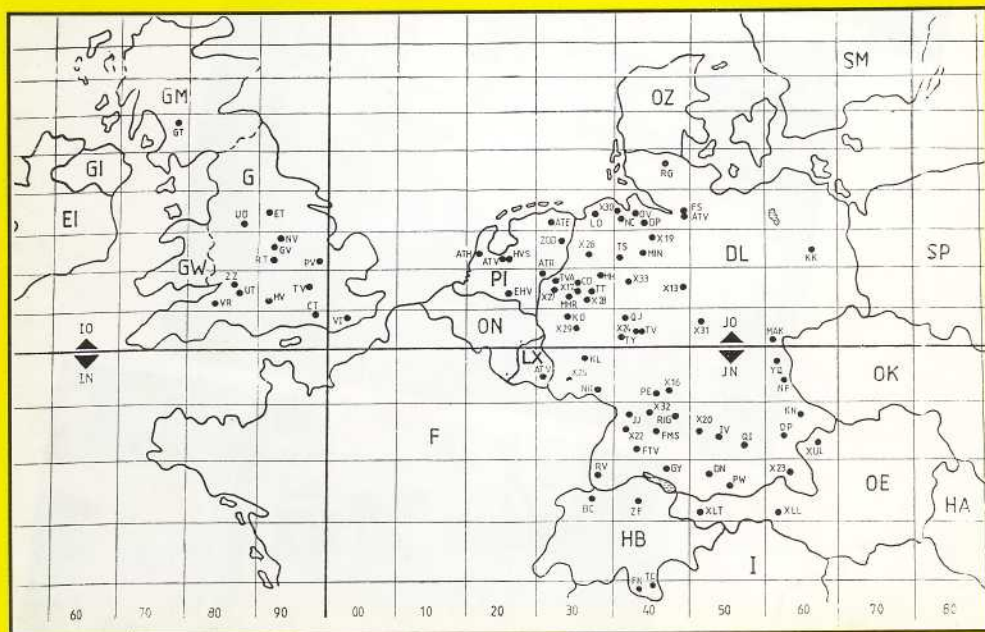


CQ-TV



No. 160

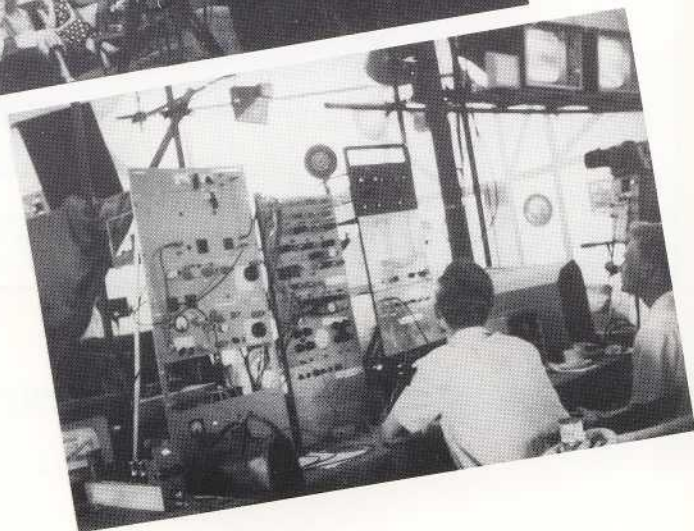
November 1992



THE EUROPEAN ATV REPEATER NETWORK

MAP SUPPLIED BY AGAF

BRITISH AMATEUR TELEVISION CLUB



The BATC at the Dagenham Town Show circa 1958/59

Courtesy of Ted Stiles G0BHT

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CLOSE FOR PRESS FOR THE NEXT ISSUE 20th DECEMBER 1992

CQ-TV is produced on a 386 PC computer system, using the PROTEXT word processing package and the TIMEWORKS desktop publishing package.

The camera-ready artwork is produced on an OKI OL400 Laser printer.

The magazine is printed and bound by APEX PRINTERS of Rugby.

POST

WANTED !!!

Wanted adverts normally appear in the Market Place section, but this one is so, so, well, so odd! to warrant inclusion at the head of the magazine:

WANTED: Loan of two 12000 foot mountains for 3cm DX working, or loan of similar! Bob 'Gun Diode' Platts (who else!). Tel: 0283 40742.

SSTV NEWS UPDATE

Dear Mike,

The missing footnote to the review of ViewPort in the last CQ-TV has brought down the wrath of the designer and several users on my head, they thought my review was incomplete because I had based it on the early version of the software. I did think my footnote on the updated software was inside the press-date. We shall survive.

Two weeks ago I received the PCB and components for the PASOKON TV SSTV system for PC computers. It took four hours to assemble, 10 minutes to install and set-up and is an almost complete SSTV system, running in all current modes, displaying in 256 VGA colours or 32K colours with a graphics board using Sierra Ram-dac L.S.I. The quality is excellent, the mouse driven menus give armchair operation, it loads and saves pictures in *.GIF, *.PCX,

*.TGA and *.HRZ formats. It allows easy access to all drives and directories. It seems to be to SSTV what hydrocarbons were to steam ! It lacks two functions soon to be rectified - frame grabbing and graphics.

N9AMR has amended his Hi-Res programme for the 1200C Robot to encompass PASOKON TV under the new name of Hi-Res 32, a copy of which should be in my computer during October. This version will add the comprehensive graphics facilities enjoyed by 1200c users to the PC. Further, a low-cost frame-grabber is imminent which, together with provision for input from a camera, will make PASOKON TV almost as comprehensive as the highly expensive commercial scan-convertors. It doesn't need a separate monitor interface-board, high stability oscillator, PSU or EPROM, all that is required is contained on the PC plug-in expansion board and included software. The system will run on all PCs, even XT machines, but in fairness it is best on a 386 with a 32K colour graphics board and 500K of free ram .

I have a limited supply of information leaflets which I will send to members needing more information (S.A.E. please). I have been on the air with this system in all modes with highly satisfactory results, for hams with PCs wanting low-cost fully compatible colour SSTV, then this is designed for just that purpose.

The more ambitious will be interested to know of a low-cost 1200C clone from Felipe Rojas AB4QC. The DFM-1200 USA costs \$300 for the PCB boards and front panel. One of the PCBs is partly wired, and tested and it is claimed that

components for the rest of the project will cost another \$200 or so. At present rates of exchange this would cost around £270 for a complete 1200C clone. Details of the main PCB and layout (A3) together with front panel enclosure construction are to hand. I need more information on this clone to be able to comment on its compatibility with the PAL system, a development board is in hand to effect full interchangeability between NTSC and PAL.

Pasokon TV is available from the UK and European Distributors: KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF, U.K. Tel: 0788 890365. Fax: 0788 891833.

Roland Humphries G4UKL

ANOTHER RESPONSE TO ANDY'S 'WHAT'S WRONG WITH ATV?'

Dear Mike

In reply to the article What's Wrong With ATV in CQ-TV 158 I have written down my own thoughts on the subject.

I believe that Bill WA6ITF has missed the point of ATV. It would be nice to be able to sit down and watch a programme dedicated to amateur radio on ATV but this is not what ATV is about. The difference between ATV and what you can watch on the other box is that ATV is interactive.

The pleasure of operating ATV is similar to any other mode in that the content of the transmission is directly dependant on the people in contact. For example, two

people who are interested in railways will show there latest train videos but with people who just want a chat all you will see is their mug shots and pictures of the shack. If what you are watching is not interesting to you then you don't just switch off. Because ATV is interactive you can tell the transmitting station what you do want to see or even better send something more interesting yourself.

No other mode tries to polish up its content before going on the air. For example, have you ever heard of prizes for the best short story on the packet network or best technical lecture on phone. If all phone contacts had to be witty, entertaining or informative then the HF bands would be deserted.

Most contacts that I've had on HF consist of a signal report, of dubious accuracy, and a weather report. This is hardly competition for the BBC but it is still the most popular route into amateur radio.

My point is that the popularity of the HF bands comes from the fact that there is always some one there rather than the entertainment value of each contact. I believe that this is also true for ATV.

I believe that the way to get more people interested in ATV is to get more signals on the air. A bit chicken and egg I realise but who would get a station on the air if there is no one else there to exchange contacts with.

I have noticed that it is not just ATV that is suffering a decline in operators but most of the bands and modes are becoming less active as the numbers in amateur radio decline and the bands and modes available increase.

As for the apathy that was commented on I am as guilty as the rest but in my defence it comes back to the activity levels.

When I started in ATV about 10 years ago there were about a dozen active stations in the Derby area and this meant that there was someone on the air most nights. I have seen it decline to levels where it is difficult to get any local contacts. I even started entering contests to try and find more activity but the numbers on those nights has also declined over the years.

Nowadays, due to other commitments like a growing family, I get into the shack about 2 hours a week. When I enter I have a choice. If I turn on the HF rig I will get a contact in minutes, 2m or 70cms phone will probably produce a contact within 15 minutes but if I call on 144.750 I will be talking to my self all night and will have to try again next time. Which would you do?

One of the things that sets ATV from the more popular modes is that it is so technically demanding. This has the effect of making people think twice before putting in the effort to get on the air. Will it be worth the effort? Who can I contact? Back to who is on the air.

70cms had the advantage that it was very easy to get a receive set up on the air to join in with the fun. I have found that with the opening up of 24cms, 70 has been left to fend for its self. I can well understand that having put in the effort to set up a 24cms station the owners want to use it but I feel that 70cms is the gateway to ATV just like short wave

listening is the gateway to amateur radio.

I have a couple of suggestions which may help bring the activity back to ATV. the first is a national activity night. It would be just like contests in concentrating the activity to a particular time slot but would allow for the long exchanges which are part of the fun of ATV. Maybe the first day of each month which is something easy to remember and pass on.

The second suggestion is the televising of GB2RS. Again this would mean that people would know when a signal is on the air but it would require quite a lot of effort from the dedicated few again.

Back on to the subject of apathy. I feel the way to get people interested is to encourage rather than whine. I feel that we need more reports of activity on the air rather than articles entitled what's wrong with. As the magazine is one of the things that promotes ATV we should be looking on the good side rather than dwelling on the down side. Articles entitled what's right with should be the order of the day.

So having got that off my chest what am I going to do about it? Well I have just acquired a new HF rig so that I can Start on Slow Scan where I hope there will be some activity. However I will re-assemble my 70cm station and put out at least one call on 144.750 each time that I am in the shack. Let's hope that I see you on the air.

73 Jeremy Powers G0JNK.

Phew ! made me reach out for the bottle of 'hard stuff' after typing that one in Jeremy ... Mike

HELP PLEASE!

Dear Mike

It's good to know that you're still at it, good for all of us bods that there is somebody to listen and help where needed!

For the past year I have presented the undermentioned problem to some of our 'vocally brilliant boffins', seeking a circuit which I would assemble, thereby getting me out of a lot of 'bitsy' editing, etc., - but no joy!

With your vast knowledgeable readership I feel I am not the first with this problem, so, with this thought in mind, would you be so good as to run the following 'ad' in your wanted column.

Better than that Mike, it's below! ... Mike

WANTED: Circuit - logic control - 'pause function' for JVC VCR HRS-IO E, also for Sony VCR SLF-IUB. I use both these portable VCRs with a JVC camera KY 1900 successfully. However, on occasion the 'pause' function would be desirable (i.e: hosepiping when hand-held!).

I would appreciate any help in the form of a practical circuit - proven! - which I could assemble and box, to be clipped to the camera, fitted with a button to activate the VCR's 'pause' - on/off, via the camera multi-socket on the respective VCRs.

All offers of help will be most welcome and any expenses honoured. Can you help?

Mike North EI7CL, 135 Downpatrick Road, Dublin 12, Eire. Tel: 010 353 1 54 22 63.

MORE HELP PLEASE!

Dear Mr. Wooding

I am writing to ask if, through the pages of CQ-TV, I might be allowed to make an appeal to your readers.

For the last 28 years I have been recording and researching BBC television test card music. My collection is almost complete but for the music used during the embryonic days of BBC2. I am convinced that someone out there has either information or recordings of this music; it is just a question of getting my message over to that person. I am enclosing (see below .. Ed) a short letter which I would be grateful if you could give consideration to publishing in a future edition of CQ-TV.

Help Wanted - researcher/genuine collector would be grateful to anyone who could come forward with any information on music used for experimental 625/early BBC2 test card transmissions 1964/65. I have many interesting items in my collection and would be happy to exchange with anyone who can help.

Paul Sawtell, 20 Seymour Road, Stourbridge, West Midlands, DY9 8TB. Tel: 0384 896679.

GB3UD NEWS

Dear Ed

Hello to all 23cm ATV repeater operators. It has been a long time since you had any information on the Stoke on Trent 24cm ATV repeater GB3UD in CQ-TV, I hope now to put that right.

First of all may I say hello to all the

GB3UD lads. GB3UD has been quite poorly for some time, low power, low deviation, etc. Well, no longer! It is now running approximately 15 watts and has a super-sensitive receiver. The repeater was originally built by Steve G4DVN, but the re-build has now been taken over by Albert G4DHO (our hero!).

The repeater is on RMT2 and is situated on a rather large PMR mast on a rather high hill called Mow Cop, between the Staffordshire and Cheshire borders. The repeater has a VCR installed which is user operated by a DTMF system, full details of which can be obtained from the group. This facility means that if the station you were hoping to catch is not about then you can leave a TV message for him/her, which that station can then remotely play back over the repeater.

As with all clubs/groups there is a subscription to join the GB3UD group, which is only £5 per year, and goes towards the running and maintenance costs of the 'box'.

For further information concerning GB3UD and the group please contact: Chris Barker G1EZJ, 52 Spode Street, Stoke on Trent, Staffs., ST4 4DY

NEWS

GB3HV NEWS

The High Wickham repeater is currently QRT awaiting a site change, after 3.5 years in service. Things are looking up,

for this repeater is to get a super new site, at High Wickham. It will be nearby to its original location (same QRA), but on an 80' tower.

A site meeting is already scheduled, so installation plans can get under way soon. A second choice school site had already been signal tested, but the new commercial mast should be much better.

The original repeater has undergone a "DE GARRY" rebuild, on much of the electronics, by Mike G8LES.

Several new features have also been implemented:

S/N ratio "calibrated P" meter, Video processing, including syncs & colour reprocessing. An "intelligent" 3 way aerial system.

The special repeater channel RMT3 will still be used:

Input 1248 MHz : Output 1308 MHz

This is to minimize interference to and from the very strong (10GW?) Heathrow Radar system. The repeater group has already had comments, that the radar engineers miss the "GB3HV calibration" signal. It is hoped that the new site is worth waiting for. And may well extend the flat band coverage well beyond the 1000 square miles or so previously obtained.

ATV ON 10 GHz - A NEW RECORD ?

Well that's how the telegram style communication arrived at the CQ-TV office. To continue:

On August 9th FC1JSR and HB9AFO achieved a one-way QSO from the Aiguille du Midi (Mont Blanc) at 3842 metres ASL to the Puy de Dome, near Clermont-Ferrand in France) - a distance of 303 kilometers.

The equipment used by Serge FC1JSR, who was part of the TV9CEE expedition on Mont Blanc, was a 20W 10 GHz transmitter (exciter on 1200 MHz feeding diode multipliers) and a 40cm parabolic aerial with an Ikea penny feed.

The equipment used by Michel HB9AFO was a modified LNB, and AR3000 modified scanner feeding a home-brew IF system and demodulator. His aerial was a 60cm offset dish.

Michel goes on to tell me that both he and Serge are QRV on 70cm and 24cm, as well as 3cm, and can be 'QRV very quickly on the top of Swiss/French mountains with mobile equipments. We will both appreciate to be contacted for a sked!'.

*Many thanks to Michel Vonlanthen HB9AFO for this interesting news item ...
Mike ?*

SUBSCRIPTION RENEWALS

If your subscription will be due for payment at the end of this year, you will have found a renewal letter in the envelope with this CQ-TV. If you are in doubt as to when your subscription will be due you can check the first two digits of your membership number, which is printed on the address label. Your subscription will only be due if the number is 92-XXXX.

Please help your club by paying before the 1st of December, this will help spread the work-load of the membership secretary over the holiday period.

The subscription rate is unchanged at £9.00 per year for 1993. Please see the renewal letter for details of multi-year discounts and overseas postage rates as applicable.

Dave Lawton G0ANO, Hon. Membership Secretary.

EEC ... VAT ?

From the 1st of January 1993 the BATC will have to add UK VAT at 17.5% to orders exported to other member countries of the EEC ! This applies to most Members' Services items, Videotapes, Photocopies and CQ-TV Binders - BUT NOT TO BOOKS. Books in the UK are zero rated, so there will be no change in the price of books. EEC members must add 17.5% to the total of Members' Services items ordered after January 1st 1993.

If you wish to save paying the VAT, we MUST receive your order before the 21st of December.

There will be no change in the price for membership of the BATC, it will remain the same at £9.00 per year.

Brian Summers G8GQS, Hon. Treasurer

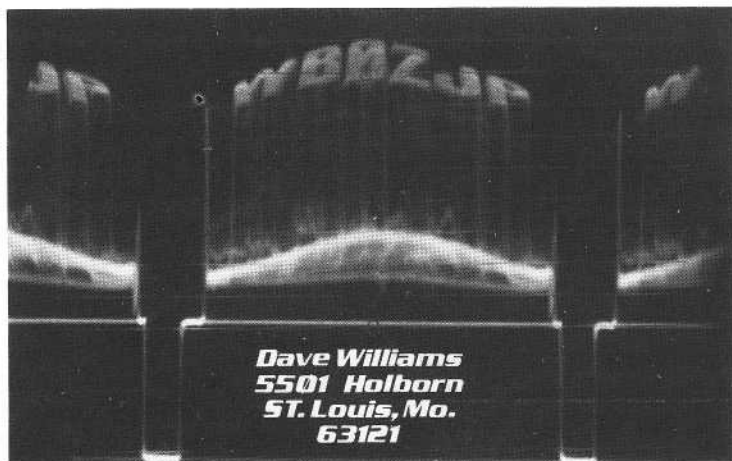
A LATE ADVERT !

Link Electronics PLUMBICON TUBE conditioner and tester, model 334. Marconi Mk.9 COLOUR CODER module

(PCB) needs +24V, +12V, +5V, -12V and pulses ... £25. COX MODULES: 150, 156, 166, 167, 168, 179, 301, 327, 633, 1u and 2u crates. Marconi Mk.4 picture and WAVEFORM MONITOR circa 1962. Marcon Mk.8 3-tube broadcast COLOUR CAMERA. Philips LDK5 3-tube broadcast COLOUR CAMERA. Barco TVDM34 rack-mount TV RX ... £30. Sony VO9600 High-band/SP Umatic with or without time-code board ... POA. Pye Mk.5 Image Orthocon CAMERA circa 1961. Incomplete CHANNEL, comprising head (no side covers) Image Orthocon tube, short camera cable, PSU, CCU, no control panel or lenses. Further details on application. Angineux 10:1 ZOOM LENS (could be made to fit above) one servo motor missing ... £65. BBC VECTORSCOPE as removed from my OB van. Marconi NTSC SUBCARRIER OSCILLATOR in oven ... £5. BBC CROSSHATCH GENERATOR ... £5. Still have a large amount of BBC white units to clear. Plainton VIDEO QUADRANT FADER ... £3. Short

length of Mk.4B CAMERA CABLE. Thorn SPG, rack-mount, 405/625, circa 1963? will need fixing. TIME-CODE generator type 304 and READER type 104 by Rapco, smart units, LED and LCD displays of hours, minutes and seconds, working order, not EBU compatible ... £65. Brian Summers G8GQS. Tel: 081 998 5739 (Answerphone).

WANTED: Quantity of perforated aluminium sheet to make sme covers for monitors. Circuit diagram for Aston time-code reader type TD20. Circuit diagram for Marconi Instruments TM9692, TF2913 and TF2914. Working rain covers for Marconi Mk.8 camera. XLR round 3-pin panel-mounting sockets, must be in good condition, urgently wanted for restoration of OB van termination panel. Pye, EMI and Marconi television product catalogues for 1950 - 1970 for research for article/book. Marconi Video Distribution Amplifier(s) type 459. Brian Summers G8GQS. Tel: 081 998 4739 (Answerphone). ?



A Synclock Unit for the BBC-B Home Computer

Hans Wessels PA2HWG

This article describes a synclock unit for the BBC-B microcomputer which I have used for over five years now. Unfortunately, the unit described achieves only synclock, but notes on how to get "genlock" are given at the end of this article.

Circuit Description.

The circuit diagram of the Synclock Unit is shown in Fig.1. The circuit achieves only true lock on a horizontal base by replacing the internal 16 MHz master clock signal by a phase locked 16 MHz clock signal, vertical "lock" is accomplished by resetting the 6845 CRT controller in the BBC-B at the proper time.

At the reference CVBS input there is an amplifier consisting of Q3 and Q4 so that input levels down to 0.5 Volts are handled safely, if you are sure the level you supply is always sufficient then it may be omitted. This amplifier is followed by a DC clamp and buffer, Q1.

The burst frequency is suppressed by the low-pass filter consisting of R31 and C23. The composite sync is stripped by U3A and the equalisation pulses are overridden by U1A, while U1B takes care

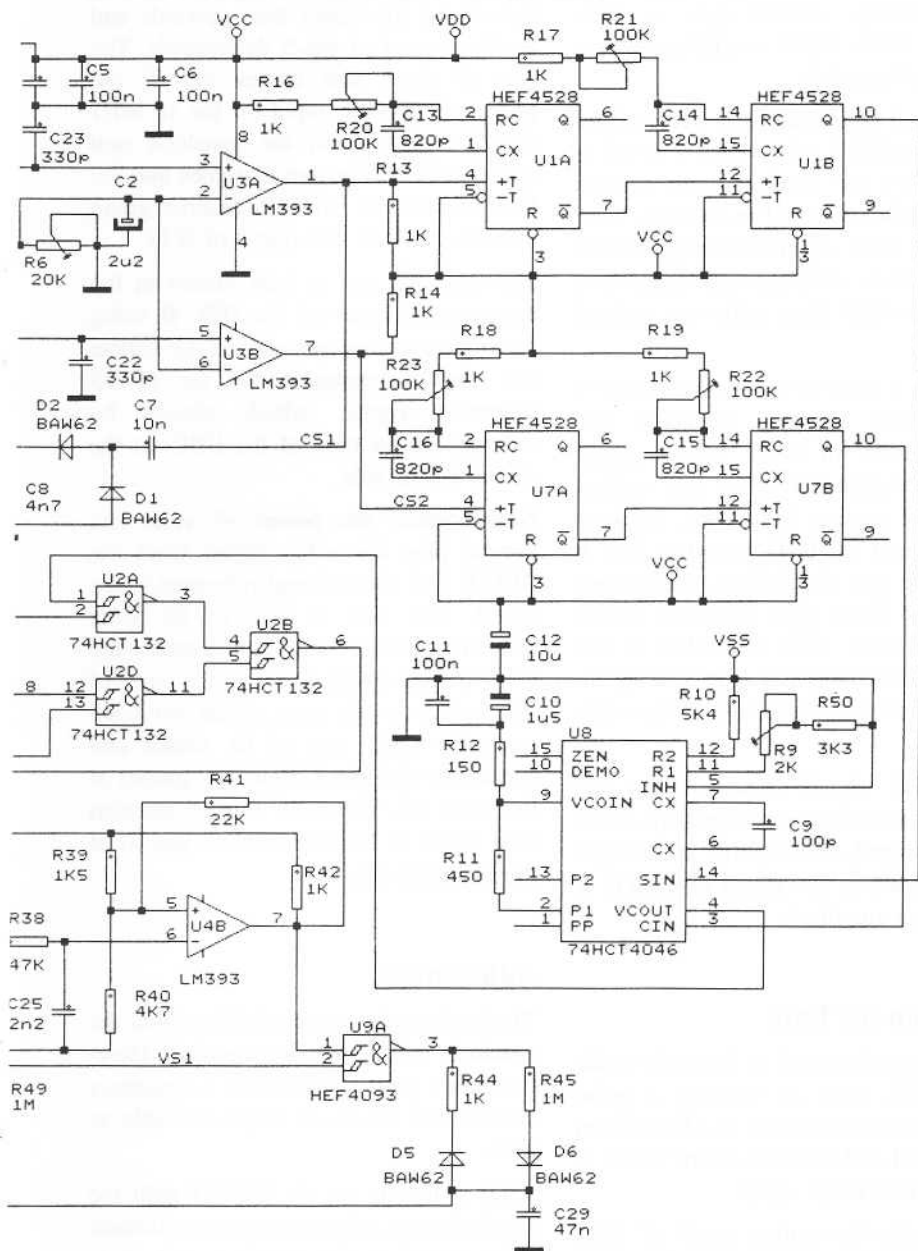
of a duty-cycle of approximately 50% needed by the Phase-Locked-Loop (PLL) circuit formed by U8.

The loop components R11, R12 and the combination of C10 and C11 at U8, a 74HCT4046, are chosen to give a very short lock time. This is done as I find myself, while editing video tapes, always short of time, so locking of the BBC-B must be instantaneously. With the chosen component values this is achieved, in fact in practice the unit will even keep the BBC-B locked while a VCR is in the fast forward mode.

The composite sync is used to detect the presence of an external video signal by D1 and D2. If an external video signal is detected the circuit will switch over to the phase locked 16 MHz signal supplied by U8. The switching action is performed by U2A to D.

If one prefers manual switch-over, as I do, this can be done by pulling the upper side of R15 to +5 Volt for external sync or to ground to use the internal 16 MHz crystal oscillator signal. The 16 MHz signal is buffered by U5, which is capable of delivering sufficient current to drive the BBC-B in the correct manner.

The composite sync signal is also fed to U4A and surrounding components, where the low-pass filter consisting of R33 and C24 removes the horizontal information.



The remaining vertical sync is then shaped by U4A, which is configured as a window comparator.

This vertical output signal is stretched by D7, C30 and R49, after which it is fed to U9A, where the vertical sync derived from the BBC-B is fed in as well. Now as long as these signals are in phase the output of U9A will keep C29 discharged via R44 and D5, thus achieving vertical lock.

Now what if there is no vertical "lock"? C29 is then charged to above the threshold level of U9D, whose output will then become low at the first vertical sync signal coming from U4A. As soon as the output of U9D becomes low it triggers the one shot U10A, this in turn triggers a fixed time one-shot which resets the 6845 CRT controller in the BBC-B and vertical lock is present again. R43 determines the position of the vertical sync.

The CVBS signal coming from the BBC-B is treated in a similar way as the reference signal, the amplifier at the input is not needed as the signal level here is sufficient in amplitude.

Setting-up the Unit.

Some preparation need to be made inside the BBC-B, such as locating a point where one can extract the 16 MHz master clock signal and to find a point where to insert the new clock signal.

I solved this by cutting pin-5 of IC43 (74LS04) halfway between the point where pin-5 comes out of the package and the point where it goes in to the PCB.

Now bend the upper half upwards and the lower part of pin-5 downwards. The part of pin-5 that comes out of the package is used as input for the 16 MHz signal coming from the synclock unit (pin-6 of JP1). The part that goes into the PCB is used as 16 MHz source going into the synclock unit (pin-8 of JP1).

The synclock unit is best placed in the upper right corner of the BBC-B using four nylon screws as stand off. Of course we need a connector for the CVBS reference signal, which should be mounted in the case of the BBC, at the rear or on the side.

Now connect the power +5 volts and ground plus the video signal from the BBC-B and the external reference video signal. All that is left to be done concerning connections is to connect the vertical reset signal, to do so lift pin-2 of IC2, which is the reset signal for CRT controller 6845, out of its socket and connect it with pin-3 (light pen strobe) of the same IC. This new formed junction now needs to be connected to pin-10 of the synclock unit.

Adjustments

The basic equipment needed to adjust the synclock unit is a video monitor. However, its a great help to have a frequency counter and an oscilloscope available as well.

After switching on the BBC-B with the synclock unit and connecting a reference video signal to the synclock unit, it is best to type in a lot of O's, this to observe linearity.

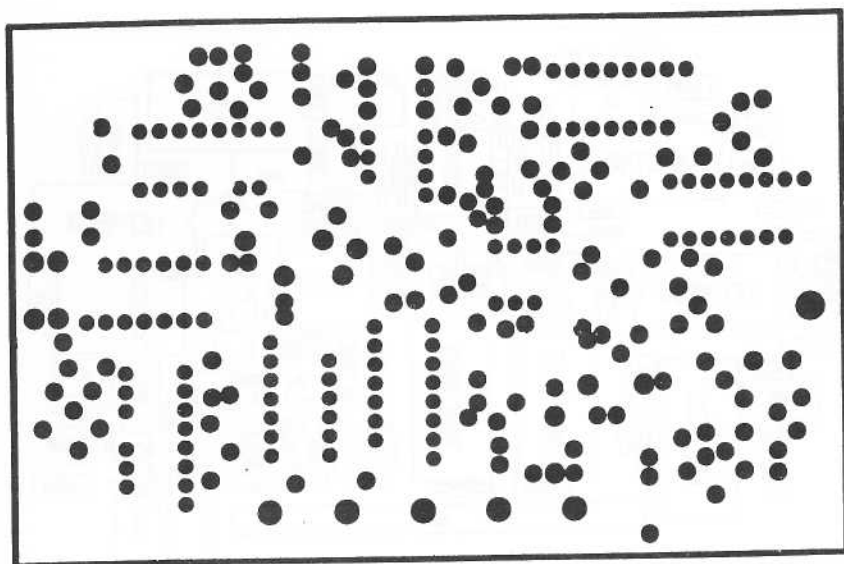
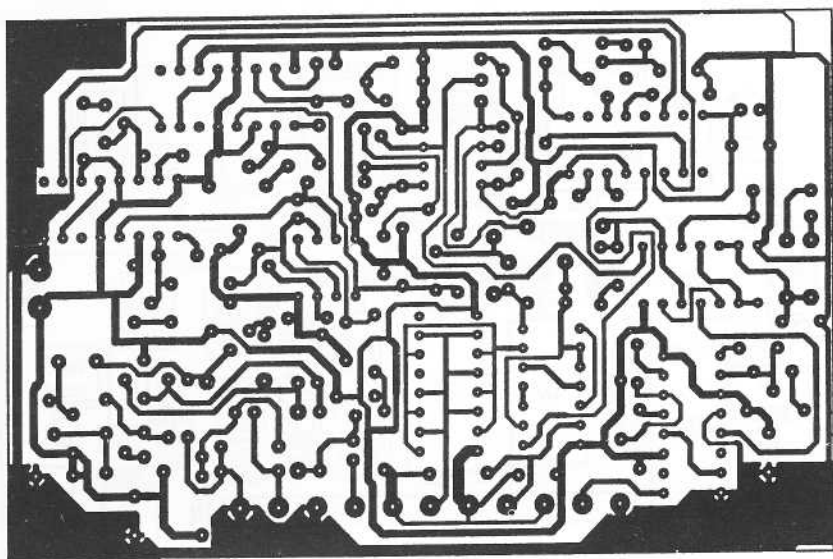


Fig.2: Printed Circuit Board Layout

Now adjust R8 and R5 in such a way that reliable sync pulses appear at pins-1 and 7 of U3. Next set R20 and R23 to give an output at the Qnot outputs of U1A and U7A of approximately 32us. Now set R21 and R22 again to give about 32us at the Q outputs of U1B and U7B.

Next we need to set the VCO frequency of U8 to about 16 MHz with R9. At this point there should be some form of horizontal locking. To check you can connect the output of the reference signal together with a slightly decreased video signal coming from the BBC-B (to make sure the monitor will lock on the reference signal) and feed the resulting signal to the video monitor. However, before you do this make sure none of the signals are DC-coupled.

On the monitor one now can observe locking of the BBC-B, where the position of the vertical sync can be set by R43. To achieve the correct position of the horizontal sync from the BBC-B and linearity over the screen one can play around with R20, R21, R22 and R23.

How to use the Synclock Unit

If you use a floppy disk, be sure to have your program loaded before switching to external lock, especially when this signal is coming from a VCR, because the jitter on the video signal and thus every signal in the BBC-B will lead to the message "disk fault" when trying to load your program.

I have no idea what will happen if you try to load a program from cassette as I never tried this out.

Limitations

As I have already implied, there is at least one limitation to the circuit as given. This is the possibility that the BBC-B will "hang" after a switch-over from internal to external reference, this is caused by the fact that this point can be anywhere in the 16 MHz cycle. Furthermore, contact bounce by manual switching can also cause the system to 'hang'.

However, this problem is not too acute, as over a five year period (and I use the synclock unit very frequently) I have experienced a system crash less than ten times.

Genlock

Of course, the ability to only synclock sources is somewhat restrictive, but it is a good base to start from. I achieve genlock by decoding the reference signal to RGB components using a TDA3561A IC. This device has teletext RGB insertion pin's where I insert the RGB signals coming from the BBC-B, after having decreased these signals to a level of 1 Volt peak. The insertion signal is formed by "OR"ring the RGB signals from the BBC-B and again, after decreasing its level to 1 Volt peak, the signal is fed to the appropriate point of the TDA3561A. After this processing so the new RGB signals are further processed in a MC1377 to give a CBVS signal again and thereby genlock is achieved.

A PCB layout and component overlay is shown in Fig's.2 and 3. The board size is 110 x 71.5mm with a ground plane on the component side.

Component List for the BBC-B Synclock

Item	Qty	Ref	Value
1	1	C1	4.7uF
2	1	C2	2.2uF
3	1	C3	47uF
4	1	C4	22nF
5	6	C5, C6, C11, C18, C26, C27	100nF
6	1	C7	10nF
7	1	C8	4.7nF
8	1	C9	100pF
9	1	C10	1.5uF
10	1	C12	10uF
11	4	C13, C14, C15, C16	820pF
12	1	C17	100uF
13	1	C19	22uF
14	1	C20	1uF
15	2	C22, C23	330pF
16	2	C24, C25	2.2nF
17	1	C28	15nF
18	1	C29	47nF
19	1	C30	3.9nF
20	1	C31	120nF
21	7	D1, D2, D3, D4, D5, D6, D7	BAW62
22	1	JPI	CONN
23	1	JP2	5V
24	2	Q1, Q2	BC548
25	1	Q3	BC548B
26	1	Q4	BC558B
27	2	R1, R2	18k

Item	Qty	Ref	Value
28	14	R3, R4, R13, R14, R16, R17, R18, R19, R31, R32, R37, R42, R44, R46	1k
29	1	R5	10k
30	1	R6	20k
31	7	R7, R20, R21, R22, R23, R43, R48	100k
32	1	R8	500
33	1	R9	2k
34	1	R10	5k4
35	1	R11	450
36	1	R12	150
37	1	R15	220k
38	1	R24	33k
39	1	R25	680
40	2	R26, R29	82
41	3	R27, R36, R41	22k
42	1	R22	390
43	1	R30	56
44	3	R33, R32, R47	47k
45	2	R34, R39	1k5
46	2	R35, R40	4k7
47	2	R45, R49	1M
48	1	R50	3k3
49	3	U1, U7, U10	HEF4528
50	1	U2	74HCT132
51	2	U3, U4	LM393
52	1	U5	74HC4049
53	1	U8	74HCT4046
54	1	U9	HEF4093

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Lighting ATV

Part-1

Norman Ash G7ASH

Lighting for television can be a headache even for the experts. For the amateur, this situation can be further aggravated by a make-shift studio and limited resources. The author has spent many years working in Closed Circuit Television and offers some general guidelines for illuminating QSO's.

Studio lighting often mimics the natural lighting from the sun. This single light source is reflected and scattered in many directions. This 'diffusion' slightly illuminates the shadows cast directly by the sun, as is shown in Fig.1. There is a

difference in the quality of this light. The shadow cast directly by the sun has a **HARD** edge to it and the light source is said to be a 'Hard Light'. However, as the reflected light hits the same object from many different angles, its effect is to cast a **SOFT** edged shadow and this light source is said to be a 'Soft Light'.

In Fig.2 a typical lighting plot in the studio is shown to mimic this natural lighting. It is adapted from a photographic lighting plot called 'Portrait Lighting'.

The main light (taking the place of the sun) is called the **KEY** light and it is best

placed slightly to one side of the camera, which causes the opposite side of the subject to be in shadow.

This shadow is said to be **FILLED** by the Soft Light placed on the opposite side of the camera to the Key Light.

The quality of the Soft Light

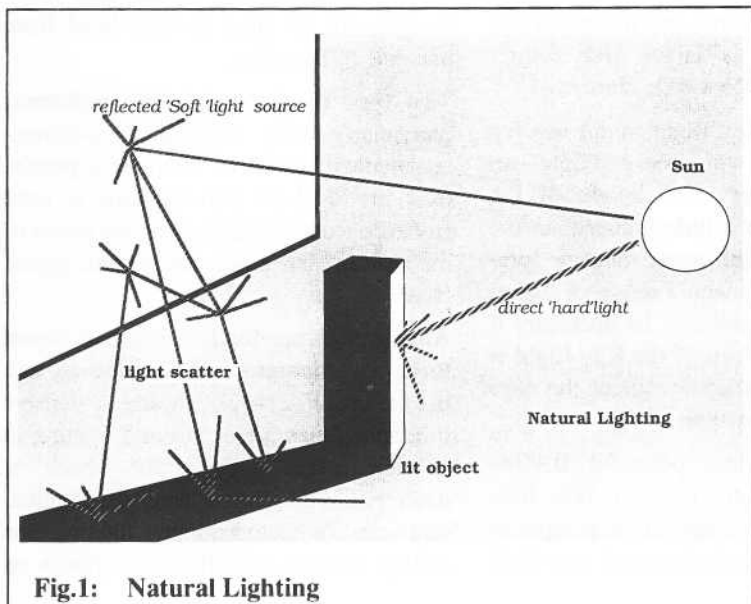


Fig.1: Natural Lighting

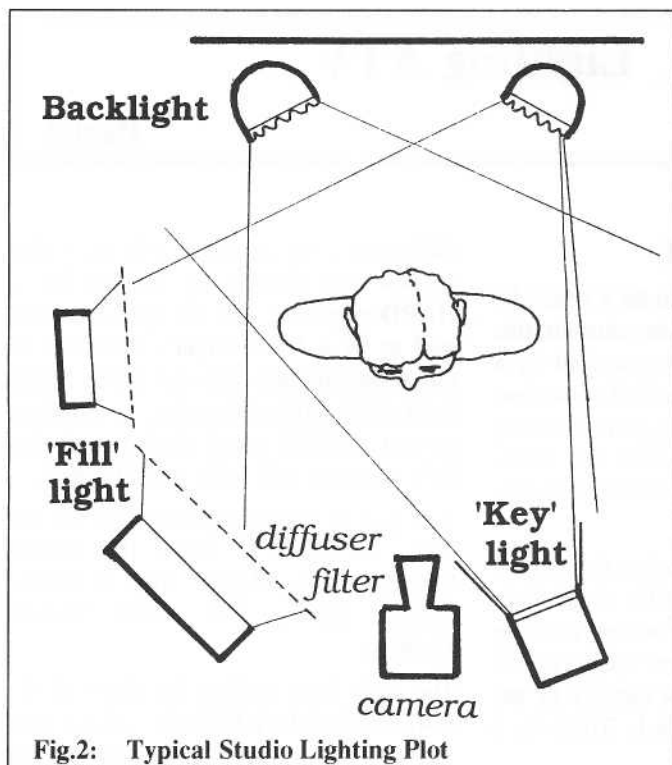


Fig.2: Typical Studio Lighting Plot

depends upon the area and quality of the diffusing source, a larger area further back is preferable to a little close in.

Positioning the Key Light might involve compromise, to suit, for example, an amateur 'presenter'. The height of the Key Light is best a little higher than the camera lens, though many amateur 'presenters' tolerances would require a higher position. This would also be necessary if spectacles were worn. If the Key Light is too high, heavy shadows about the eyes and under the chin appear.

The (normally) less powerful BACKLIGHTS are directed forward. They light the outline of the subject and separate this image from its background (one light

directly behind will do). The background itself should be lit, and be as far away as feasible to avoid the subjects shadow appearing in view on camera.

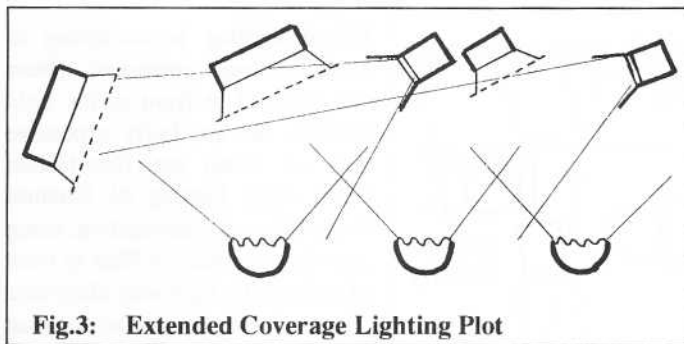
Fig.3 shows how this lighting plot can be extended to allow a degree of movement to occur within the scene. Note how the lights are arranged to overlap slightly, to give continuous coverage across the studio.

The physical spacing of the Key Lights and the Fill Lights across the studio also helps

to even out the drop in light level from one side to the other.

This type of plot can cause problems, particularly with detailed three-dimensional detail (such as instrument panels, etc.). In Fig.4 all Soft Lighting is used from the front, which lessens the effect of the shadow, but makes the picture appear 'flat'.

Already lighting for television is shown to be a compromise in many cases, and in the ATV 'shack studio' extensive limitations may arise. In Fig.5 lighting in restricted areas, such as the 'shack' is looked at. The general level of illumination can be achieved by lighting the ceiling and use of reflective surfaces on



made. Look to the even areas of grey if using black and white, where the 'speckly' noise will show up if inadequately lit. If using colour, look for the lack of response to the less-bright colours.

the (unseen) wall areas can direct Soft Light where its required. Use of a white sheet is good for this. If there is not enough room for positioning the Key Light, a mirror might be used to reflect the Key's light from the angle required. If you use glass make sure it is safely mounted!

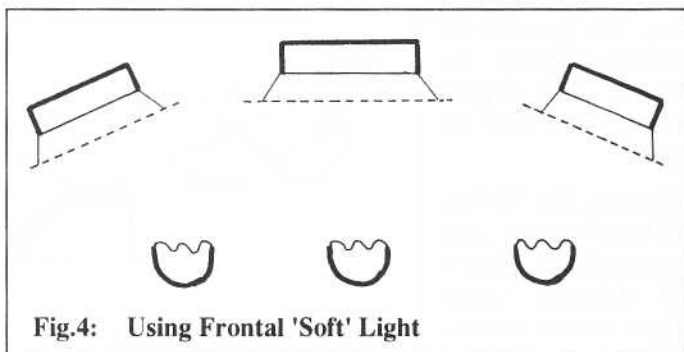
It is advisable to watch out for 'high-lights' on a television screen whilst positioning the lights. Small 'flares' might be covered with matt sticky tape, or lightly chalked where feasible. The diagram in Fig.6 shows how masks can be used in front of a light source to 'mask off' an offending source in the local area of the flare. In extreme cases use all Softlight, the offending bright spot of the source is then diffused, though not eliminated. This requires a lot of light source to achieve a reasonable level of illumination.

For those with old, less sensitive, cameras, this illumination level can be a problem. Visual judgement can be

This procedure should be carried out in conjunction with the cameras electronic gain and iris adjustments.

If, on a correctly adjusted camera, the brightest areas of the picture starts 'limiting' (a washing out of white detail) using a high level of illuminator, it is not normally worthwhile increasing the level further. Adjusting the beam current may help if it is not running flat out already! For this reason it is recommended that 'white' is avoided in the picture at all times (avoid white shirts and white paper). Even using high quality cameras this will give a better dynamic level of illumination on the screen.

Operating in colour requires extra consideration to the lighting. This is due to the



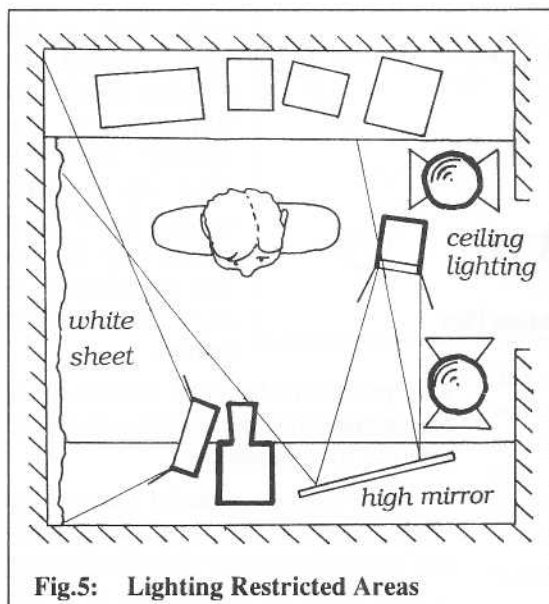


Fig.5: Lighting Restricted Areas

Mixed lighting is something to avoid, colour correction filters can be used in front of the light sources, but are fairly expensive and cut down the illumination level, often halving it! Because these filters are subtractive, using a daylight correction filter in front of a domestic light will often be a waste of time, due to the fact that there is not sufficient blue content from the source to use.

If there is a manual colour balance control on the camera, this might be used to correct light sources. Once this camera is balanced for the reference source being used, each additional light source can be adjusted with cor-

'Colour Temperature' of the light sources used, needing to be taken into account. This refers to the fact that 'white light' has a colour value.

Daylight from the sun is very much bluer than a normal domestic light source. On a colour camera the proportion of RED, GREEN and BLUE is adjusted to give a 'standard Colour' for the white content of a picture. The camera is said to be 'balanced'; that is adjusted for the colour of the light source in use. This normally involves adjusting the amount and proportion of blue and red gain.

However, this 'Colour Balance' cannot compensate for a mixture of different 'white light' source colours.

rection filters until the camera reading is the same as for the reference.

Correction filters for lighting can be obtained from theatre and film lighting suppliers. Normally small quantity sheets and half sheets are available (approximately 4' x 21 and 21 x 21").

In Part-2 of this brief introduction to lighting ATV I shall be looking at the types of lighting equipment and their uses.

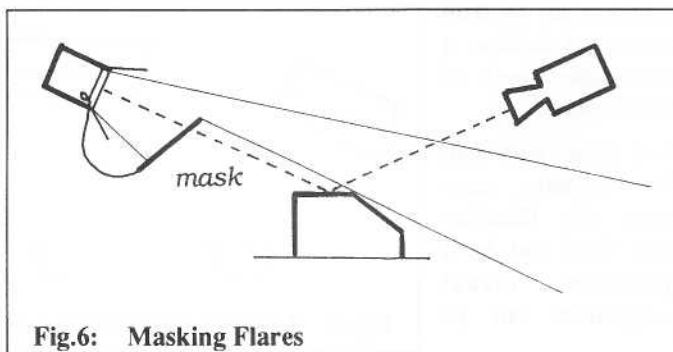


Fig.6: Masking Flares

A NICAM Decoder

This article first appeared in the May 1992 issue of Elektor Electronics and we wish to thank the Editor for permission to reproduce it here.

**Design by Rob Krijgsman
PE1CHY**

This decoder is based on a NICAM chip set developed by Micronas Inc. of Finland. The set consists of the MAS7A101QPSK demodulator, the MAS7D102NICAM decoder, and the MAS7A103 dual D-A converter. The chip set allows two high-quality audio channels (stereo or dual-language mode) to be recovered from NICAM signal at 5.85 MHz (if broadcast, and depending on the PAL system used) in the TV baseband spectrum. All that is needed to be compatible with either of the two PAL systems is to fit the correct input filter, a jumper and a quartz crystal for the demodulator clock.

THREE ICs

As shown by the block diagram in Fig.1, the upper part (say, above 5 MHz) of the TV baseband spectrum is first filtered to extract the NICAM signal centred around 5.85 MHz (system B/G) or 6.552 MHz (system 1). The insertion loss of the band-pass filter is compensated by an amplifier.

MAS7A101 QPSK DEMODULATOR

The NICAM signal is applied to the MAS7A101 QPSK demodulator IC. This is a pretty complex integrated circuit, whose internal architecture is given in Fig.2. The QPSK signal at the input is buffered before it is applied to a multiplier circuit which consists of analogue switches. The switches are opened and closed by a signal derived from a phase-controlled quartz crystal oscillator. The crystal frequency equals four times

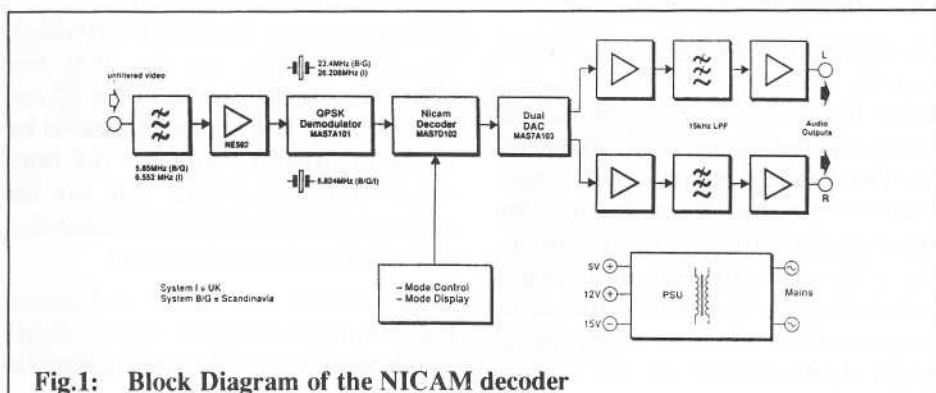


Fig.1: Block Diagram of the NICAM decoder

the NICAM subcarrier frequency, i.e: $5.850 \times 4 = 23.400$ MHz for PAL system B and G, or $6.552 \times 4 = 26.208$ MHz for Pal system 1. The quartz oscillator is locked to the received NICAM signal by means of a PLL. The demodulated signal is taken through a switchable low-pass filter, and subsequently split into two.

One signal is sent to a second PLL which serves to recover the 728 kHz NICAM bit clock from the demodulated signal. The crystal-controlled VCO in this PLL operates at eight times the NICAM bit clock, or 5.824 MHz. This VCO also provides the central clock signal for the other ICs in the decoder. The other demodulated signal is sent to a slicer circuit where it is converted into a binary digital signal. The recovered clock signal and the binary signal are available at the corresponding outputs of the MAS7A101.

MAS7D102 NICAM DECODER

The MAS7D102 NICAM decoder (Fig.3) uses the recovered NICAM bit clock to tackle the decoding proper of the bit-stream supplied by the QPSK demodulator. The decoding process involves quite a lot: descrambling, de-interleaving, error detection and correction, and reconstruction of the original 14-bit sound samples in both channels. The MAS7D102 can be programmed or wired to supply digital output signals suitable for one of three

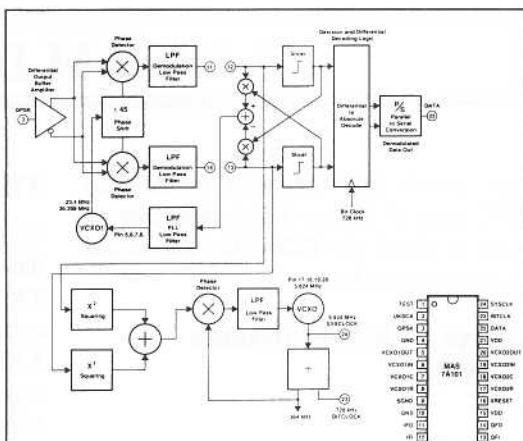


Fig.2: MAS7A101 QPSK Demodulator

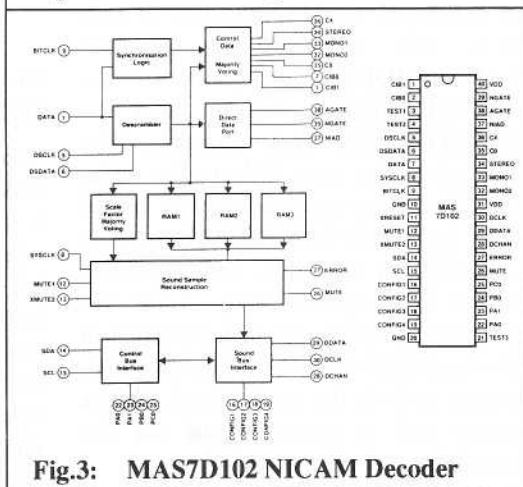
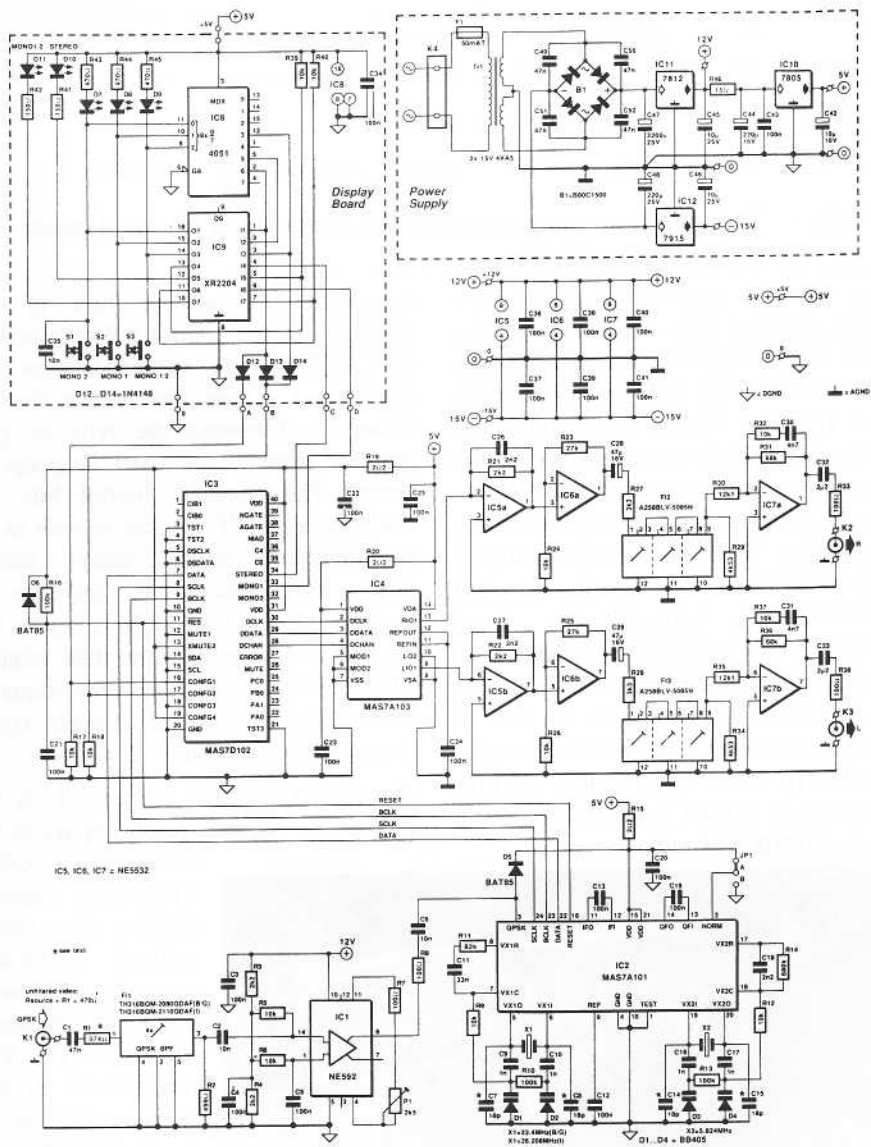


Fig.3: MAS7D102 NICAM Decoder

different systems: the I[2]S-bus (Philips), the S-bus (ITT), or the DAC-bus (Toshiba). Many functions of the IC can be controlled either via an I²C link, or by means of external hardware. The latter option is exploited here, and has the advantage of obviating a micro-controlled and a dedicated control program.

With reference to the IC architecture shown in Fig.3, it is seen that the digital signal supplied by the demodulator is



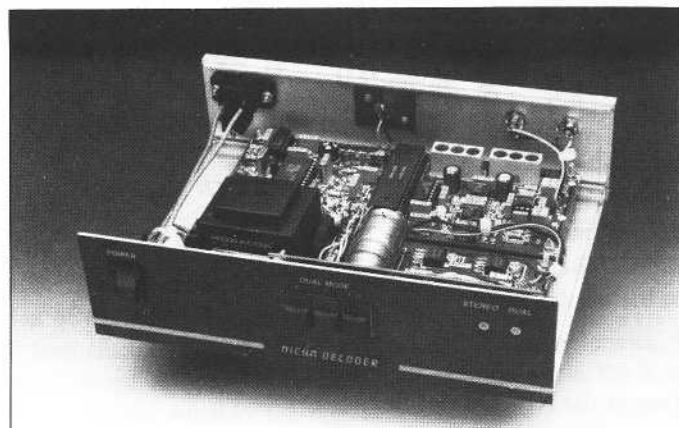
Country	TV system	Stereo sound	Main sound subcarrier	Stereo subcarrier	QPSK filter F1	Quartz X1	Jumper JP1
Scandinavia	PAL B/G	Digital; NICAM-B	5.5 MHz	5.850 MHz	TH316BQM-2080QDAF	23.400 MHz	A
United Kingdom	PAL I	Digital; NICAM-I	6.0 MHz	6.552 MHz	TH316BQM-2110QDAF	26.208 MHz	B
Germany; Switzerland; Benelux	PAL B/G	Analogue	5.5 MHz	5.740 MHz	—	—	—
Italy; Spain	PAL B/G	Digital; NICAM-B	5.5 MHz	5.850 MHz	TH316BQM-2080QDAF	23.400 MHz	A

Table 1: The choice two components and the position of a jumper depends on the country you live in

split into two. One signal is fed to a synchronisation logic section where the FAW (frame alignment word) is detected and extracted. The FAW is never scrambled. The other copy of the digital is sent to the descrambler circuit, which serves to counteract the energy dispersal (spectrum-shaping) scrambling applied at the transmitter. When the decoder chip is first switched on, it uses the standard descrambling initialisation word '11111111', which enables reception of non-encrypted NICAM broadcasts. External hardware is required to be able to change the initialisation word (or 'seed') 'on the fly' when the system is used for reception of pay-TV transmissions using encrypted NICAM audio.

Returning to the operation of the MAS7D102, the control information bits C1-C2-C3-C4 are extracted from the data-stream. These bits enable the receiver to determine the type of programme material: i.e: dual language or stereo. The decoded control bits are available in an I²C register as well as on an output port. The latter allows a simple display to be connected that indicates the receiver mode. The sound samples are fed to the decompanded to their original 14-bit resolution, and fed to the output of the IC according to the selected signal format (I²C-bus, S-bus or DAC-bus).

The format selection is effected via the I²C bus, or via logic levels applied to the configuration (CONFIGx) pins, which in addition allow you to select between mono-A or mono-B during dual-language broadcasts. The functions of all registers contained in the MAS7D102, and the configuration options that can be set in hardware, are given in Table 2.



MAS7A103 DUAL DAC

This IC converts the 14-bit sound samples furnished by the decoder into two analogue audio signals. Since the output data-stream of the decoder IC is multiplexed, the first task of the DAC is to extract and separate the information that belongs with each channel.

Next, the two digital signals are converted into analogue ones by R-2R ladder networks. These supply output currents rather than voltages, so that two external op-amps are required to obtain audio signals that can be fed to an amplifier.

Before that can be done, however, the audio signals need to be taken through a 15 kHz low-pass filter to remove the residue of the 32 kHz sampling signal. This filter takes us back to the block diagram in Fig.1, with the final remark that J17 de-emphasis is applied on the audio signals.

PRACTICAL CIRCUIT

After studying some of the background theory on NICAM (The NICAM System, CQ-TV 159, pp 24 - 33), and having acquired samples and data-sheets of the NICAM chip set, the author set out to work. and was able to design and build a simple NICAM decoder that was tested with the aid of NICAM broadcasts received from the Belgian national TV station BRT (these broadcasts were experimental at the time, and are currently regular).

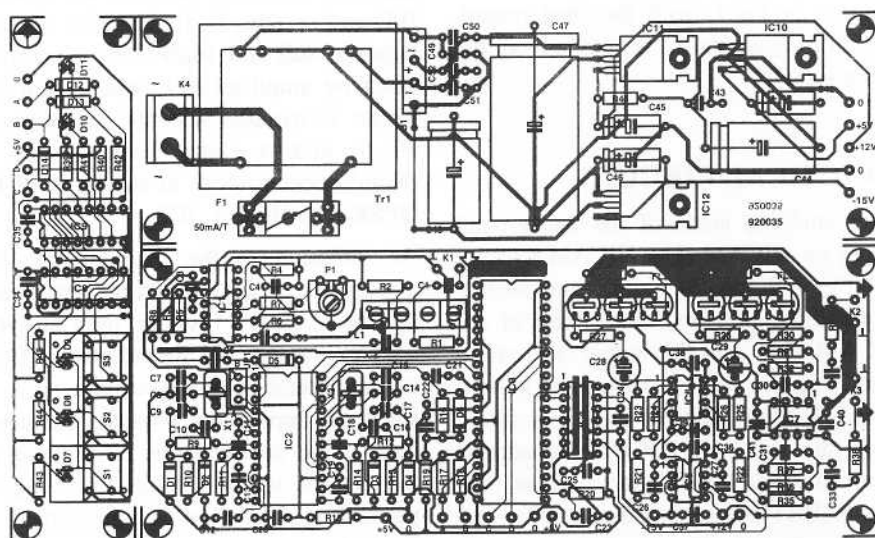
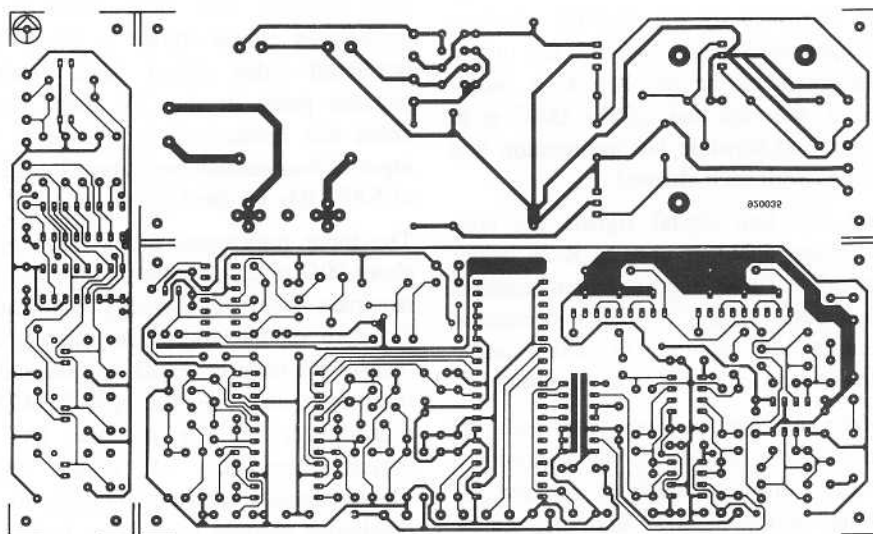
The BRT transmits NICAM-728 according to PAL standard B/G. Initially, the application circuit suggested by Microns

were built, and from there on further experiments evolved to produce a repeatable decoder. The final result is an uncluttered circuit shown in Fig.4. The unfiltered video signal taken from a suitable point in the TV tuner (more about this further on) is applied to the input of four-section bandpass filter tuned to 5.85 MHz for the UK system-I).

The input impedance of the decoder is about 90Ω to ensure that the input of the bandpass filter is correctly terminated, the sum of the source impedance and resistor R1 must be 470Ω as indicated in the circuit diagram. The type TDA2541 demodulator IC, for instance, has an output impedance of about 100Ω . The bandpass filter used is a ready-made, prealigned module from Toko (note that different types are required for systems B/G and systems I). Its insertion loss lies between 8dB and 16dB. This is compensated by amplifier IC1, whose gain can be set as required with the aid of preset P1 to give a signal level of 200 to 800mV peak-to-peak at the input of the QPSK demodulator, IC2.

As indicated in the diagram, the frequency of quartz crystal X1 is determined by the PAL TV system used in your country. Jumper JP1 should also be fitted in accordance with the system used, to select the appropriate low-pass characteristic in the demodulator. Information on the options in the circuit depending on the TV system used is summarized in Table 1.

Depending on the characteristics of the crystals used in position X1 and X2, the exact values of C7-C8 and C14-C15 may have to be changed from those shown in



the circuit diagram. Given that the quartz crystal probably have to be cut to order (the frequencies being non-standard as far as we have been able to find out), some experimenting may be required to obtain the correct oscillator frequencies.

The demodulator, IC2, supplies the recovered 728 kHz bit clock, the digital NICAM signal, and the 5.824 MHz system clock to the decoder, IC3. An R-C network, R16-C21, resets the demodulator and the decoder ICs at power-on.

Mode selection is effected with configuration bits config 1 and config 2.

The available options are mono-2, mono-1 and mono-1/2 (dual language mode). The logic bit combinations required for these settings are supplied by IC8, IC9 and three push-buttons, S1, S2 and S3. The combination of these parts forms a kind of three push-position flip-flop with a built-in latch function, a debounce circuit and an indication (on five LEDs). Capacitor C25 ensures that the levels at the 'mono-2' mode is automatically selected at power-on.

COMPONENTS LIST

Resistors:

1	374Ω (see text)	R1
1	499Ω 1%	R2
4	2kΩ2	R3;R4;R21;R22
12	10kΩ	R5;R6;R9;R12;R17; R18;R24;R26;R32; R37;R39;R40
4	100Ω	R7;R8;R33;R38
3	100kΩ	R10;R13;R16
1	82kΩ	R11
1	680kΩ	R14
3	2Ω2	R15;R19;R20
2	27kΩ	R23;R25
2	3kΩ3	R27;R28
2	4kΩ53 1%	R29;R34
2	12kΩ1 1%	R30;R35
2	68kΩ	R31;R36
2	150Ω	R41;R42
3	470Ω	R43;R44;R45
1	15Ω	R46
1	2kΩ5 preset H	P1

Capacitors:

5	47nF ceramic	C1;C49-C52
2	10nF ceramic	C2;C6
20	100nF	C3;C4;C5;C12;C13; C19-C25;C34; C36-C41;C43
4	18pF	C7;C8;C14;C15
4	1nF ceramic	C9;C10;C16;C17
1	33nF	C11
3	2nF2	C18;C26;C27
2	47μF 16V radial	C28;C29
2	4nF7	C30;C31
2	2μF2 50V solid MKT	C32;C33
1	10nF	C35
1	10μF 10V	C42
1	220μF 16V	C44
2	10μF 25V	C45;C46
1	2200μF 25V	C47
1	220μF 25V	C48

Semiconductors:

4	BB405	D1-D4
2	BAT85	D5;D6
5	LED red 3mm	D7-D11
3	1N4148	D12;D13;D14
1	B80C1500	B1
1	NE592	IC1
1	MAS7A101	IC2
1	MAS7D102	IC3
1	MAS7A103	IC4
3	NE5532AN	IC5;IC6;IC7
1	4051	IC8
1	XR2204 or ULN2004	IC9
1	7805	IC10
1	7812	IC11
1	7915	IC12

Miscellaneous:

1	3-way pin header with jumper	JP1
3	RCA (phono) socket	K1;K2;K3
1	2-way PCB terminal block; pitch=7.5mm	K4
3	Digitast push-button (narrow) with integral LED	S1;S2;S3
1	mains transformer 2x15V @ 4.5VA; Monacor (Monarch) type VTR-4215	Tr1
1	TH316BQM-2080QDAF *	FI1
1	TH316BQM-2110QDAF **	FI1
2	A258BLV-5085N	FI2;FI3
1	Quartz crystal 23.400 MHz *	X1
1	Quartz crystal 26.208 MHz **	X1
1	Quartz crystal 5.824 MHz	X2
1	Fuse 50mA slow; with PCB mount holder and cap	F1
1	Printed circuit board	910035
1	Front panel foil	910035-F
1	Metal enclosure Telet 55205	

* PAL TV system B or G

** PAL TV system I

Diodes D12, D13 and D14 provide the required logic levels at the CONFIG inputs of decoder IC. LEDs D10 and D11 indicate the currently transmitted mode: dual-language (mono-1/2) or stereo. This indication can not be changed by pressing the MODE switches.

Like the QPSK demodulator IC, the NICAM decoder, IC3, is used in a standard application circuit as suggested by the manufacturer. Similarly, few surprises are found in the kink to the dual DAC, IC4, and the subsequent two-stage

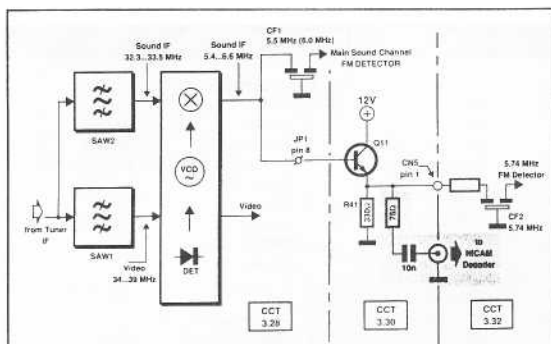


Fig.6: A suitable feed for the Decoder from a JVC HR-S5000E Video Recorder

op-amp based current-to-voltage converters/amplifiers. It will be noted, though, that the op-amps work from a symmetrical (+12V/-15V) supply. The gain of IC6a and IC7a in the right (R) output channel is set such that the loss introduced by the 15 kHz low-pass filter, FI2, is overcome whilst ensuring an audio output level that is compatible with other equipment driving an amplifier 'line' input. The same goes, of course, for the corresponding components in the left (L) channel. The low-pass filters are again, ready-made prealigned modules from Toko. Here, we are dealing with the two A258BLV-5085N three-section L-C filters (the designer apologizes for the type numbers). Finally, the J17 de-emphasis networks in the right and left audio channels are formed by R32-C30 and R37-C31 respectively. The outputs of the driving amplifier 'line' inputs.

CONSTRUCTION

First, cut the printed circuit board (Fig.5) into three to separate the power supply board, the decoder board and the key-

board. The population of these boards is entirely straightforward, and should not present problems. It is recommended to use IC sockets. The voltage regulators are bolted straight to the power supply board, and do not need heat-sinks. The fuse is fitted in a holder with a protective plastic cap. On the decoder board, the section with the blue (or red) core in the QPSK bandpass filter, FI1, is at the side of the NICAM decoder chip, IC2. The keyboard

display section of the printed circuit board has on it three Digitast press-keys with a built-in LED. The front panel of the enclosure for the NICAM decoder (if

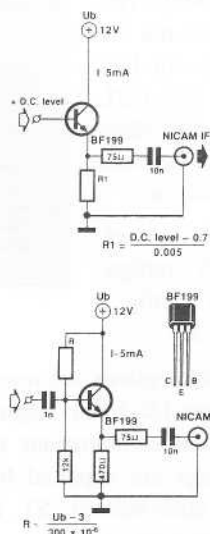


Fig.7:

Emitter followers for NICAM signals on a relatively small DC component (above), and NICAM signals on a DC component so large that AC coupling is required (below)

used) must be cut and drilled to allow the push-buttons and the two LEDs to the right of the board to protrude - more about this further on. For an initial test, the completed boards are interconnected. Switch on, and check the presence of the correct supply voltages at a number of points. Press the keys and see if the associated LEDs light. If this works all right, stop, and start thinking very hard about.....

FINDING THE INPUT SIGNAL

The present NICAM decoder is intended as an upgrade for the existing TV sets, set-top TV tuners or video recorders. In nearly all cases, this equipment will have to be opened or modified to find or create a point where the NICAM signal can be 'tapped' and fed to the decoder. The following points should be taken into account:

- ① Opening your TV set or VCR in most cases voids your warranty on this equipment.
- ② The chassis of most older TV sets is connected direct to the mains. Never work on such a TV set without using an isolating transformer.
- ③ Make sure you have the service documentation (or at least a circuit diagram) of the equipment.

The intrepid among you should be looking for a point at the input of the sound demodulator where a signal is available that contains as little video information as possible. In most cases, the input signal of the main FM demodulator (5.5 MHz for system-B/G, or 6.0 MHz for system-I)

is taken through a ceramic band-pass filter to suppress the components in the video spectrum. In general, it is best to 'tap' the signal ahead of this filter. The minimum level of the signal to be fed to the NICAM decoder should be as small as possible. This may require an emitter follower to be fitted as discussed below.

A little more complex, but certainly more convenient as far as the filtering is concerned, is a TV set or a VCR with a so-called quasi-parallel sound demodulator system. The designer used his HR-S5000E video recorder from JVC to supply the NICAM signal.

After studying the service documentation that came with the VCR, it was decided to try the output signal of an emitter follower located between the 'sound IF' output and the input of the 5.74 MHz ceramic filter fitted for the German 'dual-language' demodulator.

The search for this emitter follower, Q11, was complicated by the fact that it happened to 'reside' between three pretty large circuit diagrams. Fig 6 shows essentially what has been added to the VCR: one resistor, a coupling capacitor and a 'Phono' socket do a perfect job.

As already mentioned, an emitter follower may have to be used to prevent the input signal of the sound demodulator disappearing when the NICAM decoder is connected. One of the circuits shown in Fig.7 will be adequate.

The first, Fig.7a may be used when the signal is superimposed on a DC level between 0.3 and 0.7 times the supply voltage. The other, Fig.7b, has an input coupling capacitor, and is used in all

PROGRAMMING THE MAS7D102 NICAM DECODER

The bus format can be selected either by applying logic levels to pins Config4 and Config3, or by programming control bits Config4 and Config3 via the I²C microprocessor interface.

Config 4	Config3	DAC bus format
0	0	High-Z
0	1	S-bus
1	0	I ² S bus
1	1	Toshiba DAC bus

The pins Stereo, Mono1 and Mono2 are active-low outputs that indicate the current NICAM transmission mode.

Stereo	Mono1	Mono2	Type of transmission
0	1	1	Stereo signal
1	0	1	Dual language transmission
1	1	0	One mono sound channel and 352 Kbit/s data channel
1	1	1	No sound signal. Transparent 704 Kbit/s data transmission, or no NICAM encoded transmission

During dual-language transmissions, the main language selection is controlled by input pins Config2 and Config1.

Config2	Config1	DAC bus	Sound sample order
0	0	I ² S/Toshiba	M1 M1
0	1	I ² S/Toshiba	M1 M2
1	0	I ² S/Toshiba	M2 M1
1	1	I ² S/Toshiba	M2 M2
0	0	ITT	M1 M1 M1 M1
0	1	ITT	M1 M1 M2 M2
1	0	ITT	M2 M2 M1 M1
1	1	ITT	M2 M2 M2 M2

The decoder has two addresses on the I²C bus. Address 4E (hex) is for writing to the decoder, and address 4F (hex) for reading from the decoder.

There are three status registers (read) and three control registers (write) that can be accessed. The three control registers can be addressed individually by the two most significant bits of each control word. The three status registers can be addressed as a complete set only.

Control register	D7	D6	D5	D4	D3	D2	D1	D0
1	0	0	Test1	Test2	MuteS	MuteA	x	Reset
2	0	1	x	x	Config4	Config3	Config2	Config1
3	1	Da	Db	Dc	Pa1	Pa0	Pb0	Pc0

-Test1 and Test2 are reserved for test purposes, and must be set low.

-The MuteS control bit mutes sound output. Active high.

-The MuteA control bit mutes sound output and resets the synchronisation of the decoder completely. Active high.

-The Reset control bit resets the decoder completely. Active high.

The function of the Da, Db and Dc control bits is to define external ports Pa, Pb and Pc as inputs or outputs, as shown below.

Da	Db	Dc	Pa1	Pa0	Pb0	Pc0
0	0	0	out	out	out	out
0	0	1	out	out	out	in
0	1	0	out	out	in	out
0	1	1	out	out	in	in
1	0	0	in	in	out	out
1	0	1	in	in	out	in
1	1	0	in	in	in	out
1	1	1	in	in	in	in

The status registers of the MAS7D102 have the following structure:

Status register	D7	D6	D5	D4	D3	D2	D1	D0
1	Osn	C11	C10	C4	C3	C2	C1	C0
2	Ser10	Ser9	Mute	TestS	Pa1	Pa0	Pb0	Pc0
3	Ser8	Ser7	Ser6	Ser5	Ser4	Ser3	Ser2	Ser1

-The Osn status bit goes high when the decoder is not synchronised.

-C10 and C11 are the two CI bits extracted from each NICAM frame.

-C4-C0 are the C bits associated with the current NICAM transmission, and they indicate the mode as shown below.

C1	C2	C3	NICAM transmission mode
0	0	0	Stereo transmission
0	1	0	Dual language transmission
1	0	0	One mono channel plus data transmission
1	1	0	One 704 Kbit/s data channel

-C0 is the Frame Flag bit that indicates the super frame pattern of the NICAM transmission.

-C4 is the Reserve Sound Switching flag, which goes high when the FM mono signal carries the same programme as the digital stereo signal.

-The Mute status bit goes high to indicate that the decoder has been muted for some reason.

-TestS is a test status indication bit reserved for test purposes.

-Pa1 and Pa0, Pb0 and Pc0 indicate the status of the corresponding external pins, when they are configured as input ports.

-The Ser10-Ser1 bits show the value contained in the sample error counter. This counter is incremented whenever an erroneous sample is detected.

The control processor can read the error count at suitable time intervals, and take decisions depending on the error rate.

other cases. Remember, you are dealing with signals of 5 MHz and higher here, so keep component wires as short as possible.

TESTING

The input impedance of the NICAM decoder is fairly high: about 900Ω . This means that conventional coax cable with an impedance of 50Ω or 75Ω can not be used unless its length remains below 50 cm or so. Longer cables of either type will cause reflection and serious mismatches, resulting in attenuation of the NICAM subcarrier.

If you can not go round the use of a relatively long, low-impedance, coax cable between the TV set and the NICAM decoder, be sure to fit a terminating resistor across socket K1. This resistor prevents reflection and high-frequency loss to some extent. When a 50Ω cable is used, fit a 52.9Ω terminating resistor, and change R1 into 444Ω . Similarly, when a 75Ω cable is used, terminate it with 81.8Ω and change R1 into 431Ω .

In some cases, ordinary screened cable as used with audio equipment, or car radio coax cable (if you can get it), is the best alternative. In any case, do not fit BNC or similar low impedance RF sockets at the TV side and the decoder input.

On the prototype we used as insulated 'phono' (RCA-style) socket for chassis mounting. An insulated socket is required to prevent an earth loop between the analogue and digital ground rails.

DEMODULATOR INPUT LEVEL

Switch on the NICAM decoder, and tune the TV set or the VCR to a station transmitting NICAM sound. Use an oscilloscope to check the signal level at pin-3 of the QPSK demodulator, IC2. The level should be between 200mV peak-to-peak. If necessary, adjust preset P1 to achieve a level of about 500mV peak-to-peak.

QPSK DEMODULATOR PLL ADJUSTMENT

Connect the scope to pin-11 of the QPSK demodulator IC. You should see a so-called 'eyes' waveform (which may be very difficult for the scope to trigger on). Adjust P1 so that the tops of the waveform are just below the supply voltage; i.e. they are just not clipped. This gives a signal level of about 5V peak-to-peak. Move on to pin-7 of IC2. This supplies the error voltage of the demodulator PLL. It is a fairly 'messy' signal superimposed on a direct voltage, which will look like a broad band on the scope. Tune to non-NICAM station, and back to the NICAM station again, to see how the PLL, the DC component in the error signal should be about half the supply voltage, i.e. 2.5V. When it is too close to either 0V or +5V, change the crystal matching capacitors, C7 and C8, until the centre of the band is at about 2.5V. Increase the capacitor values (to 22pF or 27pF) when the DC component is too low, and decrease them (to 15pF or 12pF) when the DC component is too high. Try to get as close to 2.5V as you can.

The exact oscillator frequency will be very difficult to measure at pin-5 of IC2 because the impedance is high locally. This means the any capacitive load, however small, formed by a test probe will detune the crystal oscillator to some extent.

CLOCK RECOVERY PLL ADJUSTMENT

The 5.824 MHz PLL for the NICAM clock signal recovery is adjusted in a similar manner to the QPSK PLL as discussed above. Connect the scope to pin-18 of IC2, and check that the error voltage has a DC component of about 2.5V. If not, change the values of C14 and C15. It will be found that this error voltage is much 'cleaner' than the one used for controlling the first PLL. If the second PLL frequency is correct, pin 23 of the demodulator IC supplies a clock signal of 728 kHz, which is easily measured with a frequency meter.

That completes the adjustment of the NICAM decoder. If you have not already done so, connect a stereo amplifier to the outputs, and enjoy the programme!

FINISHING TOUCH

Some of you may want to fit the decoder permanently inside a TV set, while others may want to use it as a self-contained unit. The prototype of the decoder was housed in an aluminium enclosure Type 55205 from Telet. The decoder and supply boards were fitted on a perspex plate that could be slid horizontally into

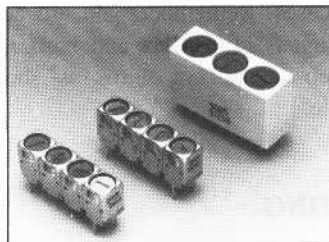


Fig.8: The Toko QPSK bandpass filter (either for system I or B/G) and the 15 kHz low-pass filter used in the decoder

the railings provided along the inside of the front and rear panels. The keyboard PCB and the mains switch are fitted on the front panel, for which a ready-made self-adhesive foil is available. This foil is used as a template to determine the locations of the holes to be cut in the front panel. A jig-saw is used to cut the rectangular clearance for the mains switch and the three push-buttons. The keyboard PCB is mounted on four screws of which the (countersunk) heads are glued to the inside of the front panel. Plastic stand-offs are used to fit the PCB at the right distance behind the front panel. The rear panel is drilled to hold the mains socket, the NICAM input socket and the two audio output sockets.

CONCLUSION

The NICAM decoder described here has been in use for some time now, and provides excellent stereo sound on broadcasts received from BRT1 and BRT2. Regrettably, the unit could not be tested in the UK, although suitable components

(a 6.552 MHz QPSK bandpass filter and a 26.208 MHz quartz crystal) were available.

Although the construction and adjustment of the unit are fairly simple, finding a suitable input signal may be daunting if you have little experience in TV and VCR technology. We feel, therefore, that it is fair to warn beginners not to undertake this project until a dedicated TV tuner is available, which will be described in a future issue of *Elektor Electronics*.

POSTSCRIPT FOR ADVANCED USERS

As already mentioned the MAS7D102 NICAM decoder has optional I²C control, which may be used to access most of the internal registers. The SDA and SCL inputs of this IC are TTL-compatible, and may be connected to an I²C bus via appropriate interfaces. If you have a PC available fitted with an I²C interface

you may use the information given in the MAS7D102 inset to implement software control on the NICAM decoder.

The descrambler on board the MAS7D102 can be loaded with a descrambling key other than the standard 'seed' used for non-encrypted NICAM broadcasts. Changes to the scrambling keys must occur synchronously at the transmitter and the receiver(s).

The NICAM decoder IC provides a serial data input, Dsdata (pin-6), and a clock input, Dsclk (pin-5) to access an internal shift register. This register contains the descrambler key that is loaded in parallel into the descrambler one can be updated at any time with a maximum clock rate of 5 MHz.

The time interval between the falling edge of the Agate signal (pin-38) is not allowed for descrambler key updating. During this interval, Dsclk (pin-5) must be held static. Output signals C0 (pin-35), Agate and Ngate may be useful for synchronisation purposes.

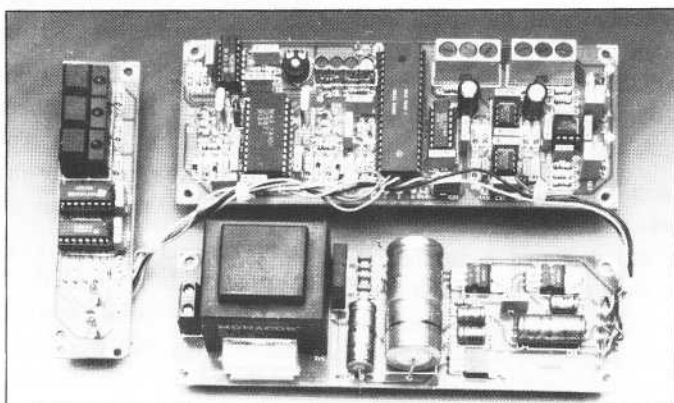


Fig.9: Completed printed circuit boards; main decoder board, keyboard and PSU

Digitalkers Revisited

The following piece is by way of an 'In Retrospect' of the original article by Trevor Brown G8CJS in CQ-TV 154 (Talking Repeaters, page-28). It is a tale of woe, but with a happy ending, and before anyone points a finger at me it was not an editorial hiccup (I think!) ...
Mike

Steve Pocock G0CPV

I have for some time been interested in digital speech synthesis and the make-up of words from their respective elements, or Allophones. Over the years a number of synthesisers have been described in the electronics press and, more recently, LSI chips have become affordable to the amateur experimenter. The original article in CQ-TV described such a device, namely the SPO256-AL2 chip from Signetics, coupled to a preprogrammed ROM word source and the associated driver gates and amplification hardware. Having an SPO256 in the chip store and most of the other parts I decided it was time to evaluate the device.

Now, I have a particular love of most things digital and logic oriented and having built and designed a number of digital items over the years I felt well qualified to debug the circuit should it fail to perform. However, in my rush to assemble the unit I made a fatal error; I did not read the circuit diagram fully and hence made a lot of trouble for myself, but more of that later.

After an evening's work I had the unit breadboarded and was ready to blow an EPROM. Being in a rush I decided to blow the code for exterminate as described in the article, rather than spend a lot of time at this stage assembling words.

Duly blown the EPROM is plugged in and I wait in anticipation for the sound. Well, instead of my word I got a lot of gurgling and then something that sounded like "oggi oggi oggi", perhaps I could sell this to some rugby fan friends if all else fails!

So what now? Initially I thought maybe the fault lay with the Hex in the EPROM, but a quick check showed that to be OK. Examine the circuitry, remove the chips and check that all connections are as per the circuit diagram (!). Yes, no problems there, out with the oscilloscope and let's have a check of the clock and counter, no problems there either Hmmmmmm.

Where has that data sheet on the SPO256 gone? I knew I had one because it came with the chip. I then spent a night looking for that and duly found it in the dog basket!! Oh well, only a bit smelly.

Now, here is the bit I want, pin-out information. What is all this? pin-9 is the Load Request point for the chip, but the diagram says that this pin is floating - now that is not right. Pin-20, the Address Load pin tells the chip to load the address bits on A0-A8, that is not right either.

Fade To Black, with A/B Mixer

Peter Carliell

Fade-to-Black

The "Fade To Black" device in ATV Compendium is a very efficient unit for such a simple design. I was interested to see in CQ-TV 157 that another constructor, Mike Hutchings, had wanted to improve the black level performance. I had already done a simpler modification which is offered here and shown in Fig.1. My scheme does not need a dual-gang fader and gives no worries about tracking of the fade and lift effects.

The black level problem arises because the TEA5114 DC-restores sync tips to an internal reference voltage. Thus, when the signal is faded its black level is faded, and does not match the black level

of the unfaded syncs. My solution is to clamp the fadeable input with a pulse already provided by the LM1881, disguised as burst gate (or burst flag). The AND gates have to be changed to NANDs and rewired, the preset matches picture black level to sync black level, and that is all there is to it. Finally, beware that the TEA5114 has an awkward output stage. Do not try to AC couple it!

A/B Mixer

The TEA5114 contains three switching elements and if the outputs of two are mixed together then one signal can be faded up as another is faded down. This can be the basis of a simple A/B group

mixer (Fig.2), where the two faders are mounted side by side, one wired "upside-down", so that they can both be operated together with one hand.

You could use a dual-gang fader but this would not allow mixing both signals at full amplitude (fader knobs at extreme ends), e.g: to superimpose a cap-

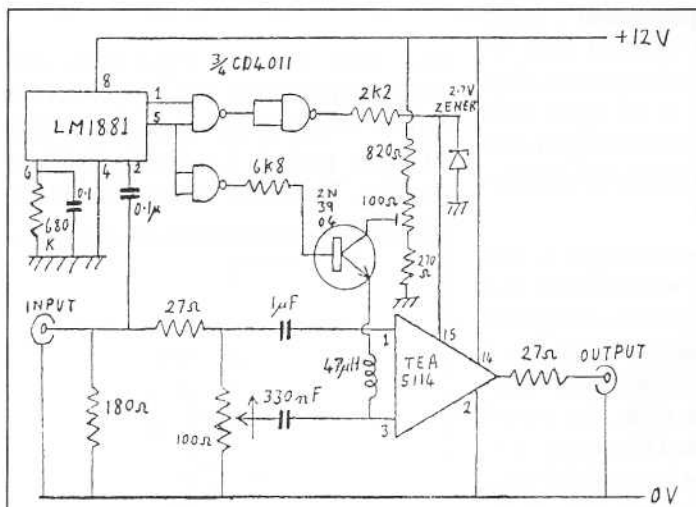


Fig.1: Improved Fade-to-Black Circuit

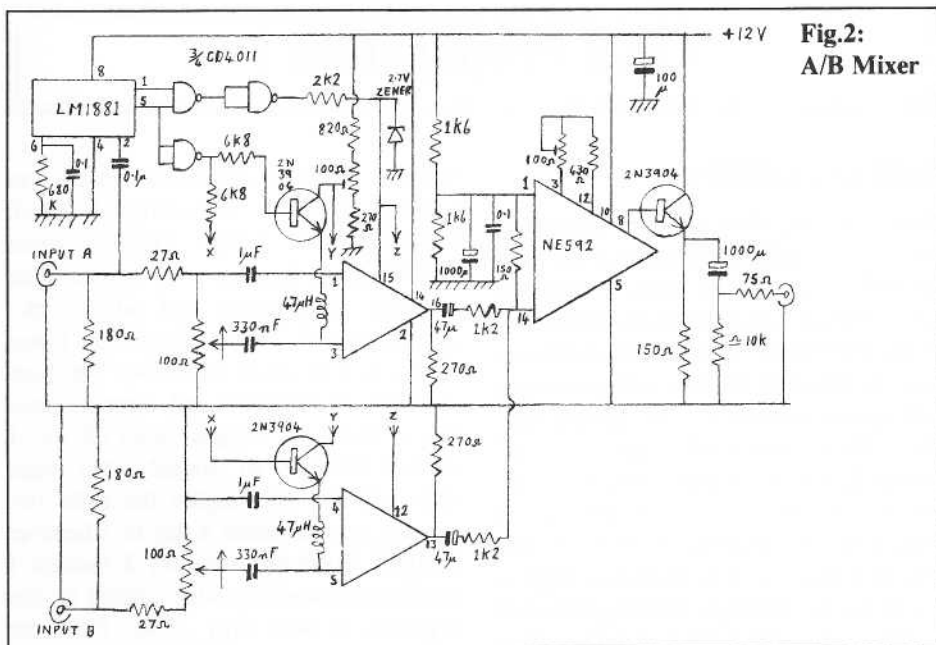


Fig.2:
A/B Mixer

If the A and B inputs are fed by two four-input vision switchers (ATV Compendium again) with their inputs wired in parallel, then a very simple 4-channel mixer can be made.

If the TEA5114 switcher is used then incorporate the emitter follower from the TEA2014 circuit. This will provide AC coupling and keep DC off the faders, avoiding noisy operation.

When paralleling the inputs use only one termination (Fig.3). I have chosen to take syncs from the A-bank, but the third TEA5114 gate could select banks, driven manually.

Construction can still be done on Vero-board, but the three resistor leads connecting to pin-14 of the NE592 must be as short as possible to ensure stability.

Beware that in order to do a mix the syncs of the two signals must of course be coincident, within limits. The BBC specification is 50nS, American 250nS, ATV = ? If both signals are colour then the bursts must also be phased to within a few degrees of each other.

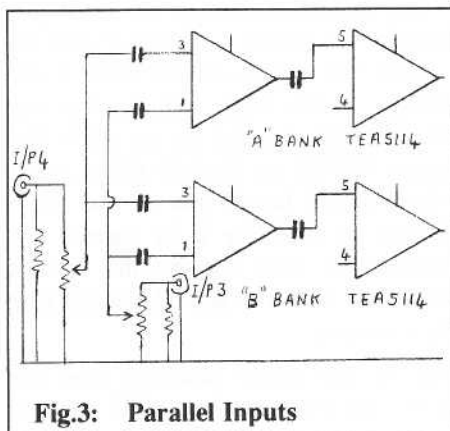


Fig.3: Parallel Inputs

Tidal Propagation ?

D.J.Barford G8KBC

Over non line-of-sight paths containing stretches of tidal water centimetric (and possibly other) signals show a considerable enhancement at low tide over normal (high tide) signal strength, regardless of time of day, but in step with prevailing propagation conditions. Not having seen this effect mentioned anywhere, and having discovered it during my search for signals on 24cm ATV I would like to bring it to the attention of others in order that they may use it to their advantage as I now do. At first sight this may not seem to be a very useful piece of information, however, there must be many amateur stations on, or near, the coast, or estuaries, or even inland, who will find paths to other GB or DX stations that cross tidal waters at some point. This information would then apply!

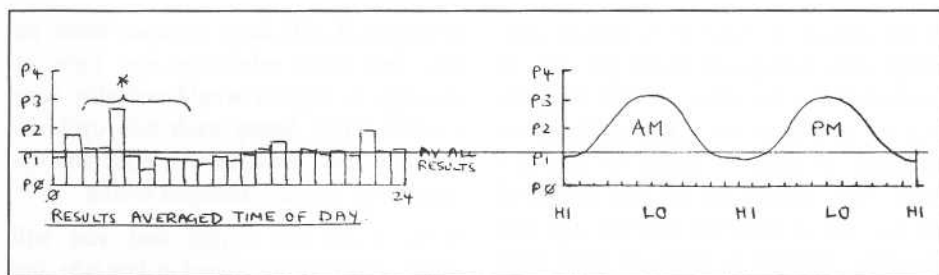
This story started about 2 years ago when I first looked for signals on 24cm ATV. Living in Lincolnshire on the coast just north of the Wash, I looked around for suitable TV signals on this band. I did manage a few local contacts, but my interest soon focused on an ATV Repeater GB3TN in Norfolk 68km away, which, I had heard, was on the air. I decided to look for it in earnest and searched in vain for months with a homebrew converter and 32-element long Yagi antenna.

One of the major problems was that never having seen an ATV repeater

before I did not really know what I was looking for, so I contacted Mark G4WVU and Adrian G0FVF about GB3TN, and they gave me a great deal of help, information and advice, etc. Armed with this new information I was determined to see it somehow! The hunt was now on in earnest and, after purchasing a Wood & Douglas RX+TX kit, I started looking in roughly the right direction and on roughly the right frequency, several times a day or whenever I could. Suddenly, one day I thought I could see something which might be the repeater, it was only about P1/2 but looked like a sort of test card (later I found out it was the 'S' meter caption on GB3TN, more often and stronger sometimes P1-P2 and also a few DX stations simplex too.

Now the bit was firmly between my teeth and I decided to increase the dish to 8 feet in diameter (1ft extra all the way round, which nearly doubled its capture area). I also built a GaAsFET preamp, all the time filling the Log of GB3TN sightings. By this time the local hams were convinced I was demented, but still I persisted!

After a a year and several hundred readings had passed there seemed to be a distinct pattern building up on the graph, so I decided to sit and have a good look and think about it one evening. When I realised there seemed to be areas where the signals were stronger, 3-4 hours some



days and 5-6 hours other days, and that these 'clumps' of signals seemed to show up at fairly regular intervals, but at various times of the day. More interested now I set about finding out why and decided to keep records of anything and everything that might affect the propagation, such as pressure, temperature, humidity, wind speed and direction, phases of the moon etc.

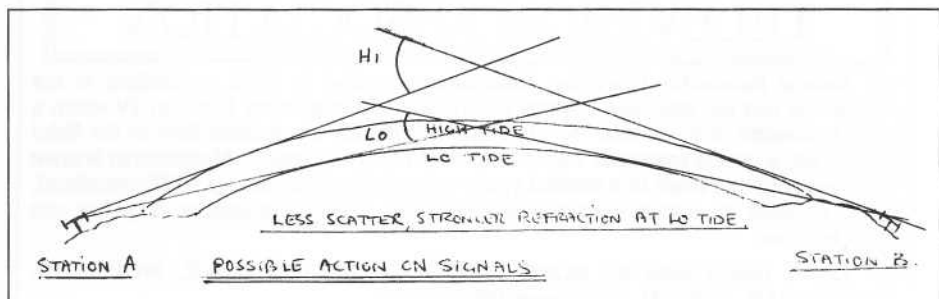
After a few more months had passed I was finding GB3TN more often and other repeaters such as GB3NV, GB3ET, GB3PV, GB3TV, GB3TT, GB3RT, GB3LO, G0NAA, G4CZJ PI6ATE, DB0OV etc., etc. I started to log these also when seen and I think it was probably that fact which made me realize that only certain stations seemed to vary in signal strength in this regular fashion. After much thought I concluded that only the sea or part sea path stations were affected in this manner, i.e: GB3TN,

G0NAA (Hull TV Beacon) and recently GB3LO; all beyond radio horizon and often stronger signals than expected considering prevailing conditions!

Suddenly the penny dropped, it must be to do with the tide or something I thought. I could not wait, I rushed around to see a friend of mine who is a part-time Coastguard and snatched his tide-tables for the area and rushed back home. I grabbed a highlighter pen and marked the low tide times on my chart.

The effect was astounding, virtually all the enhanced signals from GB3TN were at or near LOW TIDE. I just could not believe my eyes, after 2 years searching for a reason it practically jumped off the page at me in 3D!

Checking back through my other logs over local, DX and foreign contacts I found that most of the strongest signals across the sea were at low-tide, (but there



is no effect on land only paths) and, being tidal, it happens twice per day, at whatever time the tides are that day (the time of day does not affect propagation as such). In order to check the theory I made two graphs of all the averaged results, one relative to time of day and the other relative to times of tides each day.

The charts seemed to prove that the time of day had no effect on propagation and so no particular time was better or worse than any other. However, the same results arranged relative to the AM and PM tides, showed an almost perfect sinusoidal waveform with strongest signals at low tide (whatever time of the day it was). I can only presume, therefore, that apart from an apparent slight enhancement of signal over the water compared with similar distances over land, this low tide enhancement is probably caused by lowering of the intermediate horizons which in turn probably causes an increase in forward scatter or fresnel refraction, due to the smaller angles involved in the progress of the wave-front.

However, I still have an open mind on this, but have ruled out any form of ducting, as signals would probably vary several times during each tide cycle as the duct lengthened or shortened and the number of bounces changed within.

Now, I am not saying that you will always get a strong signal at low tide, but what I am saying is that you will get a stronger signal than at high tide on average, and that if ambient conditions are slightly enhanced you could well expect a very good signal across the sea at low tide, at least 2 or 3 'P' points better than normal, and that could make all the difference between seeing it or not!

So now you know when to look (or listen) the rest is up to you! I hope this will be of some assistance to one and all.

PS. Dennis 'the menace' G3LSA at Mablethorpe has recently used this information to get his first pictures of GB3TN and the G0NAA beacon on his entirely homebrew 23cm equipment, much to his surprise and delight! Well done Dennis! Good DX!

NARROW BANDWIDTH TELEVISION ASSOCIATION

The Narrow Bandwidth TeleVision Association, founded in 1975, specialises in the mechanical and low definition aspects of ATV, and offers genuine (moving) TV within a basic bandwidth of 6 - 7 kHz. The techniques, basically an updated form of the Baird system, are a unique mixture of mechanics, electronics and optics. Membership is open World-wide on the basis of a modest yearly subscription (reduced for BATC members), which provides an annual exhibition and quarterly 12-page newsletter, together with other services.

For further details write to: **DOUG PITT, 1 BURNWOOD DRIVE, WOLLATON, NOTTINGHAM, N28 2DJ.** Telephone: 0602 282896.

70cm TVI Filter

John Stockley G8MNY

I run 400 Watts on 70cm and have found this filter design very effective. It is basically a "T"eed suck out, with effective UHF braid breaker.

Parts list

Tin Plate (Steel coke can!)
Belling Lee TV Plug
Belling Lee Chassis TV socket (metal)
8" 75Ω TV Coax
2 x "Polo mint" ferrite cores
2" 22swg Silver/enamel copper wire
2-10pF trimmer
Paint (to make it presentable)

Construction

1) Cut tin plate into a cross shape (with taps to solder up) so that it can be folded up into a box 1"x 1"x 0.5". **WARNING SHARP EDGES!**

2) Drill and mount the Socket on one of the 0.5" sides.

3) Connect Plug on coax, feed on the 2 ferrite rings, on the coax.

4) Cut hole for coax in corner of box and solder in connect the core to the socket centre.

5) Wind wire into coil 3 turns approximately 0.25" diameter and solder to socket centre.

6) Make tuning hole and mount trimmer from coil to ground (shaft earthed).

7) Fold up box, just tack solder a few tabs.

8) Connect to an aerial (50ohm does not matter too much) and 70cm Rx null out a signal.

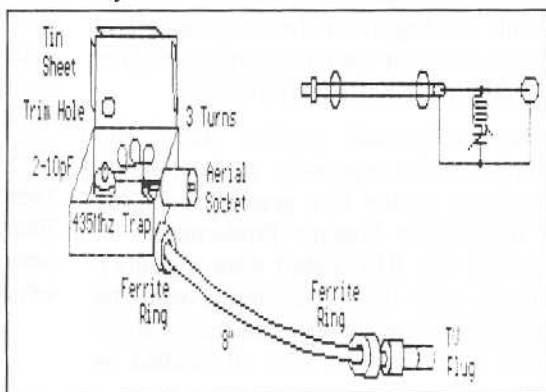
9) If all OK, solder up properly, Glue coax firmly in place, Fix rings tight to plug and box (heat glue).

10) Paint up and label "432 MHz TRAP G...." (for thick TV engineer!).

11) Re-tune for best dip and cover trimmer hole.

Conclusion

I have measured 30dB rejection on the best one, with only about 1.5dB insertion loss (550 MHz). In strong signal areas an attenuator can be all that is needed. Improved interference performance is obtained if an attenuator (3-6dB) is included in the box and the suck out connected across the middle "T" section. This is because the bad SWR of the aerial system will not then de-tune the filter.



The Middlesex Show 92

John Stockley G8MNY

This is the 8th year that the Home Counties TV club have put on a display at the two day public show. The show is one on the largest County show in the SE, with between 7-15K visitors each day.

There were two main features to this years' display: a Weatherman's TV studio, and the proverbial 'Walk about TV'.

The Weatherman's TV Studio

For this we used a lighted Blue background for chroma keying. Two monitor pairs, each pair consisting of a 14" colour for the picture and a B/W for text display, were placed to just out of shot on the left of the announcer, and another pair in near eye line, with the camera.

The floor manager (Bob G6LOB with few teeth) not only had to clip the mic on the young lady volunteers (somewhere), but had to coach them into arm waving, while reading from the teleprompt displays. Some of our public presenters give a really professional performance.

The background weather maps and scripts were especially made for the occasion by the ITV graphics company "Independent Weather Productions" on S-VHS (the BBC didn't want to know). These were then voice timed with the recorded computer text. Timebase correction & chroma key were all handled by

G8LES's much modified Panasonic M12 mixer.

The director (Mike G8LES of course, as he generally knew which button to press!) had to: synchronise, start and stop, all three tape machines (text, background and output) for each recording.

All was on S-VHS format, (except the text) with a 400 line resolution CCD camera for the studio work, the output was then copied down to VHS if the presenter wanted a copy.

24cm Walkabouts.

There were two of these: Garry G4CRJ's system using 250mW to a 1/4 wave vertical, pole mounted at 7' from a back pack with the battery and Tx. The Rx aerial was an "inverted" 1/4 wave and ground plane at 20'. My one used 1 watt into my high gain Hat aerial, battery and Tx in shoulder bag. Rx used a "Flat-plate" aerial (double figure 8 and reflector) at 26' with a rotator.

Both systems worked very well producing noise free P5 with sound over the whole site. Dual camera interviews were done using both system.

There was also an 80mW QRP Tx on 70cm providing point to point link pictures from the car park (security for ham vehicles?).

Camtech TXV4000 PLL Video Transmitter

Review

Mike Wooding G6IQM

A recently introduced product to the Camtech range of ATV equipment has been the TXV4001 PLL Video Transmitter for 24cm. This unit can truly be called state-of-the-art, utilising the latest surface-mount techniques to produce an extremely compact, yet for its size, powerful transmitter. The specifications for the unit are shown below in Table 1.

Description

As can be seen from the photographs the transmitter is constructed on a single double-sided printed circuit board, with a

tin-plate enclosure soldered to it and fitted with a snap-on lid.

The RF circuitry and the phase locked loop oscillator components are all mounted on top of the PCB inside the metal enclosure, whilst much of the DC switching and logic circuitry is made up from surface-mount components on the underside of the circuit board. Thus, the unit must be mounted in another enclosure using stand-off pillars to ensure that no short circuiting of the external circuitry takes place.

The external connections to the transmitter are an SMA socket for the RF output, an SMB socket for the audio subcarrier input and screw-lock terminals for the DC, channel switching and video inputs.

The transmitter is a two channel unit, with switching from channel-1 to channel-2 being effected by grounding the appropriate pin on the screw-

RF Output Power	400mW (adjustable 50 to 400mW)
Frequency.....	1150 to 1400 MHz
Channels.....	2
Modulation System	FM with CCIR Pre-Emphasis
Deviation.....	+/- 3.6 MHz
Frequency Stability	+/- 25ppm -10 to +55° C
Spurious Emissions	-73dBc
Harmonics	-20dBc
Channel Spacing.....	25 MHz
Video Input	1 volt peak-to-peak composite video 75Ω
Audio Subcarrier Input	50mV RMS into 75Ω
Power Supply	11.0 to 13.8 volts DC @ 320mA
Size.....	65 x 80 x 140mm
Weight.....	400gm

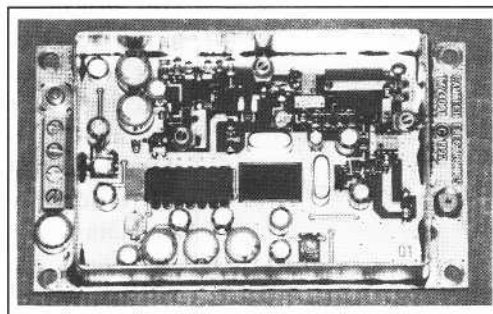
Table 1: Manufacturer's Specifications

lock connector block. This switching can be accomplished by simply using a switch, or by using logic gates, bearing in mind that the device doing the switching must be able to sink 15mA.

The oscillator is a Phase Locked Loop (PLL) circuit which is referenced to a crystal frequency. The channel frequencies are selected by choosing the appropriate PLL crystals. Thus, the desired transmit frequencies must be decided prior to ordering, as the crystals are soldered to the PCB not socketted and are fitted by Camtech.

The amplification stages use the latest state-of-the-art integrated RF devices and stripline technology. The output power adjustment is provided by means of a small (and I mean small!!) potentiometer on the first amplifier stage.

The video input is first fed to the CCIR pre-emphasis stage and then, after the addition of the audio subcarrier, is routed to the PLL stages for frequency modulation onto the carrier.



RF Output Power	490mW at 1249.5 MHz
	535mW at 1275 MHz
Frequency Stability	+9ppm from initial switch on to final frequency after 2 hours
Spurious Emissions	>-80dBc
Harmonics	-20dBc, worst case at $f_c \times 2$
Power Supply	13.5 volts DC @ 310mA

Table 2: Measured Specifications

Performance

The following test equipment was used to carry out the laboratory tests:

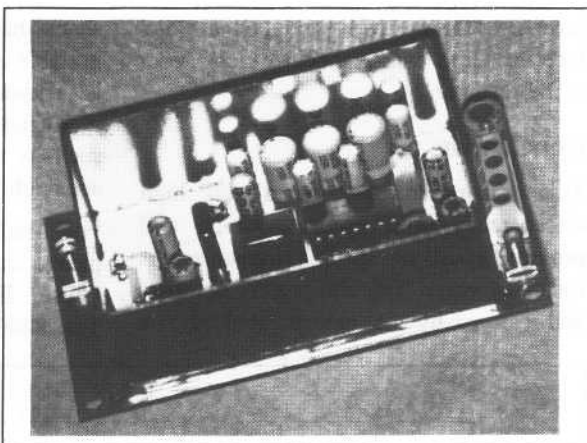
HP Microwave Frequency Counter
Marconi 2383 Spectrum Analyser
HP Plotter
Tektronix 465B Oscilloscope
Philips PM5646 TV Pattern Generator
Bird Power Meter and Sensor Head
Anritsu Signal Generator

The transmitter was subjected to the usual stringent CQ-TV performance checks and survived well. The quoted specifications were exceeded in most cases and were certainly met in all. Nothing untoward occurred during the soak-test period of around two hours and the output power remained constant throughout the tests.

The measured specifications of the review unit are shown in Table 2.

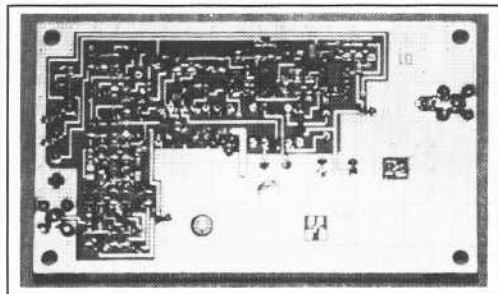
The test parameters were measured after the 2 hour soak-test period. These figures were compared with initial readings taken at switch on and, apart from a 3 or 4mW drop in output power and the minuscule shift in frequency, the parameters remained the same. The unit is extremely stable with no detrimental effects being observed from vibration.

The only really apparent effect from the 2 hour power up period was that the metal case got very hot! However, this working temperature was having no detrimental effect on the devices, just on my hands! I would recommend, when finally mounted inside an enclosure, that the unit should be supplied with some form of heatsinking to a metal case, or that a fan be used.



The plots in Fig's.1 and 2 show spectrums of the transmitted signal. Fig.1 shows the fundamental at around 1277 MHz (the frequency read-out of the analyser is only for indication and is not an absolute measurement) and the second and third harmonics. Unfortunately, due to local conditions at the location of the tests the noise floor on the day the plots were taken was quite high, the spurious signals seen on the plot are thus nothing to do with the transmitter, but more to do with other local transmissions!

Fig.2 shows a plot of the output from the transmitter when a full-colour Philips PM5646 test card as the video modulating signal and a 1 kHz tone modulated onto a 5.9996 MHz audio subcarrier. The spectrum shows good uniformity of



modulation with no troughs or peaks in the wrong places!

On-Air Tests

Owing to the fact that at the present time (and for the last few months!) my mast has been lying up the garden path awaiting the planting of a new ground-post, my aerial system leaves a lot to be desired! In fact, as far as ATV goes it is non-existent, the present vertical aerial farm providing GB7RBY with its links to the outside world!

So, to expedite matters the on-air tests were actually conducted across the test laboratory using a small 24cm vertical aerial for the transmitter and a similar one for the receiver. The results obtained from the transmitter were very good.

The quality of the video was excellent with no signs of white clipping or sync pulling and a comparison of the demodulated video waveform with that fed to the transmitter showed no transient problems either.

The audio signal was also found to be of good quality and at the full drive

level of 50mV RMS produced a good level of audio with respect to video level at the receiver.

Conclusions

This transmitter represents a very high class, ready built product, which will provide excellent quality transmissions for many years. The unit is very compact and can easily be incorporated into a

shack based, remote mounted or even portable ATV system. The output power is adequate for use in local contacts and is sufficient to drive further amplifiers, such as the hybrid power blocks which are readily available.

For further information on this unit please contact: **Camtech, 21 Goldings Close, Haverhill, Suffolk, CB9 0EQ.**
Tel: 0440 62779. Fax: 0440 714147.

Fig.1
Output Spectrum of
unit with no video or
audio input

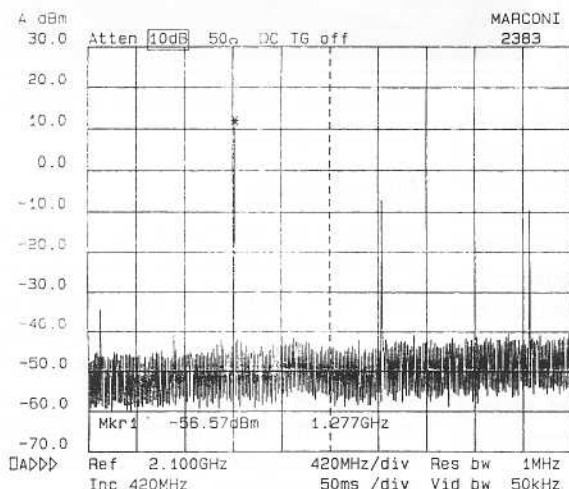
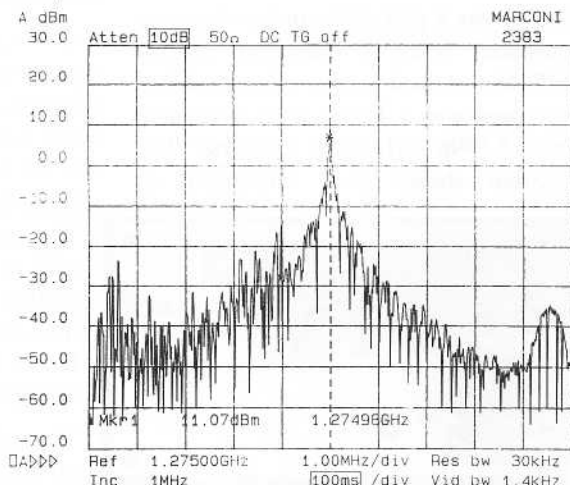
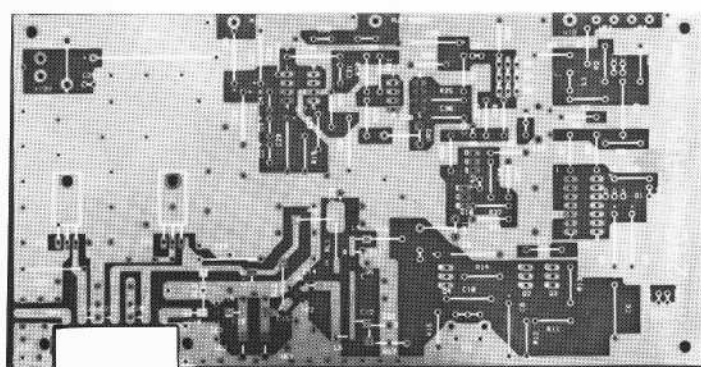
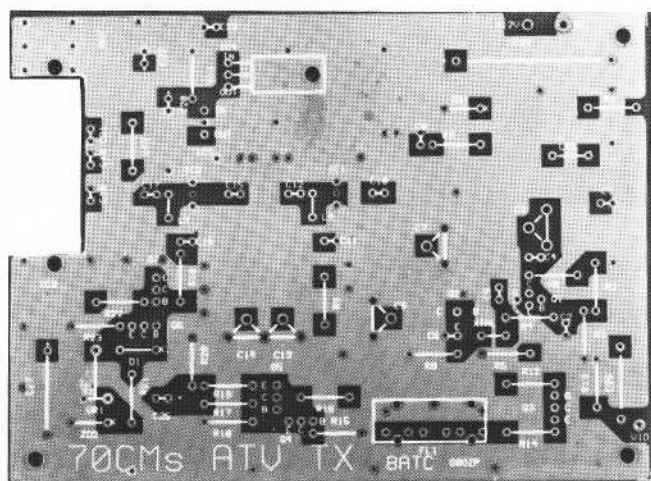
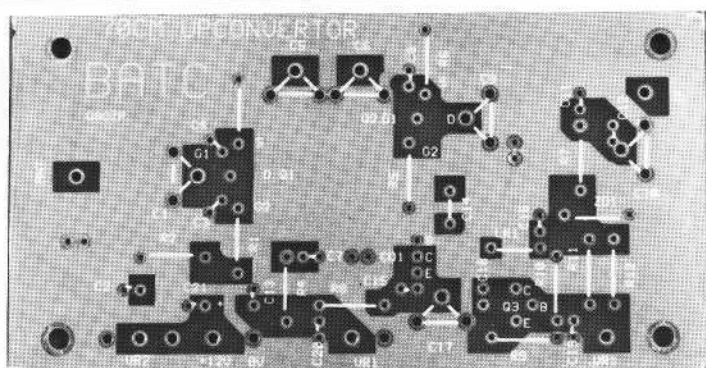
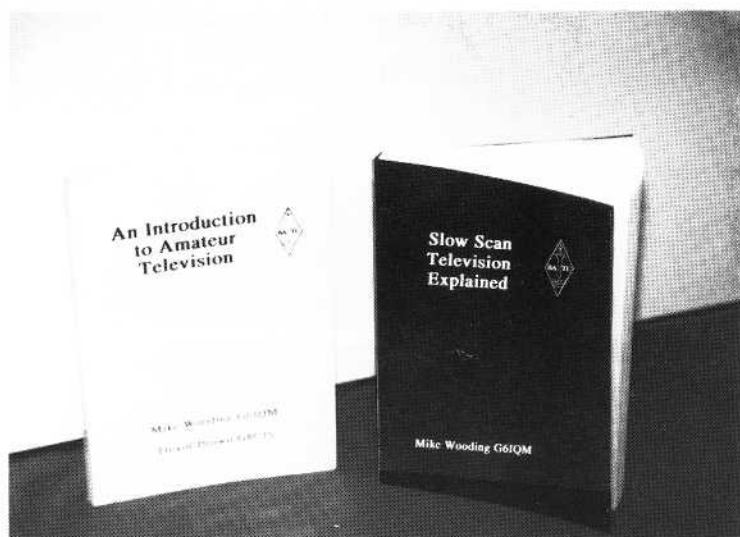


Fig.2
Output Spectrum of unit
fed with Philips PM5646
Test Card.





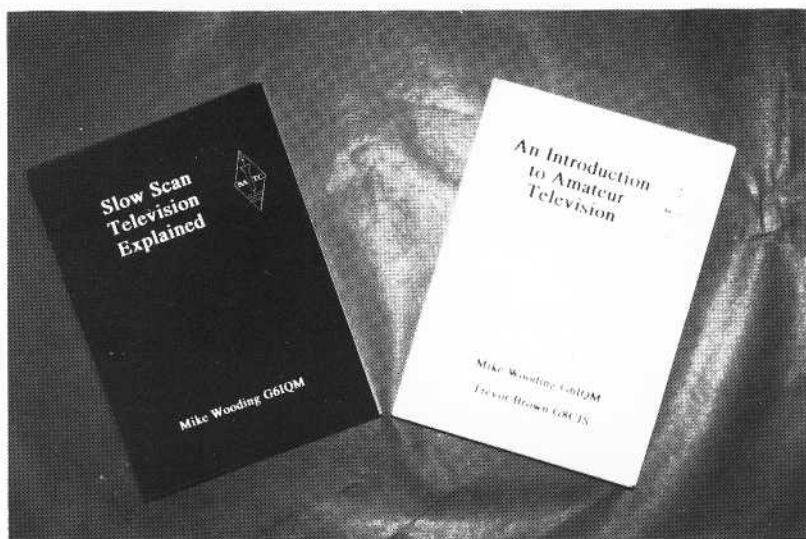
**Some of the BATC PCB's for projects from the new book:
AN INTRODUCTION TO AMATEUR TELEVISION**



THE NEW BATC BOOKS

AN INTRODUCTION TO AMATEUR TELEVISION

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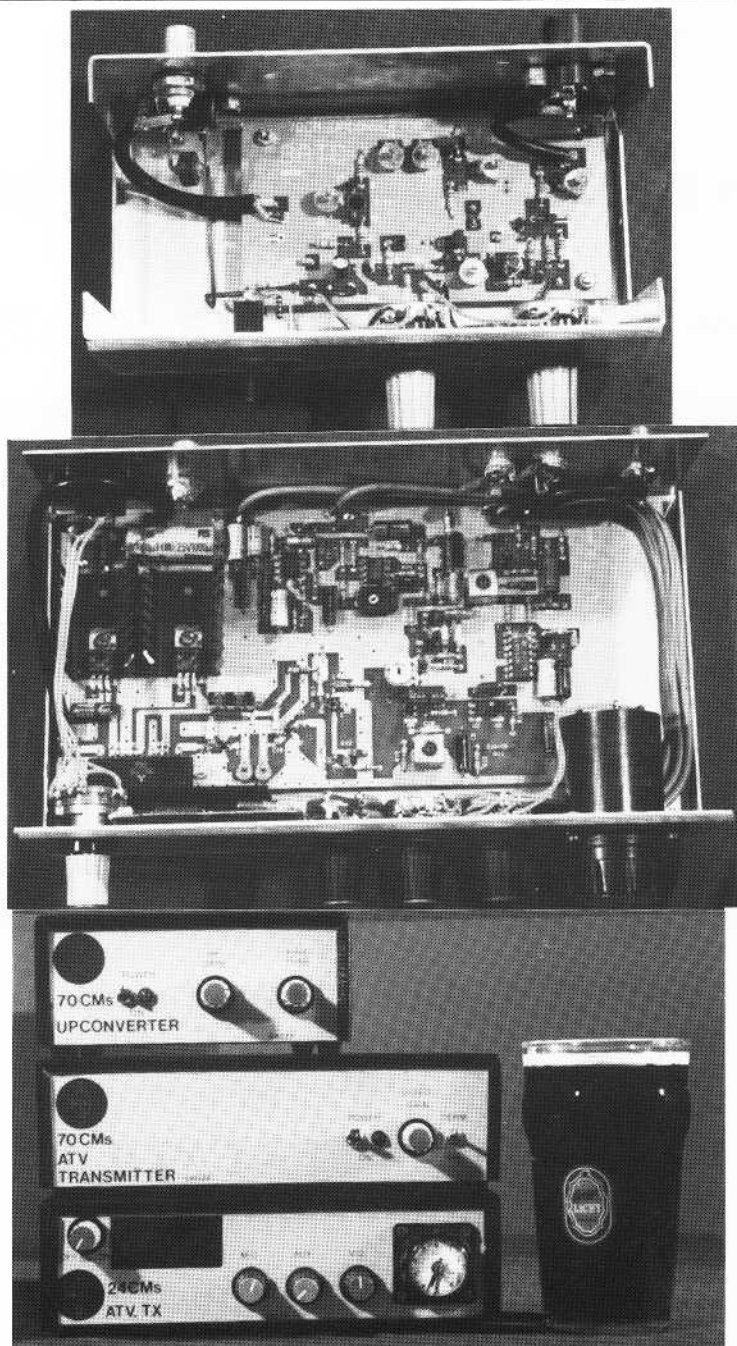


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BEYOND TTL

Part-4

Trevor Brown G8CJS

In this issue we are going to add some RAM memory to our simple micro controller. The Ram we are using comes in the shape of a single chip of 8k static Memory (6264). The difference between static memory and dynamic memory is that static memory stores the data by setting and resetting flip flops within the chip, and will retain the data as long as the power to the chip is maintained. Static RAM can be used for battery back up operations.

Dynamic RAM stores information by charging capacitors, and as we all know capacitors do not hang onto a charge indefinitely. This means that Dynamic RAM has to be constantly read and reloaded with the same data, a process called refresh. This is not as bad as it first seems, Dynamic RAM has two address buses called CAS and RAS and the address is presented as two addresses rather like X and Y coordinates, as long as the CAS address is generated for each location every 20 milliseconds the data is safe. This along with the higher power supply drain imposed by Dynamic RAM makes it unsuitable for small applications or battery back up.

Static RAM used to be in small packages, typically 2K bytes (6116), but is now available in packages of 32K bytes and as the Z80 only supports 64K of

address bus, it is not necessary on this small processor to use dynamic RAM. This was not always the case when the Z80 first hit the market Dynamic RAM was used for nearly all micro processor applications. The Z80 designers added automatic refresh to the Z80 so it can use Dynamic RAM without external refresh circuitry.

The 6264 that we have added to the circuit is almost pin compatible with the 2764 EPROM, so all that is required is that the address bus and data bus going to the EPROM is extended to the RAM. The same applies for the output enable and only the chip enable is different. This is so that we can place the RAM in a different part of the memory map to the EPROM. This we have achieved by using A15 to enable the EPROM when it is low and by connecting it to the RAM via an inverter it will then enable the Ram when it is high.

The Memory map that results is EPROM memory from 0000 to 1FFF and RAM memory from 8000 to 9FFF. If we used 27256 EPROM and a 32k RAM chip and connected A13 and A14 from the CPU to the two chips we would have a full memory map, i.e: EPROM from 0000 to 7FFF and RAM from 8000 to FFFF. I have used the smaller chips to keep the cost down, and to illustrate in software how to work with incomplete memory maps.

The only remaining pin on the RAM chip is WR this is active low and indicates to the chip that it should store the word on the data bus at the location on the address bus A0 to A12. The logic we now have is the 6264 is active when its chip enable is low, if this is accompanied by WR also being low it will store the word on the data bus at the location given by the address bus A0 to A12. If WR is not low, but output enable is, it will read and present the word to the data bus stored in the location given by the address bus A0 to A12.

The WR command comes from the Z80, but in Fig.1 it is gated with memory request, so that when the WR command is presented along with the I/O request and not the memory request as is the case when we write to the 8255 the 6264 will not over write some of its memory, because the output enable does not inhibit write in a 6264.

So much for the hardware additions now let us look at what extra advantages this provides to the software environment. The first advantage is we can use a stack to make programming easier. A stack is a temporary place to dump the contents of one or more registers so that register can be used for a different task. Up to now we have been storing temporary data by leaving it in a register. First we must tell the Micro where the stack is in the memory map. The instruction is

LD SP,0000,

the 0000 should be the top of the memory map i.e: 9FFF. From the instruction set in CQ-TV 157 pages 42 to 43 we can see that the HEX would be ED7BFF9F (low byte first remember).

If we now have a number in the HL register and we want to use the HL register without losing the number we can

PUSH HL (E5)

this will copy the contents of HL into two bytes of RAM. we can then overwrite the data in HL with

load HL,0000

where 0000 is the new data (2A0000 in hex remember low byte first) when we have finished the task then

POP HL (E1 in hex)

will put the number from RAM back into HL overwriting any data there.

So how does it work and can we store the contents of more than one register at once. SP is stack pointer and it always points to the last byte stored, it decrements down as we push things onto the stack and increments as we pop things off the stack.

If we push HL and then push BC, BC is the last thing on the stack.

If we pop BC and then pop HL then the contents of the registers will be restored.

If we push HL and then push BC followed by pop HL and then pop BC we will have exchanged the contents of the two registers.

So the rule is when you push registers pop them in the reverse order, i.e: last one pushed is the first one popped.

Another advantage of the stack is the ability to call a Sub routine. An example of this is the repetitive Bleep routine in our original K generator. You can write a bleep routine at the end of the pro-

gramme once and then call it each time you want it so the original K could have been:

```
Ld D,#90
Call bleep
Ld D,#30
Call bleep
LD D,#90
Call Bleep
Halt
```

Followed by the bleep subroutine written once only, if you were doing a long CW message this would help no end. The call instruction also uses the stack so when you call a subroutine the CPU first of all puts the return address on the stack, jumps off to the subroutine that must end with a ret (return C9). You must remember that the return address is on the stack so if you push any registers while in a sub routine you should restore them before the end of the subroutine so the stack pointer points to the return address otherwise the wrong 2 bytes will be recovered from the stack as the return address and you will not return to the correct place in the programme.

If you look at the Z80 instruction set on p42 and p43 of CQ-TV 156 you will see some instructions called rst 0, rst 8, rst 10, rst 18, rst 20, rst 28, rst 30, and rst 38. These are short calls that require only the single byte instruction stored at the address given after the rst. Otherwise you can call a sub routine by the longer instruction Call NN where NN is the address of the sub routine in low byte high byte order.

The other advantage of RAM memory is that it means we can use the interrupts on

the Z80. There are two of these called INT and NMI I will cover the NMI first. This is controlled by pin 17 on the Z80 which is normally high, if it is pulled low it will cause the programme to finish executing its current instruction and then to put the address of the next instruction onto the stack and start running the programme located at address 66, until it comes to RETI. This instruction terminates the interrupt programme and at this point the return address is recovered from the stack and the original programme is returned to.

This is used in the I²C system in order to service the keyboard. The keyboard strobe is connected to the NMI pin and when a key is pressed it will pull it low.

The keyboard service routine stored at 66 or pointed to by a jump instruction at 66 so whenever a key is pressed the Keyboard service routine is run and the information is read and acted upon. The NMI (Non Maskable Interrupt) is always available to the hardware and can not be stopped or masked in software. An example of using the NMI register to generate a CW ident each time the NMI is pulsed low can be set out as follows:

```
0000 31 ( Load Stack Pointer)
FF
9F
0003 DELAY LOOP
SET PIO
C3 (JMP 1FFC)
FC
1F
0066 CW PROG START
ED (RETI)
4D
1FFC 76 (HALT)
```

1FFD C3 (JP to 1FFC)
FC
1F

The next interrupt is the INT, which again is operated from hardware by pulling down pin 16 of the CPU. This has three modes of operation set by the instructions IM0 (ED46), IM1 (ED56), and IM2 (ED5E). To change modes they should have been included in the programme prior to the interrupt.

IM0: The programme will be halted after the current instruction and the address of the next instruction put on the stack. The Interrupting device is required to put an instruction on the data bus usually an rst which will then be executed by the CPU.

IM1: Again, the current instruction is completed and then the programme stored at 38 will now be run or a programme stored at a location pointed to by a jump instruction at address 38.

IM2: The Z80 will still finish the current instruction and then jump to a two byte address where the low byte is put on the data bus by the interrupting device and the high byte is read from the interrupt register. This register is inside the Z80

and can store a single byte transferred in from the accumulator (register A) with the instruction LD I,A ED47.

The INT action can also be disabled in software with the instruction DI (F3) and enabled with the instruction EI (FB) the default is interrupt enabled but once used it will be disabled until it is enabled again with EI. If in doubt about whether the interrupt is enabled or not no problem will arise from doing it again so repeat the instruction.

I have not covered everything in the Z80, but I hope I have given you a working knowledge so you can use the Z80 in your own designs and also to be able to write the necessary software.

There are many specialist books on the market to help you, I hoped here only to provide an insight into something which may otherwise escape your interest.

In the next issue we will be leaving the Z80 CPU for the 8086 with Chris Smith G1FEF giving the lesson,. Again, there will be programming examples that can be implemented, this time on the PC XT through to AT range of computers.

SLOW SCAN TELEVISION EXPLAINED

**The new BATC book - to be launched
at Leicester - see centre pages ⇒**

BSB on 3cm !!

Bob Platts G8OZP.

Withdrawal symptoms were setting in, with change of QTH, club projects and numerous other jobs to do, time had to be found to get back to the hills. Bob GW8AGI has for sometime been building up his 3cm equipment and was eager to get out and do likewise. After numerous phone calls, arrangements were made for the weekend of the 8th and 9th of August. As a lot of new equipment was to be tested it was decided to try several paths of increasing distance from the South West Peninsula across to Wales.

Paths of 50 to 201 kilometres were planned over the Saturday and Sunday. Myself and YL Sue travelling to Devon and Cornwall, and Bob to South Wales. As with most plans these quickly fell apart! As Bob became unavailable on Sunday we decided to go for broke on Saturday.

Neither of our equipments had been used in anger. For receive Bob planned to use the Mk.1 new BATC receiver (An Introduction to Amateur Television) and myself the Mk.2 version. We both had converted Drake LNB's. Friday night we visited Bob's QTH for calibration and short range testing. Tuning scales suitably marked we set off for Devon and Bob to bed!

An early start from Weston Super Mare saw us on the way to Hartland on the North Devon coast for our first sked. Guess what! the weather was basically

atrocious, well this is the middle of summer, what else! We arranged to call Bob at 11.00 AM from the site. Holiday traffic and very poor visibility meant that at 11 we still had 50 miles to go! Bob set off at for Tenby to drop off his XYL, then aquaplaned his way north to Myndd Preselli where, yes you guest right, it was still raining. Was this really a good idea thought Bob. An hour late we arrived at Hartland after a slow wet run down caravan alley. We located a suitable position which from the map should be clear over to Preselli Mountains in South Wales where Bob was. With visibility of about 300 yards it was a good job I had bought a compass.

We parked up on a grass verge and set the dish pointing to where I thought Bob was, but had no real idea whether the path was obstructed. by trees or buildings out there in the mist. As my 3cm TV transmitter runs 200mW and with 36db of antenna gain, giving 600W ERP, we decided I should transmit first. Bob reported seeing nothing, like the weather, gloom and despondency rained (pun intended). Not to be disheartened, re-check the dish heading.

The path length works out at 112 kilometres and good signals were to be expected. Either something was wrong, negative thoughts of a big wet Oak tree out there in the mist, or was the very wet atmosphere absorbing all the signal. Check dish again!! Check compass again!!!

To pass the time some local video recordings were made. 144.750 burst into life.

"G80ZP GW8AGI, I can see a slight change of noise on your heading but it looks more like CW".

Huh! a 250 mile drive and all we get is breakthrough. I switch the TX off and on.

"That's you", said Bob. Where's the CW from then?"

I looked up the road, a caravan, a car and a second caravan approached.

"Hang on Bob, I'll send you a K".

That was one mystery solved. Still no picture though. Back to watching the vehicles go by and work out what they are sending to Bob.

"Have syncs" calls Bob.

Mild panic sets in, check with Bob that he's optimised his dish.

"Yes" he replies, OK "I'll slowly move mine a shade". "Hold it" shouts Bob. "P2."

Spirits, but not the weather, immediately lifted, though over this distance I would have expected much stronger signals. The fog and clouds must be knocking seven bells out of my signal, or was there a tree out there in the mist? We decided to leave the kit running and see what happened. I continued making local recordings.

The clouds were lifting, and a weak, hazy sun appeared. 20 minutes later Bob reported full colour near P5, so off went the test card, on with the camera and microphone while Bob recorded my signals.

"That's better".

The whole world seemed brighter now, even the midges felt better as they started to make a meal of us. Time to try the reverse path.

Bob only runs 10mW, this could be interesting. My new Mk.2 club receiver and LNB was hooked up and switched on. Nothing!!! Things went gloomy again. My new receiver is fitted with a noise meter. Tuning the receiver indicated a peak in noise where Bob should be. Though no picture could be seen.

"Keep it coming Bob, I have a good indication of your signal, let's hope the atmosphere dries out more".

I returned to taking photographs and local recordings. After a few minutes I noticed through my camera a colour picture on the off air monitor. Mild panic number 2 sets in. I grabbed the recorder and hooked it up to the receiver, then grabbed the mike.

"I've got P3 colour Bob"

Bob came back cursing himself.

"Works better if I remember to change over the Wave guide switch as well as switch on the TX.

Bob's test card disappeared and up came live pictures. Super stuff! During the next half hour Bob's pictures peaked to P4. These included a replay of the pictures I sent to him, which were quite impressive considering a round trip of 224 kilometres on 3cm. For a comparison I had brought along my old 142Km record receiver, which was set up. Only weak syncs could be seen, this gave me great confidence for the future.

This new kit's a real performer. Originally we had planned a possible 154km path from Tintagal to South Wales and a possible from St.Ives to South Wales of 201km. It was decision time. Shall we go for broke? We were getting pushed for time. We could make Tintagal but it would be about 6.00 PM. I noted that Bob's signals were back down to P3 and the clouds closing in.

My transmissions to Bob, when checked, also proved down. Bob reported it was now raining heavily in South Wales. If you know Wales you'll know what heavy means. Reluctantly due to time and weather we called it a day. We had achieved part of our objectives, those being to check out the new equipment, but we didn't manage to break my existing 3cm TV record of 142 km. Better luck next time.

We packed up, myself and YL Sue set off to Westward-Ho for the night and Bob set off to find, who by now must be a very wet, XYL. Thank's to them both for being so supportive.

Equipment used: **GW8AGI:** 10 mW Gunn diode transmitter on 10.250 GHz; 3 foot penny feed dish; Modified Drake KU band satellite LNB feeding the new Mk.1 BATC 24cm receiver; Sony DX3000 camera. U-Matic video recorder.

G80ZP: 200mW DRO stabilised GaAs-FET transmitter on 10.150 GHz with 6 MHz intercarrier sound; 30 inch Cassegrain feed dish; Modified Drake KU band satellite LNB feeding the new Mk.2 BATC 24cm receiver; Panasonic F10 camera; VHS video recorder

PS: BSB is for Bob, Sue and Bob. Not the transponder people. ?

More on BSB Receivers - by Trevor Brown G8CJS

In the last issue of CQ-TV I covered converting BSB DMAC receivers to D2MAC. Lots of you have written to me and are now using D2MAC software to receive the TVSAT and TDF. First let me correct the errors that crept in: Fig.3 page 40, CV04 should be CV06 then it matches the text and the receiver PCB, and the two transistors also in Fig.3 are both labelled BC182, one being shown PNP and one NPN. The drawing is correct the first one needs to be a PNP type number such as a 2N3906.

The Philips software has also changed in that it has expansion and PAN facilities for the 16:9 pictures often seen on Antenna 2. Continuous tuning of the DBS band in 5 MHz steps has also been added to this latest version of the software. This is the version released so as yet you don't need to return EPROMs for updating.

For those of you using the Ferguson RX, Trac have written to me with their latest updates. They now supply a completely modified board on a replacement basis that has on it DMAC, D2MAC and PAL, along with a baseband out for feeding a Videocrypt decoder, the cost of this board is £69 and takes only five minutes to fit. The board has on it the latest version software which is menu driven. The board also has the necessary mods for tuning the complete Astra band. The PAL output is a piggy back PCB which comes already installed on the replacement mother board. They are also hoping to market a kit version, consisting of software and PAL PCB for £49. You do lose BSB under the latest version of the software, but the switch off for this service is very close now. I hope we can review one of their boards in the next issue. Trac can be contacted at: Trac Satellite Systems, Commerce Way, Skippers Lane, Cleveland, TS6 6UR. Tel: 0642 468145. Sorry about the smaller font folks - it was the only way I could fit it in ! ... Mike

13cm ATV - It's as easy as this !!

Bob Platts G8OZP

A 13cm to 23cm Receive Converter

This simple yet effective convertor is highly reproducible and stable in operation, if care and the correct components are used in it's construction.

Construction may be in two forms:

1) Firstly, with a free-running self-oscillating mixer suitable for ATV working.

2) Secondly, fed with a crystal source for narrow band FM or sideband working.

For enhanced operation a GaAsFET preamp should be used in front of the unit.

Description

The crystal source used by the author was of the DDK design, as covered in RadCom and other publications. This provides around 10mW of drive at around 1 GHz, depending on the crystal used. Other sources of a similar specification could be used.

As the circuit diagram in Fig.1 shows, the circuit is basically simple (keep it simple is one of my main philosophies). The 50Ω 13cm input is first fed to a MMIC (Monolithic Microwave Integrated Circuit) IC1. This provides around 15dB

gain, with a noise figure of about 4dB. A 3-pole bandpass filter feeds the signal on to the MMIC mixer IC2.

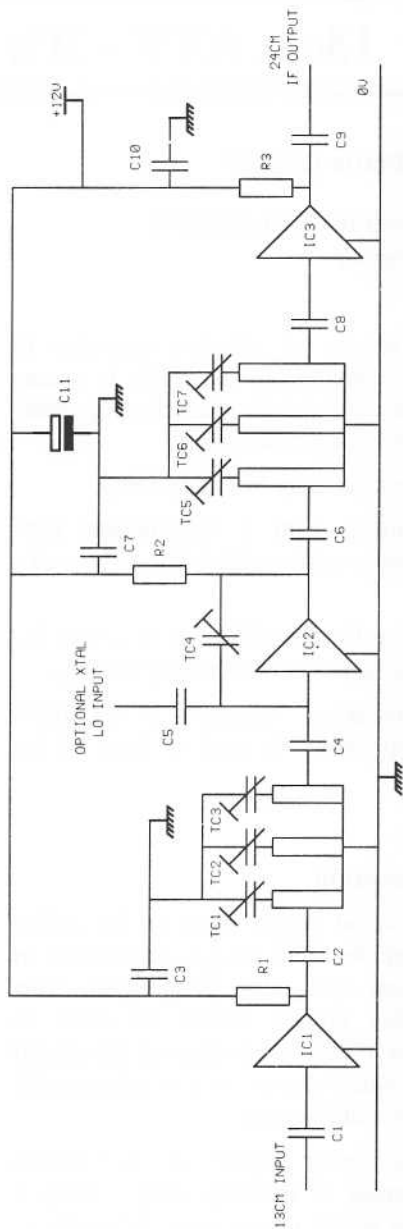
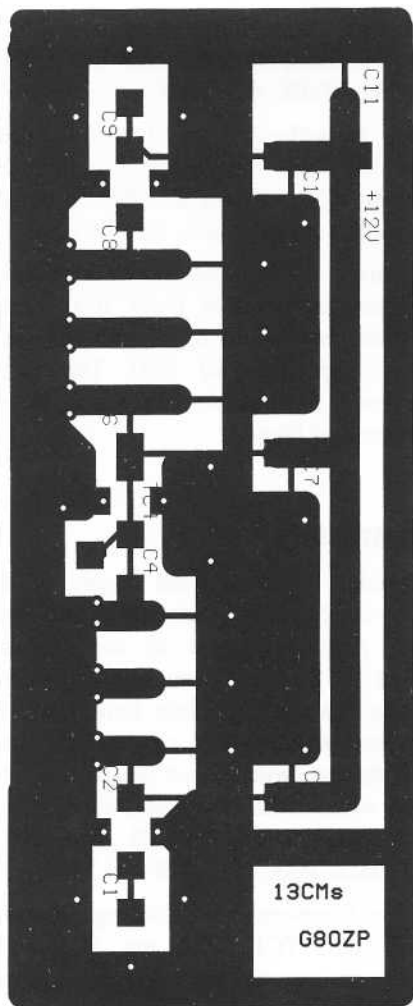
Note: In self-oscillating mode fit the local oscillator frequency determining trimmer TC4 and omit C5. The opposite applies if a crystal source is to be used.

The mixer output is filtered by a second bandpass filter which feeds IC3. This provides about 12dB of IF gain with an output impedance of 50Ω. The unit requires a clean stable 12V supply at a maximum of 80mA.

Construction

Only high quality 1.6mm double sided glass epoxy PCB material should be used. Accurately etch to the pattern shown in Fig.2, leaving the underside unetched as a ground plain. Drill holes as indicated and connect top and bottom groundplanes with circuit board pins, or stout wire, at all locations, except the ground connections for IC1, IC2, IC3, TC1, TC2, TC3, TC5, TC6 and TC7.

Fit the trimmers first soldering grounds both sides. TC1, TC2 and TC3 will require their ground leads (flat lead) to be bent out at 90 degrees for about 0.5mm then down through the board. Avoid excessive solder and heat, but a good joint is important. The ground lead for TC5, TC6 and TC7 is the one which runs down the side of the device.



Fig's.1 and 2: Printed Circuit Board Layout and Circuit Diagram of the 13cmReceive Converter. (PCB actual size: 94mm x 38mm)

Next fit the MMICs and feed resistors. R1 requires a single turn of 2mm diameter in its lead at the MMIC end to provide the choke. Resistors should be fitted to be flush with the PCB.

Finally, for the free-running version, fit TC4 across IC2. Do not shorten TC4 leads as these form the inductive component of the local oscillator tank circuit. The longer lead which runs down the side of the trimmer should connect to C6.

The unit is best mounted in screened enclosure with good quality coaxial cable and connectors for input and output. If required the board could be shortened, surrounded by a screen and connectors fitted directly onto the PCB.

Setting-Up

Tuning up is simplicity itself. For the crystal oscillator version calculate the IF frequency, which is signal minus Local Oscillator (LO). Set the receiver to this and tune for best signal.

The free-running version is slightly different. Decide on the IF required. Set the receiver to this, apply signal and then tune TC4 with a non-metallic tool for a signal, then tune the other trimmers for best signal. The LO frequency may be measured with a small loop near TC4.

It is best to keep the IF as high as available and hence the LO as low as possible. This is because they are fairly close and the LO could cause desensing of the receiver and intermod in IC3.

You should now have a working 13cm to 24cm Converter!

Components

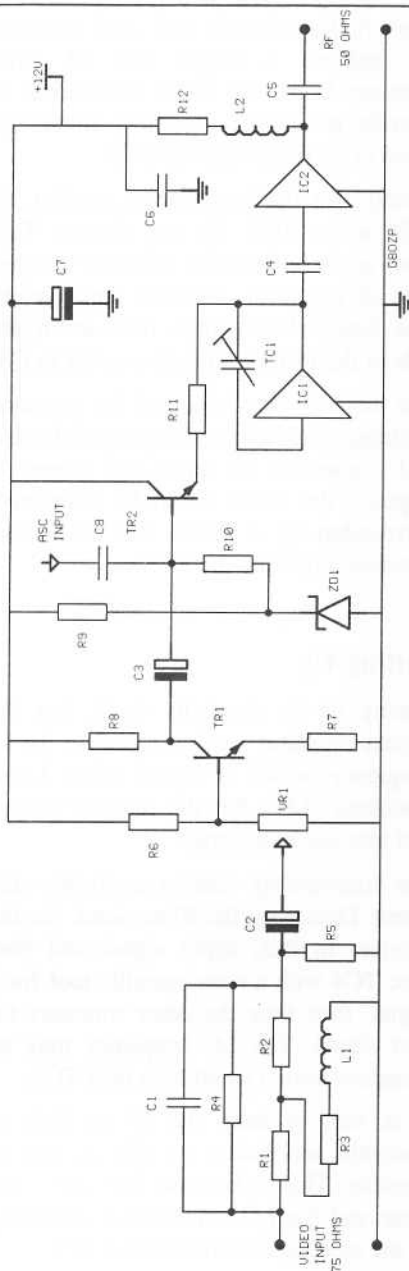
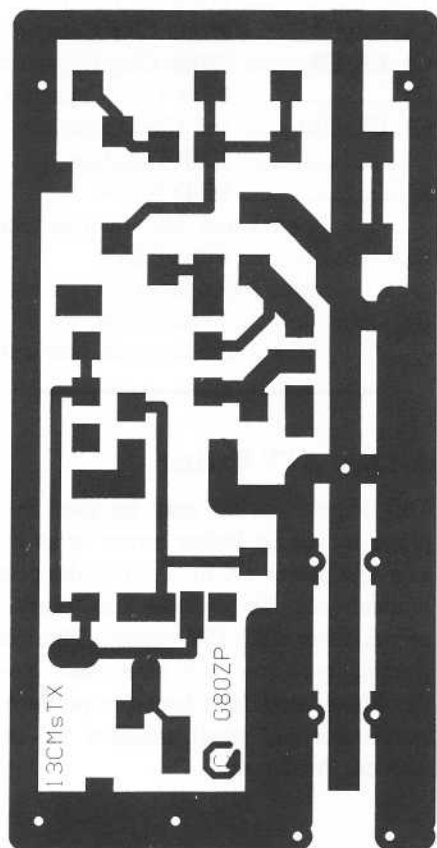
IC1.....	MSA0835
IC2.....	MSF8685
IC3.....	MSA0185
TC1, TC2, TC3 ...	Sky Trimmer Green
TC4, TC5	Murata Ceramic
TC6, TC7	Trimmer 1.5-5pF
C1, C2, C4	330pF Chip Capacitor
C6, C8, C9	330pF Chip Capacitor
C5.....	4.7pF Chip Capacitor
C3, C7, C10.....	1nF Chip Capacitor
C11	10uF Tantalum
R1	150Ω 0.25W plus 1 turn 2mm dia (see text)
R2	470Ω 0.25W plus 1 turn 2mm dia (see text)
R3	330Ω 0.25W plus 1 turn 2mm dia (see text)

A 13cm ATV Exciter

This simple exciter may be used as a prime mover for higher power or as it is as a low power TX for local working. As it stands, the unit produces 8 to 10mW of output from a 12-15V supply. The free-running oscillator will more than cover the whole band. It is hoped to produce a synthesiser and small amplifier to complement the design.

Description

Fig. 3 shows the simplicity of the design. Video is first pre-emphasised then amplified by TR1, VR1 controls the deviation. ZD1 with TR2 provides a 9.3V supply for IC1, onto which is superimposed video and audio subcarrier. IC1 is a MMIC self-oscillating mixer used as an



Fig's.3 and 4: Printed Circuit Board Layout and Circuit Diagram for the 13cm Exciter (PCB actual size: 70mm x 35mm)

oscillator, the frequency of which is controlled by the capacitance and self inductance of TC1 and the supply voltage.

IC2 provides little power gain, but is included as a buffer for the oscillator and to provide a 50Ω output. IC2 is over driven into compression by IC1. If required a more exotic MMIC device could be selected to provide more output.

Construction

The printed circuit board layout is shown in Fig.4. The PCB should be made from double sided 1.6mm glass epoxy board. Connect top and bottom ground planes with PCB pins, or stout wire, at the holes marked, with the exception of the ground connections for the MMIC devices, which should be fed through the board.

All components should be surface mounted flush to the board. Do not shorten the leads for TC1, which should be soldered across the top of IC1.

The unit is best enclosed in a small screened enclosure fabricated from brass or tinplate.

Setting up requires little more than checking work done and setting the frequency and deviation to that required.

Components

R1, R2	75
R3	18
R4	300
R5	100
R6	4k7
R7	390
R8	1k5
R9, R10	1k
R11	270
R12/L2	150 + 1 Turn 2mm ID
VR1	1k Sub Min Horizontal
C1	1680pF (1n + 680p)
C2	10uF 25V Tantalum
C3	47uF 16V Axial
C4, C5	330pF Chip Capacitor
C6	1n Chip Capacitor
C7	100uF 25V Tantalum
C8	47pF Ceramic
TC1	Sky Trimmer Green
L1	10uH Sub Min
TR1, TR2	2N3704
IC1	MSF8685
IC2	MSA0485
ZD1	10V 400mW

13cm ATV Operating Frequency

2330.00 MHz Simplex

See you there !!?

Expanding the Pace SS6000 Satellite Receiver

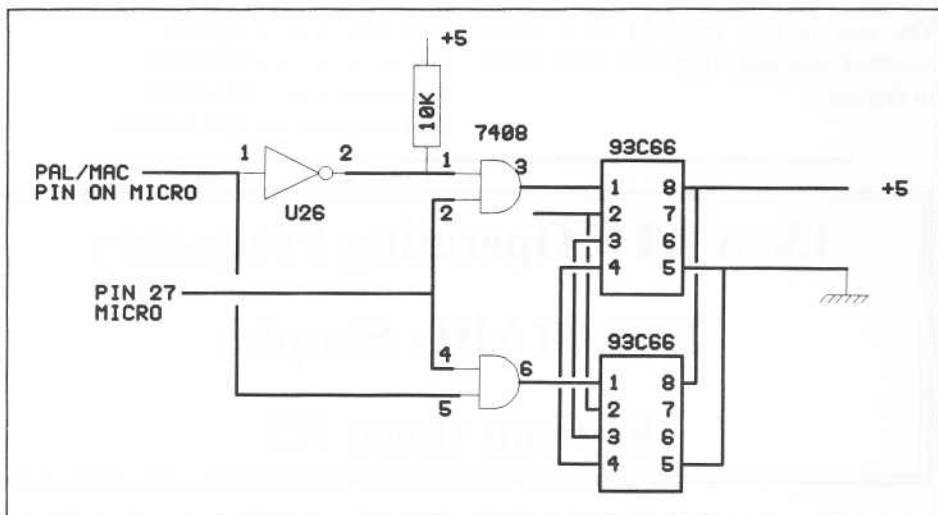
Trevor Brown G8CJS

The Pace SS6000 is a 60-channel on-screen menu satellite receiver, with facilities for selecting various parameters for each channel. On the face of it 60-channels would seem ample memory, however, when using a steerable dish system, this is soon swallowed up. Many more stations being available, not to mention the additional audio sub-carriers.

Looking at the available parameters on the on-screen menu I decided that the PAL / MAC-AUX choice of baseband output could be used to toggle in an additional memory chip. Tracing the circuit out pin-10 of the microprocessor is buffered by U26 inverter gate, pins-1 and 2, which then goes off via link-39 to

the PAL / MAC-AUX circuitry. This must be isolated by cutting link-39 and adding the 10k resistor to pin-2 of U26 as shown in the diagram below. It is this signal that is used to enable one of the two memory chips according to the menu choice.

The SS6000 uses a 93C66 non-volatile memory chip to store the channel information. The circuit below shows how to add a second one of these inexpensive memory chips. All pins are simply paralleled up, EXCEPTING the chip select on pin-1. The memory chip select from pin-27 of the micro is routed to two AND gates. The other inputs of each gate being wired across the inverter U26, pins-1 and 2. The output of the gates are wired to the 93C66 chip select pin-1.



This ensures that only one memory chip can be selected at any one time. Connect a 5 volt supply to pin-14 of the 7408 and ground to pin-7, the other two gates being spare.

The last page in each chip is used to select the alternative memory. So before you fit the hardware, programme channel-60 of the existing memory chip to MAC-AUX and then replace it with the new chip and programme channel-60 to PAL.

Now add the extra hardware and you can install and program the extra channels.

Once programmed, on paging channel-60 the data in the memory is latched into the microprocessor, such that on the next press of the memory UP key channel-1 of the new memory will be selected. Paging back to the first memory is achieved in the same way. If you are already making use of the PAL / MAC-AUX facility this is still available, however, remember to program that channel into the appropriate memory chip.

On some versions of the SS6000 a 93C46 memory chip may be fitted, the modification above should still be valid however, although this has not been checked out.

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SATELLITE TV NEWS

Paul Holland G3TZO

Many thanks to those who took the trouble to offer some encouraging comments on my first "Satellite TV News" column in CQ-TV 159. It is interesting to see the level of interest shown currently in Satellite TV and how far it has spread.

The summer has seen a considerable amount of activity in the satellite world, both with the launches of new craft and new channels, as well as the high level of programming activity resulting from events such as the Barcelona Olympics.

The autumn and winter months promise further interest, with the promised launch of several new channels carried by both existing and new satellites.

FEEDBACK

T.Jilani, from Rawalpindi in Pakistan, wrote expressing an interest in the C and S Band Yagis reported in CQ-TV 159. I am hoping in a future edition of CQ-TV to do a test report on one of these aerials. Watch this space for developments.

Most interest, naturally enough, has been in the various equipment modifications reported and described in the last edition. Will those of you who have any interesting details on successful modifications you have performed, or even system configurations that are unusual, please let me know and I will try and include them in a future column.

TRANSPONDER REPORT

For those who are confused by the new INTELSAT Satellite numbering scheme perhaps the following will help. The new satellite numbering refers to individual satellites using Arabic numerals only. The V-A series (flight numbers F10 and above) are now known as INTELSAT 510, 511, etc. Series V satellites, i.e: V F3, are now 503, and Series VI satellites, i.e: VI F5, are now 605. Clear !!

Eutelsat II F3 16 Deg E

This satellite carried much of the TV traffic resulting from the Summer Olympics at Barcelona. In the aftermath of all the excitement a number of permanent new channels have been forecast to appear. A new Turkish service, HBB TV, began test transmissions in August on TP 38 (11.616 GHz V), Eurostep will be sharing TP 20 (10.987 GHz V) with HTV, and watch out for a planned Tunisian Service on TP 39 (11.658 GHz V).

Eutelsat II F1 13 Deg E

August saw the launch of the by now infamous "Red Hot Dutch" channel. The appearance of this channel was predicted in CQ-TV 159, with a slightly inaccurate (well all right totally inaccurate) prediction that the channel would be French based. At the time of writing encryption is still based on the SAVE standard with decoders rented on a quarterly (minimum contract one year) basis. Continental TV,

who have the UK rights to this Dutch based service, have announced plans to move to an addressable encryption system within 6 months of launch. Rumours that this might be Cryptovision have not yet been confirmed.

On September 29th RTL 2 took over the upper half of TP22 (11.090 H) vacated by the German KabelKanal, which is now transmitted in the lower half of TP22 in clear D2-Mac. RTL 2 is another German service of RTL and could soon also appear on ASTRA, if a transponder can be negotiated with SES.

Eutelsat report that Europace will commence D2-Mac transmissions in October using TP41 (12.563 GHz H).

Eutelsat 2 F4 7 Deg E

July 9th saw the successful launch of Eutelsat II F4 from the Kourou Space Centre in Guiana. The satellite was deployed successfully at 7 deg E and took over traffic from Eutelsat I F4 during September. Eutelsat I F4 has now been re-located to 36 deg E, where it will be utilised for Euteltracs services.

The main significance of this launch will be seen immediately in the appearance of the two Greek and Cypriot channels ET1 and RIK, who will occupy TP 22 in half transponder mode. These channels have previously been unseen by most observers of this slot due to them having utilised an East Spot beam. Use of either "Widebeam" (West or East Antennas) or "Superbeam" footprints should produce a minimum of 46dbW over most of the UK for these channels.

Reports that Kanal 6, a Turkish service, which commenced test transmissions on

Intelsat 601, will occupy this satellite have not yet been confirmed by Eutelsat.

Telecom 1C 3 Deg E

This satellite finally relocated to 3.0 Deg E in late August. Four transponders (R2, 3, 4 and 5) were active with France Telecom Test Cards in Secam. It is understood that the main use for this satellite will now be business television.

Intelsat 512 1 Deg W

This satellite was due to go into an inclined orbit on October 1st, with traffic being transferred to Intelsat 515 18.5 deg W. The Norwegian Telecom (Televerket) are due to have moved one of the Marco Polo satellites bought from B-Sky-B and previously located at 31.0 deg W to this position by late autumn. A five channel package in either D or D2-Mac is predicted with TV4 and the new Norwegian TV2 service rumoured to be amongst the channels to be included.

Telecom 2B 5 Deg W

As predicted in CQ-TV 159, Telecom 2B has now replaced Telecom 1C at this position. Tests by ARTE on La Cinq's old transponder (TP R3 12.606 GHz V) commenced in August providing a further feed for this channel, which can already be seen both from TDF 1 and DFS-1. France Telecom is now providing a feed of Test Cards in Secam on the remaining five transponders on this satellite.

Telecom 2A 8 Deg W

At the time of writing (mid September) no formal announcement had been made regarding the Canal Plus "Bouquet" of channels due to have been launched back in April on this satellite. Rumours in the

satellite trade are that a French compromise will emerge with a D2-Mac Wide-screen service provided by Canal Plus, together with a number of Syster encrypted Secam channels.

The repercussions of the horse trading between France Telecom and the French government over this issue could mean some changes to allocation of channels on TDF1/2.

One unfortunate effect of this could be the loss of Euromusique's unencrypted D2-Mac service, which may re-appear on Telecom 2A.

Stat 11/Gorizont 11 11 Deg W

This satellite is now carrying, at various times, both Secam and PAL feeds on 11.525 GHz (RHC)0. During August it is believed that Gorizont 11 was replaced by a new satellite. No confirmation of this is available, however observed EIRP at this QTH is now much improved.

Intelsat 515 18.5 W

This satellite will carry the four Scandinavian channels relocated from Intelsat 512 1 Deg W. A new private Norwegian service TV2 was launched on 5th September. This service, in D2-Mac, is likely to be transmitted in the clear until the end of the year and then encrypted in Eurocrypt.

Provisional transponder allocations are as follows:

TV Norge	TP 61	11.016 GHz	H
SVT1	TP 61	10.969 GHz	H
TV4	TP 63	11.133 GHz	H
SVT2	TP 63	11.177 GHz	H
TV2	TP 69	11.538 GHz	H

Intelsat K 21.5 Deg W

A feed from Brightstar was the first TV traffic observed since launch on 11.560 GHz (V) in PAL. Subsequently, PAL colour bars and a Brightstar caption have been radiated from the lower half of this transponder on 11.520 GHz (V).

Intelsat 601 27.5 Deg W

Kanal 6, a Turkish language service, commenced test transmissions during August on TP 79 11.670 (V).

Marco Polo 31 Deg W

With Marco Polo 2 now on its way to 1 Deg W, the fate of Marco Polo 1 seems certain to follow the same course. The ITC found no suitable applicants who expressed an interest in Broadcasting from the UK's official DBS slot and it is likely that B-Sky-B will auction this spacecraft to the highest bidder. The Swedish Space Corporation, who operate Tele X at 5 Deg E, and who were outbid by the Norwegian Telecom for Marco Polo 1, are strong contenders.

Hispasat 1 31 Deg W

This satellite should now be operational with the launch having taken place in mid September. The payload consists of 5 DBS transponders and eighteen medium power transponders. All DBS channels are RHCP with linear polarisation for all other channels. A full profile of this satellite including channel allocations will be included in the next edition of "Satellite News".

Intelsat 603 34.5 Deg W

July 14th saw operations start on INTEL-SAT'S fifth and last Series VI Spacecraft. This satellite was the object of

much media attention during the dramatic rescue and reboost mission by the Shuttle Endeavour, which took place back in May. Intelsat 506, which was the previous incumbent of this slot, has now moved to 50 deg West. Intelsat have now moved Telephony traffic onto this satellite. However, I have had no reports of any TV activity being observed so far.

INTELSAT - NEW ORBITAL POSITIONS

As of 1st September the following orbital assignments apply to INTELSAT craft in the Atlantic Ocean Region (AOR) and Indian Ocean Region (IOR).

Intelsat 513	53.0 Deg	W
Intelsat 502	21.5 Deg	W
Intelsat 506	50.0 Deg	W
Intelsat 515	18.0 Deg	W
Intelsat 504	35.5 Deg	W
Intelsat 512	1.0 Deg	W
Intelsat 603	34.5 Deg	W
Intelsat 507	57.0 Deg	E
Intelsat 601	27.5 Deg	W
Intelsat 604	60.0 Deg	E
Intelsat 605	24.5 Deg	W
Intelsat 602	63.0 Deg	E
Intelsat K	21.5 Deg	W
Intelsat 505	66.0 Deg	W

PROFILE - INTELSAT K

INTELSAT K finally got off the ground on 9th June following a perfect launch, relayed via Brightstar's transponder on INTELSAT 601. In orbit testing took place for much of the summer months, with the occasional transponder being observed with unmodulated carriers. INTELSAT K is the first high-power all Ku band satellite deployed by Intelsat and is

capable of carrying up to 32 high quality TV transmissions. The satellite will provide downlink signals into North and South America, together with Europe, as well as uplink capabilities from North America and Europe. Simultaneous uplink facilities allow for a number of flexible configurations. These configurations include point-to-point, point-to-multi-point and multi-point-to-multi-point transmissions. Switchable downlink capabilities allow for the following options:

Downlink to: North America only
 South America only
 South and North America
 Europe
 Europe and N. America
 and/or South America
 (using 2 transponders)

INTELSAT K - principle information:

Manufacturer: GE ASTRO Series
 5000 with body
 stabilised bus
 Weight: 340 lbs
 Launch vehicle: Atlas Centaur II
 On-board power: 3.155 Kilowatts
 Operating life: 10 years
 Frequency bands;

Uplink: 14.00 - 14.50 GHz
 Downlink: 11.45 - 11.70 GHz
 (all beams)
 11.70 - 11.95 GHz
 (N & S America)
 12.50 - 12.75 GHz
 (Europe only)

Channels: 8 linear
 horizontal polarisation
 8 linear
 vertical polarisation

Coverage: North America
Europe
Key S.American cities
Signal Power: 47 - 50 dBW
TWTA's: 60 watts with 11 for 8
redundancy
Receivers: 2 for 1 redundancy
TP Bandwidth: 54 MHz
Footprints: See Fig.1.

PRODUCT REVIEW - SATMASTER V4

Those of you who regularly check out the Teletext Satellite News provided by Super Channel (Page 270) will have seen advertisements for a satellite software product called SATMASTER. David Stephenson of Design Technology who wrote the software has kindly provided me with a copy of the software to evaluate. The following notes provide a brief overview of the facilities of the product and my own personal observations of how it performs.

I should point out that my own competence with a PC is strictly limited. I do believe, however, that any good software should enable the user to extract maximum use from the product without necessarily having to understand the underlying theory of how the application, or operating system software, has been written.

If this sounds like an excuse for never having mastered a computer, it is !!

The software is supplied on a 3.5" disc and runs on IBM compatible PC's. For full benefits of the graphics facilities available you should be using MS-DOS

5. My own PC runs MS-DOS 3.21 and is capable of printing out any text files from the programme, but not such things as satellite footprints. The programme works with 80-column monochrome or colour monitors.

The main features of the programme are listed below:

- ➡ Satellite footprints can be called up and printed.
- ➡ Calculation of link budgets enabling you to input your own system parameters and see what resulting CCIR grade of picture will be obtained. The programme will then optimise system components if required to obtain either a Grade-4 or Grade-5 Picture.
- ➡ Calculation for any location of the satellites geometrically visible over the horizon, giving compass bearing, azimuth, elevation and longitude for each satellite.
- ➡ Calculation of gain versus aperture, noise figure versus noise temperature, plus many other useful relationships.
- ➡ A full glossary of satellite terms.

In practice the programme is very easy to use. I printed off the full text included in the Help and Information screens before getting started, and was soon navigating my way through the various facilities using a series of pull-down menus. The glossary of terms provides an excellent brief explanation of all the terms used throughout the programme. The effect of this is that as you attempt to perform, for example, a link budget calculation, and are not perhaps sure what "noise weighting factor" means, you can call up a

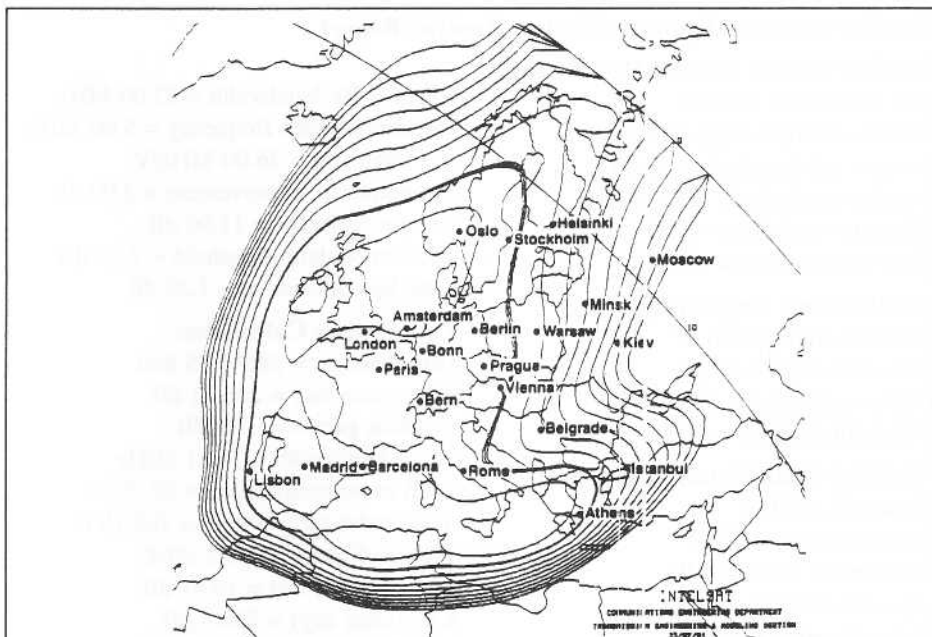


Fig.1a: INTELSAT K Atlantic 338.5° European Horizontal Beam Footprint

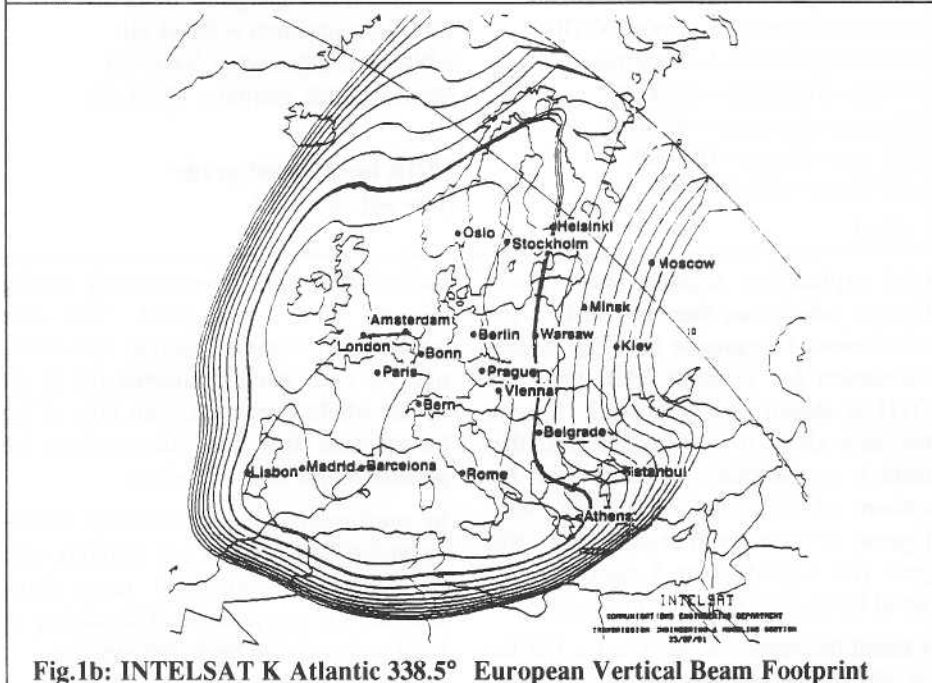


Fig.1b: INTELSAT K Atlantic 338.5° European Vertical Beam Footprint

Satellite Antenna Alignment / System Analysis Report

Receive Site and Satellite Details (deg)

Site Location = G3TZO
Satellite Name = Telecom 2A
Receive site longitude = -2.50
Receive site latitude = 53.00
Magnetic variation = -6.50
Satellite longitude = -8.00

Satellite Look Angles (deg)

Azimuth angle = 186.87
Elevation angle = 29.21
Compass bearing = 193.37
Polarization offset = 4.13

Modified Polar Mount Angles (deg)

Polar axis = 53.63
Polar elevation = 36.37
Declination offset = 6.93
Apex declination = 60.57
Apex elevation = 29.43

Link Budget Parameters

Channel frequency = 12.606000 GHz
Antenna aperture = 1.48 metres
Antenna efficiency = 62.00 %
Antenna noise temp = 42.00 K
LNB noise figure = 0.90 dB
EIRP figure = 52.00 dBW

Channel RF bandwidth = 27.00 MHz
Maximum video frequency = 6.00 MHz
FM deviation = 16.00 MHz/V
Pre-emphasis improvement = 2.00 dB
Weighting factor = 11.00 dB
RX demodulator threshold = 7.00 dB
Link loss allowance = 3.20 dB

Link Budget Calculation

Path distance = 38681.85 Km
Free space loss = 206.21 dB
Antenna gain = 43.72 dBi
Noise bandwidth = 74.31 dBHz
LNB noise temperature = 66.78 K
Total noise temperature = 108.78 K
Figure of merit = 23.36 dB/K
FM improvement = 16.81 dB
C/N (clear sky) = 23.44 dB
S/Nw (clear sky) = 53.25 dB
Maximum link margin = 16.44 dB
C/N (loss adjusted) = 20.24 dB
S/Nw (loss adjusted) = 50.05 dB
Minimum link margin = 13.24 dB

**CCIR impairment grade
(loss adjusted) = 5**

Fig.2

brief explanation, together with typical figures, which can then be used in the calculation. An example of a link budget calculation for Telecom 2A/B from my QTH is shown above in Fig.2. It soon becomes clear, if it wasn't before, that there is no substitute for aerial gain. No amount of tinkering with LNB noise figures, or receiver IF bandwidths, will give you a grade-4 or 5 picture if the aerial being used is not up to the job !!

I found the facility to print out a full list of all visible satellites at any location,

particularly useful when recently setting up my new 1.8m aerial. The data provided on compass bearing and elevation for each satellite allowed me to set up the whole system up, with little of the hit-and-miss that had characterised the process on previous occasions.

In conclusion, I can confidently recommend SATMASTER V4 to anybody who is seeking to understand more about satellite TV reception, and is aiming to build and optimise their own system.

The cost is currently £35.00 from Swift Publications, 17 Pittsfield, Cricklade, Swindon, SN6 6AN. Tel: 0793 750620.

IN CONCLUSION

Well that's it for this edition. Please do continue to write to me and tell me what you are doing in satellite TV that might interest others, and what is of particular interest to you that might be covered in a

future column. To stimulate a response I will provide a print-out of all satellites over the horizon for your QTH, with all the bearings etc., for those who write enclosing an SAE and giving their latitude & longitude.

Paul Holland, Chatterton, Chapel Lane, Threapwood, Nr.Malpas, Cheshire, SY14 7AX.

CHAMPIONSHIP LEAGUE TABLE

BATC FIXED STATION CHAMPIONSHIP 1992

This listing includes: Spring Vision, Mayday Microwave and Summer Fun contests.

Place	Callsign	Points	Place	Callsign	Points
1	G3NNG	1621	2	G7AVU	1430
3=	G6GHP	1000	3=	G7ATG	1000
5=	G8MNY	650	5=	G4YTV	650
7	G0IMP	154	8	G4WGZ	143
9	EI6EV	100	10	G7KAO	80

BATC PORTABLE STATION CHAMPIONSHIP 1992

This listing includes: Mayday Microwave and Summer Fun contests. Please note there were no portable stations out during the Spring Vision contest.

Place	Callsign	Points	Place	Callsign	Points
1	G8EQZ/P	2000	2	G4WGZ/P	907
3	G7ATV/P	514	4	G8MNY/P	410
5	GW7ATG/P	321	6	G0IMP/P	53
7	GW3JGA/P	23			

The points for the various bands in a contest including any multipliers are added together. The overall winner of that contest receives 1000 points. All the other contestants receive points in proportion, i.e: 1000 divided by leading score multiplied by your score.

CONTEST NEWS

Richard Guttridge G4YTV

Summer Fun 1992

I'm glad I have managed to please a few of you over the Summer Fun week-end, with good weather and some excellent DX. I have yet to find out what I have to do to influence those natural phenomena, any printable ideas to the editor please. I think it was the green cans of a well known lager that reach the parts other lager don't, that Clive (G8EQZ) and I took with us that did the trick! More on that later.

The lift that most of us enjoyed over the week-end started in the North and only effected the North sea coastal area during Saturday afternoon. Dave (G8KBC) and Nev (G0IMP), both in Lincolnshire, reported early contacts with the near continent. It was early evening before it reached those south of Watford and much later before the West country stations could join in the fun. John (G8MNY) started working across the North Sea about 2030 GMT. He reported on his log that he thought that he was doing quite well on 70cm with 15 contacts in the bag by midnight, until he worked a Dutchman with a serial number of 35. While we're in the South, it was nice to get a log from Ron (G6GHP) who did very nicely on 24cm to come second with 5553 points. All bar one of his contacts were outside the U.K. and he was also the only "G" to make a contact into Germany from the logs received.

A new face on the contest scene is always welcome. Nice to see your log David (G7KAO) and hope you enjoyed the day and look forward to working you from The Yorkshire Wolds one day. And now to our friends on the Mendips, who have broken new ground by sending me three logs, 70cm, 24cm and 3cm! I don't think it will be that long Viv before you have a bit more company on 10GHz from what I overhear on 144.750 MHz. Well done on the two contacts you had on 10GHz. Thanks for the full station details I have kept it for future reference.

North again to the Telford gang who have a favourite site 4km west of Wrexham. John (G4ZJY), Dave (G8VZT) and Pete (G1OAR) were holding court on a Welsh mountain top and by the look of their logs they had a fair number of callers. If you went west over another couple of mountains you would have found John (GW3JGA) giving his Solent a breath of fresh air and a shake down for the rest of the equipment. And west yet again, across the Irish Sea to Donal (EI6EV), who worked three stations in three countries. Do remember folks to give a shout in the direction of EI land during contests and lifts. I hear that they hope to be on 24cm soon as well.

As I said earlier the cans of Heineken Clive (G8EQZ) and I had enabled us to reach parts that other contestants couldn't etc., etc. and win the contest. Quite

frankly we were just dead lucky that the opening to the continent started in our patch only. We hope we made the best of it, because I think it will be a long time before we see a lift like that again on a contest.

School time ladies and gentlemen. In the excitement of working the continentals the errors shot up on the logs. This time I have only deducted points for incorrect callsigns and code numbers logged and there was one of each.

The locators I corrected this time, so some of you will find that you have more points and others less than you thought. One log put three of our Dutch friends in the middle of the Atlantic. The classic contest error when logs are hand written, the "J" of JO23 etc becomes IO23 etc., when it was misread by someone else.

However, none of the deducted and corrected points would have made any difference to the final positions. The logs must be checked and checked again please. Enough of the headmaster act, many thanks for all the input from your end.

Results 70cm Summer Fun

Place	Callsign	Points	QSO's	BestDx	@km
1	G8EQZ/P	13201	27	PA3GCV	522
2	G7ATV/P	8586	28	PE1HDX	640
3	G8MNY/P	7019	22	PA3GCV	510
4	GW7ATG/P	6619	21	PE1HDX	622
5	G3NNG	3249	10	PE1LZZ	408
6	G7AVU	1786	8	G8MNY/P	242
7	G0IMP/P	1691	7	PA3DLS	377
8	EI6EV	1108	3	G7ATV/P	338
9	G7KAO	234	4	G3NNG	128

24cm Summer Fun

Place	Callsign	Points	QSO's	BestDx	@km
1	G8EQZ/P	9501	18	PA1MPT	547
2	G6GHP	5553	9	DJ7JG	519
3	G7ATV/P	3894	32	PE1DWQ	580
4	G8MNY/P	3086	16	PE1DWQ	417
5	GW7ATG/P	1866	8	G8KBC	229
6	G3NNG	1822	9	G8EQZ/P	257
7	GW3JGA/P	373	4	G3SMU	67
8	G7KAO	325	5	G3NNG	128
9	G7AVU	188	2	G8EQZ/P	56

3cm Summer Fun

Place	Callsign	Points	QSO's	BestDx	@km
1	G7ATV/P	64	2	G3FYX	28

All Logs to: Richard Guttridge, G4YTV, Ivy House, Rise Road, Skirlaugh, Hull, North Humberside, HU11 5BH. Tel: 0964 562498

SIMPLEX WORKING FREQ's

3cm FSTV: 10.250 GHz

13cm FSTV: 2330.000 MHz

24cm FSTV: 1256.000 MHz

AUTUMN VISION

Sunday 15th November 1992 0001 GMT to 2359 GMT

Slow Scan & Fast Scan all bands

Entries to be received by Monday 23rd November 1992

WINTER ATV

Saturday 12th to Sunday 13th December 1992

1800 GMT Saturday to 1200 GMT Sunday

Fast Scan all bands

Entries to be received by 28th December 1992

WINTER CUMULATIVES

1993 Thursday 7th., Friday 15th., Saturday 23rd. and Sunday 31st January 1993

1900 GMT to 2359 GMT each session

Slow Scan & Fast Scan ATV all bands

Your three best logs out of the four sessions to be entered please

SPRING VISION 1993

Saturday 13th March to Sunday 14th March 1993

1800 GMT Sat. to 1200 GMT Sun

Fast Scan ATV all bands

Please refer to CQ-TV 157 February 1992 for the BATC rules or send a SAE A4 size to Richard Guttridge G4YTV, Ivy House, Rise Road, Skirlaugh, HULL, HU11 5BH, England.

FSTV CALLING & TALKBACK

144.750 FM / 144.170 USB

TV ON THE AIR

Andy Emmerson G8PTH

INSPIRATION FOR ALL

Here's the kind of letter I like to get. It's from Dave Clarke G7KAO in Dartford, Kent.

He writes: "As a new member of BATC and subscriber of Practical Wireless) I felt compelled to answer your article in CQ-TV entitled "What's wrong with ATV?". There are many amateurs down here in Kent on 23cm and we are active most evenings and transmit a wide range of things, i.e: pictures of latest DX or home made videos with the camera. Apart from testing and trying to improve our equipment, normally we watch Ian (G4MLY) with his latest invention, as he is always making something or trying to get more power out of his 2C39 valve! "Or if we want to get technical there's always John (G8MNY) to enlighten us, so no, we are not boring down here!

"Going back to the DX what a great lift on 29/39th of July. I worked into GB3TN (155km), saw GB3LO (159km), DB2BM (don't know its locator, perhaps someone could let me know, and worked PE1LJY (P5, 339km). I also saw several PE callsigns working thro' the Kent TV Group manned repeater G4CZJ (I am a member of this group). I would be most grateful if this or a edited version of this could be printed as I hope it will inspire other amateurs to respond with what they transmit.

"PS: I have included some photos, one

showing my antennas: 6m, 2m, 70cm and 23cm." *See inside rear cover ... Mike*

Well done Dave. I too hope it inspires people to do a bit more operating - and write in about it too. DB2BM is a he, not an it actually - the German ATV repeaters all start with DB0. But without a German callbook I cannot tell you where he (or just possibly she) lives!

EMERALD ISLE

Aengus Cullin EI4ABB from Galway in Ireland rang to say interest in ATV is increasing there. The most activity is in the Dublin area but there is also interest elsewhere. One annoying factor is that portable operation is not permitted on 70cm, although it is allowed on 24cm.

Also from the Emerald Isle, Dave Hooper pens a letter from Templeogue, Dublin. "Since I last wrote, " he writes, "I have passed the Morse test and obtained my ham licence as EI2HR. Easy to remember, Ham Radio! Since the end of February I have been on HF c.w. and two metres FM, so I'm at least equipped for ATV sound and I have contacted some ATV fellows on the ATV calling frequency.

"I recently found in a junk market some parts of a home-made 30-line TV with disc and motor missing. I thought at first it was a crooked dealer's attempt to make a piece of firewood look like a "find" for some gullible collector like me. However, I took it and no longer think that way for on opening the lamp box up

at home I found a top-pip Beehive neon inside. Vacant fixing holes suggest that a motor was once fitted, and dimensions indicate the scanning disc to have been about 14" diameter. Whether this set was made or being made from a kit or just from a constructional article, I don't know. I can't imagine anyone sending boxwood bits by post so I imagine a semi-kit form must have been used. The disc came in front of the ground glass and not behind it as I think was normal. I am now searching for a suitable alloy disc to see what can be done with it."

Another enthusiast also found the remains of a kit-built television recently, so these fascinating objects are still to be found 60 years later. You've just got to keep your eyes open at boot sales and in junk shops... Oh yes, well done on getting your amateur "ticket"!

REPEATER NEWS (1)

Dave G4NJU tells me that GB3TG, the 10GHz gateway covering the Milton Keynes area, is still working well, having the added benefit now of battery back-up. Tom G3LMX is working on a caption overlay for video passed through the box.

And now a letter from the Severnside Group in the person of Shaun O'Sullivan G8VPG. "Firstly thank you very much for the kind comments about my book, 'A Guide to 23cm Television'. We have now sold in excess of 199 copies and are doing a steady mail order trade thanks to your reviews.

"I know that you have great faith in the future of the 10GHz band and hence you and your readers may be interested in the following. As you know, we are planning

a 10GHz ATV repeater for Bristol and as we did for 23cm, we plan to help newcomers to the band by making useful items of equipment available at reasonable prices.

"I have managed to acquire a few Skyscan L1 satellite LNBs, and have had them converted expertly (by G8KUW) for 10GHz. This has been done exactly as per Bob Platts' article in the Handbook. The LO has been lowered from 10 to 9.1GHz by replacing the puck and the strip lines retuned for the lower frequency. Thus 10150MHz tunes 1050 on a standard satellite receiver and 10250 tunes 1150MHz. The cost from Severnside Television Group is £9.99 plus £2.50 postage (inland) -see advertisements.

"Work on our 10 GHz repeater is progressing well, with the hardware now well advanced. We have been tentatively offered a good site for coverage of Bristol and the adjacent part of South Wales. We now need to carry out some site trials. Unfortunately this has been delayed by the summer "silly season" of holidays etc. Initially the repeater will be a simple stand-alone device, which will test the water with the band in this area. We hope to subsequently develop it into a fully networked repeater with our own GB3ZZ, and who knows, maybe another local repeater.

"In the June Summerfun contest, we entered as G7ATV/P into the 10GHz section for the first time. I haven't checked back through the records, but I wonder whether this is the first three-band ATV contest entry. We will be active on 12/13th September on all bands and look forward to working all the usual regulars from all parts of the country."

A REPEATER FOR LONDON

Great news! Plans for the first amateur television repeater in Greater London. Many people think it remarkable that London, the greatest city in the universe (sorry, read capital city of England) does not possess an ATV repeater but this will soon be rectified if the Cheshunt & District Amateur Radio Club's plans come to fruition.

So subject to site clearance and licensing, they intend to erect FM TV repeaters on both 24cm and 10GHz in Enfield, Middlesex. Cross-band linking under user control is envisaged and they hope to achieve optional linking with other ATV repeaters if the links can be arranged. This sounds good and there is a lot of enthusiasm for the project.

The intended site is a 24-storey block of flats, which should give good coverage of the repeater's service area. The latter will be restricted because of the geography of the district, but that gives even more scope for other groups to set up repeaters on the same frequencies. If it comes off, this will be the first ATV repeater within the area enclosed by the M25 London orbital motorway.

There have been other plans for ATV repeaters in London: one was going to go on top of the London Weekend Television tower on the South Bank (where the GB3LW 70cm voice repeater is). Unfortunately LWT considered that harmonics of the output might interfere with their electronic news gathering (ENG) receivers there, so the project had to be dropped. At one time there was a proposal for a TV repeater on the Isle of Sheppey, which could have illuminated

parts of south-east London, and the new Kent repeater in the Hundred of Hoo may yet achieve this. In addition there is the Thames Valley TV repeater at High Wycombe, which covers parts of western and southern London. The latest news is that a transmitter is now being tested, with coverage trials to take place soon. And with that we wish the Cheshunt club good luck, and if you want to lend them a hand, the person to get in touch with is Roger Frisby G4OAA (2 Westfield Road, Hoddesdon, Herts., EN11 8QX. Telephone 0992-464795).

SLOW-SCAN

Ian Hollingsbee G4NVC has written from Gloucester. "I have been active on SSTV over the past ten years. I built the Robot 400 and now use the Wraase SC-1. I must admit that I have not been active for about a year, mainly because of all the standards which I can't get.

"In your articles in CQ-TV 159 you mention the Amiga computer. One letter you quote from mentions the AVT system. Up until now I have been using the BBC B micro but last month I bought the new Amiga 600 hard-drive computer. Do you know where I can get the software you wrote about?"

As far as I can remember, the UK supplier is ICS Electronics Ltd, Unit V, Rudford Industrial Estate, ARUNDEL, Sussex, BN18 0BD. tel: 0903-731101. I hope this helps, and it would excellent if other SSTV fans who have Amigas could write in with their observations of this and any other SSTV programs.

Our stalwart New Zealand correspondent Mike Sheffield ZL1ABS writes: "A few

of us have been doing some SSTV work lately. Ken ZL1TVQ has modified an 8-second converter to handle 36 and 72-second modes in B/W only. Wayne ZL1USK has his LM9000 going now, just some fine tuning still to do. Trevor ZL1BKG and Ray ZL1BDU are running a Sunday morning SSTV net on 144.250 FM in Auckland. They copy pix on 20 metres from the VK net and then replay them on two metres for the non-Morse-qualified operators."

Mike also sent over this year's ATV issue of "Break-In", their national amateur radio magazine. A complete issue is devoted to ATV one month a year, though Mike fears that this admirable arrangement may not continue in future.

Not so much slow-scan as narrow-band (NBTv), James Hawes KB9EPQ is proposing a 32-line and even a 24-line standard for world-wide application. "Very narrowband, and lots of fun to decipher on international DX. Sure it could be a colour standard, for those who want colour. But the main idea is DX and easy home construction. I think that recently hams have been losing sight of both those elements of the hobby," he writes. If you'd like to find out more, why not write to him? His address is: James Hawes, 8611 Kedvale Avenue, Skokie, IL 60076, USA.

"Of course we'll start using fancy data-compression technology in a few years," he continues. CVSD (continuously variable slope delta) or some other compression scheme - maybe fractals or Macintosh QuickTime may supplant narrow-band video. But for now I think narrow-band could be a lot of fun. Anyway we'll find out!"

MOSCOW CALLING

Yours truly visited Moscow recently - ostensibly on business - and of course I tried to catch up on the TV and radio scene there. One sight not to be missed is the trip to the top of the TV tower at Ostankino: the entrance fee is trifling and the view from the top is stunning.

If you like facts and figures you be interested to know the All-Union Broadcasting Station (it's official name but now out of date) is 537.5 metres tall, making it the tallest structure in Europe. It transmits programmes over a radius of 120km. Moscow TV programmes are relayed to most of the country by Orbita communications satellites, and through Eurovision with many countries of the world. The tower has a revolting restaurant - yes, that's not a misprint, for although it does go round while you eat I was warned the food is pretty awful.

Admission in fact costs 25 roubles and the fixed menu prices are 200 and 400 roubles. The tourist exchange rate was 300 roubles = £1 when I visited, but of course 25 roubles is a lot of money (25 times the cost of a bus ride) for Muscovites. By the way, you have to show your passport before they'll let you in.

I didn't meet any amateurs (well I did but he was English and I was staying at his flat - thanks Simon G8WTR!). But I did meet with a keen Russian SWL and enrolled him as a member of BATC. He is the Russian DX correspondent for an American magazine says he will keep us informed on TV matters from now on.

It's not difficult to find computer equipment in the shops in Moscow (plenty of

286 and 386 machines and all the accessories, at Western prices) and there are some VCRs. But ham radio gear is not on sale (as far as I could tell) and people make do with home-brew or converted army surplus. There is a lively amateur radio magazine (subscription only), but electronic components are not so easy to find.

In fact I found only two places selling parts and they were less well stocked than your average Tandy store - one was a radio-electronics department store and the other was Detsky Mir, a huge toy and hobby shop. You can also find some valves, chips and EPROMs in the street market outside Shabolovka Metro station, though all the valve and IC numbers are a total mystery unless you have an equivalents book (I have, I found one there!).

All in all, a fascinating place to visit but I think I'm glad to be back here!

RADIO INTERFERENCE

At the Vintage Sound and Vision Collectors Fair at Birmingham in May there were two nicely restored old GPO vehicles, a lineman's van and more interestingly, a Radio Interference van of circa 1950. The shade of green was a bit pale and the signwriting used ghastly modern stick-on letters, but otherwise it was spot-on. The owner would be very pleased to know what sort of apparatus his van would have carried in its day. If you can help, please write to Mr E. Irish, 56 Shobnall Street, Burton-on-Trent, Staffs., DE14 2HH.

Incidentally I ought to give this event another plug: if you find old TVs, radios,

telephones, gramophones or juke boxes interesting... you must attend! Anything old that makes a noise or picture is catered for and the venue once again will be the National Exhibition Centre, near Birmingham. Date for the fair is Sunday 16th May (not Bank Holiday Sunday, so it won't clash with the BATC's event this time) and opening time probably 10 or 11 a.m..

ATVQ & SPEC-COM: PEACE BREAKS OUT!

In the last issue I may have oversimplified or over-dramatised the situation on what I portrayed as a war or circulation battle between these two magazines. This may have misled readers and I ought to point out that Spec-Com covers far more than ATV. Both publishers consider their two publications are not direct rivals either. Fine. The good thing is that whereas both organisations used to run ATV events at Dayton which clashed with each other (you couldn't attend both), they are now talking to see if this duplication and waste of resources can be avoided. Watch this space.

Also, I had not realised that the new "ATV Workbook" reviewed last time was a QCD Publications rather than Spec-Com effort, and that too should be clarified.

Mike Stone WB0QCD now has no connection with Spec-Com magazine. In the past the same guy was behind both imprints. Henry Ruh has announced "ATV Secrets, Volume 2 For Advanced ATVers" to be published soon. The advance contents list make it look an extremely exciting book.

THE GWENT CONNECTION

Last but by no means least, here's a meaty report from Eric Edwards GW8LJJ in Barry, South Glamorgan.

"The men of Gwent were busy locating 70cm receivers and retrieving their transmitters from attics and boxes under the workbench. Peter GW4EAI of Blackwood had made five of the BATC receive converters for newly interested locals. Mike GW4JKV and Keith GW8TRO, both of Blackwood, had their 100mW transmitters working (modified Pye PF1). Mike will probably use his German-design VSB (?) transmitter and linear up from there. Steve GW1XVC is leading the team of ATVers in Cwmbran.

"I heard of this activity and decided to give SSTV a rest and start again on 70cm. My mains RX complete with 1" monitor was working. The 12-volt RX was also located and built into the top deck of a two-deck 19" rack cabinet complete with its own 9" monitor. The 100mW BATC transmitter was used with a small home-brew linear giving around 2 to 3 watts into the aerial. This, together with the RF sniffer and video filter, was built into the lower deck with plenty of room to add extra linear stages.

"It was a sunny Sunday in May (17th actually) when I had to visit Blackwood; I made phone calls to ATVers up there to tell them of my intention to go 70cm mobile. That meant leaving the gardening and painting the house to another Sunday! I set off with the camera mounted on a piece of wood sat on top of the 19" cabinet. It was just high enough to look through the windscreen (when it stayed there, that is!). A Chinese copy of a Bird

power meter monitored the 2 or 3 watts loaded into the colinear mag-mount aerial.

"A few miles approaching my destination Keith called me on two metres stating he could copy my 70cm carrier on his scanner. Seconds later, Peter announced he was receiving noisy pictures. A little nearer Mike also reported pictures, and no pre-amps were used by any of these. I travelled to a local hill (non-Welsh people call them mountains) where Mike recognised on-screen the golf club car park I had just entered; live golf was now transmitted to them. A little higher up the hill, well OK then, mountain I gave them a panoramic view of the hills and valleys. P5 pix were received and they recognised their own housing estates, though Mike was disappointed he could not see his 60-foot tower. ***** (name suppressed to protect the guilty!) didn't mind not seeing his home-brew 40-foot mast probably because he does not have planning permission!

"As I left the mountain Cess GW8MTJ called me to ask if I was still able to transmit as he had missed the exercise, so travelling towards his QTH, I sent pix that he recognised. I now visited Peter's new shack extension where I saw superb SSTV pix from his sampling camera. The next time I go mobile I shall include a trip to Cwmbran and also load a few more watts in the mag-mount aerial. Now where did I leave my wallet?"

Please send all your news etc., for TVA to: **Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH.**

SLOW SCAN TV DOES NOT HAVE TO BE EXPENSIVE ANY MORE!

Pasokon (PAH-SO-CONE) TV is the new full-featured, low-cost alternative. The whole transmit and receive converter is on a single card which slots into your PC! This is the breakthrough that has been waited for for a long time. The basic specifications are:

- * Send and receive all popular modes:
 - Robot Colour: 12, 24, 36, 72 second
 - Robot B&W: 8, 12, 24, 36 second
 - AVT: 24, 90, 94, 188 second
 - Martin: M1, M2, M3, M4
 - Scottie: S 1, S 2, S 3, S4
 - Wraase SC-1: 24,48,96 second.
- * Interface fits inside computer.
- * No extra power supply required.
- * Graphical user interface with mouse support.
- * On-screen tuning indicator.
- * Full screen images on standard VGA with 320 x 200 256 colour mode.
- * Colour pictures real-time during RX
- * No machine-dependant timing parameters to set.
- * Interface has own crystal oscillator for precise pixel timing.
- * Does not tie up serial or printer port.
- * Read and write popular image file formats: *.GIF, *.PCX, Targa, etc.
- * Resolution of 320 x 240 with 32768 colours.
- * 32768 simultaneous colours on super VGA with Sierra IECOLOR RAMDAC.
- * Test pattern generation & image manipulation.

Hardware Requirements:

- * IBM PC/AT or compatible with an empty 8 or 16-bit slot.
- * 286 or later CPU, 640 K memory.
- * VGA display (HiColor option supported).
- * Colour Monitor Mouse strongly recommended.

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Designed and developed by John Langner WB2OSZ.

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SSTV - A NEW BRITISH SCAN CONVERTOR IN KIT FORM

Review

Roland Humphries B.Sc. G4UKL

For the past decade the universally popular SSTV convertor has been the Robot range developing through the 400 series to the present model 1200C. Other convertors, such as the German SC1/2 series, because of incomplete incompatibility, have not taken off outside Europe.

The Robot 1200C, because of its widespread appeal, has been cloned and appears as the LM8000 in Australia and the NS88 in Japan, but these are clones with no radical difference from the parent.

Over the years amateurs have made many modifications to the 1200C, and a fully modded 1200C is now beginning to assume a distinct birds-nest appearance, and the limit of what can be done to improve picture quality and facilities has probably been reached.

After 10 years the need for a fresh approach was due so that the art of SSTV could advance from the present plateau.

With this in mind, a completely new convertor has been designed, with a fully working prototype and PCB designs in the system, is being offered to radio amateurs under the name of Superscan 2001.

SUPERSCAN 2001

This is a state of the art SSTV scan convertor costing considerably less than similar performance systems. The following are some of the attributes claimed:

- ☐ Compatibility with all current SSTV systems and modes, and including a specially developed EPROM by G3OQD.
- ☐ Four 256 x 256 high resolution memories, each capable of displaying 262144 colours.
- ☐ A full PAL decoder with delay lines for perfect pictures from a colour camera (NTSC available via a link on the camera PCB).
- ☐ Fast parallel computer and printer interface and a 4800 baud interface.
- ☐ Standard RGB output allowing direct connection to a 625/525 line analogue input colour monitor.
- ☐ Design parameters allow the future acceptance of a 1 M/bit EPROM.
- ☐ Built-in mouse control system.
- ☐ Text overlay features without losing stored pictures, providing on-screen help messages.

- ☐ CMOS RAM battery back-up to store information such as text screens and set-up procedures.
- ☐ Readily available components, uses 1 Mbyte DRAMS.
- ☐ High stability oscillator fitted as standard.
- ☐ Requires no additional interfaces or switching boards.
- ☐ Can be built as a receive and store only system.
- ☐ The kit is guaranteed free from defects, genuine faults rectified F.O.C.
- ☐ Free technical help hotline or by fax or post.

The commercial version of Superscan will be available by the summer of 1992 and the total cost for the kit is £200.00 or \$US400 (+/- 20% to allow for production cost variations). The kit will include a set of three PCB boards, the EPROM, and full constructional details. Intending constructors are asked to reserve their kit by

sending a deposit of £50.00 (\$US100) (refunded if kit not ready by late summer 1992) to the designer who will notify when the kit is ready for despatch, when the balance will be due.

Please note: resistors, capacitors, diodes, solder, ICs, etc., are not included in the kit but are said to be readily available. Also not included in the kit is a PC interface card, or a specially designed enclosure. I would suggest that enquiry is made to determine what hardware is or is not to be included, e.g: transformer, outlet sockets, plugs, IC holders, etc. Until this is known the final approximate cost cannot be determined, but it will be considerably more than the £200 presently quoted for the 'kit'.

The author will be building this kit and a full review will appear in CQ-TV at a later date.

Further information can be had from the designer:

Jad Bashour, 55 Brampton Road, London, N15 3SX. Tel: 081 809 3911.

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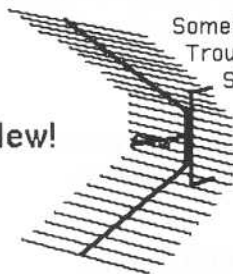
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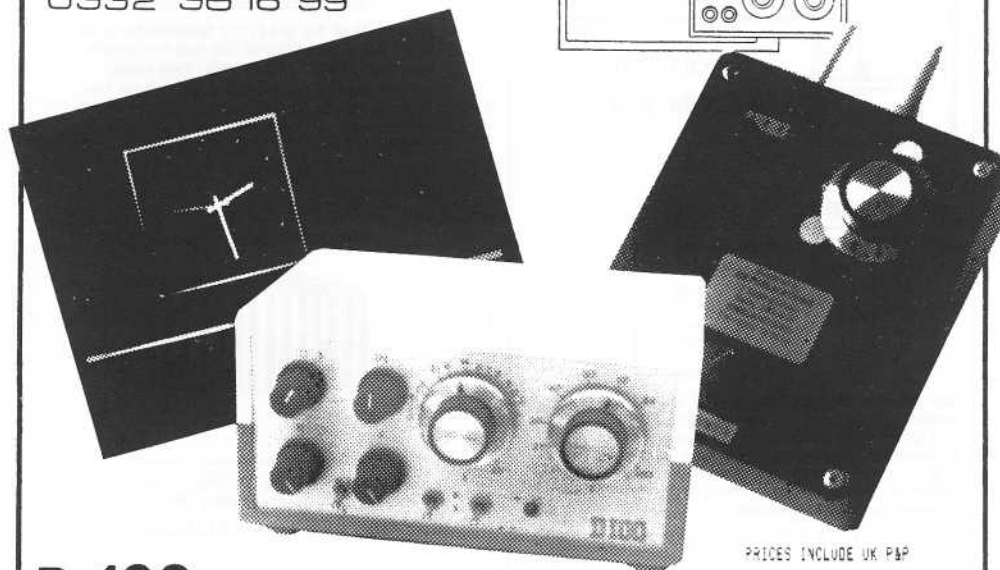
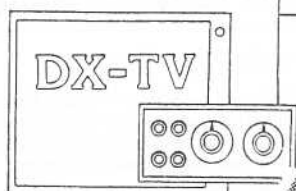
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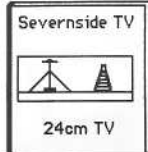
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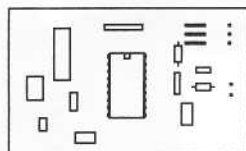
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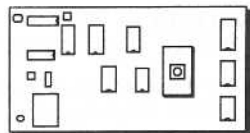
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Price £32.00 inc p&p

Colour Test Card Generator



New!! The STG now offers a ready built and tested TEST CARD GENERATOR. Displaying up to 4 test cards ready programmed with your CALLSIGN and QTH. The cards cycle automatically or can be manually displayed. The output is 1 vpp PAL comp. COLOUR. Please supply your CALLSIGN and QTH with order.

Price £75.00 + £1.50 p&p

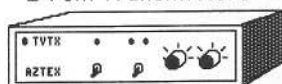
Severnside Television Group

15 Witney Close Saltford Bristol BS18 3DX
(0225 873098) after 7pm & weekends
Please allow 28 days for delivery



Aztex Electronics

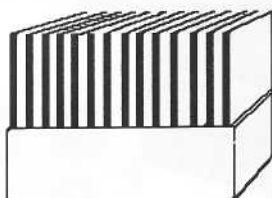
24 cm Transmitters



This state of the art FMTV transmitter gives a solid 2.5 W on either of the two switchable channels, 1249 & 1255 MHz. This ready assembled and tested unit accepts both line and mic inputs for intercarrier sound and front panel audio and video gain controls are provided. See CQTV 150 for review.

Price £265.00 + £6.00 p&p

24cm Power Amplifiers



A 20 Watt PA using the SC1040 module is now available to accompany the AZTEX TX

Price £150.00 + £6.00 p&p

24 cm Pre-amplifiers



This GaAsFET pre-amp offers a gain of 17db with a noise figure of only 1db. Designed to go between the RX antenna and your receiver The gain is flat across the 23/24cm band but has an 8db roll-off at around 700MHz to help reduce broadcast TVI. A highly stable design based on the ATF10135 GaAsFET utilises SMT components and is boxed and aligned. NB the device does not contain RF switching.

Price £52.00 + £1.50 p&p

AZTEX Electronics

Ken Stevens G4BVK 20 Coberley Footshill Rd
Hanham Bristol BS15 2ES (0272 677005)
SAE for full details. Delivery is 28 days.

**THE WORTHING AND DISTRICT
VIDEO REPEATER GROUP
GB3VR ATV REPEATER BRIGHTON**

1W FM-TV 24cm TRANSMITTER THIS TRANSMITTER GENERATES ITS SIGNAL DIRECTLY AT THE WANTED FREQUENCY WHICH MAY BE SET ANYWHERE IN THE BAND. ON-BOARD INTERCARRIER SOUND AND FIXED PRE-EMPHASIS ARE STANDARD FEATURES. THE KIT INCLUDES THE DIECAST BOX AND COSTS £80.00

23/24cm ATV CONVERTER THIS UNIT BLOCK CONVERTS THE 1.3GHz TO THE DOMESTIC UHF TV BAND. USE THIS KIT WITH A STANDARD TV TUNER AND BATC IF PCB, FOR A COMPLETE FM RX SYSTEM. APPLICATION NOTES INCLUDED. £40.00 INC DI-CAST BOX.

TWO CHANNEL PLL THIS NEWLY DESIGNED TWO CHANNEL PHASE LOCKED LOOP WILL IMPROVE THE OVERALL STABILITY OF THE SOLENT 1WATT TRANSMITTER. TWO CRYSTAL LOCKED CHANNELS, AND A THIRD FREE RUNNING TUNING POSITION ARE AVAILABLE. KIT PRICE ONLY £30.00. CRYSTALS FOR THE PLL ON CHANNELS RMT1, 2, 3 OR SIMPLEX 1255MHz £7.00 EACH. OTHER FREQUENCIES TO ORDER.

VIDEO AGC KIT. THIS UNIT ACCEPTS A COMPOSITE VIDEO SIGNAL IN THE RANGE 0.15 TO 2V p-p AND OUTPUTS A CONSTANT 1V p-p ACROSS 75-OHMS. THIS UNIQUE AMATEUR DESIGN IS A MUST FOR TV STATIONS AND REPEATERS. £16.00 EACH.

EXPANSION BOARDS FOR THE CIRKIT CROPREADY TEST CARD GENERATOR BOTH 2 AND 8-WAY EXPANSION BOARDS ARE AVAILABLE ENABLING THE SELECTION, BY S/POLE SWITCH OR BCD, OF EXTRA EPROM PATTERNS. PRICE: 2-WAY £7 & 8-WAY £18.

EPROM SERVICE FOR THE CIRKIT TEST CARD GENERATOR. A FAST RELIABLE SERVICE WITH A RANGE OF DESIGNS INCLUDING BATC, IBA LOOK-ALIKE, EBU TYPES 1 & 2 TEST CARDS, CONTEST NUMBERS, TEXT, GREY SCALE PLUS MANY MORE. THESE EPROMS ARE TO THE FULL SYSTEM I STANDARD. SAE FOR FURTHER DETAILS OR TEL. GEOFF ON (0903) 32161 (7 TO 8pm). PRICE: £6.50 PER CHIP. PLEASE STATE B/W OR COLOUR WHEN ORDERING.

COLOURISER KIT FOR THE CIRKIT TEST CARD GENERATOR. BY THE ADDITION OF THIS KIT, THIS POPULAR ELECTRONIC TEST CARD CAN BE UPGRADED TO PRODUCE COLOUR IN ANY GREY SCALE AREA, ON EXISTING OR NEW EPROMS. AN IMPROVED DESIGN TO THE CIRCUIT DESCRIBED IN CQ-TV 139. PRICE £20.00.

THE "NEW ATV" PROGRAM FOR THE 48K SPECTRUM. THIS VERSION HAS OVER 60 COMMANDS, WHICH INCLUDE 7 TESTCARDS, MEMOPAD, CLOCK WITH ALARM, MAPS, TONES, LOCATOR CALC (OLD & NEW), FLAG, X-HATCH, VARIOUS SIZE TEXT PRINTING PLUS A DISK TRANSFER COMMAND AND MUCH MUCH MORE. ALL THIS FOR ONLY £6.00. OPUS DISK VERSION £8.00. A MUST FOR ALL SPECTRUM OWNERS.

BBC AMATEUR TELEVISION PROGRAM FOR THE BBC MODEL 'B' AND MASTER. PROGRAM INCLUDES 8 TESTCARDS, MAIDENHEAD LOCATOR SYSTEM, VARIOUS MESSAGE PADS, PLUS MANY MORE FEATURES. AVAILABLE ON 80 TRACK DISC OR 40 TRACK D/SIDED DISC, FOR ONLY £8.50. SEND NAME LOCATOR AND CALLSIGN WHEN ORDERING.

ORDERS TO THE TREASURER OF GB3VR, :-
R. STEPHENS GBXEU, 21 St. JAMES AVENUE, LANCING, WEST SUSSEX, BN15 0NN.



MARKET PLACE

ADVERTISING RATES:

Market place ads - £50.00

Full page - cover - £50.00

Full page - inside - £40.00

Smaller displays - proportional

*Advertisements are placed in this column free of charge to paid up members only, please quote your membership number. Addresses will be included unless otherwise requested. All paid advertisements are subject to standard rate VAT.

Copy should be sent to the Editor at 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF before 20th December. Tel: 0788 890365. Fax: 0788 891883.

FOR SALE

Full set of AMPEX VPR2/2B (1 inch format VTR) INSTRUCTIONS and full set of diagrams, all in original ring-binders, 18" thick! ... £14.99. 1" C-format VTR TAPES on metal spools in lockable boxes, used but not bruised: 30min 1640ft/500m ... £2.50; 60 mins 3170ft/966.2m ... £4.99; 90min 4160ft/1405.1m ... £6.99; approximately 400 tapes in all; good discount available for disposal of all tapes in one lot. **SERVICE MANUAL** Avo model 8 meter ... £0.99. **SERVICE MANUAL** Telequipment Oscilloscope Type D67 ... £1.50. **SERVICE MANUAL** TV Waveform Oscilloscope HP 191A ... £4.99. Timecode REC/REP AMPLIFIER boards from BVU 800 U-matic VCR (board TC13), use as spares for existing machines, or for good variety of CMOS ICs on board ... £4.99. Miniature RELAYS RF screened can 9-12V (200 ohm) 2c/0 ... £0.50. Miniature RELAYS RF screened can 9-17V (3400 ohm) 2c/0 ... £0.50. Paignton plug-in RELAYS with sockets and clips 12-24V (dual coil) 4c/0 ... £0.40. **BETACAM SP BROADCAST TAPES** used once only; 20mins ... £5.99; 30mins ... £8.99; 90mins ... £14.99. **U-MATIC BROADCAST APES** (used) 20mins ... £1.50. P&P extra on all items. R.M.Southern, 26 Leadhall Lane, Harrogate, North Yorkshire, HG2 9NE. Tel: 0423 879006.

IVC 1" OPEN REEL VTR type 711P, with many tapes and manual ... £75. Bang & Olufsen model 3400 26" hybrid COLOUR TV, in working order ... £30. Dave Hazell. Tel: 0993 771373.

SKYSCAN L1 LNBs, ready converted and retuned for 10GHz ATV. They will tune the whole 10GHz amateur band with a standard satellite RX. £50.00 plus £2.50 p&p. Severnside TV Group, 15 Witney Close, Saltford, Bristol, BS18 3DX.

Hitachi FP1011 three-tube Saticon COLOUR CAMERA, for studio use, remote requires attention, camera also requires sync pulse feed; comes complete with camera head, CCU, remote, 16-160mm zoom lens, cables, 200m camera cable and manual. Apart from remote the camera should work if sync pulse added ... £270 or reasonable offer. Eugene. Tel: 0293 882243.

Camtech Electronics 24cm ATV equipment: COLOUR TV TRANSMITTER, 0.4W output, mint condition ... £70. AUDIO SUBCARRIER plus VOGAD board (kit) ... £20. VIDIF and demodulator board, mint condition ... £85. DOWNCONVERTER ... £95. EME COAXIAL RELAY HF400 high power 600W+ up to 13cm ... £80. EME VHF/UHF SWR/POWER METER, 100-400 MHz, reads up to 2kW, complete unit (meter, remote probe and directional coupler) superb quality ... £245. EME 5-pole 23/24cm INTERDIGITAL FILTER ... £60. SSB PA2310 23/24cm linear, 0.5W input/10W output, mint condition ... £110. kenwood 531E 10W 23/24cm FM mobile, mint condition ... £285. Wood & Douglas 1250DC50 23/24cm DOWNCONVERTER module (new) ... £55. All items postage at cost. Paul Chamberlain G4XHF, 9 Goffs Close, Southgate, Crawley, West Sussex, RH11 8QB. Tel: 0293 515201 (home); 0622 696437 (office).

SPECTRUM 48k housed in DK tronics keyboard complete with interface one and microdrive ... £50. SPECTRUM 128K in plus 2 case, RGB and composite video outputs, complete with interface one and microdrive, mint condition ... £50. 14" GREEN SCREEN MONITOR screen composite video input ideal for Spectrum very good condition ... £20. SPECTRUM HISOFT DEVPAC SOFTWARE, for writing and de bugging Z80 machine code. Complete with operating instructions ...£15. Trevor Brown. Tel: 0532 670115.

TOP-NOTCH 70cm TRANSMITTER SET-UP. Fortop TVT435 (pos/neg modulation, two freqs); EDL-432 50-watt 2C39BA linear amplifier (and it IS linear!), with blower, spare HT transformer and spare tube; solid brass 3-element interdigital filter, Fortop TVD100 video demodulator; peak sync-reading power meter (50 watts); 2 RS coax relays. Will sell as one lot at reasonable price, offers invited. All equipment well treated and maintained. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604 844130

Broadcast camera standard WEDGE PLATE. Colour PULSE and BAR GENERATOR type PBT, Gresham Lion Electronics based on BBC design. Marconi 20mc/s SWEEP GENERATOR. 3 x Painton FADERS. EMI 2001/1 colour camera MANUAL Part-2. Cossor OSCILLOGRAPH Model 1039M (2.75 inch CRT, nice little old grey item in good condition, plus handbook. No fixed prices, first reasonable offer secures the relevant item or W.H.Y. Dicky Howett. Tel: 0245 441 811.

SPG Aston SPG5 mono 624/625 line sync pulse generator, all pulses, 17" wide (add cheeks for 19" rack-mounting) ... £10. **SWITCHERS.** Dicon industrial two-input video switcher £5, two-input video H&V wiper ... £5. **CAMERAS,** Electrocraft MV-LC 2/3" vidicon b/w camera, 550 lines resolution. Clean, with manual ... £15. Philips Mini-Compact ... £5. **AERIAL,** J-Beam MBM48 70cm, good condition. Sturdy teak desk, ideal for workshop bench or operating table. Both free to club or contest group, ... £10 each to anyone else. Must be collected. **LENSES,** Various good-quality "C" mount lenses, 1" to 4" focal length, nothing over £20. Tell me what you need. **FREQUENCY DIVIDER.** Research Communications Ltd model 9056, 1.5GHz divide by 10. Cost a fortune, now ... £25 post-paid. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604-844130.

TEST CARD VIDEOS FOR SALE: 55 minute video presentation made for the BATC "The Development of the TV Test Card". Andrew Emmerson interviews George Hersee, designer of Test Card F. Lots of old test cards included. And also ... "Exotic TV Idents", from many old Communist countries and other exotic locations. In all there are over 80 test cards, station idents, news programmes and start-of-day recordings, lasting 49 minutes in all. Explanatory captions describe each segment and the recordings were made in a TV studio "somewhere in Eastern Europe". Both tapes are VHS/PAL and cost £9.99 each including postage. Please allow 14 days for delivery. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604-844130.

"405 Alive" magazine, now in its fourth successful year, covering 405-line technology and programming from the 30s to the 80s. Subscribers find it irresistible! Four 64-page issues for £12 or have a sample copy for £3.00 post paid. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH.

FOR SALE: Obsolete tape! People requiring cassette tapes for Technicolor 1/4" and Philips 1500, 1700 and V2000 VCRs should contact Stephen Albrow, Globe Video Services, 192 Castelnau, London, SW13 9DH.

FOR SALE: two video character generators (TV typewriters). FOR-A VTW200, four page memory £200. 3M model 3016, 16-page memory, scroll and crawl £300. JVC KY-2700 three-tube broadcast ENG colour camera, working but pickup tubes are useless. Makes an ideal genlockable PAL coder or colour bar generator or could be re-tubed. £50 without lens or £150 with. Andy Grant, 071-437 2004 daytime.

LOOKING FOR UNUSUAL OR HARD-TO-FIND CONNECTORS OR LEADS for your video camera, computer or VCR? NICAM, ATARI, SEGA, etc.. Try A.R. Communications on 0302-321066 Monday to Fridays 10 until 6. Access and Visa accepted.

Ferguson SRB1 BSB satellite systems complete with dish or squarial, for conversion to D2-MAC £40.00, Extended tuning mod fitted £45.00, Baseband input fitted £45.00, Or both mods for £50.00, Chris Smith (G1FEF) Tel: 0767 313292.

Eight input intelligent printer sharer. Allows up to eight computers to share one printer (Parallel, Centronics type). Automatically scans and selects active input, putting others on hold. Only £15.00, Chris Smith (G1FEF) Tel: 0767-313292.

Several Sony 0.5" REEL-TO-REEL VTRs, types AV3670CE, AV3620CE, AV3420CE and DV2400ACE - most VGC, also some B&W CAMERAS ... offers. Norman Ash G7ASH. Tel: 0234 351671 x243.

Cosmicar 6.5mm C-mount LENS, f1.8, with manual iris ... £15. **CRT DISPLAY** complete with 70mm tube, case, power supply and deflection amplifiers; as new, tested OK ... £25. David Wilson, 7 Massie Close, Willen Park, Milton Keynes, Bucks., MK15 9HG. Tel: 0908 665106.

ATARI MEGA ST4 professional computer system. Complete with Atari SC1224 medium resolution **COLOUR MONITOR** and Triangle **40Mbyte HARD DRIVE**. Ex. CQ-TV editorial system, perfect working order ... £400 ovno, plus carriage at cost (collect from the Leicester Show ?). Mike Wooding G6IQM, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF. Tel: 0788890365. Fax: 0788 891833.

U-MATIC TAPES, 20 minute and 30 minute ... £2 each; 60 minute ... £50 each. JVC GXS9E colour CAMERAS, complete and working ... £125 each. Barry Senior G8YGT. Tel: 0530 832088.

EXCHANGE & WANTED

WANTED: Service manuals for Grundig Video 2x4 Super VCR (mechanical section only) and Sony SLC6UB Beta VCR. Complete Murphy V789 or V783 mono TV + FM radio (circa 1962). Dave Hazell. Tel: 0993 771373.

WANTED: Edit low-band U-matic, very cheap! Eugene. Tel: 0293 882243.

WANTED: Skyscan K1 satellite TV receiver operating manual and any other technical information, all costs covered. J.Gallagher EI8BD, Link Road, Brownhill, Carlow, Eire.

WANTED: Early ex-broadcast colour TV camera, EMI 2001 preferred. Also, accessories such as pan-and-tilt head, tripod, power supplies, etc. Paul Gibbs, Hazlebrook, Henton, Wells, Somerset, BA5 1PD. Tel: 0749 675839.

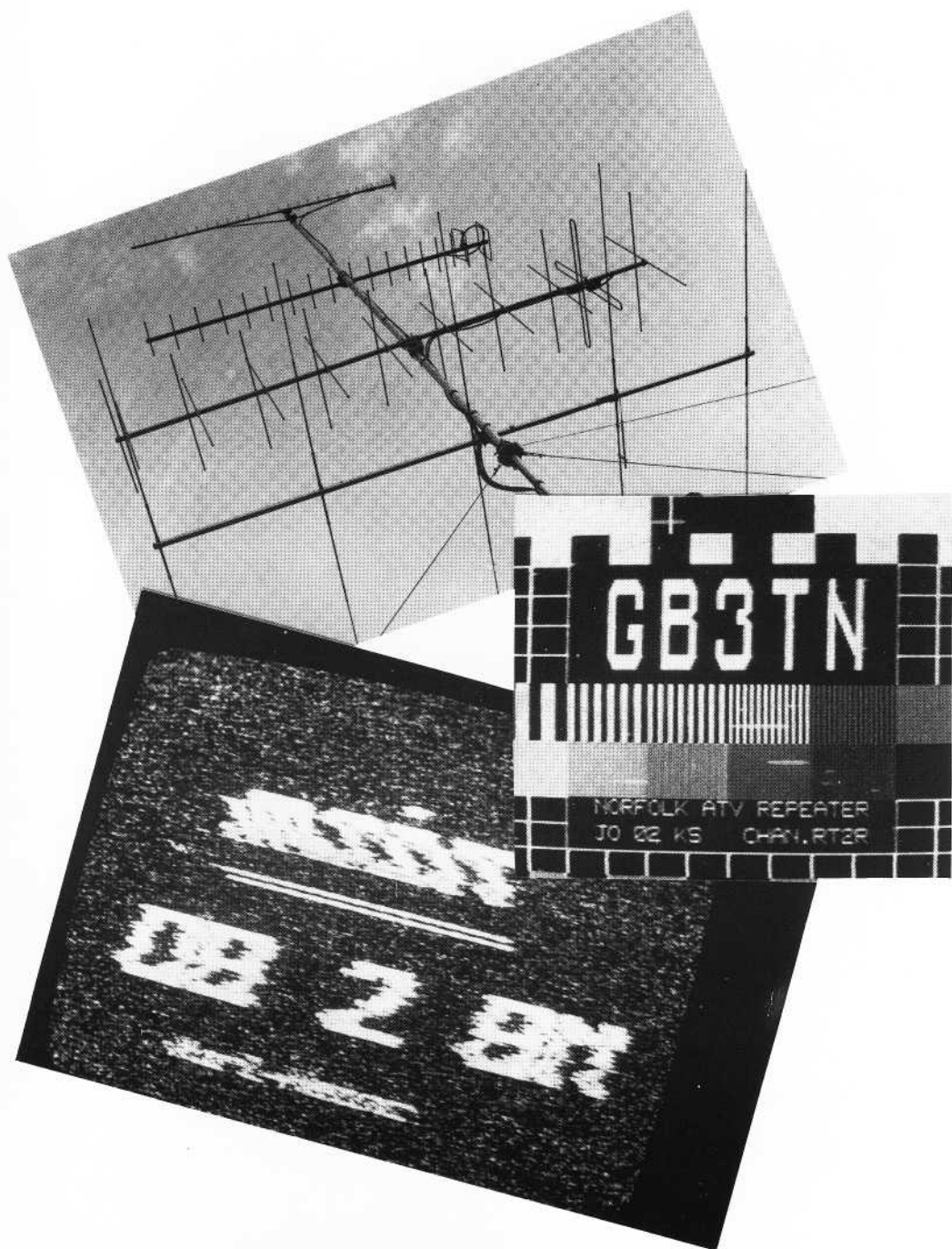
WANTED: Can anyone lend or copy for me the circuits and manual for an Akai CCU150 and CVC150 colour camera and control unit. All costs refunded. Joe Hill G3JIP, 15 Kingsway, Gerrards Cross, Bucks., SL9 8NS.

WANTED: Ex-broadcast camera/viable channel. Also, camera head and mount. Any item, any vintage considered. serious cash offered. Contact: Dicky Howett, 23 Micawber Way, Chelmsford, Essex, CM1 4UG. Tel: 0245 441811.

WANTED: I'm still looking for a monochrome industrial or broadcast vision mixer/effects generator, the older the better (maker and line standard not important). Also a decent tripod that can take a 60lb studio camera. Your price paid, all letters answered, as they say! Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH (0604-844130).

WANTED: Any practical information on the construction of a transposer for use with normal domestic UHF TV transmissions, high-band to low-band, for a small community TV self-help group. Peter Waugh. Tel: 069 172 597.

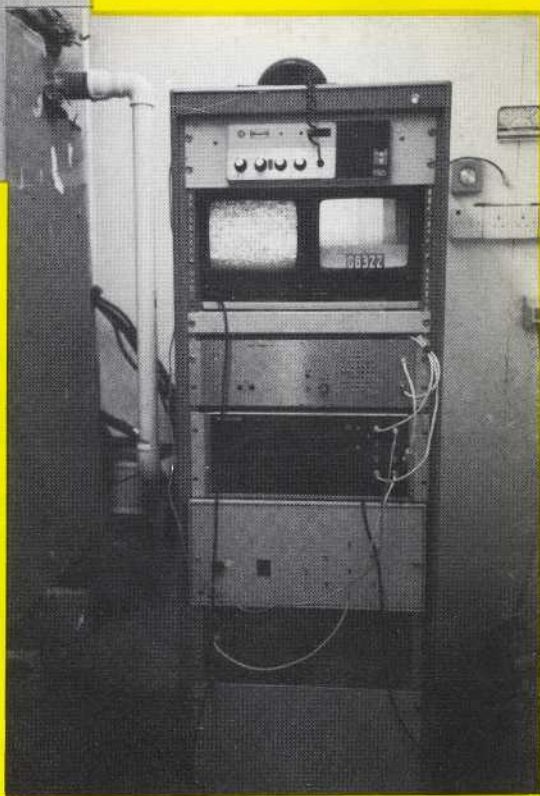
WANTED: Information on Oggitronics FS256/4 V2 Video Frame Store; circuit diagrams, manual, etc. All costs covered. Darren Salter G1ERM, 81 Norfolk Street, Cambridge, Cambs., CB1 2LD.



**The selection of photographs from Dave Clarke G7KAO
as mentioned in TV on the Air**



**The Emley Moor Box
GB3ET
(+ friends!)**



**The Severnside Box
GB3ZZ**