

# CQ-TV



No. 170

May 1995

Digital Microminor Devices

The Future of Proprietary TV

Marcum Blue-Cap LNB as a 3cms transmitter

Calibrating video receiving equipment

Automatic Receiver Alarm

Reviews

BRITISH AMATEUR TELEVISION CLUB



***CQTV article update: Paul Marshall G8MJW with now fully restored and working Marconi MK4 Image Orthicon TV camera - Home from New Zealand via Wayne Griffin ZL1UJK (See CQTV 165.)***

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CLOSE FOR PRESS FOR THE NEXT ISSUE ..... 20th June 1995

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# WHO TO WRITE TO

The BATC Committee are available to help and advise Club members on ATV related subjects. Please remember that all Club work is done in spare time, so try to keep questions to a minimum. It is better to telephone rather than write [SAE essential if you write]. Please do not telephone at unsociable hours, as a guide try to call between 1830 & 2130 Hours and not before 1130 at weekends. Thank you.

## **BATC Chairman Trevor Brown G8CJS**

Club affairs, Video tape library. technical queries, especially relating to Handbook projects. :- 14 Stairfoot Close. Adel, Leeds. LS16 8JR. Tel: 01132-670115.

## **BATC General Secretary Paul Marshall G8MJW**

General Club Correspondence and Business. Library Queries relating to the borrowing or donation of written material. :- Fern House Church Rd. Harby, Notts., NG23 7ED. Tel: 01522 703348.

## **BATC Hon. Treasurer Brian Summers G8GQS**

Enquires regarding Club finances, Donations, and constitutional enquires. :- 11 Harefield Rd. Uxbridge, Middx., UB8 1PH. 01895 810144, mobile 0850 014892

## **CQTV MAGAZINE EDITOR Chris Smith G1FEF**

Anything for publication in CV-TV, articles, review items, advertisements, letters to the Editor, and other material except as below.- 19 Ravensdale RD., Gainsborough, Lincs., DN21 1XD. Tel: 01427 614788

**TV ON THE AIR-** Andy Emmerson G8PTH. 71 Falcutt Way, Northhampton, NN2 8PH. 01604 844130.

**SATELLITE TV NEWS-** Paul Holland G3TZO, Chatterton. Chapel Lane, Threapwood, Nr. Malpas, Cheshire, SY14 7AX Tel: 01948 81429.

**CQTV AWARDS-** Bob Webb G8VBA, 78 Station Road, Rolleston-on-Dove, Burton-on Trent, Staffs. DE13 9AB Tel. 01283 814582,

## **EXHIBITIONS**

**Rally 95** - Mike Wooding G6IQM, 5 Ware Orchard. Barby, Nr.Rugby, CV33 8UF  
Tel: 01788 890365, Fax: 01788-891883, mobile: 0860-857434.

**CAT 96**, General arrangements and information about talks to clubs, demonstrations. lectures, etc. -PAUL MARSHALL G8MJW Address above.

## **CLUB SALES**

**MEMBERS' SERVICES** - PCB's; components; camera tubes; accessories; etc..  
[NOT Publications]Peter Delaney G8KZG, 6 East View Close, Wargrave, Berkshire, RG10 8BJ. Tel. 01734 403121.

**PUBLICATIONS** - Handbooks, Back copies CQTV, and anything related to the supply of BATC publications. Ian Pawson G8IQU, 14 Lilac Avenue. Leicester, LE5 1FN Tel: 0116 276 9425.

### **MEMBERSHIP**

Anything to do with membership, including new applications, queries about new and existing membership, non-receipt of CQ-TV. subscriptions, membership records, data protection act.:- Dave Lawton G0ANO 'Grenehurst', Pinewood Road, High Wycombe Bucks. HP12 4DD. Tel: 01494 528899

**CLUB LIAISON** - And anything of a political nature: co-ordination of ATV repeater licences. Graham Shirville G3VZV, The Hill Farm, Potsgrove, Milford Keynes, Bucks. MK17 9HF TEL: 01525 290343.

**CONTESTS** - Richard Guttridge G4YTV, Ivy House, Rise Rd., Skirlaugh, Hull, HU 11 5BH. Tel: 01964 562498.

**BATC TELEPHONE BBS SYSOP** - Brian Kelly GW6BWX, 12 Cotswold Way, Risca. Gwent, NP1 6QT. Tel Voice: 01633 614376. Tel BBS: 0633 614765.

**REPEATER LIAISON** - General enquires and repeater affiliation. Graham. Hankins G8EMX, 11 Cottesbrook Rd., Acocks Green, Birmingham. B27 6LE Tel 0121 707 4337

## **EDITORIAL**

Just a 'quicky' this time. You may have noticed that the magazine is a little thinner than usual, this is for several reasons: Firstly, the deadline for articles for this time of year is earlier than usual as we try to get the magazine on your doorstep before the rally - Well, I hope we make it. last minute problems meant that it was late getting to the printers. So if you didn't get CQ-TV until after the rally, I apologise. Secondly, I have had very little copy from YOU to put in the magazine! Please keep sending in articles, even if you're not sure whether it's suitable, I'd rather have too many and turn some down, than not enough to fill the pages. On a different note, thank-you to all the repeater groups who sent me their newsletters, I have passed them all on to our new repeater liaison man (see above).

Finally, just to keep you all on your toes, I've moved again(!) Don't worry - all mail is being re-directed and there's an intercept on my old telephone number, here are my new details...

**19 RAVENDALE ROAD, GAINSBOROUGH, LINCOLNSHIRE, DN21 1XD  
TEL/FAX: 01427 614788**

See you all next time, enjoy the magazine .....

## Mike's Right To Reply!

Dear Chris,

Congratulations on your first solo issue of CQ-TV, I look forward to seeing the magazine evolve and improve further under your editorship. I would like to take this opportunity, at your discretion, to answer the letters that both I and the magazine has received concerning my retirement. I would also like to say thank you, through the magazine, to all those who have spoken to me either on the telephone, or personally, since the announcement was made at Shuttleworth of my retirement as editor.

I would like to point out that it all happened rather quickly at Shuttleworth. I mentioned it to our esteemed Chairman Trevor the week before the event that I would stand for another term of office of two years as editor, but would hope to find a replacement during that time. However, by the time CAT 94 arrived Trevor had come up with a 'willing' replacement and that was that! Anyway, to the letters in CQ-TV 169. To D.A.(Slim) Haines many thanks for your thoughts. To Bob Webb, I still consider that the magazine should represent the thoughts and wishes of the members, and the editor should express, as he sees it, those feelings. I do not deny that I have been contentious in the past, that is my nature, but I certainly admit to stirring up comment and discussion. As to being the cause of all the problems within the club(?), apart from not knowing of all these problems other than citing the general apathy prevalent as is the case with all clubs and societies, if the cause has gone away - I assume you mean ME then good luck to you all - but I doubt it. One telephone call I had just after the magazine dropped on the door mat wondered how on the one hand you say that the magazine is not the place to express feelings yet on the other hand you do exactly that. Not my words but another member's!

Finally and not least to Graham Hankins. It seems Graham that you read between the lines in my editorial. What I said was that AT THE BGM not one person volunteered for the committee. That is exactly what happened, I was neither referring to what happened before or after the BGM, but to what happened at the BGM. As for your offer to stand as editor, that was a matter that was decided by the committee before the BGM. I am pleased to see that Chris has elicited your help as a sub-editor and look forward to reading your reports on the activities of the repeater groups.

OK folks, that's about it. I shall now slowly fade into the west and continue my experiments on the microwave bands - when time permits. I sincerely enjoyed my time as editor of your magazine and it is true to say that to some extent I miss it - but tempus fugit. Once again Good Luck Chris...

73 Mike

*Well, I guess Mike 's letter speaks for itself. Once again, thanks for all your hard work with CQ-TV and may all your new projects be as successful.*

## FRUSTRATED CHAP, NEEDS HELP

Dear Chris,

A retired chap I know is very excited... and frustrated as well! He has just acquired a Rank EVR Teleplayer which had been in a friend's loft since he left Ranks in 1970. It was still sealed in its packing and had never been used. He unpacked it and plugged it in, even got the film to lace up, but... there is no brightness on the CRT. EHT is OK. What makes this exciting is that the player came with nearly thirty period TV programmes, 'Benny Hill', 'Callan', 'This Week', 'Public Eye', 'The Saint' etc. and so on. From an archive point of view it would be very valuable to transfer these programmes to a modern tape format. A number of these players came on the market around 1980 and went into BATC circles. I had one myself and the book of words to go with it.... but that was 15 years ago! Someone out there must still have a book and if so, perhaps they would lend it to us (or supply a photocopy of the diagram). Expenses will be refunded and you might be rewarded with a VHS recording of some of these programmes if that grabs you. Please write to Andrew Emmerson, 71 Falcutt Way, Northampton, NN2 8PH or ring 01604-844130. Many thanks!

Letters for Post & News to: 19 Ravendale Road, Gainsborough, Lincolnshire, DN21 1XD

## BEYOND TTL BUT ONLY JUST

Dear Chris,

I have finally managed to program a 2764 with 4 pages using the "Beyond TTL" programmer. Many were the frustrations on the way and once or twice it was a toss up between ringing Chris or the Samaritans. Perhaps the following may be of use to others. I worked to the diagram sent with the software from Chris. I first tried reading and verifying old eproms. When the verify mode failed to verify, I started looking for wiring errors but found none. I then suspected pick-up on the ribbon cable I used for the connections. I reduced the length to 5 inches without improvement. This sort of thing went on (on and off) for weeks. In desperation I replaced the 74LS374 (soldered in) and started to get results. There were often failures to verify which was over-come by connecting GND (ZIF pin 14) to the metal case housing the unit. I have not decoupled anything on the unit but will probably do so during the tidying up process. Some mystery still remains. I found that Vcc pin28 was 6v when in Menu and 5v for B,V,R and P. This results from PC3 on the Maplin board being high for B,V,R,P and open for Menu. I phoned Chris about this but to date have not had a reply. I have overcome the problem on my unit by using the program voltage selector switch to raise Vcc only when in "P" mode. Having got the hardware working my troubles were all over or so I thought. Wrong again. Detailed study of ATV Compendium and CQ-TV 154 together with trial and error and a hot eprom eraser eventually revealed all the information required

to produce an eprom for Teletext Pattern Generator. Incidentally, Chris. CQ-TV 166 shows "Display buffer on screen", is this for the future ? A versatile hex editor for use within the program would be nice. Thank you for this interesting and useful project.

de G4XGD

*The problem with Vcc at the wrong voltage is not present in the current issue of the software, I think you may had inadvertently got a 'pre-release' version! There is an upgraded version of the software and a PCB for the hardware available, give me or Trevor a call for details.*

## **CONVERTING REDIFFUSION RKU10 LNB's**

Dear Chris.

It has been discovered that the F type connector on these units has a nasty habit of going short circuit internally. A four hole bulkhead BNC connector makes an ideal replacement.

Bob Platts G80ZP

## **INDECENT BEHAVIOUR ?**

Dear Sir,

From a verbatim rendering of a letter emanating from SM1BUO that you published in the January edition of your organ "CQ-TV" it would appear that I am the holder of one of the withheld callsigns as I was one of the three operators, one Belgium-exiled Englishman and a further "G" licensee who were addressed by your subscriber as "English B\*\*\*\*\*ds" and I think the other side of the coin should be aired. For quite a number of years we have attempted to conduct an early morning net on the 3.5MHz band to encompass operators wishing to have a few words during their preparations for the day's toil and those mobile en route to their place of work. along with exiled "Brits" in Belgium, Holland, Norway and Germany. Proceedings usually commence around 05.30hrs GMT, at this time of year this early start is not possible due to propagation conditions which generate quite a lot of specific station calling without any reply until the veils lift and then, depending on the net being held together by a continental operator until inter "G" working is possible. It has become a fact of life over this 94/95 winter to find that wherever one tentatively calls, as soon as the skip is such that the continentals can be heard, the first replies are either SSTV or RTTY signals irrespective of the actual operating frequency, this obviously has something to do with the broad band finals and no necessity to tune along with the intelligence quotient of the operators. Leaving a Tx running in SSTV mode also appears to be the method used to "Guard" a frequency until the operator concerned has completed his/her ablutions, breakfast or whatever and would appear to contravene the "Un-attended" operation directive of the Licensing conditions. Apropos. the SSTV segment of the Band Plan. all my information tells me that the segment is centred on 3.735.0MHz + or -5kHz, according to my calculator, from 3.730 to 3.740MHz and as is pointed out in the February RAD COM, these figures mean the extremities of the signal spread,

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not the centre frequencies so we should be able to work centred on either 3.728.8 or 3.741.2MHz without attracting the "English Bastard" tag. The continental type SSTV signal also comes into question. Not being a disciple, I speak as a layman and reinventing the wheel is not one of my fortes but I should expect to be able to transmit the tones necessary in a band width far less than the 5kHz, and in some cases 10kHz, spreads that appear to be the norm.

Erie Glossop G4LJQ The "Early Birds" Net Controller.

## **WHERE IS ATV GOING?**

*Extract from a letter to Dave our membership secretary..*

I have been a member since 1957. My interests and those of the club, have changed to a point where we no longer have sufficient common ground for me to remain a member. It is not only technology that has changed over the years... TV was a wonder, now it is commonplace when we see ourselves on tv in practically every shop window.

When I joined the BATC here were ordinary people doing things that surely only the great BBC could do? Then came colour television, all sorts of ingenuity was shown by the club's members. I see very little evidence of ingenuity and inventiveness in CQ-TV today. The scanning format, number of lines, colour encoding system, etc. are the same used by the broadcasters. It would be nice to see someone kick over the traces once in a while and suggest something original and novel.

*He may well have a point, amateurs used to lead the way, now we take a back seat. Anyone got any new ideas? Please send them in!*

## **FORTHCOMING ATTRACTIONS**

Dear Sir,

The Lincoln Short Wave Club would like to inform you of the following information so that it may be published in CQ-TV...The 14th Lincoln Hamlets will be held on the Lincolnshire showground on 10th September 1995. Entry is £1.50, morse tests available plus all usual attractions. Caravans welcome (Saturday night only). Further details: Sue Middleton (XYL G8VGF QTHR) on 01522-525760. April 12th, Junk sale; May 10th, AGM; May 17th, Visit to RAF Waddington; June 28th "The man who was Q": a video and talk by Mrs. Fraser-Smith the widow of the James Bond star; October 25th, Junk sale; November 22nd, Construction contest; December 13th, Christmas meal. The Lincoln short wave club meets every Wednesday night at the City Engineers' Club, Waterside South, Lincoln at 2000hrs. All welcome. Further details from G4STO on 01427 788356.

Yours Sincerely,

Patrick Markham G0OSO, Secretary, Lincoln Short Wave Club.

*Thanks for the info Patrick. What do you all think, should we have a regular 'Rallies / Events / Club meetings' column?*

## DANGER TO HAM ATV BANDS

Dear Chris,

I received my CQTV OK & I must say you've done an excellent job on your first issue as editor. You may not be aware but not only are Commercial Users pressing for a QRM free 433MHz (RADCOM FEB 95 EMC Column), but the RSGB was officially notified in December of several refused 23cm ATV repeater applications. due to CAA objections. There is a CAA/RA/RSGB meeting at the end of Feb, I hope there is a more positive result, & not the loss of 1300-1325MHz section that threatens! However I have serious doubts in the RSGBs ability to do successful negotiations with the RA. This follows my knowledge of a local (HF -> Telephone/Portable MW radio) QRM case, that the RSGB took up with the RA, that resulted in an NOV, rather than Rx filters, which could be demonstrated to fix the fault! In other words it is easier to cancel the licence that have a technical solution! GB3HV Still on the air despite fires/ CAA! The Home Counties ATV Group, should have a good demo of it & it's HAMTEXT Teletext service, on the BATC Stand at Sandown RSGB VHF convention.

73 John Stockley G8MNY

**Worrying news indeed, anyone know how the CAA/RA/RSGB meeting went?  
Anyone got any GOOD news!?!?**

## NEW STANDARDS CONVERTER

Dear Chris,

625/405 standards converter.

This new product uses the latest in frame store chip technology to provide a sophisticated product at a very reasonable cost. Available as either a complete boxed unit with mains power supply, or just as a PCB card. The converter provides a fully interpolated CCIR standard 405 line output waveform. The PCB card requires just an unregulated 7-9 volt supply and provides 1 volt 75 ohm output from any normal 625 line input signal.

John Gillies. TEL: 0181 573 7517

Don't Forget My New Address: 19 Ravendale Road,  
Gainsborough,  
Lincolnshire,  
DN21 1XD  
TEL: 01427 614788

# OUR MAN IN HOLMFIRTH

**BY TREVOR BROWN G8CJS**

I heard the familiar sound of my letter box opening and the sound of this mornings offerings firmly impacting on the door mat. Most people wince at the envelopes that have their name and address visible through a little window, I get lots of those. I also get ones with my callsign after my name, mixed in with a selection of ones carrying the all too familiar blue crest that means they have been forwarded from a club committee member. Some are bulky and contain PCB's (sorry BOB I have not built and tried your intercarrier sound boards yet). Some contain floppy discs with request for software, some contain VHS tapes with requests for programmes copying onto them. Some are requests for Eproms, and some are just questions on anything from Beyond TTL, through Spectrum E prom programmers to BSB conversions. Most of the problems are solvable, but one persistent problem is the request for a presence at a radio club to give a talk or a rally to put on a display. Rallies I pass to Tom Mitchell, the Radio clubs are more of a problem. The solution must be to set up a network of enthusiasts who are prepared to visit local clubs in their area and be our man in Holmfirth or Heckmondwike or wherever else the request comes from. I would love to be able to pass my mail along. So if you are interested please drop me a line.



# RALLY 95

**BATC RALLY 95 \* SUNDAY APRIL 30th \* 10am -5pm**  
**SPORTS CONNEXION, COVENTRY**  
**Adults £1.00 \* Under 14's and OAP's 50p**

Yes folks, this year's rally will be held at the same venue as last year. on the outskirts of Coventry. A map of how to get there is shown on the next page. The only change to last year's event is that we shall only be utilising the main sports hall, with some displays in the Warwick Suite upstairs (next to the bar!).

As ever there will be a good selection of traders, dealing with specialist ATV bits and pieces, second-hand equipment, components, tools, computers, software, etc. 'The 'Boot Fair/Flea Market' will be held outside in the car park (not in the same haphazard manner as last year!). Anyone wishing to trade in this area is advised to come early (I shall be on site from 0600) as space will be limited and it is first-come, first-served. Space will be charged at £5.00 for cars, £10 for vans and £20 for traders.

The GB3RT ATV Repeater Group will be running the usual Bring-and-Buy stall, so please support them. The charges will be £1 per item entered refundable upon sale (not withdrawl). The sale commission will be charged at 10% or 50p, whichever is the greater.

The BATC Club stall will be staffed by just about all of the Committee during the day, and those not manning the stand will still be available for members to meet and discuss points with. Please come and say hello to us. (Yours truly shall of course be manning Rally Control, which oddly enough happens to be on the KM Publications stand!

There will be ample car parking as last year, but be aware that if the weather is very inclement the overflow car park in the field may be a little difficult to traverse by those not used to off-road driving techniques!

Campers and caravanners will again be catered for at the "The Bull and Butcher" public house (01203 301400) half a mile south of the venue on the A423 (Coventry-Oxford road). Unfortunately, I shall not be taking my caravan this year, however, I shall be at the pub on Saturday night if anyone wishes to join me.

For those of you wishing more formal overnight accommodation, the "Coventry Knight Hotel" is located approximately 2 miles from the venue of the A45 just north of its junction with the A423. Their telephone number is 01203 301585.

# HOW TO GET TO RALLY 95

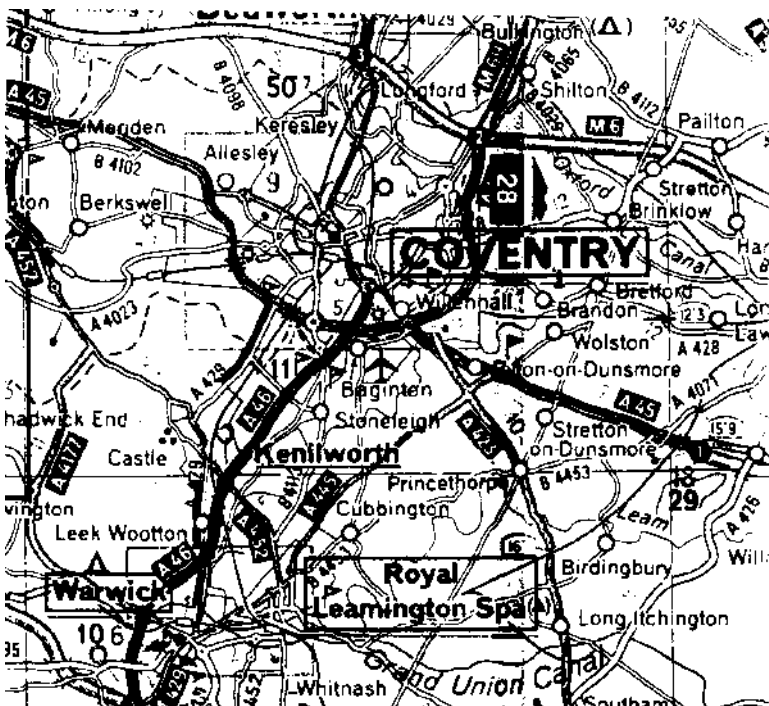
The Sports Connexion is located at the junction of the A423 and A445 at Ryton-on-Dunsmore, 3 miles south-cast of Coventry. the access to the venue and the car parks is off the A445 on the eastern side of the junction (a roundabout).

From the north and east take exit 2 off the M6 and then the eastern relief road (signposted Warwick, Leamington Spa, Coventry Airport). at the junction with the A45 take the A45 south (left) and then in approximately 400 yards take the A423 south (left over the flyover). the venue is 1 mile.

From the south east take the M45 from the M1. At the end of the M45 take the A45 towards Coventry for approximately 7 miles and then turn left onto the A445 for approximately 1 mile to the venue.

From the west and south west take the M40 to junction 15 at Warwick. take the A29 towards Warwick and then the A445. the venue is approximately 10 miles from the M40 at the junction of the A445/A423.

**Mike Wooding; Tel: 01788 890365; Fax: 01788 891883; Mobile: 0860 857434**



# CALIBRATION OF 10GHz RX SYSTEMS

By Peter Johnson G4LXC

*I was looking for a way to calibrate my 3cm dedicated receiver and just thought that if I looked at the harmonic relationship of my 23cms TV Tx that at 1,250MHz the 8th multiple would give me 10.0GHz.*

So I set up with a dummy load of 50 ohms on my Camtech 0.5W TV Tx powered up, and stood the modified LNB with the open waveguide near the dummy load. Lo and behold a very strong signal observed on the receiver, but about 50MHz off frequency! So I adjusted the Camtech Tx to exactly 1,250MHz after waiting about an hour for it to stabilise, and then I was able to adjust the LNB DRO Puck Oscillator to align it correctly with the 950-1750 tunable input of the receiver.

By shifting the 23cm, Tx frequency up by the table provided I was able to accurately set the calibration for the whole of the 3cm ATV Band.

A further check on a standard SKY satellite receiver with normal LNB revealed that a strong 9th harmonic could be seen clearly at 11.250GHz and with 23cm Tx. set at 1,300MHz a signal at 11.7GHz.

It also goes to prove that this sort of transmitter should always be used with a Band Pass Filter to avoid transmitting all those harmonics!

$$1250 \times 8 = 10.00\text{GHz}$$

$$1262.5 \times 8 = 10.10\text{GHz}$$

$$1275.0 \times 8 = 10.20\text{GHz}$$

$$1287.5 \times 8 = 10.300\text{GHz}$$

$$1300.0 \times 8 = 10.400\text{GHz}$$

$$1312.5 \times 8 = 10.500\text{GHz}$$

TABLE OF HARMONICS (GHz)

1.25	2.5	3.75	5.0	6.25	7.5	8.75	10.0	11.25	12.5
x1	x2	x3	x4	x5	x6	x7	x8	x9	x10
13.75	15.0	16.25	17.5	18.75	20.0	21.25	22.5	23.75	25.0
x11	x12	x13	x14	x15	x16	x17	x18	x19	x20

I feel sure that this will help to calibrate many different LNBs when modified to receive ATV signals, including LNBs on C Band to ATV frequencies, its all possible because of the very high gains in the RF stages of the LNBs.

# Circuit Notebook No. 54

## By John Lawrence GW3JGA

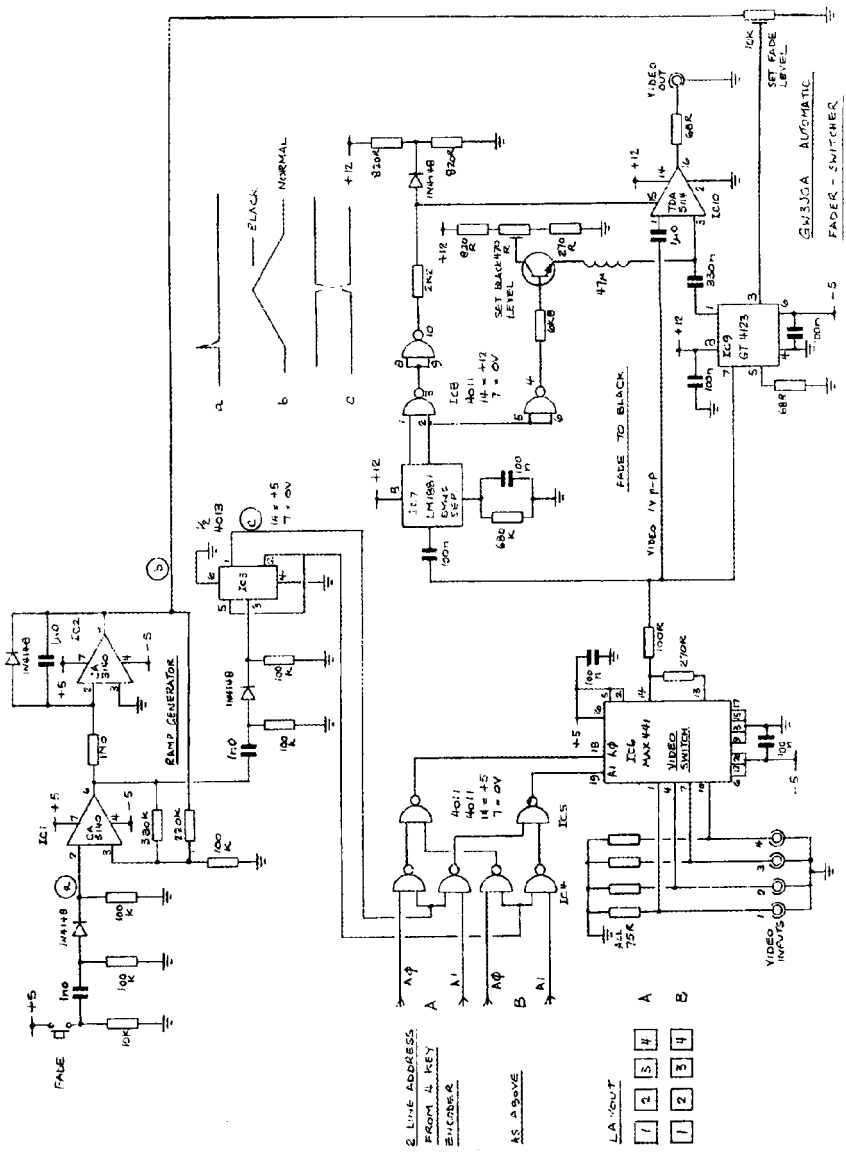
### Automatic Video Fader - Switcher

In a professional video mixer it is assumed that all incoming video sources are or can be synchronised in line, field and colour. Incoming pictures can then be switched, faded and superimposed as required. In the early days of Amateur TV, when most amateurs built everything, it was usual to have a central Sync Pulse Generator (SPG) the output from which was fed to all video sources so that the video signals were synchronised and could be mixed with little difficulty. In most Amateur TV stations today, this is no longer the case. The various video sources, camera, video recorder, computer etc., have become stand-alone domestic units. They have the same line, field and colour timings but lack the facility for synchronising with one another. However, some caption generators can be synchronised with the main video signal so that text may be overlaid on the picture, e.g. the Amiga Computer with a Gen-Lock unit. At the basic level, the station may have a coax cable connected to the transmitter video input which simply plugs into the chosen video source. One step up from this is a simple video switcher (1)(2). This consists of an electronic video switch, usually 4 inputs to 1 output, which overcomes the hassle of changing cables around, but gives a nasty picture jump when switching between sources. The next improvement is to use a video switch followed by a fade to black circuit(3)(4)(5)(6). This allows the selected video signal to be faded to black level, leaving the sync and colour burst intact (black & burst), the video switch can then select a new video source and any disturbance due to the unsynchronised signal is much less obvious as it occurs during a black screen, the new signal is then faded up. The sequence is, fade to black, switch to new video source, fade up to new picture. However, if the signal is being video recorded, the disturbance will still be present on the recording as the recorder has to jump and lock to the new picture. By the addition of a bit more circuitry, the fade and switching can be made to operate automatically by the press of a button. This opens the way to the remote control of the video fading & switching sequence.

### Circuit Description.

Digital inputs to the left of the circuit come from two 4-key to 2-line encoders, as described in Circuit Notebook 53 (7). A typical layout of push buttons/keys is shown.

The address lines are connected through IC4 & IC5 to IC6, the video switch. IC4 & IC5 route the address lines A0-A1 from either A or B keys (depending on the state of





the D type flip-flop IC3), to the address inputs of IC6 The output of the video switch is set to unity gain and is fed to the Fade-to-Black circuit IC7, IC8, IC9 & IC10

By increasing the voltage on pin3 of IC9 from zero to +1V, the video signal will be faded down to black level leaving just sync and burst. By reducing the voltage to zero again the video signal is faded back up.

### Ramp Generator & Switch.

Assume the address from A is 00 (video input 1) and the address from B is 01 (video input 2) and IC3 is set with pin1 high thus enabling video input 1. Now comes the clever bit!

By pressing the 'fade' button, a positive pulse (a) triggers IC1 which is connected as a Schmitt-trigger and produces a negative output at pin6. This causes the output of IC2 to ramp positively (b), fading video input 1 to black. When it reaches a pre-set voltage level, determined by the circuit components, IC1 flips back to its original condition, producing a positive pulse which is applied to the clock input of IC3 causing it to change state (c). This causes IC4 to disconnect the address at A (video input 1) and connect the address at B (video input 2). The voltage output from IC2 now ramps to zero fading up video input 2.

The complete fade to black, change input, fade to normal has been completed automatically in a three second sequence. The 'set fade level' pre-set is adjusted so that the amplitude of the ramp voltage at IC9 pin3 is from zero to +1V.

### References.

- (1) Four Input Vision Switcher. ATV Compendium, page 6.
- (2) Four Input Colour Vision Selector, ATV Compendium, page 8.
- (3) Fade to Black, ATV Compendium, page 10.
- (4) Improved Fade to Black, Mike Hutchins, CQ-TV 157, page 19.
- (5) Fade to Black with A/B Mixer, Peter Carliell, CQ-TV 160, page 36.
- (6) Circuit Notebook No.51, CQ-TV 165, page 72.
- (7) Circuit Notebook No.53, CQ-TV 169, page 12.

**70CMS - USE IT OR LOSE IT!**

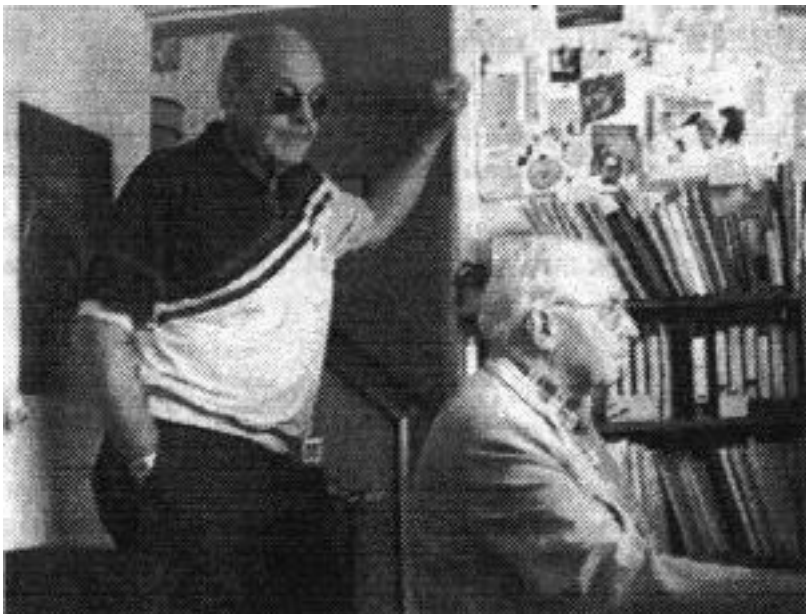
# PCB Production... A New Method

**By C. Grant Dixon.**

*For some time I have been making my own PCBs by drawing out the layout on a piece of squared paper, laying the paper on a piece of copper laminate and using acentre punch to transfer the drilling holes of the design to the copper.*

At this stage it is vital to keep the paper in place and I used small pieces of masking tape to hold it. I then used car touch-up cellulose paint and a fine paint brush to paint in the tracks and join up the marked dots. Then I got hold of EASY-PC a computer program which produces a very neat layout and beautiful artwork and I used this in conjunction with the technique described above. I have recently acquired another program called QUICKROUTE which has a track routing feature which EASY-PC hasn't got. I have yet to try this out so will not comment any further. Recently I designed a board with EASY-PC which had a lot of tracks running parallel and closely spaced. I thought it was going to be difficult as, with advancing years, I have not got the precise control over the paintbrush that I once had. I then had an idea; I took the artwork and a CLEANED copper laminate down to the local photocopying shop and asked them to copy the design on to the copper laminate. This involves copying on to a transfer sheet which carries a good deposit of 'toner'. This sheet is placed on top of the copper laminate and the pair are placed in a heated press where the high temperature melts the toner on to the copper. When it comes out of the press the operator has to remove the transfer sheet and lighter fuel is used for the purpose. Apparently the transfer sheet carries a separating medium which prevents the toner sticking to the sheet and encourages it to stick to the copper instead. When I received the copper laminate it appeared to have some 'gunge' left on it so I took it home and did further cleaning with lighter fuel to make sure that the copper between the tracks was quite clean and ready for etching. At no time did this affect the tracks themselves and it seemed that the toner had melted on to the copper and was very firmly fixed to it. After etching the board appeared to have a very professional finish and the toner covering the copper tracks was easily removed with 'cellulose thinners'. I was charged £6.00 for this service for one A4 sheet, so I did the obvious thing and put TWO layouts on to the A4 sheet and thus at a stroke I halved the cost of PCB production! If you compare this with what a commercial firm would charge for a single prototype board I think you will agree that it is very good value. Of course you still have to etch and drill the board so it is not quite an equal comparison. I must now confess that the original idea came from Ken Wood K6IIS who sent me some sheets of transfer paper which are used by hobbyists in the States. The instructions state that they can be ironed on to the copper laminate with a domestic iron but I found that the tracks

did not stick as the temperature was not high enough and it was a waste of time. The professional photocopy shop has the best equipment and it seemed obvious to make use of their services.



*Grant Dixon sitting, Ken Wood K6IIS standing - receiving SSTV picture on the Malvern net.*

## **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.

# 3cms Made Easier!

**By Andrew White G6OLV**

*I have found that the main obstacle to getting some equipment working on 3cms*

*(10Ghz) is the receiver. Gunn diode transmitter assemblies are relatively easy to obtain from surplus microwave movement detectors. These are usually on sale at*

*rallies. One of these, together with a populated Gunn diode modulator PCB makes a transmitter. This PCB is described in The ATV Compendium and is available from the BATC.*

The receiver described in The ATV Compendium requires the use of a Mitsubishi FO-UP16KF together with two amplifier PCBs in conjunction with the U321 IF and the BATC FM Demod'. I have never seen the Mitsubishi unit for sale. Although

I may be corrected by the more knowledgeable of you. I believe that these units are not widely available. LNBS with LOs at 10Ghz can be modified by grinding down the chip in the DRO. This modification is not for the faint hearted.

The latest satellite TV equipment being sold in high-street shops is advertised as "ASTRA 1D COMPATIBLE" or similar. The receiver units have 2Ghz printed on the front. I recently purchased a LNB which is compatible with these systems. On examining it I noticed that the LO (Local Oscillator) in this type of LNB is at 9.75Ghz. A quick calculation revealed:

$$10.250\text{GHz (ATV simplex frequency)} - 9.75\text{GHz (LNB LO)} = 500\text{MHz}$$

This is well within the range of the U321 tuner unit described in The ATV Compendium or any other UHF TV tuner.

Because the normal IF range of the satellite receivers start at 950MHz the next question to answer is whether the LNB will work well with only 500Mhz out. I am lucky enough to have access to a spectrum analyser, so here are the results below.

## AMSTRAD SLB3 9.75Ghz LNB

RF(Mhz)	LO(Mhz)	IF(MHz)	Relative Levels Out of LNB (dB)
9950	9750	200	-18.7
10000	.....9750		250 -20
10050	.....9750		300 -22
10100	.....9750		350 -19
10150	.....9750		400 -12
10200	.....9750		450 -3
10250	.....9750		500 -3
10700	.....9750		950 0
10750	.....9750		1000 0
10800	.....9750		1050 -10
11750	.....9750		2000 -15

The chart shows the performance is only 3dB down on the in band figure at the ATV simplex frequency. This should provide excellent performance. The drop in signal at the ends of the band may be due to variation in output from the Gunn transmitter

I used as a test source. If you want to watch a ATV repeater with a 3cms output the solution is not quite as straightforward. RT101 repeater output is at 10.040Ghz. With the LO at 9.75Ghz the IF is only 290Mhz. An up converter would be required to enable viewing with the U321/BATC FM demodulator or a satellite receiver. Although the sensitivity of the LNB is reduced at this IF frequency it may be useable.

And the price for this unit, you may ask? around £31 for the LNB or £40 including a 60cms Dish! Try your local satellite TV retailer.

**THE BATC RALLY ON  
SUNDAY APRIL 30th  
AT THE SPORTS CONNEXION - COVENTRY  
DON'T FORGET !!!**

# TWO FROM JOHN!

## By John Stockley G8MNY

*A recent GB3HV breakdown was caused by a PCB fire on an LMW 2x M57762 Brick PA board Kit. At first sight a lightning strike was suspected, but ruled out as, both of the 2 Bricks that had been left running for 3 days with no load, were still OK, and that the 3 pole inter-digital aerial filter gave very good PA protection from strike damage.*

**Damage** The PCB is mounted vertically (O/P at top) and the fire had spread up the board from a starting point under the 50 ohm strip line where the sage wire line combiner (balanced coax) was soldered. A total PCB area of 1cm x 3cm had totally burnt though melting the backplane solder dip, and vaporizing the copper 50 Ohm strip line, up to the start of the on board SWR bridge. The PA is in it's own die cast box, other wise the fire might have spread!

**Cause** This appears to be due to the very thin wire used in the combiner phase splitting coax, causing local overheating at the start of the 40 Watt strip line. Also the PCB had been mounted on washers, to permit the Bricks wires to be connected flush with the PCB. Just behind the burnout point there was a small void in the heat sync so there was no PCB cooling at this point! All these were contributing factors as well as the high duty cycle in FM repeater use.

**Cure** The whole PCB was replaced, all the original components were still OK. A piece of 1.5mm Copper wire was soldered along all the O/P RF strip lines, to spread any hot spots. This did cause a calibration problem on the SWR bridge, but swinging the diode down its line re-calibrated that. Instead of the washers, a thin aluminium sheet the size of the PCB was made to fill the gap, this also covered the void under the O/P line, holes were cut in it for the Bricks to bolt down directly to the heatsink. The whole repair took a day to complete.

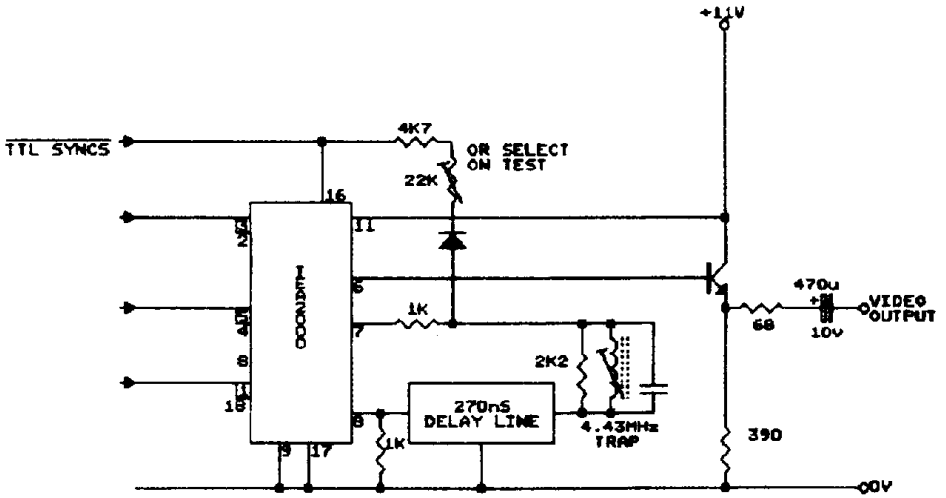
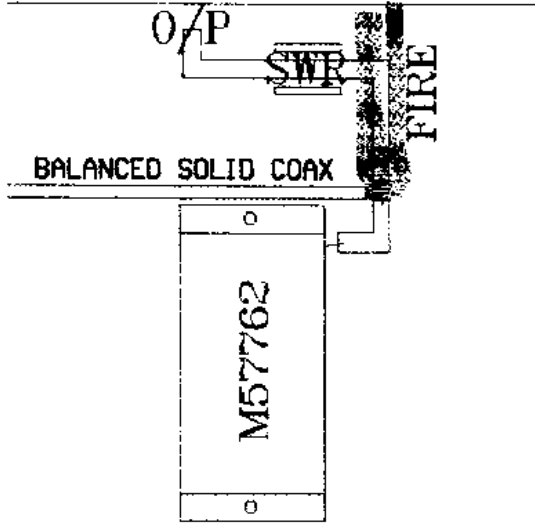
**LMW Design** The LMW 40W PA PCB is a very convenient and successful design, using precision but standard PCB, with through plated ground plane.

In the 2 years this PA had been running in test and repeater service, only one similar problem occurred with a "Dry Joint" on the same output phasing line lost the output from one Brick. But it shows what can happen, even with well built kits.

## POOR TEA2000 SYNCs

**PROBLEM:** This TTL RGB to PAL chip is sometimes low on syncs, here is a two component fix.

**HOW IT WORKS:** The diode only conducts during syncs so ensuring the video information is not attenuated. The resistor adds some of the 5V TTL syncs to the 1K ohm composite video feeding the 270uS delay line. This gives the correct timing for the added syncs.



**SETTING UP:** The value of R between 4.7K-22K can be selected on test (or use a 4K7 in series with a 22K preset) for 300mV of sync when video is correctly terminated



## BEYOND TTL

by **TREVOR BROWN G8CJS**

In this column I have tried to introduce various micro and computer concepts. The format has jumped around from machine code working with the Z80 micro chip, up to adding an EPROM programmer to a PC. In the last issue I introduced a basic programme that could be used for checking character generator designs prior to committing them to EPROM. It is hard to judge the success of any column in this magazine because the feedback is often limited to things that did not work. To assume 100% success for the projects that did not generate feedback is also dangerous because it may mean that the subject was boring and no body bothered to read it.

There are exceptions to the rule. Mr JS. Anderson asked my permission to use some of Beyond TTL in a text book, I agreed and thought no more of it, a year later a rather grandeur book called Microprocessor Technology written by Mr. Anderson and published by Newnes turned up on my doormat and made the impression of impressions both on me and the mat. It is some 390 pages and starts off much more basic than anything I have written so far. This should be a help for those of you who think I have pitched this column too high. That does not mean that if you have understood this column that you will find Mr. Anderson's book pitched too low. The sheer size of it allows the technology to be covered in depth and to progress slowly from basic concepts to a level that enables hardware and software designing. The book covers two CPU's the Z80 and the 6502 and is suitable as a study guide for BTEC NII and NIII Microelectronics, the C&G726 Microprocessor Technology course and the micro portion of the C&G224 part II Electronics servicing course. It makes you almost want to go back to school. Some of the bits from beyond TTL you may recognise such as the Z80 Roger Bleep.

The PC EPROM programmer also caused some feedback so much so I am investigating putting together a PCB for it and removing the wafer switch which is a time consuming thing to wire and replacing it with a dip switches. The software is also being looked at by one or two people with a view to adding an edit menu so you can manipulate data and create files without having to resort to other programmes such as Xtree Gold. If you are interested drop me an SAE. and if I get anywhere between magazines I will let you know,

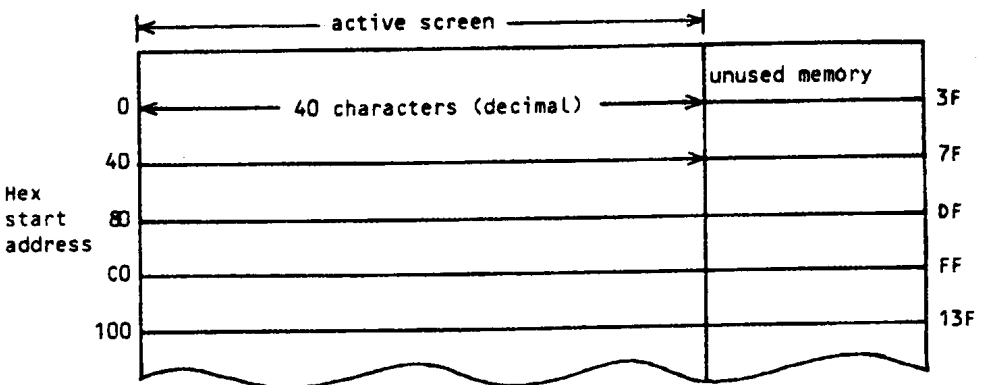
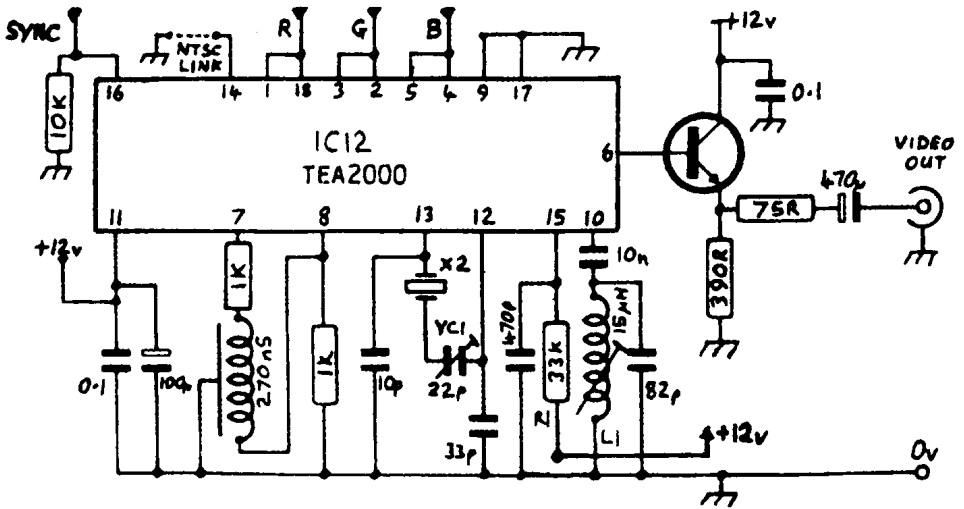
The only re-occurring question seems to relate to the stored files. These are pure binary devoid of any headers, unlike the Motorola or Intel format files that some EPROM programmers use, as such there is no reason why the programmer cannot be used with the Copredy test card designer software, at least Chris Smith assures me so for his



design, providing you have the latest version. Chris's latest address and telephone number are printed elsewhere in this magazine.

The basic programme of last month was the subject of only one will not run complaint

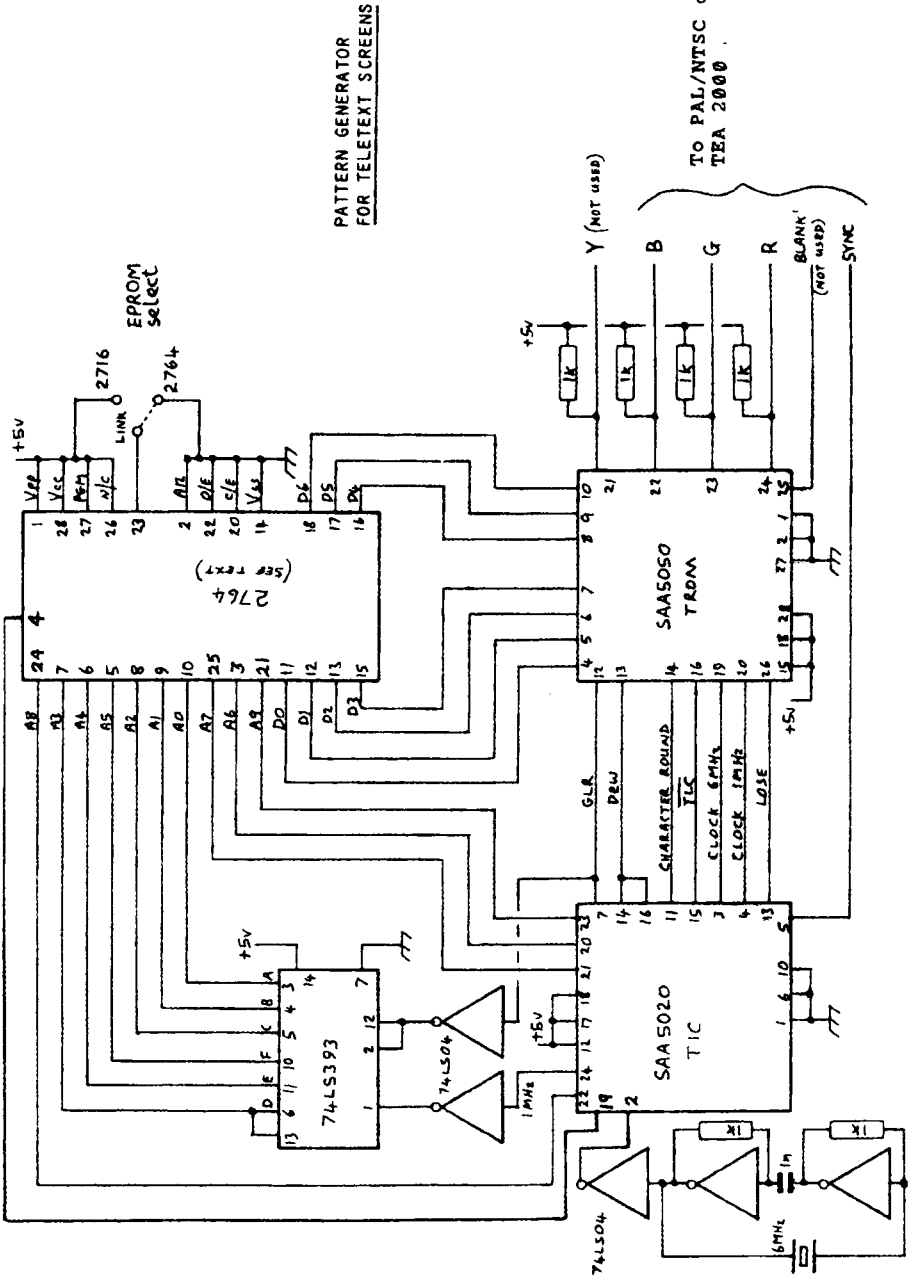
I have not cross checked it against the published one, but I did offer to pop it on a disc for the complainant if he sent me one, and as of yet the disc has not hit my mat so I assume he found the problem elsewhere.



Enough of the chat and lets get down to some ATV hardware and software. In the ATV compendium is a circuit called Teletext Pattern Generator, the book is still available but just in case you don't have a copy the circuit is reproduced here (Fig 1). Members services have PCB's in stock and although the LSI chips are no longer manufactured there are lots around. The generator produces a Teletext screen in colour. The output of the unit is RGB and syncs, (TTL) and is suitable for driving a PAL coder such as the TEA2000. the circuit of which is produced here also (Fig 2). The teletext pattern is stored in the 2764 EPROM and so those of you that have built the EPROM programmer can programme the unit. You will need some file creation software such as Xtree, but only until the new software becomes available complete with integral file generator and editor. Fig 3 shows all the characters and graphic blocks which the unit can produce. Each character block, font of colour attribute is identified by two hex digits the column digit is shown along the top and the row digit down the side so A = 41 or R = 52. Each pair of hex digits has a character and a Graphic block at the same position. To select between them we should select either Alpha or Graphics from the first two columns, and then programme the appropriate hex digit at the start of the line i.e. for yellow characters on a red background we would start the line with 01 1D 03 The background colour comes first then new background and then the character colour, if you want to change either background or foreground colour part way along a line then just add new attribute colours. Every time you start a new line the attributes will be lost and need to be programmed in again. It is not as complicated as it sounds I suggest you start at EPROM address 0000 and lay down 40 characters and then install the EPROM and check your work. When you first line is correct the EPROM address for the second line is 0040 and the next line is 0080, and then 00C0, followed by 0100 0140, 0180, 01C0, and 0200 and so on for 24 lines (see fig 4). If you use double height then you need to miss the next start address so if every line starts with double height (0D) then you will only have 12 lines of 40 characters. The last trick is hold graphics, this is used when you change foreground, background or between characters and graphics part way along a line then a gap in the picture appears over the attribute, hold graphics can be used to stretch the earlier back-ground colour over this gap. The graphic blocks are very useful for creating large characters for callsigns and repeater indents. You will soon get the hang of creating teletext format pages after a few evenings at the keyboard, but if your struggling try the following data as a start:

ADDRESS	DATA
0000	13 1D 11 00 35 00 00 6A 00 6B 21 00 00
0040	13 1D 11 00 75 70 70 7A 00 6A 00 00 00
0080	13 1D 11 00 35 00 00 2A 00 6A 00 00 00
0010	13 1D 11 00 25 00 00 2A 00 2E 24 00 00

References The Amateur TV Compendium (BATC PUBLICATIONS) CQ TV 154 by Michael Sheffield ZL1ABS



**PATTERN GENERATOR  
FOR TELETEXT SCREENS**

TO PAL/NTSC coder  
TEA 2000

		2ND HEX DIGIT (DOWN) → 1st. Hex DIGIT (ACROSS)							
	0	1	2	3	4	5	6	7	
0	NUL <sup>☒</sup>	DLE <sup>☒</sup>	☐	☐	0	@	P	-	p
1	Alpha <sup>n</sup> Red	Graphics Red	1	☐	1	A	Q	a	q
2	Alpha <sup>n</sup> Green	Graphics Green	"	☐	2	B	R	b	r
3	Alpha <sup>n</sup> Yellow	Graphics Yellow	£	☐	3	C	S	c	s
4	Alpha <sup>n</sup> Blue	Graphics Blue	\$	☐	4	D	T	d	t
5	Alpha <sup>n</sup> Magenta	Graphics Magenta	%	☐	5	E	U	e	u
6	Alpha <sup>n</sup> Cyan	Graphics Cyan	&	☐	6	F	V	f	v
7	Alpha <sup>n</sup> White	Graphics White	.	☐	7	G	W	g	w
8	Flash	Conceal Display	()	☐	8	H	X	h	x
9	Steady	Contiguous Graphics	()	☐	9	I	Y	i	y
A	End Box	Separated Graphics	*	☐		J	Z	j	z
B	Start Box	ESC <sup>☒</sup>	+	☐	:	K	_	k	~
C	Normal Height	Black Background	,	☐	<	L	2	l	
D	Double Height	New Background	-	☐	=	M	3	m	24
E	SO <sup>☒</sup>	Hold Graphics	.	☐	>	N	↑	n	÷
F	SI <sup>☒</sup>	Release Graphics	/	☐	?	O	*	o	☐

E.G. Hex Code For 'A' = 41

Hex Codes for Character Set

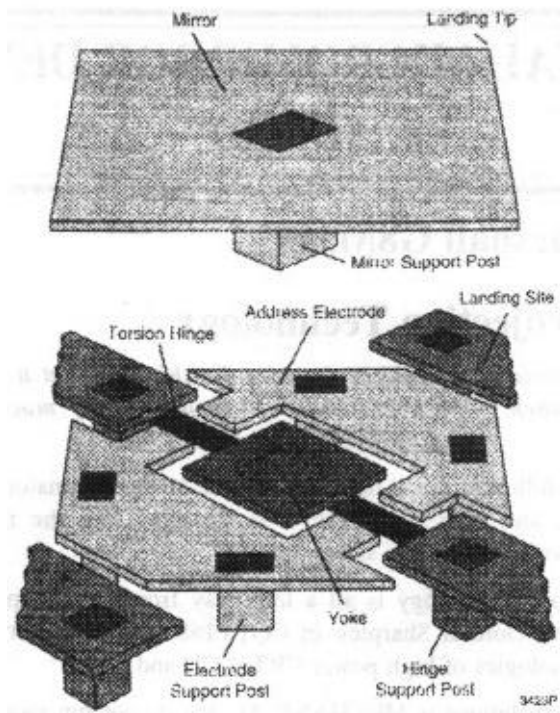
# DIGITAL MICROMIRROR DEVICES (DMD)

By Paul Marshall G8MJW

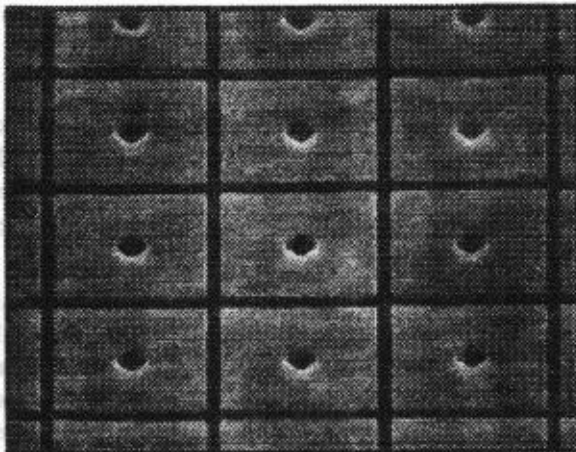
## The New Projection Technology

*Reading this article, you could be forgiven for thinking that it is some sort of April fool gag - when I first heard about it I thought pretty much the same, as it was around about April 1994.*

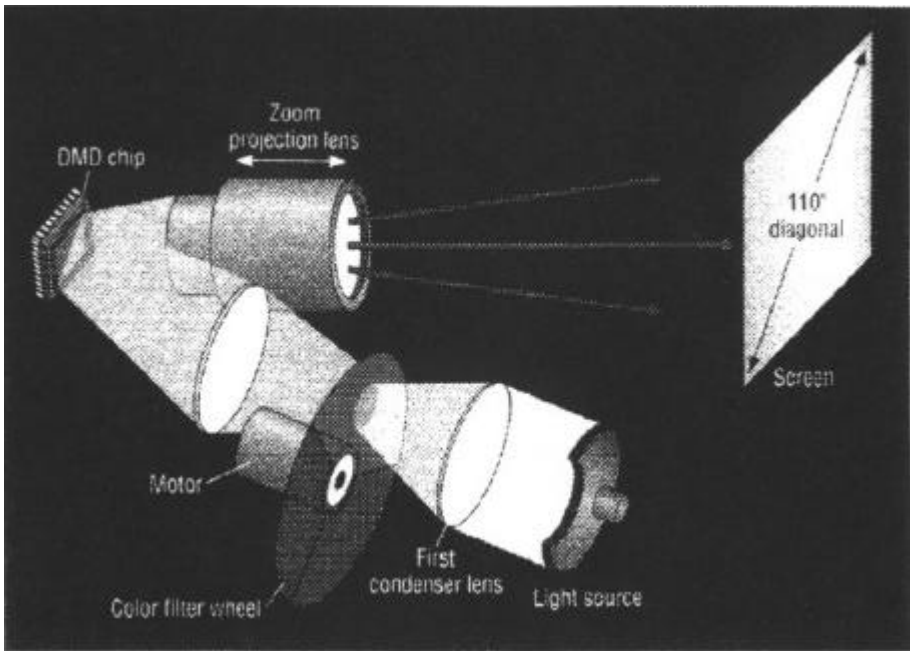
Much activity has followed since then on the part of the originator of these devices, Texas Instruments, and very soon now it is expected that the first commercially available systems will be ready for sale. This video projection technology is all a long way from the Eidophor (Light Valve) system described by Gordon Sharpley in CQTV168. It is also very different to the other existing technologies of high power CRT, LCD and Laser. Fundamentally, the technique is MECHANICAL, but do not run away with the idea of spinning Nipkow discs or polygon mirrors. This kind of mechanical is every bit as sophisticated as a microprocessor, in fact the processes involved in its manufacture bear more resemblance to static RAM production than anything else! The core of this new technique is actually up to 2.3 MILLION movable mirrors, all in a space not much bigger than a 40 pin DIL IC. (Remember what I said. this is not April fool - this all works, I've seen it, and you will too quite soon.) The inventor, Dr Larry J Hornbeck. reasoned that semiconductor processes should be capable of fabricating very small mechanical assemblies as well as electrical circuits. This was in 1987, in 1989 Texas Instruments became one of the four projection TV specialists selected by the American Advanced Research Projects Agency overseeing the US High Definition TV Display Programme. Essentially, the device consists of all these aluminium mirrors assembled in an array on top of a layer of memory cells. The mirrors pivot along a diagonal supported by a torsion hinge. (see fig 1) Each of the two opposite corners of the square mirror can be electrostatically attracted to an address electrode driven by the memory cell. A logic '1' causes the mirror to tip 10 deg one way, and a logic '0' causes the mirror to tip in the opposite direction by 10 deg. OK, wonderful technology apart, what has been created that is useful? - all this can do is turn a pixel on or off. By shining a light at the mirrors and adding a projection lens we can now produce a very bright black OR white display. Since the mirror can only be on or off. no grey scales are possible - or are they?



**Fig.1.** A schematic drawing of the construction of a DMD mirror array that places diffractive elements under the mirror elements.



**Fig.2.** A photomicrograph of a portion of a DMD mirror array fabricated through the use of a double sacrificial layer method.



**Figure 3.** DMD single-chip colour projection display.

It was rapidly appreciated that due to their very low mass, these mirrors can tilt backwards and forwards very fast, in fact in about 10  $\mu$ s. Each pixel has a full field period in a given state before the next field of information may or may not cause it to change state. So why not modulate each mirror with a variable mark-space ratio clock? In this way by varying the on time within each field the AVERAGE brightness of each pixel (mirror) can be modulated. A grey scale is thus possible.

Hang on a minute - these tiny mirrors, measured in microns, are whipping backwards and forwards thousands of times a second to achieve a picture - don't the hinges break? Texas Instruments say definitely not. The only problem can be mirror sticking. Indeed, it is this problem that has caused the delay in the introduction of first off products and devices.

It sounds crazy, but it works, and very well too. It puts all other TV projection technologies in the shade. Colour can be achieved by one of two methods - a field sequential spinning disc, which could be replaced by a solid state equivalent LCD shutter technology developed by Tektronix, or three DMDs (RGB) and a dichroic combiner. Both spinning disc and 3 chip dichroic have been shown. There is no flicker with the disc type. the field rate is converted to triple the normal. Potentially the advantages are just enormous, but there are a couple of 'downers'.

## **ADVANTAGES OF DMD OVER LCD/CRT/LASER AND OTHERS:**

1. Very small - A high resolution and high brightness video projector no larger than a 35mm slide projector exists.
2. High resolution - Knocks LCD projectors for six. HDTV panels of 2048 X 1152 have been shown.
3. High brightness - Much brighter than CRT projectors. (excluding 'light amplifier' types which are very expensive.)
4. High contrast ratio - as good as LCD, 100: 1 or more, much better than CRT.
5. No convergence - easy set-up compared to CRT and Light Valve.
6. High optical efficiency - only small aperture lenses required and very efficient use of source illumination, much better than all other types except perhaps Laser.
7. Potentially cheap - no prices yet, but the drive electronics is all on a handful of ICs, yields are not known. but should be OK. Texas are known to be targeting consumer and business applications.
8. Unity gamma - Projection CRTs have complex and awkward gammas. preprocessing can set the DMD gamma to any required value.
9. No image lag - unlike LCDs.
10. Colour range not limited by phosphors - compare with CRTs.

## **KNOWN DISADVANTAGES:**

1. No raster manipulation possible - very desirable for off axis mounted projectors, eg., ceiling mounted. (LCDs, Lasers and Light Valves suffer from the same problem.)
2. Some aliasing known to exist - quite low level though.
3. Little or no field experience to date.

Great, where can I buy one?

Not yet known, nor is how much or who will be making complete projectors. Price ought to be reasonable - the Home Cinema market seems to be a target.

The 'when' is still a little vague, they should have been out by now. Texas seems to be being very careful about the technology -there is no room for a bungled launch. I suspect that it will be early summer. Keep watching.

As a tailpiece, what about that highly elusive animal the large, flat screen TV? Its been 10 years away as long as I can remember. A new technique is rapidly gaining ground with many manufacturers jumping on the bandwagon - the FEDs are coming!

Field Emission Displays look like beating LCDs and gas plasma. I will describe them some other time, but in the meantime, watch out for the DMDs!

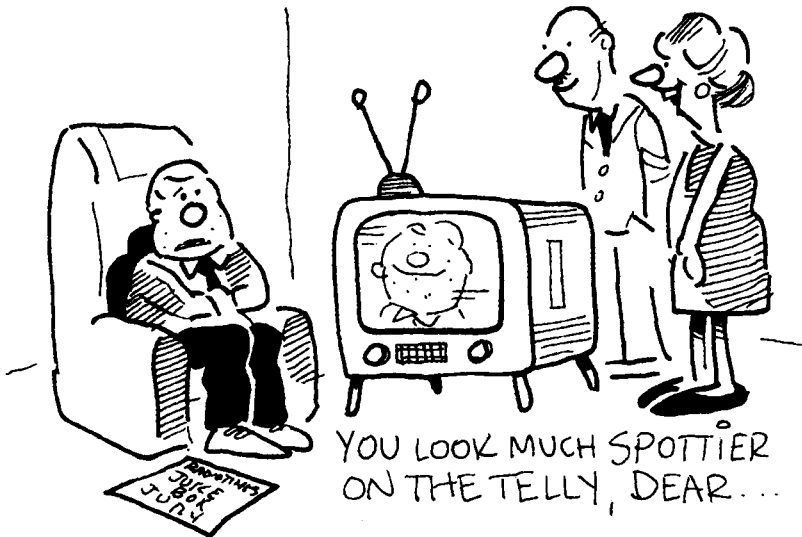


# THE BLACK AND WHITE BREAKFAST SHOW

## *Dicky Howett goes back to the olden days of television*

It's definitely an unknown fact that yours truly took part in Britain's very first breakfast tv programme. Now when was that, you may ask?..... Well actually it was as long ago as 1971. Mind you, this tv programme was never broadcast to the waking world. It was just a closed-circuit BBC 'Directors Course' staff training show, produced in cheap and glorious monochrome.

This training programme took place in studio 'G' at Lime Grove on the 13th Dec 1971. The show was wittily entitled '7 UP'. Taking part in this precursor to GMTV, Breakfast News plus the Big One (little did we realise what we had started!) were Douglas Cameron, Barry Hains and Maggie Gilchrist (proper broadcasting persons) and with me as a 'spot' newspaper type cartoonist trying (and failing) to be instantly 'humorous' on the day's news topics. (In 1971 it was something about fishermen, so what's new?). The show itself was unremarkable just a collection of news reports and interviews, with the odd (me) joke item. It bore little resemblance to the flashy modern variety of breakfast shows (no sofas, Zig and Zag or interview beds). In those days the nearest role-model was radios 'Today' programme. However, on the date in question (1971) it is interesting to note that even though colour tv had been up and running for several years, the BBC still had a few monochrome studios in full operational order (restricted by then only for school or training programmes).



Stinting nothing, our little breakfast production had a proper technical line up in studio 'G'. This included four cameras (EMI 203's) all on pedestals, three with zooms and the fourth with a turret and Autocue. Other items were a Telejector machine, a Photomix. 1 boom. 2 table mics, 3 stand mics, 2 (12"x9") caption stands, 6 floor monitors and one practical digital clock. The following year (1972) I contributed to yet another BBC monochrome training show, down the road in studio '2' Television Centre. I wasn't ,on 'air' this time, but supplied ten ready-drawn cartoons that were to be cut live to music. The purpose of the exercise was to train script girls and vision mixers. (Those were the days when broadcasting organisations, as a matter of course, actually trained with a full-sized studio!) Banks of monitors and switching gear were laid out on the studio floor from whence the trainees could practice 'cutting'. The cartoons had to be cut on the beat and in the correct order; 'Shot 5 on camera 3, cut to 3, shot 6 on camera 2, cut to 2 etc...'. Could get a bit confusing. A troupe of dancers and singers, provided also, other chances to 'cut with the beat'. I recall that the cameras in studio 2 (Marconi Mk 4s) produced some cracking pictures, the pity of which such studio quality was rarely (if ever) seen on the average home receiver.

Mind you, I saw some really rotten monochrome pictures from source at Alexandra Palace during my time there (1965/1968) working on TV News. I always cringed at the film picture quality which was produced from 16mm negative (and some agency positive) remorselessly pushed through Pye Staticon telecine machines. To start with the pictures came out scratchy (the original film went through an exhausting process where by it was viewed, edited, perhaps dubbed with extra sounds, rehearsed and then transmitted, all in a rush). Also, the pictures had to be graded on air. No easy task with a vidicon-tube telecine with a restricted contrast ratio and a lot of lag. The end result was little better than industrial quality, resulting in lots of soot and whitewash. The broadcast images lurched, smeared and ballooned all over the place: The piece de resistance being those horrible (but essential) circular cue dots at the end of each sequence (remember them?). They were applied manually by using a sort



of rolling hole-punch which produced several 'dots' in one go.

The news studio cameras were cheap devices also. Studio 'A' (BBC 2) had 4 EMI 201 vidicons and studio 'B' (BBC 1) had some strange-looking BBC-designed bulletshaped cameras that were remote controlled. These cameras also were vidicons and were based on the electronics of the EMI 201 camera channel. The focus, zoom and tilting were activated by a 'joy stick' apparatus up in the gallery. Ingeniously. this meant that four cameras could be controlled by two operators. A necessary cost-cutting exercise I'm sure, and great fun to play with. Pity about the picture quality.

Talking of quality, as a lad my enthusiasm for all things television bordered almost on the metaphysical. I used to look forward to scheduled live o.b.'s, especially ones that came from locations I could reach easily. Once, a swimming gala was being transmitted on 'Grandstand' from a pool near our street. I hot-biked it down to the baths and had a 'grandstand' look myself, ogling the scanner vans and chatting to the engineers. On another occasion, I recall standing spellbound on an exact bit of Southend pier in the full knowledge that an actual BBC camera had lingered there during a relay. Hallowed be thy planking. Mind you, years later I continue to dream on. these days with my magazine 'nostalgic tv' articles. Once such, published a year or two ago featured the unforgettable time I appeared on 'Juke Box Jury', (only as a humble member of the audience, though!) This was 1963. Later. during the broadcast recording, I took a snap of myself off the tv screen. That snap had lain in a box for 35 years. As soon as I found it, I just had to write all about it didn't I.

**THE 1995 BATC RALLY  
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Mr. RUGBY,  
CV23 8UF  
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# LAYAN - A Review

**By Mike Wooding G6IQM**

**LAYAN - an Electro-Magnetic Circuit Layout Simulation Program.**

Have you ever designed a printed circuit board for a project, especially a high-frequency RF one, only to find that when you have built the circuit it does not perform entirely as predicted? Even if you use circuit simulation software, such as Analyser III or Pulsar to test your design and then use Easy-PC Professional to produce the PCB design, you could still find that there are some undesired products or spurious signals produced, or simply that the circuit does not work as predicted, or even not at all! What is the answer to this dilemma? and one that will neither cost you an arm or a leg, nor endless hours of re-design work? LAYAN from Number One Systems is the answer to your problem.

## **The Problem?**

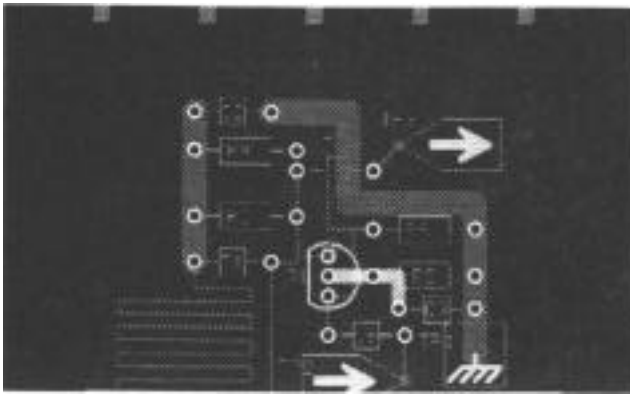
The problem that is very often encountered when designing PCBs for RF circuits, is the inability to determine the effects that any inductive and capacitive coupling between the PCB tracks, component pads, stripline components and the ground plane, will have on the performance of the circuit. Even sophisticated software simulation packages are generally unable to determine what effects these stray couplings may have. The higher the frequency then the more important is the selection of suitable materials, thicknesses and types of surface coating, for the PCB material itself. It is then still very much white mans magic to accurately determine the effects of inter-component coupling, without making lots of prototypes, which entails lots of associated testing and a great deal of expensive time.

With LAYAN, however, comes an extremely powerful software package that enables simulation of the complete circuit, including all the parasitic resistances, inductances and both inductive and capacitive couplings introduced into a circuit by the board or thick/thin film layout on which it is assembled.

## **LAYAN**

LAYAN from Number One Systems integrates fully with their Easy-PC professional XM and Analyser III Professional software packages, in fact it cannot run

without them. The result is a complete circuit layout simulation system. The package is a data extraction program that converts physical information provided by



The Example PCB to be simulated.

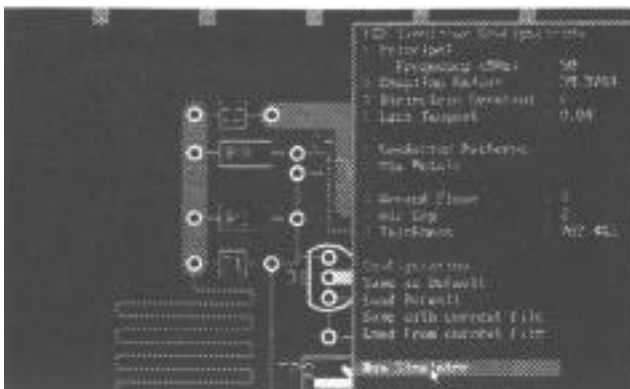
Easy-PC Professional XM into a netlist in Analyser III format. All the parameters required by the program, such as the substrate thickness and dielectric constant, the distance from the ground plane, etc.

When the Simulate command is chosen from this same menu, an automatic sequence is set in motion that launches LAYAN, builds a complete netlist including the parasitic components, and finally runs Analyser III. The transfer of data between the programs is completely automatic and requires no intervention on the part of the user. On completing the simulation and reviewing the results displayed by Analyser III control returns directly to Easy-PC Professional.

LAYAN will simulate PCBs with up to two conductor layers with close or distant ground-planes. The program extracts layout resistive, capacitive, inductive and mutual parasitics, it models skin effects and loss tangents, allows simulation of printed components and can deal with any substrate, such as printed circuit board, thick film or thin film. The software also simulates the effects of tracks, component pads and feed-through components.

The hardware requirements for running LAYAN are a PC 386 or higher. However, due to the large amount of data processed and the requirement for floating point math support, a 486 DX or better is recommended. The program files themselves require 10MB of hard drive space and additional temporary files created during simulation can require up to a further 10MB of drive space. A VGA graphics system and a minimum of 4MB of RAM are also required. It is also recommended that a disc caching system, such as SMARTDRV.SYS is used.

When LAYAN is launched, by selecting Run Simulator from the Easy-PC Professional menu, then a netlist is built by Easy-PC which is then transferred to LAYAN. LAYAN then runs a multi-process simulation based on the netlist data and the data input by the user relative to dielectric constants, frequency range, etc. LAYAN then calculates simulated values for the



The Simulation Control Menu.

various parasitic capacitances and inductances for the PCB, tracks, pads, etc., and produces another netlist and data table for Analyser III.

Upon completion of the calculations Analyser III is launched and a simulation run using the modified EASY-PC netlist from LAYAN. The resulting Analyser III simulation displayed now takes account of all the effects that the PCB and its tracks, pads, etc., has on the circuit design as well as the circuit itself.

Upon exiting Analyser III the option is given to return to EASY-PC, which, if chosen, returns you to the PCB layout display from which the simulation was run, thus allowing any necessary changes to be made prior to another simulation run.

## Conclusions

LAYAN is an extremely simple package to use. As the package requires EASY-PC Professional XM and Analyser III Professional to run the assumption must be made that the user is already conversant with these programs. Consequently, running LAYAN is totally transparent to the user, once the various parameters concerning the PCB material, etc., have been entered into the EASY-PC menu. No further user input is required and the resultant simulation is displayed in Analyser III.

If all three packages are being used for the first time, as I have described in earlier reviews of EASY-PC and Analyser III. getting to grips with these powerful design packages is very easy, and it takes only a short time to realise their full potential as schematic and PCB design tools. LAYAN now complements the design of AC circuits and PCBs to the extent that almost all the required expensive development and testing can be carried out on your PC, without the need for actually creating a PCB and building the circuit up - only to find that it does not work as predicted.

LAYAN does not slow the system down, even though it has a lot of math to carry out. The review copy was run on my 486 DX2/66 and one of the example circuits

supplied with the package, EX1.PCB was simulated. Running under WINDOWS the entire simulation took 4 min 50 sec; running under MS-DOS 6.22 the same simulation took 3 min 10 sec. Either way the time taken for a reasonably complex circuit, employing stripline inductors, was well worth the wait, knowing that the result of the run would be a more exact evaluation of the designs performance than without LAYAN.

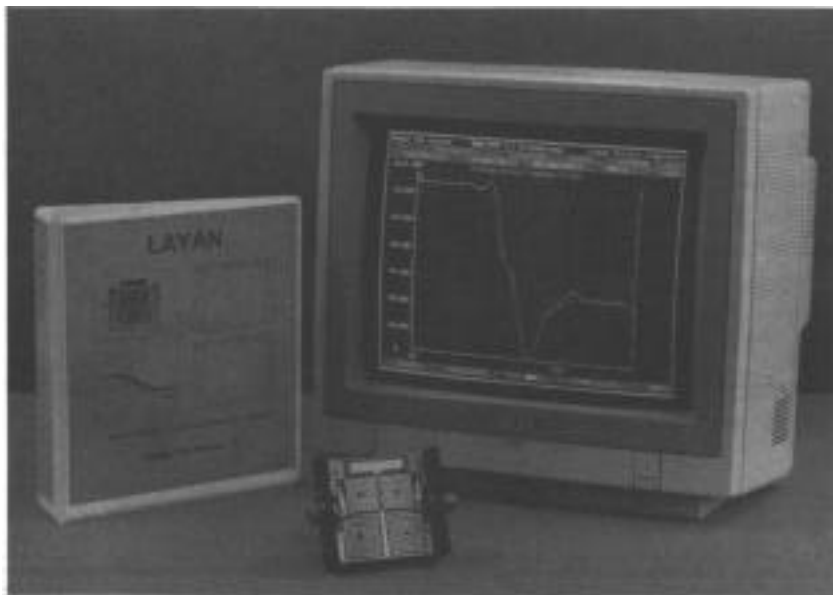
For anyone working, in the RF design field and already using EASY-PC and Analyser III then LAYAN is a must. For anyone working in this area and not using EASY-PC products, then I would suggest that a serious evaluation of them is undertaken. For the total cost of £935.00 plus VAT and p&p a complete RF design software suite can be obtained, that is as versatile as anything else on the market at far times greater cost.

To purchase LAYAN on its own to add to EASY-PC Professional XM and Analyser III professional, the cost is £495.00 plus VAT and p&p.

For those already using EASY-PC and Analyser II who wish to purchase LAYAN, but who do not already have the professional versions, upgrades are available from the suppliers.

LAYAN, Easy-PC and Analyser III are available from Number One Systems, Harding Way. St.Ives, Huntingdon, Cambridgeshire, PE17 4WR; Tel: 01480 461778; Fax: 01480 494042. These software packages are also available through KM Publications, Tel: 01788 890365; Fax: 01788 891883.

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# Camtech Electronics

21 Goldings Close, Haverhill, Suffolk, CB9 0EQ, UK

Tel: INT +44 (0) 440 62779; Fax: +44 (0) 440 714147

## **High Frequency Video Demodulator Card.**

Features 130 MHz IF input frequency, Plessey video demodulator, Switchable CCIR video de-emphasis + video invert and switchable meter functions, signal strength / tuning meter. Video output - 75 $\Omega$  composite video. Audio demodulated outputs available are 600 $\Omega$  0dBm and 0.5 Watt loud speaker amplifier. This unit is to the highest quality construction using plate-through hole PCBs with selective solder resist finish. Available in kit form or ready assembled.

## **Microwave Tuner / Down Converter.**

Features the very latest in commercial microwave integrated circuits and surface mount technology. Ultra low noise PHEMT GaAsFET front end followed by stripline image filter and MMIC amplifier to a 5 GHz Gilbert cell mixer. Exhibits 35dB conversion gain and tunes (LO) 800 to 1600MHz, with an IF output up to 200 MHz. Also features an external LO output to drive a synthesiser, such as Camtech 2.4 GHz synth board. Unit comes completely ready assembled with instructions.

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Items from these lists can ONLY be supplied to CURRENT members of the BATC  
 These lists supersede all previous ones. Components for club projects are NOT  
 available from Members Services unless within these lists.

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 provided for that purpose elsewhere in this supplement. We reserve the right to  
 change prices without notice.

Members requesting information on prices, equivalents or availability of vidicon,  
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 envelope for their reply.

QTY	CAMERA TUBES, SCAN COILS, BASES & LENS MOUNTS	EACH £	P&P £	TOT £
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## VIDICONS

1" vidicon tubes are available in different heater ratings (95mA and 300mA) normally 6" long, although some were only 5.25" long. 2/3" tubes have 95mA heaters. The 'standard' tubes were of separate mesh construction, with magnetic focus and deflection. Other tube types include electrostatic focus or deflection, and low light types. Prices vary depending on the size, type and grade of tube. A tube guide appears in CQ-TV 149 and 150. The stripe filter tubes used in domestic type colour cameras are not available through the BATC, and normally must be ordered direct from the equipment supplier.

Members requesting information on availability, prices or other types of tube or equivalents are asked to send a stamped, addressed envelope for their reply. Please note that the relatively inexpensive 'amateur grade' tubes are no longer available to the club, although ex-equipment tubes, suitable for test/line up of cameras can often be supplied.

### **CIRCUIT DETAILS can be found as follows:**

Revised ATV Handbook (vol 2): PCB's 21, 22, 53

An Introduction to ATV: PCB's 10, 18, 25, 40, 41, 82, 83, 84, 85,86

TV for Amateurs: PCB 19

Slow Scan TV Explained: PCB's 59, 60, 61, 62

Amateur TV Compendium: PCB's 11, 12, 27, 54, 55, 56, 57

Micro and TV projects: PCB's 14, 33, 34

CQ-TV (Issue No. in brackets): PCB's 13(128), 16(134),

20(130),26(142), 35(143), 58(139)

Item 46 is supplied with circuit details, etc.

BATC Publications can supply back copies/photocopies of the original articles if required.

*The club has now de-registered for VAT, the prices shown now include that part of the cost and the prices have been adjusted to avoid the need for the 'odd copper' at rallies, etc! Several prices are down in price and the postage element will no longer have VAT added to it, saving members even more! A number of items (marked \*\*) are in short supply and will not be repeated (only 1 or 2 left in some cases). If members wish to confirm availability before ordering, please telephone between 6:30pm and 9:30pm to check.*

**EVENT: The BATC 1995 Rally**

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**LOCATION: Coventry**

**DATE: Sunday April 30th**

**CONTACT: Mike Wooding G6IQM  
5 Ware Orchard,  
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# MARCONI BLUE CAP LNB AS A TRANSMITTER FOR 3CM ATV

By Peter Johnson G4LXC

*Yes, its true 80m W Tx output is possible with very little effort.*

If you consider the circuit Fig.1a and Fig.1b, the standard LNB (Low Noise Block) has all the components required.

The Tx. configuration is shown in Fig.2a and Fig.2b. To work on any equipment that contains static sensitive devices such as this contains, you must only work with a safe earth connection to yourself, the LNB and the soldering iron. Two 1 metre lengths of flex with crocodile clips at each end attached to all three parts is required.

The method of removing discrete FETs and MMICs from the PCB without damage must be done with great care. A special de-soldering bit is shown in Fig.3c. The ring of the bit is placed over the four pads to heat all at the same time, until the solder flows. Then, with a pair of tweezers, lift the device out from the middle and away to a suitable receptacle.

Please note: paint some liquid flux over the de-soldered area. It helps to make the solder flow better. Liquid flux is made from plumbers' flux and cellulose thinners mixed. Use a small paint brush to apply it. A large magnifying glass and bright light are also very useful.

To start work on your scrap Marconi Bluecap LNB, first drill out the four rivets holding it together. Remove the lid. Remove all bolts holding the diecast moulding to the unit.

Carefully lift it off. Observe the condition of the PCB, it should be clean and bright. To check the circuit, apply 12 volts positive to the centre pin of the F socket and 0V to ground. This will provide power to the circuit for some basic DC checks.

Is the 5 volt regulator working? Are the drain and gate supplies present going to TR1H,TRIV,TR2,TR3?

Assuming the PCB is not damaged by damp or water ingress, check that the local oscillator is working by looking on your satellite receiver with the Rx LNB within 6" of the local oscillator. A strong carrier should be seen somewhere. If not, do not worry yet, switch off the 12 volts, and remove the DRO Puck. Proceed to lever it off with a blunt tool. It should come off quite easily.

Proceed to mark the FETs with ident dot for the gate, and number for the device. Remove TR1H, TRIV, TR2, TR3 and the MMICs located near the F type connector shown in the drawing.

Fig 1  
(a)

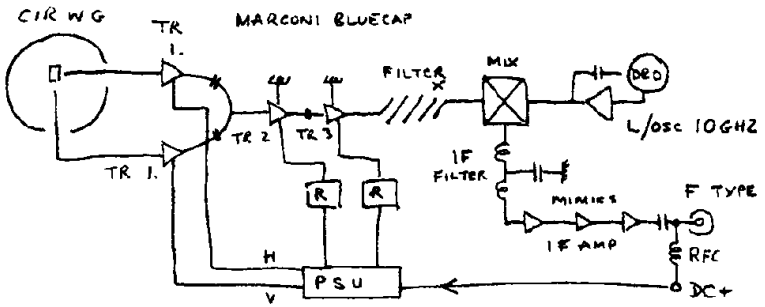


Fig 1  
(b)

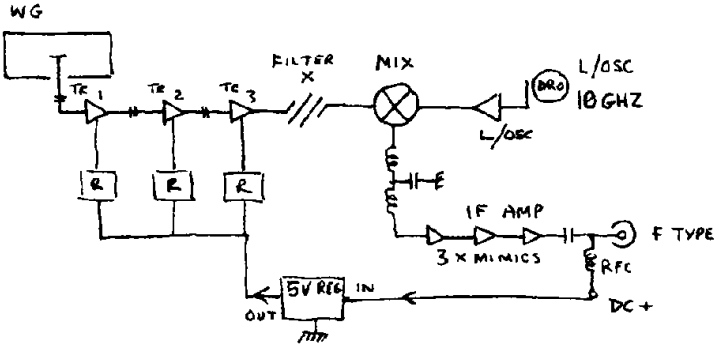


Fig 2  
(a)

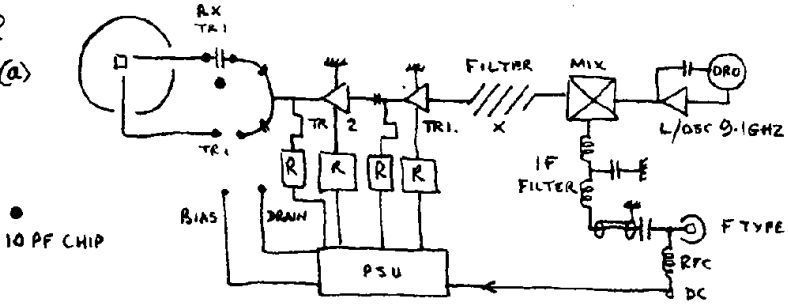


Fig 2  
(b)

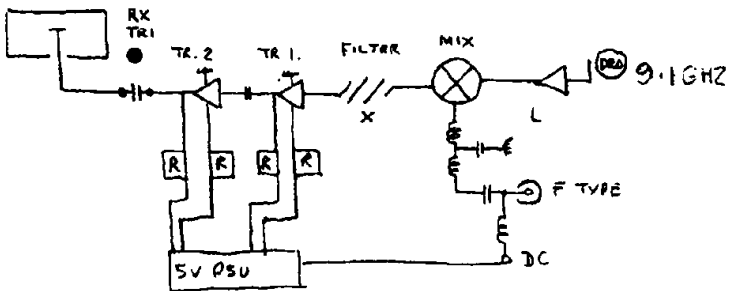


FIG 3(a)

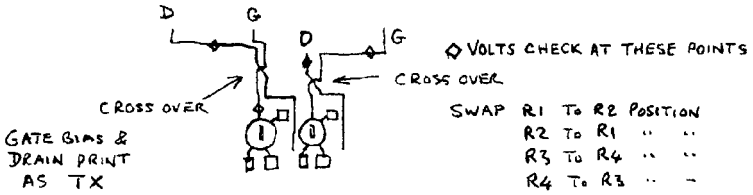
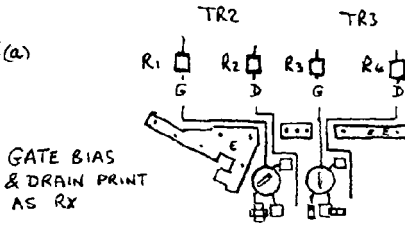
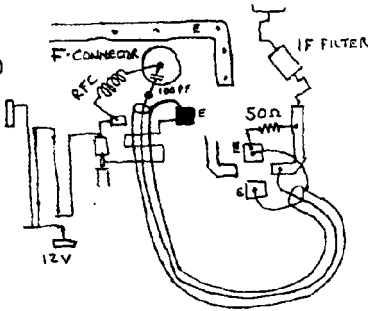


Fig 3(b)



CONNECT COAX AS SHOWN  
USE SURFACE MOUNT 50Ω 1/3W  
RESISTOR FROM EARTH PAD TO  
50Ω LINE

Fig 3(c)

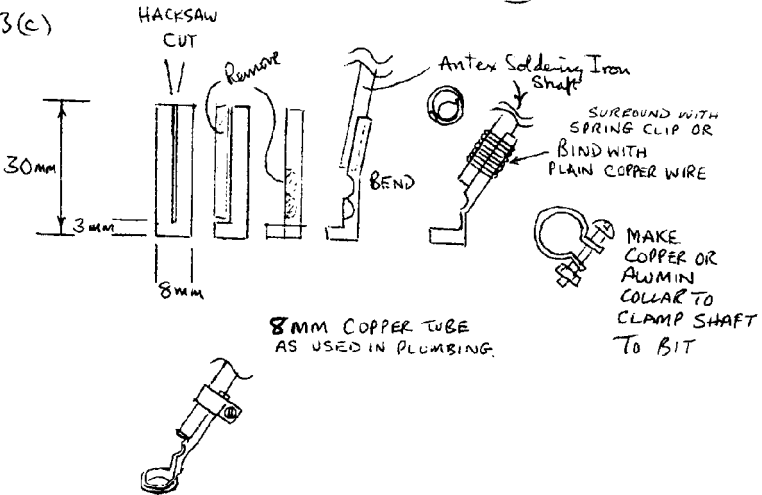
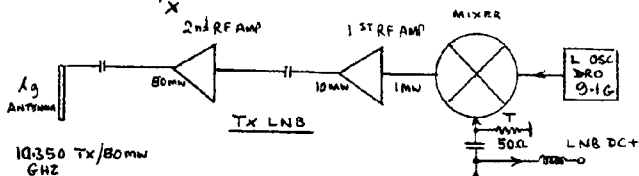
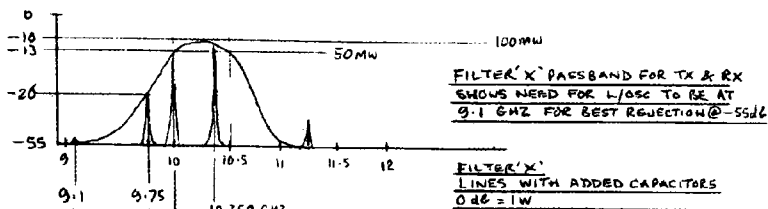
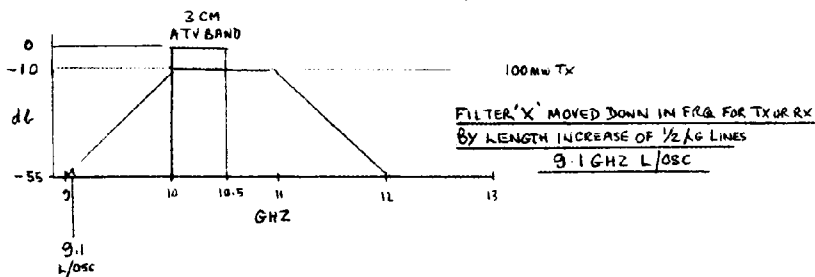
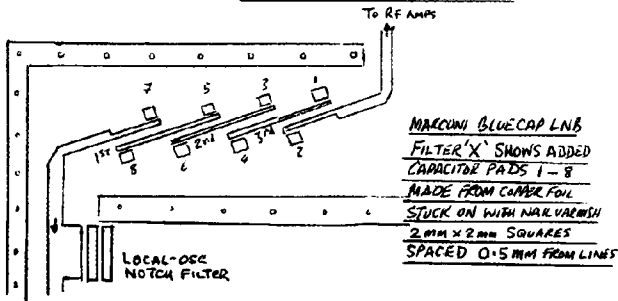


FIG 4



1250 MHz 1-5mw FM TX @ 50Ω  
+ DC TO POWER SYSTEM  
CONTAINS VIDEO & SOUND CARRIER  
FULL RANGE COVERAGE 900MHz To 1400

NOTE:-  
IF 1<sup>st</sup> LINE IS  
INCREASED IN  
LENGTH BY 2mm  
THIS SHOULD REMOVE  
THE 11.6 GHz BLIP



If you are lucky to remove the devices without damage, clean up PCB with solder wick. Now concentrate on the gates and drains of TR2 and TR3, as shown in the drawing. Use fine 36swg tinned copper wire to cross the tracks. Make a cut in the tracks only when you are very sure you have got it right. Make sure that there are no shorts. Next, remove the gate and drain resistors to swap them over for both (TR1 Tx) and (TR2 Tx). Leave the gate voltage trim pots alone at this stage. Solder a 10pF chip cap across the drain and gate position of TR1H, as shown. Replace the transistors in the transmit positions, as shown in Fig.2a and 2b (gates to the right). Replace the new DRO Puck, 9.1 GHz, in exactly the old position with the 2mm spacer of the original Puck.

Check the work you have done very, very carefully to make sure there are no errors. If you are satisfied, apply some nail varnish to the crossover wires to insulate them.

Continue to re-wire the F connector and the short co-ax. to the points shown in Fig.3b. The RFC is 5 turns of 26swg enamel copper wire, 1/8" diameter and 1/4" long. Add a 100pF chip capacitor and a 50 ohm resistor place as shown.

Check again that all the mods are correct. Connect a 12V supply with positive to the centre pin of the F connector and 0V to ground. Check the bias to TR1 and TR2 only on the DC side of the supplies and not the transistor gates. Then check the drain supplies, again not directly on the drains, but the DC supply side. The gates should be about -0.75 volts and the drains about +3.2 volts. If all is OK, switch off, disconnect the power supply connections and replace the diecast cover. If the original screws are not gripping, then you will need to drill and tap holes right through the body of the LNB. A 2BA tap or equivalent may be used.

The filter called "X" will need to be re-tuned, and the strip lines at TR1 and TR2 lengthened. This is accomplished by the addition of small pieces of copper foil added as shown in the strip line filter, items 1-8. You could actually replace the 'X' filter, see article in CQTV 169 (Bob Platts RKU-10 LNB). On the other hand, if you have a Spectrum Analyser, then its not too difficult to make tuning adjustments whilst watching the results.

Most of us do not have access to a Spectrum Analyser so the only way out is as follows

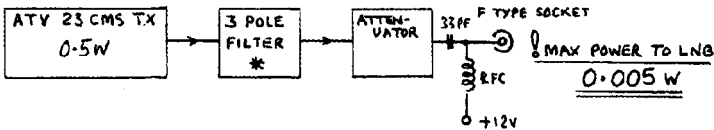
When you have re-assembled the Transmit LNB, apply 12 volts to it via the F connector. Look on your receiver and find the expected transmit frequency of approx. 10.350GHz (9.1GHz + 1250MHz).

Connect your 23cm Tx. via the attenuator, having previously checked the power level in the manner shown in the drawings. Adjust the LNB DRO oscillator screw on the diecast cover to locate with the receiver frequency. A strong signal of at least 8-10mW should be seen. On a standard satellite receiver, a much stronger signal will be seen with a standard Sky LNB. This will prove the system to be working. To get 80mW of transmit power, the alterations to the "X" filter and TR1, TR2 lines must be carried out.

This is not a project for absolute beginners. I hope this will pave the way for more thoughts on other types of LNB, as there are lots of others on the market for very little money My LNB is producing 80mW. but I have used two new NE32184A type devices, as the LNB I used cost 50p at a rally and was very poorly.

Good luck with yours, Peter G4LXC.

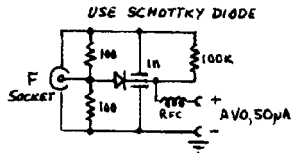
DRIVER TX & ATTENUATOR



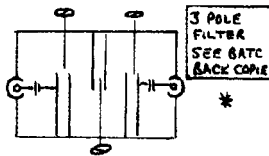
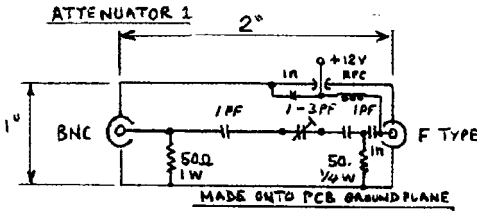
0.5W TX POWER REQ'S 20dB ATTENUATOR  
TO PROVIDE 5MW TO THE TX LNB MIXER

1.0W TX POWER REQ'S 23dB ATTENUATOR

\* YOU MUST USE A FILTER TO REMOVE  
SECOND & THIRD HARMONICS



TEST JIG TO CHECK  
POWER OUTPUT

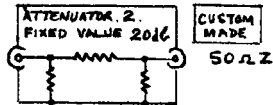


0-10 DRO PART No IS 38 DRO 9-10

AVAILABLE FROM :- OAKAVY COMPONENTS,

11 OXFORD ST, LAMBOURNE, RG 16 7XS.

TEL 04 88 71 458



# FURTHER NOTES ON THE G4LXC 3CM LNB ATV TX

## **Do not cut or change any of the tracks in the signal path until you have read the following:**

For fitting the new 9.1GHz Puck, you will require a T03 transistor mounting kit, comprised of two plastic washers and a piece of mica. In addition, a small bottle of clear cellulose varnish (cheap clear nail varnish is ideal) and a sharp cutting tool. Some nail varnish remover will also be needed.

First cut the plastic washer to provide a spacer about 2mm thick (slice off the smaller diameter part). Use a small amount of varnish to stick this to the PCB in exactly the same position as the old puck occupied. Add a tiny amount of varnish to the bottom of the DRO Puck and place onto the plastic washer spacer. Use a matchstick to push the puck around on its washer to obtain the lowest frequency. Add pieces of pre-cut mica under the puck if it will not go down in frequency. One or two pieces may be required, its messy and will need several attempts to get it right - hence the nail varnish remover is needed to clean up any surplus varnish. You should be able to get the Puck frequency down to 9.1 GHz or even 9.0 GHz. Go for the lowest possible. It may wind up off-centre - this OK if oscillation is sustained at a good level. The screw in the diecast cover should be fully out before replacement. The X filter is broadband, but does not allow very much gain at 10-10.5 GHz, so alterations are required. To reduce the frequency response of the filter there are two possible approaches; add capacitors to each end of the lines (which requires some very sophisticated equipment to carry out), or, simply add some copper to the existing length of the lines by placing over the top some copper foil. (Sticky-back PCB repair foil is ideal.) Use a sharp knife and a metal surface to cut the strip lines. Make the two new ones exactly 1mm longer than the existing ones at the position shown in fig. 1. Just stick them over the top of the existing lines. Press firmly in place. You must be very accurate with the positioning, 0.5mm overlap at each end is best.

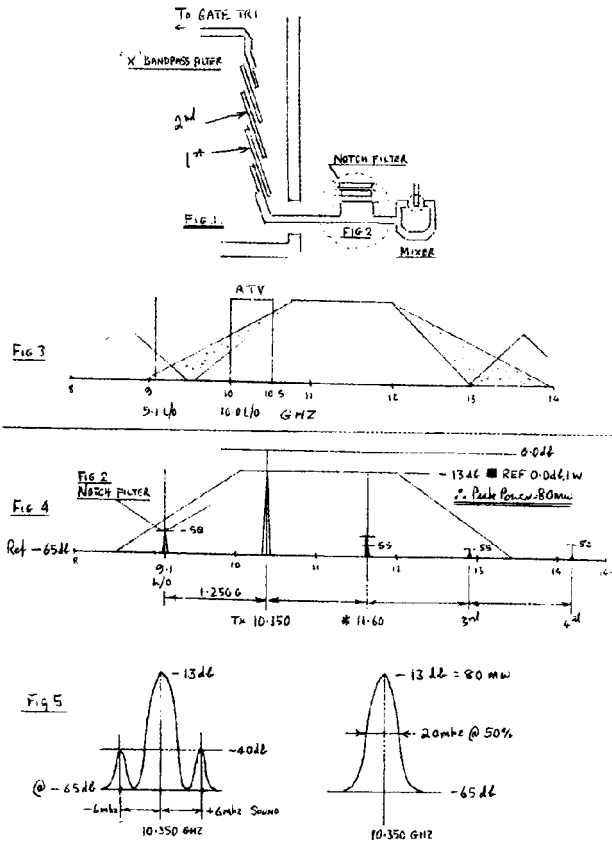
The local oscillator stop filter is shown in fig. 2. By adding copper foil over the top with additional length, the filter can be made to reduce the 9.1 GHz output from the mixer. Cut length A and B 2mm longer than the originals. By careful trimming of the lengths to be placed over the existing filter, it is possible to reduce the local oscillator at 9.1 GHz down to -55dB. ref. 0 dB 1W. This also increases the TX output from the mixer.

Fig. 3, shows the filter passband without modification, and its relationship to the ATV band and local oscillator.

Fig. 4. shows 9.1GHz local oscillator and TX frequency. \* denotes 2nd. harmonic mix from the 1.250GHz. i.e.,  $2.5\text{GHz} + 9.1\text{GHz} = 11.6\text{GHz}$ . The first strip line in 'X' will remove this effectively. The difficult frequency to remove is the 9.1 GHz and it may only be reduced to a just acceptable level. The results achieved are: local oscillator -50dB, TX -13dB, 2nd. Harmonic -55dB Ref. 0 dB =1W.

Fig 5 shows spectrum analyser results with video and audio modulation at a peak power of 80mW and 6MHz side bands of sound subcarrier. This modulation level is variable. and could be increased.

Note, the polarity of the TX signal, V-HORIZ, depends on the position of the LNB horiz/vert attitude, and does not matter if originally different.





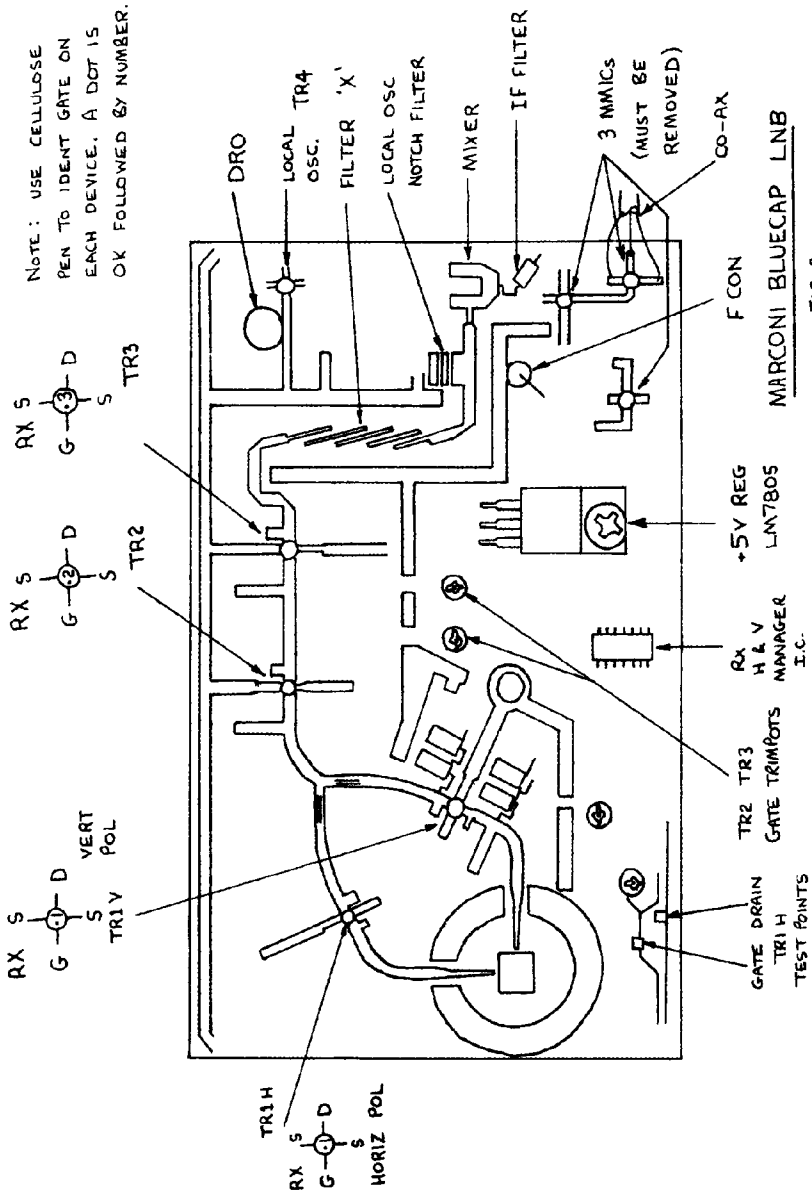


FIG. 3.

# Satellite TV News

**By Paul Holland G3TZO**

The promised flood of new satellite services for the new year with the launches of Astra 1D and Eutelsat II F6 has yet to materialise. In this edition of "Satellite TV News" we reflect on what has happened so far and what we might still expect to see over the next few months.

## **EUTELSAT NEWS**

As the "Satellite TV News" deadline approached Arianespace announced that Flight 71 would go ahead on March 14th carrying Eutelsat II F6 and Brasilsat B2 aboard an Ariane 44LP rocket. The Ariane 44LP launcher was equipped with two liquid and two solid strap on boosters to lift the 3,579 kg payload.

Initial reports on the cause of the Ariane Flight 70 failure were borne out by the official Arianespace board of enquiry report. The enquiry board established that the problem was of an "accidental nature" and was due to an interference of the oxygen flow to the gas generator of the 3rd stage rocket.

Hot Bird 3 which is due to launch in late 1997 or 1998 will carry in addition to its European Beam Transponders up to 6 Transponders that have a spot beam covering the whole of South Africa. Hot Bird 3 will be co-located at 13.0 deg E with Hot Birds 1&2.

## **ASTRA NEWS**

### **Astra 1D**

The slow take up of Astra 1D would appear to be due to the lack of capability by the majority of domestic satellite systems to tune down to the new lower frequencies. The result of this is that most of those channels which have taken space on Astra 1D (Teleclub, RTL4 RTL5 and Filmnet Europe) are directed primarily at cable head ends. We can expect to see other predominantly cable services such as Premiere to move to Astra 1D to attract new DTH services to Astra's 1A, B & C. Digital tests are being carried out on Astra 1D using Tp's 77 & 78 ( Check in the BSS Band between 11.7 & 12.07 Ghz). Transmissions have been in MPEG 2 using the News Datacom Videoguard encryption system.

### **Astra 1G**

News from SES indicates that ASTRA 1G will be launched in the 2nd quarter of 1997 and will be built by Hughes using the HS601 HP platform. Astra 1G will have a 15 yrs life expectancy, 56 channel capacity and will provide backup for Astra E and 1F. The frequency plan is shown below;

11.7 Ghz - 12.1 Ghz : 18 Channels (Astra 1E Backup)

12.1 Ghz - 12.5 Ghz: 22 Channels ( Astra 1F Back-up)

12.5 Ghz - 12.75 GHz: 16

Channels

Astra 1G will use 100 W TWTA's with Tp bandwidth of 26 Mhz in the FSS band and 33 Mhz in the BSS band.

### **Astra 1E**

SES have confirmed that Astra 1E will launch in June or July from Kourou aboard an Ariane 42L rocket. Astra 1F will launch sometime in 1996 aboard a Russian Proton D1e rocket from Baikonur in Kazakstan.

According to industry sources B-Sky-B has taken 3 Tp's on each of the next Astra satellites, Astras 1E, 1F and 1G, for digitally compressed services. It is probable that B-Sky-B will launch the first services on Astra 1E later this year, probably in the run up to Christmas and with the availability of the first digital DTH equipment. The German Kirch group have been reported to have taken up to 8 of Astra 1E's Tp's with Canal Plus already booked with 4 Tp's.

### **New orbital locations.**

With the 19.0 Deg E slot rapidly getting congested the Luxembourg Government have applied for 8 new orbital locations at 24.2, 26.2, 28.2, 31.5, 35.5, 37.5, 41.2, and 43.2 Deg East. A frequency allocation between 10.70 and 12.75 GHz has been applied for. SES operates ASTRA under a 22 yrs franchise granted by the Luxembourg Government.

### **INTELSAT NEWS**

Intelsat 704 has now been located at 66.0 Deg E following its successful launch aboard a Martin Marietta Atlas IIAs rocket from Cape Canaveral. Intelsat claim the satellite is already fully booked. One interesting customer to watch is Orbit communications who have booked four 112 Mhz transponders for DTH services. Although primarily targeted at the middle east there are reports that Orbit are planning a digital MPEG 2 European feed. The EIRP at beam centre (covering most of the UK) is 50.3dB. Orbit is using Scientific Atlanta equipment and is providing up to 28 TV channels and 12 radio channels in English, Arabic and French.

### **ARABSAT 1 DR**

For those with C Band capability check out Arabsat 1's replacement Arabsat 1DR at 20.0 Deg E. Because of the satellites footprint EIRP has dropped in central Europe. Based on experience in setting up an installation for Arabsat some months ago I would estimate a minimum antenna size of 3.5 m is required for noise free reception.

<b>Service</b>	<b>Tp</b>	<b>Freq (Ghz)</b>
Future Vision	1H	3.748
Future Vision	3H	3.820
Future Vision	5H	3.900
ART	2H	3.780
ART	4H	3.860
ART	6H	3.940
ART	8H	4.020
Al-Nufud	7H	3.980
Orbit	9H	4.060
Orbit	10H	4.100
Orbit	11H	4.140
Orbit	12H	4.180

All transponders are vertically polarised with 36 Mhz bandwidth.

### **FROM THE POST BAG**

Hot from editing VHF/UHF news in RADCOM Norman Fitch,G3FPK writes to ask if the list of satellites covered in "Satellite TV News" is up to date and complete Norman encloses a print out from the G3RUH Geosat program he has adapted for Quickbasic which lists satellites over the geostationary and asks if all satellites listed in his print out are operational. This month therefore I have updated Transponder Report to include the full range of satellites visible over the horizon from this QTH as a guide to what is available in both Ku and C Bands.

Mike Marsden,G8BQH,wrote in to point out a couple of inaccuracies in the Transponder Frequency Plan for Eutelsat II F1 in the last edition of "Satellite TV News". The plan was captioned as being a "Future" frequency plan and was my prediction for Eutelsat II F1 loading following a successful launch of Eutelsat II F6 and the subsequent musical chairs that will take place - not the current allocations. Sorry for any confusion ! Mike correctly points out that the convention for half transponder numbering is U or Upper for the high frequency and L or Lower for the lower frequency sharing the same transponder. See Transponder report for the latest news on changes that may occur;

### **ACTIVE SATELLITES**

The following is the latest list of active satellites visible from the UK. Anyone requiring a full list which includes individual transponder loading can write to meen closing an SAE and telling me what you would like to see covered in "Satellite TV News"

Intelsat 704 66.0 Deg E  
 Intelsat 604 60.0 Deg E  
 Stationar - 5 53.0 Deg E  
 Turksat 1B 42.0 Deg E  
 DFS 1 KOPERNIKUS 33.5 Deg E  
 DFS 2 Kopernikus 28.5 Deg E  
 DFS 3 Kopernikus 23.5 Deg E  
 Arabsat 1D 20.0 Deg E  
 Eutelsat II F3 16.0 Deg E  
 Eutelsat II F2 10.0 Deg E  
 SIRIUS (Formerly Marco Polo 1) 5.2 Deg E  
 Telecom 1C 3.0 Deg E  
 DegW.  
 THOR (Formerly Marco Polo 2) 0.8 Deg W  
 Telecom 2A 8.0 Deg W  
 Stat 4/ Gorizont 15 14 Deg W  
 TDF 1/2 19 Deg W  
 Intelsat 512 21.4 Deg W  
 Intelsat 601 27.5 Deg W  
 Intelsat 504 31.4 Deg W  
 Orion F1 37.5 Deg W  
 PAS 1 45.5 Deg W  
 Intelsat 513 53.0 Deg W

Intelsat 602 62.9 Deg E  
 Intelsat 507 5.07 Deg E  
 Eutelsat 1 F1 48.0 Deg E  
 Stationar - 12 40.0 Deg E  
 Arabsat 1C 3 1.0 Deg E  
 Eutelsat 1 F4 25.4 Deg E.  
 Eutelsat 1 F5 21.5 Deg E  
 ASTRA 1A,1B,1C,1D)19.2DegE  
 Eutelsat II F1/II F6 13.0DegE.  
 Eutelsat II F4 7.0 Deg E  
 Tele X 5.0 Deg E.  
 Intelsat 702 1

Telecom 2B 5.0 Deg W.  
 Stat II/Gorizont II 11.0DegW.  
 Intelsat 515 18.5 W  
 Intelsat K 21.5 Deg W  
 Intelsat 605 24.5 Deg W  
 Hispasat 1A & 1B 30.0 Deg W  
 Intelsat 603 34.5 Deg W  
 Intelsat 502 40.5 Deg W  
 Intelsat 506 50.0 Deg W

## NEW CHANNELS

### La Chaine Meteo

The new French weather channel "La Chaine Meteo" is planning a launch on French cable networks in June. It is not clear what satellite will be used at first, however the channel is mooted to be one the digital Canal Plus bouquet of channels to go on Astra 1E later this year.

### Reise TV

Reise TV the German holiday and weather channel is planning to launch this month. No Tp details were available as we go to press.

## TRANSPONDER REPORT

### DFS 1

#### Kopernikus

The Czech Cable Plus channel looks likely to be moving from Eutelsat 1 F5 to this satellite on Tp C1 11.625 Ghz (H).

### **Eutelsat 1 F5 21.5 Deg E**

The Slovakian Danubias general entertainment cable television channel commenced operation in late February on Tp 26 11.095 GHz (H).The service is initially 4 hrs per day starting at 6.0pm GMT.The Serbian RTS-Sat service currently on Tp 10 11.491 Ghz (H) looks likely to move to Eutelsat IIF4 at 7.0 Deg E in the near future.

### **ASTRA 1A,1B,1C,1D 19.2 Deg E**

Kabel 1 is due to take Teleclub's Tp 9 11.322 Ghz (H) following Teleclub's move to Astra 1D and if it obtains German licensing authority approval. RTL Disney has taken RTL 4's Tp 14 11.391 Ghz (H) following that channels move to Astra 1D. MTV is due to encrypt in Videocrypt 1 (for the UK) & Videocrypt 2 (for Europe) in July.

### **Eutelsat 11 F3 16.0 Deg E.**

TV Erotica may take a second Tp (Tp 37 11.575 Ghz H) in addition to Tp 22 11.163 Ghz (H).TV Erotica is in D2Mac using Eurocrypt S2 encryption. A new French adult channel is also claiming to be launching on this satellite under the name "The Rendezvous Channel".

### **Eutelsat II F1**

Tp 39 11.658 Ghz V MTV - With the move of MTV to Hot Bird 1 this Tp may be used for the launch of VH1 for Germany.

Tp 20 L 10.972 Ghz H Eurosport - With the move of Eurosport to Hot Bird 1 it is possible that the new German music channel Viva 2 will take the lower half of this transponder which has Viva 1 on the upper half. This may not happen however if Viva 2 takes Tp 22 L 11.146 Ghz (H) which has been used for the initial launch of the Flemish channel VT4 on cable nets in Belgium.

Following NBC Super Channels decision to give up its reservation on Hot Bird 1 it is reported that the French Canal Horizons channel will take its place. Canal Horizons can only be seen at present in C Band from Intelsat 601 at 27.5 Deg W and is encrypted in Nagravision. The Dutch channel Veronica will take Tp 22U 11.181 Ghz (H) when TRT International moves to Eutelsat II F2. A further Dutch music channel is also scheduled to join Veronica but no Tp information is available as yet.

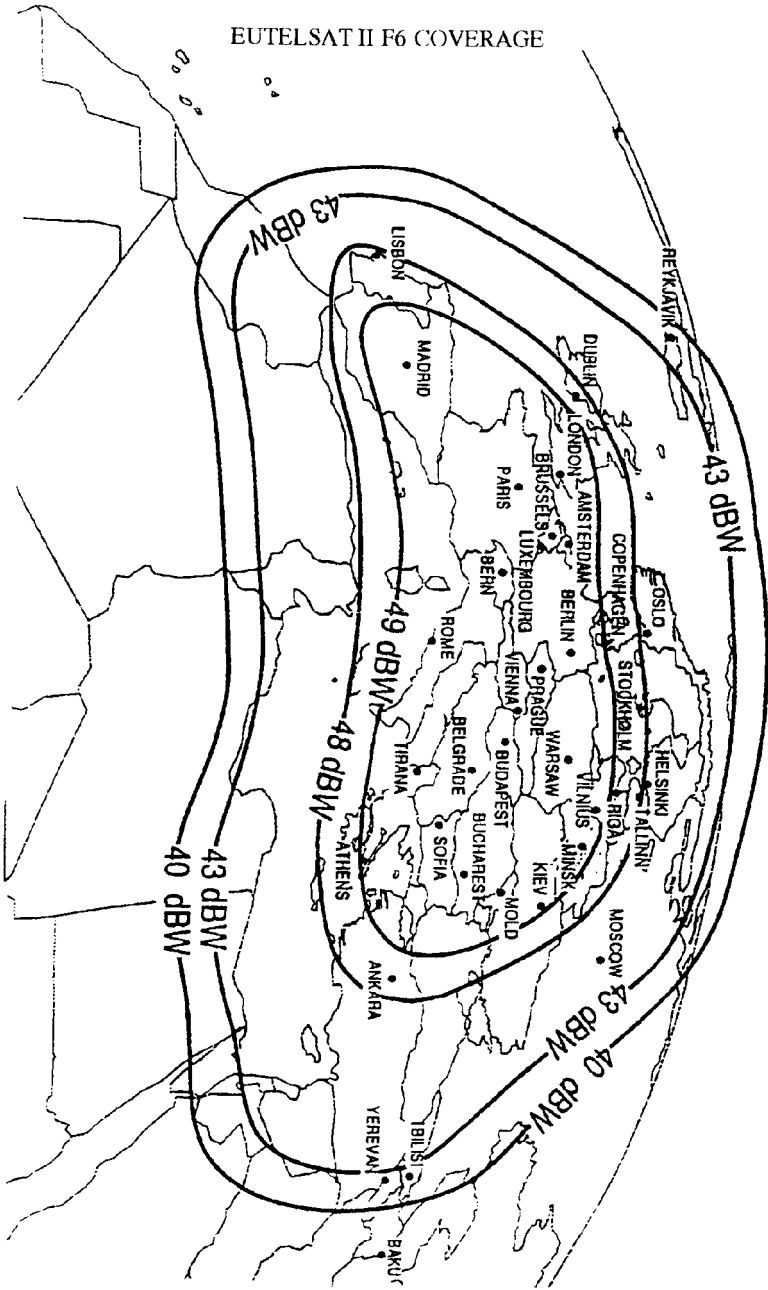
### **Eutelsat 11 F6 (Hot Bird 1)**

Tp 2 11.242 Ghz (V) MTV will use of an MPEG 2 feed to European cablenets on this Tp in conjunction with its PAL service. It is not clear if MTV will encrypt either of these feeds.

### **Eutelsat 11 F2 10.0 Deg E.**

News from Eutelsat indicates that RTP International on Tp 39 11.658 Ghz will move to Eutelsat II F1 following the launch of Eutelsat II F6. The European Union have launched a channel providing coverage of various EC debates and committees on TP 21U 11.080 Ghz (H). English sound is on 7.02Mhz.

EUTELSAT II F6 COVERAGE



### **THOR (Formerly Marco Polo 2) 0.8 Deg W.**

The Norwegian versions of the Swedish channels Z-TV and TV6 are to be carried over Thor using an MPEG 2 link. No transponder details are currently available.

### **TV SAT 0.6 Deg W**

TV Sat has been relocated to this position from 19.0 Deg W. It took up position in mid March and is now operated by the Norwegian Telecom. With the arrival of TV Sat at this position we can expect to see a number of additional Scandinavian services launched. Amongst these will be a new private Norwegian channel called TV+ which was scheduled to launch in late March.

### **Intelsat 702 1 Deg W.**

TV 1000 Cinema is now on Tp 79 11.597 GHz (H) displacing TV3 Denmark which has now taken SVT2's Transponder (Tp 75 11.475 GHz (V)) in D2 Mac and encrypted in Eurocrypt M.

### **Stat 11/Gorizont 11 11.0 Deg W.**

Mink TV is now to be found regularly on Tp 1 11.525 GHz (RHC) in clear PAL.

### **Express 114.0 DegE**

This new Russian satellite is now in position and is taking over traffic formerly carried by Gorizont 15. The transponder frequency plan is as shown below.

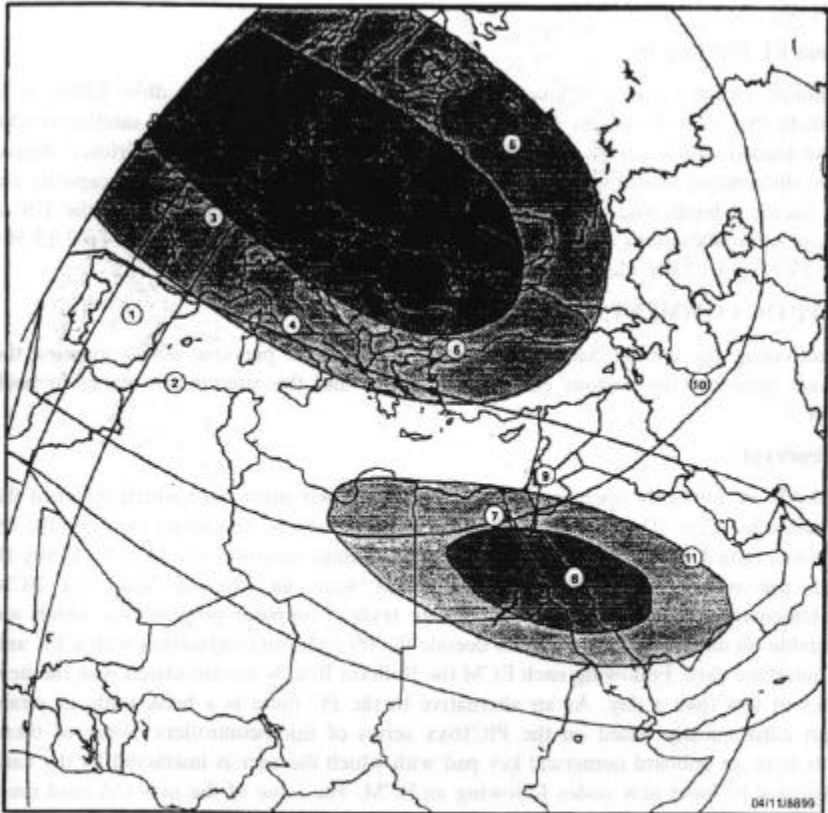
Tp	Centre Frequency	Pol	Service
6	3.675 Ghz	RHC	Ostankino Kanal 1
7	3.725 Ghz	RHC	Muslim TV Ahmaddiya
8	3.775 Ghz	RHC	Not allocated
9	3.825 Ghz	RHC	TV Madagascar/Cubavision
10	3.875 Ghz	RHC	Not allocated
11	3.925 Ghz	RHC	99
14	3.975 Ghz	RHC	99
15	4.025 Ghz	RHC	RTP International
16	4.075 GHz	RHC	Not allocated
17	4.125 GHz	RHC	91
12	11.525 Ghz	H	91
20	11.625 GHz	H	91

### **TDF 112 19 Deg W.**

By the time you read this it seems TDF 2 will be being prepared for a move to 8.0 Deg W to be co-located with Telecom 2A. It is reported that TDF2 will be used for digital tests in the run up to Canal Plus launching digital DTH services in the autumn.



# IS-704 Ku-Band at 66°E (Spot 1-2)



e.i.r.p. Levels (dBW)



- |            |           |
|------------|-----------|
| 1 Madrid   | 7 Cairo   |
| 2 Algiers  | 8 Jeddah  |
| 3 Paris    | 9 Amman   |
| 4 Rome     | 10 Tehran |
| 5 Moscow   | 11 Riyadh |
| 6 Istanbul |           |

## **Intelsat 601 27.5 Deg W**

European Business News launched on this satellite back in February prior to moving to its permanent position on Eutelsat II F6. The channel is in clear PAL on Tp 61U 11.017 GHz (H)

## **Orion F1 37.5 Deg W**

Although Orion F1 is a relatively high powered satellite (45-52 dbW EIRP) it is unlikely that we will see any DTH services being established here. The satellite is now being loaded with a variety of services such as ; VSAT for the Czech Airforce, digital radio distribution to European & US military cablenets, backup telephony capacity for the Faeroe Islands, and several contracts for digital TV distribution from the US to European broadcasters. Occasional analogue feeds can however be seen on Tp 2 12.591 Ghz (V), Tp 3 12.667 Ghz (v) and Tp 7 11.622 (V).

## **CRYPTIC COMMENTS**

In reflecting the current Satellite TV scene it would be perverse not to mention the current status of the various encryption systems and the attempts by many to hack them.

### **Videocrypt.**

B-Sky-B are currently operating the 09 version of their smart card which replaced the 07 cards last year. The 07 card had been comprehensively hacked by the time the 09 card was issued despite a number of electronic counter measures (ECM's) by B-Sky-B. With the issue of the 09 series there has been an ongoing series of ECM implementations timed to disrupt the pirate trade. Computer programmes which are available on many BBS's are able to decode the 09 codes in conjunction with a PC and PC interface card. Following each ECM the Bulletin Boards are circulated with the new codes in less than a day. As an alternative to the PC there is a brisk trade in pirate smart cards mostly based on the PIC16xx series of microcontrollers. Some of these cards have an onboard numerical key pad with which the user is instructed by the card distributor to input new codes following an ECM. The issue of the new OA card must now be imminent.

### **Eurocrypt**

Channels such as Filmnet, TV1000 and TV3 Sweden/Denmark/Norway use the Eurocrypt M encryption. In the last 12 months this system also has been substantially compromised with pirate cards based on dual PIC 1684's in common use throughout Europe. In February this year TV 1000 and TV 1000 Cinema implemented a code change however this was again hacked within a few weeks . It is believed that many of the Scandinavian broadcasters intend to upgrade to the more secure Eurocrypt S2 system

## **SATELLITE HEAVEN!**

Courtesy of ITN (see rear cover) we can observe the various antennas perched on the ITN rooftop in Grays Inn Road. London. The main steerable antenna used for SNG reception and uplinking is a massive 5.6m. Smaller fixed antenna (1.8m, 3.0m & 4.0 m) are fixed on Eutelsat II F1 at 13.0 Deg E, Astra at 19.0 Deg E, Gorizont at 14.0 Deg W. Intelsat at 27.5 Deg W and Panamsat at 47.5 Deg W. Satellite Newsgathering (SNG) has until recently used Eutelsat 1 F4 at 25.5 Deg W however due to transponder failure this has now been discontinued in favour of the Maxat Tp on Eutelsat II F1 and Orion F1.

## **NEW PRODUCTS**

### **Swedish Microwaves SMW-1600 Multifocus Antenna**

An interesting variation on the fixed versus motorised antenna option is the SMW OA-1600 multi focus antenna. This antenna, made from impact resistant ABS, is a combination of an offset parabolic and a spherical dish allowing high efficiency reception across a 26.0 deg arc. Due to the design used losses normally suffered when using multi-feeds on a fixed dish are minimised. The antenna covers all geostationary satellites positioned within a 26.0 deg arc with the same efficiency. Up to 9 feeds can be attached to the antenna with each one individually adjustable to optimise reception. Each focal point of the OA-1600 is equivalent to a 100cm normal offset antenna. The specification from SMW is reproduced below,



## **SMW OA-1600**

Satellite Range	26.0 Deg
Antenna declination	+/- 42.0 deg
Type	Offset 13.0 deg
Size	1650 /1110 mm
Material	5.5mm ABS
Surface Accuracy	0.5mm RMS
Frequency Range	10.7 - 12.75 Ghz
Gain at 12.0 Ghz	40.6 db
Focal length	700 mm
Beamwidth at 12.0 Ghz	1.5 deg

## **CONCLUSION**

Well that's it again for another month. In the August issue of "Satellite TV News" I will report once again on all the new developments on show at the annual Cable & Satellite Exhibition at Olympia. Please keep the letters coming with your news and views of whats happening in the world of Satellite TV.

*Paul Holland - Chatterton, Chapel Lane, Thrapwood, Nr. Malpas, Cheshire, SY14 7AX*



*Mike G8LES at the 1994 Middlesex County Show*

# TV ON THE AIR

**By Andy Emmerson G8PTH**

## ***HEALTH HAZARDS?***

*Have you ever felt ill after playing ATV? No, it's not a frivolous question at all.*

The point is raised by William G8CMK, who has told me several people have come down with a general soil of listless feeling, (a bit like 'flu) after exposure to RF. One guy was looking down the boom of a yagi antenna towards it whilst it was radiating 10 watts, and felt so poorly he was off work for three weeks afterwards. Another ended up in bed for three days after setting up a Worthing transmitter with the lid off. He had the most frightful head and neck ache, with so much discomfort that the doctor had to be summoned. [Callsigns supplied but not given here in case others call these guys wimps! ]. William himself said he was making field strength measurements with a Polyscop feeding no more than 10mW into a corner reflector antenna. After a couple of minutes he felt his face muscles twitching and whilst it might just have been coincidence, he thought afterwards about that pulsed RF coming straight at him. On another occasion he was using the Polyscop again, this time to align cavity resonators. He was moving piece parts inside the cavity with his fingers and it wasn't long before these ached and became quite numb. Coincidence again? Nobody knows for sure but exposure to even low levels of radiation at microwave levels is not good for the human body. All the incidents just related involved 23cm energy and William suggests you treat it like poison. Keep the covers on with RF devices and always err on the side of caution. Remember, it was alleged that the Russians used to bombard the American embassy in Moscow with low-level microwave radiation and even if this is no more than a wicked rumour, it reminds us that RF energy in the wrong place does us no good at all. Bear this in mind and play safe. If any reader is medically qualified on these matters, please write in and share your knowledge!

## **AUSTRIA CALLING**

Travel broadens the mind and even if we can't visit far-off places, we may learn something by reading about them. The same applies to our amateur radio and television hobby; there's much to be gained seeing how other people handle things elsewhere. Someone in a position to comment is Jonathan Gudgeon G4MDU, currently in Austria. Some people go there for skiing or a less strenuous holiday but for John it's work (or at least that's what he says). In any case, he has kindly sent some information on the ATV scene over there.

On the face of it, amateur television is organised in a similar fashion to Britain, though Jon's subjective impression is that the TV repeaters are more advanced than in the UK. Several, he notes, have outputs in the satellite part of the 23cm band.

ATV'ers in Austria get most of their news from the ATV pages of 'QSP', the Austrian national radio club's magazine and also from the German ATV club magazine 'Der TV Amateur'. Amateur television activity started on the 70cm band, largely in the 1970s, and has since migrated to the 24, 13 and 3cm bands. Satellite tuners are widely used for receiving ATV transmissions in the 24cm band, whilst LNBs are also converted for direct reception of 10GHz signals. The relative ease of getting on the air, at least for receiving, has not diminished interest in the experimental side of transmission and reception. At the same time, the inertia and apathy which seems to affect other ham radio modes (at least in Austria) is thankfully missing in ATV, not least because 'it needs two to tango'. Amateur television is a social thing, a people activity, not like, say, packet radio which you can do all by yourself.

## **NINE REPEATERS**

There are already nine TV repeaters in Austria, numbered TV1 to TV9, and brief details follow. Note that several have AM, rather than FM, outputs.

TV1 (OE5XLL), Linz. Twin inputs on 433.75 and 1250MHz (both AM).  
output on 1282MHz AM.

TV2 (OE5XUL), Ried and not far from Linz. Input 1250MHz FM,  
output 433.75MHz AM.

TV3 (OE2XHM), Salzburg. Input 1250MHz, output 434.75MHz, both AM.

TV4 (OE6XFD), Graz. Input 433.75MHz AM, output 1280MHz FM.

TV5 (OE7XLT), Landeck. Input 10.412GHz, output 1270MHz, both FM.

TV6 (OE8XTK), near Klagenfurt. Input 2412MHz, output 1280.5MHz, both FM.

TV7 (OE7XST), Innsbruck. Input 2412MHz, output 1278MHz, both FM.

TV8 (OE3XFW), Frauenstaffel, north-east Austria. Frequencies not yet published.

TV9 (OE7XCT), Landeck. Input 2435MHz, output 10.435GHz, both FM.

Most of these repeaters are well situated. TV5 and TV9 (Landeck) have an elevation of 2,200 metres above sea level, whilst TV7 is even higher, at 2,378 metres. TV3 and TV6 are just short of 2,000 metres when are we going to put a TV repeater on top of Mount Snowdon or Ben Nevis? Oh well, just a thought.

An international link on 10GHz to Germany (not far away!) is planned for the Landeck repeaters. All but one of the repeaters use horizontally polarised antennas, the

exception being the second repeater at Landeck because two machines are co-sited there. Taking TV5 and TV9 as an example. we find the mode is FM vision with a 6.5MHz (not 5.5 or 6.0MHz) audio subcarrier. Deviation on audio is 180kHz. whilst the video bandwidth is 16MHz. ATVers without video transmitters can use the audio channel to take part in ATV link-ups by transmitting on the international ATV calling frequency. 144.750MHz. In general, repeaters use omnidirectional colinears for 70. 23 and 13cm and horns for 10GHz.

TV9 is the newest of these repeaters and has remote control facilities to switch the transmitter between high (10W) and low (1.5W) power. When activated, the repeater first monitors the input signal and checks for video modulation. In addition it is switched on automatically for ten minutes at the start of every hour. in beacon mode. A choice of two video test patterns is available and a welcome greeting is played out on the sound channel, together with the repeater's technical details.

### **BACK TO BRITAIN**

Arthur G5KS writes from Warley in the West Midlands. "Just a few lines from this area. I have taught my younger son John and his friend Allan... and have got them a very good pass for the RAE. They have just sent for their licences and are now learning CW. They have both been instructed on building 70cm vision transmitters and will be on the air in less than two weeks [this was written in mid-February]. They are both going to join BATC, so that will make 70cm vision active around here --

I feel it is time 70cm video was given a boost! I am still active on 70 and 24cm." That's good news and it's always good to hear from the people who are at the sharp end, on the air.

Here's William G8CMK again, with some interesting views on 24cm ATV. He is very keen on promoting AM techniques on this band, even though AM is not very fashionable these days. But he argues convincingly that the benefits of FM are largely lost with the narrow deviation used by ATVers and if activity (of all types) on the 23 and 24cm bands increases at the rate it is doing, we may be forced to re-examine AM techniques to conserve bandwidth. It won't be easy, however, he says.

"AM on 23 is not a task for the average dabbler. It is possible to obtain 19.7dB from a Mitsubishi module for 10 watts peak sync if the input is properly matched," he writes. ---Some pathetically ignorant people overdrive them with 1W or more. An MGF0904a makes a good driver, with 16dB gain. This setup can be fed from an MRF965 (with 14dB gain). With a total of 50dB gain it should be easy to drive but that was where my troubles really began. Mixers, at least linear mixers, are the problem. I did use a single MRF965 with the IF into gate 2 because it was not load-sensitive and the output could be made to look like 50-ohms to better than 1.05:1 to keep the filter happy. Diode rings and filters did not mix. On SWR, worse than 1.1:1 at carrier and you are dead. A spectrum analyser would have been useful. My amateur cunning was at its limit!"

These words of wisdom remind me of an article on Mitsubishi amplifiers in another CQ-TV 170

ATV publication, where the author points out you should drive these black bricks with no more power than they need to achieve the rated output. They are easily damaged in this way (they can tolerate no-load conditions far better!) but even then the output stage may have survived and it may be possible to re-use the device bypassing the input stage. For linear use, your input power should be restricted to below 100mW.

## SHOP WINDOW

An interesting letter comes from Mike G8LES, Technical Officer for the Home Counties ATV Group, who is making a range of printed circuit boards available to those wishing to construct a 24cm ATV station. He writes: I had a great deal to do with G3CMQ when designing the Solent 1-watt ATV transmitter boards in 1984, so I have been able to enhance and update the design. Also various components have been changed to give good results first time, especially concerning the transmitter to make it very easy to achieve the rated power output without considerable fiddling. Thus these are supplied with updated drawings and mods, but you buy/scrounge your own components. Some supplier information is included as a guide following the instructions.

I hold a small stock of PCBs. Occasionally they may be out of stock. The longest wait so far has been six weeks, but is more likely to be four weeks. All PCBs are in stock at present time. The range comprises:

1. Recently updated GaAsFET/MMIC downconverter PCB. Converts 23cm 1240-1318 to UHF Choose a clear frequency for ten UHF channels in your area. 9.50
2. FM Demodulator for ATV. UHF in channels 21-68. IF limiter, narrow/wide switchable IF with AGC, variable video demodulator bandwidth, tuneable sound PLL. 1 watt audio amp, +/- video, switchable de-emphasis, video out/variable gain. 50Hz audio buzz mod to listen for DX timebase when aligning beams. Tuning meter and S-meter. A great improvement over CQ TV 122's FM demodulator. 14.00
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5. I offer a 'get it going service'. Technical support within reasonable limits is free, on the basis that you telephone me or if in range call on 144.750. Physically aligning or repairing can not be offered free. The charge is 25.00 per hour plus parts."

Full details from Mike by ringing 01420-563859 or write to him at his callbook address.



## REPEATER NEWS

Word from the Kent Repeater Group has it that their application has been submitted and is being vetted by the relevant authorities. It would appear that several other repeater groups who placed their applications before Kent are experiencing delay due to one particular authority. Concerned about this, Andy, G8SUY contacted a member of the RSGB repeater management committee to find out more information; he was told that there was a small problem and the RSGB representatives would be taking the matter up (one good reason to join the RSGB!). Meanwhile the repeater has been placed in beacon mode while work is done in preparation for its eventual move to the Isle of Sheppey. When the full repeat mode comes back it will have an on-screen signal strength meter, similar to that of the Fakenham. repeater GB3TN.

Lately there has been an increase in local activity through the Kent TV repeater, which has seen the return of Les, G3LCW. who has been busy building a 28-element loop yagi from a past KTG newsletter article, Les was unable to get hold of the specified materials so he improvised and used thick copper wire for the loops and copper water pipe for the boom. The result is a very acceptable picture into the repeater, perhaps this will inspire others to have a go? Another new face on the repeater (but an old hand at ATV) is Nick G4IM0 from Rayleigh (Essex) who seems to have been bitten severely by the 24cm ATV bug! Nick has been busy constructing a 2C39 amplifier and possibly in record time; the project was started shortly before Christmas and was fired up in the first week of January. Also making an appearance on the system is Paul G8IXC (Walderslade), who also puts a very acceptable signal into the box.

On Severnside a huge amount of technical and administrative effort has brought the 10GHz repeater proposal to fruition. On Saturday 10th December at 11:00 GB3XG was switched on as an ATV repeater for the first time. The Group is indebted to all those who helped to make it a success, specially Ivor G1IXF, John C3RFL and Nigel G7JZP who have spent many hours in wellies, treading the mud (and other things!) at 'XG's site. Ted G3JMY had the honour of being the first person to broadcast through the new repeater, Phil G1HIA also managed a respectable signal, so congratulations to both.

Other Severnside news: Ian G6TVJ has given the most distant report. He was near Little Malvern and received 'XG on a portable dish; that's a distance of about 50 miles so it looks like the repeater covers quite a respectable range. Several people have commented on the similarities between XG's switch on and the early days of GB3ZZ. Lets hope the new repeater is as successful and stimulates 10GHz activity in the same way 'ZZ did on 24cm. Ian G6TVJ has been busy improving the reception and transmission quality on GB3ZZ. He has installed a 'variable active video equaliser' in line with the receiver output, which balances the levels between low and high video frequencies to overcome some of the deficiencies in the receiver and video circuits. Over in New Zealand, the Auckland ATV repeater ZL1BQ (70cm in, 50cm/ 615.25MHz/channel 39 out) has a replacement 70cm receiver and an extra two-stage

preamp. Stations which were previously P1 through the repeater are now P3! At the same time the teletext-style G8CJS video generator had its EPROM changed to version 17, which has acquired a new NZART page giving a phone number and address for NZART headquarters in Wellington. The Repeater Information page now has details of the additional 438.45MHz FM repeater at the Klondyke site.

At the recent Hamilton rally there was great interest in the BATC handbooks and PCBs for ATV transmitters. Mel ZL1WTV has ordered a Hills VSB TV exciter for 50cm to be used in the Hamilton area. The cost is about \$NZ 850 (300). Wayne ZL1UJK has begun construction of a three-stage class A linear amplifier to go with the exciter, whilst our correspondent Mike ZL1ABS has planned out an EPROM to go in the new repeater's teletext video generator. Many thanks Mike for this information!

## **OH WHAT A NIGHT!**

So says Ian G4MLY. referring to 13th October last year when super enhanced conditions allowed contacts over paths which had previously only been dreamt of. The early evening weather bulletin warned of co-channel interference for domestic TV viewers, a sure sign that conditions were up!

"Before I'd even been into my shack, I received a phone call from my friend Ray G4MSN in north Leeds reporting that he was seeing pictures from Dave G7KAO (Dartford) at a P3 grade, I moved to the shack and made contact with Ray on two metres. We exchanged pictures on 24cm and I was running 50W to four 28-element loop yagis and received a P5 report. Ray was running 8W to a single 28-element loop yagi for which I gave a P2 report. Ray later reported seeing Tony G6EXU (Ashford) and Jeff, F5RZC.(Pas de Calais region).

"Later that evening various other signals were seen on 24 and 13cm: on 24cm a German repeater. DBONC at Bad Zwischenahn was P5. On 13cm. DBOTS at Osnabrueck and PI6ZOD (north east Holland) were very strong at times. PI6ZOD appeared to be in beacon mode. My first QSO on 13cm (2335MHz) ATV was completed with Fred PEIJY near Amsterdam who was running 1 watt. Duplex working was achieved with Fred sending my 13cm (10W to 44 elements) pictures back via 24cm. Also that evening on 24cm GB3PV, GB3TV. GB3TN, GB3HV and GB3LO were seen along with a new repeater in the Northampton/Milton Keynes region."

Ian adds that when searching for continental repeaters, 1285MHz is a frequency worth monitoring when beaming cast north east, Continental repeaters appear to switch off when not in use or giving identification, also many have multi band operation with inputs on 70cm and 13cm or various permutations of the above. Confusing? Never!

# A UNIT WORTH IT'S WEIGHT IN GOLD

By Ian M Waters G3KKD

*How do you know when your local repeater is being accessed? You can't sit watching the box all day. The following describes a system used in Cambridge with GB3PV.*

The repeater is modified so that a low level 77Hz sub-audible tone is added to the sound sub-carrier when, and only when, the unit switches from beacon to repeat mode. The tone is generated by a CTCSS board as used with the communications repeaters.

When this tone is received an alarm sounds so you can see who is on the box and join in for a QSO. At G3KKD the 23cm Rx and this unit are fed from a separate mains feed and remain armed, even when the reset of the shack is switched off.

## **CIRCUIT DESCRIPTION**

Audio from the station 23cm Rx enters the unit and is passed to TR1 and TR2 which form a squelch circuit. When no sub-carrier is being received HF noise from the receiver is amplified by TR1, rectified and used to cut TR2 off. The coil in the collector of TR1 is a line stabilising coil from an old TV set. When sub-carrier is received the noise is muted and TR2 conducts passing signals two ways, to IC1 and to the audio volume control.

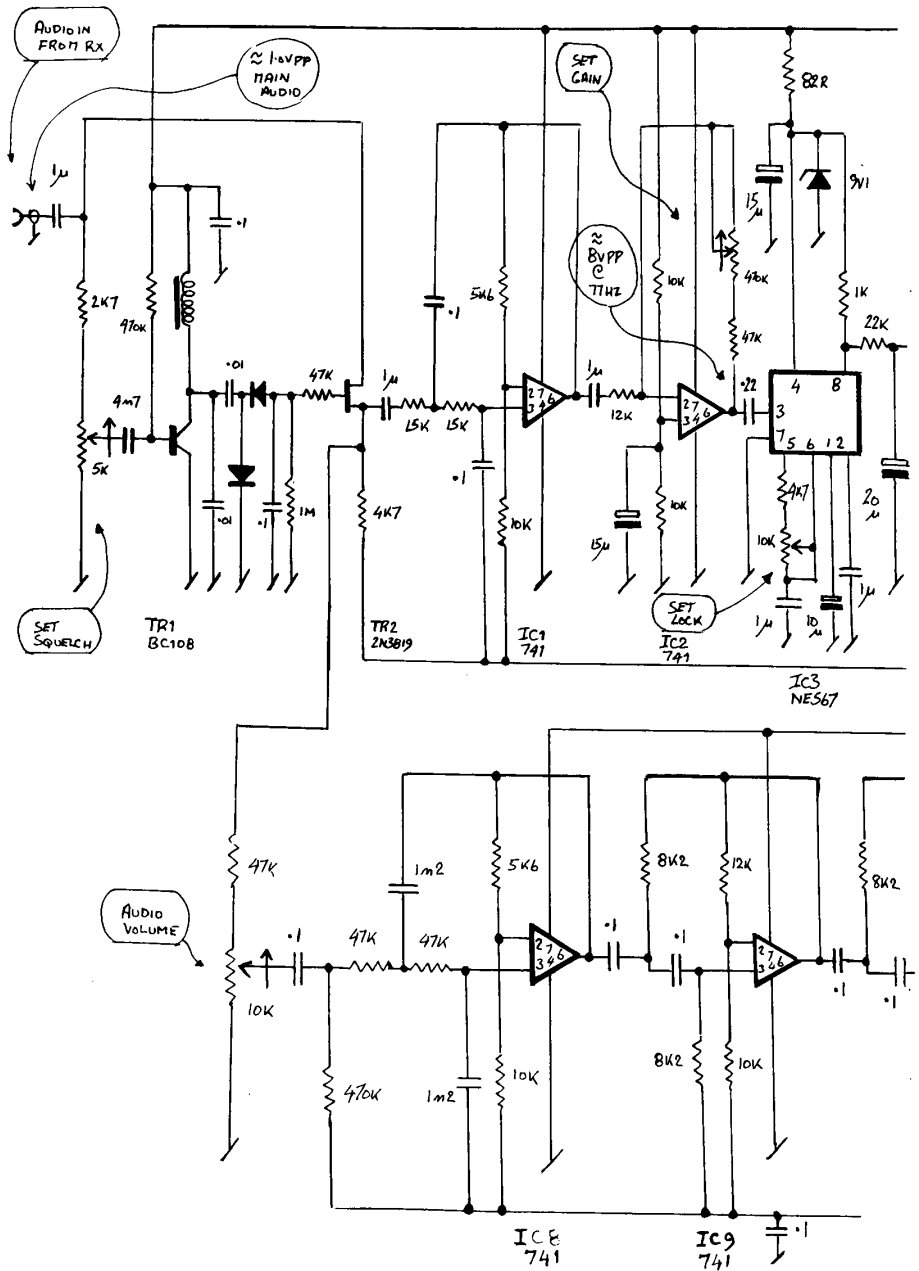
IC1 is a two pole active low pass filter which passes the 77Hz tone while attenuating programme audio. The tone is then amplified by IC2 to a level of about 8V peak-peak and passed to the tone detector, IC3. This is set to respond to 77Hz and when this tone is received, the voltage on Pin 8 falls. IC4 is a Schmidt trigger which prevents spurious responses. IC4 closes RL1 and activates the alarm tone generator, IC5 and IC6.

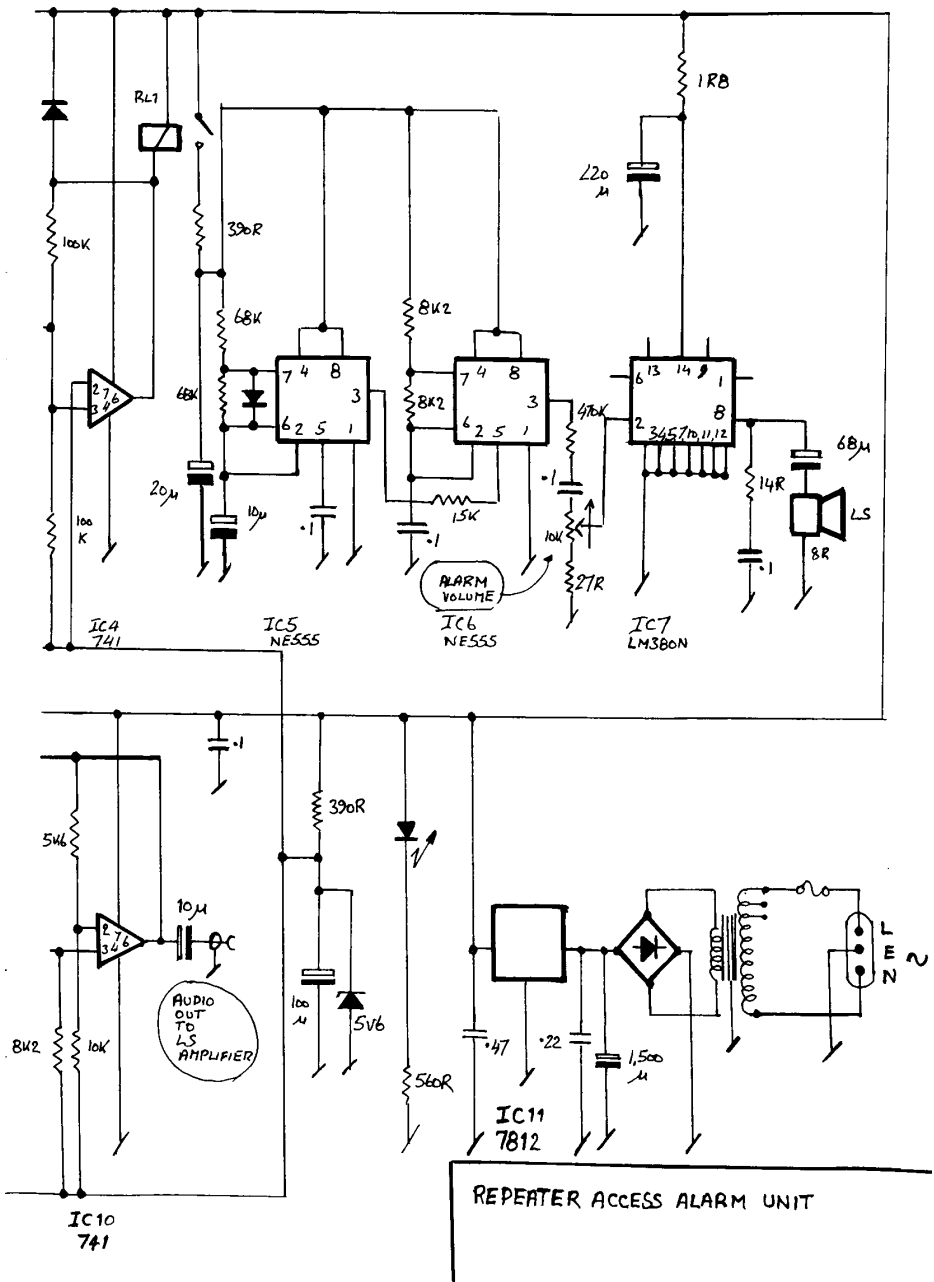
IC5 is a square wave oscillator with a period of about 1 second. This alternates the frequency of an audio oscillator, IC6, which changes between two tones, so simulating an emergency vehicle horn! This is amplified and feeds a small speaker.

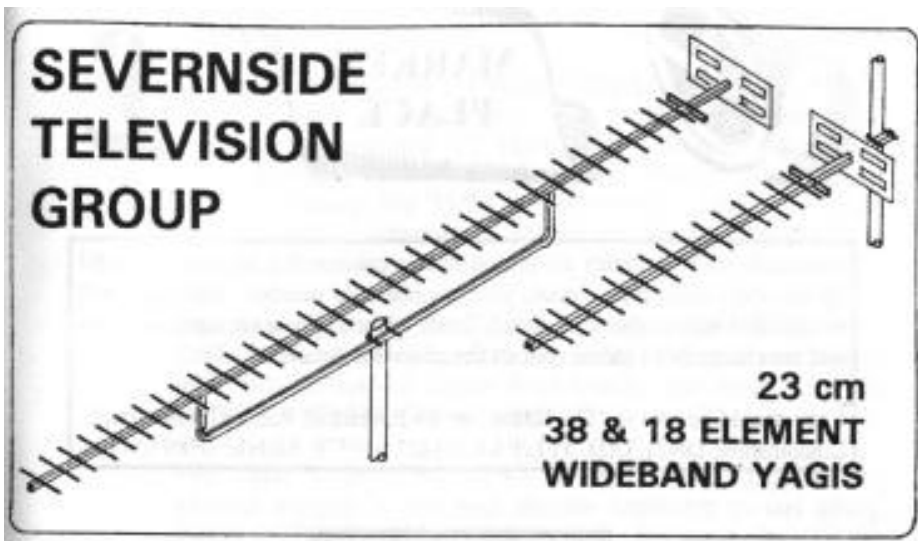
Output from TR2 also passes via the programme audio volume control to IC8. This is a low pass filter with a cut off of 4kHz which improves signal to noise ratio. Since the sub-carrier is being used for communications rather than Hi Fi. IC9 and 10 are a 4 pole high pass filter which suppresses the 77Hz tone which, depending on the responses of the loudspeaker, could be obtrusive.

The power supply is conventional.

Since building the unit I have realised that RL1 could be beneficially replaced by a transistor, and that the potential divider feeding pin 3 of IC2 is not necessary. This could be fed from the 5.6V line.







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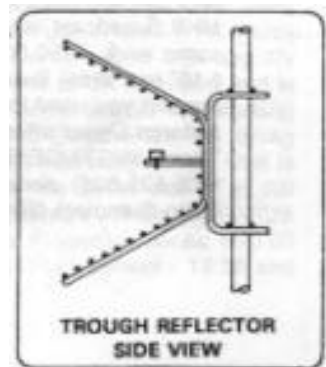
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CQ-TV 170

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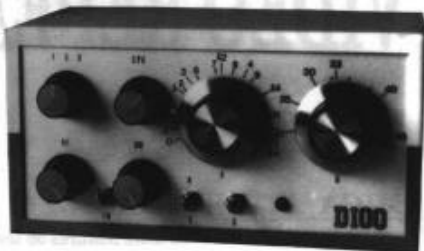
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Electronic Visuals 19" Colour monitor PAL/RGB input, working with copy of handbook. £90.00 Philips EL 8111 11" mono monitor in working order with circuit, £20.00 each quantity discount available?? Also some non workers for spares or fix. EMI 2001 Colour studio camera complete, lens cables CCU PSU phone for details. Good home needed or swap? Marconi Mk9 camera head in poor condition for spares £20.00 Marconi Mk8 broadcast studio colour camera, complete but will need some work, £150.00 Ikegami ITC CCU 601 and length of 37 pin camera cable £15.00 Glass BBC test transparency No. 52 (12"x10" test slide) swap for something of equal interest. TV lens, the sort you used to hang in front of your 1952 telly to make the pictures bigger. offers. ZNA134 SPG chip ex equipment £10.00 Light splitter from EMI 2001 colour camera £5.00 GE4/529 calibration gen. & PSU £8.00 BBC switched video delay line £4.00 UN17/509... UN21/506... UNI/643 focus gen... Thorn WG71/GE5M/501 SPG, potentially triple standard (405, 525, 625) circa 1967? will need fixing £15.00 HANDBOOKS:- Fernseh MC37 colour monitor, Barco CM33 colour monitor. Prowest PM17/9a colour monitor, Prowest PM 11/3A colour monitor, offers or swaps. **Brian Summers G8GQS 0895 810144 or 0850 014892**

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**FOR SALE:** 1.2 Metre solid fibreglass offset dish, with feed-arms, feed-horn, magnetic polariser, LNB (Uniden UST-950 1.2dB noise figure), polar-mount, actuator, and tripod ground mount. It's approx. 4 years old and is in full working condition. BUYER COLLECTS. £100 D100 De-luxe DX-TV tuning system with 'Bandscan' facility and full instruction book. Unit is in perfect condition. as only used a few times and is in full working order. Also to help you get started I include TV DX for beginners and The World At Your Fingertips books. £90 Telephone between 6:30pm and 9:30pm Monday to Saturday on **01376-517141 and ask for Nigel.**

**FOR SALE:** Studio varotal 104/300 TV88 zoom lens - no control cables £40 Tektronix 526 vectorscope - valve, OK but some controls a bit noisy £50 Cotron vanguard vidicon camera & 12x zoom lens £50 Two Sony VO 2630 editing Umatics with full back edit controller £150 Sony KV 2000UB tv with mains transformer & mod for video 1v in/out & audio 600 ohm xlr in/out £30 Two Philips LFH 0510 dictation machines, minimal use, still in original boxes £50 each. Pro-sound PRS 100E Nicam tv tuner £45 Som. Berthiot c-mount 17-85 lens £25 **Jon Rome. Day 0171 636 1422, Eve 01279 731426**

**FOR SALE:** SSTV CONVERTER TX/RX homebrew Japanese version (SCI) of the ROBOT 400 Professionally built and constructed, good working order. £130. G3WCY SSTV Converter RX, only 3 memories providing colour (3 x 8 seconds). Own design and professional construction, also good working order. £65. HF 3 ELE BEAM TH3MK3 by Hygain. Good condition. £140. **Brian Smith G3WCY, 20a Bessingby Road, Ruislip, Middx., HA4 9DA. Phone (01923) 258642 (office hours) or (08956) 77017 (evenings).**

**FOR SALE:** Vinten HF 419 Hydro-pneumatic Pedestal, complete with Vinten Mk.3 pan and tilt head. Full working order. New set of wheels fitted, plus handbook/parts list. Ex-Anglia Television (this pedestal is the classic heavy-duty studio type, still in worldwide use). Buyer collects. £250 complete - no offers. Contact **Dicky Howett, Tel. (01245) 441811, Fax. (01245) 442816 or write.. 23, Micawber Way, Chelmsford, Essex, CM1 4UG.**

**FOR SALE:** Solent 24cm 1 Watt ATV Transmitter with sound - £75. 24cm 20 Watt PA using Mitsubishi module, heatsink and fan - £110. Grundig 12V colour camera £85. Philips V100 B+W Camera, 240V AC/12V DC, including circuits - £50. MM MTV435 70cm ATV Tx. MM 70cm Transverter. JVL 24cm 28ele Quadloop. 24cm Tonner. BBC B Computer with floppy drive, eprom programmer and genlock. BATC I<sup>2</sup>C computer and teletext boards working as a repeater with DTMF control. Teletron with software working as a repeater with DTMF decoder and Teletext board. 10GHz Tx with sound and Rx using Solfan heads. FT224 2M Mobile with 144.750 crystal. 3 B/W Video monitors. Written replies only, please, to **Andy Goy G4HJD 352 Chanterlands Avenue North, Hull, North Humberside, HU5 4ED.**

**FOR SALE:** Arrow pointer generator on professional PCB, suitable for overlaying an arrow on any 625-line TV picture. Professional-quality product, already assembled, you just add 5V PSU, case connectors, switches and joystick. Paperwork supplied, £25. One item only, ring **Andy Emmerson G8PTH first on. 01604-844130.**

**FOR SALE:** Did you watch the series Classic Commercials on Channel Four? Did you think it would be nice to own a classic of your own? Well, here's your chance! How would you like to own a green GPO van like the ones used in the 1960s at television outside broadcasts? I need to dispose of an ex-GPO van, currently dry-stored under cover and with MoT. Currently gutted so most original fittings (like bench and gas heater) removed but the quaint 1930s-style 12V light fittings are still in place. Considerable potential for fitting your own racking and equipment, perhaps turn it into a your own OB van for taking to shows. It would also make an ideal control van for public address purposes or even a mobile home while you visit rallies around the country! Based on Karrier chassis, built 1962. powerful 2.2 litre Humber Hawk petrol engine (manages 40mph with ease!). Relatively compact (size of bread van or small mobile shop and similar in appearance). Windows in side and back, plenty of room to walk around inside and stand up without stooping. Low mileage. mechanically sound, aluminium body so no rust. needs only repaint and minor touch-up jobs. Genuine GPO 'crown' transfers supplied; these are extremely hard to find and in fact the Karrier is one of the scarcer commercials of the 1960s. Workshop manuals supplied, also full history and photos. Price: not expensive now, in fact highly negotiable to good home, else may have to sell for its cherished numberplate. 900 DXV. If you think this would make a nice project, give me a ring now before someone else beats you to it! **Andrew Emmerson, 71 Falcutt Way, Northampton, NN2 8PH (phone 01604-844130).**

**FOR SALE:** Lenses: selection of Vidital and Vidiac lenses (15" mount, not C-mount) surplus to requirements at bargain prices: enquire. Books: ELECTRONIC COUNTING: CIRCUITS, TECHNIQUES, DEVICES (Mullard, 1967). Well used copy, £3 post-paid. YEAR ONE. the story of Granada Television's first year of operation. Mint copy in slightly worn dust jacket, £6 post-paid. First come, first served so please enclose SAE for return of cheque if unlucky. If you are first, your SAE will be returned of course!. **Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. 01604-844130.**

**FREE:** C-band LNB. Ring G3JQN on 0181-764 0820.



**WANTED:** Anything made by SINCLAIR or Science of Cambridge except Spectrum and ZX81. I am looking especially for calculators, black watch, pocket TV, micromatic radios. etc. **John Bodle -Tel/Fax. (01273) 410749 or (0850) 104725 (mobile). Thank you!**

**WANTED:** Sony GVU5E Portable Video 8 Recorder/Player. **Brent Martin, 49 Seaview Street, Cleethorpes, South Humberside, DN35 8EU. Tel. (01472) 690383.**

**WANTED:** Any information on CEL Electronics P147 Digital Frame Store Synchroniser and Digital Timebase Corrector. **John A Ingram G4FDS, 170 Churchill Road, Parkstone, Poole, Dorset. BH12 2JF, Tel. (01202) 382625.**

**WANTED:** Pye 2780 14" monitors, working or non-working, complete, incomplete, or just parts. **Paul Hundy , 101 Goodway Road, Gt. Barr, Birmingham, B44 8RS Tel. (0121) 325 0615.**

**WANTED:** Dallmeyer 'Super Six' f/1.9 2" lens. Also any Image Orthicon camera lens of any type and in any condition. Also required, BOOKS, pamphlets, postcards, matchbox labels and beer mats dealing with the subject of TELEVISION. Money waiting. Contact **Dicky Howett, Tel. (01245) 441811, Fax. (01245) 442816 or write: 23, Micawber Way, Chelmsford, Essex, CM1 4UG.**

**WANTED:** HF Transceiver. Written replies only, please. to **Andy Goy G4HJD 352 Chanterlands Avenue North, Hull, North Humberside, HU5 4ED.**

**WANTED:** Early Pye, EMI. and Marconi television product catalogues for 1946-1960 wanted for research for article / book. TV related books wanted, in particular; "A History of the Marconi Company". by W.J. Baker, "Electronic Motion Pictures" by Albert Abrarson and any of the "Fink" TV series published by McGraw-Hill. WHY?

After much advice from all my faithful readers I have given up the quest for a tactical nuclear weapon and I shall join the green party. Bosch KCN portable camera circa 1975 for collection. "G Plan" teak wall unit and base. Van type trailer 4 wheel 1.5 tonne? 63A plastic CEE17 blue mains connector, fixed sockets needed.  
**Brian Summers G8GQS 0895 810114 or 0850 014892**

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Dishes on ITN's roof

(See Satellite TV News)



View of projected image on actual DMD

