CQ-TV MAGAZINE No. 129

BRITISH AMATEUR TELEVISION CLUB

FEBRUARY 1985

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

MEMBERSHIP

FULL YEAR: £4 or £1 for each remaining quarter of the year. All subscriptions fall due on the first of January.
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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PLEASE NOTE:-

CLOSE FOR PRESS DATE FOR THE MAY ISSUE.....6th March 1985

EDITORS POSTBAG

Dear Ed,

Having read Grant Dixon's "Notes on SSTV" in CQ-TV128 with great interest, and been told that the financial bar to greater SSTV activity has been removed by the present ability to receive and transmit SSTV by computer, I hope and trust that in his next set of notes he will deal fully with this computer produced SSTV, particularly with a comparison of the quality etc. of mono and colour pictures with the quality of 5FP7 CRT tube pictures, as displayed on a TV set/monitor.

G3LUI tells me he has seen the results of the G3LIV equipment on a BBC computer and that they are excellent.

ZS6BTD, having been told that the American software etc coped with all present and future frame speeds and lines, went to Dayton Hamvention in April 1984, with a change from his WA7WOD-3-memory-&-several-speeds-Robot 400 in mind, to computer control. He was dismayed by what he actually found. Yet Fred R.Sharp W8ASF writes to the Editor of "A5" magazine in the Oct.84 issue that the software writer Ben Blish K6AEP, (having ceased amateur production because of the wholesale 'pirating' of his software), has completed a program for the Co-Co and/or other computers that does it all, and he means DOES IT ALL! Hi-resolution, all speeds (including all the Robotcolour speeds), excellent FAX, CW and excellent RTTY.

What is wanted is some method to give complete compatibility between the frame speeds, both black and white and colour, in RGB or single frame of the Robot 400, 400C, 450C and 1200C AND the Volker Wrasse SC433 and SC-1 with or without its additional 24 and 48-seconds single frame colour facilities.

Richard Thurlow G3WW

Dear Ed,

Although many 'G' stations are active on SSTV on 14230KHz, there appears to be very little local activity on the LF bands.

For some months now, GD4HOX, EI6EU and EI3CZ have been very active on 80 metres and would welcome others to join them. They can be found on 3730KHz most Saturdays at 2.30pm and Sundays at 10.15am and often during the week at 1.15pm.

Ted Brooks GD4HOX

Dear Ed,

We are currently setting up an ATV repeater station here in Holland and have come very near to getting it on the air. The only things missing are a callsign generator and a test card.

Some specifications of the station will be: Input 1252.5MHz, Output 1285.5MHz, location Soest (almost exactly in the centre of Holland), power is to be around 40W sync erp with horizontal polarisation.

With the best regards of the entire ATV repeater group (PA3CRX, PE1CYU, PA3CVH and PA0ETE.

John Piek PA0ETE
Amersfoort, Nederland.

Dear Ed,

I am wondering about the possibilities of setting up an ATV repeater for this area.

A number of local amateurs are QRV on ATV and, as a result, they have asked me to make enquiries. We do have a local site for GB3GY which, of course, is operational.

Anyone who wishes to partake may contact me on 0472 78209.

Jim Woolliss, G4NPS,
245 Scartho Road,
Grimsby,
South Humberside DN33 2EA

Dear Ed,

Just a line from uz poor country folk down yur in Debun, to let e know that not all of uz ev gone 24cm maze.

Life down here, like lots of other areas, is difficult enough, terrain-wise, on 70cm, so please don't let everyone lose sight of the fact that 70 is still the main TV band and I hope likely to stay so.

There is not much activity round here and if you get on 24 you won't see anybody! So please let's not keep pushing 24 like mad at the expense of 70. let's remember, it's not a race to get on 24. Lots of paths are 'just not there' on 24 so it's 70 for you and me!!

Alec Jefford G8GON
Exmouth, Devon.

EDITORS REPLY

Point taken Alec. I agree that 24cm seems to have taken over recently, perhaps it's because there is still so much to be done on the band (and mode) and, now that we have repeaters, many people ARE trying to get going on that band. New techniques need to be learnt and experimented with and people are obviously writing-up their findings for everyone's benefit.

There is no question of 24 being pushed at the expense of 70. I have long been aware of the falloff of 70cm related articles and, to that end, have been putting out many feelers of late trying to drum up some trade. Since we have had 70 since just after the war though, I suspect that most people consider almost everything has already been written. They could be right, but I shall continue to strive for a balanced magazine with something for everyone. Unfortunately, (I have to say it again) one prints what one can get hold of.

Stick with us Alec, it will even itself out eventually.

JW.

Dear Ed,

As a past President of the Club, I enjoy receiving my regular copy of CQ-TV. I was interested to see the short note on page 4 of the November issue about the BBC's decision to adopt circular polarisation for their VHF sound radio broadcasts.

I thought your readers might be interested to know that it was actually we in the IBA who first introduced circular, or more accurately mixed polarisation on band II in the U.K. as long ago as October 1973, when we put the Croydon transmitter on air for the start of Independent Local Radio. It has been adopted throughout our network of VHF radio transmitters and is used (in various forms) at no fewer than 62 stations.

By using mixed polarisation, we have at the same time satisfied not only the home hi-fi enthusiast who traditionally uses horizontal polarisation but also our not insignificant number of listeners who use either portables or car radios which benefit greatly from the vertical component.

We are flattered that the BBC are now following our lead.

R.C.Hills (G3HRH)
Assistant Director of Engineering (Operations), IBA, Crawley Court.

DEAR ED,

How nice it was to see in CQ-TV 128, some of the old names and activities of the original slow scanners way back, now well over twenty years ago.

Somewhere, up in my attic, I still have the original slow-scan display unit that was used to pick up Copthorne Macdonald's first slow-scan transatlantic transmission.

Events, it transpired, turned a full circle, and the experiments at G3AST using wide band FM were abandoned in order to become compatible with the AM subcarrier system used by Cop. Macdonald.

I was looking at my original

circuitry only the other day, and found that I was using a 6SN7 multivibrator with grid returns both taken to a class-A modulation stage - this provided surprisingly good wideband linearity!

The only improvement that I offered to the AM system was the use of a "dotting oscillator" at the grid of the scanning tube. As the description indicates, this device broke up the scanning raster into a series of "dots" which allowed the use of a much simpler AC coupled video amplifier, and eliminated the need for carrier insertion.

This of course has all been swept away by the adoption of FM on both sides of the Atlantic.

We also seem to be adopting a certain amount of "newspeak" these days such as; "real time execution, symbolic debugging and macro function". 'Wonder what its all about?

John Plowman G3AST

Dear ED

During the time that Baird was experimenting with television in the U.K., one Thomas L.B.Elliott was also experimenting in the same field in Queensland. He was very successful and attained immense following and a good deal of local notoriety. I speak of the years 1934-35 and Elliott's Nipkow based, low definition equipment is today housed in the museum of the Royal Historical Society in Queensland.

The South East Queensland Amateur Television Group has decided to produce an award to commemorate the work of Elliott. The basic requirement for attaining this award will be the accumulation of 50 points during the year 1985. The award is to be available worldwide and further details will be sent to the BATC as soon as they become available.

Tom Ivins VK4ABA
Secretary/Historian, SEQATG.

Dear ED,

Recent articles in CQ-TV may prove the NE564 FM demodulator your most popular circuit. I've tried the MC1357, or rather RCA's CA2111, and saw no benefit; it also needs another chip for AFC. So I went back to the NE564 and decided on (1) 330ohm to pin 1 (jumper and surgery to the BATC PCB) which gives 6.5v to drive the PLL. (2) uA733's instead of NE592 (latter being noisy). (3) BC547B instead of BC108 (quieter and cooler-running). (4) Removed L1 and L3. In the latter's place I installed a low pass filter to cut off above 4.5MHz, and moved the final de-emphasis 75ohm resistor to terminate the filter (more surgery required!). After completion, the circuit was left running for 2.1/2 days, and was only slightly warm at the end of it. Finally, the 10n audio output capacitor (C19) completely cut-off any trace of sound in my case (a quad tuned AN240) and I found that 15pF gave the best results.

I hope my experience will be of assistance to others. I might use it for 24cm ATV one day! At present it's Direct Broadcast Satellites only.

Jim Madden ZS6CDR
South Africa.

NEWS ROUNDUP

G4MQS WINS AWARD

At the RSGB AGM held on December 10th, committee member Paul Elliot was awarded the Wortley Talbot trophy for "outstanding experimental work on Britain's first ATV repeater GB3GV, located in Leicester".

Congratulations to Paul who, we know, has put in an enormous amount of work on the project.

ATV REPEATER FOR CRAWLEY?

Crawley & District Video Repeater Group have applied for a licence for GB3CT. The 1.3GHz ATV repeater will be sited in Crawley, (ZL80H) at 325ft ASL. Channel RMT2 has been applied for and the station will be FM only with 6MHz sound spacing. Power output will be 20W erp from an Alford slot aerial.

Field trials have shown a good coverage of North Sussex and Surrey. The repeater has been built from easily obtained parts and circuits and cost about £150. The logic used is the GB3US sound repeater system with a vision detector and switching circuit added. The caption generator is a Cropredy Electronics test card circuit showing callsign, locator and input frequency.

Further details from Bob G6LVN or Jack G4TVC - QTHR or tel: 0293 28612

OVERSEAS NEWS

Overseas members are reminded that mail, especially surface, can take a VERY long time indeed. It is not uncommon, for instance, for PC boards to take 9 month to get to Hong Kong. Australasia often takes three to four months.

The reason for pointing this out is that letters are often received by various BATC departments complaining of the delay. Honestly it is not our fault. Unless extra postage is sent for air mail everything, including membership details, is sent surface.

CQ-TV128 - NARROW-BAND IF FILTER

G6IKQ discovered that the narrow-band IF filter on page 13 of the last issue did not match very well into his TV IF strip. A 5pF (max) trimmer capacitor was wired in place of the 2.2pF fixed shown on the circuit, and this allowed the matching to be optimised without further problem.

On a similar subject, LA8AK commented that a VHF Q-multiplier was proposed, some time ago, in an issue of 'VHF Communications'. He has not had time to try the idea and wonders if anyone else has? Might be a bit narrow for TV though!

BATC MAGIC DEPARTMENT...

...Otherwise known as 'Members Services!' You may have noticed that this is run by Peter Delaney, - "you'll like it....not a lot!"

Some members seem to think that we can perform magic! Several people recently have sent orders with no name, address or callsign on. By waving the magic wand (BATC members list), these can often be guessed at by using the name on the cheque instead of "Abracadabra". It is not always possible, however, to be sure.

There is still one rabbit which refuses to come out of the hat. A member, trying the above trick, has sent payment by Postal Orders; no "magic word", so the old wand is useless. The postmark (unclear) seems to be from somewhere in Devon, so if the sender would like to identify himself (or herself), then the items requested will appear - like magic!

Incidentally the above is NOT an invitation to others to test the powers, so please ensure that you fill in the order form correctly.

SUBSCRIPTIONS

All subscriptions for 1985 should have been paid by the first of January. Members who have not yet renewed are reminded that unless they do so before the first of April, they will be automatically deleted from the club's computer files and will therefore receive no further issues of CQ-TV magazine. (Perish the thought!)
Subscription is £4 per year and should be sent to:-
Mr.D.Lawton, "Grenehurst", Pinewood Road, High Wycombe, HP12 4DD

MAIDENHEAD LOCATOR

Members should note that, as from the first of January 1985, the BATC, in common with the RSGB and other amateur radio societies, is no longer using the old QRA locator system but instead the new 'Maidenhead' system has been adopted. This locator should be the only one used in future BATC contests (including the current cumulatives) as well as the International contest.

There are a number of computer programs around for converting from one to the other, and much information has already been published in 'Radio Communication' as well as other worthy journals.

IN THE STUDIO

To all those who were looking forward to the next part of John Goode's article 'In The Studio', I very much regret that, owing to extreme pressure on magazine space, the article has had to be held over till next time.

It is always painful to have to leave something out but, in a way, it is a good thing as it shows there is plenty of material coming in. I hope it will not upset too many members.

No this doesn't mean that you should stop sending material to the magazine! I need lots to maintain the current page count. Keep it up guys.

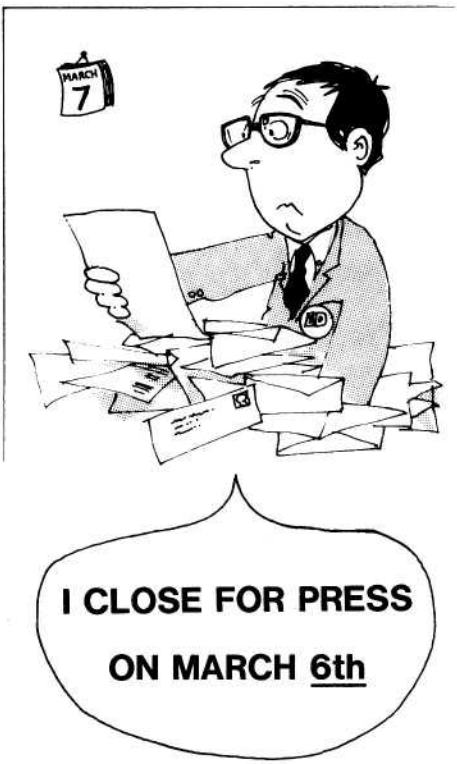
1985 BATC SHOW/RALLY

The next annual show is to be held on May 5th, again at the Post House Hotel at Crick, near Rugby (just off exit 18 of the M1). At the time of going to press further details were not available, but they will appear in full in the next issue. (see below).

NEW CQ-TV CLOSING DATE

Because it is taking so long to organise the next BATC show, I intend to bring forward the publication date for CQ-TV130 by two weeks. This is to ensure that members have full details of the event in good time for their arrangements to be made.

Anyone needing further details beforehand should contact Mike Cox at 10 Moorfield Avenue, Scholes, Cleckheaton, W.Yorks Tel: 0274 875066, especially if you need space for exhibits etc or other facilities.



THE G4ENA SSTV TRANSMIT CONVERTER

By P.M.Asquith G4ENA

To date, no low cost. high performance transmit convertor has been available either ready-built or as a kit. Since the publication of the G3WCYreceiver article in 'Radio Communication' Feb.1983, many amateurs have constructed the boards (available from BATC) and have a working receive system. It was therefore decided to design a transmit converter which was compatible with the G3WCY boards offering the maximum facilities at minimum cost.

G4ENA TRANSMIT CONVERTER FEATURES:

* Auto picture snatch of fast-scan pictures.
* 'Look through' memory for fast camera adjustment.
* Receive board memory used to store TX pictures; - allows re-transmission of a received picture.
* Positive and negative video control.
* Width control and L.S. colour receive for G3WCY board.
* 21-second Line Sequential Colour Transmission, (3 memories required).
* Audio output for direct connection to a mic socket.

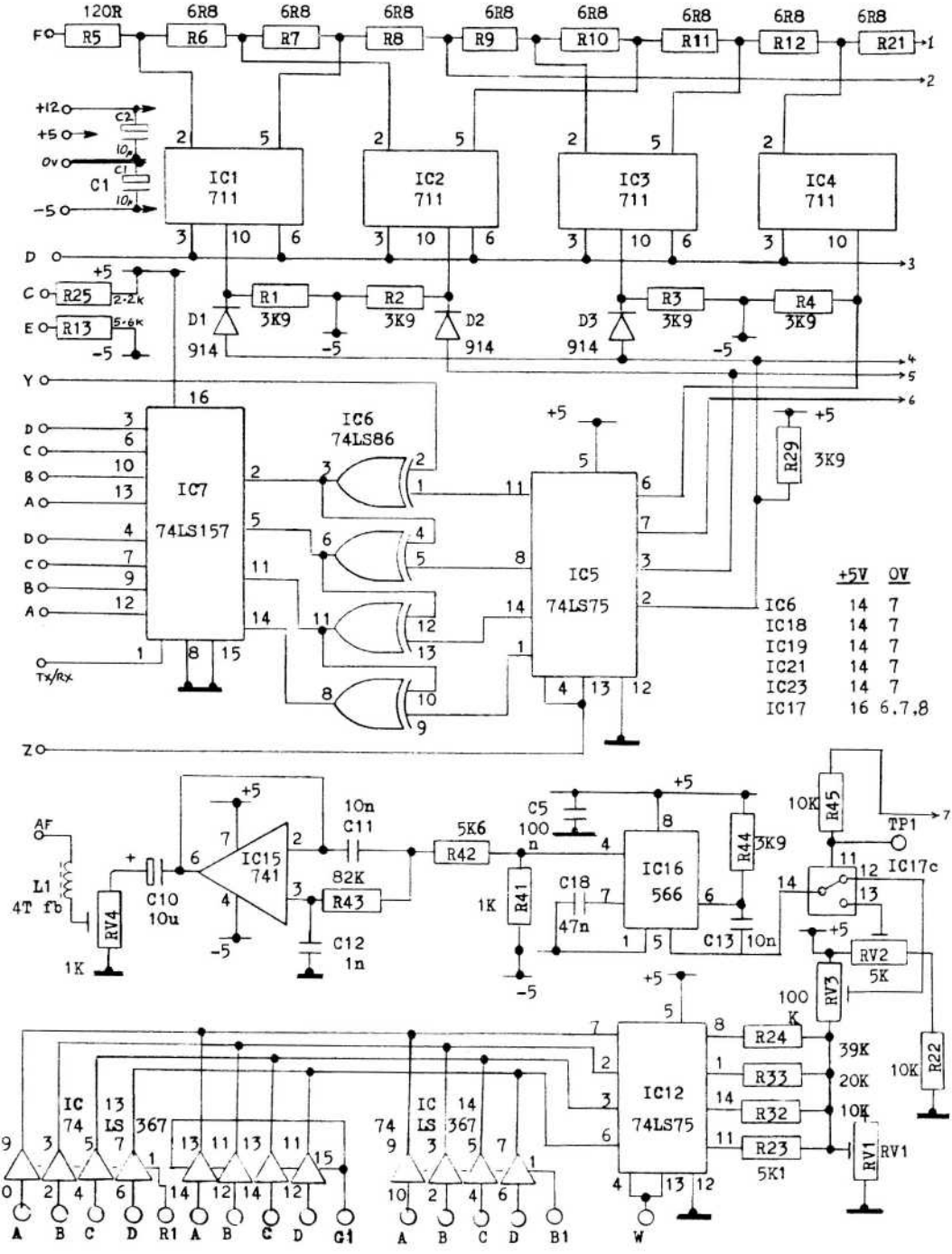
CIRCUIT DESCRIPTION

Reference should be made to the circuit diagram and the switching and interconnection diagram (Fig.2).

The selected video signal (S13) is converted to a 4-bit grey code by eight dual comparators (IC1-8). IC5 latches the video before each pixel (128/line) is loaded into memory. IC6 performs a Grey code to binary conversion. The video is stored as a 4-bit binary picture in the receiver memory. IC7 selects either fast-scan digital video or slow-scan receive video for input to the memory.

The fast-scan syncs for the memory board are switched by S14. A sync separator (TR's 1,2 and 3) extracts the external sync pulses. If an independant sync source is used, rather than composite video, then the thin piece of track connecting pins 'A' and 'B' can be cut using a sharp knife.

S1, which selects the video information to be transmitted, controls tri-state buffer IC's 13 and 14. A logic 'low' enables the buffers. IC12 latches the video at the slow-scan rate before conversion to a scaled, 16-level, analogue voltage by R's 23,24,32 and 33. Trimpots RV1 and 3 set black and white span. IC16 generates the SSTV FM audio. IC17c switches the voltage from RV2 slider


120R
6R8
R5
R6
R7
R8
R9
R10
R11
R12
R21
F
1
2
3
4
5
6
+12
+5
0v
-5
C2
C1
10n
IC1
IC2
IC3
IC4
711
D
C
E
R25
2·2k
R13
5·6k
R1
R2
R3
R4
3K9
D1
D2
D3
914
Y
Z
IC7
74LS157
IC6
74LS86
IC5
74LS75
R29
Tx/Rx
+5V
0V
IC6 14 7
IC18 14 7
IC19 14 7
IC21 14 7
IC23 14 7
IC17 16 6,7,8
AF
L1
4T fb
RV4
1K
C10
10u
IC15
741
10n
C11
82K
R43
C12
1n
5K6
R42
C5
100n
IC16
566
R44
3K9
R41
C18
47n
C13
10n
10K
R45
TP1
IC17c
RV2
5K
RV3
100K
R24
39K
R33
20K
R32
10K
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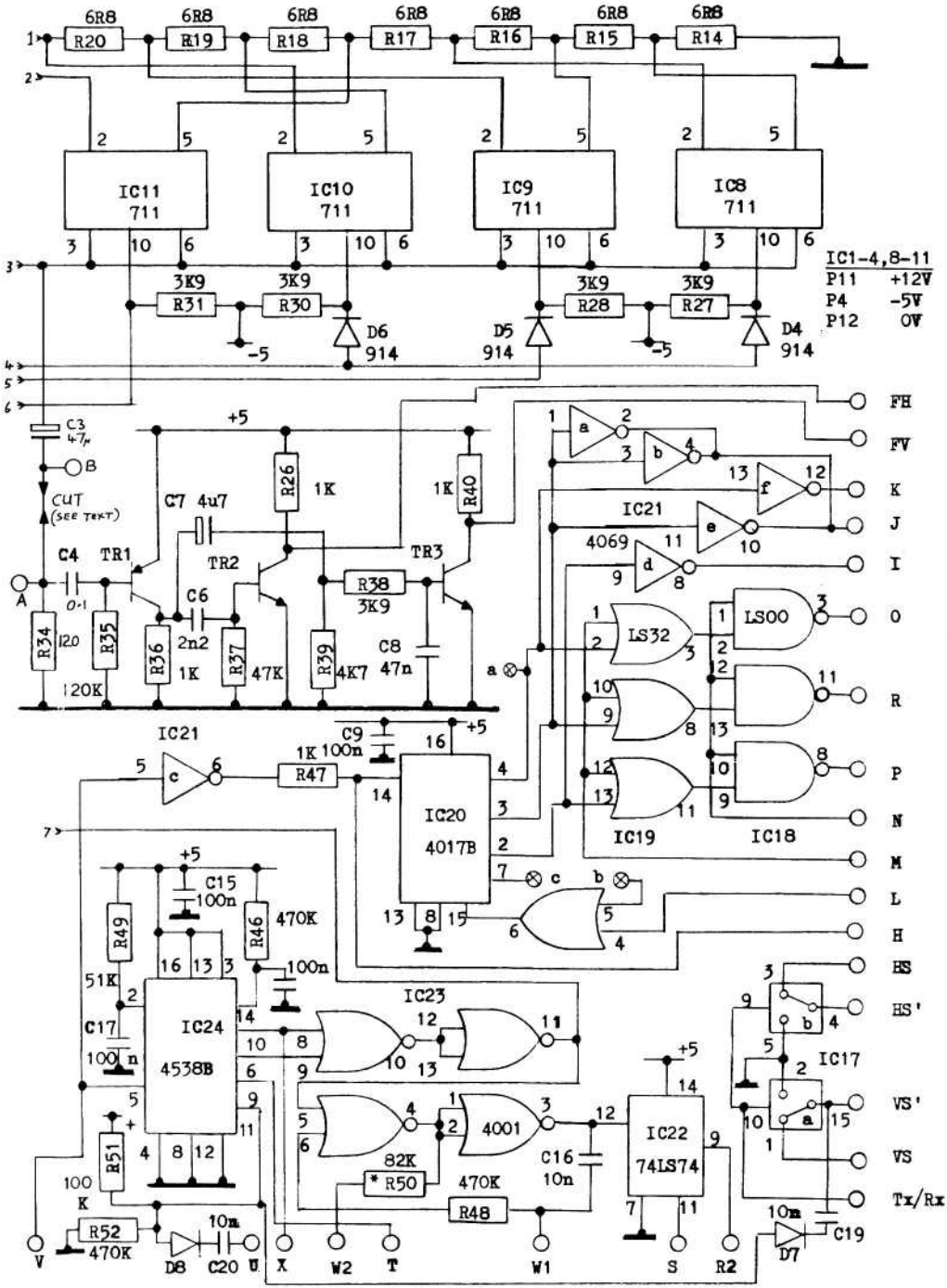
IC 74LS367
A B C D B1


6R8
R20
R19
R18
R17
R16
R15
R14
IC11
711
IC10
711
IC9
711
IC8
711
3K9
R31
R30
R28
R27
D6
914
D5
914
D4
914
-5
IC1-4,8-11
P11 +12V
P4 -5V
P12 0V
C3
47n
B
CUT
(SEE TEXT)
+5
C7 4u7
R26 1K
R40 1K
C4 0.1
TR1
TR2
TR3
R38 3K9
C6 2n2
R34 120
R35 120K
R36 1K
R37 47K
R39 4K7
C8 47n
A
a
IC21
4069
FH
FV
K
J
I
O
R
P
N
M
L
H
HS
HS'
VS'
VS
Tx/Rx
LS32
LS00
IC19
IC18
C9 100n
R47 1K
IC20
4017B
C15 100n
R49 51K
R46 470K
100n
IC24
4538B
C17 100n
R51 100K
R52 470K
D8
C20 10n
IC23
4001
82K
* R50
470K
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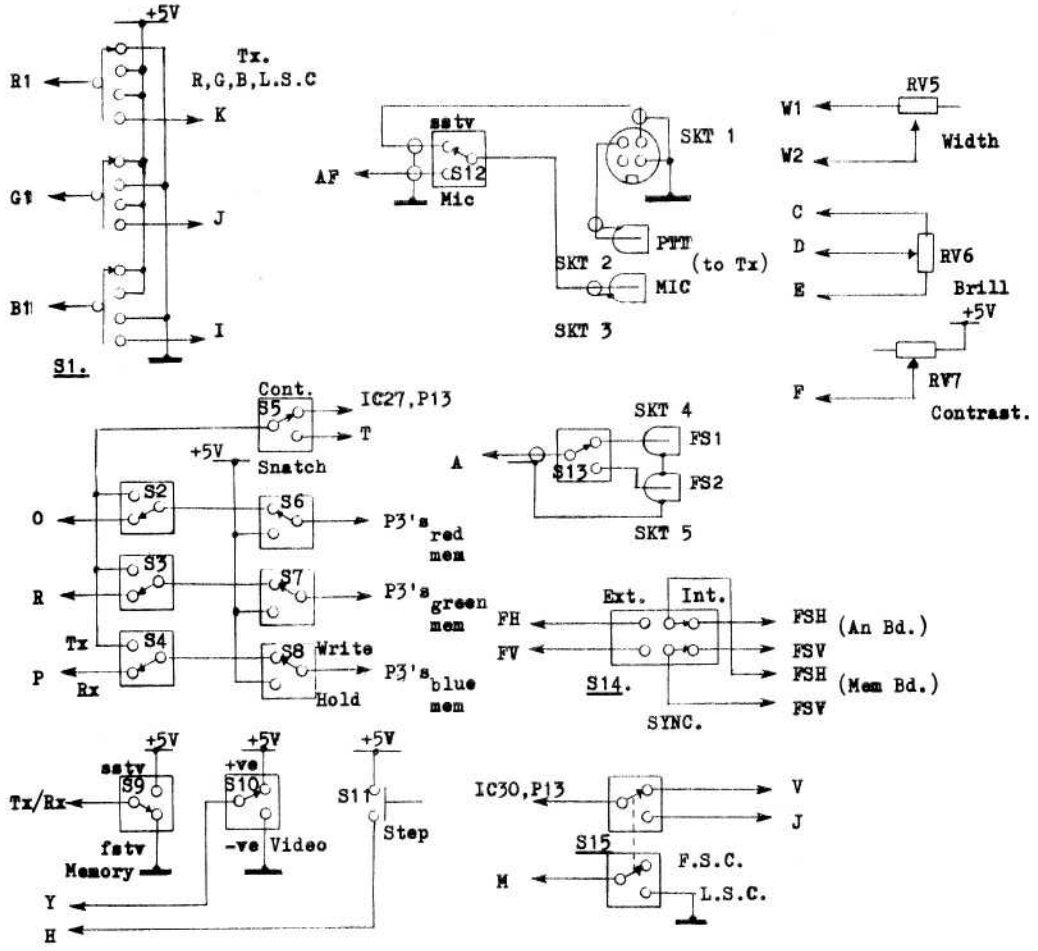
V
U
X
W2
T
W1
S
R2



Internal connections

From.	To.
G	N.C.
B	N.C.
N	IC32, P6
L	X
S	IC24, P5
R2	IC29, P13
U	IC30, P5
V	IC29, P5
W	IC32, P6
Z	IC23, P6
HS	HS (An Bd.)
HS'	S202 (Mem Bd.)
VS	VS (An Bd.)
VS'	VS (Mem Bd.)
J	S15
MEM A,B,C,D	A,B,C,D,(Mem Bd.
SSTV A,B,C,D	A,B,C,D,(An Bd.)

A	R	IC41, P13	Red Memory.
B		IC41, P12	
C		IC41, P5	
D		IC41, P4	
A	G	IC41, P13	Green Memory.
B		IC41, P12	
C		IC41, P5	
D		IC41, P4	
A	B	IC41, P13	Blue Memory
B		IC41, P12	
C		IC41, P5	
D		IC41, P4	

Fig.2 SWITCHING AND INTERCONNECTION DIAGRAMS

adding line and field sync pulses. IC15 is a 2-pole low-pass filter which removes the unwanted high frequency components from the FM audio. RV4 sets the microphone drive level.

Dual monostable IC24 produces slow-scan line and field sync pulses from timing information derived from the memory board address counters. The slow-scan line oscillator (IC23) is gated off during sync pulses, this permits the maximum use of available memory for SSTV pictures. Width control pot RV5 adjusts the oscillator frequency to cater for both 50 and 60Hz SSTV formats.

Line sequential colour timing is controlled by IC's 18,19 and 20. The link from 'b' to 'c' can be connected to 'a' and 'b'. This will load a 14-second, 256 line picture into the red and green memories. Typical signals found at various points in the circuit are shown in the waveform diagrams (fig.3).

CONSTRUCTION

The printed boards are housed in a metal instrument case. All side panels are removable allowing easy access for wiring. Full information for a suitable front panel layout may be found in Fig.4. The transmit PCB uses the IC pins to connect top and bottom tracks therefore it is not possible to use conventional IC sockets, however 'Molex' or 'Soldercon' pins, purchased in strips, may be used if required. It is advisable to solder the C-MOS components in last.

Careful checks should be made for shorts, solder splashes or IC pins soldered on one side only when they should be soldered on both. Only when these checks are completed should the boards be installed and connected up. Screened cable is used for all video and audio signals.

CALIBRATION

Check the 'width' oscillator (IC23) frequency and adjust the span by selecting values for R50 and RV5 (see waveform 8).

To set the sync frequency, connect TP1 to +5v and, whilst monitoring the audio frequency output, adjust RV2 for a frequency of 1200Hz. The simplest way to set black and white levels is to load black and white into the memory and feed AF back into the receive input, adjusting RV's 1 and 3 until peak black and white are achieved. It is most important to ensure accurate calibration of the receive board first if using this method. Alternatively, (or if only one memory is fitted) connecting W2 to 0v will inhibit the line oscillator and prevent the generation of sync pulses. With a peak white video signal (adjust 'Brill' control) and S5 switched to CONTinuous, set RV3 for 2300Hz. Toggle +ve/-ve video switch (S10) and adjust RV1 for 1500Hz. Repeat until both black and white frequencies are correct.

MODIFICATIONS TO G3WCY BOARDS.

a) Analogue board. - It is necessary to invert the polarity of the sync signal VS. The track linking pins 6 and 9 must remain. Cut VS track and link to IC11f, P8.

b) Digital board. - IC32 must time out before IC31 to enable the SSTV to be sampled for transmission. Replace C205 with 220pF. It may be necessary to use a value either side of 220pF to achieve correct timing.

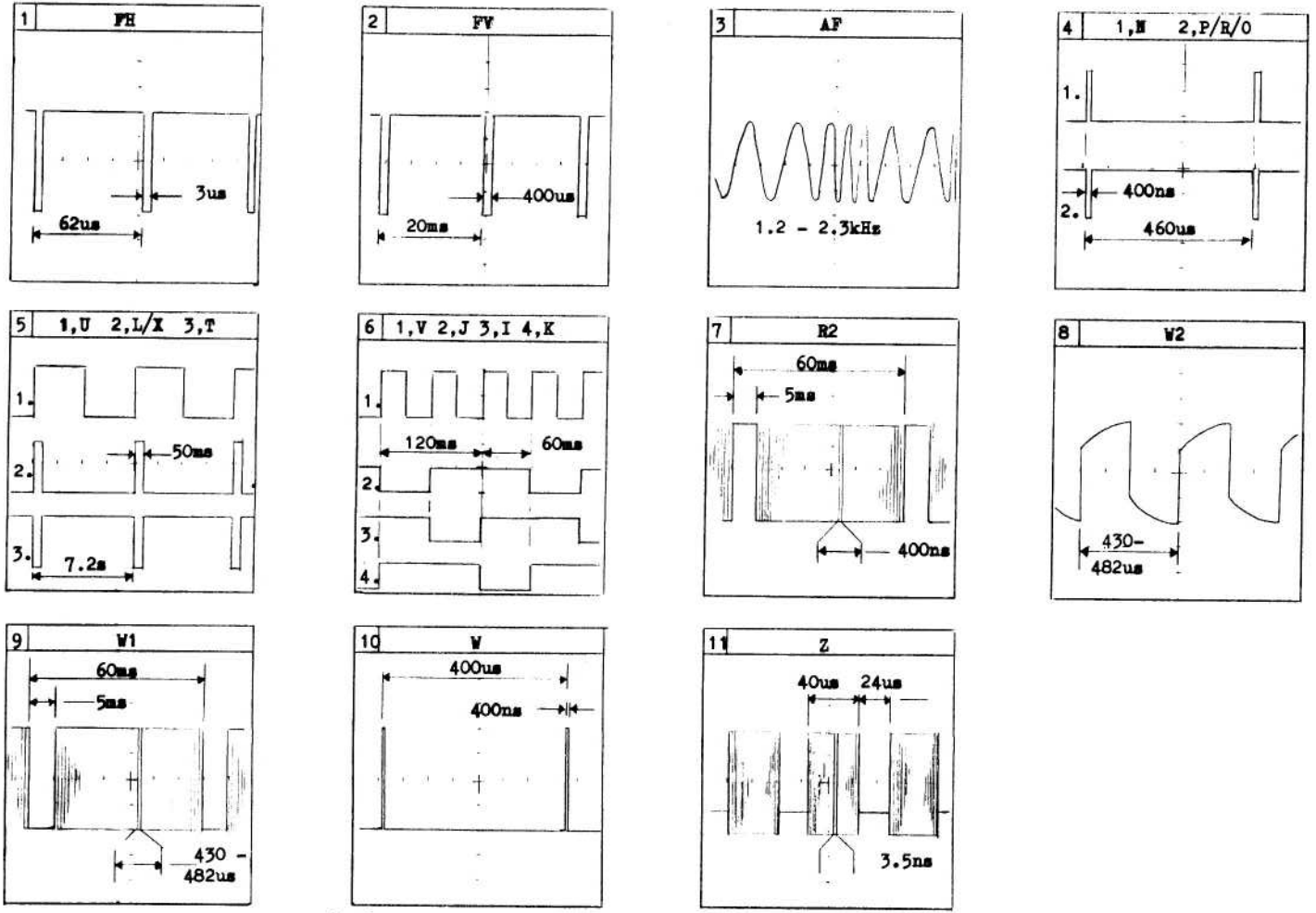
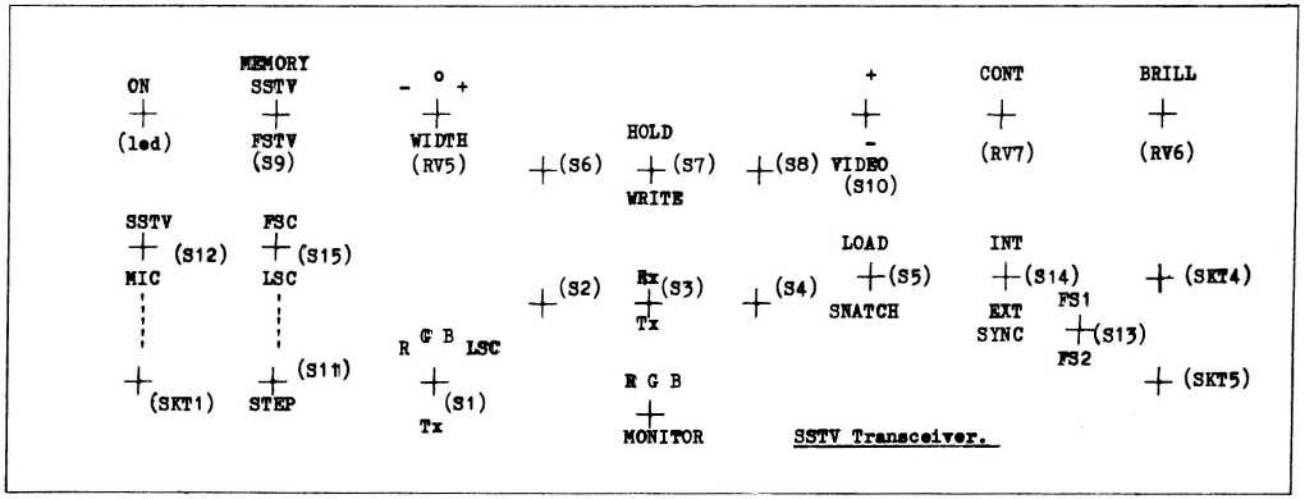


Fig.3 WAVEFORM DIAGRAMS



Case type - ½W12,2U.

Instrument case supplied by :-
H.J.Morgan Smith
Sheet Metal Engineers
Egham House
36 Furlong Road
Bourne End
Bucks. SL8 5AA

Bourne End 20415

Fig.4 FRONT PANEL LAYOUT

c) Break the track connecting IC32, P1 to P3's of IC37 - 40. Each memory R/W line is controlled from the transmit board via switches S2 - S8.

d) If G4ENA memory boards have been fitted, then the CAS (P15) lines, at present switched, must be reinstated to the CAS drive from IC31, P1. Only the R/W lines (P3's of each memory IC) are independently controlled.

Constructors should note that if you have already built the line sequential colour and width control circuits which appeared on page 10 of CQ-TV127, and are now intending to build this transmit system. Both circuits are accommodated on the new board.

OPERATION

Example: Receive SSTV into the RED memory. Set the switches to the following positions: S2 to Rx, S6 to Write, S15 to F.S.C. and S14 to INT. Either INT or EXT syncs can be used if a camera is connected. Adjustment of RV5 will fill the whole picture into memory.

Example: To transmit a picture from the BLUE memory: Set S4 to Tx, S8 to Write, S10 to +ve, S5 to CONT and S14 to EXT. Adjust contrast and brilliance controls to produce a picture which spans all grey levels from peak white to peak black. S8 set to HOLD will store the picture in memory whilst S1 set to 'B' will transmit the picture in memory.

To receive a line-sequential colour picture all three memories must be enabled and S15 set to L.S.C. If a field sync pulse is missed and the wrong colour is being loaded into the wrong memory, then correction is possible using the STEP push-button (S11). Re-transmission of the received colour is achieved by setting S1 to L.S.C.

21-second L.S.C. could be used to transmit three separate black and white pictures at a time. Various methods of generating colour pictures using a B/W camera, colour camera and computer will be the subject of a later article. This will include picture snatch of a R,G,B video signal with suitable interface details. Other developments are in the pipeline.

It is rumoured that the space shuttle will transmit SSTV using the 256 line format during 1985 although very little 256 line SSTV is normally heard on the bands.

An increase in SSTV activity from the present very low levels, would be most welcome. Recent changes to the licencing conditions has opened more spectrum to SSTV (4m and 160m), so it should be possible to avoid 'Kilowatt alley' on 20metres, and the Sunday morning madness on 80. When and where is best???

A printed circuit board for this project is available from Members Services. Please order on the form provided in each issue of CQ-TV.*

* At the time of going to press the boards were not ready. Please enquire (phone or SAE) from Members Services for the latest position.

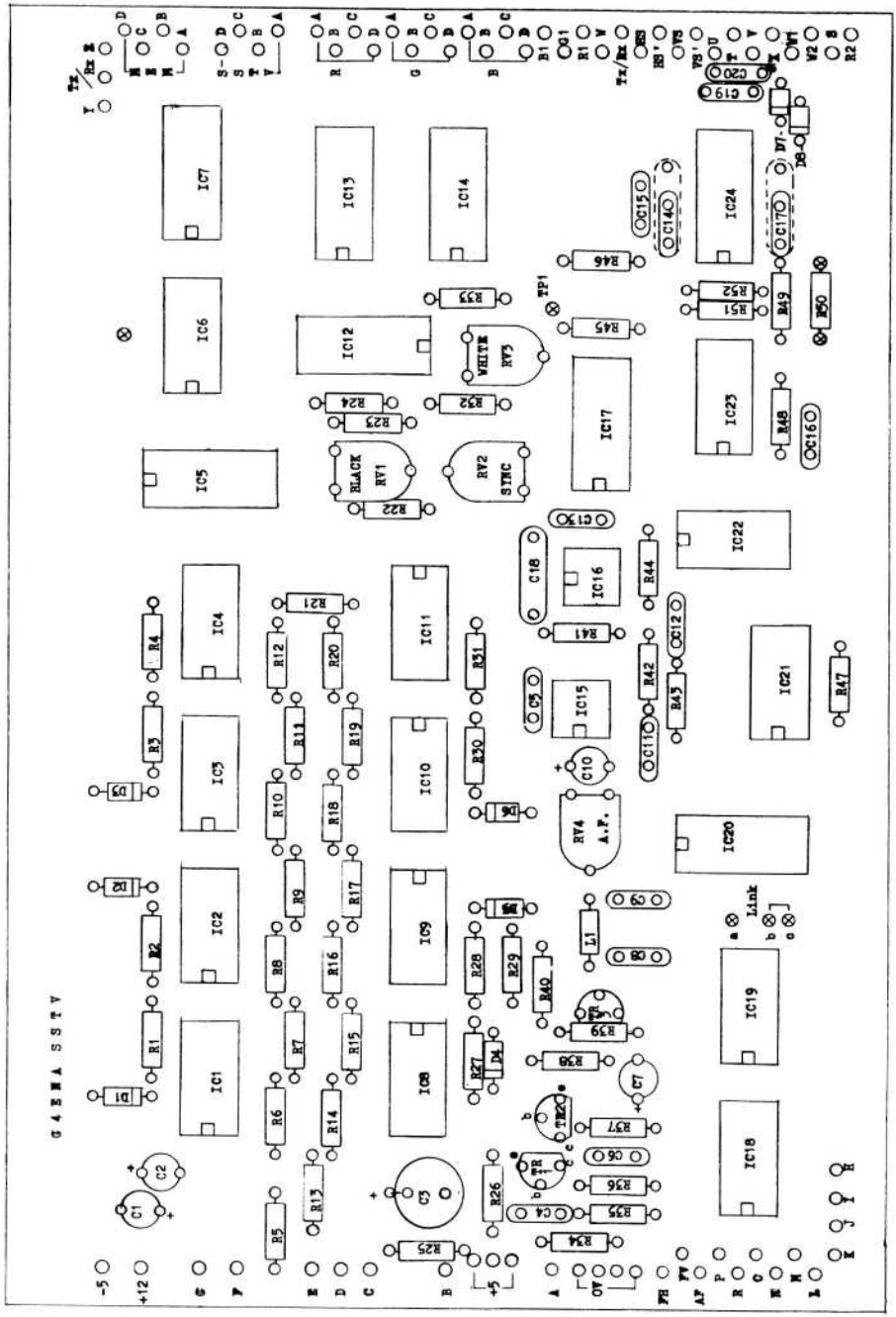


Fig.5 PRINTED CIRCUIT BOARD LAYOUT

G4ENA SSTV Tx Board Parts List.

Resistors.

R1,2,3,4,27-31, 38,44	3K9
R5,34	120R
R6-12,14,21	6R8
R13,42	5K6
R22	10K
R23	5K1
R24	39K
R25	2K2
R26,36,40,41,47	1K
R32,45	10K
R33	20K
R35	120K
R37	47K
R39	4K7
R43,50*	82K
R46,48,52	470K
R49	51K
R51	100K

* S.O.T.

RV1,2	5K (SP)
RV3	100K (SP)
RV4	1K (SP)
RV5,6	4K7
RV7	2K

Capacitors.

C1,2,10	10u (T)
C3	47u (Al)
C4,5,9,15	100n (C)
C6	2n2 (C)
C7	4u7 (Al)
C8	47n (C)
C11,13,16	10n (X7R)
C12	1n (X7R)
C14,17	100n (X7R)
C18	47n (Pe)
C19,20	10n (C)

Diodes.

D1 - 8	1N914

Misc.

L2	4T f.b.
-	Veropins

Transistors.

TR1	BC214 (BC177)
TR2,3	BC184 (BC108)

I.C's.

IC1-4,8-11	LM711CN
IC5,12	74LS75
IC6	74LS86
IC7	74LS157
IC13,14	74LS367
IC15	LM741
IC16	NE566
IC17	4053B
IC18	74LS00
IC19	74LS32
IC20	4017B
IC21	4069B
IC22	74LS74
IC23	4001B
IC24	4538B

Switches.

S1	3P,4W
S2-10,12,13	1P,2W
S11	Push Button.
S14,15	2P,2W

T - Tantalum.
Al- Aluminium.
C - Ceramic.
X7R Medium Stability Ceramic.
Pe- Polyester.
SP- Skeleton Preset.

MICROWAVE BANDS

There's 24cm, there's 13 and 3cm, there's 4 and 12GHz satellite TV not to mention microwave links and radar interference....! Now that we seem to be placed firmly in the microwave camp (not that we're fogetting the rest of course) it is perhaps time that we learn't what those funny band letter designations realy mean. For example, what is 'X' band? That's easy 'cos 10GHz comes into it but what about all the rest? OK then, here they are:

L band	390MHz	-	1.55GHz
S band	1.55GHz	-	5.2GHz
C band	3.9GHz	-	6.2GHz
X band	5.2GHz	-	10.9GHz
K band	10.9GHz	-	36.0GHz
Q band	36.0GHz	-	46.0GHz
V band	46.0GHz	-	56.0GHz

There have been other designations but the above is the one now agreed worlwide. You should however be aware that a military standard exists which is somewhat different from the above, especially if you are offered any ex-WD gear!

ATV REPEATER-GB3CT

By Jack Darby G4TVC

"The Crawley and District Video Repeater Group have built their 1.3GHz ATV repeater for under £150!" This sentence probably typifies the 'no frills' approach which we have to repeater problems, and this short piece sets out in some detail the basic ingredients for a successful project.

First, you must forget about a wide coverage area, after all, with a 25W ERP limit, which is OK for phone, it is pretty useless for ATV. Next, you must create a group of enthusiastic ATV operators within the limited area and lastly, build a repeater which meets the regulations and no more! Forget all the bells and whistles, they can be added later on.

GB3CT aims for a working radius of ten miles. Within this area we have about 20 ATV'ers on 70cm, most have stated their intention of 'having a go' on 24 "if the hardware and information is available". Very few could build high power 2C39 type equipment so their transmitters must be of the same order as those commercial or home brew boxes used on 70, therefore the power likely to be achieved on 24 from such equipment is of the order of 15 or so Watts ERP. Of course if you live in the outback things would need to be a bit different!

If an average home-brewer can build a 24cm video repeater (and we are VERY average), then why not have one in your city, town or village? Sussex has a high level of phone repeater operation, so in our case it was decided not to ask the Sussex Repeater Group for assistance, however your local repeater working group could help, it's worth asking.

GB3CT is the callsign requested in our application. The 'box' will be sited at the highest part of Crawley - 325ft ASL, not very high but the site owner is a group member. Zero site rent is a great persuader! There is no charge for a repeater licence, if you have a few ATV friends in your vicinity, have a go at putting your own unit up. If your licence application fails, all is not lost, the hardware can still be used as an attended QSP box!

To encourage users video repeater groups should make available circuits and 'hard to get' components, thus enabling interested amateurs to become active operators. The loan of a simple receiver and aerial for a few days will help not only in proving the feasability of the prospective location, but will undoubtably encourage him (or her) to get some gear on the air if some pictures can be seen.

When there is a lift on 1.3GHz the chances of making contact with other repeaters could allow those who yearn for DX more contacts than using the simplex frequencies.

The Crawley and District Video Repeater Group intend to provide real assistance to any potential operator, it's not enough to say "we've put up a TV repeater now use it". Circuit details for the repeater are available on receipt of a SAE sent to me (QTHR).

CIRCUIT NOTEBOOK
No. 41

By John Lawrence GW3JGA

A COLOUR GENLOCK BOARD FOR THE BATC PROJECT 100 SPG

This is a design by David Ellis Jones, GW8PBX, and is built around a domestic receiver PAL decoder chip, the TDA 3950.

This device contains burst gating circuitry, a reference lockable crystal oscillator, a bistable which regenerates VAS (phased to the incoming video), and an on-chip 8v5 zener stabiliser. As used in the GW8PBX circuit, the chip takes in filtered chrominance (burst plus active line chrominance) and a gating signal derived from line drive, and gives out subcarrier and VAS locked to the external video reference, together with an LED 'colour lock' indicator.

In a receiver application (the intended use !) the locked subcarrier output is taken from pin 9. This is blanked at line frequency, which is fine for a receiver BUT for generating colour we need a contiouous subcarrier (otherwise the burst would never be generated as we would not actually be making any subcarrier during this time - it's blanked !). Hence the somewhat unorthodox tap off the crystal - being before the blanking circiutry in the chip. To avoid upsetting the oscillator, a very high impedance FET source follower is used.

The FET circuit feeds (1) an amplifier stage and emitter follower, giving 6 outputs max. of 1v subcarrier into 75R, and (2) a limiting amplifier stage and schmitt (1/2 7413) giving TTL level subcarrier for the SPG reference to pin 3 on the board.

Note: The TTL level CSC is not needed in the genlock mode as the SPG is "fixed", having done a "mono" genlock pulse-wise, the BLO adding the missing ingredient - the locked colour subcarrier.

When not locked to external video, the whole SPG can be locked to a stable CSC (on 'video in' of BLO board) THEN the TTL reference to pin 3 is required together with the offset circuitry published in CQTV 103.

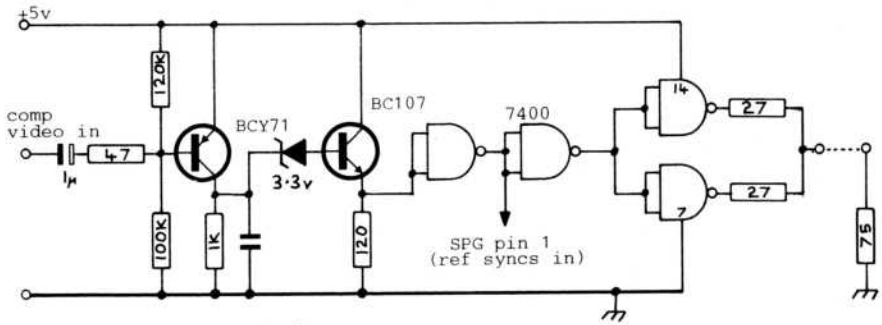


Fig.2

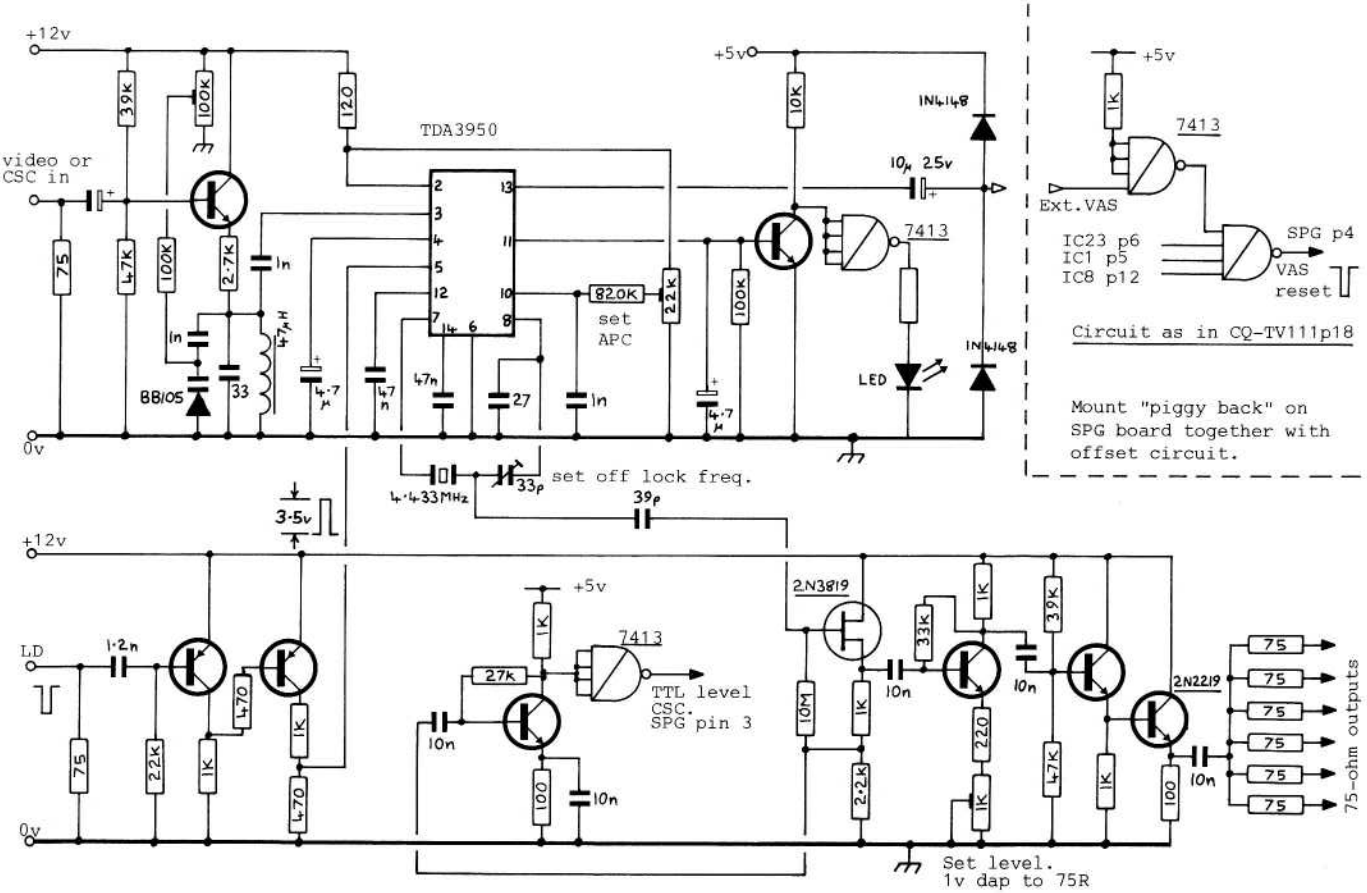


Fig.1 CIRCUIT DIAGRAM

All NPN transistors BC107 etc.
PNP transistors BCY71 etc
(unless otherwise marked)

In the receiver circuit, line flyback (suitably shaped) is used as a burst gating signal. In the GW8PBX circuit SPG line drive is delayed and inverted as a gating signal. As the SPG will have locked, the line drive is also locked and timed to line up with external (off-air or whatever) signals.

The SPG burst gate signal, though it might seem the most obvious gating pulse to use, CANNOT in fact be used as it is not line-continuous - being blanked out for 9 lines during the field blanking period. This would upset the VAS resetting system.

Video is passed to an emitter follower stage with a 4.433 MHz tuned circuit at its earthy end - the filtered chrominance signal being fed to IC input pin 3.

The whole system locks nominally to -(B-Y), 180 deg subcarrier phase, but the additional varicap loading provides a fine trim of overall system phase. An RS Components 47uH choke was used in the prototypes - the varicap circuitry then providing about +/- 15 deg of trim - a higher-Q component would allow more phase correction if needed.

Fig. 1. shows the main circuit whilst Fig.2 shows the companion sync separator circuit which has been found to be excellent (ex CQTV 77 Feb. 1962).

OPERATIONAL NOTES.

The 'colour lock' LED will illuminate (steady) when CSC lock has been achieved. It will also flicker as the SPG locks up to external video.

The IC samples active line chrominance, treating this as a colour burst and locking the oscillator to average phase, as shown in Fig. 3.

No provision has been made for phasing individual CSC feeds, this should present no problem in the amateur set-up as all cables to individual coders can be of identical length.

If the output transistor gets too warm - add a heatsink !

Three copies of the circuit have been built and all worked OK. If there is sufficient demand, a PCB will be made available from Members Services, (please enquire from there).

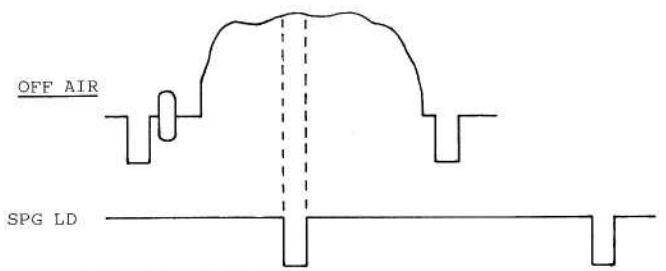


Fig.3

BATC AT SCOTTISH CONVENTION

The club boosted its membership by 23 at the Scottish Amateur Radio Convention held in Cardonald College. Business was handled by Norrie GM4BVU....the one in the kilt applying gentle persuasion to a prospective customer....and Elvin GM8BBA, with excellent demonstrations of hardware and ATV software by George GM3RVK and his son Steven GM4SJL from Kennoway, and George GM6AOR from near Bathgate.

Elvin GM8BBA, George GM6AOR and Bill GM4UBJ (L to R) discuss the finer points of ATV in GM!

A hitherto unheard of event, captured by the camera! George Russell GM8JYJ parts with a fiver for BATC membership.

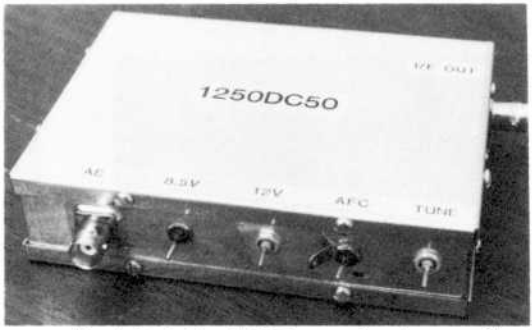
GM3RVK shows new member Robbie GM4UQG of Hamilton his DRAE slow-scan unit.

George was ably helped by his son, Steven GM4SJL to set up this impressive display of WORKING ATV, including two BBC Model B's!

EQUIPMENT REVIEWS

by Andy Emmerson G8PTH
and John Wood G3YQC.

At last we have an opportunity to review two Wood & Douglas products: their new 1250DC50 tunable downconverter and the already familiar VIDIF FM demodulator. Together they take an FM TV signal anywhere in the 23/24cm band and bring it down to baseband video, which can be displayed on a normal monitor (or put into a channel 36 modulator for viewing on a domestic TV set).

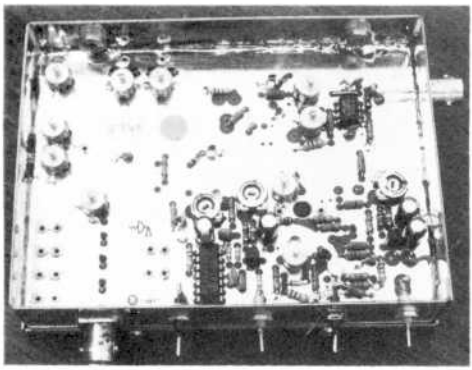


The downconverter comes in a sturdy tinplate box 5" x 3.75" x 1.25". The video IF board also fits into the same size box, which is available separately. I put my board in this box and would recommend you do likewise; the combination will then fit nicely into a standard no. 202 Verobox.

Both items are available ready assembled, but the VIDIF can also be supplied as a kit. The downconverter is not available in kit form however, and the manufacturer's explanation makes sense. "The complexity of the circuitry demands a high level of instrumentation to allow correct alignment, and minor variations in assembly technique could not be tolerated at such a high frequency." In other words this is not a "shake the box" plastic aeroplane kit! With this in mind I had to take the lid off and see the standard of their construction; it is exemplary, with separate compartments for the RF circuits.

SPECIFICATION - 1250DC50

Input frequency range.....	1240-1325 MHz
Intermediate frequency.....	50 MHz (nominal)
Conversion gain.....	25 db minimum, 30 dB typical
First RF stage.....	MGF1100 GaAsFET
Mixer type.....	discrete schottky ring
Post mixer processing.....	SL560c amplifier
Operating voltage.....	11.5 - 14.0v DC
Operating current.....	80 mA (nominal)
External connections.....	AFC input, supply input, tuning voltage input, 8.5V output
RF connectors.....	BNC



Looking at the PCB one can see the signal entering a bandpass filter, gain-matching it for the GaAsFET, then out through another filter to the ring mixer. There is an NE219 VCO controlled by two BB221 varactors and a BFR91 following. A standard Plessey SL560 amplifier leads to the output. The overall noise figure is not quoted, though it seems to be adequate. The AFC seemed unnecessary for FM to a colleague; the phase-locked loop in the VIDIF ought to be able to track the incoming signal. It is clear that a lot of thought has gone into this design, though.

After all this hi-tech, the VIDIF board seems quite tame! No problem though, it is a workmanlike product. You get a circuit diagram in this case which helps you follow the signal past an OM335 hybrid amplifier to limiting and demodulation (NE564 p.l.l.). A positive or negative video signal can be selected: all amateur FM signals are positive sense though the board comes with the link set to negative. Anyway, it's no trouble to change this. Twin 1-volt video outputs are supplied, also a 6 MHz audio signal for external detection and AFC (for front end tracking) and AGC voltage (for S meter).

SPECIFICATION - VIDIF

Input signal range.....	40 - 55MHz
Supply voltage.....	12V (with internal stabilisation for PLL supply)
External connections.....	AGC output, AFC output, IF input, twin video outputs, 6MHz audio output, supply voltage.

Connecting the two boards is a simple matter; your selected cabinet will need to be provided with modulation sense switch and tuning potentiometer. A volume control and loudspeaker - also S meter - are optional extras.

I have tried only one other manufacturer's FM receiver on the air and its performance was disappointing. After trying these two W&D units over a period of a fortnight I had no hesitation in buying them. I am not saying this is the definitive 24cm receiver design, but of those currently available it seems the best. I find the performance very satisfactory.
Good points to note are the first rate rejection of radar signals (pointing to good limiting) and no spurious 'taking off'. The modulation sense is absolute: you cannot mistune a signal with the wrong sense as you can with a rival product or some home-brew designs. The units are not a plug-in and turn-on job: you still have to build the case and peripheral circuitry. For many people this is an advantage anyway. The modules are normally available from stock, which is a particular advantage.

Made in Britain

I have two grumbles: that there is no provision for 5.5MHz sound and the tuning spreads way above the top of the band. If there is to be an overspill why not have it at both ends as some French stations still use 1227MHz? The packing of the bare VIDIF boards does need to be improved, though; in my case mishandling in the post caused the coils to poke through the jiffy bag and ... crunch! A custom-designed audio board is planned and will hopefully be reviewed here in due course.

WOOD & DOUGLAS,
Unit 13, Young's Industrial Estate, Paices Hill, Aldermaston, Berks., RG7 4PQ.
(Telephone 07356-71444)
1250DC50 Downconverter, £69.95. assembled. VIDIF board, £38.95 kit or £54.25 assembled.
Custom box for above, £5.50.
Postage 75p extra on all above items.

Made in Britain

Solent 24cm recieve converter

This Solent Scientific 24cm ATV down-converter is designed for general ATV reception within the 1.3GHz amateur allocation. It converts 1.3GHz signals to frequencies within the domestic UHF TV band, thus enabling a domestic television or a purpose-built tuning system to be employed as a tunable IF.

The product is unusual in that it is available both as a kit or a ready-built and tested unit. For the purpose of this review the equipment was supplied in kit form.

DESCRIPTION

The converter kit consists of a double sided printed circuit board having plated through holes, a bag containing all PC mounted components and five pages of documentation.

The board is to a high standard and appears to be of good quality base material. The plated through holes not only make through-staking unnecessary but ensures that the correct earthing conditions are met by ALL constructors. This is particularly important when one considers the frequencies involved.

The components are all of good quality and are easily identifiable. Any particular points such as, trimmer capacitor colour coding and transistor pin outs, are explained in the accompanying instructions.

The assembled board may be initially tested by itself but, for general operation, should be securely mounted in a diecast box. In order to do this a box, two coaxial connectors (BNC) and a suitable means of conveying the DC supply into the enclosure is required.

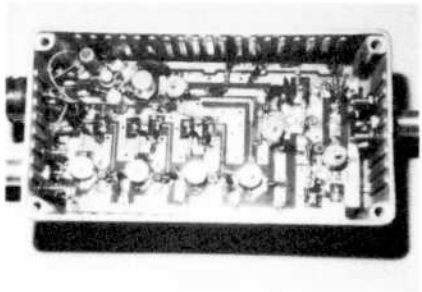
The paperwork which comes with the kit is comprehensive. A complete parts list is given together with details of one small coil which is formed using a resistor lead.

Step by step instructions are given for assembling the board as well as full details on the testing and alignement procedure.

Circuit and board layout diagrams are also included and, although hand drawn, are quite adequate. However, due to the use of component references on the layout diagram, it was necessary to continually refer to the parts list for the values which can be a little tedious.

CIRCUIT AND CONSTRUCTION

Three bipolar RF amplifiers are provided at signal frequency; the first being tailored for minimum noise. The oscillator is a conventional, free running bipolar design having printed inductors. The mixer uses a Hewlett Packard 5082-2800 Schottky Barrier Diode and a single IF amplifier completes the signal path. A two transistor voltage regulator provides a stiff 10v to the circuitry. An 'idiot' diode is also included as a safeguard against reverse polarity connection.



Anyone who can handle a soldering iron and follow circuits and layouts should be able to construct this equipment. The paperwork points out any special requirements such as absolute minimum lead lengths etc, which must be rigidly adhered to if best performance is to be realised.

When construction is finished a number of unfilled holes will be observed on the board. These are not for missing components but are there for grounding purposes to the lower plane of the PC board.

PERFORMANCE

The converter was assessed under laboratory conditions using a Hewlett Packard 8558B spectrum analyser, a Hewlett Packard 8614A UHF signal generator and a Kingshill 60V2 variable power supply.

The unit was assembled and tested in an 'average' amateur shack having access to no more than the normal equipment expected to be found therein. The following performance figures were taken from the unit without any further alignment:

Maximum overall gain was 18dB.
Bandwidth at the -3dB down points was 67MHz.
Local oscillator output (fundamental) at the IF output socket was -16dBm (max).
Local Oscillator second harmonic at the IF output socket was -28dBm.
Local oscillator overall tuning range: 472 - 780 MHz.
Maximum change in LO output level over its entire tuning range: 5dB

The stability of the local oscillator after a couple of minutes warm up was excellent, although timed measurements were not made.

A re-alignement was carried out using the test equipment but no significant improvement could be affected, however, I was particularly impressed by the smooth way in which the various trimmers operated. They showed little tendancy to self oscillation or instability and, although some capacitors were fairly critical to set, they were not unduly so and no problem was experienced in aligning the unit. Unconditional stability was maintained even with no aerial on the input.

Voltage regulation was excellent, the on-board regulator producing 10 volts. Since the input voltage needs to be at least 1.5v more than the output, one should ensure that no less than 11.5v is applied to the board. Ideally the voltage should be in excess of 12v (13.8v is just right) in order to provide a reasonable margin for regulation.

I LIKED THE.....

Good quality board and components.
Plated through holes.
Ease of construction.
Stability and reliability of operation and the ease of adjustment.
Excellent documentation.

I DID NOT LIKE THE.....

Layout diagram and the fact that continual reference had to be made to the (separate) parts list for component values.
G8CMQ callsign printed on the PC board.

CONCLUSION

The converter performed very well on air. Considering that a UHF tunable IF is used, breakthrough of commercial programmes was surprisingly low, (after correct mounting in a screened enclosure). The overall gain was found to be a bit low for long distance contacts, but not so low as to adversely affect its use for general reception. A good, low noise pre-amplifier (preferably at mast head) would undoubtably improve overall performance. In fairness, this is also the case with most converters at present on the amateur market.

A good quality converter which, at £35.95 (inc), represents good value for money.

Solent Scientific. 75 Chalk Hill, SOUTHAMPTON, Hants.

NBTVA - Membership offer

The Narrow Bandwidth Television Association is offering membership during 1985 for BATC members at a reduced rate.

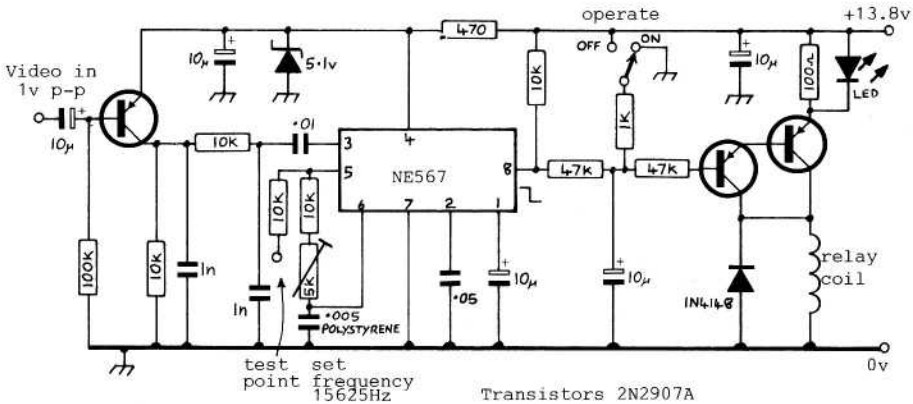
Two conditions must be met:
1) You must NOT have applied for NBTVA membership previously.
2) You must be able to prove current membership of the BATC.

If you are interested, send a crossed cheque or P.O. for £2.00 (normal subscription is £3) to the Treasurer; S.Kujawinski, 54 Park Drive, Nottingham NG15 7LU, enclosing the WHOLE envelope in which this copy of CQ-TV arrived. Write "Membership Offer 1985" on the CQ-TV envelope before you fold it up. No covering letter is needed.

VIDEO OPERATED RELAY

This video operated relay is designed to key a small 12v relay when horizontal sync is sensed at its input. It can be used in a variety of applications, for example, to remotely activate a video recorder, in an ATV repeater system or as a receiver warning alarm. Should it be necessary to activate a heavy relay, say for transmitter power applications, the small relay may be used to switch in a large one.

The VOR circuit first separates horizontal sync from the video and noise, this then passes to a NE567 tone decoder IC whose frequency is set to 15625Hz (line frequency). The decoder output signal changes state after about a tenth of a second and causes current to flow in the final transistor so energising the relay. A switch is provided to enable the circuit to be de-activated. A drop out delay of around 0.5 second is provided to cater for quick fades or multipath dropouts. The attack and delay times are determined by the 10uF and the 47k resistors associated with pin 8.



The frequency of the decoder should be set by using a frequency counter connected to the test point and carefully adjusting the pot to within 100Hz of 15625Hz. This should be done with no video connected. The normal lock-in range is around plus and minus 800Hz to allow for odd computer horizontal frequencies or badly adjusted cameras.

This circuit appeared in A5 Amateur TV magazine for August 1984 and thanks are due to the author and publisher for permission to reproduce it here. The design is from P.C.Electronics of 2522 Paxson Lane, Arcadia, CA91006, USA who produce a printed board or assembled module.

CONTEST NEWS

1984 INTERNATIONAL CONTEST

Congratulations to G8MNY for coming first on 70cms and to G8VBC for winning on 23cms. Certainly conditions were not at their best - G6WOR/P who could almost see the English Channel worked no continentals and ON7ZI and GU8FBO were the only "DX" stations available in the South - and then only for a few minutes at a time. However the level of activity on both 70 and 23 was better than ever and shows just how much interest in ATV continues to grow.

There appears to have been some confusion about the rules this year although they are basically unchanged from previous. Firstly the contest is in reality 3 contests. Each band viz 70, 23, 3cms is counted separately (hence no band multipliers) so there are 3 winning stations. Obviously it might encourage activity on the higher bands to have a "multiband" contest - see Summerfun details below.

SWL stations are those who see callsigns and code groups from other ATV stations - they must not call CQTV on phone and give half points to other contest entrants, ie "receiving Only Stations" means just that !

Full international results should be available in time for the next issue so - "Watch This Space".

'We hoped this year would have better weather but a storm in the middle of the night took out the 70cm mast at 45 feet - snapped in two - but put back up at 28 feet within 1 hour at 03.45' (G8MNY)

'Weather varied from warm sunny mild breeze to horizontal rain with galeforce "blow you away" wind' (G6CUQ/P)

'Diabolical weather! how about fixing the International Contest for summertime' (G6WOR/P)

'A very enjoyable contest' (G4RMA)

'Conditions were horrible but I enjoyed it' (G8VBC)

'The 23cms receiver could have been better if we had fitted the masthead preamp the right way round' (ANON)

SUMMERFUN ATV CONTEST

DATE:	SUNDAY 16TH JUNE 1985
TIME:	09.00 - 16.00 GMT
BANDS:	70/23/3CMS
SCORING:	The winner will be the station with the highest total combined score for all bands.
	Two way ATV QSO's on 70cms - 2 points per kilometre
	Two way ATV QSO's on 23cms - 8 points per kilometre
	Two way ATV QSO's on 3cms - 25 points per kilometre
	One way QSO's will count for half points

EXCHANGES: The following data is to be exchanged.

1. The usual 4 figure code group consisting of non sequential numbers. This code is to be selected by the entrant and must not be changed during the contest - the code group must be exchanged in video only
2. Callsigns - NEW LOCATOR - report, serial number (starting from any 3 figure number) - this data may be exchanged in video or on phone.

LOGS: The contest coordinator MUCH PREFERS entries on BATC log sheets and cover sheets (available from address below for an SAE).
Logs must record - time date callsign, report and serial sent, report and serial no received, code group received, distance and points claimed.

COVER SHEET: This must include name, address, callsign,code group sent, claimed score, new locator and station equipment details.

AWARDS: A special prize to the leading station overall and to the band leaders on both 23 and 3cms will be awarded.

ENTRIES: To be postmarked not later than 1st July 1985 and sent to:
G Shirville G3VZV. 18 Church End, Milton Bryan, Milton Keynes, MK17 9HR

1984 SEPTEMBER INTERNATIONAL ATV CONTEST

U.K. RESULTS

23CMS

POSITION	CALLSIGN	POINTS	QSO'S	LOCATION	POWER	ANT	BEST DX
1	G8VBC	602	9	ZM13E	30	-	G4LRT-52K
2	G6WOR/P	550	10	ZK09F	5	4X23Y	G4WGZ/P-93K
3	G4CRJ	351	4	ZL37F	-	23Q	G6WOR/P-84K
4	G3YQC	262	5	ZM54B	35	15/15	G8VBC-50K
5	G4EUF	257	6	ZM24J	3	20H	G3DFL-51K
6	G5KN/P	201	5	ZM455	12	F9FT	G8VBC-46K
7	G4WGZ/P	145	3	ZL26F	2	26Q	G6WOR/P-93K
8	G6HCT/P	139	2	ZL29F	10	F9FT	G6WOR/P-83K
9	G4LRT	126	5	ZM45D	-	27Q	G8VBC-52K
10	G8PTH	111	3	ZM56E	2	20H	G5KN/P-23K
11	G4VTD	110	1	ZL50D	2	F9FT	G4CRJ-55K
12	G6JFN	98	2	ZL07C	2	F9FT	G4WGZ/P-40K
13	G4LXC	67	2	ZK20B	1	F9FT	G6WOR/P-24K
14	G1APD	40	2	ZK04J	0.1	-	G4JQV-15K

70CMS

POSITION	CALLSIGN	POINTS	QSO'S	LOCATION	POWER	ANT	BEST DX
1	G8MNY/P	4770	34	ZL26F	250	88M	G6GON/P-230K
2	G4CRJ	4692	40	ZL37H	350	88M	ON7ZI-293K
3	C6CUQ/P	4381	28	YM36J	100	88M	G8MNY/P-165K
4	G6WOR/P	4332	41	ZK09F	100	19Y	GU8FBO-225K
5	G4NUT	3538	35	ZM77A	400	24Y	ON7ZI-309K
6	G6YLG	3451	32	YM40E	100	2X88M	G8CMQ-184K
7	G5KN/P	3085	23	ZM455	30	21Y	G6CUQ-122K
8	G4RNA	2636	24	ZN43B	100	2X48M	G5KN/P-120K
9	G1DDA/P	2337	25	YN79B	70	18P	G4WVI-223K
10	G4EUF	2294	20	ZM24J	10	18P	G4CRJ-126K
11	G6HCT/P	1947	31	ZL29F	50	88M	GU8FBO-290K
12	G4RSB/P	1887	22	ZN53C	80	2X18P	G3RJM-107K
13	G3SQQ	1749	17	ZN74B	50	48M	G6CUQ/P-127K
14	G1COI/P	1701	19	ZK09D	20	24Y	G4NUT-138K
15	G8UGU/P	1660	13	ZM64B	3	48M	G6YLG-197K
16	G8BWC	1568	22	ZN74J	25	48M	G8UGU/P-186K
17	G6HMS	1463	14	ZN67C	100	2X48M	G5KN/P-89K
18	G3YQC	1434	15	ZM54B	12	18P	G6CUQ/P-115K
19	G4VTD	1343	22	ZL50D	80	21Y	G4NUT-92K
20	G6PKS	1316	20	AL41J	20	21Y	G4NUT-92K
21	G3SBV	1151	18	ZL50J	5	21Y	G8MNY/P-64K
22	G1BTF	981	13	AL32E	50	21Y	G4NUT-95K
23	G8ZQF	906	13	YL38G	100	22Y	G4NUT-142K
24	G4VBS	837	9	AM64G	100	2X48M	G4NUT-92K
25	G1APD	830	10	ZK04J	-	-	G4CRJ-83K
26	G6JFN	797	11	ZL07C	30	-	G6WOR/P-117K
27	G6SKO	754	14	ZN74H	80	48M	G3YQC-84K
28	G8XPZ	702	11	ZN74E	10	48M	G6YLG-77K
29	DA4DG	602	7	DL61C	8	21Y	DB4ET-84K
30	GM4BVU	581	22	XP20E	-	-	GM6JWH/P-35K
31	G2BMI	526	12	ZL38J	12	18P	G8DTQ-43K
32	G8PTH	434	10	ZM56E	150	48M	G3DFL-76K
33	G4TEP	420	10	ZL29D	10	88M	G1COI-P-90K
34	G8EUX	288	5	ZM66F	-	-	G5KN/P-34K
35	G4LXC	116	3	ZK20B	38	88M	G6WOR/P-24K

MEMBERS SERVICES

Items from these lists are available to club members only.
This list supercedes all previous ones.

QTY	PRINTED CIRCUIT BOARDS	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	
	Amateur television receiver (HB1)	£1.50	0.30	
	Electronic character generator (HB1)	£3.00	0.30	
	Colour test card (set of 3-double-sided)	£15.00	0.60	
	Horizontal aperture corrector (HB1)	£3.00	0.30	
	PAL colour coder (HB1)	£3.00	0.30	
	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	
	Piggy-back keyboard (HB2)	£2.25	0.30	
	70cm TV transmitter (TVA and CQ-TV122)	£3.00	0.30	
	ATV up-converter (TVA and CQ-TV112)	£2.25	0.30	
	Video filter (TVA and CQ-TV122)	£1.00	0.17	
	SPG, greyscale, char gen (Ham Radio Today)	£4.set	0.60	
	G3WCY SSTV to FSTV converter & reprint (Rad Com)	£10.set	0.60	
	G4ENA modifications for above CQ-TV127 - set of 4	£5.set	0.30	
	Sync processor (CQ-TV129)	£3.00	0.30	
	STATIONERY,ACCESSORIES AND COMPONENTS			
	BATC test card - with data sheet	0.50	0.24	
	BATC reporting chart (illustrated)	0.12	0.20	
	BATC lapel badge - diamond - button hole	0.40	0.17	

_____	BATC lapel badge - round - pin fastening	0.50	0.17	_____
_____	BATC callsign* lapel badge-pin fastening	£1.50	nil	_____
	*Write callsign CLEARLY. Sent by supplier			
_____	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	_____
_____	1" Vidicon scan-coils (low Z focus coils)	£6.00	£1.20	_____
_____	1" Vidicon scan-coils (high Z focus coils)	£6.00	£1.20	_____
_____	2/3" Vidicon scan-coils	£6.00	0.80	_____
_____	Vidicon bases - 1" or 2/3" (state which)	0.50	0.17	_____
_____	TV camera lens mounts - 'C' type	£1.00	0.24	_____
_____	13.14MHz TV TX crystal (Hbk 2)	£5.00	0,17	_____
_____	108.875MHz TV TX crystal (TV for Am)	£7.00	0.17	_____
_____	5MHz SPG crystal (P100)	£2.75	0.17	_____
_____	TBP28122 PROM. Pre-programed for colour test card circle. (eqt.74S471)	£10.00	0.25	_____
_____	2732 EPROM. SSTV program (HB2)	£12.00	0.17	_____
_____	4.433618MHz PAL colour subcarrier crystal HC18-U (wire leads),	£2.75	0.17	_____
		TOTAL		£_____
	*HB1 & HB2 = BATC Handbooks. TVA = TV for Amateurs	POSTAGE		£_____
		TOTAL ENCLOSED		£_____

CAMERA TUBES & ORDERING INFORMATION

Members requiring EEV Leddicon, EMI 9777 Ebitron, 9728, 9706, 9677 (1" EMI) vidicons or 9831 (2/3" EMI) vidicon should enquire for the latest prices and delivery. ALL enquiries needing a reply should include a SAE or IRC. OVERSEAS MEMBERS should ask for a quotation of postage costs before ordering. PUBLICATIONS must be ordered separately from the Publications Department. CHEQUES are payable to "The BATC" and should be for English banks only please ORDERS TO:- Mr. P.Delaney. 6 East View Close, Wargrave, BERKS RG10 8BJ, England. Tel: 073 522 3121

BLOCK LETTERS PLEASE

name	call
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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	____
	CQ-TV BACK ISSUES. The following issues are still available although stocks of some are low. Please circle those required.			
____	68,77,89,90,91.....	0.25	*	____
____	94,96,100,102,108,111,119,.....	0.50	*	____
____	122,123,124,125,126,127,128,129..... *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 per sheet	0.20	____
____	INDEX. All main articles in past issues of CQ-TV and 5 Handbooks. Inc. page count, (essential for ordering re-prints). (40gm)	£1.00	nil	____

TOTAL £____

ANY EXTRA POSTAGE £____

TOTAL ENCLOSED £____

Weights indicated above are in Grammes and are to assist in estimating the correct amount of postage.

Please send orders for publications only to:-

BATC PUBLICATIONS, 14 LILAC AVENUE, LEICESTER, LE5 1FN, ENGLAND

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name	call
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More hardware than an ironmongers

More demo's than Tupperware

More junk than Steptoe's yard

More chat than mother-in-law

More traders than the E.E.C.

More TV's than the BBC

More lectures than dad

ALL THIS AND MORE AT.....

BATC RALLY/SHOW '85

5th May 1985 at CRICK POST HOUSE HOTEL

FULL DETAILS IN THE NEXT ISSUE OF CQ-TV.

Further information from Mike Cox, 10 Moorfield Avenue, Scholes, Cleckheaton, W.Yorks Tel: 0274 875066

EQUIPMENT REGISTRY

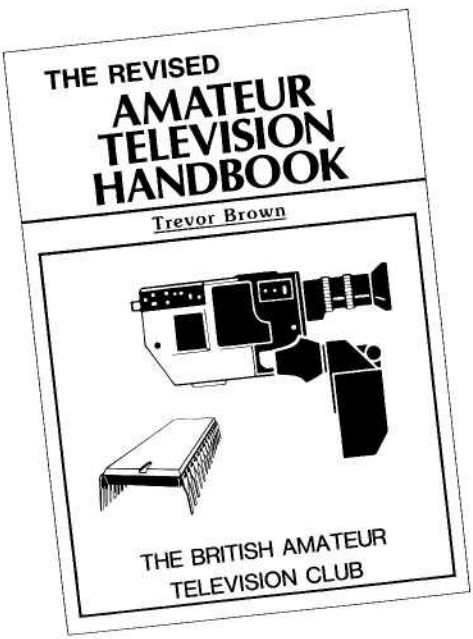
The Equipment Registry was started way back in the early seventies, to cater for the needs of members with equipment for disposal and also, when ex-broadcast gear became available, to help distribute this throughout the club. This system worked extremely well for the first seven or eight years but since then demands have declined steadily, we did at one time have a silly period when very trifling items seemed to be placed with the registry, but by and large it did fulfill a very definite need. Recently correspondence seems to have reached a very low level, with much of it being requirements only. Most of these have been passed to Brian Summers who has processed some via his computer, the rest have had to be placed in the 'Market Place' section of CQ-TV.

Do members now think that this service should be discontinued or even changed to a different system? Should we maybe have more negotiations with Broadcast companies and manufacturers of broadcast gear to see if they have more for disposal, this could mean storage problems, particularly with certain items that we could not find homes for!

In passing, I feel that mention must be made of London Weekend Television who have themselves been extremely generous via our President Roger Appleton, many thanks.

Perhaps you have ideas of your own which you would like to air, I should be grateful for any suggestions you have so please put pen to paper and send your ideas to me at: 'Somerby View', Bigby, Barnetby, Lincolnshire DN38 6EU.

Alan R. Watson,
BATC Equipment Registry.



SYNC PROCESSOR

By Nick Harrold G4IMO
& John Wood G3YQC

This sync processor provides the means whereby a locally generated or off-air television signal having poor synchronising pulses may have a complete set of new - near broadcast specification - pulses added in perfect synchronism with it, thus permitting a TV monitor to display the picture without the distortion which may otherwise occur.

The photographs here and on the front cover adequately demonstrate just what a significant difference sync processing can make, particularly to a weak signal.

We all have the problem. Trying to lock - in a weak DX station whose signal is so distorted that the frame persists in rolling and the picture verticals are all ragged and in some cases distorted and twisted across the screen. One can spend a long time trying to make a positive identification of the signal, however, if the sync pulses could be made of sufficient quality to allow the monitor to do its work, the problem would be considerably eased.

BACKGROUND

Nick Harrold developed the original system as an aid to locking 4GHz satellite TV pictures. It worked so well that the circuit was passed to Hugh Cocks who, at the time, was writing for 'Satellite TV News' magazine. Hugh embellished the basic design with some circuits of his own and the resulting system was published in STVN magazine. It must be said though that the article was so poorly put together and there were so many mistakes in the drawings (not Hugh's fault) that it is doubtful whether any but the very experienced were able to build the design satisfactorily.

Once the system was examined with an eye to applications in amateur television, the potential was realised and so, after much experimentation and modification, the system described here was devised and has been built several times in prototype form to ensure that it is (hopefully) error free. Approximate cost?....£50 (assuming all components are purchased new).

Although the unit was designed especially for use as an aid to receiving off - air pictures, there is no reason why it shouldn't be used in the shack where it may be 'genlocked' to any vision source including video recorders. With this in mind, provision has been made to switch between two time constants within the processor's locking circuits. The design in its present form will not provide colour pictures but it is possible that a future version may be colour compatible.

CIRCUIT DESCRIPTION

Operation of the circuit may be likened to the flywheel sync system commonly used in domestic television sets.

A demodulated, composite video signal is applied - at the standard 1v p-p level - to Tr1 where it is inverted and amplified to 3 volts and passed to IC1.

IC1 is a Horizontal Combination device used widely in domestic sets as a line oscillator. The chip has a noise gated sync separator, a line oscillator which may be phase-locked to the incoming signal and a variable time constant for video recorder applications.

The horizontal oscillator pulse train appearing at pin 2 is locked to the incoming frequency by VR3 and set in phase with it by VR2. The pulses are brought to TTL level by Tr2 and passed to one half of a dual monostable IC2 whose time constant is set to produce pulses of 10uS duration at its output. These pulses are fed back to IC1s coincidence detector and phase comparator for loop 2 as well as to the input of IC3.

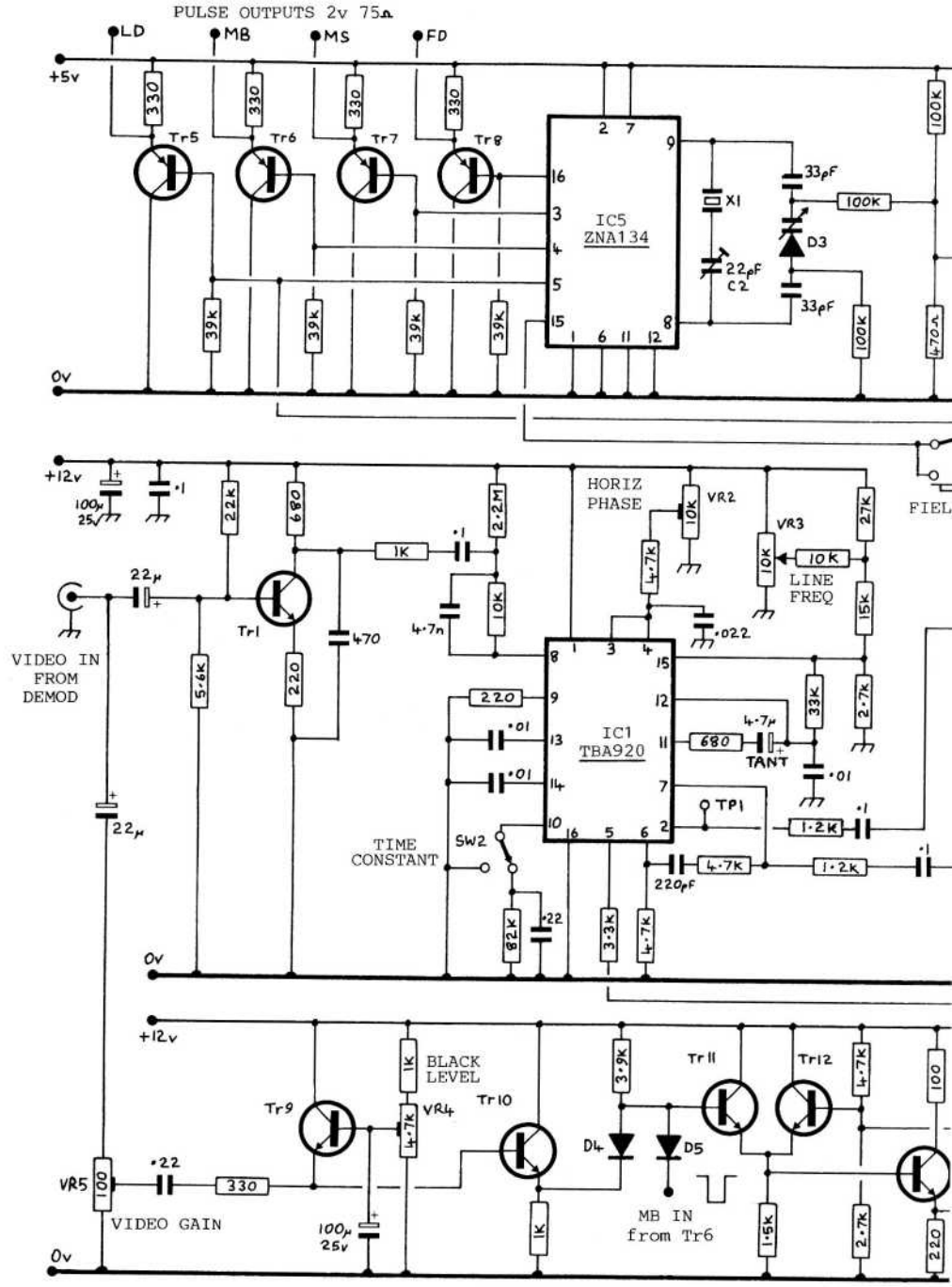
IC1 pin 7 produces composite sync pulses which are fed back to IC1s phase comparator for loop 1. These pulses are also brought to TTL level by Tr3 where IC6a inverts them and passes them through an integrating circuit to the other half of IC2. The resulting field rate pulses have a duration of around 100uS and are used to field reset IC5.

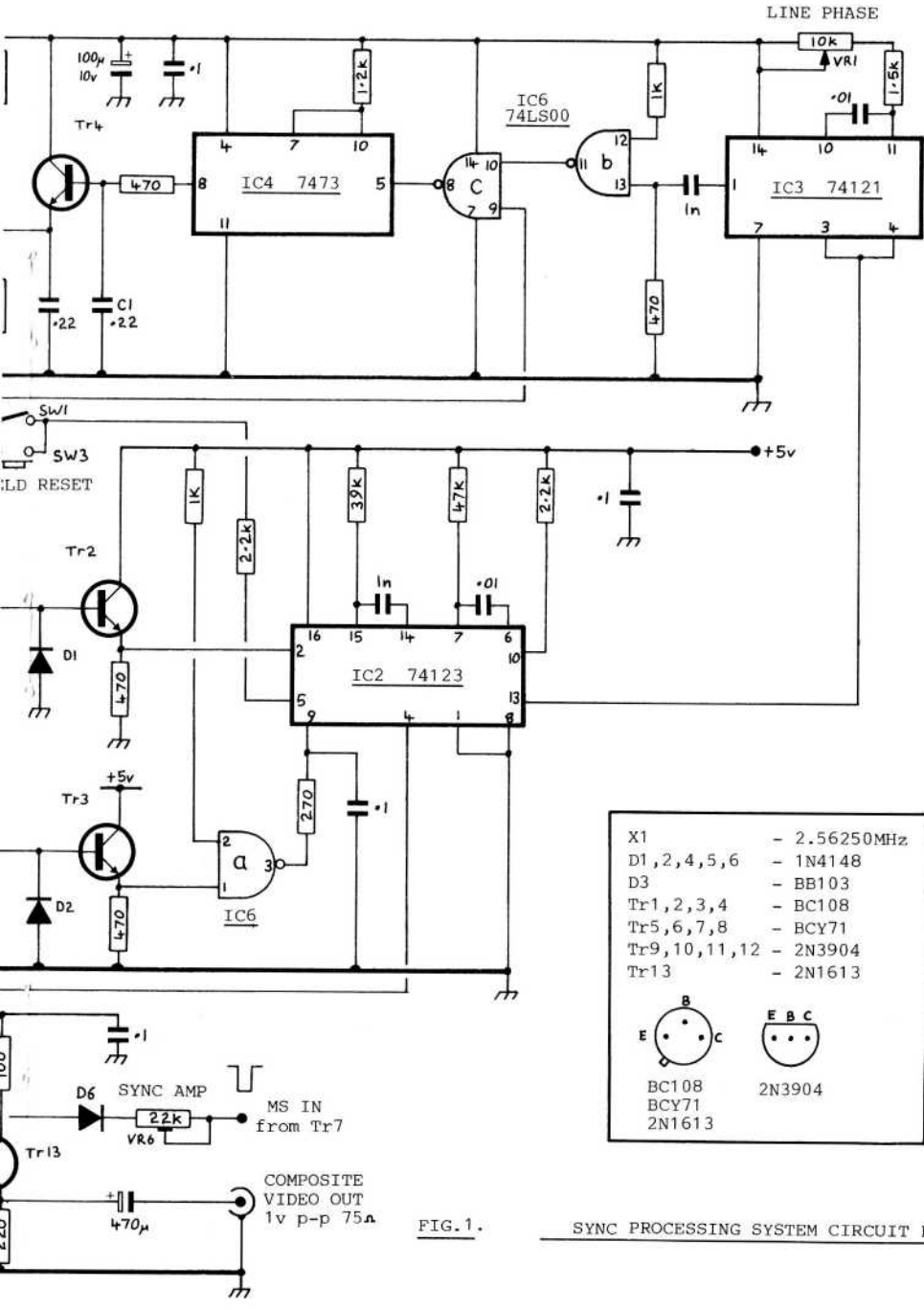
IC3 provides line frequency pulses whose width may be varied by VR1, the 'line phase' control. The signal is passed through IC6b and combined with line drive generated by IC5, in IC6c. The resulting signal is applied to IC4 - a dual J-K master-slave flip-flop - which acts as a phase comparator and produces a square wave having a variable mark-space ratio. This square wave signal is used to charge C1 and, in conjunction with Tr4, an error voltage is obtained which is applied to the varactor diode D3 whose changing capacitance varies the reference oscillator of the single-chip sync pulse generator IC5. C2 is used to set the free-run frequency of IC5 to near that required for correct 625 line operation.

The four pulse outputs available from IC5 are buffered and brought to around 3v p-p when terminated in 75-ohms. Suitable value output coupling capacitors should be used to provide DC blocking before such terminations are applied, but these are not provided on the board. The pulses may be used to drive other vision equipment in the shack.

As well as going to Tr1, the incoming composite video is also applied to a vision processing amplifier, where the new synchronising pulses are added to the existing video.

VR4 and clamping transistor Tr9 sets the black level on the output to that of the incoming signals. Mixed blanking is added at the base of Tr11 and Tr12 introduces mixed sync pulses, (both derived of course from IC5). The resultant composite video signal is amplified in Tr13 whose output provides a standard 1v p-p composite video signal across a 75-ohm load.


PULSE OUTPUTS 2v 75Ω
LD
MB
MS
FD
+5v
0v
330
Tr5
Tr6
Tr7
Tr8
IC5
ZNA134
39k
100K
33pF
X1
22pF
C2
D3
470Ω
+12v
100µ 25v
·1
22K
680
1K
2·2M
22µ
VIDEO IN FROM DEMOD
Tr1
5·6K
220
470
4·7n
10K
HORIZ PHASE
VR2
4·7K
VR3
LINE FREQ
·022
15K
27K
IC1
TBA920
·01
4·7µ
TANT
680
33K
2·7K
TP1
1·2K
SW2
TIME CONSTANT
82K
·22
3·3K
220pF
Tr9
VR4
BLACK LEVEL
Tr10
Tr11
Tr12
3·9K
D4
D5
MB IN from Tr6
1·5K
100
VR5
VIDEO GAIN
FIEL



X1	- 2.56250MHz
D1,2,4,5,6	- 1N4148
D3	- BB103
Tr1,2,3,4	- BC108
Tr5,6,7,8	- BCY71
Tr9,10,11,12	- 2N3904
Tr13	- 2N1613

BC108
BCY71
2N1613

2N3904

FIG.1. SYNC PROCESSING SYSTEM CIRCUIT DIAGRAM

CONSTRUCTION & COMPONENTS

A single sided printed circuit board is available from BATC Members Services department measuring 100 x 160mm, on which all components are mounted with the exception of VR1, VR3, SW1, SW2 and SW3 which are all front panel mounted.

Due mainly to the expense of IC5, it would be prudent to provide a low-profile socket for it. Similarly a socket should be provided for IC1. The main reason is that there are some devices which don't seem to work as well as others; it may help in the initial commissioning to be able to change this chip. All other devices may be soldered straight onto the board. The crystal will probably be to the HC6-U package specification, however it may be possible to obtain crystals in the smaller HC-18 or 25-U styles in which case provision has been made to accommodate either. The crystal itself should be carefully soldered in. VR3 was originally intended to be board-mounted and, indeed, suitable holes are provided for a skeleton pre-set. However, in service the unit takes several minutes to stabilise due to the temperature effects of ICs 1 and 5. During this period it may be necessary to slightly adjust this control in order to maintain reliable locking with the incoming signal. SW1 is shown as an ordinary switch however it is convenient to also mount a 'push-to-make' push-button (SW3) in parallel with it since, under certain conditions, the frame reset needs to be applied only momentarily. More on this later.

Although in other circuits using the ZNA134 SPG chip, the crystal fine frequency adjust capacitor is around 60pF, with the units tried in this design it has been found that a 22pF component is adequate for C2.

TBA920 ICs are available in both DIL or QIL (Quad In Line) versions (suffix Q). The board is drilled for DIL but if only "Qs" are available the legs may be bent to form a DIL configuration. TBA920s are also available as CA920AE.

IC6 may be an ordinary 7400. Those who wonder whether the ZNA234 chip (which is much cheaper) can be used have a short answer: No! The '234 does not have field reset and is, in any case a less accurate device, moreover it does not directly provide all four external drive pulses.

Details of the other components may be found with the layout diagram.

INSTALLATION

The sync processor may be mounted in a suitable aluminium cabinet or similar enclosure and is most versatile if treated as a 'stand alone' unit since it may be used in a variety of applications. Ensure that the cabinet has adequate ventilation because there is some heat generated.

If you wish to power the unit from a single 12-volt source, the 5-volt supply may be derived from a 3-terminal positive voltage regulator installed in the cabinet. A 7805 1-Amp device is suitable. Be sure to provide adequate decoupling at the input and output pins to discourage self-oscillation.

VR1 and VR3 should be front panel mounted and are standard linear controls. SW1, 2 and 3 are also mounted on the panel.

A 'switch through' facility may be provided in order to observe the difference between a signal with or without sync processing, the arrangement shown in Fig.2 may be used. This also means of course that the receiver system may be used without the need to disconnect the sync processor.

Suitable 75-ohm connectors may be provided on the rear panel to convey the four pulse outputs. Video in and out coaxial sockets should also be provided.

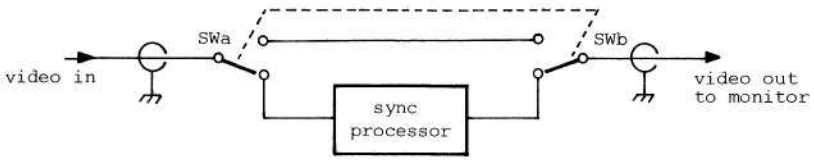


Fig.2 SWITCHING CIRCUIT SHOWN IN "PROCESS" POSITION

SETTING UP

Although not absolutely essential, a double beam oscilloscope will greatly ease alignment of the unit.

First carry out the usual DC checks on each IC and ensure that power rails are 'clean'.

Set C2 to half-mesh and switch on. Make sure that pulses appear at the four output terminals.

Set VR5 fully clockwise and VR4 and 6 to half way. Apply a 1v p-p composite video signal to the input and monitor the video output on the 'scope. Ensure that the output is terminated in 75-ohms. Adjust VR4 so that black level corresponds to that of the incoming signal, (the video will not yet be locked). Set VR6 to display 0.3v of sync on the 'scope. Adjust VR5 for 0.7v of video making 1-volt p-p overall.

The following adjustments should only be carried out after the unit has been allowed to warm up for at least 5-minutes.

Display the output signal on a monitor and ensure that the video signal applied to the unit is to the correct 625 line frequency. It is probably best to tune in to a commercial broadcast for this. The video will be rolling through. Adjust C2 so that the picture is very nearly stationary on the screen but set it so that it is slowly drifting through.

Connect the 'scope channel-1 probe to TP-1 and channel-2 probe to the video input. Lock the timebase to the channel-1 signal. Pulses should be locked on channel-1 whilst channel-2 remains unlocked. Carefully adjust VR3 until the vision locks (see Fig.3). This indicates that IC1 is locked to the incoming signal. Transfer channel-2 probe to IC1 pin 5 and adjust VR2 until the sync pulses correspond (Fig.4).

The picture should be locked or trying to lock by juddering across the screen. Adjusting VR1 should make the picture lock correctly and the control may be used to move the picture to right or left so that the picture is central.

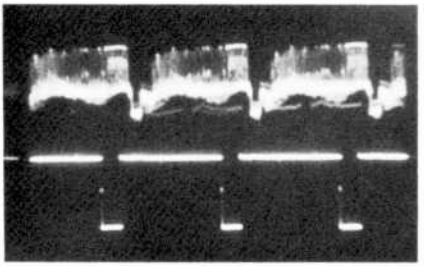


Fig.4a.
SYNC PULSES DO NOT CORRESPOND.

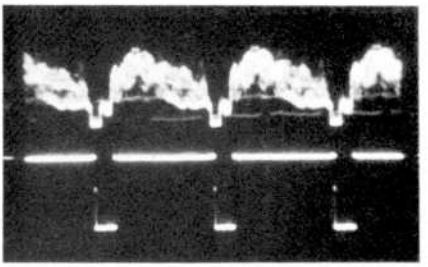


Fig.4b.
SYNC PULSES CORRESPOND.

If the processor is warmed-up the picture should stay locked. It will tend to move sideways gradually for the first few minutes and should be adjusted using VR1. The reason for this is the temperature drift associated with IC5.

To prove that the picture is indeed locked to the input, adjust VR3; this unlocks the internal signal from the input and causes the picture to roll through. If the roll-through is too fast locking may not be reliable. In this case C2 should be re-adjusted so that the internal SPG is close to the source frequency. When correctly set, VR1 will allow the processed video picture to be phased up to plus or minus half a line with respect to the input signal.

If a strong signal is being received the field reset switch (SW1) may be left closed. If signals are weak the picture will probably frame-lock somewhere down the screen. A touch on the field reset push-button (SW3) should lock the frame correctly. However if the field reset is left applied the picture will almost certainly jitter up and down.

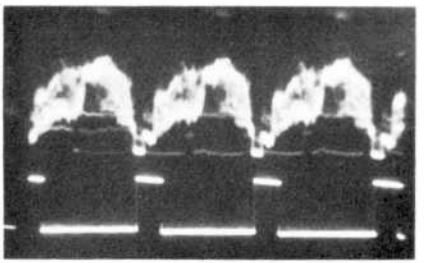


Fig.3.
ADJUST FOR CORRECT LOCKING.

OPERATION

At the time of writing several of these processors have been built, mainly to ensure that the design, which has untill now been largely experimental, is re-producible. The units have all worked and have been extensively tested under various conditions. Nevertheless, there may still be the odd peculiarity which has not been discovered, therefore the design should not necessarily be considered as 'definitive' but, as with most other 'amateur' designs, may be subject to further minor alterations or modifications.

Since the internal sync generator locks onto incoming pulses, it stands to reason that if the input signal goes below a certain threshold, locking cannot take place. The signals most affected are those which fade considerably or are sporadic by nature (sporadic-E propogation). It will be found that the processor is very sensitive and needs only a 'whisper' of signal to be able to lock. Should signals however be too weak, it may be possible to adjust the

frequency of IC5s oscillator so that the two are in 'pseudo' synchronism. Possibly a front panel control for C2 could be provided. This has not been tried but may be food for thought for 'real' DXing.

Perhaps a better way is to build a 2-times line frequency crystal oscillator (31.25KHz) then a divide-by-two circuit, the output of which is fed to the base of TR1 (after removing the 22uF isolating capacitor at TR1's input). With a trimmer capacitor across this oscillator it is possible to lock the incoming picture to it. This has been tried and indeed works well. Frequency stability may not be particularly good using a low frequency crystal however and it would undoubtably be improved by using (say) a 10MHz crystal followed by a suitable divide chain.

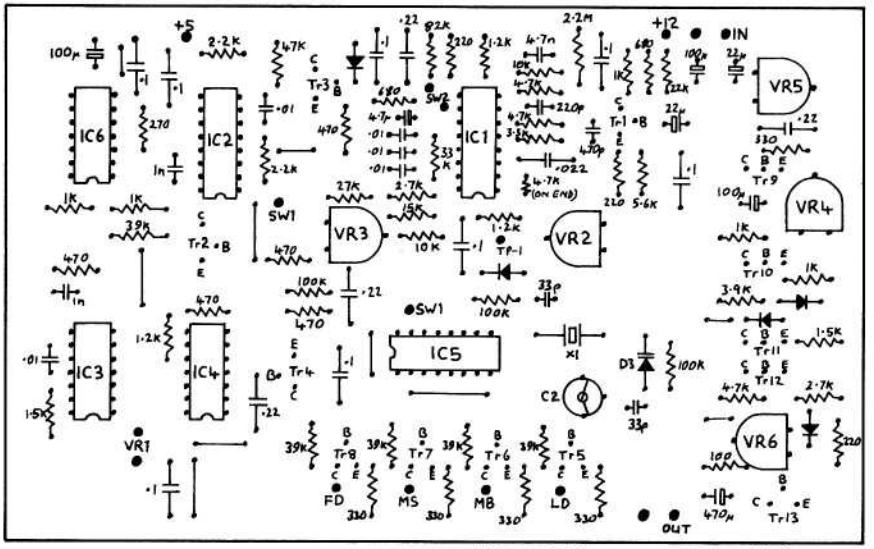
The 'normal' operating position for the time constant switch (SW2) is that shown on the circuit diagram. If a video recorder signal is being used and the picture shows signs of jitter, changing the switch to select a fast time constant (pin 10 to ground) should help in many cases.

Photographs taken from the same TV programme clearly illustrating the difference that sync processing can make.

You will notice that the picture does not 'snap' into lock but rather drifts in quite slowly. On occasions - particularly if a noisy or 'ghosty' picture is being received - the pictue may tend to want to go out of lock. The reason is that disturbances are occuring on the incoming signal which momentarily unlocks the system. Often the picture will restore itself to the correct position but sometimes a small adjustment of VR1 may be necessary.

Provided the sync processor is working correctly you will soon get used to 'driving' it. The results will most certainly be worth the effort (and expense!) and you will wonder how you ever managed without it.

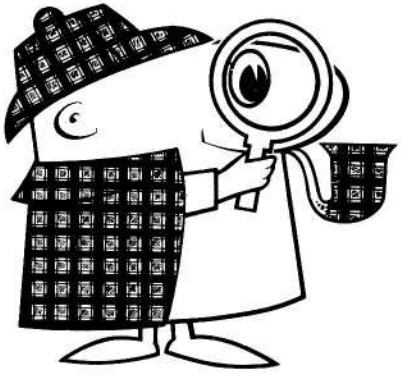
Our thanks to Andy Emmerson G8PTH and to Rod Timms G8VBC for their help in proving the prototypes.



(Viewed from component side)

SYNC PROCESSOR PRINTED BOARD LAYOUT

0.1, 0.22uF capacitors - 10mm lead spacing.
0.01, 4.7n capacitors - 5mm lead spacing.
Small value capacitors - plate ceramic.
All electrolytics vertical (radial) mounted.
All resistors ⅓Watt.
X1 - HC6-U package
IC5 should be fitted into a DIL socket.
VR2, 4,5,6 - sub-min skeleton pre-set.
C2 plastic film dialectric or similar.



DX SPOTTING?

You've a better chance

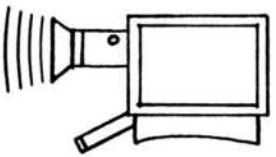
in a contest

The BATC WINTER CUMULATIVES ARE ON NOW.

See full details on page 29 of the last issue of CQ-TV.

SEE YOU THERE!

MORAY FIRTH AMATEUR TELEVISION



The Moray Marathon was held on 12th August and organised by, among others, the Moray District Council Recreation Department. The 26-mile race which had well over two hundred competitors from all over Scotland, started and finished at Cooper Park, Elgin, and was routed through towns and villages in the area.
The Moray Firth Amateur Television Club (GM8AVT) took the opportunity to send live pictures of the race to a receiving station at Cooper Park from two sites: One at Covesea which is about 4.5 miles North on a high part of the road between Lossiemouth and Hopeman, and the other at Lesmurfie Road about 1.5 miles north-east on the outskirts of Elgin. This site was chosen to show the runners after the start and again in the latter stages of the race.

TV amateurs taking part in this excercise (not the race!) included GM4VRE, GM4IZY, GM4GUQ, GM6UHC, GM4PMT, GM8AZS, GM4HMN, GM4WJA, GM8ETF and GM4XKG, showing clearly that ATV is a very active mode in the north.

A hot discussion between GM4VRE and GM4IZY with GM4GUQ wisely keeping his head down!

SOME NOTES ON SSTV

Part 2

By Grant Dixon G8CGK

COMPUTERS AND SSTV

Computers with large memories are becoming very common, and also remarkably cheap, so it is natural that we should want to use them for SSTV purposes. Unfortunately, when we look at the problem of analogue to digital conversion, most computers which have this facility do not run fast enough to cope with a fast-scan TV signal. Likewise, the computer does not easily cope with the task of displaying a 128 x 128 pixel SSTV picture. If your computer has a graphics capability for displaying a 128 x 128 square, AND it can make each element have a grey value from 0 to 15 units, then it is merely a question of writing a suitable program. Such a program should sense the SSTV frame and line sync pulses to effect the correct timing, recognise the grey level of each pixel, and store the required data in the screen area of the memory map. In part 1 of this article mention was made of the timings for the black, white and sync frequencies and it is easily seen that a fair amount of computation can be done within each waveform, and hence within the pixel time. It must be emphasised, however, that this is in machine code or assembler language; Basic is definitely far too slow for this application.

Storing a fast-scan picture in computer memory is best done by converting the signal to SSTV and then arranging an interface which allows the digital signal at SSTV rates to be sampled and stored by the computer. Fig.6 appeared in CQ-TV 110 in a previous article and serves well for this purpose. The computer samples the 4-bit video, the line sync and the frame sync at an input port; it can also deliver, via an output port, the 4-bit video stored in memory, and a control line which is used to switch the two video sources. After the interface, the scan converter does a digital to analogue conversion and this analogue signal modulates a VCO to give the usual FM SSTV signal.

An alternative method for storing all, or part, of a fast-scan picture was described in 'Electronics & Computing Monthly' for June and July 1983. This is a sampling method, but it does not require any modification to the camera. It relies on the fact that the computer's memory is truly random access; therefore, although the picture is scanned vertically and stored in memory, the data can easily be read out as horizontal lines. With the circuit given in the article the picture is stored in about 2 seconds. The article related specifically to a Spectrum computer but it should be easily adaptable to other computers. I would advise readers to modify the circuit by fitting a rather better sync separator; see CQ-TV 119 page 14 for an alternative circuit.

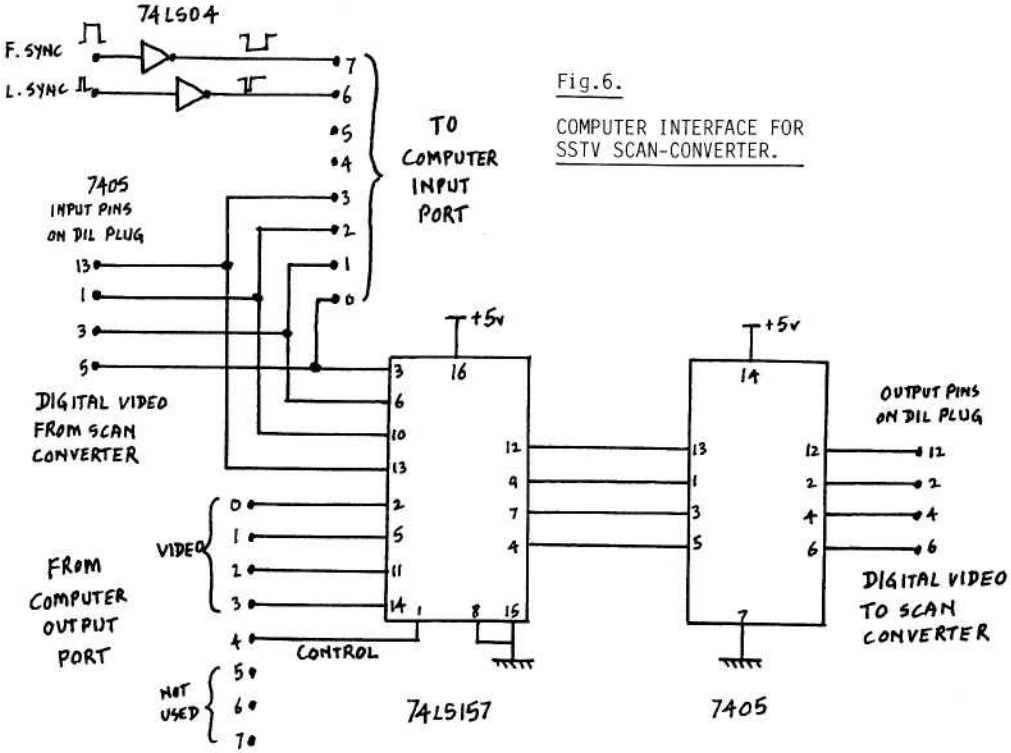


Fig.6.

COMPUTER INTERFACE FOR SSTV SCAN-CONVERTER.

Once we have got a picture stored in memory, what can we do with it? Here are a few suggestions:-

1) Switch between the computer picture and the current picture to inlay a small picture.
2) Inlay text in either black, white or grey.
3) Invert the picture...left to right, top to bottom or black to white.
4) Use the computer to generate a test card.
5) Alter the grey scale to give a more contrasty or less contrasty picture.
6) Print the picture using a dot-matrix printer.

Once you have the facility for manipulating the elements of a picture then the sky is the limit and it is a great challenge to the imagination of the reader.

There are one or two facts in connection with the use of a computer in this way which need pointing out, and I shall refer to my own SSTV gear for this purpose. For the fast-to-slow conversion I use the original DL2RZ (Volker Wraase) board. The SSTV line and frame pulses are derived from the camera frame sync by division, and as the computer samples these pulses to determine

whereabouts in the picture it is at any given time, it is essential to have the fast-scan camera running even if its picture is not being used. The alternative is to write a program which generates SSTV sync pulses; with such a program the computer will be self-contained and able to deliver a digital SSTV signal with sync pulses. If your computer has an internal timer, such as a 6522, then the problem is eased considerably. I do not have such a facility with the TRITON which I use, and I rely on a series of delay routines which are a bit "fiddly" to adjust. If you are using the external sync pulses then you could use interrupts to service routines for the line and frame requirements. I have not tried this approach.

On the display side I use a ZL1LH converter which was modified by G3WCY and featured in 'Radio Communication' for Feb. 1983. This uses two boards, one for digitising and the second one for display. I have built an interface, which goes between the two boards, similar to that already described. When a tape recording of off-air SSTV is played into the system and the picture is stored in the computer memory for replay, the computer continues to use the sync pulses from the recording when trying to display the picture. Now these sync pulses may be rather ragged due to conditions of reception, so when using a computer video display I switch to the fast-scan camera or test pattern generator input to get a source of clean sync pulses.

TOMORROW'S SSTV

This is where I stick my neck out and make one or two suggestions for a system which is only in the mind and has never been tried out. Just think what has happened to normal broadcast TV on a historical basis; better definition, colour, digital techniques and Teletext have all arrived on the scene. In the SSTV world we have colour and digital techniques but what about Teletext? Remember that the earliest SSTV was defined as a 120-line picture and it gave good results; let us see how we could use the eight extra lines if they are not being used for picture information. If we chose to send characters in ASCII code at 1200 Baud then 1 bit is 0.833ms and the period of one line is 60ms, less 5ms for the sync pulse. Thus in 55ms we can store 55/0.833 = 66 bits per line. Now the number of bits per character can vary between 9 and 11 depending on the number of stop bits and whether 7 or 8 bits are used for the actual character code. If we say that 10 bits are used, then we can send 6 characters per line with 6 bits over to cater for timing margins. Thus with 8 lines we can send 48 characters. These characters can be displayed on the computer VDU and will constitute a running commentary on the picture display. Alternatively, the characters can be stored in the computer memory in such a way that they can display screens of text in the usual SSTV format.

There is, of course, a snag with this system and this has already been experienced by people trying to receive broadcast Teletext in areas of weak signal strength; a noisy signal will make it difficult to resolve the text, whereas a noisy picture can often still be seen by the observer as a picture, due to the ability of the eye and brain to integrate data into a recognisable image. Our own computers are still much better than the ones we build! But with a good signal path it should be quite feasible to send accurate text. Note that the SSTV signal carrying the square waves of the text data will normally be passed through a low-pass filter before transmission over the air. At the receiver, the near-sinewaves are squared up by limiting amplifiers before they are passed to the UART in the computer. Provision must also be

made for selecting the 8-line period and removing the sync pulses. Regarding the former, it is most easily done if we make the 8-line period occur at the bottom of the picture rather than at the top. The binary counter does a count from 0 to 127 and line 120 is 1111000 in binary. We can thus detect the presence of 1111 as the four most significant digits and use this to provide a gating signal.

For those who want to wring the last ounce out of the system, instead of sending text characters one could send Teletext-type graphics characters and thus build up a graphics display in computer memory; there are obviously endless possibilities in this direction.

ASPECT RATIO

As stated earlier, the present 1:1 aspect ratio is a relic from the earliest SSTV which used a circular radar display tube. How nice it would be if our SSTV picture could fill the normal TV screen which has a 4:3 aspect ratio.

One way of doing this would be to redefine completely the SSTV standards, and there is something to be said for a 256-line picture which would fit nicely into the 262 lines of the American TV and the 312 lines of our own (ignoring the interlacing). A small adjustment of the vertical height would then fill the screen. There is no reason to alter the timing of the SSTV lines, but the picture would benefit by the use of 2566 samples along a line. Such a picture would suffer from the disadvantages of taking twice the transmission time, i.e. 15.36 secs, with a corresponding loss of immediacy. Existing 128 line pictures would be displayed, as now, by line doubling.

Of course such radical changes would need international agreement and would make an awful lot of equipment redundant; but do we still bother with 78 rpm records and 404-line TV? If we are really stuck with 128 lines and transmissions must be compatible with existing equipment, then the only way to get a 4:3 aspect ratio is to use 3/4 of the lines for the picture i.e. 96 lines, and the remaining 32 lines could possibly be used as indicated above. Such a transmission could easily be displayed on a 312-line TV screen by sending each line three times giving a total of 288 fast-scan lines. Rather unfortunate for our friends in the USA who have only 262 lines to play with! The vertical definition would be rather poor, and I only present the idea as an idle thought without much enthusiasm.

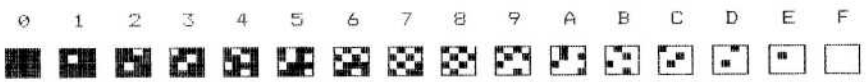


Fig.7 SET OF RECOMMENDED PATTERNS FOR PIXEL PRINTING.

HARD-COPY SSTV

When dealing with computers I mentioned their use for printing out SSTV pictures and a sample picture appeared in CQ-TV 125. In this method each pixel is represented on the paper as a 4x4 square of dots and the greyscale is obtained by printing the appropriate number of dots. There are actually 17 levels obtainable....0 to 16 inclusive...and one dot combination must be omitted somewhere; in my case it is 8 dots. The actual arrangement of dots in the square is important and after a lot of experimentation and subjective tests, the set of dots which I recommend is shown in Fig.7. The first eight squares are the negative of the last eight squares, thus giving a symmetrical greyscale. Other arrangements have been proposed which start filling the square at one corner, or in the middle, and build up on the dots already present. When a picture is printed with this system it has a more 'liney' appearance; with the recommended patterns given here there is a greater randomness and a smoother appearance to the picture.

This is the state of the art at the moment, but ideally we would like to see an SSTV picture on paper in which the pixels are shown as levels of grey and not by arrangements of dots. The only description, as far as I know, of such a system was given by W6WMI in an article in 73 Magazine for March 1973. This was a home-built helical scanner which used a roll of wet 'electrolytic paper'. It was a very praiseworthy attempt, but I am sure that with all the knowledge of FAX transmissions it is not beyond the bounds of possibility to produce a machine which is equipped with a roll of paper, not just a sheet wrapped round a drum, which will record fast enough to allow SSTV pictures to pour out of the machine as they are received.

FINALE

Well! There you have it; a few notes on various aspects of SSTV which for some people will be familiar stuff, but for others will be light in the darkness. Now it is YOUR turn to send an SSTV contribution to the patient, hard-working editor.

TV ON THE AIR

Andy Emmerson G8PTH

Doesn't time fly? It really does not seem long since I was writing the last column, but I suppose that means I must have been enjoying myself! Anyway I have a load of letters to condense into a few hundred words here - thanks to all of you who wrote in. As I write it is mid-December and we have just had a pretty respectable lift on 70 and 24. The local grapevine worked as well this time: whover is first on phones someone else and so the message is passed on - this way nobody misses out.

Much of our 70 cm. news is from foreign parts, so let's start with a couple of short reports from overseas BATC members. In Australia John Ingham VK5KG says all local activity is on 70cm, but as they have the use of 420 to 450 MHz that may be understandable. A recent development is aeronautical ATV mobile by Geoff Summers VK5GO. He has used both fixed wing model 'planes and helicopters - sounds like fun. John is also organising a small group of ATVers to assist with airborne ATV for bush-fire spotting on board the State Rescue helicopters.

In Belgium Jose Robat ON7TP writes about the Liege ATV group of which he is a member. About 10 folk transmit a two-hour programme of news, techniques etc. every Saturday at 2pm. The station's call is ON6PM/T and dates from 1977. Next construction activity is for 24 cm.

I am not sure whether Scotland counts as foreign, but who cares? At the Scottish Amateur Radio Convention 23 new TVers were signed up for the BATC. Included among the new sations are Des GM1BVK from Mount Vernon, Bill GM4UBJ in Motherwell - after a long apprenticeship as an eyewig. On receive are GM4UQG (Robbie, Hamilton), GM1AYT (John, Milton of Campsie), GM4YAA (John, Paisley), GM6KTP (Ken, Hardgate), GM3ZDH (Bob, Carmunnock) and GM4XLU (Eddie, Cumbernauld). The number of stations now receiving ATV in central Scotland is estimated to be around 50, with about a dozen stations transmitting.

More significant is the greater general level of activity. GM3KXQ received pictures from GM1FAI/M in the Bathgate Hills via a reflection off hills on the 17th September. '3KXQ uses a W&D preamp into a modified 70 to 2 transverter, the antenna being a double quad in the roofspace. GM6HFH and GM4UBJ have exchanged P4 both ways, while GM6AOR (George, Longridge) received 'UBJ at P3. Gordon GM3ULP and Bill GM4UBJ, both in Motherwell, swap P5 with ease. GM4YAA (ex-GM6KEC) in Paisley has given P1 to GM4BVU and GM3ULP, and P2 to GM4UBJ over what is a very difficult path, and again must be reflection off the hills. '3ULP has had good reports from GM4CXM, GM4PSV and GM3ZDH. Thanks to Norrie's news agency for this lot.

Returning to the December 10th/11th opening, it seems to have been a patchy affair with lots of ducting (went straight over the heads of some stations). For some people, especially coastal stations, it was excellent and for most 70cm was favoured. John G8UWS in Folkstone had a field day on the 11th, making two-ways with ON7XM, ON1KRG, DL9GX, DL6ZAC, DG1KAO, DF7KN, ON6XN, ON1AHT and ON4PT. "All went dead at 2239"; nice to see some German stations worked anyway.

We start in North Britain this time, so back to the GM4BVU news service. The Moray Firth ATV Group (GM4AVT) held a demonstration of 24cm ATV on November 18th in the Community Centre, Lossiemouth. Ewan Crawford GM4GUQ of Inverness gave a live talk on how the transmitter - kindly loaned by Wood & Douglas - was designed. The programme was transmitted from another building outwith the Community Centre. Attendance was very good and included ATV enthusiasts from the Fort William Group. A static display of video equipment was on show during the afternoon. It was a very successful meeting and the first time 24cm ATV had been seen in the Moray area.

Peter G4RNA writes from High Bradfield near Sheffield: he is assisting G3PYB with the latter's design work for you-know-who by putting out an FM TV signal on 1290 MHz. As the QTH is 1250 feet above sea level even QRP should do well!

Allan G8CMQ has been doing a lot of 24cm mobile operation lately. He is running 10W into a single quad element with both horizontals bent 90 degrees into a "V" type formation in order to achieve horizontal polarisation. The whole affair is mounted atop a 4ft mast and guyed to the car roof. At the end of October this setup was installed for a Jamboree on the Air event and during the session P5 pictures were received back at the JOTA main station. These were retransmitted on 70 to other amateurs. Signal strength remained quite constant over a 5 mile radius although terrain and greater distances made the signals vary considerably. The JOTA station, GB2WES, was run by G1APD. A few days later Allan and Mike G8LES sent mobile pictures to G6GXG in Romsey. Later, while static mobile in the New Forest, a good contact was made between the mobile and G4WHO in Wimborne, Dorset, a distance of some 20 miles. Pictures from the mobile were also picked up by G1DSO in Havant who also re-radiated them on 70 for the benefit of other TVers.

Allan adds that he is TX-only whilst mobile, not wishing to upset the local constbulary. He also took his 10W mobile setup to St. Boniface Down (near Ventnor on the Isle of Wight) on 18th November. P4 or better results were received in Southampton, Havant, Chichester, Worthing and Brighton. G6MPE was the Brighton station: this was a distance of 55 miles and John could see Allan P1 using just a 2 metre quarter-wave whip! Allan says thanks to all who participated, viz. G6MPE, G4WTV, G8KOE, G5NBX, G6CSX, G1DSO, G6RSV, G1APD and G4JQU. As Allan was using an omni-aerial all stations could see at once, which makes it a super site for a repeater. Who is going to ask the CAA nicely, then? Another good site is Stoney Cross in the New Forest - Allan made a 20 mile haul to G4WHO in Wimborne from there, again using 10W and an omni-quad.

More snippets of news from the South Coast ... The lift of 11th December enabled G6MPE to hook up with F3LP in Le Havre. Another person who has worked France recently is Peter G4LXC (ex- G8EIM and author of several CQ-TV articles); he has moved to Hove and worked F1EDM with P5 results for 1.5 watts. He mentions that GB3VR is scheduled to move up to Race Hill, Brighton where it should give improved coverage all along the South Coast (and to France!). Aerial system is a dual Alford Slot. Final 24cm word: the Dual Quad antenna from the "UHF Compendium" works very well, giving 11dB gain. Use aluminium mesh or expanded metal for the reflector panel.

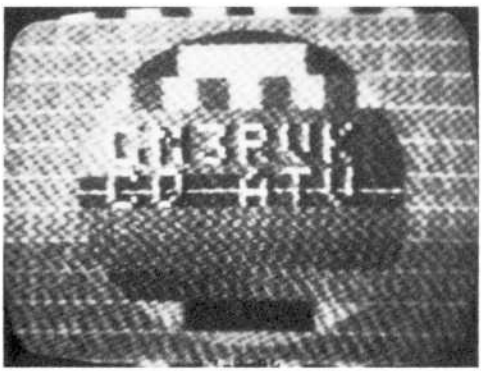
Last time I appealed for other SSTVers (other than G3WW, that is) to send in their news. John Cowie GM6KJD from Aberdeen has answered my call and sent in a number of Epson MX-80 prints: Unfortunately our printers considered them too pale for decent reproduction in the magazine. John uses an FRG-7700 and 10 metre wire antenna; this feeds audio to a home-brew interface box and then to a BBC microcomputer running homebrew software. Pictures are then saved to disc and dumped to the printer. The interface itself is very similar to the analogue board in a 1983 RadCom, except that the ADC is a ZN449E. This generates three bits of Video and syncs for the user port on the BBC micro. After many months of design, veroboard fabrication and keyboard bashing John says he fair leapt in the air when he received the first results! Since then he has improved the program and also written a TX routine, though unless some activity starts on 2 metres this is of little use. Reception is mainly on 14.230MHz, with European SSTVers and a lot of inconsiderate 'phone operators. John says the main disadvantge of the Beeb for SSTV is the limit of 8 bits for the greyscale, though faces are still recognisable. He asks if there is a norm for gamma of SSTV pix - some received images have a lot of black-crushing, which has caused John to design a black-stretcher in the interface. All in all he enjoys the challenge of snatching frames out of warbly tones on 20 metres.

G3WW is our only other purveyor of SSTV news, so here goes with the news from Wimblington. More and more Ws are appearing on 20 metres using the new Robot colour system and have been worked two-way using either 12, 24, 36 or 72 second single frame colour, the last two being today (9.12.84) in the persons of WA2WFF and N2WA, near neighbours in Patterson NJ. Both use Robot 1200C models with Tandy TRS-80 computers both for control and graphics generation. They will be able to work both our G2BAR and G4UFV 1200C-equipped also. Recent short-skip on 20M enabled G3WW and G3WIL to swap Robot 450C colour pictures, while on 2 metres G2BAR and G3WW have played out each other's "replays" in colour.

Volker Wraase (DL2RZ)'s various SC model scan converters around Europe continue to give their owners 2x SSTV QSOs with G3WW in 8, 16 and 32 second b/w frames and 24 (and now 48) seconds single frame colour. Eight seconds b/w and 3x3 or 2x2 RGB remain the standard type of SSTV transmissions.
There seems to be a possibility of SSTV being transmitted from next April's scheduled 51-H Space Shuttle flight of Tony England WØORE. In the USA "concern" - a surprisingly mild word for it having regard to the letter which the editor of A5 magazine has written to ARRL's KD1N thereon - has been expressed over the picture mode formats to be used! Maybe the RSGB can reserve the UK two metre SSTVers at least a QRM-free frequency? Some hope!!! opines Richard.

Richard received a letter from Maurice Webb G1AMR on Merseyside saying that SSTV is on the increase around there. All are using ZX-Spectrum computers and Maurice has sent pix to five other stations, who could not send him any back but hoped to record his signals. he has had two-ways with G3CCH, G4NJI, G8NSE, G3KLL, G6YBC, G6ICR, G1BIF and G6HDD (last three using Spectrums). G3WW was apparently the only person to write to the RSGB protesting at the loss of "SSTV Scene" (speaks for itself!) but recommends the new magazine "SSTV Today" - write to him QTHR for details. He has also provided some details on all the various proprietary line "standards", which I hope will find its place elsewhere in CQ-TV in this or an upcoming issue. Richard comments on the latest update of the Wraase SC-1 (with "excellent 48 sec. single frame colour") and the Robot 450C, also the DRAE SSTV receive-only converter. He concludes there is no real "best-buy": all three offer different facilities at different prices, so you tend to get what you pay for ... !

The fast-scan pictures this time have a common link: they were all taken in Holland by Ryn Muntjewerff. GM3RVK (Kennoway, Fife), GU8FBO (Guernsey)and G4DUZ (particulars witheld at licensee's request - it's a nice testcard anyway).
That's it; let me have lots more letters for next time and address them to Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH. Or dictate your 60 seconds on 0604-844130 if you're too busy to write!



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

By Peter Johnson G4LXC

It has only been in relatively recent times, that the GaAsFET has emerged onto the amateur radio scene as a serious contender to bipolar and MosFET devices, for low-noise RF amplification. Although they have been around for some years, prices have dictated their employment, which has remained largely in commercial and military fields. Then the RSGB Microwave Committee managed to obtain a number of Mitsubishi MGF1402 devices from Aspen Electronics, and these have helped to popularise their use in amateur radio (and TV) applications. The devices are available from the RSGB at £12 each (while stocks remain)[1], but I believe they are also available from some retailers.

CIRCUIT DESCRIPTION

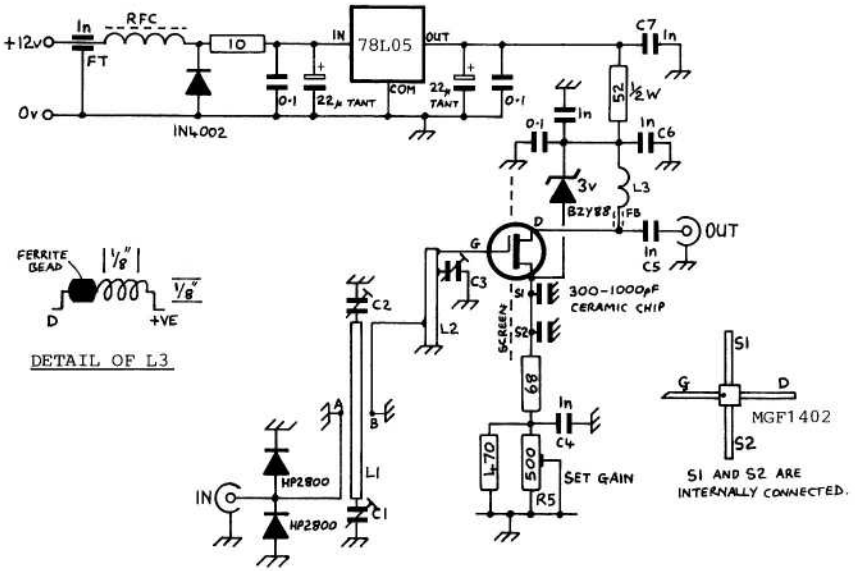
The circuit described here was developed to precede my CQ-TV (117) down converter but can, of course, be used in front of most converters, including narrow-band ones. The amplifier has been designed to work over the range 1200 - 1350MHz making it ideal for ATV applications. However, since, for performance reasons, a bandpass filter is incorporated in the design, a reasonably flat bandpass characteristic is normally available over only about half the above range. Consequently, to change from one end of the band to the other, Cs 1,2 and 3 need to be changed and the unit re-aligned. Fig.4 shows two dotted wires across the filter; these may be used if required and, when brought into close proximity, provide over-coupling of the bandpass filter so reducing the through loss and increasing overall bandwidth. This form of modification however will certainly reduce the amplifiers noise performance, although not usually to a significant degree.

If operation over the whole band is required, points 'A' and 'B' on the input circuit should be linked together with a short piece of insulated wire, (ground 'stakes' should of course be omitted). This removes the filter and effectively provides a constant 50-ohm input line. If this is done C1 and C2 should be omitted and the grounding 'stakes' at the ends of the two lines.

The design has proved stable in operation, provided certain precautions are observed; the most important of these is the screening of the input from the output, this is due to the high gain of the amplifier. The use of low-Q striplines helps to maintain stability.

The gain of the MGF1402 is specified at 19.5dB at 1300MHz with a quoted noise figure of <1dB, which only rises to 1.1dB at 4GHz. I have every reason to suppose that the performance of this unit is reasonably close to that specified for the device.

The preset source resistor (R5) is set for optimum gain/noise figure, (gain increases as R5 is reduced in value), this represents approximately 30mA current at 3v although devices will vary slightly, but the values chosen



C1,C2,C3	0.2 - 1.5pF PTFE tubular (for 1290 - 1350MHz) 1.0 - 3.5pF PTFE tubular (for 1240 - 1300MHz)
C4,C5,C6,C7	1n min plate ceramic
L3	3t 22swg enam. 1/8" dia 1/8" long, with small ferrite bead over drain end (see inset)
RFC	3t 26swg on ferrite bead

Fig.1 1.3GHz GaAsFET PRE-AMPLIFIER

ensure safe operation. It is worth remembering that the permitted voltage across the source and drain should be no more than 3v. R5 is normally set to around mid-range.

CONSTRUCTION

A printed circuit board to the size and layout detailed in Fig.2 should be made. Material should be double-sided and of good quality glass fibre around 1.6mm thick. All components fit on the printed side of the board.

Before any components are mounted, wire 'stakes' connecting the top and bottom ground planes should be soldered in where indicated by dots in Fig.4. They may be made from resistor leads or 18-22swg tinned copper wire. Be sure to solder both sides making as short a connection as possible, and clip the ends off neatly.

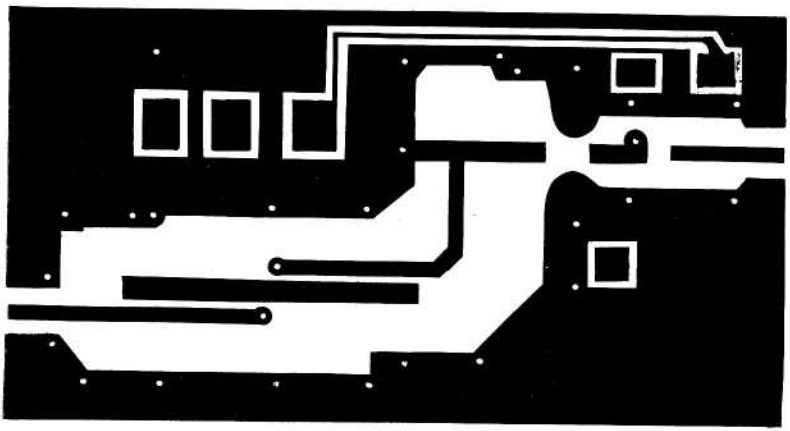


Fig. 2 PRINTED BOARD PATTERN - ACTUAL SIZE (103 x 54mm)

Next the two leadless ceramic source capacitors should be carefully fitted. They should be flow-soldered onto the copper land using a 25-45W soldering iron. Fit the remainder of the components as shown with the exception of the GaAsFET. If the input bandpass filter is not required, points 'A' and 'B' should be joined across with a short length of hookup wire, and Cs 1 and 2 omitted.

An enclosure should be constructed to exactly fit the PC board. (A die-cast box is not suitable since correct earthing cannot be affected). The box may be constructed out of copper laminate PC board or tinplate. The PC board should be fitted into the enclosure and soldered ALL ROUND on both the top AND bottom earth planes. Holes to facilitate tuning of the tubular trimmers should be drilled in the sides in appropriate positions. BNC coaxial sockets (or 'N' types if preferred) should be firmly fixed to the box and the solder spills soldered to the PC board tracks. A tinplate cover should be made to be a press-fit over the compartment covering the component side.

Microwave components such as the chip capacitors, PTFE tubular trimmers, min plates, Schottky diodes etc. may be obtained from LMW Electronics, 102 Stamford Street, Ratby, Leicestershire LE6 0JU. (SAE for enquiries/list).

TESTING AND ALIGNMENT

The GaAsFET should still not be fitted.

Check over the circuit carefully and, if all is correct, apply 12v dc and check that +5v is available from the regulator.

The zener source biassing circuit may be checked by connecting a test meter (0-100mA range) between S1 and S2 capacitors. Varying R5 should show a point where current variation stops. This means that the circuit is working correctly.

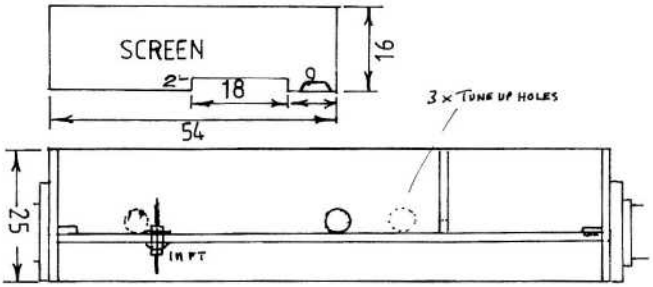


Fig.3 POSITION OF SCREEN AND BOX DETAIL

The GaAsFET should now be installed and the following sequence is recommended:-

1. Remove the power lead from the unit.
2. Lay the unit onto a 12" x 12" piece of kitchen foil and connect the two together using a short piece of wire and two croc clips. Using another jumper, connect the box to a 15W soldering iron fitted with a small tip. Similarly connect yourself, via a metal wrist watch, bracelet or piece of foil to the box.
3. Carefully remove the device from its anti-static package and, using an insulated tool, place it the correct way round in position. Make sure the gate is correct and don't drop it onto the nylon carpet!
4. Solder the Source leads to the tops of the disc capacitors (1-2 seconds max.) using as little solder as possible.
5. Solder Gate to L2 stripline.
6. Solder Drain to output line and clean off surplus flux resin with a small brush dipped in cellulose thinners or PCB cleaning solvent.

The screen may now be fitted in the position shown in Fig.3. The cutout in the screen is to accomodate the GaAsFET and chip capacitors and should be checked for size before soldering in. The lid should now be fitted.

Tune the converter/receiver to a suitable off-air or local signal source and connect the amplifier. Check that the total current drawn is of the order of 40-50mA then, using a non-metallic trimming tool, tune for maximum signal. Be sure that the signal you are receiving is coming in at the aerial socket and not by stray pickup. You may notice that even a non-metallic trimming tool has a small effect on the gate tuning, however this is not enough to de-tune the circuit significantly when it is removed.

Now some important DON'TS:

Do not flow solder along the PCB tracks, particularly the tuned lines. To prevent tarnishing, the board should be sprayed with a PCB lacquer such as 'Electrolube' prior to fitting any components.

Do not fit the GaAsFET until all checks are carried out.
Do not apply power until pre-power checks have been completed.
Do not run the amplifier without its screen.

Optional schottky diodes may be fitted as shown at the input of the circuit diagram. If a relay is in use; this protects the input from excessive power leakage.

A weak, off-air signal is ideal for final tune-up, and the unit will need to be re-peaked depending on whether you are receiving in the top or bottom half of the band if you are using the input bandpass filter.

Results with the CQ-TV down converter have been excellent, and the presence of the input bandpass filter has effectively eliminated broadcast breakthrough via the front end input.
If there is sufficient demand, the BATC may make printed boards available for this project. Please enquire from Members Services.

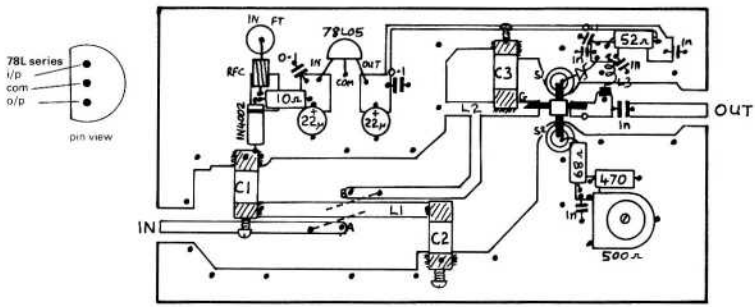


Fig.4 COMPONENT LAYOUT

1. MGF1402 GaAsFETS are available price £12.50 plus 50p postage from Mr.S.J.Davies G4KNZ, 80 Faulkner Road, Newton Aycliffe, Co.Durham DL5 4NW.

THE GOOD OLD DAYS

Volume 10 No.2 of the Narrow Bandwidth Television Association Newsletter carried an interesting piece entitled "Questions and Answers on Thirty Line T.V." Acknowledgment is made to Doug Pitt, Editor of the NBTV Newsletter, for permission to reproduce the article here.

In 1972, Chris Long, whilst still attending High School in Australia, received the following answers to a series of questions he had posed to Mr. D.C.Birkinshaw, BBC TV's Engineer in Charge from 1932 till 1962 (excepting the war years).

Chris Long, although resident in Victoria, Australia, is an active member of the NBTVA and was the first person to transmit 30-line television pictures since the Baird/BBC service closed in 1935. The transmissions were made in 1972 on 160 metres to Dan van Elkan, a Dutch radio amateur.

QUESTIONS AND ANSWERS ON THIRTY LINE T.V.

Q. How did the BBC deal with aperture distortion in the 30-line system?

A. Correction of this can be conveniently done with the aid of a constant impedance bridged-T equaliser, and this was what we used in 1932.

Q. Would some sort of automatic level control be useful in maintaining good signal-to-noise ratio on noisy paths?

A. AUTOMATIC LEVEL CONTROL: In theory this should not be necessary, and we never used it. It was rare for a picture not to contain an area of peak white, and all you did was to set the gain so that the peak video voltage was as desired, and leave it, at any rate if the picture was more or less static. If, however, a dancer were to move about so as to disturb the level then we adjusted it.
The overall level was greatly bound up with the individual levels coming out of the four banks of photocells, each of which had their own level control. These level controls naturally affected the picture as would the dimmers on individual lamps in a modern high definition studio. So in a practical production one juggled with the five controls, and one soon became quite adept at producing an interesting picture no matter where the artist strayed - within limits, of course!

Q. How were the synchronising signals derived? A sync pulse generator? A white background?

A. SYNCHRONISING PULSES. Neither guesses are quite right. We had no generator as such, neither did we need to place the artist up against a black background. The 30-line projector was so designed that when the beam, after tracing out a line, reached the top of the scanned area, the beam for the subsequent line did not immediately enter the scanned area. The reflected ray from the mirror about to come into action was masked off within the projector, and thus an interval of some 10% of the

scanning time was created at the start of each line. There is no hard and fast rule about how much time you allot to synchronising. If too short there will be insufficient in the sync. signal. If too long, you needlessly waste useful picture scanning time, and the result, via a long chain of cause and effect, which I won't include here, is a loss of resolution in the picture.

Q. We have had tremendous difficulties with 50Hz hum levels. Did you have similar troubles?

A. We had no trouble. It is essential to screen the photocells all round except for the window, and to screen the cables and earth the screens. In short, you do all the things you would do in a properly designed video or audio installation, and I know of no special problems.

Q. What order of illumination was used in the 30 line days?

A. ORDER OF ILLUMINATION. I do not know the answer to this, at any rate in exact figures, and I doubt if we ever knew. We used a 10 Amp arc close up to a metal aperture about 1/8" square, and kept all the mirrors and lenses spotlessly clean. It's surprising how much light you can lose if you do not do this. I suppose one could calculate the luminous flux but I see no point in doing so.

Q. What sort of motor was used for the scanner?

A. DRIVING MOTOR IN THE PROJECTOR. This was a synchronous motor, with shaped poles for self-starting, and as it was of fractional horsepower, it was started direct on line. It ran, of course, at 750 r.p.m. and for some reason it came from America, and was regrettably on 110 volts. I merely put this in for historical interest. I do not know if you would have any difficulty in getting a suitable motor in Australia, but if you cannot get a motor, then maybe you can allow the tail to wag the dog and choose a field frequency to suit the motor! There is more in this suggestion than meets the eye. The outstanding defect of our 30 line system was the flicker which was truly terrible. If you are going to operate on amateur bands, are you restricted to 13KHz? If you could go up to 25KHz you could use a synchronous motor running at 1500 r.p.m., which I imagine would be much easier to obtain. Mind you, the centrifugal force on the drum mirrors would then be four times as much, but might be susceptible to good design.

Q. How do you make sure the motor speed doesn't drift with AC frequency?

A. CONSTANCY OF FIELD FREQUENCY. You need not worry. Just drive the drum with a synchronous motor and do no more. There is no problem here that I can see. These motors, locked to the mains, keep a perfectly adequate speed constancy. Moreover, the effect on the sidebands of small changes in the field frequency will be trivial. From your letter, it looks as if you have been trying to use a series DC motor, in which case, no wonder you are having difficulty. Try and use an AC motor, or if this is impossible, there are established techniques, used in film cameras, for locking to the mains, or to some independent field frequency, a shaft driven by a DC motor.

(To be continued)

AN ALTERNATIVE TO GENLOCK

From an original circuit by WD0CTA in July '83 'A5' Magazine

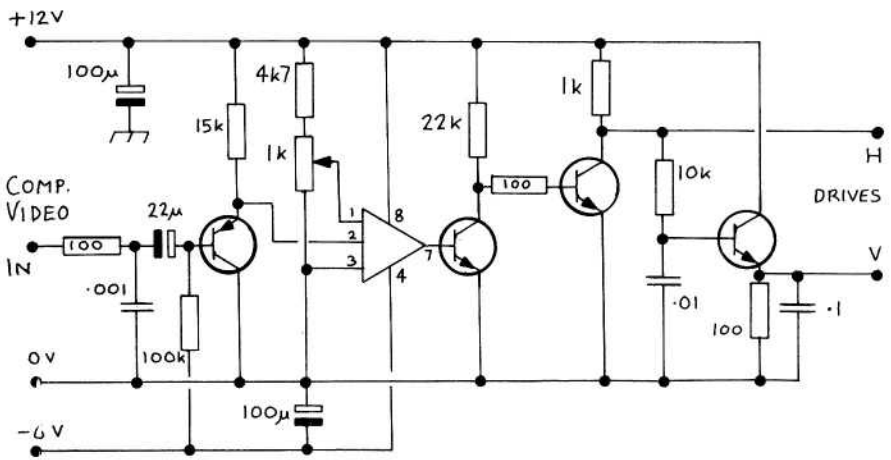
When it is required to drive one piece of video equipment from another composite video source, this is usually achieved by 'genlocking' an SPG to the input video in order to derive the necessary pulses. However, for many applications such complexity is unnecessary. This relatively simple circuit enables vertical and horizontal drives to be obtained from a composite input, to drive for example a monochrome camera from a VTR or off-air source.

The 1k preset adjusts the sync separator threshold and should be set for optimum separation. Note that this type of circuit is voltage-sensitive, and so both supply rails should be stabilised.

In the original circuit, an SK9175 or SK910 is suggested for the comparator - as these American devices may be difficult to obtain in the U.K. a possible alternative might be the 710 comparator, which uses the same power rails. The respective pin connections are as follows:

SK9175	710	
1	3	Non-inverting input
2	2	Ground (0v)
3	4	Inverting input
4	6	-V
7	9	Output
8	11	+V

The transistors may be any general-purpose types e.g. PNP-2N2905, NPN-2N2222



24CM RADAR SUPPRESSION

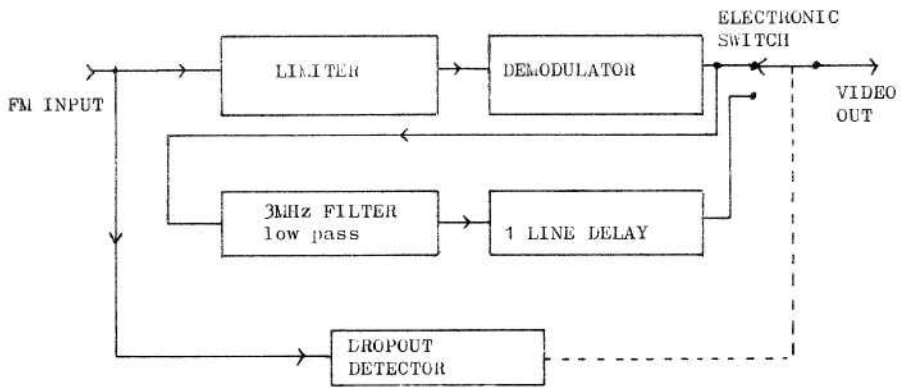
By Trevor Brown G8CJS

My recent visit to the German ATV convention in Bremen gave the chance to discuss common television problems and standards. The conversation naturaly turned to FM-TV on the 24cm band. One problem which soon arose was that of radar interference.

I have not yet witnessed radar interference myself but the description given to me is one of pulse interference randomly distributed across the screen with the pulses being about 3 to 10 uS in duration. Guaranteed to spoil ones viewing pleasure I should imagine. I fell to wondering if there could be a fix for this problem.

The only parallel I could think of is that of video tape recordings where television pictures are recorded onto tape in the form of an FM modulated carrier. On replay 'holes' in the signal can occur due to oxide imperfections and, on a bad tape, this problem can be considerable. The solution to this problem is the dropout compensation circuit which operates in the following manner:-

The detected video is presented to a delay line having a duration of one line. Both delayed and direct video signals are passed to an electronic switch. The switch is normaliy in the 'direct' state. The FM carrier is monitored in a dropout detector and, should it suffer a loss in amplitude of more than 12-18dB, this indicates a loss of RF and picture due to oxide imperfections. Under these conditions the switch changes to the delayed position and the previous line information is displayed for the duration of the missing picture.



Referring to Fig.1, which is a block diagram of such a system, I have included a 3MHz low pass filter in the delayed path. Its purpose is to remove colour during a dropout fill. Colour fill requires a 2H delay because of the phase inversion which takes place on alternate lines in a PAL system. Monochrome fill is quite acceptable for amateur purposes since small losses of colour during dropout fill go largely un-noticed due to the human eye's inability to discern fine colour detail.

For practical purposes the 1H delay could be achieved by modulating the video onto a 4.4MHz subcarrier and passing it through a 1H glass delay line similar to those found in colour TV receivers. A test mode could be incorporated where a small one-line window is generated using monostables and the switch put into the delay mode for the duration of this window, thus enabling the gain and DC level of the fill to be set and viewed.

To extend this compensator to radar interference rather than tape dropout, one would have to remember that radar is a pulse of RF rather than a loss of RF so the detector would need to detect a loss of modulation rather than loss of carrier. The best way to do this could be to look at the sound subcarrier which would not be present when the radar blanks out the TV signal. A bypass switch would also have to be incorporated for stations not sending sound subcarriers otherwise monochrome pictures would result.

I would be very interested to hear from anyone who has done any development work in this area or would like to do so or indeed anyone with constructive criticisms of this suppression system.
25 Gainsbro Drive, Adel, Leeds LS16 7PF

SOFTWARE NOTEBOOK

2 - Three pictures for ATV

By Peter Delaney G8KZG

This program is for the BBC Micro-computer. It generates three patterns: colour bars, a BATC badge with personalisation and a simple test card, also with personalisation. The program is menu driven and the user can select any one pattern or all three in sequence.

In the interests of conserving space, this listing has been produced using a special formatter which splits some program lines over several lines of print. When entering a line do not press RETURN until you reach the next line number.

To personalise the patterns, appropriate changes should be made to lines 290, 350, 360, and 440.

```
 10 ON ERROR GOTO 30
 20 X%=0
 30 MODE 7:CLS:CLG
 40 PRINT '''"Select pattern then
    press RETURN"''
 50 PRINT " (0)  END"'
 60 PRINT " (1)  COLOUR BARS"'
 70 PRINT " (2)  BATC BADGE"'
 80 PRINT " (3)  TEST CARD"'
 90 PRINT " (4)  PATTERNS 1,2,3
    in sequence"'''
100 PRINT "To stop at any time
    press ESCAPE"''
110 INPUT X%:IF X%<0 OR X%>4
    THEN GOTO 110
120 IF X%=0 THEN END
130 IF X%=1 THEN MODE 2:PROCBAR
140 IF X%=2 THEN MODE 4:PROCBADGE
150 IF X%=3 THEN MODE 1:PROCTEST
160 IF X%=4 THEN GOTO 470
170 REPEAT UNTIL FALSE
180 DEF PROCBAR
190 VDU 23;8202;0;0;0;
200 VDU 24,0;0;160;1023;
    :GCOL 0,135:CLG
210 VDU 24,161;0;320;1023;
    :GCOL 0,131:CLG
220 VDU 24,321;0;480;1023;
    :GCOL 0,134:CLG
230 VDU 24,481;0;640;1023;
    :GCOL 0,130:CLG
240 VDU 24,641;0;800;1023;
    :GCOL 0,133:CLG
250 VDU 24,801;0;960;1023;
    :GCOL 0,129:CLG
260 VDU 24,961;0;1120;1023;
    :GCOL 0,132:CLG
270 VDU 24,1121;0;1279;1023;
    :GCOL 0,128:CLG
280 VDU 24,0;0;1279;350;
    :GCOL 0,129:CLG
290 VDU 5:MOVE 480,150:PRINT
    "G8KZG":VDU 4
300 ENDPROC
310 DEF PROCBADGE
320 VDU 19,128,4;0;19,1,3;0;16,
    29,640;512;5
330 MOVE 0,450:DRAW 200,0
    :DRAW 0,-450:DRAW -200,0
    :DRAW 0,450:MOVE 0,150
    :DRAW 0,310:MOVE 0,230
    :DRAW 45,300:MOVE 0,230
335  DRAW -45,300:MOVE -60,120
    :DRAW 60,120:DRAW 30,50
    :DRAW 30,-40:DRAW -30,-40
    :DRAW -30,50:DRAW -60,120
    :MOVE 0,-60:DRAW 0,-180
    :MOVE -50,-180
340 DRAW 50,-180:MOVE -30,-205
    :DRAW 30,-205:MOVE -20,-230
    :DRAW 20,-230:MOVE -10,-255
    :DRAW 10,-255:MOVE -160,0
    :PRINT "B.A.":MOVE 60,0
    :PRINT "T.C.":MOVE -475, 470
350 PRINT "G8KZG   G8KZG     G8KZG
       G8KZG"
360 MOVE -500,20:PRINT "Q.T.H"
    :MOVE 310,20:PRINT "LOCATOR"
    :MOVE -550,-20:PRINT "WARGRAVE"
    :MOVE 320,-20:PRINT "IO91NL"
370 MOVE -375,-470
    :PRINT "TALKBACK ON 144.750 MHz"
    :MOVE -600,-600
380 ENDPROC
390 DEF PROCTEST
400 VDU 19,0,7;0;19,1,3;0;19,128,
    2;0;:VDU 16,29,640;512;5
410 FOR A =-600 TO 600 STEP 100
    :MOVE A,-500:DRAW A,500
    :MOVE A+1,0:DRAW A+1,1000
    :NEXT A
    :FOR A = -500 TO 500 STEP 100
    :MOVE -600,A:DRAW 600,A:NEXT A
    :MOVE 0,395:MOVE 0,395
    :GCOL 0,0
420 FOR A=RAD 90TO RAD -90STEP
    -RAD .5
    :X%=395*COS A:Y%=395*SIN A
    :PLOT 85,-X%,Y%:PLOT 85,X%,Y%
    :NEXT :GCOL 0,1:MOVE 0,0
430 FOR A=0TO RAD 45STEP RAD .5
    :X%=395*COS A:Y%=395*SIN A
    :PLOT 69,X%,Y%:PLOT 69,Y%,X%
    :PLOT 69,-X%,Y%:PLOT 69,Y%,-X%
    :PLOT 69,X%,-Y%:PLOT 69,-Y%,X%
    :PLOT 69,-X%,-Y%:PLOT 69,-Y%,-X%
    :NEXT :GCOL 0,3
440 MOVE -320,10
    :PRINT "G8KZG            G8KZG"
    :MOVE -70,285:PRINT "G8KZG"
    :MOVE -70,-280:PRINT "G8KZG"
450 MOVE -100,0:DRAW 100,0
    :MOVE 0,-100:DRAW 0,100
460 ENDPROC
470 ON ERROR GOTO 500
480 MODE 2:PROCBAR
    :FOR T=1 TO 20000:NEXT
    :CLS :MODE 4:PROCBADGE
    :FOR T=1 TO 20000:NEXT
    :CLS :MODE 1:PROCTEST
    :FOR T=1 TO 20000:NEXT:CLS
490 GOTO 480
500 ON ERROR OFF :GOTO 10
```

TRADE NEWS

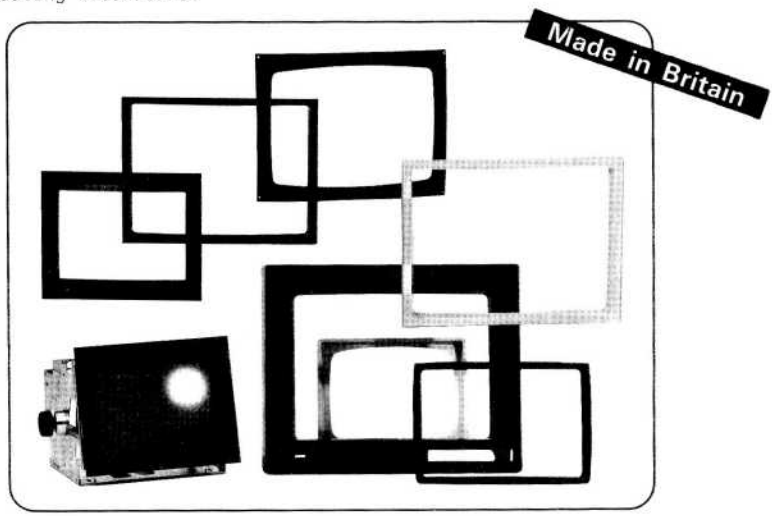
Bezels for CRT-units

Anyone building or re-furbishing a monitor may be interested in the products of G.A.Stanley Palmer Ltd of Elmbridge Works, Island Farm Avenue, West Molesey Trading Estate, Surrey KT8 0UR. The company produces a comprehensive range of bezels for CRT-units.

Both front and rear versions are available in a range of standard sizes from 5" to 17". Prices vary between £6.56p for the 5" rear mounted to £13.20p for the 17" front. These prices are for one offs and the company is willing to supply direct to members.

Other products include glare reduction filters and special plastic products. The company is able to offer custom made items in quantities and will be pleased to quote for such orders.

Please make sure that a large (12"x8") stamped, addressed envelope is enclosed when requesting literature.



Microwave components

LMW Electronics of 102 Stamford Street, Ratby, Leicestershire LE6 0JU (Tel: 0533 386364), looks to be a good source of specialised components. A four-page leaflet lists such things as the 'NE' series of low-noise microwave transistors and GaAsFETS. Power transistors are also available.

Other items include a range of diodes including Schottky, mixer and general purpose types, UHF and microwave capacitors including leadless (Trapezoidal) types, semi-rigid coax, coax connectors, and sundry other items. The company also makes and sells 23cm pre-amps, local oscillators, mixers, amplifiers - including a 10W solid state one at £58.50 as a kit or £107. built and tested. 23cm and 13cm transverters are also included in the range.

New Solent Scientific kits

Made in Britain

23/24cm 1-Watt FMTV transmitter.

A new transmitter available from Solent Scientific has been designed using the latest microwave transistors. It features video pre-emphasis and sound subcarrier. The signal is directly generated at the final frequency to avoid spurii and alignement diffuculties - ideal for those without acces to a spectrum analyser.

The transmitter is supplied in kit form (less box and connectors) and is ideal for home construction, needing only minimum skills and test equipment to get it going. The unit is powered by 12v DC and is ideal for QRP, portable/mobile or as a driver for a larger amplifier. Price: £64.95 plus £2 postage.

10-Watt 23/24cm POWER AMPLIFIER.

Also from Solent a 10W solid-state PA which has been specifically designed for FMTV use. The unit is small and robust and, again, is suitable for home construction and alignment. Power requirements are 12 - 14v DC. The amplifier is designed to follow the 1W transmitter described above, but can, of course, be used with other drivers including FM rigs in the 1296 - 1298MHz segment. It may also be used for SSB but would need to be slightly under-driven in that mode.

The kit is supplied as a PCB with its associated components and full instructions. The diecast box, heatsink and connectors are not included. Price: £69.95 plus £1 postage.

Solent Scientific, 75 Chalk Hill, Southampton, Hants. Tel: 0703 464675

New Ferguson colour monitor/TV

Thorn EMI have introduced a new 14" Ferguson TX monitor/colour TV - MC01 which features separate RGB, composite and aerial inputs.

Unlike many other sets currently available, the MC01 has been specifically designed to function as a monitor as well as being an excellent quality domestic receiver. For ATV purposes this set offers everything one could wish for in the small station or studio. It means that you no longer have to purchase separate colour TV's and monitors.

Switching between the various functions is electronically controlled from the front panel which also contains the usual volume, brightness, contrast and colour controls. The rear-mounted RGB socket is a DIN type as is the composite video socket. Both have provision for sound signals and the RGB also has a sync input.

Recognising that output signals from home computers, video games, video recorders and ATV equipment can vary somewhat, the composite video input can be adjusted to maximise the performance. (dealer adjustable).

GOODBYE 405-LINES

I guess it is with mixed feelings that, from the first week in January 1985, we say goodbye to our old 405-line television (System A). As it passes into obscurity and the museums, it may be fitting to reflect upon the history of the system.

In 1935 the new 405 line system was announced as a British television standard competing, as it was, with the Baird 240-line sequential system.
According to "Electronics & Wireless World" (Dec '84): 'The long-lasting Blumlein waveform, with positive modulation (excellent apart from susceptibility to ignition interference) and a.m. sound might have been a 243-line system if the EMI team had not tried the effect of changing one divide-by-three multivibrator into a divide-by-five (243x5/3=405)'.

The old system will be remembered by many for the often audible 10.125Hz timebase whistle and for the visible line structure. There was a system to reduce this effect which used a spot-wobble technique. Unfortunately the idea never caught on and the original system remained largely unchanged.

DX-TV enthusiasts will miss the band-1 service (?). Owing to the fact that most European countries use band 1 for their 625-line transmissions, our 405 line signals have often caused foreign DX stations to be missed. On the other side of the coin, during favourable sun spot cycles, the British band 1 transmissions could be seen by enthusiasts over much of the world including Australia and the United States.

Now the squabbling over who-gets-what in band one can hot up!

INTERNATIONAL ATV CALLING

144.750 MHZ

MARKET PLACE

ADVERTISING RATES:

Classifieds - 3p per word*
Full page - cover - £20
Full page - inside - £18
Smaller displays - proportional

*Advertisements are placed in this column free of charge to paid-up members. If possible an address label from a recent CQ-TV magazine should accompany your advertisement. All ads should be sent to the Editor at 47 Crick Road, Hillmorton, Rugby CV21 4DU. Tel: 0788 69447.

FOR SALE

70cm Vestigial Sideband ATV transmitter. 10W peak sync output, built by Fortop Ltd. £120 or offers.
D.Wills G3XKX, 70 Hidcote Road, Oadby, Leicester LE2 5PF. Tel: 0533 715378

4GHz SATELLITE FEED HORN, 4-stage GaAsFET low noise amplifier, down converter. Also separate Magnum Microwave TO-8 UHF IF oscillator package £100. (Designed and built by G4IMO ('Television' articles)).
2 MARCONI broadcast standard vision distribution amplifiers, intended for rack mounting, 1-in and 5-out. 240v ac. £3 the pair. BRAND NEW VHF/UHF TV field strength meter, features barograph inlay over integral monitor/TV. System B/G, includes sound. Made in Italy by Unaohm/Decca (model EP732). 220v ac or 12v dc. Very upmarket, hardly used, includes manual £195. Suit aerial rigger or TV DXer. SAE for further information. Prefer buyers inspect and collect. R.Bunney, 33 Cherville Street, Romsey, Hants SO5 8FB.

COLOUR MONITOR/TV - JVC CX610GB, 5" screen, VHF/UHF tuning plus direct video input £200. YAESU FT290R, nicads and charger together with 9-element portable Tonna £210. SSTV to fast scan converter, ZL1LH design on printed circuit boards - good picture without fading £90.
Contact: Dr.J.Morecroft on 0703 777222

RAD COMM' (G3WCY) SSTV to FSTV converter, including recommended PSU plus Sony 9" TV , battery/mains, modified to accept video input from converter. £50.
Tony Edwards G3HNP Tel: Sapcote 2955 (Leicester area).

FDK700E transceiver £110. LINER 430, Liner 2, homebrew power supply/stand £150. BURNDEPT UHF mobile transceiver, 5W output, working, crystalled on RB0 £40.
A Jefford G8GON. 78 Churchill Road, Exmouth, Devon. Tel: 0395 264872

FUJINON TV zoom lens. 20-100mm, f1.8, C-mount, motorised zoom control, iris and focus, 12v DC. Nearly new condition £50. ITC 9" MONITOR, transistorised, used condition but picture OK, use with computers? £20. ASTEC 10" monitors, 3-off. New and unused - approx. 3-years old but in perfect condition, with circuits £45. POWER SUPPLY unit. Many outputs: 2x5v and 2x25v. Regulated and protected outputs £15. RGB conversion board for Ferguson TX90. Complete PCB with full description and installation instructions £15.
Carriage extra at cost on the above. David Wilson. 4 Harkness Close, Bletchley, Milton Keynes, Bucks MK2 3NB. Tel: 0908 641234

YAESU FRG7700 plus ATV £250. 5-ELEMENT 10 metre beam £50. TET MV-5BH vertical HF aerial (damaged) £25.
George Lee, 6 Hoylake Gardens, South Oxney, Watford, Herts WD1 6LG. Tel: 01 421 1506

MONOCHROME VIDICON CAMERAS: Two Shibaden FP100 with Fujinon 20-100mm C-mount lens (push rod zoom), camera cables, connectors and service manual. ONE ITC VF302 with Cosmicar 22.5 - 90mm C-mount lens, camera cable, connectors and service manual, £45 each (worth it just for the lenses!) SHIBADEN SG-105B monochrome SPG £5. SAMSON HUSKY tripod and skid £5. TEKTRONIX type 525 colour waveform monitor, working but needs minor attention. With service manual £50. Offers considered for any or all of the above items.
P.C.Major, 6 Priors Way, Olivers Battery, Winchester, Hants SO22 4HJ Tel: 0962 62281 ext 248 (daytime) or 0962 54851 (evenings/weekend).

* HEAVY DUTY pan & tilt heads, as used on Pye CCTV contracts, £5 each. They are heavy so phone to arrange carriage/pickup arrangements.
* MIDBAND VHF groundplane, professional quality. £15.
* PROJECT 100 cards, not works of art but fully functional: SPG, PAL coder and single-board pattern generator. £10 each.
* TWO 19" rack cases: 5.25" and 10.5" usable height. Former includes Radiospares card frame and front panels (£10), latter is empty (£3). Buyer collects.
* ICOM IC-120 23cm FM rig, very nice but no activity here so very nice price (to you!) £250.
* GREEN SCREEN (12") monitor by GBC - proper metal case. As new, £45.
Please add a realistic amount for carriage, also ring first to confirm availability or send SAE with letter (in case I have to return your cheque).
Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604 844130.

MM MMC/435/600 ATV receive converter £20. PYE 17" B/W monitor £30. JAYBEAM PBM18/70 18-element 70cm Parabeam £25. KW ATLANTA, with fan and PSU, serviced in August by KW £160. Collection or carriage extra.
H.Burton G2JR, 149 Longfellow Road, Coventry, Warks. Tel: 0203 455021

I.T.T. (STARPHONE) UHF FM base station type B395 (FM5). Complete with talkthrough facility, ideal for 70cm repeater. £60 ono. VIDEO SYSTEMS mono TV camera, solid-state with vidicon £40 ono. N.Cook G8UCL,
71 Reservoir Road, Selly Oak, Birmingham B29 6ST. Tel: 021 472 6689

EXCHANGE, WANTED & FREE

FREE TO A GOOD HOME:
NATIONAL 525-line NTSC VCR in working order with 3 cassettes, type VZ-T60 with manual (in Japanese!). RCA CTC-16 colour TV, (1965 vintage), modified to UK standards. 21" round tube u/s otherwise OK. Museum piece?
George Crump G3VGC. Tel: 01 659 0845. (S.London). May deliver near A1.

FREE TO GOOD HOMES:
1 CREED teleprinter with tape readout.
7 Pye UHF valve base stations, less valves (could possibly assist here).
4 MID-BAND Ultra Burndept base stations.6 BURNDEPT UHF mobile RT.
6 70MHz STORNO hybrid mobile RT.
VARIOUS lengths of UR67 coax and mobile aerials.
All the above are free to members who can collect.
SCOPE WANTED. Does anyone have a cheap 'scope, mine has given up!
K.E.Therden G8BOY, 'Highfield', Parrotts Lane, Cholesbury, Nr. Tring, Herts HP23 6NY. Tel: 024029 260

G.S.A.P 16mm Bell & Howell cine GUN CAMERAS wanted; ex U.S. government vintage (1942/3), 24v dc operation, magazine loading, any condition.
John Sims, 25 Brecon Close, Melksham, Wilts SN12 7RZ. Tel: 0225 706795

WANTED ATV & 136MHz Microwave Modules converters. TELEREADER CWR610E. MuTEK BBA500U pre-amp. MK Products SSTV active filter board. 73 Magazine SSTV book.
Graeme Wilson, 65a Gypsy Lane, Nunthorpe, Middlesbrough, Cleveland TS7 0DR. Tel: 0642 318451

TO SWAP, BUY OR BORROW, old 35mm slides of testcards, tuning signals, etc. I hope to be offering a souvenir videotape of several dozen old slide and monoscope generated testcards (and sound idents) during 1985. Keep in touch if interested!
Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604 844130.

CIRCUIT DIAGRAM for JVC colour monitor model TM41EK/EG, PAL/SECAM, also any information on conversion to RGB use. All expenses paid.
Paul Raynor G6EUF, 51 Bonchurch Street, Leicester LE35EG. Tel: 0533 59245

SOLENT SCIENTIFIC

Allan Latham G8CMQ
75 Chalk Hill SOUTHAMPTON

Tel: 0703 464675

23/24 cm 1W FM TV TRANSMITTER — Kit £64.95 + £2 pp

NEW PRODUCT

* 1V pp Video and 4mV Sound inputs, adjustable.
* Video and Sound pre-emphasis.
* Sound subcarrier can be set to 5.5 or 6MHz.
* Output adjustable to any frequency in the band.
* Robust output transistor.
* Ideal for shack or portable use, needs 12V unregulated.

23/24 cm 1W to 10W POWER AMPLIFIER — Kit £69.95 + £1 pp

NEW PRODUCT

* Ideal for use with the 1W transmitter
* Very robust transistors
* Ideal for shack, portable or even masthead use, needs 12 to 14V unregulated (13.8V for full output)

UHF FM TV RECEIVER — Kit £74.95 + £2 pp

* Ideal for use with our converter, covers 470 to 870MHz.
* Every possible feature: Tunable sound, AFC, S-meter, tuning meter, +/- video, de-emphasis, sync improver.
* Superb performance optimised for weak signals.
* Ideal for shack or portable use, needs 12V unregulated.
* Kit includes specially modified UHF tuner.

23/24 cm TV CONVERTER — Kit £34.95 + £1 pp

* Excellent performance covering the whole band.
* No breakthrough problems, choice of IF in the UHF band.
* Ideal for shack or portable use, needs 12v unregulated.

23/24 cm FM TV MICRO TRANSMITTER — Boxed & Aligned £29.95 + £1 pp

* An essential item of test gear for this band as well as a "real" transmitter.
* Approx 10mW output, preset to your choice of frequency
* Deviation set for 3MHz

All our kits are designed for easy alignment with simple test gear and come complete with the PCB, all on-board components and comprehensive construction and alignment instructions. A full back-up service is available to kit constructors at a reasonable rate.

Please note that the kits exclude all the external components e.g. box sockets, meters etc. Kits are normally available for immediate delivery from stock. Please phone for price and delivery of ready built units.

Full details of the above items and recent additions to our range are available: just send a large SAE.

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.

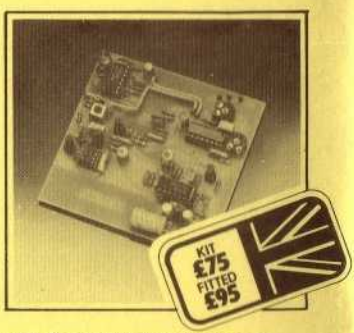
For example, the unit has been used on outside broadcast operations to reduce the level of wind noise and other background noises before recording. An ideal noise reducing unit for "U-Matic, VHC, Betamax, etc, VTRS.

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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Telephone: Liss (0730) 893444/892742 Telex: 86134