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## Chairman's Column

They say that everyone remembers where they were when Kennedy was shot - well, I am one exception. However, I did know where I was when George Harrison died - Thames Television, trying to breathe life into a 25-year-old VT machine. Perhaps this is a sign of changing times, or just different values.

I think times or values are changing for the club. This year's rally and BGM will be at Shuttleworth. For those of you that remember the 200 ft marquees at Crick Post House, with traffic backing up to the M1 and beyond, or the splendour of Harlaxton, or the Sky Blue Connexion, then we are changing. Last year's event was at Bletchley, with all the history of the Enigma and the excellent turnout of satellite up-link and Terrestrial links vehicles. Unfortunately, due to the success of the "Enigma" film, Bletchley Park is now open to the public all year round and not available for prestigious events, such as our annual rally. This is the reason for returning to Shuttleworth, where we held the last BGM; it is not too far from Bletchley, so I hope the people that provided the impressive hardware last year will be able to make it to Shuttleworth. We have been there before, and held the last BGM there. The BGM is where we elect a committee to run the club for the next 2 years, so if you would like to get involved in club affairs, this is your opportunity. Most of the club decision making is carried out on email. The other tasks of putting stands on at rallies, updating the club database, packing and posting CQ-TV, editing CQ-TV, updating the website and keeping accounts still have to be done and take considerable time and effort. We are always on the look out for willing volunteers - should you want to volunteer please let Paul Marshall the honorary secretary know that you wish to stand for the committee.

Grant Dixon has unearthed a VHS copy of CAT 70. The original was shot in 405 line B/W and later standard converted to 625 (which did nothing to improve the quality). Our illustrious webmaster is going to attempt web streaming some of the highlights. Personally, I think the bandwidth is so limited that it would travel down the phone line as is, without resorting to any clever digital technology. What the tape does show is a very young Graham Shirville operating a mobile ATV station that used a QQV02/6 PA on 70 cms, if my memory serves correctly. Other highlights are Ian Waters as an unflappable TV anchor man ad-libbing through numerous technical problems and Jeremy Royle running an in band 70 cms relay (such was the bandwidth in those days). "Never mind the quality enjoy the nostalgia" must be the watchword for this project, coming soon to a website near you or [www.batc.org.uk](http://www.batc.org.uk) to be precise, the award winning site with over 4000 hits a month.

The IARU are meeting in September and Graham Shirville will again be attending, but this time instead of at his own expense, RSGB are funding a joint ATV/Amsat place, so Graham will be wearing two hats - a wise precaution in the San Marino sun.

DATV is still moving. The German ATV enthusiasts are now on a third generation encoder, which can be received by a Sky set-top box. When R&D is complete, I am sure we will be the first to buy and evaluate the system. If this is before Shuttleworth, then perhaps we could treat you all to a demonstration, on the same lines that Noel did at Bletchley with COFDM. If your German is better than mine is then <http://www.d-atv.de> will keep you up to date.

**Trevor Brown, BATC Chairman**  
email: [Chairman@batc.org.uk](mailto:Chairman@batc.org.uk)

## Bob Platts G8OZP

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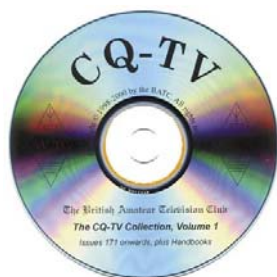
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## Contest News

Due to the foot and mouth, I only received three entries for the International (or that is what I'm telling myself). I am hoping you all have been busy putting together your station for this year contests over the winter!

John G7JTT and Giles G1MFG activated G7SEZ/P portable on behalf of the SCART (the Solent Club for Amateur Radio Television) on top of Butser Hill near Petersfield in Hampshire. The best DX over the weekend was F6KPL on 70cm over a distance of 155Km. They reported that the locals must have disappeared of the planet as they only worked two stations on the Saturday. A picture of their portable station can be seen in CQ-TV 196 page 21. I would like to congratulate them on first place.

Dave G8GKQ also went portable and only managed to work John G8MNY on 23cm due to failure of his equipment. John G8MNY managed to work eight local contacts but due to the short distances only scored less than a quarter of the SCART group. I would like to thank the above for sending in their results. From the logs sent in a total of fifteen stations were on the air over the period.

I have received the International results from Jean Michel Fournier F5AGO, I would like to thank him on the quick return of the results. I never did get the results for the International 2000. I have posted the results on the BATC web site, if you require a hard copy please get in touch.

From the results, F1IIG/P managed to come first with a total of 13095 points with G7SEZ/P in 14<sup>th</sup>, G8MNY 21<sup>st</sup> and G8GKQ/P in 23<sup>rd</sup> place.

I'll end with my famous last line, please send in your results even if you only work one station one way, you might come first!

**Richard Parkes G7MFO 7 MAIN STREET, PRESTON, HULL. HU12 8UB. ENGLAND. Tel:- 01482 898559**

E-mail:- [contest@batc.org.uk](mailto:contest@batc.org.uk)

### International 2001 Results

Place	Callsign	Locator	QSO 70cm	Score 70cm	QSO 23cm	Score 23cm	QSO 13cm	Score 13cm	QSO 3cm	Score 3cm	Total Score
1	G7SEZ/P	IO90MX	2	348	6	872	1	190			1410
2	G8MNY	IO91XI	3	42	5	354					396
3	G8GKQ/P				1	80					80

### Contest Calendar

**Spring Vision 2001 (Joint European)**

**Saturday March 9<sup>th</sup> – Sunday March 10<sup>th</sup>**

**Summer Fun 2001 (Joint European)**

**Saturday June 8<sup>th</sup> – Sunday June 9<sup>th</sup>**

**Both from 1800 GMT Saturday to 1200 GMT Sunday**

**Fast Scan ATV all Bands.**

# TX/RX Modules Down Under

By Richard L Carden VK4XRL

Over the past few issues of CQ-TV we have read with great interest the modifications that have been made to both units to achieve reasonable results. The following is an overall view of the results and modifications carried out by myself on these units.

Having obtained a 13cm TX and RX unit tests carried out indicated a frequency response problem associated with the video. First the on board video gain pot was removed and replaced with a link. Also an 82ohm resistor was added to the video input connection.

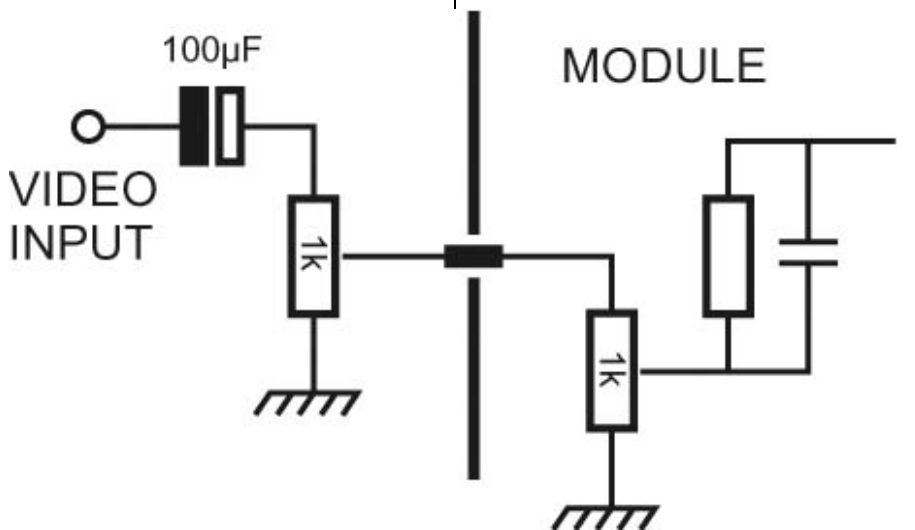
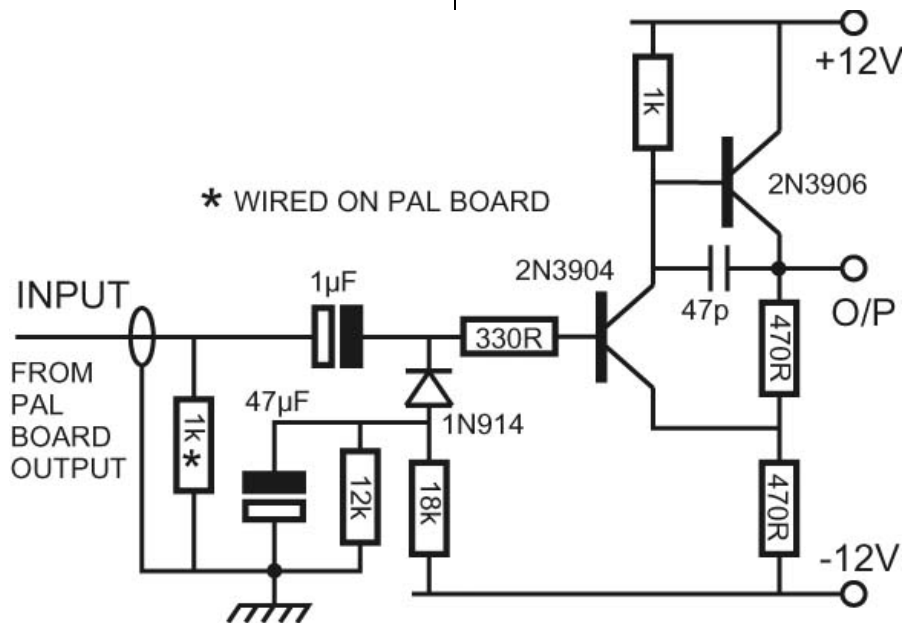
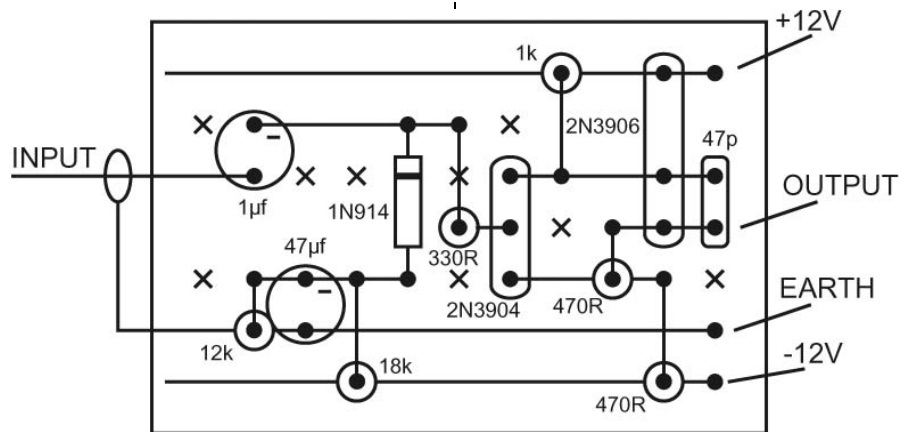
What now was required was to define a method to determine which or where both units produced the problem. Having been fortunate with access to a broadcast quality 70MHz modulator and demodulator a simple up-converter was used at 23cm to check out a satellite receiver as a reference test receiver.

The satellite receiver used was a now redundant M-BAC unit from Scientific Atlanta Model No.9708 fitted with a PAL demodulator board. The modulator was then set for correct deviation and multiburst was feed from a Tektronix 148 to its input. The output was low level as you would expect, however the response output was found to be flat to 5.8MHz.

A small video amplifier with a gain of two was constructed and fitted to the receiver so that the overall gain could be set to 1v P/P with the internal gain control.

Other test signals were also used to check on group delay etc. Having checked out the system at 23cm the next test was to use this reference receiver at 13cm. For this test a MDS down converter was used producing an IF output at around 464MHz to 488MHz.

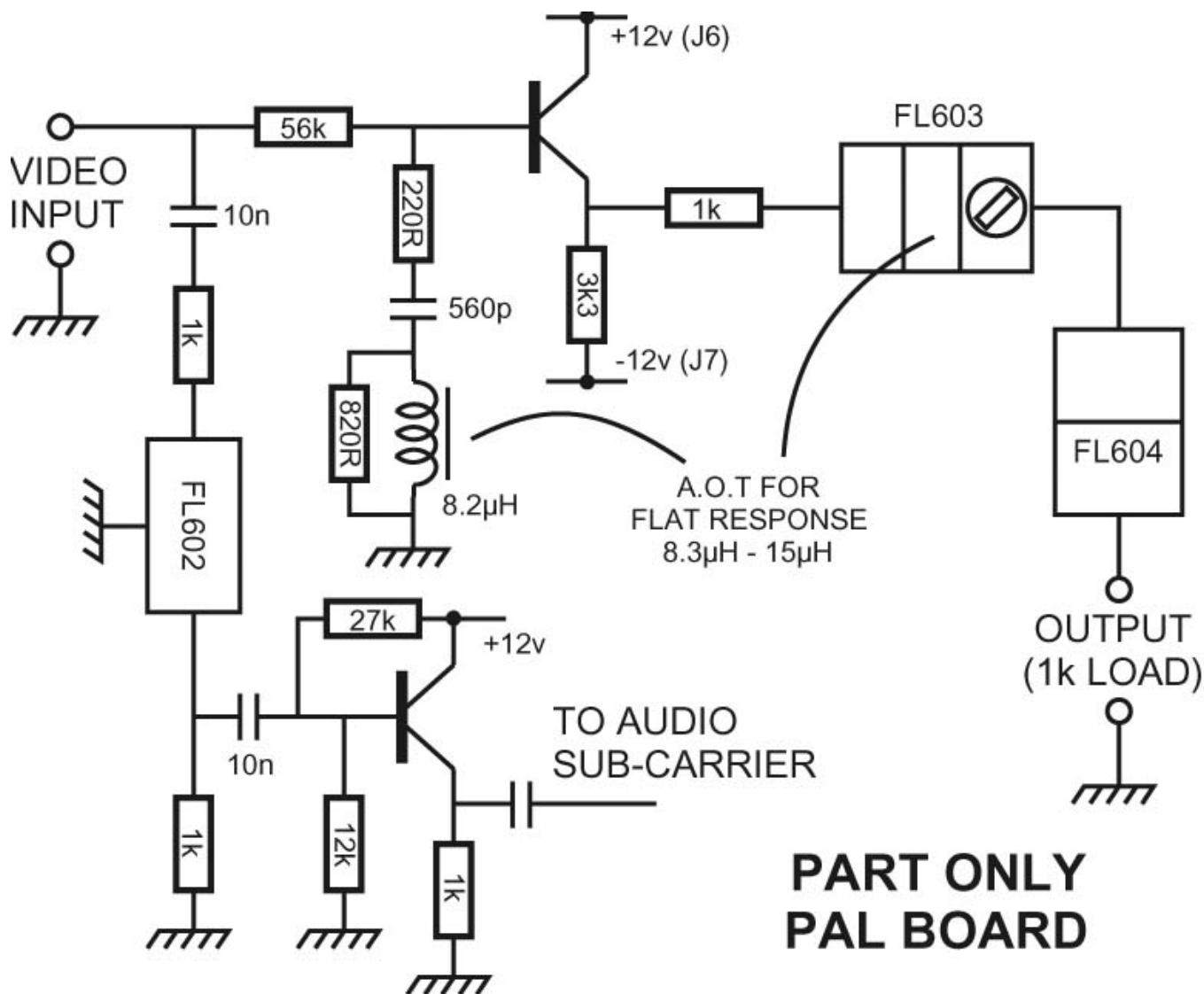
An up converter was then constructed with an LO of around 800MHz, this converted the MDS down converter signal so that the satellite receiver could tune the signal. Feeding the 13cm TX unit via suitable pads for an input level of around -40db the overall response shown by the reference receiver was around -1.5db at 4.8MHz. Also the



leading and trailing edge of the white bar produced a very large negative and positive overshoot.

The video input circuit was then copied as best we could and is shown below.

The first step was to reduce the spikes and this was easily achieved by reducing



## PART ONLY PAL BOARD

the parallel resistor in the HF correction circuit as shown. Next the amplitude difference between the highest and lowest frequencies was noted. This was around  $-5.2$  dB, and the method to improve the overall frequency response was to provide an equaliser circuit in the video-input line as shown.

The pad in the equaliser circuit reduces

the lower frequency amplitude to match the higher frequency response. The output from the reference receiver is now down on amplitude however the internal video level can be adjusted for correct output. An input pad maybe included at the video input to provide a better match for the equaliser circuit.

Therefore from the above it indicates that

further HF or pre-emphasis must be included else where in the unit. It hasn't been an easy task to complete the circuit diagram other then the input shown. To check on the above conclusions the standard pre-emphasis circuit was fitted as indicated on the web site. This produced a rising response on the standard reference receiver.

### 13cm TX Tests

Measured output +15dBm

Sound Carriers -24dBc

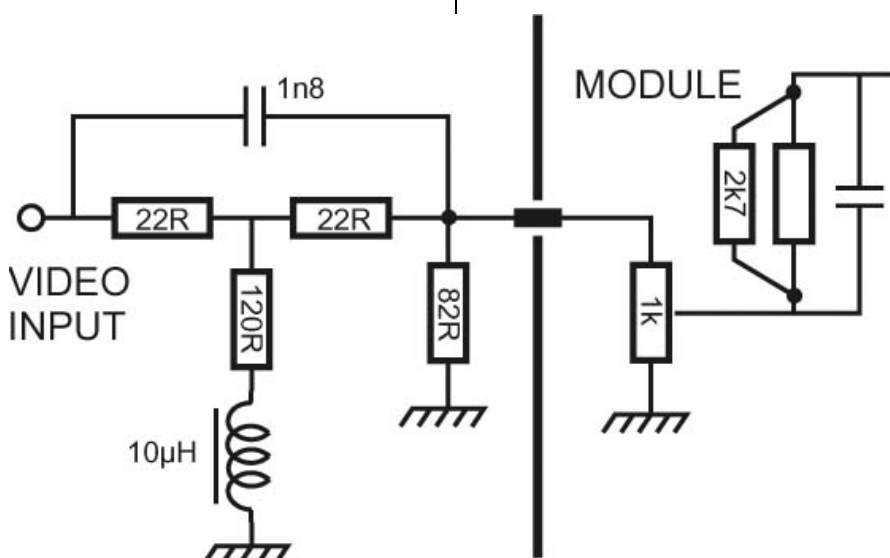
Audio Level for  $\pm 20$ kHz Dev. 1V P/P  
(Normal reference operating Level)

### Reference

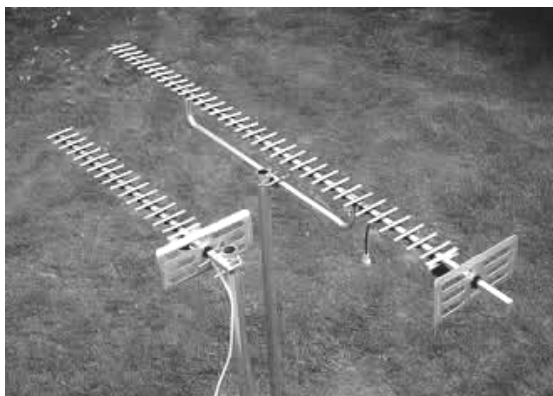
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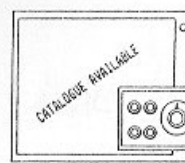
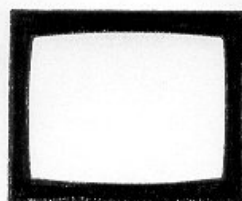
**Telephone: 01827 897920. 7:30pm - 10pm  
weekdays.**

**Fax: 01827 702434**

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## BATC Accounts for 1998

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### THE BRITISH AMATEUR TELEVISION CLUB Income and expenditure account

Year ended 31 December 1998

Income	1998	1997
Subscriptions	17,033	17,131
Members services	305	288
Publications	201	-
Advertising	595	300
Building society interest	292	230
Bank interest	1,698	1,497
Exhibitions	3,350	3,698
Donations	92	417
Postages	247	176
Miscellaneous	2	27
	23,815	23,764
less		
Expenditure		
CQ TV printing	13,836	17,338
CQ TV postage	3,415	4,000
CQ TV production	206	299
General office expenditure	303	115
General postages	589	582
RSGB affiliation fee	20	20
Committee members expenses	150	5
Exhibitions	2,670	2,508
Insurance and legal	148	72
Miscellaneous expenses	525	416
Accountancy	323	323
Rally attendance	129	166
Recruitment	74	101
Advertising and publicity	-	315
Project development	-	29
Bank charges	165	132
Publications	-	777
	22,553	27,198
Ex cess of income over expenditure/ (expenditure over income) for the year	£ 1,262	£ (3,434)

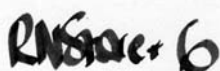


## THE BRITISH AMATEUR TELEVISION CLUB Balance sheet

At 31 December 1998

Fixed assets	1998	1997
Office equipment		
Additions	312	142
less- Depreciation	(312)	(142)
Current assets		
Stocks- members services	3,063	3,636
publications	1,200	2,051
back issues- CQTV	1,500	1,588
Debtors	500	250
Nationwide Building Society	11,716	11,424
GiroBank account	119	119
Royal Bank of Scotland- current account	11,263	7,230
investment account	30,040	30,040
	59,401	56,338
less		
Current liabilities		
Creditors and accruals	1,027	1,350
Subscriptions received in advance	21,145	19,021
	22,172	20,371
	£ 37,229	£ 35,967
Represented by		
Accumulated fund		
Balance brought forward	35,967	39,401
Excess of income over expenditure/ (expenditure over income) for the year	1,262	(3,434)
	£ 37,229	£ 35,967

In accordance with instructions given to us, we have prepared these accounts from the accounting records of The British Amateur Television Club, and from information and explanations supplied to us.



R N Store & Co. Chartered Accountants Gainsborough

11 December 2001

# Comparison of VK3LM to W9NTP Robot 36 second TX with 30.5 second HDSSTV TX

On the right is a Robot 36 second image received by W9NTP, from a transmission by VK3LM, on 20 Meters.

A few minutes before, the image, bottom right, was sent in a 30.5 second transmission from VK3LM to W9NTP, using the same radios via SSB on the same 20-meter frequency.

A new method of digital communication was used to transfer an exact copy of the original digital file. The [links below](#) lead you through a presentation of this method of digital communication made at the 2001 Dayton Hamvention.

Papers on Selected Aspects of HDSSTV

Links to the initial version of one paper, and to incomplete drafts of two other papers are provided in the list below.

[Initial Measurement of Tuning and Timing Parameters in HDSSTV Tx from AU to US](#)

[Propagation Delay Variations in HDSSTV Tx from AU to US](#)

[Decoding Beyond the Designed Distance](#)

Top Level Index to 2001 Dayton Hamvention Presentation

[Summary of Australia to United States Tests](#)

[Summary of Method Used](#)

[Coding Examples](#)

[Block Diagram of Tx Side](#)

[Encoders](#)

[Modulator](#)

[Why 2 Levels of Coding](#)

[Block Diagram of Rx Side](#)

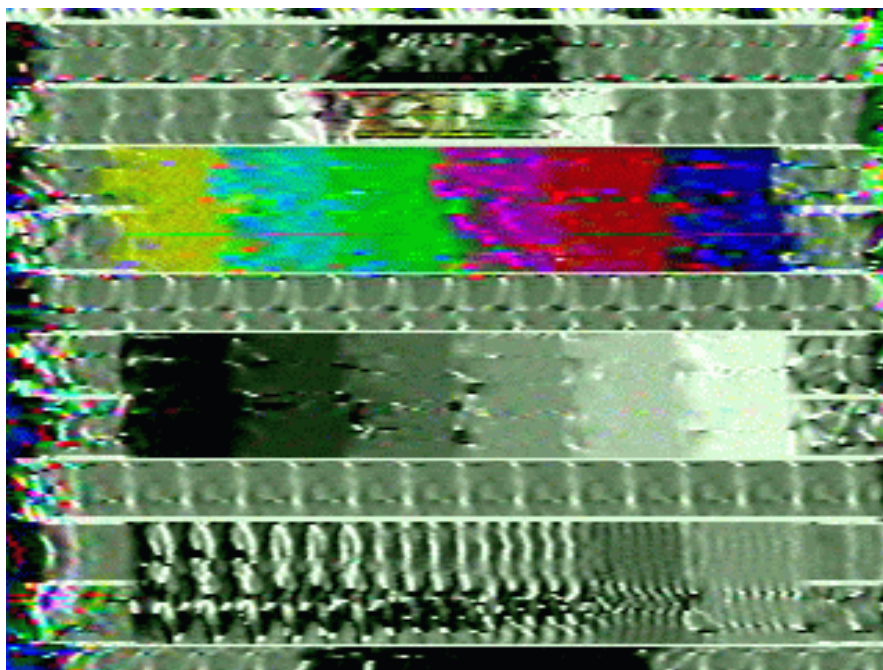
[Demodulated Waveforms](#)

[Tx Operational Considerations](#)

[Rx Operational Considerations](#)

[Images from Over the Air Tests](#)

[Performance](#)

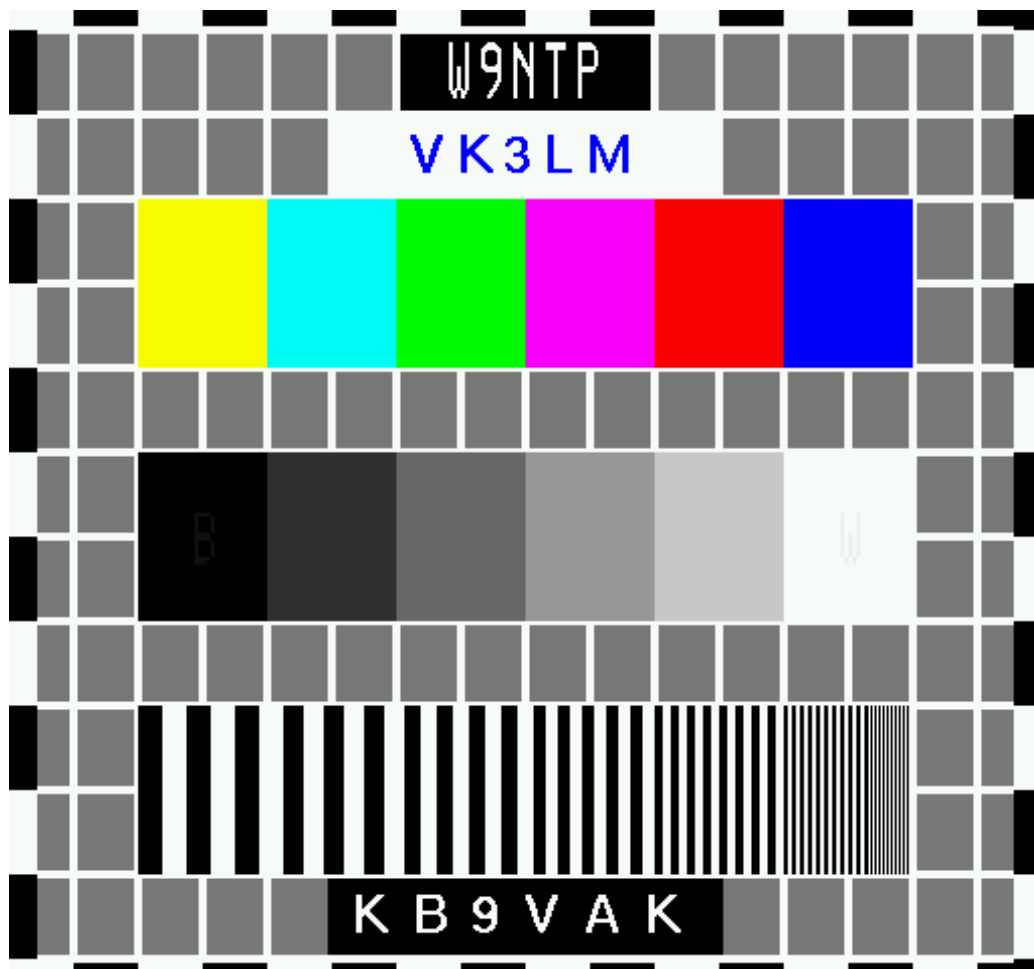


[Summary of Accomplishments](#)

Barry Sanderson, KB9VAK, 15 August, 2001

[Acknowledgments](#)

[Software Status](#)



## Paul Holland, G3TZO

### New Year Blues

With only four issues a year it always seems that I have hardly had time to reflect on the start of one New Year and then another one is upon us.

Despite the promise of the new millennium it seems that much of the optimism about the expansion and use of new technology appears as overblown hype. The satellite industry has been hit like many by the general downturn in the global economy and the expansion in Satellite TV services last year certainly reflected this.

What is clear however is that the switch over from analogue to digital is certain to speed up and that nearly as many services will close as those that are launched.

Interest in Satellite TV however is still strong. The events of last autumn provided a fascinating period for those who hunt down the various news feeds and despite all the pre Xmas gloom this year brings with it the usual promise of new satellites, new services and some wallet tempting new technology.

### Transponder News

The following snippets of news can only reflect a small proportion of the many changes happening on an almost hourly basis. For up to the minute news of changes I suggest you use the Internet to visit the following two sites <http://www.lyngsat.com/> and/or <http://www.sat-hagedorn.de/transpon2.htm>. The first site provides complete transponder loading for every satellite aloft whilst Stefan Hagedorn provides daily email updates of the changes which are taking place.

### Astra 2 & Eurobird 28.5 Deg E

**BBC Regions.** Although much of what goes on at 28.5 E is simply the addition or subtraction of a series of second rate television channels there are some interesting developments to report.

One of the irritations of the BBC's package on Sky in that there is no local

news service. However, using the technology employed last year for the Open Golf and Wimbledon viewers will now be able select the regional programme of their choice from a menu of five alternatives. The first phase of the project will apply to viewers in the London area, the North West (broadcast from Manchester), the North region (broadcast from Leeds), the West Midlands (broadcast from Birmingham) and the South (broadcast from Southampton). The BBC hope to launch the rest of the English Regions local news programmes on satellite soon.

**Thomas Cook TV.** Thomas Cook was due to launch a 24-hour holiday shopping channel on Sky Digital in December. The channel was initially reported testing on 11.527GHz (V) SR 27.5 FEC 2/3.

**RTE.** The Irish channels RTE1, N2 and TG4 are due to launch any time now together with the 2fm, RnaG and LyricFM radio services. Only viewers in Eire and N Ireland will receive the Mediaguard encrypted TV services however the radio will be FTA.

The **Dental Channel** (CPD TV) has launched on Eurobird at 11.527GHz (V). The channel will broadcast Monday to Friday between 8:00 and 10:00 PM and at weekends between 9:00 AM and 12 noon. It will be free-to-air to all Sky Digital customers for one month, after which it will be subscription only.

Arabic entertainment TV channels **Al-oula, Al-thania, Al-thalitha, Seris** and **Music Now** should also have joined the Sky digital service before you read this.

Music channel **Viva Plus** launched on 1<sup>st</sup> January replacing Viva 2. Viva Plus will transmit in MPEG-2 clear on 12.552 GHz (V) SR 22000, FEC 5/6.

The Belgian French language service **RTBF** launched back in November on 12.610 GHz (V) ST 22000, FEC 5/6.

The **ITN News Channel** is to close in the New Year, according to press reports.

### Astra 1D 24.0 Deg E

Now at 24.0 Deg E Astra 1D carries an analogue PAL test card on 10.773 GHz (H). Primarily aimed at German Cable Head-ends most of the occupied Tp's are carrying services encrypted in Betacrypt. Digital FTA test cards have been seen on 12.032 (H) & 11.954 GHz (H)



Astra 1D Test Card

### Hot Bird 1-5 13 Deg E

Music station **Rock TV** has started on 12.054 GHz (H) SR 27500 FEC 3/4. **RTB International** has replaced **Magic Star** on 12.303 GHz/V. **TV Moda** has started on 12.111 GHz/V. **Tele 24** has left 12.380 GHz/V.

### Atlantic Bird 2 8.0 Deg W

Atlantic Bird 2, which launched back in the autumn carries 26 Ku-band transponders and will be used primarily for trans-Atlantic services. Co-located with Telecom 2D there are now a total of 37 Ku-band transponders at this position. As we closed for press the majority of transponders has been activated and carry a variety of temporary feeds.



Telstar 5 15 Deg W

**Liberty TV** has launched recently providing a vehicle for propaganda aimed at Saddam Hussien. The channel on 12.599 GHz SR 3617 FEC 3/4 provides an unedited insight into the Baghdad regime with a mix of news, music and

discussion, also video footage filmed secretly inside the country.

## Quattro LNB's

If you are installing a Quattro LNB with a Satellite Switch such as the Global 4x4 illustrated below you will find the following table handy to provide a quick reminder of which connector on the LNB connects to which input on the satellite switch.

Inputs	Polarity	Band
13V/ no tone	V	Low Band
18V/ no tone	H	Low Band
13V/ 22KHz	V	High Band
18V/ 22KHz	H	High Band



Typical 4x4 Switch

## HAM Radio / Club-TV

Information provided by Ben SM6 CKU advises of a satellite delivered monthly HAM TV magazine. The broadcasts can be received via Sirius 2 on 5 Deg E. In most parts of Northern Europe reception is possible with a 1m dish and a Universal LNB. It uses SCPC on 12590.5 MHz (V) SR 6667 FEC 1/2 (Vpid 4130 Apid 4131 PCR 4130). They are also asking for contribution of home made videos of reasonable quality showing any amateur radio activities. For further details go to [www.parabolic.se](http://www.parabolic.se).

## SatcoDX Shareware Version

For those unfamiliar with SatcoDX this is a web site dedicated to providing up to the minute transponder data. Subscribers to the German Telesatellite magazine have been receiving a CD-ROM with updated transponder data

free with each issue. For those with compatible digital receivers the data can be used for update purposes by linking a PC to their receiver. Now however it is available in a shareware version. It can be downloaded from [http://66.33.61.96/WS\\_II.EXE](http://66.33.61.96/WS_II.EXE) (5.6 MB) or from [http://66.33.126.74/WS\\_II.ZIP](http://66.33.126.74/WS_II.ZIP) (2.6 MB).

The shareware is fully operational, including the Chart Update facility. The only feature not available in the Shareware version is the Print and Save function. If you need to use these features, you can get a full version, by ordering from:

<https://www.tele-satellite.net/secure/int/>

## Astra Broadband Interactive System

Aimed at business users SES Astra has now launched a Broadband Interactive System (BBI). BBI, which uses Ka-band frequencies on the Astra 1H satellite, is the first commercial Ka-band two-way broadband satellite service available across Europe. Using satellite interactive terminals (SITs) users can send data at rates of up to 2 Mbps via the Astra 1H satellite using the BBI hub. The content then can be sent for multicast distribution via satellite or for routing to the terrestrial backbone. Astra's BBI can support all standard IP-based services, such as file transfers, email, database management and broadband Internet access. The BBI hub provides a standard DVB-RCS forward path capable of delivering up to 38 Mbps of IP data or content to SITs located at client premises. It also incorporates a Ka-band receive diversity site. This ensures that, when operating at Ka-band frequencies, the optimum availability of Ku-band satellite communication systems can be maintained.

## DX from Europestar 1 45.0 Deg E

I thought readers would be interested in a recent successful test transmission between an unnamed UK earth station to a teleport in Perth, Australia via the EuropeStar 1 satellite. This now opens up possibilities for direct (and therefore less expensive) transmissions between Australia and Europe. It is expected that availability figures of 99.9 per cent to 99.99 per cent will be achievable dependant on conditions and transmission parameters. Sadly there was

no mention of the dish size but we can safely assume it was in excess of 60cm!

## From the Post Bag

A number of readers have taken interest in references in the last issue to the Technisat Sky Star 2 PC card. Ian Waters G3KKD queried the basic spec for a PC suitable to use with the card. Information from Technisat confirmed the card requires a spare PCI slot, Windows ME, 98,95, 2000, XP, Linux or MAC, at least a Pentium II processor and 32MB RAM (or higher) for data applications. Ivan Currell G3WBA bit the bullet and has acquired the card. Although Ivan reported some initial problems on the initial set up he subsequently confirmed success with "fine" pictures coming through. He is looking forward to experimenting with data reception in due course. Back in November Laurie G3ILD reported the disappearance of PA0ALK from its usual position at 16.0 Deg E. The feed was relocated to 12.742 GHz (H) SR 3000 FEC 5/6 however it was due to close again on that frequency on 1<sup>st</sup> January. As we closed for press there were no new details of if or where it would reappear.



Farewell PA0ALK?

Arthur G2FUD and John G3INZ have both written with comments on their experience with their Echostar AD3000IP receivers. Arthur reports he has upgraded his AD3000IP software to V4.00, which fixed a few minor bugs, though he still laments the poor user manual. Arthur also makes reference in his mail to some editing software called SATEDIT. This is available from Wolfgang Litzinger, [www.satedit.de](http://www.satedit.de) and will control & edit (via a null-modem cable) Echostar receivers including the AD3000IP (& Viaccess) and LT8700. There are apparently also versions for other popular satellite receivers. Wolfgang's site has user manual, screenshots, a demo & full version downloads. SATEDIT is shareware: DM

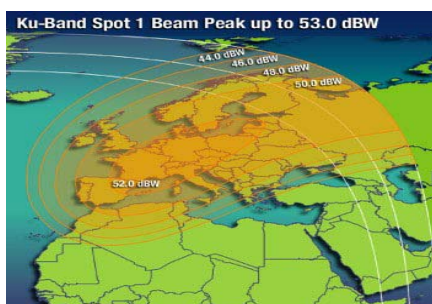
59 (which is only about £20). John G3INZ writes to say he is now able to see 19 satellites between +/- 40 Deg and is getting to grips with the various DVB reception parameters although he still enjoys searching for the ever-reducing number of analogue signals.

## Upcoming Launches

The New Year once again promises the launch of a number of high power next generation satellites. Eutelsat continues to reinforce its Hot Bird position at 13 Deg with Hot Bird 6 and 7 launching. They also continue the growth of specialised platforms such as E-Bird, which will target primarily data applications. As usual, the actual lift off dates given below are subject to change.

### Intelsat's 903, 905 & 906

When launched later this year these three satellites will provide a footprint for the UK which will enable reception with 80cm antennas.



IS 903, 905 & 906 Spot Beams

Having a similar specification they each carry 22 36 MHz Transponders in Ku Band and an astonishing 76 36 MHz Tp's in C Band. Ku Band Tp's operate with Linear polarisation whilst C Band Tp's operate with the usual circular polarisation. Ku band down-links will be in the range 10.95 to 11.20 GHz and 11.45 to 11.70 GHz whilst C band down-links will operate in the range 3625 to 4200 MHz. IS 903 will deploy to 34.5 Deg W replacing IS 603 and IS 905 will deploy to 24.5 Deg W replacing IS 601.

### Hispasat 1D

When launched later this year the Hispasat 1D satellite will be located at 30° west. Hispasat 1D has 28 Ku band Tp's and will provide contingency for Hispasat's 1A and 1B, which come to the end of their scheduled lifetime in 2003. In addition to contingency it also provides an additional 6 switchable Ku

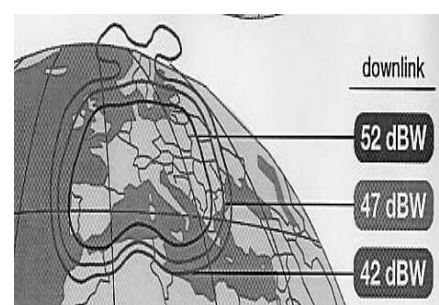
Launch Date	Satellite	Launcher	Deg	Payload
0201-03	Intelsat 903	Proton	34.5° W	12 Ku and 44 C tps will replace Intelsat 603 footprint map
0201-03	Atlantic Bird 1	Long March 3A	12.5° W	28 Ku tps for Europe & Americas will replace Eutelsat II f2 footprint maps
0203	Express A1R		14.0° W	5 Ku and 12 C and 1 L tps
0204	Stellat 5	Ariane	5.0°W	35 Ku and 10 C tps will replace Telecom 2C footprint map
02 spring	NSS 7	Ariane	21.5° W	Ku and C tps will replace NSS 803 and NSS K footprint maps
020509	Hot Bird 6	Atlas 5	13.0°E	28 Ku tps will replace Hot Bird 5
0204-06	Astra 1K	Proton	19.2°E	Ka tps and 46 Ku tps will replace Astra 1B & 1C
0204-06	Astra 3A	Ariane 5	23.5°E	20 Ku tps in 11450-11700 & 12500-12750 MHz will replace Kopernikus 3
0204-06	E-Bird	Ariane 5	25.5°E	20 Ku tps
0206	Hot Bird 7	Ariane 5	13.0°E	40 Ku tps will replace Hot Bird 3
0206-09	G-Sat 2	GSLV		C and S tps
020814	Hispsat 1D	Atlas	30.0° W	28 tps in 10700-10950 & 11200-12200 MHz will replace Hispasat 1A/1B footprint map
0207-09	Intelsat 906	Ariane	27.5° W	14 Ku and 42 C tps will replace Intelsat 605 footprint map
0207-09	Intelsat 905	Ariane	24.5° W	12 Ku and 44 C tps will replace Intelsat 601 footprint map
020831	Kypros Sat	Ariane	39.0°E	16 Ku tps

Band transponders for American and transatlantic connection options.

### Stellat 5

April will see the launch of Stellat 5 to the 5°W orbital slot. Stellat 5 will support new multimedia services, notably broadband Internet access, and ensure continuity and development of Television and Radio services currently supported by Telecom 2C. Stellat 5 will have 35 Ku-band and 10 C-band transponders and will have a matrix of some 200 possible connectivity options for its different coverage areas. It will enable two-way broadband Internet access via antennas as small as 60 cm.

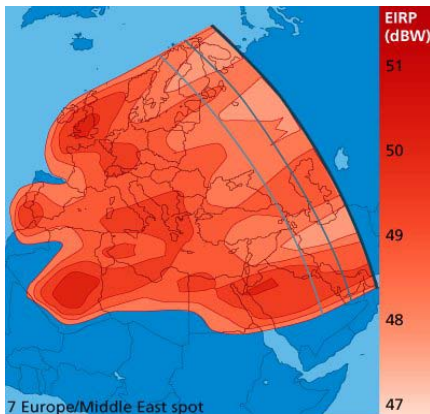
Stellat 5's positioning at 5° West allows connectivity between the East coast of North America, the Middle East, western Asia, the Indian Ocean, Europe and South America.



Stellat 5 @ 5 Deg W

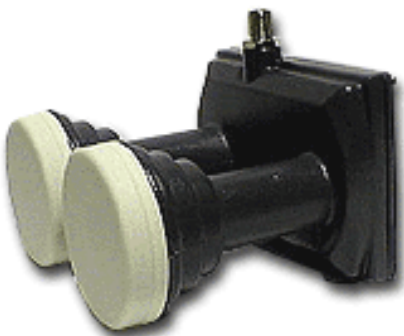
## NSS-7

This new Atlantic satellite from New Skies based in Holland will replace NSS-803 and NSS-K at 21.5° W by early Summer this year. Manufactured by Lockheed-Martin it will have 36 C-Band and 36 Ku-Band Transponders. EIRP at Beam Centre in Ku band will be 47 to 51dBW (See footprint below). C-Band downlinks are in the range 3662 to 4171 MHz and Ku-Band downlinks in the range 10.99 to 12.72 GHz.



## Mono-block LNB's

I recently had the opportunity to install one of the so-called new Mono-block LNB's. These LNB's are particularly



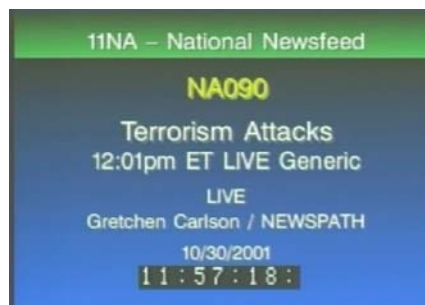
useful when you want to obtain reception from two satellites which have a 6 Deg separation and which have a reasonably high power footprint. They incorporate two identical Universal LNB's with DiSEqC switching to allow one cable feed back to the receiver. On the particular installation I was involved with I set up LNB 1 on Hotbird (the slightly weaker satellite) and LNB 2 then automatically was aligned on Astra. The actual set up was fairly straightforward using the Satlook spectrum analyser as it enabled me to readily check I was peaked on both satellites and could switch using DiSEqC commands between LNB 1 and LNB 2. The LNB sits in a standard 40mm collar and tweaking is just a matter of twisting the

LNB in the mount and then tightening up. Using A Humax 5300 digital receiver signals were perfect. I have to say that this is where the Satlook comes into its own. Although the LNB was easy to install the initial "brand new" receiver tried (an Echostar 5110) failed to scan in all programmed frequencies. Without the use of the Satlook it would have been very difficult to prove I was actually switching between Port 1 and Port 2, H & V polarity and high and low band frequencies on the LNB. The Satlook provided commands for switching all these parameters and allowed me to observe the result as both a frequency spectrum and where analogue signals exist (as they do on Astra and Hotbird) to confirm what I was actually receiving. The LNB I fitted is illustrated above. The MTI LNB illustrated below has an identical function but has an alternative bracket arrangement for fixing to the end of the LNB arm.



## Off Air

I have recently acquired a nifty little USB device for the PC that allows me to capture any video input as a still JPEG image. Called Win TV Live USB from Hauppauge it now allows me to save any off air image from Satellite. A couple of the more exotic (for me) are reproduced below.



BT Washington

Picture from IS K at 21.5 W on the BT Washington Feed.

Also again from IS K at 21.5 Deg W comes the CNN continuous news feed. This feed has been alternating with shots of site clearance activities at "ground zero" in Manhattan.



CNN News-feed



Iran TV from Telstar 5 at 15 Deg W



Natwest TV - Eutelsat W2 at 16.0E

## Conclusion

That's its again for another issue of Satellite TV News. Thank you to those who wrote and emailed last time – its always nice to know what you are doing and passing on any tips or experiences you may have had. As usual the contact details are the same; email via [paul.holland@btinternet.com](mailto:paul.holland@btinternet.com) or phone to 01948 770429 or even fax to 01948 770476.

## A (very) simple Xtal marker

### Bob Platts G8OZP

Crystal oscillator modules for microprocessors are readily available from a number of component suppliers and also to be found at rallies. They contain a crystal oscillator and buffer amp within a sealed metal housing.

Output frequencies are typically available within the range 2 to 50MHz.

Generally the accuracy and stability is very good. For example a number of 50MHz devices I tested were all within 1KHz of 50MHz.

The output is a square wave and as such is rich in harmonics making them ideal as simple markers.

The more useful frequencies are probably 10MHz and 50MHz.

With the addition of a  $\frac{1}{4}$  wave length of wire as a simple antenna soldered directly to the output pin, harmonics are produced beyond 10GHz.

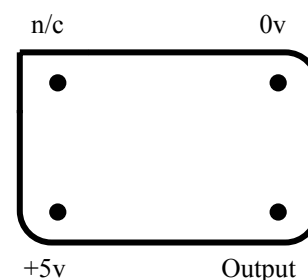
The output can be modulated via the 5v supply. About 0.5v of modulation such as a square wave will provide a low level of deviation allowing the carrier to be seen on a video receiver.

A simple Gunn diode type modulator is ideal for this.

With a little thought and ingenuity these modules could form the basis for a more advanced marker generator.

Several modules could be used, each selected by switching the power.

The outputs could be fed via filters to select specific harmonics or combined



Pin view of Xtal module connections

and fed into a buffer amplifier or attenuators to adjust the output.

With good filtering on the output they can even be used as a basic form of very low power test beacon.

## Satellite TV chipset adds TV Channels

STMicroelectronics (ST) has developed a single chip based on an unmodified 0.18 $\mu$ m CMOS process that performs direct or zero-IF, down conversion and demodulation on a satellite TV signal. The addition of a second chip gives the set-top box the ability to handle a new generation of Turbo codes that could boost the number of channels per transponder by 50%.

Armando Caltabiano, business unit director for the satellite and terrestrial

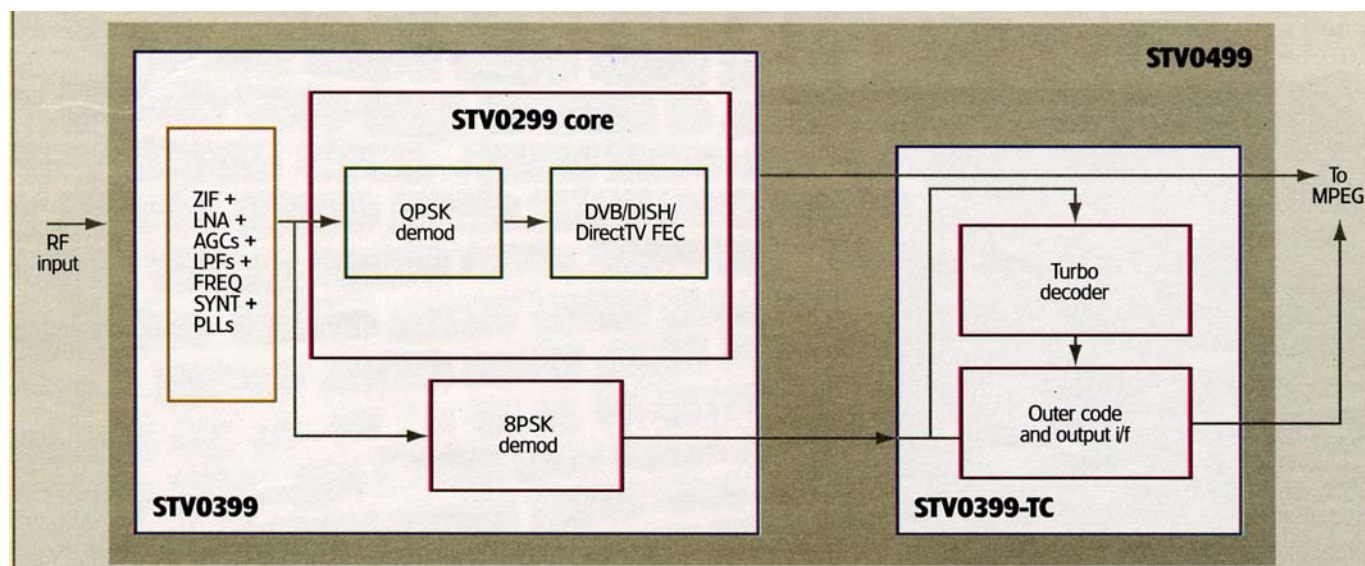
front-end group within ST's consumer broadband division, said: "The other companies which have announced zero-IF in CMOS forget to mention an extra letter or two. They leave out the fact that they use BiCMOS in their designs."

The front-end chip includes the various active analogue components needed to build an integrated tuner, including a low-noise amplifier, automatic gain control, low-pass filters, frequency synthesisers and the zero-IF downcon-

verter itself.

"The 0.1 8pm process supports voltages that range from 1.8 to 3.3V," said Caltabiano. "It allows us to drive different analogue linearities to reduce noise in different parts of the chip." Feeding an RF signal directly into a CMOS chip meant careful impedance matching and other fine-tuning to the design.

"One of the big challenges was to move



from the cad stage to the test chip with its wire bonding. That's where we had to fine tune the process to take account of that," said Caltabiano.

Because the chips in its new set-top box architecture use essentially the same process and design rules, the company has considered pulling the entire demodulation and MPEG2 decode sections together. "We proposed this idea two years ago to the set-top box manufacturers. But many of them said 'if I put the tuner next to the MPEG, I have to re-layout the board and everything around it'," said Caltabiano.

The partitioning will also be affected by the speed at which satellite TV operators take up technology such as the Turbo codes developed by France Telecom and licensed to ST.

According to ST, satellite TV operators are expected to start deploying services using these more efficient codes next year as they try to add data services to their existing pay-TV channels. The codes make it possible to get almost to

the Shannon limit for coding efficiency, at the cost of complicating the decode process.

They will be combined with a more sophisticated modulation scheme, 8-PSK instead of the four-way QPSK scheme, to improve bandwidth use.

According to Jacques Meyer, integrated system architecture group manager for ST, Turbo codes use a convolutional encoding scheme similar to that used by Viterbi-based systems.

They differ from Viterbi codes in that they use an iterative decoder, feeding back previous estimates to work out what each received bit was meant to be. The iterative process uses less power than a comparable Viterbi decoder on the comparatively long convolution sequences needed for high coding efficiency.

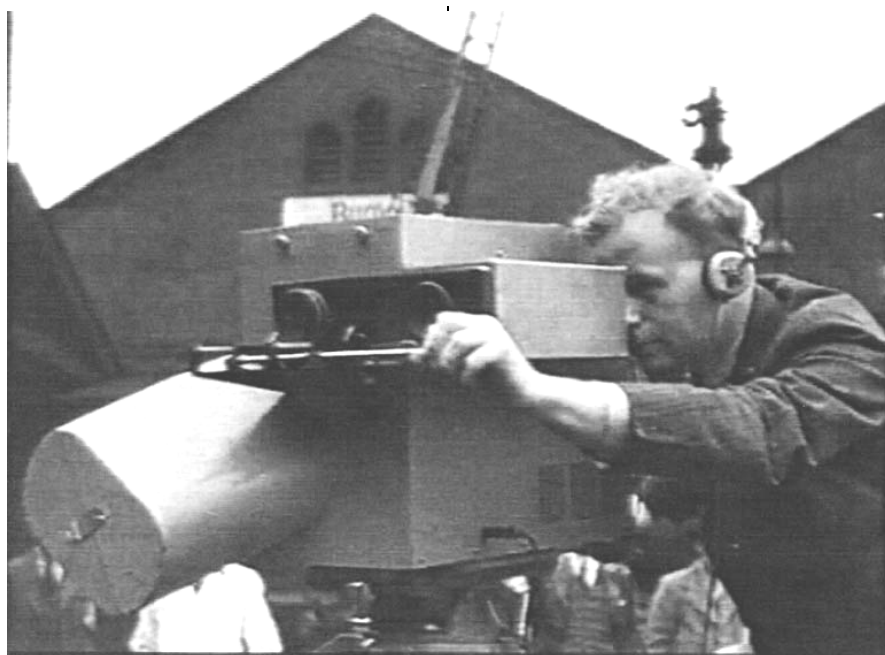
Even so, the die area needed for a Turbo decoder is in the range of five to ten times that for existing Viterbi decoders. The ST design uses four feedback stages.

Meyer said: "The feedback loop gave the codes their name, behaving in a similar way to a turbocharged engine. With each iteration, the estimate improves but it quickly reaches an asymptote where you get little additional benefit for each extra iteration."

Although the DVB consortium is drafting a standard for the use of Turbo codes in its system, the delay caused by this process means that the US is expected to be the first to adopt a system based on Turbo codes.

Philippe Geyres, corporate vice-president of the ST consumer broadband group, said: "We see a big push from the set-top box manufacturers to align the US and European systems. Which one will have control is still to be determined."

*From Electronics Times, 22<sup>nd</sup> May 2000.*  
[www.dotelectronics.com](http://www.dotelectronics.com)



The enclosed picture (above) was the topic of discussion during a recent ATV activities evening (Tuesdays) on the GB3TM (Anglesey) repeater.

It originally appeared in a video called LMS Diary of Events compiled from archived films of the BTF Collection.

The date is Monday the 19<sup>th</sup> October 1938 and the occasion was the opening

of the Centenary Exhibition of the London and Birmingham Railway held on platforms 6 & 7 of Euston Station. The film showed the Lord Mayor of Birmingham opening the proceedings and interposed are shots of the TV camera panning around. I showed an edited version via the repeater concentrating only on the camera, John GW3JGA and John GW3MEO identified it as being of the iconoscope family.

Bill MWOBLU very kindly captured a frame, hence the picture off air. In reply to his email the Bradford Museum identified it as a Super Emitron Camera, a type which was in use with the BBC from 1937 to the early 1950s. The camera which has the tube offset to one side came in differing casings and was a huge improvement on the original emitron.

I wonder if I could ask the readers of CQ-TV whether they have anything to say about this TV camera and especially if anyone can give some indication as to its use at this particular event.

The film shows a grandstand full of black suited male dignitaries, would the camera have been used to show the event on a closed circuit to ordinary people, wives families etc at another venue - Or - does any one possess a Radio Times (or similar) of that date which confirms that the event was televised as an outside broadcast by the BBC? One thought is that the camera was used experimentally on trial at this early date in TV programming.

73. Dewi E. Roberts GWOABL



## Subscription rates

### By the Membership Secretary

Years	Surface	Airmail
One	£15.00	£21.00
Two	£29.00	£41.00
Three	£43.00	£61.00

Please note that the 'Surface' rate covers postage within the EEC, airmail rate is **not** required.

We have also continued to improve our web site at [www.batc.org.uk](http://www.batc.org.uk) and this has proved to be very popular and is now attracting many new members. Also, we have a web site devoted to the CQ-TV magazine at [www.cq-tv.com](http://www.cq-tv.com)

If your subscription is due shortly, you will find a renewal letter enclosed with this magazine.

You hope you will continue to support the Club and we look forward to receiving your renewal either by post or via our web store.

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## Deadline

CQ-TV is published quarterly in February, May, August and November each year. The deadlines for each issue are as follows: -

- February ..... 20<sup>th</sup> December
- May ..... 20<sup>th</sup> March
- August ..... 20<sup>th</sup> June
- November ..... 20<sup>th</sup> September.

Please send your contributions in as soon as you can *prior* to this date.

Will all prospective contributors please be sure to read the 'Notice to Contributors' on page 1 so that you understand the implications of submitting an article for publication.

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## 625 Test Generator

By G. Lewis

This 625 generator was built as a source of monochrome test signals during the development of a 625 to 32 line NBTv converter. The output is a standard 625 waveform and readers may well find a use for it, or for parts of the circuit, elsewhere.

There were two areas that I needed to test in the converter.

I was working with a single 5v rail and needed to produce a large signal with no clipping, despite a changing average picture level (APL) content.

The second one was checking the frequency response after passing through a LPF.

The generator produces a sequence of one line of test signal plus 3 lines of lift/test signals. This sequence is repeated down the field. The lift may be set to black level (BL), or peak white (PW).

By switching through from BL, Test, PW, the APL of the waveform can be varied from near zero to nearly 100%.

The test signal is selectable to be either sawtooth for linearity measurements, or a line sweep for frequency measurements.

I chose to use a square wave for the sweep since I thought it more representative of a typical TV waveform, and also because it was easier to generate!

Like most amateurs, I tend to use whatever comes to hand in the parts drawer. The ZNA134 SPG chip I suspect is now obsolete, but any source of sync, mixed blanking and field drive should suffice. The field drive is used as a reset and timing is not critical, so it could be derived by integration from the mixed sync (MS) waveform.

I have used the 74HC range of TTL, since it produces very clean and fast waveforms that swing from rail to rail.

An HC132 LC oscillator feeds the SPG chip from which syncs are used to clock the HC74 divide by four line counter.

Field drive (FD) reset ensures that this starts in the same phase for each field.

The HC4051 data selector decodes the addresses from the HC74 and switches the four inputs in turn to the output stage, where syncs are added and the 1 volt composite output delivered at 75 ohm impedance.

S2 controls the logic level of input C of the HC4051 and when it is at logic 'high' the upper four inputs are selected in preference to the lower four.

In this manner either sawtooth or sweep can be selected as the test signal.

The white bar is a "potted down" output of mixed blanking.

A black line is produced by the simple method of shorting out the white bar.

An optional input of wider blanking (to suit the NBTv aspect ratio of 2 x 3) can be applied at pin 13 of the HC132.

The line sawtooth is produced using a temperature compensated PNP current source to charge a capacitor, which is discharged every line with blanking. It was found necessary to add a small dc offset to the discharge transistor to equalise the blanking level between the test and lift lines. A judicious amount of positive feedback at the base of the current source compensates for the loading of the output stage and linearises the early part of the sawtooth.

The line sweep is generated by using only the VCO part of an HC4046 fed with line sawtooth to sweep from around 1MHz to 5MHz. I found that I had to add a small dc offset to the sawtooth, as otherwise the early part of the sweep had a negative region and swept downwards for the first few microseconds. To ensure that the sweep is coherent with the TV line, the timing capacitor is reset with mixed blanking.

R1 is adjusted on test to set the frequency and S2 disables the sweep during sawtooth selection to prevent signal breakthrough. There is a small amount of sweep breakthrough on the white bar during sweep operation and

purists would probably disable the sweep during bar operation as well. I ran out of strip board at this stage and left it as shown!

The circuit is capable of further development. Adding a further divide by two to the line counter and feeding this to the C input of the HC4051 will yield an omnibus signal with sweep and sawtooth being present together with lift in an 8 line sequence.

Only the non-standard power pinouts of the ZNA134 are shown; pins 7-14 and 8-16 are assumed for the rest.

The whole circuit was constructed on a small piece (80mm x 115mm) of DIL RS Stripboard (434-021) and consumes about 140mA from a stabilised 5 volt supply.

As it is free standing and wired in as necessary, I added a IN4007 - reversed biased across the rail - so that in the event of the supply being applied the wrong way there is a measure of protection.

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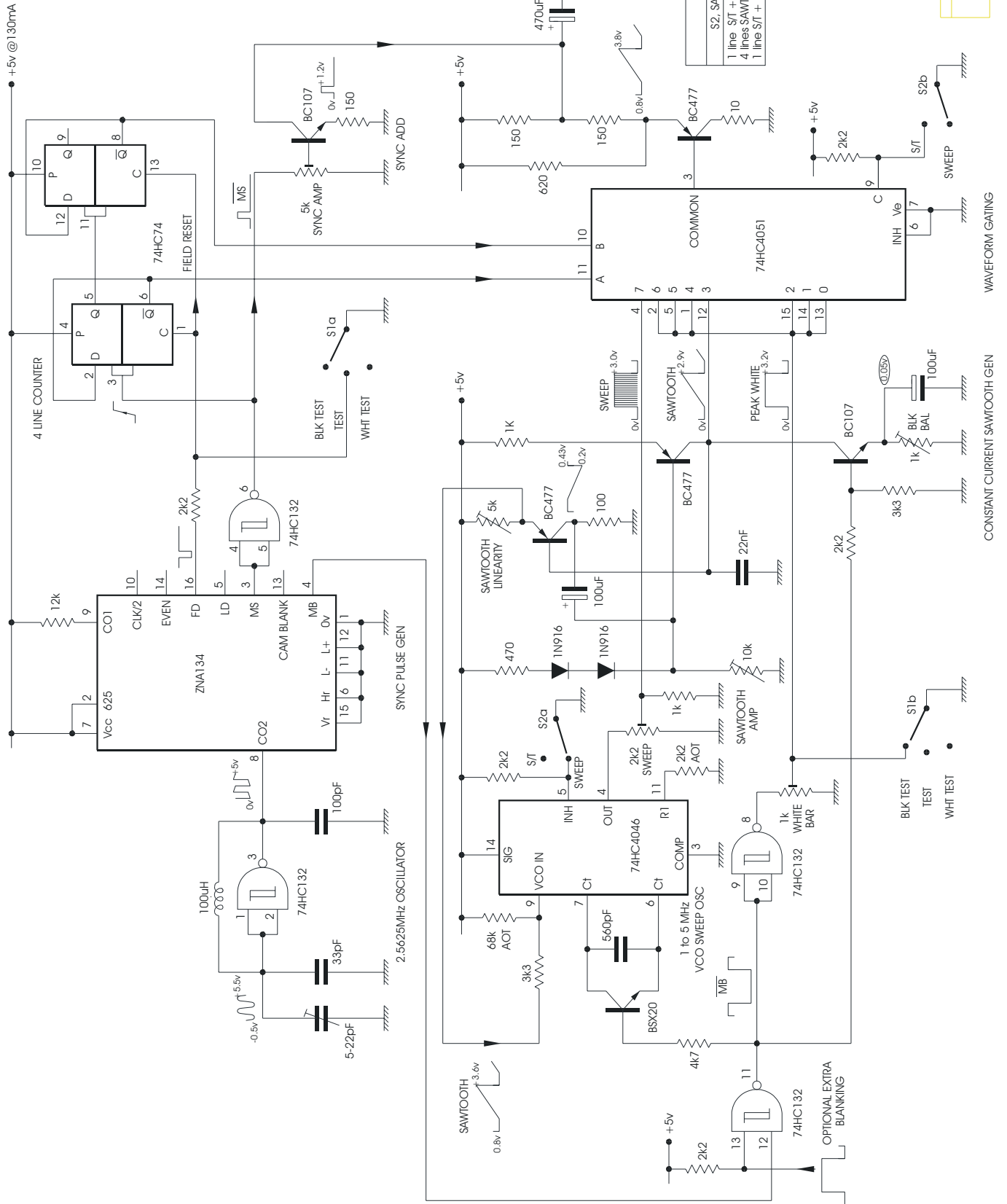
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# A Personal View of Digital Television

By Mike Cox

## Digital Terrestrial Television

Unless the Government have more up their sleeve than most believe, it is hard to see how they can expect to be able to switch-off the analogue television services by 2010, never mind 2006 as originally proposed.

The appeal of Digital Terrestrial Television (DTT) was offered to the public as a service with "improved" picture and sound quality. The driver behind the rush to convert is to be able to sell off unused bandwidth for additional services (mobile phones etc, although

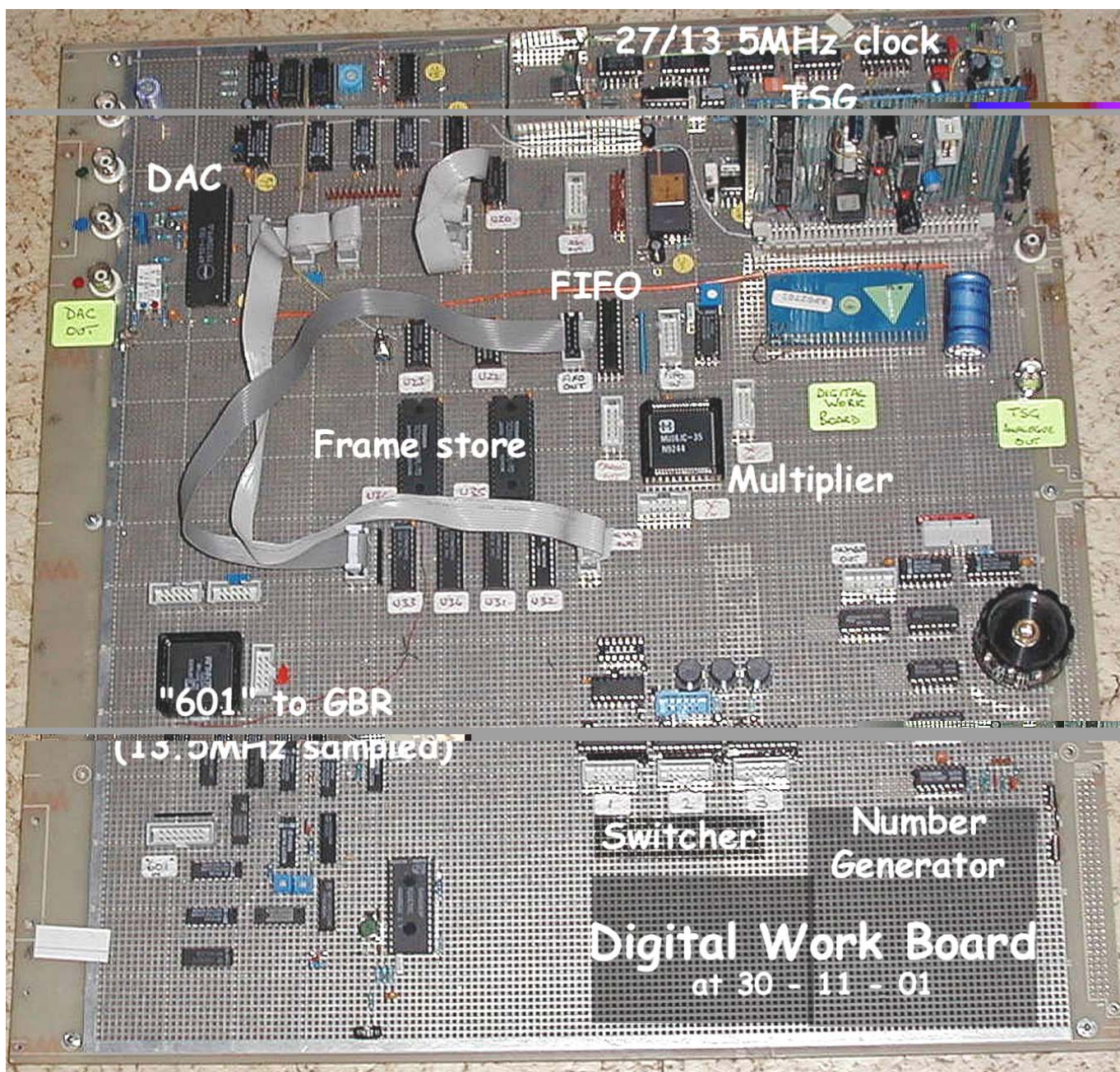
how many of these operate in the UHF bands as used for TV?).

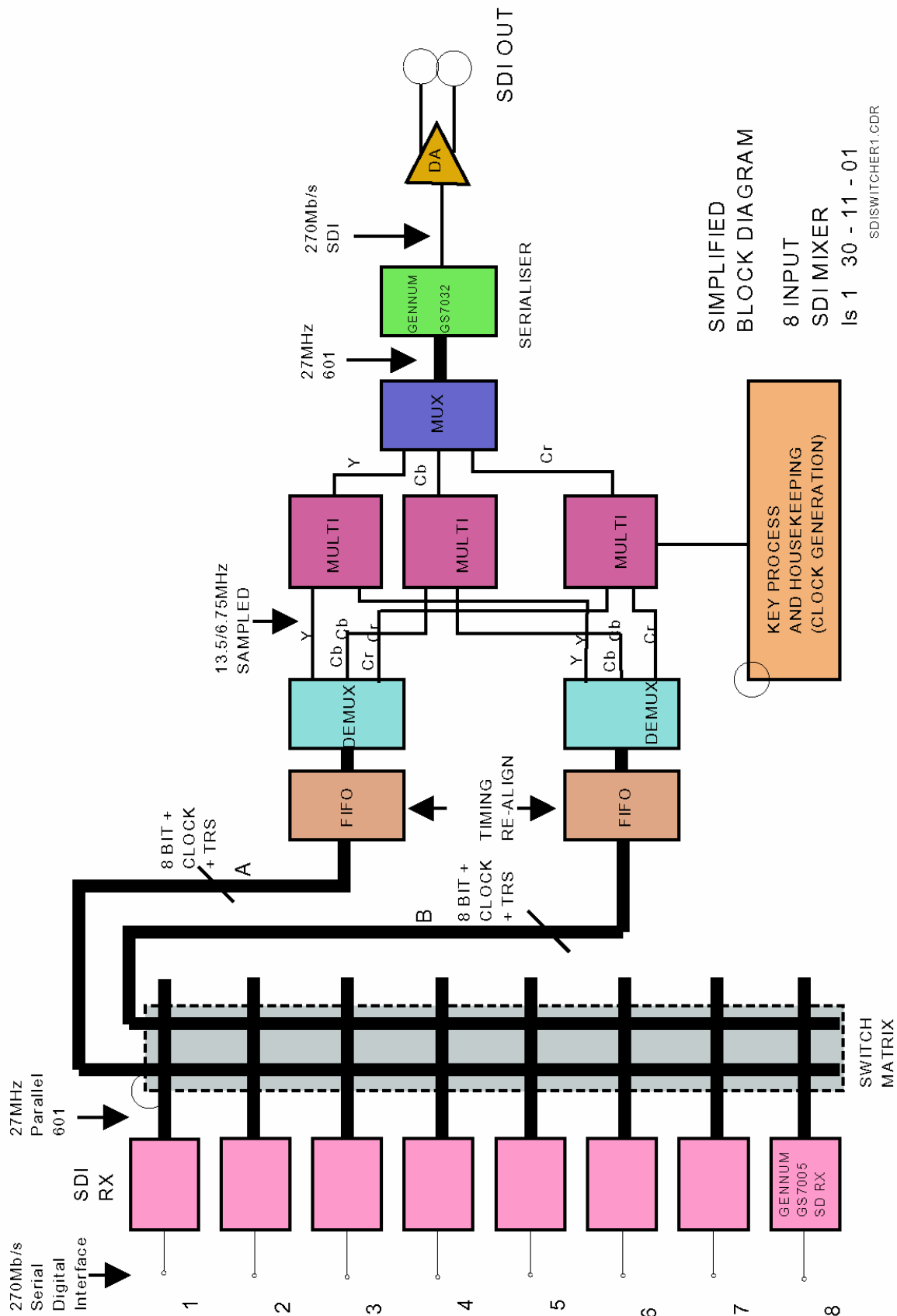
The public, in the USA, in the UK, and in Scandinavia have proved distinctly underwhelmed by the goods on offer. After two years, only about 1.2 million subscribers have followed the "monkey" and signed up to ITV Digital in order to get a "free" Set Top Box" (STB). Beyond that, few (about 300,000) have bought Integrated Digital Televisions (iDTV), largely because there are few about, and they are very expensive. My local Comet had one when I went in, among several tens of analogue widescreen sets of varying sizes. So the total UK DTT homes amount to 1.5

million.

In addition to slow take up, there are some technical issues which affect the UK.

In the rush to get off the ground first, UK chose a COFDM (Coded Orthogonal Frequency Division Multiplex) system with 2000 carriers, whereas the later starting continentals chose the 8000 carrier variant. An 8000 carrier chip set will work with a 2000 carrier signal, but not the other way round. The software package that operates the auxiliary information such as the electronic programme guide (EPG) is an older device called MHEG-5, whereas the





DVB group have chosen MHP as the software platform for such information. Again, we are locked out of future development.

Another problem is the sheer scale of the conversion exercise. Many homes in the

UK have 2 or more TV receivers, together with a separate VTR. Each one of these will need an STB before analogue can be switched off. The planning for the UHF colour service on 625 lines, started in the late 60s assumed population coverage of 99%, as any less

than that would be politically unacceptable.

Would any one like to make about 50 million STBs, to sell for about £25 each?

We cannot even look at our US cousins, as they seem to be in deeper do-do than we are.

The US government is still publicly sticking to 2006 as the analogue switch-off date, but there has been a frenzied attempt to re-open the choice of 8-VSB as opposed to COFDM, chiefly on the grounds of 8-VSB having much poorer multi-path performance than COFDM. An attraction of COFDM is its performance in mobile applications such as TV reception in moving vehicles. It is thought that COFDM requires slightly more ERP for the same coverage.

This debate, coupled with the lack of a defined display standard in the USA, has not encouraged set sales in any way.

### Digital Television and the amateur

From a BATC stand point, the problem with DTV is that it is extremely complicated unless you have access to FPGA or ASIC design capability, and even then, the assembly mechanics are pretty daunting with 160 pin MQFP chips and now Ball Grid Array (BGA) chips with around 380 pins. Devising an 8-VSB modulator to be fed with an MPEG data stream could be feasible for the amateur. There are a number of chips around for mobile phone use that could perhaps be used.

The studio is a different matter. Much of studio equipment is now digital, with

DVTRs and servers dominant in storage and layout.

Spurred on by my activities at IBC, (see CQ-TV's past), I have decided that I must drag myself into the new century, and have started on a programme of work leading to replacing the analogue component switcher used for the IBC Message Service by an SDI version. As most of the sources are SDI capable, and the switcher output was immediately converted to SDI for distribution anyway, this is not such a vast step.

Some years ago, I started a Digital Work Board. This is a double-sided colander ground plane, with holes pierced on a 0.1inch grid. On this was built an ADC with 5.5MHz pre-filter, a 27/13.5/6.75MHz clock generator. Over time a triple DAC has been added, together with a multiplier, a frame store (2 x 1Mb RAMs), and a number generator 0 – 255 (0 – FF) operated by a shaft encoder.

Recent work included a "601" to RGB section, taking in parallel multiplexed YCbCr signals, de-multiplexing the signals and performing matrixing back to RGB. A Gennum GF9103 chip does most of the work, although there is fun to be had in recovering sync from the 601 signal. (See picture)

More recent work has added a FIFO to allow some re-timing, and currently a 3 input switcher is being added to the board to select sources. All the work is

being done in an 8 bit parallel domain, since 8 bit parts are more readily available than 10 bit parts. The initial object is to produce a simple switcher with cross fade, split screen, and limited keying. Once it is operating, then it should be relatively simple to expand this to three parallel channels, with final multiplexing back to 601 and serialising to SDI. The final unit will have 8 SDI receivers, which de-serialise the 270Mb/s stream back to parallel 601 (now at 27MHz), then source selecting and de-multiplexing to the Y, Cb and Cr streams (now at 13.5MHz). Mixing and keying can now be carried out and the three streams multiplexed back to 601 and the serialised to SDI. This will have to be constructed on a multi-layer board, and I may have to seek professional help for this. (See Block Diagram above)

To aid inter-connections on the Digital Work Board, 10 pin box headers are used for in and out of each stage. 10 pin IDC connectors and ribbon cable make up short jumper leads. This is a very cost-effective solution for short inter-connects of 8 bit signals.

Purist among you may say that the SDI specification is for 10 bit video signals. Well, tough! Show me where I can acquire 10 bit parts easily and cheaply. Eight bit parts such as RAMs, latches counters are readily available and that is what I propose to use. Watch this space.



An Tesla IO camera on display at the Prague Technical Museum. Margaret H operates.



Low cost Czech TV. Shape of things to come?

These pictures from Dicky Howett

By John Lawrence GW3JGA

## Variable Gain Video Amplifier

Most ATV stations rely on a domestic satellite receiver for the reception of ATV transmissions on 24cms. Some satellite receivers work well without modification, but others require an RF pre-amplifier to increase the sensitivity and/or improve the front-end noise performance.

Also, as a result of the relatively narrow deviation of an ATV signal, compared with the wide deviation of a satellite transmission, many receivers produce a low video output signal, typically 0.5V peak-to-peak instead of the usual 1V p-p. In some satellite receivers it is possible to increase the video output signal by adjustment of an internal pre-set gain control, e.g. Maspro SRE 90R. Where this is not possible, an external video amplifier is required.

## Video Amplifier Circuit

A suitable circuit using an Elantec EL2020CN 50 MHz current feedback op-amp (Farnell 399-115) is shown in Fig.1. It operates from a 'commonly available' single +12V supply. The circuit could be simplified if both + and - supplies were made available.

The overall gain of the circuit, video input to video output into a 75R load, is from X1 to X4 (0 to 12 dB), which depends on the setting of the pre-set gain control RV1. The measured -3 dB bandwidth is from 25 Hz to beyond 20 MHz. The prototype circuit was built on 'Veroboard' as shown in Fig.2.

## Connection

Where the satellite receiver has a video output socket, this can be connected directly to the input of the video amplifier. Alternatively, where only a SCART socket is available then connection to pin 19 - video out and pin 17 - video earth/ground can be used. The pre-set control on the amplifier can be adjusted to provide a video output signal of 1V p-p into 75R, either by monitoring it with an oscilloscope, or by comparing it on a monitor with a known 1V p-p video signal, e.g. the output from a camcorder.

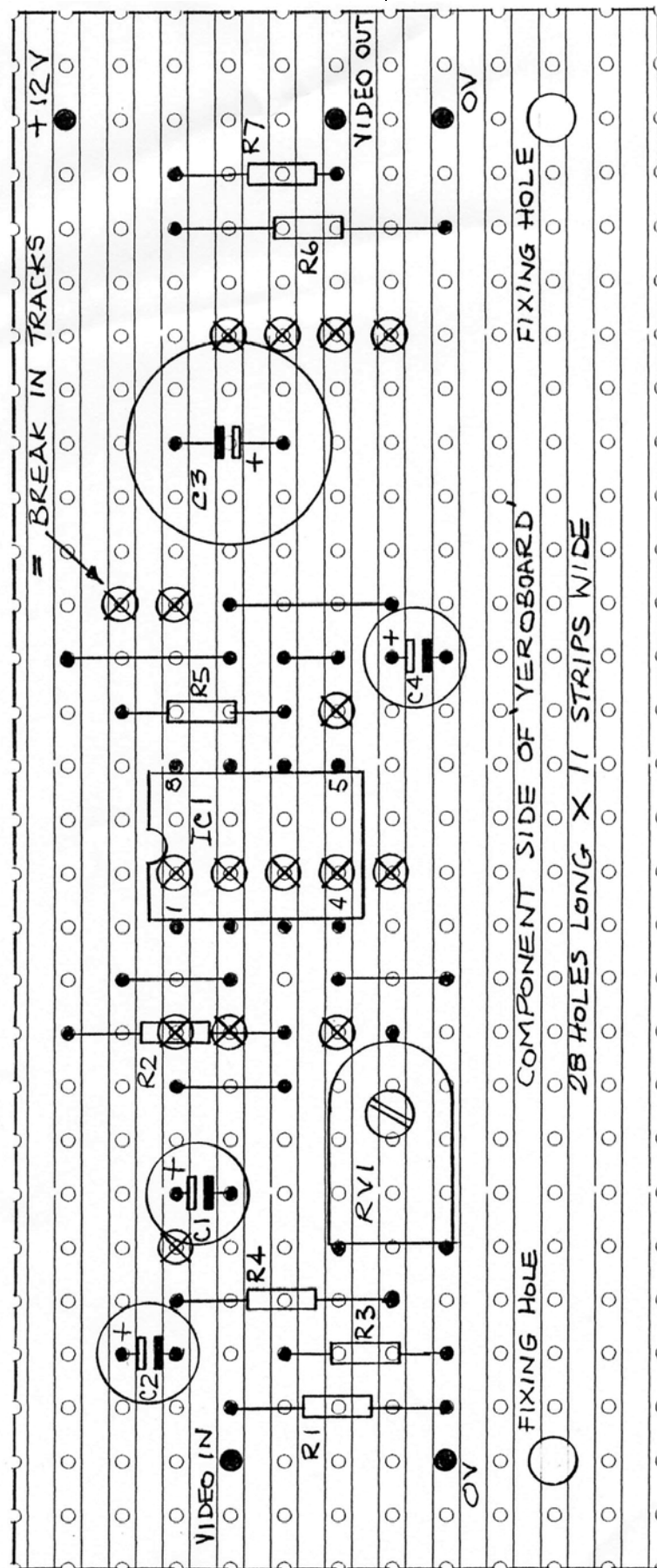
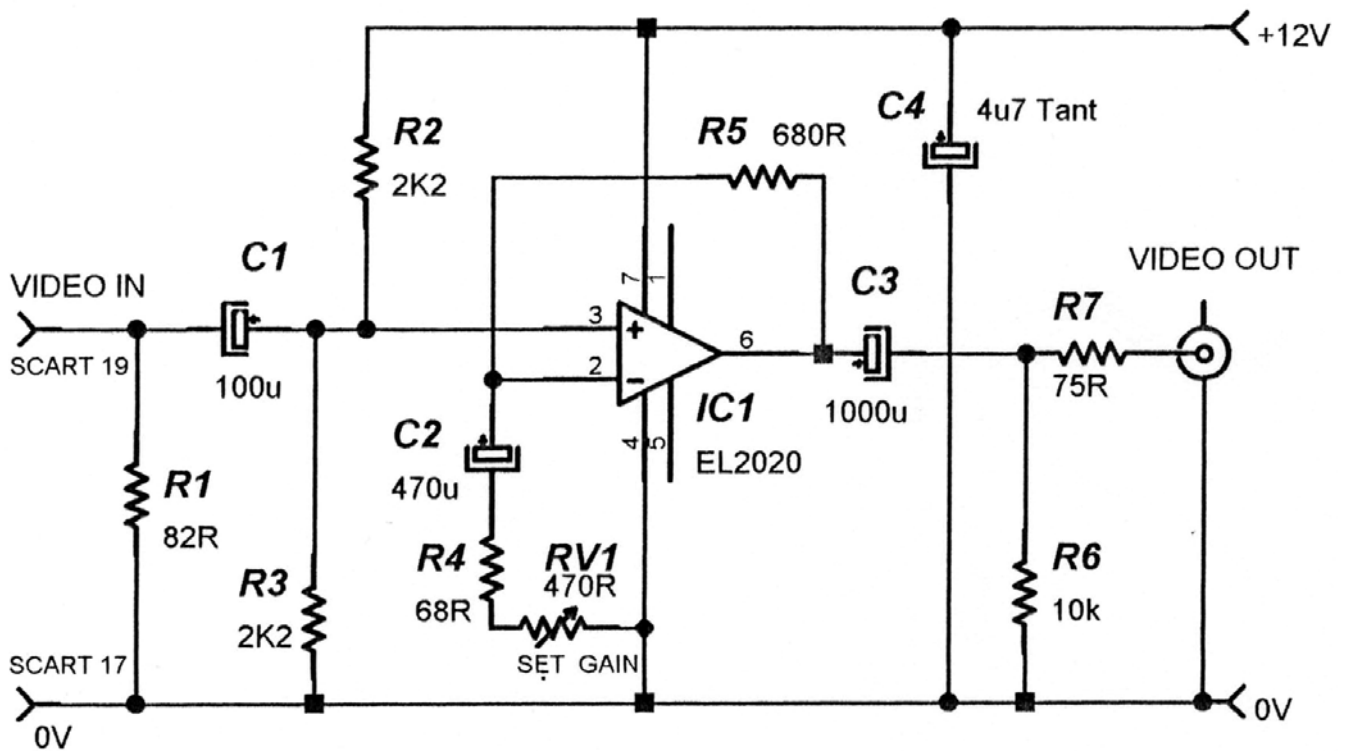


Fig. 2. 'Veroboard' Layout



**Fig. 1. Video Amplifier Circuit**

**References**

EL2020C Data Sheet Elantec Semiconductor Inc. 1997 data Book, [www.elantec.com/pages/](http://www.elantec.com/pages/)

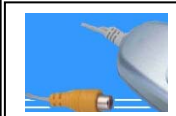
See the front cover for a picture of the completed project – ED.

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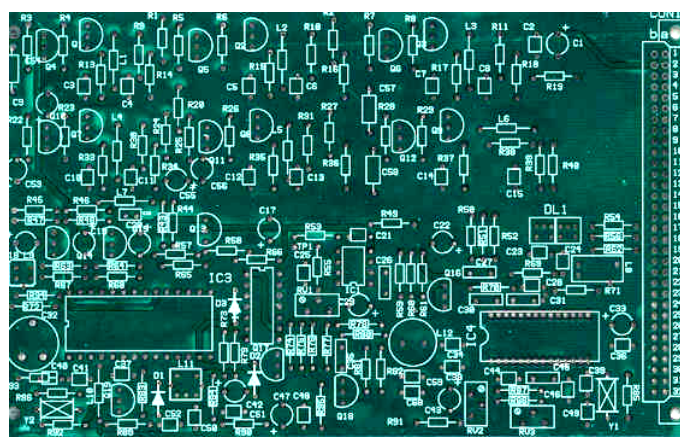
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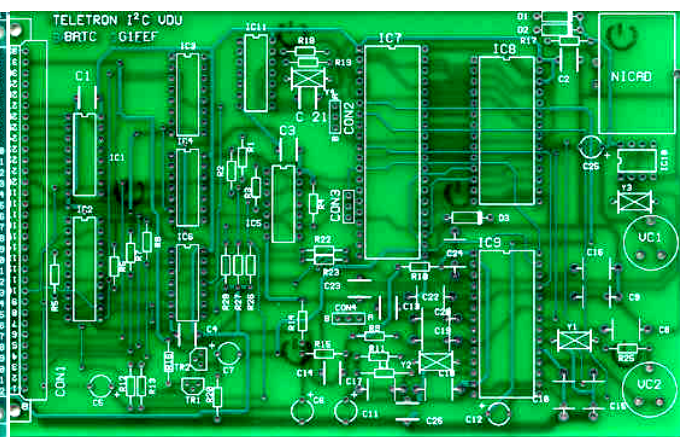
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## 70 Revisited Part 2

### By Ian Waters, G3KKD

In CQ-TV No 196, I described a narrow band ATV system being used to investigate the quality of black and white ATV picture that could be transmitted in today's 70 cm band avoiding MUTUAL interference with other modes.

I reported some initial tests carried out using 5 mW of power within the confines of my own property.

The picture quality yielded by the use of a -3dB passband of +/- 1.25 MHz appeared quite adequate for communications purposes.

Also with a transmission of this width, centred on a carrier frequency of 437.25 MHz, no sideband energy could be detected below 435.55 MHz, ie 1.7 MHz from the carrier.

While this was encouraging, further tests using higher power over a greater distance seemed desirable.

### Tests with G8RYL

The transmitter, with an output of 18 W ps together with a 12 dBd aerial, giving an ERP of about 200W, was taken to the QTH of Ian, G8RYL, about 2 miles distant. The transmission on 437.25 MHz was received at my QTH using the set up described in Part 1. It was necessary to reduce the TX power by 10 dB and for me to beam off by 90 deg to prevent my receiver being totally overloaded. Under these conditions a P5+ picture was received and using my communications receiver, fed from the same aerial, the first lower TV sideband, at less than S1, was heard at 435.3 MHz or 1.95 MHz from the TV carrier. It was not possible to investigate the upper sideband. With my aerial in this position bearing 270 deg the GB3SUT beacon, 90 miles distant on 432.890 MHz, could be received at S1 with no trace of QRM. It was possible to reduce power by 23 dB or 1 W ERP, while still bearing 90 deg off, and receive a P4 1/2 picture. The first detectable sideband was the 1.65 MHz from the TV carrier.

### Tests with G8GML

As a second test, arrangements were made to operate the TX, still with an

output power of 18 W ps giving an ERP of about 1.1 kW, to send pictures to Paul G8GML at a distance of about 3 miles. GML used an FT847 communications receiver to explore the band. The TV carrier on 437.25 MHz read S9+40dB on his S meter. Results very similar to both those with the low power and G8RYL tests were obtained. TV sidebands started to be heard, at less than S1 or about 50 dB below carrier, at 435.7 and 438.9 MHz ie approx +/- 1.6 MHz from the carrier. No interference could be detected on any of the communication channels.

The tests were conducted with a picture of the S meter relayed to G3KKD via the GB3PV repeater.

These tests seem to have adequately proved that TV can still be used on 70 cm without causing interference TO other modes, but what about interference FROM other modes to ATV? This has a significant bearing on receiver design.

### Receiver Design

In part 1, I said that it was intended to use a standard system I television receiver with a frequency converter for reception. The circuit diagram of this converter is given in Fig 1.

If the received ATV signal is strong, a simple arrangement without an IF filter will probably be satisfactory. However as the receiver IF passband extends to 4.5-5.5 MHz above the vision carrier (depending on receiver quality), all frequencies above 1.25 MHz would be adding noise and very probably unwanted signals, while contributing nothing to the desired ATV picture. Filtering seemed desirable, but what form should it take?

The channel to be used on the TV receiver determines the converter local oscillator frequency. Potentially we have from 470 to 860 MHz available. Channels used for TV transmission locally need to be avoided. At my QTH the taboo frequencies due to strong analog transmissions are 21,24,27,31 and 34. To these could be added the digital channels from 40 up to 67. However if digital signals were to penetrate the ATV system they are not likely to be a problem. They would not cause

patterning but just slightly raise the noise floor.

As the narrowband TV transmission is symmetrical about the carrier it does not matter, as far as receiving the ATV picture is concerned, whether the converter local oscillator is on the high or the low side of the carrier. I opted to use the lowest clear channel, CH22 Fv 479.25 MHz and a low side oscillator. This gives a lower local oscillator frequency, 42 MHz, making the oscillator easier to design and giving greater stability.

### Filtering

With the oscillator on the low side there will be no sideband inversion and the LF, or vestigially suppressed, side of the receiver response will be exposed to signals in the amateur band below the ATV channel. Measurements show this suppression to be adequate and even powerful signals below 435.7 MHz do not cause a problem. Note that a TV set needs good suppression on the LF side to avoid interference from lower adjacent channel sound carriers.

However, the HF side of the receiver response, above 1.25 MHz is exposed to signals from 438.5 to say 442.75 MHz. Thus signals in the top part of the amateur band and transmissions, which could be strong, from other services above it will cause interference.

The first idea was to put a filter between the tuner and the IF stages inside the TV set. The IF frequency is low enough to enable the design of a simple, compact filter with the necessary selectivity. This idea was however rejected because it would tie the converter to a particular TV set and I did not wish to maul a good receiver.

The next idea was to insert a filter, of a type generally like the one I published in CQ-TV 195, between the converter and the TV set. Ideally this should be 2.5 MHz wide. It would suppress the unwanted signals above the ATV channel and also augment the receiver vestige side suppression. However such a filter would need a 0.5% bandwidth, which is beyond the limits of filter design. A wider filter, suitably tuned, could be used to suppress the upper



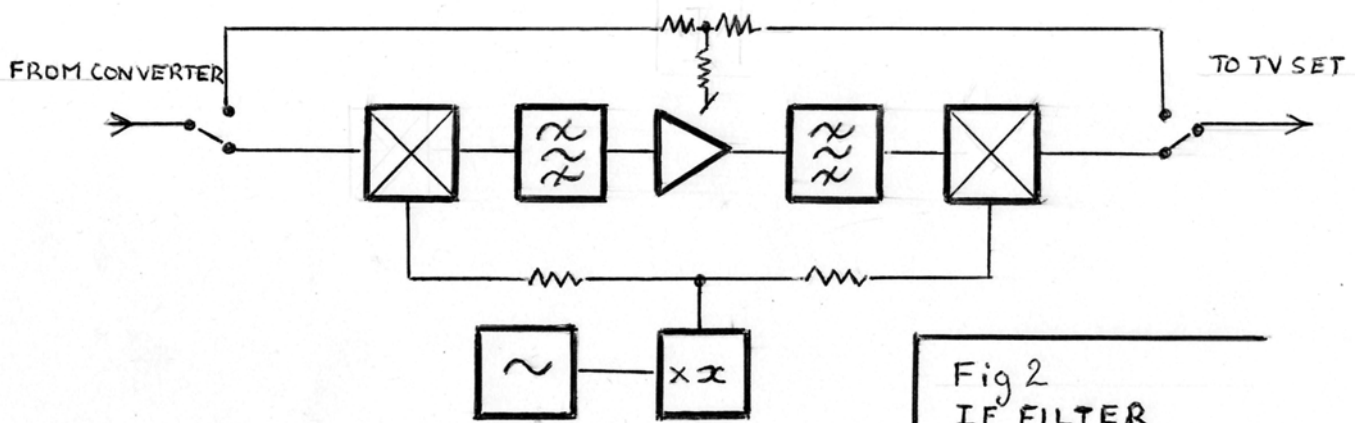


Fig 2  
IF FILTER  
11-12-2001

power is about 37% of ps, so ps is 2.7 times this reading.

However, we do not all have thermal wattmeters. The method used here is to down convert a sample of TX output to a frequency low enough to enable the envelope to be displayed on an oscilloscope. The peak-to-peak sync amplitude is measured. The modulation is removed and the cw carrier power is increased to the same value. This is measured with any available wattmeter, i.e. a diode meter that tends to read peak value.

The down converter oscillator needs to be, say, 10 MHz from the carrier. It does not need to have an exact frequency or to be very stable. The mixer needs to be fairly linear.

### Appendix

Frequency converter inductor details.

Image filter strip lines. (2 off) Copper 1/4 inch wide x 1/16 inch thick x 1 3/4 inch long, 1/4 inch above earth plane, taps 3/8 inch from earth, lines separated 7/8 inch CRS (centres ??).

Oscillator coil. 7 1/2 turns, 16 SWG, 7/16 inch ID, 7/8 inch long.

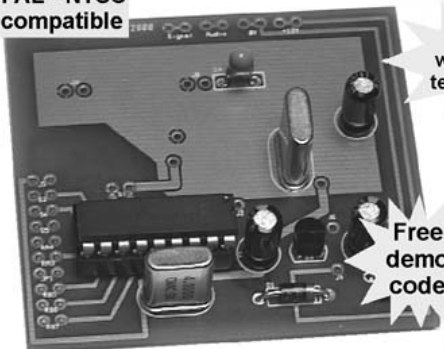
Harmonic filter coils.(3 off) 5 turns, 22 SWG, 1/4 inch ID, 3/8 inch long.

### Thanks

I would like to thank my colleagues in the Cambridge GB3PV ATV group, especially G8RYL and G8GML, for their help with this project.

## PIC On Screen Display Project Board

PAL - NTSC compatible



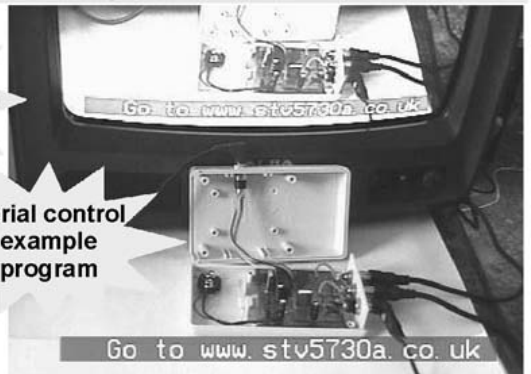
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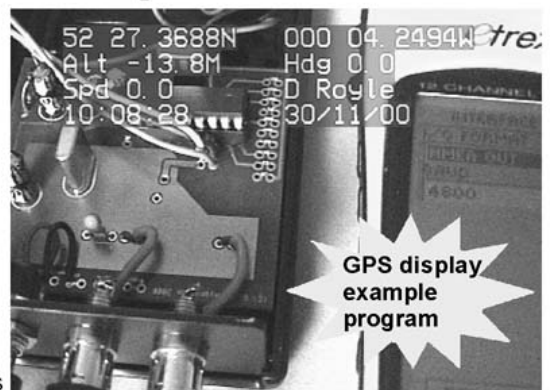
This project board combines a PIC microcontroller with an on screen display IC. It is designed to overlay text and graphics characters onto any composite video signal. Example programs are available pre-programmed and as PIC source code.

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GPS display example program

# A Return Loss Bridge

By Tony Jaques, G3PTD

## Introduction

In Amateur Television practice a somewhat cavalier approach to terminating a video circuit is often seen. Commonly a single 75Ω resistor is just wired into the circuit. Realistically this is usually quite near enough for amateur practice, where cable lengths often amount to just a couple of metres. However, I was recently given some ex-broadcast equipment where the approach is slightly different, and more out of academic interest than practical necessity, I began looking into how this is used. In much the same spirit, I present here my approach to a method of taking advantage of the better termination offered.

## Why terminate?

I recently heard someone on a two metre repeater asking why a piece of television equipment that he had just bought at a rally had “two input sockets joined together”. Some of the possibilities offered were quite amazing. But then it occurred to me to wonder where today’s newcomers find out about these basic things. So briefly - so as not to bore the long serving members rigid; when we send a video signal along a cable we treat it as if it was rf from a transmitter being sent to a dummy load. That is, we use coax cables for the link and connect a resistor across the far end (Fig 1). This resistor is a “terminating resistor”, and the circuit is said to be “terminated”. In transmitter terminology this is a “matched load”.

There are two ways in which we differ in television. One is that we use 75Ω coaxial cable and 75Ω resistors, rather than the 50Ω used (for some strange reason) for rf. The other difference is the reason for using this approach. The



Fig 1: Sending Video

transmitter user wants to achieve maximum power transfer and sends his signal to a matched load in order to eliminate “reflected” power. The video man also wants to eliminate reflections, but in his case it is because they show on the picture as multiple images! (It takes time for the reflections travel to and fro along the cable, so they appear later in the display.)

Amplifier” or VDA. The trouble with this approach is that it costs money, so an alternative is often used - especially in Amateur TV. It is called “looping” or “bridging”.

In this approach each piece of equipment has two sockets that might be simply wired together inside the box. The video input signal is connected to one of them, and then “looped” on to the next piece of

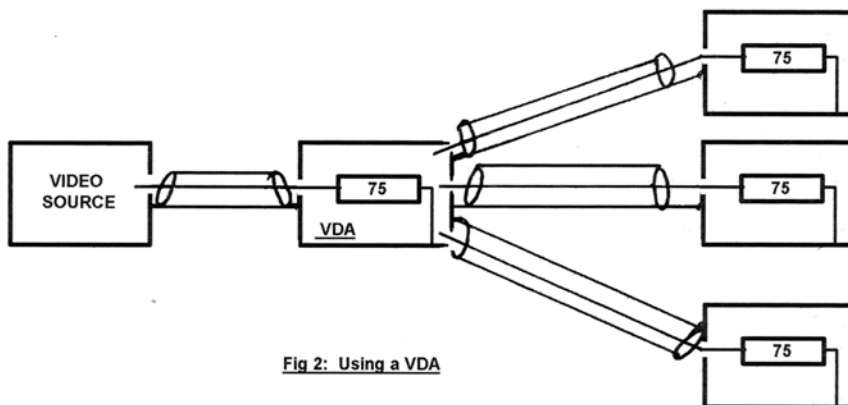


Fig 2: Using a VDA

## Distribution

So ideally we want to send a video signal down a good quality 75Ω cable to a destination that can be represented by a 75Ω resistor. But what if we want to send the same signal to more than one destination?

The “proper” way to do this is to use an amplifier which accepts the one input and provides several outputs, each of which can be sent to a terminated destination (Fig 2). (Actually it does more than that, but that is the basic idea.) The amplifier is a “Video Distribution

equipment by taking the output from the second socket (Fig 3). The circuit is terminated by plugging a “term” into the second socket on the last piece of equipment at the end of the chain. The termination will be just a 75Ω resistor inside a BNC plug (the 75Ω version of course!). There are variations on this, but the end result is the same.

Fine in theory but... there are two likely problems with the looped through arrangement. One is that cable losses will reduce the video level if the cable length becomes excessive. This can be easily overcome by using an amplifier to bring the signal back up again. (But if a VDA has to be used, one might as well do it properly in the first place.) The other is that, at each loop through, the circuit may cease to have that vital 75Ω characteristic. Just connecting the two equipment sockets together and taking a wire off to the internal circuitry can hardly be regarded as maintaining a 75Ω coaxial configuration!

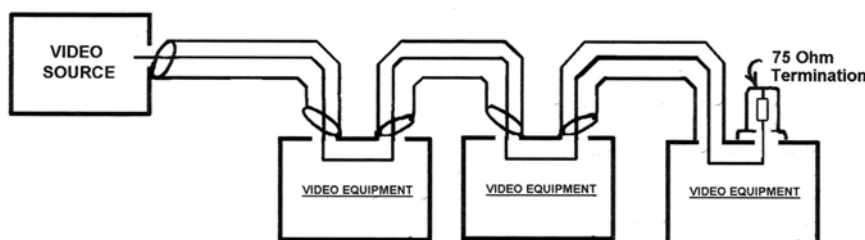
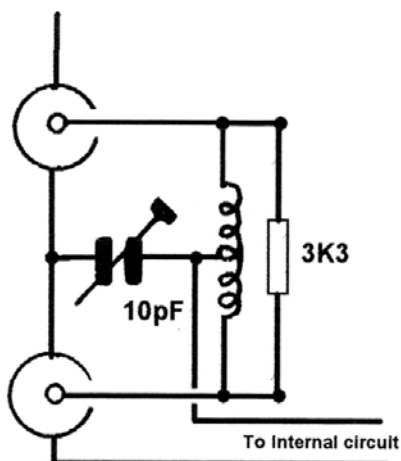


FIG 3: LOOPING THROUGH

Reflections can then occur at each loop through.



**FIG 4: An improved termination**

### An improved input circuit

The input circuit can be improved by adding a few components (Fig 4). A small value series inductance is added in series with each socket. Although these could be variable inductors it is easier to use fixed inductors and deliberately add some extra stray capacitance in the form of a trimmer. It is the trimmer that is adjusted for optimum matching.

The resistor is present to damp out

resonance effects, but it also acts as a convenient coil former.

### Practical values

I have not measured the inductance value of the inductors that are in the recently acquired equipment, but they consist of 5 turns of 18 swg wire, centre tapped, and spaced at about the wire's own diameter. A half watt resistor is used as the former so the coil diameter is about 3mm internal. The coil ends are taken along the resistor body and soldered to the component leadout wires. The trimmer measured as 10pF, but it ends up as about a third meshed, so 5pF will probably do as well.

So, given the improved version, how do we set it?

### The Return Loss Bridge

The gadget used to set the input circuit professionally is called a return loss bridge, but I was quite unable to find the circuit of one. What I have done therefore might just be new for this application - but I doubt it. I do not regard myself as an original thinker. So I apologise if I have unwittingly trodden on anyone's toes! When you think that what we are doing here is line matching you will realise that what is needed is an equivalent to the rf SWR bridge. But the

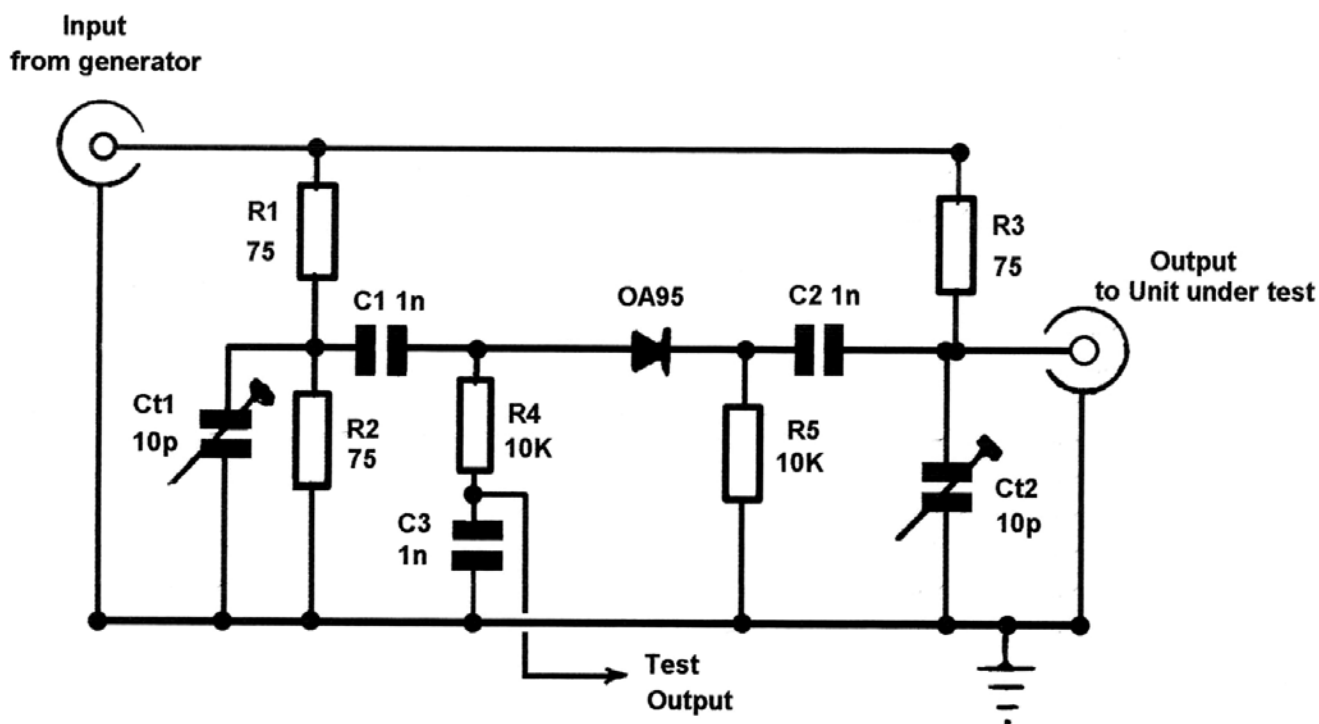
usual SWR bridge with two coupled lines is no use to us (I think). We are dealing with about 12 mW rather than tens or hundreds of watts.

There is a version of the SWR bridge, favoured by QRP enthusiasts, that just uses resistors, and after some experimentation, I arrived at Fig 5.

### Circuit operation

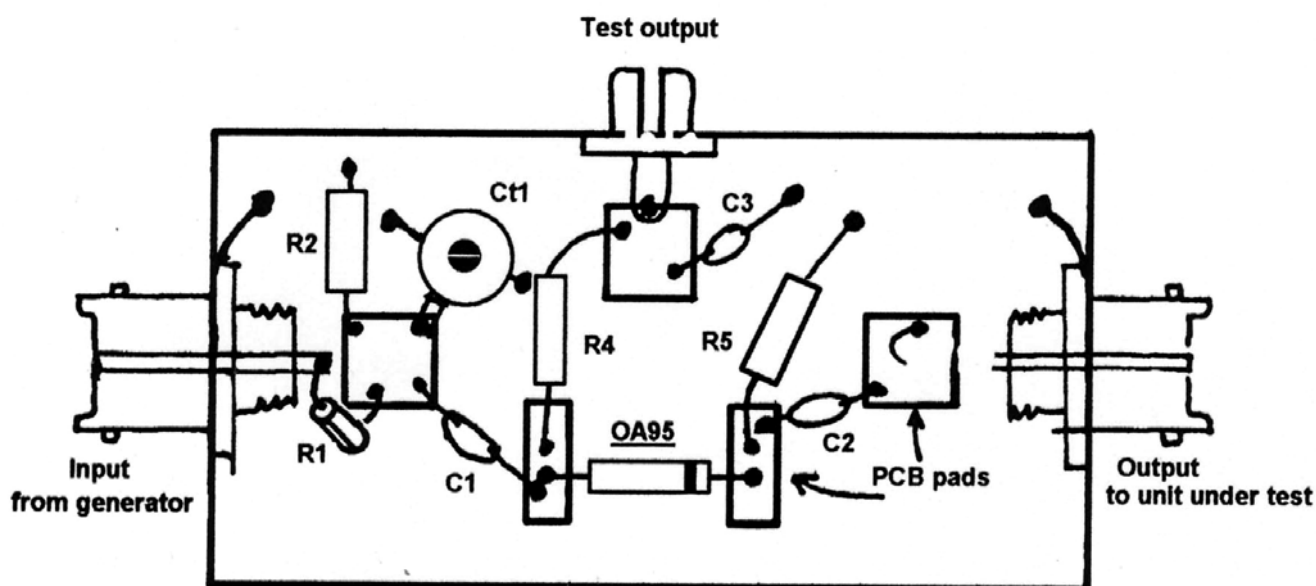
It is possible to do a complicated analysis of this bridge arrangement, but I always favour a down to earth approach:

Suppose that the input is 1V p-p. At the junction of R1 and R2 there should then be 0.5V p-p. If the output is properly terminated then there will also be 0.5V p-p at the bottom end of R3. That is, there will be no voltage difference between those two points and no current will flow in the rectification circuit between them. The test output voltage will be zero. Now suppose that the output is open circuit (unterminated). The bottom end of R3 will now have close to 1V p-p on it, but the junction of R1 and R2 will still be at 0.5V p-p. Similarly, if the output is short circuit the bottom end of R3 will now have 0V on it, and again there is a difference of 0.5V p-p between the two junctions. In either case the difference will drive a current through the rectifier circuit, and a



**FIG 5: A Return Loss Bridge**

**FIG 6: The component layout**



**(R3 is connected directly between the sockets)**

negative voltage will appear at the test output. In principle one would expect about -250mV output, but in practice the output when unterminated is likely to be higher, and when shorted lower, than that. This is because the output voltage from the source (and therefore at R1/R3 junction) is likely to change with such wide changes in load value.

With some other mismatched condition the test output will be less than at those two extremes, but the point is that it becomes zero when the load is correct. So adjustment of the termination trimmer is aimed at reaching zero volts at the test output of the bridge.

### Component values

The 75Ω resistors should have a 1% tolerance, but there is no point in going better than this because they should be about 74.5 ohms anyway. Apart from that, the circuit values are quite uncritical. It also seems likely that other germanium diodes would serve as well. The 10pF trimmers are used to compensate for stray capacitance. In my case however Ct2 was not needed and Ct1 finished up at slightly over half meshed.

### Construction

For such a simple circuit a "proper" printed circuit board is hardly justified, but having the components just hung in

space is definitely not good enough. I built the circuit on a 48 x 23mm piece of PCB with "islands" of PCB material stuck on to it where needed. Fig 6 shows the layout.

The board was then put into the bottom of a small (50 x 25 x 25mm) aluminium box with a BNC socket on each end. It is held in place by being soldered to the BNC socket solder tags. I used a "phono" socket for the test output, but any other connector could be used.

Ideally the video output should be on a plug so that it goes directly into the equipment under test. Unfortunately I could not find a chassis mounting BNC plug so I had to use a socket with a plug-to-plug adapter. The output must not be through a length of coax cable!

Note that if a light proof box is not used then it will be necessary to paint the diode body black if it is of the clear glass type. Otherwise variations in ambient light will generate variable (positive) voltages sufficient to mask the results.

### Monitoring

Either a meter or a 'scope may be used to monitor the test output voltage. An oscilloscope is probably the best option simply because it gives an analogue display and will only place a light load on the circuit. A DVM is more portable of course, but not as easy to use when

detecting a minimum. I find that when a minimum is set using a 'scope the DVM reads typically 0.1mV.

### The source

It would appear that any TV source could be used, but if real moving pictures are used the output bounces as the picture content changes - especially with incorrect termination. If a fixed test signal (e.g. colour bars) is used then at least the test output is steady. But in either case the residue of the video signal at the output (the "ripple" in rectifier terms) makes it impossible to determine where zero volts is. Practically a continuous input signal is needed. The logical choice to pick is the subcarrier output from the station SPG. If an SPG is not available then there is no shortage of subcarrier generator designs in CQ-TV to choose from.

### Initial adjustment

Connect the generator to the input socket and connect a 75Ω termination to the output socket. It is definitely not good enough to just wire a resistor across the output, except for first experiments.

The termination absolutely must be a properly constructed known good 75Ω termination plug. Monitor the test output, preferably on a 'scope and adjust the trimmer(s) in the bridge for as near to zero volts output as possible.



## Equipment test

Just as it is impossible to measure the SWR of an aerial at the shack end of the feeder, so also it makes no sense to put the return loss bridge at the generator end of a cable. Plug the bridge directly into the input socket of the equipment under test (NOT via a cable) and terminate it at the loop through socket with your known termination. If no loop through facility is provided then the equipment's own internal termination must be used in the hope that it is a good one. It will soon show if it isn't!

Adjust the return loss trimmer on the equipment for as near to zero volts output as possible. And that is it.

## Return loss specification

Manufacturers usually specify the return loss in dB at subcarrier frequency. In the days when broadcasters made a pretence of caring about quality, under IBA threat, a reasonable figure was some 45 to 50dB. In terms of output from this design 0dB is about 250mV, so -45dB equates to 1.4mV.

I am not brave enough to claim that return loss can be measured accurately with this approach, and my reasoning might make a sieve look solid, but it appears that return loss can at least be set to better than a reasonable spec. in this way.

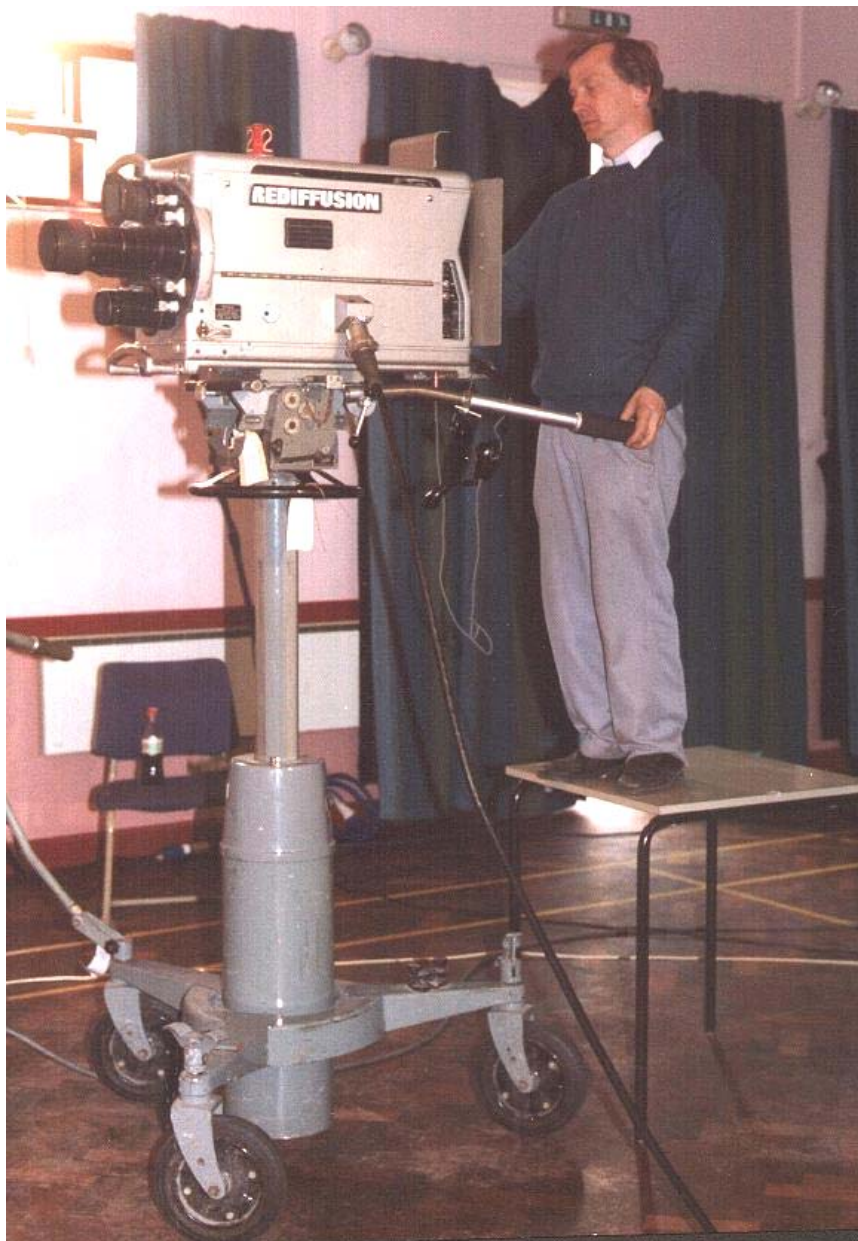
If there is anyone who can do comparisons between this circuit and a "proper" return loss bridge, I would be most interested to hear of the results.

## Other uses

The unit can be used to compare the quality of coax cables when properly terminated. Some of the thin cheap cables (with phono connectors on them!) from the usual "photo shop" sources are truly awful! In fact the device is so effective that the effect of merely including a "T" piece in the circuit can be clearly seen; especially if it is a 50Ω one intended for a computer network.

## Conclusion

It must be admitted that if all this is followed it might be that no difference in the video output can be seen. But even so, some interesting investigations are possible, and where equipment that does have a return loss adjustment is available, it can be nice to know that it is right.



**We feel that Mr Paul Marshall has either shrunk, or his cameras have outgrown him.**

**Picture by Dicky Howett**

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## Members only!

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As mentioned previously (CQ-TV 188, page 42), we have set up a 'members only' section on our web site. Access to

these pages requires a username and password. This quarter's codes are: -

**Username:** amember

**Password:** winter

---

## In Retrospect

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### CQ-TV 182

CQ-TV 182, 23cms Panel Antennas, page 69, drawing 3,

The lengths of the arms of the 'T' splitter, shown as 28mm long, should be

39.25mm long if solid dielectric cable is used.

Various people have contacted me for more detail and I have advised them to use 34mm, but G8CML, who did the

original design work on these antennas, now advises a length of 39.25mm

Thanks to Ian Waters G3KKD for this information.

---

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## 1 Watt FM-TV 24cms Transmitter

The 1 Watt transmitter, now on its fourth version, is now on its final run after its original design in 1984. Only a small number of kits remain so get in quick if you would like to be the owner of one of the most reliable and robust ATV units. Please note the Tx meets ATV specs by DESIGN not by addons!

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### Orders should be sent to:-

Worthing Video Repeater Group, 2 North Farm Rd., Lancing, Sussex. BN15 9BS  
Cheques payable to "WVRG".

# UK ATV Repeater List, December 2001

Using the contest software I have produced a worksheet with all the UK ATV repeaters and proposed ATV Repeaters. The 'UK ATV Repeater list' can be found on the BATC web site through the 'UK Repeaters' link. The worksheet automatically works out the

bearings and distance from the inputted locator to all the repeaters on the list. All the information was obtained from the RMC web site and past copies of CQ-TV. The list has been produced overleaf; please get in touch with me if you can fill

out any of the blank cells or if any of the information is incorrect.

E-mail:-

[richard@g7mfo.karoo.co.uk](mailto:richard@g7mfo.karoo.co.uk)

	Callsign	Locator	NGR	Aerial	Mast	Freq I/P	Freq O/P	Site	Town	County	Keeper	Name	Surname	Aerial	Info
				AGL	ASL										
1	GB3AD	IO91VW	TL251255		122	1249	1316	Meredith Road	Stevenage	Hertfordshire	G0OVO	A.D	Wiltshire	Alford Slot	
2	GB3AT	IO91HB	SU451293		143	1249	1316	Sarum Farm	Winchester	Hampshire	G6HNJ	Ian. T	Bennett	Stacked Arrays	
3	GB3BG	IO82WN	SO923942		227	10.425G	10.240G	Beacon Lane	Sedgeley	W.Midlands	G6WJJ	A.J	Kendal	20 Slot Colinear	
4	GB3DH	IO92SX	SX375421		0	1249	1316	Drum Hill Little Eaton	Derby	Derbyshire	G8DKV	M.C	Coldicott	8 Over 8	
5	GB3DJ	IO82SQ	SJ703106		166	10.425G	10.065G	St Georges	Telford	Shropshire	G8VZT	D.B	Hall	Slotted WG	
6	GB3EN	IO91XP	TQ328968		30	1249	1310	Civic Center, Silver St	Enfield	Middlesex	G4DVG	John	Douglas	Bowtie	
7	GB3EY	IO93WT	TA256388	29	16	1248	1308	Aldrough	Hull	E. Yorkshire	G8EQZ	Clive	Reynolds	Alford Slot	
8	GB3GV	IO92IQ	SK479103		184	1249	1316		Markfield	Leicestershire	G8OBP	Dave			
9	GB3GW	IO72VW	SH513402			1280	1310	Braich Y Saint	Criccieth	Caernarfon Wales	GW4KAZ	B.V	Davies	Alford Slot	
10	GB3HV	IO91OO	SU850919		152	1248	1308		High Wycombe	Buckinghamshire	G8LES	Mike	Sanders	4Rx, 4Tx Flat Plates	
11	GB3KT	JO01JJ	TQ969725		4	1249	1310	Minster In Sheppey	East Kent	Isle of Shwpprey	G8SUY	Andy	Parnell	Alford Slot	
12	GB3LO	JO02VL	TM550937		0	1249	1316		Lowestoft	Norfolk	G4TAD	M.R	Wooltorton		
13	GB3MV	IO92NF	SP756609		52	1249	1316	The Mounts	Northampton	Northamptonshire	G1IRG	S.J	Manning	Alford Slot	
14	GB3NV	IO93IA	SK503459			1249	1316	Watnall	Nottingham	Nottinghamshire	G6SKO	Dave		Alford Slot	
15	GB3PT	IO90JO	SZ539792			1255	1282	Stenbury Down	Wroxhall	Isle of Wight	G8CKN	R.G	Powers	Phassed Plate A	RMC
16	GB3PV	JO02AF	TL322594	15	62	1249	1316	Madingley	Cambridge	Cambridgeshire	G4NBS	A.J	Collett	Alford Slot	
17	GB3RT	IO92FH	SP335671		113	1249	1316	Ashton Court	Leamington Spa	Warwickshire	G1GPE	D	Murray	Alford Slot	
18	GB3RV	IO90WT	TQ328051	25	135	10.425G	10.24G	Brighton Gen Hospital	Brighton	E.Sussex	G8KOE	Martin	Newell	Horn	
19	GB3TB	IO80FL	SX913680			1249	1316	Burton	Torquay	Devon	G0EKH	K.J	Harper	Dipoles	
20	GB3TG	IO91PX	SP907305		161	10.425G	10.24G	Great Brickhill	Milton Keynes	Buckinghamshire	G3LMX	T.W	Mitchell	Slotted WG	
21	GB3TM	IO73UJ	SH471906		130	1249	1316	Nebo	Amlwch	Gwynedd	GW8PBX	D.E	Jones		
22	GB3TN	JO02KS	TF946251	22	78	1249	1316		Fakenham	Norfolk	G4WVU	Withheld			
23	GB3TV	IO91RU	TL004183	15	222	1249	1318.5		Dunstable	Bedfordshire	G4ENB	Clive	Asquith	Alford Slots	
24	GB3TX	IO74CR	IJ387928			1249	1300	Cairn Road	Carrickfergus	Co.Antrim Ireland	G16IXD	Alan	Stewart	Alford Slot	RMC
25	GB3UD	IO83VC	SJ858575		242	1249	1318.5		Stoke On Trent	Staffordshire	G0KBI	W.T	Burdred		
26	GB3UT	IO81UJ	ST797664		184	1276.5	1311.5		Bath	Avon	G0LIB	R.B	Weston	AM-TV	
27	GB3VL	IO93RF	SK978718		8	1248	1310	Lincoln Cathedral	Lincoln	Lincolnshire	G7AVU	Bob	Fisk	Alford Slot	
28	GB3VR	IO90WT	TQ328051	25	135	1249	1316	Brighton Gen Hospital	Brighton	East Sussex	G8KOE	Martin	Newell	Yagi, W-E 25ele	
29	GB3VV	IO90WT	TQ328051			2335	2435	Brighton Gen.Hospital	Brighton	East Sussex	G8KOE	Martin	Newell	Yagi	
30	GB3VW	IO93RS	SE954325	22	152	2330	2435	South Cave Weedley	Hull	E.Yorkshire	G7MFO	Richard	Parke	Alford Slot	
31	GB3VX	JO00CT	TQ577018		105	1249	1310	Butts Brow	Eastbourne	East Sussex	G1IFV	N.J.J	Ginger	Alford Slot	
32	GB3XG	IO81QJ	ST551668		198	10.315G	10.065G	Dundry Hill	Bristol	Avon	G4BVK	Ken	Stevens	Slotted WG	
33	GB3XT	IO92EU	SK241269		52	10.340G	10.065G	Rolleston On Dove	Burton On Trent	Staffordshire	G8OZP	Bob	Platts	Slotted WG	
34	GB3XV	JO00CT	TQ577018			10.425G	10.065G	Butts Brow	Eastbourne	East Sussex	G0TJH	Withheld		20dB Horn	
35	GB3XY	IO93RS	SE954325	25	152	10.315G	10.065G	South Cave Weedley	Hull	E.Yorkshire	G3RMX	Bill	Hall	Slotted Array	
36	GB3YT	IO93BS	SE091307	360	20	1249	1316	Mickle Moss Farm	Queensbury	W.Yorkshire	G3TQA	Allan	Robinson	Alford Slot	
37	GB3YX	IO93BS	SE091307	360	25	10.425G	10.240G	Mickle Moss Farm	Queensbury	W.Yorkshire	G3TQA	Allan	Robinson	Slotted WG	RMC
38	GB3ZZ	IO81RM	ST602788		52	1249	1316		Bristol	Avon	G4BVK	Ken	Stevens		

(Sorry for the small type size in the above table, but it was the only way that I could get it to fit onto the page, ED)



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## A few words from our Book Critic, Dicky Howett

A recent foray into the environs of second-hand book shops produced a nice (£1.50) copy of a television 'history' by Robert Metz charting the rise of the famous NBC morning breakfast show, THE TODAY SHOW. The book itself is mildly diverting, with pictures of the show's star, Dave Garroway and an odorous chimpanzee called J. Fred Muggs. It transpired that in order to boost the ratings, the great NBC under the leadership of Lieutenant-General David Sarnoff resorted to the lowest of fairground ploys i.e. get the morons hooked with a freak show. Naturally, given the general cultural level of American TV, the Sarnoff inspired simian snare worked and the show (plus

chimp) went on to become legend throughout the known world.

Unfortunately, later in 1953 during a sound-only relay of QE II's Coronation, just as HM was crowned, the cavorting chimp raised his arse to the camera and did something quite rude. This chimp naughtiness, at the time, was hardly remarked upon. (In the usual course of US TV events, anything or anyone is fair game: All grist to the cornflake mill). However, back in Britain, news of the chimp's capers reached outraged ears. To quote from Robert Metz's book, "...a terrible uproar ensued in the House of Commons. Some said that the British were so appalled by the episode and the commercialism that made it possible,

that television's arrival on the shores of jolly old England *was delayed for several years.*" (My italics)

The author of the above heinous inaccuracy probably meant the arrival of *commercial* television, but even there he is wrong. Planning for British commercial television was well underway by June of 1953; the Act of Parliament, which introduced it, was passed the following year. Hardly a cheeky chimp-inspired setback. Such is the continuing inaccurate history of television. Later, of course (and this is a true TV fact) the British breakfast channel TV-AM was 'rescued' not with a chimp but with a Roland rat.

## Counting the Cost

As the trials and tribulations of ITV Digital continue, Prime Minister Tony Blair has restated the government's commitment to switch off the analogue TV signals between 2006 and 2010. So the challenge now is to concentrate on the cost of going through with it.

One UK company has come up with a low-cost way of providing TV reception that opens up various sponsorship and business models and allows new ways of charging for content and advertising.

London-based Access Devices is looking at providing a low-cost digital terrestrial TV (DTT) receiver, combined with Internet access, for the same cost as current digital TV receivers. This will prove important in the take-up of digital TV, according to Anthony Walton, director and co-founder of the company. "The Independent Television Commission says 40% of homes don't want to pay for digital TV," said Walton. "We believe it's the last 50% you have to target, which is 10 million homes, and you can't do that with a £200 box." The spin-off company from Two Way TV has developed a set-top box for browsing the Internet on existing analogue TVs that will cost well under £99. Integrating this directly into TVs will cut the cost even further. The central chip, designed by California company LuxSonor, includes three microprocessors, allowing much of the work to be achieved in lower-cost software rather than hardware. Access Devices says it has the exclusive European rights to the chip, while Cirrus Logic, the new owner of LuxSonor, plans to sell it in the US and Asia.

Access Devices has worked with another London company, Oregon, to develop the browser for the box, keeping the size of the software small so that fewer memory chips have to be used. The browser has to handle all the latest Internet software standards to be able to view all Internet pages rather than the cut-down browser approach favoured by other companies' interactive TVs. This means having the potential to upgrade the amount of memory in the design rather than going for the absolute lowest-cost options that are available today but won't be around in two years time, says Walton.

The bill of materials for this box is between \$60 and \$70, says Walton, and that includes the modem and wireless keyboard that are necessary for e-mail and other services. It also includes the connection to a phone line and a Universal Serial Bus connector to link to a broadband DSL or cable modem connection.

Most of this cost is in the design, the circuit board, connectors, power supply and the plastic box, says Walton. Getting rid of most of this by putting the circuit board inside the TV cuts the bill of materials to \$42. Adding a \$25 tuner/receiver module to the box provides Internet browsing capability, because the central chip can decode the digital video stream in software to display it on the TV, unlike other set-top boxes that still use part of a chip to do this. This is under development at the moment and should be on the shelves for next Christmas, says Walton. And the cost means the box could be given away free by Internet service providers to boost their turnover. A key part of the design is to have a smartcard reader in the box - not for conditional access, like Sky, but for credit cards using the latest banking smartcard standard called EMV. This would allow operators to charge small amounts for services such as downloading data or running a search on a premium search engine. It could also be used to pay for streaming video for video-on-demand services. Adding Internet access gives advertisers more options, and provides a way of allowing broadcasters to charge more for adverts. This could include Internet links in TV programmes, using already established standards, so that a click will bring up the associated Internet page during the ad break.

These extra features are vital, says Walton, compared with the low-cost DTT-only box launched by Pace Micro Technology in September. This is believed to be aiming at the 050 to 5200 price range - all Pace will say is that it will be comparable to a year's subscription to a service such as Sky.

"We know Pace very well and we wouldn't bet on them," said Walton. "There is no case for a simple, low-cost,



DTT product" He includes in this the forthcoming Multimedia Home Platform (MHP) standard for interactive TV: "We have a keen disregard for standards like MHP because everyone signs up for it, until it has to be deployed, and then it is dropped. We will move up from the bottom and add more features. And at \$100 for the box we can do that, while a \$300 MHP box can't"

But it has not been an easy ride to get to the current box, the AD2001. Back in 1999, the company had a deal with PowerChannel of the US to supply a low-cost box for its joint venture with Granada Media in the UK, which has had problems. So Access Devices only shipped 65 000 of the original order of 250 000 units before the two principals ended up in court.

That first design was for immediate shipment, so the company licensed a design from TeraLogic in the US, based around a 166MHz StrongArm processor, and with a relatively high materials bill of \$160. This box was being shipped to bring revenue into the company while the low-cost box was being developed so that, despite the hiccup, the company is already profitable. The AD2001 started shipping last month to an Internet service provider.

Market researcher Ovum predicts that the market for such boxes and integrated TVs will grow from 10 million last year to 290 million by 2005. Walton is aiming for a share of that: "We have a huge amount of interest from around the world and, if only 10% of it comes off, then I'll be ecstatic," he said.

Electronics Times 26<sup>th</sup> November 2001  
[www.electronicstimes.com](http://www.electronicstimes.com)

# Polymer Batteries

## Nick Flaherty looks at the latest developments in polymer-based batteries.

Polymers are starting to take over the electronics industry, not just with plastic displays, but also with the batteries to power them. Building on the success of lithium (Li) ion batteries in mobile phones, the industry is moving to Li polymer.

The latest personal digital assistant from Compaq Computer, the iPAQ H3600 Pocket PC, is the first to use a Li ion polymer battery developed by Danionics in Odense, Denmark. The 3mm thick cell offers 950mAh of capacity to power the 133MHz StrongArm processor in the handheld computer. Danionics is now looking for more OEM customers after its first full year of production.

The company uses a graphite anode, Li cobalt oxide and a proprietary gelled polymer electrolyte, with cells from 100 to 4000mAh for notebook PCs.

More and more manufacturers are ramping up for Li polymer production - and this time the technology is not limited to Japan for high volumes. Now that the safety issues of overcharging Li batteries have been tackled, partly through removing any metallic Li in the cells, the greater energy density and lower environmental impact are making these batteries more popular.

At the end of July, Ultralife Batteries, of Newark, New Jersey, started volume manufacturing of standard Li polymer cells for OEMs and distributors, building on the company's initial success with the cell with mobile phone makers.

Julius Cirin, director of marketing at Ultralife, said: "Product designers have always said that thin, light, high-energy batteries would greatly enhance the design and capabilities of their products, allowing them to provide what today's portable electronics customers continue to demand more powerful devices in smaller and lighter packages."

The UBC443483 is just 4.4mm thick, weighs 21.5g and has a rated capacity of 725mAh at 3.8V, while the UBC543483 is 5.4mm thick and 26g and is rated at



930mAh. Both cells are 83mm tall and 34mm wide. The company says it can produce a range of polymer cells with the same length and width dimensions, but with varying thickness down to less than 1 mm, making it the world's thinnest polymer cell.

The production line at Newark has completed its final qualification and is now in the process of undergoing a planned ramp-up, which will result in an initial polymer cell production capability of 200,000 cells per month before the end of this year.

NEC is also pushing Li polymer in standard products with a manganese laminated Li ion rechargeable range of cells. The batteries use a laminate film for battery packaging in place of conventional aluminium or iron, enabling smaller battery packages.

They also give a higher energy density of 150Wh/kg, which the company says is a 25% increase on the 120Wh/kg of conventional batteries and works out at 1250mAh for a 3.8V, 25g cell.

The batteries use NEC's proprietary manganate spinel cathode material, a highly stable crystal structure that offers greater safety in instances of overcharging, over-discharge or of current limits being exceeded, which are key problems with Li batteries. While NEC says the manganese Li batteries inherently provide thermal stability and can withstand overcharging, an

integrated protection circuit in the battery provides added safety.

TDK has developed a rectangular polymer Li battery that it has started shipping to mobile phone makers. There are two versions, with outputs of 630 and 580mAh, while the company is also working on a 1900mAh version for notebook PCs.

Late last year saw a range of Li ion batteries emerging that are being designed into equipment for this year. South Korean battery developer Fine-cell developed a 4mm thick, 500mAh Li ion polymer battery using a patented porous structure for mobile phones, and a simpler manufacturing process, while Sanyo's UPF363562 Li polymer cell has a capacity of 570mAh suitable for mobile phones, and Hitachi's PLS 3089116 cell has a capacity of 1.5Ah for notebook PCs.

When fully developed, Li polymer batteries are expected to be the lightest weight and highest energy density batteries on the market, in easing the energy density by a factor of four in a volume six to eight times smaller compared to typical nickel cadmium batteries. There are several research programmes aiming to make that happen.

In April, Eagle-Picher Technologies signed a technology deal with the US Air Force Research Laboratory's propulsion directorate power division to develop Li dry polymer battery technology with

even more performance. The deal will provide a total funding of \$1.44m over three years under the Department of Defence's Dual Use Science and Technology (DUS&T) programme.

Robert Higgins, new technology director at Eagle-Picher, said: "The combined investment funding of the government and Eagle-Picher on this DUS&T programme will accelerate the development of rechargeable Li polymer batteries by focusing on high risk areas such as polymer electrolyte conductivity, high cation transference numbers, strength, durability and manufacturability."

The programme aims to develop a high energy density rechargeable Li polymer battery that can be used on military and commercial satellites, aircraft, and ground vehicles and for various portable power applications.

At the same time, Samsung SDI (formerly Samsung Display Devices) is

working with Polyplus Battery of the US to develop a Li sulphur battery in a \$3m development. These potentially have a capacity three to five times larger than Li ion batteries, can be made with cheaper base materials and are more environmentally friendly. They can be used for next-generation mobile communication appliances such as 3G phone systems and for electric vehicles. Samsung SDI, which already makes Li ion and Li ion polymer batteries, sees Li polymer batteries as the next generation for commercialisation.

There are of course always other polymer battery technologies being evaluated. NEC has developed the world's first proton polymer battery, an electrochemical device that uses proton exchange type conductive polymer electrodes that offer up to 10 times the energy density of lead batteries, the highest of any electrochemical battery technology.

Having demonstrated a successful prototype, the company is commercialising the device and plans to begin sampling in October, based around an indole-derivative polymer for the anode and a quinoxaline-derivative polymer for the cathode, both in sulphuric acid.

The advantage of this technology, which NEC has patented, is that only the proton takes part in the transfer of electrons. This allows a current discharge 20 times higher than possible with lead batteries in a 200mAh device, giving 9A in 10s, and can be recharged in around five minutes.

The technology will be available in a credit card shaped thin package type and as a traditional lead battery style package, and NEC is also looking at uses in electric vehicles and car fuel cells.

*Reprinted from Electronics Times, 21<sup>st</sup> August 2000. [www.dotelectronics.com](http://www.dotelectronics.com)*

## Display forms basis of e-books

Densitron has completed a prototype manufacturing run of a nanotechnology-based reflective display technology, NanoChromics. It was developed by Ntera, a spin-out from University College Dublin.

Densitron plans to convert one of its LCD production lines in China to produce NanoChromics ased products.

Nick How, director of Densitron Europe, said: "We are looking to eventually license the technology. NanoChromics is such that you don't need to set up an entire production line. We can go from an LCD to a NanoChromics process quite easily. We hope to produce products by the second quarter of next year."

The initial target market is signage but, in the longer term, NanoChromics could be used for electronic books.

A NanoChromics display contains a white, reflective layer made from titanium dioxide. Nanostructured transparent films with a high surface area are laid on top. Attached to the films are molecules that Ntera calls viologens, which can be coloured or bleached through the introduction or removal of an



**A NanoChromics display is of similar quality to paper.**

electron. The viologens are bi-stable and do not require power to maintain their colour, or lack of it. Ntera says the display is similar in quality of contrast

and viewing angle to that of paper. And as it is reflective rather than emissive, it does not strain the eye.

Electronics Times 3rd December 2001

# Extending Edit Facilities – Adding Auto-Start to CD Player and Mixer

By Mike Cox

In CQ-TV 194, I wrote of the vagaries of video editing, and of some of the facilities in my home edit suite. Subsequent experience led me to the conclusion that at times I lacked enough hands to cope with some tasks in a "linear" edit. Thoughts turned to automating some functions. The first one was auto-start on the CD player. My particular machine is a Sony portable that I picked up cheap at Schipol airport a few years back. I also have a number of copyright free CDs for stings, background music etc. Would it not be nice, I thought, if I could select the track, pause the CD player, and when the time comes, move the fader up on the sound mixer and the CD would start without using that third hand, because the right hand is already doing something like fading or cutting in a title.

One solution would have been to acquire a CD player with remote facilities, but they are not cheap, and where is the



engineering challenge in that?

So I took the Sony machine apart (it is out of warranty!) and found that there is room for a 2.5mm jack socket next to the dc power inlet. It was relatively simple to route some wire-wrap wire from the original pause switch (momentary make)

to the jack socket, and then to re-assemble the CD player. (See Fig. 1)

The next task was to derive a momentary closing contact from the audio fader on mixer input 3. Some high-end audio faders have micro-switches at the end-stops, but the maker of this particular

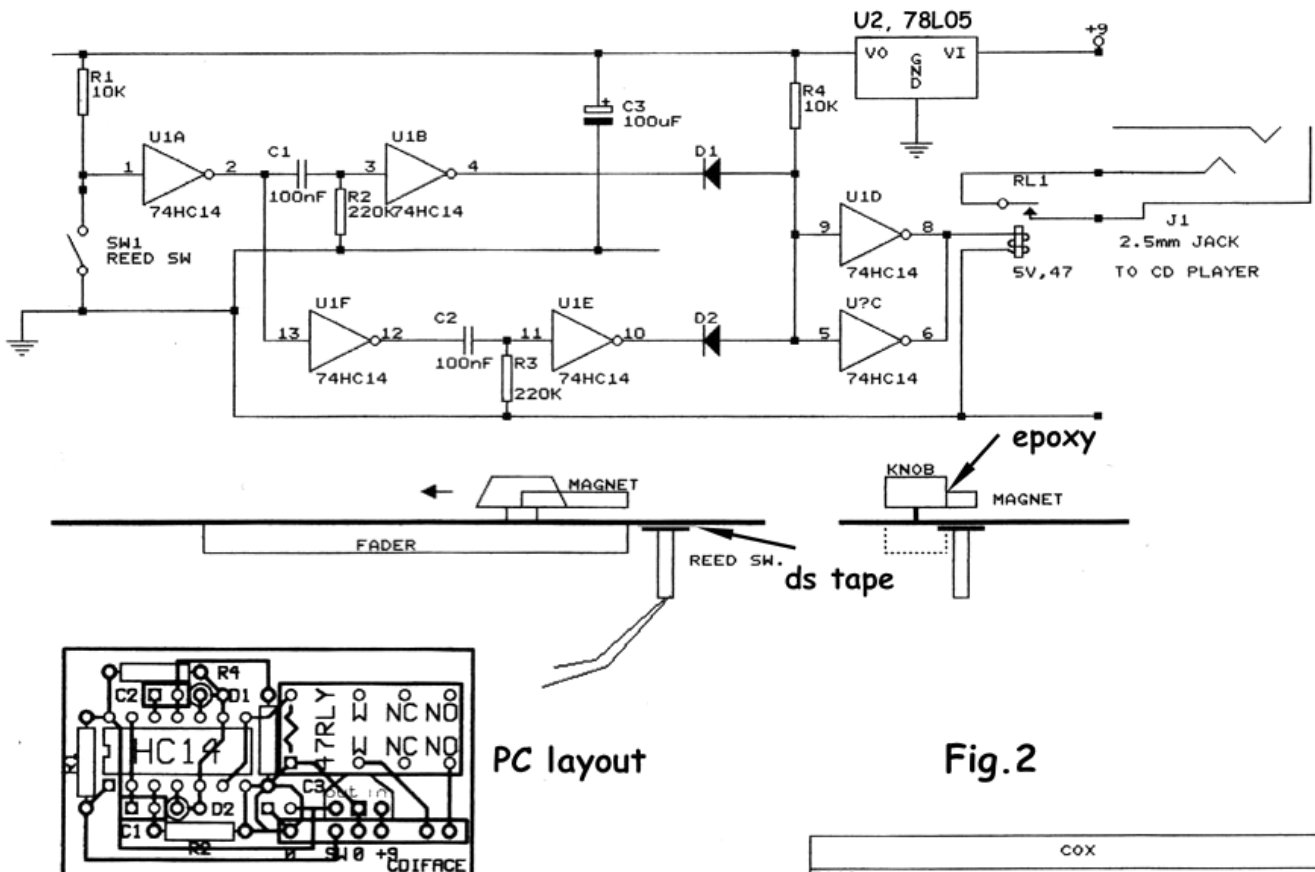


Fig. 2

COX			
Title	CD ON/OFF I/FACE		
Size	Document Number	REV	
A	CDIFACE.SCH		
Date:	October 22, 2001	Sheet	of

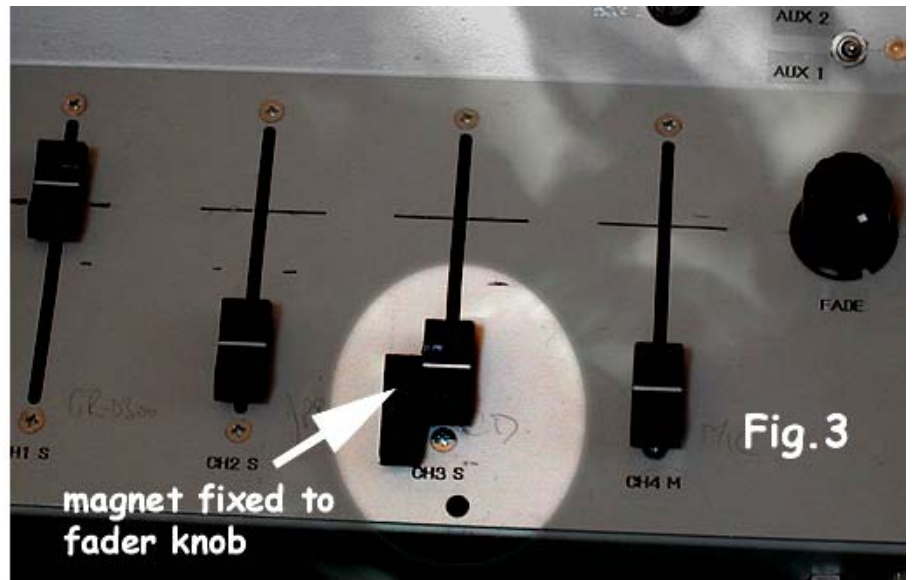


audio mixer had chosen otherwise. Thoughts of using a micro-switch were dismissed as I had none around, but I remembered that I had some reed switches and magnets that I had used for a very effective “freezer door open” indicator which had come from Rapid Electronics (stock no. 78-0797, £0.98 each).

Experiment showed that the switch would operate through a 3mm Al. Alloy panel.

It is necessary for the switch to generate a momentary contact closure when the fader is brought to its end-stop, and again when it leaves it. Further, to avoid any clash between ground potential of the mixer and CD player pause circuitry, a relay should be interposed.

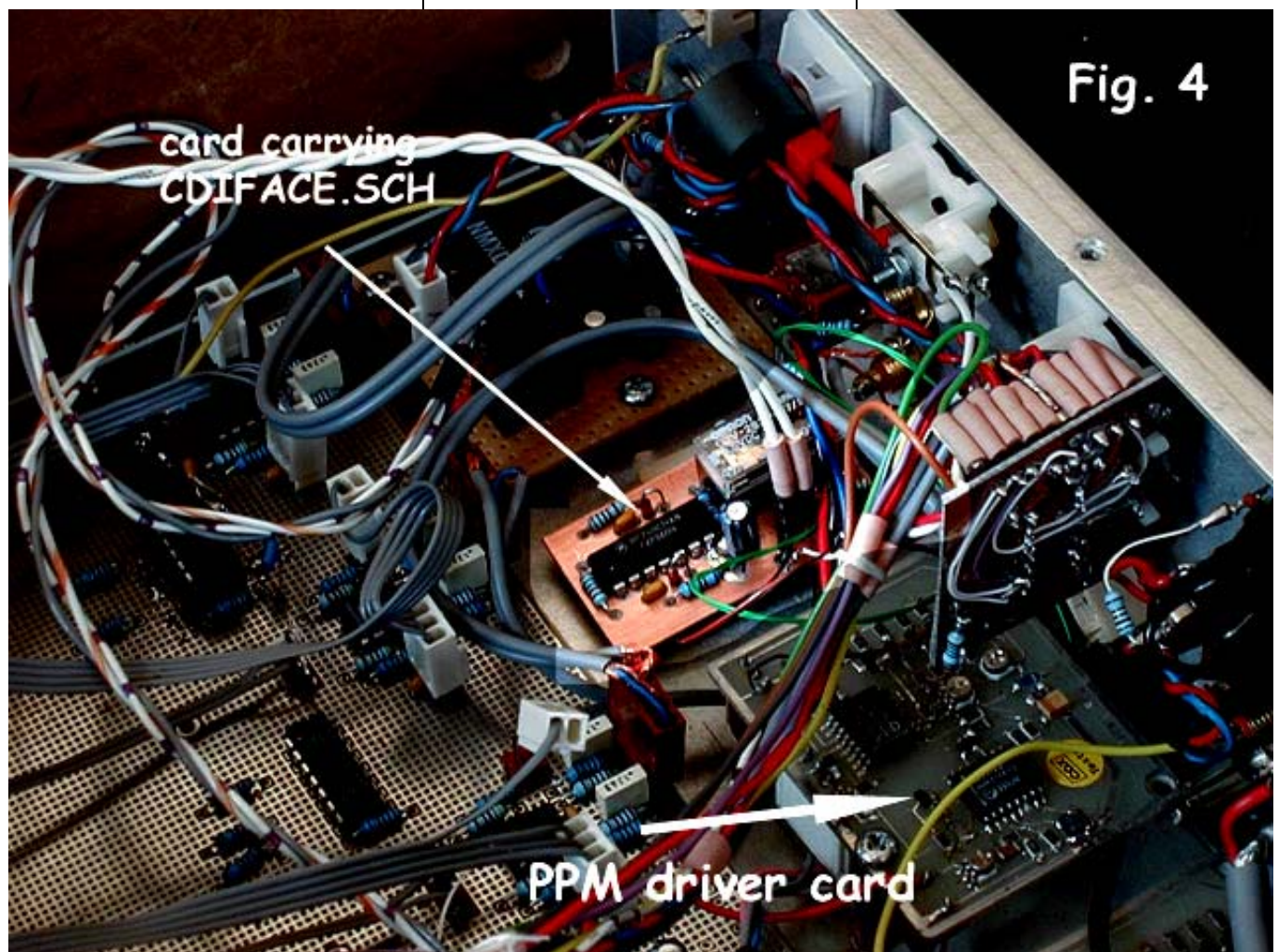
The circuit employed (see Fig. 2) uses a 74HC14 (hex Schmidt buffer) to buffer the reed switch, provide the two pulses and drive the relay. A standard 78L05 regulator drops the +9 volt rail of the mixer to +5 volts for IC and relay. Note that a large (100uF) capacitor is fitted to avoid lumping the mixer supplies when the relay energises. Note that two sections of the ‘HC14 are paralleled to



give enough current for the relay.

Below the circuit is a diagram showing how the reed switch and magnet are juxtaposed. Double-sided tape is used to fix the reed switch under the panel as close to the end of the fader assembly as possible. After this some experiment is needed to find the best position for the magnet on the fader knob. It can then be secured with epoxy adhesive. (See Fig. 3)

The layout for the small circuit board was done on “Boardmaker”, printed 1:1 on plain paper, and then stuck onto the Cu side of a small piece of 0.8mm single sided Cu clad laminate. I recommend keeping a small stock of this – you may be able to get offcuts from a local PC maker, as it is extremely useful and quick for a variety of pseudo-PCBs. Using a centre punch, the pad holes are marked and then drilled (1mm is fine). A 3mm drill bit can then be used to clear

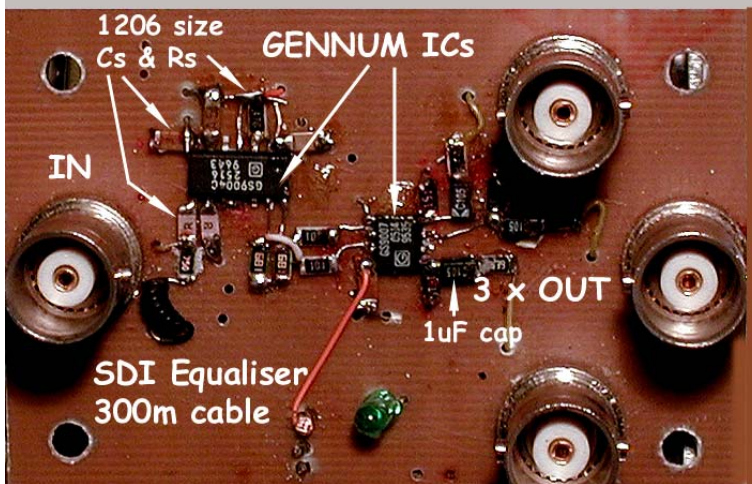


copper away from pads that do not connect to ground. Leave ground connections uncleaned – they can then be soldered directly, and you get a ground plane! “Track” is then put on the rear or the front of the board using wire-wrap wire. This process is relatively quick and efficient. Fig. 4 shows the card in place in the mixer.

Note that this process can be used for surface mount components. In such a case, components are glued to the fibreglass side, and wired directly using wire-wrap wire. Ground connections are made by drilling through the board where needed, and soldering wire links in place, giving a very short path to the ground plane. I have successfully made two SDI (270 Mb/s) cable equalisers using this technique using Gennum GS9004C and GS9007B sm ICs. PC mount BNCs are used for in and out,



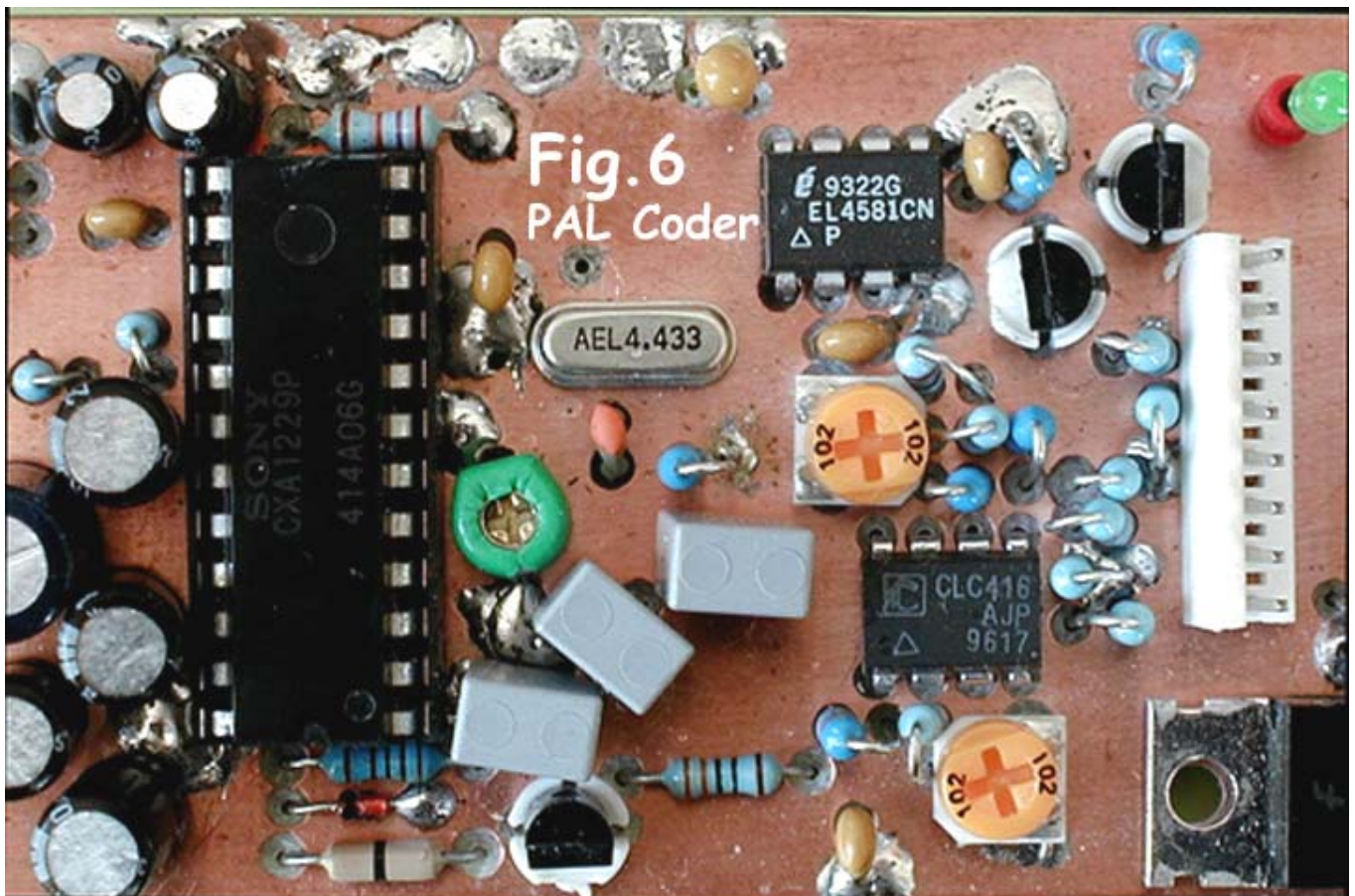
Fig. 5 SDI Equaliser



and the equaliser fits into a small die cast box. (Fig. 5 shows a surface mount card, while Fig. 6 shows a conventional component card)

Returning to the original plot, the last task was to mount a 2.5mm jack socket adjacent to input 3 on the rear panel of the audio mixer, but isolated from ground for the reasons explained above. Not having any insulated sockets, another piece of Cu laminate was used. A 10mm hole was pierced in the rear panel, and a 5mm hole in the laminate. The jack socket was fitted to the laminate with Cu side away from the panel, and the whole fixed inside the rear panel with epoxy.

After testing, the units were re-installed in the edit facility, and provide a useful extra to the system. Now, what is the next project?



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# Wanted: Dead or Alive!



## Pye Mk6 Image Orthicon

This camera made by Pye in 1963 to an exacting BBC outside broadcast specification was a remarkable and heavy beast! These cameras were built for the new, in 1963, outside broadcast fleet of 10 MCR's (mobile control rooms). These were deployed at Wembley in London and the television regional bases around the country. Each MCR had 4 cameras with provision for a fifth camera. I am not sure how many cameras were made but I suspect it was less than 50. As far as I know they were not used elsewhere.

They had a few interesting technical innovations, Hybrid valve/transistor construction, and a switching SCR regulator in the PSU. There was an inverter for tube high voltage supplies. Each side panel hinged down revealing plug in quick-change chassis modules. Operation was possible on 405, 525, or 625 lines. An annoying failure of the mechanical design was the iris motor, this stuck out of the center of the turret at the front of the camera. It looked just like a handle and in such a convenient position.... You only did it once!

The Pye Mk6 was used on the full range of outside broadcasts, from Wimbledon to the State opening of parliament and everything between. They continued to be used into the early seventies being slowly displaced by colour cameras.

Now for the wanted bit. I am keen to get one of these cameras as I have one of the above mentioned MCR's No. 21 to be exact. I have been restoring bits of the above MCR as original equipment comes to light and I would love to add one of the original cameras to it. I know of 3 survivors, where have the other 47 or so gone? Do any survive in dark corners of storerooms? Please contact me if you can help.

**Brian Summers G8GQS 01276 677879 Briansummers@thersgb.net**

# Amateur Television HatCam

By Mark A Phillips, G7LTT

I can't claim any originality for this project but I can claim to have improved upon it and given some folks a good laugh at the same time. "What's an ATV HatCam?" you ask. Well, it is a camera on a hat that uses Amateur Television to send its pictures to a TV set. Amateur Television is part of Amateur Radio. Hams have been sending pictures to each other for over 50 years.

OK, let's get to it. Firstly take a look at this [PDF document from PC Electronics](#). These guys probably didn't come up with this idea either, but this is where I started. As you'll see from the document it's quite a simple setup. BEWARE! Whilst it is simple to make, it is not cheap. If you have to buy everything, it'll set you back about \$200. Mine cost \$250.



So here it is. The KC2ENI variant ATV HatCam. As you can see it is just a construction hat with a camera and an antenna on top. I used the wide brim "Pith Helmet" type that you can get from most Do-It-Yourself stores like Home Depot (B&Q to us Brits).

Inside the hat is a Video-Lynx 100mW TV transmitter which you can also get at

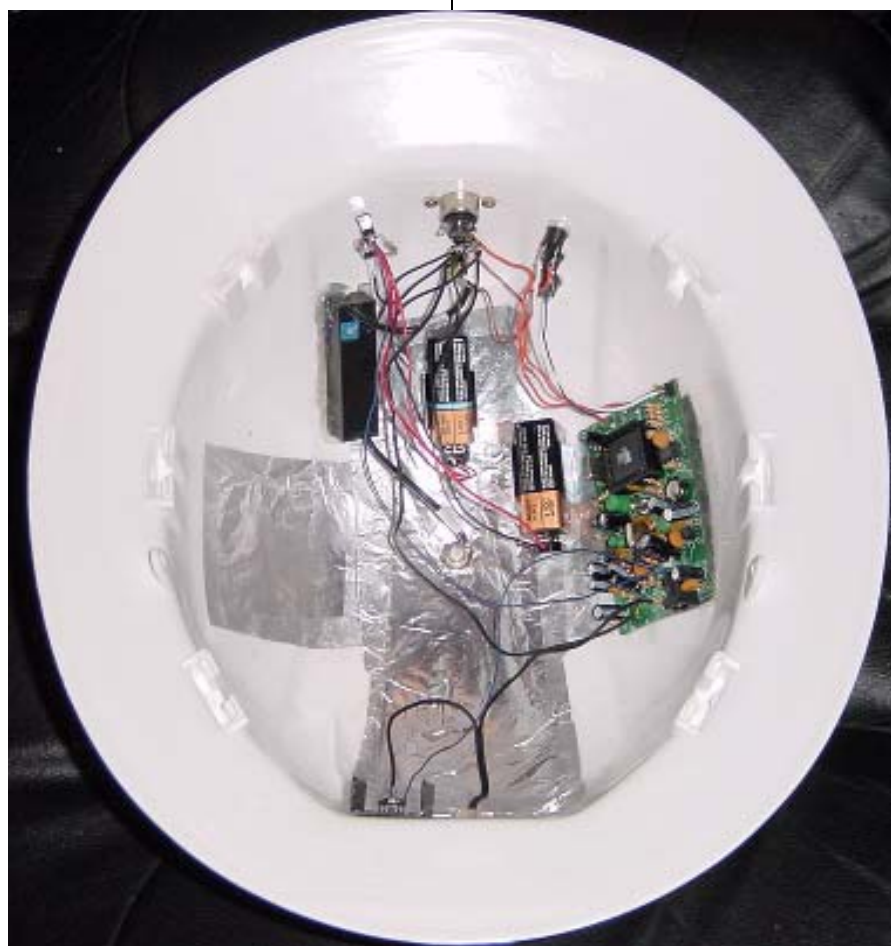


This is the caption generator

MFJ and some other places. It outputs the picture on 433.97MHz, so it can be used the world over on 70cms. This also works out to be cable TV channel 59.

Also included is a caption generator or "Down Stream Keyer" that puts my callsign and the time and date onto the picture. This is especially useful as the

law here in the States requires the picture to be visually identified. Normally one would do this by holding a card up with one's call letters in front of the camera at the appropriate time, but I can never remember to do this. The transmitter has no audio facilities so Morse ident is out of the question.





The power switch with its light

So why does mine vary from the original document? For a start mine has the DSK added, but it also has some other capabilities. The picture above shows the buttons, switches and sockets on the back of the HatCam.

In the middle are a switch, a phono socket and a 5 pin DIN socket. The switch selects the picture source. This can be from the built-in camera or from the phono socket. It allows me to use a



camcorder instead of the built-in camera. The 5 pin DIN plug allows me to supply external power for longer periods instead of using the internal batteries. It also allows me to charge the internal batteries.

The buttons on the right allow me to program the DSK with the time and date plus whatever message I want to have on the screen. Mostly it will display my callsign.

The camera is a CCTV camera that I got from Ebay. It needs a 5VDC power supply which is a problem as the rest of the HatCam runs at 9VDC. You'll notice a screw head on the right of the camera. This is holding down a 7805 regulator to convert the power from 9 to 5VDC.

Power is supplied by 2 PP3 type 9VDC batteries wired in parallel. The 2 batteries give me extra current which should sustain the operating life of the HatCam. I can get about 24 hours out of the HatCam on a fully charged set of batteries.

On the top of the hat I installed a BNC antenna connector so that I could fit a Rubber Duckie antenna. In an effort to



get the most out of the antenna I lined the inside of the hat with tin foil so as to create a "ground plane" for the antenna to work against. This can add as much as 3dB's to the signal level so it's worth the hassle.

I said earlier that it cost me about \$250 to build. Why so much? Let's take a look. I had to buy everything from scratch apart from the switches and sockets etc.

- 100mW TV transmitter - PC Electronics - \$99
- Colour camera - Ebay - \$49
- Caption generator - WuJu - \$49
- Hard Hat - Amazon.com - \$15
- Rubber Duckie antenna - \$25
- Rechargeable batteries - Ebay - \$5

© Mark A Phillips, G7LTT, 2001

**Editors note: -**

The PDF file mentioned can be found at <http://www.g7litt.com/ATV/Hatcam.pdf>



## Silent Key

Doug Wheele, G3AKJ, died suddenly on 4 June 2001, aged 78. From the early days of the Club, he did a great deal to help in a variety of ways.

His son Andrew can still remember the early BATC meetings in their house in Chadwell Heath, and the design Doug made for the club badge and the stationery, which he printed. He owned a large and most impressive printing machine and numerous boxes of type, which he became skilled in setting up. He printed many leaflets for the club and larger booklets. An important BATC publication was the 26 page booklet *Slow-Scan picture Transmission* by J.A. (Pluff) Plowman published in 1961 at a price of two shillings and sixpence (12.5 p). BATC visitors to Doug's home were encouraged to assist in setting the type, which was an interesting experience. In his house, there was also a telephone dial, which enabled him to switch on lights and other appliances by remote control - an innovative system in its day.

Doug served on the committee from the early days of the Club; in CQ-TV 15 (December 1952) he is listed as being nominated for re-election. In June 1954, he took over as Hon. Secretary from the founder, Mike Barlow, and held the post most effectively. He stood down at the Fourth Convention in September 1958, handing over to Don Reid.

Doug also put considerable efforts in helping with organization of the BATC stand at the annual Dagenham Town Show for several years in the 1950s and 1960s. The show always provided good publicity (in those days, it was rare for members of the public to see their faces on a TV monitor) and many new members joined. The 1957 show, described in CQTV 34, included 6 cameras and the "Matilda" group, who travelled from Cambridge. His history of these days, he made into a video, but the rest of the equipment no longer survives except his CRT with etched test card as the anode, which he kept in its wooden protective box.

Doug was always calm and good tempered when problems arose.

Doug Wheele was elected to Honorary Life Membership at the same time as Ivan Howard and Mike Barlow. He will be sadly missed by us all and remembered as a pioneer of the Club.

Martin Lilley, Don Reid and Andrew Wheele

## Breakthrough with NBTV software

What VK3DHT in "ATV-Quarterly" recently had wished to be developed is reality now: the radio amateur Con Wassilieff, ZL2AFP, from New Zealand wrote PC software for an NBTV system based on well-known analogue SSTV modulation (FM). This "narrow band television" system with 32 lines resolution enables any Windows-PC user equipped with video grabber card and soundcard to make quasi-real-time live video contacts (b-w) with 2,6 frames per second via any speech channel. Model of this standard is the historical NBTV system invented by the British TV pioneer John L. Baird which used mechanically scanning Nipkow dishes to transmit first live video into the living rooms from the year 1926 on.

A small but fine amateur association in Great Britain, the NBTVA, held up the tradition with AM-video transmissions on shortwave and promoted the development based on PC software by several group members in Europe and

abroad leading to this success. A TX window and an RX window on the computer screen are showing a vertical stamp sized video frame besides some control boxes. Any video (from a simple electronic camera or such) picked up by a windows standard frame grabber card is transmitted with the appropriate size via soundcard output, and the receiving end program puts it into the window with about 0,4 seconds refreshing period similar to slow real video streams on the internet. An additional FM-TX program provides for usage of stored video data on hard disc.

Now even newcomers with VHF/UHF only licence have a chance to exchange live video on amateur radio channels in FM or SSB modulation. Similar to SSTV it is recommendable to use the mike and give call and mode before exchanging video. The call sign printed in big fat letters can get inserted too. On the 144 MHz band the seldom used FAX calling frequency 144,700 MHz in the all mode

section is my advice for NBTV tests, and an additional phone contact should use the 70 cm band. The RX program function "AM demod" can be tested on 80 m every Saturday morning after 7 hours UTC when NBTV friends are meeting around 3,7 MHz.

### Software downloads:

Live-TX-program: -  
<http://www.highnoonfilm.com/tvdx/Txfmtv1.exe>

RX-program: -  
<http://www.highnoonfilm.com/tvdx/Rxfmtv1.exe>

TX-program from hard disc: -  
<http://www.highnoonfilm.com/tvdx/FMscreen.exe>

NBTVA-Web: -  
<http://www.nbtv.wyenet.co.uk/news.html>

Klaus, DL4KCK (AGAF e.V.,  
[www.agaf.de](http://www.agaf.de))

## For Sale

CASE 19" Rack Cabinet Combined 36U (1.6m). Cabinet height approx. 1.8m. Includes front and back door (front smoked plastic), internal mains distribution, floor mounted casters (wheels) and internal fan tray. Ideal for use in repeater project? Unit is in good condition but dismantled and free to a good home. Contact Adrian Hurt on 01920 468138 (Herts). email: [adrian\\_hurt@msn.com](mailto:adrian_hurt@msn.com)

**THE GUINNESS BOOK OF TV FACTS & FEATS.** Kenneth Passingham. 1984. Hard to find fully illustrated book on tv technology and programming. d/w. **£7.**

**ITV 1969.** Last days of ITV monochrome. Reasonable copy. **£10**

**TELEVISION ENGINEERING.** Amos/Birkinshaw. 4 vol set. Vol 1. 1953. Fundamentals-Camera Tubes-Tv/Electron Optics. Vol. 2. 1956. Video frequency-Amplification. Vol 3. 1957 Waveform Generation. Vol 4. 1958 General Circuit Techniques. All first publication with slightly chipped d/ws. Generally clean condition apart from slight water stain on back of vol 2. **£38** the set or **£10** each.

**BBC TV PRESENTS.** A Fiftieth Anniversary Celebration. Nicholas Moss.

BBC 1986. Profusely illustrated large format television history book

covering BBC Television from the beginning. Lots of programmes and

old-time stars. **£6**

**INTRODUCTION TO TELEVISION.** A. Folwell. Chapman & Hall 1948. Nice

period 'primer' to tv inc, The Cathode Ray Tube. The Television

System Modulation & bandwidth. Pictures of studios and the Emitron

camera. Covers a little grubby o/w VGC. **£5**

**TELEVISION- BEHIND THE SCENES.** Peter Jones (ex-tv cameraman)

Blandford Press 1984. Obs, ENG, drama. All covered in this engaging

fully-illustrated book. d/w **£5**

**STAGING TV PROGRAMS & COMMERCIALS.** Robert J Wade. Hastings House

1954. American tv production techniques, including lighting, special

FX, design, cameras. Lots of pictures. **£6**

All books in VGC. Postage minimum **£1.50.** Contact Dicky Howett. Phone: 01371 820155 Email: [dicky.howett@btinternet.com](mailto:dicky.howett@btinternet.com)

Due to shortage of space the following equipment has to go, 2 x Marconi Mk8 Camera channels - £175.00 each, Shibaden Colour Camera type FP1200AK & CCU (with handbooks) £100.00. Offers are invited for the following items: Prowst ABCD Mixer (type 591) with drawings and extender boards, 2 inch x VTR, Vinten pan & tilt

head. (I am looking for the handbooks to the Mk8 cameras and VTR). 40+ spools ½ inch computer tape. Buyers collect. G4STO - 01427 788356 or 01427 788257

For sale

Icom IC 3200E 144/430MHz FM transceiver, boxed + manual

Trio TR-9130 2m. All mode transceiver, boxed + manual

Microwave Modules MML 144/100-S 100watt linear

Microwave Modules MML 432/100 100watt linear

B.N.O.S LPM 144-25-180- 180watt linear

B.N.O.S LP144-30-50 50watt linear

Weltz SP-425 140-525 MHz SWR&PWR meter< 150watt with dummy loads & co-ax switch. Various Fortop & Aztec ATV TX RX & converters

Antenna: 2xSlot 2xCircular element yagi, 2xGroundplane.Tonna 1296 MHz 2x Tuning units 144-2500MHz & 430-2500MHz Quantity of TX co-ax & R.F. connectors New 4CX 250BC ceramic TX valves plus TX unit. Offers for any item or all as 1lot. **Contact Barney Swain 01840 211109 or [tobarney@treforda.com](mailto:tobarney@treforda.com)**

## Wanted

Teledyne RF filters model 4756 wanted urgently. These are a silver-colour box approximately 120 x 40 x 30mm with 3 SMA sockets and lots of sheared-off adjustment screws. If you've got one (or ten!) in your junk box I'd love to buy them from you - reasonable price paid. Phone or email for more information.

Giles Read, G1MFG - tel. 01489 860 318 or email [Giles@Read.net](mailto:Giles@Read.net).

Eric, G3KXE, requires handbook and circuit diagram for Marconi Poewer Meter type TF893A. Will reimburse

expenses **Contact Eric on 0238 8046 6506**

THOMPSON tripod plates required for 1640 / 1647 type camera's.

Please contact Mark on 01508 499009 or [mark@threeways51.freeserve.co.uk](mailto:mark@threeways51.freeserve.co.uk) with details of price/ location.

High Performance 70cms ATV RX Tuner built, or or just the PCB and IF unit as in The Amateur TV Handbook or any other top grade design. Would consider ELC1034 Tuner modules. 70cm Preamp. 70cms ATV TX. Any Top Grade kit considered, partially built etc. Valve P.A stages etc. Interdigital Filters for 23cm an 70cms. 3 - 5 pole and above.

7 Pole VSB filter would be nice. 23cms valve P.A stage complete or just the cavity. **Tony Kempton G1BYS** [anthony.c.kempton@btinternet.com](mailto:anthony.c.kempton@btinternet.com) or 020 8462 7051 or 0207 432 5413 (work)

Wanted:-



Ge Ian

Thought you might be interested in the attached picture in view of the club connection with Bletchley.

We have just returned from a trip to St. Omer and visited La Coupole, a museum on the V1 and V2 rockets, most interesting we will be going back again. Time was short but also we discovered a section on Enigma. The poster was on the entrance door and on the LHS. you can see a V1 rocket suspended from the ceiling.

The displays are excellent.

Regards Brian Alderson

[ [g3kix@thersgb.net](mailto:g3kix@thersgb.net) ]

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