CQ-TV 201

Contents

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Chairman's Column

Happy New Year and welcome to CQ-TV 201. This is the second magazine to come to you direct from the printers without first turning up on some unlucky committee member's doorstep, in a large van ready for a weekend of envelope stuffing prior to another large van collecting the envelopes some days later. This streamlining of the delivery process was inevitable, it just happened sooner than later. It does add to the production cost of CQ-TV and to the cost of posting as this new system is unable to support press stream a process that resulted in a discount from Consignia or should that be Royal Mail. One of the results is an increase in the commercial advertising rates. They only just cover the printing cost for the page they occupy and still represent excellent value for money. This is also the first issue in which we will be awarding a prize for the best letter. The winning letter will be selected and the current prize an electronic character generator will be sent to the winner, providing their subscription is up to date. I had a chance earlier in the month to check out one of these generators and its well worth putting pen to paper for, or should that be a finger to the keyboard.

We have also been reviewing the services supplied to you by our website www.batc.org.uk. The CQ-TV back archive is now restored, only this time it is restricted to members. The four most recent issues are not part of this archive although they are on the club CD. Another possible addition to the site could be an up to date news service, using the similar technology to that which brought you the extracts from CAT 70. The technical innovations for this service are now in place but we lack an ATV journalist to compile and read the news, initially on a month-by-month basis, and if possible to update to a weekly service at some future date. If you feel this is a task you could undertake, providing Ian with a *.WAV file then Ian would like to hear from you.

One rather disappointing result from the website was someone using a stolen credit card to order BATC goods. The amount was for £28 and is only the second incident since we started this service; the previous fraud was for £5. The present system checks for valid credit card details but is unable to crosscheck the delivery address with the cardholder address. To do this we will have to sign up with one of the online companies, a step we have thought previously unnecessary, but a decision we will now be reviewing.

BATC members have been reducing in numbers over the last few years, and we are now running a membership drive. Brian Summers who is contacting lapsed members, and sending them a complimentary back copy of CQ-TV along with an invitation to re join the club, spearhead the first step in this drive. Most of the people he is writing to lapsed before CQ-TV moved to the A4 format it presently enjoys. If you know anyone who would like to see a back copy of CQ-TV with a view to joining the club then drop Brian an email and he will see they get a back issue.

I hope you all enjoy this first magazine of 2003.

Trevor Brown, BATC Chairman
email: Chairman@batc.org.uk

Prize writer

As trailed in CQ-TV 200

The winner of this issues 'best' letter or email is Richard L. Carden VK4XRL

The winner will receive a TV character generator, kindly donated by: -

The BlackBoxCamera™ Company Limited

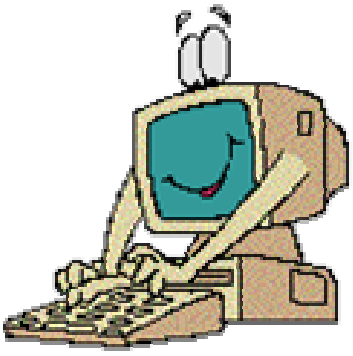
For full details, visit their web site http://www.stv5730a.co.uk

Letters and emails

Dear Editor

It appears that the long-running CQTV feature Members Sales and Wants has been dropped. This popular section of our journal has apparently reached its sell-by date due to the 'success' of the BATC web page version. My point is that not everyone goes 'on-line' or is aware of what is on offer. To this end perhaps it wouldn't be too much of an effort To Whom It May Concern: reprint the 'on-line' ads in the magazine? Our gallant editor is always trying to fill the magazine as it is! Doubtless, most items would have sold by the time CQTV appears, but people have also 'wants' and these would benefit from a prolonged exposure in print form. Another point is that I have had in the past, buyers for my (unsold) stuff who happen to pick up an old copy of CQTV. 'Do you still have that SPG...?' etc. It's there preserved in the magazine, whereas 'on-line' stuff drops off and is never seen again. If we are to finally lose our beloved small ads perhaps this could be made clear. In the magazine, naturally.

Dicky Howett



Dear Editor,

In your reply to a letter from Mr Giles in CQ-TV 200 you have made some remarks about folk not building kits anymore. I would like to comment on this: I have always been a keen home-brewer and most of the ATVers I contact with are or have been. However, over the past few years there has been a change in circumstances that has made it very difficult for most to keep up d.i.y. in electronics. The reasons are not a lack of interest but a lack of component availability, lack of spare time due to work load at the qrl and also lack of understanding of new technologies. If you want to build a project from scratch these days you need to obtain or make your PCB, well, BATC are no longer providing these, but one could make one yourself. Now try to populate the board and you will find that for sophisticated projects you have to order special semiconductors at a low price each, but in minimum quantities of a thousand or so. Or for older designs you may not get the pieces at all because of discontinuation. I do not need to comment on the lack or spare time, but take my third point, the lack of understanding: With digital approaching there is a fundamental change in technology both on the video and on the RF side, which many of us, who are not in the trade, find hard to get into. It seems that CQ-TV more than other magazines is covering basics of video, TV, digital etc., but it still takes time to become accustomed to the new terminology, leave alone the underlying principles. On the RF-side of things it is hardly worth building your own TX or antenna. Things have become relatively cheap to buy and I have never had much success in building antennas (hi).

I believe that your sentence "people just WANT to buy 'black boxes'..." will have to be modified into "people have not got a choice but to buy 'black boxes'..." to be fair with the majority of us out here. I would love to build something like the President's digital projects, but...(see above). I also firmly believe that once digital becomes established in amateur use many more people would be willing to buy digital building kits for the very same reasons, should they be available.

Regards,

Jörg Hedtmann, DF3EI / GM4YRI

P.S.: I am currently building: a new 70cm-analog ATV transmitter...

Dear Ian,

Having just read G4LBH's letter about the availability or this case non availability of PCB's for CQTV articles has struck a nerve. I'm currently building/assembling gear to get going on ATV. Flicking through past issues of CQTV members services pages there have been numerous PCB's available. If as you say no one buys PCB's could this be due to the fact that they are not available? If there is such a low demand as you say, would it be possible to at least let members

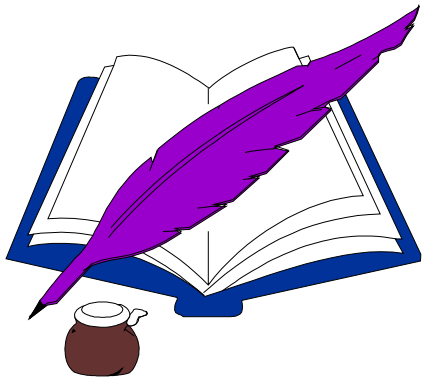
have access, (perhaps by the web or post), to the art-work so at least we can produce our own PCB's?

Regards, Chris McCarthy, G3XVL

Editor, CQ_TV Magazine

Dear Ian,

There is one thing I have, as well as others here in Australia have appreciated and that has been the technical content of CQ-TV. I have been a member since CQ-TV58 and have found the contents very rewarding. Having been associated in television for the past 44 years and



then only up to the signal leaving MCR I found the articles very refreshing. I have always looked forward to receiving CQ-TV and to see what others have to say as well as what can be built, especially on the transmission side. At one stage when CQ-TV was not printing many technical articles, a few of us were not going to renew subscription. For us the cost of subscription is high, added with the high costs of airmail, which does not help. Therefore the magazine must have some interest otherwise you have a magazine that runs nothing but ads and I have seen many fall by the way side. In fact CQ-TV and Silicon Chip (Australian Electronics Magazine) are the only two magazines I receive on a regular basis. Others are brought when I see something that interests me. Also having been out of the industry for a period of the time and being isolated with respects to parts etc. the technical side of CQ-TV is a must. I would rethink the idea of providing PCB's as I have found them invaluable and it has enabled a project to be up and running where otherwise it might not have got of the ground.With experiments in digital it would make it so easy and should work first time.I think the past issues have been very well biased and I also appreciate that you have to have articles on the Satellite scene in Europe. Over the years I have received help from Trevor Brown, Peter Delaney (who I met back in 1985) and now Mike Cox. Without CQ-TV and the help when required, I might not be where I am today. Therefore, to the Chairman, President, editor and committee, keep up the good work.

Television is technical and without the circuitry, production could not do the things that it can now, just ask John Logie Baird.

Kind Regards,

Richard L. Carden VK4XRL

The Editor, 26th November 2002

Dear Editor,

I have no equipment for transmitting or receiving amateur TV at present, but I follow with interest the current articles on 70cm TV and other transmitting topics in CQ-TV.

I am tempted to get on the air, but is anyone out there? I fear that I may be in an area of low activity. Just my luck to get on 70cm to find everybody in my area is on 3cm!

May I ask members to write to the editor for some indication of activity- where and what band –for inclusion in CQ-TV.

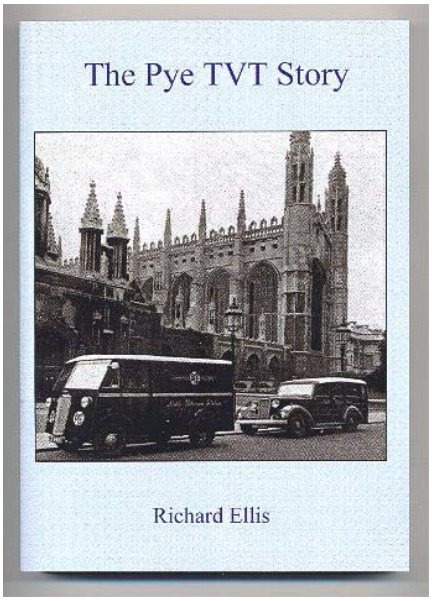
Yours truly, Bob Harry - G3NRT

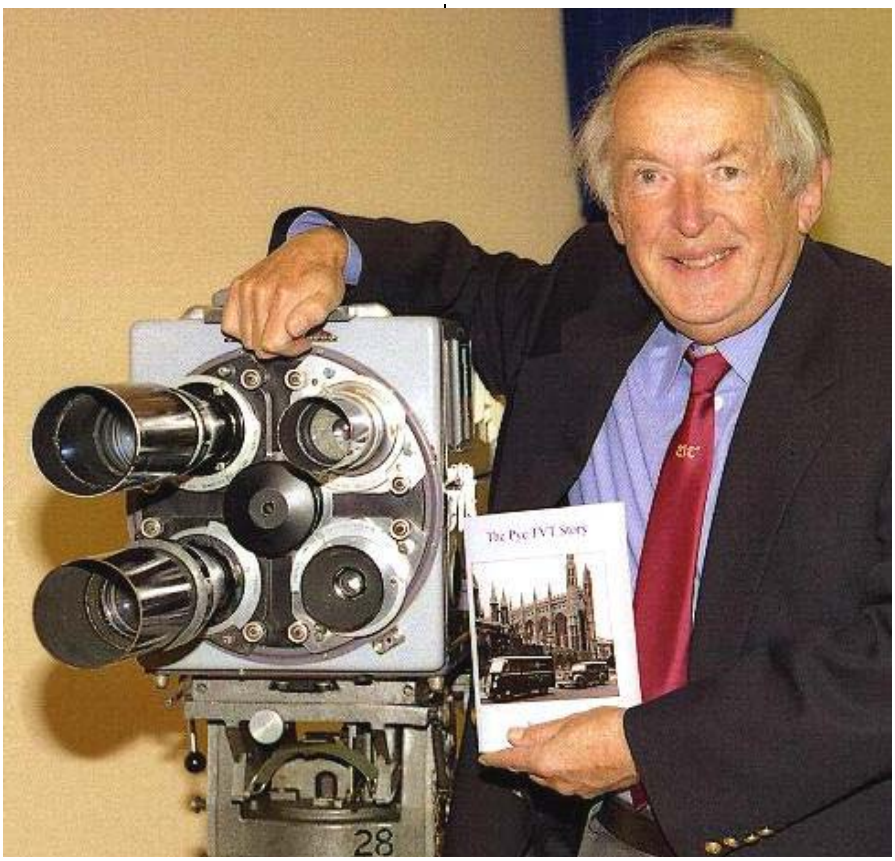
G7MF0/P Portable Set-up International 2002

The PYE is Dished - review

Dicky Howett reports.

At last it's on the shelves! It's a book called The Pye TVT Story and as the title suggests, it's everything you ever wanted to know (or didn't realise) about the broadcast television arm of that famous Cambridge company, Pye. The book, written and complied by Richard (Dick) Ellis - former Chief Engineer of Pye Studio Activity - covers a wide range of Pye's post war tv engineering production. Chapters include transmitters, studios, closed-circuit, OB vans and cameras plus history and comment. The book is compiled with significant contributions from senior Pye engineers respectively, A. James Bennett, Ian Waters, and Mike Cosgrove plus a fascinating account by Mike Gaisford of Pye TVT's commercial dealings around the world. Because several hands have written for the book, there's a certain amount of repetition (and a few re-prints from other sources), but this doesn't detract. Apart from the allure of arcane and unadorned television technicalities, the book (342 pages) is leavened throughout with a sprinkling of amusing anecdotes (in one or two cases, baffling to this writer, but no doubt pertinent to Pye people) plus a profusion of photographs, many unseen for fifty years.





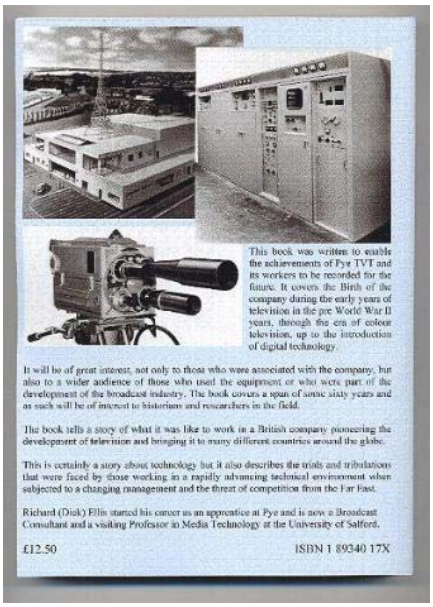
Author Richard Ellis poses with his PYE TVT history book and a genuine Pye Mk 3 camera supplied by our very own Dicky Howett.

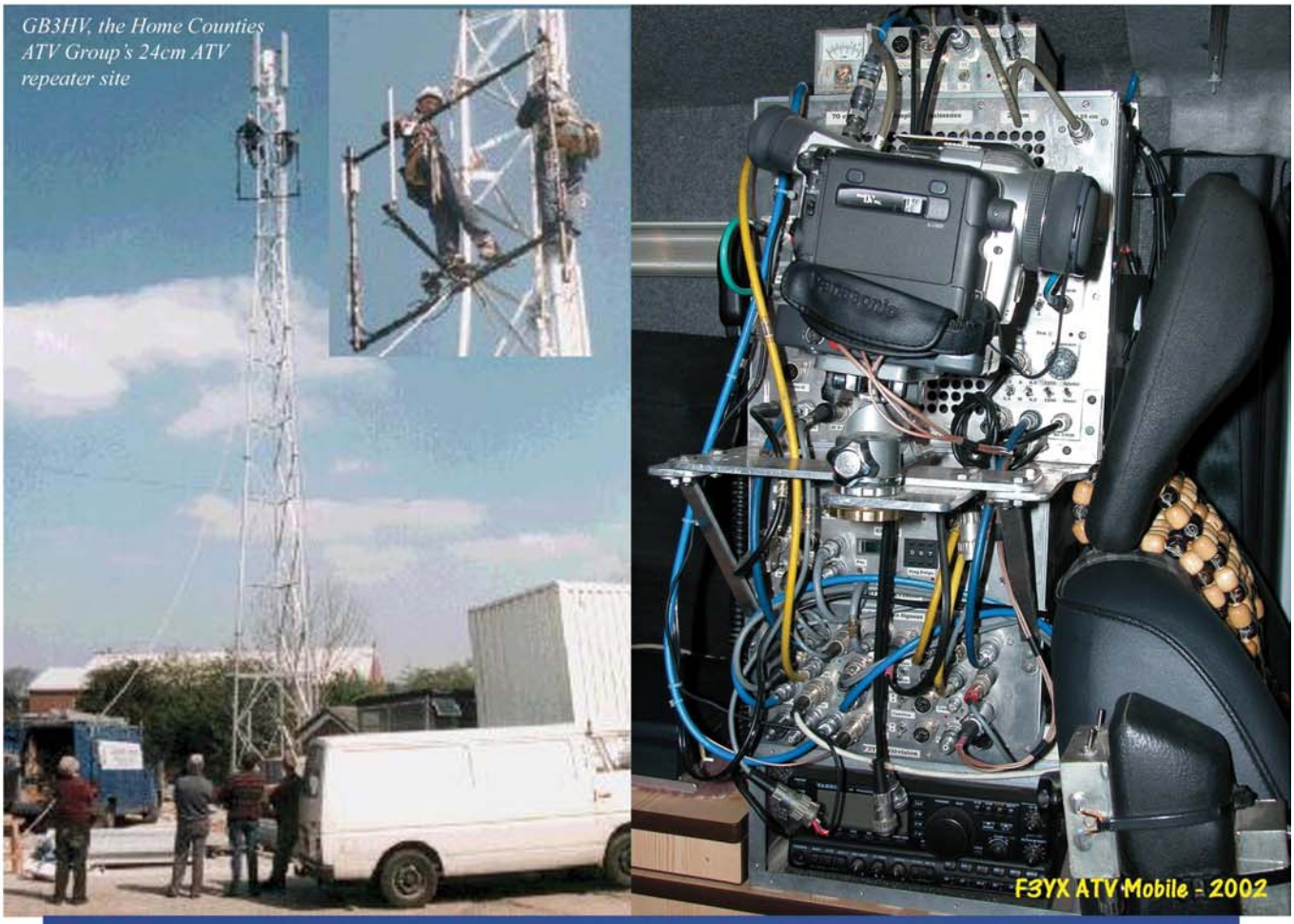
The book itself was mooted originally in 1987 by Richard Ellis. Only now, with the benefit of 'desk-top publishing', has it been feasible to produce something in reasonable quantities that previously would have involved Mr Nat West Bank, linotype, flatbeds and lots of photogravure. The Pye TVT Story is a welcome addition to the growing canon of broadcast histories, (and complimenting the recent IEE Pye biography of C. O. Stanley, 'The Radio Man'). I feel the only omission is that The Pye TVT Story has no index. None the less, recommended.

THE PYE TVT STORY by Richard Ellis. 342 pages. Illustrated.

ISBN 1 89340 17X - £12.50 + £2 pp.

To order your copy, send cheque for £14.50 payable to 'R.J.G. Ellis Book' Richard Ellis, 114 Dixon Drive, Chelford, Macclesfield, Cheshire SK11 9BX. email: rjge@globalnet.co.uk




GB3HV, the Home Counties
ATV Group's 24cm ATV
repeater site
F3YX ATV Mobile - 2002


578 BRC 91
F3YX ATV Mobile - Juin 2002 au Mt Aigoual

Web Cams: A New Communications Channel?

Peter J. Stonard has been experimenting with web cameras for a year or so, and reports his findings.

The root of television, both professionally and amongst amateurs, is communication. While radio and television have matured technically, (and some may say degenerated in content…), the recent technology that powers the Internet offers us an exciting communication tool, the web cam.

So, What Is A Web Cam?

Simply put, it's a device that places a picture (still or moving) where anyone with access to the Internet can view it. We'll take a look at the author's simple system. Quite literally, take a look, if you are reading this article online, or you have ready access to the Internet.

Like radio and television before it, this parcel of technology (it's a system with several components rather than a single device) has stimulated active and inventive minds and the results are both fascinating and diverse.

Not In Front of the Children

To be quite clear here, many web cams are actively displaying adult themes, either intentionally or to suit the tastes of voyeurs. The author doesn't encourage this activity and you won't find it in this article, but each to his (or her) own. Just be a little cautious when viewing some web cam sites. They may be offensive, or not suitable for minors.

JenniCam

An articulate young lady called Jenni (Jennifer Ringley) was interviewed on radio, about her life on the Internet. She is a self confessed Computer Geek (Swot, Boffin, and Nerd). Odd enough perhaps, for a member of the fairer sex, in the mostly male dominated 1990's world of the personal computer. She was perhaps the first to rig up a web cam to watch a person, in this case, herself. A single camera in her college bedroom study area sent a snapshot PIX to the Internet every few minutes around the clock. Jenni has since expanded her activities, and you can read about her in this on-line newspaper article:

http://classic.sacbee.com/ourtown/life/jennicam.html

Or visit the current JenniCam site here:

http://www.jennicam.com/

Interactive Web Cams

There were other web cams before Jenni. The author's favourite was a model railway layout in the basement of the University of Ulm in Germany, which allowed three model trains to be moved by anyone in the world, using email commands. They (and others watching) saw the trains move live over a web cam. Truly a technology marvel for 1995! It's still in operation as of this writing:

http://rr-vs.informatik.uni-ulm.de/rr/

Some web cam purveyors have turned their work into a "pay-per-view" business, one that generates revenue.

We're straying a bit from the television and video theme of this article, but with these few examples you can see that technology has provided yet another way for people to communicate, which is the basis for amateur radio and amateur television.

Web Cam System

A web cam system is similar to an amateur TV station, in that images are converted to electrical signals and converted again for transmission. In the web cam signal path, we have mostly digital data, and the network is really hardwired, possibly with radio links, rather than a single transmitter broadcasting over the air**. Figure 1**.

Unlike the radio amateur pioneers who often made or modified electronic components by hand, the web cam systems are built from modules or blocks and typically the finished system does not require construction skills or access to lab test gear. It does cross several disciplines, not just electronics, so familiarity with computers and connectivity to the Internet is necessary.

Web Cam In A box

Borrowing the concept of instant soup: "Just add boiling water", there are web cams that connect directly to the Internet. They do not require a personal computer at all, and are called "Internet cameras". Of course the snag is going to be the Internet connection, which you likely only have because you already use a computer. In many newer buildings, also offices and hotels, Internet connectivity is build in, along with indoor plumbing and electrical outlets. So the hardware phase of the web cam project could just mean plugging a box into a wall jack.

Look, No Wires!

Taking it one step further, there are web cams with RF modems for completely wireless use. Here's an example that rides around Manhattan Island, New

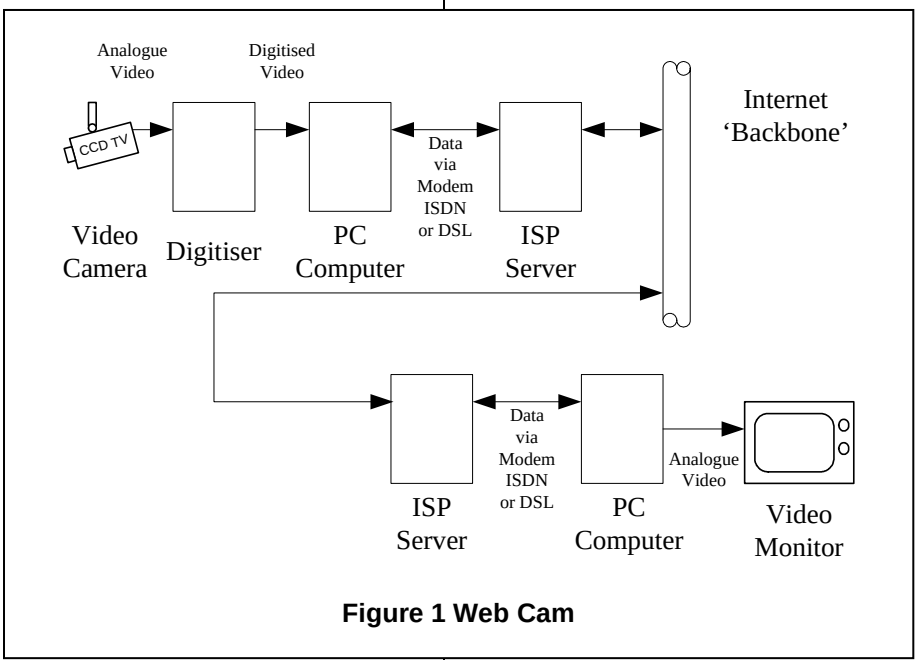


Figure 1 Web Cam

York, on the public tour boat known as 'The Circle Line':

http://www.earthcam.com/usa/newyork/circleline/

Access

We're getting a bit ahead of ourselves here. Let's review the signal path of a web cam and explain how to access an existing one.

Starting at the output end, see **Figure 1,** viewers' use a Personal Computer (PC) that has Internet access, to request digital data, using the web browser.

The data is formatted and displayed on the computer screen, according to a script (a computer program embedded in the web page data). The PC must have access to the data, by using both a communication programme and a browser programme. Internet Explorer (IE), and Netscape are the two popular browsers today, but others can do the same tricks. The incoming web cam data is treated like any other Web Page, and formatted to the screen.

Often a browser will hold previous data in the local computer memory, to speed up browser response time, when the same page is visited again. This is called cache memory. So to get good web cam images, the browser's data must be 'refreshed' automatically.

Web cams are always sending out new data, some do it in real time (called video streaming), so the browser must be told to grab new data periodically. The script that was sent as part of the Web Page data controls this task.

Broadcasting

At any given time, many people may request the data, and view the image. The upper limit on the number of 'visitors' is set by the speed of the server and the available 'bandwidth' of the connection. Frequent users of the Internet will already know about access times and network congestion from their own experience.

Connection to the Internet

There are various methods of connecting to the Internet. Each has advantages or disadvantages. Often, telephone lines are used with a modem, but this will not support full bandwidth video. Faster connections such as ISDN or DSL, which may still use the existing telephone wiring, or cable TV modems that use part of the cable TV RF spectrum, offer better performance.

Even a slow connection will allow a still image to be seen, after all the data has arrived and been assembled.

Data Storage

We have now introduced a "middle-man" or "broker" that stores the data from the web cam. **Figure 1.** This is the same role as the storage of web page data for all sites that you may visit using a browser. Very often the storage is done at a physical computer (called a server) that may be located anywhere. Busy commercial sites often have "mirror sites" that duplicate the same data, in different places, or even countries, to improve overall access.

From time to time servers can be overwhelmed and data is lost or slow to arrive after a request. We'll come back to this point later. It's possible to feed the web cam (or other data) directly in to the server, if they're in the same room. In fact early web sites did it this way, but for security (better protection against virus and hackers) and maintenance

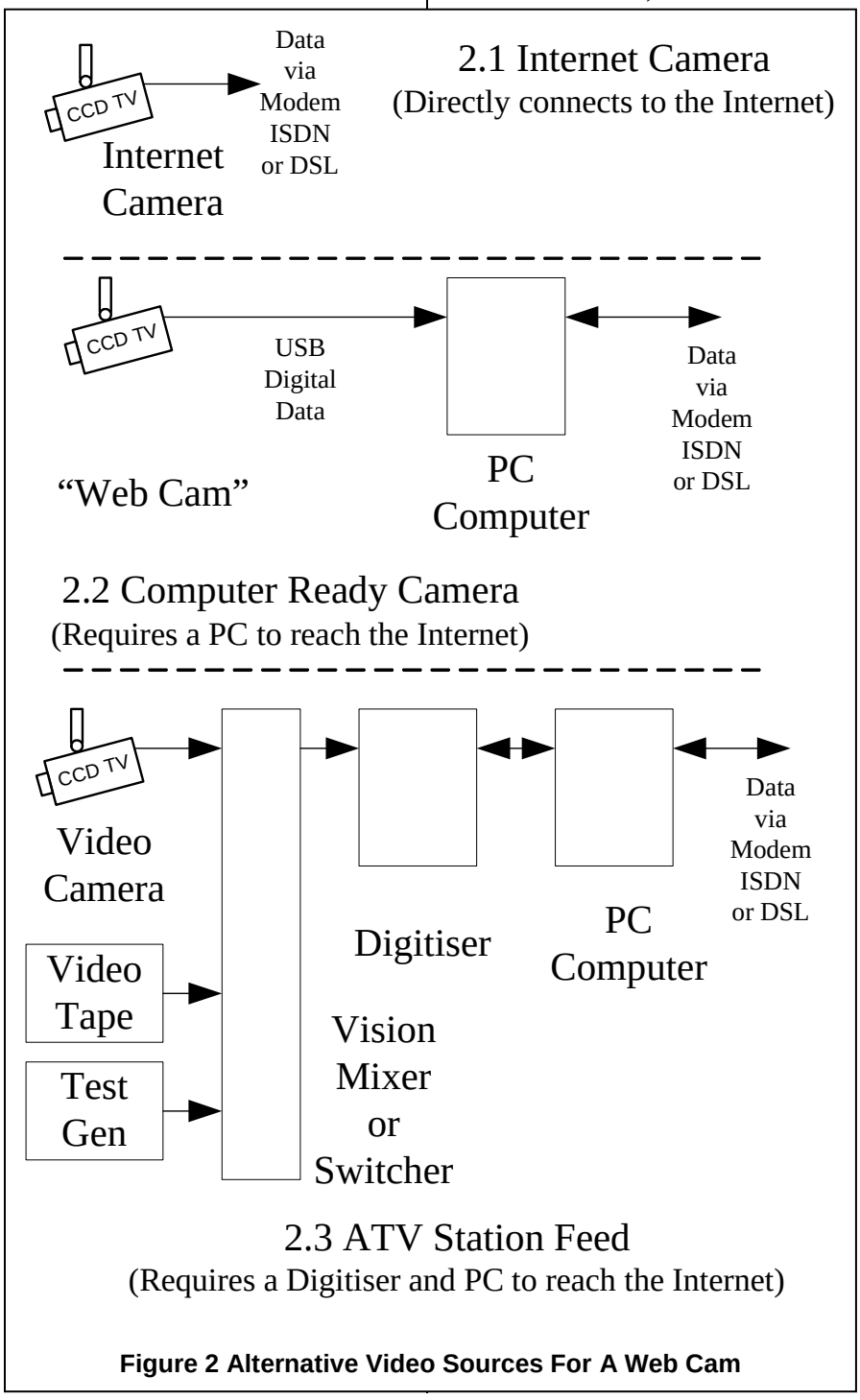


Figure 2 Alternative Video Sources For A Web Cam

(uninterrupted power and monitoring), most, if not all, web pages are located on remote host servers that charge a fee for the service. Hosting web pages (and other data such as web cam images) is a common service from an ISP (Internet Service Provider). ISPs also store email and provide the hardware connection to your computer.

Video Source

Finally, we see the source of the web cam data. **Figure 2.** Here the images from a camera are formatted for "upload" to the ISP server via a modem (slow), ISDN (better), or DSL (best) link. Unless it is an Internet Camera, **Figure 2.1,** with a direct connection to a network, the web cam data will need to be manipulated by a personal computer (PC). **Figure 2.2.** The PC not only formats the data, but also determines when and where to send it. Other camera control software features allow the addition of captions, timed or triggered events, and in some cases physical movement of the camera (if fitted with a pan and tilt mechanism).

Local archives may be made of the web cam data, for later review. Usually the fresh data from the camera overwrites the old data already on the server, so no history is kept. A local archive may be needed for some applications, such property security.

Radio Links

If the camera is remote from the PC, it is possible to link them using radio, or even cellular phone paths. This is how the Circle Cam on the tourist boat (noted earlier) sends the camera data to the shore.

So called 3G (third generation) cellular handsets that use WAP, I-Mode or other wider bandwidth channels (64kbps compared to 9.6kbps for audio data rates), can be used to view web pages as graphics or text, and newer models include colour cameras for data collection.

Amateur TV Systems

Most readers of CQ-TV have analogue video at hand. Probably a lot of it! So with a digitiser and PC it is possible to turn your amateur TV signals into web pages. **Figure 2.3.** This allows us to use our analogue cameras, etc. There are several inexpensive digitisers on the market; some are boards that fit inside the PC. Others connect by high speed digital serial ports such as IEEE standard 1394, sometimes called Firewire (Apple Computer), or called DV (Digital Video). Still others use the USB (Universal Serial Bus) connection to the PC. The lower cost models are of poor signal quality, at least in the author's experience.

Newer model digital camcorders often have a DV port for direct connection to the PC, and some models have analogue inputs on the camera. In effect they are video A2D converters. The latter allow archived analogue videotapes to be rerecorded on to DV format, or to capture them digitally to the computer's hard drive via the DV (1394) digital path.

Web Cam Hands-On

Now that we have a working model of the signal path, let's take a look at some practical components and software.

Figure 3 A Commercial USB Camera

Cameras

Any camera will do; there are lots of opportunities to salvage old security cameras. Most of these are analogue and will require a digitiser at the output. A better solution is to buy a camera with digital output designed for web cam service.

Camera performance has steadily improved in the last decade, and single chip CMOS or CCD colour cameras are now small, high performance, and very cheap!

Those for web cam or picture phone use with a PC simply plug into the USB port, and draw power from it. The output is formatted to JPEG, and supporting software controls allow adjustment of the image type and quality. Most have auto iris (exposure) and auto colour balance. In fact, there are only two controls on the camera body – focus and a snapshot button (not required here, it just trips a software routine running on the computer to grab a still frame when used for video teleconferencing or document capture).

The only caveat when looking for one of these cameras is the lens format and quality. Glass lenses are better, and a wide-angle type is best for general use.

The better ones have the ubiquitous 1/4 – 20 thread for a tripod mount, and this can be used to attach the camera to the wall or other platform. Look for old security camera hardware at boot sales or rallies they make great supports. The author also has used wall speaker brackets (which have a ball mount and clamp) to allow easy shot adjustment.

Software switches (in the support programme running on your PC) can invert or mirror the image digitally, so mounting them upside down is often easier.

Image Quality

In the computer world images are described by their spatial geometry and resolution. Better quality images have more Pixels and bigger word sizes, with the highest quality models rated at more than one thousand pixels wide by 24 bits deep. Standard TV images are typically equal to 480 x 240 x 8 bits, so a camera with 640 x 480 x 24 bits performance looks outstanding on a computer monitor! Lesser quality cameras have only 320 x 240 geometry, and some claim higher resolution by software manipulation. Anyone trained to critically view images (and that includes readers of CQ-TV) will not be happy with this lower resolution level. Look for cameras with a native 640 x 480 imager.

Figure 4. Up Side Down Mount

Another factor when rating cameras is the frame rate. For video speed we would expect 25 (or 30) frames per second, translating to a raw data rate of about 10 megabits per second. USB can't support

this rate, so the frame rate is dropped to 12.5 (or 15) frames per second, which hits the maximum throughput for USB (1.0 spec).

Web Cam Limitations

The negatives are simple, and can usually be worked around: outdoors weatherproofing and cable length.

As these cameras were intended for indoor use, the housings are not waterproof. The author has had good luck with sheltering the camera from rainwater and direct sunlight, but a salt-water spray or wide seasonal temperature change might be a problem. Commercial security cameras often have all weather housings, which could be adopted for your web cam installation.

Universal Serial Bus

USB format cameras have a fixed length cable, which can't be extended easily. This is the biggest hurdle that the author faced, because most of the good scenery is not within two metres of your PC! A little experimenting revealed that the camera power drops (due to cable resistance) and the digital data suffers ringing and reflections (poor wire quality and incorrect terminations). Just like professional digital video, such as 601 serial (270 to 360 megabits per second), signal quality does not degrade until a threshold is reached, then it 'falls off a cliff' and completely stops working.

Using a ready-made USB extension cable (computer accessory stores have these) the cable can be extended to about 3 metres. Another trick is to use a USB hub to power the camera locally, instead of over the long cable run from the computer. Currently the author has run 12 metres with two extension cables and one hub (used as a repeater).

USB is a shared bus structure, and placing a camera on it hogs the available bandwidth. If the camera is shared with other devices, problems can arise. Typically, the other devices are slow (mouse, keyboard) or medium speed (printer, scanner), while the camera dashes along at top speed, even if the data is not being used.

Multi Cameras

The concept of a web cam for video conferencing or picture phone service assumes only one camera is required. Adding a second camera is impossible! (Please email the author if you know a work around). The USB port can't throughput enough data for two cameras. All the cameras are made with the same hardware ID, so a second camera won't be recognised if plugged in to the same PC as the first one. The obvious solution is to add a PC for each camera, and the author did it this way. It's not an elegant (or cheap) solution. Perhaps Mike Cox can invent a web cam digital mixer, with USB format inputs and output, for us?

Camera Location and Adjustment

Where you put a web cam is up to you. Be aware that looking over fences or into windows is against the law, but looking out on streets and scenery is not. An active scene is better than one that does not vary during the day, but having said that, it's amazing how sunlight and shadows vary in one day, or trees and shrubbery vary over the seasons. A lot of web cams are 'on loan' to storefront and windowed offices on high floors. The owners of the camera just loan the gear to a host, who then plugs it in to power and either a phone jack or network connection.

Figure 5. Reflections Hit Camera

Take care not to expose the camera to direct sunlight, which may permanently damage it. The CMOS and CCD cameras are very tough, and can survive the glare from headlights at night or reflections from glass, mirrors, chrome, etc. Typically the image smears vertically, as noted in this screen shot, see Figure 5.

The light level dynamic range is outstanding too, producing useable (but noisy) video at dusk or under street lighting. In figure 6 a single lamp lights the swimming pool.

Digitisers

If the camera has a digital output, it connects directly to the PC. For analogue cameras and other sources of video, a digitiser is required.

Figure 6. Image in Low Light

This may be as simple as a video capture card that fits inside the computer. Some non-USB cameras come with their own interface card that provides power and drive signals to the camera. The author found that some models of 'TV Tuner' cards, which put a TV receiver function on the computers desktop, also have line level video inputs for direct connection of external analogue video. The inputs can be selected from the supporting software, and it is convenient to feed a colour bar signal to the system for testing or adjustment.

This completes the hardware part of the project!

Software

There are two pieces of software; both are required by the web cam system. One must be built into the web page used to view the resulting images. The job of the other software is to capture the camera image data and transmit it to the server that hosts the web page. Advanced users can write their own software, which might not be very complex for a simple web cam application, or use commercial software. A third alternative is to use 'shareware' software, which is free to use, but works on the honour system to compensate the author. Either a small fee or an agreement to display the name of the author (a form of advertising) settles the agreement.

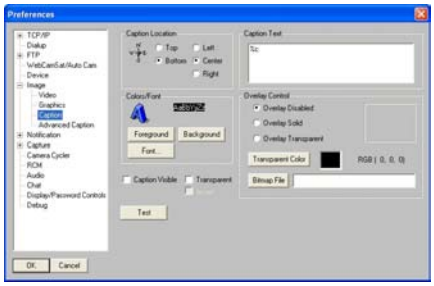


Figure 7. Web Cam Set Up

Web Cam Software

The goal of this application is to periodically grab a frame, store it locally, and then send it out to the server over the Internet. It is possible to use a modem connection, in which case the web cam software dials the server's modem, sends the data, and then shuts down. Files may be sent almost continuously, for moving images, or periodically, depending upon the subject matter. Either way, this and most of the other "set up parameters" are fed into the web cam's software during installation.

The software needs to find the camera's data on the computer, so that they work together. Typically this may include a camera model or a brand-specific software control panel to adjust the camera. The variations are endless, and the configuration is a little intimidating to the first time user.

The author purchased the WebCam32 software product from Surveyor, Inc. here:

http://www.surveyor.com/index_webcam32.html

So far, it's been a delight to use, and it is admittedly crammed with many features not yet explored.

Captions

A nice feature of web cam software is the addition of captions on the final picture. This can include a fixed caption, or the current time and date.

Image Capture Options

To configure the software requires specific network parameter information. It's beyond the scope of this article to go through this in detail, and after all it doesn't make very good reading! It is also the place to set up an optional local archive (saving each new snap shot to the hard drive), and invoke the timers. The timers set the frequency of the snap shots, and can also block them on certain days or time of day. (This is quite useful if you put the camera outside, and don't need pictures during the dark of night).

The fun part of this exercise is setting up the colours for caption text, position, font styles, and testing the results. If the data is sent too often, it will be wasted, depending upon the action in the scene. It may also incur tariffs from the ISP, who may want you to pay for the amount of data that you transport over their connection or the size of the storage space that your data needs on the server.

The camera image can also be seen live on the preview window, which is very helpful for aiming, framing, and focusing the camera.

Software for Displaying Images

Web pages are viewed with a browser, and conform to a construction called HTML (Hyper Text Mark up Language). Other data can be embedded in the web page, and this instructs the browser to assemble the data as graphic images, such as a web cam image. There are two operations that are dependent on each other, graphics formatting and refresh. The latter keeps the display up to date by reloading a new image over the old one periodically. In the case of streaming video, this needs to be at video frame rate, representing a sustained throughput of 2 to 4 megabits per second! (MPEG compressed data).

The simplest method of building a web page to show a web cam is to load the image from the server once, and let the user (of the browser) reload it using their refresh button. A much better solution is to run a timer in the browser, and reload the image data automatically. A script (computer instruction or program) that does this for the author's web page is shareware written by Fabio Ciucci. Here:

http://anfyteam.com/anj/anfycam/anfycam.txt

The Author's Web Cam Page

http://www.stonard.com/

Figure 8. Author's Web Page

As of this writing, the author has two web cams operating, each with different PCs but sharing a single DSL link to an ISP.
Both cameras view the author's swimming pool, and are mounted under the eaves of the roof. Each camera transmits a snapshot every two minutes. The upload timers are deliberately offset by about one minute. The resulting image is displayed on the viewer's screen by the application script embedded in the web page HTML. The refresh timer is set for twenty seconds, so the image will either refresh itself or be replaced by the image from the other camera. The script employs a randomly selected effect, (wipes or fade) so the resulting image transitions smoothly.

Sometimes viewers will see a feed from a colour bar generator or views from another camera inside the author's video lab.

Because the author is eight hours behind GMT, viewers in the UK will likely see a black image when it is night here. The on screen date and time keep track of when the image was captured.

Failures and Problems

The system, as described, is simple and reliable, but not bullet proof. From time to time the images freeze, usually because the USB port stops. The only cure is to recycle the PC power and restarting Windows (Currently Windows XP).

Another failure mode is caused by traffic collisions on the DSL line, and these are related to automatic downloading of virus software (at odd hours) or failures at the ISP end.

The author has had his share of DSL problems but they have been resolved. A local software company was allegedly dumping huge data files at 3pm each day, choking the local Internet backbone. The author lives in Silicon Valley, and everyone shares the same fibre optic Internet link.

Future Development

There never seems to be enough time to try every idea or experiment that comes along, but the system has lots of potential for improvement. The author's family are outside more in the summer, when they use the pool, so the images may seem boring during the winter months. If you have some suggestions let the author know by email.

Photos by the author, who lives in California, and best reached by email: pstonard@ix.netcom.com

STV 5730A Character Generator - Review

A few issues back I had a look at the STV 5730A Character Generator from the The BlackBox Camera Company Ltd.

This small hand-held unit powered by a PP3 battery was capable of generating full colour captions or inlaying B/W text over an existing colour picture. A simple 3-button interface and an on screen menu composed the captions. The three-button control has now been replaced with a serial port that connects to a PC and enables captions to be composed on the PC and downloaded to the unit where they are stored in 1 of 4 pages. The memory for the unit is non-volatile so when you power down they are not lost.

I had a chance to road test one of these new units. The model I tested was the ATVX that has multiple pages and a real time clock, and comes ready assembled in a small hand held enclosure for £75. The old three button interface had the advantage that it could be set up with just the aid of a picture monitor, this new version needs a PC and at first was a little more of a fiddle, perhaps because there is no on screen cursor to guide you. I found it best to create captions from scratch and correct errors with a re-type rather than using the edit mode, although I could see with a little more keyboard

time I might adapt.

The software was a standard terminal editor and as such a little unfriendly, but I am sure it will not be long before one of our enterprising members puts custom software together to ease this burden.

The unit functioned well; the inlayed captions were clean and held up on noisy signals.

Is there anything I did not like about it? Its a little greedy on battery life and this would be improved by the addition of an on/off switch, although it does have a socket for an external power pack which is probably the preferred method for powering the unit.

The stored pages are only selectable by the PC interface and I would love to be able to switch between them when away from the PC.

I think also we have to keep in mind that the unit is intended as development aid for the STV5730A and has many more applications in the field of data display than just simple ATV captions. With this in mind the PC interconnect is the next logical stage of development, in that it adds a communication interface to the unit.

For more information on the STV5730A visit http://www.stv5730a.co.uk

Each issue of CQ-TV The BlackBox Camera Company Ltd. will be donating one of these units for the winning letter entry so get writing and one could be yours.

Trevor Brown, BATC Chairman
email: Chairman@batc.org.uk

Rallying Around

By Graham Hankins

Of the many amateur radio rallies all over the country during the year, a few are worth taking the BATC exhibition display to. These lucky ones are usually the two-day events or a large or significant enough venue likely to attract more than just the local crowd. "We open in Picketts Lock, then on to Telford…." to allude to Gilbert and Sullivan! I have also taken the club banner to Drayton Manor, Donnington, the new London venue at Ware, and Elvaston Castle near Derby. I may not go to Elvaston in 2003; trying to find one table pitch among several rows, outside, on grass, is bad enough. With rain and wind, no fun at all!

The rewards from the average rally are usually a few renewals, a few new members, a few books or back issues sold – and some given away free! At a rally the BATC rarely deals in bulk! And, of course, I strongly feel that 'being there' at all is a reason in itself. Shows the flag, proves the club is still around.

But the true value of an exhibition table is becoming the 'butt' for information and comments from members. The sight of a person standing behind the BATC banner will bring out the thoughts and 'wish lists' that otherwise would go unstated. Not everyone has Email, or would take the time to sit down and compose one – much less have time or inclination to write a letter and envelope then stamp and post….life is too short! But 'face to face' with a BATC rep! That's different!

Top of the Wish List is basic ATV construction within the magazine. If a 'kit of bits' is not available, and then the project should use common, easily obtained components. But what is 'easily obtained'? Maplin is a strong possibility of course (a huge store has opened in the centre of Birmingham….hooray!) Then there is Farnell - I believe Farnell will supply the individual hobbyist. Radio Spares (or is it RS Components now?) I am not sure about ….do you have to have an account? From what I have seen of rallies, don't rely on these for components - certainly not for analogue satellite receivers to strip down! I didn't see any of these in 2002. And most folk do not have extensive 'junk boxes' these days.

Many other suggestions for the BATC or CQ-TV have been noted at rallies:

- Modifications to the Solent 24cm 1W transmitter. Although now discontinued, many were sold. I understand that several modifications have been made, particularly to the sound circuits. Someone had a folder of these; this is a reminder for that person to send a few in to CQ-TV!
- Simple antenna designs in CQ-TV. The person who suggested this was looking at a helical antenna on the North London stand at the time. Now the helix may have been bettered by other designs, but you get the 'drift'!
- Colour test cards on CD for printout from computer. Or maybe download from the web site? This is a good one. The idea is to put the printout in front of a camera of course.
- EASY test card and callsign project to construct. This was suggested / requested by someone who could only do ATV as portable from hilltops. Some 12V unit to give pattern and ident in a car etc. Now there are lots of folks in this situation; they are keen to do ATV, but their location is 'in a dip' and/or there is no repeater on air, or accessible. Anyone want to submit a circuit that does not use obscure / specialist/ expensive 'bits'?
- There are frequent calls/complaints that there is no mention of SSTV in CQ-TV. Crawley ARS has completed a very successful SSTV project. I have asked the ARS contact to send details to me or the mag.
- Accessible/stable location for rally. This one may be trickier, especially as access by public transport was specifically mentioned! I explained the reasons for our present and past venues and that the committee would be discussing the next rally soon……
- Continuous tuning mod for G1MFG receiver? This is a request for a simple (note that word again?) potentiometer circuit to achieve continuous coverage. Anyone care to send something to Ian please?
- Less photos of chairman (at least, nobody commented less photos of aerials!!!)

Circuit Notebook 80

By John Lawrence GW3JGA

Satellite Receiver Control

The Anglesey ATV Repeater GB3TM had been operating reliably, with exception of a seized cooling fan, for about 6 years. Last year several faults developed, one of which, required the replacement of the original receiver.

The new receiver is a PACE 9200 satellite receiver. This has good RF performance and at present is operating without a pre-amp. The receiver frequency and other parameters can be programmed in and stored using the remote control.

When first powered-up the receiver is in standby mode and the 'on/standby' button must be pressed for the receiver to operate. It commences operation in channel 1 and this can be programmed for the repeater input frequency.

The requirement was for an automatic switch, which on powering-up, after a mains failure, would electrically switch from standby to operate, on channel 1.

The circuit of the control switch is shown in Fig.1. It consists of two 555 timers operating as two mono-stable circuits, one triggered by the other.

I am not a fan of 555 timers. They virtually short circuit the supply rails during switching transients and produce spikes on the supply, causing false triggering of other devices. The decoupling capacitor C6 is therefore an essential component needed to prevent this problem.

Circuit Operation

At power-up, the trigger input, pin 3, of IC1 is low, thus starting the delay period, which is determined by R2 and C2. D1 is provided to rapidly discharge C1 in the event of a mains glitch. The output, pin 3, of IC1 goes high and provides a delay of about 1.5 seconds.

At the end of the delay period, pin 3 goes low and the negative transition passes via C3 and R3 to the trigger input, pin 2 of IC2. A low-pass filter, formed by R3, C4 is included to eliminate spurious spikes, which appear at the output of IC1 on power-up.

The IC2 mono-stable operates for about 1 second and the output at pin 3 energises the relay for this period. D2 and D3 are fitted to prevent IC2 latching-up. The relay coil should have a resistance greater than about 200 ohms and most small 12 V relays will be suitable. The relay 'normally open' contacts are wired directly across the receiver 'on/standby' switch contacts.

The circuit was built on Veroboard and installed inside the receiver, the 0V connection is connected to chassis and the + 12V to the receiver + 12V line.

Although this circuit was built specifically for our repeater, it may have uses in the shack for booting up the station satellite receiver instead of using the remote control.

References

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Data Book, Vol. 3, Page 4-11 (1992)

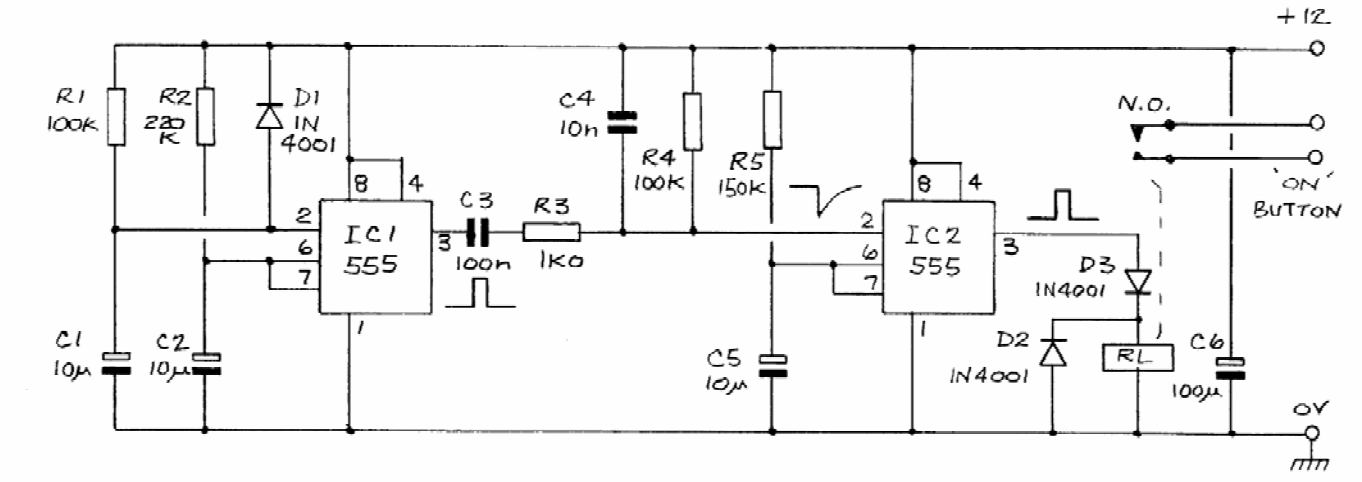


Figure 1 - Satellite Receiver Control Switch

Please visit our we site at www.cq-tv.com

Satellite TV News

By Paul Holland G3TZO

Welcome to another edition of Satellite TV news as again we look forward to a New Year full of promise for exciting developments in the world of satellite TV. It always seems like tempting fate to try and predict where Satellite TV broadcasting is likely to take us in the next 12 months or so. Last year at this time I predicted the steady growth of video streaming by satellite delivered IP based services, which have seen a steady, if not dramatic, growth this year.

Although not immediately on the horizon there are now observers predicting that over the next few years we will see satellite transmission used as the vehicle to launch High Definition Television in Europe. The logic for this is centred on the explosive growth and development in DVD products. The arguments run that as more and more people opt for the kind of picture quality offered by DVD, particularly if the new HD-DVD and blue ray technology is widely adopted, that broadcasters will be forced down the HDTV route. Given that a HDTV signal can require as much as 19.45 Mbit/s of bandwidth we may be sure that commercial considerations will ultimately dictate the pace of change.

Recent Launches

The unpredictability of the satellite launch business was underlined before Christmas with two major failures for the European satellite industry.

Astra 1K

Late November saw the latest satellite in the Astra fleet suffer a major setback when one of the early stage rockets failed to ignite, placing the world's largest civilian communication satellite into the wrong orbit. French Alcatel Space, who constructed the satellite, initially denied rumours that it has been officially classified lost. According to SES sources, the launch during the early morning hours of 26 November from the Baikonur Cosmodrome in Khazakstan using a Proton Block DM booster rocket was initially within mission parameters. However, the upper stage of the International Launch Services (ILS) rocket failed to fire for its second burn, leaving SES's fourteenth Astra bird in a decaying orbit just 109 miles (175km) up. The sixth Astra launch onboard a Proton should have delivered the satellite to its geostationary transfer orbital altitude of 22,367 miles (36,000km).

Following the launch strenuous efforts were made to prevent Astra 1K from de-orbiting resulting in the debilitated vehicle being placed in a higher, circular orbit at an altitude of 180 miles (290km) to allow the engineering teams to assess the status of the satellite. The satellite was eventually de-orbited over the Pacific Ocean with the assistance of satellite manufacturer Alcatel Space and the French Space Agency CNES.

Astra IK in construction

Fortunately for Astra now, with an existing fleet of 13 satellites already in orbit, and a capacity excess of 20 per cent, no immediate problems should occur, though it is likely that the next few months will see a major reassessment of customer supply and demand. The 5.25-ton Astra 1K was due to provide enough capacity to eventually replace Astra 1B, 1C, and 1D at Astra's 19.2 degrees East orbital slot, which is used to relay digital services to the French market and both analogue and digital services to Germany. It would also have expanded Astra's geographic coverage into Central and Eastern Europe as well as the European part of the CIS, and supplying spot-beam transmissions to the Iberian peninsular and Eastern Europe as far as the Ural Mountains. The satellite's Ka-Band payload was also designed to offer enhanced broadband interactive satellite services for its designed lifespan of 13 years.

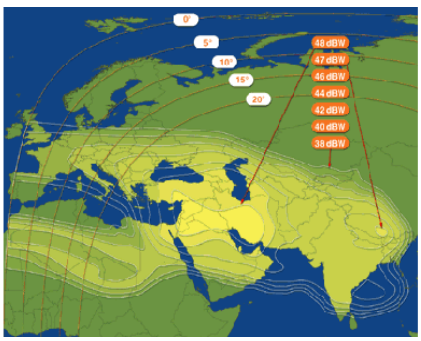
Hot Bird 7

The delayed launch of the first upgraded European Ariane-5 rocket carrying Hot Bird 7 ended in disaster on 18th December when it had to be destroyed soon after blast-off from French Guiana sending both Hot Bird 7 and the Stentor satellites plunging into the Atlantic Ocean. The explosion was the second failure of an Ariane-5 rocket in its 14-mission history and has now halted Ariane-5 flights for an indefinite period. Hot Bird 7 was designed as an early replacement to Hot Bird 3 at Eutelsat's 13 Deg E position. Stentor, was an experimental satellite developed by the French Space Agency CNES, France Telecom and the French Defence Procurement Agency.

Eutelsat have said that they will continue service at 13 Deg E with Hot Bird 3 which has a remaining expected life of 10 years.

Eutelsat W5

Eutelsat W5 was launched to 70.5 Deg E in early November last year aboard the maiden flight of a Boeing Delta IV rocket. The Delta IV rocket utilised a Medium+ (4,2) configuration of the five-member Delta IV family of rockets developed by Boeing. The W5 satellite, built by Alcatel, will serve telecom users and service providers for video distribution and contribution links, occasional-use video, particularly satellite news gathering, as well as Internet backbone connections. W5's coverage will extend to Asia as far as the Pacific though will be too low down on the horizon for most in the UK



W5 footprint (38dBW in UK)

Hispasat 1D

A Lockheed Martin-built Atlas IIAS successfully launched Hispasat 1D back in September in the seventh mission of

the year for International Launch Services (ILS). Hispasat 1D will provide communications, broadcast and multimedia services in Europe, the Americas, North Africa and the Middle East for Madrid-based Hispasat S.A. The 1D satellite weighs more than 3 metric tons, and carries 28 transponders at Ku-band. It is now co-located with Hispasat 1A, 1B and 1C at 30 Deg W. Hispasat 1D uses the Spacebus 3000B2 platform and was built by Alcatel Space in Cannes, France.

International Rescue

Given the scale of the disasters recounted above it was surely not coincidental that as we closed for press in late December a company called Orbital Recovery Corp made public there plans to undertake a rescue plan for satellites such as Astra 1K. Orbital recovery claim that they have developed technology that could prevent a malfunctioning satellite falling back to earth and breaking up on re-entry. Their proposals are based on launching a salvage mission that would use Orbital Recovery's new "space tug" called the Geosynch Spacecraft Life Extension System (SLES). The SLES is designed to boost a satellite which in the wrong orbit back to the desired 35,000-kilometre orbit.

SLES Docking approach

The first SLES could be launched in about 18 months time. Once firmly attached to the stranded telecommunications satellite, the space tug will use its own propulsion system to raise its altitude and reduce its inclination to the Clarke Belt orbital plane thus allowing the spacecraft to function for up to its original expected mission lifetime in geostationary orbit. The SLES is a modular spacecraft that can be adapted to operate with a full range of three-axis telecommunications satellites, from just small relay platforms, to massive 5-metric ton spacecraft such as ASTRA 1K. In addition to the rescue of stranded satellites, the SLES is designed to extend the operating lifetimes of telecommunications satellites in geostationary orbit that routinely are junked when their on-board fuel supply runs out. Orbital Recovery Corp. has identified more than 40 spacecraft currently in orbit that are candidates for life extension using the SLES.

Ariane 5 Launcher

As mentioned above Hot Bird 7 was the victim of the second failure of an Ariane 5 rocket to successfully launch its payload into the correct orbit. Following extensive testing after the first failure Ariane 5 was starting to achieve the reliability associated with it smaller Ariane 4 relative. The problem really lies in the fact that as satellites get larger and heavier the demand for improved performance in launch vehicles has grown. In the course of the last 10 years or so satellites have increased in mass from just 2.5 to almost 5 tonnes, and since 2000 there have been satellites weighing 6 tonnes or more. To achieve this greater lift capability in the Ariane 5 that has just failed the solid boosters carried 10% or approximately 2.5 tonnes more propellant. The extra propellant was intended to provide an additional 50 tonnes of thrust in the first 20 seconds following lift-off. Improvements were also made to the main stage, which was modified to increase its thrust by 20%, to 137 tonnes. Probably the most important change however was in the upper stage, where the storable propellant stage (EPS) was replaced by a cryogenic version (ESC-A) carrying 14.6 tonnes of liquid oxygen and hydrogen and accounts for 60% of the increase in performance compared with the preceding launcher in the series. As we closed for press Arianespace was launching a full independent enquiry into the failure.

Astra 1A at 5.2° E

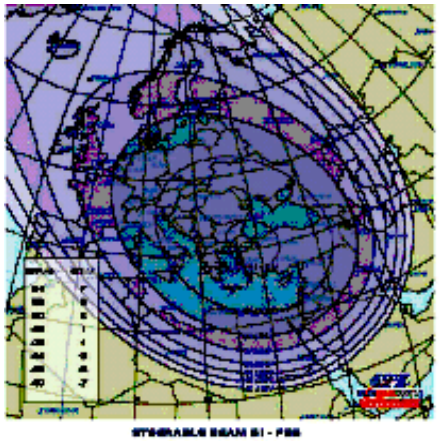
With the relocation of Astra 1A to 5.2° East and the satellite's shift into inclined orbit it now provides full, part-time and occasional transponder access for organisations needing to deliver data or programming to regional, national or international users who are not direct-to-home (DTH) customers. This targets a number of customers including news agencies, broadcasters, ISPs and other organisations. Astra 1A allows connectivity for ISPs to Internet backbones and to corporate networks communicating LAN to LAN. Customers may choose to transmit data via a contribution link to a multiplexing platform or an uplink station for re-transmission to other satellites

ASTRA 1A currently provides contribution services to broadcasters GermanConnect (formerly ChannelD) and AB Sat while NSAB has contracted one transponder for occasional use services.

Transponder News

Türksat 1C 42.0 Deg E - SuperSport has started on 11025 V SR 6510 FEC 5/6 and is available FTA using the West Beam footprint receivable in the UK

Eurasiasat 1 42.0 Deg E - The Georgian Rustavi-2 TV is now on 12595 GHz (V) S/R: 2500; FEC: 5/6 FTA using the S1 beam which is receivable in the UK.



EurasiaSat European footprint

Astra2 & Eurobird 1 28.5 Deg e - Adult channel SCT has launched on 12525 GHz (H) SR14650 FEC 2/3 using Viaccess encryption. Note that Eurobird has changed its name to Eurobird 1.

Arabsat 2A at 26E - KTV 1 has started on 12540 V, SR 4340, FEC 3/4. FTA

Hotbird 1-4 13.0 Deg E - Senato Italiano (Italian Parliament) has launched on 11.766 GHz (V) SR 27500, FEC 2/3,. The transmission times are Monday-Friday, 10:00 - 12:00 CET.

Atlantic Bird 3, 5 Deg W - Check for occasional Elpitel-feeds on 11.503 GHz (V), 11.521 GHz (V), 11.585 GHz 9V)

and 11.605 GHz (V) using SR 13020, FEC 3/4 and also 11.682 GHz (V) SR 6510, FEC 3/4) using superbeam.

Italian Parliament on Hot Bird

Sirius 2 4.8 Deg E- TRK Ukraine has started on 11766 GHz (H) SR 27500 SR 3/4 FTA

Nilesat 101/102, 7.0 Deg W - The Voice of Palestine Radio can be found on 11.823 GHz (V) SR 27500 FEC 3/4 and 12.195 GHz v SR 2894, FEC ¾.

Telstar 12, 15 Deg W - NITV has returned to 12.595 GHz (H) SR 31840, FEC 3/4, Azadi TV has started on 12595 GHz (H) SR 31829 FEC ¾

Hispasat 1D 30.0 Deg W - TVE Internacional Europe has started on 12591Ghz (V).

Birds on the move

Eutelsat II F2 has replaced Eutelsat II F1 at 48.0 Deg E. All channels are on the same frequencies and parameters as before

Thor 1, which was known previously as BSB 2, and launched in Aug 1990 has now left 0.8 Deg W and was drifting W to an unknown location as we closed for press.

Intelsat 601 left 33.0 Deg E in October and has moved to 64 Deg E.

Intelsat K has now been moved to a junk orbit.

Hispasat 1A has been allowed to go into an inclined orbit.

Hotbird 5 left 13.0 Deg E in September when it was replaced by Hotbird 6 and has move to 33.0 Deg E renamed as Eurobird 2. Eurobird 2 will provide additional capacity for broadband Internet access and direct-to-home (DTH) satellite television, though as we closed for press there were no active transponders. Eurobird 2 is also equipped with a Skyplex payload allowing broadcasters to uplink individually to the satellite thereby bypassing the need to deliver signals to an on-ground multiplex through a contribution link.

New Channels

NASN - The North American Sports Network (NASN) began service via GlobeCast capacity on Eurobird in early December using 11634 (H) SR 27500 FEC 2/3. The channel is initially downlinked at GlobeCast's New York teleport from satellites serving the major US sport networks with a link then to GlobeCast's teleport in London via the company's transatlantic ATM fibre network. The signal is fed again via fibre to NASN in Dublin to the transmission playout facility, then returned to GlobeCast London for digital encoding and uplink to Eurobird 1. GlobeCast provides NASN with monitoring, encryption services and integration with the Electronic Program Guide (EPG) operated by Sky Digital.

Performance - Performance, the former cable only channel, will finally be making a launch on Sky Digital on February 1st. No announcement has been made regarding satellite carriage details or if the service will be FTA.

DoH TV - The Department of Health (DoH) has announced plans to launch a nation-wide healthcare information service on digital TV by 2004. The digital TV version of NHS Direct will initially offer an information-only format. However, the DoH will test interactive services potentially enabling the viewer to book GP appointments and conduct consultations with NHS nurses at a later date.

MPEG and all that

Given my speculation in the introduction with regard to the introduction of HDTV at some point in the future it is perhaps timely to look at the background and some emerging developments in the MPEG standard. Most will be familiar with MPEG 1 as the precursor to MPEG2. MPEG 1 was originally designed to compress progressively scanned half resolution images to 1.5 Mbit/s so that a feature film could be fitted onto a standard CD. As a subset of MPEG 2 it lacked the ability to handle interlaced sequences.

MPEG-2 was designed for a wide range of applications requiring different performance and complexity. MPEG 2 is divided into Profiles with each Profile subdivided into Levels. The current Standard Definition TV (SDTV) broadcast throughout Europe uses Main Profile at Main Level. This specification gives 720x576-resolution, 4:2:0 sampling and a bit rate of 15 Mbit/s. There are two further profiles that describe a higher definition standard. The first specification known as “High 1440” effectively doubles the definition to a 1440x1152 picture. The other specification known simply as “High” not only doubles the resolution but maintains that resolution with a 16:9 picture by increasing the number of horizontal samples to 1920 giving a resolution of 1920x1152.

Whilst there is currently no MPEG 3 standard many of you will probably have seen references to MPEG 4. The new MPEG-4 format is able to compress digital video to the extent that DVD-quality broadcasts are possible. The OPENSKY platform currently on Atlantic Bird 2 at 8.0 Deg W, 12649 GHz (V) SR 27500 FEC 5/6 has a bouquet of TV channels using MPEG 4 which can be received using an OPENSKY PC-card or USB box and dedicated client software. The Channels available via OPENSKY are currently all FTA, however PPV services may be added in the future.

Looking further ahead there is currently an international standards team that is close to approving another new compression format for digital video known as H.264 (among other designations). This new format is also claimed to deliver DVD-quality broadcasts over the Internet but with a 33 percent improvement over MPEG-4. Watch this space for developments.

Off Air

If any readers have off the air shots of their own that they would like to share please let me have them (in GIF or JPEG format please).

Just a few shots captured off air this issue include a test card from Lebanese television on Arabsat 3A at 26.0 Deg E.

Also pictured below is a frame captured from one of the BT feeds on NSS7 at 21.0 Deg W.

Upcoming Launches

As usual the launches in the table above are subject to revision. It is likely that Hotbird 8's planned launch in July will be impacted by the loss of Hot Bird 7. Eutelsat have indicated that Hot Bird 8 will probably act as a replacement for Hot Bird 7's mission which was intended to provide backup capacity for the Eutelsat fleet at 13.0 Deg E.

Eutelsat W3A

Eutelsat W 3A satellite, due to launch in mid-2003, will be located at 7 degrees East and will help create Eutelsat's newest "hot" position. W 3A will add 50 Ku band transponders to the 24 already in service on W 3 at 7 Deg E, making this orbital position the second largest operated by Eutelsat after 13 Deg E. W3A will have the same coverage as W3 at 7.0 Deg E and will extend this to Asia and sub-Saharan Africa for a wide range of applications including digital DVB broadcasting, multimedia, broadband access and pay-per-use bandwidth for corporate networks. Eutelsat expect that the use of 6.0 Deg dual feed LNB's used currently for Astra and Hot Bird reception will become common for Hot Bird and W3A reception. The payload on W 3A will operate in both Ku-and Ka-band and will have the flexibility to allow multiple regional coverage for intra-regional networks or regional connectivity. Five Skyplex units on W3A will enable on-board digital multiplexing and the uplinking of signals using small antennas from anywhere within the coverage area. Skyplex was previously offered only at 13 Deg E.

Launch Date	Satellite	Launcher	Deg	Payload
0204-06	E-Bird	Ariane 5	25.5°E	20 Ku tps
030201	Hellas Sat 2	TBA	39.0°E	34 Ku tps
030406	Eutelsat W3A	TBA	7.0° E	50 Ka & Ku tps co-located with Eutelsat W3
030709	Intelsat 10-02	Proton	1.0° W	20 Ku and 36 C tps replacing Intelsat 707
030712	Hotbird 8	TBA	13.0°E	4 Ka and 44 Ku tps replacing Hot Birds 1 & 2
0304	Yamal 202	Proton	49.0°E	18 C tps
03	Zohreh 1	Proton	34.0°E	12 Ku tps
03	Express AM 1	Proton	40.0°E	18 Ku and 9 C and 1 L tps

E-BIRD

Eutelsat's e-BIRD, which is scheduled to launch in the first quarter of 2003, is optimised for high-speed Internet access.

Express AM1

Eutelsat has entered into an agreement with the Russian Satellite Communications Company (RSCC) for 12 Ku band transponders on this satellite, which is to be launched in 2004. From its orbital position at 40 Deg E, it will cover the whole of Europe and support SESAT in western Asia.

FortecStar FS-5800HA

There are now a number of receivers on the market which incorporate a HDD. The FortecStar FS-5800HA is a fairly new entrant from the Far East and comes with either the HDD supplied or ready for you to fit your own. In considering the fitting of a HDD it is important to consider the heat and noise it may generate. It is suggested that a 40-80 GB HDD with a spin rate of 5400 RPM will probably provide the best solution. Some manufacturers (e.g. IBM) offer special software, which tune a HDD to produce less noise by reducing the HDD speed. A drive that supports this function is worth considering. The receiver has two CI slots together with an embedded Irdeto CAM. The receiver will support a HDD of up to 80 GB. Although there is a digital S/PDIF audio connector there is no digital video output. Many high-end DVD players are now supporting a Digital Video Interface (DVI) connector. The significance of this ultimately will be the potential to transfer video at a digital level thus eliminating any degradation caused by digital to analogue decoding and encoding. The ability to do this is being thwarted by software licence holders who realise the potential for counterfeiting material from either DVD's or off air from a digital satellite receiver. Some Far Eastern manufacturers seem to be pushing against this resistance and for those interested in recording a digital signal directly it may be worth hanging on to see if DVB compliant receivers are equipped in due course with a DVI socket.

FortecStar FS-5800HA Rear Panel

Conclusion

There was no postbag this time around. I do rely on input from readers to let me know the column is of interest and to help share experience. As usual the contact details are the same; email via paul.holland@btinternet.com or phone to 01948 770429 or even fax to 01948 770476.

Contest News

By Richard Parkes G7MFO

I'm writing this article at the beginning of December just after completing the results for the International. A bit about the contest, it was arranged at the IARU Conference in Lillehammer 1999 that the BATC would organise the results for 2002 on behalf all the countries in IARU Region 1. This is the first time I have had to amalgamate and check the results for several other countries.

Most of the results luckily were received via email using the contest spreadsheet this made it a lot easier to check the results. One station sent in there logs via email which were over 5Mb in size, after lucking why the files where so big it was noticed that their 'declaration signature' was 1.5MB in size! The other errors I received was the basic logging error of forgetting to put the /p for portable stations worked etc. Also please make sure when send an email to me you send it to contests@batc.org.uk and not 'contest' as Ian Pawson has had to manually send these to me of the server.

As you can see from the results not many people entered the contest this year which was a double edge sword for me, not very good when I was on top of a hill on the Yorkshire Wolds calling CQ, but was good for myself when I have had to put the results together!

The International was the first time I managed to get out portable this year for an ATV contest this year, which I really enjoyed. This year I went to a place called Water near Pocklington on top of the Yorkshire Wolds. I was not able to use my normal contest site as the field had just been ploughed a week before the contest, which caused last minute panic to find a new site. The site is about 100m up the road to the site Richard G4YTV and Clive G8EQZ used to use, luckily the commercial mast had been removed in the last year which had stopped them using this site before. I was located behind the mast which unfortunately was next to a public footpath. Anybody who has worked portable before is aware of the 'general public' wanting to no what you are up to when you have got several aerials and dishes in the air! The most interesting was when I had a nock on the mobile shack door, at 10pm on the Saturday night. The mobile shack window guides were closed so I could not see outside to see who it was and I was all on my own, luckily I was TX on 23cm to an amateur in Lincoln at the time. I open the door to see two police men, who wanted to know what I was up to. They were on the 'night shift' and were amused why I was up there, both of them had never heard of amateur radio which made it much harder for me to explain why I was up there!

It was nice to see several stations had gone portable for the contest even though they all did not send in results. I would have been a lonely man this year, if it wasn't for Lincoln Amateur Radio Club G6COL, who was portable this year. It was nice to work a few of the stations around Lincoln as it is not far away from my QTH. Normally I can only work these stations on 2m from my QTH because of the Lincolnshire Wolds.

It was also nice to work Crawley Amateur Radio club but un-fortunately only on 2m, if it hadn't been for the contest, I would have been at the Microwave 'round table' at their club on the Sunday.

Getting back to results which are on the BATC clubs web site if Ian does not have space to put them in CQ-TV the most popular band was 23cm followed by 70cm, 3cm, 13cm. It was a surprise to me that I had only received entries for four bands and 13cm was the least used band with only three British stations sending in results. The longest distance worked from the stations sent in was F1IIGP/P between F6KPL at 738Km on 70cm.

When checking the British contest results it was noted that several of contest stations had made their points from 'local' contacts. This was a contradictory to the French stations that had made fewer contacts but at much longer distances. Not much DX was achieved due to the flat conditions; luckily it did not rain over the weekend in the UK.

Congratulations go to the Severnside group on top of the Mendip Hills who came first from the UK entries sent in and F1IIG/P who was the overall winner of the 2002 IARU ATV Contest.

Richard Parkes G7MFO 7 Main Street, Preston, Hull. HU12 8UB. England. Tel:- 01482 898559

E-mail: contests@batc.org.uk

Contest Calendar 2003

Spring Vision 2003 (Joint European) Saturday March 8th – Sunday March 9th

Summer Fun 2003 (Joint European) Saturday June 14th – Sunday June 15th

IARU International ATV Contest 2003 Saturday September 13th – Sunday September 14th

All from 1800 UTC Saturday to 1200 UTC Sunday

Fast Scan ATV all Bands.

IARU ATV Contest 2002

14/15 SEPTEMBER 2002

70 CM Section 1

Place	Call	Points	Locator	Nb Qso	Dx	Km
1	F3YX	5947	JN18AP	18	G8GON/P	468
2	F1IIG/P	5462	IN92OX	15	F6KPL	738
3	F1AHH	3794	IN95QQ	10	F3YX	385
4	F1DXP	2651	JN05CU	7	F9ZG	216
5	F6KPL	2492	IN99IO	8	F1IIG/P	738
6	F6IQG	2346	JN08BM	9	F1AHH	320
7	F1TGU	874	IN98XI	5	F6KPL	166
8	F1OOG	300	JN08QS	2	F3YX	56
9	G8GKQ	266	IO91TP	2	G8LES	72
10	G6RC	122	IO91VC	1	G8GKQ	61
11	G7MFO/P	86	IO93PW	1	2E1AMU	86
12	ON1MCF/P	49	JO10TQ	3	ON5ID	18
13	F1HPR	26	JN18DT	1	F3YX	26

23 CM Section 1

Place	Call	Points	Locator	Nb Qso	Dx	Km
1	F1IIG/P	8492	IN92OX	13	F1DOJ	343
2	F3YX	5942	JN18AP	14	F1AHH	386
3	G7ATV/P	3472	IO81QC	20	G8LES	111
4	F1DXP	2766	JN05CU	3	F1IGO/P	241
5	G7MFO/P	2682	IO93PW	10	G8GML	202
6	S51DA	2580	JN66XF	5	IK4ADE	313
7	G6COL/P	1724	IO93RG	11	G0KOO	144
8	S58RU	1618	JN65UM	5	IK4ADE	246
9	F6KPL	1140	IN99IO	4	F3YX	265
10	F6IQG	997	JN08BM	2	F8MM	135
11	ON1MCF/P	940	JO10TQ	8	ON6GN	48
12	GW4NOS/P	784	IO81FP	2	G1MFG/P	120
13	DB1EPO	460	JO31HG	2	ON1BPS/P	117
14	HB9DUG/P	356	JN36EL	3	HB9AFO	44
15	G8GKQ	312	IO91TP	2	G8LES	72
16	HB9AFO/P	236	JN36GU	2	HBPDUG/P	44
17-	G3RMX	132	IO93UV	2	G7MFO/P	28
17-	G6RC	132	IO91VC	2	G8GKQ	61
17-	DK7UP	132	JO30NI	1	DF4PN	33
18	F1HPR	104	JN18DT	1	F3YX	26
19	HB9AZN	44	JN36DN	1	HB9DUG	11

13 CM Section 1

Place	Call	Points	Locator	Nb Qso	Dx	Km
1	G6COL/P	1775	IO93RG	4	G7MFO/P	75
2	G7MFO/P	1755	IO93PW	3	2E1AMU	86
3	G7ATV/P	1465	IO81QG	5	G0WJR	49

3 CM Section 1

Place	Call	Points	Locator	Nb Qso	Dx	Km
1	HB9AFO/P	2850	JN36GU	3	F5LHW/P	226
2	G7ATV/P	785	IO81QC	4	G0WJR	49
3	HB9DUG/P	780	JN36EL	2	HB9AFO	44
4	GW4NOS/P	380	IO81FP	1	G7ATV/P	76
5	F6KPL	305	IN99IO	1	F9CH	61
6	G6COL	250	IO93RG	1	G6ZVE	50
7	G3RMX	50	IO93UV	1	G4YTV	5

General Section 1

Place	Call	70 CM	23 CM	13 CM	3 CM	1,5 CM	0,7 CM	Points
1	F1IIG/P	5462	8492					13954
2	F3YX	5947	5942					11889
3	G7ATV/P		3472	1465	785			5722
4	F1DXP	2651	2766					5417
5	G7MFO/P	86	2682	1755				4523
6	F6KPL	2492	1007		305			3804
7	F1AHH	3794						3794
8	G6COL/P		1724	1775	250			3749
9	F6IQG	2346	997					3343
10	HB9AFO/P		236		2850			3086
11	S51DA		2580					2580
12	S58RU		1618					1618
13	GW4NOS/P		784		380			1164
14	HB9DUG/P		356		780			1136
15	ON1MCF/P	49	940					989
16	F1TGU/P	874						874
17	G8GKQ	266	312					578
18	DB1EPO		460					460
19	F1OOG	300						300
20	G6RC	122	132					254
21	G3RMX		132		50			182
22	DK7UP		132					132
23	F1HPR	26	104					130
24	HB9AZN		44					44

23 CM Section 2 (RX)

Place	Call	Points	Locator	Nb Qso	Dx	Km
1	F1AHH	1364	IN95QQ	8	F3YX	2728

A Low Cost Caption Generator

By Steve Drury, G6ALU

Those ATV enthusiasts who like me don't have a deep pocket might find this title generator of interest. If like me you use the family camcorder, you would have found how unfriendly the built in titling facility is. Another failing is the inability to control the text position, normally displayed across the centre of the viewing area.

I believe I have presented a functional and cost effective solution in this article, instead of using keys to scroll through the available characters I have incorporated a PC (AT type) keyboard interface.

Features

- Superimposed or full screen text
- Coloured background when in full screen mode
- Internal sync when no video input present
- Text entered via directly connected PC type keyboard
- 8 Pages of text stored in eeprom (no backup batteries)
- Push button for changing viewed page when keyboard isn't connected
- Video bypass switch
- 8-15V supply @ 80ma (plus keyboard power)

Readers will previously have seen an article in CQ-TV relating to the OSD chip type STV5730A. This unit doesn't use one! Constructors will need to find an abandoned Pace satellite receiver, from which the OSD chip type M50555-001SP and 17.734MHz crystal will be required. Hopefully there are a few left that haven't been skipped!

The chip used here, made by Mitsubishi, has a limited but still useful character set. Notable omissions are the question mark (?) and currency signs. There are several exclamation marks available but all have another character following, the one I have chosen to use is an exclamation mark and dot (!).

A solution using this chip is more complex in comparison to that used by the STV5730A, all the extra components are however inexpensive and probably in the junk box.

Circuit Description

As previously mentioned the main device is the Mitsubishi OSD chip, a 24LC16 eeprom memory device stores the pages of text with a PIC micro taking control of the system.

The M50555 requires a 2V P-P video signal; this is generated from the input signal by Q1 and Q3 in the classic video amp combination, gain being set by R2 and R7. Q2 is a clamp transistor; sync tip clamping is used with a clamp pulse obtained from the sync separator circuit. The output of the OSD chip is presented to emitter follower Q7, this signal doesn't requiring amplifying as it's already at 2V P-P. L1, C16 and C17 are the timing components for the "dot" oscillator, the values of which can be varied to change the text display width. The "F5" key can remove any horizontal text offset. The chrominance circuit requires an oscillator frequency of 17.734475MHz, this is provided by XTAL1 and its load capacitors C21 and C22. If a no colour symptom is observed then these capacitors may be adjusted in value to trim the chrominance frequency. This wasn't required in the prototypes.

The sync separator is built around Q4 and Q5, this circuit was chosen in place of the normal LM1881 type on cost grounds, although it was met with some scepticism it has performed very well giving good clean sync with most video sources. Positive going sync derived from Q5 collector is supplied to the clamp circuit and signal detector. Signal present detection is required so the micro knows when to switch to internal sync generation. Positive pulses are detected by D1 with a time constant set by C11, R20 and applied to port Ra0 of the micro.

The micro-controller "talks" to the eeprom via the I^2C bus, Scl on port Ra3 and Sda on Ra2. The OSD chip is addressed by a standard 3 wire bus consisting of chip select (active low) Rb3, clock Rb1 and data Rb2. Sw2, the page advance switch is applied to port Rb5 using pull ups internal to the micro. Not implemented on the PCB is a facility to initialise the whole eeprom, this can be accomplished by powering up whilst port Rb6 (pin 12) is grounded with a 100 Ohm resistor. It was thought unnecessary to include this circuitry as pressing the home key whilst in edit mode may initialise each page separately. R16, R17, R24 and R25 are all pull up resistors and not critical in value. R23 and C14 are the oscillator components, the values used set a frequency of about 4MHz. Note that when a PIC16F628 is used these components can be left out as the internal oscillator option is utilised.

A bypass switch is included (Sw1) so video can pass straight through when power is removed or to allow comparisons to be made.

The power supply simply consists of a 5V regulator and decoupling capacitors C3, C7, C9 and C10. A forward biased diode (D2) has been incorporated to prevent any nasty accidents.

Construction

Most components are easily available, the exception being IC4 the OSD chip and its crystal, these can be removed from a now redundant Pace satellite receiver. Models to look out for are the PRD800/900, MSS500/1000 and all the "badged" variants. The clamp transistor Q2 can also be obtained from a PRD800/900 (also available from Farnell Ltd). If using electrolytic capacitors removed from the same, don't use any from around the power supply area.... they are unlikely to be any good!

The PIC program is available on the CQ-TV web site; suitable versions for PIC16F84 and PIC16F628 devices are ready for download. If the constructor doesn't have programming facilities a ready-programmed device is available from me.

Many of the components can be substituted for ones of nearby values, avoid making substitutions which will significantly change bias conditions. Note that voltage ratings haven't been given for the capacitors, all except C7 have 5V maximum across them. C7 should be rated appropriately for the supply voltage used (16V rating would be OK).

Component Reference	Value	Qty
C15, C19	1000pF	2
C1	1000uF	1
C10, C12, C13, C20, C9	100nF	5
C11	10nF	1
C18, C6	1uF	2
C4	10uF	1
C2	100uF	1
C21, C22	12pF	2
C3, C7	220uF	2
C14	22pF	1
C16	27pF	1
C17	33pF	1
C5	470pF	1
C8	Not fitted	1
R6, R10, R14, R16, R17, R21, R22, R24, R25	10K	9
R11	100K	1
R2, R7, R18, R27	100R	4
R4, R13, R15	1K	3
R1	1K2	1
R3	1K8	1
R8	220R	1
R12	2K2	1
R28	2K7	1
R20	390K	1
R26	3K9	1
R9	470R	1
R23	4K7	1
R19	75R	1
R5	82R	1
L1	15uH	1
XTAL1	17.735MHz	1
D1	1N4148	1
D2	1N4001	1
D3	Red LED	1
Q1, Q4	BC548	2
Q3, Q5, Q6, Q7	BC558	4
Q2	ZVN3306A	1
IC1	7805	1
IC2	PIC16F84 / PIC16F628	1
IC3	24LC16	1
IC4	M50555-001SP	1
SK1	Mini 8 pin DIN	1
SW1	2 Pole 2 way latching	1
SW2	2 Pole 2 way non-latching	1
Supply, Supply Gnd, Video In, Video In Gnd, Video Out, Video Out Gnd	1mm Terminal pins	6

A double-sided PCB has been used to make a compact unit, all components except the Video and power sockets are directly mounted to this. As the OSD chip doesn't use a 0.1" pin spacing (actually 1.77mm) utilising strip-board won't be easy. The PCB hasn't been designed to fit any specific case but for UK builders Maplin type LF08J is a good choice having ample room for fixing the video and power sockets at the rear. Use the bare PCB to mark the case for drilling; the PCB needs to be positioned with the DIN socket touching the inside of the case. A large clearance hole may be required to allow the keyboard plug to mate correctly with this socket.

A mounting screw should pass through the hole in IC1 tab and into the case; a metal case will aid heat sinking of the regulator. Note that there can be a considerable difference in power consumption between keyboards; 100ma is common for an old keyboard whereas 1ma has been measured with one recently purchased.

If making your own PCB, download the CAD files from the CQ-TV web site. These may then be loaded into Easy-PC and printed on a transparency so a PCB can be made using the photo-reproduction technique. A demonstration version of Easy-PC is available from www.numberone.com, this demo version will allow printing and modifying of the board but won't allow changes to be saved.

As many components need ground connections soldering on the topside of the board, fit those with difficult access first. You will notice that completely hidden ground pads - under electrolytics for instance, need not be soldered as they are connected on the underside. There is one link on the topside that also requires through connections. If there is enough interest I will have made double sided plated through boards, please email me if you have an interest.

Testing

Once the board is fully constructed connect the output to a monitor and apply power.

After initialising itself the micro checks for valid data in the eeprom, if invalid (previously unused in the character generator) the micro loads in default values. Eeprom initialisation takes between 10 – 20 seconds, during this period the picture is likely to be blank and if connected the keyboard won't function. When initialisation has finished the screen will turn blue, connect a keyboard, an input signal and carry out a functional test. Note that the firmware will “hang” if an eeprom isn’t fitted.

In Use

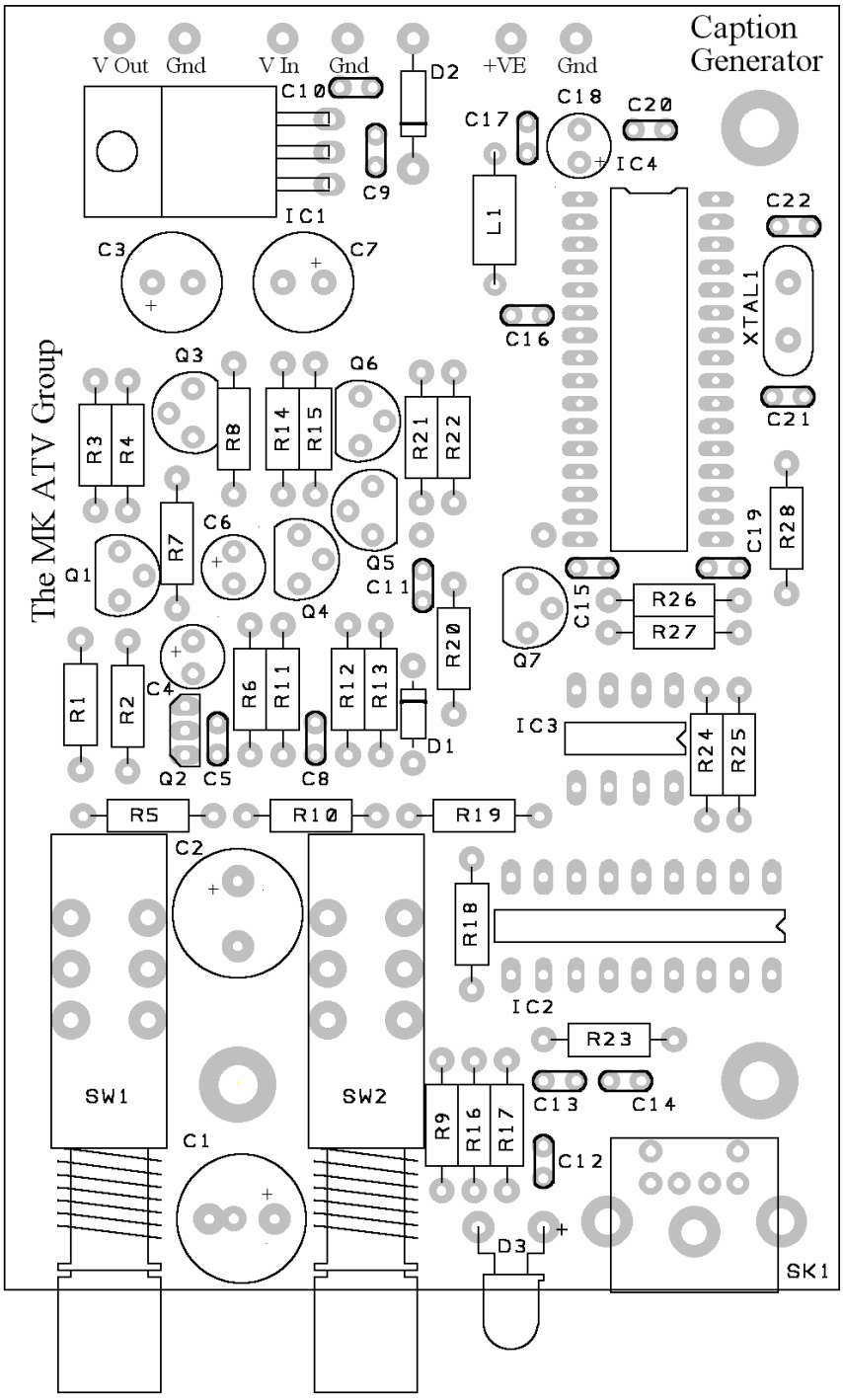
Text can only be changed whilst in the edit mode (entered by pressing Esc), whilst in this mode spaces are indicated by a ° symbol, the character at the current cursor position will flash. Shift space characters appear blank. If enlarged characters are used ensure that none appear off the screen edge, these may cause sync disturbance.

Keyboard functions	
F1	Help screen (not available with PIC16C84/F84 processor)
F2	Select background colour
F3	Screen mode, full-screen or superimpose
F4	Not used
F5	Text horizontal position
F6	Text vertical position
F7	Text border type
F8	Border mode, allows different borders between lines 1, 2-9 and 10
F9	Horizontal size line 1
F10	Vertical size line 1
F11	Horizontal size lines 2-10
F12	Vertical size lines 2-10
Esc	Toggles between edit and view modes
Home	Clears current screen to defaults
Arrow buttons	Allows navigation around screen
Page Up / Page Down	Increment or decrement viewed page
Shift & space	Writes a special space character, seen as a space on a normal screen but as a black box in some background modes
Alpha-numeric keys	All keys have their normal function but remember the limitations of the character set!

Conclusion

I hope anybody constructing this unit gets the same satisfaction I have from designing it. Note that for those wishing to program their own PIC micros (types 16C84/F84 and PIC16F628) the source code is on the CQ-TV web site. The data sheet for the OSD chip and any updates can be found on my web site at www.radio-kits.co.uk.

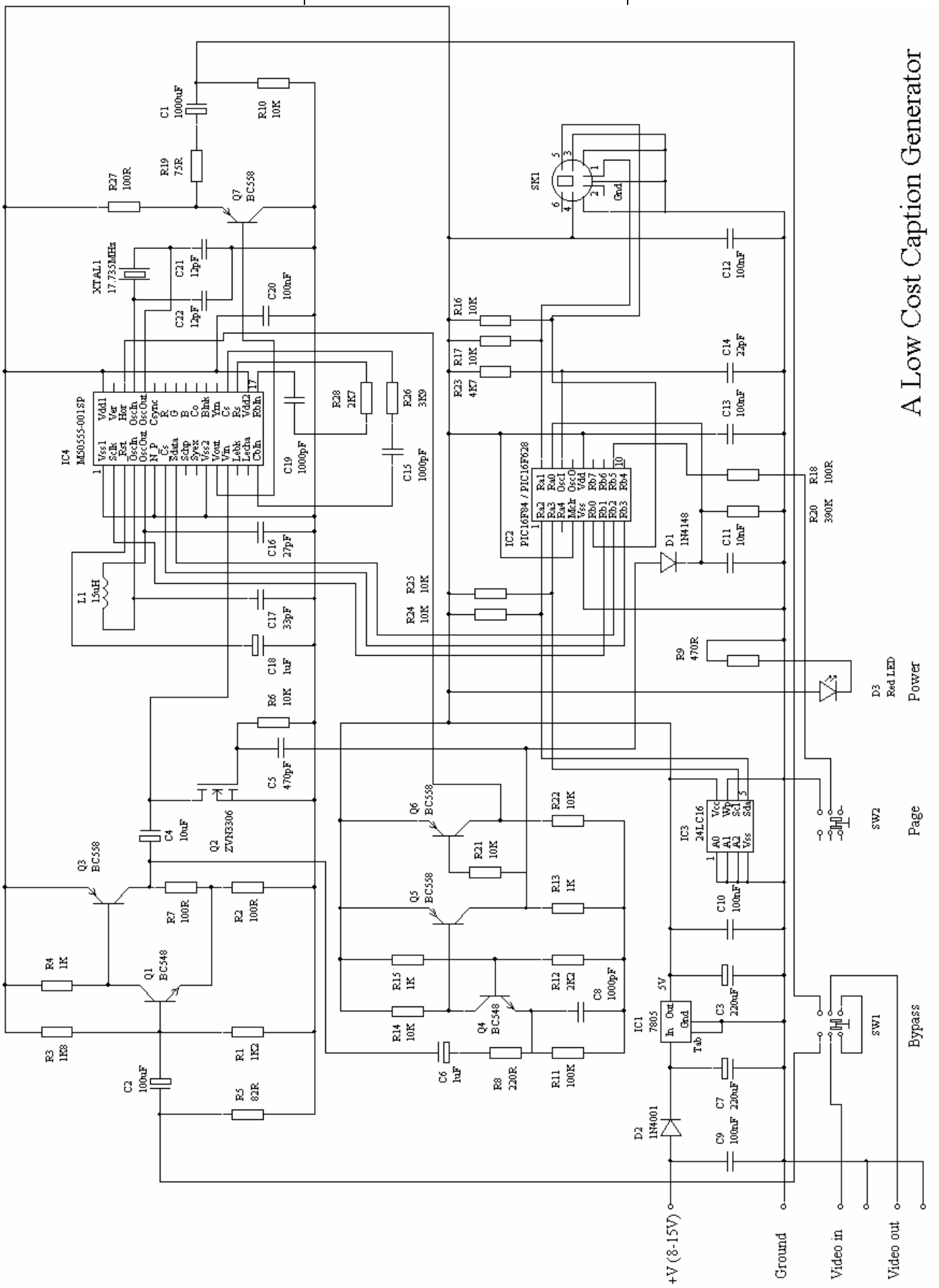
Should there be sufficient interest I will have made professionally produced PCBs with plated through holes, silk screen etc. Please contact me by email to register your interest. My email address is cg@radio-kits.co.uk.

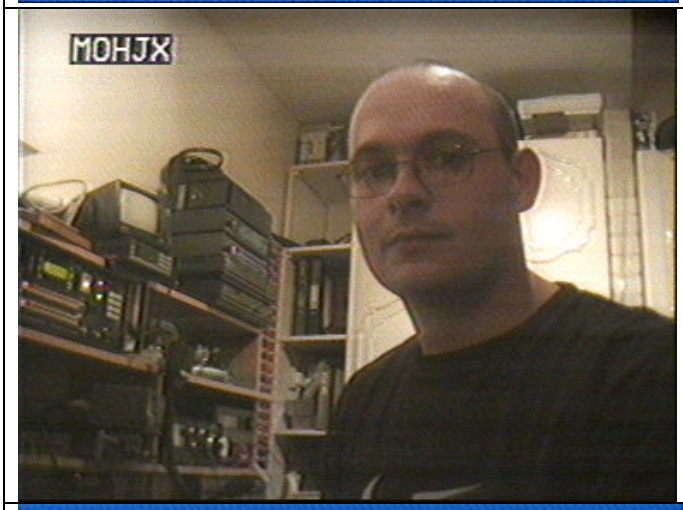


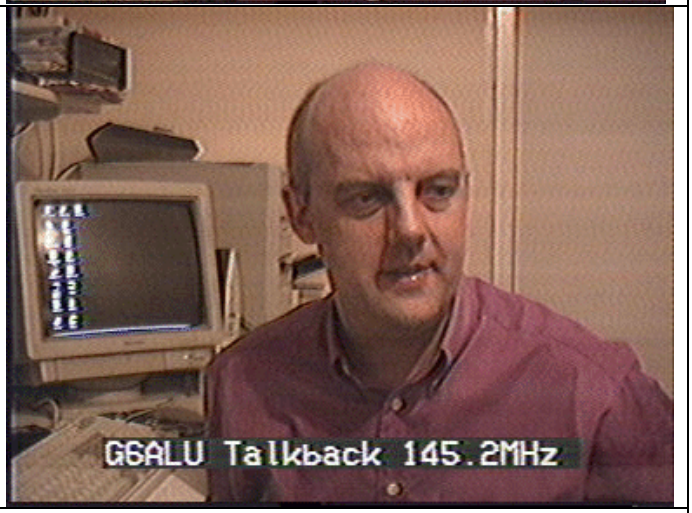
PCB Overlay

Thanks

I must thank Calvin - M1EPM and Carl - M0HJX for their suggestions and input.







Screen shots showing the generator in use

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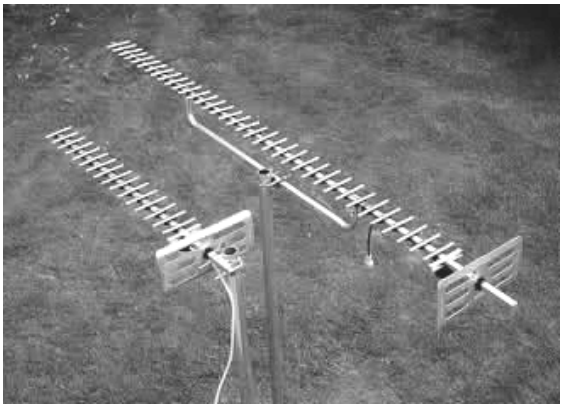

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- *May* ..... 20th March
- *August* ..... 20th June
- *November* ..... 20th September.

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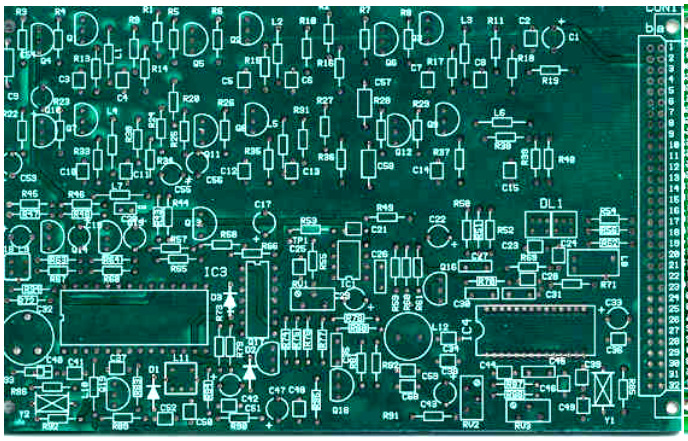
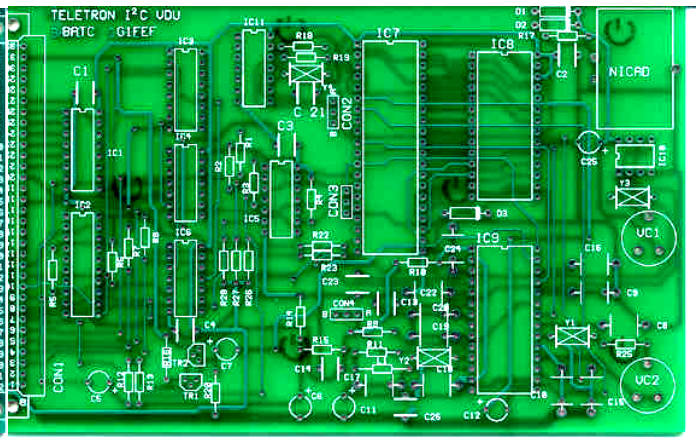


The Sync Pulse Generator PCB (item 7)



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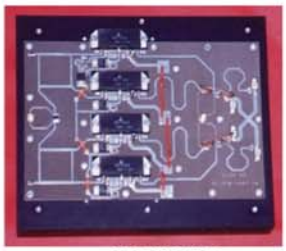

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A Personal View of Digital Television - Part 4

By Mike Cox

In CQ-TV 200, I promised a report on the SDI Mixer from IBC and thoughts on construction of a digital test generator.

Report on the SDI Mixer in action.

The last issue of CQ-TV had pictures of the mixer installed in the IBC Info Service Master Control.

It was very gratifying when all the 4 Aston machines were cabled up, together with the odd DPS machine, the mixer was turned on, and SDI signals emerged.

There were one or two problems. For some reason, operating the Split On/Off button would occasionally cause the C bank de-multiplexer to go out of sequence, giving a Cb signal when it should be Y. I had seen this problem in the lab at home, but thought that by extra decoupling in the control panel and the control leads at the rack end, it had been cured. Obviously it had not. Also similar effects were noted when using input 4 of the mixer.

The immediate action was to re-patch signals so that input 4 was not used. The Aux. Bus was used as an emergency switcher, and a Shootview 4 x 1 SDI switcher G-clamped to the desk was used to select Mixer Out or Aux. Bus out. It also involved using some home made SDI DAs as the Shootview switcher has only one SDI output. Having lashed all this lot up, the Mixer behaved itself for the duration of the show.

A lesson learned is that it is always a good idea to have some form of emergency bypass built in, if you are using it in a live show, as we were for 6 days.

The other problem encountered was that as set up, all pictures were off to the right. This suggested that Aston machines have some considerable offset as delivered to us between the black burst reference in, and their SDI outputs. Also, the three L48212 multipliers in tandem have a considerable transit time. I fitted 2 x 0.5 uS delay blocks in the reference feed to the mixer, which helped, but I could have done with a lot more. Accordingly, since the show, a small card has been produced which has 2 x 8 bit shift registers, and appropriate selectors. Referring to Fig 1, p9 in CQ-TV 200, the output track from pin 1 of U8 [LM1881] is cut, and the SR circuit inserted. It uses the 5 MHz clock from pin 24 of the SAA1101 SPG [U7}, giving 0.2 µS steps up to 3.2 µS max sync delay. A Hex push button switch on the front panel sets the delay.

The card has been installed in the mixer crate, glued to the motherboard. It works.

See Figure 1 for details of the card and its switch on the panel, and Figure 2 for a reminder of the clock recovery/SPG circuit.

Simple Digital Test Generator

The next part of the ongoing project as promised is a simple digital test generator. This provides two test signals, which when used will provide a lot of information about the system in use. It has both digital and analogue outputs to increase flexibility.

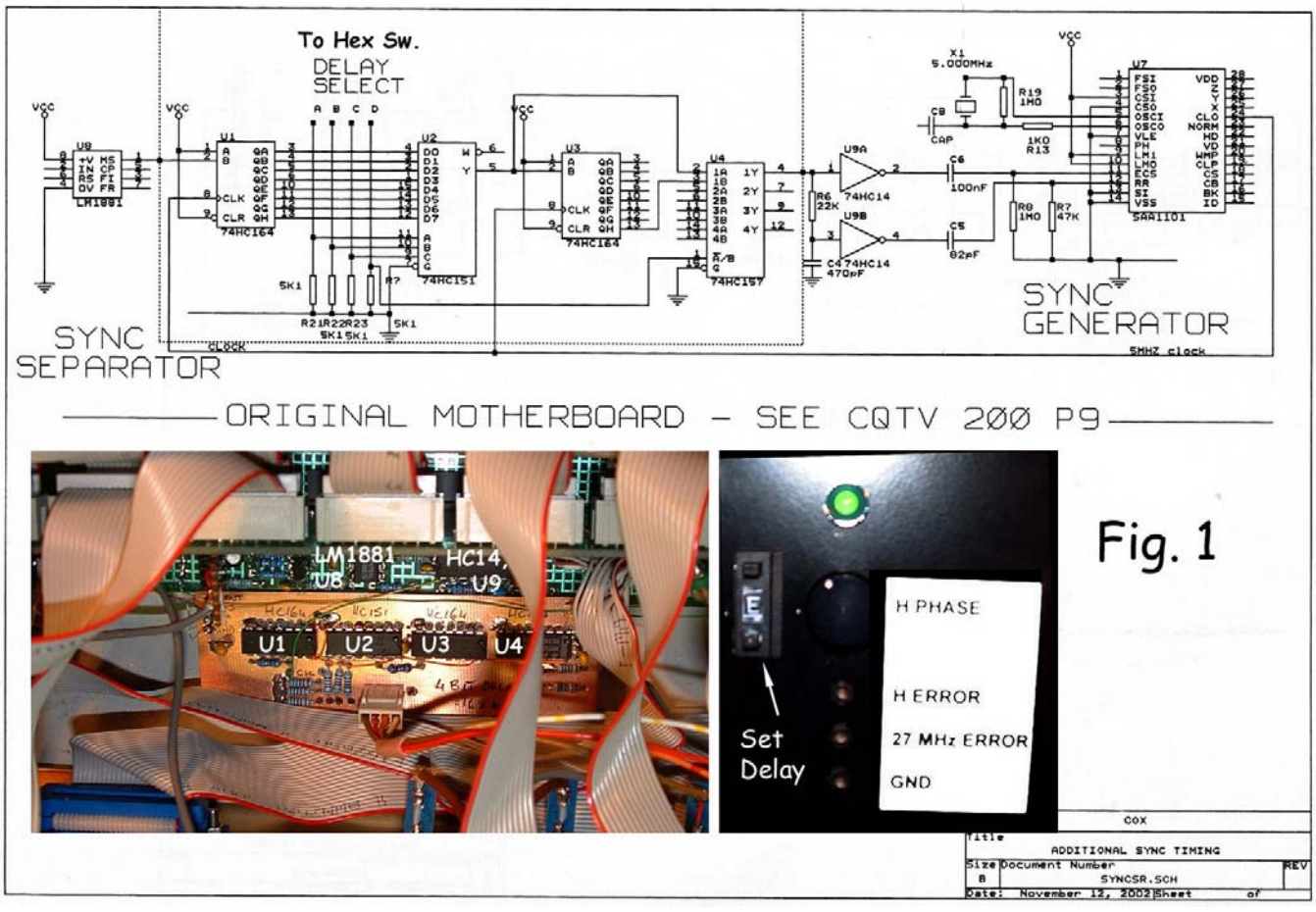


Fig. 1

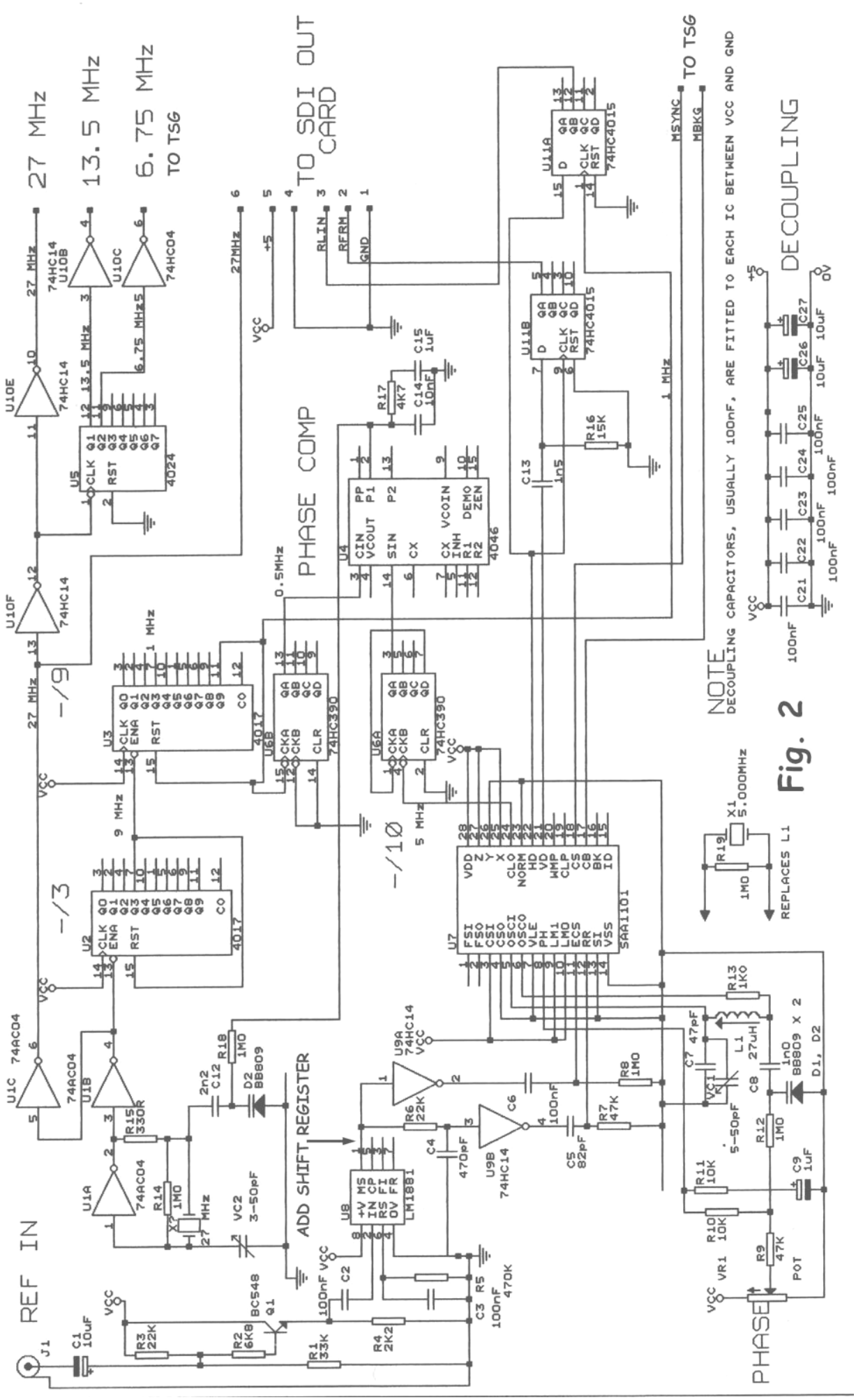


Fig. 2

The test signals are programmed in an EPROM. The minimum requirement for use at 6.75 MHz clock speed is a 150nS device. 27C64s are fairly common at this speed, but one which is worth a look is type 27C256/70nS, Farnell stock no. 597-454, and which were £4.03 each. This is much too big for this project but offers much space for future test signals. You need only programme what you need initially. The 27C256 can be read out with a 6.75 or 13.5 MHz clock.

The test generator described uses a 27C64/150 nS clocked at 6.75 MHz. The test signals are paged, that is they take up a line's worth of space, with around 2 "pages" making up the field. This is similar to the XGA PLUGE Generator I described in CQ-TV 198, and a lot of the circuitry is similar. To get a slightly better answer, a TDA8702 DAC is proposed for the analogue output, as the DAC08 can show a few glitches at these speeds. The generator expects sync, blanking and clock from a generator such as the one I showed in CQ-TV200, and shown again. Figure2

There are two ways to go to generate the clock. Either: - build the SPG/27 MHz generator package, which will be useful for further digital work, or build just the SPG for now and use a keyed oscillator for the clock, as done in the XGA PLUGE generator.

Programming

However you tackle it, the main task is to programme the EPROM. My particular programmer is a Dataman Softy 3 that I have had for many years. One advantage of this machine is its emulation capability. In this way the machine is programmed using its own keyboard, the emulation lead plugged into the EPROM socket, and the emulate facility started. You can then see how your EPROM will work when it is blown. If anything is amiss, it can be changed and re-emulated until it is right. [Figure 3] If you do not have a programmer, you may be able to borrow or hire one.

It saves a lot of keystrokes if you fill the EPROM with 10h [16 in decimal] from location 000 to 3FF. This defines the black level as used in the CCIR601 luminance signal. For similar reasons the white point is taken as EBh [235]. If you are mainly concerned with the analogue output, there is an exception to this with

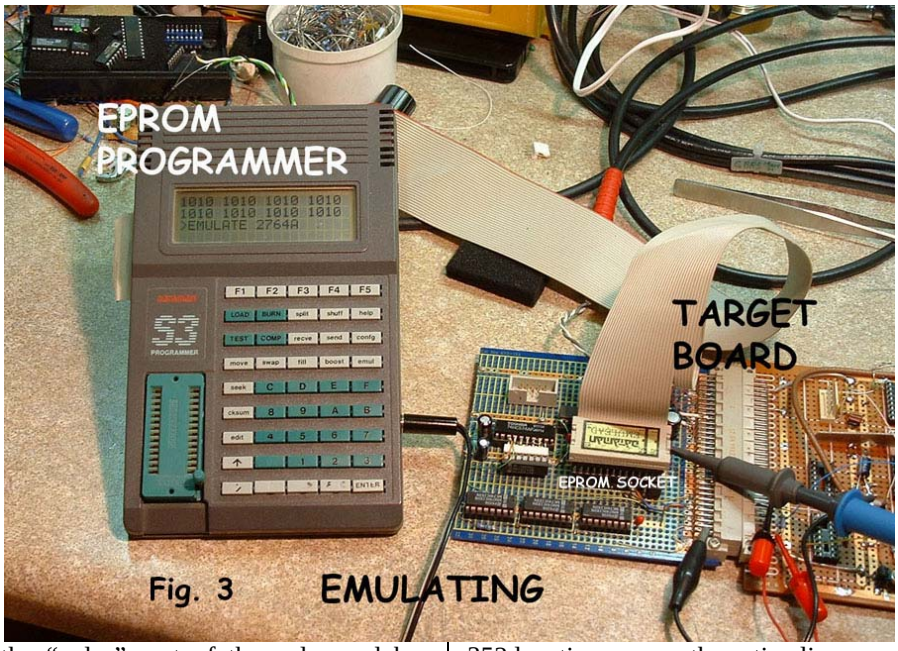


Fig. 3 EMULATING

the "pulse" part of the pulse and bar page.

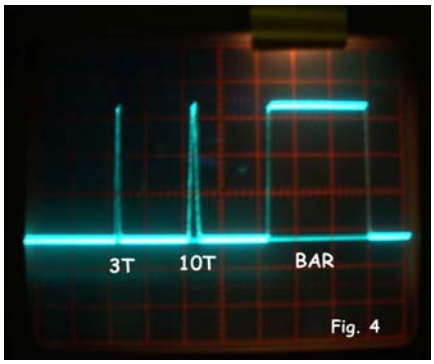


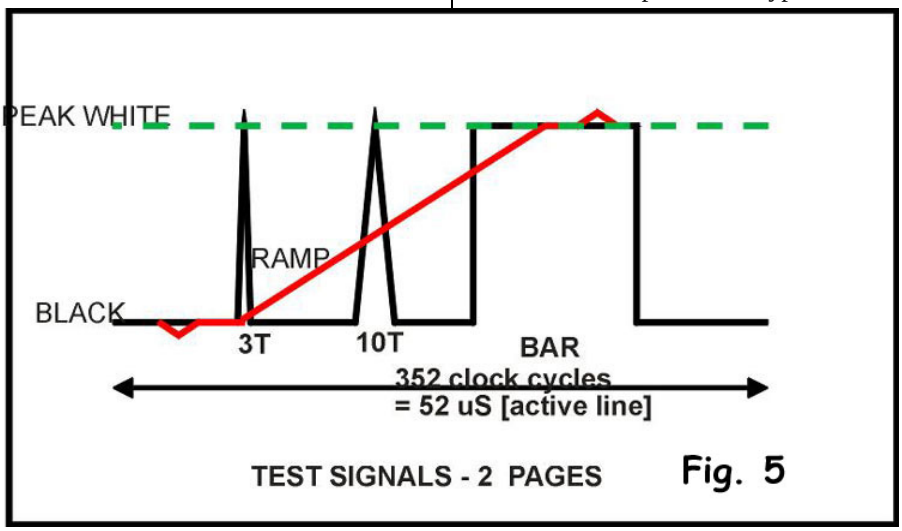
Fig. 4

Page 1 of my EPROM contains a 3T pulse, a 10T pulse and a bar, [Figure 4 shows pulse and bar, Figure 5 shows idealised test waveforms, while Figure 6 shows actual output] and page 2 contains a ramp with triangle elements on the flat top representing peak white, and on the black level before the ramp starts. These are intended to show up clipping of either black or white areas.

If a 6.75 MHz clock is used, there are 352 locations across the active line.

As mixed sync is used as reset for the address counter, the first location to programme is 0069h. The value is 95h. The next location [0070h] has a value of FFh. This is followed by a value of 90h. Note that the peak value exceeds that of the assigned peak white value. This is because the reconstruction filter will reduce the height to 100% as it smooths out the nominal sine squared shape of the pulse. The 10T pulse has more values starting at 1Fh at location 00B1h. These values have been optimised for the analogue output using a Gaussian re-construction filter.

To get the right answer on the digital output, the values will have to be changed, or a digital filter using FIR techniques will be necessary. This comprises a series of shift registers in tandem with each tap feeding a multiplier and then into an adder. By choosing the multiplier coefficients, and the number of taps, various types of filter



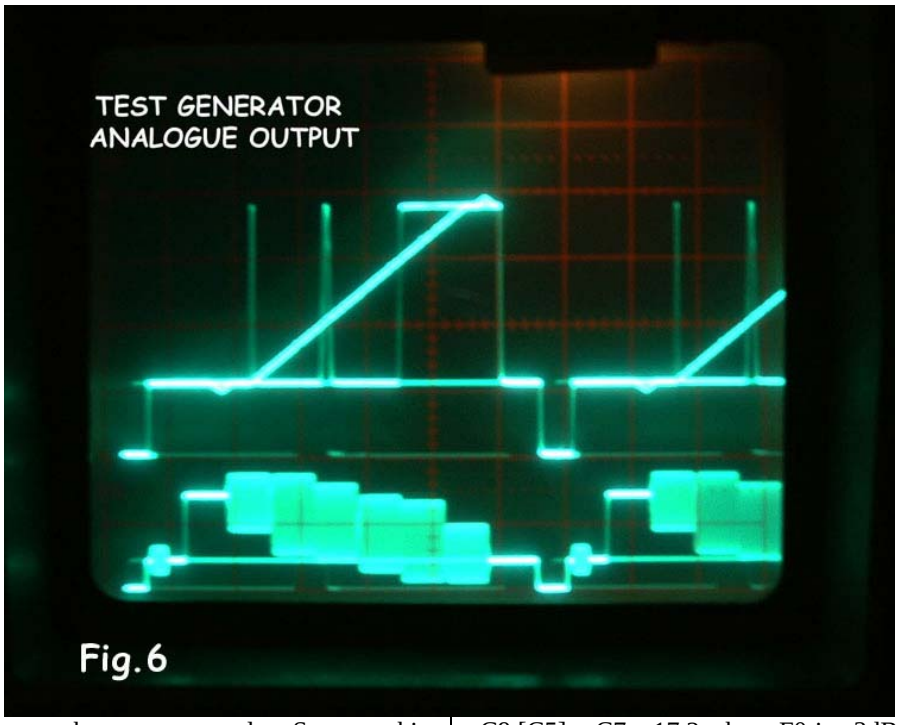


Fig.6

can be constructed. Some chip manufacturers offer FIR chips, where the user merely has to programme in the coefficients.

This is largely beyond my ken at the moment, but I will try to get some details for a future article. [Figure 7 shows block diagram of a FIR filter]

See Table 1 for EPROM programming details.

Gaussian Filters

It is worth spending a little time looking at this type of filter. It has important uses as a shaping filter, and because of its linear phase characteristic with frequency, displays no ringing or overshoot. It is used as the chroma band-defining filter in PAL coders for example, and also as a sync shaping filter.

For most practical cases, the so-called fifth order filter will work adequately.

Once a design has been worked out, it can easily be scaled for other frequencies, and for other impedances.

Consider the 5th order example shown in Digitsg.jpg. [Figure8]

The filter consists of C7, L2, C8, L3, and C9. It is driven from and to 75 ohms.

•C7 [C1] = 20.83 x 10 –3/F0 x R

•C8 [C3] = C7 x 4.95

•C9 [C5] = C7 x 17.2 where F0 is –3dB frequency,

•L2 = 61.93 x 10-3 x R/F0 and R = impedance chosen

•L3 [L4] = L2 x 2.51

The rise time of a step signal applied to such a filter is given by: -

Rise Time = 0.43/F0

This information comes from a BBC Designs Department booklet [No. 9.42(64)] written by Les Weaver in the 60s, which contains a wealth of mathematical detail on this type of filter, based on work carried on by a man called Dishal. These filters are sometimes known as Dishal filters.

The Generator

The address counter is made up from 3 HC193 4 bit up/down counters in tandem [U1 – U3] to provide the 9 bit address lines. The counter is reset by mixed sync from the SPG.

The EPROM [U4] shown is a 27C64/150nS device – if you choose to use something like a 27C256/70nS, remember that address pins higher than A12 have to be grounded. I have shown address pins A10 – A12 brought out to pins. This is to offer the possibility of writing some more test signal pages to the EPROM, and select them with a high on the appropriate pin.

The /OE pin of the EPROM is fed with mixed blanking. The output thus goes high impedance during the blanking intervals. However it has to be pulled down to 0 during this time, except for O4, which is pulled up to 1. This defines black level at 10h. EPROM outputs can be somewhat ragged, so the output is re-clocked by an HC574 latch.

This drives the DAC [U6]. The recovery amplifier is half of a dual current mode operational amplifier [CLC416]. The first half drives the Gaussian/Dishal filter, and then the output half drives up to 3 75-ohm loads.

An HC541 buffer drives the digital output. Note that a pull down resistor is included, and that Mixed Sync feeds the Output Enable pin. This gives a 00 level during Sync time, as a crude timing reference signal.

A monostable circuit [U10] derives a half field [approx. 10 mS] signal that selects page 0 or page 1. Display of the output at H rate shows both test signals superimposed. [Figure 6]

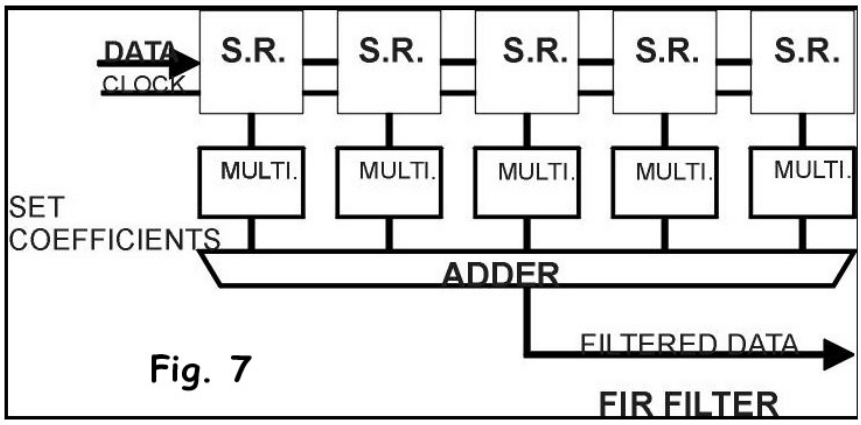


Fig. 7

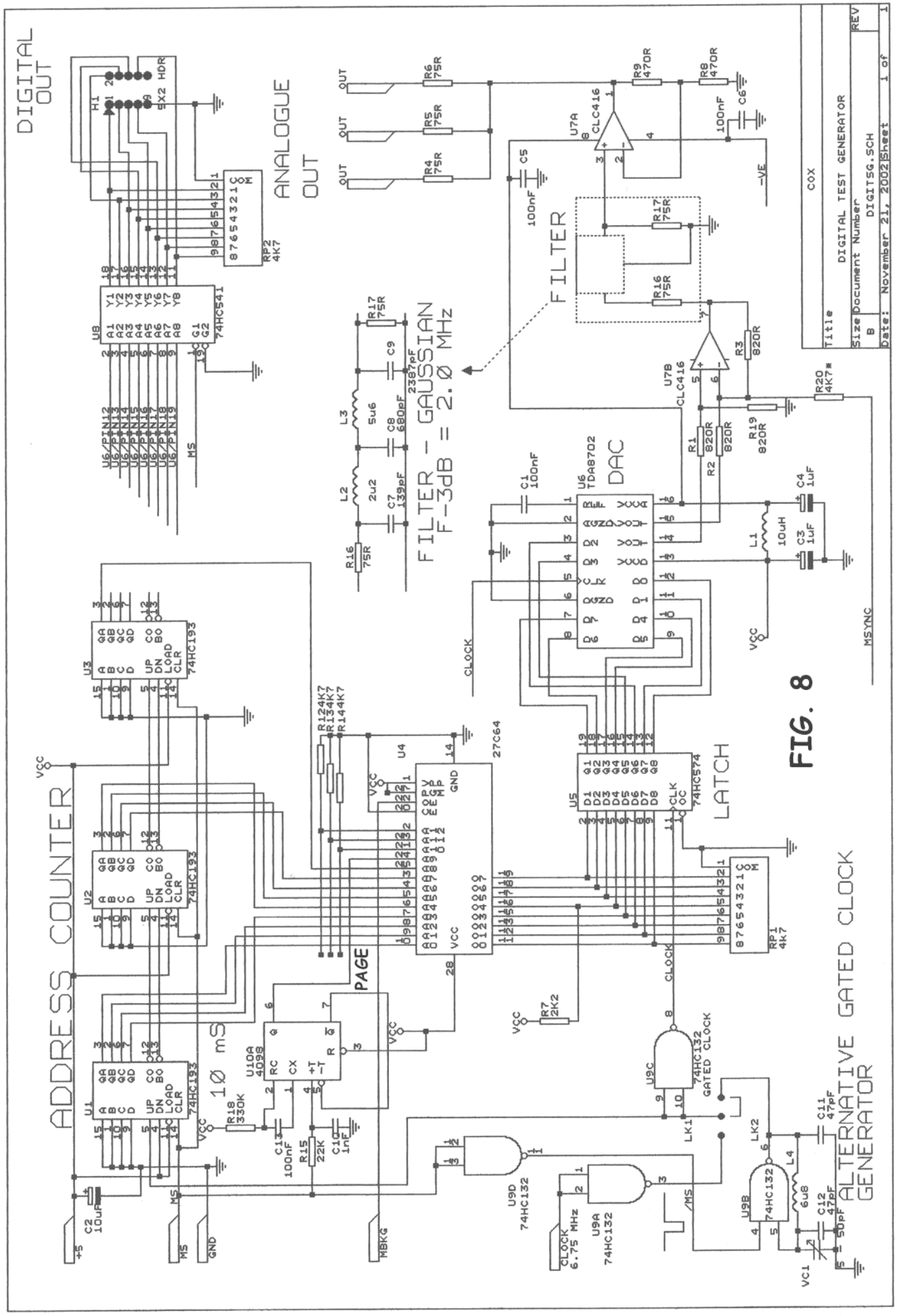

DIGITAL OUT
ANALOGUE OUT
FILTER
FILTER - GAUSSIAN
F-3dB = 2.Ø MHz
DAC
LATCH
ADDRESS COUNTER
ALTERNATIVE GATED CLOCK GENERATOR
DIGITAL TEST GENERATOR
PAGE
10 mS
CLOCK 6.75 MHz
GATED CLOCK
MSYNC
MBKG
-VE
VCC
GND

FIG. 8

TEST GENERATOR EPROM PROGRAMMING									
			Page 1	**Pulse and Bar**					
LOCATION 0000 - 0068 - VALUE 10h									
Loc.	69	6A	6B	then	B1	B2	B3	B4	B5
Val.	9Ah	FFh	90h	10h	1Fh	47h	7Fh	B6h	E0h
Loc.	B6	B7	B8	B9	BA	BB	BC	then	100
Val.	F0h	E0h	B0h	7Fh	47h	1Fh	10h		10H
Loc.	101	102	until	167	168	169	until	1FF	
Val.	75h	EBh		EBh	75h	10h		10h	
			Page 2	**Ramp**					
Loc.	200	to	240	241	242	243	244	245	246
Val.	10h		10h	0Fh	0Eh	0Dh	0Ch	0Bh	0Ah
Loc.	247	248	249	24A	24B	24C	24D	24E	24F
Val.	09h	08h	07h	06h	07h	08h	09h	0Ah	0Bh
Loc.	250	251	252	253	254	255	to	269	26A
Val.	0Ch	0Dh	0Eh	0Fh	10h	10h		10h	11h
Loc.	26B	26C	26D	26E	26F	270	271	272	273
Val.	12h	13h	14h	15h	16h	17h	17h	18h	19h
increasing by			345	to	34F	350	351	352	353
value 1 per location to 344			EBh		EBh	ECh	EDh	EEh	EFh
Loc.	354	355	356	357	358	359	35A	35B	35C
Val.	F0h	F1h	F2h	F3h	F4h	F5h	F4h	F3h	F2h
Loc.	35D	35E	35F	360	361	362	363	364	365
Val.	F1h	F0h	EFh	EEh	EDh	ECh	EBh	EBh	EBh
Loc.	366	367	368	369	until	3FF			
Val.	EBh	EBh	75h	10h		10h			

If you have the full 27 MHz clock and SPG system, then the clock is more or less available. If you only have the SPG, then the diagram shows a simple gated oscillator using an HC132 Schmidt

NAND gate. The values shown should work at around 6.75 MHz. The point of the gating is that the oscillator output is always phase-coherent with system sync.

The whole generator including the basic SPG should fit on a 100 x 160 mm EuroCard. If you only have +ve supply available, the –ve supply for the output op-amp can easily be derived from a Newport or similar dc-dc converter.

A chip list may be helpful: -

SAA1101 SPG chip try Cricklewood Electronics, 020 8452 0161

TDA8702 DAC

CLC416 Op Amp - Farnell, 0870 1200 200

LM1881Sync Separator

27C64, 27C256EPROMs

74HC serieslogic

Inductors

The next task is to find out why input 4 of the SDI mixer behaved badly, and then to contemplate a new control panel with an RS422 interface. I have in my lab some prototype systems I designed for Vistek some years ago to control a proc. amp using CDP1854 UARTs (RCA). The system then gave 3 8-bit words, and some other switch functions, so should be simple to extend to matrix control, and faders. Editor willing, I will report progress in the next issue.

Good programming!

What 'Amateur Television' means to me!

The personal view of Graham Hankins G8EMX

There can be no doubt over the meaning of the term 'amateur radio'.

Experimentation and self-training with radio frequencies as a method of communication, on frequency bands allocated for amateur use, or that include amateur use. A 'radio amateur' is any person – regardless of their job, trade or other paid employment; or their academic training, or life background, who has voluntarily demonstrated, by passing the Radio Amateurs Examination, adequate knowledge of radio and electronics theory, and legalities, to become licenced to transmit – I emphasise TRANSMIT - on some or all of the radio bands available to the amateur service. Apologies to the editor, proof reader, and members for that long sentence, but please keep it that way hi!

Therefore, transmitting a modulated radio signal is the defining purpose of 'amateur radio'. That is absolutely why 'amateur radio', as an experimenter's hobby, exists – otherwise, no examination of competence would be needed. If that modulation comes as a scanned picture signal from a camera, then what we have - at least in my dictionary – is 'amateur television'.

Now even at the basic level, television is a more complex mode than audio. I became and continue as a BATC member primarily for news, views and circuits for ATV being transmitted, and received, over the amateur bands and I

look to the content of our magazine CQ-TV to help me and others to do this. Members who join for the first time need 'starter' advice as beginners, maybe progressing to more advanced ATV stations. Some views have been expressed recently that the BATC, and the magazine, have drifted 'a few degrees' away from this. But the editor can only print what comes in, he really can. Unless he starts to 'chase' copy which, having done some of this myself, is certainly time consuming, and not always with any significant success.

The BATC is indeed a 'broad church'. There are members with television interests entirely unrelated to amateur transmitting, or computers; the BATC and CQ-TV have to reflect this too. However, perhaps the members who ARE actively putting out ATV pictures, running repeaters, starting repeaters etc can note the 'wish list' elsewhere in this issue. Then, maybe, the 'amateur TV' content of our excellent magazine can grow, particularly for new members, renewing members and those who left us but whom we are about to actively attempt to encourage back into the BATC.

Completing the G8SUY 24cm ATV transmitter!

By Graham Hankins G8EMX

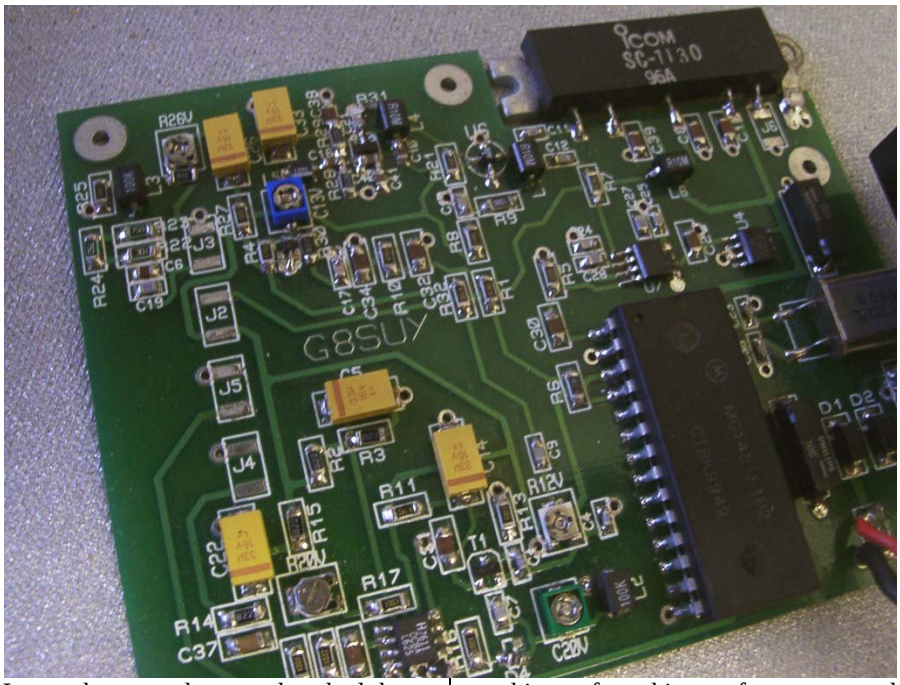
Here is a bit of actual ATV!

In CQ-TV 199 I had built the G8SUY transmitter, but had not set up or tested it.

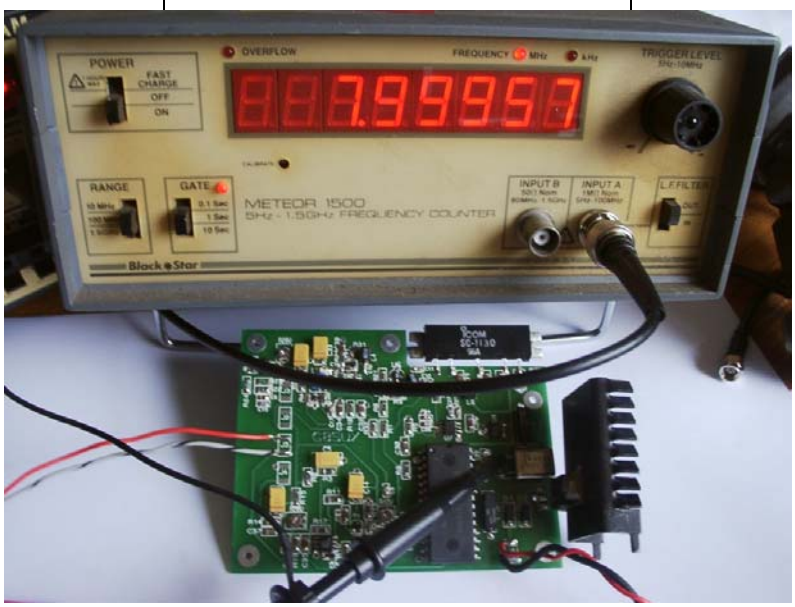
The supplied paperwork includes setting the main oscillator and phase locked loop by monitoring a voltage point and adjusting a trimmer C.

Unfortunately, this did not go as planned. The monitored voltage was too high (nearly the supply 8V) and adjusting the trimmer had no effect. Now the most three most essential items of test equipment are a digital multimeter, a frequency counter and an oscilloscope with probe. The meter confirmed that both regulated supplies were ok, and the oscilloscope displayed the crystal reference oscillator on the phase locked loop chip. But there was no output from the 1.3GHz divider into the PLL. Voltage checks indicated that the buffer amplifier feeding the p.a. may have been be faulty (8 volts drops to 1.7 v across a 100 ohm resistor?) So it looked like a replacement IC was needed, or use Andy Parnell's 'get you going' service.

An Email to Andy and the transmitter was packed into a box and posted. Andy Emailed to confirm receipt (always reassuring!) and a few days later mailed to say that the kit was now working fine.



I was keen to know what had been wrong. Main problem had been the mounting of the MAR 8 RF. pre-amplifier. My input had been where the output should be! Given that there were two alternative body and pinout markings for this surface mounted component (smc) position, depending on the device actually supplied, and these are very small items anyway, my error was perhaps understandable! There had been a few dry joints around the big phase-locked loop chip too - well, it's been a while since I did any soldering……..anyway, that's my excuse! Andy also 'tidied up' some of the surface mounted inductors, adjusted the pre-sets (video deviation etc), shortened the leads to the P.A. 'brick' (see photo) then gave the unit a soak-test. With the Worthing kit having ceased distribution, the G8SUY 'PCB and components' is now the only 24cm ATV transmitter kit available – as far as I know?



The BBC for all to See - A 'Backstage' tour of Television Centre

By Graham Hankins

The Beeb has put itself firmly on the 'must see' tourist map of London with 'rolling' tours of its Television Centre in West London. I had already seen the 'BBC Experience' at Broadcasting House, so I joined a trip around this distinctively curved building in Shepherds Bush. As with the 'Experience', the Centre tour is aimed purely at the 'lay viewer' so don't expect any great insight into the technicalities (although, those who don't know already will learn what 'Chroma key' does)

The Corporation is clearly very proud of its journalism. Our tour began in the News Centre and while the guide voiced her facts and figures I looked out over a sizeable open-plan space filled with satellite news feeds, picture editing suites and the stairs leading to the 'News 24' areas. All television and radio news now came from here, making the operation very efficient, editorially and financially.

We spent much of the next couple of hours conducted up and down stairs and along curving, 'Star Trek' like corridors to view a few of the TV studios. This was strictly a 'though glass' affair from galleries above and although lighting – and there is seriously lots of that – concealed much of what was happening on the floor, a pop group was rehearsing in one, and Eamonn Holmes was quizzing lottery contestants in another, for transmission that night! A pre-recorded video along one of the corridors told how the weather forecasts appear on our screens. The trip concluded with three of our number volunteering as

'contestants' for a short quiz, then into the BBC Shop!

The tours run throughout the day, weekdays too; each tour can be different, depending on 'what's going on' that day.

Now some 'fascinating facts'……

- The familiar curve of the TV Centre came from the '?' mark drawn on an envelope by the designer while seeking inspiration.
- The fountain underneath the golden statue of Ariel is rarely played, because of noise echoing around the circular atrium – and it incited staff to make frequent visits to the loo!
- The BBC never uses 'canned' laughter in its comedies. What you hear is genuine 'audience reaction', although sometimes edited into different parts of the action!
- Christmas shows were 'in the can' in October.
- The news presenters are experienced journalists with thorough knowledge of world affairs who write their own scripts, can handle failed autocues, changes to running orders etc.

My thanks to London Transport, who can replace a faulty Underground train within three minutes - amazing!

Bye-bye Betamax

Thought you might be interested in the following snippet written by George Cole in The Independent Electrical Retailer, October 2002, p. 12:

You may be surprised to read that Sony has announced plans to end the production of Betamax recorders, with the final 2000 being made for the Japanese market. Many people had assumed that Betamax went off to the great electronic scrap heap in the sky almost 20 years ago, when VHS pulled ahead and stayed there. Not so. When I visited Japan in the mid-1990's, I was amazed to see Betamax recorders still on sale in Tokyo stores. And it wasn't a case of the odd token Betamax model either, because there were around half a dozen products, some of them were high-end models. Betamax had a lot going for it technically and the format was the first to bring us picture search, hi-fi sound, the camcorder and improved picture quality (Super Beta arrived well before S-VHS). Sadly, from Sony's point of view, it wasn't enough to save the format from eventual oblivion.

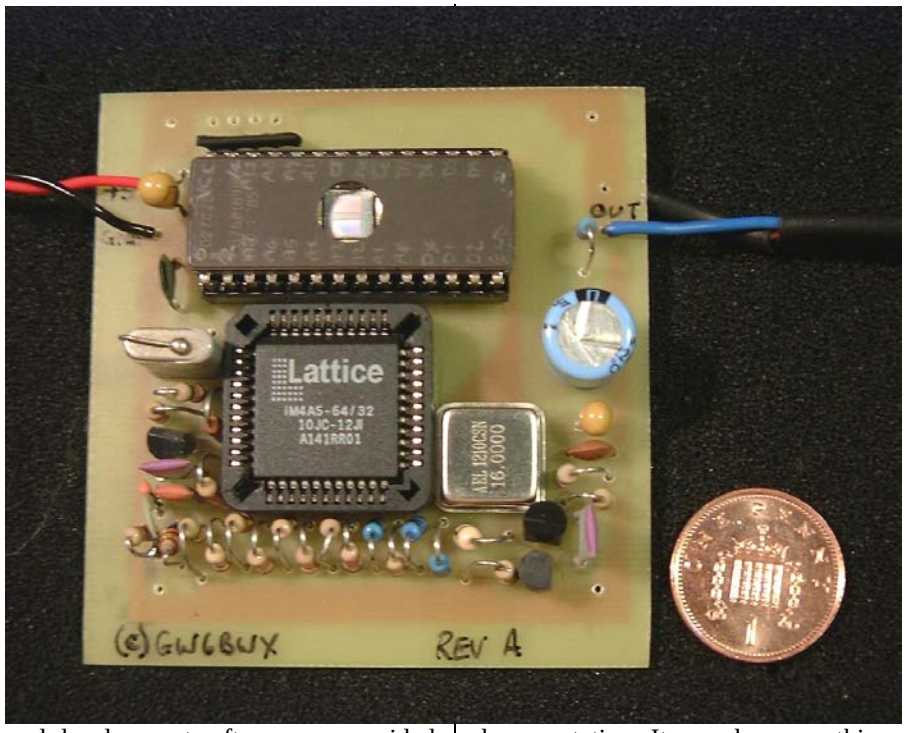
Low-Cost Colour Testcard Generator

By Brian Kelly. GW6BWX

This project was conceived out of two needs. One was to make a very low cost test signal generator; the other was to teach the author how to use programmable logic devices (PLD).

It is doubtful that many involved in the electronics trade have never seen one of these. They come in all shapes and sizes and a multitude of different internal properties. They have become the replacement for 74 series TTL and their CMOS counterparts, allowing their many individual functions to occupy the same slice of silicon. Their logic functions are, however, identical to their predecessors.

In a world where conventional dual-in-line (DIL) chips are becoming scarce, the author was faced with the challenge of learning how to use them or be resigned to using outdated technologies. Having decided to bite the bullet, the next stage was to see what tools were available on the market to teach about and use PLDs. There are several development kits on the market, some being way outside the authors budget, but one stood out from the crowd and was easily available at relatively low cost. This is the ISP development kit, sold by Farnell and others. It is designed by, and specifically for use with, PLDs made by Lattice Semiconductor Corporation. Two sample devices, a simple demonstration board

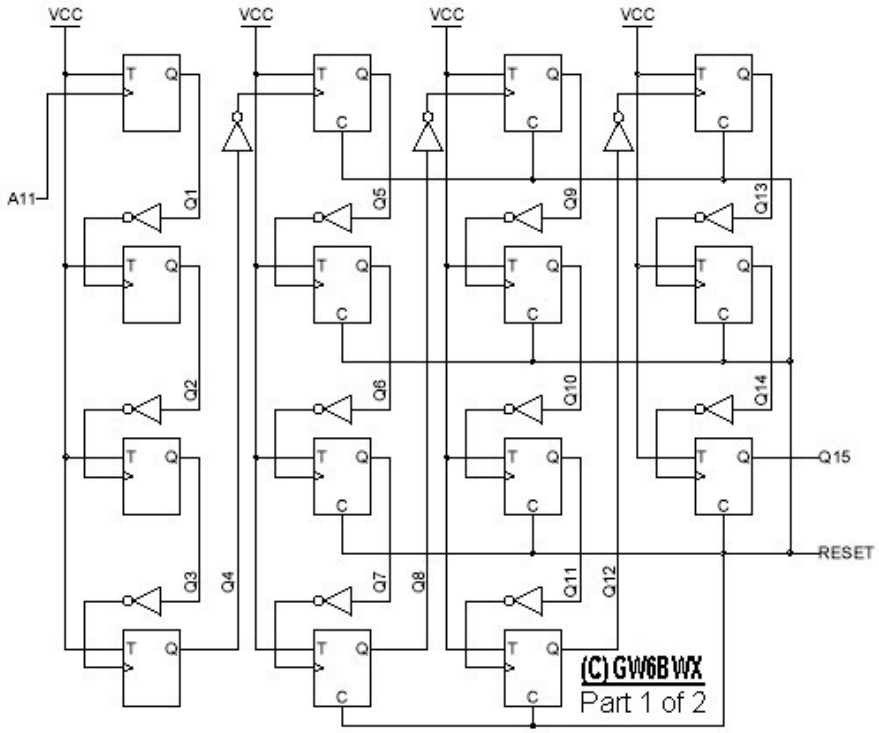


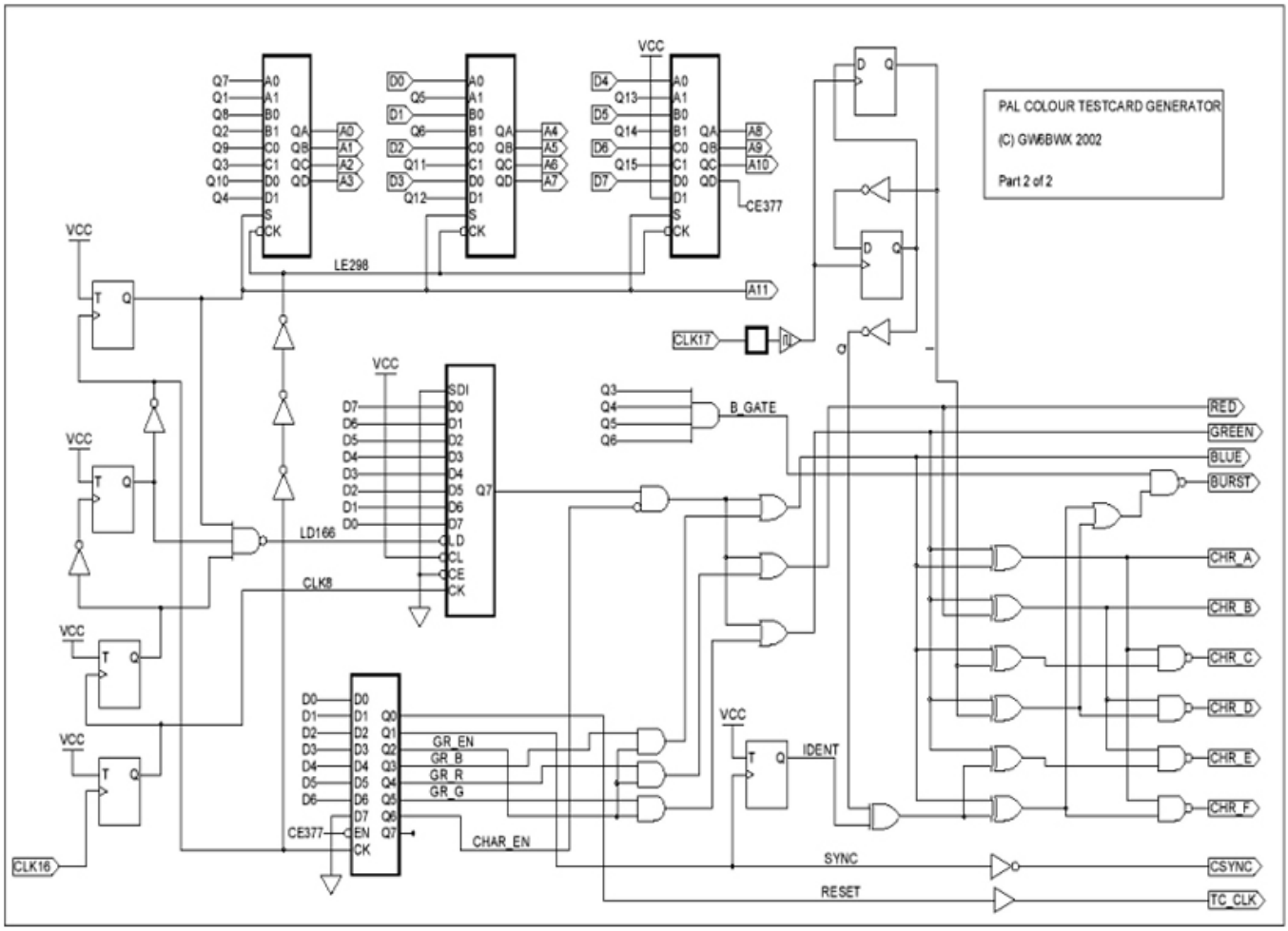
and development software are provided in the kit. The demo board can be used to program the PLDs via a cable that plugs into a PC printer port. I'm not going to upset Lattice by divulging the schematic for their board and cable. Suffice it to say that there would be little left over if the demo part of the board were removed. The actual programming hardware is extremely simple.

The development software is quite complex but it comes with extensive documentation. It can do many things that I still haven't worked out but the core operations needed to input a design and prepare it for placing on silicon are fairly straightforward. The design can be entered as logic equations or as a schematic using a drawing program. I chose the latter method.

When the design has been entered, it can be simulated to check it works properly. This process is quite easy and allows the design to be checked before committing it to a real device. All you do is draw the input waveforms you expect to feed in to the device and ask it to show its outputs. Pressing the 'run' button provides a display of input, output or both signals in an on-screen logic analyser. If something doesn't look quite right, it is a simple task to revisit the design, change it and try again.

When happy that here's a good chance of it working, the tools for optimising the chip can be run. One of the really nice features of Lattice PLDs is that the software optimises the way the logic functions are placed on the silicon, so that the inputs and output pins can be exactly where you want them. In the testcard design, for example, the PCB was designed before the logic design was finished. The software was told to connect the pins to match the board layout making the design much easier





and allowing a no-links single sided board to be used.

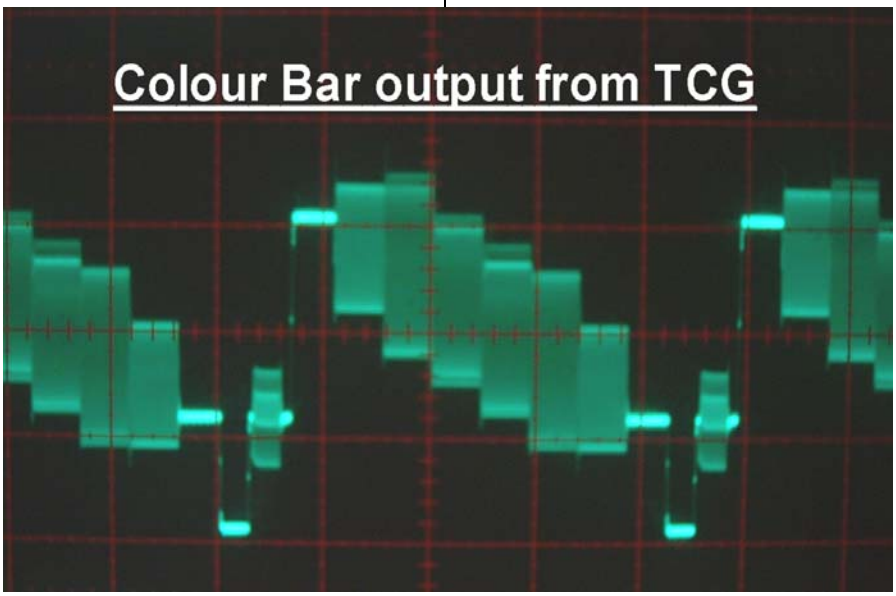
The final step is to put the design into the chip. This is done with another Lattice tool and is very quick. It only takes about five seconds to program and verify the chip. Lattice have designed another really nice feature into their PLDs; they can be erased and reprogrammed over and over again. This was particularly useful while developing the testcard chip, as it took many attempts to get it right. I'm not going to tell you exactly how many, that would reveal how bad at logic designing I am!

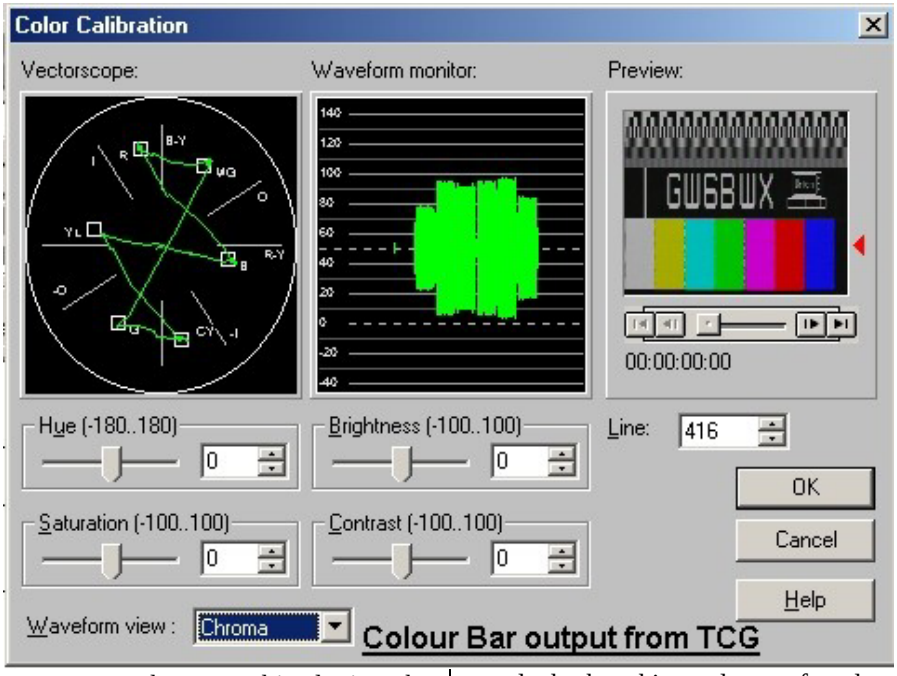
The Testcard Generator.

These are always useful gadgets to have in the shack and not too complicated to consider for a first attempt at PLD design.

I had for some time had the idea to try redesigning my existing generator into a single chip. My old generator is based on a design by, I believe, Colin Edwards which was published many years ago. I originally planned to copy the logic 'structure' directly into the new chip but found there was sufficient spare capacity left over to try incorporating a PAL encoder too. This part proved to be more of a challenge.

I confess to delving into old textbooks and browsing the Internet for ages, trying to re-learn things long forgotten about colour encoding. It was a quite enlightening experience and well worth trying yourself if you have a few weeks to spare! What became apparent was that there was no need to use an analogue encoder as all the possible colours from the generator section were at the same level. They are just switched on or off in different combinations to achieve the standard colour bar colours. With this in mind, it is relatively easy to generate the required chroma phases for each primary colour and turn them on only when necessary. For alphanumeric characters, which are always white, the red, green and blue are all turned on together. The relative levels of each colour phase and RGB output (Gamma) is set by a crude but effective array of resistors. These form a simple digital to analogue





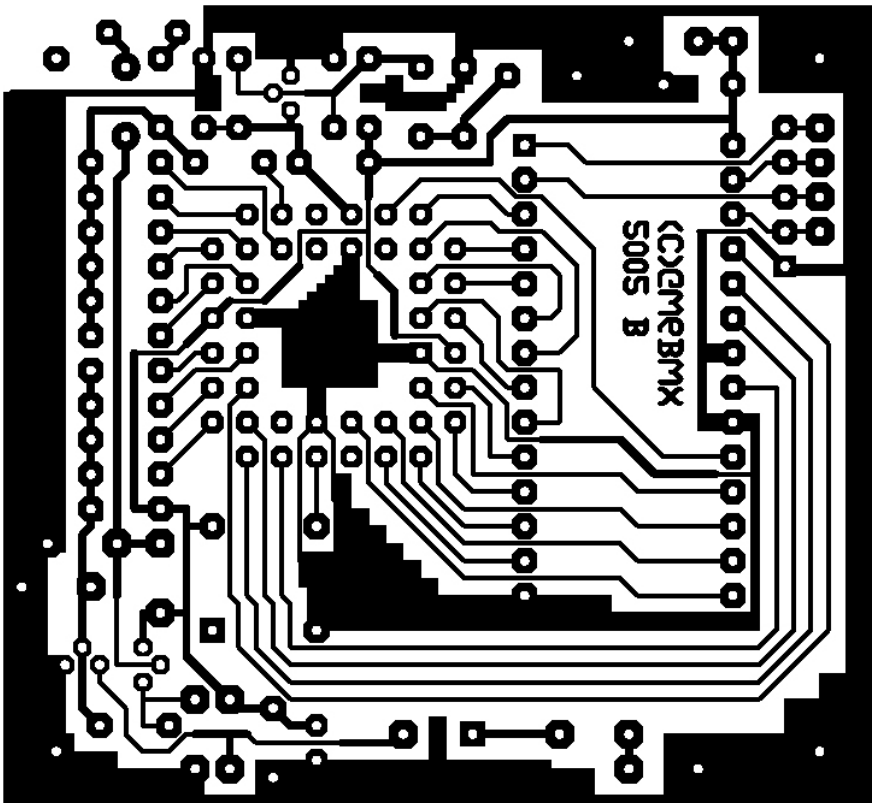
converter when combined in the transistor buffer stage. The second buffer is simply to remove the effects of loading by whatever you are driving into. Without it the chroma level varies too much as the load impedance changes

The vectorscope display shows that the final result is actually quite good for such a simple design and comparable with that from far more complicated units.

The first prototype used a crystal oscillator running at twice the colour subcarrier frequency. The circuit has to drive a clean signal at high output level to clock the chip and was found to occasionally flip the ident phase with disastrous results. The design here uses a crystal at four times subcarrier frequency and internally divides it by four. This was found to give far superior results but still demands a high output from the oscillator circuitry. I would advise sticking to the component values given or you may encounter strange encoding effects. The reliability could be improved by adding a buffer stage after the oscillator but this would increase both cost and complexity.

The burst signal timing is not correct but is close enough that none of the monitors or video capture cards I tried noticed anything was wrong. I tried in vain to improve the timing but ran out of silicon on every occasion.

The internal schematic of the chip is shown for interest only; I don't expect anybody to manually copy it into the Lattice schematic capture tools. It does show how much it is possible to pack into a single chip though. For those

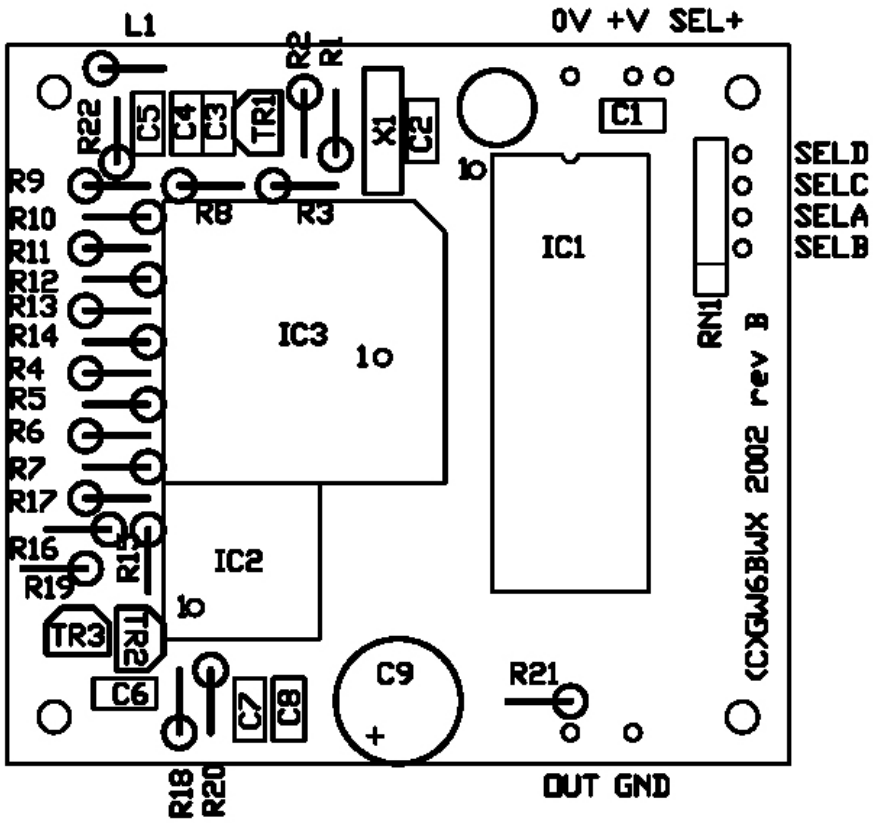


Pin No.	IC1 name	IC3 name
1	A15/VPP	GND
2	A12	A2
3	A7	A1
4	A6	A5
5	A5	A4
6	A4	A6
7	A3	A7
8	A2	A3
9	A1	D7
10	A0	
11	D0	CLK17
12	D1	GND
13	D2	
14	VSS	TC_CLK
15	D3	CHR_A
16	D4	CHR_B
17	D5	CHR_C
18	D6	CHR_E
19	D7	CHR_D
20	OE	BURST
21	A10	CHR_F
22	CE	VCC
23	A11	GND
24	A9	RED
25	A8	GREEN
26	A13	BLUE
27	A14	A8
28	VDD	CSYNC
29		A9
30		A11
31		A10
32		
33		CLK16
34		GND
35		
36		D3
37		D2
38		D4
39		D1
40		D0
41		D5
42		A0
43		D6
44		VCC

wishing to build the generator, I will have a word with the editor and see if he will put the PCB files and the JEDEC file on the BATC web site. JEDEC files are lists of the connections inside the chips that allow them to be programmed. They conform to a standard that Lattice and most other programming systems will understand.

When in operation the board consumes about 120mA from a *five* volt supply. The PLD is easily damaged if this is exceeded. Because of the problems mentioned earlier about the subcarrier clock levels, the circuit will start to malfunction if the supply drops much below five volts. The prototypes dropped to black and white at 4.5 volts but miraculously still gave a reasonable black and white picture down to about 3 volts. The PLD used is an M4A5-64/32, the '5' indicating its supply voltage rating. There is also an M4A3-64/32 that runs on 3 volts. I have not tried this device, but it may allow lower voltage and current operation. The 5V version takes less than one quarter of the power taken by the original discrete component design.

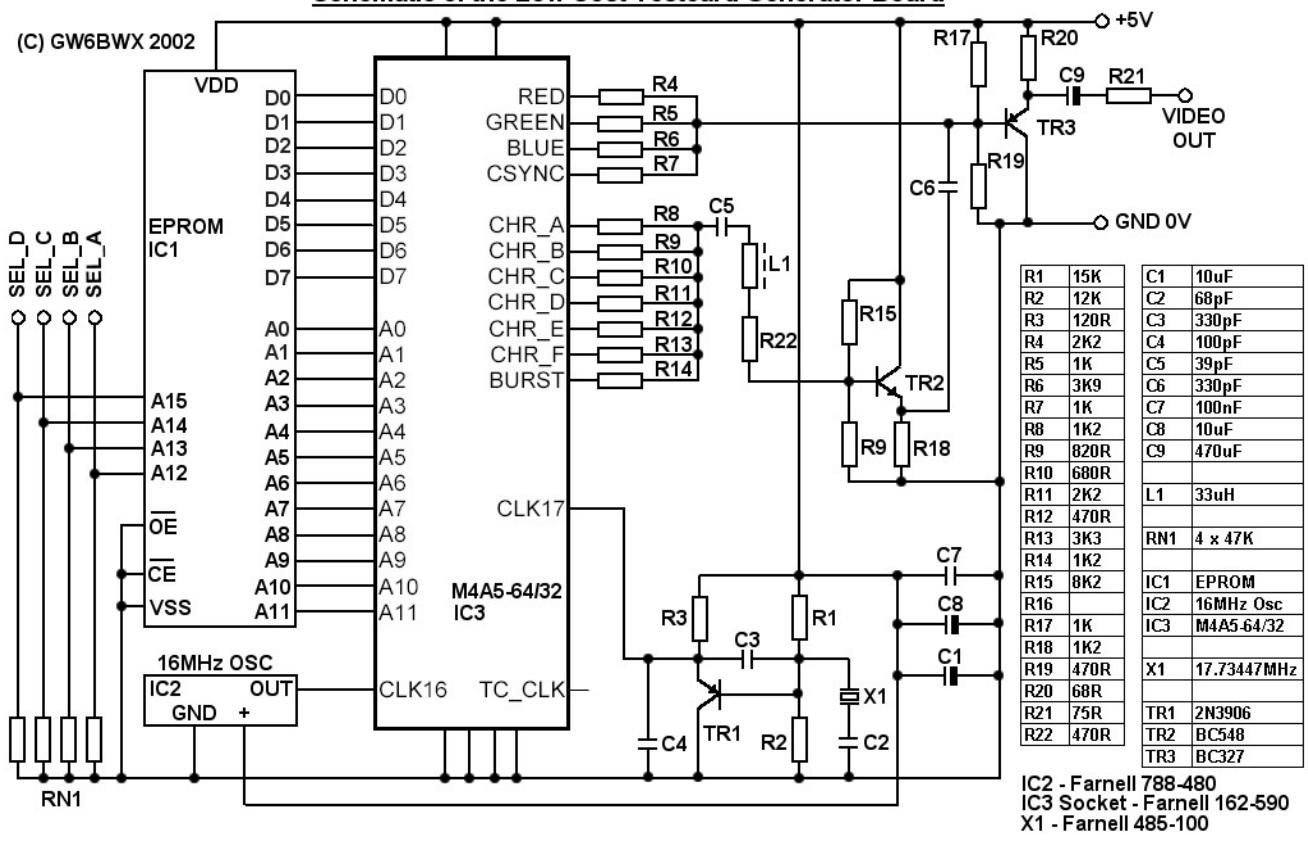
The EPROM contains exactly the same data as used on the discrete design. This makes it compatible with almost all the homemade testcard generators in use today. The only difference you might see



is that connections to the topmost four address lines are brought out to pads. The pull-down resistors ensure these are at logic zero level unless externally pulled high. If the EPROM used is a 2764 or 27128, always connect the pad nearest the corner of the board to the 5V supply. This is because some makes of these devices insist that pin 1 (VPP) is connected to the same potential as the supply pin. For bigger EPROMS, all four pins can be used and up to 16 different testcard patterns selected.

Some of the PLD pins are intentionally left unconnected. These are used only for

Schematic of the Low Cost Testcard Generator Board



R1	15K
R2	12K
R3	120R
R4	2K2
R5	1K
R6	3K9
R7	1K
R8	1K2
R9	820R
R10	680R
R11	2K2
R12	470R
R13	3K3
R14	1K2
R15	8K2
R16	
R17	1K
R18	1K2
R19	470R
R20	68R
R21	75R
R22	470R

C1	10uF
C2	68pF
C3	330pF
C4	100pF
C5	39pF
C6	330pF
C7	100nF
C8	10uF
C9	470uF
L1	33uH
RN1	4 x 47K
IC1	EPROM
IC2	16MHz Osc
IC3	M4A5-64/32
X1	17.73447MHz
TR1	2N3906
TR2	BC548
TR3	BC327

IC2 - Farnell 788-480
IC3 Socket - Farnell 162-590
X1 - Farnell 485-100

programming and testing the chip. The pin labelled 'TC_CLK' is an output which carries a brief pulse once per field at the start of the vertical sync pulses. It can be used to synchronise an off-board circuit to change the signals on the testcard select pins if desired. This will remove the possibility of switching testcards except during the retrace period, reducing the chance of momentarily losing sync as the pattern is changed.

The PCB design I used (which you might recognise from CQ-TV 200) measures 6cm by 6.5cm (about 2.25 x 2.5 inches) so it is quite small. For the purist, the capacitor in series with the crystal can be replaced with a small trimmer to set the subcarrier frequency accurately. The board is laid out to take a fixed capacitor, trimmer or both. If you use your own layout, keep the connections to the clock inputs on pins 11 and 33 of the PLD as short as possible to minimise noise pick-up and RFI radiation. Please note that the photograph of the board shows the revision 'A' layout, since taking it I have made some minor placement changes to make it easier to build. The track layout and placement diagram are for the latest release. The differences between the old and new board are very small.

Designing and developing this project has been educational and fun. The outcome is a low cost and very practical device, well worth the pains of climbing the learning curve that it subjected me to. I'm still not an expert at logic design but with the tools I now have, I can play and experiment until I get things right. I hope I inspire you to have a go too.

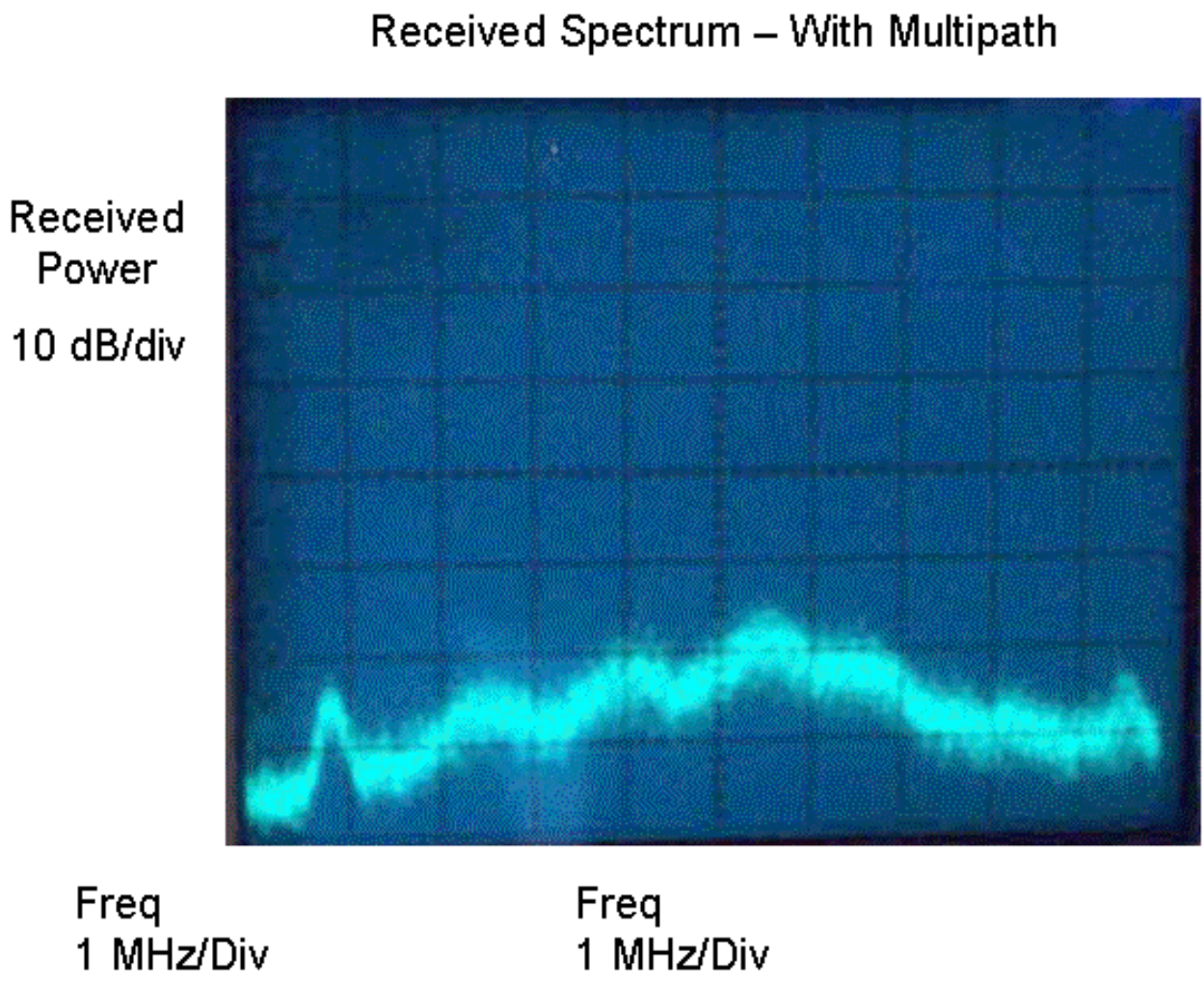
The software to go with this article is available from the CQ-TV web site - Ed.

Effect of Multipath Reception on QPSK Digital TV

By David Crump – G8GKQ

In my article in CQ-TV 200 about digital TV, I inadvertently forgot to send one of the photos to the Editor. The photo below shows the effect of aircraft flutter on the received digital ATV signal on 70cm. The peaks and troughs move along the spectrum as the second path length changes. Video decoding was only lost when the troughs were at their deepest. I have since heard that commercial tests have also found QPSK to be less affected by multipath reception than was originally thought.

I hope to do more tests on my return to the UK in March – I am presently working in Saudi Arabia for 4 months.



NBTV pattern generator with Genlock

By Klaas Robers, PA0KLS and Grant Dixon, G8CGK

This generator for NBTV video signals uses an EPROM to store several pictures that can then be selected by means of thumb-wheel switches. Alternatively, if the pictures stored are in a definite sequence, they can be selected to run as an animation of rather limited duration - 2.56 sec's.

Each pixel is represented by one byte, which consists of 8 bits numbered 7 to 0. A digital to analogue converter generates the grey levels according to the value of the bytes. One bit is normally used to generate the NBTV sync.

The standard aspect ratio of 3:2 would suggest that the picture would be 48 pixels x 32 lines in size. However 64 pixels is an easier number in the digital world. As we are converting from digital to analogue before displaying the signal it does not really matter how many pixels there are in a line.

If each picture takes 32 x 64 = 2048 bytes (2 kilobytes) then a 27512 EPROM used will hold 32 pictures which, at 12½ pictures/sec gives us an animation of 2.56 sec's. If the EPROM exactly holds 32 pictures there is no need to have any special reset pulse and the clock generator is allowed to free-run. The 27512 has a total of 16 address lines; the bottom 11 lines address a picture. They are counting up from 000 to 7FF hexadecimal. This is the size of one picture. The top 5 address lines are used to select one out of 32 pictures. Smaller EPROM's can be used as well. A 27256 will hold 16 pictures, a 27128 holds 8 and a 2764 just 4 pictures. They all fit in the same socket.

Front panel of the prototype unit. The socket on the PCB is connected to a ZIF socket on the panel by means of ribbon cable

The prototype

In the prototype a couple of hexadecimal thumb-wheel switches are used to select one out of 32 pictures. The switch contacts connect the appropriate address lines to +5V to give a 'high' or to ground to give a 'low'. In Hex the pictures are numbered from 00H to 1FH. Note that the second switch only has to switch one line. For economy, a toggle switch could have been used here.

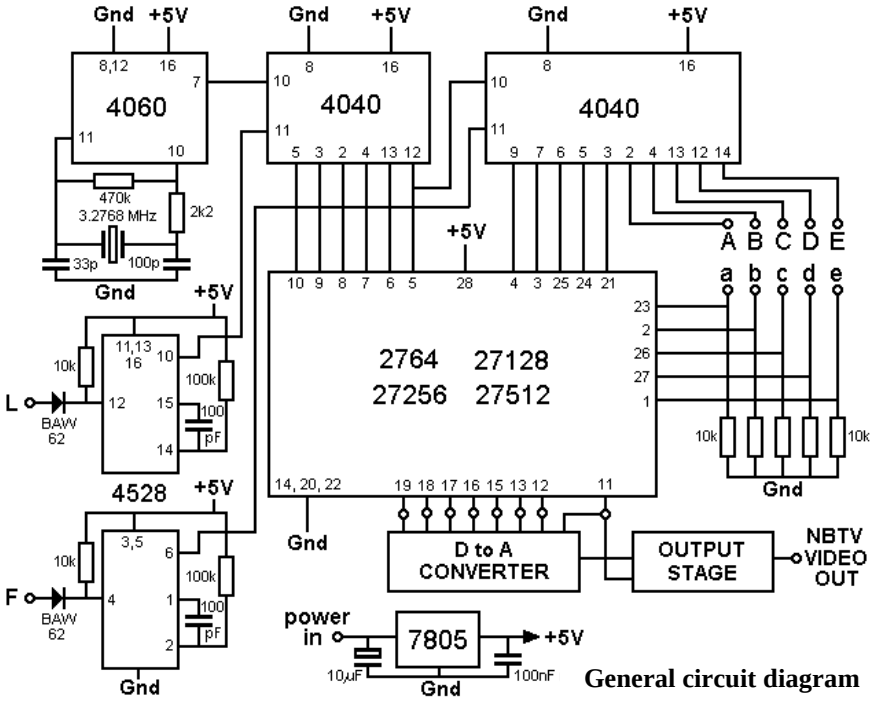
A 5-pole 2-way switch is used to select either the switch contacts for 32 still pictures, or the lines from the free-running counter, when an animated sequence of 2.56 sec's is generated.

Some details of the diagram

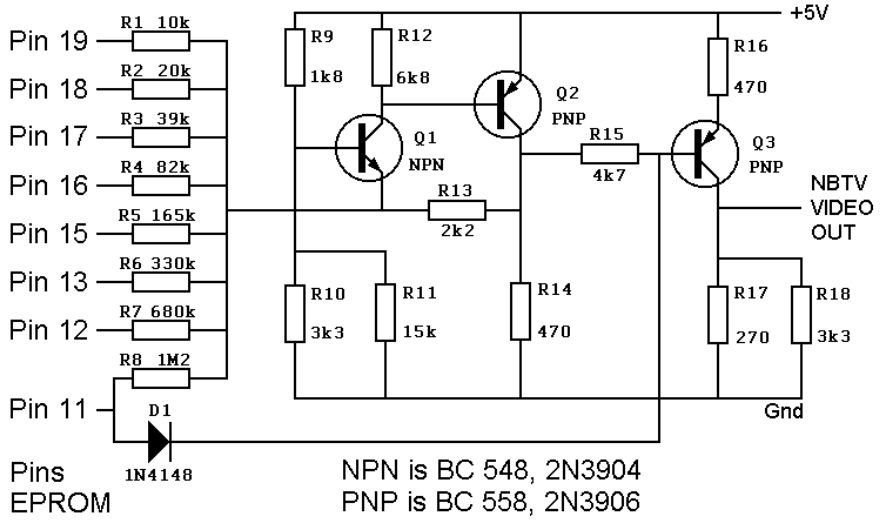
The master clock is locked to a quartz crystal. This crystal has a standard frequency; you will find it in radio flea markets in large quantities and at low prices. The advantage is that it runs with high precision without any adjustment of the frequency.

There is an input for external line sync and frame sync. When connected to these sync signals derived from an NBTV video signal, this generator synchronises itself. This is generally called 'genlock'.

An upgoing edge on the line sync input resets the line counter.



General circuit diagram



D to A converter and output stage

An up going edge on the frame sync input resets the frame counter.

Note: you can't genlock moving video, as the frame counter is reset on each incoming frame pulse. However, after getting in genlock you might disconnect the frame sync and the generator will remain in sync on line sync alone.

The positive going line sync and frame sync signals may have an amplitude of 5 volts or more, e.g. 12 volts. Diodes protect the inputs of the 4528 from excess voltages.

The outputs of the EPROM can be used for timing signals.

The digital outputs of the EPROM are converted to an analogue signal by means of a resistor network which is in the ratio 1:2:4:8:16..... namely, resistors of 10k, 20k, 39k, 82k, and so on. The resistors of the D to A converter are directly connected to the EPROM.

If all resistors R1 to R8 are mounted the D/A is 8 bits wide. In this case you can't mount the diode D1. If diode D1 is mounted instead of R8 then bit 0, the least significant bit, is used for sync and the video has to cope with seven bits. When you skip mounting R7 then just six bits are D/A'ed.

It is also possible to use other bits for the value to be D/A'ed. Then you should mount the resistors R1, R2, R3, and so on, in another position on the PCB.

The output stage was designed by Jim Wood, a USA member of the NBTVA.

The sync/video ratio and the video amplitude can be corrected by parallel resistors. The video amplitude is defined by resistors R17 and R18. With the values shown a video signal of 1 volt black to white is obtained. In case you want to adjust to a very precise amplitude, you may alter the value of R18. The video/sync ratio is defined by resistors R10 and R11. With the values shown the prototype gave a ratio of 30% sync and 70% video. If you want to have more sync, then you have to change R11 to a lower value.

Use as a timing generator

As the generator can be genlocked, the outputs of the EPROM can be programmed to provide us with timing signals, e.g. to synchronise a Nipkow disc. The synchronisation is now obtained in two steps:

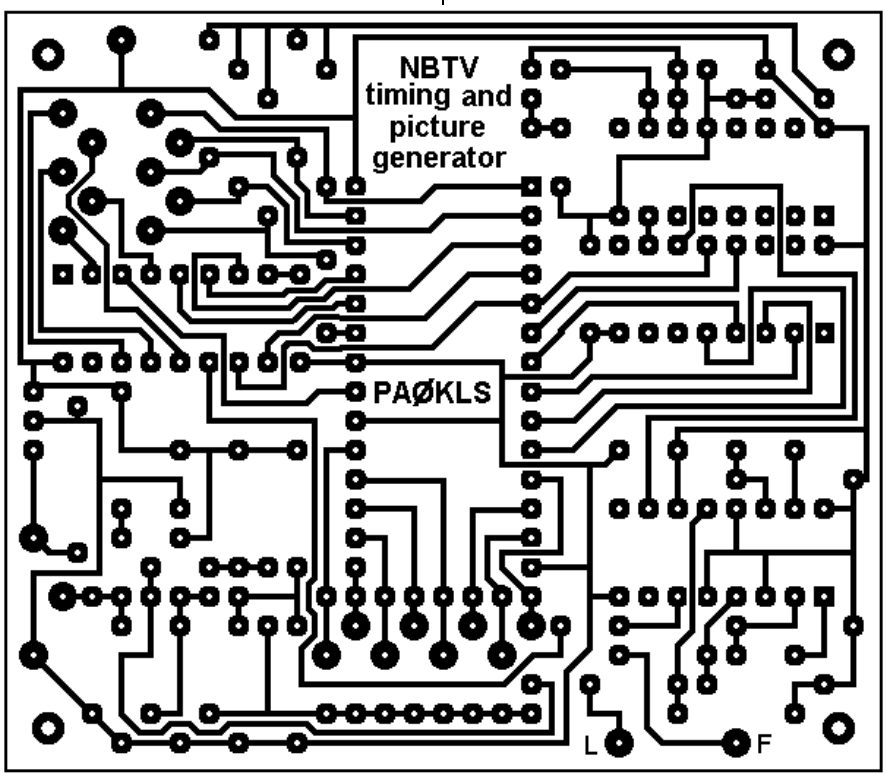
1. the disc is synchronised to the generator,

2. the generator synchronises itself to the video signal

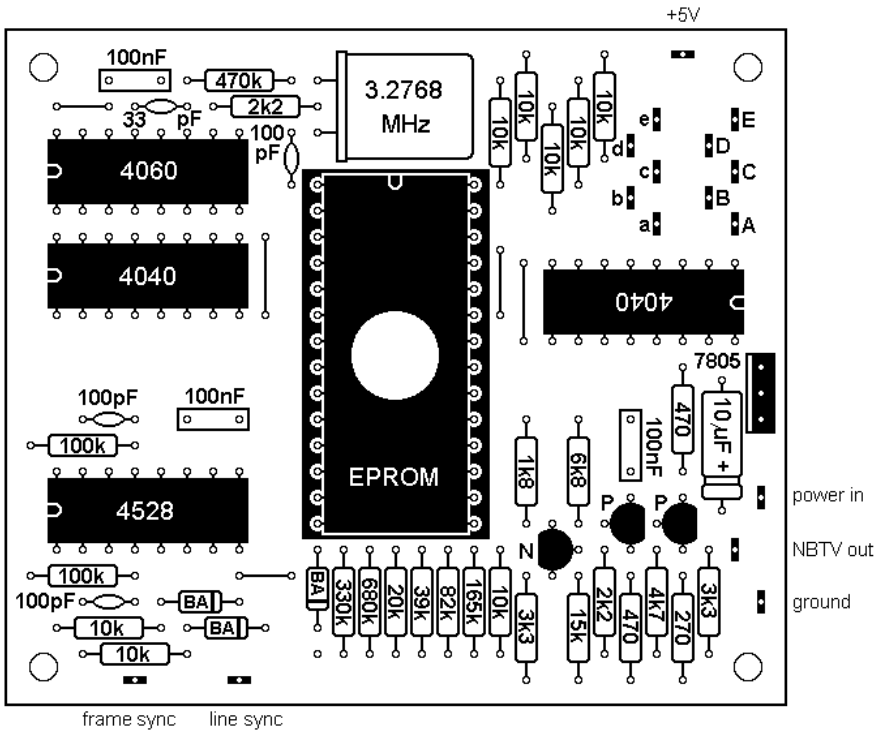
The first advantage is that the generator keeps running even when no NBTV signal is coming in. So the disc is always running at optimum speed, synchronised to the precise crystal generator.

The second advantage is that the EPROM can contain all kind of signals that you need for synchronisation of a Nipkow disc. For instance if you need a 50 Hz sine wave to run a bike dynamo as a synchronous motor (it runs at 12½ rev/sec when connected to 3 volts 50 Hz AC) then this sine wave can be programmed in the EPROM. Contrary to the 50 Hz from the power grid, this 50 Hz remains synchronous with the NBTV sync because of the genlock.

In the same way an NBTV monitor can be made from an existing oscilloscope.



A printed circuit board



Mounting instructions

The D to A converter now generates the wave for line or frame deflection. Missing sync pulses cause no problem.

Construction

For this generator a printed circuit board has been designed. This makes the assembly of the electronic parts easier.

The single sided board measures 76 by 66 mm (for the USA: 3in by 2.6in).

Always use a socket for the EPROM as you will need to remove it several times during experimenting.

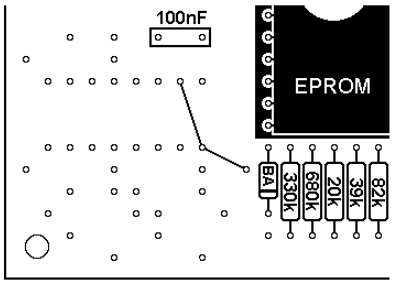
Don't forget the 5 wire links. They are made from clipped off wires of resistors and capacitors.

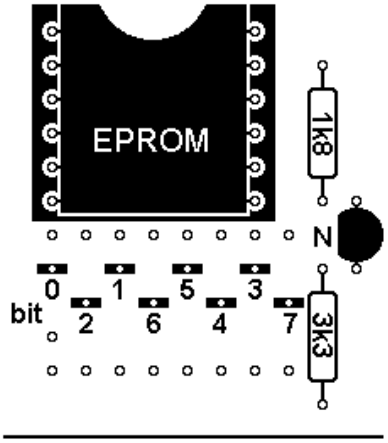
The N indicates an NPN transistor, the P a PNP transistor.

The diodes are labelled as BA. They can be any type of small silicon signal diode, e.g. BAW62 or 1N4148. Observe the position of the dark band indicating the cathode.

You may use standard C-MOS IC's from the 4000-series, e.g. MC4040, HEF4040, or IC's out of the 74HC or 74HCT series, e.g. 74HC4040 or 74HCT4040. In place of the 4528, either a 4538 or 74HCT4538 may be used. There are no changes in other component values needed.

If you know in advance that you will never use the genlock function, you may skip the 4528 and its surrounding components. Please mount in this case the two wire links shown. (Below, left)



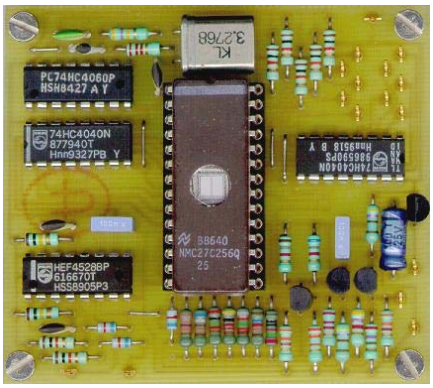


The resistors R1 to R7 of the D to A converter are positioned in a non-consecutive order, as this order was easier for the PCB design.

Resistor R8 of the D to A converter is not shown. It should be placed on the position where the diode BA is placed. The diode and the resistor share the same position on the board; only one of them should be fitted.

You may use the outputs of the EPROM as a direct digital signal. Underneath the resistors of the D to A converter are connection points. When you don't mount the resistors you can solder eyelet s, noting the order of the bits.

The voltage stabiliser 7805 should be mounted with its metal back side towards the 10µF electrolytic capacitor. There is no need for a heat sink; it runs luke warm on natural cooling. Alternatively, you may use a 78L05, which is the low power version in the plastic housing of a transistor. Place the flat side towards the 10µF capacitor.



The assembled PCB, here with a 78L05 low power voltage stabiliser IC in a plastic transistor housing.

Operating the PCB

The power voltage can be from 7 volts to 25 volts DC. The current drawn is less than 20mA. A small type of AC-DC adapter will do the job. Do not apply a voltage that is higher than the 10uF electrolytic capacitor can withstand.

The remaining outputs of the free running frame divider 4040 are connected to soldering eyelets marked A to E. The corresponding address inputs of the EPROM are connected to eyelets marked a to e.

If you only want to have moving video from a 27512 then you can simply connect A to a, B to b, and so on. However if you want to generate video stills, then a thumbwheel switch, as used in the prototype is a good solution. The switches should connect to +5V (eyelet) on a 1 and open on a 0.

If you want to do both, use a 5-pole 2-way switch to select either the switch contacts for the still pictures, or the lines A to E from the free-running frame divider. This is what is done in the prototype.

Different types of EPROM's need certain fixed pre-sets on their inputs. This table gives an overview:

input	2764	27128	27256	27512
a	S	S	S	S
b	S	S	S	S
c	+	S	S	S
d	+	+	S	S
e	+	+	+	S

An S indicates that a switch-output should be connected, a + indicates that the eyelet should be connected to +5 V.

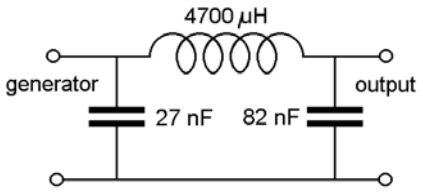
For a 2764 you need 2 contacts, for a 27512 you need 5 contacts.

If you have connected all inputs a to e to switches, then you still can use smaller EPROM's than 27512. In certain positions of the thumb-wheels the inputs are connected to +5 V.

Hexadecimal thumb switches that go from 0 to F are harder to get than Binary Coded Decimal (BCD) switches that go from 0 to 9.You can use a BCD switch and connect only the lowest 3 outputs. The switch now had his range from 0 to 7. Number 8 equals to number 0, and number 9 equals to number 1. Be aware that most thumbwheel switches are of the type 'one out of ten'. They are called decimal switches and you can't use them in this project.

If you want to do fine tuning of the video amplitude and the video/sync ratio, do it at the very end of your experiments. The two adjustments don't interact. However the output impedance of the type of EPROM that you use does influence both the video amplitude and the sync amplitude. In the prototype we used a C-MOS type 27C512 for good results.

The output signal of this generator shows some 'glitches' and the waveform is a kind of staircase. The glitches can easily been suppressed by connecting a



Video low pass filter

capacitor of 4n7 across the output of the generator. However it is much better to eliminate the staircases as well. To do this you have to place a low pass filter between the output of the generator and the output connector. This filter is formed by two capacitors and one inductor. Frequencies higher than 10 kHz are then attenuated and the stepwise waveform is smoothed. The inductor is a so-called 'microchoke' and it looks like a fat 4k7 resistor. The filter can be built on a small piece of perforated experimenter's board or it can be directly wired.

For more information on NBTV, visit The Narrow-Band Television Associations' web site at www.nbtv.org

This is an expanded version of a article first published in the NBTV Newsletter Vol. 28, No 1. - Ed

Worldwide ATV - contacts using Internet Radio Linking and the Internet for Talkback

By Ian Abel G3ZHI

A number of ATV repeaters around the world now stream their 'off air' video on the internet so anybody anywhere in the world who is connected to the internet can view the video.

The next step for hams was to make a talkback facility available for two way communications.

There are a number of ways talkback can happen - either by using the internet itself and one of the voice/video communications programs or by using your local internet voice gateway – where a local fm vhf/uhf repeater or simplex channel is linked to the internet.

If you wish to use a computer chat program to talk to someone on the internet your computer must have a soundcard microphone and speakers. Next download one of the chat programs such as Microsoft MSN Messenger or Net Meeting – both are free and allow you to call an individual or groups of people and talk to them. Net Meeting also allows streaming video so you can exchange your off air ATV video.

The refresh rate of the video depends on your internet connection – 1mb broadband means faster refresh than a 56k dialup.

After first downloading MSN Messenger and installing the program the next step is to sign up for an Hotmail account - if you do not have one already. The person you wish to talk to also has to do the same. I use my callsign for my account name so I am g3zhi@hotmail.com.

On MSN Messenger there is a facility to add people to your address list by adding their email address so to add me to your contact list you would just insert my email address in the box provided.

I will then receive a notification on my MSN that you have done this and I click OK to add you to my contact list.

When you go online you can check your contact list and it informs you who - at that moment is on line and who is not – so it is very useful to see if your friends are about for a live chat.

Using MSN you can chat on the keys or you can use voice - which works on full duplex.

So if you were looking at the streaming video on a web site from say an ATV repeater in Sydney Australia and the ham sending it was on your MSN Messenger list you could just call him and tell him what you are seeing.

As MSN messenger only has text and voice, if you wanted to send him some ATV video you could use Net Meeting or the iPHONE program to do this.

You could take your off air ATV repeater video and transmit them to the ham you are talking to or you could stream them on a web site so that many hams around the world could view them.

There are basically 4 methods of internet radio linking.

Three run on Microsoft Windows iPHONE eQSO and EchoLink and can be downloaded free from my web site. These programs allow you talk ham to ham over the internet who is talking on a computer at the distant end or on a radio link which could either be on a repeater or a simplex channel – or radio to radio i.e. you could jbe on the radio at your end and use a local internet voice gateway provided by another ham near you.

The fourth internet linking system is call IRLP - this does not permit you to talk from your computer indeed the system is very secure to prevent this – it works under Linux Redhat 6.2. or 7.3 and links over 750 repeaters around the world. Each repeater can be called up on demand by the user. There are IRLP gateways around UK and in a number of countries around the world. Most are in the USA Canada and Australia.

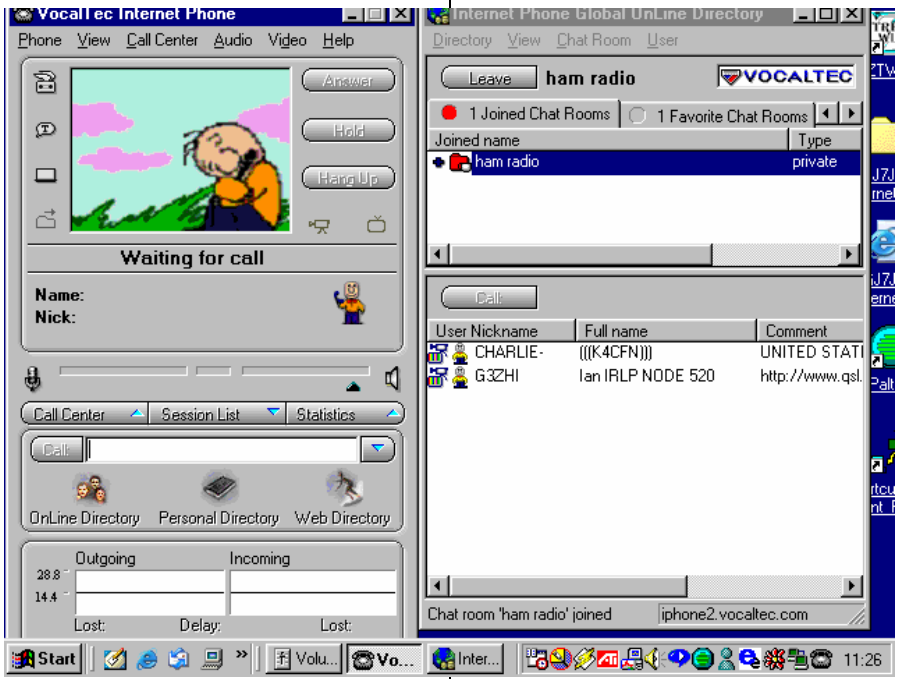
Any ham with an Intermediate of Full class of licence can install a voice internet gateway you just need an NOV from the RA

I would be very happy to answer any questions on internet linking and I can be contacted by email of telephone.

The following which is published in the RSGB 2003 callbook

Internet Linking

It is now commonplace for those on the



Iphone

Internet to communicate with friends and family around the world using voice and video, which requires their computer to have a camera, microphone and soundcard fitted. For radio amateurs the next step was to link their FM VHF or UHF transceiver to the computer sound card, enabling audio from their transceiver onto the Internet. If a similar link was taking place on a remote computer and both computers were linked together via the Internet (in the UK or anywhere in the world) you could have a radio-to-radio QSO with the Internet providing the link in the middle. The transceiver could be operating on either a local VHF or UHF repeater, or an FM simplex channel. All Internet linking on repeaters takes place in the shack of the amateur providing the link, nothing is done at the repeater site. The audio quality is normally excellent, with DX stations sounding just like locals.

With the more liberal amateur radio laws in the USA and Canada, Internet repeater linking has been in use there for more than six years. The first program used was IPHONE from Vocaltec, but any program that allows audio over the Internet, e.g. MSN Messenger or Paltalk, can be used for linking and to provide basic radio communication. This would be done by holding the transceiver's microphone to the computer's speaker and transmitting the audio off the Internet over the air, then holding the computer's microphone to the transceiver's speaker and transmitting the audio over the Internet. TX/RX changeover would be made by manually

IRLP Board

Tone Dialler

pressing the PTT, but with more sophisticated programs like IRLP, changeover is done automatically using an interface board and the transceiver's 'COS' (carrier operated switch)data line, allowing repeaters to be connected to the Internet 24 hours a day. In the UK, permission had to be obtained from the Radio communications Agency to link amateur radio to the Internet and a personal request to do so was made by Ian Abel, G3ZHI, to RA Chief Executive David Hendon at their Road Show in Leeds October 1999. Permission was granted in January 2000.There are currently four Internet linking systems in use: IPHONE, iLINK, eQSO and IRLP. The first three run under Windows 95® and above, and each program can be downloaded fromG3ZHI's web site. IRLP runs under Linux Redhat6.2 (this version only). For those not familiar with Linux, the UKIRLP Group are willing to help with installing Linux and the IRLP software. Using Linux is straightforward when the Graphical User Interface (GNOME) is also installed, as the Desktop looks similar to that of Windows. As of April 2002, 186 NoVs had been issued for simplex Internet gateways, 74 on 2m, 111 on70cm and one 70cm 7.6MHz split repeater.

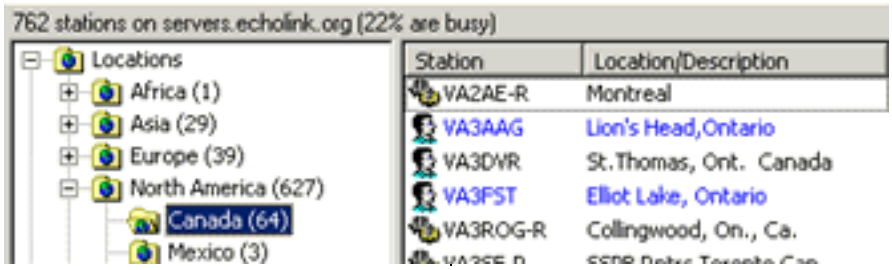
Getting Connected

If you wish to install an Internet gateway, you first need to apply to the RA for a Notice of Variation(NoV) to your Amateur Radio Licence. For a simplex link the application can be made online the RSGB DCC web site. It lists all the 2mand 70cm frequencies available. If you wish to put the link on a repeater, you must first obtain written permission from the keeper which must then be forwarded with the application to the RSGB RMC Chairman Carlos Eavis, G0AKI, QTHR, supplying all the information required for a simplex link, plus the call sign of the repeater you wish to put the link on, a copy of your licence validation document and the written permission of the keeper. Alternatively, you could apply to install your own Internet linked repeater as the changes to the channel spacing on 2m and the 7.6MHz split on 70cm have increased the number of available frequencies. Some software changes will probably have to be made to the repeater logic, because no repeater identification may be sent over the Internet- as it causes problems with the other repeaters that are connected, producing a 'ping-pong' effect(repeaters continuously keying each other on and off). The logic must also be capable of operating CTCSS. As Internet linking is worldwide, amateurs in many different time zones help to police the links24 hours a day, with any problems being reported to the stations providing the links.

Contacts

Using an Internet link, DX stations can be worked from home, while out walking, or bicycling using a handheld transceiver. A typical example is to have a round-table QSO with amateurs on repeaters in the USA, Canada, South Africa, The Caribbean and Australia, all in the same QSO. Some American repeaters transmit simultaneously yon multiple frequencies (e.g. 2m, 6m, 10m, 220MHz and 70cm), so you can be transmitting on many different frequencies all at the same time. The most remote place on IRLP is the American McMurdo Base in Antarctica

The base has a 'live cam' (http://live7.truelook.com/nasa/mcmurdo/index.jsp) which you can control. The picture quality is very good. For six months of the year the base is in 24-hour daylight, so, with a little organisation, it would be possible to seethe person you were talking to if they stood in front of the camera. Some overseas repeater linked systems are very sophisticated, with many repeaters linked together by radio. In New Zealand for instance they have the 70cm National System that has 19repeaters linked together, providing nearly full coverage of both the North and South Islands. In2001, when Tony

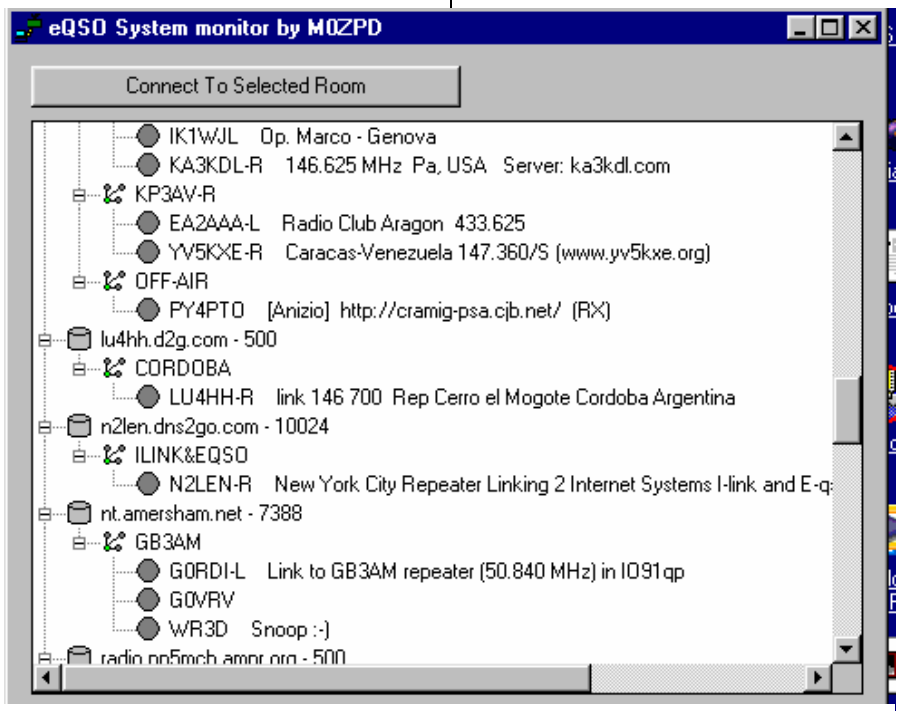


EchoLink Status Page

Whitaker, G3RKL, was walking the length of the country (1,300 miles from top to bottom) G3ZHI was able to keep in touch with him daily while he was on his walk and patch him through to his local repeater GB3US in Sheffield to talk to his friends (Tony is actually the keeper).In the USA and Canada there are a number of linked systems.

One example is the Winsystem in California, which links San Diego to San Francisco via 17 mountain top repeaters (some over 8,000ft high) all linked together. Another US repeater with excellent coverage is the Tram repeater in Palm Springs, California, so called because the tram goes to the top of the mountain where the repeater is located. Also on the top of the mountain there is a 'live cam' which is next to the repeater site, which you can view from the Tram web site (www.pstramway.com) and enjoy the beautiful scenery and see the repeater coverage. In the future maybe all repeaters in the world will be linked to the Internet, enabling amateurs to keep in touch with friends visiting any city in the world that has a repeater. Internet linking is ideal for DX QSOs, making it possible to have in depth discussions unaffected by QRM or QSB. Contacts can be 'one to one' or in a 'round table' where many repeaters are linked together. Sometimes on IRLP, 30 repeaters can be linked and all the users on each repeater are able to hear each other.

For the elderly, who are no longer able to look after their aerials and towers, or amateurs that go into retirement homes, this is an excellent way for them to keep in touch with friends. While at work, university, school or at an Internet cafe, provided the computer you are using has a microphone and soundcard, you can talk or just listen to your amateur friends without having access to a radio. Internet linking will work on a 56k-dialup modem, but a high-speed connection is best. Repeaters represent a big investment in both time and money and the aim of the Internet radio linking project is to increase activity on repeaters and simplex channels. Using IPHONE 4.5, one of the memorable QSOs G3ZHI had was with the Motorola Museum club station in Chicago, USA, K9MOT..



eQSO

While talking to K9MOT over the N9EP-R repeater, a radio amateur passenger in a light aircraft joined the QSO, working aeronautical mobile (which is permitted in the USA). Just at that time the aircraft was flying above the museum and the radio amateur in the plane was sending live video to the club, they then forwarded it via the IPHONE program, so G3ZHI was able to see the video from the plane.G3ZHI has also worked another radio amateur passenger in a light aircraft, this time while out cycling and using a handheld on GB3DV, the70cm repeater in Maltby, which was connected to N9EP-R in Chicago via IRLP. With the consent and co-operation of the repeater keepers, a UK repeater system could be developed providing full coverage of each motorway, e.g. the M1 could have several repeaters all linked together, providing continuous coverage from London to Leeds.

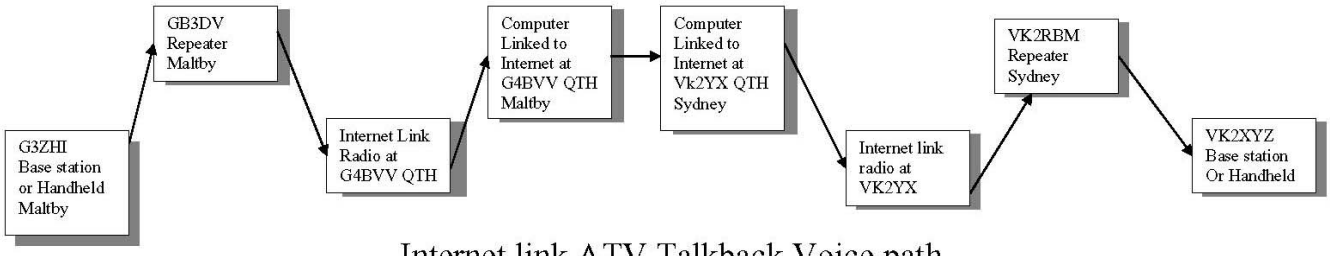
To use the Internet linking programs on a computer it must have a microphone, soundcard and speakers fitted. It is a good idea to first test that your microphone and soundcard are working correctly, by using the sound recorder program located in Windows Accessories.

Further information

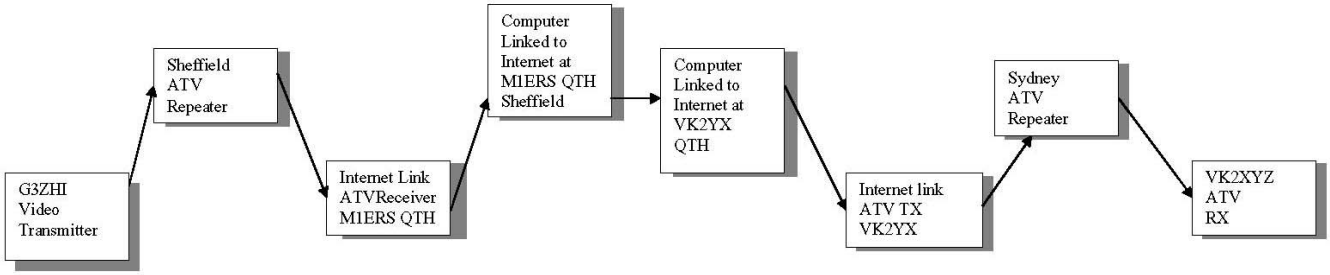
Check http://www.dcc.rsgb.org/ShowGates.asp?call=ALL to see if you have a local gateway near you. If you live within 10 miles of a gateway you should be able to hear it when it is active. They are not all 24 hours a day and you may need to contact the keeper to check when the link is available.

Echolink

Developed by K1RFD EchoLink is software which allows Amateur Radio stations to communicate with one another over the Internet, using voice-over-IP (VoIP) technology. The program allows worldwide connections to be made between stations, from computer to station, or from computer to computer. There are more than 38,000 registered users worldwide!



Internet link ATV Talkback Voice path



Internet link ATV Video path

For licensed hams, EchoLink opens up new possibilities for communicating around the world with other amateurs. Your PC links you or your local repeater to any of more than 45,000 other stations over the Internet.

The station-list screen keeps running tabs on who's currently on the system. Stations which have recently come on or off are noted separately. Sort the list any way you like. You can set up any number of "alarms" which will sound when your favorite stations come online.

In Sysop mode, EchoLink connects to a conventional FM transceiver using either the custom-designed linking interface boards from WB2REM and VA3TO, or general-purpose digital-mode interfaces such as the RIGblaster from West Mountain Radio. The board connects to your computer's sound card and serial

The program includes a number of important security features, such as the ability to restrict access by country, to help comply with your nation's third-party traffic or reciprocal operating rules.

There can be 800 users on the EchoLink list at any one time. You can then call any station on the list, or any station could call you. The station you call could be someone sat at his or her computer using a headset, a repeater or a simplex radio link. There are also several different conference rooms, with all stations in the room able to hear each other. When you have finished your QSO click on 'END', which disconnects. There is no SWL listen facility, so you must be licensed to download and use the program. Each station is given a unique number and using DTMF on a radio you can call an individual station. However, when you are mobile and not able to seethe list of stations connected on a computer screen, you do not know who is on line as stations come and go at random (although some are on-line 24 hours a day). You have to use your experience to gauge which stations are likely to be on line at any particular time. You can dial '00' that will connect randomly to any station that is on-line at that time, or '02'connects you to any free conference server. '#' disconnects, while '0' checks the on-air node status. For those using computers there is also a text chat facility, which is very useful if you are having audio problems or don't have a microphone. The audio quality is very good and the servers are very reliable. To transmit you press the space bar once and then press it again to listen. There is an 'info text' file, which you can edit, so when someone connects to you the information is displayed on his or her computer.

For more information

http://www.synergenics.com/el/

Yahoo egroups
: http://groups.yahoo.com/

There are a number of 'egroups' on Yahoo, which have discussions about Internet linking which you can join. For sites on repeater Internet linking, search using Google (www.google.com).

http://www.eqso.net/ eQSO FAQ: http://www.2e1ehm.freeserve.co.uk/RSGB guidelines on Internet linking: www.rsgb.org/extra/intlinks.htm eQSO screen shot. eQSO This was developed by M0ZPD in 2001. It is available as a 400k download from http://www.eqso.net/ Installation is straight forward. When you join a server, everyone in the room you select can all hear each other. You can change servers, change rooms on that server, view the full list of all servers and rooms and who is in them. eQSO can be installed on any computer, including a laptop, anywhere in the world, to have QSOs with fellow amateurs. SWL stations are welcome to listen and should identify that they are SWLs. They must not speak unless they are in an SWL-only room, which is off air and has no radio attached. There are three levels of security in place and people can be 'kicked', 'banned' or 'muted' by controlling stations that are monitoring around the clock. Amateurs across the world are using eQSO -and some are in very remote areas. Part of the fun is you never know who you will find on the system. Recently the Chinese have started to use the program, indeed one Chinese amateur has just installed the first RF 70cm Internet gateway in China.

IPHONE

IPHONE has been used for amateur radio linking since about 1996 and offers audio and video .After downloading (5MB), the first chat room you connect to is the default 'General' room which can be deleted. You need to join the' ham radio' private chat room. To do this,

first click on the drop-down menu 'Chat Room' on the 'Global On Line Directory' then click on' New/Private', type in 'ham radio' (all lowercase), then click 'join'. You will then see a list iPhone screen shot. iPhone VOX.of all the stations in the room. Click on a call sign to call the station, which could either be an individual who is using a computer, a repeater, or a simplex link. Non-licensees can also use the program, enabling SWLs to talk to licensed operators (this is fine, provided there is no radio link involved).

You can link a transceiver to the Internet with the IPHONE program by using a VOX unit to operate the TX/RX function. Ready built VOX units are available from CPC(http://www.cpc.co.uk) part number HK00035,priced £16.Vocaltec no longer sell the IPHONE program and they will not allow you to register it. However, it can be uninstalled and reinstalled as many times as you wish (it only takes a couple of minutes) on a 7-day free trial basis .IPHONE also has a 'white board' facility that allows you to exchange text, photos and diagrams with the person you are talking to. Unfortunately, if you are on a handheld which is connected to the Internet via IPHONE, you have no way of knowing who has joined or left the room. Therefore you are not able to call stations, you must rely on people that join the room who are using their computer and can see the list, calling you. When someone click son your callsign and calls on your link, their audio triggers your VOX unit and puts your transceiver into transmit. When they stop transmitting, your transceiver returns to receive and the transceiver's audio is passed straight on to Internet. Consequently, when you transmit they hear your audio. IPHONE provides little security, so links need to be monitored when the program is being used. IPHONE used to support conference rooms but the facility is no longer available.

IRLP

Developed by Dave Cameron, VE7LTD, in 1977, Internet Radio Linking Project is available from http://www.irlp.net It is primarily a worldwide Internet linked repeater network with over 400 repeaters connected together 24 hours a day. The number grows almost daily. It is a totally secure system running under Linux Redhat 6.2 (not later versions).You cannot speak on the IRLP system from a computer which is connected to the Internet, like you can using the Windows programs, because IRLP was designed just to link repeaters around the world (although there are a few links that are on simplex channels).When using IRLP, you call a repeater by using DTMF tones. There is a directory list of all repeaters giving their individual 3-digit number. You use the number to connect and disconnect from the repeater you wish to call, adding a control digit '0' to turn a link 'on' and a '1' to turn a link 'off'. Example: To call VK2RBM in Sydney, tune your radio to a local Internet linked gateway frequency and key 6000 to turn the link 'on' and 6001 to turn it 'off'. You will hear a voice announcement identifying which repeater you are connected to. When you disconnect you get another voice announcement, saying 'you are now disconnected', again identifying the repeater you have left. You can use a 'touch tone' DTMF microphone costing about £50, or buy a DTMF keypad costing £2.50including P&P available from UKIRLP. You can call individual repeaters or connect to a Reflector, which is a 'conference room' which can have as many as 30 repeaters in the room. Anyone speaking on any one the repeaters can be heard by all the other repeaters, so it is vital that no CW indents or courtesy tones pass from a repeater on to the Internet as it would cause problems. To connect your repeater to the IRLP network requires an IRLP interface board costing US $60plus $15 carriage. To order an IRLP board, visit www.irlp.net/

UKIRLP (United Kingdom Internet Radio Linking Project) will help anyone unfamiliar with Linux DTMF keypad. to install the hardware and software. You can view the 'live' status page of all the repeaters on the system by visiting status. irlp.net Dialup connections can be used for IRLP, and Linux will automatically reconnect if you are disconnected abruptly or if you get disconnected after every two hours. However, if you are using a dialup connection you are not able to connect to reflectors, so a high-speed connection is the best option. Some repeaters connected to IRLP are connected to multiple linked systems, eg the Winsystem in California and the New Zealand National System. You can listen to the 'live' audio on reflector 9200 at http://www.live365.com/stations/253404 and on the Winsystem.

Useful links

www.irlp.net

www.qsl.net/g3zhi/ukirlp.htm

www.radio.gov.uk/topics/amateur/document/linking.htmRSGB

Data communications Committee: www.dcc.rsgb.org/

RSGB Repeater Management Committee: www.coldal.org.uk/rmc.htm

List of All simplex UK Internet gateways: www.dcc.rsgb.org/ShowGates.asp?call=ALLCall_Channel

List of repeaters with links

GB3BN RU240 (RB0) Bracknell

GB3CL RU258 (RB9) Clacton

GB3DS RU266 (RB13) Worksop

GB3DV RU242 (RB1) Rotherham

GB3EE RU264 (RB12) Chesterfield

GB3GN RV62 (R7) Aberdeen

GB3HH RV56 (R4) Buxton

GB3LI RU260 (RB10) Liverpool

GB3LM RV58 (R5) Lincoln

GB3LV RU244 (RB2) Enfield

GB3NA RV54 (R3) Barnsley

GB3PZ 7.6 Manchester

GB3SY RU252 (RB6) Barnsley

GB3TP RV58 (R5) KeighleyGB3US RU240 (RB0) Sheffield

GB3WJ RU250 (RB5) Scunthorpe

GB3XN 430.925 7.6 Worksop UK

Irlp links

5100 G4CUI Sheffield

5120 GB3EE Sheffield

5130 GB3DV Maltby

5140 G0FUO Mexborough

5150 GB3US Sheffield

5170 G6YHW Middleton, Leeds

5200 G4NJI Rotherham

5210 G8UVE Burnley

5220 G4EID Southport

5230 G4EID Southport

5240 GB3LI Liverpool

5280 G6PHF Lancaster, Lancs

5300 M5GUY Carlisle

5350 G7PCT Melton Mowbray

5400 G0XEL Manchester

5500 M1ERS Sheffield – Experimental

5510 MM0GEQ Edinburgh

5600 GB3LV London

Bibliography

RadCom G3RKL, April 2001.G4CUI, February 2002.

Ham Radio Today G3ZHI, February 2000.

Radio Active G3ZHI, January 2000.132

ATV web pages

http://psycho.psy.ohio-state.edu/atco/homepage.htm

db0vox live steam

http://db0fhn.efi.fh-nuernberg.de/db0vox/stream.pls

16 live ATV repeaters

http://lea.hamradio.si/~s51kq/ATVrptLIVE.HTM

Some of the above first appeared in the 2003 RSGB CallBook

TV On the Air

By Graham Hankins.

Yes it has been a long time since this appeared! TVOA used to consist of ATV contact reports sent in to whoever compiled this page – 'A' had worked 'B' on some band over a phenomenal distance; 'C' had sent P5 pics to 'D' from a hilltop on 75GHz. Etc.

Well, instead of printing similar reports, let us ask for some basic information. Moreover, this goes back, again, to the rallies last year. There are new members eager to try ATV, but asking if there is any activity in their area? Prepared to put up an antenna, fire up a transmitter; modify a satellite receiver if there are other stations to work!

So let us try to gather some data! Email me with your callsign, activity night, band and approximate area – e.g. nearest town, and we can list these in TVOA. Now it could be suggested that anyone wanting activity should call or listen on 144.750 – but that would need a substantial 'listening watch'. Or you need not even give a callsign – maybe first name, band, area and best time etc. That way, you are not 'revealing anything' but giving any new station a bit of a 'clue'.

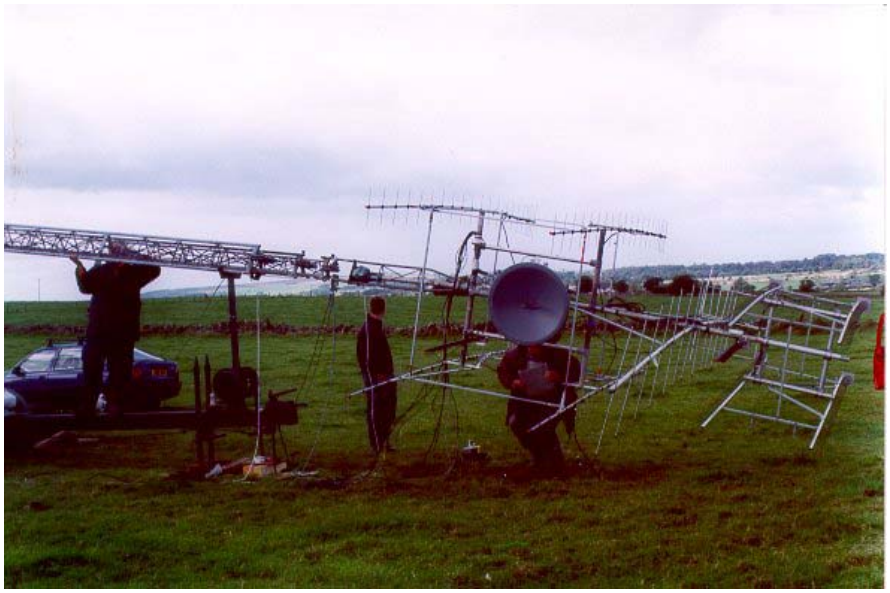
My Email address is still graham@ghank.demon.co.uk

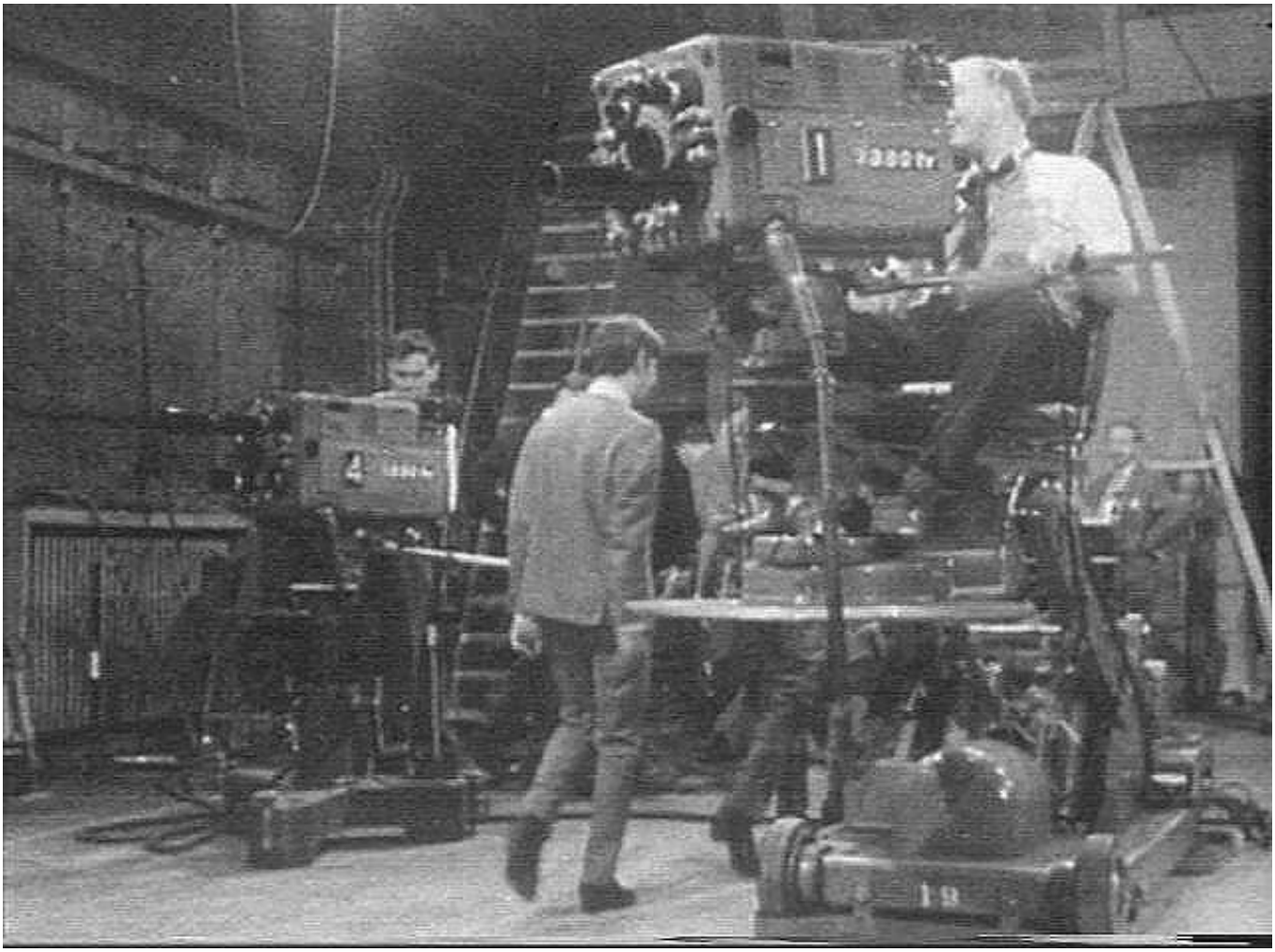
From a telephone conversation, I hear that work is being done towards a new ATV repeater for Blackpool. Information is that Crawley ARS is continuing its ATV repeater project; also that there is repeater interest in Tamworth. In addition, in 2003 there could be a fresh initiative towards that occasionally mentioned but not much progressed ATV repeater somewhere in Birmingham!

In addition, G8EMX really aught to be TVOA himself, what with two transmitters, two receivers, a portable mast, two antennas and a camcorder!

GB3GV - There is very little usage of this repeater but a slight problem has been reported. This needs to be quantified precisely and then it will be looked at. If anyone can give me more details I will pass it on to the appropriate engineers.

Aerials – what aerials?





Where Are We Ringo? Dicky Howett writes: -

This back view of Ringo Starr amongst the Marconi MkIII cameras is from a brief BBC clip often shown, but never identified. So what studio is it? It's not anywhere in London but it might be BBC Manchester's Dickenson Road, the home originally of Mancunian Films and latterly of Top Of The Pops. Note the radiator behind the Eclair mechanical pedestal (cheap OB kit here) and the gallery ladder. The camera-number positions and 'BBCtv' lettering are typical of BBC Manchester. Any ideas, folks? Email me on dicky.howett@btinternet.com I really would like to know.

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A Happy New year to all our members

