for CQ-TV should be sent to the Editor.

Orders for books & magazines should be sent to B.A.T.C. Publications.

Orders for equipment & components to Club Sales.

Please address your letters to the most suitable Club Official, also please enclose a stamped addressed envelope for any reply.

# EDITORIAL

You will by now be aware that Andy Hughes has unfortunately had to resign as editor of CQ-TV due to the pressure of other commitments, this has meant that temporary editors have had to step in to fill the gap and to produce issues 110 and 111.

The committee would like to apologise for the late despatch and printing quality of CQ-TV 110, this was unavoidable under the circumstances since emergency procedures had to be adopted.

Fortunately, John Wood G3YQC has offered to take on the job of editor and his first issue will be 112. It is hoped to catch up on publication dates soon and to revert to the usual issue times.

John is of course anxious to obtain material for inclusion in future magazines, full scale articles, ideas, reports, reviews, photographs etc. will be most welcome.

Please address all mail to his new QTH at; 47 Crick Road, Hillmorton, Rugby. CV21 4DU.

Closing date for the December issue is October 1st and for the February issue December 1st.

*Editor*

*Mike Crompton G5DLX*



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# B.A.T.C. CONVENTION 1980

October 5th at the Post House Hotel

## LEICESTER

*Organiser*

*Mike Cox G8HUA*

- 10 am Convention opens  
11 am AGM Start - Wolsey Room  
12.30 AGM Finishes (Lunch)

2.00 Wyggeston Room

Members exhibition of Gear  
G8GQS/OB Van in Car Park  
On air ATV Demo(s)  
Free flea market  
subject to B.A.T.C. rules.  
Teletext/Prestel Demo.

Wolsey Room

TAPE SHOWS

Various video tapes of A.T.V.  
Interest and Activity.

5.00 Convention close.

Members are invited to bring equipment to exhibit.

Persons attending the Exhibition and wishing to use hotel accommodation may qualify for special rates, mention B.A.T.C. Convention when booking.

Only fully paid up members of the club will be allowed to participate in the General Meeting.

If you wish to place a topic on the Agenda, please send it in writing to reach the Chairman by 20th September. Notification in this way does not necessarily mean that the item will be included, but every effort will be made to so so.

The proposed Agenda is:

1. Apologies for absence
2. Treasurer's Report and adoption of the Accounts for 1978 and 1979
3. Treasurer's Report on the current year to date
4. Any other business relevant to the retiring Committee
5. Election of Committee members
6. Announcement of the members of the new Committee
7. Any other business.

The Committee would welcome nominations for other members who are prepared to help in the work of running the Club. If you wish to nominate a member to serve on the new Committee, please send his name and address, together with your own, to the Chairman. Make sure that the member you nominate is willing to stand.

#### HOW TO FIND THE POST HOUSE

The Post House Hotel, Leicester, is located at the junction of Norborough Road (A46) and Braunstone Lane East (B5418).

#### BY ROAD

If travelling on the Motorway M1 - leave at junction 21 and follow the signs for "city centre" which is a dual carriageway. The Post House is approximately 1 mile along this road on your right at the junction with the B5418 S.P. Aylestone. There are traffic lights at this junction and you should turn right to gain access to the Post House. If travelling from other directions when in the city centre follow signs for A46 Coventry and M1, these will take you along the Narborough Road when the Post House will be on your left at the junction with the B5418 as above.

#### BY TRAIN

Bus service number 52 leaves the city centre at 8 and 38 minutes past the hour, this takes approximately 15 minutes to reach the Post House.

Return buses leave the Post House at 26 and 56 minutes past the hour for the city centre.

The map shows the location of the London Road Station and the bus pick up points.

# City Centre Bus Stops



# Main Roads



## A GUIDE TO AMATEUR TELEVISION

The Club has now sold out of the above publication.

A new Handbook is being prepared and details will be released as soon as available



COMMITTEE MEETING HELD AT RUGBY SPORTS CENTRE 15.6.80

1. COMMITTEE PRESENT. Mr. Reid (Chairman), Mr. Crampton, Mr. Elmer, Mr. Pawson, Mr. Summers, Mr. Shirville, Mr. Brown.
2. MINUTES OF LAST MEETING 2.3.80. The minutes of the meeting were taken as read
3. MATTERS ARISING. Mr. Crampton informed the committee that all promised information for the Club's Information Sheet is required within the next month.  
Mr. Reid informed the committee that the signature problems on Club cheques is now cleared up with the aid of the previous meetings minutes and a now available Club Constitution. Computer addressing of CQ-TV was discussed but thought inviable but to be left on the agenda for review at a later date. The committee also heard from Mr. Lawton that addressograph have been used to clear the back log of work and that plates are now up to date.
4. FINANCIAL COMMENTS. Mr. Reid provided a cash statement from Mr. Rix which was circulated and approved. The complimentary CQ-TV list was also reviewed by the committee as per Mr. Rix's request. Mr. Crampton asked for finance to print the information sheet.
5. EDITORS COMMENTS. Mr. Crampton relayed an offer to help from Mr. Wood (our "off air" correspondent) to edit CQ-TV. This offer was gratefully accepted. Mr. Elmer informed the committee CQ-TV 110 would be out by the end of the month.
6. REPORTS ON VHF CONVENTION ALEXANDRA PALACE AND STONELEIGH. Mr. Crampton reported low takings from VHF Convention but Alexandra Palace had a reasonable return. The committee also discussed the forthcoming Stoneleigh Town and Country Festival and Mr. Brown's video walkabout demonstration and a letter from Bob Nash was read. Mr. Brown will answer all the incurred technical queries.  
The Club will have a stand at the forthcoming ARRA Exhibition at Granby Halls, Leicester.
7. CONTEST NEWS. Mr. Shirville relayed the results of the joint B.A.T.C. Radio Ref and AGAF activity contest and passed around some very impressive looking certificates. Next ATV contest 13th 14th September 1980.
8. 1980 CONVENTION. This will be on the 5th October at the Post House Leicester. To include the G8GQS scanner, an off air demonstration, Prestel demo, a flea market and various video tapes will be shown.
9. COMMITTEE FOR 1980/82 Committee members who need to stand for re-election or election in order to continue; Mr. Reid, Mr. Rix, Mr. Hughes, Mr. Lawton, Mr. Dixon, Mr. Elmer, Mr. Lawrence, Mr. Cox, Mr. Sparrow, Mr. Pawson.
10. PAPERS FOR I.A.R.U. Mr. Shirville to do a draft paper for Mr. Brown and Mr. Crampton to add comments to in defense of our use of the 70cm band.
11. NEW HANDBOOK Mr. Brown brought the committee up to date on the books progress and expenditure and showed samples of the PC boards designed and outlined all the articles. Mr. Brown also informed the committee of Mr. Wood's increasing roll and asked for him to be included in the circulation list of committee minutes. The print order was set at about 2 - 3 thousand copies.
12. VIDEO TAPE Mr. Brown reported on the current state of the video tape to send to Australia which is hoped to be completed before the 1980 convention.

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 \* TV ON THE AIR. by John L. Wood. G3YQC \*  
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In a recent column I reported that I had ordered a PC Electronics ATV transmitter and 10W linear amplifier. It duly arrived and has been in use now for about three months.

Delivery took about seven weeks, payment was made with a Mastercharge (Access) card and I had to pay £20.17p to the postman to cover import duty and VAT.

When the units were unpacked they were in good order apart from one ceramic trimmer which was cracked. I had already purchased the required 109 MHz crystal (HC25/U type). I installed the two units into a small metal box after first removing the video gain and bias pre-sets and substituting panel mounted controls, the transmitter was aligned according to the instructions and produced 11 Watts of carrier. When video was applied the power meter reading dropped to about 5 Watts indicating good modulation depth.

Results on the air are very good indeed, not once have I had a complaint of poor locking even with very weak signals. Colour bars have been transmitted successfully showing the adequate bandwidth. As a guide it is generally reported that signals with this transmitter show little detectable difference in strength to those received from my QQVO3/20A rig and the resolution and modulation depth are noticeably improved.

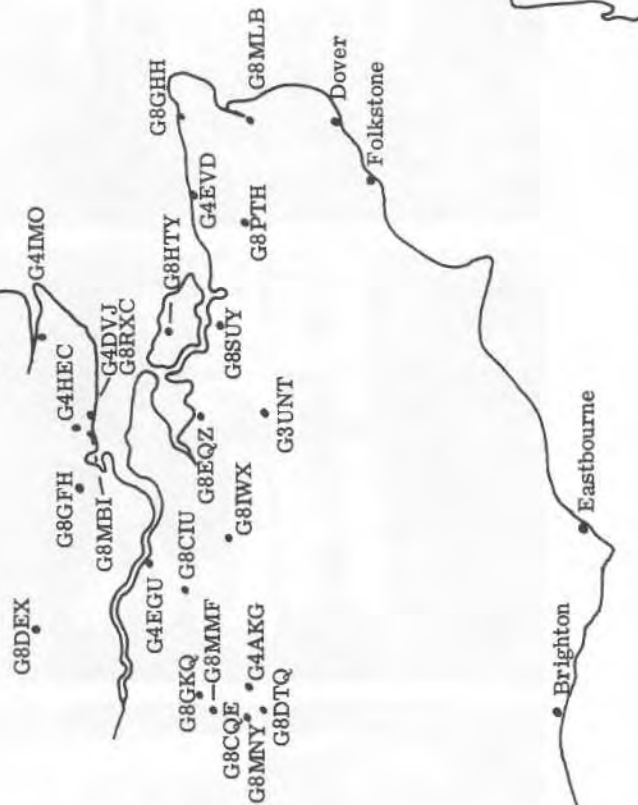
I am very pleased with the rig and consider it good value for money.

Details may be obtained from; Andrew Emmerson, G8PTH, Blean Video Systems, 4 Mount Pleasant, Blean Common, Canterbury, Kent. CT2 9EU enclosing a large SAE.

Speaking of G8PTH Andy observed an unexpected opening on May 16th, It had been hot during the day but with a fair breeze and no pressure drop. Around 1630 Hours G4IMO in Essex was able to work a couple of French and Belgian stations. Although Dutch broadcast TV transmissions were well up 70cm appeared flat until about 2200 Hours when a Dutch amateur TV station was first noticed. From then on conditions improved progressively until 0130 Hours the next morning when the last Dutch station was almost broadcast quality, G8PTH together with G8MBI, G8EQZ and G8SUY formed a sort of net and worked PE1BSJ in Amsterdam, PAØHLA and PAØJBB both in the Hague. Andy thinks there was probably some ducting since there was no trace of ON, F or G DX stations. Two meters apparently had no such opening. For those in the south east Andy has sent a map showing the distribution of some active ATV transmitting stations in his area.

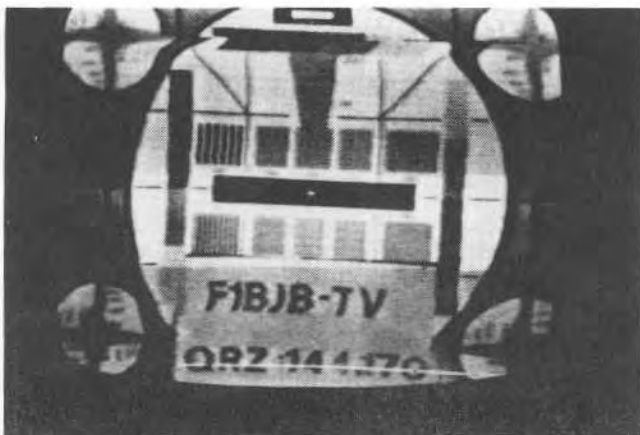


G8DEX Chigwell  
 G8GKQ Penge  
 G8GFH Basildon  
 G4IMO Canewdon  
 G8GHH Westgate  
 G8MMF Selhurst  
 G4EGU Erith  
 G4DVJ Westcliff  
 G8RXC "  
 G4EVD Herne Bay  
 G8MBI Hadleigh  
 G8HTY Minster  
 G8MLB Sandwich  
 G8CQI Shirley  
 G8CIU Sidcup  
 G4AKG Addington  
 G8EQZ Rainham  
 G8SUY Teynham  
 G8PTH Canterbury  
 G8MNY South Croydon  
 G8DTQ Caterham  
 G8IWX West Kingsdown  
 G3UNT Maidstone



SOME ACTIVE TV STATIONS IN THE SOUTH EAST.

Pictures received  
from stations worked  
by G4CRJ during the  
November 1979  
opening.



G3PTU as received  
by R.J. Muntiewerff  
in Holland.



The photos show just two of the stations worked during last November's opening by G4CRJ (Middlesex). Belgian stations were also worked. The stronger contacts were recorded on video tape and in the case of F1BJB the 5.5 MHz inter-carrier sound was also received using a converter and an AR88. The receiving system at G4CRJ is an 88 element Multibeam with a BFR34A microstrip pre-amp into a Thorn dual standard TV using the 850 chassis. The QTH is 200ft asl.

The photo of G3PTU's caption was taken during the November opening in Holland by R.J. Muntiewerff, the original is almost noise free. The photo shows the G3PTU electronic caption generator (CQ-TV 109) superimposed over a live camera source.

A touch of despondency now from G3PTD (Urmston, Manchester) who says "Over the last few years the ATV activity in the Manchester area has dropped off until it has become practically non-existent, I frequently tune the band and occasionally radiate some vision just in case someone may be viewing, but there is never any result". Tony made a point of operating during the BATC activity week in February but despite spending much time on the band nothing at all was worked.

My advice to Tony and others in a similar position is not to give up, just 'hang on in there' (to quote an Americanism), the main thing to do is to advertise yourself, mention your ATV activity to everyone you work in your locality, there will usually be someone who will be interested enough to at least set up a receiving station even if you have to loan them a spare 1043 tuner. Once you have found one station you can make sure that television is heard regularly by working him as often as possible, hopefully before long others will be eavesdropping and wonder what it's all about and may even consider it worth getting going themselves.

G8MAF (Bowes Park, London) has until now been strictly SSTV but has recently become interested in fast scan television. He has acquired an ELC1043 tuner and should be receiving 70cm by now. I'm sure Tom would like to hear from any other TVers in his area.

G8VBC (Nr. Derby) transmitted vision over a 50Km path to G5KS (south Birmingham) on the 17th April using just 100mW output, reception report was 3, not bad eh? Who said you need lots of Watts? I'll admit though that G8VBC is in a pretty good location.

By the time this issue is published I hope to have moved QTH so please note the new address at the end of this column.

Finally, starting with the next issue I shall be the new Editor of CQ-TV magazine and won't have time to continue with this column. I am therefore looking for someone to take over, it doesn't take long to write and there are only four per year so if anyone would like to try their hand I should be very glad to hear from them.

TV on the Air, 47 Crick Road, Hillmorton, Rugby. CV21 4DU. Warks.

# CONTEST NEWS

*Contest Organiser*

*Graham Shirville G3VZV*

Not too much to report for this issue but you will find the official rules for the International ATV contest printed below. Not many changes from previous but please note that multi-operator stations may only use one call sign - for reasons which will be quite obvious !!

The slow scan contest last year was somewhat poorly supported so it has been decided as an experiment to make it a 2 metre only contest for this year with the more usual points for kilometre scoring. I hope that this will encourage greater activity all round as I would then perhaps be encouraged to organise an H.F. event early next year.

73's

GRAHAM SHIRVILLE G3VZV

## BATC VHF SLOW SCAN CONTEST

- DATE: 23/24 November 1980  
BANDS: 144.00 MHZ and via any OSCAR satellite  
TIMES: 19.00 to 23.00 GMT Saturday  
09.00 to 13.00 GMT Sunday  
SECTIONS: A - Stations both transmitting and receiving SSTV  
B - Stations only logging SSTV signals
- CONTEST EXCHANGES: Shall consist of the callsign signal report (RST) serial number QRA locator, (of these the last three shall be exchanged in video only)  
Serial numbers will commence at 001 and advance by 1 for each QSO.  
Only one contact with each station will count for points
- SCORING: 144 MHZ - One point per kilometre  
OSCAR - 300 points
- CONTEST LOG: Must give - date, time, callsign, report serial no, and QRA received and transmitted, together with points claimed.
- GENERAL: Please include brief station description and full postal address. Stations may operate from only one location.
- ENTRIES: Postmarked not later than December 8th 1980 to:-  
G. SHIRVILLE G3VZV  
18, CHURCH END,  
MILTON BRYAN,  
MILTON KEYNES,  
BUCKINGHAMSHIRE MK17 9HR

## 1980 INTERNATIONAL ATV CONTEST

Contest period: 13-14th September 1980 18.00 Saturday to 12.00 Sunday (GMT).

### SECTION A: TRANSMIT/RECEIVE-STATIONS

#### SCORING

Logs have to be entered per band operated

- A) Two-way QSO on 70 cm: 2 points/km
- B) Two-way QSO on 23 cm: 8 points/km
- C) Two-way QSO on 3 cm: 16 points/km

Multi-op-stations may only use one call

Crossband-QSO's must be entered in the log for the transmit band  
QSO's via repeaters do not count

#### EXCHANGES

The following data is to be exchanged

1. Code-group, which consists of four digits, individually chosen  
by each entrant, i.e. 1865 or 9732. The code group must be exchanged  
in video only.
2. Call, QTH-Locator, report, serial number starting at 001 this data  
is to be exchanged via video and, if necessary, via phone.

Should one of the stations fail in receiving the picture of the other,  
the scores of both stations are to be halved.

144.75, 144.80 and 144.17 MHZ are well-known ATV calling-channels in Europe.  
Please QSY from these frequencies as soon as a QSO is established.

### SECTION B: RECEIVE ONLY STATIONS.

For SWL's the same rules as above are applied

Entrants of section B may not "give" points to stations working in section A !

LOGS: Must include postal address, locator, and station details and be mailed  
not later than September 30th to:-

G. SHIRVILLE G3VZV  
18, CHURCH END,  
MILTON BRYAN,  
MILTON KEYNES,  
BUCKINGHAMSHIRE MK17 9HR.

# Computer SSTV

*By Grant Dixon G8CGX*

Having built a Triton computer complete with L5.1 monitor and Tiny Basic the next question was how to use it for SSTV purposes. The first thing that came to mind was a keyboard for SSTV and I was most grateful to Martin G3QQD who had taken the 6800 programme of K6AEP and re written it for the 8080/8085 with a modified version of the character generator. As my Triton had a rather different memory configuration I took Martin's programme and altered all the jumps and addresses to fit the Triton and soon had a programme which produced 5 lines of 6 letters on the TV screen and would store 6 pages of text. The programme output was in the form of video and sync and a small VCO interface board was constructed to give true SSTV output for transmission in the usual way.

The display on the monitor showed a line of figures 1 - 5 spaced out, and when a page was entered the first letter of a line on the SSTV screen came under the figure; 1 for the first line, 2 for the second line etc. But when a page was entered there was no way of knowing what was on the page without displaying it on the SSTV screen. Accordingly a small "LAYOUT" sub routine was written which printed all the pages side by side on the VDU screen and then invited you to retype any page of your choosing. If no alteration was needed the computer was used to compile a programme of pages to be sent 1/1, 2/4, 1/3 etc indicates 1 frame of the first page, 2 frames of the fourth page, 1 frame of the third page etc. Up to 9 frames of any page can be sent and as there are 6 pages this could mean 54 frames, which is quite a long SSTV programme.

Having used this programme once or twice it soon became obvious that a lot of English words exceed 6 letters in length and it would be better to have more letters to the line. The original programme constructed it's letters from "Pixels" which were 3 lines in height and a similar amount in width. By reducing this to 2 lines in height a 50% increase in data can be obtained each direction. In actual fact I found that a small amount of alterations to the programme gave a very satisfactory display of 7 lines each with ten letters. The "layout" sub routine needed considerable alteration and the programme was adjusted so that when ever a page was typed it appeared on the VDU screen as 7 lines of 10 letters exactly as it would be seen on the SSTV monitor. This programme gave a very much better result over the air provided that there was reasonable good reception but I am sure that for DX working with plenty of noise and QRM the larger letters of the original programme would be preferable.

The main snag came when attempts were made to use the programme in a QSO - trying to type a full page (or pages) whilst listening to the other chap, who then hands the transmission over to you when you are in the middle of a page, is difficult. Even more so when you make a typing error and have to go back to the beginning to get the page corrected. The programme is ideal for assembling a series of standard pages and transmitting a short programme but it is not good for conversational interchange.

Hence the third programme which adopts a different technique - it has two buffers each of which is one page long. The first buffer is one which is loaded by the operator and the second buffer is one which is actually used by the computer for transmission as SSTV. Those buffers are seen on the VDU and are displayed by a process known as "memory mapping" which means that any change in the buffers is immediately visible to the operator.



The transfer from "load" to "transmit" buffer occurs during the SSTV frame sync pulse when "\$" is keyed in by the operator. A further improvement was effected by introducing a backspace facility which eases the problem of correcting typing errors (all too numerous in my case !). With this programme SSTV is generated all the time the programme is running and the page being transmitted is shown on the VDU under the heading "TRANSMIT PAGE"; the operator has an area under the title "LOAD PAGE" into which he can type one page of text - when this is filled he types "\$" and holds it down until the page is transferred to the transmit side, and the LOAD area is cleared. From the operators point of view this is a much easier programme to use and it is a distinct advantage to have SSTV being transmitted all the time.

The next innovation was inspired by those bands of moving text which are sometimes to be seen in city centres giving the latest news. There is really no need to use all the 128 lines of SSTV and a vertical scan of 12 lines or so will give a line of text in a short period of time. Accordingly a programme was written which displayed a single row of 16 letters having a "pixel" size of 1 line (i.e. half the height of the previous ones). A buffer was established in computer memory into which text could be typed and the first 16 letters of this buffer are transmitted as SSTV - but, at each vertical scan the letters are shifted one space to the left and new text appears from the right. It soon became apparent that with a normal 5FP7 tube the phosphorescence had not decayed enough between scans and the letters were somewhat blurred unless the text was stationary; in addition the small size of the letters meant that they were not always accurately drawn due to slight variations in the line sync, so the programme was modified to give the larger letters used previously and a compromise line length of 12 letters was used. With the larger letters the scanning time is increased and hence the rate of text movement was reduced. The display on the VDU shows a line of text with arrows showing the length of the transmit buffer - all text to the right of this has been typed in and is available for transmission a pointer shows the current cursor position. When the cursor pointer reaches the right hand end of the transmit buffer all movement stops and the last 12 letters of the text remain stationary on the screen. For obvious reasons I have called this programme "LINEWRITER".

Now I have said a lot in the past about not sending text via SSTV as this medium is ideal for pictorial information and any text can be sent by teleprinters or speech. So I really must justify myself by saying that it was my intention all along to marry the text and picture and all the keyboard programmes mentioned previously were merely a way of gaining experience with the computer. It is worth mentioning at this stage that all programming was done in assembly language and not in Basic as the latter is not fast enough and does not lend itself to the "bit manipulation" which is needed.

So the next stage was to couple up "Triton" to the DL2RZ scan converter. First of all an interface board was built to enable the scan converter to output line and sync information and 4 bit video information to the computer - also to accept 4 bit video and a control bit from the computer. See CQ/TV no. 110

A board carrying an input and output port (two 8212's) was also added to the computer to cope with the signals.

When in operation and running a programme, the computer is now a slave to the fast scan camera whose frame pulses control the SSTV line and frame pulses by division.

The first programme using this set-up was designed to place a single line of text (12 letters) across an existing SSTV picture generated by the camera - this line to be locatable anywhere in the vertical direction. Part of the programme from LINEWRITER was used to generate the text and the programme was written so that the letters would be either white or black and the background could either be grey or picture. The VDU shows a buffer space of 12 units and also a space for "G or P" and a space for "B or W" so that the correct display can be selected. To display a title "@" is typed during the vertical retrace period and the title appears on the next frame. To cancel the title the buffer is filled with spaces and "P" and "B" are selected; on entry this will restore the picture. As it stands at the moment in order to alter the position of the title in the vertical direction it is necessary to stop the programme and change the initialisation figure for one of the counters but this could easily be built into the programme so that it is more easily accessed by the keyboard. The present programme puts a title across the top of the picture.

The final programme or perhaps I should say the most recent one, manipulates the video data of an incoming picture and places a half sized picture in the top right hand side of the picture which is being sent. As this half sized picture is in the computer memory it is possible to store, for example, a picture of the operator and call it up into the top right hand quarter of the frame whenever it is required. It can be stored, along with the programme, on cassette tape so that whenever the programme is loaded the picture is instantly available. Details are as follows, the 4 bit video data of the first pixel is loaded into the accumulator, shifted 4 places to the left and stored in a temporary store (register B); after a suitable delay, the data for the next pixel is loaded into the accumulator and the contents of register B are added to it - the result is then stored in the first memory location. Thus each byte (8 bits) of memory stores 2 pixels. By using 64 pixels to the line and loading alternate lines we have  $64 \times 64 \times 4$  bits to be stored; dividing by 8 gives us a picture store of 2648 bytes i.e. 2k bytes. As the Triton has, without any extensions, 2½k bytes of user RAM this means that the programme must fit into ½k and this can easily be done. As far as the operator is concerned once the programme is running he has to type L for loading a picture, D to display the picture and C to cancel it. Loading or displaying always starts at the next vertical retrace period and cancellation can only be accepted during the lower half of the scan. Thus a typical sequence is as follows - type L for loading; VDU displays "loading" and waits for next frame; loading occurs during this next full frame and at the end VDU displays "picture loaded"; typing D causes VDU to show "displaying" the picture will not appear until start of next frame; during a subsequent frame if C is typed after the small picture has been displayed then it is cancelled and will not appear in the next and subsequent frames and the programme is ready for loading or redisplaying.

Clearly the whole process could be expanded and four such pictures could be loaded into 8k bytes of memory with keyboard control of destination of each picture. The SSTV screen would then display 4 small pictures, one in each quarter.

By now you must surely be asking "where can one get one of these marvellous computers and why hasn't he given us the programmes in CQ/TV ?".

The answer is rather complex the Triton is sold by Transam limited who advertise in the computer magazines but it should be pointed out that it is not the only computer available to the hobbyist and there are others which may be more suitable, in the long run, to your requirements. My particular version of Triton is running with a non-standard 8.1 Mhz crystal and all the timing of the programmes would have to be altered if other crystals were used. In addition, the Triton uses an 8080 processor and it has it's own particular memory layout and monitor programme; thus it is not possible to make a tape of a Triton programme and play it back into any other computer. If you have a computer which uses an 8080, or a Z80, and has a memory mapped VDU between 1000 and 13FF then it may be possible to modify a programme listing to make it run on your system. If you have a Triton L5.1 then I can supply a tape to run on your machine.

If you are interested please write to me quoting the programme in which you are interested.

1. SSTV KBRD
2. SSTV KBRD2
3. SSTV KBRD3
4. LINEWRITER 4 (no's. 1 to 3 were experimental !)
5. SSTV TITLER
6. QUARTER PIX

C. Grant Dixon,  
Kyrles Cross,  
Peterstow,  
Ross on Wye,  
HEREFORDSHIRE.



Program 1



Program 5



Program 6

# Project 100

*By Tom Mitchell G3LWX*

For the benefit of all those members who have been wondering what has been holding up project 100, I had better explain that the temporary change of work location referred to back in CQTV 105 became permanent, with the result that I had to move QTH out of London just under a year ago !

As a consequence of these changes I have had little time for any aspect of Amateur Radio, P100 has had priority however several circuits have been investigated and at long last I am finding time to get down to designing boards - not one of my favourite pastimes at the best of times.

One of the problems has always been to decide what goes on each board in order to provide the most flexibility, after all I doubt if any two amateurs would require exactly the same combination of items in their stations.

Some members will no doubt require full broadcast specification whilst others will be satisfied with less, both must be catered for without excessive redundancy or unwanted expense.

A typical example might be considered in providing full specification output pulses, this cannot be done without the provision of filters and a negative power rail to give 0 to -2V pulses. Whilst such a board would be of interest to some members it is probably best designed by one of those who may need it, for a specific application. I would like such an item but in my own case would give it a low priority. The designer of such an item would however be unhappy if he had to purchase a board containing little more than six emitter followers or line drivers if for example it contained a couple of I/C's required to reset the VAS in agreement with a remote colour source in Genlock mode.

Some degree of compromise is required and I have decided that the colour Genlock system, IC Sync Pulse Separator, Burst Lock Oscillator and VAS comparison system are probably best provided on a separate board for three reasons

- A) The BLO will require more than +5 volts.
- B) Genlock and 25 Hz offset are not required at the same time
- C) You may not require Genlock.

This brings us back to the question of what is the logical thing to provide on the space remaining on the 25Hz offset board. On reflection it would appear that the offset generator is best complimented by a source of subcarrier, especially as not all those that have built the SPG require the pattern board as well.

In order to stay within the +5V supply constraint the oscillator will be based on that in the pattern board which is of reasonable stability, but provision will be made for locking this oscillator to

- A) An external source (of higher stability)
- B) The output of the Colour Genlock Board

Development work is already under way but as this goes to press the final circuit has yet to be established.

In an attempt to show that I have at least got something to offer those who have been waiting I am giving two circuits of amazing simplicity. They both work, although component values may change before they are finally incorporated in project boards.

#### A. RESETTING VAS IN GENLOCK MODE

Once the SPG is monochrome Genlocked to incoming video i.e. by comparison with incoming syncs (a two field sequence to account for odd and even fields) it is necessary to check and reset the VAS or Pal Ident waveform (which is a fair field sequence) by comparison with the information given by the burst on the incoming video.

There are several ways in which the necessary information can be derived. If we were only concerned with locking to sources with true Bruch Blanking, it would be possible to reset the sequence by simply detecting the field (field 3) in which burst is transmitted closest to the field sync group by the simple process of amplifying, rectifying and gating the first burst with a monostable or counter triggered by field syncs, this would provide a short reset pulse every four fields.

Unfortunately since much non broadcast PAL gear dispenses with Bruch blanking the above system falls down, one could find oneself either never resetting in which case we would have a 50/50 chance of being correct, or resetting on every field which would be rather disconcerting.

The most practical method is to use the information given by the swinging burst, by looking at the  $\frac{1}{2}$  output wave form produced by a TV type BL0 chip used also as the source of subcarrier in the Genlock mode. Before we use this  $\frac{1}{2}$  wave form to reset our SPG there are two points to consider.

- A. It may be the wrong way up either because it is inverted out of the chip or because there are international differences in which way up it is specified for distribution at the studio end.
- B. If external VAF is directly applied to the VAF reset, the reset would override the SPG timing circuits and VAS timing would be independent of SPG line phase - not a very desirable state of affairs.

The circuit given below has been built and tested. If you wish to try it the IC can be mounted Piggy-back on top of one of those on the SPG (I suggest ICI). Since the line phase range has been restricted to a little less than  $\pm \frac{1}{2}$  line to avoid field genlock problems. The circuit samples the external VAS for a short period in mid line and generates a narrow reset pulse on alternate lines resetting the SPG if necessary.

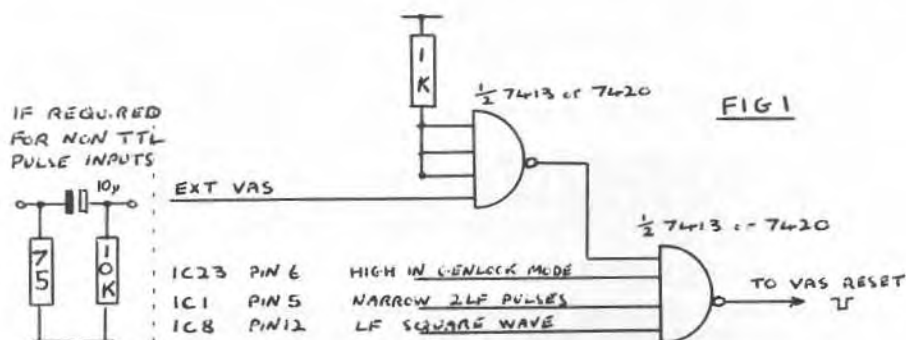


FIG 1

PROVISION OF EXTERNAL VAS RESET IN GENLOCK MODE

B LOCKING THE PATTERN BOARD TO EXTERNAL SUBCARRIER

This is almost too good to be true, during investigations into methods of either using a common oscillator or locking the subcarrier and SPG boards together I came up with a phase lock system that was so simple that I hope to include it later in a revised version of the pattern board.

Once again it can be implemented by mounting a single I/C Piggy-back on existing boards.

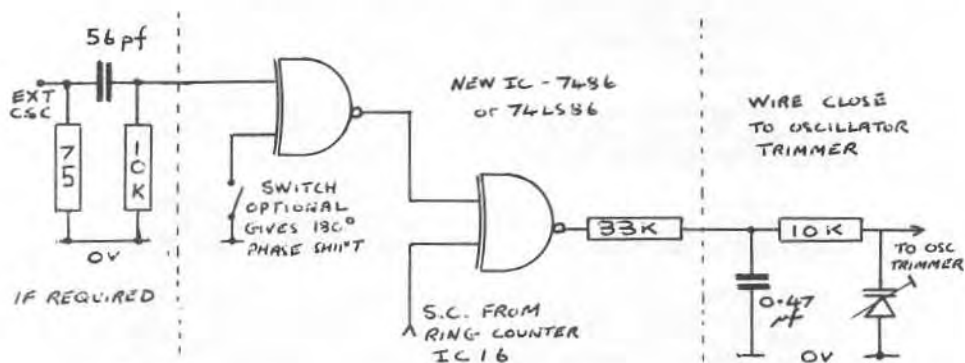


FIG 2

LOCKING CPG TO STATION SUBCARRIER



I mounted the new IC on top of the ring counter IC16 which has four quadrature S/C feeds available on it's output pins and as a final bonus I discovered that not only was there a very positive lock with such simple filtering but that the output phase could be shifted over almost 90° by adjustment of the oscillator trimmer.

The Varicap diode used was in fact a standard power rectifier 1N4006 mounted in place of the 20pf AOT Capacitor, across the oscillator trimmer. Wire the 10K resistor and .47nf capacitor across the diode using short leads, the cathode end goes to the live side of the trimmer.

More soon !



#### P100 SALES

Sync pulse board	£4.50
Pattern generator PCB	£4.50
5 MHz crystals	£2.75
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orders should be sent to

T. W. Mitchell G3LMX.

27 Hanmer Road,

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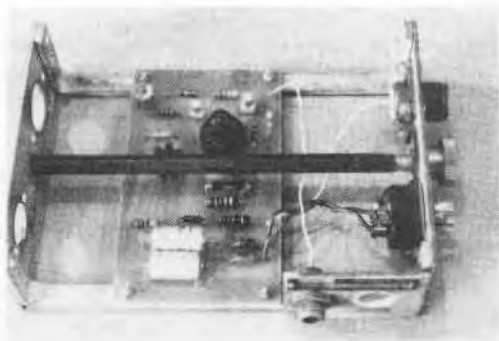
# Buffer amplifier module

*By Brian Summers G8GQS*

This transistor amplifier was built to modernise an old EMI video switching matrix and in the photograph you can see the new printed circuit board mounted in the old valve chassis. The existing input and output connectors are still used.

## Specification

Gain preset to 0db  
Output impedance 75 Ohms  
Bandwidth DC. to 6MHz  
K. rating 2T 1%  
Power supply + & - 12v @ 50ma.



## Circuit description

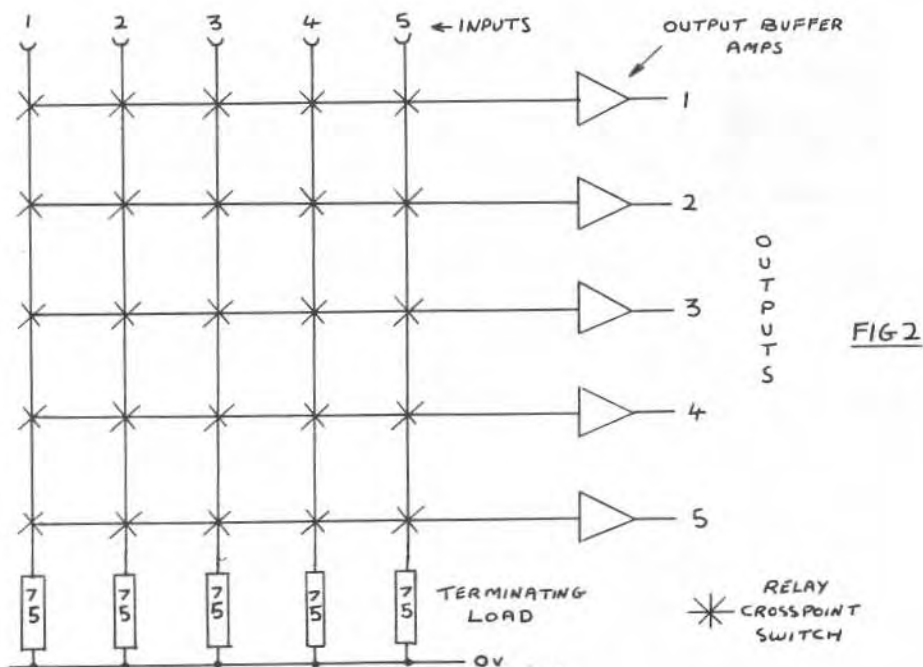
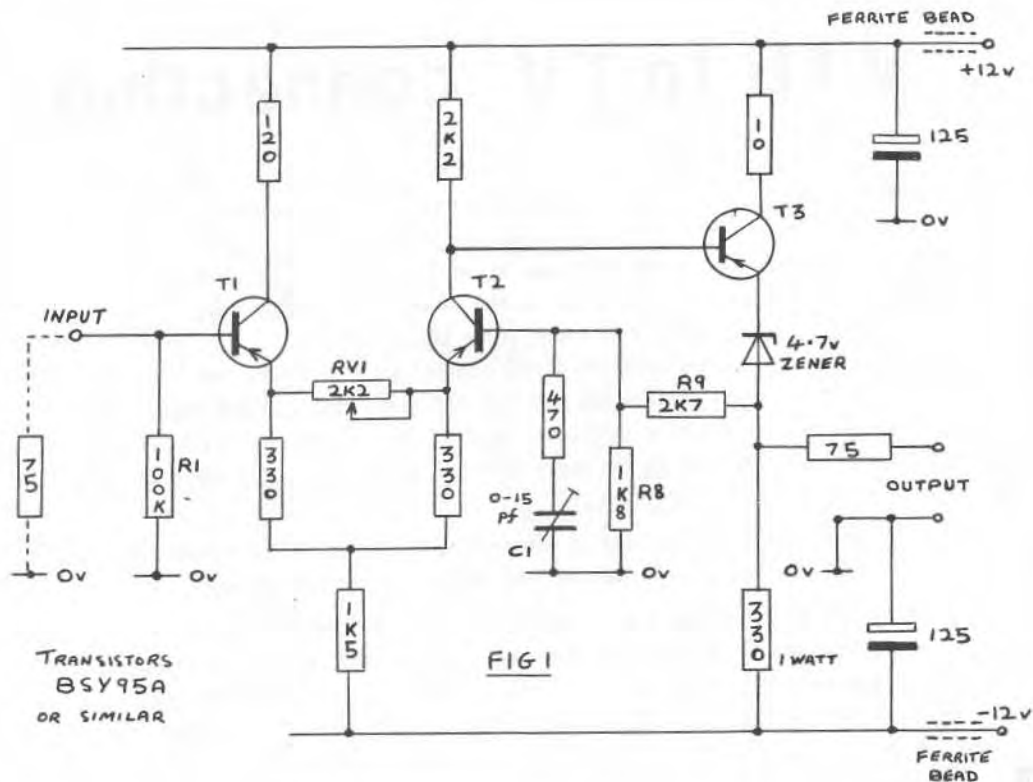
T1 and T2 form an emitter coupled gain control stage, with Rv1. The input should be terminated with 75 ohms when in use. R1 (100K) provides a return for the base current of T1 if the 75 ohm termination becomes disconnected. T3 is an emitter follower output stage with feedback to the base of T2 via R9 and R8. The high frequency response is controlled by the adjustment of C1. As the unit is directly coupled any D.C. component on the input will be present at the output.

## Relay frame

Fig. 2 shows the simplified relay switching frame 5 X 5 any input can be connected to any output. Typical uses are as a vision mixer, preview or engineering monitor selection.

## Set up data

Connect the output of a pulse and bar generator to the input of the module with 75 ohm termination. Connect a 'scope to the module output, with 75 ohm termination. Adjust RV1 for 0db. gain and C1. for min. overshoot and pulse amplitude. If a LOT colour pulse is available adjust C1 for a "flat" pulse bottom.



# VTR to TV connection

*By Trevor Brown G8CJS*

I think the most reoccurring technical query is how to connect a VTR up to a domestic television set. The biggest problem is always that a majority of television sets have a live chassis and this makes it a dangerous place to go poking around, so the best way for replay purposes only is to use an RF modulator and access it via the aerial socket. The answer always comes - "back but I want to be able to record from the set as well".

The above circuit makes possible direct connection of a VTR to the Thorn 1500 chassis. First isolate the set from the mains with a double wound isolating transformer of a sufficient rating. This allows the chassis of the set to be connected to the earth pin of a 3 pin plug. THEN AND ONLY THEN CAN THE ABOVE CIRCUIT BE INSTALLED.

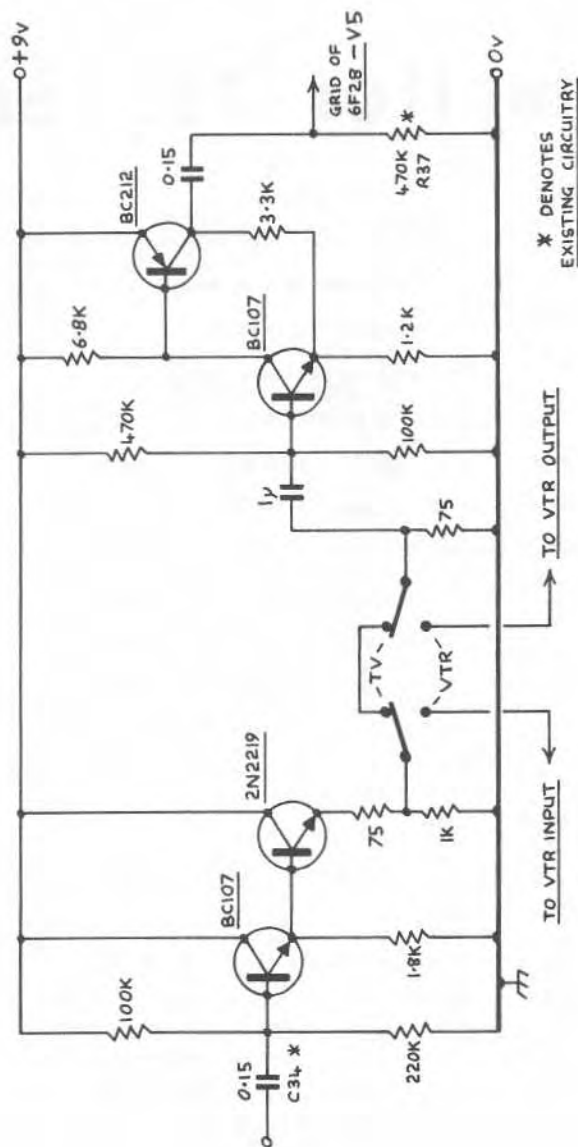
\*C34 is part of the TV set and is normally connected to \*R37 and then to the grid of V5, disconnect C34 from R37 and instal the circuit between.

The switch marked TV-VTR enables the TV to function normally when the VTR is disconnected by using the TV position, when switched to VTR the pictures will appear as normal in record via the EE loop of the VTR when the VTR is in a replay mode it will over-ride the TV and its replay will appear on the TV.

The circuit was designed for the Thorn 1500 chassis but the problems are the same for most TV sets in that the detected video is about 3 to 4 volts peak and requires reducing to about a volt and made capable of being terminated in 75 ohm.

The VTR replay requires its level increasing from 1 volt back to the original 3 volts to feed back into the TV set.

The audio is not shown as most people seem to have no problem here.



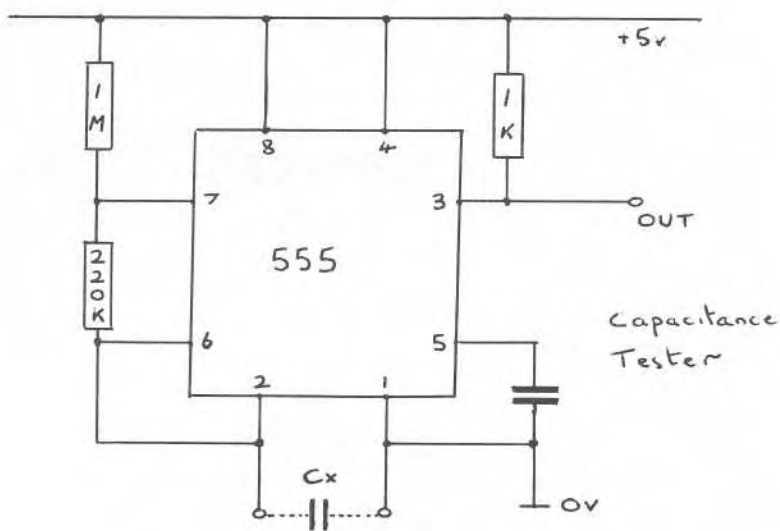
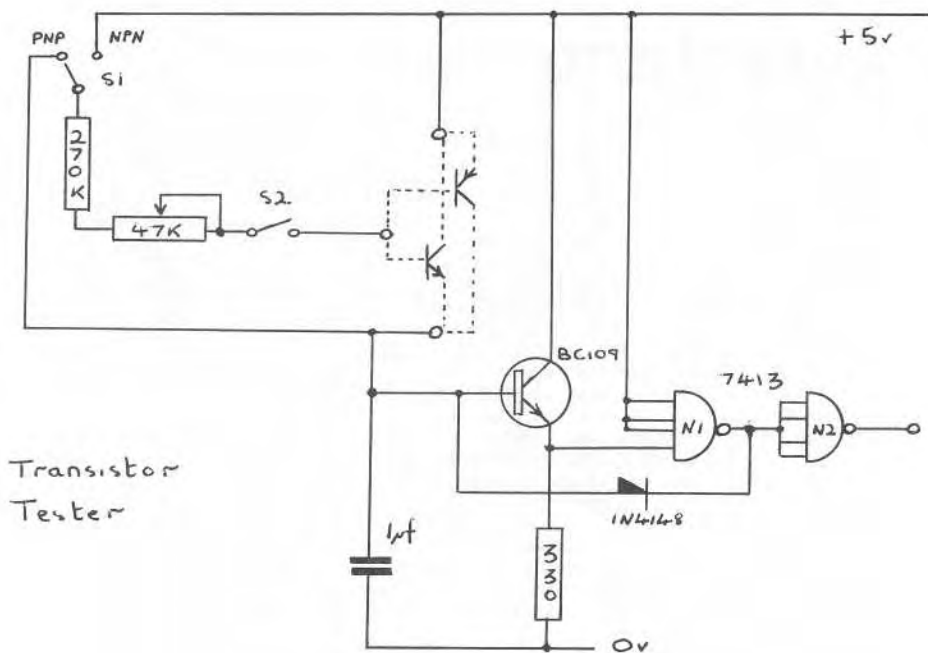
# Transistor & Capacitor Tester

*By Ian Pawson*

No originality is claimed for the circuits shown on the opposite page. They are presented here together to show how the range of a frequency /period counter can be extended to measure capacitance and transistor gain. The transistor tester works as follows, the gain determines the charge rate of the capacitor. The schmitt trigger is driven by T2 so that when the voltage across the capacitor reaches a certain value, N1 will switch. At the same time, the capacitor is discharged by the diode. This causes the voltage at the emitter of T2 to drop rapidly until it reaches the level where N1 switches back. This means that with a fixed base current, the gain of the transistor under test determines the frequency of the output. The base current can be adjusted so that a current gain of 100 gives an output frequency of 1000Hz.  $H_{fe}$  is then proportional to the output frequency over a wide range so that the gain can be read directly from the counter.

The capacitor tester is different in that the period, not the frequency is measured. The 555 timer is connected as an astable multivibrator, whose output period is proportional to  $C_x$ . With the values shown,  $\mu s$  is pF,  $ms$  is nF and  $Sec.$  is  $\mu F$ . For best accuracy, the resistors should be metal oxide 1%. As the circuit board and wiring will have capacitance it is best to pad this out with a trimmer to a convenient value, to enable small pF caps to be measured. Mine I made read 200pF with nothing connected. This means, of course, subtracting 200pF from every reading. However this only matters in the pF range. High leakage stops this circuit from measuring electrolytics above a few  $\mu F$ .





# Computer to TV camera interface

*By Tom O'Hara W6ORG*

Wouldnt it be nice to be able to put subtitles or computer graphics superimposed on the camera video? Well here is a simple little circuit that will do it. The Radio Shack TRS-80 microcomputer was chosen for the example only because it is the most popular machine at the time but with only 3 points to tap into it can be easily adapted to other computers or even RTTY converters such as the Infotech.

The difficulty with trying to mix two video sources is that they must both be in sync. The horizontal frequency and phase must be the same. Commercial people do it by using one master sync gen and slaving all cameras to it. Actually any one video source can be made the master and the rest slaves by tapping into the blanking pulses, buffering, and amplifying to 2 to 4 v peak to peak, negative going into a 75 ohm line. There are cameras that are designed to accept the external vertical and horizontal drive pulses and lock up on them. The one I use is the Hitachi HV-62 SU. These are a little more expensive due to the fact that they have to be able to free run if the external sync is lost. If not you could burn a line or hole in the vidicon target.

The price of the HV-62-SU is about \$300 compared to a standard line locked vertical and free running horizontal synced HV-62U at \$239. Even if you do not use the external sync feature you get 2:1 interlace for a little more horizontal resolution.

The 2½ x 3 inch board fits down in one of the two wells in the TRS-80 keyboard case. Wires are run about 12" long and soldered on the component side of the CPU board directly to the IC pins. +5 VDC and ground are taped in to components in the regulator section. You should be familiar with the disassembly of the case and not be afraid to violate the warrenty by going into the unit.

Get a copy of Radio Shacks TRS-80 Micro Computer Technical Reference Handbook catalogue number 26-2103 for \$9.95. Its a good reference to see what is going on inside the machine. The board can be attached with foam with double sticky backed tape (Radio Shack 64-2344). So as not to have to drill or cut any holes in the case I ran some small RG 179 72 OHM coax through the bottom vent slots in the bottom of the unit. (Belden 83264 or 9221). This coax is less than 1/10 of a inch in diameter and fits nicely. The only problem is building up tape on the video out cable to fit into a PL259 to fit the transmitter or monitor. 3 of these coaxes just fit into the external sync plug that comes with the Hitachi HV-62-SU.

Note that the TRS-80 operation and monitor are un-affected by this attachment. The combined video output is separate. Before buttoning back up the computer, adjust the drive pots to just above the point where they lock up, and adjust the white level (or black if you like but white shows up much better) of the computer letters.

```
TEST PROGRAM
100 CLS
200 PRINT CHR$( 23)
300 INPUT A$
400 FOR P = 1 TO 16
500 PRINT
600 NEXT P
700 PRINT A$
800 GOTO 300
```

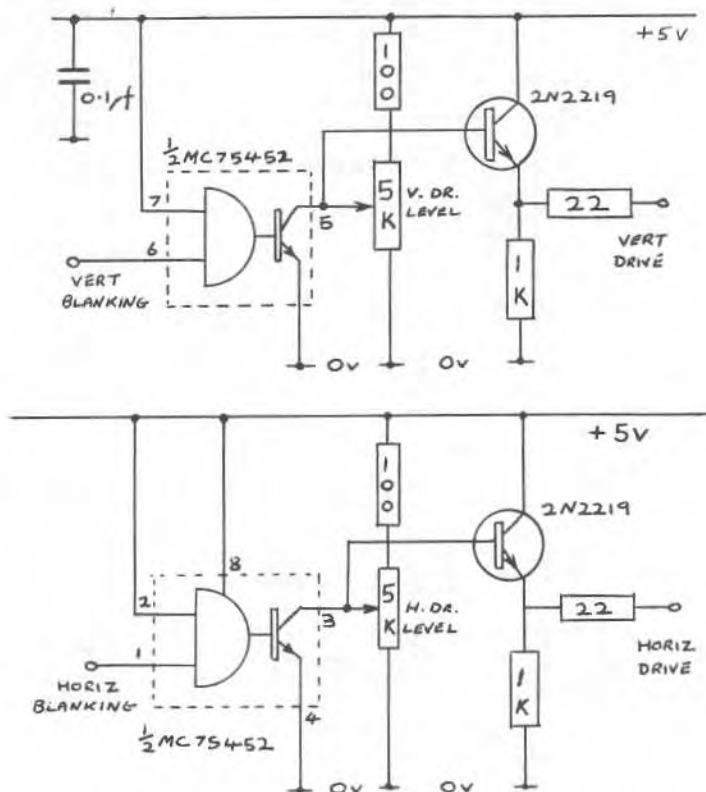
I'll leave the applications to your imagination but the simple programme above will put two lines of what ever you type in at the bottom of the camera video in double size letters. How about a large letter CQ ATV scrolling over your camera looking at the shack ? OR the camera looking at the model of the star ship enterprise as you play Star Trek?

\*PC Board and two MC 75452 ics ..... \$10.00 ppd

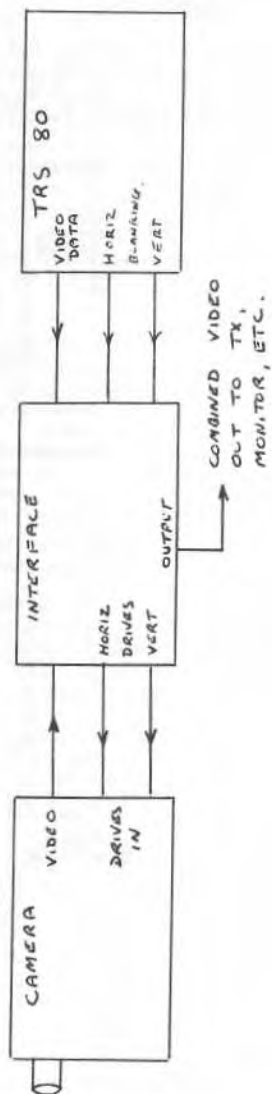
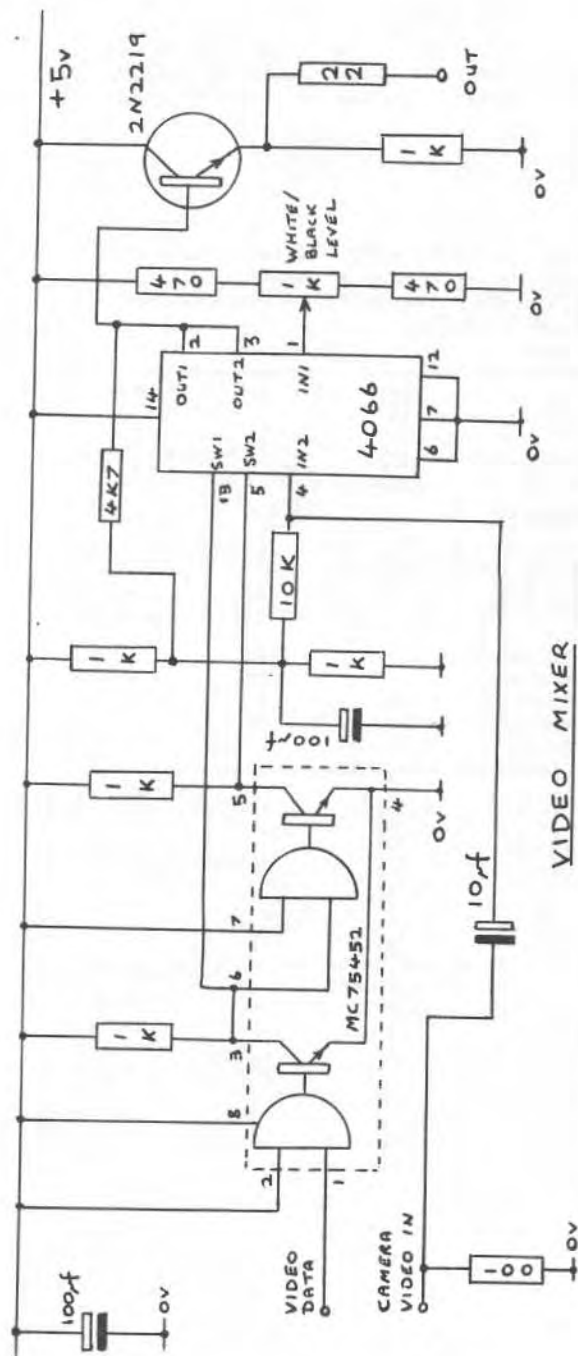
CCI-1 wired and tested module ..... \$25.00 ppd

### Editors Note

This article was written by Tom O'Hara W6ORG 2522 Paxson Lane Arcadia CA 91006 and originally produced in A5 magazine. UK enquiries should be sent to Blean Video Systems, 4 Mount Pleasant, Blean Common, Canterbury, Kent CT2 9EU.



CAMERA SYNC DRIVERS



# IF output stage

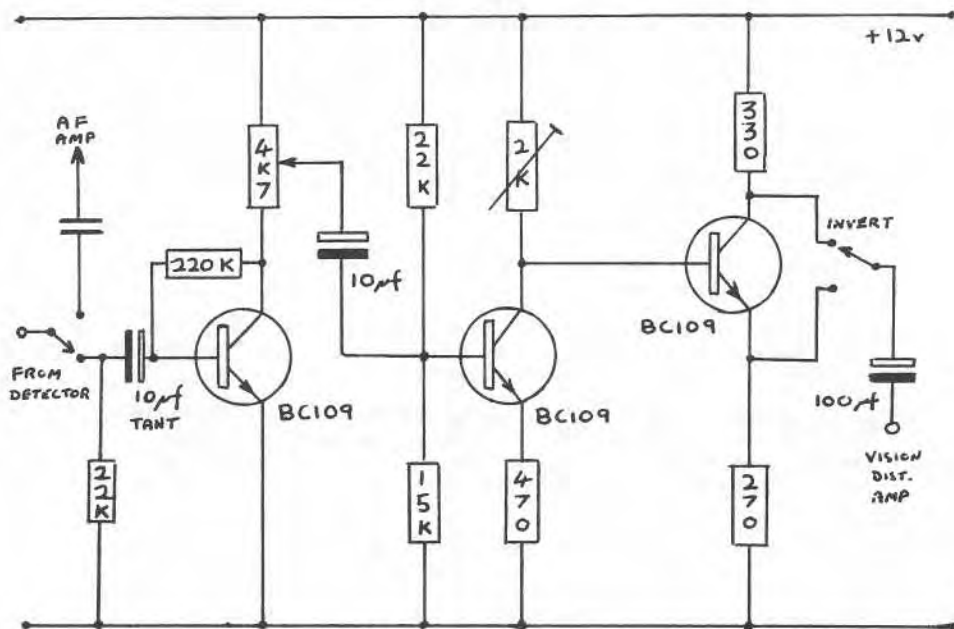
By Peter Johnson G8EJm

Manor Supplies are currently selling a IF Board for G5, this is a Bush Murphy IF 620 1G (Z718, IF BC6100). The board has both sound and vision outputs, the sound output being at 100MV and the vision at 1V P-P. The board comes complete with circuit diagram and uses a 12V DC. Negative ground power supply.

The vision output is at high impedance so the simple matching network shown was added to the unit. This circuit also allows the modulation sense to be changed.

As the board was originally designed for use in Europe the filter fitted is for 5.5 MHz however a 6 MHz filter is available from Manor Supplies for 50p. The switch on the input of the board allows the detection output to be fed to a audio amplifier to enable AM sound idents to be copied.

I strongly recommend this unit ! it is used in a colour set, so there are no bandwidth problems with colour signals.



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