

# CQ-TV



No. 163

August 1993

USING TELEVISION

SYNC NORMALISER

TUNING 70

PCB'S DOWN THE LAND LINE

PLL SYNTHESISED 70cm

WHAT IS NBTV ?

BRITISH AMATEUR TELEVISION CLUB



Preparing for the BBC's first television outside broadcast, the Coronation of H.M. King George VI: The picture shows one of the three camera positions at Apsley Gate, Hyde Park Corner on May 11, 1937, the day preceding the event itself, when a rehearsal (for troops and police) of arrangements for the Royal Procession was held. The camera on the rostrum would show the procession as it emerged from the Park, then across to the Wellington Arch en route for Buckingham Palace. The other two cameras were positioned nearby just inside the Park, behind the Gate, and would pick up the Procession coming from Marble Arch along the East Carriage Drive, with a close-up of the Royal Coach when passing by.

# CONTENTS

|    |   |   |              |
|----|---|---|--------------|
| 6  | EDITORIAL - CONVENTION 94                               |   |              |
| 9  | THE HARLAXTON SHOW                                      | Mike Wooding G6IQM                        | Dicky Howett |
| 10 | USING TELEVISION Part-2                                 | Norman Ash G7ASH                          |              |
| 16 | SYNC NORMALISER   | Trevor Brown G8CJS                        |              |
| 18 | TV ON THE AIR   | Andy Emmerson G8PTH                       |              |
| 24 | CROPREDY GENLOCK UPDATE                                 | John Stockley G8MNY                       |              |
| 25 | TUNING 70   | John Stockley G8MNY                       |              |
| 27 | POOR MAN's CAE 1 & 2 <i>Review</i>                      | Mike Wooding G6IQM                        |              |
| 31 | BSB Part-5  | Trevor Brown G8CJS &<br>Chris Smith G1FEF |              |
| 36 | CIRCUIT NOTEBOOK 49                                     | John Lawrence GW3JGA                      |              |
| 38 | MEN WITH A MISSION                                      | Andy Emmerson G8PTH                       |              |
| 40 | SERIAL-TO-PARALLEL KEYBOARD                             | Chris Smith G1FEF                         |              |
| 43 | PCB's DOWN THE LAND LINE                                | Trevor Brown G8CJS                        |              |
| 48 | A SIMPLE LOW-COST 23cm LINE AMP                         | Dave Clarke G7KAO                         |              |
| 49 | BEYOND TTL  | Trevor Brown G8CJS                        |              |
| 53 | GOOD VIBRATIONS & BLACK THOUGHTS                        | The Committee                             |              |
| 54 | GB3PV PROGRESS  | Ian Waters G3KKD                          |              |
| 56 | JUST A FEW LINES <i>Review</i>                          | Mike Wooding G6IQM                        |              |
| 57 | PROSAT II SOFTWARE <i>Review</i>                        | Mike Wooding G6IQM                        |              |
| 61 | PLL SYNTHESISED 70cm                                    | Chris Smith G1FEF                         |              |
| 64 | SATELLITE TV NEWS                                       | Paul Holland G3TZO                        |              |
| 73 | A NEW USE FOR OLD RUBBISH                               | Paul Marshall G8MJW                       |              |
| 74 | IN RETROSPECT   |   |              |
| 75 | A TRIP TO CALIFORNIA                                    | C. Grant Dixon                            |              |
| 80 | WHAT IS NBTV?   | Jeremy Jago                               |              |
| 83 | THE PONT PSA-100 FFT<br>SPECTRUM ANALYSER <i>Review</i> | Mike Wooding G6IQM                        |              |
| 92 | MARKET PLACE  |   |              |

**CLOSE FOR PRESS FOR THE NEXT ISSUE ..... 20th SEPTEMBER 1993**

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

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

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

## POST

### ROBOT

Dear Mike,

It is a long time since we have spoken but I trust you are keeping well and am sure that you are keeping very busy what with CQ-TV and your new books.

I continue to get great pleasure from reading the magazine and am sending today for Slow Scan Television Explained and an Introduction to Amateur television. Whilst I am regrettably too busy to be active at the moment I still like to keep abreast of what is happening.

I have been meaning to write to you with reference to the article in the February 1993 magazine, No.161, by Pam Penlington. I much enjoyed the article, and naturally appreciated her complimentary references to the Robot 1200C, but was a little surprised to find that amongst the many useful addresses at the end Robot (UK) Ltd. was not included.

We are still here, alive and kicking, and still have 1200C's in stock for immediate delivery when required. bearing in mind that, over the years, the price of these units has always come downwards they seem to offer exceptional value, at today's prices.

Commercially speaking we are now heavily involved with digital transmission, normally 14,400bps on the public switched telephone network but also higher speeds on the ISDN. We are also using Personal Computers as the recep-

tion terminal and conditional refreshment techniques to speed up picture transmission.

It is all quite exciting and I agree with Andy Emmerson in his article 'ADV is Here'. There is a lot for radio amateurs to be excited about in the future narrow band transmission of television.

Kindest personal regards.

Yours sincerely ... Damien Mannix, M.D.  
Robot (UK) Ltd.

*Many thanks for your kind words and wishes Damien. I have not yet found time to write back to you so I am doing so here. It is interesting to note that you are still active in the amateur market, although as Andy reports below, perhaps the parent company is drifting away. It is interesting to note that you are still active in the digital television field, one, as you say, that will surely benefit and interest amateurs in the not too far distant future. Best Regards ... Mike*

### PAM PENLINGTON GWOLAL

It is with deep regret that I have to advise that Pam passed away earlier this year. It was a great shock to me as I was conversing with her on a regular basis until shortly before her death. I wish to extend my own and the Committee's and Club's condolences to her family for their sad loss. Slow Scan Television has maybe lost its most ardent fan.

Mike

## HELP PLEASE

Dear Mike,

As a recently joined member of the BATC I have to say what an excellent job you and the committee do in producing the 'Journal' and providing the general backup (PCB's, etc.). As a newsletter editor myself I know just what has to go into producing 'things of worth' and thank you once again for your efforts.

Would you be kind enough to place the following request under the 'Wanted' section in the next issue of CQ-TV.

(Many thanks for your kind words Gareth, however, I thought your plea for help was more suitable for the Postbag pages, so it follows below ... Mike)

Like many others who attended Harlaxton '93 I spotted the front end of an Amstrad colour camera (CCD, mechanical iris, PAL) new for the bargain price of £20 in the boot fair area. Several other people bought them as well, as the pile decreased during the day! I also bought a manual for it and have successfully powered it up and extracted B&W video from it. As the original was never designed to provide video out the colour information appears at around 600 kHz, (for putting on tape) not the desired 4.43(?) MHz. Has anyone come up with a quick and easy way of producing colour video from this unit?. if so I would like to hear from them! Please contact Gareth Evans G4XAT on 081 657 2944 or write to me at 50 Princes Avenue, Sanderstead, South Croydon, Surrey, CR2 9BA.

Thanks in eager anticipation ... Gareth.

## 50 UP !

Dear Mike,

I am sending you Circuit Notebook No.49 which I hope you will find suitable for inclusion in CQ-TV.

The next Circuit Notebook will be the half-century!! How time flies. I was looking in my Licence file and saw that I obtained my 'T' licence in January 1958 for the princely sum of £12 and I had to give full technical details of the signal I was proposing to transmit. I think I copied the details from the Bible of the day - 'Television Engineering' by Amos & Birkenshaw. I quoted my TX frequency as 432.6, crystal controlled. With so many multiplier stages it took me several weeks with a Lecher Line to find the band - Happy Days!

With all Good Wishes ... John Lawrence

*I wonder how many of today's members or professional TV engineers would know what a Lecher Line is, let alone use one! My own reminisces of using such a beast would not be classed as Happy!!! ... Mike*

## HIP, HIP, HOORAH !!

Three cheers for the flea market at Harlaxton: at last I found a decent tripod, also a monochrome vision mixer! No, I am not mad nor totally living in the past but I do believe this old equipment needs to be saved to inform and give enjoyment to future generations.

With that in mind, I'd love to know who bought some Pye Studio Staticon cameras from Brian Summers fifteen years ago and if they still exist: these are large grey

vidicon studio cameras with a four-lens turret, based on a "drainpipe" industrial camera head and using an 8½" picture monitor as the viewfinder. I've got one of them and perhaps its brothers (sisters?) are languishing in someone's garage. Ahhh! Give me a ring if you can help - Andy Emmerson on 0604-844130.

## NEWS

### END OF AN ERA

Andy Emmerson reports that Robot Research is reportedly leaving the amateur market: this is a bit of a shock considering that Robot slow-scan gear was been a fixture in amateur radio since 1969. In those early days of SSTV Robot established a vital standard and benchmark for hams working slow-scan. Since then a multiplicity of new standards have arisen ("Yeah, sure we're in favour of standards, that's why we support so many of them!) and many lower-priced lookalike products have robbed Robot of sales.

So it was not surprising that Robot is now concentrating on commercial sales, which is where the real money is. Slow-scan equipment is used by many police forces for sending mugshots over 'phone line television' and Robot Research Inc. now claims to be an international leader in the field of digital video products and closed-circuit TV control systems for security purposes.

Writing in the American magazine 'ATV Quarterly', Henry Ruh notes how the early days of SSTV were underwritten by the founders of Robot. They were also hams and took annual losses, financing the business from their own pockets. This did not come to light until the original owners died and it was discovered they had been using their personal finances to continue production of ham products at a price well below the commercial equivalents.

In the past few years computers have taken over much of the ham radio domain, especially in SSTV and RTTY. Computers with powerful graphics conversion capabilities like the IBM PC and the Amiga are well placed to manipulate SSTV images and the multiple display formats that SSTV enjoys. The Robot 1200C was a stout colour SSTV system, says Henry, but with little promotion and a high sales price (compared to computers that could do a lot more), sales had dropped to 2 units a month, according to Robot management. Thus the decision was taken to discontinue the amateur equipment line and the last of the 1200Cs was sold earlier this year.

### VIDEO SYNC SEPARATOR

The EL4581 Precision Video Sync Separator, just announced by Kudos Thame, has been designed to meet the demands of the professional video expert, who requires 50% sync tip slicing in order to provide superior noise immunity.

The design follows the standard video practice of the best professional circuits, by sampling the sync tip and the back

porch to obtain the 50% point. Additional features include adding a delay to the sample gates to provide an extra degree of precision to the sampling process.

The EL4581 requires a single 5V supply. It is a pin-compatible upgrade to the LM1881, but some of the external filtering circuitry is not required, thus reducing the component count. The low power (1.3mA typical) Elantec device has an additional internal single pole filter to deal with chroma burst on board.

## **THE BATC 24cm ATV RECEIVER**

You may know that the Astec module used in this project is ideally suited for this design, on account of its dual inputs with relatively low noise and high sensitivity, and the option of a narrow bandwidth to suit our purposes. At the time it was published it was such a new design that we were still awaiting the first development samples to appear in the UK for testing! This should have guaranteed ease of supply - another reason for choosing this particular module (I understand that the French designs use now obsolete modules and IC's). Unfortunately, this has not been the case, and much time and effort has been expended to try and procure a further batch of the AT2320. I am still negotiating for the BATC to buy the entire stock held in the Astec factory in Hong Kong, with phone calls about every ten days. boards will be manufactured to match the number of modules available -through-hole-plated, tinned, printed with a solder-resist and silk-screen component legends

(the same appears on the cover of the February 1993 CQ-TV - a delight to work on!).

In view of the supply situation these modules will be sold only as a set with the appropriate PCB (except for those members who have already purchased the module, for whom the board will definitely be available) on a strict cash-with-order, first come, first served basis.

If you would like to know when further information becomes available, and have not already requested this information, please send a stamped and addressed envelope. They will be sent as soon as I have definite news.

I am sorry that this has taken so long to arrange, but we wanted to get the best possible price for you, which depends on being able to make a batch order for the PCB's, once we have secured the further modules. At present Astec are wanting to charge us £97 each for the modules - their own UK agent considers this extortionate, and we hope to obtain them for a price closer to that of the earlier batches. It is assumed that this situation will have been resolved by the time you read this and that the modules will be in stock.

Please note: the part number for the 6 MHz Audio Subcarrier trap coil is MKANSK1731HM, and not as printed in articles.

Peter Delaney  
BATC Members' Services.

## EDITORIAL - CONVENTION 94

### Mike Wooding G6IQM

As Dicky Howett says in his Convention Report on page-9, this year's event was, apart from the weather, a great success. All the trading tables were taken, although one trader failed to appear on the day, the boot fair/flea market was well attended and the outside display by Brian, Paul and Richard excellent as ever.

However, for multivarious reasons, not least of which was the constant stream of letters and comments received by various committee members from the membership, the Convention will not be held at Harlaxton again. Before continuing I would like, particularly on behalf of the Committee, to thank Paul Marshall for his unflagging efforts as Convention organiser since we have been at Harlaxton. Also, on behalf of Paul and myself I would like to thank Francis Watkins of the Harlaxton staff for her efforts on our behalf with Harlaxton Enterprises and her Stateside powers-that-be.

Right, back to 1994. The BATC Convention 94 will be held at the **SPORTS CONNEXTION**, on the outskirts of **COVENTRY**. This event will be the biggest ever BATC event and will also be one of the largest indoor rallies of 1994, with 320+ trading tables.

The event will have all the usual features, including the outside flea market/boot fair, the bring-and-buy, a lecture programme and the O.B. display. Good catering facilities are to be found at the Connexion and the bar will be open all day! Unfortunately, and this affects me personally, there is no on-site facilities for caravans and camping, but I hope to be able to arrange facilities with a local farmer. Similarly, there is no on-site overnight accommodation, but there are several good motels and hotels within minutes of the venue. More in the next issue.

The event will be organised and coordinated here from the CQ-TV office. All information on the event and requests for trading space, etc., should be directed to me at the usual address which I have included below. Due to the size of the Convention I would like **VOLUNTEERS !!!** to register with me their intent to help and what amount of time they would be willing to offer. PLEASE do not leave it all to the committee, we are only 21 strong and not all available on the day or all of the day. We would like to enjoy it too!! If you would like to help please let me know so that I can 'mark the register' and organise the various tasks accordingly. The sort of jobs to be done will include marshalling the door, the flea market, assisting with the outside display, placing the tables before the show and clearing them afterwards (we shall be starting around 6am on site on the day - will you?), plus a few other assorted tasks. This is the Club's event, **YOUR** event, please help as you can.



Finally, I know that there has been discussion in some quarters concerning the movement of the Club's Convention away from the original 70's/80's concept of a get together of members displaying their gear, etc., to a full-blown rally with money-making overtones. Whilst I have to agree that the Convention has oft times provided the Club with a useful income, I do not necessarily agree that the original concept has been totally lost. We have always attempted to cajole members to bring along their equipment for display and demonstration, but usually to no avail. Perhaps those that criticise should remember that they must participate, they should provide the demonstrations, etc., it is hardly fair to expect the committee (21) to provide it all for the membership (2200+).

However, if enough of you respond that such a Convention/Get Together is wanted then we shall provide one. At another venue on another date the Committee is willing to organise a members-only event, entirely for the purpose of demonstrating, operating, displaying and discussing ATV and related topics and the only traders present, if any, would be ATV related ones only. This event would, of course, have to be funded entirely as no, or very little, income would be received from it, but this is acceptable to your committee, is it acceptable to you and do you want it? **PLEASE** write to me and let me know so that we can act accordingly. If you wish to write to other committee members please do so, but I would ask you to copy the letter to me so that the replies (if any!!) can be collated ready for the next Committee meeting.

OK then - that's it. Convention 94 will be held on Sunday May 1st at the Sports Connexion, Coventry (see map on opposite page). All enquiries please to me at the address below. Offers of help, etc., please to me as soon as you can and, of course, letters by the ton for or against a second smaller ATV get-together please ASAP - if not sooner!

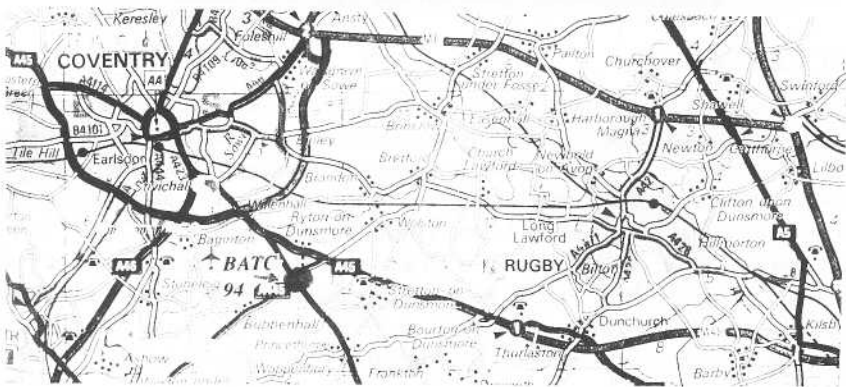
**Mike Wooding, Convention 94, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF.**

**Tel: 0788 890365 / 0860 857434. Fax: 0788 891883.**

## **ARTICLES PLEASE**

As you will see from the contents page of this issue, if it were not for a stalwart few then the magazine would be considerably smaller than it is at present. I have to admit that this issue may be, to some, rather top-heavy with equipment and such reviews. Although I feel that it is the duty of CQ-TV to introduce you to all that is new or useful, it may be that many of you do not. However, as the in-tray for CQ-TV is now empty I had no choice. So, the answer is please, please, please send me your articles, etc., for the magazine. It is **YOUR** magazine, representing **YOUR** club and **YOUR** views. Without the interaction of you ALL, then CQ-TV will become like the other 'amateur radio' magazines, rather than the Journal of a specialised Club.

OK, soap-box put away for another issue. But, rest-assured I shall be back, and with a vengeance unless you contribute - **AND THAT MEANS YOU !!!**



SPORTS CONNEXION, COVENTRY - CONVENTION 94

# THE HARLAXTON SHOW

## Dicky Howett reports on the 1993 BATC Convention

The Club's annual convention took place this year under warm and azure sunny skies. Actually that's a lie, (the bit about 'warm and azure sunny skies', I mean). If the truth be told Sunday the 2nd of May 1993 was just about the coldest and dampest South Lincs Sunday since ... well, the last coldest and dampest South Lincs Sunday!

Atmospheric forces notwithstanding, the Convention itself proved a resounding success, helped in no small part by the sheer hard work of the Convention staff.

At the mid-day count, over 1600 people had passed through the Manor's portals, on the quest for bargains, (and incidentally to warm up and get dry!). The many trader's stalls were well-patronised, offering the usual mix of test equipment, spare parts, computers, with this year, the ability to 'upgrade your BSBI. A worthy aim to be sure. Elsewhere, a 'home security' stand was alarmingly popular as was the Narrow Bandwidth TV stall and the BATC Club stand. In attendance also was the Severnside Television Group and the Worthing and District Video Repeater Group. For the less electronically minded, there were a few 'craft' stalls, one of which offered the chance to 'dress a porcelain doll'

The lectures in the Gold Room were well-attended; 'packed out' was the phrase. Particularly well-received was 'Amateur TV in the USA', a talk given by Don (Mr. Atomic-finger) Miller.

Outside, the Car Boot Sale organiser, Brian Summers was wielding his big banging stick. With it he managed to shoe-horn a total of fifty one Bootees (eight foot each) into a size-restricted location. It all proved quite cosy and business was brisk. But if more cars had arrived the traffic flow would have been problematic.

Fronting Harlaxton Manor the Summers/Marshall/Harris outside broadcast display proved once again that old cameras never die, they just end up in the rain. This year (sitting slightly uneasily on a variety of mismatched tripods and skids) the discerning could spot a splendid array of ex-broadcast equipment, including a Marconi Mark 8, a Link 110 and it's sleeker cousin, the 125. Nearby, dripping discreetly was a Philips LDK5 (ex-Thames TV of fond memory) and an exotic-looking Bosch KCP60. This compact camera was enjoying a breath of damp air since being released from it's mundane life in the BBC TV Television Centre news studio. (Let's face it, anything's better than photographing captions and Martyn Lewis!)

The O.B. team had hoped to relay, via a microwave link, the Gold Room lectures to an outside bank of monitors. Unfortunately, the awful weather put paid to the plan. The punters had to make do instead with a recording of 'BATC-THE MOVIE'.



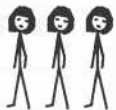


**Mrs. Smart Logi jun. Grandpa sen. Mr Blockhead**

Mrs. Smart feels insulted by being talked down to and rapidly gets bored. Logi junior thinks your presentation is *really boring* ...it's just the same picture all the time and it's so slow - besides, he doesn't understand any of that *silly* jargon anyway ! Grandpa senior to, can't understand this latest jargon, anyway it's much too fast for him to follow, the sound isn't *loud* enough and he can't read the vision - it's much too small ! While Mr. Blockhead thought he was watching a *broadcast play*...how was he to know you **REALLY** wanted him to phone you !

You might find a mixed audience if you are demonstrating your ATV station at a rally, club or special event. To carry your mixed audience with you is very difficult - **Keep it simple** is the rule - content of a general nature simply presented.

If your audience is less mixed, then identify their common characteristics :



or



or



or

what are your audiences **interests** ?

will your presentation gain & keep your **audience's interest** ?

what do they **already know** ?

**what needs explaining** to them ?

is your presentation on the **same level** as this audience ?

( can they readily understand - without being talked up or down to ? )

**can they understand** all your intended explanation ? ( what about jargon ? )

is the explanation **easy for them to follow** ?

( is it consistent - has it a 'thread' to follow ? )

**what pace** can they follow easily ?

## Methods and Techniques

Unless you have been able to build up a lot of television resources and you have plenty of willing help on hand, many of the best methods and techniques may not be available to you. Most of us have to ask what the best solution is to achieving our aims, within the limitations of the resources we have available.

## Production Methods

There are two basic television production methods, both in their way illustrate this point :

**Multi-Camera Method**

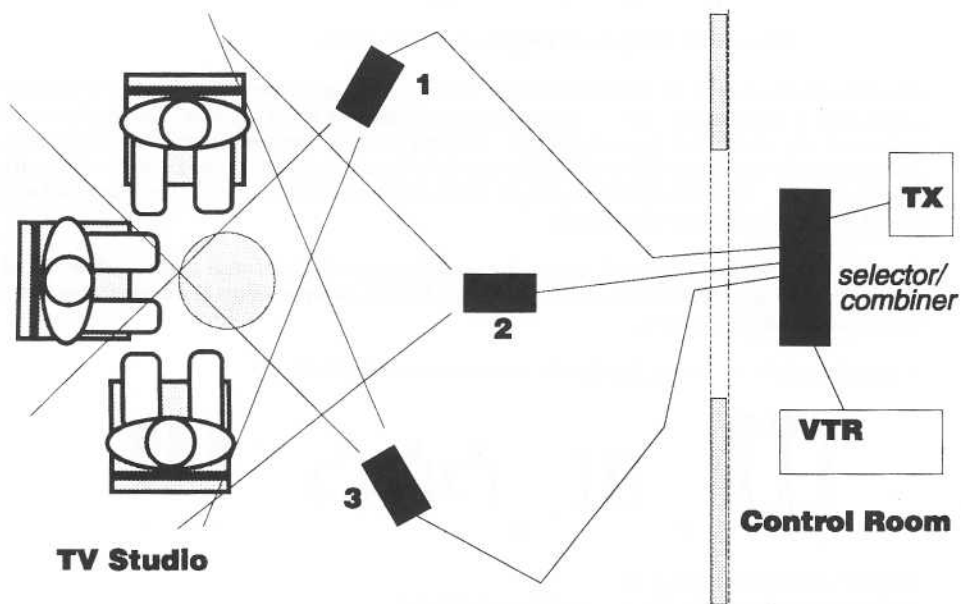
and

**Single Camera Method**

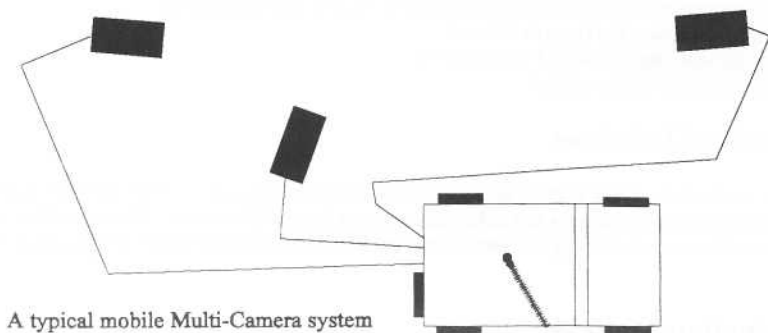
( *sometimes known as Filmic Method* )

## Multi-Camera Method

Multi-Camera Method involves using more than one camera at a time, to create your presentation:



The key to understanding Multi-Camera Method is its *ability to have alternative views available* to use, at any one instant **during** production :



A typical mobile Multi-Camera system

A producer can achieve continuous coverage of an event by carefully placing the cameras, to obtain the different required views. However, the producer needs to **predict what will happen** (as closely as possible) to ensure good coverage.

You may notice in the TV Studio illustration, that camera 2 has coverage of all three people. This view is important, not only as an *establishing view* (as we saw in part one), but it is also important where we cannot predict the event to follow...say the chairperson (centre) asks a question not directed towards one individual - no one knows if the person on camera 1 or 2 will reply. Therefore the presentation uses a view of the whole group until it is known. This visual coverage also reflects and expresses the current interview position. When coverage changes to a closer view of the person replying, it punctuates and reinforces what is happening with the discourse.

**Multi-Camera Method** is preferably applied, where it is best *not to stop the action*. Notice how the cameras can be *re-set* to cover the next predicted view, once each previous view is finished with. Allowing enough time for camera changes, is a good example of how the roles of **Producer** and **Director** are inter-dependent. It is likely that most Amateur Television enthusiasts, will both want and have to do both tasks.

Another important characteristic of Multi-Camera Method, is that the selection of views happens while the event continues. This can produce the final finished presentation without further production work. This naturally makes it invaluable for *live* presentations - the sort of presentation which most ATV enthusiasts are most likely to want !



## Single Camera Method

Single Camera Method (as the name implies) only uses one camera. Therefore only one view is available at any one time :

The Amateur may not have any more than a single camera available, yet (as we saw in part one of this series), we need to exploit the beneficial qualities of using television...the *selection & isolation* of images, use of *visual movement* and the best *visual point of view*, are some examples of this.

It is easy to see from this, how difficult it is for an Amateur to exploit these qualities, when only using a single camera in a *live* situation and how easy it would be to fall into operational habits, which exhibit negative qualities.

## Best Method?

**Single Camera Method** however, can be the best method of production (it is sometimes known as *Filmic Method* and is the way in which films are made). Why can it be the best then ? The main reason is in the way in which such a presentation is produced (remember with Multi-Camera Method the producer had to **predict** what was going to happen next and try to eliminate uncertainty from the coverage - this is a big drawback involving the accuracy to which you can apply *appropriate coverage*).

In **Single Camera Method** you can have *total control* over the final presentation... If you can *stop the action* between each view - **line up** the camera, **try out** what will happen, record it (then **re-record** it if not perfect - until it is).

### Drawbacks

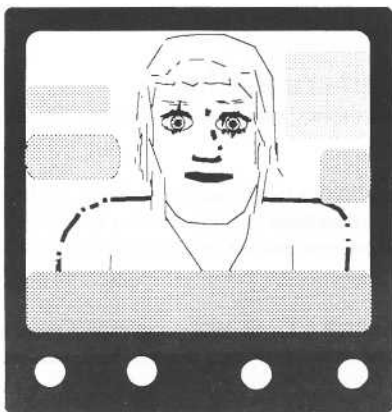
This is only possible in *non-live / pre-recorded* uses of this method. Also the technical capability of your equipment to join these separate views together (properly) is often limited :

Unlike in Multi-Camera Method (where the selection of views was made during the event covered), each separate view has to be joined together in a *post-production* process called **Editing**. Editing involves a lot more than simply *cutting up videotape* - **this should never be attempted** ! Video Editing these days, is (almost) exclusively done by **electronically re-recording** your original material, as this is done, the views you want, are *accurately aligned* and the electronic signals between recorder and player are *synchronised* together [ More about Editing later in this series ].

If you were to combine these two methods ( using Multi-Camera for *live* events and single camera for *pre-recorded* events - *where you can stop the action* ), you would have the best of both methods.

### Introducing Techniques

To help you put what you have seen is possible to achieve with production methods, into practice, I am going to introduce some of the common techniques.



'Still view of a moving talking head'

Would you watch this for 5seconds ? ...Would you watch this for 5 hours ?!

If you have ever transmitted a picture like this from your radio shack, then once it has been seen for a few seconds, the viewer is no longer interested in it. The reason is because they have received all the salient information it contains. However, immediately the picture changes, interest in the viewer is stimulated once more, as further information is made available.





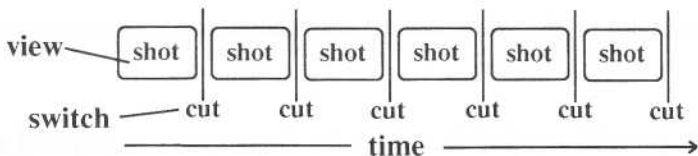
It is important for you to be aware that this can work against you as well. Take an example where you are the presenter in the above view and an (ex!)friend makes a rude sign behind you! Will the viewer be paying attention to you? NO WAY !! They will be sharing the joke - **at your expense!** Moral - **Avoid distracting irrelevant content** in your views, if you want the viewers to get YOUR message!

## Television Jargon

There are some television terms in common use now, particularly associated with television production techniques. Some Amateurs will already use and understand these.

Television techniques go back to the early days of film and photography. In photography, a *stills* camera was *aimed*, *lined up* and an exposure was taken by *firing off* a trigger mechanism like on a gun. Each view taken is known as a shot. Film and television camerawork has adopted this same terminology.

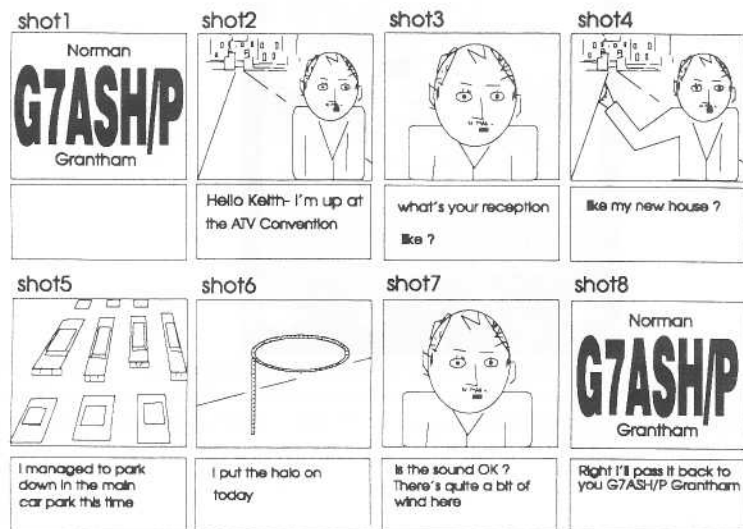
A term from film we use a lot, describes the sudden switch of image from one shot to the next. This is called a cut and comes from the way *wanted film shots* were *cut out*, to be joined together in the editing process.



Over a period of time television presentation typically *cuts* from *shot* to *shot*.. The amount of time the presentation remains on each shot, varies according to the specific application at that instant in your production. In this way the television producer can build up a series of shots into a '*complete progression of images*', which takes the *visual dialogue* from one natural point in the visual message to the next. This we call a sequence.

A television production is made up of many such sequences, each with a number of shots. Therefore these shots are numbered (usually from the start of the production).

Let us end by looking at a simple sequence of shots :



This is called a 'Storyboard' as it describes how a sequence of images link together to form a convincing effect upon the viewer, which progresses through your message, communicating as in a story.

As we have seen the sound is very important and details of this are entered below an outline sketch of each shot.

Preparation and planning such as this, may look a waste of time to many Amateurs involved in the (simple?) requirements of ATV communications, but this is not so. Preparing for a QSO with visual and audio illustrations improves your QSO considerably, by making it visually interesting and stimulating, at the same time communicating your message effectively and concisely.

In part three, I shall be taking a close look at Camera Work and how to get the best results from your camera.

*Normally material supplied by authors for the magazine is prepared and edited by myself and master artwork produced on the Club's laser printer. However, in this case the material supplied by Norman is of such a high quality, and equally so as not to cause detriment to the professional artwork layout, I decided to use Norman's original material as supplied and, courtesy of a bit of KM Publications hardware, scan Norman's artwork in as an image. This means of course, that the fonts and text size will vary from my norm, but I hope that the effect that Norman intended has been preserved ... Mike*

# Sync Normaliser

## Trevor Brown

The science of taking something to bits to discover how it works has been defined as reverse engineering. To some extent this is something I suspect we all engage in to some degree or another. The motive is probable not to discover some industrial secret, more likely than not it is to figure out how the circuit works in order to fix it, interface to it, or just to discover what we bought at the rally.

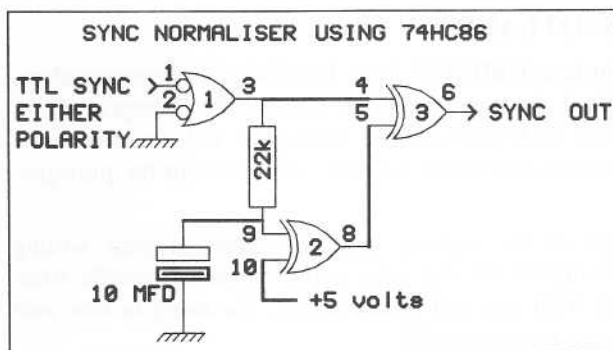
The process involves laboriously tracing at PCB copper work and documenting what we find, as well as looking up the functions of the chips we find, when data books are available. The problems start when you come up against an unmarked chip or one that data on is not to hand or available. It is often that you breath a sigh of relief when the copper work takes you in the direction of familiar chips such as 74 series TTL.

I thought at this point that I had seen most configurations of 74 series TTL until the other day when struggling to sort out a VDU, what revealed itself was a very ingenious building block in the path of the mixed sync. Its purpose was to correct inverted TTL syncs so that no matter which way up they were piped to the VDU they leave this part of the circuit the correct way up.

How does it work well the Exclusive OR gate 3 is able to invert or not invert depending wether the unused input supplied with a logic 1 or logic 0. Gate two provides this logic by integration. If the sync is the correct way up then the 10uF capacitor will charge for 58µs (active picture) and discharge for 5.6µs, the result a charged capacitor via the 22k resistor and a logic 1.

If the Sync is inverted then the reverse happens, the 10uF capacitor will charge for 5.6 micro seconds and discharge for 58µs, the result is a discharged capacitor or logic 0.

The end result is a TTL building block that is very simple and no matter which way



up the incoming sync is supplied it always leaves the correct way up. unfortunately this was not the problem with the VDU, that lay further down the copper work and revolved around a chip neither I nor my data books had heard of, isn't that always the case!

# TV on the AIR

## Andy Emmerson G8PTH

### GB3VI LIVES!

Keith Ellis G8HGM has generously responded to my plea for information on the 'secret' TV repeaters and writes this 'tear-stained' letter about the Hastings (Sussex) repeater.

"We are pleased to inform you that we do still exist and apologise for not keeping you informed on progress. The original AM repeater, though usable, was taken out of service to improve the service area. The particular need was for good interdigital filters.

"Whilst waiting for these, a separate FM repeater was built and left running on dummy load, the plan being to apply for an FM licence. Eighteen months later, and still minus filters, the repeater group was deliberately shocked out of apathy by throwing in the sponge!

"At this stage, another member of the group undertook to build from scratch an AM transmitter, which he was commissioned to do, with the sword of Damocles poised over his head, for completion by May 1993, the renewal date of the licence.

"To date the transmitter is running at approx. 6 watts and a usable picture can be received in Eastbourne, approximately 12 miles away. Vice versa, a 6 watt transmitter in Eastbourne gives a good repeatable picture into Hastings. Filters have now been made and progress towards a completed RMT1 repeater is steady but slow.

"A talk on ATV has been booked for the local club and there are several interested amateurs building downconverters."

### GOOD CHEER FROM SCOTLAND

Here's a letter from Bob Johnstone GMIYGV from Inverloch in Inverness-shire, written on behalf of the Highland Amateur Television Group. They comprise Dave GM3WML, Dick GM8AZS, Bob GMIYGV, Donnie SWL, plus welcome assistance from Bill GM4LNH, other amateurs and family members. So much for the prologue, now read on!

"Please don't feel discouraged at the seeming lack of interest in your writing endeavours. Many people like myself are not what could be called prolific letter writers, yet we do like to read what you and others tell us. For many in less well populated areas, articles like yours are most useful.

“If your geography is good, you will have noticed that we come from a low population, mountainous area and therefore don’t operate much ATV or (yet) much VHF and up on other modes either. What my friends and I have done over the past couple of years, has been to build some 23cm ATV gear from kits, and to use it both locally and further afield for demonstrations to the public. This has been done from the top of Ben Nevis 4,410ft high to the more low level (?) activity at for instance the European Mountain Bike Championships (British Leg) at Aviemore, over a full two days. This meant transporting a mass of gear and setting it up so that the public could see what was going on, and so introducing them to amateur radio. This was a great exercise and well thought-of by the public.

“Another similar in scope event, was the European Three Day Horse Trials Championship, at Blair Athol, Perth-shire. We only operated for two of the days on this occasion and had a great surprise. AT first we had P5 pictures on 23cm, P3/4 on 70cm, then as the dew dried out on the trees, which were quite high, our 23cm P5 died away to nothing, but increasing the 70cm picture to full P4. The only explanation that I can really imagine, is that the heavy dew on the treetops caused some form of ducting on 23cm. Afterwards we thought that perhaps it had been reflected signals that we had started with, but this does not seem quite right.

“Perhaps one day as we get better equipped, we shall take part in some contesting and work some, to us, DX. Perhaps even work you!”

## FOREIGN NEWS

A phone call came in from CT1BRM in Lisbon: they want to build an ATV repeater in Portugal. This was passed on the G8VPG of the Severnside Group, since they have one of the most technically developed repeaters in Britain (no arguments please!). Let’s hope something useful comes from this.

Jose Robat ON7TP writes from Liege in Belgium that their ATVB group recently made a 25-minute instructional video showing how Jacques ON5EE made a 3-element Yagi antenna for the 2 meter band. Jose used his JVC GR-C1 camcorder together with a CG-P50 character generator, also by JVC. He has also just finished the construction of the new TVRO receiver (CQ-TV 135) with the S-meter circuit from CQ-TV 142 and digital display from TV Amateur 63/1986.

Regular correspondent Mike Sheffield ZL1ABS made it over from New Zealand to the BATC convention this year again and regaled us with tales of ATV operation there. He also left copies of details of 36 different PCBs for television projects. These are of professional quality and quite moderately priced. An 11-page catalogue is available if you send me a cheque for £1 (71 Falcutt Way, Northampton, NN2 8PH).

## ANOTHER ANNIVERSARY

Recently we mentioned Gordon Sharpley G3LEE and his pioneering amateur PAL transmission. Another stalwart member of BATC goes back even further in colour transmission on 70cm, in fact this year sees the 40th anniversary of his "first". He is of course Grant Dixon, G8CGK (formerly G6AEC/T and 2DBQ before that). In a letter to 405 Alive he writes: "Here are a few notes which might be of interest to readers... "My interest in television started when I was 13 years old and I bought the first copy of the magazine "Television" from a station bookstall. When I reached the sixth form I made a 30-line television receiver with the disc driven by a DC motor as there were no AC mains in the town where I was living - I was rather better off than another enthusiast in a neighbouring town who used a water motor to rotate his disc. I gather he lost sync when someone had a bath and lowered the water pressure.

"Interest in 405-line TV was aroused for me by G4OY in Sheffield who was receiving reasonable pictures from Alexandra Palace using a VCR97 6" electrostatic tube and a 1355 radar receiver.

"I then moved to Rossendale and reception of "Ally Pally" was not possible, but the Sutton Coldfield transmitter was due to be commissioned and I was all ready to receive pictures when I moved to Ross-on-Wye. Reception of Sutton Coldfield was easy from the new location and I think I was the fourth person in the town to have television in the home. I was using the VCR97 tube mentioned above with its green screen and after an evening's viewing, when I took the dog for a walk, I noticed that the full moon was magenta-coloured. (N.B. Magenta is the complementary colour to green).

"I was using an antenna which was originally a U.S. Army antenna, cut to size for Sutton Coldfield. It was constructed from steel tubing and was painted olive green. A visitor who came to see the marvels of television asked if the picture was green because I was using a green aerial. It was about this time that a TV service engineer climbed onto a customer's roof to turn the antenna upside down because the set was displaying an upside-down picture!

"My six-inch tube did not give a very large picture and I bought a Perspex magnifying lens which was filled with oil - this gave a slightly larger picture which was easier to view. Actually, back in 1933, when I was experimenting with a 30-line disc, I got two clock glasses, sealed them together with surgical tape and filled the cavity with liquid paraffin. Was I the originator of the oil-filled lens which was so popular in the early 1950s? I never took out a patent so did not benefit from this original idea.

"I joined the British Amateur Television Club in 1950 and was their first Chairman from 1952 to 1962. I was inspired at a demonstration of colour TV by the Pyc company using rotating colour filter discs -I worked hard to reproduce their efforts, scaled down a bit to more reasonable standards for an amateur. I first transmitted live

colour pictures over a closed circuit on Christmas Day 1953. Later I took most of my gear to the home of Ralph Royle G2WJ/T and sent electronically generated colour test patterns over a 13-mile path to G3CVO in Chelmsford. I did not have the camera with me as it would not fit into my car. I believed this to be the first transmission by an amateur of colour TV in this country, possibly in the world. This took place on April 8th 1956 which was before the BBC began test transmissions of colour television."

## **IS THERE LIFE IN SLEAFORD?**

Nick G0HFL writes from Sleaford, Lincs. and says he really looks forward to reading this section in PW. Well, I always suspected I had at least one satisfied reader! But he has a serious question as well.

"I hope to set up a 24cm ATV station here and I would be interested to hear from any other stations who are already active on this mode." If you think you could work Sleaford, please write to Nick Masor G0HFL at 36 King Edward Street, Sleaford, Lincs., NG34 7NN.

## **FENLAND REPORT**

Now here's a nice, meaty letter from Ian Waters, G3KKD. He writes: "Your 'sermon' in CQ-TV 162 has stung me into making a reply. Yes, I think some of us do care but are too busy with our soldering irons to sit at the WP. I always feel guilty in taking time out to do this. I, however, agree with you it is sometimes a hard road.

"Firstly concerning the Cambridge TV repeater GB3PV. GB3PV is one of 7 repeaters run by the Cambridgeshire Repeater Group. This is not a TV repeater group as such.

"Although it has been on air since 1987 it has seen very little traffic. This may in part be due to its having a rather poor performance. I can transmit a picture to it and see it returned in my shack at any time. I use a diplexer, an inverse one to that used in PV, for single antenna working. Although I monitor it quite regularly I have only ever seen two other pictures apart from its beacon test card. One was during a lift and was from someone in the Midlands and the other was a test specially set up with Sid G6FKS in Chesterton, Cambridge. As he and I enjoy a very solid simpler path we do not normally need to use PV.

"On the subject of publicity, this is hard going. We give talks to the local radio club, show pictures off-air and explain what one has to do to join in ...but none of them seem to want to do so. I think they are all too busy with packet. We are giving another presentation later this summer.

"I was surprised to learn that PV is not affiliated to the BATC. I will try and do something about this.

“Secondly concerning my own station G3KKD. I have been continuously operational, if not always very active, since August 1955. I am currently QRV with 70cm and 23cm amateur TV. There was a time 20 or more years ago, when East Anglia was one of the most active areas for ATV in the country. That was one reason why we held CAT 70 in Cambridge. I have a video alarm in my shack (published in CQ-TV) and this was often giving warning of signals on the air. I doubt if it has sounded in the last five years. There just seems to be virtually no ATV activity now in East Anglia, especially on 70cm. The only time the 70cm equipment gets used now is during contests. During these events I can usually work the portable stations on mountain tops in Wales and the West of England. The lack of local QRM is thus beneficial!

“On 23cm there is a nucleus of activity in the greater Cambridge area. Once we get PV sorted out we hope to build on this base.” Thanks, Ian, for this comprehensive report.

## **AN APOLOGY**

Very sorry but I have had to hold over some letters this time, I've had so many. From famine to feast...

## **LAST WORD**

Just before we close the column this issue, I'd like to explain how I write this article each time. It seems that my comment last time about the meagre information flow from certain repeater groups hit its mark, even though the result was I received a call halfway through a Sunday evening demanding “an explanation” why I took the attitude I did. This, frankly, is the kind of phone call I don't really appreciate receiving, but since the caller believes he has a right to an explanation, I am happy to provide it... though here in this column at a time that suits me and not over the telephone at the time he petulantly demanded.

The way it works is this: you write it, I print it. Dead easy. But I don't invent material, I don't make it my business to ring up repeater group chairmen on the off-chance that something has happened nor do I consider it my duty to attend their meetings to find out. I just compile this column from the letters that thoughtful and well-intentioned readers submit. It's a simple formula and one that has worked well up to now.

So please don't tell me that I've let you down by ignoring your repeater in the magazine, especially if you haven't even taken the trouble to become an affiliated group. Nobody, but nobody, has the right to demand a mention in “TV on the Air” (they are entirely at liberty to write their own article if they please). With hand on heart, I say that I have never suppressed any material submitted for publication. Occasionally I have to edit it for reasons of space or clarity but that's all.



It may be that some readers believe a better job of the column could be done by someone else. I seem to have been writing the column for quite a long time (since November 1980 in fact) and I am perfectly happy to hand over to anyone else who can satisfy the editor he or she can do a better job. In the meantime it's business as usual but I restate that I am not prepared to accept whingeing criticism by telephone from anyone, but particularly not from amateurs who have never once in their lives picked up a pen to submit a contribution to this magazine.

If some of you end up thinking I'm an arrogant, self-satisfied prig, that's a pity ...because I'm not, I just cannot avoid speaking bluntly now and again. Right, that gets this gripe out of my system and apologies to everyone else. Normal service is now resumed!

---

## OBITUARY

### PETER WATTS

Those of you who knew our member Peter Watts from Southall will be very sad to hear that he was 'wiped out' in a road accident whilst on holiday in Cornwall earlier this year. His car was struck by another running out of control, on the wrong side of the road, driven by an inexperienced motorist. There was no room to escape and Peter took all the impact; his wife and two young children survived.

Those of you who knew Peter will recall he was a quiet stalwart of the club and a long-time member. Quiet, thoughtful and dependable, he had wide interests and often surprised people with his odd but very relevant insights. He was also methodical, resourceful and technically well qualified. Working latterly as an instructor in audio-video equipment, he was generous in imparting his unquestioned practical knowledge.

I believe Peter's place in the next world is assured; too bad for us and the family he leaves behind that he got there early. He was a genuine 'nice guy' and will be missed. Our sincere sympathy goes out to Emily and the children, also his sisters.

Andrew Emmerson.

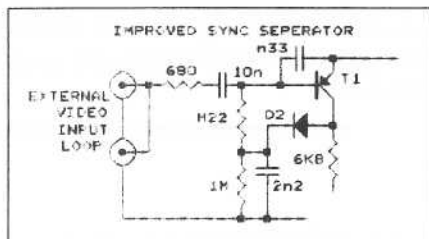
# Cropredy Genlock Update

**John Stockley G8MNY**

Four minor improvements to the Genlock circuits in CQ-TV 162 have been made.

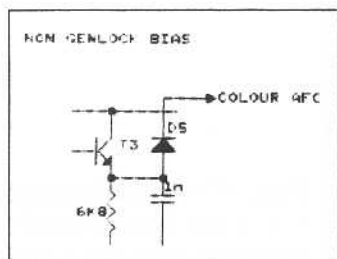
## B&W Sync Separator

The original one, did not like changing input levels, or large colour bursts. The improved circuit has better clamping. Diode D2 and the 2n2 capacitor, store the peak level of sync extracted and change the bias to T1 automatically. The input C is now a 10n giving frame sync response. The input 680R and 33nF capacitor, form a simple colour burst filter.



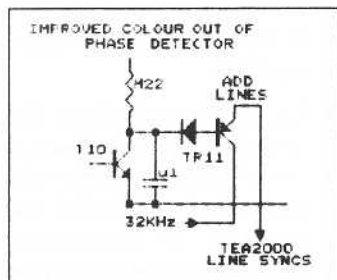
## Colour on Non Genlock.

The varicap voltage falls with no external syncs and may pull the Colour frequency out of limits. Adding a diode D5, from the frame separator voltage, which goes to 4V with no external syncs stops this.



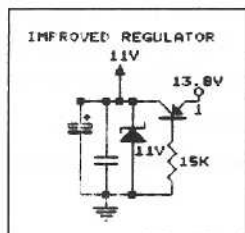
## Colour out of phase

The add line circuit was not as efficient as it could be. By changing TR11 for a PNP and removing the 33k, hard corrupting 32 kHz pulses are switched to the TEA2000.



## 12V Colour Regulator

Not a change to my circuit, but I found the TEA2000 runs hot on 12V and the original R and zener are not so good for with 12-14. supply. The proposed circuit uses a PNP as a near constant current source (the 15k is select-on-test to give some current through the zener) and the zener is changed to an 11V one.



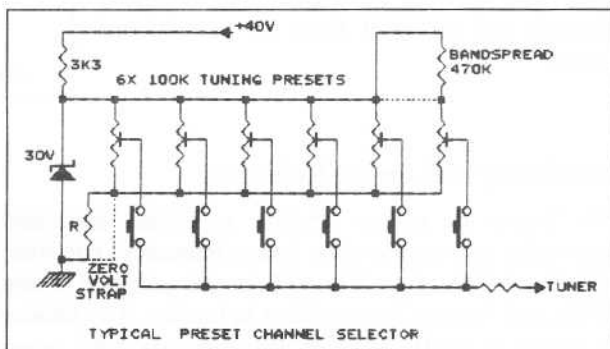
# Tuning 70cm

## John Stockley G8MNY

The best way to receive 70cm ATV is to tune it directly on your TV/VCR, without using converters. About 30% of TVs, and 50% of VCRs will tune 435 MHz without any modification. For those that just won't, some persuasion is needed: (Note: Values quoted are typical).

### Zero Volts

Often the only modification required is to short out a resistor (R) that stops the tuning voltage from reaching ground. Careful inspection of the preset pot tuning panel can lead to its location. On fully electronic tuning another approach may be needed, see negative volts.



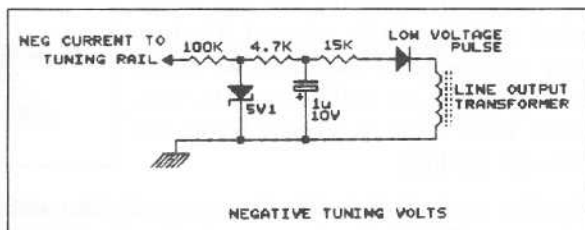
### Bandspread

For best results, finer tuning is needed on the weaker amateur signals. This can be achieved by cutting the track feeding the +30V to the tuning pots and putting a 470k in series, with it.

### Negative Tuning Volts!

When all else fails try adding in some -ve voltage, from a 9V battery through a 100k to the tuning rail. The varicap diodes will conduct at -0.4V and the oscillator will stop, but up to that point the increase in capacitance is

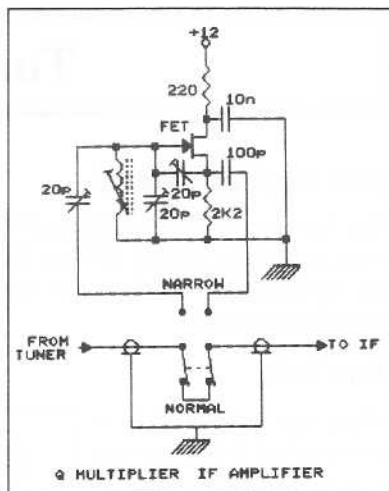
huge. This approach should pull all tuners onto 70cm. When a successful test has been done, you have to find or build a negative supply. The easiest way is to rectify one of the lower voltage line output pulses, drop the voltage, smooth and zener.



## Narrow IF

With decent tuning arrangement reduced IF bandwidth gives remarkable improvement to weak signals. Switching from a 5 MHz Bandwidth to 0.5 MHz gives a 10dB improvement, but of course you loose all detail, so not so good on bigger sets.

With a changeover switch in the tuner to IF lead, fit a switched amplified IF filter/amplifier with the required bandwidth (Q multiplier design!) and power it from the sets internal supply.

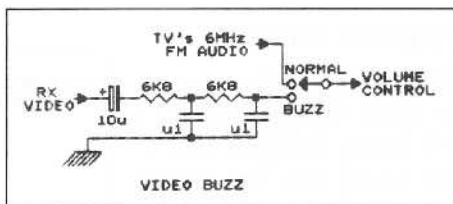


## Sensitivity and Image Rejection

TV Tuners are not as sensitive as modern communication front ends. They are reasonable at rejecting their image frequency, but with the direct reception method, CH 26 (1M Watt from Crystal Palace) is a normal IF image ( $2 \times 38 + 435 \text{ MHz} = 511 \text{ MHz}$ ) and this can be a problem in London. The solution to both of these difficulties, is to use a good low noise tuned amateur band preamp, this will make the ATV signals much bigger and severely attenuate the image frequency.

## Less than P1

With weak signals a method of beaming up the aerial before the TV has recognized anything, can be achieved. The best way is to couple a 70cm SSB Rx to the preamp output as well as the TV. This gives about 20dB of warning before the TV sees anything.



Another approach is to take the recovered video and feed it to the TV audio stages, after some CR filtering to remove the line timebase. This works by listening to the 50 Hz buzz, as your ear/brain is a few dB better than the TV sync stages. It also works on 10 GHz/1255 MHz FM TV just as well.

# Poor Man's CAE 1 & 2

## Public Domain Software Development

### programs for the IBM PC

*Review*

#### Mike Wooding G6IQM

Poor Man's CAE 1 & 2 are two extensive collections of programs for the IBM PC and compatible computers have been compiled and documented by Jorg Smith Ing.(Grad.) DJ5UN. The software should be very useful for radio amateurs, professional engineers and students alike, to aid in the design of communication equipment, etc.

Each of the packages comes on 5.25" discs and is complete with a well-produced and bound manual. Both are a collection of forty programs. The computer requirements are very basic, an PC or compatible with a minimum of 256k of RAM, MS-DOS and GW-BASIC, a printer for some of the routines and virtually any display adapter.

The following is an abbreviated list of the program descriptions:

#### CAE No.1

##### Antenna Design

Parabolic Antenna Design Program

##### Amplifier Design

Amplifier Analysis Using "S" Parameters

Matching Using Stern's Stab. Factor

Design Of Amplifiers Using "S" Param.

Cad Of Microwave Transistor Amplifiers

##### Noise Calculations

Converts S, Y, Z, H, A, Parameters

##### Component Calculations

Helical Resonator Design

Design And Analysis Of Coils, Calculates Inductivity Of: Wire, Strap, Coil,

Microstrip, Microstrip Dimensions

Analysis/Synthesis Of Parallel Plate Cap's And Microstrip

Magnetic Core Calculations

Synthesize And Analyse Microstrip Lines

Calculate Cut-Off Frequency Of Wave Guide

## Active/Passive Filter Networks

- Modern Filter Design
- Low Impedance Double Tuned Circuit
- Cascade Of Active Filters (Lp, Hp, Bp)
- Design Narrow Bandpass Filter With A Basic Program

## Matching Networks

- Design "H", "T" Attenuators
- Design "Pi", "T" Matching Networks
- Design L-Matching Networks
- Smith Chart Calculations On Your Microcomputer
- Simple Bandpass Filter Synthesis
- Matches Load To Source With Desired Q
- Calculates Z From Reflection Coefficient And Vice Versa

## Network Analysis

- A Ladder Analysis Program For Passive Components
- Network Analysis Of Active Parts

## Propagation Calculations

- Communication Range As Function Of Rx/Tx Antenna Parameters
- Calculates S/N Ratio At Satellite
- Troposcatter Path Loss Calculations
- Calculates Maximum Height Of An Object In A Loss Path

## Receiver Calculations

- Intermodulation Products
- Mixer Spur Calculations
- Noise Factor Of Cascaded Stages
- Approach To Calculate Intercept Point And Noise Figure
- 14 Routines For The RF Engineer

## CAE No.2

### Antenna Design

- Capacity And Radiation Resistance Of A Short Vertical Antenna
- Calculation Of Helical Short Antennas
- Amplifier Design
- Amplifier Calculations Using S-Parameters

### Component Calculations

- Inductance Of A Straight Rectangular Bus

Inductance Of A Hairpin Loop  
Program To Calculate Spiral Inductors On A Printed Circuit Board  
Twisted Wire Transmission Line Impedances

### **Filter Networks (Active/Passive)**

Chebyshev Filters With Arbitrary Source And Load Resistances  
A Design Program For Chebyshev Low Pass Filters  
Disk Rod Low Pass Filter Design  
Elliptical Lowpass Filter Loss Program  
A Design Program For Elliptical Low Pass Filters  
Computer Aided Interdigital Bandpass Filter Design  
Equal Ripple LC Filter Synthesis  
Calculation Of Passive Low/High Pass Filters (Lin., Phase, Butterw, Chebys.)  
A Design Program For Butterworth Low Pass filters  
Basic Program For Op-Amp Active Filters  
L.Orloff's Unequal Terminated Filter Design

### **Matching Networks**

Cad For Lumped Element Matching Circuits  
T Pad/Pi Pad Calculations

### **Microstrip Applications**

The Program Computes Various Parameters Of Microstrip Circuits, Including Impedance, Dielectric Constant, Line Widths, Capacitor And Inductor Dimensions, Delay, Dispersion, Loss And Propagation Delay  
Program For Analysis And Synthesis Of Microstrip Couplers  
Cad Amplifier Matching With Microstrip Lines  
A Parallel-Coupled Resonator Filter Program  
Impedance Of A Transmission Line

### **Network Analysis**

A Ladder Analysis Program  
Network Analysis For Active/Passive Components

### **Other Programs**

Program To Find The Approximate Coax Cable Loss Between Two Specified Frequencies  
Heatsink Design  
Transmission Line Loss Calculations  
Linear Full Wave Regulated Power Supply Design With Off-The-Shelf Components, For Use With Gw-Basic  
Basic Ripple Voltage Calculations For A Power Supply

## Propagation Calculations

Pathloss Calculations Program To Calculate The Elevation Angle From A Transmitter

Propagation Range Calculations Using Egli Model

## Receiver Calculations

Noise Bandwidth Calculations

Calculation Of Noise Temperatures Of Two Stages From Noise Factor And Gain

Q-Problem Program Combining Gain, Noise Figure And Interception Point For Cascaded Elements

Calculation Of Spurious Frequencies

## Utility Programs

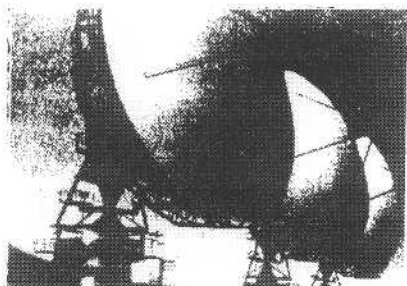
Program To Hold Screens In Memory

Program To Print The Screen To An Epson Printer (Lx850 Or Similar) When Using EGA Graphic Mode

These program collections are available at a cost of £70 each plus £5 post and packing from KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF. Tel: 0788 890365; Fax: 0788 891883.

---

# Linie D



## Components for satellite DX

Components of Linie D are tools for picture improvement for satellite DX and weak signal reception.

Interested?

For full details please write or phone. We will send you our free documentation.

NKM - Elektronik GmbH • P.O. Box 1705 • D-7850 Loerrach  
Tel. +49 7621 / 18571 • Fax +49 7621 / 18840





## BSB Part-5

**Trevor Brown G8CJS and Chris Smith G1FEF**

*This time its an Astra conversion for the Ferguson, Philips  
and Tatung receivers*

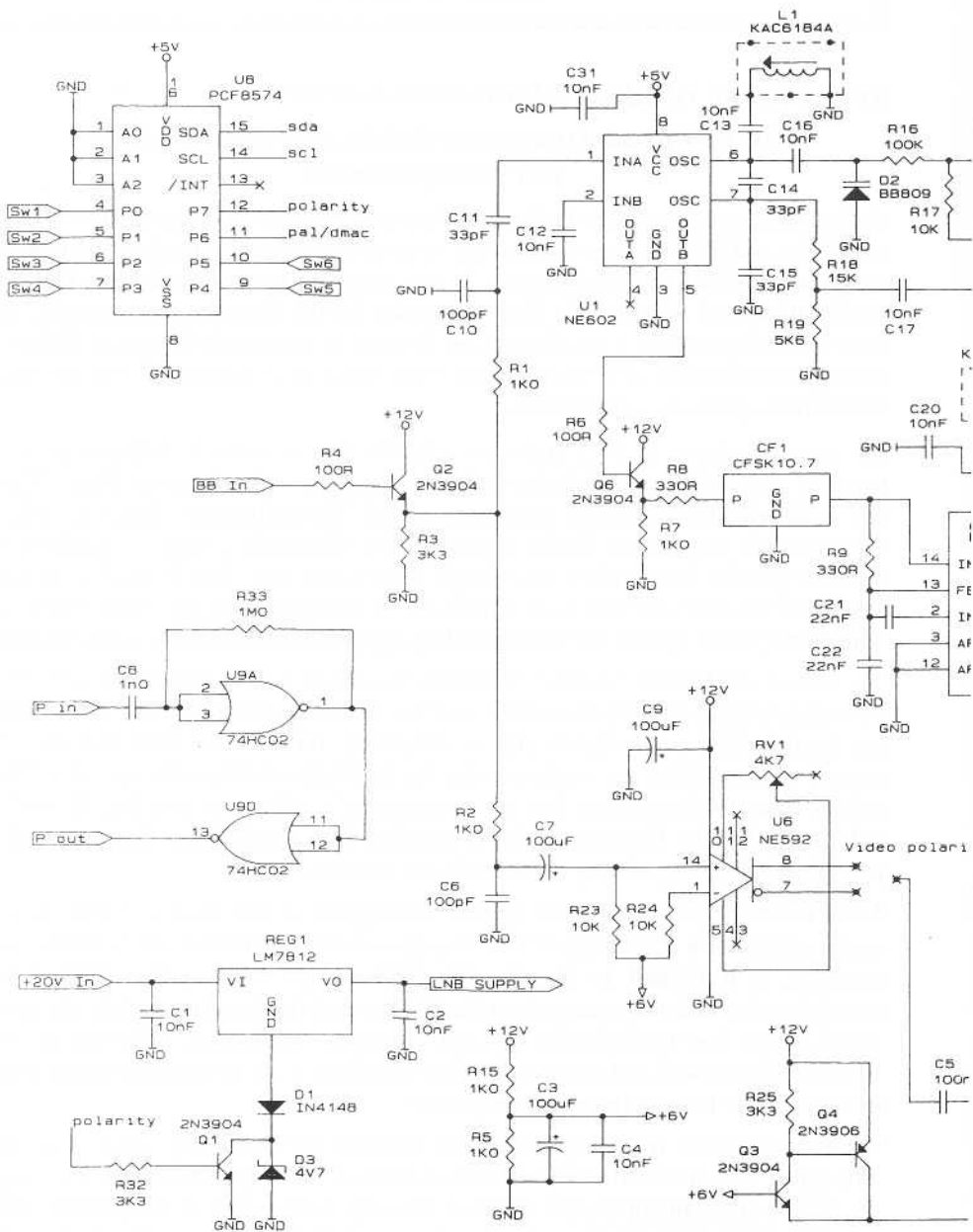
Having fitted software to the Philips and Ferguson receivers and looked at the D2mac on TV Sat and TDF we have come to the limit of software only changes, and look this month at a full hardware modification. In past issues we have covered minor hardware modifications and reviewed the Trac conversion for the Ferguson receiver only. This time we have produced a circuit that can be used to convert the Ferguson Philips or Tatung BSB receivers to PAL operation. The circuit is switchable so that the Dmac and D2mac operation is still retained.

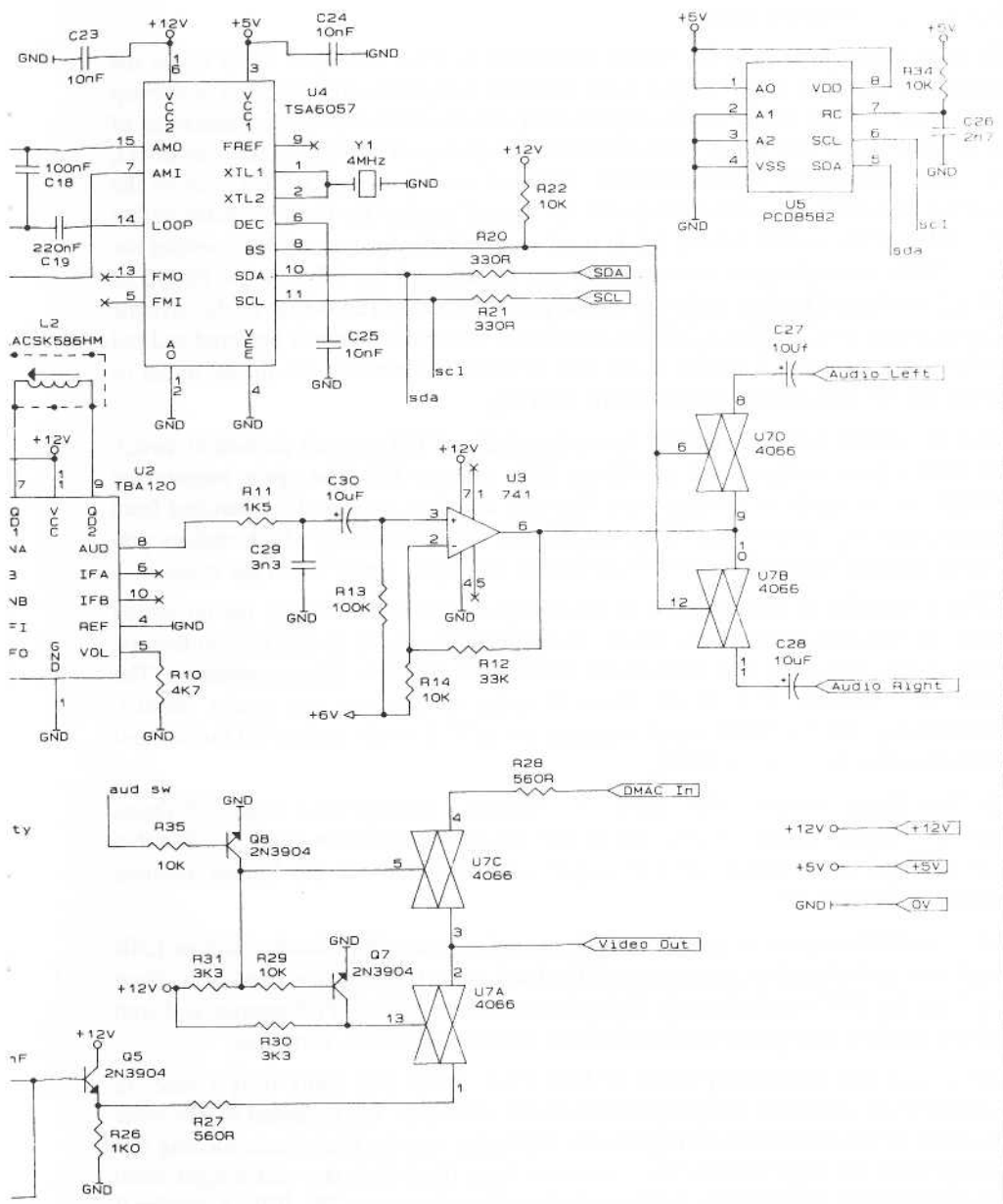
The circuit is shown in Fig.1 and a predrilled PCB is available to help you put it all together. This will then enable the custom software to switch between Dmac D2mac and PAL with fully tuneable intercarrier sound. The software is driven by full on screen menu's even on the Philips receiver. The LNB supply voltage is switchable for those of you that have LNB's that change polarity this way. The PCB also has some spare port bits that are TTL level which can be switched from the menu system and will enable you to control any other ancillary equipment such as multi standard LNB's

The Circuit and PCB is the same for all three receivers, but the software is different as you would expect, they have a similar feel but there any similarity ends. The software has been written from scratch and is completely different for each receiver. The menu's on the Philips are made possible by hardware modifications and if software only is fitted to this receiver then on screen menu's will not be possible. If software only is fitted to the Ferguson or the Tatung then Dmac and D2mac functions will be possible but anything relating to PAL will not function.

I will not bore you with a blow by blow description of how to drive the menu's on each receiver, or a description of how to populate and install the PCB in either of the receivers, it is enough to say that the software and PCB comes supplied with comprehensive instruction on routing the I<sup>2</sup>C bus and baseband inputs into the circuit board and on how to obtain the +12 and +5 power supplies, etc. Wherever possible links have been used and track cutting has been kept to an absolute minimum and in the case of the Tatung eliminated completely.

The base band that is de emphasised and routed to the Dmac chip set is also routed into Q2 of our circuit. The output at the emitter of Q2 is split two ways, one way to the NE592 video amplifier, The output of this chip is via a link so that polarity can be selected, this is different for each receiver and needs to be set to - for the Ferguson





and Philips unit and + for the Tatung. The video is then clamped to remove dispersal and fed to U7 the analog switch to enable you to switch between Dmac and PAL from the receiver's on screen menu.

The base band output from Q2 emitter is also fed to U1 a mixer, and VCO where the intercarrier sound is mixed with a local oscillator frequency controlled by a varicap diode driven by U4. U4 is an I<sup>2</sup>C chip and requires the SDA and SCL connections of the receiver's I<sup>2</sup>C bus, It can then control the frequency of the local oscillator in U2, by voltage modulating the varicap diode. The local oscillator runs 10.7 MHz above the required intercarrier sound frequency and the desired product Fo-Fc is extracted with a 10.7 MHz ceramic filter. L1 and L2 do need some initial adjustment and by setting the audio tuning to midway on the menu, L1 can be adjusted for 5.5 volts on pin 15 of U4, L2 is adjusted for best audio by listening to the results. The output of the ceramic filter is routed to U2 a TBA120 FM demodulator. The audio output is buffered and fed to the analog switch U7 so that it can also be switched between the digital audio of Dmac and the Intercarrier sound for PAL working.

U8 is the control port, here the I<sup>2</sup>C bus is decoded and TTL outputs derived to switch the LNB supply voltages and the Dmac PAL selector U7. The spare outputs are brought out onto pads so that any extra bits such as relays, etc. can be controlled from the receiver's on screen menu. U5 is an I<sup>2</sup>C non volatile memory which enables you to store channel information that will not be lost when you power down the receiver.

IC9 is a chip that is only required on the Philips receiver and enables the on screen menu's to function in the D2mac mode. The problem is a basic design flaw in that the Dmac clock operates at 20.5 MHz and is switched to 10.25 for D2mac operation. The ACM card requires 20.5 at all times in order to generate on screen menu's. Unfortunately, the 20.25MHz clock output is not at TTL levels and so U9 buffers and level shifts the clock for the ACM.

The New Philips software also inhibits the frequency hunting for a clean 625 Dmac data line which is absent on PAL signals and left you with a slow cyclic sparkle that was an unavoidable feature of the simple hardware mod for the Philips receiver covered in CQ-TV 161.

Now your BSB receiver is capable of PAL operation, you will of course need an LNB to put you in the fixed frequency part of the band and an appropriate sized dish. Once you leave the DBS band where the high power satellites such as TDF operate and start looking for the lower power satellites such as Astra this becomes inevitable.

This project has taken many hours of both Chris Smith and yours truly's time. In writing the software and designing the hardware and PCB. We managed to get some prototype PCB's and Hardware together for Harlaxton only by Chris home etching and drilling them the night before. The comments from those that saw and bought them was encouraging, including the gentleman who referred to me as Mr. BSB, I wonder if Andrew Neil knows. The PCB has now being commercially etched and is available

from Chris or myself at a Cost of £25 including Software and installation and operating instructions. please state which receiver you require it for. In the case of the Tatung which uses a special address latched EPROM (IC705) this needs to be removed from your receiver and sent along with your order so it can be reprogrammed with the new software.

I hope all this meets with your approval the whole project has taken many hours of design testing and redesign. The midnight oil was certainly in full flow the week before Harlaxton.

The cost of the Software is £15, The PCB £10 and together £25 this includes postage and packing and can be ordered from either Trevor Brown, 14 Stairfoot Close, Adel, Leeds, LS16 8JR, or Chris Smith, 19 Crabb Street, Rushden, Northants, NN10 0RH.

---

## **The Parabolic 24cm Preamplifier**

**A fully weather-proofed very high-quality preamplifier covering 1200 MHz to 1360 MHz. Mounted in a sealed diecast enclosure with weatherproof N-type sockets for input and output. DC powered via the output socket for remote mast-head mounting.**

**GAIN >40dB across the band**

**NOISE FIGURE <1.6dB**

**£120 + £5 post and packing**

**KM Publications, 5 Ware Orchard, Barby, Nr.Rugby,  
CV23 8UF, U.K.**

**Tel: 0788 890 365; Int: +44 788 890 365**

**Fax: 0788 891 883; Int: +44 788 891 883**

**ALL MAJOR CREDIT CARDS ACCEPTED**

# Circuit Notebook 49 - An Auto-Morse Keyer for Beacon or other use

**John Lawrence GW3JGA**

This circuit uses 4 IC's to produce a Morse code keyed audio tone and has several applications, such as, Beacon or Repeater identification, modulating the transmitter for EMI /EMC testing etc. The Morse code is stored as a bit pattern in an EPROM.

The circuit consists of a clock oscillator running at about 600Hz using two gates, IC1a and IC1b, of a 4011. The output from the oscillator forms the audio tone and also drives a 4040 12bit binary counter(IC2), the last output (Q11) from which drives a further 4040 binary counter (IC3). Outputs Q6 to Q11 of IC2 and Q0 to Q3 of IC3 are connected to the address lines A0 to A9 of the 2716 EPROM (IC4). Address A10 is switchable between +V and 0V to give a paging facility. The data output (Morse keying waveform) is taken from pin 9 of IC4, the least significant data I/O line. Any I/O line could be used depending on how the EPROM is Programmed.

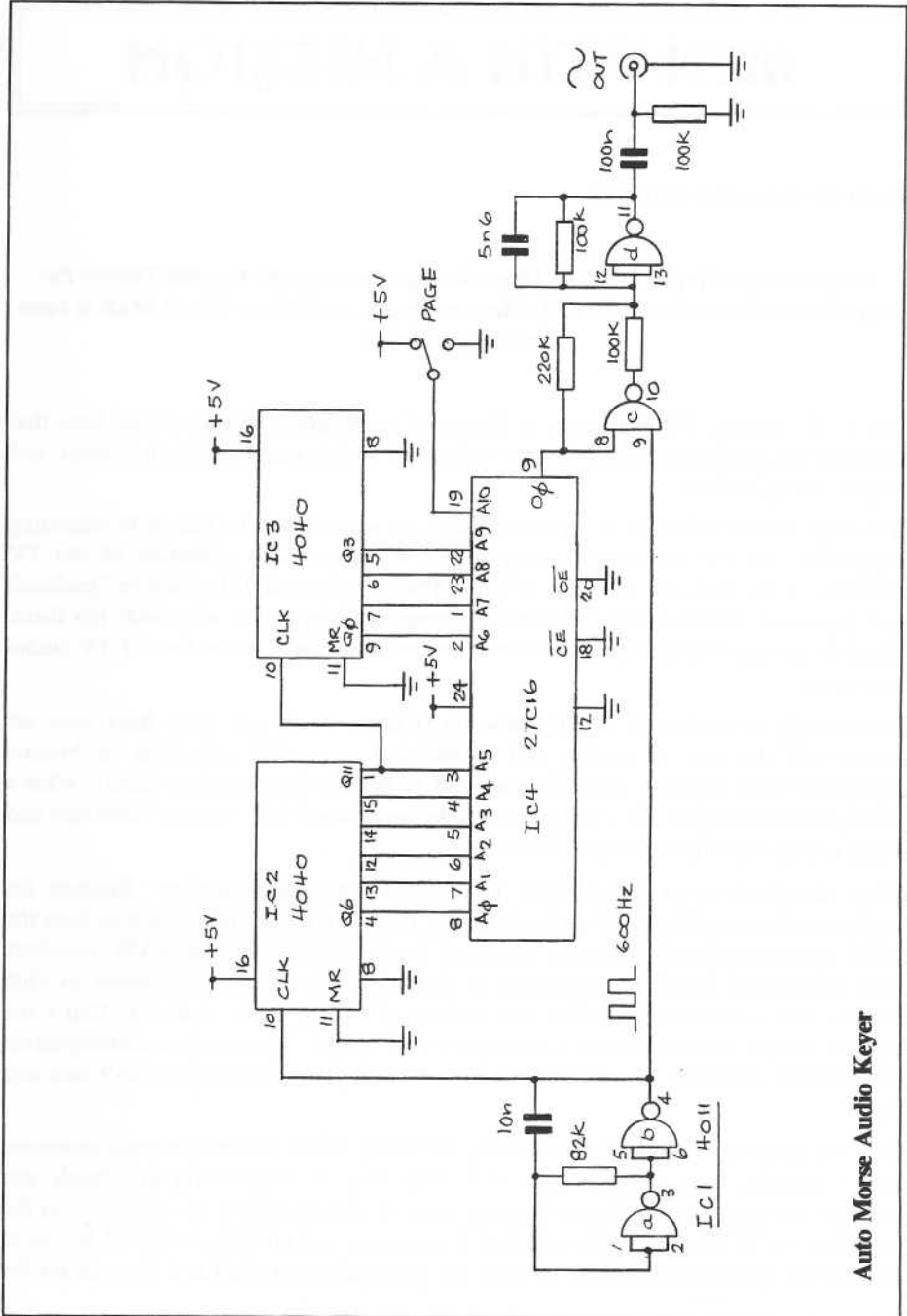
This keying signal is taken to IC1c to gate/key the audio tone on and off. IC1d is used as a crude low-pass filter to round off the clock oscillator waveform and couple the keyed audio tone to the output connector. Additional filtering may be used to further improve the waveform and reduce the signal to microphone level.

The EPROM is programmed by filling sequential address locations with FF (you could use 01 but FF is easier) or 00. FF would represent a dot, FF FF FF a dash, 00 a space within a character, 00 00 00 a space between letters etc. (continuous FF would give continuous tone). The address counters, IC2 & IC3, step through the memory addresses and the output forms the morse code message. With the component values shown, the speed is about 10 words per minute and the 2716 EPROM holds about 4 minutes of code which repeats indefinitely.

If you need to drive a relay, then the output from IC4, pin9, could be buffered by a transistor or MOSFET to power the relay coil. An easy way of building the circuit is by using a prototyping plugblock board, e.g. Maplin FD31J or RS 488-618. IC1 supplies are 0V pin 7 and +5V pin 14.

References:

1. Modified W4RFR Code Beacon Keyer, David G. Meier N4MW ARRL. Proc. Microwave Update 91, p.39.
2. A Microwave Beacon Callsign Generator & Keyer, G4FRE RSGB Microwave Handbook, Vol.2, p.9.21.



Auto Morse Audio Keyer

# MEN WITH A MISSION

**Andy Emmerson G8PTH**

*They're rough, they're tough and they don't go away empty-handed. They're the crack team who make up the BATC Rescue Squad... and it's not kittens stuck in trees that they go after.*

In fact it's historic TV equipment in danger of annihilation or even worse fates that this elite group of trained professionals make their snatch-squad sorties to recover, and they're deadly serious.

You may wonder why this is when museums are supposed to be full of broadcasting equipment, but the sad thing is they aren't. Even our best collection of old TV cameras (at the National Museum of Film, Photography and Television in Bradford) has gaps in it and that's not for want of trying, for they do an admirable job there. There is an urgent need now to mount a concerted rescue mission for old TV studio equipment.

Accordingly a number of BATC stalwarts (I think I can call them that) have set themselves the task of saving and maintaining a parallel collection of historic equipment (and anything over 20 years old is historic in television terms). What's more, the cameras you see on display outside the restored O.B. vans at Harlaxton and other events are fully working exhibits.

They also back up or complement the 'official' museum collections. Because the equipment is privately owned and maintained, there is a unique motivation to keep the items up to scratch and to acquire additional items. There are several BATC members who restore old broadcast equipment in this way and we all get together at club events, also collaborate to make sure nothing of use to us is scrapped. That's the trouble though: so little of this equipment is still around. We are even contemplating repatriating a Marconi Mk. IV camera from New Zealand because we can't find any here!

Yes, we need your help to track down the remaining items: cameras, tripods, monitors, etc. - anything over, say 25 years old. They may be languishing in schools and colleges but probably the biggest treasure trove of old equipment is - surprise - in the hands of BATC members who acquired it years ago and no longer want it! So we're making an appeal for members to clear out your garage or shed and do your bit for



preservation. You'll even earn a little money -or you can let the Club be the beneficiary. We guarantee this gear won't be sold on to film props companies but lovingly restored instead. It ought not just rust away in members' sheds, whilst taking it to boot sales is a hit and miss way of disposing of it, not really the right thing to do. So please read our display advertisement and act on it - thanks!

What about the history of amateur television? Good question. The Club is concerned that photos, filmstrips and other archives of its past existence need to be conserved in a proper manner. The Committee is working out a proper archives policy but in the meanwhile please notify Paul Marshall if you have anything of this kind.

Fig. 1: You'd never believe that a whole Marconi Mk. III image Orthicon camera chain could fit inside a Citroen estate car. It's rather like the TV Times... I never knew there was so much in it.

Fig. 2: Prize capture - an unused EMI 4½" image Orthicon tube. Brian Summers G8GQS wonders who'd willingly use those wimpy little CCD chips when you could have a real camera tube like this.

Thanks to Ted Gilbert G8TMM in Harpole for having the good sense to hand over his camera without putting up any serious resistance.

## **TVT COMMUNICATIONS TX103 AMATEUR TV TRANSMITTER**

The transmitter comprises of an exciter and an in-built power amplifier, representing the first time such a self-contained assembly has been available in the UK for amateur use. Frequency control is accomplished by a crystal referenced Phase Lock Loop and ensures that the unit will always be "on frequency". The transmitter comes as standard with three frequencies available, 1249 MHz (RT2 I/P), 1276 MHz (RT1 I/P) and 1256 MHz (simplex), which are selected by a front panel switch, giving the user all the commonly used U.K. repeater and simplex frequencies. Other frequencies to special order - delivery approximateley 2 weeks.

|                                |                            |
|--------------------------------|----------------------------|
| 13.8v DC Supply                | 20 Watts RF Output         |
| 3 Frequencies Built-In         | PLL Frequency Control      |
| Pre-Emphasis to CCIR 405.1     | Built In Subcarrier Sound  |
| Adjustable Video Deviation     | Adjustable Audio Deviation |
| Rated For Continuous Operation | 115mm x 115mm x 250mm      |

**Price £399.95**

**Shipping U.K. £10.00 : Overseas £15.00**

**Available only from: KM Publications, 5 Ware Orchard, Barby,  
Nr.Rugby, CV23 8UF. Tel: 0788 890365. Fax: 0788 891883**

# Serial-to-Parallel Keyboard

**Chris Smith - G1FEF**

Parallel keyboards seem to be on the decline nowadays, as the market is flooded with 'PC' keyboards which are serial. A lot of equipment still requires parallel data and for new projects, parallel data can be handled a lot easier than serial bit streams. So I thought, why not use a cheap 'PC' type keyboard and convert its output to parallel. Spurred on by several people requesting this (Yes Bob, here it is at last!) here is my solution . . .

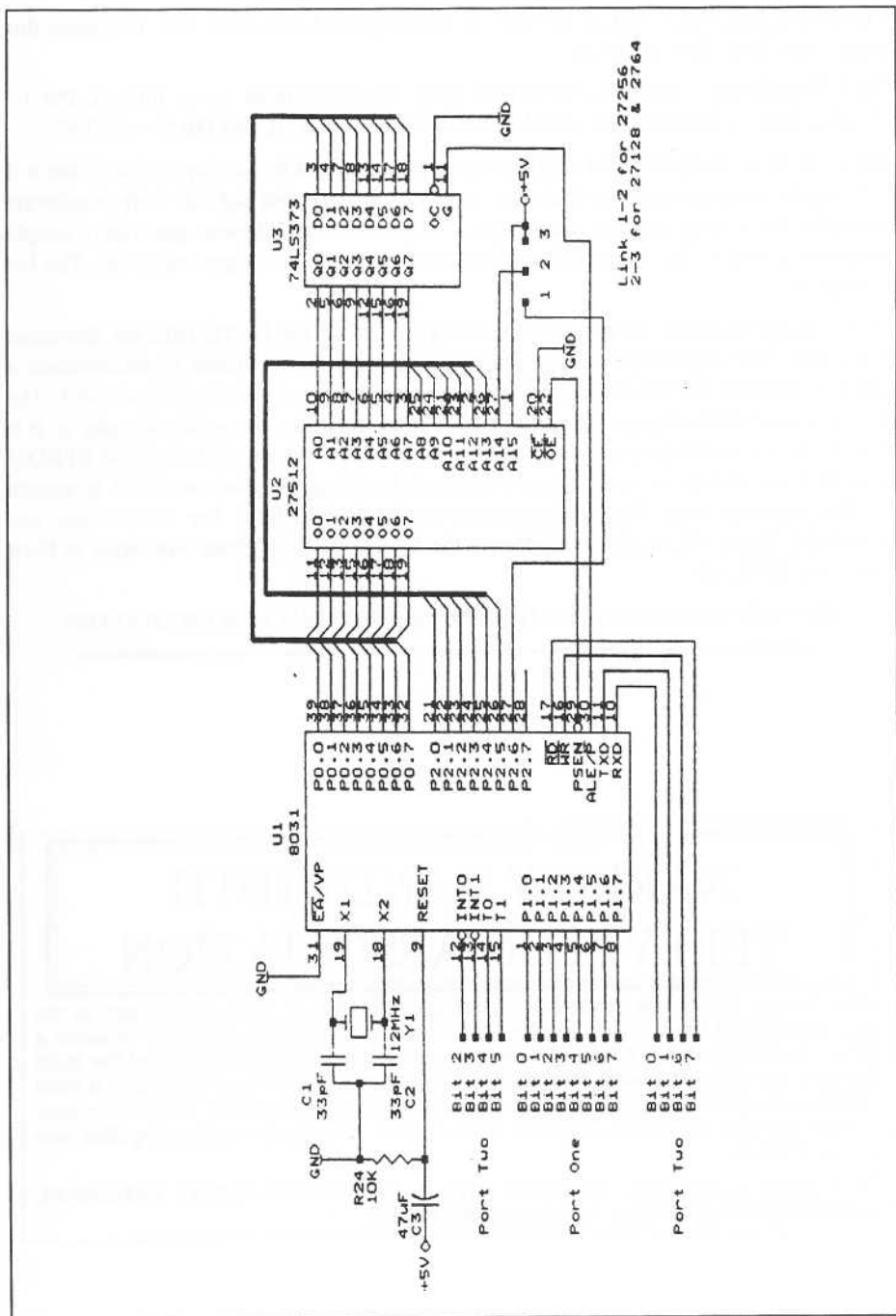
The 'PC' keyboard has four connections: +5V, 0V, DATA & CLOCK. Every time a key is pressed, an 8-bit scan code is transmitted. The data is sent one bit at a time on the DATA line, with the CLOCK line qualifying each bit. When the key is released another code is transmitted. These scan codes are peculiar to PC's, so a straight serial-to-parallel conversion would not provide an ASCII output. The easiest approach seemed to be 'do it in software', especially as I'm a software engineer! So I dreamed up the simplest hardware configuration I could, see figure one. It is an 8031 micro controller, with an external EPROM. This processor multiplexes the lower order address bus with the data bus, so an external address latch is also required. I could have used an 8051, which has an internal PROM, the result would be a one chip solution (instead of three), but then the PCB could only be used for the one application. As it stands, with a change of software in the EPROM, this PCB can be used wherever a bit of 'processing power' is needed.

The processor has 128 bytes of RAM built in, this is enough for most simple control and processing applications. External RAM up to 64K can be accommodated, but I did not make any provision for it on the PCB. The device also has two 16-bit timers, which can be programmed as timers or event counters. There is also a fully duplex serial port and a two level, five source interrupt structure. So it is quite a versatile device.

With the external EPROM connected, there are 16-bits of I/O left free, the PCB allows all 16 to be connected to, but in this application only 13 bits are used:

- Port 1 bits 0-7 output the 8-bit ASCII data
- Port 3 bit 0 is the DATA line from the keyboard
- Port 3 bit 1 is the CLOCK line from the keyboard
- Port 3 bit 7 is the STROBE output, positive going pulse when Port 1 has new data
- Port 3 bit 6 is the STROBE output, negative going pulse when Port 1 has new data
- Port 3 bit 5 is a RESET output, negative going pulse.

The RESET output, is a negative going pulse that can be used to reset the equipment you are connected to (e.g. The RESET line on the I<sup>2</sup>C computer). It is activated



whenever CTRL-ALT-DEL is pressed on the keyboard. PC users will recognise this as the 'soft boot' key sequence.

The PC keyboard is usually a 5-Pin DIN plug, the connections are as follows: Pin 1 - CLOCK Pin 2 - DATA Pin 3 - No Connection Pin 4 - GROUND Pin 5 - +5VDC

As the PCB is an open ended design, you are encouraged to develop software for it. I can supply a cross-assembler that runs on a PC. I may even publish further software examples (if I ever get the time!) e.g.: Morse decoder, Morse generator, simple repeater controller, I<sup>2</sup>C controller, musical doorbell, sync pulse generator, etc. The list is endless.

I have designed a PCB for this project, it is available on the BATC BBS for download if you have the capability to make your own. I could be persuaded to manufacture a SMALL number for any interested persons, for an appropriate fee (of course!). The software is available from me as well, I have released it into the public domain so it is free of charge and the source code is also available. Send me a blank 2764 EPROM with £1.00 in stamps to cover return postage & handling. Or send me £5.00 in stamps or cheque/postal order if you wish me to supply the EPROM. The source code and assembled binary file is also available on the BATC BBS for those who wish to blow their own EPROMs.

My telephone number is (0933) 58220, the BATC BBS is on (0933) 413396.

---

## NARROW BANDWIDTH TELEVISION ASSOCIATION

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

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

# PCB's Down the Land-Line

**Trevor Brown G8CJS**

*Ever tried designing your own PCB's, or made one from someone else's artwork? Heres how to do it on a PC including a free copy of 'Easylase' to BATC members.*

Home etching of PCB's seems to be a thing of the past probably because we have been spoiling you with members services. The technology of photo etching from a transparency may not have moved significantly, but the process of preparing the transparency has certainly progressed.

## HOME PHOTO ETCHING

For those of you that have never photo etched a PCB I will run through the process briefly. The artwork needs preparing on a transparent gel usually with transfers and sticky tape where copper is required (positive artwork). The bare PCB board is best purchased presensitised i.e. it is coated in a photosensitive chemical and covered in black plastic sheet to keep the light off the board until you are ready to use it. The black plastic may be removed in normal room lighting and the artwork placed in contact with the board and exposed to Ultraviolet light for about 15 minutes. The board is then developed in a solution of sodium-hydroxide or better still photoresist developer. The resultant board is then etched in ferric chloride solution. All the details can be found in the Maplin catalogue including the presensitised board, chemicals and light box.

## ARTWORK THE ARMSTRONG WAY

The process is fairly trouble free, reliable and yields usable results. The major problem is preparing the transparent artwork which needs to be on a scale of 1:1. The best way used to be, design your artwork on a scale of 2:1 using imperial graph paper and pencil. The corrections being made by rubbing out and redrawing. The final artwork was then prepared by laying a transparent film over the pencil work and laying down tracks with sticky tape and transfers using the graph paper design as a guide, this then needed photo reducing to a scale of 1:1 for the contact print process described earlier, to be carried out.

## **CREATING ARTWORK ON A PC**

Technology has now marched on and the artwork can be created on a computer and edited, parts saved for inclusion in other projects and other parts moved and repeated in much the same way that text is processed. This does make life easy, take for instance a 6 channel audio mixer where only one channel needs laying out and then marking around with the mouse. The artwork is then repeated at the screen cursor position with a single keystroke. 6 keystrokes and you have 6 channels. The artwork is viewable on the screen and is WYSIWYG (what you see is what you get)

## **THE HARDWARE**

The computer I use is a PC not the flashy 486's with 100 Mb of hard drive, but a second-hand 286 with a 20 Mb hard drive. The hard drive was unnecessary, in this instant. The software I use runs from floppy disc. The screen is colour VGA and is necessary to create, view, and edit PCB layouts, but to receive and print other peoples PCB designs only, any screen will do ( see later).

## **THE SOFTWARE**

The Software I use to create PCB's is called EASY-PC and was reviewed in CQ-TV 154. I will not repeat Mikes review, but it is impossible not to be able to use this very friendly piece of software and its hard to find a way of screwing up, without ignoring numerous prompts, it takes a single evening to get to grips with, and you become an expert within the week.

## **PRINTING OUT THE ARTWORK**

When you have finished the artwork you come to the single indulgent, but necessary piece of equipment, a laser printer. Preload the printer with photocopy safe overhead projector transparency, (it must be photocopy safe) and costs around 25p per sheet as opposed to 10p for the other kind that melts when it reaches the hot air dryer in the printer (first mistake). I must also point out that I don't own a laser printer, or know a man who does, but the advantage of a PC is there are so many around and usually wired to a laser printer. I carry the artwork to such a set up on floppy disc and push my luck while the boss takes his usual liquid lunch.

The file for printing, to a laser printer is called EASYLASE.EXE and is part of the EASY-PC package. When this file is run it first prompts for the file name of the artwork and then presents the following menu:

## EASY-LASE

```

Input from :  ttl1.sch

Summary      :  Tracks   : 11
               Pads     :  2
               Text     :  6
               Symbols  :  3
               Holes    :  2

Board size   :  3.142,1.406

K. Centre print      L. Start print
M. Save setup        N. Restore setup
P. Compensation      Q. Quit to DOS

Enter option :          Print will fit

A. Output to         :  File
B. Resolution        :  300 Dots /
C. Copies            :  1
D. Output layers    :  Together
E. Scale             :  1.000
F. Pad holes         :  Avoid
G. Pads only        :  No
H. Paper size       :  A4
I. Print offset     :  0.000,0.00
J. Print from       :  0.000,0.00
                   to  :  3.142,1.40
O. Change input file

                                Layers
                                0  1  2  3  4  5  6  7  8  9
                                Printed Not Printed

```

If you have a printer option A is LPT1 COM1 COM2 so you can tell it where the printer is plugged into, and proceed direct to printing it by 'L'. If you need to change the size of the print to compensate for size corruption then use 'E' I found this unnecessary for the three printers I tried. The layers option may need to be experimented with Layer 0 should be the silk-screen print of how to place components. Layer 1 should be links on a single sided PCB and component side tracks on a double sided PCB layer 9 should be the underside tracks. From this it follows that you should turn on only layer 9 when printing the transparency and layers 0 and 1 should be printed on paper to show you where to place the components and links. This format may not have been followed by the PCB designer and may need experimenting with on paper before you load the transparency.

## RECEIVING FILES OVER THE LANDLINE

Lets push the technology a little further if you have a modem and connect to the club BBS then PCB files are stored in the Engineering workshop. If you do not have EASY-PC then do not despair, you can find a copy of Easylase in the programme controllers office. Also in the programme controllers office you will find a copy of EASY-PC demonstration, so don't take my word on how easy it is to use try for yourself.

The files in the Engineering workshop are stored in a dual format EASY-PC and zipped HP.PCL format so if you don't own a PC you can retrieve the HP PCL zipped file on an Atari and again there is suitable Atari software in the programme controllers office to unzip the file. Sorry to owners of other computers we don't have the software to unzip the file on your machine yet, but if you do then please upload it to the BBS. If you have any EASY-PC files that could be of use to other members then please upload them, Sysops will create the HP.PCL zipped version.

At the time of going to press, the only PCB file there is on the BBS is for a Z80 CPU. This uses a 2764 and 8255 PIO, if you have been following beyond TTL then try building it and writing some software to run on it. I will award a free BATC handbook to the first person to download and build this PCB.

I hope in this way we can exchange simple single sided PCB designs that may not be viable for the club to produce. EASY-PC is written by Number One Systems and can be obtained from KM Publications. The bad news is it costs £98 Ex VAT.

## ADVANCED SOFTWARE

Having put all the above together and come up with a workable standard for files in the dual form of EASY-PC and HP PCL the world changed yet again. Number One Systems sent me a demo copy of their latest offering EASY-PC Professional. The Demo along with the full version requires 3Mb of hard disc space so my hard disc was required after all. Its not easy to review a programme from a demo version but the highlights of this programme are :- You can create schematics along with PCB layouts, as in EASY-PC, but in the professional version the two are coupled together. Having drawn the schematic you select layout and the components appear already joined together, unfortunately the tracks are all crossed in what is known as a "rats nest" and you have to sort it into a non crossing PCB. Because of the connection between the two the software is able to check for crossing or missing tracks. EASY-PC professional can also check if two of the tracks are too close together with a default of 12 thou that can be user set. Also on the demo disc was a demo copy of Analyser and Pulsar the former will plot the frequency response and gain of any circuit diagram you care to key in as a schematic. Pulsar plots pulse chains at definable points and is used for debugging digital circuits. Both these software packages have already been reviewed in CQ-TV so I will not repeat the information, you can buy the back issues. It is enough to say that the packages can be all called from within each other so it is a simple task to draw your circuit in the schematic mode and then check it out in Pulsar or Analyser, if all is well proceed to layout and sort out the "rats nest".

If you would like to play with the the demo version of EASY-PC professional, It can be found on the BBS in the programme controllers office.

## GETTING AROUND COMPATIBILITY

The only problem is compatibility, EASY-PC professional will import EASY-PC files, but not the other way around. So, if you upload EASY-PC Professional files please indicate to Sysops that they are Professional files and can not be imported into EASY-PC or printed with EasyLase, the answer maybe to download the zipped



HP.PCL file and unzip it. The software to unzip (PKUNZIP) is again in the programme controllers office. You can print it, using the dos command:

COPY B:\path\file LPT1

As the professional version of EASY-PC is £195 Ex VAT it may not be a problem. Pulsar Professional and Analyser professional are both optional extras at a further £195 each Ex VAT. These prices may seem steep to Amateurs who do things for fun, but if you are a working engineer they would soon pay for themselves in saved time, they are very impressive pieces of software. They also appear in non professional versions at £98 Ex VAT each, and upgrade packages are available to enable them to be upgraded to the professional versions when funds permit.

My thanks to Don Peel who bought me a pint and explained how to make the transparent gel, to Mike Wooding who negotiated the distribution of EasyLase to BATC members, and all who have contributed to the debate on the BBS on how to get a PCB interchange system. Any problems my Mail Box is always open.

*All Number One Systems products can be obtained ex-stock from: KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF. Tel: 0788 890365; Fax: 0788 891883.*

## TH2 IMAGING

Tel : 0843 - 223831  
Tel : 0843 - 596256

34 PRINCES GARDENS  
MARGATE  
KENT CT9 3AR



### TH2SAT Version 2.0 PC Weather Satellite Decoder - £100 + £5 P&P

TH2SAT is a software and hardware package that will allow the display of APT signals on an IBM Personal Computer (or compatible). The PC half card contains a single phono input socket, decodes all APT signals to 256 levels and samples at 4800Hz. In 1024x768 pixel video mode, each pixel is a discrete sampled value, i.e. no scaling up from a lower resolution - ideal for zooming. The input signal level is controlled directly from the keyboard (no knobs to set up or adjust). TH2 Imaging strongly recommend use of Super VGA.

- 3 Video modes supported 320x200 640x480 1024x768 - all modes 256 colours
- Synchronises to METEOSAT (including start tone), NOAA and METEOR, Zoom image facility
- Colour images with dynamic range controls and multiple palettes with specific infra red palettes
- Built-in signal level controller from keyboard - no hardware set up, Built-in brightness controller from keyboard
- Picture show facility (up to 255 image files), 3-dimensional projection with two linearity modes and three intensities
- High-pass (three intensities), low-pass and median filtering, Histogram frequency graph, image negation and inversion
- Instantaneous contrast equalisation enhancement and contrast stretching
- Unattended operation of up to 99 passes or METEOSAT frames over 2 days
- Monochrome and **full colour animation** with selectable zooming for visible or infra red images, with choice of palettes
- Animation speed, brightness and land colour controllable while animation sequence is running
- Extended memory (XMS) support for animation (greater than 10 frames/second on a 386SX 16Mhz)
- TH2SAT is a single, self-contained program - all features work with all satellite images
- Simple menu-driven system - no mouse required, PCX image translator program included

### METEOSAT Loop Yagis - from £55 + £6 P&P

TH2 Imaging supply loop yagis (complete with "N" type connector) for METEOSAT reception. They are provided as an easy-to-assemble kit.

TH2 Imaging operates on the basis of the price you see is the price you pay. There are no **hidden extras** or **additional charges**. Postage rates apply to UK. Prices apply to BATC members only.

# A Simple Low-cost 23cm Line Amp

Dave Clarke G7KAO

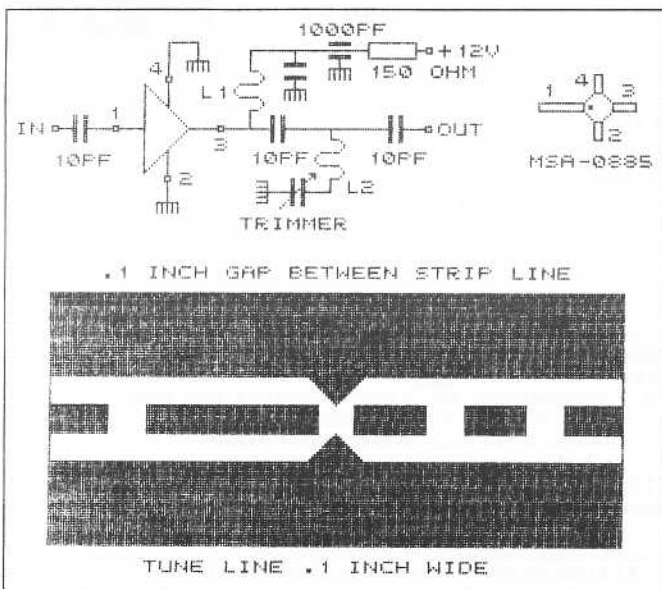
I find that most amateurs use a preamplifier at the mast-head or as close to the aerial as possible. The problem then is that a proportion of the gain is lost in the feeder cable. So, rather than using another costly GaAsFET preamplifier at the receiver why not use a MMIC IC? I find that this adds at least another 'P' point on to my received pictures. Details of how to build this amplifier are given below.

I did find, however, that to reduce broadcast TV breakthrough a built-in filter was needed. The value of the LC tuned circuit may vary depending on the frequency of the local TV stations.

The MMIC used is an MSA-0885 device, with a quoted gain of 22.5dB at 1 GHz with a noise figure of 3.3dB.

## CONSTRUCTION

The PCB is cut to size (1.5" x 4") and the track layout shown below cut out using a Stanley knife or etched if facilities are available. Mount the components with their leads as short as is practically possible. The board should be enclosed in a brass or tin-plate enclosure



with N-type sockets for the input and output. The trimmer capacitor should be tuned for minimum breakthrough. If the amplifier appears to suffer from any instability attenuation may be required on the output.

For more information on MMICs and their use refer to the 'Microwave Handbook'.

# Beyond TTL

**Trevor Brown G8CJS**

*No Machine code this time just Basic, TTL and a circuit you may have seen before !*

In the Introduction to Amateur Television we covered how to build an ATV repeater using a Spectrum Computer. The circuit as it appeared had a couple of minor bugs, an omitted inverter and an 'AND' gate with incorrect pin numbering. The software also had a line of programme missing I am indebted to John Ashton G4NTS for debugging it and producing the new listing.

The Software was written in basic so for those of you who have not yet got to grips with machine code, this will give you a chance to mix TTL logic and Basic. As it was necessary to reproduce both the circuit diagram and the software, so you can all update your books, I have taken the liberty of adding some condensed text so as to make it into a complete article for those of you who have not read the book yet.

The first problem the Spectrum computer is that it has no video output, only RF. This is fixed by a simple modification in Fig.1, but it does mean delving into the inner workings of the computer. The little tin box that is the RF modulator is located at the rear left hand corner. Open up the modulator and insert a 470pf capacitor in the lead from the modulator circuit board to the phono socket centre pin. This capacitor acts as a DC block between the phono socket and the modulator. Now we can add the rest of Fig.1, the BC109 mounts outside the can, the base connects to the video in terminal on the can, the collector connects to +5V also on the can. The emitter connects via the 150 $\Omega$  to the can itself. The 75 $\Omega$  resistor connects the emitter to the phono socket, there is a hole in the plastic block to allow the resistor through into the can. What we have now done is leave the RF connected to the phono socket, but via the 470pF. We have also buffered the video in to the modulator with an emitter follower and fed it via a 75 $\Omega$  build up resistor again to the phono socket. The Phono socket now has both video and RF, the computer can be plugged into either a monitor or a TV set.

Now we have both video and audio available on the rear of the spectrum suitable for driving the 24cm transmitter via the relaxed contacts of the repeat/beacon relay. The Logic in Fig.2 can now be put together using a small piece of Veroboard. The connections to the rear of the Spectrum have been kept to a minimum.

The logic uses only four integrated circuits. The connections to the Spectrum edge are via the appropriate socket that fits the PCB connector situated on the rear of the

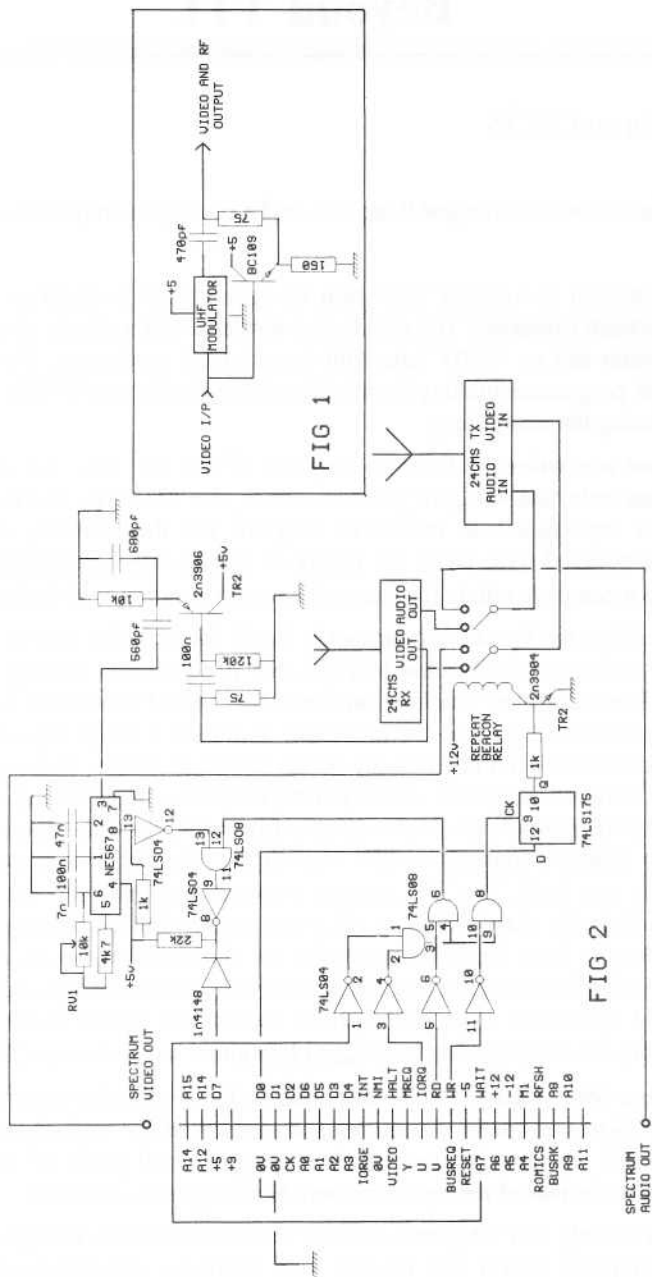


FIG 2

computer. The +5 supply can be taken from the computer as there is sufficient reserve for RS232 add-ons and micro drives. In their absence the low power Schottky logic and NE 567 will not overload the computers internal +5 volt regulator. The +12 for the relay would best be derived from an external source as the Spectrum power supply at best manages about 10 volts under load and finding a reliable relay to operate under these conditions may be a problem. The relay switches between Spectrum sound and video, and the 24cm receiver's sound and video.

The Spectrum needs to be aware that someone is trying to access the repeater. This is accomplished by looking at the video output of the receiver and deciding when a video signal is present. This is accomplished by TR1 which is a sync separator, it is biased in such a way that it only conducts on the negative excursion of the composite TV waveform. The waveform on the collector of TR1 has inverted sync pulses and little or no video. This waveform is passed to the NE567 tone decoder via a small 560pf capacitor. The free run oscillator of this decoder is set to 15.625 kHz in the UK (625 line speed) by adjusting RV1. When the NE567 receives pulses of the correct frequency it will present a logic 0 on pin 8.

The computer software is constantly pulsing A7, IORQ, and RD low. This enables the 'AND' gate to pull the computers D7 bit low via the diode in the presence of video. The software will respond to this logic 0 by energising the relay and putting the receiver's outputs to the transmitters inputs

This is achieved when the computer puts a logic 1 on D0 at a time when A7 WR and IORQ are all low. This high logic state on D0 is latched in the 74LS175 and as such will turn on TR2 and energise the repeater/beacon relay so that the repeater goes into the repeat mode.

The software will now monitor the tone decoder to ensure the incoming video remains, and will also time the over. If the video disappears the computer will send D0 low at a time when A7 WR and IORQ are also low and thus latch a logic 0 into the 74LS175, switch TR2 off, and relax the repeat beacon relay, to put the computer's sound and vision on air. A 'K' will be sent on both the screen video and via the computers audio channel in CW. If a response from the the tone decoder is not forthcoming indicating the continued absence of video, then the software will respond by sending out the repeaters callsign both as video, and as a CW ident. If the incoming signal times out rather than drops out the repeater will drop into beacon mode and again identify itself. The software will also generate periodic idents in the beacon mode to identify itself and comply with UK licensing laws.

The software is reproduced as a listing that can be easily typed into the Spectrum and run. It is in a skeleton form, and although it will run, it would benefit from some customising. The CW ident is self explanatory. Line 280 can be replaced with block graphics to produce a full screen "K". The same goes for line 20 where again block graphics can be used to produce a more impressive beacon mode screen.

I hope this simple setup for a repeater will prove useful as a back up logic or as a get on the air quick for new repeaters. It is also intended as a more serious exercise in mixing TTL and software, in what can be a very rewarding way.

## BASIC SOFTWARE LISTING

```
5 LET a=120:REM SET TIMER
10 OUT 127,0:REM BEACON MODE
20 PRINT AT 10,10;"GB3ET"
25 REM CW IDENT
30 BEEP .4,6:PAUSE 5
40 BEEP .4,6:PAUSE 5
50 BEEP .1,6:PAUSE 25
60 BEEP .4,6:PAUSE 5
70 BEEP .1,6:PAUSE 5
80 BEEP .1,6:PAUSE 5
90 BEEP .1,6:PAUSE 25
100 BEEP .1,6:PAUSE 5
110 BEEP .1,6:PAUSE 5
120 BEEP .1,6:PAUSE 5
130 BEEP .4,6:PAUSE 5
140 BEEP .4,6:PAUSE 25
150 BEEP .1,6:PAUSE 25
160 BEEP .4,6:PAUSE 100
190 REM LOOK FOR SYNC
200 LET b=IN 127:IF b<=127 THEN GO TO
240
210 LET a=a-1:IF a=0 THEN GO TO 5:REM
DEC TIMER IDENT IF ZERO
220 PAUSE 50:GO TO 190

240 REM REPEAT MODE
250 OUT 127,1:
260 LET b=IN 127:IF b<=127 THEN GO TO
330
270 OUT 127,0: REM BEACON MODE
280 PRINT AT 10,10;" K "
290 BEEP .4,6: PAUSE 5 REM CW K
300 BEEP .1,6: PAUSE 5
310 BEEP .4,6: PAUSE 300
320 LET b=IN 127:IF b<=127 THEN GO TO
240
325 GO TO 5
330 REM DEC TIMER
340 LET a=a-1:IF a=0 THEN GO TO 5
350 PAUSE 50:GO TO 240
```

## Good Vibrations ... and Black Thoughts

Not even the worst efforts of the drizzle could put a dampener on this year's convention at Harlaxton. Everyone who attended seemed to have a good word for the whole effort (and the organising team), and with more than 1,500 visitors through the gates, that means a lot of satisfied people (apart from the many spiders cruelly made homeless by Gordon Sharpley G3LEE to display his old camera - too bad if this means nothing to you, you should have visited the display inside the BATC demonstration bus!).

But... strange to relate, murmurings were heard among some BATC committee members - people who never normally say anything untoward in public. What on earth were they muttering? Well, it seems that a few (fortunately it is only a few) members are expecting, even demanding, more than the club is able to deliver.

Perhaps the good-natured and understanding membership would remember that all the club's operations (membership, publications, supplies and events) are carried out on a voluntary, unpaid basis and as a pastime for a hobby organisation. The work is done by a small number of dedicated people giving up their spare time when they could be with their families, earning real money on overtime or even playing ATV. They do it month in, month out, too. Is it because they enjoy it? Is it because they crave for recognition. Are they megalomaniacs? Hardly, it's more that they just feel it is right to put something back into a hobby which has given them a lot of pleasure.

Sadly, though, a few club members are under the misapprehension that their subscription 'pays' for the 100-page magazine they receive regularly every three months. It doesn't, of course; what that subscription does is put money into the pockets of the Post Office and into the pockets of Apex Printers; but it doesn't pay a penny for the work that goes into the magazine and it barely covers the cost of running the club.

On the one hand, it is flattering that members expect a professional standard of service from the club, and of course, the club's officers try to provide this - but within the constraints of voluntary effort. On the other hand, it is disappointing that a minority of members demand a level of service that even a profit-making organisation would be hard pressed to provide.

Phone calls with technical queries at eleven o'clock at night are out of order (that's why we say in the phone numbers list please don't call at unsocial hours). It is also unreasonable to ring up in the middle of a weekday, demanding to know why a certain board is not ready, wanting paperwork faxed to them the same day or to berate contributors over their articles.

Remember: all effort in the BATC is purely voluntary and must be treated as such.

Of course, the vast majority of members are a very understanding and generous crowd and appreciate what the club's officers do for them. It's a pleasure serving them and the good atmosphere at events like Harlaxton is its own reward. Prices are held lower than at other rallies and swapmeets, and everyone has a good time. So let's keep it that way and treat each other with respect and understanding. We have a great hobby and a great society - long may this happy state of affairs last!

--- Your Committee.

---

## GB3PV PROGRESS

### Ian Waters G3KKD

The Cambridge 23 cm Amateur Television Repeater GB3PV, built by the late Godfrey Spires G4XHM, went on the air from the Madingley site in June 1987. Allowing for some outages for servicing it has given a reasonably reliable service. Its quality of performance has however proved to be inadequate. There are two main problems and some minor ones.

The main problems are:

- \* The receiver became deaf, or should one say blind? In January 1992 it was replaced as a temporary measure by a receiver kindly loaned by Phil G4BIK.
- \* The diplexer, for single antenna working, has an inadequate bandwidth for television and an inadequate transmitter/receiver isolation. The bandwidth results in a low sound carrier level and an inability to repeat colour. The isolation causes receiver desensing.

The minor problems are:

- \* There is only one beacon mode test card which is not in colour.
- \* There is some low frequency video distortion which can cause sync tearing on some receivers.

In January 1993 it became possible to address these problems seriously and a small working party was assembled consisting of Phil G4BIK, Dave G8LHD, Andy G6OHM, Ian G1NOO, Sid G6FKS and Ian G3KKD.



At the time of writing:

- 1 A completely new receiver is nearing completion. It consists of parts taken from a Telecomm L700 front end together with broadband MMIC RF and IF amplifiers and a Camtech IF and demodulator assembly. It is intended to employ a HEMT front end for the best possible receiver noise figure.
- 2 A completely new diplexer has been made. This uses the circulator released recently by the rebuilding of the GB3PS diplexer together with two bandpass filters. The filters are very high quality 7-pole combline units which the writer was fortunate to find in a junk sale at a small fraction of their real cost. The new diplexer has an adequate bandwidth of 26 MHz and an isolation of about 96dB.

The existing transmitter, feeder and antenna are satisfactory and will not be changed at this stage, but in the longer term an additional transmitter P.A. stage could be added to bring the repeater output up to the full licenced ERP of 25 watts. The ERP is at present 2.5dB below the licenced level and unfortunately some additional loss associated with the new diplexer will reduce this further.

On the baseband side, also in the longer term, it is intended to replace or modify the logic etc. so that a sequence of colour test cards can be radiated when in the beacon mode. Pages of text, which can be up-dated as required, can also be added to give details of the repeater service, etc.

It is anticipated that GB3PV will have to be taken off-air for a few weeks in about June/July after which a significantly improved service should be available. Phil may even get his receiver back!

So watch this space, or better still watch RMT2 on 1318.5 MHz for further developments.

---

***DON'T FORGET***

***REGISTER YOUR REPEATER GROUP AS AN AFFILIATED  
BATC GROUP AND GET THE FULL BENEFITS OF BATC  
BACKING, INCLUDING SUBSIDISED PCB'S, TECHNICAL  
HELP, LICENSING HELP ETC.***

***SEND YOUR GROUP'S DETAILS TO BRIAN SUMMERS***

## Just a few lines ... Vintage Wireless

Review

### Mike Wooding G6IQM

I must apologise to the British Vintage Wireless Society for the long delay in reviewing these excellent publications, but as you all know (I hope!) I am just a little busy at times, and during the past year even more so with the new Club handbooks and my own magazine). However, better late than never.

Firstly, the Bulletin of the British Vintage Wireless Society 'VINTAGE WIRELESS'. I think that the Society and its Bulletin perhaps is best summed up by repeating here the quotation on the front cover of issue No.2 of Volume 18:

'Sir Edward Elgar, whose music was broadcast by the BBC from the earliest days, was a keen listener too. He is pictured here in 1929 with his new Marconiphone type 39 set....'

This quotation and accompanying front-cover photograph of Sir Elgar set the scene for the Bulletin. The Society and its bulletin are devoted to the history of Wireless and Television and as such have a wealth of knowledge and information and archive material on the subject.

For further information on the British Vintage Wireless Society please contact the Membership Secretary: Gerald Wells, Vintage Wireless Museum, 23 Rosendale Road, West Dulwich, London, SE21. Tel: 081 670 3667.

### Just a few lines

Again, quoting from the front cover of this special publication:

'The birth an infant years of BBC Television - a personal memoir by T.H.Bridgwater OBE, sole survivor of the original technical team which began it at Broadcasting House in 1932.'

That statement epitomises the content of this historical publication. Just a few lines was published in August 1992 by the British Vintage Wireless Society to mark the Diamond Jubilee of television broadcasting by the BBC, which, of course, is also the Diamond Jubilee of television broadcasting in the U.K.

Another quotation from the London Evening News dated August 22nd 1932 opens the book:

'Today August 22, 1932 will be a date long to be remembered in the annals of wireless, for it will mark the beginning of practical television transmissions - the

radiation of pictures of moving objects and artists by wireless, as sponsored and controlled by the BBC. These transmissions, as distinct from those of an experimental character which have been conducted in the past, will be the first entertainment broadcasts in the British Isles'

Thus, this book will serve as a reminder to those who were 'there' at the time and have since mislaid those memories and for those of us who were not 'there' will serve as a historical document. The booklet is full of original photographs and has a very interesting and detailed explanation of the original studio. A must for all devotees of the Television art!

*Just a few lines costs £5+ 0.75 p&p and is available from KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF. Tel: 0788 890365; Fax: 0788 891883.*

---

## PROSAT II - Weathersat Software

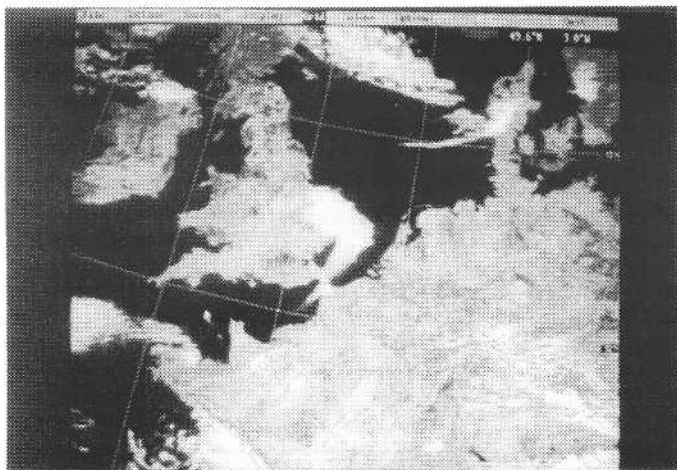
Review

### Mike Wooding G6IQM

PROSAT II is a weather satellite receive package for the IBM PC and compatible computers. It is a full-featured system for the reception of Meteosat and NOAA, Meteor and OKEAN transmissions with the optional PROsat NOAA receiver and aerial.

The system is supplied as a package, comprising an interface card to install into the computer, the software on 3.5" or 5.25" discs and a user manual. The interface card simply fits into any free 8 or 16-bit expansion slot in the computer, and all connections to the receiver are made via the sockets accessible, as usual, on the rear mounting bracket of the card. The input-level adjustment potentiometers are also accessible via the rear mounting bracket, thus facilitating on-line adjustments without dismantling the computer.

Once the interface card has been installed the software is be loaded. Following the instructions in the user manual and the on-screen prompts, this is simplicity itself, a mark of most modern software packages. The various questions 'asked' on-screen during the installation set the main parameters of the system, such as display type and screen mode. If the answers to any of the questions are not known then the manual offers default answers, which will at the very least get the system running, albeit perhaps not at its best. Fine tuning or changing any of the various parameters is always possible at any time.



Note: like all modern software systems PROSAT II requires a large amount of hard drive space; ensure that you have a minimum of 6MB of free space before installation. To run the system at least 5MB of free disc space must be available.

Having installed the card and the software the system is ready to go. Connect the appropriate receiver, a METEOSAT/GOES/GMS and/or a NOAA/SCANNER receiver, into the interface card, using either the supplied cable or one made up according to the wiring instructions given in the manual. Once the connections have been made and a satellite signal is being received then the level program is run by typing LEVEL at the command prompt (ensuring that you are in the PROSAT directory of course) and then adjusting the appropriate potentiometer on the card (accessible from the rear bracket as previously mentioned) for the receiver in use so that the on-screen reading peaks at around 240 to 250. The receive level is now set up.

The main program is now run by typing MENU at the command prompt. This results in the master menu being displayed on the screen, which allows selection of the various programs. Selecting a program is facilitated either by double clicking the mouse in the appropriate screen area, or by typing the first letter of the program name and pressing return. Exiting any of the programs returns to this master menu.

The main menu offers a selection of four programs:

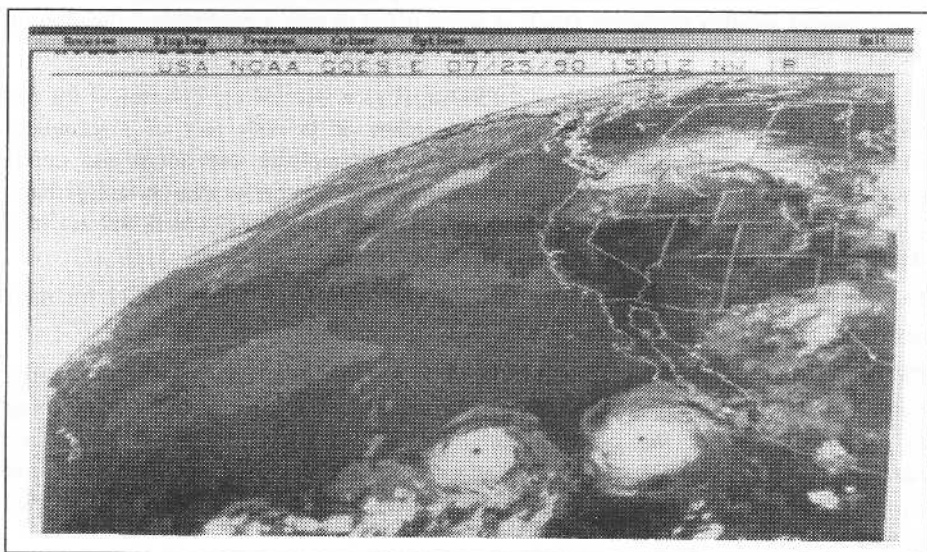
- Geostationary;
- NOAA/Polar;
- Animation;
- Track II.

**GEOSTATIONARY:** Selecting this menu operation runs the VGASAT IV program, for the reception and display of images from the Meteosat, GOES and GMS satellites. The program is displayed on-screen with the selected image full-screen with a menu bar across the top. There are too many features to the program to go into any depth here, suffice it to say that images can be received and displayed, saved to disc, manipulated with colour palettes, printed, etc. The zoom feature allows you to zoom in and out of the images and various processes are available to reduce noise, adjust for best contrast and enhance the image.

**NOAA/Polar:** Selecting this program runs the software for the reception, etc., of the NOAA, METEOR, OKEAN and Fung Yen satellites. The features are much as for the geostationary program, but with the main exception of being able to read the temperature directly from any NOAA satellite, by simply positioning the mouse pointer over the area in question, the temperature at that location is then displayed on-screen.

**ANIMATION:** This selection allows you to animate up to 100 full screen frames. Images from the satellite can be automatically received and displayed. Previous images are automatically deleted and updated with new images and the system is completely flicker-free. The facilities of this program include the ability to zoom into any area of an image and checking the amount of free memory in your computer and relating that to the maximum number of images that can be animated.

**TRACK II:** Selecting this menu operation resulted in the on-screen message 'TRACK II not currently installed, available from Timestep.....' So, if you want to know what it is you have to buy it!



## Conclusions

Firstly, I must point out that for this review I only ran the software package and did not receive any pictures live off air, using only the images supplied on the discs.

I found the system extremely simple to install, just following the on-screen prompts and answering the basic hardware questions, and the system was loaded. Typing MENU then presented me with the 'windows' type menu display from which the four programs described can be run. Not wishing to type menu at the DOS prompt whenever I want to run the system I loaded it as a DOS application under WINDOWS 3.1, installed it in to one of my Windows Groups and ran it from there without experiencing any problems.

Manipulating the images in either of the main programs was quite easy once I found my way around the menus, all of which are the now familiar 'drop-down' type found in most good software packages these days, and make for very 'user-friendly' systems.

The zoom facility was very impressive, with the ability to zoom down to quite small areas of the image, although to actually get down to really useful image areas (i.e. to enable you to differentiate small towns, rivers, etc.) then a very much higher resolution system such as Timestep's HRPT system is required. However, for the purposes of weather prediction and monitoring then PROsat II's zoom capabilities are excellent.

As mentioned previously, one of my favourite features of the system is the ability with NOAA images to read the temperature of the planet's surface anywhere in the displayed image. This, coupled with a knowledge of weather pattern movements, which could be obtained by running the Animate program, would surely give even the most amateur weather predictors (such as yours truly) to give a creditable indication of things to come!

In a nutshell, I can wholly recommend PROsat II as a worthwhile investment for the dedicated and advanced weather satellite watcher. It is only part of a complete weather-watchers system of course, a receiver, preamplifier and aerial and aerial tracking system of course being required to complete a weathersat station, but perhaps the computer end of the system may be the most important and PROsat II will act very successfully as that.

I would like to thank Dave Cawley of Timestep and Henry Neal of RIG for their assistance and for the loan of the PROsat II system for the review.

*PROsat II is available from Timestep Weather Systems, Wickhambrook, Newmarket, CB8 8QA, UK. Tel: 0440 820040; Fax: 0440 820281. The price at the time of going to press was 199 for the system including VAT and UK carriage, VAT and Air carriage to EC countries, duty but not sales tax or carriage in N.America, Air carriage but not duty or tax to other destinations. Please contact Timestep for full details.*

# PLL SYNTHESISED 70cm

**Chris Smith G1FEF**

## INTRODUCTION

I have recently been playing with old BSB receivers, converting them to D2-MAC and whilst doing the Philips I came across the PLL IC they use to tune the front-end. It is a GEC-PLESSEY device, SP5510. After obtaining data on this chip, I realised how useful it is. The device is capable of locking a VCO from 50 MHz right up to 1.3 GHz all on its own! It also has four output only ports and four bidirectional ports, one of which is also a 3-bit analogue to digital converter. The device is controlled via the 2-wire I<sup>2</sup>C bus, so pin count is kept to a minimum (18-pin DIL).

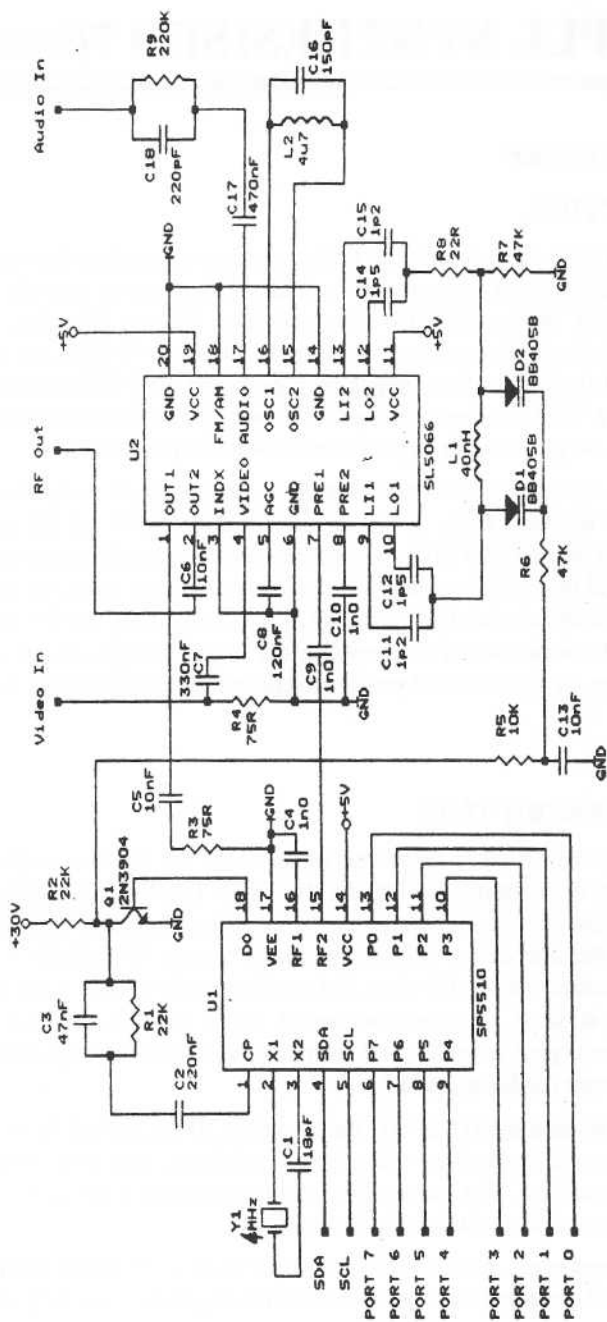
The following circuit is a two chip solution to generating an accurate and stable AM TV signal for 625-line PAL. It will generate about 80uV of RF into 75Ω, from 400 MHz up to around 800 MHz, it also can produce tuneable intercarrier sound. So this circuit could be used for piping TV signals around your home on cable. In fact the second IC, SL5066 (another GEC-PLESSEY device) is designed for just that purpose. Disable the intercarrier sound and amplify the output though, and it makes an ideal source for 70cm. In fact it would make a useful bit of test equipment without boosting the output.

## CIRCUIT DESCRIPTION

U1 is the PLL chip, it takes command signals over the I<sup>2</sup>C bus on pins-4 and 5, the crystal provides its reference for locking the VCO. The VCO is contained within U2, this chip also contains the intercarrier sound oscillator (tuned by L2 and C15). U2 will FM modulate the intercarrier sound from audio on pin 17 and place it on the main carrier at the correct level. U2 also AM modulates the main carrier from the video signal present at pin-4. A small amount of RF is fed out of pin-7 to U1, this is compared to the crystal reference and steers the VCO into lock by altering the voltage on the two varicap diodes across L1.

The crystal is divided by 512 in U1, the incoming RF is divided by 8 before going to a 15-bit programmable divider, this gives a minimum step size of 62.5 kHz when using a 4 MHz crystal. This means there are 16 steps per 1 MHz, a nice round figure and more than enough resolution for TV work.

L1 is a self supporting inductor, about 2 or 3 turns of 18 SWG should work, but it depends on the layout and experimentation is the key here (especially if you want it to



70cm PLL Synthesiser



tune up to 900 MHz). L2 and C15 can be any combination that tunes to 6 MHz, providing the Q is greater than 20 it should work. The sub-carrier oscillator in U2 will oscillate from 4.5 MHz to 6.5 MHz.

## CONCLUSION

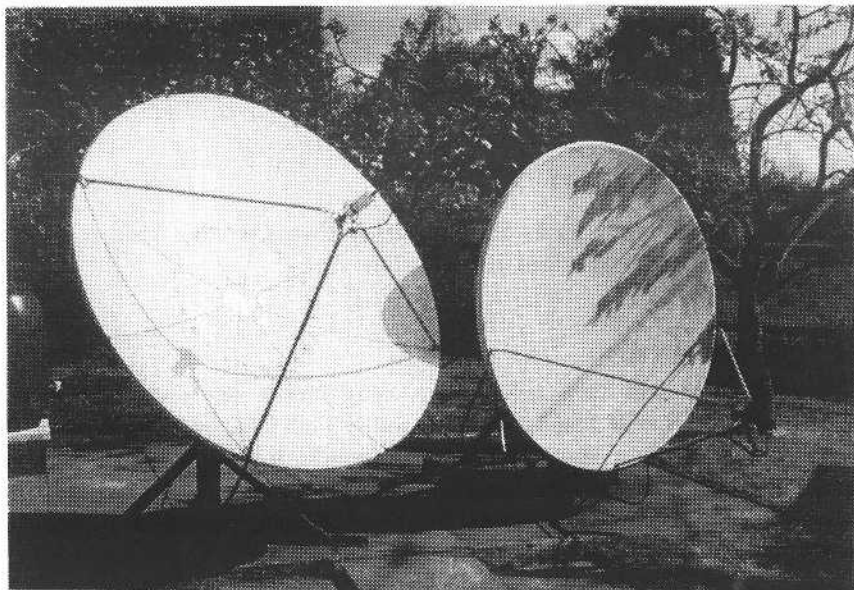
The circuit can be controlled via the PC bus and I have designed a module that will allow you to tune up and down the band, as well as display the frequency currently tuned to. The design for this should appear in the next issue of CQ-TV. In the mean time anyone interested should contact me on 0933-58220. A PCB for this project and the control module is available.

I am currently working on a 23cms PLL ATV transmitter and receiver using the SP5510, so watch this space!

## REFERENCES

GEC-PLESSEY Consumer IC handbook September 1991

---



**Dish installation at Paul G3TZO's (Satellite News) QTH**

# SATELLITE TV NEWS

**Paul Holland G3TZO**

*Welcome to another edition of "Satellite TV News". This issue reflects on the successful launch of ASTRA 1C and provides a report on some of what could be seen at the Satellite and Cable Industries annual trade show held at Olympia back in April.*

## **HARLAXTON**

There will no doubt be other reports in this issue of CQ-TV regarding the BATC convention in May. Suffice to say that despite the soggy weather there was a considerable amount of equipment on display from the various traders to interest the TVRO enthusiast. Much in evidence were the redundant BSB receivers from Ferguson, Philips and Tatung.

Still on sale and incredible value were the Matsushita "Squarials" which could be picked up for a few pounds. For those wanting to build up a basic system or a second system with which to experiment there was a considerable choice of system components including unpainted spun aluminium dishes up to 1.2M in diameter. Many of the traders carrying Satellite TV components who were present at Harlaxton also do the Mobile Rally circuit so keep your eyes open!

## **CABLE & SATELLITE 93**

This trade only show is now in its 5th year and is always worth a visit. A selection from what was on view is described in brief below:

### **PACE - MSS1000 Receiver.**

This receiver which will be launched this August breaks new ground by offering Dolby Pro Logic Surround Sound. An IRD it offers both PAL and D/D2Mac options and has both Videocrypt and Eurocrypt capabilities. It has multiple smart card readers, a built in positioner, 250 channels, on screen graphics, dual LNB input, and electro magnetic or electromechanical polariser control. No price has been announced as yet.

Pace Electronics, Shipley, Yorks. 0274 532000

### **EGIS-OFFENBACH - Bi-Axial Antenna Rotor**

This bi-axial positioner will enable tracking of geosynchronous and inclined orbit satellites together with weather and OSCAR satellites that are not in geostationary orbit. The positioner allows for 90 deg elevation and 360 deg Azimuth positioning. It has an RS232 computer interface, receiver AGC interface and accompanying control unit. It currently has 87 orbital locations stored in memory. Installation is achieved by inputting your latitude/longitude and then peaking reception on a known satellite position (such as ASTRA) by adjusting the elevation and azimuth controls on the indoor control unit. After inputting which orbital position has been set the controller then automatically tracks the antenna from East to West stopping at each preprogrammed position with no further adjustments required whatsoever - Magic ! ..... but not cheap (about 300 pounds)

EGIS OFFENBACH GmbH Offenbach/Main 010 49 69 858327

### **CHAPPARAL - VTE 4.0 Video Threshold Extender**

This was one of a number of units being demonstrated which all claim to extend a receivers demodulator threshold. This unit from Chapparal is specified to improve Threshold performance by 3dB. It sits in the IF loop (if your receiver has one - my two receivers don't) and requires 12 V DC @ 250 mA to power it. The improvement can best be seen with highly saturated colours present and is quite impressive.

CHAPPARAL - European Technical Support Centre 010 31 2207 4422 or Steve Childer Trading 081 566 7830

### **DIGITAL MUSICAL EXPRESS - Digital CD-X Audio System**

Scientific Atlanta, best known for their Broadband Cable equipment, were demonstrating a new satellite delivered music system which is due to Launch on ASTRA as a DTH service later this year. The service demonstrated currently operates from Intelsat 601 at 27.5 deg W and provides for 30 digital stereo audio channels per transponder. The equipment on show at Olympia was not of the consumer DTH variety but intended for cable head end providers. Subscribers to either cable or satellite will need a Digital Musical Terminal (manufactured by Scientific Atlanta) which provides facilities through a remote handset such as :-

- individual channel selection (30 Channels)
- identification of service i.e., CLASSICAL, JAZZ, ROCK
- identification of ARTIST, RECORD COMPANY
- volume control
- favourite channel presets
- CD Standard digital audio output (SPDIF)

The current tariff for Cable subscribers is pitched at about £10 per month. The DTH tariff will depend on negotiations between ICT Europe and B-Sky-B who are rumoured to be the likely service provider on ASTRA.

ICT Europe - 081 569 9500

## **NSL - ENHANCED DEMODULATION SATELLITE RECEIVER**

Tucked away in the corner of the exhibition was a small company demonstrating a fascinating state of the art professional satellite receiver developed initially for B-Mac reception. The key feature of the receiver on show was its ability to operate at low link margins. A comparison between the demonstrated receiver and a normal commercial DTH model was carried out on the Greek Cypriot Channels on Eutelsat II F4 at 7 Deg E. Signals on the NSL Enhanced Demodulation receiver exhibited no noise on saturated colours with good P5 pictures from both ET1 and PIK. An interesting aspect of the design is that instead of a normal PLL Discriminator the receiver employs slope detection. The following text is an extract from a paper written by P.Smolka and J Wild on the design concept of the receiver ;

'' A normal phase discriminator suffers from the presence of negative slopes on its frequency characteristic and therefore has to be built with a very wide bandwidth to operate in a linear fashion. It is the negative slopes which produce ''sparklies'' when presented with noise or over modulation. Due to rejection in the IF stages,if a linear detector without extended threshold is used in the receiver design,there will be little energy in this part of the spectrum. This is at odds with the PLL design because of the relationship between the centre of the detector characteristics and the actual FM spectrum. The PLL set up might occasionally move into the negative slope area of the phase detector,which will turn the loop gain positive. This will result not only in not just tiny sparklies, but large splashes which are typical of most extended threshold FM systems when exposed to noise levels beyond their design range. Slope detectors are more resistant to over-modulation because their are no negative slopes on their characteristic. It is therefore easier to design them as narrow band with a precise shape to their characteristics,thus reducing the problems caused by over modulation''.

If anyone would care for a full copy of the very interesting paper that this is taken from, just drop me an A4 SAE.

## **TRANSPONDER REPORT**

### **DFS 3 Kopernikus 23.5 Deg E.**

DFS 3 has now taken over from DFS 1 at this position. Transponder allocations remain as before with no noticeable difference to the signal received at this QTH.

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

The successful launch of ASTRA 1C took place in the early hours of May 12th and was carried live on ASTRA 1A TP 13 (RTL4). Early services from Astra 1C may well have started by the time you read this. Services rumoured to be carried by 1C in addition to those listed in CQ-TV 162 are Sky Home Shopping Channel (24 hr), Turner Network Channel (general entertainment channel), The Family Channel, The Womens Channel (sister channel to UK Gold), The USA Network Channel (general entertainment), The Sci-Fi Channel, HBO (subscription film channel), Viva (German pop music channel) and Cinevision (subscription film channel).

There is now a clear indication that US Cable networks such as TNT and The USA Network see significant potential for expansion in Europe and we can expect to this trend to gather pace as digitally compressed services become a reality with the launch of ASTRA 1D in 1994. The only impediment to this progress will be the issue of copyright which has held up the real expansion of Pan European broadcasting for so long.

### **Eutelsat II F1 13.0 Deg E.**

Tests of the Videocrypt clone "Enigma" took place in early June on "a channel" broadcasting on Tp 22 (11.181 GHz H). The Enigma system seems to be simply utilising the Videocrypt hardware by developing its own smart card. It seems the Enigma backers are deliberately challenging News Datacom who own and licence Videocrypt. The advent of this "hijacking" of the Videocrypt decoder technology has been taken one step further by Megasat of Germany who are now offering in Germany their SV1A "cardless" Videocrypt decoder.

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

Tests commenced in June of a new Turkish channel called ATV on TP 20 10.986 GHz (H). This service originated by a Turkish company called SATEL would appear to be uplinked by Telefonica from Spain and joins a growing number of Turkish services uplinked from outside Turkey due to restrictive regulations applied by the Turkish authorities within that country.

### **Telecom 2A 8 Deg W.**

France 2 has been replacing its normal D2Mac 4:3 service on this satellite with a service called Supervision in D2Mac 16:9. This service results from a collaboration of broadcasters and manufacturers to promote 16:9 programming. The transmission timing at present however is unpredictable and I suspect would not tempt many people to go and buy a widescreen receiver!

### **Intelsat 515 18.5 W**

The East Spot beam of Intelsat 515 has been repointed to serve selected areas of Central Europe and the Western parts of the CIS.

### **Olympus 19 Deg W.**

A new narrowcast subscription channel commenced in May called Setanta Sport. Initial transmissions were in PAL with no encryption. The programming consists mainly of Gaelic Football and is intended for pubs having large numbers of Irish customers. Reception at this QTH is P4 on the 1.5 M offset antenna.

### **TDF 1/2 19 Deg W.**

It is possible by now that France 2 will have ceased transmissions from this satellite. Rumours have also emerged that MCM was to have gone to full encryption about the same time. Intelsat K 21.5 Deg W. Due for launch by a company called Taurus during the summer were two Spanish channels forming part of a 5 channel package entitled "Canal Hollywood". Uplinked from the US and intended for Spain the initial channels will be transmitted using General Instrument's DigiCipher digital compression standard. The DigiCipher uplink encoder, manufactured by GI's VideoCipher Division, is capable of handling up to 6 channels on a single transponder and uses an integrated DigiCipher receiver decoder at the cable head end.

### **Intelsat 601 27.5 Deg W**

As predicted in CQ-TV 162 a new cable only channel, Wire TV, appeared in early May. The channel uses TP 74A 11.515 GHZ (H) in full transponder mode and is P5 at this QTH. Look out for a service called ASTV (Anglo Saxon TV) which was due to have launched around July. This service is linked to the old Lifestyle Channel formerly on ASTRA 1A and is due to show similar programming.

### **Hispasat 1A 31 Deg W**

Hispasat 1B is due to launch in October to provide the full service that Hispasat 1A has failed to deliver. Due to a malfunction on the spacecraft the beam focus was centred in central France rather than Spain ! The Hispasat 1A owners have therefore been offering the spare capacity on Hispasat 1A to non Spanish users.

### **Intelsat 504 31.4 Deg W**

Intelsat have announced the re-location of this satellite from 41.0 deg W to this new position serving the Atlantic Ocean Region (AOR).

## **INTELSAT NEWS**

Intelsat have placed contracts for both Series VII and VIII spacecraft. The series VIII satellites are planned to serve the Pacific Ocean Region and have 38 C Band transponders with power levels of 36 dBW. Delivery of Intelsat 802 will not be completed until January 1996. Both Intelsat 801 and 802 will be launched by Arianespace in 1996 and will have an operational lifetime of 16 years. The nine planned Series VII craft have 26 C Band and 10 Ku Band Transponders with Intelsat 701 due for launch by Arianespace in October of this year.

## **PROFILE ASTRA 1C**

### **Launch Information:**

Launch Contractor Ariespace (Flight 56) Launch Slot May 1993 Launch Vehicle Ariane 4 Launch Site Kourou, French Guiana Launch Mass 2790 kg

### **Orbital Information:**

Manufacturer Hughes (HS601 Platform) Location 19.2 deg E Stabilisation system 3 Axis type Expected lifetime 15 years Total power consumption 3300 W

### **Transponder Information:**

Transponder capacity 18 TWTA output power 63 W Nominal EIRP 52 dBW Eclipse protection 18 transponders Transponder bandwidth 26 MHz Full back up for ASTRA 1A

|                   |                                |
|-------------------|--------------------------------|
| Channel Capacity: | 34                             |
| 10.90 - 10.95 GHz | 2 channels                     |
| 10.95 - 11.20 GHz | 16 channels                    |
| 11.20 - 11.45 GHz | 16 channels (Astra 1A Back-up) |

The footprint data released now by SES and reproduced here on the following pages, shows a considerably enlarged area served by 60 and 80 cm antennas and allows for reception across the whole of the UK mainland with a 60 cm antenna.

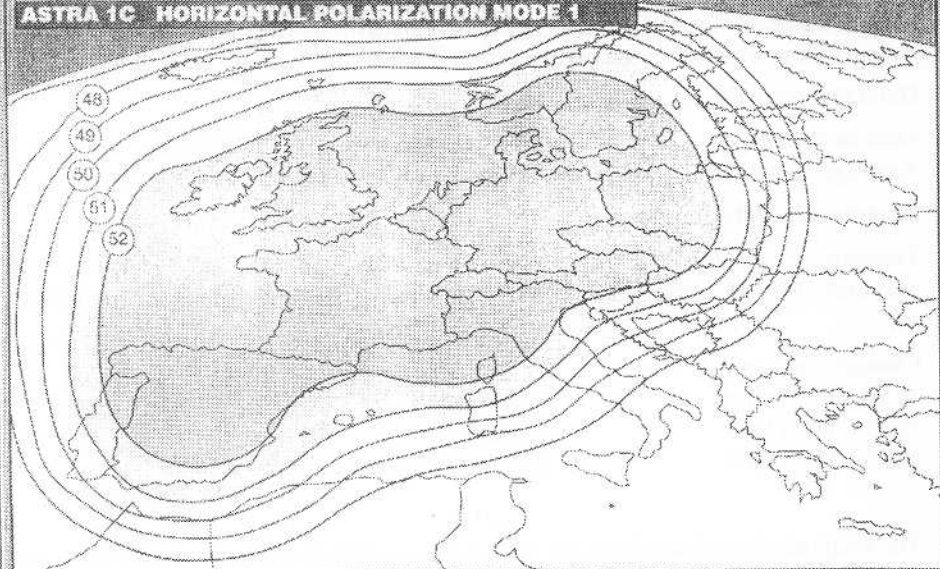
Astra 1C offers broadcasters on Astra 1A full backup protection in the event of a transponder failure and will generate considerable interest in receivers that can tune down to 900 MHz to receive the two cable only services. I understand that the two channels concerned are another Filmnet service and the Dutch RTL5 . They will be found on TP 63 10.920 GHZ (H) and TP 64 10.935 GHZ (V).

## **ARSENE**

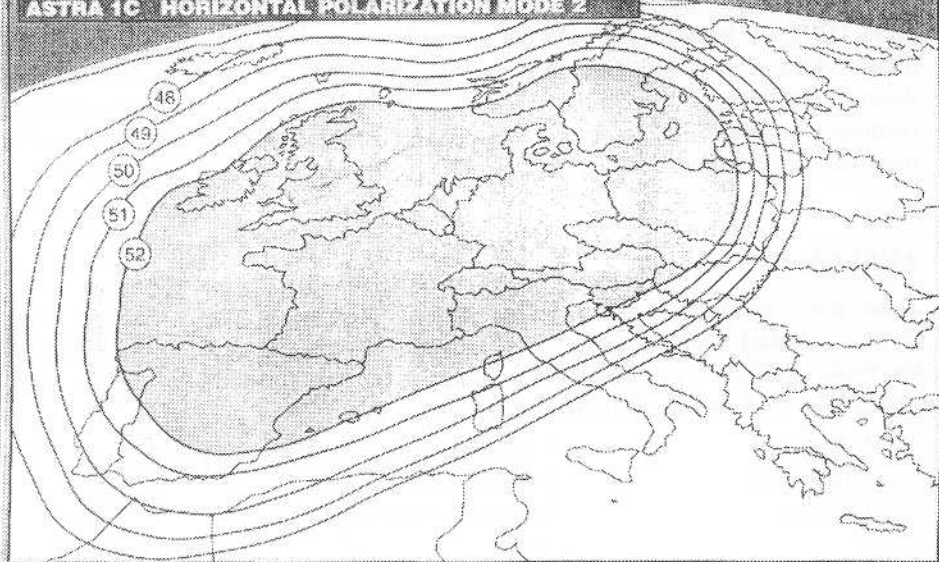
Those active in amateur satellite communications will know that Ariespace Flight 56 also launched the new ARSENE spacecraft. This amateur satellite was funded by the Radio Amateur Club de l'Espace (French) and piggy backed on the Astra 1C launch. The payload for ARSENE is as follows ;

|           |                           |
|-----------|---------------------------|
| S Band:   | 1 transponder 2.446 GHz   |
| VHF/UHF:  | 145/435 MHz               |
| Circuits: | 3 channels AX 25 (packet) |

**ASTRA 1C HORIZONTAL POLARIZATION MODE 1**



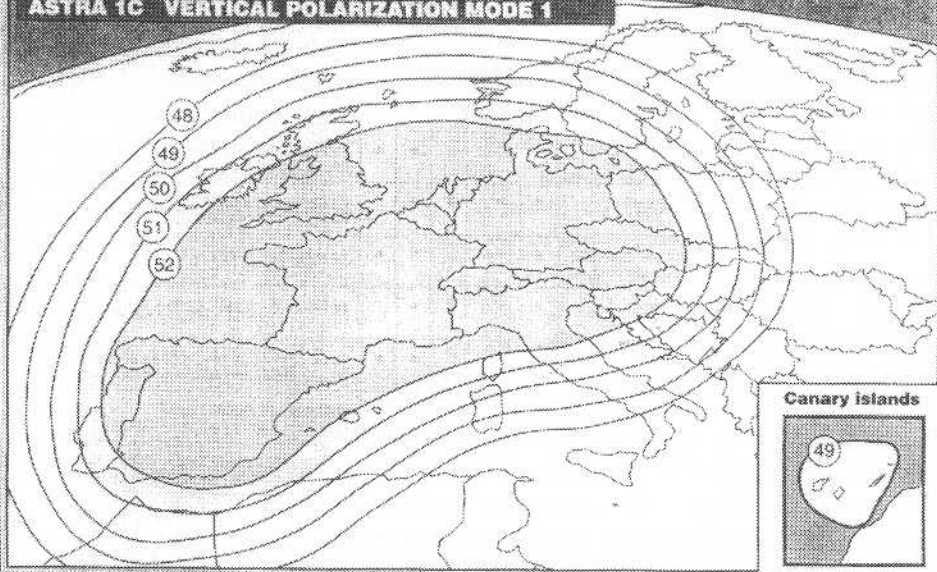
**ASTRA 1C HORIZONTAL POLARIZATION MODE 2**



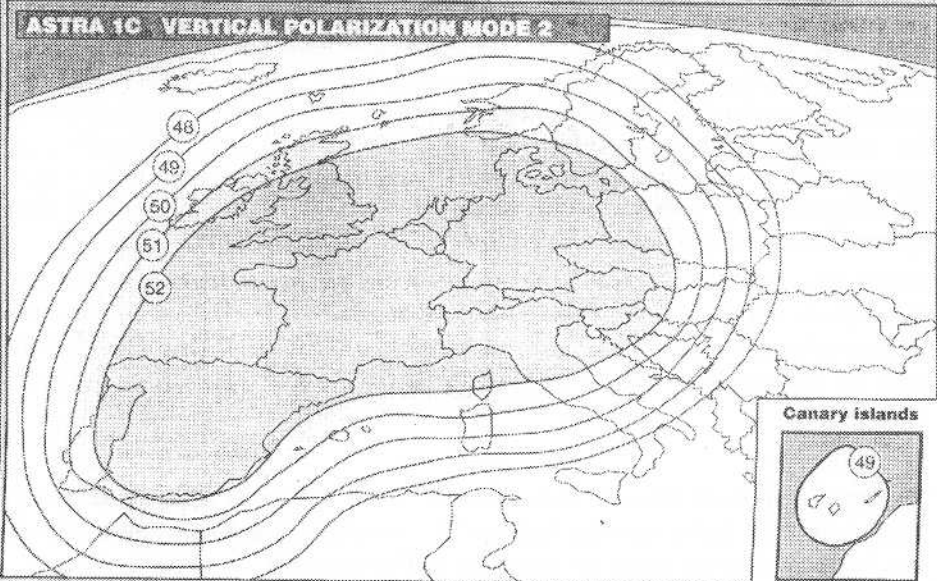
**Levels in dBW**



**ASTRA 1C VERTICAL POLARIZATION MODE 1**



**ASTRA 1C VERTICAL POLARIZATION MODE 2**



**Levels in dBW**

## CORRESPONDENCE

Martin Pipe of Maplin's has written in to draw my attention to some excellent articles that are contained in "Electronics", the Maplin's monthly magazine. Recent articles written by Martin have described modifications to ex BSB and Amstrad equipment and contain a wealth of useful tips and circuits. Martin has confirmed that Maplin are due to launch a Secam to PAL decoder in the Autumn. The product is currently undergoing extensive bench testing before being offered for sale some time in September. Martin has kindly agreed to let me have a unit to review on your behalf when they become available.

Mike Hutchings has written again to give an update to his experiments with the Elektor Satellite RX. Following his success in raising the supply rail voltage to improve threshold performance (CQ-TV 162) Mike has now been experimenting with the IF bandwidth. He writes... "continuing my quest to squeeze better performance on Eutelsat transmissions I experimented with the IF bandwidth. I increased it to a nominal 36 MHz by removing the partial screening strips introduced as the published modification (Elektor, Oct.'89), to accommodate 27 MHz bandwidth Astra broadcasts. Subsequent careful IF strip realignment resulted in a major further reduction of sparklies such that the picture quality was now as good as any I had seen on the higher powered Astra, only certain saturated colour areas being at all affected.

The only remaining problem with the receiver was that the increased heat dissipation resulting from the previously described increased rail voltage was causing tuning drift, not to mention the increased stress on the components. Reasoning that the picture improvement pertaining to the rail voltage increase was due to increased signal level at the vision demodulator, the power was returned to 12V, and additional gain incorporated in the form of an external preamplifier. This was based on a Mini-Circuits MAR-7 device giving 12 dB of gain at a NF of 5dB in a 50 ohm system. This indeed gave excellent performance and eliminated the drift problem".

Mike's letter highlights a common misconception that picture quality improvement can only be achieved by reducing IF bandwidth. At nominal link levels there will be some impairment in receiving say a Eutelsat transmission using 36 MHz channel bandwidth with the receiver IF at say 27 MHz (most fixed IF receivers used on Astra use 27 MHz).

Well that its again for this edition of "Satellite News". Please do write and share any success you have had in receiving Satellite TV - no matter how simple it may seem to you I am sure there are others out there who will be interested.

# A NEW USE FOR OLD RUBBISH

**Paul Marshall G8MJW**

## **STOP!**

*Don't throw away that old electric razor - you know, the one you bought in '63: can't buy a new foil for it, but it WAS a lot of money to buy!  
We're talking about the old mains vibrator type - Remingtons, Brauns, etc.*

*Picture this - 4,000 miles from home and a mega-buck flight simulation monitor whose only crime was a faulty Positor (the bit that uses thermistors to reduce the degauss current to minimum, nice and smoothly).*

*Result - lots of pretty colours, all of them wrong! Its Friday afternoon, the degauss coil is back in the lab 4,000 miles away and not a Positor in sight.*

*This was one even Barclay Card International Rescue couldn't solve (with or without the help of Rowan Atkinson).*

*Castling frantically around for substitutes for a 'get you going' fix suddenly produced a £14 Hitachi electric razor. In no time the picture was much better - not quite perfect but good enough to prove a point.*

*I've since used the idea a couple of times - it will deal with minor impurities that the internal degauss misses or an emergency total degauss.*

*Remember to sweep in circles spiralling away from the screen before switching off.*

*If this model isn't powerful enough for you then you can always make a real one out of a wooden frame and a few thousand feet of PTFE wire -but then I'd better not give details about that, everyone seems to be afraid of anything over 12V these days!*

*No, this isn't an April fool - it does work!*

# IN RETROSPECT

## BATC 24CMs TX NOTES.

### Bob Platts G8OZP

In excess of 25 of these transmitters have been built with only a couple of minor problems reported. The following notes are include just in case things don't go quite as expected.

Take care note to misplace R19 and R22.

The original design layout was for 100mil chip caps. 50mil caps are supplied in the Mainline kit. They will fit but extra care is needed.

Slightly smaller than original chip inductors are supplied in the Mainline kit again care is required here.

Take care not to mix up the chip caps as in some cases they are frequency determining components.

If the sub carrier oscillator will not go down to 6MHz. change C39 from 330pf to 390pf. (The Mainline kit should contain this value).

The solder resist will need to be scraped away to enable C13 to be soldered. Sorry but I'm only human.

Due to minor tolerance and component changes the main oscillator may run high preventing tuning below about 1260MHz. A small brass or copper tab 2mm X 5.5mm soldered on Q5 collector such that it covers the C legend will bring the frequency down. Alternatively R16 could be reduced to 4K7, as this will have a similar effect.

The video gain control can be padded with a 15K resistor on each side to provide less course control if required.

An RS components heat sink number 401.497 or similar is ideal for IC4. Either as it is or sawn in half length ways. Take care not to cause a short on the underside of the board.

NE592 is basically the same as an LM592.

The dot on the MSA0485 indicates the input.

If wider audio deviation is required R28 may be reduced in value (22K min). L10 will require re-adjustment. Apparent low dev may be due to wide audio bandwidth on an RX.

The audio modulator was designed for speech communications. Replacing IC8 with an NE5534 will give improved HF audio performance.

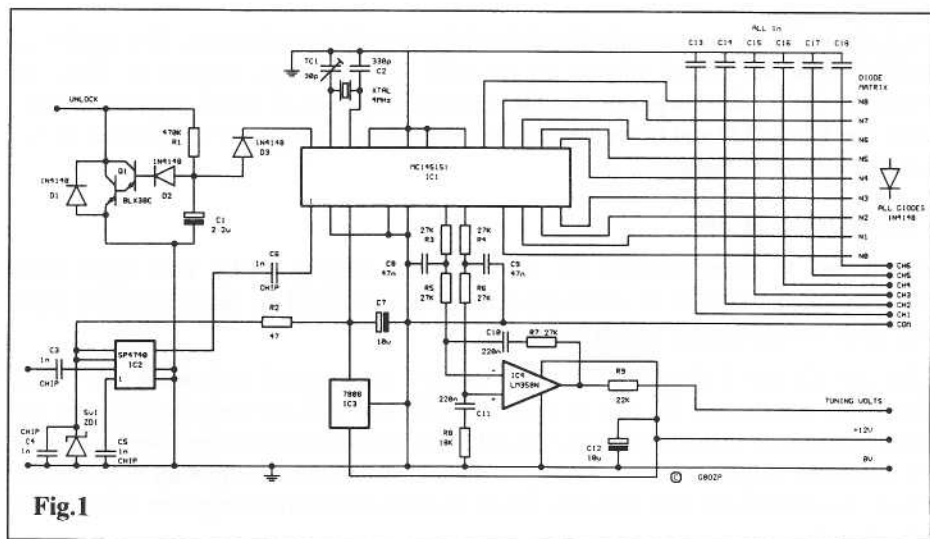
# 24cm ATV TX SYNTHESISER

## Bob Platts G8OZP

This unit is specifically designed for the BATC 24cm ATV TX, but should be compatible with most types of similar TX's with a free running oscillator at output frequency. Frequency is programmed in 1MHz steps via a diode matrix which provides six switched channels. (This can be expanded if required). A frequency display board again programmed via diodes complements the design.

Fig.1 shows the frequency control circuit and frequency selection diode matrix. The RF input to IC2 should be in the range 20 - 250mV. This is first divided within the ECL prescaler IC2, by 256 and then fed into the PLL IC1. The 4 MHz reference Xtal is divided within IC1 to produce a loop reference frequency of approximately 3.9 kHz. The input to pin- is divided by the binary value set by the diode matrix, then compared with the 3.9 kHz reference frequency in a phase comparator within IC1.

This produces two complimentary outputs the mark space ratio of which depends on whether the divided input signal is higher or lower than the reference. The two outputs are first filtered by R3, R5 C8 and R4, R6 and C9 then feed OpAmp IC4, which is provided with further filtering and produces the tuning voltage for the varicap diode. If the divided TX oscillator is greater than the reference oscillator the uneven mark space ratio causes the output voltage of IC4 to decrease hence lowering the osc and visa versa. Thereby holding the TX oscillator on frequency.



When the loop is not locked on frequency pin-28 pulses low. This discharges C1 via D3 thereby starving Q1 of bias current, turning it off. Q1 controls the LED frequency display, turning the display off when the loop is unlocked. An optional relay may be used to disable the TX output when unlocked.

## FREQUENCY PROGRAMMING

The required frequency is set by pull down diodes on control lines N0 to N8. Internal pull up resistors are provided within IC1. Calculation for diode positions is very simple and uses a binary sequence. N0=1. N1=2. N2=4 etc. Diodes are fitted to provide a low on a control line. The binary code for each channel is the required output frequency in, MHz minus 1024. i.e. code for 1257 MHz would be:  $1257-1024=233$ . This should then be converted to binary. The following table shows the commonly used frequencies:

|         | N0 | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 |
|---------|----|----|----|----|----|----|----|----|----|
| 1248MHz | L  | L  | L  | L  | L  | H  | H  | H  | L  |
| 1249MHz | H  | L  | L  | L  | L  | H  | H  | H  | L  |
| 1255MHz | H  | H  | H  | L  | L  | H  | H  | H  | L  |
| 1276MHz | L  | L  | H  | H  | H  | H  | H  | H  | L  |
| 1316MHz | L  | L  | H  | L  | L  | H  | L  | L  | H  |

## FREQUENCY DISPLAY

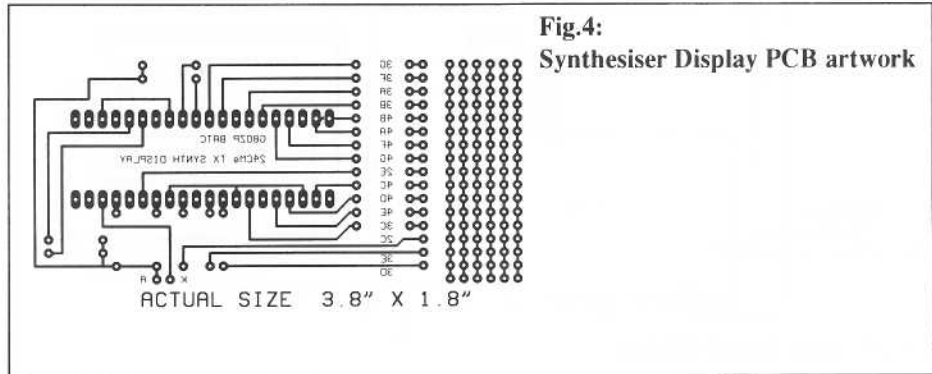
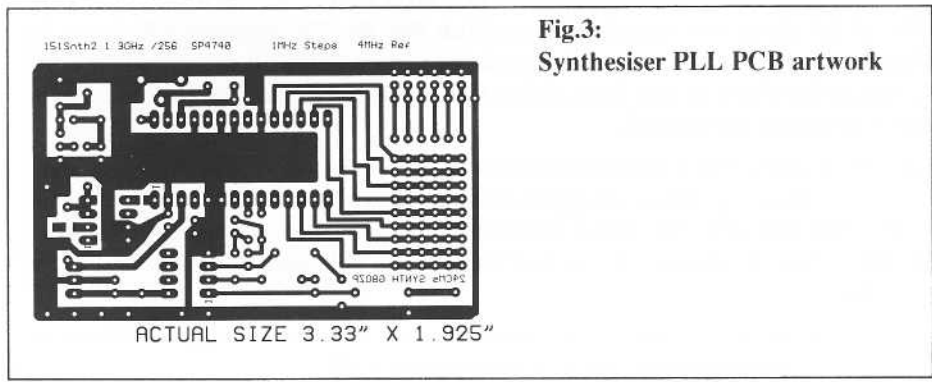
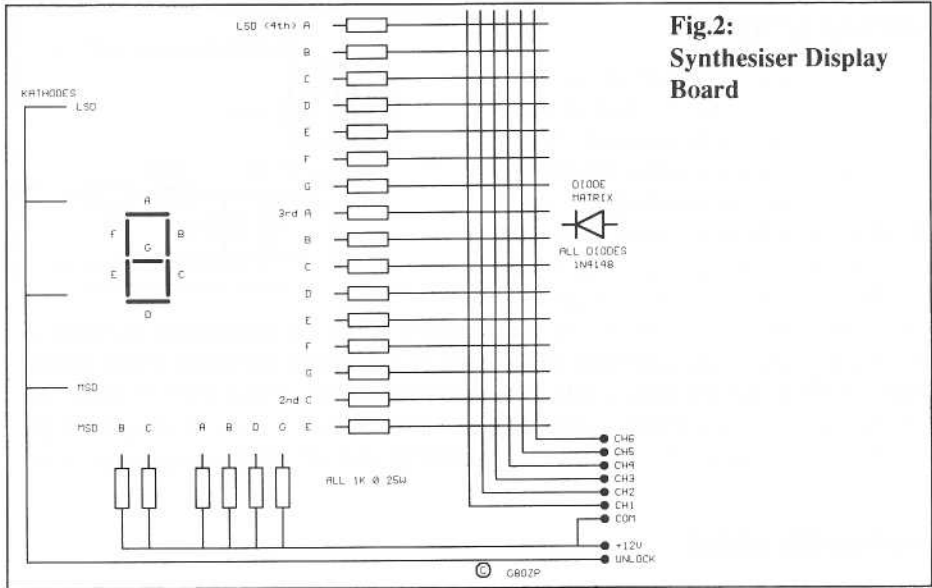
The display uses a second diode matrix, this was deliberately chosen (as opposed to driving the display from the PLL matrix via a PROM (which would require programming)) to give added flexibility. For example, with a 2.3G Hz divide by two up front for 13cm, or in mixer systems where the output frequency is not the PLL frequency.

Fig.2 shows the circuitry involved and should require little explanation. The display is enabled from the unlock circuit on the PLL board. Diodes should be fitted to illuminate the required segments for the selected frequency. B and C segments of the MSB and the A,B,D and G segments of the second digit are permanently wired as for 24cm these do not change.

## CONSTRUCTION

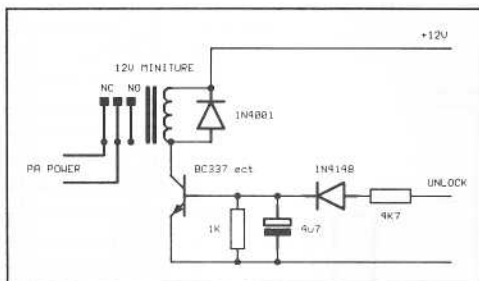
Fig's.3 and 4 show artwork for the PLL and display PCBs and Fig.5 their interconnections. If there is sufficient demand boards could be made available from club sales. Please contact members services.

Chip caps C4 and 5 should be fitted first as these are mounted underneath IC2 which should be mounted on the rear of the PCB. IC1 and IC2 are static sensitive so the usual precautions should apply. C8, C9, C10 and C11 should be close tolerance types. C2 should be polystyrene. The matrix diodes are mounted vertically with their anodes soldered to the board. The cathodes for each channel are linked together with tinned copper wire.



## INSTALLATION

The PLL board is designed to be mounted vertically on the edge of the 24cm TX by the main oscillator. The holes along the bottom of the PLL PCB match with plated through holes on the TX. Wire or PCB pins should be used to mount the board and provide 0V. Thin 50 ohm coax should be used to connect the input to the junction of C15 and L8. Keep the connections as short as possible. The plated through hole at the base of L8 should be used for the screen. Replace C45 on the TX with a 1uF. Disconnect the tuning control VR4. Connect the PLL tuning volts output with a short link to the C45 end of R17. If the unlock PA inhibit relay is used cut the link between the 12V in and 12V (PA) connections on the TX.



## COMMISSIONING

Accurately set the reference osc with TC1 to 4 MHz with an insulated tool. Before the loop can be tested it is important to establish that the TX oscillator will cover the whole band with room to spare at both ends by manual tuning. If the TX will not, see the notes elsewhere in this issue. Other than slight retrimming VC1 on the TX no other adjustments are required.

**NOTES:** A video FM modulated oscillator is, by its nature, not symmetrical about the carrier frequency. This is exaggerated by a video clamp and depends on picture content. This gives the PLL a hard time holding the oscillator on frequency. Releasing the video clamp by changing C7 on the TX to a non polarised 1uF gives the PLL an easier time.

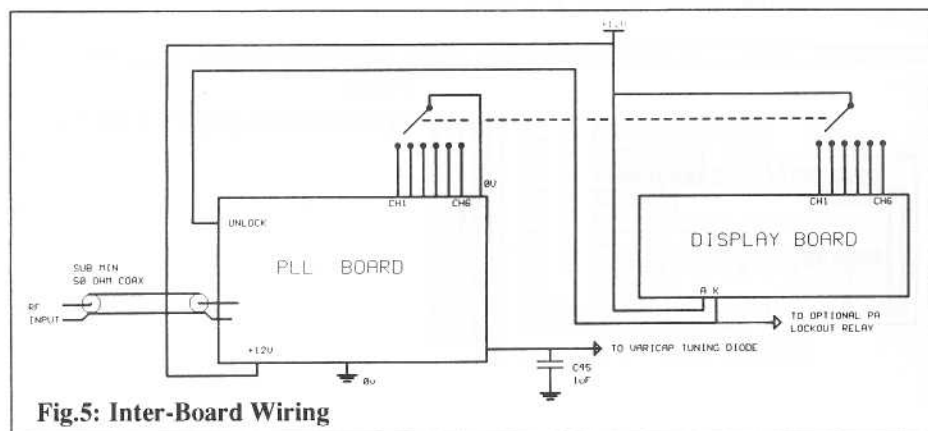


Fig.5: Inter-Board Wiring



# A TRIP TO CALIFORNIA

## C. Grant Dixon

Many years ago, about 25 years I think, when SSTV was in the early stages of development I received a carefully compiled list of references to SSTV from an American amateur ... Ken WOOD K6IIS. As I was the BATC librarian at the time this was a very welcome addition to the library. In return, I was able to send him a few references from British and European publications. Following on that initial contact Ken and I have corresponded, exchanged cards and gifts, but have never met, so I decided to go to California and meet him face to face. Ken and his wife Christine were good enough to invite me to stay for a week so I set off on May 25th from Heathrow.

I was met at Los Angeles airport and driven about 60 miles east to Fontana. Covering this area there is an ATV repeater on Santiago Peak and I hadn't been in the house very long when Ken switched his transmitter on and my picture was being radiated over quite a large area of Southern California. Other ATVers kept coming in through the repeater to pass on their greetings and when there was an interval the repeater radiated its own identification picture complete with a snappy comment on the bottom line. These comments appeared to be selected at random and served as an amusing sideline to the normal contacts. I noted that although sound and vision were radiated a careful watch was kept on 146.43 MHz in case anyone else wished to join in. This is the frequency in the Los Angeles area, in other parts of the USA other frequencies are in use. A plea for standardisation was voiced in Amateur Television Quarterly.

California is a big place and there are quite a number of repeaters to give a good coverage. Fortunately there are some very high mountains to the east and one repeater has been located at a new site about 3500ft HIGHER UP !! Several of the repeaters are linked together so as to provide an increased coverage and there is talk of installing a remote controlled video camera at one of the repeater sites. As the inputs to some repeaters are in the 430 MHz band there appeared to be a problem with radar interference. The outputs are in either the 900 MHz or the 1250 MHz bands and when the repeater was radiating its own ID signal the picture was brilliantly clear, the interference only showing up on the incoming signals.

Study of the newsletters and magazines showed that the Californian ATVers engage in some very large demonstrations, many of which are designed to help the local authorities, police etc. Typical events are :-

The PASADENA ROSE PARADE ... a gigantic carnival procession with 1 million spectators lining a 5 mile route to watch the many large floats go by.

Flying an ATV balloon to view an eclipse from the stratosphere.

Surveillance of crowds being addressed by a known troublemaker.

Arranging for local schoolchildren to be in direct contact with the astronauts on the shuttle.

In general the accent was on using ATV for the benefit of the local community and they are doing a good job over there.

On Sat May 29th there was a gathering of ATVerS at Ken's house for a 'poolside barbecue to celebrate the 10th anniversary of the Santiago Peak repeater ... I was present as an added attraction. About 50 people turned up and a good time was enjoyed in typical sunny Californian weather. At this party another amateur ... Bob Raynor W6LUY ... invited me to spend a few days at his house in Simi Valley to the north of Los Angeles. This was a different area served by a different repeater and I am very grateful to Bob and Lillian for providing a very welcome extension to my holiday.

In the early days of amateur television we in this country led the world, but if the ATV scene in California is a good indicator for other parts of the USA, I think they have caught up with us, or even surpassed us in the use of ATV equipment. I got the impression that there is less and less amateur construction going on, but this is true of amateur radio in general.

---

## What is NBTV?

### Jeremy Jago

Narrow Bandwidth TeleVision allows the transmission of moving images within a bandwidth normally associated with audio. In designing an analogue TV system, one approach to conserve bandwidth is to reduce line number and frame frequency. For example, in Slow Scan TeleVision this means sacrificing some definition and all movement. NBTV uses the same method, but reduces the line number radically and frame rate less so - the effect being to allow actual movement at lower definition.

The following standard has been agreed between experimenters for some years:

Lines per picture: 32

Frames per second: 12.5

Line frequency: 400 Hz

Sync: blacker than black

Line sync + blanking: 250 $\mu$ s maximum

Line scan: Vertical, upward

Frame scan: Leftward

Aspect ratio: 3 vertical x 2 horizontal

Black level: 30%

To better utilise this limited definition a different aspect ratio is used - the normal horizontal oblong is turned, lines and all, through 90 degrees - better fitting it to the human face; the format that photographers call 'portrait'.

The picture obtainable conveys human faces quite expressively and also suits simple captions and other images. Frame scan at 12.5 Hz give clear, unbroken depiction of, for example, face and hand movements of average speed. Medium persistence CRT's reduce flicker without noticeable 'smearing' and spot-wobble widens the lines to touch without defocusing. Frame scan is non-interlaced to prevent line crawl and leftwards to improve caption reproduction, by running counter to eye movement. Digital scan conversion to standard 625 line/50 Hz display is also practised, either by computer package or hard-wired logic.

If anyone notices more than a passing similarity to the Baird days -yes, you are correct! Baird TV 1928-35 used a similar standard for MW broadcast. The updated version reduces the 7:3 aspect ratio and increases 30 lines to 32 for digital compatibility. NBTV offers wide range of experimental challenges in digital and analogue electronics and, for anyone interested, mechanics. Signal sources in use include spinning disc, drum, flying spot, Vidicon, CCD and scan converter. Vision and sound can be recorded on stereo audio tape.

NBTV can also act as a test-bed for Fast Scan TeleVision ideas, like filter or sampler design, making measurements easier in a sort of 'scale model in the time domain'!. A narrow bandwidth video signal suggests comparative research with 625 into the effects of signal path on visibility and exploring restricted receiver bandwidth for increased signal-to-noise ratio and range.

NBTV, try it you might like it.

*The NBTV Association is BATC affiliated. Further details can be obtained from: Doug Pitt, 1 Burnwood Drive, Wollaton, Nottingham, N28 2DJ. Tel: 0602 282896.*



## Are you sitting on buried treasure?

Possibly! If you are you won't be wheeling cash to the bank in a wheelbarrow but... you could be in for pleasant surprise financially (or you could nominate the Club to benefit). It's also a chance to clear some space and make other Club members happy.



**So what's the treasure?** Well, we know that buried in their garages many BATC members still have some broadcast television equipment that they never use. Some of this turns up sporadically at Harlaxton and earns them the odd fiver. But why settle for a paltry fiver? And why wait until next year to clear some space? We will arrange prompt collection.

**What sort of equipment?** Well... cameras, CCUs, picture monitors, waveform monitors, audio equipment, mixers, VTRs, in fact any studio equipment over 20 years old. Colour or black and white, 625 lines, 405, whatever.

**Is this equipment valuable now?** Not intrinsically (it's just old metal and glass after all) but it is getting scarcer. And it really ought not be rusting slowly in people's sheds and garages but restored to working order for display at Club functions. You'll earn a respectable price or, if you prefer, the BATC will benefit.

**Ah, but is someone making a killing afterwards?** Not at all. There is no commercial market for this stuff and anyway we want it for restoration and display. So it will not be sold on; instead it will be distributed among the BATC members who put on displays every year at the Club's convention or else passed on to the National Museum of Film, Photography and Television at Bradford.

## GIVE US A RING NOW!

**Marconi and EMI cameras:** ring Paul Marshall G8MJW on 0522-703348.  
**Other cameras, pedestals, tripods:** ring Dicky Howett on 0245-441811.  
**Monitors and other non-camera equipment:** ring Andy Emmerson G8PTH on 0604-844130.

# The Pont PSA-100 FFT Spectrum Analyser

Review

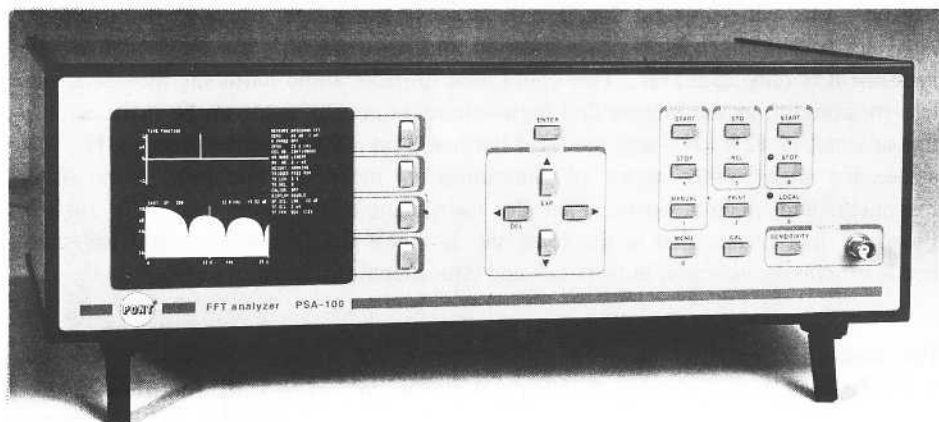
## Mike Wooding G6IQM

The Pont PSA-100 is an Audio Spectrum Analyser operating in the frequency range DC to 25.6 kHz. Although reviews of such equipment do not usually appear in CQ-TV, I thought it worth a brief mention as many of our readers are professional engineers, and such instruments are used widely in broadcast and audio engineering.

The unit has an impressive range of features for what is a relatively low-cost instrument. Using powerful Digital Signal Processing (DSP) techniques a range of measurements is made available, including basic audio spectrum analysis, auto-correlation, cepstrum analysis and a true RMS voltmeter mode.

The instrument is very neat and compact, measuring 440 x 320 x 145mm and weighing only 6kg. The spectra or voltage measurements are displayed on a 5" CRT, with an auxiliary composite video output to drive an external monitor and a parallel interface for a graphics printer. There are few user controls, the various measurement modes and parameters being set up using on-screen multi-level menus.

As standard the instrument is fitted with 16k of battery backed-up RAM for recording measured spectra and measurement set-ups. Optional extra memory boards can be installed if required. Also available as optional extras are a GPIB/IEEE and RS-232C interface cards, to facilitate automatic measurements under external computer control.



As previously mentioned, the measured spectra are displayed on a 5" CRT as a 400 line image, with either a single full-screen image or two separate spectra, one in the top half and the other in the bottom half of the display area. The span of the image can be over the whole 25 kHz band or over any sub span (in powers of 2) down to a minimum of 12.5 Hz and the spectrum can be zoomed by up to 32768 times around any line. The instrument also has 'smart' cursors for spectral measurements. In the RMS voltmeter mode the display consists of large alphanumeric characters with the reading user-selectable in Volt or dB units.

The basic parameters of the instrument are:

Input Sensitivity: 1mV to 31.6V in 10dB steps (manual or autorange)

Dynamic Range: non-linear distortion, spurious and alias products <-80dB below input sensitivity, except 1st spectral line which is <-40dB.

Absolute Amplitude Accuracy: +/- 0.2dB at any input sensitivity level. Internal 2048 Hz voltage reference for auto-calibration.

Overall Frequency Response: +/- 0.1dB from 10 Hz to 25.6 kHz at spectrum line centres (25.6 kHz span). Maximum +/- 0.18dB with zoom filter (span less than 25.6 kHz or in zoom mode).

Measurement Modes: Baseband Spectrum, Zoom. Autocorrelation, Cepstrum, 1/3 Octave, Full Octave and digital Voltmeter.

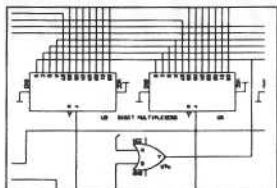
In conclusion, this instrument represents real 'value-for-money' in these difficult times, with a price range that begins at £2200 for the basic model. Many of the instrument's features are normally only found on much more expensive units and the basic accuracy of the measurement modes is more than enough for most modern measurement needs. The control functions are very 'user friendly' and the on-screen menus easy to navigate.

My only real criticism, and this is only because I regularly use a Dynamic Signal Analyser with a much higher specification and price!, is that the bandwidth of the instrument is only 25.6 kHz. This could tend to make audio harmonic measurements less meaningful, as the highest 2nd harmonic measurement that can be made is on a fundamental of 12.8 kHz, and the third harmonic on a fundamental of 8.5 kHz. That aside, for many other types of measurement, including vibration, audio filter responses, and electroacoustic, then the instrument could more than fully suffice. Finally, I feel certain that at the relatively low cost the instrument could fill many needs in schools, colleges, universities and educational institutes.

For further information about the PONT PSA-100 contact: Manor Technology, 8 Manor Road, East Tytherley, Salisbury, Wiltshire, SP5 1LN, U.K. Tel: 0794 40923.

# Electronic Designs Right First Time?

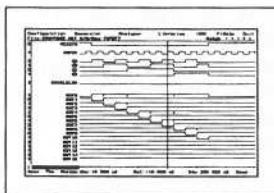
## From Schematic Capture -



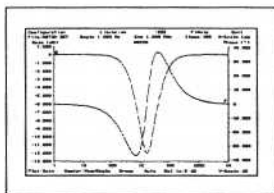
EASY-PC Professional

Create your schematics quickly and efficiently on your PC using **EASY-PC Professional**. Areas of the circuit can be highlighted on screen and simulated automatically using our **PULSAR**, **ANALYSER III** and **Z-MATCH II** simulation programs.

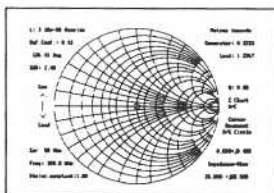
## through Analogue and Digital Simulation -



PULSAR



ANALYSER III

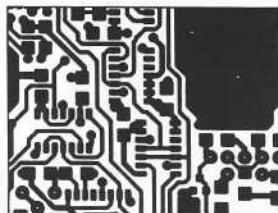


Z-MATCH II

If the results of the simulations are not as expected, the configuration and component values of the circuit can be modified until the required performance is achieved.

## to Printed Circuit Board Design!

The design, complete with connectivity, can then be translated into the PCB. The connectivity and design rules can be checked automatically to ensure that the PCB matches the schematic.



EASY-PC Professional

## Affordable Electronics CAD

|  |          |         |
|--|----------|---------|
| <b>EASY-PC:</b> Low cost, entry level PCB and Schematic CAD.   | \$195.00 | £98.00  |
| <b>EASY-PC Professional:</b> Schematic Capture and PCB CAD. Links directly to ANALYSER III and PULSAR. | \$375.00 | £195.00 |
| <b>PULSAR:</b> Low cost Digital Circuit Simulator ~ 1500 gate capacity.                                | \$195.00 | £98.00  |
| <b>PULSAR Professional:</b> Digital Circuit Simulator ~ 50,000 gate capacity.                          | \$375.00 | £195.00 |
| <b>ANALYSER III:</b> Low cost Linear Analogue Circuit Simulator ~ 130 nodes.                           | \$195.00 | £98.00  |
| <b>ANALYSER III Professional:</b> Linear Analogue Circuit Simulator ~ 750 nodes.                       | \$375.00 | £195.00 |
| <b>Z-MATCH II:</b> Smith Chart program for RF Engineers - direct import from ANALYSER III.             | \$375.00 | £195.00 |

*We operate a no penalty upgrade policy. You can upgrade at any time to the professional version of a program for the difference in price.*

US\$ prices include Post and Packing

Sterling Prices exclude P&P and VAT.

Ask for our fully functional Integrated CAD DEMO!

## Number One Systems Ltd.

Ref: CQTV, Harding Way, St. Ives, Huntingdon, Cambs. PE17 4WR, UK.

For Full Information: Please Write, Phone or Fax.

**Tel: 0480 461778**

**Fax: 0480 494042**

International tel: +44 480 461778 fax: +44-480 494042

VISA, MasterCard, AMERICAN EXPRESS



# VHF COMMUNICATIONS

VHF COMMUNICATIONS magazine is published four times per year and is available from KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF, Warks. U.K. Tel: 0788 890365; Fax: 0788 891883. The yearly subscription is £12.00 for 1992 and £13.00 for 1993 - *both years for £22.50* - which is payable by credit card (+ a surcharge of 50p), personal cheque (drawn on a UK bank or bearing the name of a UK banking agent), postal orders or bankers draft made payable to **KM Publications**. This subscription includes surface mail charges, air mail is extra. The magazine is a **MUST** for the radio amateur interested in VHF, UHF and Microwave working, containing, as it does, detailed constructional articles for equipment operating in these bands.



**BACK ISSUES ... £3.50 each: £12.00 per YEAR VOLUME**

**BINDERS TO HOLD 12 ISSUES ..... £5.00**

Surface mail charges included - Air mail extra.



- TXV4000** 24cm Low cost Video transmitter, excellent miniature VFO design, 400mW output, 12V DC input, Ready assembled and cased transmitter.
- TXV4001** 24cm Two channel PLL video transmitter module, 400mW output, 26 MHz bandwidth. 12VDC input, complete built and tested surface mount assembly.
- PAI001** 24cm Power amplifier module to compliment TXV4000 series transmitters, 2.5Watt output, 12V DC input.
- LHA2001** 24cm Pseudomorphic HEMT ultra low noise GaAsFET preamp, outstanding performance using 0.15dB noise figure PHEMT ! Supplied in weatherproof IP65 enclosure with N connectors.
- CV7001** 24cm Down Converter, 40MHz IF output, 27dB Gain, 1dB Noise Figure. Complete built and tested surface mount assembly.
- MI9001** Phase Lock Loop module based on Plessey SP5060 IC. Complete synthesiser on single PCB, includes regulator and loop filter components.
- VIDEOIF** Camtech's complete video IF card demodulator, IF at 40MHz with 6MHz sound demodulator all on a single Euro card PCB.
- ASG+VOGAD** Intercarrier sound modulator board for TXV4000 series transmitters, enables you to transmit sound with your video pictures.

**Specialist 24cm ATV suppliers, RF, Telecoms and Microwave design consultants + PCB CAD and prototype/small volume manufacturing service.**

## Sevenside Television Group Aerial Products

**New!**



**New!**



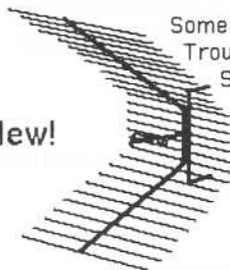
**New!** A 38 element high performance version of our famous 23 cm aerial 14 db gain, SWR less than 1.5:1 and 1.8 metres long. Remember - all STG aerials are wideband to cover the repeater input and output.  
Launch price only £25.00 each, P&P £3.50 (1 item) £5.00 (2+ items)

**New!** No need to buy a new aerial, our 20 element extension upgrades your existing 18 element STG aerial to the full new 38 element specification. Everything you need is supplied.  
Launch price only £12.00 each, P&P £3.50 (1 item) £5.00 (2+ items)

The original 18 element wideband aerial is still available. 10 db gain SWR is less than 1.5:1, 90cm long and it covers the repeater input and output.

Still only £14.00 each, p&p £3.50 (1 or 2 items) £5.00 (3+ items)

**New!**



Something different for the mast! A 23 cm wideband Trough Reflector. 11 db Gain across the whole band

SWR is less than 1.5:1 Overall dimensions: 55cm high, 35cm wide and 30cm deep. Supplied as a complete kit of pre-formed & pre-drilled parts for easy "screwdriver" assembly, no tuning is needed.

Launch price only £18.00 each, P&P £3.50 (1 item) or £5.00 (2+ items)

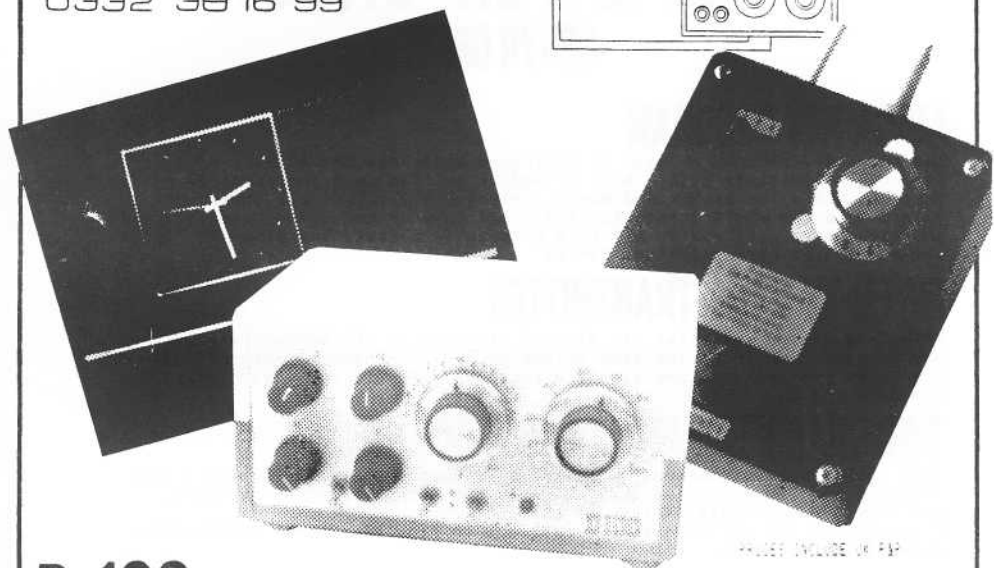
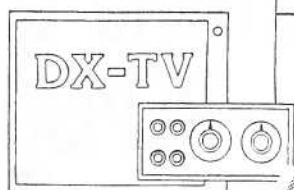
**See our other advert for more products**



We regret that we can only post aerials to UK addresses. Delivery 28 days. Cheques Payable to "Sevenside Television Group". Send to 15 Witney Close, Saltford Bristol BS18 3DX. Tel: 0225 873098 (after 7pm & weekends only please)

HS PUBLICATIONS  
7 Epping Close  
Derby DE3 4HR  
England

0332 38 16 99



PRICES INCLUDE UK P.P.

## D-100 WITH BANDSCAN ONLY £99.<sup>99</sup>

STILL USING AN UPCONVERTER OR  
TV WITH WIDEBAND I.F.s FOR DX-ING?

OUR RANGE OF CONVERTERS PROVIDES A NARROW IF BANDWIDTH FACILITY  
ESSENTIAL FOR RECOVERING WEAK SIGNALS FROM THE NOISE.

THE LATEST D-100 FEATURES A USEFUL BANDSCAN FACILITY ALLOWING THE USER TO  
PREVIEW THE BAND WHEN AN OPENING IS IMMINENT. IT'S IDEAL FOR WINTER DX-ING TOO  
LEAVE IT SCANNING VIA A SPARE SET WHILE YOU ARE WATCHING YOUR DOMESTIC TV!

## HS D-400 SERIES ONLY £49.<sup>95</sup>

IMPROVE YOUR DX RECEPTION WITH THIS LOW-COST TUNER  
(REVIEWED IN TELEVISION AUGUST 1992)

- VARIABLE BANDWIDTH VISION I.F. (3-6MHz approx).
- YOU CAN RECORD VHF DX RECEPTION FROM THIS UNIT
- COVERS: BAND I NZ1-R4 BAND III E5-E12 UHF E21-50 APPROX
- DC INPUT 13V - IDEAL FOR MOBILE USE
- THE TUNER IS SIMPLE TO USE AND COMES COMPLETE WITH POWER UNIT

PLEASE ADD £8.00 TO THESE PRICES FOR AIRMAIL DESPATCH TO EUROPE

# WORTHING & DISTRICT VIDEO REPEATER GROUP

## GB3VR GB7VRB

### AMIGA ATV PROGRAM

The Amiga ATV program as seen at Harlaxton Manor now has 49 different selectable testcards with a host of additional features including wipes, text control, QRA calc, Background Music, selectable displays all cards are overscan ie the whole screen is used, load in your own customised testcards and much more. If you do ATV this program is a must. Two disk set. Please state callsign when ordering. £20.00

### 1W FM-TV 24cm TRANSMITTER

This transmitter generates its signal directly at the wanted frequency which may be set anywhere in the band colour or B/W. On-board intercarrier sound and fixed pre-emphasis are standard features. The kit includes diecast box and cost £80.00

### TWO CHANNEL PHASE LOCKED LOOP KIT

This add on vastly improves the overall frequency stability of the 1 watt transmitter. Two crystal locked channels and third free running tuning position are available. Kit price only £30.00  
Crystals for the PLL on channels RMT1,2,3 or simplex 1255Mhz £8.00. Other frequencies to order.

### VIDEO AGC KIT

This unit accepts a composite video signal in the range 0.15 to 2V P-P and outputs a constant 1V P-P across 75-Ohms. This unique design is a must for TV stations and repeaters. £16.00 each.

### THE SPECTRUM ATV PROGRAM

This 48K version has over 60 commands which includes 7 Testcards, memo pad, clock, maps, tones, locator calc (old & new), flag, x-hatch, various size text printing plus disk transfer command and more. All this for only £6.00  
Opus disk version £6.00 a must for all spectrum owners.

BBC AMATEUR TELEVISION PROGRAM £8.50

CROPREADY EXPANSION BOARDS 2-WAY £7.00, 8-WAY £18.00

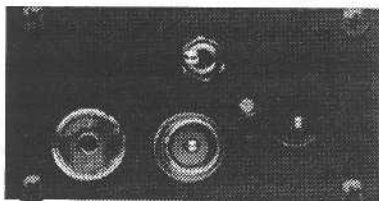
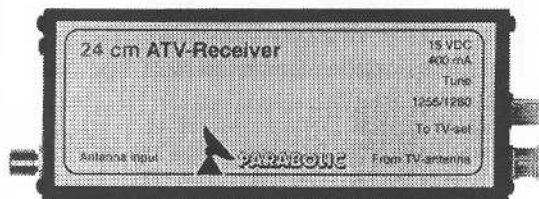
CROPREADY COLOURISER KIT £20.00

CROPREADY EPROM SERVICE £6.50 PER CHIP SAE FOR DETAILS

**ORDERS TO:-** TREASURER OF GB3VR, R. STEPHENS GB8XU, 21 St. JAMES AVE,  
LANCING, WEST SUSSEX, BN15 0NN. 0903 765760 7 to 8 pm  
CHEQUES PAYABLE TO:-  
'Worthing and District Video Repeater Group'

# NEW GENERATION OF 24 cm FM-TV

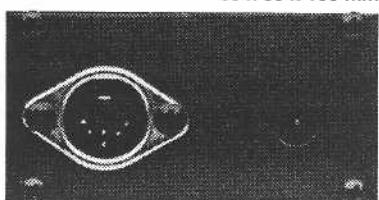
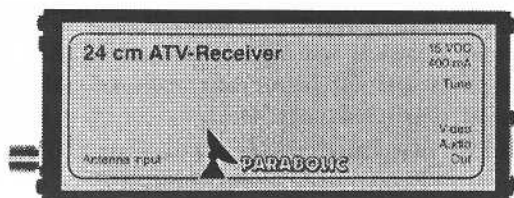
Get linked with near broadcast quality.



The world's smallest satellite receiver with modulated output on 48.25 MHz and audio on 53.75 MHz. (European use only).

SEK 1.300

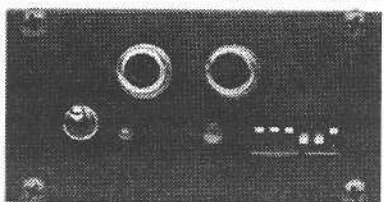
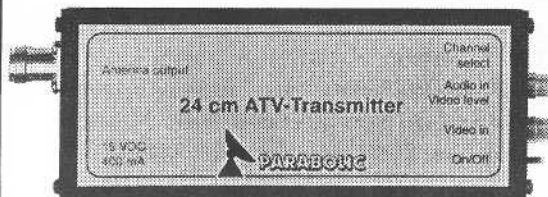
65 x 35 x 160 mm



Same receiver with Video and Audio outputs. Will tune approx. 1200 to 1500 MHz.

SEK 1.300

Both receivers deliver voltage for a preamp through the coax cable.



200 mW FM-transmitter that tunes between 1240 and 1279 MHz in 1 MHz steps. Will drive the M57762 to about 10W.

SEK 1.750

All modules use 15VDC max 400mA (incl. preamp) but 13.8VDC is OK. The transmitter will work as low as 10VDC. A preamp with 1,0dB NF and 40dB gain is also available.

One year guarantee.

P&P SEK 200



**PARABOLIC**  
Systems AB

Fax: +46 - 300 40621  
P.O. Box 10257 - S-434 23 Kungälv - SWEDEN



## MARKET PLACE

### ADVERTISING RATES:

Market place ads - £50.00

Full page - cover - £50.00

Full page - inside - £40.00

Smaller displays - proportional

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

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

**IVC 761P 1" VTR** in full working order, with service manual ... £50. Also a 761P for spares, various IVC manuals and literature, electrical and mechanical spares kits, including video heads for 700 and 800 series and 20 brand new reels of 3M 461-1-2150 1" tape for IVC (or Ampex) and some used ones. make me an offer I can't refuse! Wild Vision 245 genlock board for Archimedes 300/400 series, has very little use, with Chromatext caption software ... £120 ono. BBC model B MICRO with BBC-designed genlock board, low-pass filter board for the RGB outputs, Aries B20 sideways RAM board (allows a full 32k for the program area) with two 40-track 5.25" disc drives in metal case with separate keyboard, 12" green monitor or 14" colour monitor, manuals and circuits, caption software ... £125. Also non-genlock BBC B's, disc drives, monitors, Aries B20, B32 and B12 (sideways ROM) boards and View chips (with manuals) - phone for prices or make me an offer. Panasonic VW-EC300 edit controller with manual, as new ... £125. Panasonic WV-MX10B 2-input video + audio mixer with frame store, effects and caption facility; vgc, service manuals available ... £400 ono. Buyer collects or I can arrange carriage at cost. Peter Major, 6 priors way, Olivers Battery, Winchester, Hampshire, SO22 4HJ. Tel: 0962 854851.

**AERIALS:** Jaybeam 2m 8 ele crossed Yagi, new ... £50. Met 2m 6 ele crossed Yagi, as new ... £35. JVL 23/24cm 48 ele Loop Yagi ... £60. Jaybeam 23cm double 15 Yagi ... £30. Roger G3MEH. Tel: 0442 826651.

**ROBOT 400, 8sec B&W SSTV** fitted with 16sec B&W converter, good condition ... £250 ono, (may PX general coverage receiver). Standard C58 multimode 2m, good condition, 2.5W output, leather case ... £180 ono. Binatone 12" B&W TV, VHF Band 1, very good condition ... £35. Paul. Tel: 0933 56861.

**BAXALL 2/3" ULTRACON CAMERA**, little used, with manual ... £30. Baxall 1" Ultracon camera, little used, with manual ... £50. Cotron 1" Vidicon camera, new tube but needs attention, with circuit ... £10. Grundig FA70 1" Newvicon camera c/w 50mm f0.95 Schneider auto-iris lens ... £75. Baxall 9" mono hi-res monitor, hardly used ... £25. Baxall 12" mono hi-res monitor with sound added ... £30. RCA, two monitors in 19" rack with 6U free space ... £50. Baxall DS1/6 6-way switcher ... £25. Baxall DS1/2 2-way switcher ... £10. Lenses: Tarcus 50mm f1.8 auto iris ... £25; Computar 75mm f1.8 auto iris ... £30; Fujinon 12.5mm f1.4 manual iris ... £20; Fujinon 25mm f1.9 manual iris ... £20; Fujinon 5.5mm f1.5 wide angle manual iris ... £35. Telequipment S51B single beam oscilloscope with manual ... £30. Details on any of the above on request. Denis Hoare GIAPE. Tel: 081 205 5431.

**CAMTECH CV7001 24cm Down Converter**, 40 MHz IF ... £70. Camtech Video IF Demodulator to suit above ... £75. Wood and Douglas 1250FM1 FM PA 20-150mW in, 1W out (new) ... £40. Video AGC kit ... £8. EME coaxial HF400 high quality relay unit (N connections) up to 13cm/600W (new) ... £70. Black Star 'Orion' colour bar/test Pattern Generator (TTL/comp/analogue plus sound - as new) ... £130. 2-port Tonna Aerial Power Divider (1296 MHz+) ... £25. Sony EV-3CE Video 8 edit type Video recorder (new) ... £180. Sony RME E1000V Video Edit Controller (new) ... £60. BNOS 13.8V/25A metered PSU (as new) ... £130. Reflecta 1kW Video Light (barn doors - new) ... £15. Slik heavy duty Video Tripod, castors, fluid head, top-of-range model (as new) ... £75. Postage/carriage at cost. Paul Chamberlain G4XHF, 9 Goffs Close, Southgate, Crawley, West Sussex, RH11 8QB. Tel: 0293 515201 (home); 0622 696437 (office).

**BSB DISH & LNB ... £10. THORN V21, V23 Modem ... £20.** Mullard V23 Modem ... £20. Farnell 5V 60A switched mode PSU ... £5. Decca Viewfax (contains Mullard Teletext panel) ... £15. Spectrum 48K ... £25. Astec AT 1020 Satellite module (CQ-TV 136) ... £25. Used 2764 EPROMs, 8 for ... £5.00. D.L.Smith, 081 650 9601.

**ADVANCE PG528 PULSE GENERATOR**, modular unit in nice condition ... £50. Solartron VF252 AC Millivoltmeter, with copy of handbook ... £15. Marconi TF2600 AC Millivoltmeter, needs repair, copy of handbook ... £5. Gresham GXL series PSU module type 12/2, 5V/3A ... £4. Visa Link VDU terminal with keyboard, PC tem and other protocols, orange phosphor, works well, clean ... £15. Marconi Mk.IV picture and waveform monitors, 3 available with spares ... £50 the lot or will split. EMI dual PAL Coder, good condition ... £25. Pye 3 x 20 Watt Power Amplifier in rack ... £30. Richard Harris, 7 Fosse Lane, Shepton Mallet, Somerset. Tel: 0749 343876.

**EUMIG CARTRIVISION 525-line B&W VIDEO CAMERA** with UK 240-volt power supply. Optical through-the-lens viewfinder, 2/3" vidicon, ideal for oddball projects or making videos to send to the States! ... £20 post-paid. Mullard XQ1271 2/3" vidicon, unused in box ... £10 post-paid. The CAT-70 souvenir tape is still available, £5 ... post-paid. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH.

**INVICTA 9" CONSOLE TV**; Ekco 12" table TV with Band III tuner fitted; Ferguson 16" dual-standard Courier portable; Pye 12" monitor (as used in OB vehicle); Bush TV165 19" dual-standard; two 15 MHz oscilloscopes (Solartron CD1400R and Telequipment D43R); CRTs AW53-88 good condition, GEC 6504A doubtful, Mullard 36-24 good, Mullard A56-120X believed OK. The Invicta and Pye TVs show every sign of life (good bright raster) and the scopes are in good working order. I therefore naturally hope to get a fair price for these items. Everything else needs a good home for a few pounds. John R. Huntingford, 'Astro-Lode', Hog's Back, Guildford, Surrey, GU3 1DD. Tel: 0483-505504.

**TEKTRONIX 491 SPECTRUM ANALYSER**, frequency range 1.5 - 12.4 GHz with N-type input connector. Also includes service manual/instruction book and mains lead with plug! ... £400 ono. Operating/service manual for HP432A Power Meter ... offers. Nigel Page, 6 Turstan Road, Witham, Essex, CM8 1PB. Tel: 0376 517141.

**NEW TAPE! ATV USA-STYLE.** Yes, now you can see for yourself what's happening over there, converted to PAL from NTSC. Watch KB9FO put up a \*real\* man's antenna, ATV balloon transmitter and loads more too fabulous to describe. Two hours's entertainment on a quality E-180 tape, just £15 post-free. Price includes donation to the G8PTH standards converter fund - I had to buy one (gulp!) as I could no longer scrounge time on broadcast station converters! Andy Emmerson, 71 Falcutt Way, Northampton, NN2 8PH. (Please allow three weeks for delivery in case I am swamped).

**TATUNG BSB RECEIVER**, converted to D-MAC/D2-MAC/PAL. Fully tuneable audio in PAL mode, voltage switched polarity, menu driven software, with remote control ... £30.00. Drake ESR324E Satellite receiver. Tuneable audio, switched polarity with skew adjustment and 'band scan' ... £20.00. Printer multiplexer, 8 computers share one parallel (Centronics) printer, automatically scans and locks on to active computer ... £10.00. Buyer collects or pays postage on all items. Chris Smith - G1FEF. Tel: 0933-58220.

**LINK ELECTRONICS PLUMBICON** tube conditioner and tester model 334. Marconi Mk9 colour coder module (PCB) in new condition with circuit, needs +24v, +12v, +5v, -12v, and pulses ... £25. Marconi NTSC sub. Carr. osc. in oven L5. BBC Crosshatch gen ... £5.00. Short length of MK4B camera cable. BBC 6 o/p vision distribution amplifiers 8 in crate with back connectors, good condition ... £20 second crate, grubby ... £12.50. Audio Jackfield, 5 rows in Neve colours ... £30. GE2M/543 BBC augmented pulse & bar generator, working ... £25.00 GE4/529 Calibration Gen. & PSU ... £10. PA9/9 BBC mains distribution panel ... £3. JF3/509 Musa connection panel ... £10. (not jackfield) UN21/506 Video relay unit ... £5. Selection of BBC grey blank 19" panels. Video MUSA plugs ... £1.00 for 4. Musa jackfield L15. Phillips PAL coder ... £30. Link extender board. Selection of BBC, Marconi and other extender boards. Electronic Visuals Vectorscope 4020A ... £150. Electronic Visuals Waveform monitor 4040 in as new unused condition ... £175. second one in normal



used condition ... £100. Vidchron timecode generator, 8 digit display of hours, mins, secs, frames in smart plastic box, video input etc. (NOT broadcast SMPTE T/C) hours of fun for a ... £10. Modern (1990) CCD Camcorder, viewfinder, Stereo Microphone, power op. lens, etc. only ... £30 and post !!!! snags, well, just a couple, the tape mechanism and battery have been removed and it is thought that it is 525 line standard. In as new condition Ideal for experimentation. No data Not tested. B.Summers G8GQS. Tel: 0895 810144 not QTHR.

**COX PRESENTATION MIXER 1221**, 12 channels with DSK, preview & eng matrix, remote eng control panel in good condition working with H/books ... £250. Patrick White. Tel: 081 847 3995 day or 0628 21718 eve.

**SILENT KEY SALE:** Vinten Pan & Tilt head, torsion spring model OK for cameras about 90lbs. ... £100. BBC MN6/502 waveform monitor ... £75. 5 off Reliance 12" mono monitors ... £15 each or £50 the lot. Tek 585 scope on Tek trolley with extra plug-ins (80 MHz) ... £75. Marconi Instruments Sine Squared Pulse & Bar Gen. ... £30. M.I. Grey Scale Gen with handbook ... £30. Marconi Mk7 aperture corrector ... £10. Marconi Mk7 Pal coder ... £30. IVC 1" VTR L25. Prowest vision Mixer in good console, 10 channel with A/B cuts, fades, wipes, chromakey, 20 pattern effects, cables and electronics (21U high) in excellent condition ... £150. 2 Reliance vidicon cameras with viewfinders in poor condition ... £20 pair. EMI dual Pal coders L40 pair. Vintage RBM 19" shadow mask hybrid colour monitor and separate decoder ... £50. Vortexion valve preamp ... £15. Quantity of Prowest 19" mono monitors CHEAP neg. Tek 526 vectorscope ... £85. Veteran PYE 2780 14" monitor circa 1955 unfortunately in poor condition due to bad storage hence only ... £35. Marconi Mk5 picture and waveform monitor ... £25. The above is offered on a "as seen" basis no details as what works or doesn't work is available. Circuits may come to light in the fullness of time. Please contact Brian or Paul on 0895 810144 or 0522 703348.

**WANTED:** JVC (not Sony) U-Matic recorder and JVC first-generation VHS HR 3300. For photography purposes, so visual appearance must be first-rate. Michael Bennett-Levy, 031-665 5753.

**WANTED:** To augment my working collection of 405-line studio gear I'd really like to find a Pye 2780 14" precision monitor - this is the big valve job with the smooth rounded corners and a row of silvery control knobs below the screen. Also a Pye video waveform monitor with the big round green CRT and any other accessories in the light blue and mauve colour scheme (or grey!). I am also looking for most other 405 studio gear (not TVs, thank you) and will pay money for what most people treat as old junk, even come and pick it up! That's not because it's worth mega-fortunes now but simply because someone ought to be saving it for future generations. So clear out your garage and make some money as well without having to wait until the next rally! I am happy to collect from you; generous prices paid for any of these, also a late model valve tester that handles nuvistors as well as everything else. Andy Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. 0604-844130.

**WANTED:** Cox vision mixer, working or not but preferably complete. Cox PAL coder, any other Cox units. Service manuals for Tektronix 453 oscilloscope, to buy or borrow for photocopying. Please phone or write with details. Peter Major, 6 priors way, Olivers Battery, Winchester, Hampshire, SO22 4HJ. Tel: 0962 854851.

**WANTED:** Service information on the Panasonic NV3000 video recorder (colour burst now absent). P.Simkins G3MCL. Tel: 0962 865814.

**WANTED:** Socket for Sony 2000P Camera cable to fit into, preferably, chassis mount. David Long G3PTU. Tel: 0484 400020.

**WANTED:** Colour Bar Generator module for the Link PAL Coder type 235. Circuit diagram for the Cox 1U type 168+150. Down Stream Keyer modules, including the outboard control circuits for fading - to buy, borrow or photocopy. Any Cox modules 1U type - cash waiting. A.Parnell G8SOY. Tel: 0795 531541.

**WANTED:** Circuit diagram and details of following Microwave Modules products: MTV-435 ATV transmitter, MML-432/20 70cm linear, MM 70cm ATV receive converter. All postage costs gladly refunded. Contact: Bob Tomalski G6CQF Tel: 081 646 0694 or write: 18, Fitch Court, Laburnum Road, Mitcham, Surrey CR4 2ND.

**WANTED:** Pin connection details of Mitsumi Satellite Tuner Head TIF5-E31P-8630/40T, also Edition 1 of 'European Scrambling Systems' by J.McCormac. Contact J.G.McCormack, 920 Manchester Road, Castleton, Rochdale, OL11 2SR.

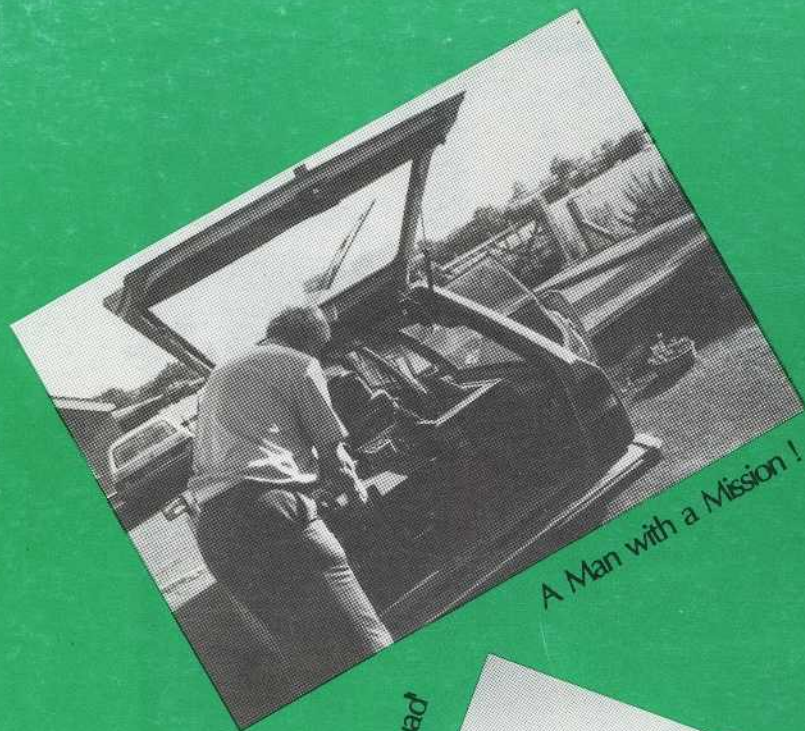
**WANTED:** Link 120 Camera Cable, wanted urgently or information on the whereabouts of any. Will collect. Richard Harris, 7 Fosse Lane, Shepton Mallet, Somerset. Tel: 0749 343876.

**WANTED:** Circuit for Aston time code reader "TD20". Circuit for Conrac Color (it's American) monitor model 6123/c19. Working rain covers for the Marconi Mk8 camera. Pye, EMI, and Marconi television product catalogues for 1950 - 1970 wanted for research for article / book. Marconi Video Distribution amplifier(s) type B4006. IBA Technical Review No. 1 and 3 exchange for No's 15,16 & 20 or other TV related books wanted WHY. Tall bench stool/chair with gas lift. 1.25" HOP Plumbicons. B.Summers G8GQS. Tel: 0895 810144 not QTHR.

**WANTED:** Two yokes with tubes if possible for Ikegami HL77 camera, also Handbook & diagrams. Circuit for Barco Dual standard decoder Secam/NTSC also Circuit for Link SPG model 250. Patrick White. Tel: 081 847 3995 day or 0628 21718 eve.



Mobile Control Room: Located inside the Park near the Gate, this housed all the control equipment for cameras and microphones, connected to both by cables. The van and contents were new from the factory (EMI) and had been delivered only a few days before the event. Equipment included numerous controls for ensuring correct setting up for each camera, with picture monitors for displaying the image from each, and a vision mixing desk for camera selection. Vision output was fed to Alexandra Palace by wideband Post Office cable and (as standby) a VHF transmitter and aerial (VHF was in those days usually called ultra short wave).



*A Man with a Mission!*

*A member of the BATC Museum Hit Squad*

