

# CQ-TV



No. 165

February 1994

24cm FM ATV TRANSMITTER

THE IVFAX SYSTEM

LIVING WITH THE BATC

A PC VIDEO DIGITISER

RIGONDA MODS

MAKING PCBs

BRITISH AMATEUR TELEVISION CLUB

We wish all our  
Members and  
Readers a Safe,  
Peaceful, Happy  
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1994

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CLOSE FOR PRESS FOR THE NEXT ISSUE .....1st MARCH 1994

CQ-TV is produced on a 386 PC computer system, using the PROTEXT word processing package and the PRESSWORKS desktop publishing package. The camera-ready artwork is produced on an EPSON EPL-5200 Laser printer.

Printed by *keyword* Print Company, 6 Butt Lane, Walcott, Lincs, LN4 3SS.

# POST & NEWS

## THE BELGIAN ATV REPEATER ON0MTV

*The following letter from Jack has been edited at his request into our more usual rendition of our ridiculous language. If I have misinterpreted anything from the original letter please accept my apologies Jack ... Mike*

Dear OM,

I wish to give you the news of our home-built ATV repeater, ON0MTV, here in Antwerp city, locator JO21EE.

The repeater is accessed by a DTMF tone on 439.900 MHz. Input-1 is on 2325 MHz and input-2 on 10400 MHz. The output is on 1280 MHz.

The repeater is active on Sundays for transmitting information on technical matters and for Ham traffic between 1000 and 1100 hours GMT, the same on Thursday evenings from 2230 to 2330 GMT. The audio from the repeater is FM.

The repeater aerial is sited on a high building some 75m tall and the polarisation is horizontal. The repeater also acts as a beacon and gives a mix in full colour and a few seconds later sends colour bars and technical information about the repeater. Audio tones are also transmitted in beacon mode.

I receive a P5 picture from the repeater over a 5km path using an indoor rotatable home-brew colinear aerial (see diagram), which pleases me because there is a wood of trees much higher than my house about 1km away from me and directly in my path to the repeater. The colinear aerial is made from brass tubes which are readily available from modelling shops and 25m of 50 ohm cable.

I am looking for construction details for 1280 MHz and 10400 MHz transmitters but I have not found anything suitable yet (see the BATC book "An Introduction to Amateur Television" ... Mike)

73 ... Jack Geerherts ON5NM

## SSTV - MODE SPLITTING ON HF!

Dear Mike,

Because of the increasing shortness of frequencies for image transmissions on HF, we have a war type situation - some SSTV Hams are threatening to QSY to busy DX frequencies in response to deliberate QRM by phone/SSB/CW mode Hams, and other are thinking of going QRT (in spite of having invested very much money in modern equipment). In fact, the problem is not only the ignorance of some CW and SSB operators, but also the polymorphic scan modes treating each other in a very restricted area. While many not informed OM think that all



SSTV Hams are sitting in front of a green shining radar screen in their darkened shack, there is a big run onto the frequencies per band by more and more computer stations with various SSTV and FAX software systems. You can hear 8 seconds text transmissions from Eastern Europe running over 120 second colour pictures (Martin Mode) and colour Fax (360 lpm) running over plain Fax with 120 lpm and so on.

Should not the various picture modes have the same rights as the digital modes - a special segment for each mode? The occupation of the former Fax segment around 14105 kHz by Packet radio has never been balanced by a widening of the now missed Fax/SSTV area around 14230 kHz. It is just not good enough that the CW fanatics who have the say at the IARU have not even given us the status of an official mode segment! So, all concerned OM have to try and solve the problem by themselves, and this is my suggestion:

At first we should push all B&W transmissions in Fax and SSTV to the area below the middle frequencies (i.e 3730, 14230 kHz) but be polite in your phone plea! Most of the older converters and computer programs can handle these modes. The higher portion of 5 kHz above could then be used by the modern colour SSTV and FAX transmissions, which are able, in most cases, to switch the receiving equipment to the right mode by digitally coded headers.

If this agreement should not function, we still have the opportunity to explore the frequencies above 14300 kHz (no SSB contest QRM) for using our colour modes.

Another problem comes from computer controlled equipment, where the PTT is activated by pressing a key on the keyboard. In some cases, Hams experimenting with their new Fax or SSTV software, seem to overlook that they are severely disturbing existing SSTV QSOs by testing one menu gadget which automatically fires up the transmitter! Please switch your PTT only by hand, with your mind only as the guide, or can the developers add squelch circuits (standard feature with digital modes) to prevent the machines from transmitting when other transmissions exist?

Have fun with Fax and SSTV.

73 ... Klaus DL4KCK, AGAF  
(BBS: DK0MWX)

## **THE BIRMINGHAM ATV REPEATER**

Dear Mike

I've just revised the February, May, August and November magazines to see what was last printed about our activities in Brum - I was searching for a site and was about to conduct a trial from the HQ of the Midland ARS.

Well, the M.A.R.S. HQ WAS tried. Those of you familiar with central Birmingham will know it to be a veritable "Concrete Jungle" - so my hopes were not high; nonetheless, an Alford Slot was raised on a mast as high as could be done manually but nothing could be detected of an incoming transmission about six miles away. So, until a more satisfactory support could be erected, other options were explored. My caravan was towed to the Turners Hill area (where the 2m repeater 'BM used to be) and with Colin G8YJT operating a Worthing Tx plus PA into an Alford Slot, I drove home to receive on a loop yagi. Although our batteries were a bit down and only 5W was going out, a signal was detected, albeit unlocked.

By this time I knew that we must endeavour to gain wider support, so a write-up of our efforts went into the M.A.R.S. newsletter, for anyone interested to contact me. At the subsequent AGM, several hands went up so arrangements are now in hand for a more substantial trial and demo. Several lengths of mast section are available to erect a temporary tower which should put a Slot or beam well above everything else that M.A.R.S. uses at the moment.

I have also made contact with the South Birmingham R.S.; regrettably, they had recently lost their only ATV'er so I joined them too! S.B.R.S. use a winch-up mast topped with beams for 23cm phone and run a 3.4 GHz beacon, so tests may be set up from there as well!

Mike and Andy mention my Progress Bulletin. Well, the next one, dated October, is still waiting to be posted! After it had been produced, I held it back until a letter from M.A.R.S. had been received. That came, then something else developed.

My thanks to Arthur for past and future assistance, Colin for sitting in caravans and Alf for knowledge and advice and thanks to Andy Emmerson for putting five ex-BT monitors my way!

73 ... Graham Hankins G8EMX

## THE BATC 24cm RECEIVER

Membership Services is now please to announce that the long awaited Astec modules for this project are now in stock. The Astec AT2352 module, whilst slightly different from that used in the design and featured in the project in the Club book 'An Introduction to Amateur Television', it will act as a direct replacement without any modification or deterioration in results.

The module will only be supplied complete with the PCB. As the supply is limited it will be on a first-come, first-served basis. The cost of the module and the PCB is £59 plus VAT plus p&p. Please refer to the Services to Members supplement page-SUPP5 in the centre of this magazine.

## The BATC CRYPTOGRAPHIC DEPARTMENT

You may be wondering why the B.A.T.C. has need of such a service. The Oxford Dictionary defines Cryptography as .... A secret manner of writing, intelligible only to those possessing the key.

OK I will come clean, the BATC already has such a service but it is more commonly known as the Membership Secretary. If you saw the examples of handwriting that we receive, you would wonder no more. Not that we are too worried that your change of address notification is written in hieroglyphics, after all we already have your money. Mind you, it is astonishing just how many magazines, destined for paid up members, are returned marked "gone away" or "no longer at this address". As I write this CQ-TV 164 has been out for three weeks and the score to date is, magazines returned to us 'gone away' ... 5, and change of address with a renewal notice ... 15.

Please help us to give you good a service, so let us know if you are moving and when writing to ANY Committee Member, please PRINT CLEARLY IN CAPITALS your name and address including the postcode, and if this is a new address, also include your old address.

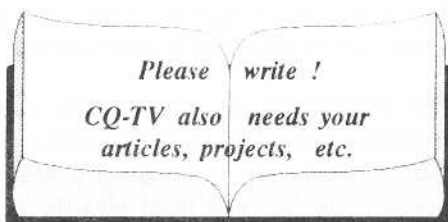
I once had a change of address just giving the new address and signed Mr. Smith. I have thirty six on record and it took a long time to work out which one it was. A callsign, if you have one, is

also useful, this helps to trace you when you move in secret, and also we can look you up in the Callbook if your handwriting is illegible. Your membership number is also a great help. The important point is that we want to retain you as a Member. Remember you can read your own handwriting but can I, that is why we say **Please PRINT CLEARLY IN CAPITALS.**

It is also important to check your address label to make sure I have the address correctly, postcode missing, etc. Please let the Membership Secretary know of any corrections that are needed.

On a general note, it is important to write to the correct Committee Member, each person deals with their own section and only their section and if, for example, someone writes to me concerning Publications or Sales Items, all I do is forward the letter on to the appropriate person when I next have cause to write to them, this causes a delay in you receiving a reply.

Dave 'Enigma' Lawton - Membership Secretary



# STOP PRESS! - THE 1994 RALLY/ CONVENTION WILL BE SPLIT!

Two in one year? Well, not quite

The **May 1st** Event will be as previously published at the **SKY BLUE CONNEXION** for the **BATC Rally** (see following pages) - *BUT* there will be an additional event on **SEPTEMBER 9th/10th** (provisional) at the

## SHUTTLEWORTH COLLEGE

near **Bedford**, for the **BATC Convention** (*just next door to the famous SHUTTLEWORTH COLLECTION!*)

This will be the venue for the following:

- \* Biennial General Meeting of the BATC
- \* TV Repeater Forum
- \* Full lecture programme
- \* Evening 'social' on 9th
- \* Members' Equipment Exhibits (including vehicles)
- \* Some 'TV ONLY' Traders

**NOTE - THE EVENT WILL BE MEMBERS ONLY + GUESTS.** Full details will appear in future CQTVs.

**WHY?** - For some time now, the BATC Committee has felt that the Rally has had a dual personality - is it a rally or a convention? So for '94 (a BGM year) it has been decided to try a split.

*The Rally*, which will be bigger and better than ever, at the spacious Sky Blue Connexion, occupies the traditional May Day Bank Holiday weekend slot.

*The Convention at Shuttleworth* will take many of the bits of the former combined event that most members said they never had time to see, as bargain hunting came first! Overnight reasonably priced accommodation will be available with evening bar and meal plus the proximity of the Shuttleworth Collection of vintage aircraft immediately adjacent.

The College is set in pleasant park land with all modern facilities in purpose-built lecture and exhibition halls. Yet it still retains considerable charm due to the delightful mansion house.

*Hope to see a few more people at the BGM in '94 as a consequence!*

### **ORGANISER FOR SKY BLUE CONNEXION BATC RALLY IS:**

Mike Wooding, 5 Ware Orchard, Barby, Nr.Rugby, Warwickshire, CV23 8UF  
Tel: 0788 890365; Fax: 0788 891883

### **ORGANISER FOR SHUTTLEWORTH CONVENTION IS:**

Paul Marshall, Fern House, Church Road, Harby, Nottinghamshire, NG23 7ED  
Tel: 0522 703348

*The events are designed to be complementary, with some overlap -so see you at both in '94! ... Paul Marshall G8MJW Convention 94 Organiser*

## **BATC RALLY 94 SUNDAY MAY 1ST**

As you will now be aware from reading the previous news item the **BATC Rally 94** will be held at the **SPORTS CONNEXION** at **Coventry** on **Sunday May 1st**. Full details of how to get to the Sports Connexion will be given in the next issue of CQ-TV, which you will receive mid-April. Any of you who went to the 'Centre of England Christmas Rally' on Sunday December 12th will already know the location - as it was held there.

The Sports Connexion lies approximately 3 miles South of the Coventry City boundary and is at the junction of the A445 and the A423 - see the map on page-8 of CQ-TV 163. It is within easy reach of the M45/M1/M6 and M42 and the major road links to and from Coventry, and the bypasses around the city mean that it is very easy to get to.

For those of you who wish overnight accommodation in the area, the closest hotel/motel is the Coventry Knight Hotel (0203 301585), which is approximately 2 miles from the venue. A special weekend tariff rate of £28 per person, per night,

bed-and-breakfast applies. There are, of course, many other hotels in the Coventry area should this not be suitable.

For those of us who wish to caravan or camp, I have arranged a 'perfect' site only half a mile from the venue, which is next to (and belongs to) the 'The Old Bull & Butcher' country public house. The cost is only £2.00 per night and it is available to us Friday, Saturday, Sunday and Monday. All bookings to be made through me (Mike Wooding) please. The pub also serves very good evening meals, which it is suggested are booked in advance. The Old Bull and Butcher will also be the venue for the Saturday night 'get together', for anyone who wishes to join us as usual - full details of the location in the next issue.

Entrance to the rally will be from 10 AM onwards on the day and the admission price will be £1.00. There will be over 300 trading tables and over 100 traders in the two halls and a large Bring and Buy. We shall also be providing a facility on the first floor of the building for a 'Members Only' enclosure, where Members can sit down, relax, eat, drink, discuss and display equipment, etc. The full refreshment facilities of the Sports Connexion will also be open all day.

Outside there will be the now infamous display of Outside Broadcast vehicles (it gets bigger every year - and 1994 will be no exception!) and an outside boot fair/flea market area.

For this event, even more so than ever before, we shall be needing lots of volunteer helpers on the day. We only ask for an hour or so of your time, in order to let everybody, even *YOUR COMMITTEE*, enjoy the event and at least get to see part of it. We shall be starting at 6 AM on Sunday morning. We shall also probably be spending a few hours at the venue on the Saturday evening. So, if you can help us by offering some help for a short while during the event please contact me at the Editorial address.

This will be the largest event ever staged by your Club. I hope it will be a success - only you can make it so. We have had many requests over the past few years to stage the event more centrally again and closer to major roads, etc. Well we are doing so, and what's more we are staging one of the largest rallies in 1994. But, it will still be the BATC Rally, which means that it is *YOUR* rally, so please give us your support.

*Mike Wooding G6IQM - BATC Rally 94 Organiser*



# A Synthesised 24cm FM Television Transmitter

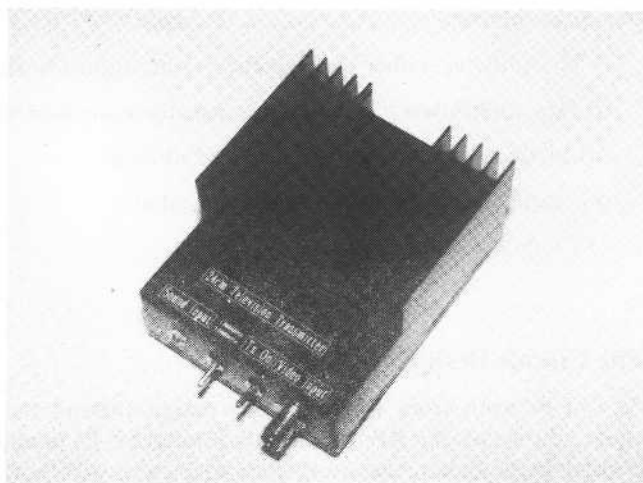
Tim Forrester G4WIM

## Introduction

*Due to the availability of satellite receivers, receiving is usually the first step towards operating on TV and normally presents few problems. Having successfully received some amateur signals, viewers then more often than not want to transmit as well! The problem is how to construct an effective transmitter, given the inherent problems of 1.3 GHz construction. One of the major hurdles with any 1.3 GHz design is consistency, i.e. ensuring that any copy of the design is built exactly the same, even down to component lead lengths and height above the PCB, etc. Other problems are the frequency stability and power output, both must be adequate to ensure a noise free picture into the repeater.*

Dealing with the problem of components first, this design is totally surface mount. That means all the components are soldered directly to the board with pre-set lead lengths and at a pre-determined height above the PCB. This technique ensures a high degree of repeatability and as a bonus a compact easily portable design for 'outside broadcast' use!

Obviously a free running oscillator at 1.3 GHz is going to drift, but as the receiver bandwidth is typically 15 MHz its not too much of a problem. This transmitter though is a fairly powerful compact design and the heat generated from other parts of the circuit could lead to unacceptable amounts of frequency drift. Therefore a simple phase locked loop is included to maintain frequency accuracy - more on the design of the loop later. If operators don't mind the occasional re-tune of



the transmitter frequency, it is possible to leave out the PLL circuits and install a potentiometer to set the operating frequency. This approach makes for a unit costing approximately £30 less than for the complete device. Of course the PLL circuit could always be added at a later date.

RF power gain at 1.3 GHz can be difficult to achieve (and expensive) using individual components, fortunately these days it is possible to buy RF power amplifiers which come in the form of modules offering guaranteed performance. Their cost is considerably less than buying the individual parts and there are no alignment problems.

The inclusion of the sound circuitry is very simple and based upon well proven techniques and does not merit much description. It too uses surface mount parts for the sake of consistency and ease of mounting the PCB. Other designs have been published which use more complex audio circuits and sub-carrier oscillators, but it has been found that this simple circuit is perfectly adequate for working simplex and into the repeater. GB3MV actually uses a more complex arrangement to peak limit the deviation and maintain the sub-carrier frequency to tighter limits.

70cm TV has traditionally used amplitude modulation (AM) which means that all the modulation stages and subsequent amplifiers had to be linear if picture distortion was to be avoided. On 23cm frequency modulation (FM) is used almost universally. FM offers several advantages over AM for TV work and few disadvantages. Perhaps the major advantage is that RF amplifiers can operate in Class C, i.e. a non-linear, but high efficiency mode. Also a properly designed FM TV receiver can exhibit a much better picture quality for a lower RF signal to noise ratio at the receiver input. These two reasons alone explain why FM is used for satellite TV broadcasting, and why amateurs have adopted similar techniques and standards. Broadly speaking, any FM TV transmitter comprises the same basic stages, as follows:-

- i) RF oscillator, either on frequency or multiplied to final frequency.
- ii) Pre-emphasised FM modulator, usually associated with i) above.
- iii) Frequency maintaining phase locked loop
- iv) Sound amplifier and sub-carrier oscillator
- v) RF power amplifiers

## The Circuit Design

As can be seen from figure 1, this design follows the basic principles outlined above. In detail, the RF oscillator is formed by T2 running directly at 1.3 GHz. D3 is used to modulate the oscillators frequency with both baseband video and the

6 MHz sound sub-carrier, in conjunction with the PLL circuits it also maintains the desired mean frequency.

As FM noise rises with frequency, a better overall system signal to noise ratio can be achieved by boosting (pre-emphasising) the high frequency video signal and then using de-emphasis at the receiver, the desired flat frequency response is restored - the same principle as is used on terrestrial FM radio. In this design the components between J3 and R26 perform pre-emphasis to CCIR 405, a broadcast standard. R26 sets the total video deviation.

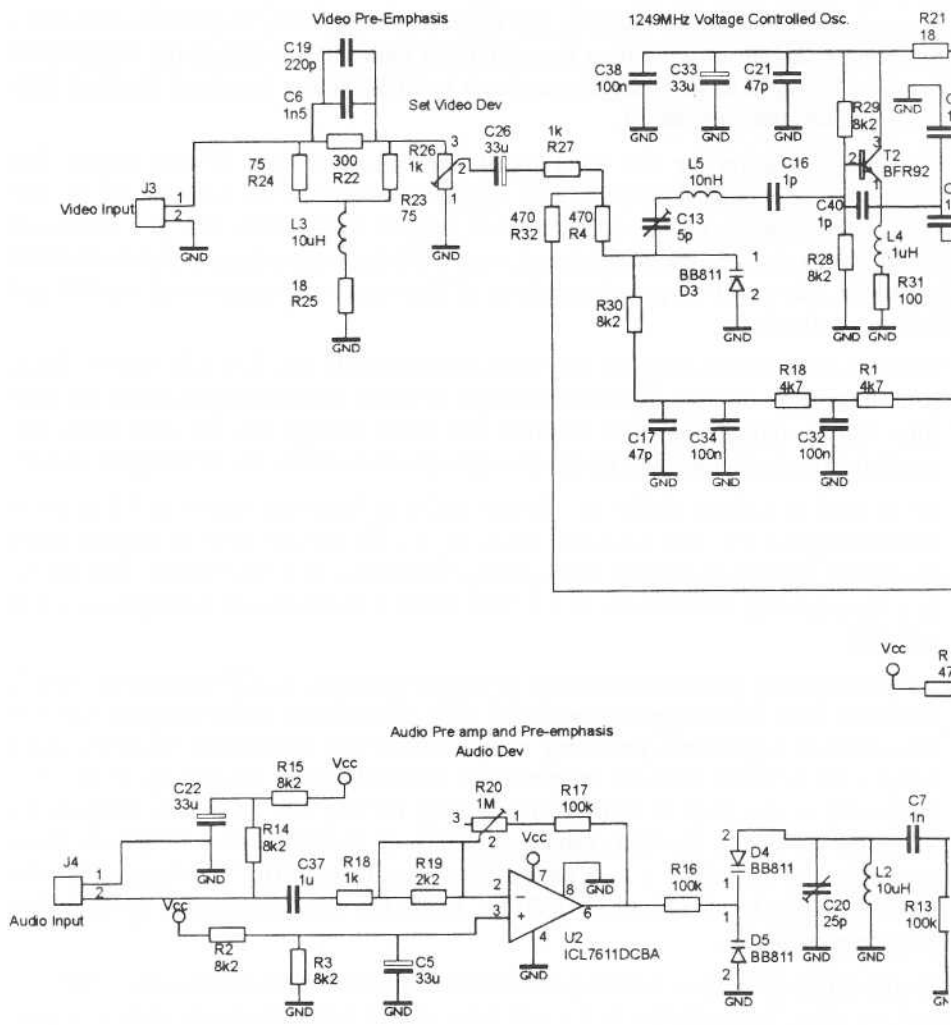
U6 and U5 amplify the low level signal from T2 up to circa 2 watts output. The transmitter RF output is turned on by applying bias to U5 via a switch on J2. The PLL is left running all the time power is applied to the unit. U2 is a the sound pre-amplifier and pre-emphasis circuit, with T1 being a frequency modulated 6 MHz oscillator. The exact frequency and level of the sound sub-carrier is set by C20 and R12 respectively.

The PLL used in this design is very basic and uses only two IC's, U3 and U7. There is no loop filter op-amp, instead the output of U3 is used directly to drive the loop filter whose output via R30 controls the mean voltage on D3 and hence the oscillator frequency. R1 and R6 are in series purely to make the PCB layout easier!

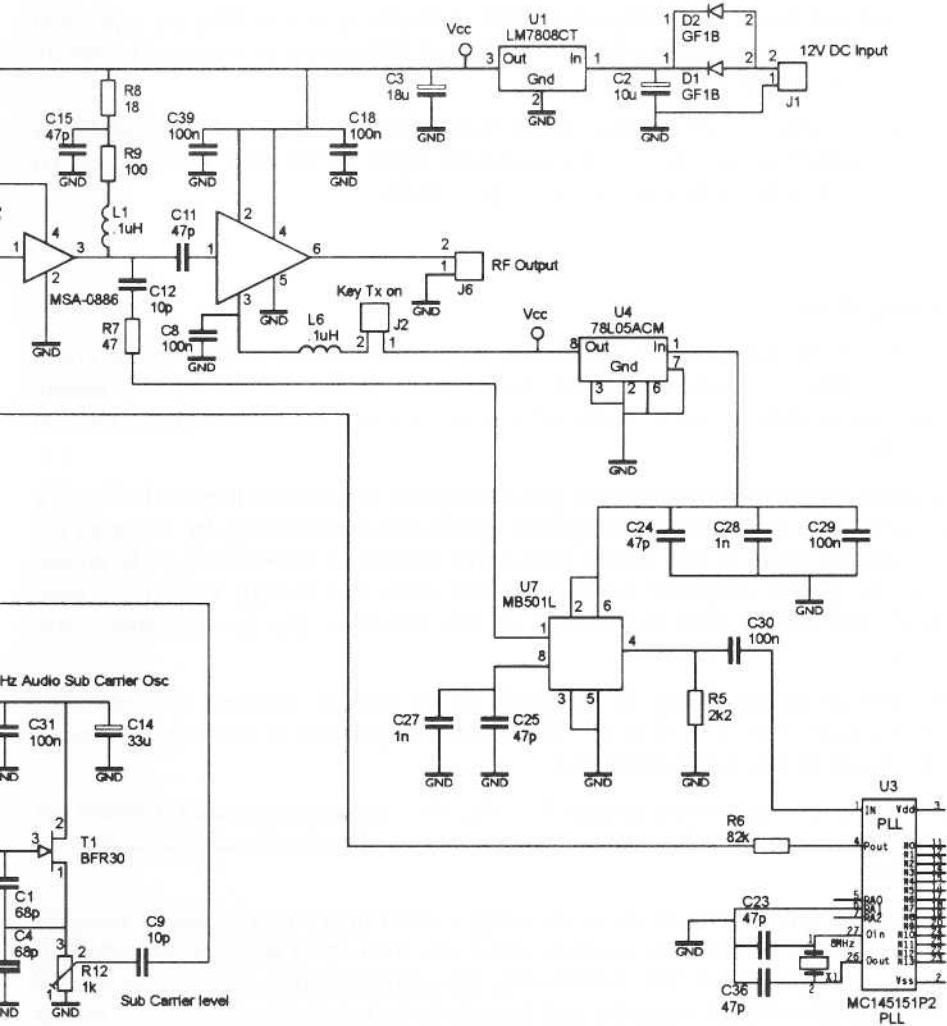
U7 is used as a fixed divide by 128 pre-scaler to bring the output of T2 down to within range of U3. The reference frequency of U3 for use with its internal phase detector is 8 MHz divided by 2048, giving a reference of 3.90625 KHz. This results in a channel step of 500 kHz at 1.3 GHz when it is effectively multiplied by 128 with U7.

For good quality pictures the overall frequency response of a TV transmitter ideally would be from DC to approximately 5.5 MHz. Usually the high frequencies are not too much of a problem, providing care is taken with the design. However when using a PLL which tries to maintain the nominal carrier frequency, if the PLL bandwidth is too great it can effectively strip off any low frequency components. Therefore to ensure the PLL cannot attenuate or distort the low frequency frame sync pulses, it must have a loop bandwidth of less than 50 Hz. The design presented here has a loop bandwidth of circa 30 Hz, easily low enough to ensure adequate low frequency response.

A side effect of using a low loop bandwidth with a basic design like this is the PLL lock up time. Typically the PLL could take several hundred milliseconds to acquire lock from switch on. That is why in this design the PLL is kept 'hot' all the time and the transmitter turned on by applying bias to the PA. This technique offers the benefit of having a low level signal present for picture alignment purposes before actually going 'on-air'. The low loop band bandwidth of 30 Hz also makes it very easy to attenuate any traces of the 3.90625 kHz reference frequency which may otherwise leak through into the signal path and modulate the transmission.



**Fig. 1: Circuit Diagram of the 24cm ATV FM Transmitter**



By varying the divide ratio in U3, it is possible to program any other frequency in the band to a resolution of 500 kHz. With a link (or switch) across J5 the transmitter will operate on 1249 MHz, the most popular repeater input frequency. Due to spreads in X1 and C23 and C36 the reference oscillator may not be exactly on 8 MHz and result in a slight frequency offset of maybe up to 100 kHz, not a problem with a 15 MHz receiver bandwidth! If desired C23 could be trimmed to ensure operation on exactly 1249 MHz.

Leaving J5 open circuit results in the transmitter operating on 1265 MHz for simplex operation. All the "N" programming inputs to U3 have internal pull up resistors so its quite in order to leave J5 open circuit.

## Construction

Virtually all the parts used in this design are readily available surface mount types, however there are a few parts which are normally leaded. X1, U1 and U3 require converting to surface mount, easily achieved by forming the leads to fit the pads on the PCB.

Generally the use of surface mount parts throughout makes installing the PCB into a case very easy with no need for special spacers etc. Additionally, by fastening the PCB directly down to the case a good earth is ensured between the PCB ground plane, RF power amplifier module and the case, this in turn leads to a more reproducible design with less chance of RF instability due to circulating earth currents.

The printed circuit board is designed to fit into a standard die cast box approximately 4.75 x 3.75 x 1". If continuous operation is envisaged, then an additional heat sink is recommended.

In certain critical areas operating at 1.3 GHz, ATC capacitors are used. I would not recommend using any other manufacturer, otherwise the circuits may not operate as intended.

Building the unit up is very easy, providing a small tipped iron, a pair of tweezers and fine gauge (32SWG or similar) solder are used. It is recommended that all passive parts are loaded first, followed by the semiconductors, leave fitting the RF power amplifier till last when the unit is ready to be installed in its case. All testing and alignment is carried out with the PCB in situ.

Ensure that when loading polarised components (especially diodes and capacitors) they are fitted the correct way around, an obvious statement but when using surface mount components its sometimes difficult to identify which end is which.



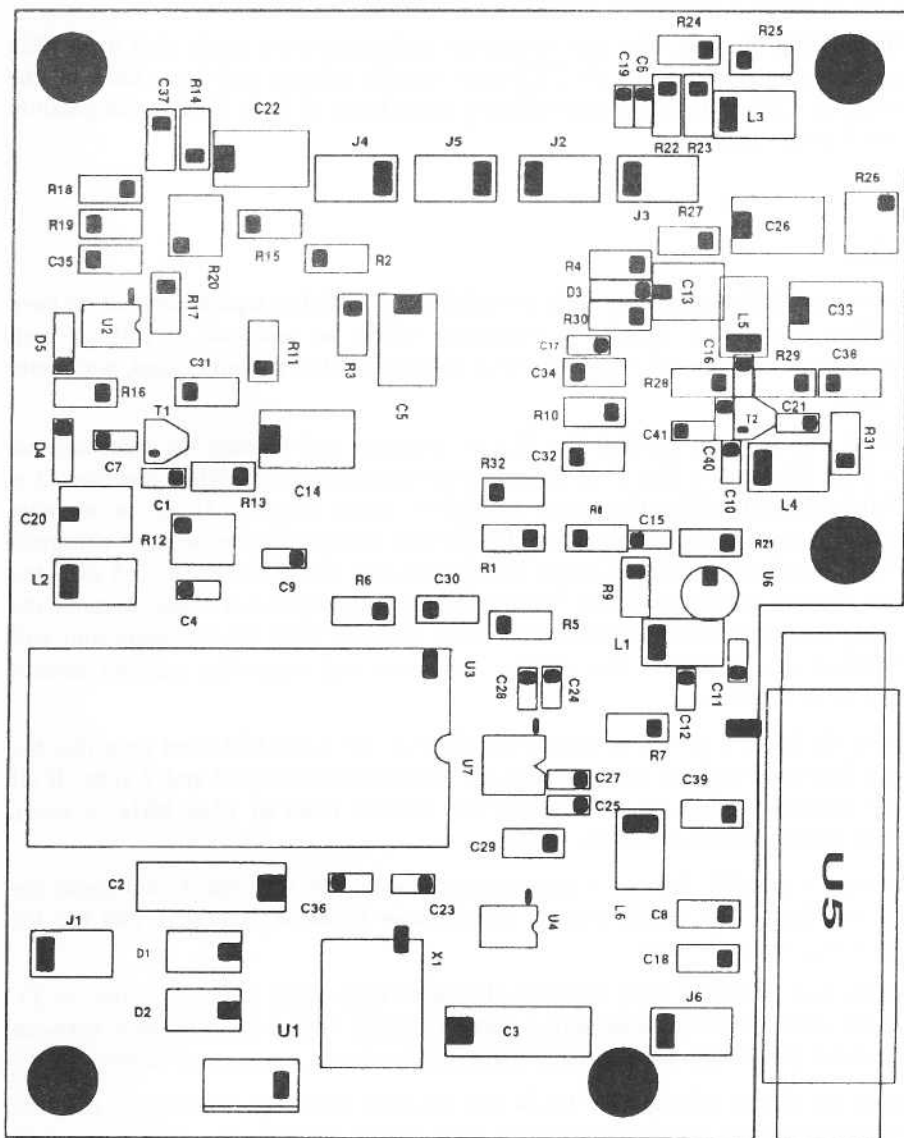


Fig.2: Component Overlay for the 24cm FM ATV Transmitter

Figure 2 shows the location of all parts on the PCB and identifies by means of a black rectangle which is pin 1 of any component, so with reference to the circuit diagram in figure 1 it is possible to determine the correct orientation.

While building the unit, take care to inspect each joint as its made, then if possible before applying power wash the PCB in a suitable solvent and then check all the joints again. Care in construction will save many hours of fault finding and possibly damaged components.

## Testing

It is assumed that constructors have no suitable 1.3 GHz test equipment, but do have a satellite receiver, a source of composite video, an ammeter, a DM or high impedance multimeter and some sort of aerial load (either a dummy load, wattmeter or aerial).

The first step is to ensure that the PLL is operating and holding the frequency on 1249 MHz. Make sure that J5 is linked (so programming 1249 MHz) and that J2 is NOT linked (so disabling the power amplifier). Apply power to J1 via an ammeter (the standby current should be about 70mA), then using a high impedance voltmeter or DVM, monitor the voltage at the junction of R10 and R30, adjust C13 until the voltage reading is between 2 and 7 volts, ideally mid range i.e. 4 Volts. Remove the trimming tool after each adjustment as stray capacity from the trimming tool will often affect the oscillators free-running frequency and hence the required control voltage from the PLL.

Remove the link on J5, so programming the PLL for 1265 MHz and note that the voltage increases slightly, but still remains somewhere between 2 and 7 volts. If all is well replace the link on J5 and tune the satellite tuner to 1249 MHz. A blank raster or similar should be on the screen.

Make sure a suitable load or wattmeter is connected to J6. Link J2 to enable the power amplifier. The supply current should now be about 1 ampere and the RF output power about 2 watts.

Set both R12 and R26 fully counter clockwise then apply a video source to J3. Gradually turn R26 clockwise until a picture is seen with a good balance between contrast and grey scale. Ideally use a pattern generator as a source of video.

Connect an electret microphone to J4 and set R20 mid-way. Make sure that the satellite tuner sound channel is set for 6 MHz. While watching the picture turn R12 until a slight patterning can be seen, then reduce it until it just becomes invisible. Adjust C20 for maximum quietening on the sound channel combined with best audio quality.

Following the above procedure should be sufficient to get the unit operating, but some of the settings may require fine adjustment on air when working a more distant station.

Connecting the unit to an aerial is all that is required to be "on air" I would recommend the use of a G3JVL quad loop Yagi. This particular aerial design offers excellent gain and perhaps more importantly adequate bandwidth to cover both repeater input and output frequencies. Mike Walters G3JVL can be contacted at 26 Fernhurst Close, Hayling Island, Hants, PO11 0DT.

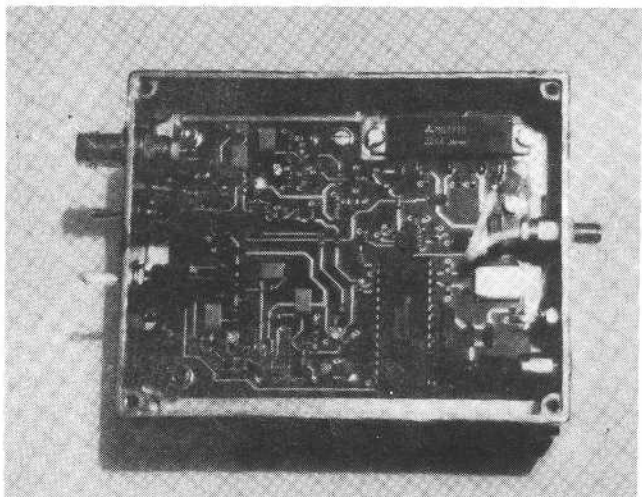
Often two aerials are used, one for transmit and one for receive, if they are placed sufficiently far apart (typically greater than 1 metre) it is usually possible to run "look through" without any additional filtering.

## ATV Operation

Ideally all amateurs aiming to use ATV should try to run "look through" when operating through a repeater. Running look through offers several advantages, probably the most important being able align and adjust your signal through the repeater for best effect. Secondly, if any one else wishes to use the repeater they can usually be seen to cause patterning, etiquette normally decrees that the present user drop out and let the other station operate!

One of the unusual aspects of ATV is that when a station is on air, other people (usually unlicensed) often get in on the act and find themselves being televised and sometimes having a conversation with the person on the receiving end! It seems to be an unwritten rule that this is permissible, providing the license holder is present to monitor proceedings, on this basis ATV can get the whole family involved in the hobby!

For those stations watching but not able to transmit, talk back usually takes place on 144.750 MHz or 144.725 MHz, so offering full duplex operation of sound if not vision.



**NOTE:** If all of the above has got you fired-up and keen to disconnect the domestic satellite tuner from the LNB and fit a 23cm aerial in its place, a word of caution. The DC power for LNB unit is sent up the coax, that's OK if you're planning to fit a mast head pre-amp and power it in the same manner as the LNB, but if your tuner has sufficient sensitivity or you live close to the repeater and decide you don't need a pre-amp, then be careful to either disconnect the DC feed inside the tuner or use an aerial which is a DC open circuit. Otherwise you stand a chance of shorting out the LNB power feed and if its not current limited you could do some damage. Some tuners however have an LNB fuse, in this case its just a matter of removing the fuse when using an external aerial which is a short to DC.

## Conclusion

In an article such as this it is impossible to cover and explain all the various aspects of ATV operation, but it is hoped that a little light has been shed on the subject for those readers who have never heard of amateur TV.

Television is a very technical field and much more demanding in terms of equipment performance and operation, however because of these problems, the rewards for success are that much greater and well worth the effort.

Finally I would like to thank Eddie G3ZJO, Mike G6CJN, Dave G4SCJ and George GOKOG for their help in proving and testing the design.

## Parts List

Item	Device	Value	Item	Device	Value
C1	ATC100A	68p	C18	CER.CAP	100n
C2	elec	10u	C19	ATC100A	220p
C3	elec	10u	C20	trimc	25p
C4	ATC100A	68p	C21	ATC100A	47p
C5	tant	33u	C22	tant	33u
C6	ATC100A	1n5	C23	ATC100A	47p
C7	ATC100A	1n	C24	ATC100A	47p
C8	CER.CAP	100n	C25	ATC100A	47p
C9	ATC100A	10p	C26	ATC100A	1n
C10	ATC100A	1p	C27	ATC100A	1n
C11	ATC100A	47p	C28	ATC100A	1n
C12	ATC100A	10p	C29	CER.CAP	100n
C13	trimc	5p	C30	CER.CAP	100n
C14	tant	33u	C31	CER.CAP	100n
C15	ATC100A	47p	C32	CER.CAP	100n
C16	ATC100A	1p	C33	tant	33u
C17	ATC100A	47p	C34	CER.CAP	100n

Item	Device	Value	Item	Device	Value
C35	CER.CAP	100n	R9	RES.25W	100
C36	ATC100A	47p	R10	RES.25W	4k7
C37	CER.CAP	1u	R11	RES.25W	47
C38	CER.CAP	100n	R12	SMPOT	1k
C39	CER.CAP	100n	R13	RES.25W	100k
C40	ATC100A	1p	R14	RES.25W	8k2
C41	ATC100A	1p	R15	RES.25W	8k2
D1	DIODE	GF1B	R16	RES.25W	100k
D2	DIODE	GF1B	R17	RES.25W	100k
D3	Vcap	BB811	R18	RES.25W	1k
D4	Vcap	BB811	R19	RES.25W	2k2
D5	Vcap	BB811	R20	RES.25W	18
J1	Hdr_2		R22	RES.25W	300
J2	Hdr_2		R23	RES.25W	75
J3	Hdr_2		R24	RES.25W	75
J4	Hdr_2		R25	RES.25W	18
J5	Hdr_2		R26	SMPOT	1k
J6	Hdr_2		R27	RES.25W	1k
L1	COIL	.1uH	R28	RES.25W	8k2
L2	COIL	10uH	R29	RES.25W	8k2
L3	COIL	10uH	R30	RES.25W	8k2
L4	COIL	.1uH	R31	RES.25W	100
L5	COIL	8nH	R32	RES.25W	470
L6	COIL	.1uH	T1	N_FET	BFR30
R1	RES.25W	4k7	T2	RF_NPN	BFR92
R2	RES.25W	8k2	U1	pos_reg	LM7808CT
R3	RES.25W	8k2	U2	OP-Amp	ICL7611DCBA
R4	RES.25W	470	U3	PLL	MC145151P2
R5	RES.25W	2k2	U4	pos_reg	78L05ACM
R6	RES.25W	82k	U5	RF PA	M67715
R7	RES.25W	47	U6	MMIC	MSA-0886
R8	RES.25W	18	U7	DIVIDER	MB501L
			X1	XTAL	8 MHz

*For further information or to obtain a printed circuit board please contact: Tim Forrester, 24 Corran Close, Dallington, Northampton, NN5 7AL. Tel: 0604 757401.*

*We wish to thank the Editor of Elektor Electronics for permission to reproduce this article in CQ-TV.*

# Making Printed Circuit Boards

Peter Delaney G8KZG

*Often in CQ-TV and elsewhere there are circuits that you may wish to make on a Printed Circuit Board (PCB), for which a pattern is not given, or you may want to make a board for circuits that you develop yourself. The process using photo-sensitive coated material is not difficult, as explained below step-by-step. It is important, however, to work safely at all times. The chemicals used are hazardous, so should be handled with suitable precautions, not left where children might find them, and used in containers used for no other purpose. They, and the other materials needed, can be obtained from suppliers such as Electrovalue, Maplin or R.S.*

Here then is what you do.....

- a) Draw a plan to scale on graph paper (if possible with lines 0.1" apart) as seen from the board side. Each resistor is 0.4" long and remember to draw ICs with the pins 0.1" apart, each row 0.3" apart and draw it as seen from below (which is not as shown in the data books).

Transistor pin-outs as shown in data books as if viewed from below so they are OK. Do not try to pass more than 2 tracks between IC pins, or more than one between the pins along a row (you will find it MUCH easier if you avoid passing tracks between pins anyway). For other components, like variable resistors, you can measure them, although most diodes and small capacitors will fit holes 0.2" apart. You will find that it helps later if you keep a note of where you placed each component - the easiest way is to stick a piece of tracing paper over the graph paper, hinged with sticky tape along one edge. If you work in pencil you can modify the pattern as you progress. Remember that two separate wires cannot cross on the board without being connected - you have to reroute one or both to avoid unwanted joins.

- b) Collect the materials you will need: i) a piece of coated PCB material of the right size - it has a black plastic layer on which you must not remove yet!  
ii) a piece of clear acetate (as used for overhead projector transparencies) of about the same size, small scissors and a scalpel

III) mix, ready for the next stage, a solution of Sodium Hydroxide at a strength of 7gm per litre, to put in a plastic tub in due course, big enough to hold your piece of board. **BE CAREFUL** - Sodium Hydroxide is a hazardous



substance, so you should wear suitable protection, including safety eye goggles. Add a little of the Sodium Hydroxide to the water at a time so that the heat generated has time to disperse.

iv) a small saw (junior hacksaw), a G-clamp, sticky tape and an ultra-violet light source (the sun on a bright day if you do not have access to a lamp - special u-v light boxes can be made, or bought from R.S. or Maplin).

v) a plastic or glass container to do the etching in, preferably with a lid. If you can arrange a non-metallic fish tank type heater and aerator in it, as heating the solution and keeping it moving aids the etching process. Ensure that all electrical connections are absolutely safe, remembering that there is to be a corrosive liquid around. (If you are rich then buy a purpose-made tank from R.S. or Maplin).

vi) mix sufficient saturated Ferric Chloride solution to half fill the tank. Ferric Chloride is another hazardous substance, so take suitable precautions, such as wearing gloves, eye protection, etc. Mix the solution in a glass container - remember that it is intended to 'eat' metal. A saturated solution is made by continuing to add the crystals until no more can be dissolved in the water - weaker solutions will work but take longer, with the risk of 'undercutting' of the copper.

- c) You now need to make a copy of your graph paper plan, using transfers and black tape wherever you want the copper and leaving a space where you want no copper on your board. First, if you use graph paper with 2mm squares have it enlarged on a photocopier by 127% -also enlarge the component plan by the same proportion. Keep the drawings as they can be used in your final written report.

Fix the piece of acetate to your enlarged drawing of the copper pattern. Start with the integrated circuits - the IC pads are spaced at 0.1" on the sheet. You rub them down onto the sheet of acetate with a Biro until they look grey rather than black. At the end of each component, or each lead of a transistor, rub down a small round pad. The pads are joined together, following the lines on your drawing, with black tape. The tape can be gently curved where needed - try to leave a gap between each track equal to the track width. Allow the tape to overlap each pad slightly (but leave the centre hole - it helps when you drill the board later). Put a spot near pin-1 of each IC. It helps you to get the pattern the right way round if you put some words onto the pattern (e.g. your name or project title).

Hold up the pattern to a strong light to check for cracks in the tracks/pads, or to see if there are any marks where there should not be (a hair on the pattern will become a copper wire that you do not want!).

- d) The next step takes around half an hour, so make sure that you have enough time to complete it before you begin!! Cut the piece of board to size - slightly bigger than the black taped pattern. Now remove the plastic film (on one side only if a double-sided board). Tape your plastic pattern to the board so that it is the correct way round - check with the words - and ABSOLUTELY flat to the board. Try to keep the sticky tape at the edges, off your patter. If it is difficult to keep the plastic flat across the board, sandwich the pattern between the board and a piece of clean glass. Support the board so that the pattern is between the board and the u-v light source. Expose the board to the u-v light for 5 or 6 minutes (give it a little longer if you put an extra sheet of glass in between the pattern and the lamp, and about 30 minutes if using sunlight - you may need to experiment to get suitable exposures with your light source).

Remove the board at the end of the exposure and remove the taped pattern and keep it (for your write-up for CQ-TV , and also if you need to make another board later). Put the board into the Sodium Hydroxide solution for 5 to 10 minutes. BE CAREFUL as the chemicals are dangerous, so use plastic tongs and wear safety goggles. When the board is ready you will see a sharp image (usually green, sometimes blue) exactly the same as your black taped pattern. If some parts have not developed fully put the board back into the solution for a little longer. When you are satisfied that there is a clear 'print' on the copper board rinse the board, dry it carefully (use kitchen roll type paper gently and store it in the dark until you reach the next stage to stop any light affecting the pattern you have on the board - a black plastic bag such as photographic paper is packed in is ideal).

- e) You now need to put the board into the etching 'tank' of ferric Chloride solution. This takes at least 20 minutes, depending on the temperature and freshness of the chemicals and the size of the board. The chemicals are dangerous, so you MUST wear goggles and use plastic tongs. (As the chemical is going to 'eat away' metal it would harm metal tongs - if you get it on your fingers they will stain, as if you have been smoking a lot of cigarettes!, apart from any other damage it may do to you). Put the tank on to warm up then place the board into the tank, if possible supported vertically so that the surface is in contact with the liquid, fit the lid and turn on the pump, which bubbles air through the aerator in the liquid (if you have one). Every 5 minutes remove the board, using tongs and with your goggle on, and rinse under water so that you can examine the board. To begin with it will look much the same so put it back into the solution, but when complete there will be a copper pattern to match the black taped one. You need to leave the board long enough that there are no 'whiskers' of copper left where there should be gaps, BUT not too long or the tracks will get too thin or even have

gaps in. The board material is a different colour to the copper, so, when the liquid is rinsed off, it is easy to see when it is 'done' - although you need to check carefully at narrow gaps. If the board has not finished at the end of the time you have available do NOT leave it in the solution, but remove, rinse, dry and store it until you can complete the task. You also need to rinse and dry the board when finished.

- f) You need to drill holes for the components. Drill the holes 0.8mm in diameter from the copper side of the board. The space in the middle of the black dots will have left a depression when etched which helps you to line up the drill. The tiny drill bit will snap if the board moves sideways (or the drill does, but a hand-held drill is NOT a good idea). You will also need to drill fixing holes - about 3mm diameter is suitable for most boards. A useful tip - secure the board onto a piece of Formica surface wood when you drill the holes and there is less likely to be a burr on your holes.
- g) File the edges of the board smooth and make sure that they are square. Clean the ink and other impurities from the copper by rubbing the copper surface with wire wool.
- h) Insert the components from the non-copper (or ground plane side for double-sided boards). Check that each component is in the correct place and the right way round - your tracing paper pattern will help here. Solder them into place using a really hot clean soldering iron for as short a time as possible and trim the leads. Do not try to solder all IC leads in one go - the heat build up can damage them. (Try 2 or 3 IC pins, then do a few resistors, the next 2 or 3 IC pins, and so on). Trim all the spare bits of component leads so that the board is neat and tidy and that they cannot touch where they should not.
- i) Set up and test your circuit making any necessary adjustments.

If your board does not etch correctly then you can make another using the original pattern as many times as needed. Similarly, if you find that there is a mistake it can be corrected and a new board made, without having to make a complete new pattern.

*70 cm - use it or lose it !!*

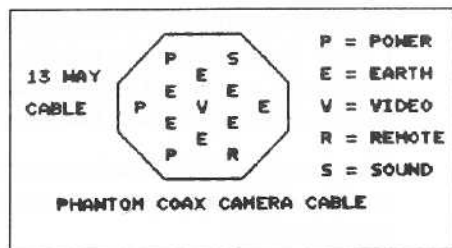
# Using Non 75W Video Cables

John Stockley G8MNY

*There are many good quality audio and computer cables that can be used for long Camera cables, here is how.*

## Coax or not

If the cable has a screened lead, then this can be matched to give an echo free response, and then boosted up to 1V and 75W again. Even with no screen a Phantom coax can be made, by earthing out all the surrounding cores. However so some video crosstalk will be experienced to the sound wire, but it is often acceptable!



## Zo

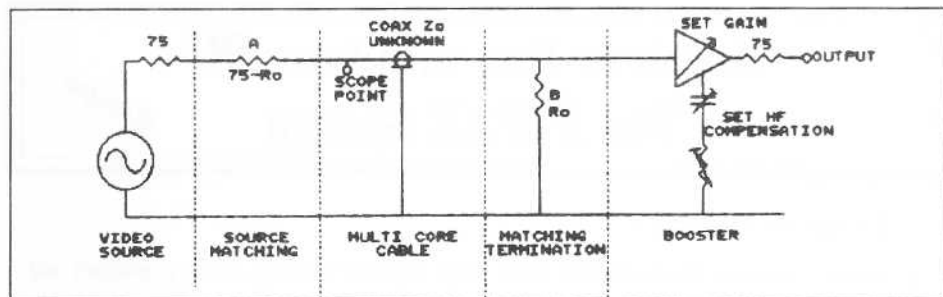
To find the cable impedance place a small preset resistor (no wire wounds) of a few hundred ohms across the far end. Drive the near end with a video signal (pulse and bar is best) and scope it at the driven end. Adjust the preset and see the local sync pulse distort due to the reflected pulse. Measure the preset terminating resistor value when the sending pulse is the best shape this is the best match value, and approximates to the Zo of the Cable.

## Matching

The Generator (camera) is only designed for a 75W load, so it is best to add a series (or shunt) resistor "A", to correct the "seen" impedance. Although the cable has a complex L and C components responsible for its impedance, most cables do look resistive, so for minimum reflections and flattest response the load resistor "B", is the same value of the preset measured earlier.

## Video Booster

This is the Achilles heel, you do need a video buffer amplifier to not only compensate for any HF lost, but replace lost gain if there was a high mismatch loss. There are many amplifier designs published, and it is not difficult to set one up, to correct for the long cable losses.



## Equalization

For short cable runs of a few tens of metres, scope the HF loss on colour bars before and after the cable. Set up the booster gain for unit loss on the peak white, and set the HF lift components (C and R) for the correct colour level. With very long cables a couple of CR networks with different values may be required to flatten the fall off in middle luminance frequencies as well. These are normally set up using Pulse and Bar test signals, that contain LF and HF components, and you twiddle the equalizers for best shape.

## ***KM Publications - Software List***

'PUFF' with Handbook (Caltech)	£ 18.50
Motorola/SM6MOM-W6 PUFF Supplement	£ 11.00
Siemens S-parameters	£ 9.50
Philips S-parameters	£ 14.50
HP AppCAD/HP	£ 16.50
Post & packing on above £1.50 for UK, £3.00 for Overseas, £7.50 for Airmail	
CAE No.1 collection (CQ-TV 163, pp 27-30)	£ 70.00
CAE No.2 collection (CQ-TV 163, pp 27-30)	£ 70.00
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# Amateur Fax with your PC

## The JV FAX System

Review

Art Backman SM1BUO

*Facsimile systems have always been very popular among radio amateurs all over the world. One reason for that is the excellent picture quality attainable, and another reason is that the picture will be on paper for archiving.*

One can either use a photographic or an electrostatic system. The first uses a photosensitive paper and a modulated light source, whose beam will be directed to the paper. This is mounted on a drum that will be turned with a certain constant speed. The picture quality is excellent, but the system has many disadvantages. The paper must be attached and exposed in darkness and then developed with conventional darkroom techniques. The other method employs electrostatic paper, where a wire electrode burns away the uppermost white layer so that the black layer under it will be visible.

To build a fax machine from scratch puts great demands on your mechanical skill. It is a precision work that involves synchron motors, drum, drive mechanisms and, electronics of course. With a fax recorder you are stuck with paper size and drum speed. It will be complicated to receive and transmit in another mode.

### JV FAX - A SUPERB COMPUTER PROGRAM

All of the above can now be considered as history and the fax machines can be put aside as antiquities through the introduction of a software program called JV FAX 6.0, invented by a clever young German, Eberhard Backeshoff, DK8JV it is now possible for everyone equipped with a personal computer to receive and transmit fax, - even in colour. Various software that enabled the reception of WEFAX, APT and certain modes in amateur fax have been around for some time, but up till now it has not been possible to receive AND transmit amateur fax in colour.

The greatest advantage perhaps with JV FAX is that it will hardly cost you anything, provided of course that you own an IBM type personal computer. With version 6.0 recently released you can even receive AND transmit in the popular SSTV modes M1, M2, S1, S2, SC1, SC2 and the old fashioned B&W modes. You will not get ripped off any more like you were when buying SSTV gear such as converters, add-ons, interface boards, EPROMs and software. JV FAX will only cost you the normal price of the disk proper.



One will get maximum performance with at least a 386, Super VGA and minimum 4 Mb of RAM.

If you can refrain from the colour possibility, a 286, DOS 3.0 and graphics from CGA to EGA, Hercules and VGA will do. But, as mentioned above, colour requires SUPER VGA.

## COMPETES WITH SSTV

JVFAX with its superior resolution and colour is consequently a severe competitor of colour SSTV. Furthermore it costs only a fraction of SSTV and it is very easy to set up. The only disadvantage with JVFAF is that a colour picture in mode "Ham Color 4" takes three minutes and 10 seconds compared to one minute and 50 seconds for SSTV in mode M1. You can also transmit B&W in mode "WEFAX" which has the best resolution, i.e. 1810 pixels/line. One "WEFAX" frame takes about 10

minutes and, strangely enough, this mode seems to be the least susceptible to QRM.

## RECEPTION OF WEFAX AND APT

One can also use this software for the reception of WEFAX and APT and synthesized colours can be added. Pictures can be stored in memory and recalled and printed. A stored picture can be displayed again on the computer screen, it can be zoomed and retransmitted. Pictures are stored in the well known GIF format and therefore a wealth of picture material is available as shareware.

## INTERFACES

The interfaces for reception and transmitting respectively are very simple in their simplest forms. The receive interface is shown in Fig.1 and consists of a 741 OpAmp and a few components. They can be mounted on a small Veroboard,

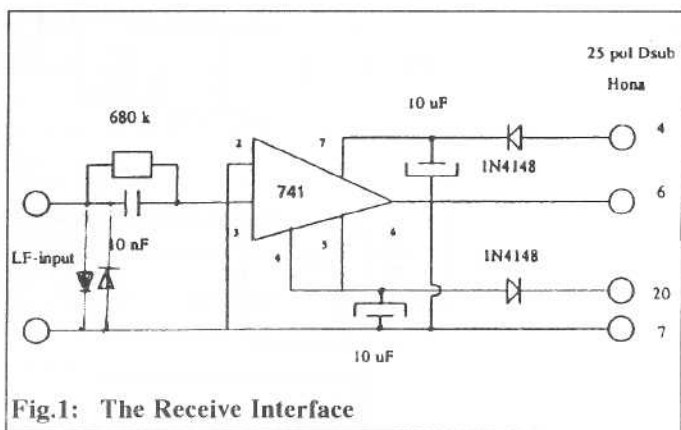


Fig.1: The Receive Interface

connected to a 9p Dsub and plugged into the COM port. The other end is connected across the radio's loudspeaker. The transmit interface is in principle the same

as used by the HAMCOM software for RTTY, (Fig.2) but in order to isolate the computer ground from the radio two miniature audio transformers are connected back to back on a small Veroboard. The two leads from one transformer is connected to the computer's loudspeaker and the two leads from the second transformer connected to a 9p Dsub mounted on the rear panel of the computer. The small board could preferably be taped to the computer chassis close to the loudspeaker. The balanced leads going to the switch box need not be shielded.

Figure 2 suggests how to wire the switch box for convenient switching between SSB, SSTV and FAX. Still another suggestion for Kenwood TS440 and TS850 owners is shown in Fig.3.

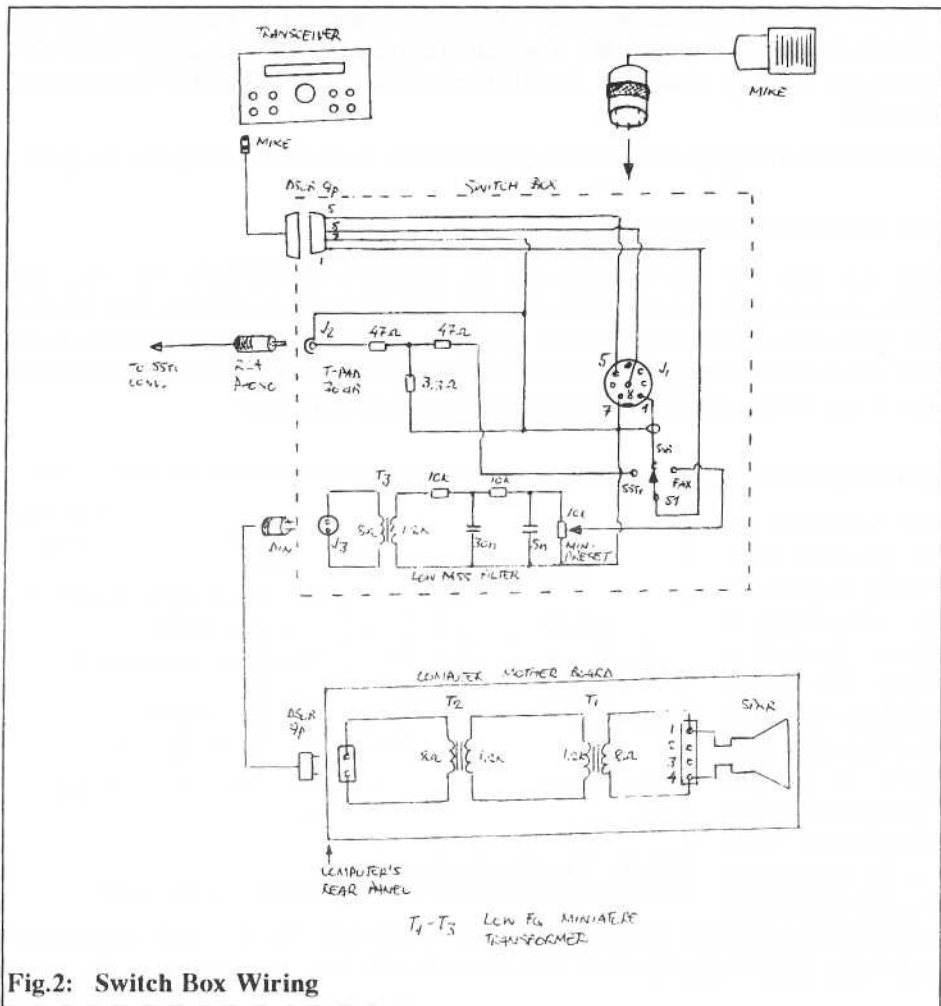


Fig.2: Switch Box Wiring

## DOCUMENTATION

There is a manual in English as well as in German on the disk. One must read the 50 pages several times, but you should start practising at once to grasp the meaning of the text quicker. You can then use the manual as a reference.

## CONFIGURATION

After having installed JVFAX you start the program and press "C" for the configuration menu. Following data should be written into the various fields. You move between the fields with TAB and you change the values by pressing the + key until you see the desired text. When you are done, press CTRL-ENTER in order to save the configuration. You can change the configuration at any time.

DEMODULATOR	7 bits comparator
ADDRESS	03f8h/IRQ4
BIT	0 is SSTV sync -YES
MODULATOR	6 bits on speaker
ADDRESS	0000h
BAUDRATE	57600
GRAPHICS	SVGA (256 colours)
ENABLE SCROLLING	Yes
SSTV GRAPHICS	SVGA (256 colours)
PRINTER	HP DeskJet 500C
FORMFEED AT END OF PICTURE	No
ALLOW TONE ALERT	Yes
MAX INTERRUPT FREQ	7500
ENABLE AUTOLOCK	Yes
CLOCK TIMER FREQ	1183181
DEFAULT PICTURE DIRECTORY	C:\JVFX
STORE PICTURES IN GIF <sup>89a</sup>	Yes
MISC. SETTINGS	Blank
CALLSIGN	SMIBUO

Be VERY careful with the configuration. If you are using the simple receive interface it MUST read "DEMODULATOR 7 bits COMPARATOR" and nothing else. It is also important that you have the appropriate GRAPHICS data written in. If you have Super VGA you must get into a sub menu once you have reached "SVGA (256 colours)". Do exactly the same when you come to "SSTV GRAPHICS". A similar procedure applies to the "PRINTER" setting.

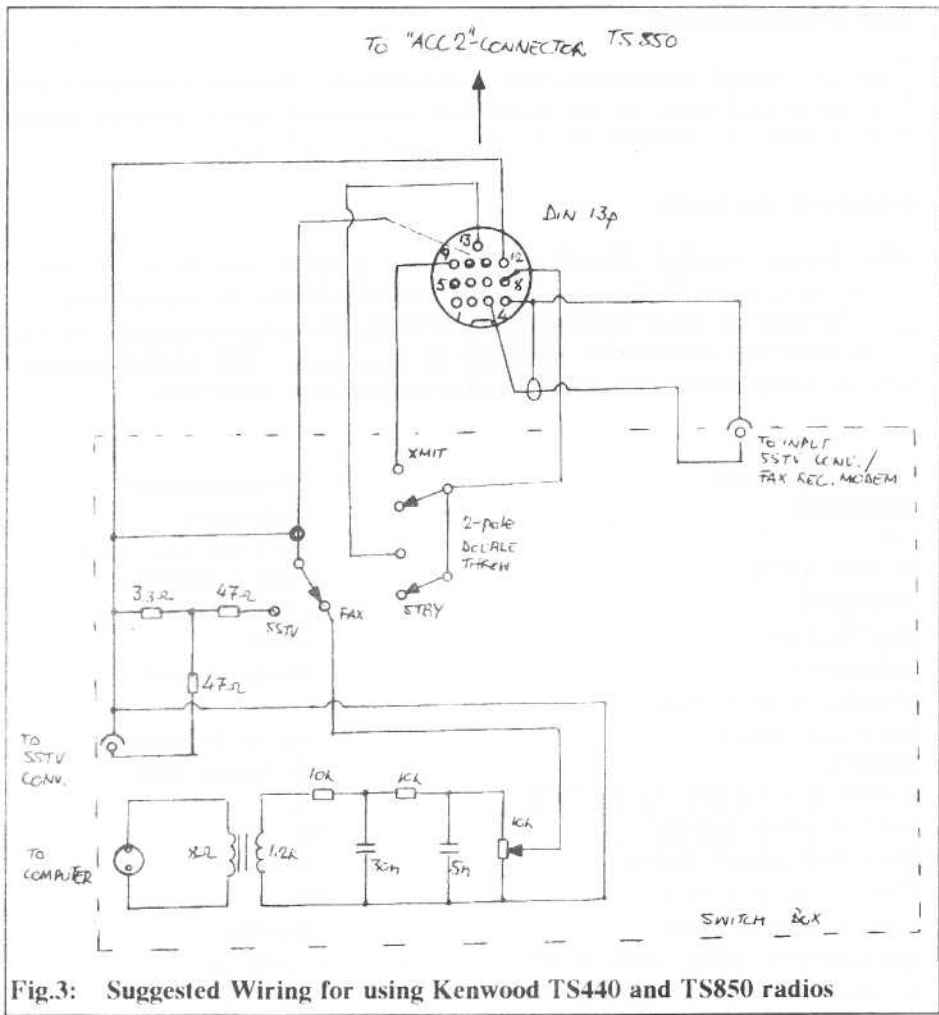


Fig.3: Suggested Wiring for using Kenwood TS440 and TS850 radios

## SETTING THE VARIOUS MODES

After configuring it is time to set the various modes - there are 10 altogether. In my opinion it is sufficient for radio amateurs to use only three of these to transmit pictures, e.g. 1, 4 and 5. Consequently only those three are quoted below, and you could try anything you like in the other modes, but it is important that we establish a standard.

MODE	1	4	5
IOC	576	204	288
LPM	120	360	240
RESOLUTION	1810	640	905
DEVIATION	400	400	400
ATC	on	on	on
INTENS.LEVELS	64	64	64
APT-MODE	tone	tone	tone
PHASING SIGNAL	norm.	norm.	norm.
SCAN DIRECTION	dwn	dwn	dwn
APT START TONE	300	200	675
MIN. DURATION	3	3	5
APT STOP TONE	450	450	450
MIN. DURATION	3	3	3
DISPLAY WIDTH	100	100	100
PRINTER WIDTH	100	100	100
RECEIVE PIX INV.	off	off	off
COLOR PALETTE	standard	standard	standard
JVCOLOR MODE	off	on	off

## HOW TO OPERATE JVFAX

Now is the time to go onto the air and start listening for a station transmitting amateur fax. When you press "F" in the main menu you get a black screen and a small square in one corner. The square contains text that can be changed by pressing various keys, and a mini-oscilloscope showing the signal if ATC is ON. The oscilloscope signal is the criterion for connection between the radio and your computer. If there is a signal on you have missed the start signal and must press "A" for "APT:running". There will now be scanning lines starting from the top, but if the picture cannot be read, you are in the wrong mode. You must press a key between 1 and 9. Take a chance on 4 since you will get into mode 5 when you start up.

If the picture is slanting you can adjust it with "APT" in the "waiting" mode. Pressing the forward slash ("/") places a vertical line in the middle of the picture. Move the line close to either of the picture's vertical margins with "CTRL-ARROW LEFT" or "CTRL-ARROW RIGHT". Now simply align this line with the picture margin using the cursor keys and hit "ENTER". A sure-fire calibration source is Darmstadt/Offenbach on 132.8 kHz USB.

If the start signal does not have any effect the phasing of the picture will be wrong and it will be displaced left or right. This can be remedied by pressing "R", which will give a short vertical line in the middle of the picture top. Move this line with one of the cursor keys until it coincides approximately with the picture margin.

When you press "ENTER" the picture will be correct again. It is important to do this while the scanning is in the picture header. There is ample time for this once you get the hang of it. When receiving colour pictures it happens very often that the colour sequence will be wrong. You can see that on the RGB plates in the header, but don't worry. Press "V" until you have the correct sequence and everything will be fine.

## WHERE TO FIND AMATEUR FAX

The recommended segments for SSTV and FAX in Region 1 are:

3730 - 3740 (rather 3730 plus/minus 5 kHz)  
7040 - 7045  
14225-14235  
21335-21345  
28675-28685  
144.700

The segment on 14 MHz is not a very clever choice it emanates from the childhood of SSTV. We now hear talk of moving FAX to 14245 away from SSTV but this does not make sense when one considers that with JVFAX6.0 and other systems you can receive and transmit both SSTV and FAX in colour, thus it does not make sense changing frequency when changing mode in a QSO with several slow-scanners.

## HOW TO PRODUCE PICTURES

JVFAX will only accept pictures in GIF format. Thereby a lot of material is available through shareware. But this is boring in the long run - think of the endless transmitting of flowers on 14230 in SSTV, not to mention all the half naked girls. Personally I think that it is silly to transmit a picture that you can find in any coloured magazine. So please do not bore me any more unless it is something terrific - and I don't mean porno. We have had porno magazines in Sweden for 40 years and most people are tired of it. Besides it is bad taste and it is awkward for the receiving operator in case there are visitors or children in the shack. Maybe you want to use FAX and SSTV for what it is really meant, namely picture information. By that I mean a picture of yourself, family members, the shack, your house, the antenna farm, the vacation trip, circuit diagrams and so on. With a hand-scanner for B&W, such as Logitech's ScanMan Model 32 one can scan photographs, drawings and text and get the pictures in TIFF, PCX and IMG. These can then be converted into GIF by means of some software, such as HIJAAK, and moved into JVFAX.

Should you want to produce colour pictures you must have a colour scanner or colour video camera and some software like Video Blaster. This program can convert the color pictures into BMP, TGA, PCX, TIFF, GIF and MMP.

# Rigonda Mods

John Stockley G8MNY

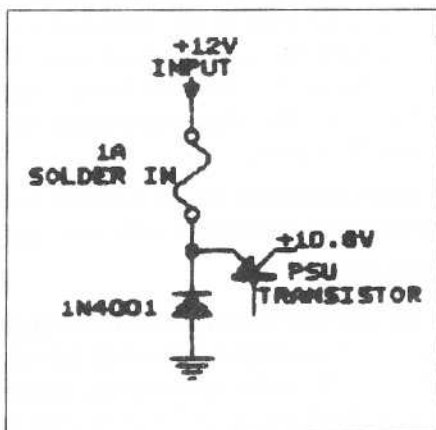
*The little 6" Russian B&W TVs make ideal monitors, this is how.*

## RIGONDA VL100

### 12V power

There were several versions, the older one (often Grey) had a fuse, but its PSU used a negative regulator for the internal 10.8V, and this one should not be used on an earthed 12V supply. A later version had a conventional positive regulated PSU but it was not fused! So a miswire caused instant destruction. Solder in a 1A fuse and reverse shorting diode before the regulator transistor.

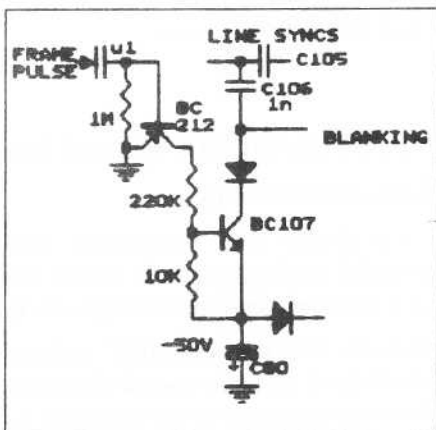
The volume control 12V switching was done on the negative, this gets bypassed with external connections, so you may wish to rewire this as well.



### Frame Blanking

Modern Teletext causes dots and dashes over the top 1/3 of the screen, the solution is to add frame blanking.

Put in a wire from the frame trigger pulse test point T15/K15 on the bottom front corner of the time base panel, to the top corner of the PSU panel. This pulse drives a BC212, mounted on the component side of the panel on a convenient earth point. This in turn pulses a BC107 on the -50V rail. The resultant -50V frame blanking pulses are fed through a diode to the blanking point. The line blanking feed capacitor C102 is changed to a 1nF.



## Video input

Remove and bypass the earphone socket. Drill out the chassis hole to take a BNC socket. With a heavy soldering iron, solder in a small slide switch above the socket, to the chassis. Make matching holes in the plastic back.

Connect up an  $82\Omega$  resistor to switch and socket, and wire away to the Brilliance pot on the IF panel, using screened lead. Fit the  $220\mu\text{F}$  by soldering its negative end to the back of the Brilliance control case with the screened lead outer. Connect the BC212 collector to the Contrast pot case. All other components should now fit in place.

Some adjustment of the internal brilliance preset, on the bottom front of the IF panel, may be required if the external video picture is too dark.

## RF aerial

The original 3.2mm jack aerial socket can be changed for the TV standard "Belling Lee". Depending on type, drill holes to fit, solder in place. Make holes in the plastic back to fit, make an extra one, above the aerial socket for a thin  $75\Omega$  coax lead to go back into the case. Fit a TV plug on a 5" piece of thin coax, thread into the back and under the new video term switch (if fitted). Connect an earth tag to the case and another one to the rod aerial, then connect the coax.

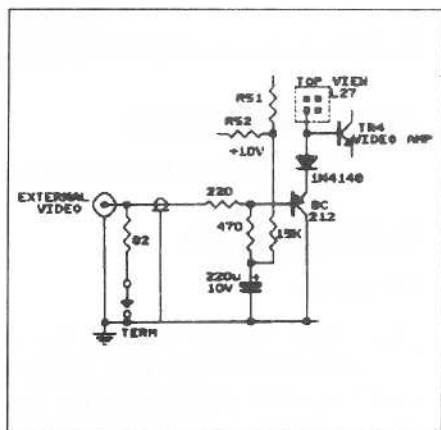
Although the rod aerial is no match for the original rectangular loop, it is not easily damaged and folds away.

## RIGONDA FIESTA 401 and VEGA 402

### Video and Sound in

Fit a double pole change-over switch, BNC and Phono sockets, in the holes provided in the top corner of the rear chassis. Remove the plastic back from the case and make holes matching holes in it for the switch, and sockets.

Wire the  $75\Omega$  across the BNC socket and wire to the switch. For the video input use screen lead from the switch through to front part of the PCB. TR1 is mounted on the component side of the top hinge out PCB.





The sound connections are near the input and short 2" leads are all that is required.

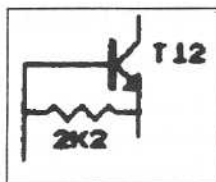
### Line Width

As with most TVs, mine was well over scanned. The line linearity magnet has some affect but at the detriment of linearity. Check the TV's supply

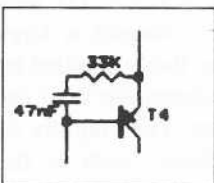
voltage is 10.8V, but this has only a very small effect on the width. The width is controlled by the the value of the LOPT tuning C which is C39. The value should be reduced in steps and making sure that a you don't power up with no C at all! Values range from 6.8nF to 30nF.

### Line Blanking

On my two TVs the blanking transistor was slow to turn off after the blanking pulse, causing the LHS of the screen to be dark. I added a speed up resistor base to emitter of TR12 to discharge the base charge.



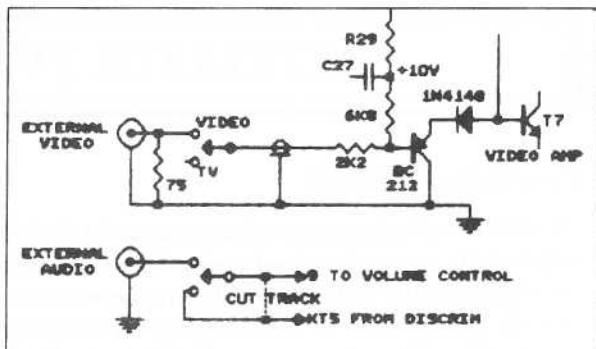
### Frame Top Linearity



Stretched top of frame seems to be designed in this timebase circuit. I found that a small CR across one of the frame output transistors sorted it out.

### LS socket

As with the early type this was a 3.2mm socket, but with care it can be drilled out to, or changed to, the standard 3.5mm jack.



**70cm ATV is under threat!**  
**let's not lose it through our**  
**own inactivity!**

# SATELLITE TV NEWS

## Paul Holland G3TZO

*At a recent symposium on advancements in digital television a speaker was heard tapping the microphone and saying "one-zero, one zero, one zero ...". The writing is clearly on the wall! Digital Television will be here very soon and satellite will be the initial means of delivering digital transmissions to the home. In this issue of Satellite TV news I report on developments in digital TV technology that will soon be having a significant effect on what we will be able to receive via satellite in the next year or so. I am also gazing into my crystal ball as we enter the new year and look forward to some of the other developments we can look out for in the satellite TV world this coming year.*

## NEWS FROM HERE AND THERE

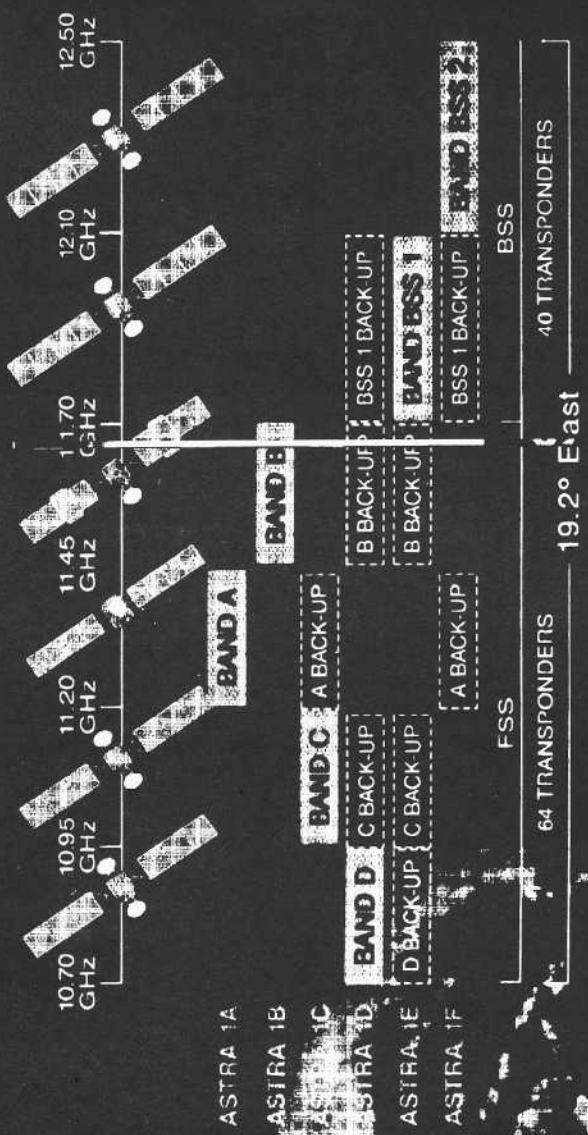
### Astra 1D

It seems no time at all since we were waiting for the launch of ASTRA 1C. With that satellite fully occupied now that SKY SPORTS 2 has been allocated the last free transponder we are looking forward to the launch of ASTRA 1D in the late summer/autumn. ASTRA 1 D will not be received by the majority of satellite TV viewers using their existing equipment due to the fact that ASTRA 1D uses frequencies below the normal FSS band (10.7 - 10.95 GHz). I suspect a large majority of people will opt for frequency extender devices such as those supplied by Global Communications (see New Products below). The other alternative is to opt for a triple band LNB and a receiver with an extended IF range. The majority of new receivers now come with an IF of 950 - 2050 MHz. Some, such as the AMSTRAD SRD550, cover from 700 -2050 MHz. The frequency allocation for the ASTRA system up to and including ASTRA 1F is shown opposite, however, I will give a full report on ASTRA 1D in the next issue of "Satellite TV News".

### MagyarSat

Antenna Hungaria are pressing ahead with plans for the launch in 1995 of MagyarSat. The project includes Deutsche Aerospace, Israel Aerospace Industries and Alcatel of France with launch facilities provided by Arienspace. Described as Eastern Europe's first dedicated satellite telecommunications service, MagyarSat will carry 10 transponders and deliver 16 TV channels. No orbital slot has yet been announced.

# ASTRA SYSTEM DEVELOPMENT ASTRA 1A - 1F



## **Turksat**

January 21st was scheduled for the launch of Turksat 1A on an Ariane 4 launch vehicle from French Guyana. Turksat, which has been built by Aerospatiale and Alcatel, will have 16 transponders and is capable of carrying up to 22 TV channels simultaneously. It is likely that some of the current commercial Turkish services carried by Eutelsat will move on to Turksat in the next few months. CNN has also booked transponder capacity and it is reported that some of the former Soviet republics have also booked capacity. Turksat 1A is due to be operational in March and will be located at 42 Deg E. Turksat 1B is due to launch within 12 months and will be located at 31 Deg E.

## **New Dishes for Old**

With the demise of BSB and the subsequent sale of Marco Polo 1 (now known as THOR) some of the uplink antennas previously located at the former IBA site in Chilworth have been removed and relocated at Crawley Court. One of the 8.1 M antenna has been used for digital TV tests using NTL's System 2000 via the Gorizont satellites at 11.0 and 14.0 Deg West. The second Marco Polo satellite currently at 31.0 Deg W has now been reported as sold by B-Sky-B. The new operator was not revealed as we go to press.

## **Egyptian Space Channel**

The French licensing authorities have given permission for the launch of the Egyptian Space Channel. Primarily intended for delivery via cable networks the service will be carried via satellite. No date or satellite has been given for launch.

## **Guglielmo Marconi satellite**

Plans have been announced by the Italian Post Office Minister for an Italian television satellite system. The system will comprise of two DBS satellites based on the ITALSAT design employing 120 watt TWT's. Digital audio broadcasts (DAB) will also be carried in addition to television services. Marconi 1 is unlikely to come into service before 1996.

## **Russian "GALS" satellite launch**

December saw the launch on a four stage Proton rocket of the first of 5 regional "GALS" satellites from the Baikonur space facility in Russia. The 2.5 ton DBS satellite carries 3 Ku band transponders in the range 11.7 - 12.5 GHz. Transponder power is planned to be 75 watts with recommended antenna sizes of 1.8m for

domestic reception. After launch the spacecraft was located initially at 90 Deg E before moving to its permanent position at 44 Deg E. GALS 1 has an expected lifetime of five to seven years.

## **From the Post Bag**

There was a healthy response when last year I gave details of the NSL Enhanced Demodulation Receiver. Amongst those who wrote in was Chris Pescod, G4BMW, who has been experimenting for some time with improving the detection circuitry of FM demodulators for satellite TV reception. Chris has been looking specifically at the range of GEC Plessey semiconductors such as the SL1451, 1452, 1454 and 1455 and also the Philips NE568. Chris says that all these FM demodulator chips use quadrature detection and employ injection locked oscillators and phase locked loops. I look forward to learning what success Chris has achieved in due course and will pass details on. In the same letter Chris refers to my comments in CQ-TV 164 regarding the Synchron Processor. He points out that much the same facilities are provided by the Sync Processor described in CQ-TV 129, but laments the fact that the PCB is no longer available.

## **TRANSPONDER REPORT**

### **Eutelsat I F1; 36.0 deg E.**

As predicted Eutelsat have moved their ten year old spacecraft Eutelsat I F1 from 25.6 deg E to 36.0 deg. The move was co-ordinated by the European Space Agency.

### **DFS 1 Kopernikus; 23.8 Deg E.**

Following the closure of Eins Plus in December it is reported that NEN TV might take the vacant transponder (11.625 GHz H).

### **Astra 1A & 1B & 1C; 19.2 Deg E**

The launch of Sky Sports 2 on Astra 1C Tp 47 is not expected before September or October '94 and therefore we can expect some other developments on this transponder over the next few months. Strong rumours persist that Vox on Astra 1A Tp 5 may be replaced by the much revamped NBC Super Channel, currently on Eutelsat II F1. Look out for new Teletext services on Bravo, CMT, The Family Channel and DSF. Teletext for the English services is being provided by a company called Intelfax.

### **Eutelsat II F3; 16.0 Deg E.**

Transmission from Albanian TV (TVSH) should now be carried on a regular basis following a test period at the end of last year. Transmissions can be found on 11.575 GHz (V). Dubai TV is also reported to be taking a transponder on this satellite in addition to Arabsat 1C and Eutelsat II F1. No allocation was known at the time of writing.

A private Hungarian commercial channel known as BP1 was observed testing on Polsat's transponder (TP 34L 11.638 GHz V) just before Christmas, although there is no news of a formal launch. Look out for Nile TV using encrypted PAL on Tp 27 11.158 (V). The picture quality on my 1.8 m antennas is P2-3 on a good clear day. The channel would appear to be operating in half transponder mode, but is much weaker than any other channel on this satellite. Programming is mainly in English.

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

Dubai TV commenced transmissions on December 6th on one half of TP 34 (11.638 GHz H). This followed the end of Filmnet's two transmissions on each half of this transponder back in November. Rumours were circulating that either the Travel Channel or the Sci Fi Channel might take the vacant half transponder. The long forecast Viva Music channel, which is uplinked from Cologne in Germany by the DBP, launched finally on December 24th on 11.005 GHz (H) sharing TP 20 with Eurosport.

Look out for TV69 a Danish uplinked Adult Channel due to have launched in January. TV69 will initially use Videocrypt (or Enigma) and will probably take the night time capacity on TP 22 U (11. 181 GHz H). It is possible that TV69 will adopt Videocrypt Europe later in the year when volume production of decoders has been achieved.

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

A new Turkish film service Cine 5 commenced transmissions on TP21 (11.080 GHz H) just before Christmas. The PAL service appears to be largely encrypted using Nagravision.

### **Intelsat 512; 1.0 Deg W.**

Norsk Dag, a Norwegian daytime service, can now be found on Transponder 63, 11.177 GHz (H). The service is in D Mac with Eurocrypt encryption and operates between 10.00 and 14.00 Monday to Friday.

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

The single Ku Band transponder on 11.5GHz (RHC) can now be observed carrying a Czechoslovakian cable service known as Cable Plus. The feed is in unencrypted Pal and appears to operate in the evenings only.

### **Intelsat K; 21.5 Deg W**

Canal Hollywood has commenced test transmission in unencrypted PAL on TP 3L 12.640 GHz (V). This planned 24hr 6 channel film service will go digital for its launch in April using General Instrument's DigiCypher system.

### **Hispasat 1A & 1B; 31.0 Deg W**

The long awaited arrival of broadcasters on Spain's first DBS satellites should have appeared by the time you read this. The two state owned services of TVE were scheduled to appear in the clear before Christmas. Tele Cinco and Antenna Tres were due to launch initially in the clear by January with Canal Plus Espana following in the spring and encrypted in Nagravision. It seems likely that Tele Cinco and Antenna Tres will also encrypt in Nagravision in due course to form a mini pay package with Canal Plus Espana.

## **DIGITAL TV**

The days of free (or partially free) access to satellite TV transmissions are drawing to an end. The migration of services such as Filmnet from analogue to digital formats is conclusively the end of a very thin wedge. Although this is very much a downside for those who have enjoyed fairly unfettered access to a range of broadcast and commercial traffic from the Clarke belt there is an upside. With the introduction of digital DTH services in 1995 we will see an explosion of new programming coupled with improved picture quality. This enhanced quality in pictures will result from the adoption of a common worldwide digital TV format known as MPEG 2. The following notes summarise the current state of digital broadcasting and highlight what we can expect to see over the next 12 - 18 months.

Up until quite recently the CCIR standard for digitising studio quality 625 line 50 Hz frame rate European and 525 line 60 Hz frame rate American colour video was CCIR Recommendation 601. The resultant data stream from CCIR 601 of 270 Mbit/s would occupy far more bandwidth than is currently available in either terrestrial or satellite distribution networks. Digitised video at 270 Mbit/s is therefore normally to be found only within the video production arena to enable studio quality to be preserved throughout the editing and production process.

The normal bit rate in the UK for distribution of standard PAL TV signals is 140 Mbit/s. BT distributes all Channel 4 programming to transmitter sites via its higher order digital network by compressing a standard 140 Mbit/s video feed into four 34 Mbit/s signals. The compression techniques currently being utilised in this network are proprietary, that is they do not fully conform to any agreed international standard. Whilst this provides no barrier for point to point distribution on a closed network such as that provided for Channel 4 it does not provide the basis for a universal multi vendor format suitable for digital DTH broadcasting.

The forum that has been addressing the issue of a common digital broadcasting standard is the Motion Picture Expert Group (MPEG). Formed in 1988 the MPEG committee have worked to develop what is now a common worldwide standard for digital TV transmissions known as MPEG 2. Leading up to the freezing of the specification in mid 1993 there have been a number of partial proprietary implementations of the standard such as NTL with their MPEG 1 based System 2000.

The main elements to be considered in establishing a digital TV standard are baseband video and audio, the transport configuration, modulation, error correction and conditional access (encryption). The key area for a common "Systems" standard is that of conditional access. The encryption battle in Europe for analogue formats has largely been won by News Datacom with Videocrypt. The only other serious contenders are Canal Plus with their Syster system and a small clutch of Scandinavian channels using Eurocrypt.

It remains to be seen how the encryption issue is resolved as we enter the new digital era. The fact that News International has already contracted to NTL to develop the encoding, decoding and multiplexing technology for an MPEG 2 DTH service from ASTRA 1E is significant. NTL are working with COMSTREAM from the USA to develop the modulation and demodulation techniques for the service, whilst News Datacom are providing the conditional access facilities.

As with Videocrypt, it is likely that the first broadcaster to gain a critical mass of audience with one standard is likely to secure a dominant market position. The subsequent royalties for the "De Facto" standard will be significant. This has already been demonstrated with the extension of the UK Videocrypt system into its Videocrypt European variant now used by Filmnet's Multi Choice service.

There is competition for News Datacom however. General Instruments (GI) have developed a proprietary digital compression product known as DigiCipher specifically for satellite TV applications. The first generation of DigiCipher was used in September '93 for the distribution of the BBC's World Service TV (WSTV). The advantage that DigiCipher provides for the BBC, unlike a European only system, is that of compatibility with local distribution employing DigiCipher in the USA and Canada. GI are already developing a second generation of DigiCipher



which can be implemented in a domestic set top converter. This second generation implementation of DigiCipher will be MPEG 2 based.

The benefits of digital compression techniques for satellite TV broadcasters are primarily in reduced transponder charges. The comparison between the current analogue generation of ASTRA satellites and the first digital variant in ASTRA 1E bears witness to this fact. Whereas ASTRA 1A carried sixteen channels on sixteen 27 MHz transponders, ASTRA 1E is capable of carrying fifteen to twenty channels on each of its eighteen transponders. The precise number of channels per transponder will be determined by the nature of the channel being carried. Movie Channels will probably occupy a 2.0 Mbit/s channel whilst sports channels will probably utilise 6.0 Mbit/s.

The variation in data rate required stems from the fact that faster moving images require a more frequent screen refresh time than more static images. Digital compression algorithms rely on the fact that in most pictures there are large areas of the screen that do not change over a given period of time. The data being transmitted at any given time therefore relates only to changes in the image being viewed, thus reducing the overall data needed to reproduce an accurate image. In practice it is likely that there will be a mix of channels on each transponder. High Definition TV (HDTV) or Enhanced Definition TV (EDTV) will require as much as 10.0 Mbit/s.

ASTRA 1 E will carry digital transmission in the BSS band (11.70 GHz -12.07 GHz) when it is launched in 1995. Astra 1 F will also operate in the BSS band (12.10 GHz - 12.50 GHz) when it launches in 1996 and, as with ASTRA 1E, will be dedicated to digital TV and Radio services. At the same time as ASTRA is rolling out its programme for digital TV services, it is clear that Eutelsat will be doing the same at 13.0 Deg E. Both the "Hot Bird" and "Hot Bird Plus" satellites will carry digital services. It remains to be seen how the development of satellite delivered TV is changed by the introduction of digital technology.

I look forward to digging my hands even deeper in the XYL's purse to pursue my interest in satellite TV reception. Will it ever arrive - will she find out. Watch this space !

## **NEW PRODUCTS**

### **Frequency Extenders.**

Two new products from Global communications will allow reception of ASTRA 1D transmissions in the lower FSS band (10.7 GHz to 10.95 GHz). Two units are available with the following specification:

	Frequency Extender TE4	Frequency Extender ADX
Input Freq	1750-2500 & 950-2050 MHz	600- 950 & 950-2050 MHz
Output Freq	950-1700 & 950-2050 MHz	1100-1450 & 950-2050 MHz
Loss	4.0dB      4.0dB	4.0dB      4.0dB
LO freq	800 MHz	500 MHz
Control	0/12 V switch	0/12V switch
(Model TE4 & ADX)		
Control	Manual switch	Manual switch
(Model TE4M & ADXM)11		

Contact: Global Communications 0621 743440

### Motorised LNB's !

A product called Select-A-Sat was demonstrated at the Northern Video & Hi Fi Show before Christmas. The device is an advance on the multiple LNB assemblies often used by people with fixed antennas who want to access more than one satellite. Select-A-Sat is a motorised LNB assembly that replaces a single fixed LNB. It will allow reception of satellites across a 30 Deg arc. Construction of the prototype on show appeared to be quite good. Selection of individual satellites is controlled from a separate indoor control unit.

Contact: Select-A-Sat (UK) 0453 827378

### CONCLUSION

That's it again for this time. In the next issue of Satellite TV News I will look forward to the launch of ASTRA 1D and will, as usual, try and reflect all that's new in the world of satellite television.

Please do write and let me know what you are doing in satellite TV. I am always happy to try and answer your questions either through this column or direct on the land line (keep BT's profits and my pension up). I will look forward to hearing from you.

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

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PUBLICATION	EACH	QTY	TOTAL
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by Mike Wooding G6IQM & Trevor Brown G8CJS

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We reserve the right to change prices without notice.

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1 .....	One inch vidicon scan coils	6.00	1.50	.....
2 .....	2/3 inch vidicon scan coils **	6.00	0.95	.....
3 .....	One inch vidicon base	1.00	0.30	.....
4 .....	2/3 inch vidicon base	0.65	0.30	.....
5 .....	C-mount for lens	P.O.A	0.30	.....
6 .....	Camera tube	P.O.A	1.20	.....

QTY	VIDEO CIRCUIT BOARDS/COMPONENTS	EACH	P&P	TOT
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12 .....	Teletext pattern PCB	3.00	0.43	.....
82 .....	Monochrome pattern PCB	2.00	0.30	.....
13 .....	Greyscale/colourbar generator PCB	3.00	0.43	.....
14 .....	Colour test card PCB set	15.00	0.70	.....
15 .....	TBP2BL22 circle program PROM	10.00	0.30	.....
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18 .....	TEA2000 colour coder PCB	2.00	0.30	.....
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20 .....	Video processing amplifier PCB	4.00	0.43	.....
26 .....	Video level indicator PCB	5.00	0.43	.....

TOTAL GOODS THIS PAGE £.....

QTY	VIDEO CIRCUIT BOARDS/COMPONENTS	EACH £	P&P £	TOT £
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22	..... Vision switcher logic PCB	4.00	0.43	.....
23	..... Vision mix effects amplifier PCB	4.00	0.43	.....
24	..... Wipe effect generator PCB	3.00	0.43	.....
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27	..... A - D and D -A converter PCB	5.00	0.43	.....
28	..... Digital video read address PCB	5.00	0.43	.....
29	..... Digital video write address PCB	5.00	0.43	.....
30	..... Digital video RAM PCB	4.00	0.43	.....
31	..... Digital video backplane PCB	6.00	0.43	.....
32	..... UVC3130-09 A-D and D-A IC	40.00	0.30	.....
33	..... Spectrum user port PCB	3.00	0.43	.....
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40	..... I2C CPU PCB	8.50	0.43	.....
41	..... I2C VDU PCB	8.50	0.43	.....
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47	..... 70cm downconverter PCB	9.00	0.30	.....
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51	..... ATV up converter PCB**	2.25	0.30	.....
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58	..... 6MHz audio subcarrier generator PCB	2.50	0.30	.....
59	..... G3WCY SSTV scan converter PCB set	10.00	0.65	.....
60	..... G4ENA colour etc. SSTV mods PCB set	5.00	0.43	.....
61	..... G4ENA SSTV transmit mod to WCY PCB	6.00	0.43	.....
62	..... G4ENA auxiliary PCB	2.00	0.30	.....
63	..... SSTV sync and pattern gen PCB	3.00	0.43	.....
64	..... SSTV spg/pattern 2732 EPROM	12.00	0.30	.....
65	..... MC1445 gated video amplifier IC **	3.50	0.30	.....
66	..... TEA2014 video switch IC	1.10	0.30	.....
67	..... TEA5114 video switch IC	1.50	0.30	.....

TOTAL GOODS THIS PAGE £.....

QTY	STATIONERY & STATI0N ACCESSORIES	EACH £	P&P £	TOT £
48 .....	13.14 MHz crystal	5.00	0.30	.....
68 .....	4.433618 MHz crystal	2.75	0.30	.....
69 .....	5.0 MHz crystal	2.75	0.30	.....
70 .....	6.0 MHz Teletext crystal	1.50	0.30	.....
71 .....	BATC diamond buttonhole badge	0.40	0.30	.....
72 .....	BATC round lapel badge	0.50	0.30	.....
73 .....	BATC blue diamond clutchpin badge	1.50	0.30	.....
74 .....	BATC cloth badge	3.50	0.30	.....
75 .....	BATC equipment label (6)	0.20	0.30	.....
76 .....	BATC square windscreen sticker	0.10	0.30	.....
77 .....	Set of ferrite cores for VSB TX	0.20	0.30	.....

ZERO RATE VAT ITEMS

78 .....	BATC test card	0.50	0.43	.....
79 .....	BATC reporting chart	0.12	0.43	.....

TOTAL GOODS THIS PAGE	£.....
TOTAL GOODS FROM PREVIOUS PAGES	£.....
ADD POSTAGE	£.....
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**MEMBERS SERVICES** Items from these lists can **ONLY** be supplied to **CURRENT** members of the **BATC**. Please note that **ONLY** the items listed in the **CURRENT** "Services for Members" leaflet are available - a description of most the various PCBs and components can be found, in the "What's What" supplement sent with CQ-TV 149. Components for club projects are not available from Members Services unless contained within these lists. All Club crystals are HCLB/U (wire ended). Items marked thus: \*\* are available only until present stocks are exhausted. To avoid delay and inconvenience, please be careful to include the correct amount of VAT with your order, ie 17.5% of total goods **AND** postage, unless a member outside the EEC. Payment should be by cheque or crossed postal order in favour of BATC - do NOT send cash or stamps please.

## **VIDICONS**

1" vidicon tubes are available in different heater ratings (95 and 300mA) - 6" long; 2/3" tubes have 95mA heaters). These tubes are all of separate mesh construction, with magnetic focus. Tubes available to special order include electrostatic focus or deflection, and low light types not previously available to club members. Prices vary depending on the size, type and grade of tube. A tube guide appears in CO TV 149 and 150. Please contact Members Services for further information. The stripe filter tubes used in domestic type colour cameras are not available through BATC, and normally must be ordered direct from equipment supplier. Members requesting information on prices or other types of tube or equivalents are asked to send a stamped, addressed envelope for their reply.

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

Revised ATV Handbok: PCBs 7, 17, 21, 22, 23, 24, 53, 63  
Amateur TV Handbook (vol.2): PCBs 52  
An Introduction to ATV: PCBs 10, 18, 25, 40, 41, 36, 47, 82, 83, 84, 85, 86  
TV for Amateurs: PCBs 19, 49, 51  
Slow Scan TV Explained: PCBs 59, 60, 61, 62  
Amateur TV Compendium: PCBs 11, 12, 27, 28, 29, 30, 31, 54, 55, 56, 57  
Micro and TV projects: PCBs 14, 33, 34  
CQ-TV(xxx): PCBs 13(128), 16(134), 20(130), 26(142), 35(143), 58(139)  
Item 46 is supplied with circuit details, etc.

Members of the BATC Committee are available to help and advise Club members on any ATV related subject. Please remember that all Club work is done in spare time, so please try to keep such queries to a minimum.

**CQ-TV MAGAZINE** - Anything destined for publication in CQ-TV or forthcoming publications; articles; review items; advertisements; other material. EDITOR: MIKE WOODING G6IQM, 5 Ware Orchard, Barby, Nr.Rugby, Warwickshire, CV23 8UF. Tel: 0788 890365 (Answerphone); Fax: 0788 891883.

**CLUB AFFAIRS** - Video tape library; technical queries, especially related to Handbook projects: TREVOR BROWN G8CJS, 14 Stairfoot Close, Adel, Leeds, LS16 8JR. Tel: 0532 670115.

**MEMBERS' SERVICES** - PCB's; components; camera tubes; accessories; etc., (other than publications). PETER DELANEY G8KZG, 6 East View Close, Wargrave, Berkshire, RG10 8BJ. Tel: 0734 403121.

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**CONTESTS** - RICHARD GUTTRIDGE G4YTV, Ivy House, Rise Road, Skirlaugh, Hull, North Humberside, HU11 5BH. Tel: 0964 562498.

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

**CQ-TV AWARDS** - BOB WEBB G8VBA, 78 Station Road, Rolleston-on-Dove, Burton-on-Trent, Staffordshire., DE13 9AB. Tel: 0283 814582

**SATELLITE TV NEWS** - PAUL HOLLAND G3TZO, Chatterton, Chapel Lane, Thrapwoun, Nr.Malpas, Cheshire, SY14 7AX. Tel: 0948 81429.

**TV ON THE AIR** - ANDY EMMERSON G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604 844130.

Where possible, it is better to telephone your query rather than write. Please do not call at unsocial hours. As a guide, try to call between 1830 and 2130, and not before 1130 at weekends ... Thank you.

# Using Television - Part-4

## Norman Ash G7ASH

### Carrying on Framing

Continuing my look at Camerawork from part 3, I shall be expanding this subject, with some more on the practical use of the TV camera, which the Amateur Television enthusiast may find of value.

The start of part 3 had a summary of the function of camerawork, this indicates the amount of thought which camerawork requires, to present your message well. 'Content' and its 'treatment' both carry your message to the viewer together and in this article I look at this combined approach, with examples of techniques used for dealing with particular content.

### The Golden Rule

Listening to amateur video producers you will often hear them saying how well various shots of various subjects "have come out" and that they are "Editing them together".

When producing a presentation always ask yourself :

- why every detail of your presentation is there?
- why has it been presented in the manner it has?

Professionals often have to bin much very good footage, just because it doesn't fit in, or it doesn't contain sufficient importance to the message.

If you cannot come up with a good reason why the viewer requires either aspect, you should be thinking strongly about cutting it out - or replacing it with something better. You will notice a marked difference in presentation, try it out for yourself !

## Craft

Video Production is a creative activity and a craft, rather than a science :

There are varying degrees of effectiveness, where successful outcome is concerned. Often you will find yourself (in practice) balancing one aspect off, against another, with no single 'right' way of doing things, only better, or alternative ways in which to get your message across.

If you fail to get your message across, maybe this counts as the 'wrong' way - your 'visual coverage' included...

Even the 'framing of an image' is carried out with due regard to:

the message ♦ the visual context ♦ the production techniques



Which SHOT looks right to you and what does it tell you?

Are you making assumptions about what is going on by the type of presentation?

Here is my interpretation of these SHOTS :

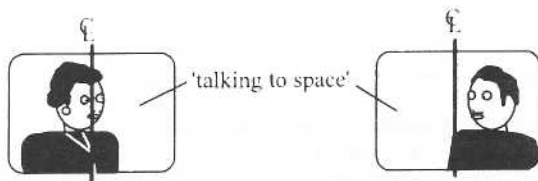
- The viewer is observing what's going on - like a '*fly on the wall*' (part 1)..

[We are *visually excluded* from participating by the image's attention being directed away from the camera lens]

- 1st shot she is 'talking to someone to her left'.
- 2nd shot 'the way she is wearing her earring' is the message.
- 3rd shot 'we are not interested in her at all, but something that may, or may not be behind her'.

Your interpretation may be different, but it illustrates how simply positioning the camera's frame can completely change the 'visual message' of a particular SHOT.

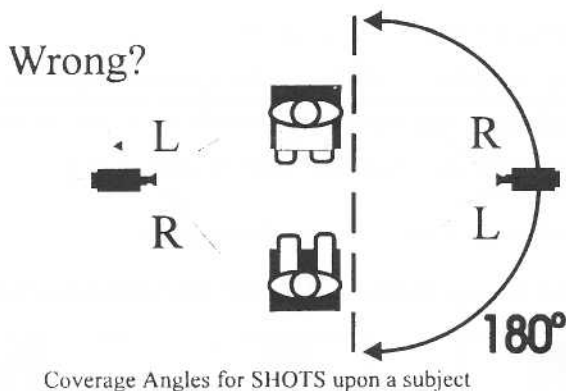
The 1st shot is framed with the person 'offset', so that there is more screen space in front of them than behind, this is called 'talking to space':



Here we see the 'complementary shot'  
(which suggests that the man is talking to the woman, who is on his right and she left).

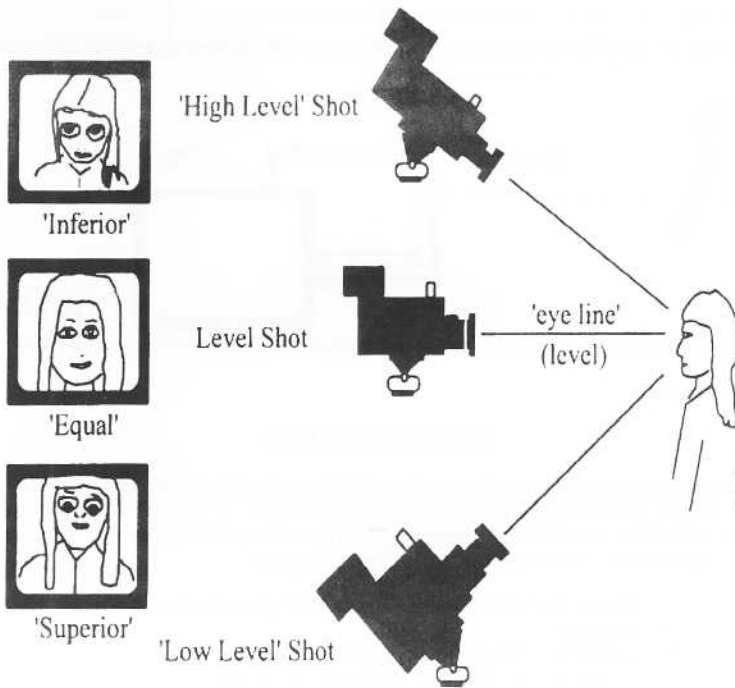
#### 'Crossing The Line'

It is very important that you do not confuse the viewer (*by mistake*), with your coverage. Notice how in the following diagram, left and right is reversed if any of your SHOTS exceeds an angle of  $180^\circ$  upon the subject



'Cutting' these two SHOTS together, will make the man and woman appear to suddenly change places.

When framing an image, you not only have to take the horizontal positioning of the camera into account, but also the vertical position:

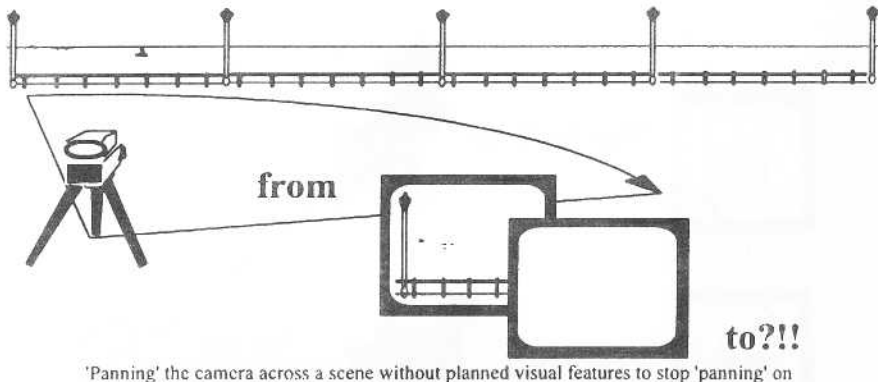


- Where the height of the camera lens is the same as the persons eyes, they appear 'equal' to the viewer.
- If the camera lens is higher than the person, they appear 'inferior' to the viewer.
- If the camera lens is lower than the person, they appear 'superior' to the viewer.

## Moving the Camera Frame

If you are new to using television I recommend, getting used to a 'fixed frame' technique first (locking up the camera and letting the movement happen within and between the shots). The experience will help you considerably in gaining vital practical skills (it also makes the 'cutting / Editing' easier!).

To introduce the camera's moving frame, you require a reason why it is moving, which 'adds something' to the viewers understanding of your message:



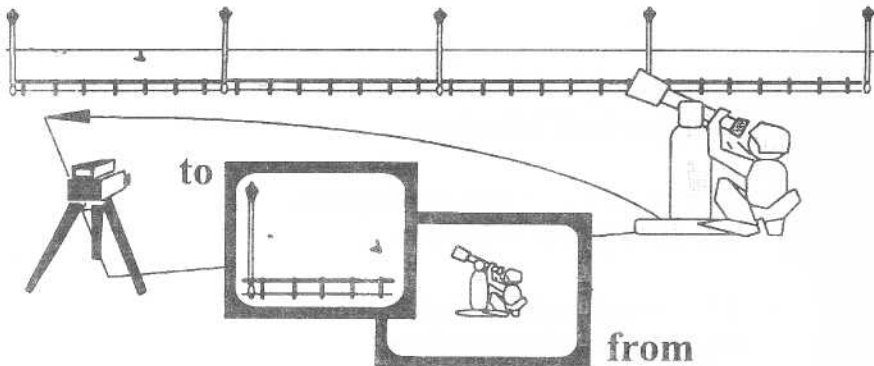
'Panning' the camera across a scene without planned visual features to stop 'panning' on

### Planning movement:

#### Fixed Frame to Fixed Frame

At least, this example starts with some features (at sea)! Distraction and confusion of the viewer is likely, unless you stick to the relevant features within the scene coverage. It will call attention to your poor presentation, rather than your 'intended message' (!!!). The viewer gets frustrated and loses interest in your presentation (with no *constructive* information being conveyed).

- Plan out the features, where you want your 'pan' to start and stop.
- Try it out.
- Decide the speed and the size of your image.
- Co-ordinate with the action in the scene / sound tracks



Where it can work : 'The viewer sees someone watching'

Presentation techniques here depend upon your message. You may have had an 'establishing shot' before which relates this view into that context. A more advanced technique would be to knowingly break this 'establishing' rule, to put a question in the viewers mind. You may want them to ask at this point what's going on and this makes them want to find out, by watching what's going to happen next. The camera pan may only reveal the object of interest, but not the venue. This may make the viewer want to know where it is and keeps watching with interest to find out.

Notice how if you were to use 'fixed frame' shots to cover this, the images would be essentially static. 'Panning' adds interest by the camera frame movement. This can allow the movement to reveal and feature the atmosphere, directing the viewer's attention to it and it being likely to take longer, can provide a better technique for this, than fixed frame coverage.

In professional production, such a sequence might be used as 'reinforcement' for a spoken dialogue 'voice-over' (although it can be very effective on its own).

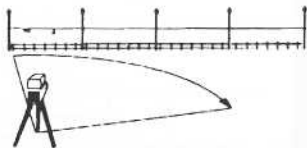
### Camera frame movements

- can convey more information
- can take longer
- can create interest & direct attention
- can limit your presentation options

### Cutting on a Moving Frame

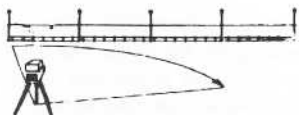
In the normal technique for the movement of the camera frame, the viewer sees the frame start to move and stop, before the change of shot, in a sequence. Moving the camera frame, moves the 'visual references' which the viewer has. A constantly moving frame might disorientate the viewer (being no longer able to relate the visual cues within these transitory images to fixed references). A sequence of moving frame can express a 'dream sequence' quite effectively for this reason.

- 'Cutting' on a moving frame can appear as simply bad television, unless you take into account the rules!

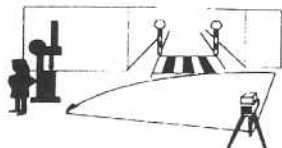


If this scene had 'cut' to another 'shot' before the camera frame had stopped, it would appear to the viewer that the camera had been moved by accident from the features of the scene and that the Director had not 'Edited' it out.

However the Director can make use of this shot, 'cutting' on the moving scene, if a 'complementary shot', which is 'panning' in the other direction is 'cut' to:



Camera Panning Right



Camera Panning Left

Take particular care using this technique; use it too much and it can become wearisome for the viewer. Your sequence would normally end by the viewer seeing the camera frame stop, before you 'cut' away.

In the example, the girl might be watching out to sea, on a deserted sea front. The sequence, in its context within the production, will direct the viewer to think whether the two shots are part of the same venue, or if you are 'cutting' to a completely different location with the girl, i.e. you may have shown an 'establishing shot' of the sea front including the features of both shots.

## Image Size

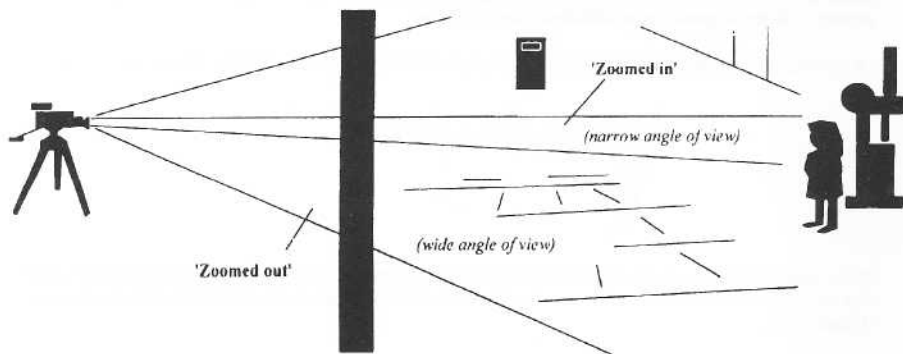
We saw in part 3, how image size is normally 'cut' between a total view, a middle view and a close view, however the use of the Zoom lens allows a continuous change from one extreme to the other. A common mistake is to continuously 'trombone' in and out. Avoiding its use altogether, makes it much more effective when you do need it.

A typical use for a 'Zoomed' shot is when the image is essentially static (imagine how boring 'cutting' through your static 3 shot sizes would be). The 'Zoom' adds movement, which helps to carry (an otherwise boring presentation. Broadcast use it a lot when they are filling in time, waiting for something to happen (Broadcast tends to get plenty of practice!).

Applied well, the zoom can be highly expressive..

*imagine: a slow 'zoom in' to a BCU (big close-up) of a girl's face in a deserted street - alone, looking plaintively out.*

The transition from the reality of this scene, to her 'innermost thoughts' is expressed by the combined effect of 'isolating the (visually expressive) face' and losing the 'visual reference' of the scene (until it is re-established upon her face):



### The Zoom or 3D

The image on the television screen is flat (2D), but the scene itself is 3 dimensional. There is a penalty for using the Zoom control - you are simply magnifying, or reducing this flat image. This has a completely different effect compared to physically 'tracking' (moving the camera in and out), often a far more expressive technique. Try this for yourself (a wood is an ideal venue), use either technique to shoot the same scene. It is most often best to shoot 'tracking' shots with as wider camera angle as possible



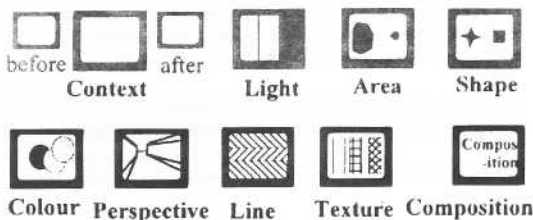
Wide angle tracking shots:

- the 3D effect is greater
- as the camera's image is at minimum magnification, any unwanted camera movement is minimised.

## Factors Effecting Framing

Many Amateur Television enthusiasts will not wish to get too sophisticated and so a look at what would (*normally*) always apply, may be of value to you:

Visual Balance :



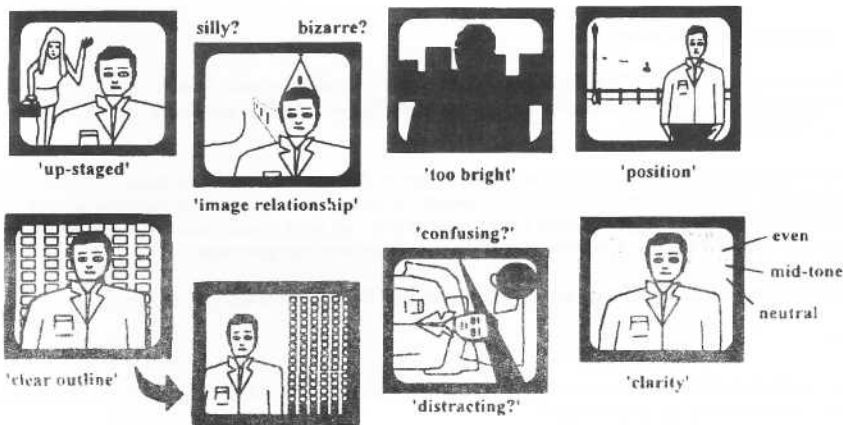
All these factors effect the positioning of the camera frame for a 'visual balance' of its static image.

Part of the craft of camerawork is that the viewer accepts the framing of the picture, without noticing that it has been 'lined-up'.

Visual balance may require each part of the image to have equal effect, or it may require concentration upon particular features. The viewer can be distracted from looking at a presenter's face, by a large bright red area on the other side of the frame, for example.

In my experience, there are many good camera operators who know instinctively when the image is well balanced. Others need to learn the craft by practice and experience.

## Background



We have already seen in part 2 how careful you have to be with being 'up-staged' in your background!

These are some further things to think about..

- bizarre image relationships can go unnoticed at the time  
- try to avoid lining-up people so that they appear to have trees, or poles, etc. growing out of their heads!
- If the background is too bright  
you will find that the illumination on the subject(s)  
in the foreground will become too dark  
(avoid bright skylines, etc.).
- Position your presenter (etc.) in the frame,  
so that all the main features are unobstructed  
and the presenter is positioned for ease of (any) action,  
which can be clearly seen from the camera position.
- An uncluttered background behind the person  
makes their outline stand out, giving a much clearer image.
- The final illustration shows an ideal presentation background.

### Hand Held Camerawork

It is often preferable to use the camera fixed upon a camera mount, but there are times when you will have to use hand held camera's.

Imagine that the camera is a part of your body:

- hold as much of the camera as you can, well against you.
- **move your body** with the camera firmly held to it (**not** the camera alone).
- use the **whole** of your body to obtain good camera movements.

[Where the camera is in a stationary position]

- use anything suitable for camera support  
(i.e. wall, fence, pole, your knee, tree, car seat, etc.)

### Camerawork Summary

The camera operator is a highly skilled craftsman and you can gain much satisfaction from the craft. Camerawork is very creative and rewarding, if it is to be effective. It is also demanding, in time, skills and in understanding the medium.

I have tried to indicate some of the more advanced aspects this time: I hope I have helped to interest the majority of Amateur Television enthusiasts enough, to take a look at their own camerawork and the potential there is in it. Much of what I have covered may not seem directly relevant to the way many operators work, until you look into the principles upon which these examples work.

In the last article I shall be looking at what's known as '**Post Production Work**' (i.e. 'Editing').

Plea

I would be grateful for comments on this series (to Ed. please). Maybe if there is enough I can pick up on your comments at the end of this series?

## *Living with the British Amateur Television Club !!!*

Jill Marshall G6MLH

*I took a call one day from a gentleman shortly before a recent BATC jaunt across the sea to Ireland on the occasion of a two-day Radio Rally we were attending. It was the Rally organiser wanting to confirm arrangements. Towards the end of our conversation he said he wanted to ask Paul (G8MJW) for a few tips on getting started in Amateur Television.*

The call having interrupted a somewhat vain attempt at tidying the house, I enquired if he was married! I then went on to encourage him first to be sure his wife could stand the strain! As his phone bill would have raised an eyebrow or two had I continued to elaborate on the subject of being an 'ATV widow' I didn't go on any further. However, I thought I'd run over a few points here and maybe strike a chord of recognition in some long-suffering partners' minds.

When I first met him, apart from one or two nick-knacks stowed at his parents' address, all Paul's TV worldly goods were squeezed into the back of his Escort Estate! NOW - we'd need half a dozen pantechnicons to move us and a strong set of Acrow Jacks to keep the house standing. From the back of an Escort Estate to a coal house and cupboard under the stairs, we rapidly progressed - perhaps not the word I'd normally use - to a four-bedroomed house with a double garage (that rarely sees a car), an ex-mobile home and ample parking for the odd OB Van. An extension was built, for good measure, with designer holes for cable runs to and from the garage!

I believe that over the years the village has got used to the Marshall household, which erupts at intervals from May to September with various odd bods in cars stuffed to the brim with assorted ATV gear, old and new (as if there wasn't enough here already).

It is usually the occasion of a BATC Convention or a visit to a Radio Rally somewhere around the Country, when several ugly-looking ex-Broadcast vehicles also turn up to block our end of the village. There's a flurry of activity for a day or two, whilst everything gets turned out onto the lawn and frantically worked upon. The locals find large one-eyed monsters on tripods gazing malevolently at them as they pass by, following their every movement. Power consumption in the village soars alarmingly for a few hours whilst everything is set up, tested and last minute repairs carried out - and Brian Summers' (G8GQS) temperature rises alarmingly as

his tea level sinks to dangerous levels. G6MLH mans the kitchen day and night, feeding the hordes and trying to keep Brian's tea level constant! Suddenly there's a mass exodus, the road is blocked for a time by clumsily manoeuvred vans and a bus. Then, as suddenly as it was shattered, peace returns to Harby - briefly.

Upon return there's a wild dash for the pub - and Brian promptly falls asleep!

In our house, only the kitchen and smallest room escape what normal people might call scrap, but to certain others is like part of the family. Cables thick and thin pass from room to room; power sockets have wires added where they were never intended to be added and the cats leap in and out of sophisticated electronics kit, live and uncovered. Walls are lined with the ever-growing BATC library - for "added insulation", I try to tell myself. The TV's on the blink, the video recorder has a mind of its own, the stereo's temperamental, and so am I!

One tries to hit back: refusing to learn how to use the video recorder other than play, rewind, etc. as a protest, and with the odd demijohn of fermenting liquid; the occasional item of horse gear and knitting yarn here and there, and a massive turkey stag trained to attack, who, if he could move fast enough, would chase the postman - but its a futile attempt.

Perhaps its just as well I started working life in the home of British Broadcast design and manufacture - the great Marconi Company Limited -as it was then! At least I was led gradually and gently to my fate!

*I was brave enough to let Krystyna read this Jill - her comments were along similar lines - I wonder why? ... Mike*



# IARU REGION 1 CONFERENCE - SEPTEMBER 1993

*BATC Committee member Graham Shirville G3VZV attended the above conference as an observer and below is his report on the salient points of interest to the UK ATV fraternity.*

The triennial conference of the IARU Region 1 (Europe, Africa and the Middle East) was held in mid September in De Haan in Belgium.

The VHF/UHF/Microwave matters were discussed in a 'specialist Committee referred to as "C5".

A number of papers were discussed which related directly or indirectly to ATV and these are detailed below.

This year, as well as the writer, who was an "observer" attached to the RSGB delegation, the C5 Committee also had Paul Veldekamp PAOSON as part of the Dutch delegation and Jose Robat ON7TP in the Belgian Delegation. Both of them are ATV "men" and in addition the IARU Satellite Coordinator Freddy ON6UG is also active on 23cm FM ATV.

In regard to the 2 metre band, there were a number of proposals relating to the usage of the lower part of the band. A number of decisions were made, one of which affects the 144.750 ATV calling and talkback channel. However, it was also agreed that the RSGB would coordinate a Region 1 review of usage and band planning of the 144-145 MHz part of the band. This review is intended to take place over the next 18 months and report to the next VHF Managers' Meeting. Some people suggest that there is little activity on 144.750!!! so we must make lots of noise on it. Seriously, I would appreciate details of regular nets that take place on this (or any other) channel so as to emphasise our presence.

Turning to the 70cm band, this, as they say, is where the action is! In the short term an RSGB proposal to start using the European RU system (repeater inputs around 430.95 and outputs around 438.55) was accepted. The RSGB proposal is to have these only as low power fill-in units but BATC has formally written to the RSGB Repeater Management Group regretting their decision and requesting that the EIRP of the units be limited to 5 watts.

In the longer term the Committee discussed the likely outcome of the various reviews that are taking place inside the ITU, ETSI, ERO and a myriad of other organisations involved in the decision-making processes relating to Radio

Frequency Spectrum allocations. The consensus view is that it is possible that, in Europe, we may end up with only 432-438 MHz. This allocation is already in existence in the Scandinavian and countries. Again there will a group looking at the implications of this and the question is "HOW TO JUSTIFY ATV". In some European countries they have ATV Repeaters with AM outputs on 70cm and this does nothing for the ATV reputation with other users. Maybe we should consider adopting the SATV standard that was adopted by IARU as long ago as 1975!. This system limits definition to 1 MHz and allows audio by narrow band FM modulation of the vision carrier. Obviously colour and intercarrier sound would be impossible but, with narrower filters in the RX, weak signal working would actually be better than now. With the increasing availability of equipment for FMTV on 23cm and above for the full spec high definition signals, would this be a sensible and defensible compromise?

On the microwave bands above 1 GHz a number of band plans were adjusted but without having any effect on the ATV allocations.

The other band which is under threat from commercial users is 13cm. As well as the existing microwave ovens there is upcoming usage by wireless LANS for computers and video links for OB's etc. The view is that sometime in the future we may have a band that is only perhaps 10 MHz wide. A suggestion was made to the meeting by the RSGB President G3RZP asking for a secondary allocation in the 2450 - 2483.5 MHz region. This would be usable for ATV and he thinks that it might be accepted due to the lack of attractiveness of this area to other users. The IARU will be going forward on this basis.

Finally, I can report that the rules for the IARU Region 1 September ATV contest were looked at and a number of minor amendments to scoring and rules for disqualification were made. The organising societies for the contest over the next few years were agreed as: 1994 VERON, 1995 BEF, 1996 UBA, 1997 BATC, 1998 VERON, 1999 DARC!

*If any member has particular questions about, or views on, the above items or any other matter that was discussed at the Conference I would be happy to pass on whatever information I can.*

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# Test Card Program

*Review*

## David Wilson

The Worthing and District Video Repeater Group have produced a test card program for use on an Amiga with a minimum of 1 Megabyte of memory. I tested it on an Amiga 500.

When the program autoboots, a test card D with coloured blocks and your callsign or ident will be displayed. Click the mouse button or press any key on the keyboard to bring up the small icons of the test cards that are available. Moving the cursor to the selected icon and using the left mouse button will bring up the full screen version.

There are so many permutations of test cards, colour bars, greyscales, frequency sweeps and crosshatches that it will be impossible to describe them accurately - for example, there is one screen with a low and a high frequency grating at the top, colour bars in the centre with your station ident inserted and greyscale blocks at the bottom. The test card F has three overlapping coloured circles in the centre instead of the girl, the blackboard and the cuddly toy. Most displays can be selected to have the station ident and/or QRA superimposed.

There are other test cards on the disk to be loaded into the spare icon screens, T1 to T5. I liked the "Genlock Test card" with a blank space in the centre so that you may insert your own pictures.

Instead of using the mouse/icon system, most of the functions can be selected using the keyboard and also from the pull-down menus. A few more options are available using this selection system. The keyboard functions are listed on the MISC-HOTKEYS menu.

There are functions to display your talkback frequency and also to display four numbers which nearly fill the screen in either black on white or white letters with a black background. A simple digital clock can also be displayed.

You can design your own test card with a suitable paint program and incorporate this into the display sequence. You may select a sequence of test cards to be displayed at several preset time intervals or, alternatively, until the mouse button is pressed. A number of wipe shapes can be selected - vertical, horizontal, corner wipes and others - and the default setup is a random selection. This randomly selects one effect from the list and uses that for the next transition. There is a brief description of the origins of some of the test cards used.

The text print function has a number of useful features. You can have up to 10 messages in various lettering fonts and sizes and these can be selected by the function keys f1 to f10. The auto-centering will make your screen layout symmetrical if required, but this can easily be turned off. You may have a black or white shadow around the text if you want. There is also a sideways scroll function using two messages you can type in and you can toggle between these by using the right hand mouse button.

A second disk is also supplied to provide music to go with your test cards. I am sure that the label on this disc should read "THIS IS A PUBLIC DOMAIN DISC" but somehow the letter L never seemed to have been typed in! The music is supplied in a mixture of styles and a variety of tune titles. You might be able to find one to suit your application.

If you have use for this selection of test cards and test signals with a P.D. music disk then the £20 cost looks good value. Further information on ordering the disk is in the Worthing Group's display advertisement towards the back of the magazine.

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# MARCONI Mk.IV

## THE RETURN HOME

### Part-1: Michael Sheffield ZLIABS

*Visiting G-land with the prime object of attending the 1993 BATC Convention at Harlaxton Manor (Thanks to Andy G8PTH for accommodation and transport from Northampton), I admired the display of vintage TV studio equipment and cameras. I mentioned that there was some surplus vintage Marconi TV equipment back home in New Zealand.*

Since the technical museums in ZL already have a set (or aren't interested due to lack of space), amateurs were having trouble disposing of old TV gear they no longer wanted, other than by scrapping it for parts. I said that there is Marconi Mk.IV camera channel equipment, picture monitors, picture-and-waveform monitors, test pattern generators, etc., gathering dust in several shacks. It is in danger of being dumped as it had outlived its usefulness to the amateurs concerned. Andy nominated Paul Marshall to coordinate where all the gear was to go to once it arrived in England (It is a three month trip by ship).

Paul set about checking with the various enthusiasts who might want to rescue some items of British Made TV heritage. I mentioned, without thinking that there would be any interest, that there could be some EMI gear also. Quickly the fellow in the Blue OB van (Brian 'The Chequebook' Summers) said, "I'll have that!". Back at Andys' QTH after the Convention I set the wheels in motion via a satellite telephone call to Wayne Griffin ZLIUJK.

*"You haven't scrapped those old monitors and video generators yet, Wayne?" ; "No, but I was about to put those that I don't want to keep in a jumbo bin (UK translation mini skip) this weekend, Mike. The best items I am storing under the house, till I find a permanent place to put them" ; "The BATC members want to buy them and will pay for the shipping" ; "Fine, I just don't have the room to keep them any more". Murphy must have been on holiday too! "Give Rod ZLITFX a call and see if he is willing to part with his Marconi Mk IV and EMI gear" ; "OK Mike. I will call you back later".*

I completed the remaining four weeks of my holiday, visiting the STG and GB3ZZ in Bristol, G8AZQ in Bournemouth, WB2LLB in Huntsville Alabama and the K4BFT ATV repeater on the way back to New Zealand. After all the unpacking was done and I'd gotten reintroduced to the forty hours working week after a marvellous two month break, it was time to check with Wayne ZLIUJK again.

*"The garage is pretty full of gear, but there is room for stuff from Rod ZLITFX. I'll need your station wagon to collect it, Mike"; "OK. How about Saturday afternoon?"; "OK".*

After a pleasant hour and a half drive from Auckland to Hamilton, we arrived at Rod ZLITFXs QTH. Rod said: *"I haven't done much in the shack for some time"*.

He wasn't joking either. The 2M rig was actually covered with cobwebs! By moving things outside piece by piece we were able to clear a path to the Marconi gear. Pity the homeless spiders! Retrieving the cables was a difficult task as they ran behind and under so much other equipment. More spiders were made homeless. Bit-by-bit such treasures as lenses, manuals and spares were unearthed. The camera head was well and truly stuck on the homebrew pedestal beyond the abilities of us the pull it free by hand. Using the Post Office no.1 Adjuster (a large hammer) and a long, thick screwdriver we jemmied it free. Carefully following the path we'd cleared in the cluttered shack we carried it out to join the PSU rack box, the CCU rack box, the CCU panel, Picture-and-Waveform monitor plus the sundry items.

I wasn't too certain all the equipment would fit in the car. But by careful positioning of items, it did, with blankets over and between items for protection. The springs of the car were quite depressed due to the weight. As the wagon is only 1500cc there was a noticeable lack of pulling power on the return trip home, to Auckland. With the gear now safely stored in Wayne ZLIUJKs' garage/shack, he set about cleaning the dust and dirt off it. *"Cor these cables are a bit bungy, all covered in mould"*, he said, then proceeded to give them a scrub with hot soapy water. *"I can't have HM customs rejecting the shipment on "Danger to agriculture" grounds."*

Later that week I went round to his QTH and took some pictures of all the gear, so that the BATC members would see what's coming before it arrives. Two weekends later Wayne and I set off again for Hamilton. This time Rod ZLITFX had decided which items of his EMI gear to dispose of: a camera head, PSU/CCU box and control panel were eased up, over and around the other things to the interior of my car. In trade for a solid state monochrome monitor, Rod gave Wayne some UK made PYE brand monitors and cameras to send to Andy G8PTH. I loaned Rod a video tape of my visit to GB3ZZ (Bristol) which he told me later was great viewing.

This week Wayne is boxing up the small items, ready for the truck from the shipping company to pick up the load of equipment to be crated and packed into a container. Thence it goes onto a ship destined for old mother England. Fortunately for those paying for this exercise, the charges are by cubic area rather than simple weight. I think the shipping company is going to be astounded how much iron we are sending. Who wants to be next to obtain some vintage equipment? Wayne has feelers out for more of the same plus other items like TeleCine chains. He's asked several people to hold onto their Vintage broadcast TV gear in the meantime.

## Part-2: Wayne Griffin ZL1UJK

Finally I had all eighteen items ready for the freighting company to pick up. After making an arrangement that the company would pick up the items on Thursday, I took time off work to be home that day. To my surprise a van showed up. I said to the driver: *"I was expecting a truck as there are quite a few items"*, and wondered if all the monitors, PSUs, Marconi Mk.IV gear, etc. would fit into the van. We loaded it all into the van. The poor van, its rear end and tires really noticed the weight! I said to the driver: *"Take it easy as the roads are wet"*.

The next day, I rang the freight company to check the progress. The chap who answered said: *"We have weighed the items, Sir. It comes to a total of 400 kg. This is going to cost a lot to Air freight to the UK"*; *"No, no"*, I said, *"I want the items shipped to England by the slowest, cheapest way. The recipients don't mind waiting a few months for it to arrive"*.

Somehow the chap must have thought it was personal effects from someone relocating from New Zealand to England. The fellow said: *"We will repack the items and load them into a container. They will be on the ship by next Wednesday 29 September. The trip to England will take about 35 days"*.

Ashley Giles ZLIVOX visited the freight company to inspect the packed items. He said that it's all on a pallet ready to load into a container. Also he said that the items look reasonably well packed. He didn't recognise some of it since cleaning for the export trip had changed its appearance.

*Wayne Griffin can be contacted by writing to W. Griffin, 15 Line Road, Glen Innes, Auckland, New Zealand. or telephone 00-649-5289118. Please keep the twelve hour time difference in mind when choosing when to ring.*



# A Video Digitiser for your PC

Mike Wooding G6IQM

*During my review of the Pasokon SSTV system in the last issue of CQ-TV I mentioned the Ventek VIP 640C Frame Grabber which I would be reviewing in this issue of the magazine. Well, a lot of video has gone through the recorder since then and, due to the eventual cost after importing the unit, duty and VAT, I decided that it would not be a viable commercial proposition and consequently did not take up the options. However, after further market research I found that a unit marketed by a company I already have an association with is admirably suited to the job, and at a very realistic price - even more so at the moment as it is on 'special offer' until the end of February! Therefore, instead of reviewing the Ventek unit here I am going to take a look at this system.*

## THE MICROEYE 1C

The MicroEye 1C is a full colour image capture card which enables users of presentation (ATV/SSTV) Desk Top Publishing and paint packages to use a standard CamCorder, video camera, or static video source, to capture high quality colour images and save them in digital image format onto a hard or floppy disc.





The system is supplied as a PC card requiring an 8-bit slot, with CVBS and RGB inputs accessible at the rear of the computer as normal, a 3.5/5.25 inch disc containing the Windows (3.0 upwards) based capture software and a users handbook.

The minimum hardware requirements to run the system are a 386 PC with at least 2M of RAM (as the system runs 'under' Windows this will obviously be satisfied), as spare 8-bit slot, Windows 3.x running in Enhanced mode and 256 Colours mode (16 colour mode is not supported) and, of course, a video source.

As the system is essentially a high-speed line grabber then the video source must be static, at least for as long as it takes to digitise the picture, which I shall be detailing shortly. Captured images can be saved into \*.BMP, \*.PCX and \*.TIF file formats. The capture application also supports the Windows editing functions, enabling images to be copied to the Clipboard so that they can be pasted directly into other applications.

The MicroEye 1C card will operate satisfactorily with any 256 colour VGA card (most VGA cards will operate in this mode - all modern cards will). With standard VGA cards images can be captured up to resolutions of 640 x 480 pixels. With SVGA and XVGA cards resolutions of 800 x 600 in 24-bit True Colour (16.7 million colours!) can be captured. One very nice aspect of the card is that it does not use any DMA or IRQ request lines and no memory-resident device drivers.

What this means in the real world is that there should be no conflict problems with any other hardware installed in your PC and makes it very easy to install and configure.

The handbook is compact (a nice way of saying small!) but very concise. It guides you through the very simple method of card and software installation and then gives a full explanation of each of the menu commands. Within a few minutes of receiving the system you can be grabbing pictures of a very high quality.

## THE MENU COMMANDS

The WinGrab software package loads up into a standard Windows screen with a command menu line at the top. The four command menus are: File, Display, Setup and Help.

**File:** This is the standard Windows file menu and offers Open, Save As and Exit commands.

**Open:** opens a previously saved image

**Save As:** allows you to save a captured image in a choice of format with the path of your choice

**Exit:** quits the system

**Display:** this menu offers a choice of five commands: Focus, Grab, Clear Screen, Copy and Dimensions.

**Focus:** this displays a small monochrome window which is constantly refreshed with continuous grabbed images. This allows you to focus the camera and compose the image.

**Grab:** This performs the digitising of the image and displays it on the screen. The type of digitising is dependent of the settings in the Display group, which are covered below.

Whilst the picture is being digitised a 'Reading in...' window appears on the screen to indicate the progress of the process. Colour palette optimising may take a little time depending on how much memory is available. In Optimised mode (see below) the first 33% of the reading in indicator shows the input of the data, the second 33% is the calculation of the palette and the last 33% deals with the actual creation of the image.

**Clear Screen:** this command clears any displayed image from the screen and allows sizing of the window to be carried out.

**Copy:** any image that is displayed on the screen can be copied into the Windows Clipboard as a bitmap. This allows the image to be simply pasted into other Windows applications.

**Dimensions:** this command displays a box showing the overall border dimensions of the WinGrab Window.

**Setup:** this menu offers to commands, Video and Digitizer.

**Video:** this command displays the Video Settings dialogue box. Within the box and scroll bar settings for Brightness, Saturation (colour), Contrast, Hue (NTSC option only - not that it is needed for PAL anyway !!!) and Threshold. These scroll bars allow the appropriate settings to be adjusted and, if the 'View Settings' window has been activated then the settings can be altered, the 'View' button selected and the changes seen in the window, the displayed image is only updated each time the 'View' button is selected.





Threshold only operates in the B&W display mode and adjusts the ratio of black to white. The 'Display' selection area of the dialogue box offers a choice of Diffused, Optimised, Mono or B/W. Diffused digitises into a full 256 colour image which uses a fixed palette. This means that the same 256 colours are always used to display the image and therefore many diffused images can be displayed at the same time. Optimised digitises into a full 256 colour image which uses a unique palette. This palette consists of the optimum 256 colours which best represent the grabbed image. A better quality image is obtained but only one optimised image can be displayed at a time. Also, the process of capturing the image and calculating the palette and writing the image uses more memory and takes longer than diffused images. Mono digitises into a monochrome image and uses the 64 grey levels available from a fixed palette of 256 colours. B/W digitises into a binary image made up of only black and white. The ratio of black to white is determined by the Threshold setting.

Finally, a sizing option is selectable within the dialogue box which offers 'Stretch Bitmap'. This affects the way saved images are loaded and displayed in the window. Whatever size the image was saved as will be dimensioned so that it fits the current size of window.

**Digitizer:** this command selects the digitiser settings dialogue box. The TV Standards area allows the type of video source to be selected: PAL, NTSC or Canon ION. The Input area sets either Composite or RGB. The Fields box selects either Single Field or Frame, for non-interlace or interlaced inputs respectively. The options box displays the base address of the digitising card which is switch-selectable on the card. A 'Zero Wait State' option is selectable on or off to overcome any clock timing problems that may occur if your PC is not quite a true clone. A 'Filter' on/off selection is also available to filter out any chrominance noise that may be present and is suggested to be selected for composite sources and deselected for RGB.

## USING THE MICROEYE IC

When using MicroEye IC to capture images the most important thing to remember is that it is not a 'real time' system, and that consequently the video source to be captured must be static for as long as the system is digitising. With this fact in mind the system is capable of producing extremely high quality results - results which are



only dependant on the computer's video card and graphics capabilities and the quality of the input video source.

Once the required parameters have been selected and set up from the WinGrab menus it is simply a matter of setting the camera up, or video source, checking the focusing and video settings in the WinGrab windows as described earlier, and then digitising the image. If Diffused digitisation is selected then, depending on the speed of the computer and available RAM, the picture is digitised in around 4 to 8 seconds and processed in a further 10 to 15 seconds. After the image has been initially digitised a mono image is displayed on the screen, which is updated to the final colour image after the full processing has taken place. Thus, after 20 seconds or so the final digitised image is on-screen. However, this does not mean that the source has to be static for upward of 20 seconds, but only for the initial 5 or seconds as the image is initially digitised.

If Optimised digitisation is selected the process is basically the same but takes longer. The actual digitisation of the picture takes upwards of 15 seconds (again dependant of computer speed and RAM) and the rest of the processing upwards of 40 seconds. No image is displayed until all processing is complete. Mono and B/W digitisation processes are essentially the same as for Diffused.

All four methods gave good results using my Sony CamCorder as the input source. The Mono and B/W methods producing sharp images with good grey scales. The Diffused method gave good images with quite acceptable colour tracking and tones, however I found that the depth of field was a little off at times in that close objects in the field of vision sometimes had ghost like qualities to them.

Selecting Optimised digitisation produced the best results of all, with excellent colour rendition and image quality. Even making the 'mob' sit still for the required time was not as difficult as it seemed to result in an acceptable image. 'Still life' pictures produced superb results. It only took around 30 minutes or so from unpacking the system to being able to digitise pictures with the above results. There were no conflicts with any other resident systems on the computer system I used - and believe me it has a lot on board! The software is exceptionally easy to use, especially if you are Windows conversant.

The computer system I used for the tests was a 386 running at 33 MHz with 8M of RAM. Essentially I found that the MicroEye 1C is an excellent budget system for the amateur and professional alike. The cost belies its performance!

*Note:* for Pasokon users the system is ideal. Although it cannot be accessed directly from within Pasokon, the available \*.PCX image format is supported by Pasokon. Thus, images can be snatched and saved and then loaded into Pasokon (it must be noted here that, perhaps due to the odd configuration of the computer I used, that I had to load a saved image into Paintbrush first and resave it before Pasokon would accept it).



For a limited period (at least until February 28th, 1994) the MicroEye 1C system complete with the WinGrab software is available at only £175.00 + £6 p&p and insurance UK or £12.00 p&p and insurance Overseas. All prices inclusive of VAT.

If anyone is interested in a 'real-time' digitisation system - you may have seen it at some of the rallies being demonstrated on the KM stand - then the 'Big Brother' to the 1C is available called the MicroEye 2C. This system will capture an image from a MOVING picture in around 250ms without distortion and with excellent colour results. For more information please contact me at KM Publications as below.

*For more information or to obtain your MicroEye 1C system send your enquiry or order to: KM Publications, 5 Ware Orchard, Barby, Nr.Rugby, CV23 8UF.  
Tel: 0788 890365; Fax: 0788 891883.*

## TV on the Air

### Andy Emmerson G8PTH

This time the bulk of the letters are about repeater operation and microwaves - does this mean that 70cm and slow-scan activity has dried up? Convince me otherwise with lots of letters! Whispers reach me that work is proceeding apace to rebuild the Leicester television repeater GB3GC at Markfield, also that further effort is going into the Cambridge television repeater. Confirmation would be most welcome.

And now here's an update on GB3MV, the Northampton ATV repeater, provided by Tim Forrester G4WIM.

"Just a few quick lines to let you know what we're up to in 'MV Land'. We now have quite a few regular viewers and users (when are we going to see you on the air?!). Stations equipped for both transmit and receive are Dave G4SCJ, George G0KOG, Simon G1IRG, Steve G0NZP, Paul G4XKM, Dick G3TMQ, Paul G0HWC, Mike G6CJN, Phil G4HIO and me, Tim G4WIM. Apologies if I've missed anyone of the list!

With the exception of Dick G3TMQ, all of the above are using a PLL transmitter of my design (see article on pages 9-19 of this issue ... Mike) using surface-mount technology throughout.

We also have quite a cluster of regular viewers all of whom I can't recall, but appear on the 'MV Hall of Fame', about eight receive-only in total, some of whom will transmit as well!

If funds, time and licence permit I hope to link MV to TV via TG on 2.3 GHz. I've had a few chats with Dave G4NJU about it and he seems quite keen. MV continues to operate well, although a better site is being sought and I am planning to make a slotted waveguide aerial for improved ERP and input sensitivity, assuming I can source the right size of extrusion! If people want any further info give me a call on 0604 757401".

Tim added that CQ-TV would be welcome to reprint his article subject to the approval of the Elektor team. Printed circuit boards will be available through himself in this country and through Elektor magazine elsewhere (Elektor Electronics: February 1994); these will be top quality professional boards, so that everyone who builds the project should get optimum results. The unit employs the Mitsubishi 2 Watt 'brick' (as do most other designs) and provides sound and vision. The board measures 3" x 4" and fits neatly in a standard-sized die-cast box.

## The birth of ATV ??????

We don't always have room to report all ATV events as they happen, so here a little belatedly is some info from last summer as related by Brian G3SMU. You've seen 'The Weirdest of Bravo' (well, you may have done if you have satellite TV) now here's some only slightly less strange goings on on ATV. Darren G7LWT decided to film his wife giving birth (and why not?); he then digitised this and sent it as a sequence of moving pictures via modem and PC to Tony G4CBW. The transmission took 30 minutes on the phone line and was then rebroadcast on 24cm, with P5 pictures received by Brian on Winter Hill. Other events covered on ATV included the Battle of the Atlantic (I think they mean the official opening of the refurbished Western Approaches wartime control bunker, not the actual skirmish some 50 years earlier). This was a full-scale outside broadcast on ATV (well done!).

At this stage my scribbled notes lose their thread a bit, but they mention Mike EI2DJ operating from HMS Plymouth. Anyway, whoever was working from wherever, the signals were sent on 3cm to G3SMU, on from there to Tony G4CBW and were then rebroadcast on the Stoke-on-Trent repeater GB3UD. Sounds highly complex and a barrelful of fun for all involved. Brian adds that GB3UD is working very well and will soon have 3cm input and output, which should increase activity and promote further interest in 10 GHz. Good stuff!

## More repeater news now....

This time from Chris G1EJZ, who says this is just a few lines to keep readers up-to-date with what's going on in Stoke-on-Trent.

"A few weeks ago a conversation took place on two metres with Tony G4CBW about the possibilities of the lads here in Stoke using 10 Gigs (or Gigglyhurts by some) and within a few days the orders went off to Trevor Wraith for a lorry load of Solfan heads. The Gunn boards were ordered from BATC Members' Services and when they arrived I had the job of putting FIFTEEN of them together and about TWELVE intercarrier sound boards! Well, after a few 'minor problems' the situation is like this. I (G1EJZ) use a pair of 9 inch horns on transmit and the same on receive. The two systems are both rotatable.

Mark G0NMY has a Solfan on a 6 inch horn for transmit and a BSB dish for receive (P5 links with Mark from here!).

Trevor G0KBI and Arthur G6KGS in Kidsgrove both have excellent links to each other and also with Brian G3SMU in Bolton!

Martin G7MRF is working on a 200mW system and will be operational by the time you read this (power mad!).

Other members of the group who are in the position of getting their systems up and running are Alf G3OGD, Malcolm G7IAM, Eric G1YUI and Bill G1OMV.

Albert G4DHO is working on the Stoke-on-Trent 10 GHz repeater! So keep your dished pointing at Stoke and you just never know!

Just a few lines on 24cm activity now. GB3UD is working fine at the moment except for the input being hit by packet radio (whose bright idea was it to stick it on 1240 MHz?) so Martin G7MRF has machined a 7-pole interdigital filter which inserted into the repeater's input should put paid to the breakthrough.

Can I also say welcome back to Steve G4DVN, who has been absent on the ATV scene for some time. Well that's it for now. I hope that this has been of some interest. Can I also thank Trevor G0KBI for all the running about that he does for the group and for the time he spends chasing around for bits and pieces. Well done Trevor. 73 to all, De Chris G1EZJ.

That's all for this time, but keep those letters coming in.

### **Thanks and Help Please !!!**

Due to the intense commitments on Andy's time as a freelance journalist, columnist, editor, etc., he has reluctantly decided that after 13 years of stalwart service he can no longer continue to produce the TV on the Air column for the magazine. In the meantime, unless one of you out there comes to my rescue, I shall take on the responsibility for the column. Therefore, please send all information, etc., for the TVA column to me at the Editorial address.

I would personally like to thank Andy, and also on behalf of the Committee and the Club, for his service to the magazine over the years, not only in the production of the TVA column, but for translating the many German articles for us over the years, and also for the help and advice given to me since taking over CQ-TV in 1988.

If you feel you could handle the production of the TV on the Air column, and this includes putting up with an oft times domineering, pedantic and unmovable Editor (*especially where closing dates are concerned!*), then **PLEASE** contact me at the Editorial address.

**Thanks Andy ... Mike**

# Circuit Notebook No.51

John Lawrence GW3JGA

*Of Faders and Switchers: I have been following the development of the various fade-to-black circuits in CQ-TV, in particular those using the TEA5114 video switch IC. The problem with the TEA5114, as I understand it, is that it internally DC restores to sync tips, which results in a DC shift as the input signal is faded. Mike Hutchings, in CQ-TV 157, has produced a design to overcome this problem. Peter Carliell has come up with a further elegant solution in CQ-TV 160, he uses a transistor clamp circuit to clamp the back porch to a pre-set reference voltage. This holds the black level constant as the signal is faded.*

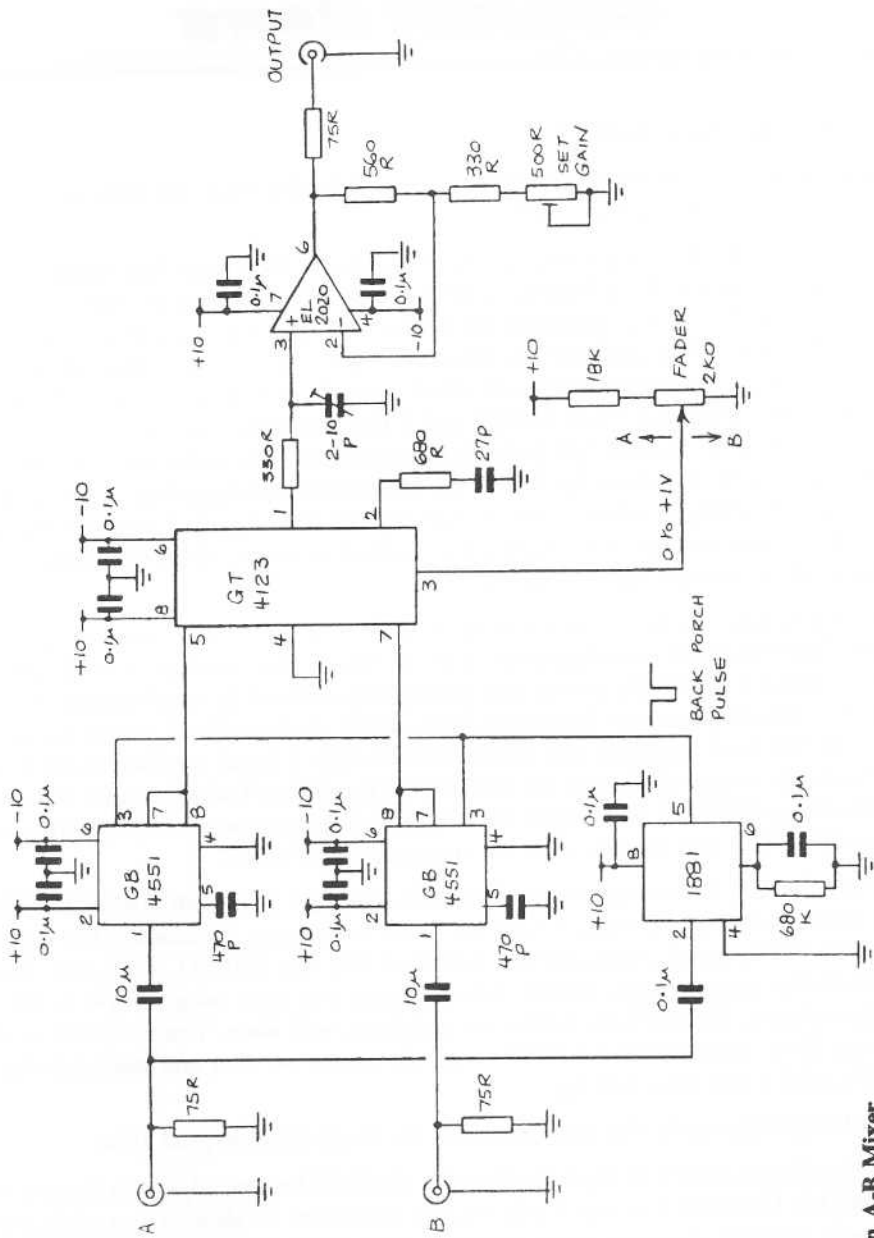
The fader control in most of the designs published is very simple and effective, consisting of a 100 ohm variable potentiometer resistively padded to match 75 ohms. Unfortunately this means that the video signal must be brought up to the front panel of the mixer. A voltage controlled amplifier/fader will avoid this problem but when built using discrete component the circuit is usually quite complicated.

I recently came across a complete 2-channel video multiplier/mixer housed in an 8-pin DIL package. The GT4123 is made by the American Gennum Corp. who specialise in professional video ICs. The GT4123 operates from +10 & -10volt supplies and requires a variable control signal of 0 to +1.0 volts to provide a linear fade from input B to A. The bandwidth is DC to 10MHz +/- 0.05dB. This device could replace the variable potentiometer(s) in the TEA5114 fade-to-black circuit and would provide remote operation of the fader control by a variable DC voltage.

Gennum also make a video clamp IC, the GB4551, which can be used as a back porch clamp by driving it with the `back porch pulse output` from a 1881 sync separator IC. I have extracted various circuits from the extensive Gennum application notes and, as a paper exercise, joined them together to form an A-B mixer design, as shown. This is not intended to be a constructional project but to show how video ICs can be connected with the minimum of external components to provide a specific function.

## References.

1. Fade to Black, ATV Compendium, page 10.
2. Improved Fade to Black, Mike Hutchings, CQ-TV 157, page 19.
3. Fade to Black, with A/B Mixer, Peter Carliell, CQ-TV 160, page 36.
4. Gennum Corporation Data Book 1993. (which includes application information), Colsan Microelectronics, Rosedale House, Rosedale Road, Richmond, Surrey, TW9 2SZ.



An A-B Mixer

# ***Contest News***

## **Richard Guttridge G4YTV**

I must first apologize for the incorrect Contest Calendar in the last issue of CQ TV. I think I sent the wrong file to Mike.

It's mid December, I've got my feet up in front of a nice warm fire while outside the wind is howling like a banshee. Sounds all too familiar to me, doesn't it to you? The Autumn Vision was infamous for it's weather and not much else! I received nineteen fastscan logs and one for slowscan, with a total of two hundred and one QSO's. I think we missed the lift by about a week. A look at the forecast on the Friday night convinced Clive G8EQZ and I that discretion was the better part of valour and that we wouldn't go portable that weekend. Late on Saturday afternoon I was beginning to wonder if the folk at the Met Office had slipped up. It was almost a dead calm with just a bit of rain falling. By the time I packed up early Sunday morning it was raining a bit harder but nothing to worry about the wind. ATV activity on the contest was very modest.

Six hours later, I woke to the bedroom windows rattling, it was time to lower the mast. That was easier said than done with the way it was bending. It took half an hour to make it secure. By now it was getting very difficult to stand outside and the odd slate was beginning to fly around. Back in the shack and back on the air again most of the local amateurs had similar tales to tell. I found out later from Tony G0NAA, the owner of the site for GB3EY the local East Yorkshire ATV repeater, that between 0730 and 0830 GMT the average wind speed was 75 MPH with gusts up to 98 MPH. I was glad we were not sitting on top of a hill.

The highlight of the entries for me were the 3cm logs. Tony G4CBW in IO83UB had done a lot of arm twisting to get his locals to make an appearance, but it paid off with twelve good solid contacts. The best DX was G3I'NQ at 80 km. Tony mentioned in his letter that all the stations except two were using 10mW to 60cm dishes or horns. Thanks Tony for the log and letter, well done. You've shown us all how to do it. John G7ATG (G4ZJY) was also active on 3cm and managed three QSO's, with a best DX of 43 km.

It's all happening in the West Midlands and the North-West. A good effort.

On 24cm Peter G4RNA at High Bradfield Nr. Sheffield had the edge over the rest of us with his 1300 foot location. Under the flat conditions he showed us a clean pair of heels. Activity was very quiet, however there were one or two new call signs appearing on the logs for the first time, so a warm welcome to Richard G7MFO whose QTH is 8 km East of Hull. During the contest he was running 1.5 watts from



his Solent to a 48 element JVL at 50 foot, and no pre-amp yet.

Keith G8VMP located at Finchley in North London is also a newcomer to the contest scene and asked "Is it always as quiet as this. And is it allowed to bribe the locals with beer to persuade them to come on?" Keith if you say things like that you might find that you have many more locals than you thought!

That brings us to 70cm. All the stations that were in the running were very close to each other on the points. No real DX was worked apart from John G8MNY who managed to get one contact of 228 km and another John G7ATG (G4ZJY) who snatched one of 222 km. The contact John G8MNY had just gave him the edge over Peter G4RNA. Well done everyone it was hard work. The logs never show the effort that goes into a contest when conditions are flat.

I've just received the results of the International 93. A full report will be in the next CQ TV. This will be a brief run down. These are the overall results:-

Place	Callsign	Points	Place	Callsign	Points
1	F6IFR	16727	12	G8MNY	8106
13	G7ATV	7963	15	G8EQZ	7762
17	GW7ATG	7140	65	G6WLM	666
66	G7KAO	562	72	G4TEP	164

There were a total of 84 entries.

Well done everyone more details next time. Please keep those logs coming in.

## AUTUMN VISION 93 RESULTS

### 70cm

Place	Callsign	Pts	QSO	Best DX	@Km
1	G8MNY	812	8	G4LDR	228
2	G4RNA	732	5	G4YTV	95
3	G4YTV	606	6	G4RNA	95
4	G7ATG	517	7	G8MNY	222
5	G4XMQ	407	5	G4RNA	75
6	G0PIA	110	2	G8MNY	32
7	G4WGZ	82	3	G0PIA	22

### 24cm

Place	Callsign	Pts	QSO	Best DX	@Km
1	G4RNA	1106	7	G8KBC	123
2	G7ATG	630	8	G3SMU	102
3	G4XMQ	379	4	G4RNA	75

4	G4YTV	372	6	G4RNA	95
5	G8VMP	358	7	G7KAO	34
6	G7MFO	295	5	G4RNA	95
7	G8MNY	281	7	G3WFM	38
8	G7KAO	244	6	G3WFM	36
9	G0PIA	148	3	G8MNY	32
10	G4WGZ	96	3	G8VMP	29

### 3cm

Place	Callsign	Pts	QSO	Best DX	@Km
1	G4CBW	1049	12	G3FNQ	80
2	G7ATG	190	3	G4CBW & G4DVN	43

### SLOWSCAN TV - 2m

Place	Callsign	Pts	QSO	Best DX	@Km
1	G4XMQ	180	2	G7BTP	45

# ***Contest Calendar 1994***

All contests, except the Cumulatives, take place on the second full weekends in the months of March, May, June, September, November and December. The start time is always 1800 GMT on the Saturday and the finish is always 1200 GMT on the Sunday. The Cumulatives take place during January and July. Do remember many of these contests coincide with contests in Europe and are open to all licenced radio amateurs who are equipped to transmit and/or receive pictures by either Fast or Slow Scan TV. Non transmitting amateurs or SWLs can also take part.

## **SPRING VISION 94**

Saturday 12th to Sunday 13th March  
Time 1800 GMT Sat to 1200 GMT Sun  
Fast and Slow Scan ALL Bands  
Entries to be posted by 28th March 1994

## **MAY MICROWAVE 94**

Saturday 14th to Sunday 15th May  
Time 1800 GMT Sat to 1200 GMT Sun  
Fast Scan only - 24cm and above  
Entries to be posted by 30th May 1994

## **SUMMER FUN 94**

Saturday 11th June to Sunday 12th June  
Time 1800 GMT Sat to 1200 GMT Sun  
Fast and Slow Scan ALL Bands  
Entries to be posted by 27th June 1994

## **SUMMER CUMULATIVES 94**

Tuesday 5th, Wednesday 13th, Thursday 21st and Friday 29th July 1994  
Time 1900 GMT to 2359 GMT for ALL sessions  
Fast and Slow Scan ALL Bands

Please send logs for ALL the sessions and indicate the three logs you want to include in your entry. Couldn't manage three logs? Please send one or two then! If you send four logs it helps me to cross check other entries

Entries to be posted by 22nd August 1994

## THE INTERNATIONAL 94

Saturday 10th to Sunday 11th September

Time 1800 GMT Sat to 1200 GMT Sun

Fast Scan only all bands

See the International rules issued every August by the contest manager in the UK

If you want a copy, please let me know

Entries to be posted by 26th September 1994

## AUTUMN VISION 94

Saturday 12th to Sunday 13th November 1994

Time 1800 GMT Sat to 1200 GMT Sun

Fast and Slow Scan ALL Bands

Entries to be posted by 28th November 1994

## WINTER VISION 94

Saturday 10th to Sunday 11th November 1994

Time 1800 GMT Sat to 1200 GMT Sun

Fast and Slow Scan ALL Bands

Entries to be posted by 2nd January 1995

The BATC log sheets with entry form (please copy) and rules are available from the contest manager: Richard Guttridge, G4YTV. Ivy House, Rise Road, Skirlaugh, Hull. North Humberside. HU11 5BH. Tel: 0964 562498 only between 1900 and 2200 local.



**The BATC Telephone BBS has moved !!**

**The new phone number for the BBS is:**

**0633 614765**

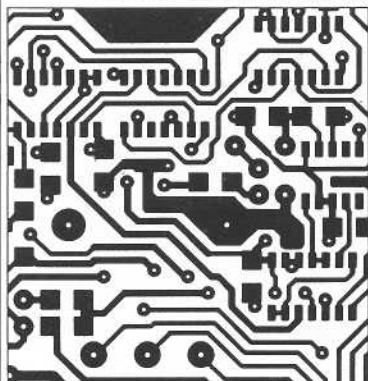
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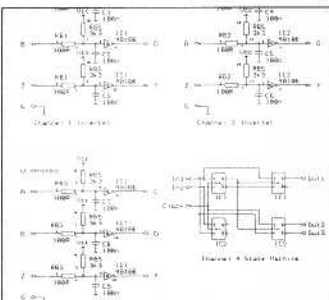


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ANALYSER III: Linear Analogue Circuit Simulator ~ 130 node capability.	\$195.00	£98.00
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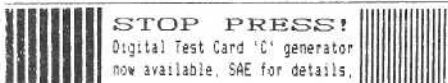
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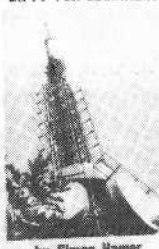
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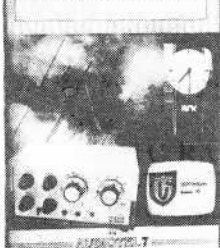
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**MICROVITEC MICROGRAPHICS HI RES COLOUR MONITOR** ... £30. Spectrum 48k ... £25. Spectrum +3 ... £60. Viewdata terminal (Mullard Teletext chipset) ... £15. Video printer ... £25. Cross-hatch generator (faulty) ... £10. 2764 used EPROMs, 5 for ... £3. Eurocard frame ... £5. Various Modems ... £10-£25. Z80 support chips ... £1. RGB combiner for BBC B ... £10. D.L.Smith. 081 650 9601.

**PRIME FOCUS 1.6m ALUMINIUM DISH** with heavy-duty mounting and ground pole assembly, unused ... £85. Decca CS2640 26" professional receiver/monitor with some spares, working ... £25. BRC 26" 3500 chassis receiver, working, new tube fitted ... £30. V21/23 Modem as new ... £50. Geoff Turner. Tel: 0684 566979.

**ROBOT 450C SSTV** colour Scan Converter in good order, c/w upgrade EPROM for SC-1 compatibility. Full camera snatch etc ... £300. Peter Bruce. Tel: 081 689 2813.

**ROBOT 70D SSTV MONITOR**, working but requires some adjustments ... £60. Robot 80A Camera, requires intermittent fault to be located, less lens ... £10. Both items plus carriage. Gordon GM3ULP. Tel: 0698 253394.

**PROWEST BBC REGIONAL MIXER 528-1** plus full manual and circuits ; 12-channel plus wipes, effects and colour . 19" rack unit and cables to control desk. Complete but needs loving care and attention. Offers or W.H.Y. B.Swain, Little Treforda, Trewalder, Delabole, North Cornwall, PL33 9EY. Tel/Fax: 0840 213308.

**SONY AV 3670CE MONOCHROME REEL-TO-REEL VTR** and JVC CR6000 U-matic VCR. Both items in good working order and appearance. No reasonable offer refused as I need the space. Terry Martini, 6 Levant House, Mile End Road, London, E1 4RB. Tel: 071 790 6807; Fax: 071 702 8774.

**PHILIPS LDK 5 EX-BROADCAST 3-TUBE (25mm) COLOUR CAMERA** with Schneider 30x12.5 lens package, power supply, TV 36 multicore cable, handbook. Viable ... £100. Also, IVC 7000P portable ex-broadcast 3-tube colour camera with Angenieux zoom, multicore cable and base station, which incorporates all sync pulses and coding. Handbooks plus two spare 25mm tubes (green and blue). Viewfinder non-operational. Some spare boards as well as Sony 4" viewfinder CRT plus three NEC 2" CRTs ... £75. Both cameras will need attention. Consider it a challenge. Preserve a bit of technological history! Dicky Howett. Tel: 0245 441811.

**SONY CCD-F340E VIDEO 8 CAMCORDER**, case, batteries, tapes (some brand new), absolutely as new ... £400. Slik heavy duty video tripod (mint) ... £55. Black Star Jupiter function generator (up to 200 kHz), sine, square, TTL, etc.,(mint) ... £70. Icom AH7000 discone antenna 50-3000 MHz, mast-head preamp (new) ... 3105. Sony SLV-353UB video recorder, jog, shuttle, etc., hardly used ... £185. Paccom Tiny-2 Mk.2 TNC ... £95. Welz 4-5S 3-15V/4.5A metered PSU ... 40. Kamtronics Hostmaser II and PC software for KAMs, KPCs (original) ... 40. Carriage all items extra. Paul G4XHF (QTHR). Tel: 0293 515201 (home - evenings) or 0622 696437 (office - day).

**FERGUSON VHS MODEL 3V43**, this was a top-range recorder with SP/LP, Dolby and Hi-fi tracks, 14 day 8 event timer, infra-red remote control, facility for direct connection to VHS camera. It's a few years old now and the head drum apparently needs replacing due to a fault. I have not got a jig so if anyone wants it for spares or repairs I am open to offers. Old Sanyo Betacord betamax VC, it is old and has piano keys, useful for spares, again offers. Quantities of Betamax tapes, prices from ... 50p each plus p&p. VHS camera, Hitachi VKC-870, perfect working single-tube Saticon with electronic viewfinder, shoulder-mounted with variable iris and titling facilities. Plugs into a standard VHS socket as on the Ferguson VHS recorder above. Still in original box ... £100 ono. Martyn Taylor. Tel: 0689 826827.

**SPECTRUM PLUS**, interface 1, micro drive with cassettes, Mirage microdriver (copies any tape to cassette), printer and loads of software ... £100. L.A.Hood G3LCW, 'Little Cheverelle', Cherry Lane, Gt.Mongeham, Deal, Kent, CT14 0HF. Tel: 0304 364197

**WANTED:** Reel-to-Reel VTR equipment (wants list available again) working or not for spares or repair. Also required: video heads for Sony CV2000 and Akai VT110 portable VTR. Will accept non-working machines with good heads for these parts. Also looking for Akai VT350/VTS400 series portable VCRs (Akai VK format). All other cassette formats are NOT required. Offers of equipment etc. to Terry martini, 6 Levant House, Mile End road, London, E1 4RB. Tel: 071 790 6807; Fax: 071 702 8774.

**WANTED:** PCB for use in test card as featured in "Radio & Electronics World" July 1983. Cropredy unit? Also, colour board for 1" JVC model 871P VTR. Electromechanical spares from IVC 800 series machines available. Please contact C.G.Stirling. Tel: 041 440 4584 (day); Tel: 041 632 9960 (evenings).

**WANTED:** Has anyone any HM4864P-2 64k by 1 dynamic RAM. 4164 etc. will not do. Please contact C.G.Stirling. Tel: 041 440 4584 (day); Tel: 041 632 9960 (evenings).

**WANTED:** Prewar Televisions; prewar CRT of EMI (Marconi or HMV); cabinet for Ekco TA201; prewar television brochures. I can collect. AVO Valve Data Manual (original or copy) for VCM163. Does anyone know of the existence of a Philips TV (with radio) type 663A (c.1949) and of a Philips experimental TV (with radio) type SG860A (c.1947-1948)? Thank you for your kind help. Jac Janssen PE1OCE, Hoge Ham 117D, NL-5104 JD Dongen, The Netherlands. Tel: (from UK evenings) 010 31 1623 18158; Fax (office from UK - please mark "private") 010 31 13 624427. **OFFERED:** help with documentation of Dutch (mainly Philips) TVs from 1930s to approximately 1960.

**WANTED:** Have you upgraded to an I.R.D.? If so and your MASPRO SRE 90S is surplus to requirements please contact Kevin Davies GW8NAC, 45 Castle View, Simpson Cross, Haverfordwest, Dyfed, SA62 6EN. Tel/Fax: 0437 710760.

**WANTED:** Video cassettes for Funai/Technicolour portable VCR. Also require service manual for this machine (model 212B) and the tuner and monitor units to complete the kit. I also require an Akai 1/4" reel-to-reel portable colour VTR. Reasonable prices paid for all of the above items. Terry Martini, 6 Levant House, Mile End Road, London, E1 4RB. Tel: 071 790 6807; Fax: 071 702 8774.

**WANTED:** Image Orthicon camera lenses (TV88 fitting). Has anybody got at least a broken one they can sell me? I need a 5 inch and an 8 inch to complete a set. Thanks. Also any Marconi or EMI product catalogues. Call the ever hopeful Dicky Howett. Tel: 0245 441811.

**WANTED:** Any technical information on the Olivetti M24 SP computer, particularly FFD controller and display adaptor. I want to upgrade these areas. Peter. Tel: 0445 822922 (evenings) or 0533 522179 (day)

**WANTED:** Circuit diagram for a Samsung model V1520T VCR (video switching fault), all costs refunded. John Cronk GW3MEO, 2 Mostyn Avenue, Prestatyn, Clwyd, LL19 9NF. Tel: 0745 888355.

**WANTED:** Lens hood for an EMI 2001/1 camera. Paul Gibbs, Hazelbrook, Henton, Wells, Somerset. Tel: 0749 675839.

**WANTED:** Cropredy test card PCB or PCB layout, or finished board, kit, non-goer, W.H.Y. L.A.Hood G3LCW, 'Little Cheverelle', Cherry Lane, Gt.Mongeham, Deal, Kent, CT14 0HF. Tel: 0304 364197

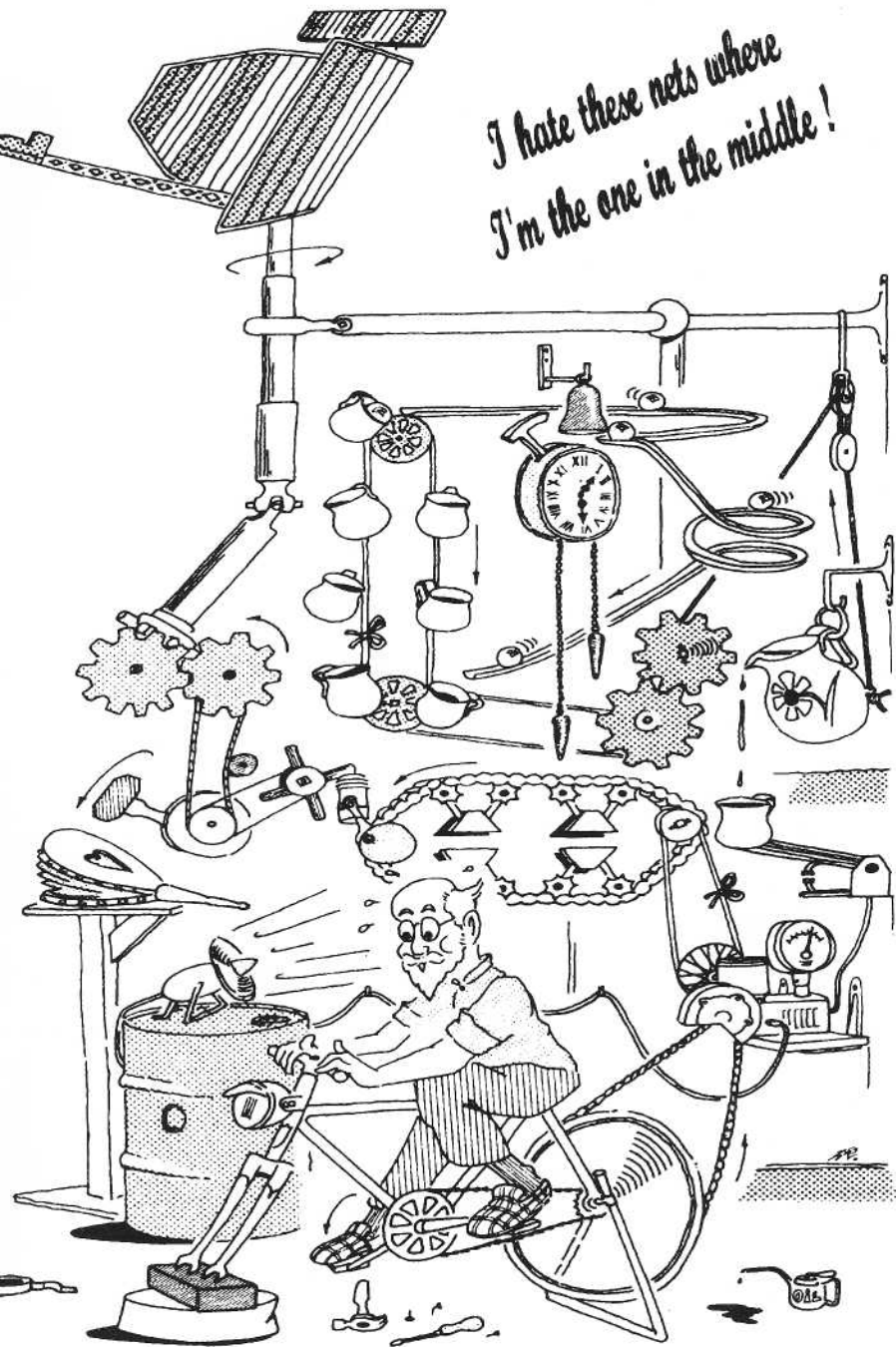
**WANTED:** Service information on the following 405-line equipment: Philips TVT5M solid-state pattern generator; Tequipment WG/44 valve pattern generator. I am also looking for some early 405 sets. Geoff Turner. Tel: 0684 566979 (Worcs.)

**WANTED:** Circuits/manual for RCA mono CCTV camera TC2014/x. E.H.T. unit, self contained, -12V to -24V in, 15kV + aux supplies out, possibly ex-Pye mono studio monitor? Barney Swain, Little Treforda, Trewalder, Delabole, North Cornwall, PL33 9EY. Tel/Fax: 0840 213308.

**WANTED:** Ectar 35mm. film camera lens with approx 2 3/16ths inch fine thread mount. Circuit for Aston time code reader "TD20". Circuit for Tektronics ITS gen 148. Circuit for CEL P169v 8\*4 vision matrix. Circuit for Marconi TF2701 Bridge. 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. TV related books wanted WHY. 1.25" HOP Plumbicons. B. Summers G8GQS 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 251. Manuals and circuits for CEL P147 TBC., VTW300 video typewriter. 8 pin Sony VT/monitor cable. Patrick White 081 847 3995 day or 0628 21718 eve.

*I hate these nets where  
I'm the one in the middle!*







The BATC at Spalding 1993