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Production Team

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Let's start this issue with some good news, but yes in true tradition there is also some bad news. First the good news Graham Shirville G3VZV is the new BATC president, Graham joined the BATC committee back in 1972 as the contest secretary and has been a tireless worker and supporter of ATV from its analogue days. He was one of the live video contributor into CAT 70 (1970) and transmitted his contribution from a canal narrow boat, using a small 70cms AM transmitter with a valve PA. Trevor stole the idea and transistorised it as a walk-around demo for the BATC's contribution to the Stoneleigh County Festival some years later. Graham follows in the footsteps of Peter Blakeborough, Mike Cox and Arthur C Clarke, so on behalf of the production team at CQ-DATV we wish him well in his new role. Also lets us take this opportunity to remind all BATC members that the BATC BGM is Sunday 25 September 2016. 13:30 hrs and is taking place in the Conference Room of the RAF Museum, Cosford.

OK, the bad news - Es'HallSat-2 launch has been put back to Q3 2017. I know we all had plans for DATV through this geostationary satellite that was scheduled for launch later this year, but into everyone's life a little rain must fall. Let's hope it does not get pushed back any further.

Here at CQ-DATV we have been investigating download problems some of you with poor internet speeds have been experiencing downloading large files from the CQ-DATV website. The main culprit is the Omnibus file. It can time out under http protocol, sorry. We came up with a temporary solution and tested it using a guinea pig reader. The solution was temporary hosting using https protocol which fixed the problem. Now we know the solution we have to figure out how to host at no cost as we are a free magazine with no income. Most ISP sites hold their hands out for money to use this protocol, so we have not as yet come up with a solution

we can implement, but we will keep working on it. If you have a fix then please let the editor know.

Moving on, in this issue we have the final part of the VTR story that commemorated 60 years since the first broadcast VTR was launched. We understand that this article will also appear in the AGAF magazine (TV for Amateurs) and that Klaus DL4KCK has been hard at work on a German language translation. Well done Klaus. We hope all your German Language readers appreciate your hard work.

We also have the Lancelot links truck story, from Scott Richardson. This truck was originally a broadcast TV links truck and it is now a killer ATV station for portable work. One that many of us would die to own.

Ken W6HCC has the latest notes on the DATV express project, John G3RFL has taken time out of the workshop to reflect on Guglielmo Marconi and we have all the usual ATV news. Mike Stevens G7GTN continues his look at on screen display modules based the MAX 7465 chip with a look at the latest incarnation.

Coming up in the next issue is a rather interesting aerial solution, by Mick Ampt VK3CCH to the problem of a new five story building that blocked his path to the local ATV repeater (VK3ATV). I won't spoil it for you, you will just have to download your copy next month. So sit back and enjoy CQ-DATV 39.

CQ-DATV Production team

Please note: articles in this magazine are provided with absolutely no warranty whatsoever; neither the contributors nor CQ-DATV accept any responsibility or liability for loss or damage resulting from readers choosing to apply this content to theirs or others computers and equipment.

Ofcom 5 GHz Consultation – RSGB and AMSAT-UK responses



In their response to the Ofcom consultation on Wi-Fi in the 5 GHz Amateur Radio allocation the RSGB said "We are deeply disappointed in respect of Ofcom's compliance with its duties..."

The Radio Society of Great Britain (RSGB) response highlighted that:

- a) *Ofcom has deliberately not contacted the most innovative incumbents/stakeholders as stated in Para 3.43 (only Wi-Fi) prior to the formal consultation period*
- b) *As an incumbent we have been blocked from contact during the consultation*
- c) *Ofcom has ignored their duty with respect to CEPT ECA allocation footnotes ECA17/23*
- d) *We expect Ofcom to make amends and engage, or we will consider escalating this*

The Society pointed out that "Ofcom's research is badly flawed and belittles incumbents..." and "Ofcom strategy for Consumers is also flawed..."

The RSGB describes how "Ofcom's preference risks causing harmful interference at home and internationally" and "Ofcom continues to unfairly suppress the most innovative stakeholder in the band, and undermine technology for innovation and emergency communications..."

Read both the RSGB and the AMSAT-UK responses at <http://rsgb.org/main/blog/spectrum-forum-posts-overview/spectrum-forum-papers-consultations/2016/08/01/5ghz-wi-fi/>

Ofcom propose using Amateur Radio band for Wi-Fi <https://amsat-uk.org/2016/05/13/ofcom-propose-using-ham-radio-band-for-wi-fi/>

CEPT European Common Allocation Table <http://www.erodocdb.dk/Docs/doc98/official/pdf/ERCREP025.PDF>

New Facebook Group



John Lannigan has been pondering his teenage years back in the 70's. In that era, the Russians and the communist bloc were desperate for western currency and the market was flooded with all sorts, much of it electronics, radio's and TV's. Their components were strange and they had a rather unique approach to design.

So, John thought it might be an idea to form a facebook group, that concentrates on WW2 through to the cold war era and look at what was turned out during this time. The group is very new, so please bear with him until membership goes up and the group gets busy....

<https://www.facebook.com/groups/1638604833047616/>

British Amateur Television Club (BATC)

Graham Shirville, G3VZV, has been chosen to be the next president of the British Amateur Television Club (BATC).



Graham Shirville

He succeeds Peter Blakeborough, G3PYB, who died last December.

BATC chairman Noel Matthews, G8GTZ, said he was delighted Graham had agreed to take up the role.

"Graham has the experience and gravitas, is passionate about ATV, and has contacts throughout the amateur radio community. "He will serve the BATC well in the role as president."

The appointment is for two years.

ISS SSTV on Baofeng handheld

The Chertsey Radio Club demonstrated that you can receive pictures from Space using just a Baofeng VHF handheld radio and a Lynx-7 Tablet



On Monday, August 15, 2016 radio amateurs from India to Brazil successfully copied Slow Scan Television images transmitted on 145.800 MHz FM from the Russian amateur radio station located in the ISS Service Module. The Russian Cosmonauts were using a Kenwood TM-D710 transceiver thought to be running about 25 watts output. It gave a good signal which could easily be copied on VHF handheld transceivers such as the popular Baofengs.



The annual ATV/DATV QSO Party is confirmed for Friday evening 23rd September and Saturday 24th September Eastern Australian Standard Time.

As usual we will have a "around VK Friday night" followed by contacts with our friends in the US and UK on Saturday (Friday night 23 rd in the US and Saturday morning 24 th in the UK/Europe)

Art Towslee WA8RMC who is one of the DATV Express designers, will anchor from Columbus Ohio while Don Hill KE6BXT will anchor from Mission Vieja California.

The QSO Party on Saturday will start in the morning and continue into the early afternoon (Eastern Australian Standard Time.) With a break, we will then try some contacts via the UK Repeater GB3HV.

The concept is for stations to operate through their respective repeaters while anchor stations use Skype or other means as the international conduit between repeaters. This will maximise the use of amateur radio. The Melbourne DATV Repeater, VK3RTV will have a stream running via the BATC, but also a SD version on U Tube. This signal can also be used to send to local repeaters. Single international stations are also welcome to participate and should send a Skype contact request to 'datvqsoparty'.

I note by reading the mail in this forum that there may be more repeaters in the US active and possible anchor stations should contact pcossins@bigpond.com to discuss arrangements.

Hope to see you - **Peter VK3BFG**

2016 ARRL/TAPR DCC (Digital Communications Conference)

Mark your calendar and start making plans to attend the premier technical conference of the year, the 35 th Annual ARRL and TAPR Digital Communications Conference to be held September 16-18, 2016. in St Petersburg, FL. The conference location is the Hilton St Petersburg Bayfront

The ARRL and TAPR Digital Communications Conference is an international forum for radio amateurs to meet, publish their work, and present new ideas and techniques. Presenters and attendees will have the opportunity to exchange ideas and learn about recent hardware and software advances, theories, experimental results, and practical applications.

Topics include, but are not limited to: Software Defined Radio (SDR), digital voice (D-Star, P25, Mototrbo, CODEC2, FreeDV), digital satellite communications, Global Position System (GPS), precision timing, Automatic Packet Reporting System(tm)(APRS), short messaging (a mode of APRS),

Digital Signal Processing (DSP), HF digital modes, Internet interoperability with Amateur Radio networks, spread spectrum, IEEE 802.11 and other Part 15 license-exempt systems adaptable for Amateur Radio, using TCP/IP networking over Amateur Radio, mesh and peer to peer wireless networking, emergency and Homeland Defense backup digital communications, using Linux in Amateur Radio, updates on AX.25 and other wireless networking protocols.

2016 ARRL/TAPR Digital Communications Conference

**September 16-18
Saint Petersburg,
Florida**





Make your reservations now for three days of learning and enjoyment at the Hilton Saint Petersburg Bayfront Hotel. The Digital Communications Conference schedule includes technical and introductory forums, demonstrations, a Saturday evening banquet and an in-depth Sunday seminar. This conference is for everyone with an interest in digital communications—beginner to expert.

Call Tucson Amateur Packet Radio at: 972-671-8277, or go online to www.tapr.org/dcc



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DKARS MAGAZINE



In deze uitgave ondermeer:

De DKARS/CAMRAS weak signal dag
Een reactie op een negatief krantenartikel
En weer heel veel meer!

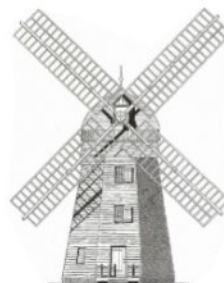
VHF-UHF-SHF Weak Signal dag

17 September bij

CAMRAS

te

Dwingeloo



DKARS

Dutch Kingdom Amateur Radio Society



Prijs / Price € 0,00 / \$ 0,00

Augustus 2016 editie 25

Check out the DKARS website at:-
<http://www.dkars.nl/>

DATV-Express Project - July update report

Ken W6HHC continued to update and clarify the Users Guide for Windows for Currently draft06 of the Users Guide for Windows is available for download from the <http://www.DATV-Express.com> project website on the DOWNLOADs page. Quite a long discussion about setting up vMix Basic (an optional video-mixing tool) occurred on the Yahoo forum for DigitalATV. The DATV-Express Users Guide does not cover set-up and running vMix in detail, since it a free third-party product and there are tons of YouTube tutorial videos describing how to set up and use the vMix product. At the end of this Yahoo forum discussion, Bob WB6KWT was able to successfully run vMix Basic with the DATV-Express v1.11 software. The only problem observed with vMix was that Ken could observe "occasional spectrum analyzer dropouts" within the DVB-S haystack when using his old Intel 3GHz Duo Core DELL notebook.

Interestingly, WB6KWT was not having any dropouts using an Intel 2GHz Duo Core HP notebook. This tells me that vMix with Express_DVB-S_Transmitter may need to run on a reasonably fast computer....and Intel 3GHz Duo Core may be marginal CPU speed. Charles G4GUO suspects Ken's dropouts could be caused by the internal USB architecture/design inside his Dell notebook?

At this time, Charles G4GUO and Art WA8RMC are investigating the possibilities of a second more powerful board creation for DATV, so stay tuned. Nothing has started yet, so it may take a while to produce.

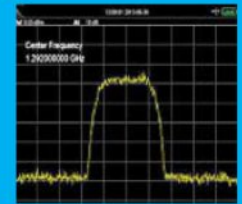
The project plans for the project team during August are to continue to support users of the beta v1.11 software for Windows. There are currently no bugs being reported.

"Project speed set to slow" ...de Ken W6HHC



Digital Amateur TeleVision Exciter/Transmitter

Now available from



DATV-Express

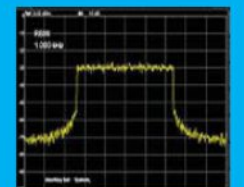


- A more affordable DATV exciter can now be ordered
- Fully assembled and tested PCBA
- DVB-S protocol for DATV (using QPSK modulation)
- Can operate all ham bands from 70 MHz-to-2450 MHz
- RF output level up to 10 dBm (min) all bands (DVB-S)
- Software Defined Radio (SDR) architecture allows many variations of IQ modulations
- "Software-Defined" allows new features to be added over the next few years, without changing the hardware board
- Symbol Rates from 100K to 8000K Symb/sec allows RB-DATV
- Requires PC running Windows or Ubuntu Linux (see User Guide)
- Price is US\$300 + shipping – order using PayPal



For more details and ordering
www.DATV-Express.com

Register on the web site
to be able to see
the PURCHASE page

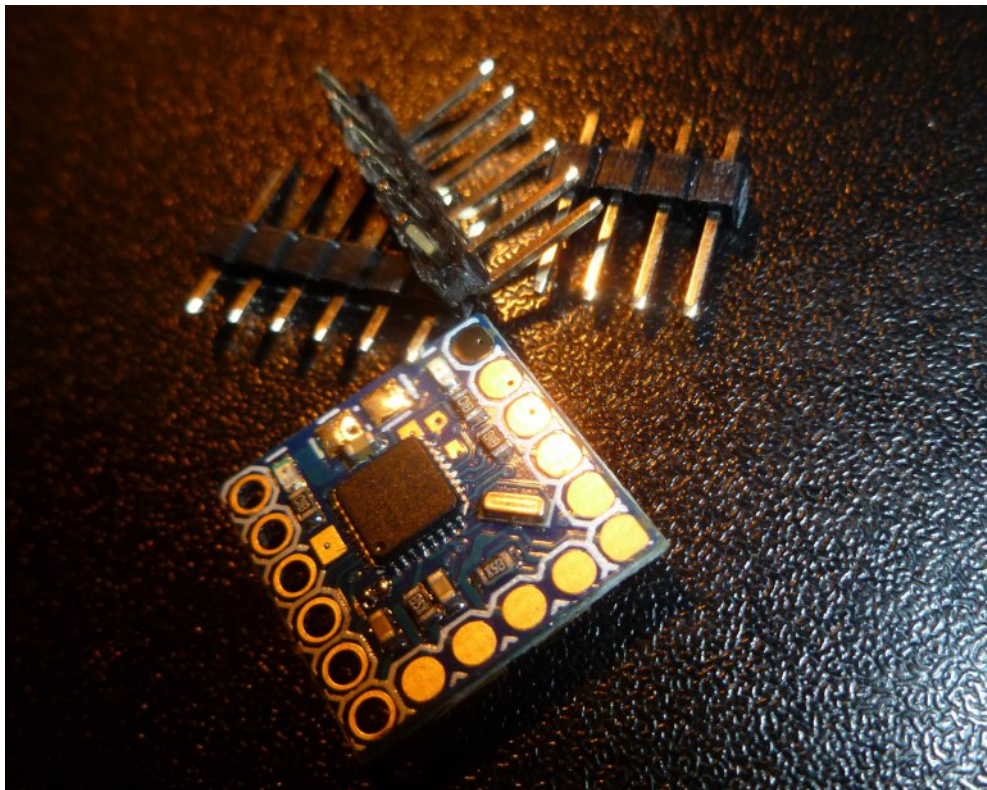


Mini MAX7456 OSD Module Review

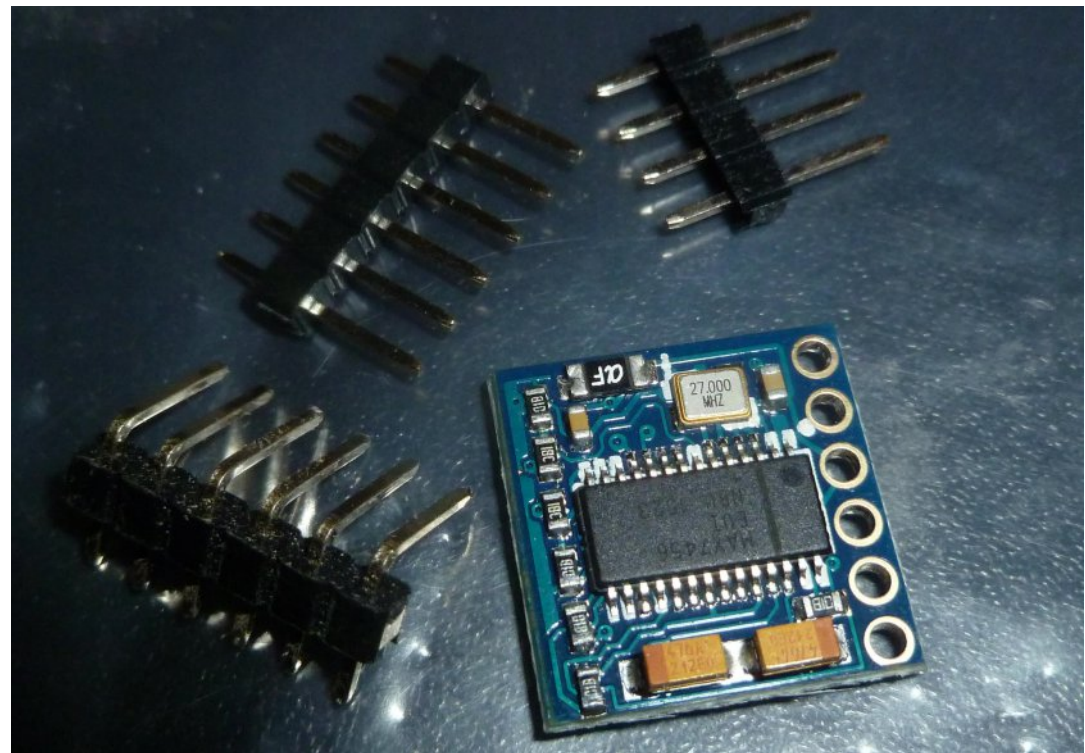
Mike Stevens G7GTN

We have all seen the minim OSD modules based on the MAX7456 chip that were originally intended for the model flying hobbyists, and indeed we had a series of articles on how to modify these to make them more specific to our particular television hobby.

A newer version of this module is currently available from eBay for around £5.16 UK fully shipped. These are incredibly small at 15mm X 15mm in size. They use the same ATMEGA328 processor that the original had, and also include an Arduinio bootloader burnt in to allow software development via a common USB to TTL adaptor.



CPU side



OSD side

Where this newer style of module becomes potentially more interesting is that additional I/O has been pulled out of the processor. In this incarnation this is used to measure battery voltage again relevant to the model aircraft hobbyist in particular. So with very good eyesight and probably a microscope, we can remove these resistors and bridge the pads to get at these additional connections to create some different control schemes of our own.

We were slightly constrained previously only having two available pins in RX & TX of course we used them in other ways instead under the known principle that they are underneath at the processor level just generic I/O pins. The PCB silkscreen names them purely for convention but we can re allocate them in software function with no effort on our part.



Hardware connections

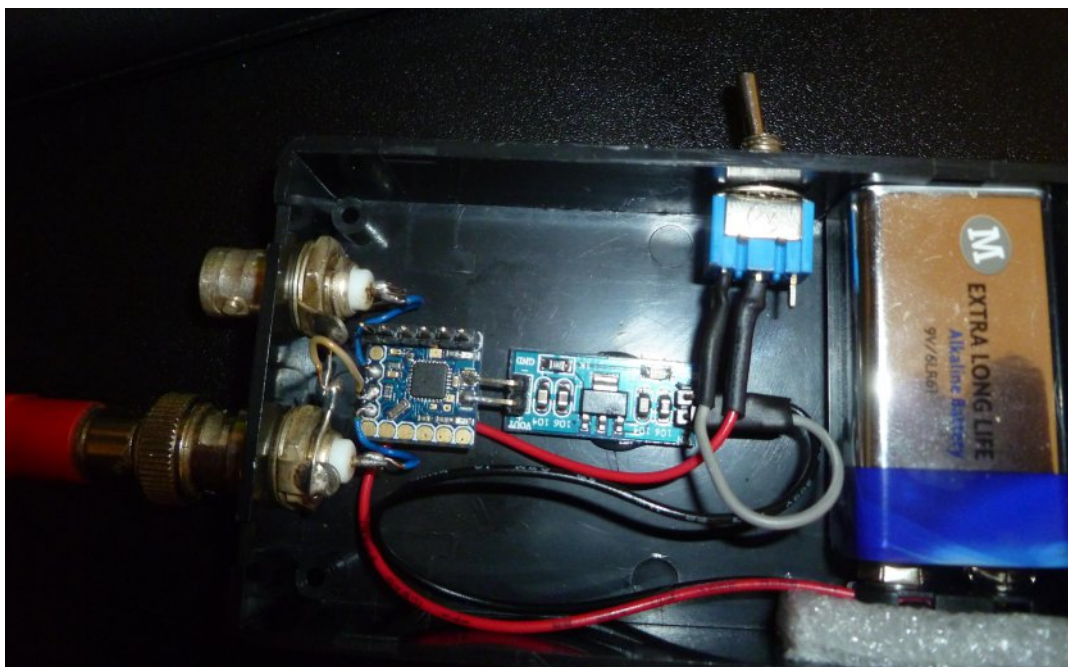
As depicted in Figure 2 we require the video input and output connections. As shown in Figure 3 (next page), I fitted male header pins to allow the connection of the USB to TTL converter. Also shown in Figure 3 is the small +5V power regulator module that I used. As the MAX7456 datasheet warns us the device requires 500mA.



Caption generation software

References

1. Re-flashing the character set CQ-DATV edition 12
<http://www.cq-datv.mobi/12.php>
2. MAX7456 Datasheet
<https://www.sparkfun.com/datasheets/BreakoutBoards/MAX7456.pdf>



Cased unit with additional 800mA 5 volt power supply module (Figure 3)

British Amateur Television Club

The club provides the following for its members:

- ▶ A **colour magazine**, CQ-TV, produced for members in paper or .pdf (cyber membership) formats.
- ▶ **Web site** – where you can find our online shop stocking hard to get components, software downloads for published projects and much more.
- ▶ A **members forum** at www.batc.org.uk/forum/ for help, information and the interchange of ideas.
- ▶ A **video streaming facility** at www.batc.tv which enables repeaters and individual members to be seen worldwide.
- ▶ An **annual Convention** held in the UK where you can meet other members, visit demonstrations and listen to lectures.
- ▶ **Meet other club members** at the BATC stand at local rallies across the country.

www.batc.org.uk

Summer 2016

Volume 29-No 3

ISSN 1042-198X

USPS 003-353

SINGLE ISSUE

\$7.00 USA

\$8.00 CANADA

\$10.00 ELSEWHERE

Amateur Television Quarterly

Dayton Hamvention 2016 ATV Activities

Adding DVB-T to your ATV Repeater

N7ZEV Mt. Potosi ATV Repeater Work Party

HiDes HV-120 DVB-T Receiver Evaluation

DownEast M/W L432LNA Kit

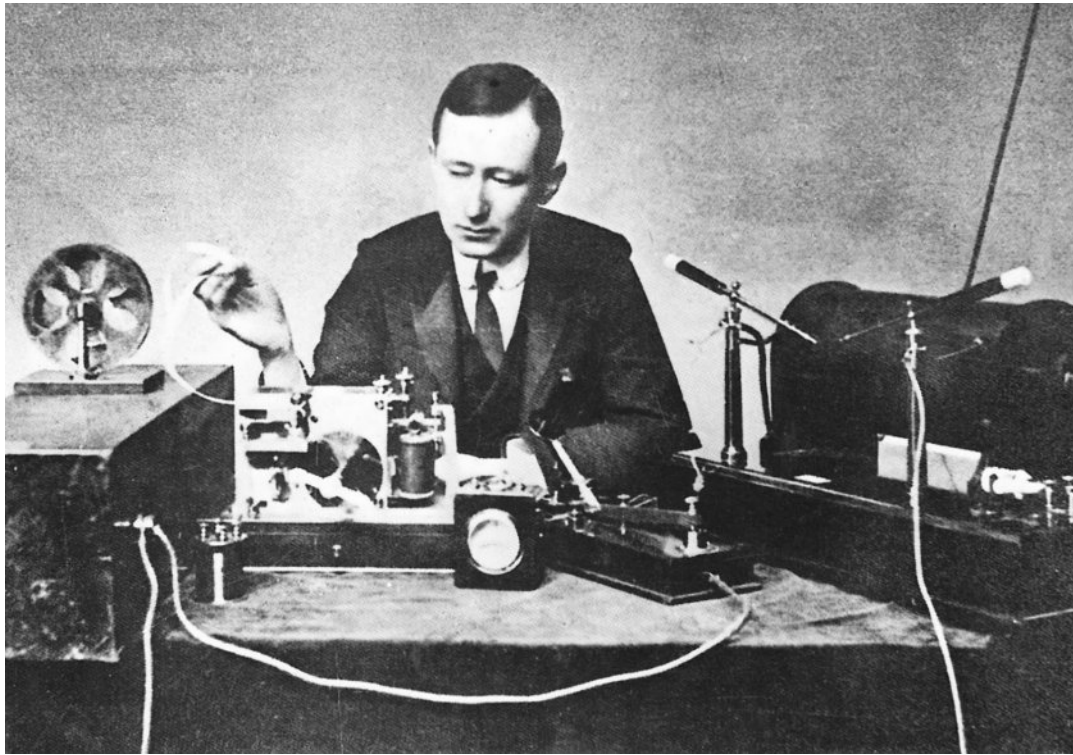
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Published by ATV Quarterly tel (909) 338-6887
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The Marconi Story

By John Hudson G3RFL



Hertz died in 1894 and later the same year Sir Oliver Lodge, a British scientist, gave a lecture in his memory. He demonstrated some of Herz's experiments and showed that the wireless waves could even pass through stone walls.

From then onwards, inventors and scientists tried to find ways of using these electrical waves to send or transmit wireless messages in the dots and dashes of the Morse Code.

One of them was a young Italian called Guglielmo (William) Marconi. He was able to send waves thirty feet across his room to make an electric spark hump across a gap. Next he used wireless waves to ring a bell in another room.

Marconi was then ready to try his experiments outside, to discover whether the electrical waves could carry a signal a long distances. He found his results were better when he placed his equipment higher. So he placed his apparatus to receive the signal, the receiver, on a hill at the bottom of his father's garden at the Villa Grifone at Pontecchio in Italy.

Here he put up the first wireless aerial mast with help of two broomsticks (sounds familiar to Ham's). Marconi tapped out a message on his transmitter in the house, and his brother waved a flag to signal he had received the message on the receiver. By 1895 Marconi had transmitted electrical waves a distance of one and half miles.

The following year he came to London to get help, There he met William Preece, the Chief Engineer of the Post Office. Marconi was invited to set up his apparatus on the roof of the G.P.O. at St. Martin's-le-Grand. From there he sent signals to a receiver on the top of another building, a few hundred yards away. The Post Office decided to help Marconi and he was invited to carry out tests on Salisbury Plain. There he transmitted messages one and a half miles in front of the Navy, Army and Post Office officials.

At the same site in March 1897, Marconi sent signals four and a half miles using kites. Two months later, however, Marconi flashed his signal using Morse Code from Lavernock Point near Penarth in South Wales to the island of Flat Holm in the Bristol Channel, three and a half miles across water. Later, signals were sent as far as Brean Down, in Somerset, nearly nine miles away.

The Wireless Telegraph and Signal Company in 1897 was set up to develop his work. The first wireless station in the world was built at Alum Bay near the Needles, on the Isle of Wight. Broadcasts were made to a small steamer going along the south coast at distances of up to 18 miles.

Then a few months later a second station was opened up at Bournemouth and signals sent between the two. This was known as the Marconi-gram June 3rd 1898. Later that year the second station was moved to Haven Hotel at Poole.

In 1900 the Company name was changed to "Marconi Wireless Telegraph Company Ltd." The next was to try across the Atlantic and required to go two thousand miles from Poldhu in Cornwall and his transmitter had to be one hundred times more powerful than he had previously made.

Marconi himself, his two assistants, Kemp and Paget, set off for St. John's, Newfoundland. The letter "S" was sent at regular intervals from Poldhu and on Dec 12th, 1901, the signal was faintly heard on the other side of the Atlantic.

A year later the signals went the other way so that now signals had gone both ways.

Later, ship to shore communications came about using the S.S. Philadelphia up to two thousand miles away.

Next, in 1904 Ambrose Fleming, who helped Marconi on several occasions, invented the wireless valve. Two years later, Lee de Forest added a mesh called a grid the first triode valve.

In 1910, wireless helped to arrest a murderer called Crippen on the Liner Montrose.....G3RFL

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Nr. 181
48. Jahrgang
2. Quartal 2016
EUR 6,- SFR 6,50 USD 8,-

Zeitschrift für Bild- und digitale Daten-Übertragung im Amateurfunk

Die AGAF auf der HAM RADIO 2016 in Friedrichshafen:
Vorträge im Forum »Digitales Amateurfunkfernsehen« → Seite 3



Aus dem Inhalt: Einladung und Tagesordnung zur AGAF-Mitgliederversammlung in Friedrichshafen • Internationale DATV-Vorträge auf der HAM RADIO 2016 • Bericht vom Norddeutschen ATV-Treffen 2016 in Glövin • ARISS-Erfahrungen mit HamTV • Neues Schmalband-DVB-S/S2-Receiver-Konzept



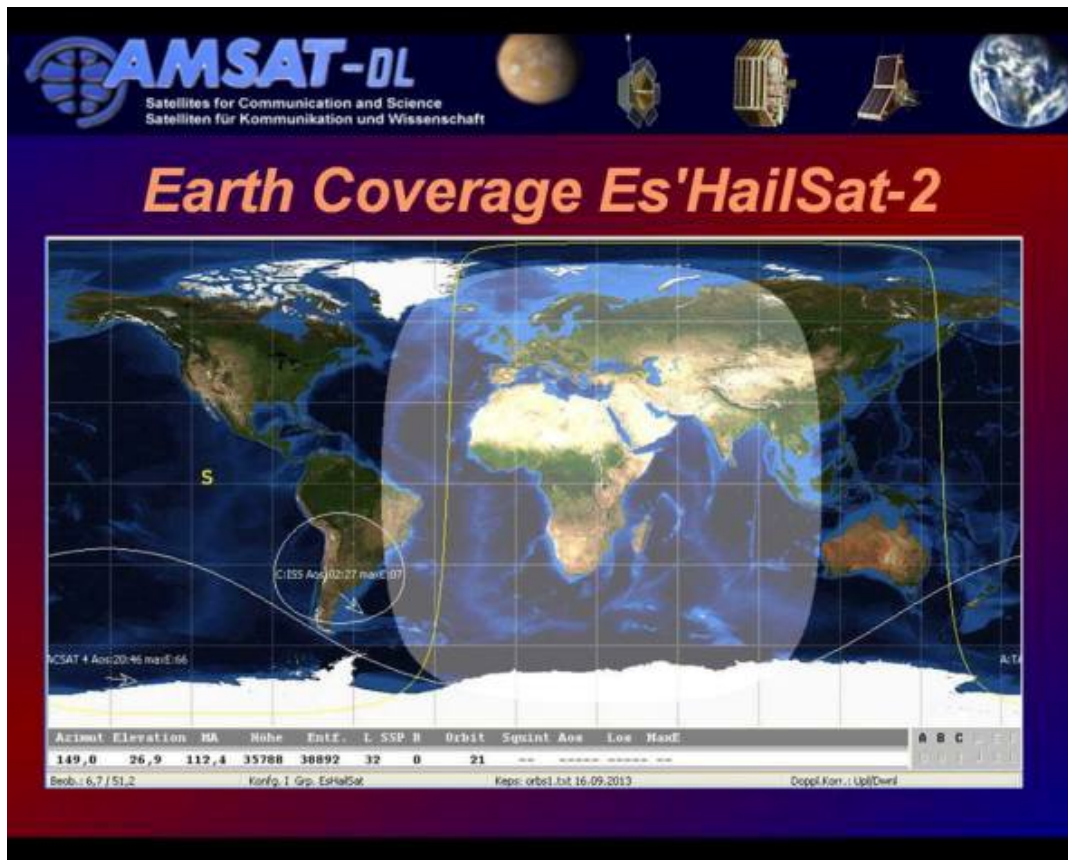
TV Amateur is a German Language ATV Magazine It is published 4 times a year and if you would like to subscribe go to <http://www.agaf.de/>

Es'Hail-2 Geostationary P4-A Transponder Frequencies

The launch of the Es'Hail-2 satellite into a geostationary orbit at 25.5 degrees East was planned for December 2016, but has been put back to the third quarter of 2017! The coverage area of the amateur radio Narrowband (NB) and Wideband (WB) transponders should extend from Brazil to Thailand.

Es'hail 2 will carry two "Phase 4" amateur radio non-inverting transponders operating in the 2400 MHz and 10450 MHz bands.

Es'hail-2 coverage area



A 250 kHz bandwidth linear transponder intended for conventional analogue operations and an 8 MHz bandwidth transponder for experimental digital modulation schemes and DVB amateur television.

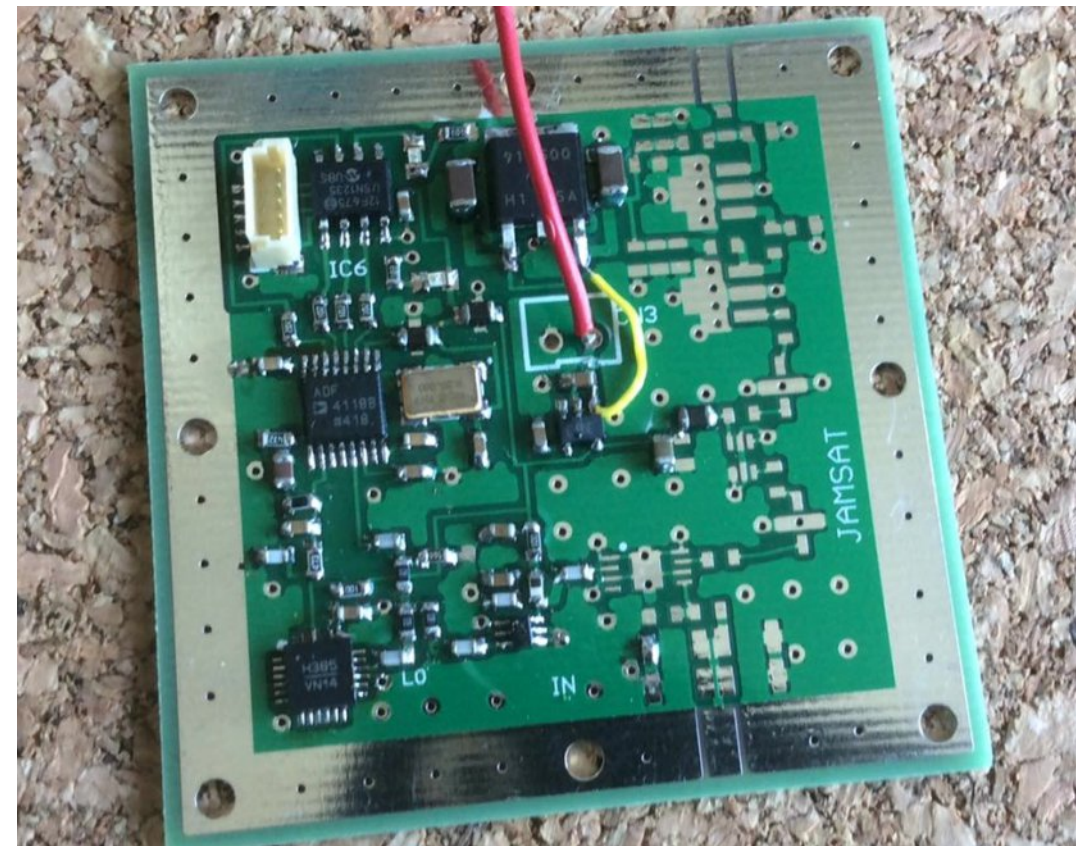
Narrowband Linear transponder

- 2400.050 - 2400.300 MHz Uplink
- 10489.550 - 10489.800 MHz Downlink

Wideband digital transponder

- 2401.500 - 2409.500 MHz Uplink
- 10491.000 - 10499.000 MHz Downlink

Phase-4A GeoSat S mode uplink converter developed by JH1CEP Assembled power line and local oscillator by JA1OGZ



Equipment requirements:

X-Band 10 GHz Downlink:

- 89 cm dishes in rainy areas at EOC like Brazil or Thailand
- 60 cm around coverage peak
- 75 cm dishes at peak -2dB
- NB: linear vertical polarisation
- WB: linear horizontal polarisation

S-Band 2.4 GHz NB-Uplink:

- narrow band modes like SSB, CW
- 5W nominal Uplink power (22.5 dBi antenna gain, 75cm dish)
- RHCP polarisation

S-Band 2.4 GHz WB-Uplink (DATV):

- wide band modes, DVB-S2
- peak EIRP of 53 dBW (2.4m dish and 100W) required
- RHCP polarisation

Presentation on Es'hail by Peter Guelzow DB2OS, President of AMSAT-DL, at the 2013 AMSAT-UK Colloquium

<http://www.batc.tv/streams/amsat1306>

Source: AMSAT UK [https://amsat-](https://amsat-uk.org/satellites/geosynchronous/eshail-2/)

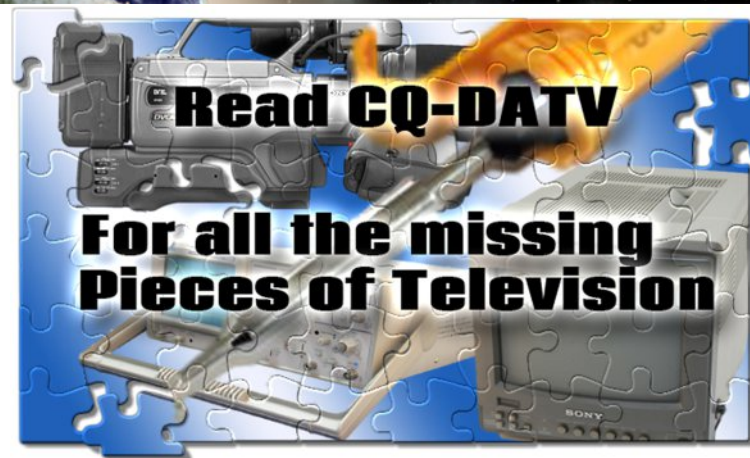
[uk.org/satellites/geosynchronous/eshail-2/](https://amsat-uk.org/satellites/geosynchronous/eshail-2/)

The now scheduled launch in Q3 2017, of this high-powered, advanced satellite will further boost broadband delivery, broadcasting and global connectivity in Qatar, the entire region and beyond.

Es'hail-2 will also provide the first Radio Amateur Satellite Corporation (AMSAT) geostationary communication capability that connects users across the visible globe in one single hop and in real-time.

It will allow also the AMSAT community to validate and demonstrate their DVB standard.

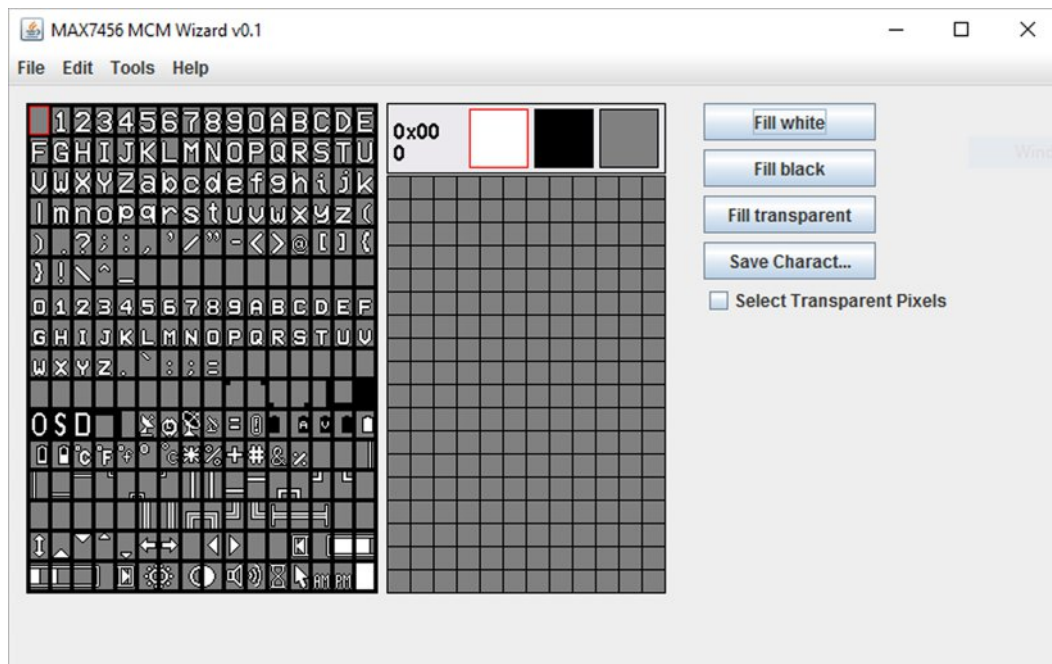
Source: <https://www.eshailsat.qa/en/satellites/index/#>



MAX7456 OSD Font Editing

Mike G7GTN

With the MAXIM MAX7456 based modules we have the ability to download custom font sets that can comprise individual characters alongside what would constitute standard alpha and numeric symbols. Once these individual characters are placed together in the correct sequence we can for example create a custom on screen logo to add on top of our video transmissions.



(Figure1) Java Based Font Editing Application

Software as always neatly comes to the rescue

Whilst we could technically edit the MCM font file manually, this would be making very hard work of doing so. Happily a very nice Java based application surfaced on the internet around 2010 being written by Daniel Mueller for this exact purpose.

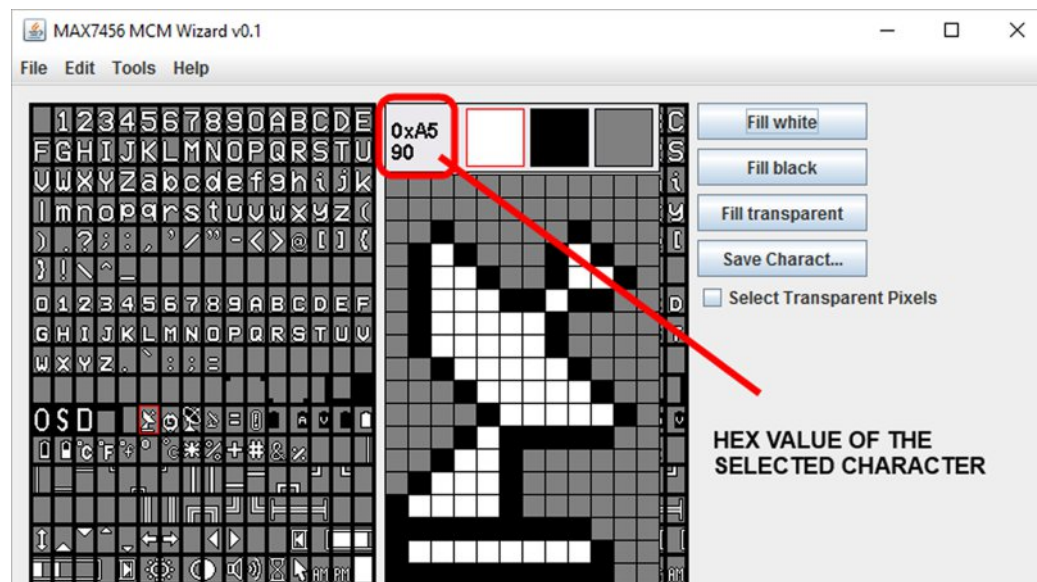
Another option is to register at the Maxim Semiconductor website and download the application tool they created, but this unfortunately is only for the Windows platform.

Mapping the characters

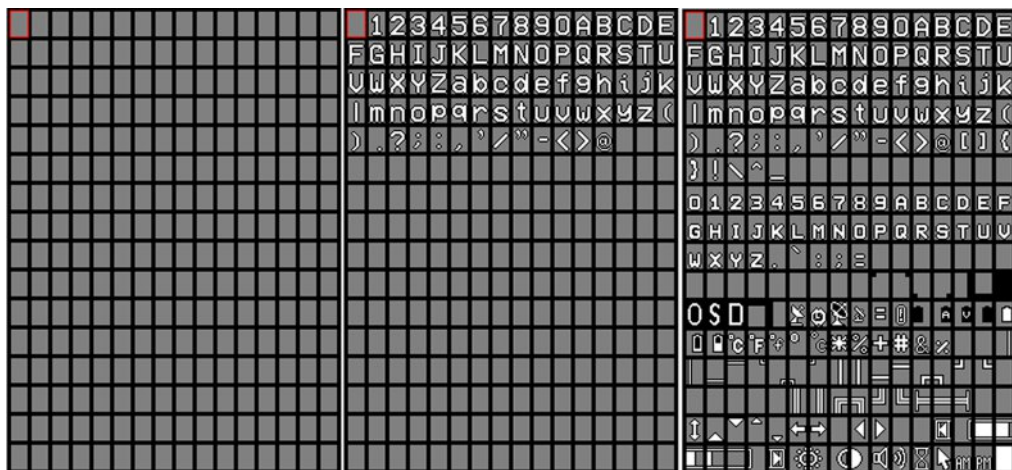
Each (12 X 18) character is formed on a grid each one having a unique hexadecimal value as shown in Figure2 we can use this information to display a character that does not fall within the ASCII range and hence being mapped to a key on our keyboard. Within our caption code is a small function named `small_Caption()` that we feed in these values taken from the font editing software. Since these values are hexadecimal we always prefix this digit with a zero. So as an example to get the dish icon the entry would be

```
printMax7456Char(0xA5,2,3,0,0); // DISH ICON
```

Firstly we point to the required character along with the X & Y location, the last two digits control if this character is to be inverted or blinking.



(Figure2) Character set hex values



(Figure3) Fully Blanked characters, Partial and Full characters

The font sets shown in Figure3 are available as a download along with the mentioned Java application for you to edit your own creations. The file is obtained from the usual CQ-DATV magazine [download page](https://www.maximintegrated.com/en/app-notes/index.mvp/id/4117) as fontedit.rar

References

<https://www.maximintegrated.com/en/app-notes/index.mvp/id/4117>

CRANKY OLD MAN

When an old man died in the geriatric ward of a nursing home in an Australian country town, it was believed that he had nothing left of any value. Later, when the nurses were going through his meager possessions, they found this poem.

Its quality and content so impressed the staff that copies were made and distributed to every nurse in the hospital. And this old man, with nothing left to give to the world, is now the author of this 'anonymous' poem winging across the Internet.

Cranky Old Man

What do you see nurses?
What do you see?
What are you thinking

A cranky old man, not very
wise,

Uncertain of habit
with faraway eyes?
Who dribbles his food
and makes no reply.

When you say in a loud
voice
'I do wish you'd try'

Who seems not to notice
the things that you do.
And forever is losing
A sock or shoe?

Who, resisting or not
lets you do as you will,
With bathing and feeding
The long day to fill?

Is that what you're
thinking?
Is that what you see?

Then open your eyes, nurse
you're not looking at me.
I'll tell you who I am
As I sit here so still,
As I do at your bidding,
as I eat at your will.

I'm a small child of Ten
with a father and mother,
brothers and sisters
who love one another.

A young boy of Sixteen
with wings on his feet,
Dreaming that soon now
a lover he'll meet.

A groom soon at Twenty
my heart gives a leap.
Remembering the vows
that I promised to keep.

At Twenty-Five, now
I have young of my own,
Who need me to guide
And a secure happy home.

A man of Thirty
My young now grown fast,
Bound to each other
With ties that should last.

At Forty, my young sons
have grown and are gone,
But my woman is beside
me to see I don't mourn.

At Fifty, once more
Babies play 'round my
knee.

Again, we know children
My loved one and me.

....Continued page 23

Lancelot the link truck

By Scott Richardson



My ATV truck and it has a name 'Lancie the link truck' named after Lancelot

Jenny (my wife) screamed "NO"! She said it would be a waste of money but I wanted an extreme DATV machine.

In 2000 the Seven Network Australia wanted to replace their aging fleet of link trucks with the ultimate News gathering vehicle, they contacted 'Custom Mobile Products' from Ohio to build 7 Chevy Suburban link trucks. The suburban's were going to have everything, the tallest masts, the longest cables and the best communications. For fifteen years these link trucks dominated news-gathering in Australia and covered all the big stories and events.

(img,, alt: link2 src: ../Images/link2.png)

Because we use right-hand drive vehicles in Australia 'Custom Mobile Products' had to travel to Australia to build the trucks because they could only source left-hand drive vehicles in the USA.

Another major difference is Australia uses PAL and the USA is NTSC, this caused some technical changes. All the equipment was freighted and the engineers flew to Australia, the vehicles were all built at the Sydney studios in Epping. The build took on average 12 weeks each, the wiring looms taking the most time.

Specifications

- 1999 Chevy Suburban 1200
- 3.5 tonnes
- 351 cu inch engine
- Four speed automatic transmission
- 3x batteries (one for the engine and two for the rack)



The interior of Lancie in it broadcast days

- 17 metre Will-Burt pneumatic mast
- 90 metre multi-core cable on a reel with electric rewind.
- Eight input router, analogue and SDI
- 2x 6" CRT monitors
- Radiowaves dish with 33DB gain
- D-Tec, mast collision detector
- Uplink cone for transmission to the helicopter
- 5000 watt inverter, driven from the engine and Auregen 120 volt generator with 240 volt step up transformer mounted behind the drivers seat.

After fifteen tough years of service these trucks were retired and replaced with new vehicles, many of the old vehicles went to scrap and I was lucky to get my hands on the last one only weeks after it finished active duty. The truck I purchased was called 'NewsCrusier Two' or 'News Two'.

After a new gearbox and brakes I started to strip most of the analogue gear from the truck and I began to fit it out with digital transmitter and the new number plates "02GHZ", all the 'techo' people understand.

When the link trucks were being decommissioned most of the components were removed to be installed in the new link trucks. Seven had removed the power supply and switching so I had to rebuild the unit with limited information, luckily the Seven engineers had left a few drawings behind that gave just enough information with a little trial and error to rebuild the power supply.

With the power restored I needed to make the dish pan and tilt. The first problem was the 'quick-set' dish would'nt move, the pan and tilt motors brushes needed to be replaced.

Yes I kept the pump up mast, and I did not need Johns Rotator solution, it now has an dish for the 2Ghz amateur band



Replacing the brushes was very tricky but after several attempts I managed to get the dish panning and tilting, I still have work to do. I think it had a 'stow' button to park the dish for transport, I didn't know how to get the dish to stow in the park position. I stow the dish manually at the moment.

I had some surplus equipment in the shack and I began the to install it. I don't have any shelter at home so work was only done in favourable weather; I avoided working in the middle of the summer days when the temperature would regularly be over 40 degrees Celsius (104 Fahrenheit). The truck is now operational with HD-SDI with embedded audio and has a 4K eight camera switcher with multi viewer, HD H264 2GHz transmitter and loads of comms.

Present specs

- *1999 Chevy Suburban 1500*
- *3.5 tonnes*
- *351 cu inch engine*
- *Four speed automatic transmission*
- *3x batteries (one for the engine and two for the rack)*
- *Xxx metre Will-burt pneumatic mast*
- *Xxx metre multicore cable on a reel with electric rewind.*
- *Xx dish with xxDB gain*
- *D-Tec, mast collision detector*
- *Omni-directional 2GHz antenna*
- *5000 watt inverter, driven from the engine and Auregen 120 volt generator with 240 volt step up transformer*
- *4K eight input switcher with audio follow vision and embedded audio.*
- *19" HD Sony LCD monitor with outputs from the multi-viewer and patch panel.*
- *HD SSD recorder/player.*

- *HD XDCAM disc recorder/player.*
- *Xx" Preview LCD monitor*
- *Xx" Program LCD monitor*
- *SDI patch field*
- *H264 HD 2GHz Tx*
- *H264 Diversity Rx*
- *Mpeg2 SD Rx*
- *Mpeg2 SD Tx*
- *2x IFB channels*
- *2x iPhones*
- *2x UHF IFB transmitters*
- *UHF repeater*
- *5000 watt inverter*
- *1200 watt inverter*
- *12 watt 2GHz PA (power amp)*
- *LCD Off-air monitor*
- *2metre and 70cm radios.*

I built the H.264 HD transmitter from components from SR-Systems. It was hard to build the transmitter without a receiver or test gear so I got an old analogue 2GHz receiver and fed the 70MHz IF output into a DVB-T set-top box that was tuned to 70MHz, then I tried to get Tx to work.

It wasn't too difficult to find the right settings, it's a great feeling when you finally work out the last piece in the puzzle. Garry Nosworthy helped modify an old mast-top PA (power amp) I sourced from another TV network to work a few hundred MHz lower in the amateur band, the PA was mounted on the top of the mast (to overcome loss in the coax) it is capable of 12 watts from 100Mw drive, the output of the PA is fed into the xxx db gain dish. The dish is mounted to a quickset pan and tilt head that is used to optimise the signal.

Garry also had the gear to sweep the dish on the truck and it was just in band for the 2GHz amateur band.

The top of the mast has a lot of hardware. A QuickSet head, UHF antenna, free to air TV antenna, an omnidirectional 2GHz antenna and the xxx dish. There is a coax relay that is used to switch the power amps output between the omni and dish.

The next step is to have HD wireless connection between the cameras and the truck. I am presently building a H.264 diversity receiver and a 100Mw camera back transmitter to allow the cameras to send their vision wirelessly to the truck. First results are impressive, although I have a lot of latency.

The link truck is known as 'Lancie' or "Lancie the link truck", the full name is 'Lancelot Link'. The truck was named after 'Lancelot Link Secret Chimp' from the '70's TV series about a talking chimpanzee (check out the show on YouTube). I've put vinyl stickers on the dish and the back of truck, some people see what the connection is. The colour bars are now called 'Monkey Bars'. Jenny has changed her opinion of Lancie and she's driven him on the road.

I think I have built the ultimate DATV vehicle and 'Lancie' would perform well against any of the TV network trucks.

Who knew that they had snow in Australia!

**Not only do we have snow, we have ski resorts too!
(PDF Ed)**



First-Hand: My Ten Years at Ampex and the Development of the Video Recorder

By Fred Pfost

*This article was first published in the
[Engineering and Technology History Wiki](#)*

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When our videotape recorder was first being used in the field for time shifting to accommodate the various time zones in the USA it became obvious that programs needed to be edited before broadcast just as audio tapes were edited extensively from their first use in radio broadcasting. (At first, audiotapes were cut apart with a razor blade and reassembled in a sequence desired by the director using splicing tape to join the two pieces of tape.) But just how to edit a videotape presented a problem. In order to cut and splice video tape the cut had to be made between two appropriate head tracks (a space of 0.005 inch) and that cut had to be where a vertical blanking signal was located or the resulting picture would be partially of one picture field and partially of another field. (Also because the horizontal pulses would not be timed properly, the picture would "roll," spoken of as a "glitch"). In order to be able to see where the recorded tracks were located we found that a solution of a volatile liquid (e.g. turpentine) with a little powdered iron (called carbonyl iron) evenly dispersed in it and spread thinly over the recorded tracks would allow the iron particles to be attracted to the magnetically recorded tracks on the tape. These tracks were then plainly visible.

Now in order to find the proper track containing the vertical sync pulse we recorded a short, magnetic pulse on the control track at the location of the video track that held the vertical sync signal. With a razor blade and a straight edge and a sharp eye it was possible to make the cut.

This sounds difficult (or impossible) but this was the method used for years by the industry to edit tapes. Later, we found that powdered stainless steel (instead of carbonyl iron) gave a much brighter indication of the track locations. And, even later, a proprietary material called Ferrofluid made the tracks stand out exceedingly well.

The reason I bring up this whole complicated subject is that I was ask to develop an instrument to automate this splicing activity. I made a transport mechanism onto which one could clamp two lengths of two-inch recorded videotapes that were to be spliced together. (Fig 26).

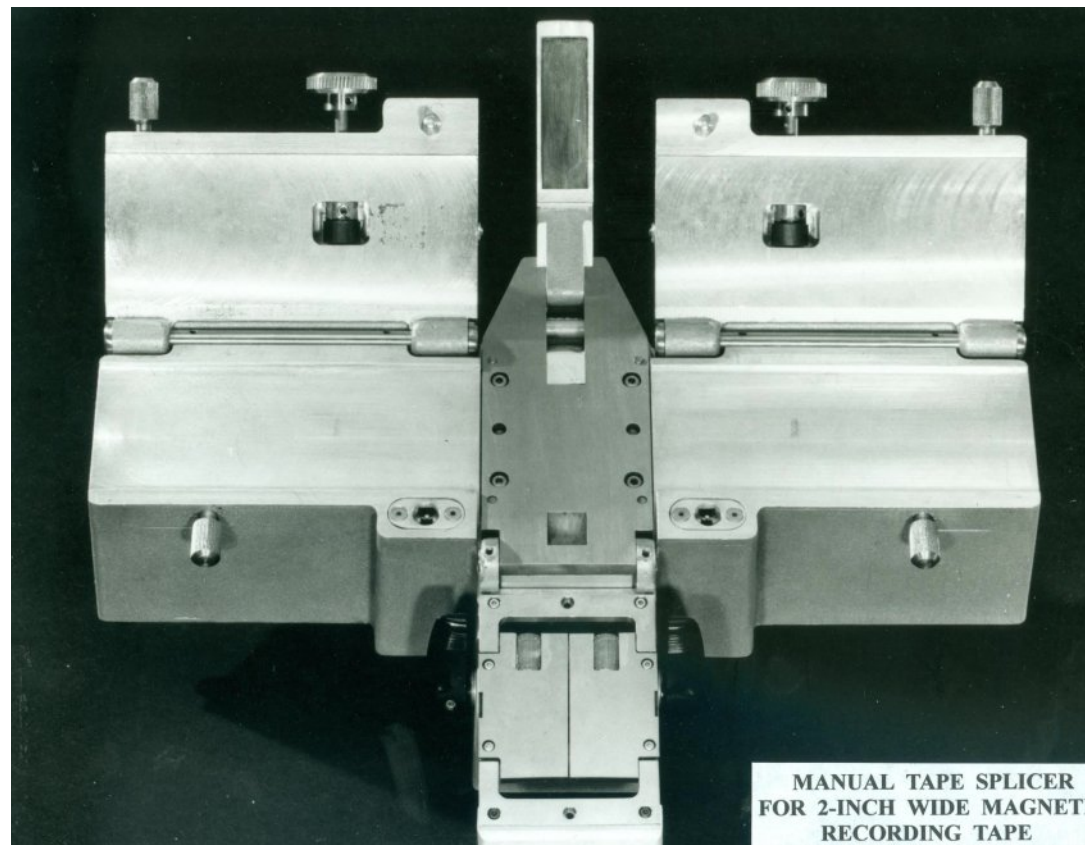


Fig. 26 - Manual tape splicer for the 2-inch wide magnetic recording tape, designed by Fred Pfost

(Presumably, these two pieces had been cut at approximately the proper place with respect to the program material). One would cause a slight overlap of the two tape ends at the center of the device and then rotate the two adjustment knobs, one on each end, while observing each electrical meter, one for each tape end, for a maximum output. This indicated that a control track sync pulse was in the right place to make the cut. Then one would rotate the "guillotine" blade to cut the two ends simultaneously in the right position. Next one would pull a lever that brought splicing tape over the cut to gently join the two tapes together at exactly the proper place. In the process of this development I had to develop two flux-sensitive heads to read the stationary tapes tracks.

This device worked extremely well and was very easy to use. However, at about that same time, an all-electronic splicing technique was perfected at Ampex wherein two recorders were used: one to play the first program material and the other to read the second program that was to be inserted into the first. At the proper time the system stopped playing the first program while it recorded on that first tape the information from the second tape. This worked very well and put my splicer on the shelf forever. Therefore it was never produced by manufacturing.

Three interesting sidelight items are as follows: Dale Dolby designed every videotape recorder transport that Ampex made, except for the original Mark III and Mark IV, including the digital recorders in the later years at Ampex.

Before the Video Project started in 1951 the Ampex marketing department made a short-term prediction of the number of recorders it would take to saturate the American market. The number was 5. When the manufacturing of quad recorders finally came to an end, twenty-some years later, the total number manufactured was 15,000 and the number of head assemblies was 50,000.

Of course, this included the overseas sales and also Mexico. The reason for this large number of head assemblies was in order to have one head assembly on the recorder and one backup unit on the shelf and one unit back at the factory being renovated after some part (usually the video heads or the bearings) needed replacement.

In the summer in 1955 Ampex and the San Francisco Symphony Orchestra put on a fantastic program to demonstrate the quality of audio recording instruments of the day. Three very high-quality loud speakers were placed across the stage at the S. F. Memorial Opera House. A model 350 Ampex 3-track tape recorder had previously recorded an orchestral presentation of Mozart's Marriage of Figaro in the opera house. The orchestra assembled on stage and proceeded to play that selection. Halfway through the presentation the members of the orchestra started laying their instruments down until no one held an instrument. Yet, the same music continued to emanate from the stage. It suddenly became clear that none of the music had been generated by the orchestra but was emanating from the loud speakers on the stage. The quality was indistinguishable from the "real thing." Similar demonstrations were repeated over and over where one instrument would play a stanza while being recorded and then it would be reproduced by the audio recording setup.

There was no indication of quality difference at any time until there was an effort to reproduce the timpani. During the reproduction effort suddenly, there was an explosion above one of the loud speakers with accompanying smoke. The announcer then admitted that there were still some limits as to the ability to reproduce sounds.

During this entire program Ross Snider, "the voice of Ampex," was announcing the procedures. Next to him on the floor was lying a small Samsonite suitcase with it's lid open and speaker facing the ceiling.

Remarkably, this was "my" little amplifier/speaker that George Brettell and I had developed the year before. It - with its 10-watt amplifier and 8-inch speaker - was filling that entire opera house with the loud, clear sound of his voice.

I will add other subjects to this paper as time goes by.

Some of these subjects will include:

- *a demonstration I made for the Board of Directors to convince them of the amazing effects of stereo sound. (about 1952)*
- *the 5-channel system I put together for the recording of the movie "Oklahoma." (probably sometime in 1953)*
- *helping George Brettell with the creation of the famous "Ampex Listening Room."*
- *a remarkably bad demonstration of the video recorder I made in Los Angeles at a TV advertisers convention in the summer of 1956.*



In my home, 2012, holding the 1957 Emmy given to Ampex for the VR 1000 Video Recorder

Continued from page 16

Dark days are upon me
My wife is now dead.

I look at the future
I shudder with dread.

For my young are all
rearing young of their own.
And I think of the years
And the love that I've
known.

I'm now an old man
and nature is cruel.
It's jest to make old age
look like a fool.

The body, it crumbles
grace and vigor depart.
There is now a stone
where I once had a heart.

But inside this old carcass
A young man still dwells,
And now and again
my battered heart swells.

I remember the joys
I remember the pain.
And I'm loving and living
life over again.

I think of the years, all too
few gone too fast.
And accept the stark fact
that nothing can last.

So open your eyes, people
open and see.

Not a cranky old man,

Look closer, See ME!

Remember this poem when
you next meet an older
person who you might
brush aside without looking
at the young soul within.

We will all, one day, be
there, too!

Re-published from the
August 2014 Smoke
Signals, official journal
of the Central Coast
Amateur Radio Club,
Gosford,
New South Wales,
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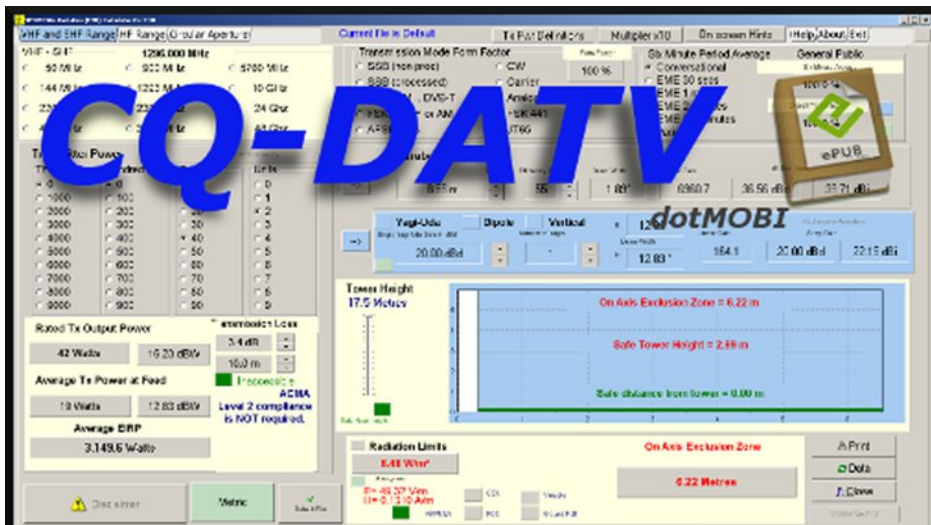
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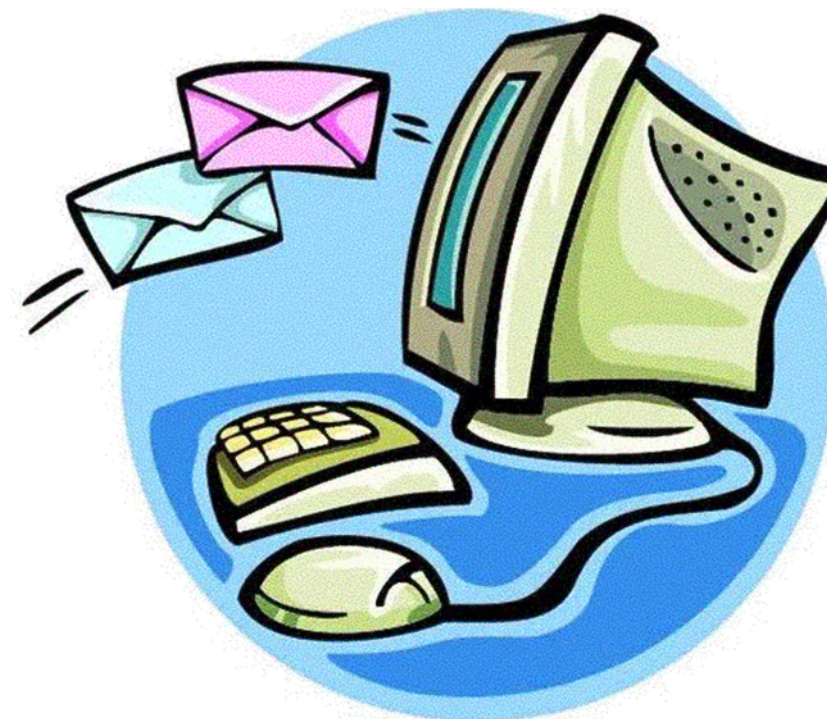
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Issue 40 - October 2016



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