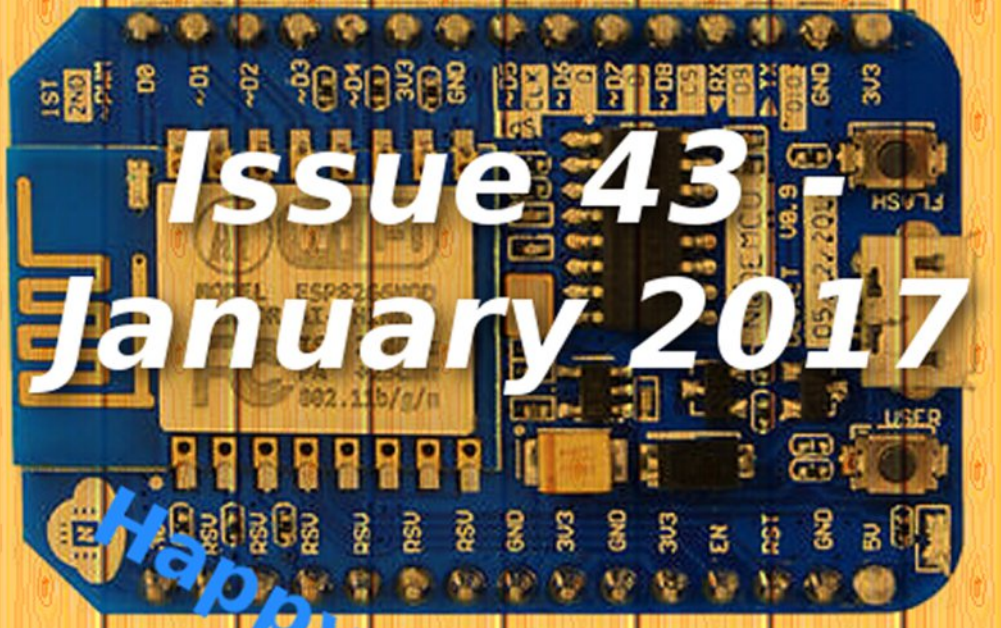
CQ-DATV

dotMOBI



Issue 43 - January 2017

Happy New Year!!!

http://cq-datv.mobi

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In this issue

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Editorial

Welcome to CQ-DATV 43. This issue marks the start of our 4th year of publishing a free electronic magazine. We produced issue 1 in February 2013 and we started by publishing on alternate months. By August we had taken the leap to a monthly publication.

Problems have come and gone. One that persisted was download problems, not often, but even if it was only one of our readers, with a slow internet that timed out, it is one too many.

We have taken steps to provide alternative ways of downloading your magazine. One is to read it on line at ISSUU (*https://issuu.com/cq-datv*). The other is to visit our Facebook page where CQ-DATV and the previous 12 issues are stored there. We will add issue 43 as soon as possible. Can we ask you to use this option only if the other two options are not practical as we do like to keep track of how many of you download our magazine and where you are in the world. You will have to be a member of Facebook to use option 3, but your numbers keep growing and you are always welcome to our page.

When we are not solving distribution problems, the team is doing what it does best, producing the largest circulating ATV magazine. This time we have added a new column called Micro Corner, where we will be looking at Micro's with a focus on television applications.

This was Mike G7GTN's brain child although we have noticed in this first official launch, Mike has dodged the bullet and it seems to have embedded itself in Trevor's Desk! Joking apart, Mike and Trevor seem to have joined forces to launch the column and introduce a very small, inexpensive, Micro Controller that comes equipped with WI- FI, and can be flashed with a resident ESP BASIC and retails at under £3.

Ken W6HCC has been looking at vMix software. For those that have never tried it there are various levels, starting with a free download and the results are really incredible, but let's not steel Kens glory! Read on and let Ken take you through one of the best TV products to ever come out of Australia, with the exception of CQ-DATV PDF, which is put together on the same continent by Terry VK5TM.

Staying with Australia, Richard VK4XRL has produced part 3 of his home made vision switcher. Something that has gone down well with all our home constructors.

From a different part of the world Klaus DL4KCK has written up a translation of what is happening in the AGAF German Language magazine TV for Amateurs.

So please, enough of us sit, back and enjoy CQ-DATV 43 and we hope to see you on our Facebook site

https://www.facebook.com/groups/285807174898375/

CQ-DATV Production team

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Like us on Facebook

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.

18th Anniversary of Mir Space Station SSTV

Monday, December 12, 2016, marked the 18th anniversary of the activation of the MIR SSTV Amateur Radio developed System which was transported and put aboard the MIR Space Station

The MIR SSTV System sent pictures over a period of about 2 years and 4 months to the delight of Amateur Radio Operators and others worldwide. (Mir was deorbited in March, 2001).

For those interested in this historical event and background, the publication Amateur Television Quarterly (ATVQ), Spring 2015 issue has an article, "How Did the MIR SSTV System come into Existence"?

Back issue copies of ATVQ containing this article are available via *WA6SVT@aol.com*. See also web address: *www.ATVQuarterly.com*.

A small sampling of perhaps thousands of received pictures may be found in web sites:

http://www.marexmg.org/marexmirweb/fileshtml/galleryimagepage1.htm

http://www.qsl.net/dg7ro/afu/mirsstv.htm

Background information and initial efforts on developing the MIR System and early efforts to provide SSTV for the ISS may be reviewed at:

http://www.marexmg.org/fileshtml/sponsorspeople.htm

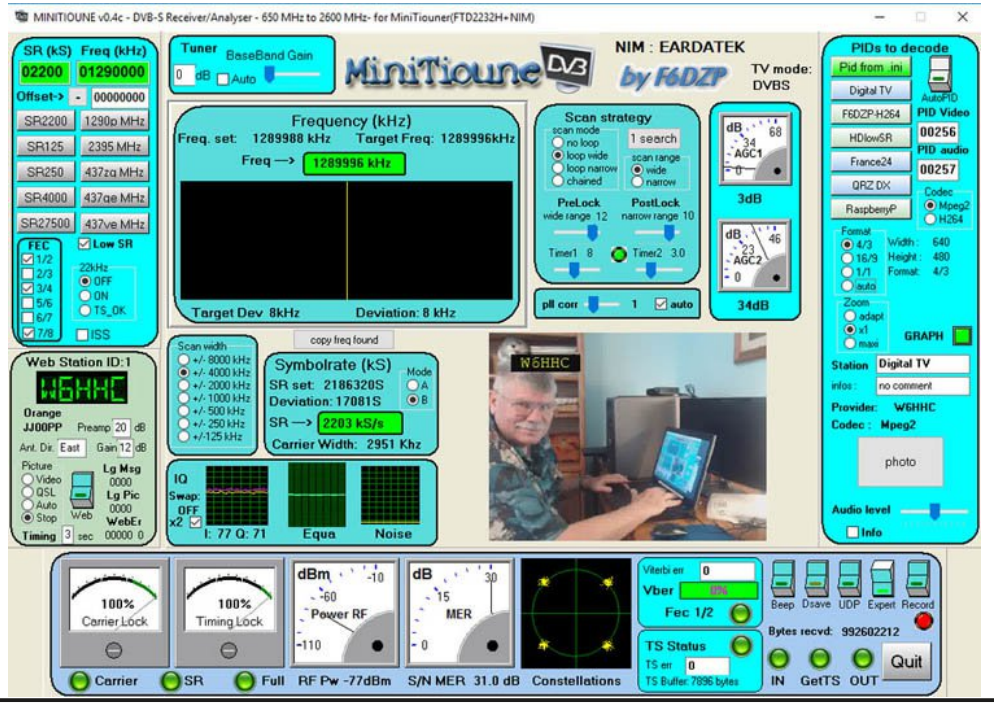
The ISS is now transmitting a similar series of SSTV transmissions to that of MIR:

https://amsat-uk.org/beginners/iss-sstv

Farrell Winder, W8ZCF
Source AMSAT Bulletin Board
http://www.amsat.org/mailman/listinfo/amsat-bb

Installing FT2232H driver for BATC "FT2232H for NIMtuner" module

Good news that I am now running my MiniTiouner with MiniTioune_V0_4c successfully with video. I have a unique setting/problem on my Win10 notebook that prevented the MiniTioune_V0_4c software from creating a DirectShows graph. But a simple work-around change was made by F6DZP to the MiniTioune "decod Mpeg2.GRF" file on my machine and now all is well. A very large "Thank You" to F6DZP for his help.



Below I have listed the steps that I took or installing the driver and getting ready to run the Minitioune_v0_4c software on Windows10 (32-bit):

1) download a FT2232H device driver from the FTDichip website (the FTDI CDM driver) :
http://www.ftdichip.com/Drivers/CDM/CDM21218_Setup.zipI

2) also download a tool called FT_PROG (also from the FTDI site) that will be used to check the configuration of the FT2232H module to confirm it contains the BATC programming

3) plug-in MiniTiouner board and install FT2232H driver by allowing an internet connection to find the driver (it is all done silently on Windows 10…wait perhaps 5 minutes for installation to become completed)

4) download the FT_PROG app note AN_124 User Guide for FTDI FT_PROG Utility

5) install and use FT_PROG tool to now confirm that the USB-module contains the BATC programming (and is in Direct D2XX mode)

5A) select "Scan and Parse" from the "EEPROM -> Devices" menu of FT_PROG

5B) select HARDWARE SPECIFIC….first PORT A HARDWARE should be already set as RS232 and DRIVER can be set to VCP or D2XX

5C) Next PORT B HARDWARE should already be set as 245 FIFO and DRIVER should be set to D2XX DIRECT

6) If FT_PROG shows everything is correct in step 5…go directly to steps 7 and 8 ELSE…install the driver manually per the CDM21218_Setup.zipI file you previously downloaded,

ALSO…if necessary there is excellent procedure to fully re-program the FT2232H module memory contents on the vivaDATV website at:
http://www.vivadatv.org/viewforum.php?f=80 (English)

7) make necessary adjustments to the minitiounr.ini file … (note: software now automatically detects any kind of "acceptable" NIM)

8) Get prepared to use MiniTioune_V0_4c executable file in the steps below

8A) move the downloaded Minitiounev04c_pack folder to a convenient document location.

DO NOT install the Minitiounev04c_pack folder in the Windows Program Files area because MiniTioune_V0_4c does not have admin rights to run there

8B) you can test your MiniTiouner using the software "TestMyMini Tiouner_v1_3b" you must have 0 errors

8C) be sure that you have the good codec : install LAVfilters
http://www.videohelp.com/software/LAV-Filters
(currently version 0.68.1)

8D) be sure you have registered the "usrc.ax" file in the windows registry by running the file "install_usrc_ax_winXP.exe" as an administrator (NOTE this tool will work OK on any version of Windows from WinXP to Win10)

8E) test that all is good using the software "CheckMiniTiouneDriverAndFilters V0_2b"

8F) if all LEDs are green you can now run "Minitioune_v0_4c" executable file

9) Make sure the there is a transmitted DVB-S signal out there, then power up the MiniTiouner board…and start the "Minitiounev0.4c" executable file. Make any adjustments to frequency and the expected SymbolRate etc until you see the modulation constellation displayed by the MiniTioune software screen.

73…de Ken W6HHC

Ofcom requests destruction of RSGB Callbook 2017

The UK communications regulator Ofcom has admitted it released radio amateurs' private home address instead of their mailing address

This information was published in the RSGB Yearbook 2017 and the 2017 Callseeker Plus CD and Flash Drive.

Ofcom has asked the RSGB to destroy all the unsold copies of the RSGB Yearbook 2017 and replace those that have already been issued with a corrected edition.

Read the RSGB statement at:

http://rsgb.org/main/blog/news/rsgb-notices/2016/12/13/administrative-error-in-rsgb-yearbook-2017/

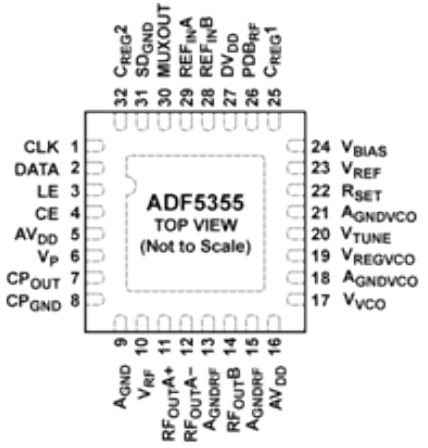
ADF5355 - Microwave Wideband Synthesizer with Integrated VCO

Features and Benefits

- *RF output frequency range: 54 MHz to 13600 MHz*
- *Fractional-N synthesizer and integer-N synthesizer*
- *High resolution 38-bit modulus*
- *Phase frequency detector (PFD) operation to 125 MHz*
- *Reference frequency operation to 600 MHz*
- *Maintains frequency lock over −40°C to +85°C*
- *Low phase noise, voltage controlled oscillator (VCO)*
- *Programmable divide by 1, 2, 4, 8, 16, 32, or 64 output*
- *Analog and digital power supplies: 3.3 V*
- *Charge pump and VCO power supplies: 5 V, typical*
- *Logic compatibility: 1.8 V*
- *Programmable dual modulus prescaler of 4/5 or 8/9*
- *Programmable output power level*
- *RF output mute function*
- *Analog and digital lock detect*
- *Supported in the ADIsimPLL design tool*

Product Details

The ADF5355 allows implementation of fractional-N or integer-N phase-locked loop (PLL) frequency synthesizers when used with an external loop filter and an external reference frequency.



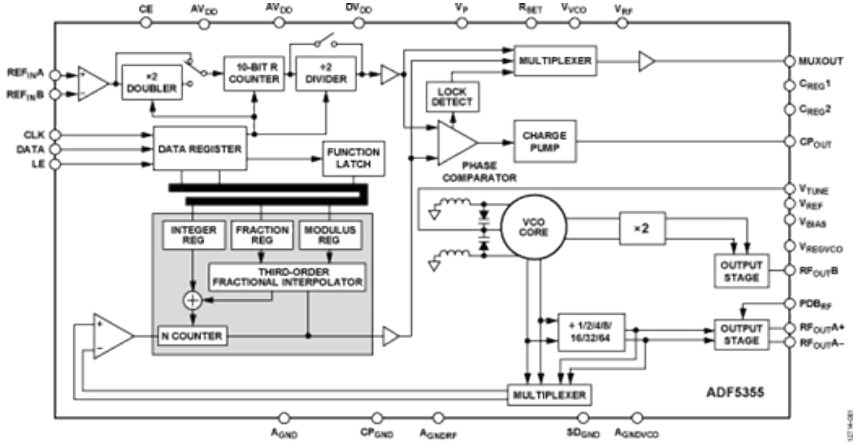
32-LEAD LEAD FRAME CHIP SCALE PACKAGE [LFCSP_WQ]
5mm × 5mm BODY, VERY, VERY THIN QUAD
(CP-32-12)

The wideband microwave VCO design permits frequency operation from 6.8 GHz to 13.6 GHz at one radio frequency (RF) output. A series of frequency dividers at another frequency output permits operation from 54 MHz to 6800 MHz.

The ADF5355 has an integrated VCO with a fundamental output frequency ranging from 3400 MHz to 6800 MHz. In addition, the VCO frequency is connected to divide by 1, 2, 4, 8, 16, 32, or 64 circuits that allow the user to generate RF output frequencies as low as 54 MHz. For applications that require isolation, the RF output stage can be muted. The mute function is both pin and software controllable.

Control of all on-chip registers is through a simple 3-wire interface. The ADF5355 operates with analog and digital power supplies ranging from 3.15 V to 3.45 V, with charge pump and VCO supplies from 4.75 V to 5.25 V. The ADF5355 also contains hardware and software power-down modes.

Applications



- *Wireless infrastructure (W-CDMA, TD-SCDMA, WiMAX, GSM, PCS, DCS, DECT)*
- *Point to point/point to multipoint microwave links*
- *Satellites/VSATs*
- *Test equipment/instrumentation*
- *Clock generation*

Source: *http://www.analog.com/en/products/rf-microwave/pll-synth/fractional-n-plls/adf5355.html#product-overview*

UK 434 MHz balloon over North America

An Around-The-World balloon carrying 434 MHz and APRS that was built by Bristol students has successfully crossed the Pacific and reached Alaska

The UBSEDS21 balloon was built from 50 micron thick PA-EVOH-PE multilayer film and is about 1.9 meters in diameter, the payload weight was 34.2 grams.

After launch on December 11, 2016 the balloon achieved a stable altitude of 15.2 km flying in an easterly direction on its potential circumnavigation of the globe.

The initial plan was to use UBSEDS21 to contact the International Space Station (ISS) via APRS on 145.825 MHz. However, the VHF radio on the ISS is out of order, so this flight is used to test the amplifier and hopefully talk to any APRS enabled satellites.

The winter launch means the payload needs to deal with the sun staying low above the horizon during the day. For this reason, sideways facing solar panels were used.

See the UBSEDS21 track at:

https://tracker.habhub.org/#!mt=roadmap&mz=2&qm=All&f=UBSEDS21&q=UBSEDS21

UBSEDS

http://www.bristol-seds.co.uk/

UBSEDS21 satellite APRS test

https://amsat-uk.org/2016/12/09/ubseds21-145-825-aprs/

DKARS MAGAZINE

In deze uitgave ondermeer:

Doe mee aan de DKARS panelvraag en win!!!

Ga naar panel.dkars.nl en vul de vragenlijst in.

Onder de deelnemers verloten we een Icom IC-7300!

Deelname staat open voor alle Nederlandse zend-en luisteramateurs.

ISSN: 2452-1809

DKARS

Dutch Kingdom Amateur Radio Society

Prijs / Price € 0,00 / $ 0,00

November 2016 editie 28

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

ATV-Express Project - November update report

By Ken - W6HHC

During the month of November, the DATV-Express project team made the decision to build another batch of hardware boards. The project team was flooded with stand-by orders and as of now have orders from all over the world totaling 38 boards.

Art WA8RMC has ordered forty-eight blank PCB boards and has ordered all of the electronic components for delivery scheduled in early-December. If events go according to plan, Art will receive the first assembled boards around Dec 17 and begin testing. His goal is to then turn on the PayPal coding to again allow "real ordering" for the stand-by hams and to be able to ship completed assembled boards by the end of December.

Ken W6HHC continued to do testing of the experimental set of coding for DVB-T protocol (2 MHz and 1 MHz channel-bandwidths only) that was included in the release of v1.23 software.

It appears that the DVB-T receivers for 2 MHz channel-bandwidths are available from HiDes. Ken ordered a HiDes model UT-100B Tx/Rx USB unit and after some initial problems installing the BDA_Viewer software, he was able to download a newer v2.4.9.2 BDA_Viewer_plus receiver code from HiDes support that worked on Windows 10.

Charles G4GUO had reported some difficulties testing DVB-T to a UT-100B receiver. Only one of his three 64-bit computers running Express_DVB_Transmitter software would allow the UT-100B to lock on his signal.

Charles believes the DVB-T software is running close to the limit of the USB-2 real-world thruput limits and the software requires a fast and well-designed PC for the DVB-T transmissions to be received without problems.

After resolving the HiDes issues with the upgraded software, Ken was able to have the BDA_Viewer_plus receiver lock onto the 434.000 MHz DVB-T transmission with BW=2.0 MHz on the very first test. The Windows10 computer Ken was using was a fairly new 64-bit DELL i7 CPU notebook. More receiver testing of DVB-T protocol to follow.
(img,, alt: update1 src: ../Images/update1.jpg)

The HiDes UT-100B receiver immediately locked onto the DATV-Express experimental DVB-T signal on 434.000 MHz using BW=2.0MHz FEC=3/4 SR=2.2MSymb/sec and QPSK modulation.

Charles G4GUO has reported that he received a LimeSDR Tx/Rx board, but is having some driver problems installing on Windows10.

His first commitment is to prototype RF Channel-simulation functions for testing receivers at microwave frequencies. This will be a difficult first project on LimeSDR board since simulating multiple reflections of the received signals quickly doubles and even x12 the size of the code and data handling needed in the FPGA.

After prototyping the channel-simulator project, Charles will turn his attention to porting the DATV-Express software over to the LimeSDR hardware board. Initial alpha testing of this DATV-Express/LimeSDR software is not expected before maybe June of next year.

73...de Ken W6HHC

Editorial (Jvrg Hedtmann, DF3EI, AGAF chairman)

"Yes, we can!" I can't bear it any more, US president Obama shouted it loud, Chanceller Merkel called it in german "Wir schaffen das!", companies are making ads with it, and my doctor uses it meanwhile, too. But I must admit, it has something in it: when I took the first chair of AGAF in June, I did not suspect all the mess I was going into.

At first the members data base, an old self-written software by Heinz, DC6MR, with many capabilities. But over the years much has changed (SEPA, IBAN) that does not fit into it. Additionally it was Windows-only in a real DOS-box - we needed new software.

This is working ok now for a year, and the data quality rises with each correcting input. So we are begging all AGAF members for help, please report faults or make suggestions!

Another problem is paper-work for club management, we still haven't seen all old files from the recent chair. Now we started to build up an electronic "document management system" (DMS) for administration, classification and searching in all papers.

Remember, AGAF has an office (in Berlin now), but no professional staff. First experience shows, that DMS is a valuable tool for efficient club management, and it helps, if any communication with AGAF office is done electronically. Better scan your letter and send it by e-mail than to mail it via post office.

The last big job-site is a legal one, updating the register of associations is needed to make our club capable of acting again.

First steps have succeeded, and the latest changes from 2016 will follow suit. I want to thank all extended board members as well as other club members, who contributed to our now brighter looking future.

It is true: "Yes, we can do it!"

New QTH DB0QI near Munich (Ernst, DJ7DA)

On November 9th 2016 we received our licence document for ATV repeater DB0QI at the new site Vierkirchen near Dachau. The basic change against the old site in Munich is the allowed bandwidth for our DVB-T output on 436 MHz: instead of 2 MHz it is only 1 MHz now. So all receivers (USB stick or stand-alone) for the old output of DB0QI are useless now. HiDes (from Taiwan) has a new DVB-T receiver in stock that is capable of 1 MHz bandwidth - the HV-122-TV. We have done some testing, video and audio reception works ok - the new exciter at DB0QI has 1 MHz BW.

New ideas for HamTV

The ARISS meeting minutes for August 16, 2016 cover the discussion about using a Raspberry Pi computer board to generate video to feed the ISS Digital ATV transmitter. An idea was proposed by Jean-Pierre Courjaud F6DZP for using Raspberry Pi at the transmitting ground stations for generating a H264 video stream that modulates a DVB-S or DVB-52 carrier. His report was distributed to the ARISS team on August 12, 2016.

Discussion: Jean-Pierre Courjaud had brought this idea to a Ham TV Technical (HTT) meeting for using Raspberry Pi to generate a H264 video stream. Raspberry Pi is used in the United Kingdom for DATV on 2 meters.

Gaston Bertels ON4WF termed this a cost effective solution, probably easy to work on, many people and schools would be able to receive video from the ISS, and he inquired if this idea was proposed for the Paolo Nespoli IZ0JPA flight next year.

Jean-Pierre Courjaud related that Paolo Nespoli had asked about it, and the team hopes he could use it if the idea is presented for review to the ARISS-International Technical Evaluation & Support Committee and approved by ARISS Delegates.

Jean-Pierre Courjaud explained that Raspberry Pi could be a solution for two things: first, the webcam could be used instead of the onboard ISS camera, and second, signals received by schools could be transmitted back to the crew.

Frank Bauer KA3HDO felt the astronauts would like this.

Dave Taylor W8AAS asked about the type of receiver schools would need and how signals would be uplinked.

Jean-Pierre Courjaud clarified that schools would have a narrowband ATV receiver that uses a USB dongle; this would bring the signal to the Surface Pro computer that Paolo Nespoli plans to fly on ISS, and modified mini-tutioune software would decode the uplink signal received from the L-band antenna.

Dave Taylor inquired what new hardware would have to be tested and certified for flight.

Jean-Pierre Courjaud said that Nespoli plans to take the Surface Pro, and to be tested and launched would be the USB interface that would work with the L-band antenna and serve as an L-band receiver with the Surface Pro.

During Nespoli's mission the mini-tutioune software could be uploaded to his Surface Pro.

Oliver Amend DG6BCE planned to share the meeting discussion with Emanuele D'Andria I0ELE and ask him and the committee, because the project originated with AMSAT-Italia, to give the plan, including what must be tested and launched, to Mark Steiner K3MS, chair of the ARISS-International Technical Evaluation & Support Committee.

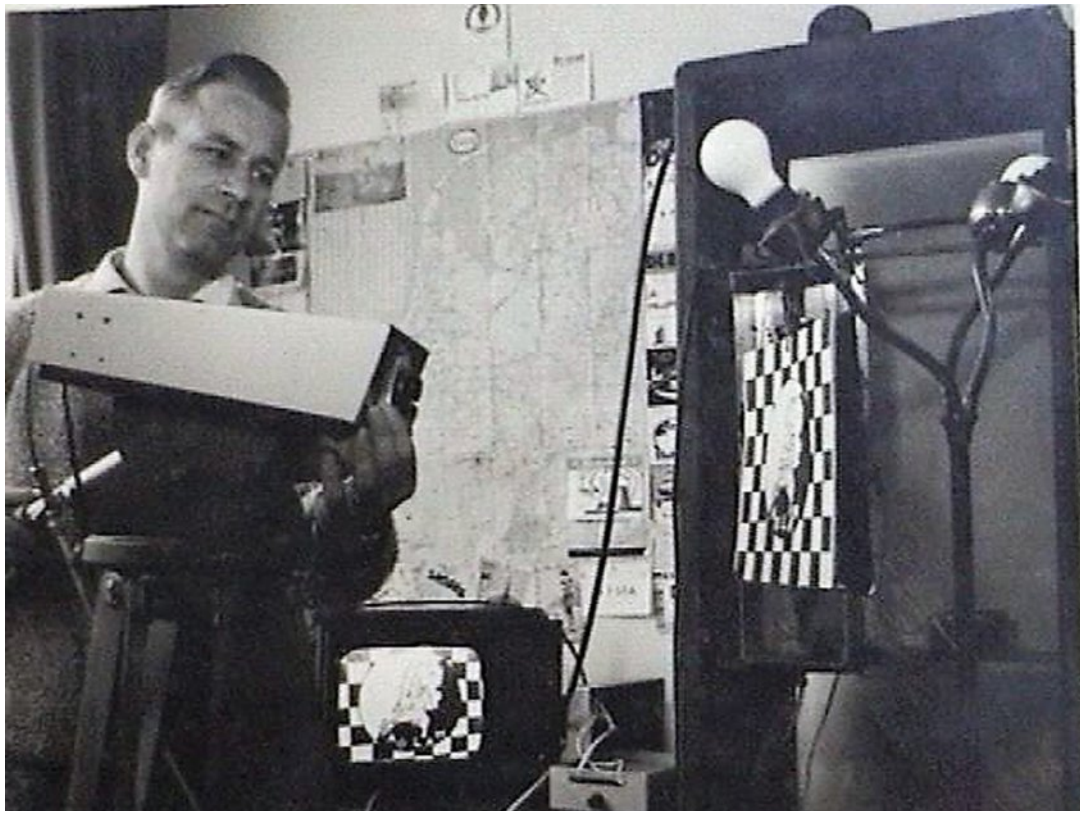
Read the full ARISS Meeting Minutes August 16, 2016 at

http://www.ariss.org/meeting-minutes/august-2016

Amateur radio pioneer Arthur Lambriex, ON4FIN (Klaus, DL4KCK)

Arthur, ON4FIN, was a farther colleague of Uwe Kraus, DJ8DW, at the well known company Philips in The Netherlands some decades ago.

These days he found old documents of his early ham radio activities and sent it to me by e-mail.



First steps in ATV

In June 1956 Arthur succeeded in a first AM-ATV fast-scan contact under his call PA0LAM to another radio amateur near by, his self-made video camera is shown in a photo from 1962.

Color SSTV pioneering 1972

The German DIN-A5 ham radio magazine QRV from January 1974 (Koerner publishing company was rivalling CQ-DL by DARC) reported about the "very first contact Europe - USA in color SSTV" on 1.1.1973 between W2DD and F6BDJ.

Devices used were a self-made analog Slow-Scan-TV converter with P7 long-persistent phosphor picture tube from RADAR installations (also used in the commercial ROBOT SSTV monitor) and a color photo camera with red, green and blue filters subsequently put between them (frame sequential) for multiple exposure records. As the chemical film had to be developed, some OM used a Polaroid-Camera for a faster full-color result.

For production of frame sequential color SSTV pictures a modified black-and-white video camera with the usual scan rate of 8 seconds for one frame containing 120 lines and 120 pixels put out audio varying between 1500 Hz (black) and 2300 Hz (white). This sound was recorded on audio tape and repeatedly played back to the TX input in an SSTV QSO. Regular 1200 Hz synchronizing bursts at each line and frame start helped to tune the distant shortwave SSB receiver onto the correct QRG.

This way Arthur as PA0LAM had a direct contact to W.H.DeWitt, W2DD, on April 9 1972 already, when he recorded WA2DD4s color SSTV picture and transmitted it back to USA.

On April 30 1972 Arthur transmitted his first self-made color SSTV picture in return to WA2DD, who mentioned that in a five pages article on that mode in CQ magazine of September 1972.

Meanwhile Arthur is working in Belgium (retired) as ON4FIN with modern computer SSTV software like JVCOMM by Eberhard, DK8JV, enabling better picture quality and resolution.

Digital storage on PC hard disk simplifies the picture exchange enormously, compared to those early days…

Translations Klaus, DL4KCK *www.agaf-ev.org*

Trevor's Christmas

Micro Corner

There are 12 days of Christmas and none of them fall in November, was the comment from my neighbour when he caught me putting up Christmas lights on the outside of our house in late November.

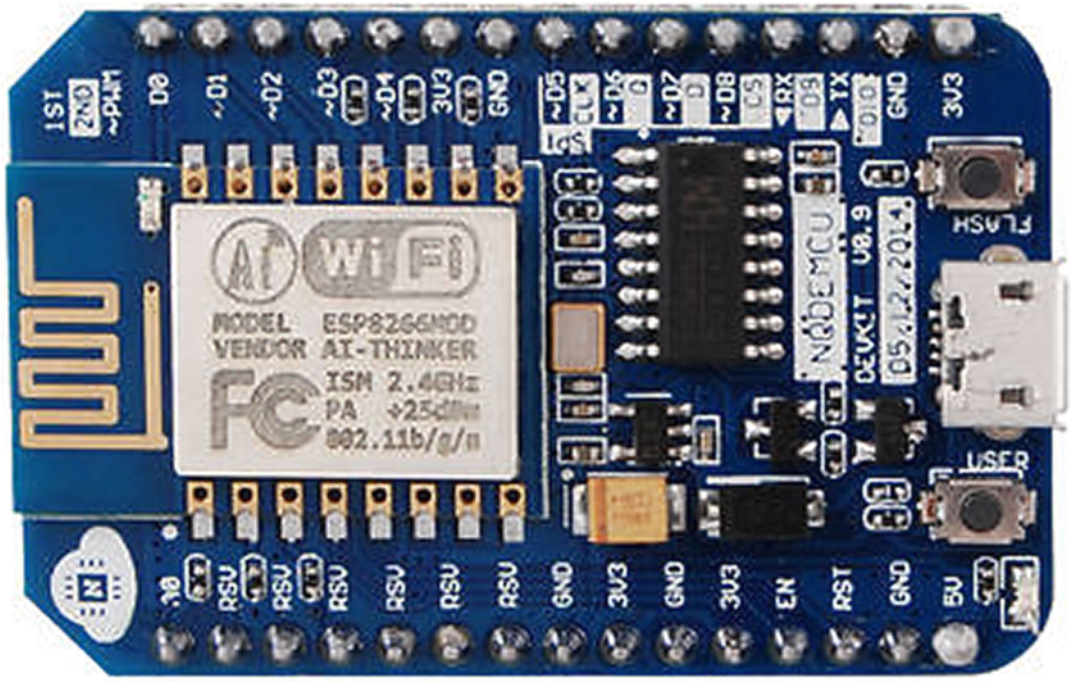
What he did not know is that, yes it is still November, but that I had already received my first Christmas present! No it did not come tied up with string although I will explain. It did have strings!

It came in a Jiffy bag from Mike G7GTN who has often been described as the CQ-DATV resident micro expert, and yes it was a micro module. The note was the 'strings' part - "make this do something with television for the next issue of CQ-DATV" (what was that TV programme called, was it "Challenge Anneka") from memory I think she got a lot less demanding challenges. Just when I thought my micro days were well behind me and I could slide quietly into anonymity.

The module is the ESP 8266. Now I don't normally disclose how much I spend on Christmas presents or indeed how much others have spent on me, but if I am going to summon up some enthusiasm amongst you for purchasing such a module and pitching in on this column then I feel you ought to know they are under £3.

This is a complete micro with 4MB of Ram, I/O and Wi-Fi and USB connection, so it is not your normal run of the mill micro.

It delivers a lot for a very low cost and I can well see why Mike is getting so excited about it.



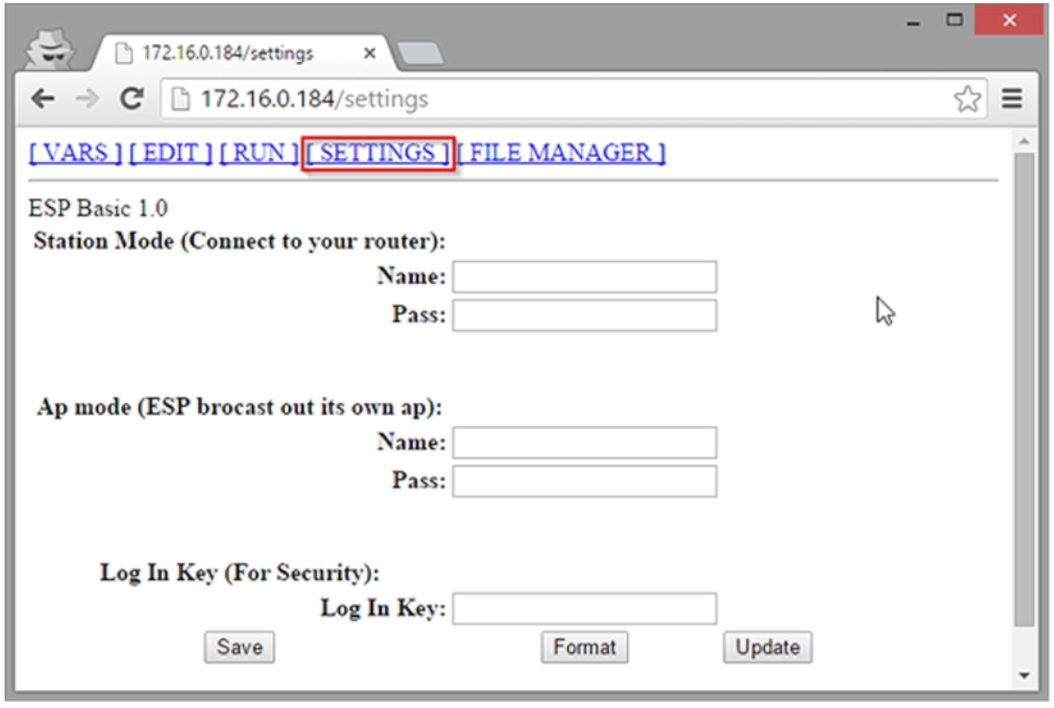
Top View of the ESP8266

Plugging it into the USB port of my PC was the easy part, but making contact with its WiFi was a little more complex, let me explain.

I have a PC on my desk connected to a router, but I do not have a WiFi card in my PC and these micros don't come shipped to connect to a router. They are the router, or web server might be the correct term.

So I borrowed my wife's iPad went into settings and asked it to look for a WiFi connection other than my router and it came up with a 192.168.4.1 so on the ipad I could then put that number into the browser and find the page it was generating.

The settings mode allows you to switch between Station Mode and AP mode where it is the web server. On the settings page you can specify the network it should connect to at boot time.



The ESP 8266 opening page

You can also configure the device to start up in AP mode and set a network name and password for this.

The login key allows you to secure the devices editor. If the device has been set it will then prompt you for a log in key, thereby allowing no one else to reach these pages. For me I chose Station mode.

Now it has a new IP address, 192.168.0.23 (DHCP at work) and it sits powered by my USB, but I can see it on my PC browser and talk to it via my keyboard. This works best for my set up, but those of you with WiFi cards or have their own iPad, you may prefer it as shipped in web server AP mode.

To progress any further you need to figure out how to talk to it as it does not come with an in built resident language.

I had fears here because my computer language skills are a little limited. I left the world of BASIC, C+ and Z80 machine code behind some years ago and have neglected keeping up with new and emerging languages such as Python.

Well like Indiana Jones I hate snakes.

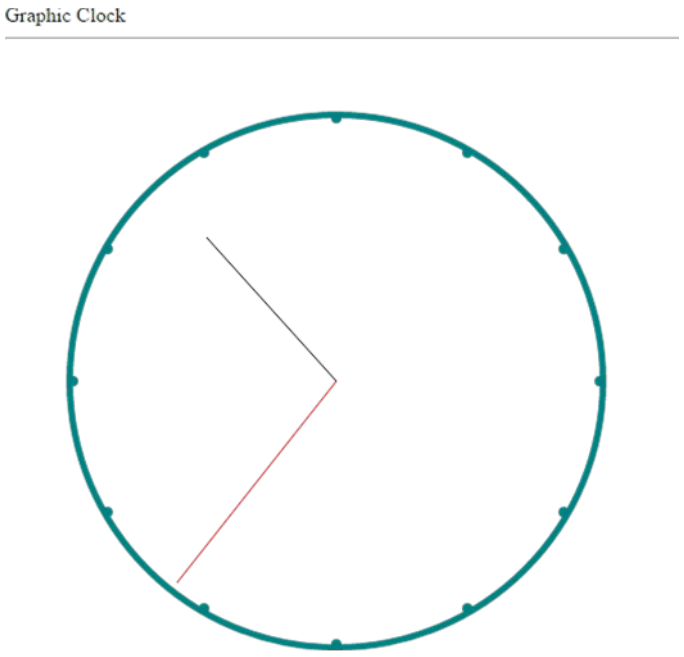
The option for a resident language came in the shape of ESP BASIC. Now that makes a welcome change for me and I suspect quite a few others out there who grew up with computers that had a resident BASIC. Remember the BBC, Spectrum, and even Q BASIC on the PC? Happy days are here again. The EPS module needs flashing to provide it with resident EPS BASIC that is resident even if the power is removed.

To flash the module you need to go to the flash links and download the Windows Flasher (Sorry Ian I am sure there is a way to do this in Linux), follow the instructions and from memory the LED flashes on the module as it accepts the BASIC Language Code.

Ok, my next step was to find some proven BASIC code to put in the micro and see if it will run. All programming is done in the web browser. No need for a USB to serial converter, just open your browser and type in the IP address of the module, insert the Basic on the editing page, save and run.

This brings us to the clock link which is BASIC coding for an analogue clock. Using cut and paste, I copied the code into the editor page, saved it and ran it.

There was nobody more surprised than me when the clock appeared in my browser telling the correct time! Could this code be changed to look like the famous COX VTR clock? If so, might that be the answer to my challenge Anneka? Watch this space.



ESP8266 running the analogue clock programme

Ok, onward and upwards. TV TX links takes you to a guy who has turned the ESP 8266 into a TV transmitter. Now I wish I had kept that VHF television set, but alas let me soldier on at a lower level and look at the I/O for this device.

It does have a lot of I/O some of it dedicated some of it not and has warnings of 3.3v so presumably we have a logic level problem for TTL, but if we are looking at output only and 3.3v is logic 1 then if we interface this to CMOS on a 5v power rail, CMOS changes logic level at half the power rail, say 2.5v, will this not interface into Richard's video switcher? This being the one that was featured in the last two issues of CQ-DATV.

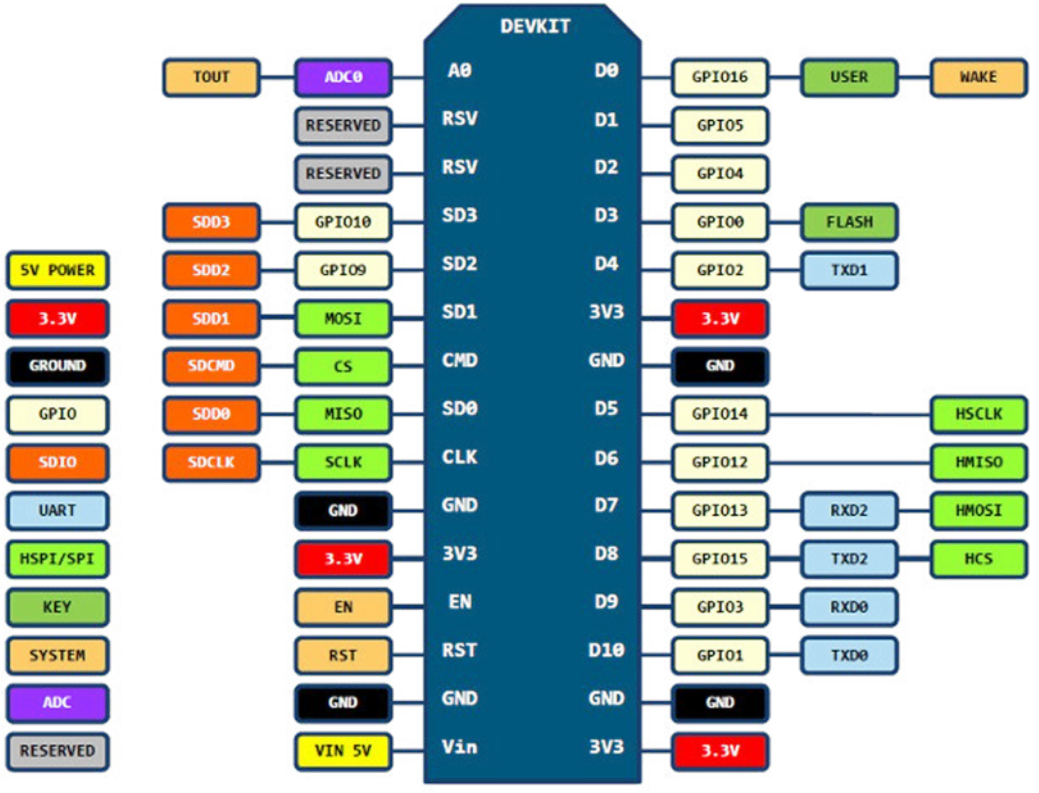
Could we not have a 3 input video switcher interfaced to this small micro and if so, where will that take us? Well, for a start, a mini ATV repeater maybe?

Let's draw a flow chart showing the logic of a dual band ATV repeater.

Things always look clearer when we have a flow chart, three output lines two for the video switcher and a third for a Morse ident.

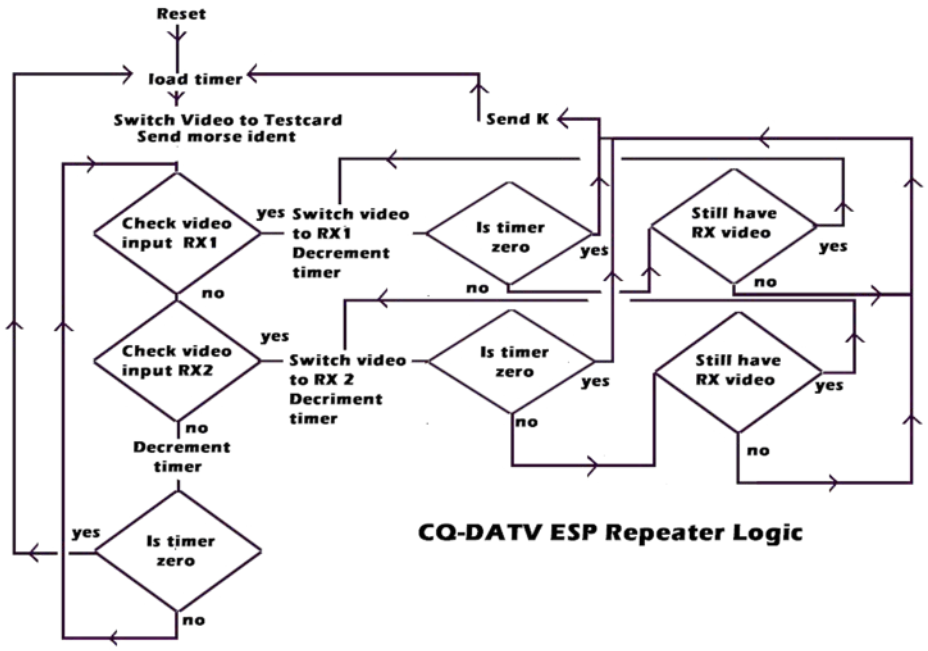
Hopefully the tone generator can be in the software, but if we are struggling on the small micro, it could be a hardware tone generator, just commanded by the micro on its third output line.

If we still have output lines left then one to flag which receiver we accessed on, so as to select a test card that would indicate which RX was accessed on RX carrier drop. It would need a video detector on the output of both to deliver a logic level when video and possible AGC are present.



D0(GPIO16) can only be used as gpio read/write, no interrupt supported, no pwm/i2c/ow supported.

Hardware view of the ESP 8266



CQ-DATV ESP Repeater Logic

Add a little audio magic and on this point I would always say never switch the audio mix it with the ident and then when one channel is in operation with video the other input would still have audio access.

So a proposed ATV repeater hardware duplex QSO can take place on audio. Useful for duplex and would be viewers can hear both halves of the QSO without additional hardware.

I have seen this audio mix idea in operation at Heinz DC6MR's QTH via his local repeater and it worked well, but I must add you need receivers with a good audio squelch.

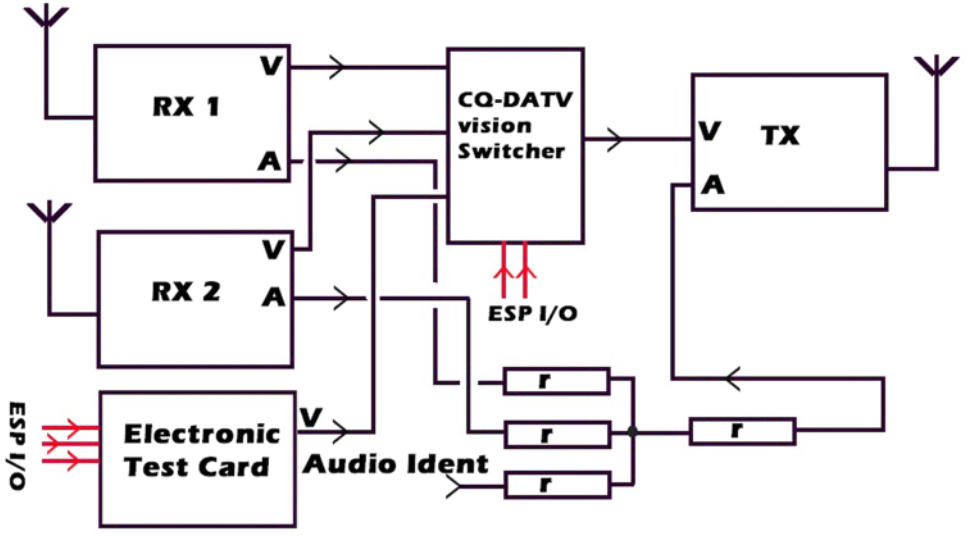
Have I met challenge Anneka? Well I hope I have presented some ideas. I might be wary of meeting the postman and especially if he is carrying a Jiffy bag.

Like every idea I hope it opens a door for others to step through and if you do please share it with CQ-DATV readers, they are a friendly lot.

- Flash Link: *https://www.esp8266basic.com/download.html*
- Clock Software: *https://www.esp8266basic.com/graphic-clock-example.html*
- BASIC Examples: *https://www.esp8266basic.com/examples.html*
- TV TX 1 VHF TV required: *https://www.youtube.com/watch?v=SSiRkpgwVKY*
- TVTX2 VHF TV required: *http://hackaday.com/2016/03/01/color-tv-broadcasts-are-esp8266s-newest-trick/*
- ESP BASIC: *https://docs.google.com/document/d/1EiYugfu12X2_pmfmu2O19CcLX0ALgLM4r2YxKYyJon8/pub*

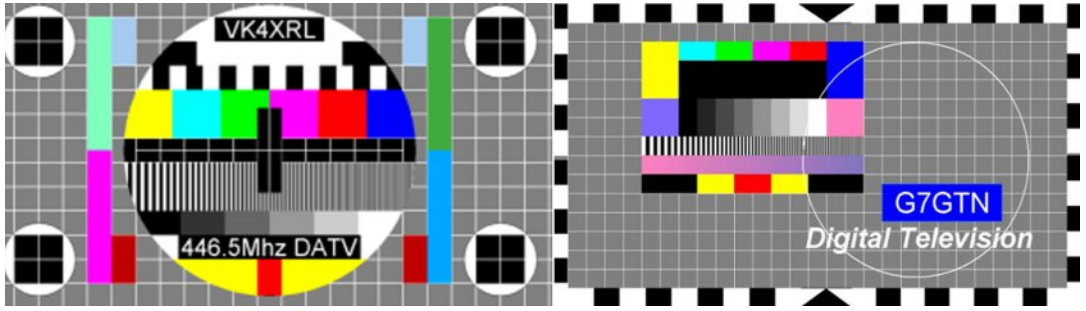
Other useful links

- Forum Help: *http://www.esp8266.com/viewtopic.php?f=40&t=6732*
- Driving an LED light strip: *https://www.youtube.com/watch?v=7Dv70ci-MOw*
- **Nice demo:** *https://www.youtube.com/watch?v=fVpAN3adK9A*



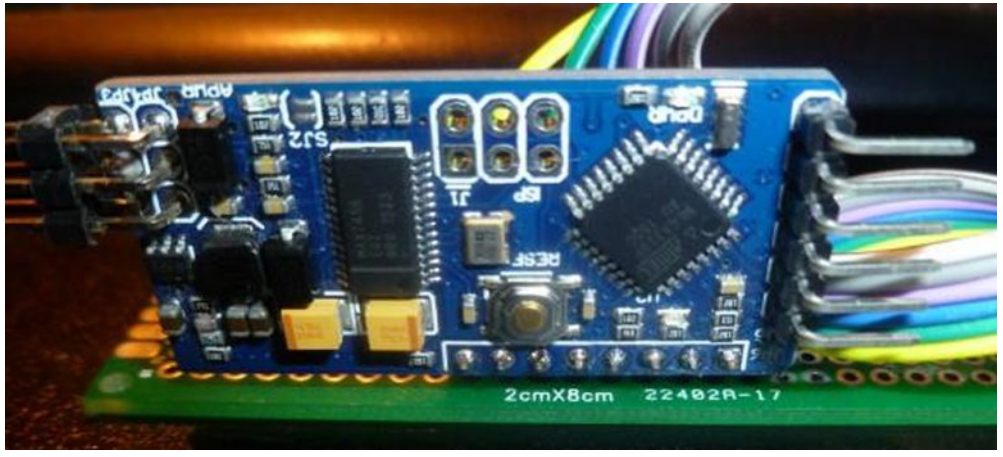
Digital WorldAnalogue 8x1 Video and Audio Switcher-Part 3

Richard Carden VK4XRL and Mike Stevens G7GTN



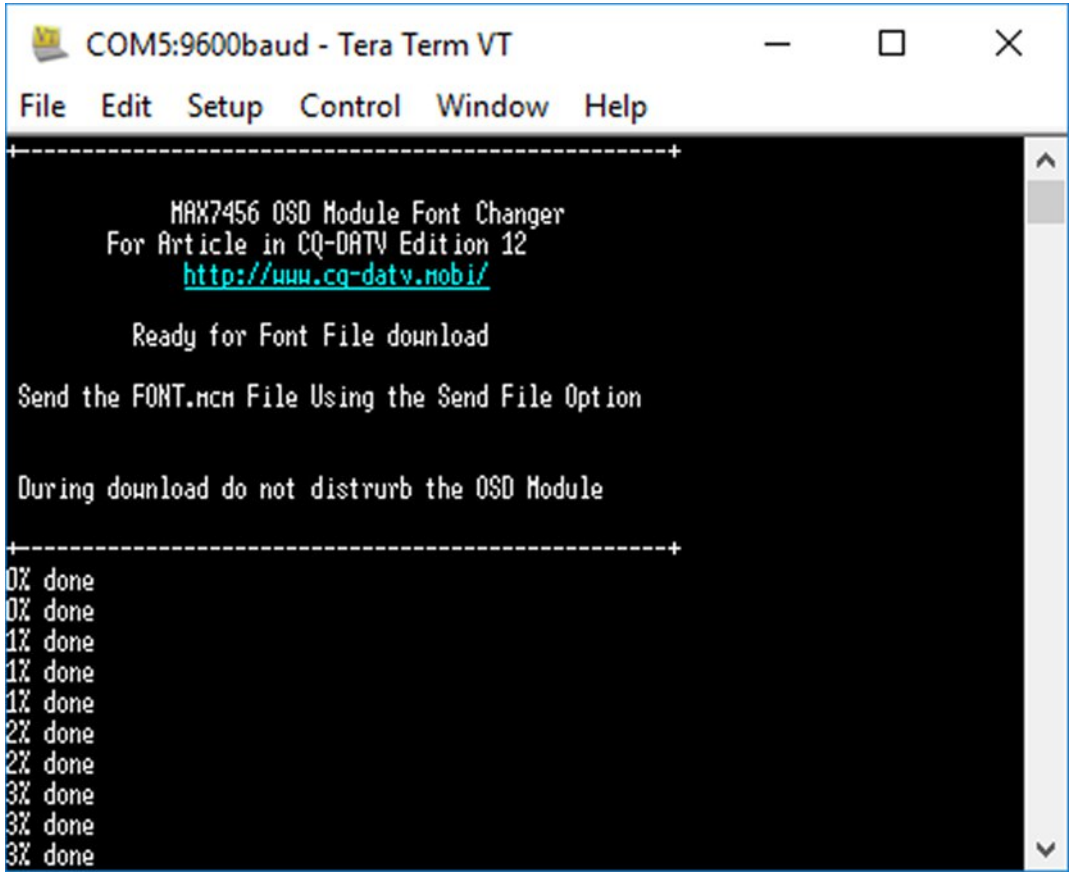
In the last issue of CQ-DATV Richard VK4XRL and Mike G7GTN added to the switcher project to provide an additional video channel again based on the 74HC4351 and proven video op-amp combination.

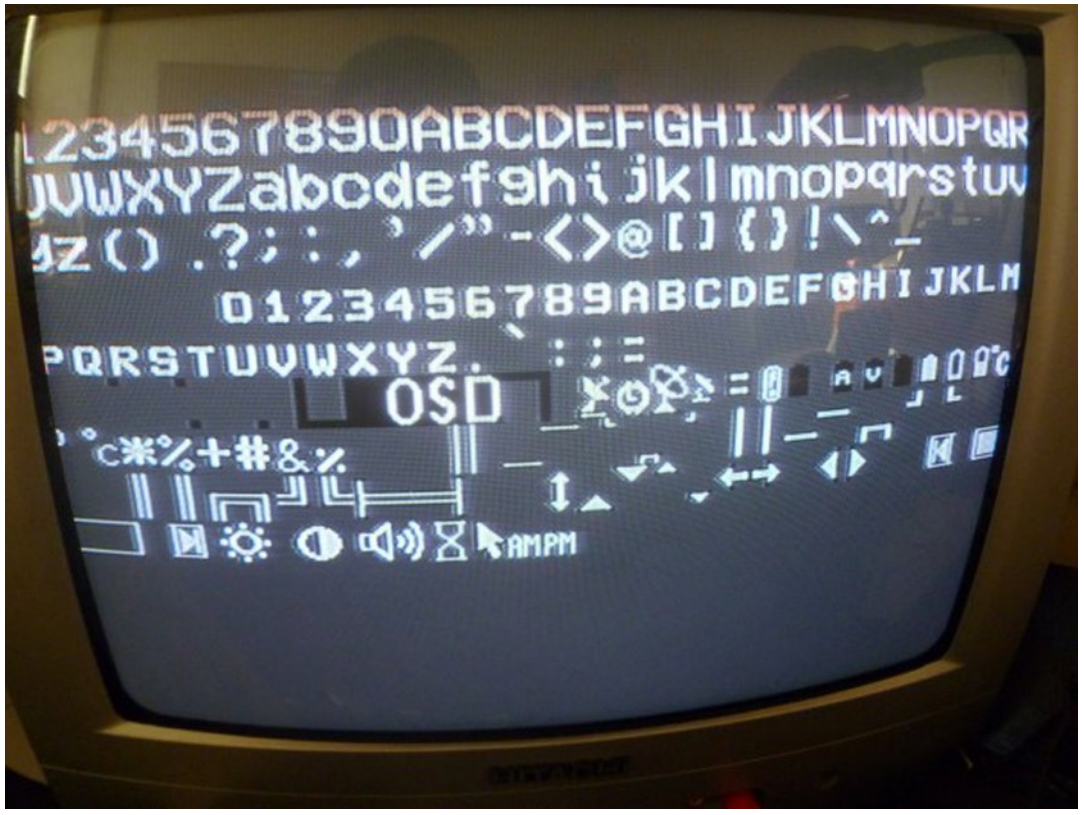
In this edition we will add a small On Screen Display (OSD) module for your Captions or Callsigns. It will no doubt be familiar to many of you as the cheaply available eBay type called the Minim and intended originally for the model flying hobbyist market. This was found to be the perfect companion to the switcher design being easily controlled via a one pin serial connection from the Nano controller micro.



For this part we have to do some basic setup firstly on the OSD to change the font or character set in to something that is applicable for our actual application. The OSD module needs to be connected to your computer via a USB to Serial TTL adaptor; both an FTDI and also CH340G device have been used with good success by us.

Within the code download for this article you will find a sketch called MAX7456FONTS.ino which you need to upload to the OSD module. Once this is running from a terminal program such as Tera Term you select a font file that you wish to download which is then stored in NVRAM, the one we have supplied has been already modified by us to include a few more icon style graphics characters that might have uses later on.





Once this has completed (allow just over two minutes for this process) once the countdown of the percentage complete gets to 99% pressing the return key you will see a display of all the new fonts we have just downloaded as in Figure2 with a video monitor connected to the output.

You may now upload the second supplied sketch for the project called OSDCONTROL.ino on to this module this is where you enter your required Captions or Callsigns along with the screen location you would like them to be displayed on.

You may also change two additional bits (in software) to turn them on to give either blinking or inverted text effects if so required. Full details are provided within the comments section of the code which further describes this in more depth than space would allow us here.

The two elements of the project communicate using a simple ASCII command set the new OSD module just being setup to act on a received serial command. The switcher of course also needs some new code to allow us to select which caption we would like to display. The most obvious choice for us was to make use of the Teletext coloured buttons (Fasttext) to allow the selection of four captions.

Caption number one controlled by Teletext RED has been already programmed to time out after 1 minute making it ideal for an auto Callsign type display. The other three need to be user cleared from the screen using the VOL minus (-) button when no longer required on your TX output video source.

The selected caption number will be shown on the LCD for a few seconds before going back to the previous source information display. The switcher also needs to be uploaded with new control code called SW8300.ino to now have the facility to control these on-screen captions.

Using the ASCII Command set we can simplify positioning the Captions with the correct screen locations by using the Arduino IDE Serial Monitor, where a small menu option will appear when set to 9600 baud rate. So you adjust the screen positions and upload for testing using the numbers all prefixed with a C from 1 – 4 (remembering that caption 1 does already have a one minute timeout placed on it). This should provide an easier way of setting up your captions before we then move on and connect the OSD module to the actual physical Switcher unit.

The only required hardware connection between these two modules is a single cable from the Nano main controller serial TX pin (Digital D1) to the RX Input on the OSD, you should also make a Ground connection to the OSD from the Nano micro controller this is further depicted in Figure3 for the sake of completeness.

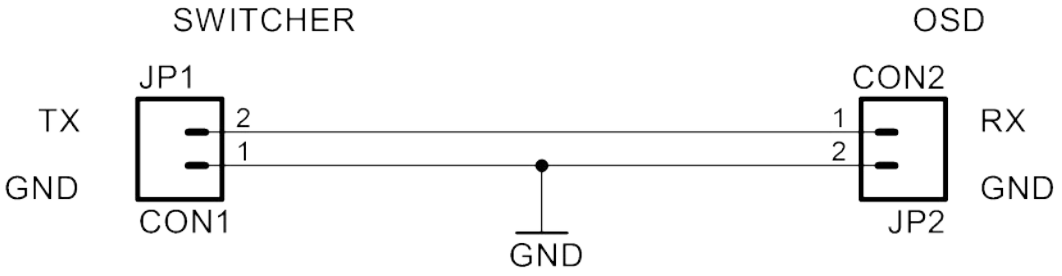


FIGURE 3 - OSD SWITCHER INTER CONNECT

Whilst this could be perceived as a somewhat complex addition, due to the three step operation of firstly downloading the fonts and then now two sets of control code it is very much the opposite when you follow all the instructions in a stepwise manner.

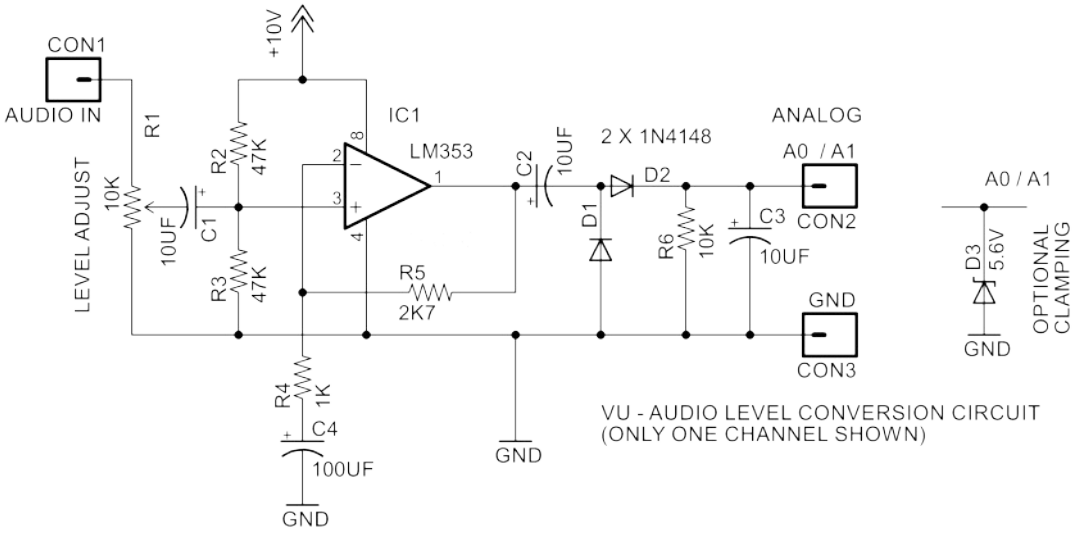
One caution that should be made is about how you power the MAX7456 OSD side – just because the MAX7456 has an on board linear regulator any voltage above +12V is a bad idea, my own personal preference now is to power this from +9V with the Micro ATMEGA328 portion of course only being feed with a clean +5V and stable supply line.

Audio VU Meter Addition

We wanted to have even the basic ability to be able to monitor audio levels, given that we are only using a (16X2) LCD this presented an issue. A further engineered solution is to employ a larger display and have this always visible on the display using two lines.

Our solution involves a push to make button to call and also dismiss this feature when no longer required. We need firstly to convert audio signals in to a level that can be processed by the ATMEGA328 internal Analogue to digital converter (ADC for short)

Audio input is feed to the level calibration adjustment before feeding the op amplifier IC1.



This can be any single op amp like that shown or a dual op amplifier such as a LM 883 etc. The gain is set to around 3.7v and runs from the 10v Vin supply so that no clipping of the audio waveform takes place.

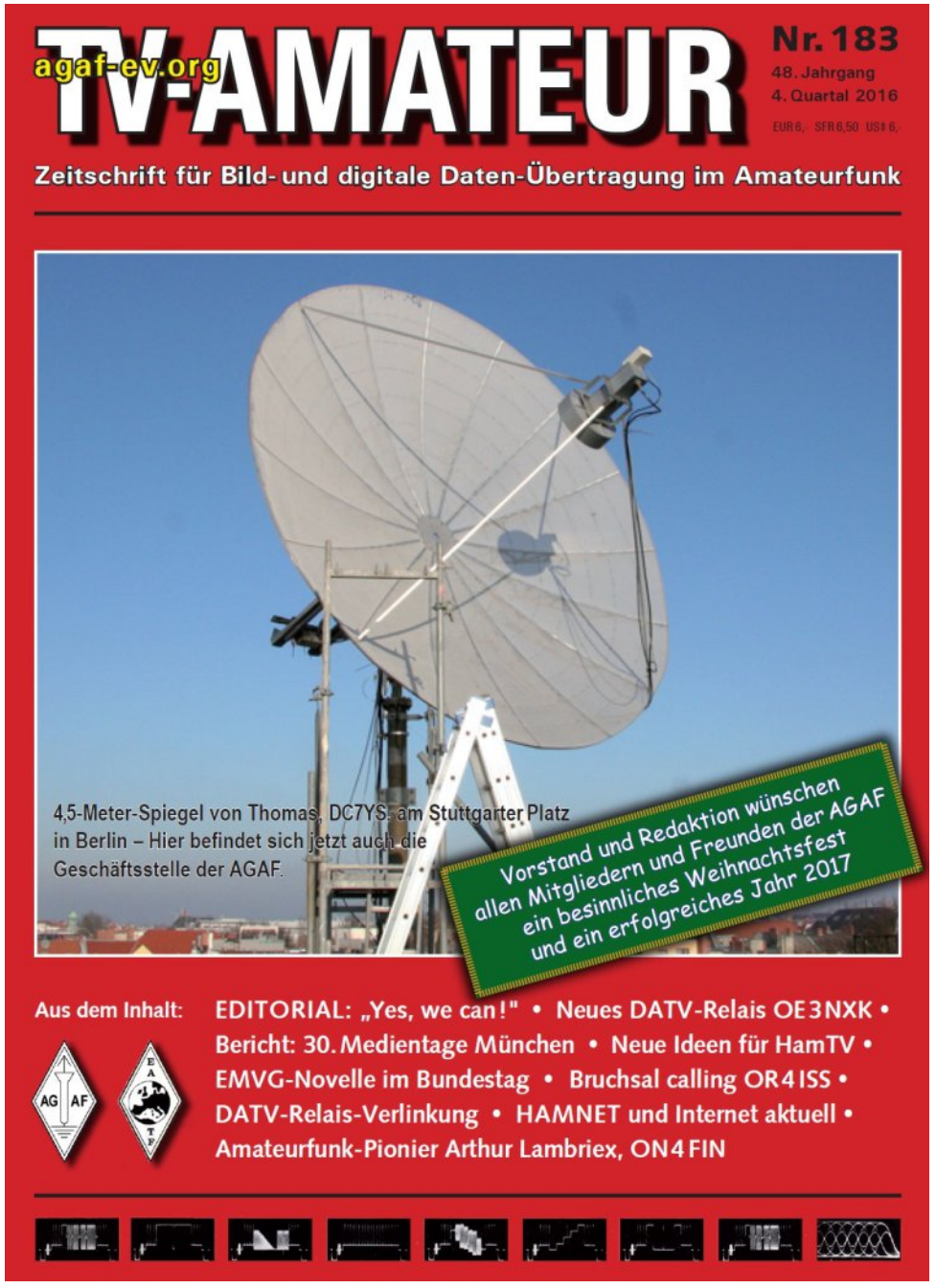
C2 feeds a voltage detector consisting of D1 and D2 which is wired as a voltage doubler, while R6 provides the load and C3 and R6 form the time constant for the rate of change as seen on the LCD.

As push-buttons actually bounce before the settle time we have a parameter (in milliseconds) that you can tune to the actual button you use. This can be found on line number 145 of the code.

Samples of on screen captions can be seen in the pictures on the next page.

In part four we will provide a pi Zero Testcard Generator.

My thanks to Mike G7GTN for his development of the software.



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://agaf-ev.org/* NOTE new URL

DATVtalk15 - vMix Video Mixer for DATV

by Ken W6HHC

Reproduced from the Orange County Amateur Radio Club newsletter. www.W6ZE.org

[Please Note – This is the Fifteenth article in a series of DATVtalk articles to introduce Digital-ATV to hams and to explain various aspects of this new area of ham radio. In the CQ-DATV5 issue, the DATVtalk02 article was an introduction article about basic Digital-ATV. This latest DATVtalk article describes a very useful video editing program (and free) called vMix that can be used to control and mix multiple cameras and other video sources.]

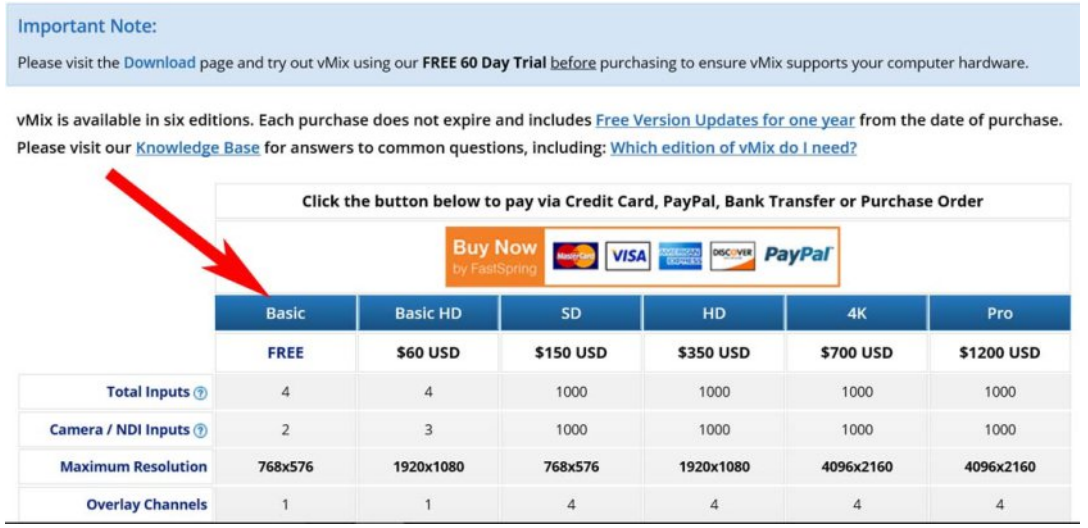
The vMix software is a good companion software application program that allows the user to switch and mix between different cameras/video-files and also do special video-effects, including "green screen".

It works well with ham radio Digital-ATV (DATV) activities. Perhaps the best part is that the entry-level software package, called vMix Basic, is free to download for SDTV format video (Standard Definition) from *vMix.com*.

This DATVtalk article is NOT a tutorial on how to use vMix (there are tons of tutorial-videos on YouTube to walk you through the steps), but rather this article is an overview of the many concepts that vMix brings to the user. This article is written from my experience with the DATV-Express DATV transmitter product, but is also applicable to other ham radio DATV product lines that are compatible with vMix.

Which vMix Product to Get?

vMix Basic is a free video-mixer-editor software package for SDTV format video (Standard Definition) that is available from *vMix.com*.



Important Note:

Please visit the Download page and try out vMix using our **FREE 60 Day Trial** before purchasing to ensure vMix supports your computer hardware.

vMix is available in six editions. Each purchase does not expire and includes Free Version Updates for one year from the date of purchase.
Please visit our Knowledge Base for answers to common questions, including: Which edition of vMix do I need?

Click the button below to pay via Credit Card, PayPal, Bank Transfer or Purchase Order

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	Basic	Basic HD	SD	HD	4K	Pro
	FREE	$60 USD	$150 USD	$350 USD	$700 USD	$1200 USD
Total Inputs	4	4	1000	1000	1000	1000
Camera / NDI Inputs	2	3	1000	1000	1000	1000
Maximum Resolution	768x576	1920x1080	768x576	1920x1080	4096x2160	4096x2160
Overlay Channels	1	1	4	4	4	4

Figue01 – The array of vMix products – including free vMix BASIC

There are more-professional HDTV products that are available for sale, including the vMix Basic HD for US$60. See Figure01 for array of vMix products. The download you want is currently called vMix 17

The free video-editing software allows you to:

1. *support one or two USB-cameras*
2. *use a JPEG file as a "Test Pattern" video source*
3. *switching between the two video sources (see Figure02)*
4. *adding a better-looking call-letters-overlay*
5. *try "green-screen" video tricks*

The vMix Main Screen

The screen-capture in Figure02 shows the normal screen to operate vMix.

The large window in the upper left is called the Preview Window. The large window in the upper right is called the Live Video Window.

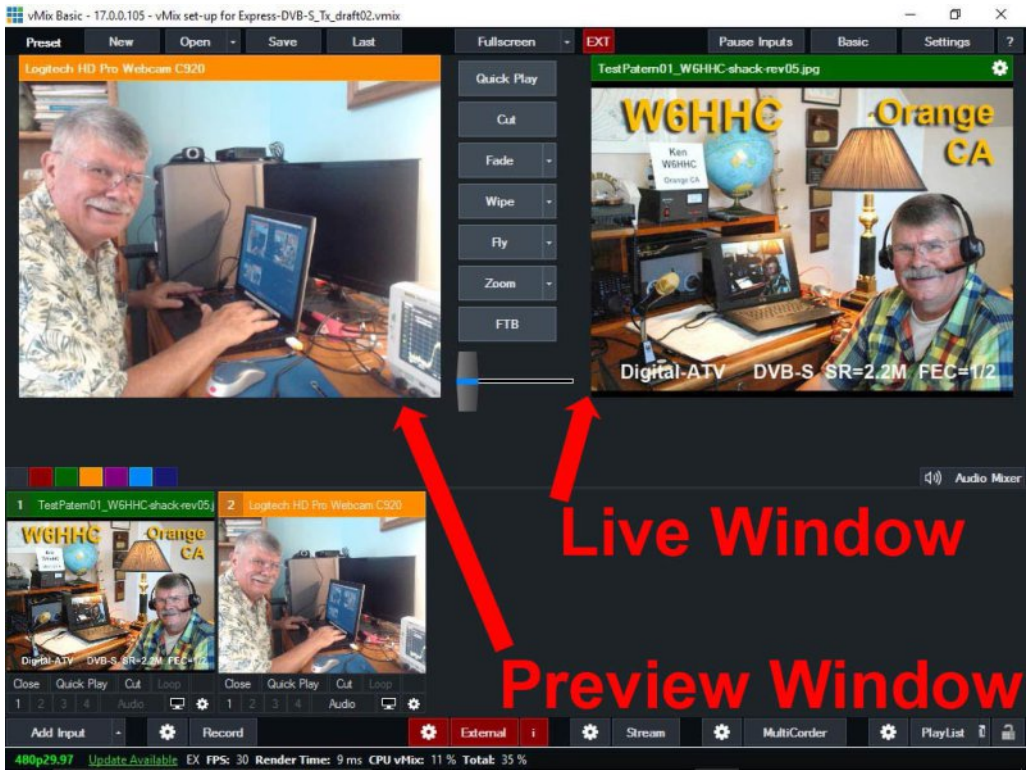
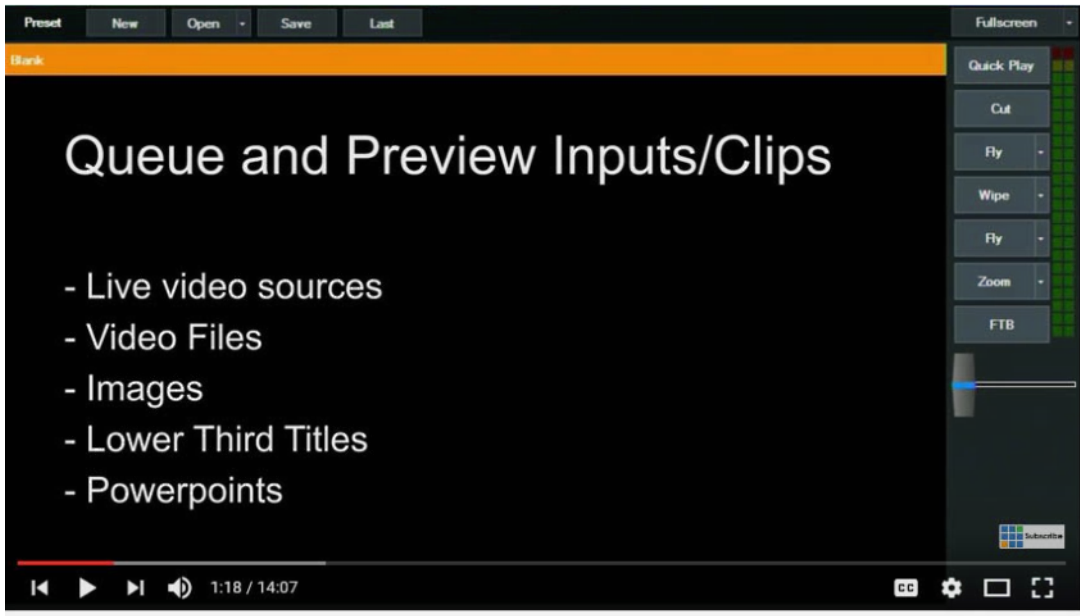


Figure02 – An example of vMix Basic video Main Screen with one camera (in Preview) and a "Test Pattern" JPEG (in Live Window)

The two smaller screens in the lower left are where you bring in new cameras and video to look at…and then select for Preview. The free vMix Basic only allows three video sources to be viewed in the lower-left. More-professional products available for sale can allow more video sources to be viewed here.

vMix Preview Window

The Preview Window allows you to queue up a number of video sources and have next selected video ready to become "Live" at the push of a button. What can be selected for display here can be cameras, video files, JPEGs, and PowerPoint slides for a slideshow video stream.



vMix Live Production Software - General Overview & Demonstration Tutorial

Figure03 – Main capabilities of the Preview Window

You will be able to switch from "Preview" to "Live" by clicking a single button.

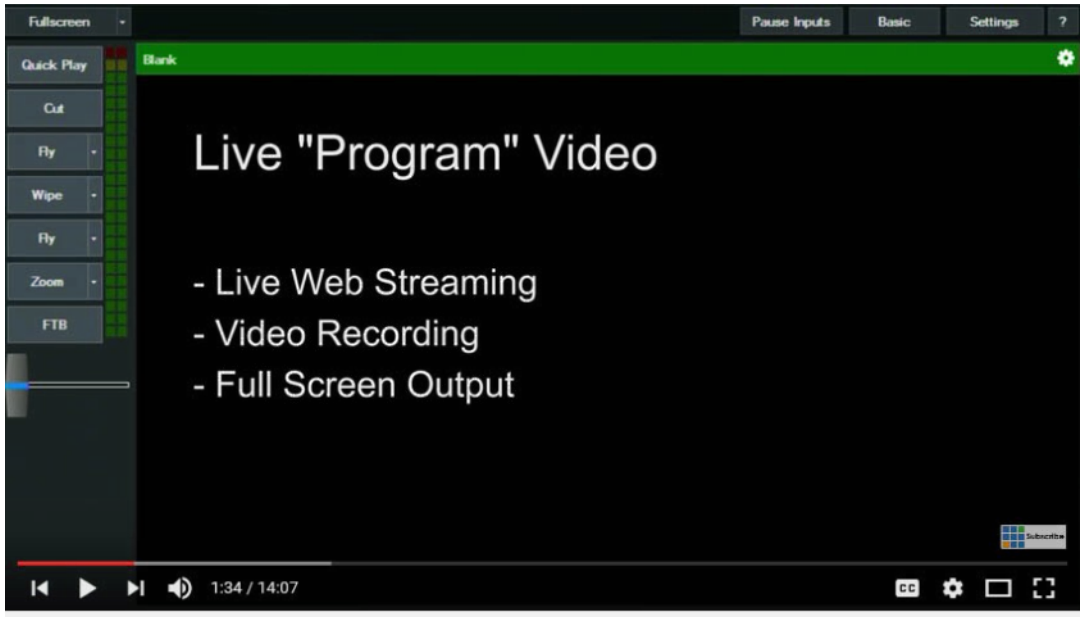
vMix Live Program Video Window

The Live Video Window displays the actual video that you have chosen to transmit or stream out (Figure04).

vMix Input Selection List

When setting up a Preview Window for the correct camera and microphone, the user just presses the ADD INPUT button in the lower left corner of the Main Screen.

A long list of choices for video sources and audio sources will appear as shown in Figure05.



vMix Live Production Software - General Overview & Demonstration Tutorial

Figure04 – Main capabilities of the Live Program Video Window

Here is a partial list of inputs to vMix that can be selected:

- *Video files*
- *DVD*
- *Cameras*
- *NDI allows Skype as input*
- *JPEG file (as Test Pattern, etc)*
- *A slideshow of JPEG files*
- *Audio files*
- *Microphones*
- *Adding Title overlays*
- *Your web browser*

Figure05 (Right) – List of input sources available to be selected by DATV users.

One important concept about configuring your camera in vMix is selecting the correct frame rate. The selected framerate for vMix is ALWAYS set to equal the framerate being output from the camera, NOT the framerate that you want to transmit via DATV. The vMix tutorials on YouTube spend a lot of effort to explain that:

- *PAL = 25p (progressive output fps)*
- *PAL = 50i (interlaced output fps)*
- *NTSC = 29.9p (progressive output fps)*
- *NTSC = 59.9i (interlaced output fps)*

vMix Titles

vMix has the ability to allow you add a "title overlay" to your video. I personally do NOT like this feature very much, because it takes up too much room on the screen and is too fancy for my style.

Figure06 – Using the vMix Titles feature to overlay your transmitted video stream

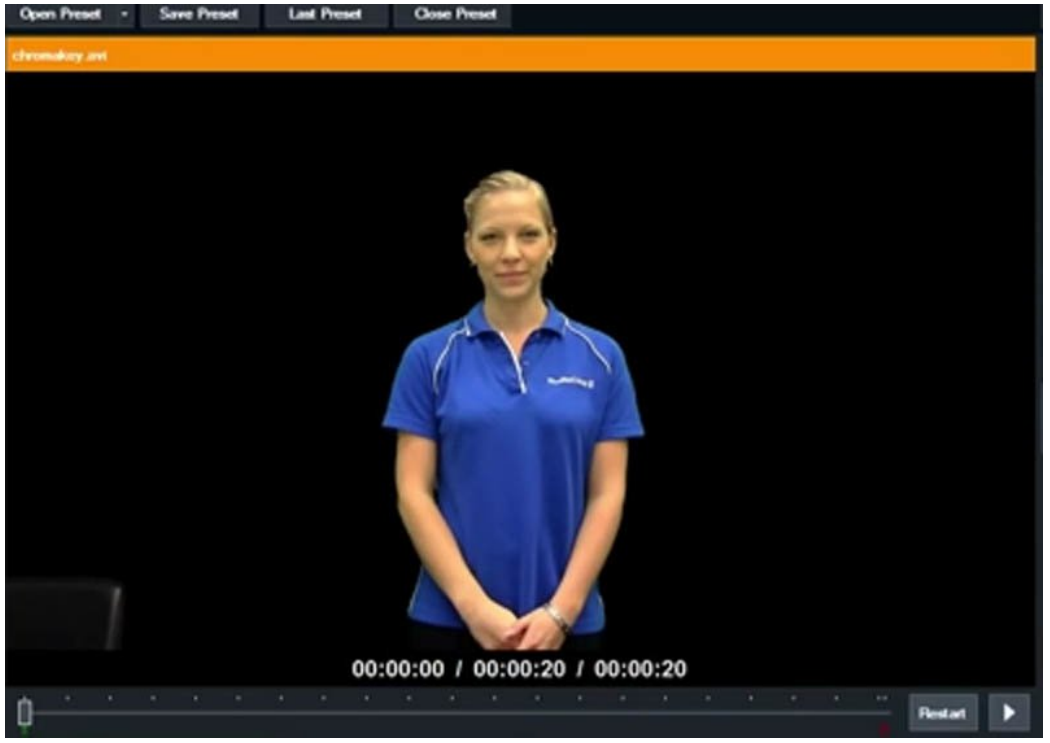
Green Screen Effects

A neat feature of vMix is to create "green screen" tricks to combine a live camera shot (perhaps a talking presenter in the studio) with a video clip of a faraway place. As shown in Figure07. There are three parts:

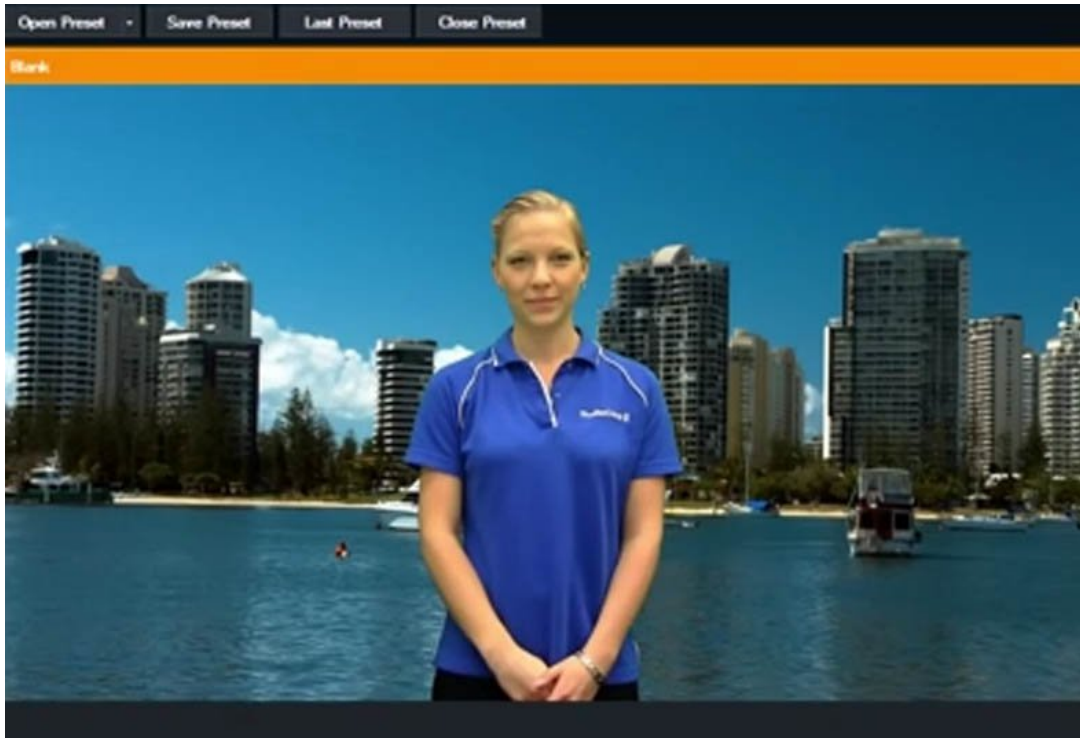
The studio camera video presenter stands in front of an actual green sheet

Figure07 (above) continued next page

Part 2 and 3 top left and right respectively



Using vMix to make the green sheet become transparent, leaving only the studio presenter remaining



Combining the transparent studio video and video file

Conclusion

The vMix function makes a good companion software package for Digital-ATV. The cost of the entry level vMix Basic product (SDTV) is free. The cost of the vMix Basic HD product (HDTV) is reasonable at US$60. vMix is very useful if you have more than one video camera being used for DATV transmissions. Or if you use one camera and want to switch to a Test Pattern sometimes or want to switch to a slideshow sometimes. vMix is a much better product than an old EMPREX model BMP-001 media box for producing DATV slideshows/test-patterns from JPEGs.

Contact Info

The author may be contacted at *W6HHC@ARRL.net*

Useful URLS

- *vMix Product descriptions, prices and downloads: www.vMix.com*
- *vMix tutorials (including YouTube) on how to use features: https://www.youtube.com/watch?v=ESWTcbtWq7U&list=PLrm0RX9U0Mzxg-uJeE5Em3DAsgBHHaY8P and http://www.vmix.com/support/training-videos.aspx*
- *British ATV Club - Digital Forum: www.BATC.org.UK/forum/*
- *CQ-DATV online (free monthly) e-magazine: www.CQ-DATV.mobi*
- *Orange County ARC entire series of newsletter DATV articles and DATV presentations: www.W6ZE.org/DATV/*

More Efficient Mobile Encodes for Netflix Downloads

By Andrey Norkin, Jan De Cock, Aditya Mavlankar and Anne Aaron

Last January, Netflix launched globally, reaching many new members in 130 countries around the world. In many of these countries, people access the internet primarily using cellular networks or still-developing broadband infrastructure.

Although we have made strides in delivering the same or better video quality with less bits (for example, with per-title encode optimization), further innovation is required to improve video quality over low-bandwidth unreliable networks.

In this blog post, we summarize our recent work on generating more efficient video encodes, especially targeted towards low-bandwidth Internet connections. We refer to these new bitstreams as our mobile encodes.

Our first use case for these streams is the recently launched downloads feature on Android and iOS.

What's new about our mobile encodes

We are introducing two new types of mobile encodes - AVCHi-MobileVP9-Mobile. The enhancements in the new bitstreams fall into three categories:

(1) new video compression formats
(2) more optimal encoder settings
(3) per-chunk bitrate optimization

All the changes combined result in better video quality for the same bitrate compared to our current streams (AVCMain).

New compression formats

Many Netflix-ready devices receive streams which are encoded using the H.264/AVC Main profile (AVCMain). This is a widely-used video compression format, with ubiquitous decoder support on web browsers, TVs, mobile devices, and other consumer devices. However, newer formats are available that offer more sophisticated video coding tools.

For our mobile bitstreams we adopt two compression formats: H.264/AVC High profile and VP9 (profile 0). Similar to Main profile, the High profile of H.264/AVCenjoys broad decoder support. VP9, a royalty-free format developed by Google, is supported on the majority of Android devices, Chrome, and a growing number of consumer devices.

High profile of H.264/AVC shares the general architecture of H.264/AVC Main profile and among other features, offers other tools that increase compression efficiency. The tools from High profile that are relevant to our use case are:

- *8x8 transforms and Intra 8x8 prediction*
- *Quantization scaling matrices*
- *Separate Cb and Cr control*

VP9 has a number of tools which bring improvements in compression efficiency over H.264/AVC, including:

- *Motion-predicted blocks of sizes up to 64×64*
- *1/8th pel motion vectors*
- *Three switchable 8-tap subpixel interpolation filters*
- *Better coding of motion vectors*
- *Larger discrete cosine transforms (DCT, 16×16, and 32×32)*
- *Asymmetric discrete sine transform (ADST)*
- *Loop filtering adapted to new block sizes*
- *Segmentation maps*

More optimal encoder settings

Apart from using new coding formats, optimizing encoder settings allows us to further improve compression efficiency. Examples of improved encoder settings are as follows:

- *Increased random access picture period: This parameter trades off encoding efficiency with granularity of random access points.*
- *More consecutive B-frames or longer Alt-ref distance: Allowing the encoder to flexibly choose more B-frames in H.264/AVC or longer distance between Alt-ref frames in VP9 can be beneficial, especially for slowly changing scenes.*
- *Larger motion search range: Results in better motion prediction and fewer intra-coded blocks.*
- *More exhaustive mode evaluation: Allows an encoder to evaluate more encoding options at the expense of compute time.*

Per-chunk encode optimization

In our parallel encoding pipeline, the video source is split up into a number of chunks, each of which is processed and encoded independently.

For our AVCMain encodes, we analyse the video source complexity to select bitrates and resolutions optimized for that title. Whereas our AVCMain encodes use the same average bitrate for each chunk in a title, the mobile encodes optimize the bitrate for each individual chunk based on its complexity (in terms of motion, detail, film grain, texture, etc).

This reduces quality fluctuations between the chunks and avoids over-allocating bits to chunks with less complex content.

Video compression results

In this section, we evaluate the compression performance of our new mobile encodes. The following configurations are compared:

- *AVCMain: Our existing H.264/AVC Main profile encodes, using per-title optimization, serve*
- *AVCHi-Mobile: H.264/AVC High profile encodes using more optimal encoder settings and per-chunk encoding.*
- *VP9-Mobile: VP9 encodes using more optimal encoder settings and per-chunk encoding.*

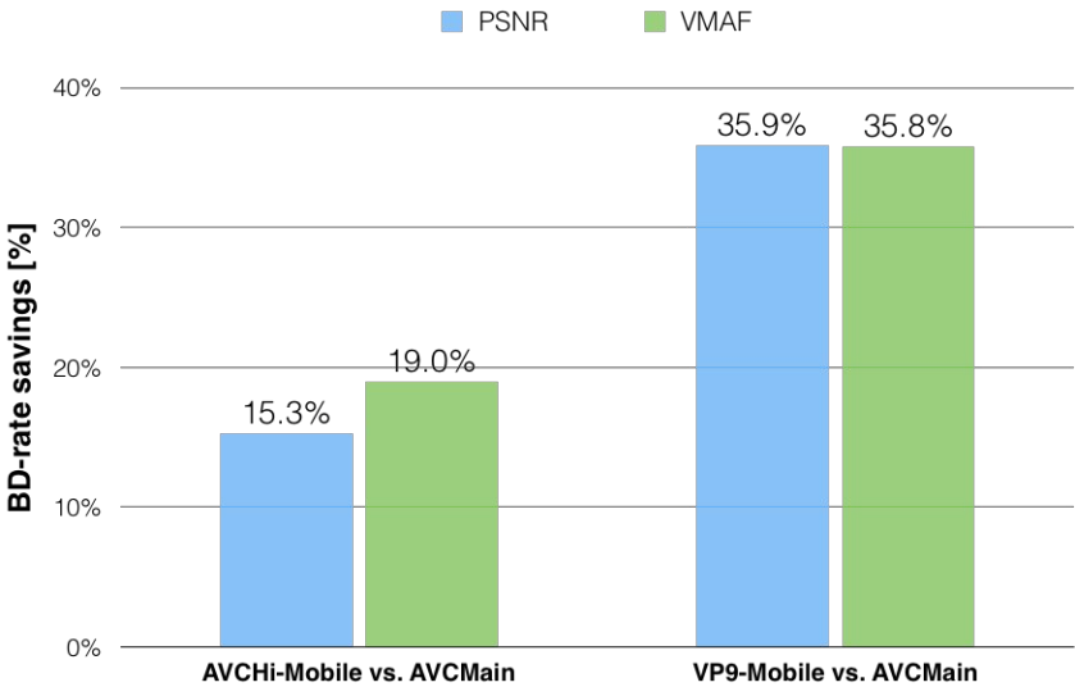
The results were obtained on a sample of 600 full-length popular movies or TV episodes with 1080p source resolution (which adds up to about 85 million frames). We encode multiple quality points (with different resolutions), to account for different bandwidth conditions of our members.

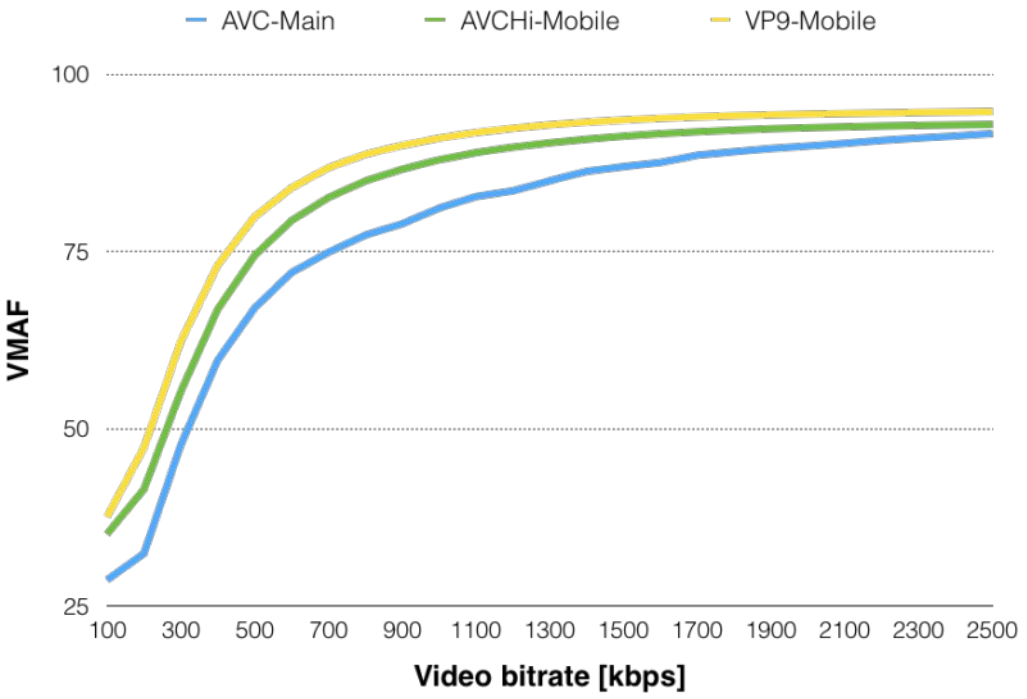
In our tests, we calculate PSNR and to measure video quality. The metrics are computed after scaling the decoded videos to the original 1080p source resolution.

To compare the average compression efficiency improvement, we use Bjontegaard-delta rate (BD-rate), a measure widely used in video compression. BD-rate indicates the average change in bitrate that is needed for a tested configuration to achieve the same quality as the anchor.

The metric is calculated over a range of bitrate-quality points and interpolates between them to get an estimate of the relative performance of two configurations.

The first graph (next page) illustrates the results of the comparison. The bars represent BD-rate gains, and higher percentages indicate larger bitrate savings. AVCHi-Mobile streams can deliver the same video quality at 15% lower bitrate according to PSNR and at 19% lower bitrate according to VMAF.





The VP9-Mobile streams show more gains and can deliver an average of 36% bitrate savings according to PSNR and VMAF. This demonstrates that using the new mobile encodes requires significantly less bitrate for the same quality.

Viewing it another way, members can now receive better quality streams for the same bitrate. This is especially relevant for members with slow or expensive internet connectivity.

The next graph illustrates the average quality (in terms of VMAF) at different available bit budgets for the video bitstream. For example, at 1 Mbps, our AVCHi-Mobile and VP9-Mobile streams show an average VMAF increase of 7 and 10, respectively, over AVC-Main.

These gains represent noticeably better visual quality for the mobile streams.

How can I watch with the new mobile encodes?

Last month, we started re-encoding our catalogue to generate the new mobile bitstreams and the effort is ongoing.

The mobile encodes are being used in the brand new downloads feature.

In the near future, we will also use these new bitstreams for mobile streaming to broaden the benefit for Netflix members, no matter how they're watching.

Source: *http://techblog.netflix.com/2016/12/more-efficient-mobile-encodes-for.html*

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But if you have a Kindle 3G then yes, but only to Amazon, and there is not a lot of ATV material on their site.
Smart phone reading apps are ok providing that you have a 3G data connection.

Note: These links will fire up your devices browser and if you are using 3G/4G then you will incur data usages charges.

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Although a formatted article showing the layout can be sent, we prefer an unformatted text file of the script, along with annotations of where important images should be placed. All images should be identified as Fig 1 etc and sent seperately.

Images should be in PNG format if possible and the best quality available. Do not resize or compress images, we will do all the rework necessary to publish them.

If you are sending a construction project, please include the dimensions of any pcb's and make the pcb image black and white, not greyscale.

CQ-DATV reserves the right to redraw any schematics and pcb layouts to meet our standards.

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