In this issue

The CQ-DATV editors gratefully acknowledge all those authors that have contributed articles for this free magazine.

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Editorial

Welcome to CQ-DATV 78

Let's start with the news. In the UK we now have a drone registration scheme and a mandatory test to operate drones weighing more than 250g. The is an online test costing £9. With an estimated 130,000 drones in operation it is probably well overdue. I suspect that this will not effect the 5GHz ATV equipment that is a spin-off from this technology and proving very popular with the ATV fraternity.

Trevor has written part 11 of the GVG panel developments and the software now has the ability to provide pre-set and take functions. It's also interesting to note that a pair of GVG panels appeared on Ebay and changed hands for £88. One was complete with a case the other panel was sadly without a case. If you are the new owner, drop the editor a line as we would like to keep track of these panels.

Trevor is not the only person looking at vintage equipment. Jim Andrews, KH6HTV is looking at a 1980's Frequency West microwave oscillators that often turns up on e-bay and hamfests (something to look out for). They have a VCO that runs between 1-2GHz, but is locked to a xtal in the 100MHz - 110MHz range, and a step recovery diode multiplier is then used to generate higher order harmonics. A narrow band band-pass filter is then used to pick off the desired harmonic. I will let Jim talk you through the units but they sound like a clever bit of kit.

Mario Badua, Jr KD6ILO takes us into the word of Video Conferencing and Amateur Television. Having eight members out of eighteen in his group who prefer to just watch ATV using their DVB-T, DVB-S set-top receivers or watching the streaming media source.

Jim Andrews, KH6HTV & Dave Pelaez, AH2AR are evaluating the Hi-Des, Model BR-101EH, DVB-T Repeater. This is a complete self-contained DVB-T repeater built into a USB dongle. It is extremely small and comprises of a TV receiver and TV transmitter combo (admittedly of very low power) with coax connectors. It is a stand-alone unit in that does not need a support PC when in operation, just a 5V DC power supply. A PC is necessary however to initially setup the unit's operating parameters.

Trevor has come up with some revised links and notes for anyone planning to make a Christmas video. Well, this is the season of good cheer and who does not get out the family camcorder and thrust it at them to record the event. So plan early for the best results.

John Gebuhr - WB0CMC has been taking us through a 250 watt 70cm PA that he built some 2 years ago. It uses an MRF6VP3450H transistor and the layout recommended by the manufacturer. John has pushed this amplifier to 400w but only for CW and rates it at 250 Watts for full linearity.

One from the Vault looks back at CQ-DATV 40 wuth Mike Stevens G7GTN quick overview of the Great Cow Basic Compiler.

So sit back and enjoy CQ-DATV 78 and from all our contributors and the editorial team have a Merry Christmas and a Happy New Year. Look forward to twelve more editions of CQ-DATV in 2020.

Drone on

DJI Mavic 2 Pro 20MP Camera Drone

Drone users in the UK must now sit an online test and pay a £9 annual fee or face a £1,000 fine after the launch of a mandatory national registration scheme on Tuesday. Owners are obliged to identify and label all drones by 30 November, and operators must pass a test about legal and safe usage before they can fly them.

The Civil Aviation Authority estimates that about 130,000 people will have to pay and register by the end of the month. All drones weighing more than 250g, which encompasses virtually all but the smallest toys, must be registered and labelled with a unique licence number. This means they will have to be grounded to identify their owners, but in future it could be done remotely or while drones are in the air. Some models already have transmitters that would enable that. The government announced the register in 2017 in response to growing concern over drone use, from smuggling drugs into prisons to the potential for collisions with planes around airports. Plans for a database of owners predated the most high-profile incident, the prolonged closure of Gatwick airport last December when a drone was repeatedly flown near the runway.

Further legislation has since been tabled to enhance police powers, including possible on-the-spot fines. Pilots welcomed the launch of the register. The Balpa union's head of flight safety, Rob Hunter, said: "This is another measure to encourage responsible drone operation, which is desperately needed to ensure a collision between an aircraft and a drone is avoided."

In a bid to soften the blow of mandatory tests and fees for owners, the CAA is launching an accompanying "drones reunited" site, citing research showing that more than one in four owners claims to have lost a drone. The platform will allow the CAA to return wayward drones, an occupational hazard that results from loss of power, poor signal, technical failure or operator error.

A CAA spokesman said the site would "give something back to the community, helping responsible drone owners and operators to be reunited with lost drones and continue flying"

(ED: To help with this 'problem' some drone manufactures latest products weigh in at 249g.)

Grass Valley Mixer Conversions - Part 11

Written By Trevor Brown G8CJS

The night before CQ-DATV 77 went to press I managed to get some code running that enabled the preset and take logic to work on the PST and PGM banks. This enables selection of sources pre-set on the PST bank to be mirrored by the PGM bank when the cut button is pressed.

Unfortunately we had passed the issue 77 deadline, which left the GVG column a little thin. This is now working and there is a demo of this operation on the *CQ-DATV Facebook* site.

This logic is important as it's a feature of this type of mixer and differs from the previous range of mixers which are often referred to as A-B mixers, because the T-bar sits adjacent to the A and B banks indicating which one is live in the event of a mix. This was fine in its day, but once mixers became connected to edit controllers the T-bar could get out of step when a mix was commanded from an external controller.

Also this earlier generation of mixers where live cutting on the PGM bank was the order of the day, meant there were only on air cues or tallies to the camera operator. The pre-set and take mixers gave warning cues to the camera operator that his or her camera was selected on the PST and was about to go on air.

The camera cues differentiated between PST selection and on air selection with different coloured camera cue lights. Yes, you can still cut on the PGM and if so a warning will not be possible or if this facility was not wired to the camera or if the camera was not equipped with dual tally cues.

Lets not down grade our GVG panel and enable a preset and take logic with some revised source code. The revised code is called GVG 10b and is on the download site. The code is in two parts:-

Line 189 if B=4 and e= 191 then gosub cut ' cut button

This is a push-button command from the push button map (B4 191) published in an earlier edition. Line 189 is in the button pole section so it is frequently scanned by the programme counter looking for button presses.

When one is detected this code directs the programme counter to the code to process that particular button in the push button director code, where the appropriate subroutines are called. These are commented to help you negotiate your way through.

The code

B4 191 is the address of the cut button and when pressed will take you to Line 352 where the cut button subroutine is located.

Line 352 cut:

```
if (r AND 2)     <>  0 then  let r=r-2              'If PGM 0 lit
turn off
if (r AND 8)     <>  0 then  let r=r-8              'If PGM 1 lit
turn off
if (r AND 32)    <>  0 then  let r=r-32            If PGM 2 lit
turn off
if (r AND 128)   <>  0 then  let r=r-128           'If PGM 3 lit
turn off
if (o AND 32)    <>  0 then  let o = o -32         'if PGM 4 lit
turn off              Cut button lights turned off
if (o AND 128)   <>  0 then  let o = o -128    'if PGM 5 lit turn
off
if (o AND 64)    <>  0 then  let o = o -64          'if PGM 6 lit
turn off
```

```
if (o AND 16)    <>  0 then  let o = o -16        'if PGM 7 lit
turn off
if (n AND 1)     <>  0 then let n=n-1             'If PGM 8 lit
turn off
if (n AND 4)     <>  0 then let n=n-4             'If PGM 9 lit
turn off

if (n and 16)  <>   0 then let n=n+4              'PST9 cut to
PGM9
if (n and 64)  <>   0 then let n=n+1             'PST8 cut to PGM8
if (n and 128)  <>  0 then let o=o+16            'PST7 cut to
PGM7
if (n and 32)  <>   0 then let o=o+64            'PST6 cut to
PGM6      set the PGM latch that corresponds to
if (n and 8)  <>    0 then let  o=o +128         'PST5 cut to
PGM5                    the PST selected source
if (n and 2)  <>    0 then let o=o+32            'PST4 cut to PGM4
if (r and 1)  <>    0 then let r=r+128           'PST3 cut to PGM3
if (r and 4)  <>    0 then let r=r+32            'PST2 cut to PGM2
if (r and 16)  <>   0 then let r=r+8             'PST1 cut to PGM1
if (r and 64)  <>   0 then let r=r+2             'PST0 cut to PGM0

if (n and 16)  <>  0 then let x =  80        'PGM 9 IO update
if (n and 64)  <>  0 then let x =  96             'PGM 8 IO
update
if (n and 128)<>0  then let x = 112               'PGM 7 IO
update
if (n and 32)<>  0  then let x = 128              'PGM 6  IO
update
if (n and 8)  <>  0  then let x = 144             'PGM 5 IO
update          update the PGM I/O port
if (n and 2)  <>  0  then let x = 160             'PGM 4 IO
update
if (r and 1)  <>  0  then let x = 176             'PGM 3 IO
update
if (r and 4)  <>  0  then let x = 192            'PGM 2 IO update
if (r and 16)<>  0  then let x = 208             'PGM 1 IO update
if (r and 64)<>  0  then let x = 224             'PGM 0 IO update
gosub strobeo                                    ' O latch lamps
write the data to the push-button lamp
gosub strober                                    ' r latch lamps
latches
gosub stroben                                    ' n latch lamps
 i2c.begin IOa        'I/O port a'
i2c.write x+w          'PGM bank to I/O
update the shared I/O
i2c.end
return
```

The cut subroutine is in three parts. The first part is to clear the lights in the PGM bank, the second part is to identify the PST latch (remember you cannot read the GVG latches) so it relies on looking at the mirror copies of the commands stored as variables in n, o, and r in the software. It then extracts the relevant buttons by anding it with a number to mask all but the required latch bit and see if it is set or not. Once the set bit of the PST latch is located the corresponding lamp in the PGM bank is turned on so as to synchronise the PST selection with the PGM selection which is the on air Bank. This is done by writing to the latches that control the lamps.

Unfortunately for the third part we can't just call the PGM I/O subroutine as it updates the PGM I/O by button presses and we have written directly to the PGM latches and not pressed any PGM buttons. This problem is overcome by decoding the PST button pushes again and this time updating the variable x which is the PGM I/O data, adding it to w value which is the Key I/O. Remember they share the same I/O port (4 bits each bank) and finally updating the latches o, r, n, to illuminate the button lamps.

This enables you to preview a source on the PST bank and cut it up on air only if it is what you want. If you cut up a source on the PGM bank then it will be on air, no if's, no buts. This was a bit fiddly to get working with several pauses to go lie down in a dark room.

X Address

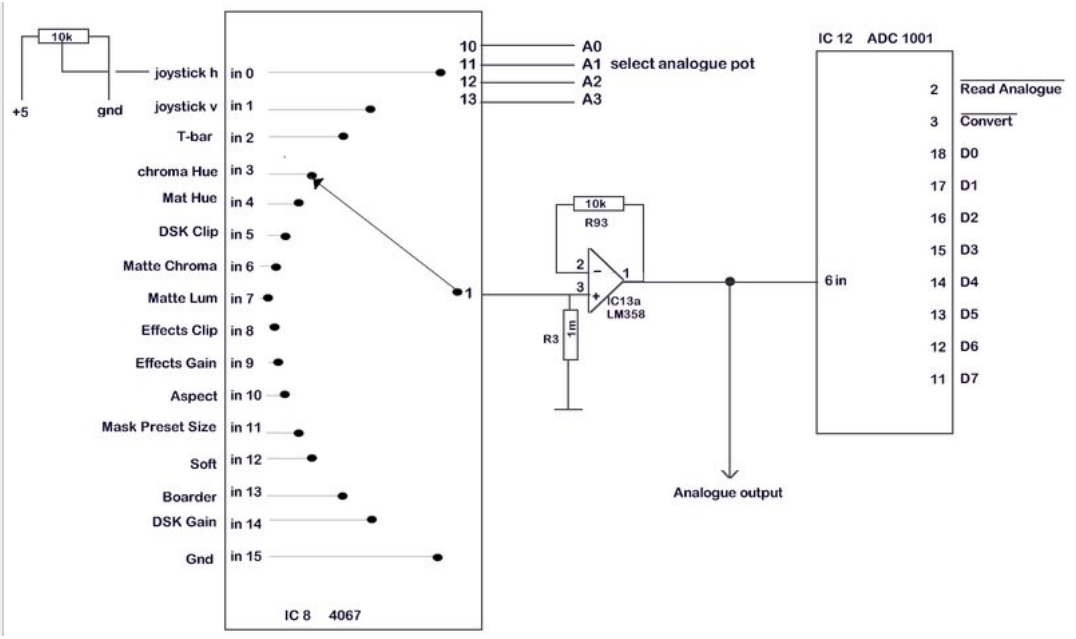
Y Address

PORT 4 single row word (decimal)	PORT 3 ADDRESS 0 latch LS0 soft copy n	PORT 3 ADDRESS 1 latch LS1 soft copy o	PORT 3 ADDRESS 2 latch LS2 soft copy p	PORT 3 ADDRESS 3 latch LS3 soft copy q	PORT 3 ADDRESS 4 latch LS4 soft copy r	PORT 3 ADDRESS 5 latch LS5 soft copy s	PORT 3 ADDRESS 6 latch LS6 soft copy t	PORT 3 ADDRESS 7 latch LS7 soft copy u
1	PGM 8	KEY 5	EFF KEY INV	KEY 3	PST 3	FTB	KEY	
2	PST 4	KEY 4	EFF KEY MASK	ASPECT ON	PGM 0	DSK INV	BKGD	DSK MAT
4	PGM 9	KEY 7	EFF EXT	KEY 2	PST 2	DSK MASK	AUTO TRANS	OUTLINE
8	PST5	KEY 6	EFF KEY BUS FILL	Nb key lamp power	PGM 1	DSK MIX	KEY 8	DSK EXT VIDEO
16	PST9	PGM 7	EFF MATT FILL	KEY 1	PST 1	DSK PVW	WIPE	SHADOW
32	PST6	PGM 4	PST PTN	NB PGM lamp power	PGM 2	?	KEY 9	DSK EXT SOURCE
64	PST 8	PGM 6	CHROMA KEY	KEY 0	PST 0	UPPER LIMIT	MIX	BORDERLINE
128	PST 7	PGM 5	EFF KEY	NB PST lamp power	PGM 3	LOWER LIMIT		DSK BUS SOURCE

The lamp map for the mixer

Let's move on to reading the analogue controls in the GVG mixer panel, such as the T bar, Joystick and all the other pots. I have chosen to poll around two of these and initially just print two of their values on the screen with the wlog command to verify they are working. Remember all the I/O is full, so to bring these to the outside world will mean more hardware, something I don't want to do, if the software to our ESP module is slowing down (not that it has shown any signs so far).

We read the analogue pots by putting the address of the potentiometer onto the address bus (A0-A3). 15 inputs (address 0-14). This controls IC8 the switch in our diagram which switches the selected pot to IC12 (A to D converter).



How the analogue selector works and the A to D stores the result

Then we set the "convert" line to low and back to high again to latch the desired pot inside the A to D converter. Then set the "read analogue" to low, and the data from the A to D converter is available on D0-D7 as an 8-bit word. This is the code that performs that function.

```
i2c. begin PRT3
i2c. write  2          'tbar address
i2c. end
i2c. begin PRT1
i2c. write conv        'line low
i2c. end
i2c. begin PRT1
i2c. write tristate    'high again
i2c.end
i2c. begin PRT1
i2c. write  analogue   'analogue line low
i2c. end
```

```
i2c.reqfrom PRT4,1
tt = i2c.read        'tbar value
i2c.end
wlog tt       'print the value of the tbar
```

This example will put the T-bar value on editor screen, yes it keeps scrolling, but it will update as you move the T-bar back and forth. I can add some more I/O and push the variable tt out to it and I may yet do this. The write 2 can also be changed for any of the other analogue devices in the table below.

```
let analogue  = 239
let conv      =    231
let tbar      =    02
let joystick = 01
let joystickh = 00
let ckhue     = 03   'CK hue
let hue       =  04   'Matte Box Hue
let chroma  = 06   'Matte box Chroma
let lum       = 07   'Matte box Lum
let clip      = 08   'CK clip
let gain      = 09    'CK gain
let aspecta  = 10     'aspect pattern adjust
let mask     = 11    'mask preset size
let soft      = 12     'set softness
let width    = 13     'boarder width.
let pri       = 14     'effects priority
```

In the latest version of software (version 10b) , I have added these to the equates so just change write 2 to write joystickv or write joystickh for the vertical or horizontal joystick axes. The joystick has a limited range (at least on my hardware) and will detent at 97 for joystick horizontal, far left will deliver 68 and far right 124

Joystick vertical will detent at 157 and full up will deliver 186 and full down will deliver 128. Not enough to justify two 8-bit ports for horizontal and vertical Joystick data.

Adjusting the T-Bar for 255 to set zero pull the T-Bar down and the zero pot is in the sample position at the top

All the other analogue pots deliver 0 for CCW ranging to 255 for full CW, which is the limit of an 8-bit word in decimal and is pretty much what was expected.

The T-Bar is 0 to 240 on my panel, but there are some pots which can adjust this.

On early panels it's necessary remove the top deck to access them.

On later panels they can be accessed down the T-bar slot. Push the T-bar up and right at the bottom of the slot on the PCB is the top end adjuster. A quick tweak and my panel now has a T-Bar that ranges 0 to 255. The low-end pot, for setting the zero is reached through the top of the slot.

I have called the new subroutine analog1 and then repeated it as analog2. I set the first one as write T-bar and the second as write soft. I put two subroutine calls in the button pole part of the programme (line 128 and 129 see the new software download version 10b). E.G. gosub analog1 and gosub analog2.

The programme printed out the value of the T-bar and the softness control alternately and showed no sign of slowing up while I operated the mixer push button banks and both the T-bar and softness pot.

Should this prove annoying or should you want to change the wlog tt can be deleted at lines 636 and 662 for the T-Bar or Softness pot.

All line numbers refer to software version 10b. I hope that they enable you to follow the code. I know it is probably not structured quite as a professional code writer would do.

As I said in article 1, this is an exploratory dongle so that we can see how the GVG panel works, what is located where and how we could bring these functions out via an I2C interface.

Please feel free to experiment with the code and please keep CQ-DATV in the loop if you come up with any refinements as I am sure there are many that can be made or improved on.

All you need is the free Annex editor software and an ESP micro to develop your version of the code. Yes, a panel would help, but we can always run your code for you and provide feedback.

The downloaded code can also be opened in notepad, but you will not see the line numbers, so the free Annex editor is strongly recommended and is available from :

https://sites.google.com/site/annexwifi/home

The panel has flexibility, but we cannot keep adding PCF8574's and adding subroutines we need a plan and although I am sure Mike G7GTN can produce PCB's, we need to realise there is a limit to the number of PCF 8574's the I2C bus will support and even if we use a mix of PCF 8574's and PCF 8574A's there is still a limit. Also, GVG 100 control panels are not flooding eBay. They are good value for money, perhaps because they are long gone and what have not been dispatched to that great TV station in the sky, have been converted to ATEM controllers.

I hope that this edition delivered on my analogue promise, if only numbers to the screen so you can test the pots, T-bar and Joystick or whatever you change the analogue subroutines to control.

This is not the end. I hope before the next issue to have discovered how to drive the four 8-bit display LED's which look like numbers only, I'm afraid so no displaying your call-signs in that window.

This is your free ATV magazine.
Please consider contributing an article!

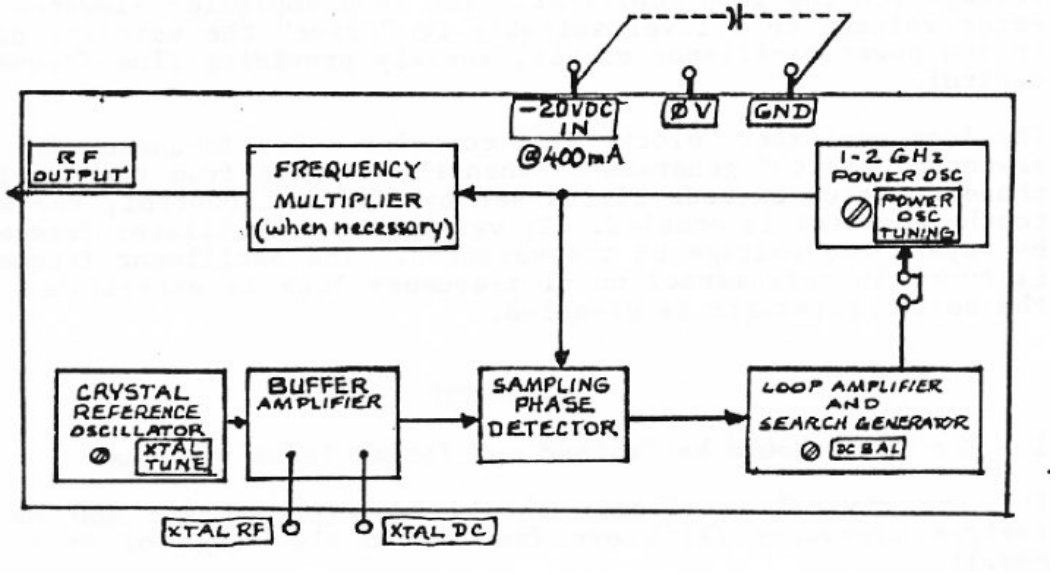
CQ-DATV

ALL BACK ISSUES AVAILABLE

Frequency WesT - Microwave Oscillators

Reprinted form Boulder Amateur Television Club TV Repeater's REPEATER November, 2019 with kind permission Jim Andrews, KH6HTV, editor

The fundamental building block used by most ham, microwave enthusiasts is a Local Oscillator (LO) built by Frequency West. These are vintage items dating from the 1980s and were used in a lot of microwave relay stations. As shown in the above photos there are several variations in the construction. These are available at ham radio swapfests, on E-Bay, and also from commercial, used microwave equipment dealers. Current prices are found to range all over the place from as low as $20 to over $500. At $20, "Buyer Beware !", it probably is a non-functioning unit.



Frequency West Block Diagram - Thanks to K0CQ

The basic configuration starts with an oven controlled crystal oscillator in the 100-110 MHz range. Next is a free running voltage controlled oscillator (VCO) running in the 1- 2GHz range. The VCO is phase locked to a harmonic of the crystal oscillator. For outputs higher than 2 GHz, a step recovery diode (SRD) multiplier is then used to generate higher order harmonics. A narrow band, band-pass filter is then used to pick off the desired harmonic.

The FW bricks were all designed to run off of -20 Vdc and draw typically about 400 mA. They all also have two or three test outputs labeled ΦV, Xtal & Alarm. The ΦV monitors the VCO search generator. If a square wave is present, the VCO is not locked to the crystal. When lock is achieved, the square wave stops and a dc voltage is present. The Xtal test point gives a dc voltage relative to the crystal oscillator output. Alarm is a contact relay switch which closes to ground when the VCO loses lock. Some FW bricks allow for an external reference frequency input. Also some FW bricks provide an output of the internal reference frequency.

Here are a few hints from Don, N0YE, on checking out and tuning a FW brick oscillator: The cavity oscillator has a sweep circuit to find the frequency on which to lock onto a multiple of the crystal oscillator frequency. If the RF output is not stable and moving around a lot, then the VCO is not locked to the crystal.

The first question is there a crystal in the brick? If so, is the crystal oscillator circuit oscillating? If not try tuning to get that circuit to get an oscillation. If there is no crystal, get one and get the circuit to oscillate. The brick may require an external reference. Given that the brick has a crystal oscillator circuit, there is variable capacitor accessible to the outside that is used to fine tune the crystal oscillator.
Once you have a crystal oscillator up and running, the cavity oscillator needs to be locked to the reference oscillator. There is a large screw that is adjustable from the side of he brick. Turn this screw in or out to find the cavity frequency that locks to a multiple of the crystal oscillator. When you have a lock, the brick output will become fixed. Your spectrum analyzer will show when the cavity in locked. There may be two or more multiples of the crystal oscillator frequency that the cavity will lock onto. All lock frequencies are integer multiples of the crystal oscillator. It may be the cavity on your unit is close to lock, and so tune in a short distance and out a short distance in hopes the lock is nearby.

For more information on these FW bricks, there is more info available on the internet.

A good summary is from Gerald Johnson, N0CQ – "The Frequency West Bricks are more Versatile than Advertised"
http://www.geraldj.networkiowa.com/papers/2017/2017VersatileFWBricks.pdf

Another excellent resource for ham microwave projects is Bob Atkins, KA1FT's web site.
www.bobatkins.com/radio

His section on Local Oscillators includes a link to: "Frequency-West - Tune-up Procedure - Phase Locked Sources and Oscillators" (in .pdf)

http://www.thegleam.com/ke5fx/brick/fwbrick.pdf by N5GO & N5BHX

Video Conferencing integration programs and Amateur Radio Television

Written by Mario Badua, Jr KD6ILO

Getting veteran and the new membership of the Amateur Radio community interested in the mode of image communications is a challenging task at best. With the advent of Integrating video conferencing applications in to our network planned program, we may help introduce those who don't have the means and to those whom have shown some interest to participate and join us on our televised network meet ups.

Receiving our output RF signals being transmitted or simulcast via streaming media such as, BATC – British Amateur Television Clubs server or a YouTube "LIVE" streaming channel is a big plus. We have eight members out of eighteen in our group who prefer to just watch ATV using their DVB-T, DVB-S set top receivers or just watching the streaming media source.

Since most are more behind the scene active then wanting to be in front of the camera.

[ATN] Amateur Television Network, W6ATN, use of the video application, "Whereby", helps bring in their membership and affiliate Groups via IP video from around the U.S. and the world to their very large television network to include guests from other amateur radio television networks.

Members use it on their travels, vacations and for those whose stations that are temporally off the air use the service to continue checking in to the net to participate.

SD | Oceanside DATV Group, Use of the video conferencing application, "Vsee" works in just the same manner.

First we chose this application because of ease of setup, performance and flexibility. Second its use with our counter parts in Europe which I connect with each week to the United Kingdom and to three DATV stations in Belgium for the live down link video feeds coming from AMSAT-DL, QO-100, and having a video talk group with the three operators "LIVE" and transmitting it on to our repeater.

I have the application on my PC {Mario_KD6ILO} and Android [Moto-Z] smartphone aka {Remote KD6ILO} shown in the overlay. I use my Moto-Z smartphone as my show and tell camera also. Launched with my drone with its' 35-minute flight time the Moto-Z payload sends the live feed directly to my mobile VR-Link mobile repeater and to everyone that is linked to our conference at the moment.

Innovation, integration and application use of these video conference tools such as, Whereby and Vsee are great assets to our hobby when its used in sharing the hobby of amateur radio and television.

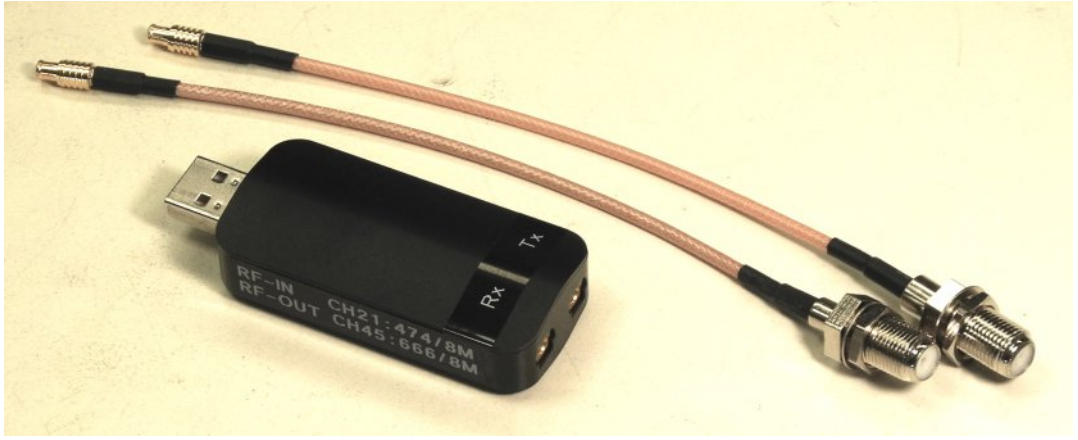
Where by *https://whereby.com/*

VSee - Download *https://download.vsee.com*

Note: More video than audio since it was just for a test program and testing of our channel 2 DVB-S 1268 KD6ILO DATV |Test Program Multi-screen |Test DVB-S2 1286 | 6 MHz

Evaluation of Hi-Des, Model BR-101EH, DVB-T Repeater

Written by Jim Andrews, KH6HTV & Dave Pelaez, AH2AR



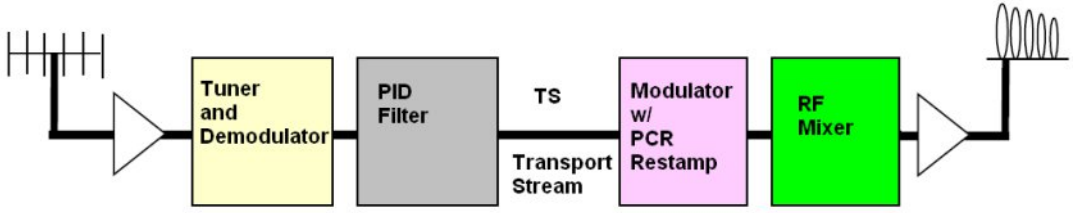


Fig. 1 Hi-Des BR-101EH & block diagram

The Hi-Des model BR-101EH is a complete, self-contained, DVB-T repeater. As seen in Fig. 1, it is extremely small. It is essentially a USB dongle TV receiver and TV transmitter combo (admittedly of very low power) with coax connectors.

It is a stand-alone unit, in that it does not need a support PC computer when in operation, just a 5Vdc power supply. A PC is necessary however to initially set-up the unit's operating parameters, such as frequency, bandwidth, etc.

The block diagram in Fig. 1 shows that the incoming TV rf signal is demodulated down only to a Transport Stream (TS) level and is then modulated onto a new, different TV rf carrier frequency. Because it only goes down to a TS stream and not all the way down to an HDMI signal, and then from HDMI back again through extra decoding & coding processes, there is essentially no digital signal degradation. Hi-Des claims no MER loss or noise addition.

The input and output channels are totally independent. The new transmit channel's frequency, bandwidth, code rate, guard interval, FFT, constellation can be totally different from the original received signal's. If the input channel data rate is less than the output, auto null-packet insertion will be done in the modulator.

Key Specs

For the BR-101EH from the Hi-Des web site are: Receiver frequency range = 50-950MHz; Transmitter frequency range = 50-950 & 1200-1350MHz; Bandwidths 2 to 8MHz; RF power out = -4dBm, & -18dBm (1.2GHz band), MCX rf connectors, runs on USB power of 5Vdc at 390mA. Size is a large USB dongle. Price is $239 (shipping included) *http://www.hides.com.tw/product_BR101eh_eng.html*

Hi-Des Customer Support

Before proceeding we want to comment on the excellent customer support from the Hi-Des company. We encountered two problems with both of the two new BR-101s we tested.

The first, most serious was they did not work on the 33cm band. They quit above 880MHz. The second issue was the video call sign feature on the turn-off trailer did not work. The trailer and timer worked but no call sign video appeared. We contacted Calvin Yang at Hi-Des about these issues. Hi-Des immediately went to work and within a week got us a new firmware update which resolved both issues.

So, if you ever have issues with any Hi-Des gear, do not hesitate to shoot an e-mail to Calvin at *calvin@hides.com.tw*

Accessories

Hi-Des supplies along with the BR-101EH, a 5Vdc, 2 Amp - AC wall wart power supply, a 7" USB extender cable, two coax cables with MCX & F connectors, and a CD. The CD contains in pdf the spec sheet, instruction manual, and the necessary program(s) files to set-up the unit.

Software

The software supplied on the CD was labeled: BR-101EV03 DTV Bridge-DVBT2DVBT_V1.1_20150827. This was dated from 27 August 2015 and was their latest version as of Nov. 2019. Thus the design of the BR-101 dates from 2015.

The first step in evaluating the BR-101EH was to install on a Windows PC the programming software called "DTV Bridge Controller". The Hi-Des manual is clear on how to install and use this program, except for the Call Sign. More on that later.

After encountering the above mentioned issues, Hi-Des supplied us with new firmware identified as: IT9517_1_19_1_0_DVBT_EagleDongleV3.bin If the reader should purchase in the future a BR-101, do not use the old 2015 firmware, but be sure the newer firmware is installed. If not, contact Hi-Des to get a copy of the latest firmware.

Initial Set-up

As the BR-101 comes from the factory, it has been programmed to the default settings of RF-in = 474MHz / 8MHz BW and RF-out = 666MHz / 8MHz BW. Assuming you want to use it on different frequencies/bandwidths, etc. – you will need to re-program it. To do this, it is necessary to first remove the top cover of the unit as there are several pc

Set DTV bridge board in configuration mode by **short Jumper J1 pin 1&2**

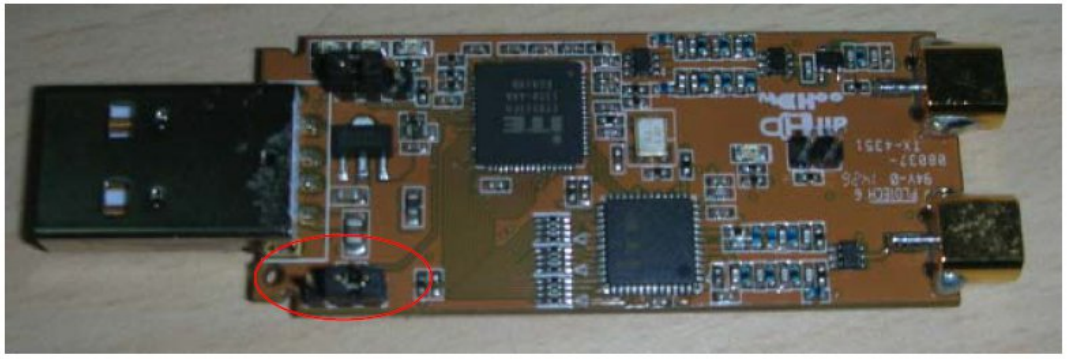


Fig. 2 BR-101EH with covers removed

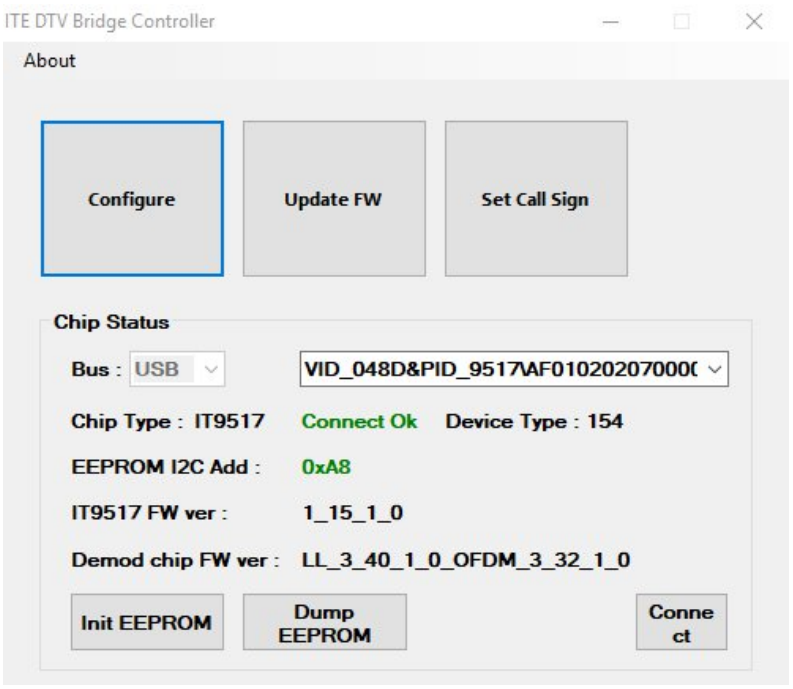
board jumpers that need to be set properly. This requires that you pry off the top cover. See Fig. 2.

After setting Jumper J1 to Configuration Mode, then connect the unit to your PC and run the program "DTV Bridge Controller". Two green LEDs will light up on the pc board. The first screen that will appear, Fig. 3, has a high-lighted button labeled "Connect". Click on this. Next click on the "Configure" button. This brings up a configure screen with factory default settings.

Every time we connect the unit to our PC for set-up, we will always get this default configuration screen. Next we need to click on "Read EEPROM" to down-load the current settings in the unit, which we will then modify as needed. We will always get some error message warnings. Just ignore them and click "OK".

At this point, we are now ready to start programming the BR-101 to work on our desired frequencies, etc.

Fig. 4 shows the setup used for initial testing of the BR-101 as a cross-band, 70cm to 23cm repeater. The receive frequency was set to 441 MHz and a bandwidth of 6 MHz. The transmit frequency was set to 1243 MHz again with a 6 MHz bandwidth.



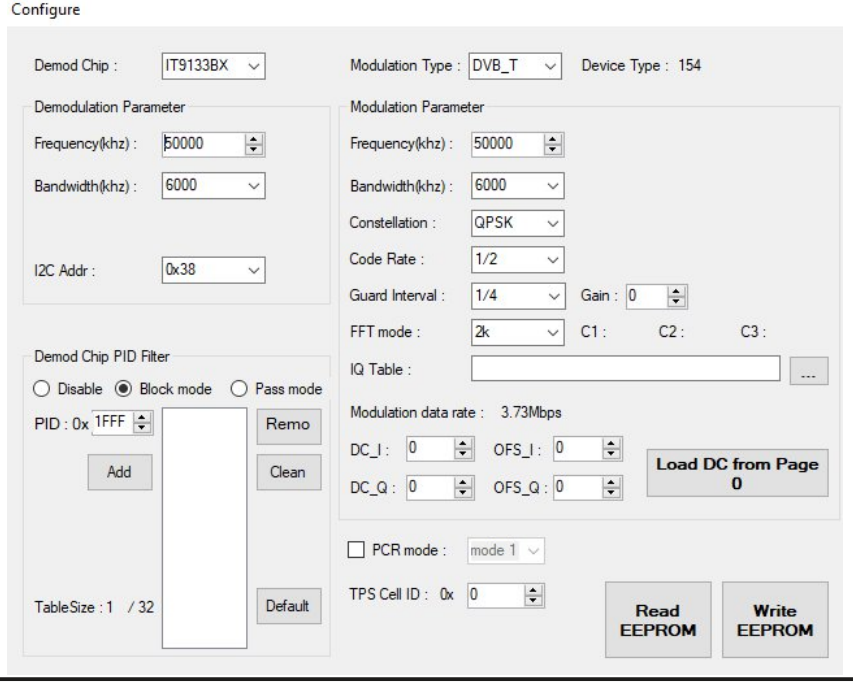


Fig. 3 Start up screen (top) and Configure screen (bottom) for DTV Bridge Controller

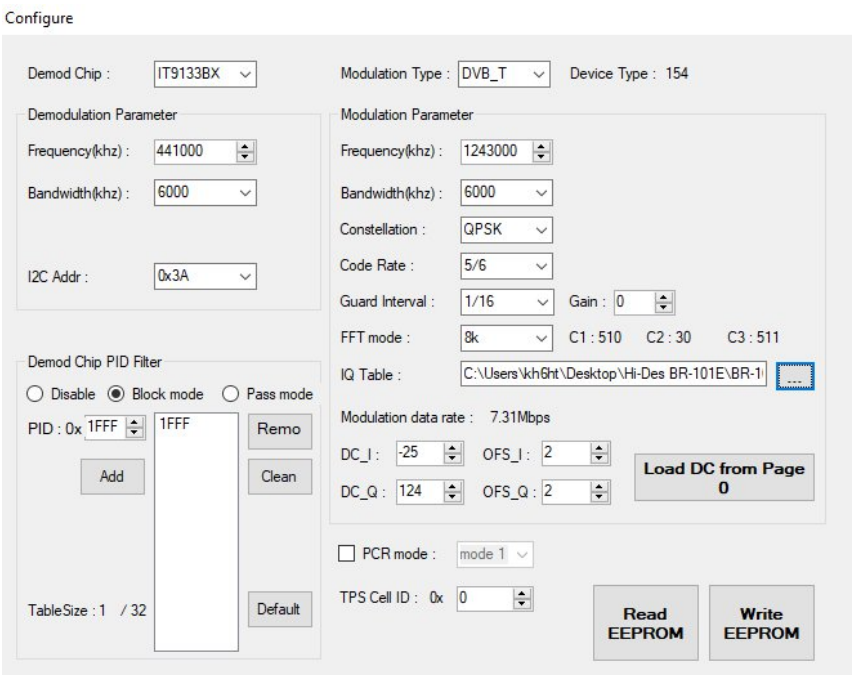


Fig. 4 BR-101EH set-up for operation as a cross-band, 70cm to 23cm DTV repeater

For the other transmission parameters of constellation, code rate (FEC), guard interval & FFT, the "Normal" settings for amateur DVB-T were used. See reference [1] for details. Hi-Des recommends using PID BLOCK Mode and only blocking the null-packets with PID = 0x1FFF. — thus leave set as "Block".

DC Calibration: This definitely needs to be loaded as it helps the modulator to perform properly. Follow Hi-Des instructions. It was found that it only needed to be loaded once. It was then retained in the EEPROM.

I-Q Table: Again, this definitely needs to be loaded as it helps the modulator to perform properly to achieve a good spectrum with minimal out of channel distortion products. We did find however, that it had to be reloaded every time the BR-101 was reconfigured.

The I-Q Table required is supplied by Hi-Des on the CD. It is labeled as: IQ_TBL_BR101V03.bin

After you have entered all the necessary data for your desired operation, then click on the "Write EEPROM". At this point you may then close out the program and remove the unit from your PC. Before using the BR-101, you must first reset the jumper J1 to the Normal Mode (J1 pins 2-3 shorted).

The table and photo on page 2 of the Hi-Des instructions shows the proper settings for the three pc board jumpers. The BR-101 is now ready for testing or operational use as a DTV Repeater.

Repeater Test

The first test was to see if it really functioned as a cross-band, 70cm to 23cm, repeater. A Hi-Des HV-100EH modulator was set on 441 MHz / 6 MHz bandwidth and input "live" HDMI, audio/video from a DVD player.

A lot of attenuation on the output of the modulator was used to control the rf input to the BR-101. The rf output from the BR-101, was sent to a Hi-Des HV-120 receiver with an HDMI video monitor. A 30dB, SMA attenuator was used on the HV-120 receiver input. The receiver was set to 1243 MHz / 6 MHz bandwidth. Bottom Line – IT WORKED !

Dave, AH2AR, had expressed concern about whether the BR-101 would also work as a 70cm in-band repeater. He was worried that due to the very close proximity of the on board receiver and transmitter, there would be too much cross-talk for close in channels. The BR-101 was tested again, this time with rf input of 441/6 MHz and rf output of 423/6 MHz. Bottom Line – IT AGAIN WORKED ! More specific details to follow.

DC Current

Hi-Des's spec. is 5Vdc @ 390mA. We measured 320mA when transmitting, 160mA in stand-by mode and 70mA in programming mode.

Frequency Coverage

Hi-Des specifies the receiver will cover from 50 to 950 MHz and the transmitter will cover from 50 to 950 MHz plus 1200 to 1350 MHz. We tested this and found the receiver did work over this range. However, in the initial testing, there was a failure in the transmitter's coverage. It worked from 50 up to 880MHz and again for the amateur 23cm band. It would not work for the amateur 33cm band (900-928 MHz). After contacting Hi-Des, they supplied us with new firmware which resolved this problem.

RF Output Power

Hi-Des specifies the output power will be 0dBm for 50-950 MHz and -12dBm for the 1.2 GHz band. (Note: there are inconsistencies in this spec. between the web site and spec. sheet provided on the CD) The rf output power was measured using an HP-432A power meter with a model 8478B thermistor power head (0.01-18GHz). The BR-101 was set to 6 MHz bandwidth and the internal attenuator to it's highest output setting (i.e. Gain = +6dB).

Frequency (MHz)	50	100	250	423	700	915	1243	1300
Pout (dBm)	0.5	2.2	0.0	2.6	2.0	-0.7	-5.8	-6.6

Thus the unit was in spec. for the 50-950 region. It was 6dB stronger than spec. for the 23cm band. When the bandwidth was changed to 2 MHz, the rf output power remained essentially the same. At 1249 MHz, we measured -6.2dBm.

The internal rf attenuator in the BR-101 was also spot checked using the HP power meter.

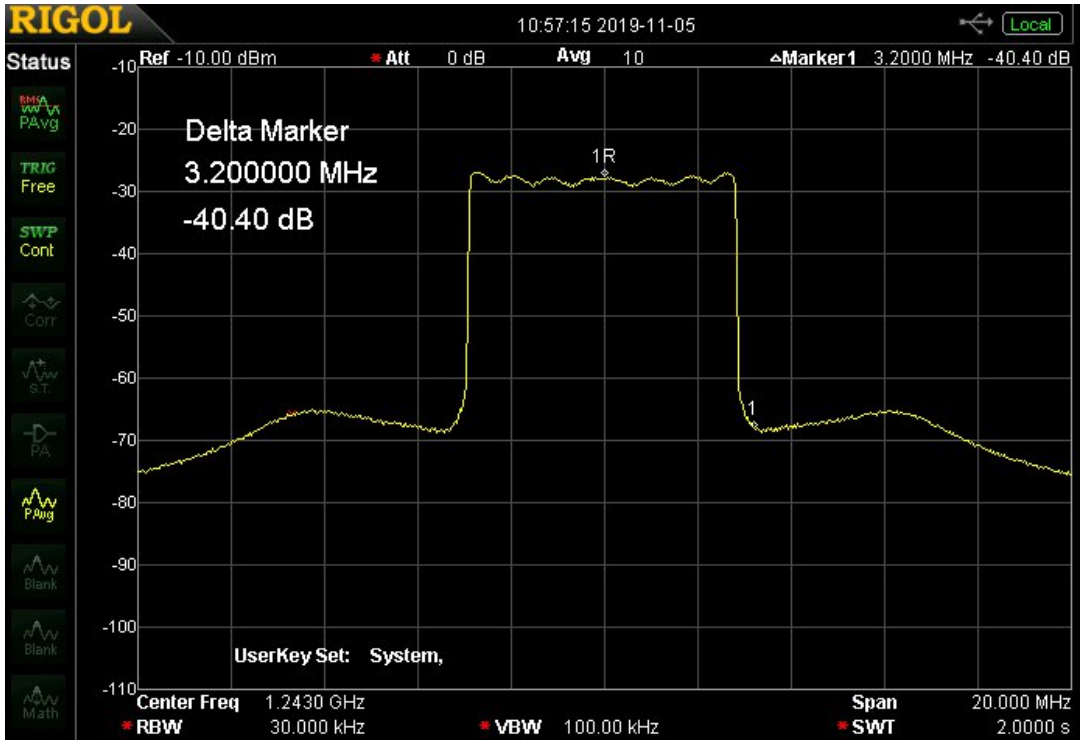


Fig. 5 BR-101EH's spectrum at 1243 MHz, 6 MHz bandwidth. 10dB/div & 2MHz/div

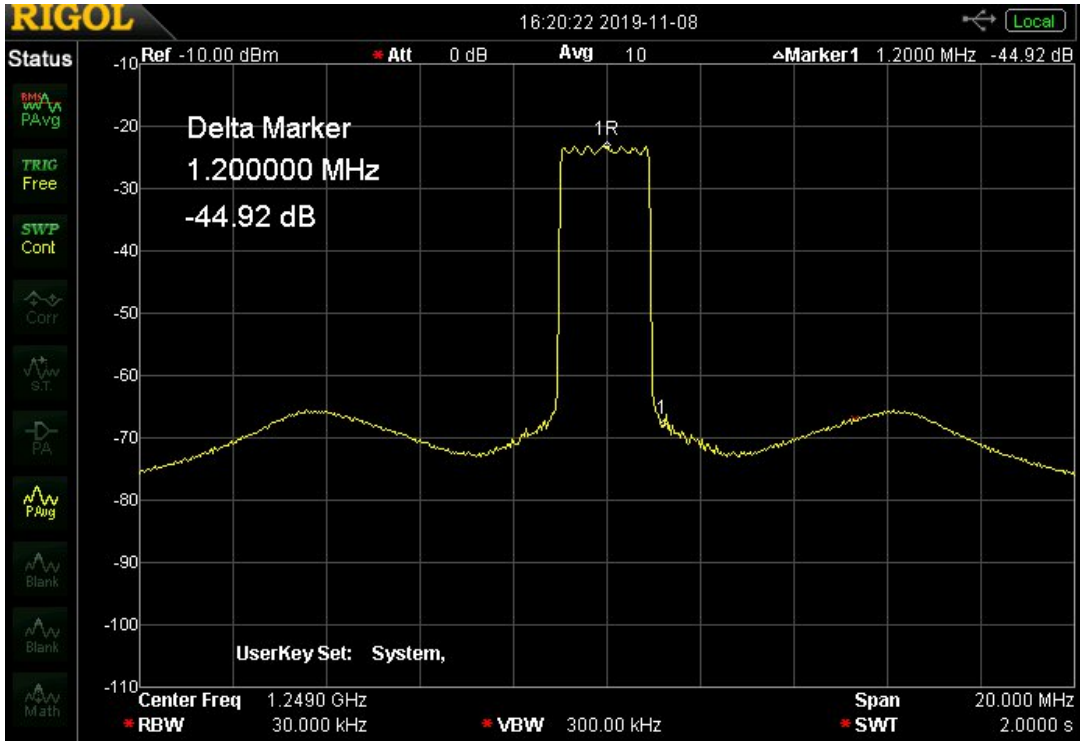


Fig. 6 BR-101EH's spectrum at 1249 MHz, 2 MHz bandwidth. 10dB/div & 2MHz/div

The Hi-Des's spec. is 0 to -15dB in 1dB steps. It was tested at settings of +6dB, 0dB & -4dB for a range of 10dB. The delta changes were quite accurate within 0.2dB.

RF Spectrum

The Hi-Des spec. for spectrum shoulders is better than 40dB for the low band and better than 35dB for the 1.2 GHz band. Figs. 5 & 6 show the measured spectrums for 23cm outputs with 6 and 2 MHz bandwidths.. These were measured with the maximum rf output power setting.

Spectrum Analyzer settings were per the ITU recommendations for measuring DVB-T signals. See W. Fischer, reference [2]. Center Frequency = center of channel, Span = 20 MHz, Resolution Bandwidth = 30 kHz, Video Bandwidth = 300 kHz, Detector = RMS, Sweep = 2 seconds Spectrum shoulders are measured using markers at ±200 kHz beyond channel edge, i.e. ±3.2 MHz from center frequency for a 6 MHz bandwidth.

For 6 MHz bandwidth, the spectrum shoulders were measured at each frequency tested for rf power from 50 to 1300 MHz. In every case they were -38dB or better at 200 kHz beyond the channel edge. At every frequency tested the spectrums were essentially the same shape as seen in Fig. 5. It should be noted that there was always a peaking in the out of channel spectrum at ±6 MHz from the center frequency. This was noted for both 6 and 2 MHz bandwidths. This peaking was typically about +3dB above the measurement at the channel edge.

Spectrum Spurious

We did discover that the BR-101 does put out a very low level carrier when in the stand-by mode. It is at the center frequency and is -62dBm in amplitude and 10 kHz wide.

Receiver Sensitivity

The test setup consisted of using a Hi-Des HV-320E modulator with input "live" HDMI, audio/video from a DVD player.

To minimize leakage and to be able to precisely control the rf test signal level, the modulator and DVD player were placed in another room. A long run of RG-58 cable was used to bring the rf signal to the test bench. An HP-432 power meter was used to measure the rf signal from the coax cable at the test bench.

Two, 20dB, SMA attenuators along with a Weinschel, step attenuator (0-69dB, 1dB steps) were then used to get a known, extremely weak, rf signal into the BR-101 receiver. The rf output from the BR-101 was sent to a Hi-Des HV-120 receiver driving an HDMI monitor.

The modulator was set to transmit with "normal" amateur DVB-T digital parameters. They were: modulation = QPSK, 8 K FFT, 5/6 code rate (i.e. FEC), 1/16 guard interval. The data rate was always set, per Hi-Des' recommendation to be about 80% of max. modulation data rate. For 6 MHz bandwidth, the data rate was set to 6 Mbps and resolution to 1080P. For 2 MHz bandwidth, data rate was set to 1.8 Mbps and resolution to 480i.

Sensitivity was defined to be the lowest level rf signal that gave solid, reliable, pictures with full motion and audio. Dropping the level one more dB resulted in freeze frames. Dropping one more dB and the picture totally disappeared.

Another good indicator was the on-board, green receiver LED which indicated receiver lock. It flickers with freeze framing and is solid green with a P5 picture.

For 70cm repeater service, the ARRL' band plan recommends the input be cable channel 60 (438-444 MHz) and the output be Ch 57 (420-426 MHz). Thus for 6 MHz bandwidth DTV, the center frequencies are 441 & 423 MHz. Thus the BR-101 receiver frequency was set to 441 MHz.

The first test was operating as a cross-band repeater with the output on 23cm (1243 MHz). The second test was as an in-band repeater with the output on 423 MHz. The measured sensitivities were:

cross-band, 70cm to 23cm = -97dBm
70cm in-band 441 to 423 = -97dBm

Thus, the conclusion is there was no desensing when using the BR-101 as an in-band, 70cm, 6 MHz bandwidth, DVB-T repeater. The sensitivity values measured compared favorably with previous measurements on other DVB-T receivers [3]. These tests were then repeated using 2 MHz bandwidths for both input and output. For 6 MHz bandwidth we only used the standard 18 MHz split for a 70cm repeater. For 2 MHz bandwidth, we tested splits of 18, 12 and 6 MHz. The measured 2 MHz bandwidth sensitivities were:

cross-band, 70cm to 23cm = -99dBm
70cm in-band 441 to 423 = -100dBm
70cm in-band 435 to 423 = -100dBm
70cm in-band 433 to 423 = did not work
70cm in-band 429 to 423 = did not work

Thus a narrower, 12 MHz split is workable for 2 MHz bandwidths. It should also be noted that going to a lower bandwidth of 2 MHz buys us another 2 to 3dB in receiver sensitivity.

The BR-101 was also tested for 441, 2 MHz BW input with 1243, 6 MHz BW output. This configuration would not work

FCC ID & Timer

The BR-101 does not have the ability to insert it's own embedded "Service Name" which we are able to do with the Hi-Des HV-100 & HV-320 modulators. However, it does pass directly through on it's transmitter output the embedded Service Name of the incoming DVB-T signal. So, if the input signal carries an amateur radio call sign as it's service name, then the outgoing rf transmission from the BR-101 is automatically identified with that same call sign.

The Hi-Des instruction manual has a separate section on "Call Sign". (section 7, pp. 18-19). It is not very informative. What the BR-101 is capable of doing is attaching a sign-off trailer at the termination of an incoming DVB-T signal. The trailer can consist of only a few video frames with your repeater's call sign. You need to create your own video file. See Appendix. A timer is started when the incoming signal drops. At the end of the designated Period, the transmitter is then turned off.

To use this feature, see Fig. 3, the left "start-up" screen.

Click on the "Set Call Sign" button. This brings up the screen shown in Fig. 7. To activate this feature, check the "Call Sign Enable" box. Note, if this box is unchecked, then the transmitter will never turn off, even when there is no incoming signal.

Set the desired duration of the trailer in the period box. It is recommended that you set the New PID as shown to 0x641 and the Call Sign Origin PID to 0x1011. For the box "Call Sign" you need to tell the program where on your computer to find the video file with your call sign. The blue outlined box allows you to browse your computer to find this file.

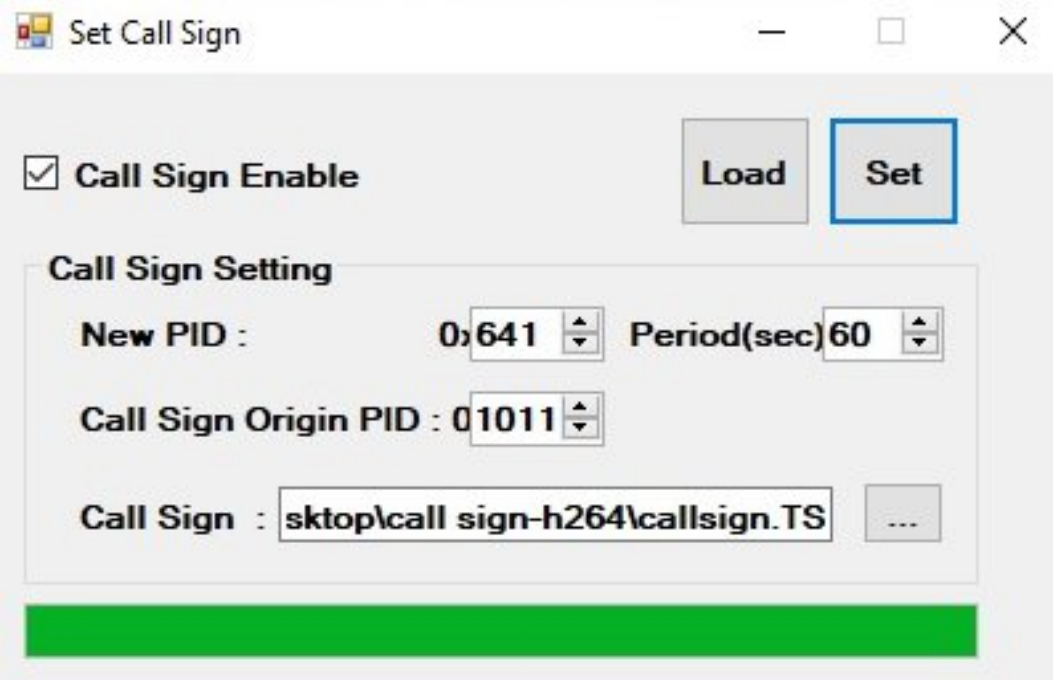
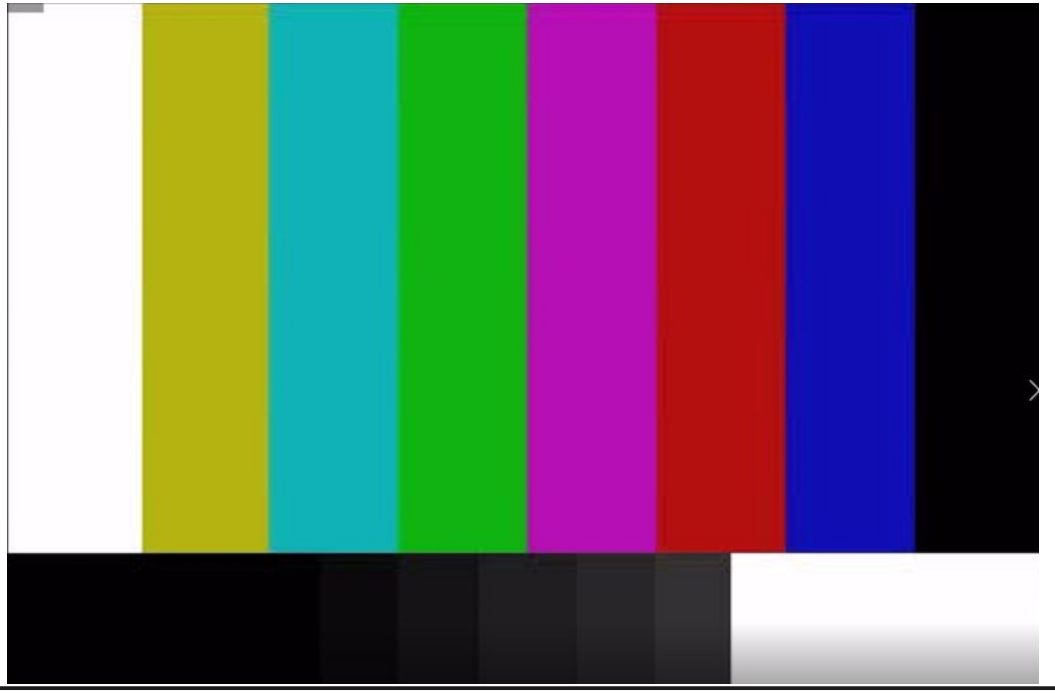


Fig. 7 DTV Bridge Controller – screen for setting Call Sign (top) & Hi-Des' CallSign.ts file (bottom)



Hi-Des includes on the CD a sample video file. It is called "CallSign.ts" It is a simple color bar display with no text on it. We suggest you use it first to verify you can make it work. Then create your own call sign video screen. See the Appendix for instructions from Hi-Des on how to create your own call sign video screen as an h264.ts file.

When we first tested this feature with the old 2015 firmware, the trailer and time out timer worked, but the video call sign was not displayed. Now with the new firmware, the feature does work with H.264 DVB-T transmissions.

Repeater Service

Jim, KH6HTV, has previously written a couple of articles about DTV Repeaters, both in QST [4] and as the application note, AN-23 [5]. Where these showed using a separate Hi-Des receiver and modulator connected with an HDMI cable, they could certainly be simply replaced by the BR-101. The very low, 0dBm, rf output power from the BR-101, if used alone would only allow for a DVB-T repeater covering a very small service area. For wider area coverage, one needs to add an rf linear power amplifier to the transmitter.

A cross-band, 70cm to 23cm repeater would be extremely simple to implement with the BR-101, even on the fly as a temporary repeater. Just connect two separate antennas and you are up and running.

An alternative cross band arrangement is to use a single, dual-band (70cm/23cm) antenna along with a duplexer. Good tri-band (2m/70cm/23cm) antennas suggested for this would be either the Diamond X-6000 base station antenna or the Diamond NR-2000, mobile antenna along with the Diamond MX-3000 triplexer (2m/70cm/23cm) [6].

An in-band, 70cm, DVB-T repeater is also possible. However, more rf engineering will be required due to the necessity of keeping the transmitter power out of the receiver with the narrow channel spacing, especially when using rf linear power amplifiers. Good sharp cut-off, band-pass, channel filters with two separate 70cm antennas or a good ATV duplexer with a single 70cm antenna will be required.

References

1. "DVB-T Recommended Parameters", Jim Andrews, KH6HTV Video Application Note, AN-39, June, 2017, 9 pages

2. "Digital Video and Audio Broadcasting Technology", W. Fischer, 3ed edition, 2010. Springer Heidelberg Dordrecht, London & New York, ISBN 978-3-642-11611-7. See Chapter 21 "Measuring DVB-T Signals"

3. "DVB-T Receiver Sensitivity Measurements", Jim Andrews, KH6HTV Video Application Note, AN-29, June, 2016, 5 pages

4. "Digital ATV Repeaters", Jim Andrews, KH6HTV, QST, Sept. 2019, pp. 40-41

5. "DVB-T Television Repeater", Jim Andrews, KH6HTV Video Application Note AN-23e, rev. Sept. 2019, 7 pages

6. "70cm Antennas for ATV", Jim Andrews, KH6HTV Video Application Note AN-40, Aug. 2017, 6 pages

Appendix

Instructions from Hi-Des - How to Create a Call Sign .TS Video Image from Calvin Yang

7. Prepare image files with your call sign

a. The image files must be in JPEG format, resolution in 640x480.

b. The image files should be named sequentially as callsign_01, callsign_02, callsign_03,callsign_04,…

c. The file number determines the final output TS file size

d. The file size must be limited to under 20 Kilo-Bytes(KB).

8. Use any one of many video applications to create a .ts file from your .jpg images.

9. Find the output file "callsign.TS"

10. Use BR-101 tool to program the callsign TS file to BR-101, refer to Chapter 8 of BR-101 installation guide.

11. Note: remember to change the "CallSign Original PID" to 0x1011 in the tool.

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CQ-DATV Christmas

Written by Trevor Brown G8CJS

Christmas does have a habit of creeping up on you when you least expect it, even though it happens on the same date every year. We launched CQ-DATV 1 with some advice for filming the family at these festive events and although most of the advice is still good, it's a good time to dust off the article and add some new advice for getting the most out of filming, not just at Christmas, but at any family gathering.

I still have the Samsung NX500 I owned when CQ-DATV 1 came out and I still think it's a very good value for money camera both for stills and filming videos. Yes, had the budget been bigger I would have looked at a full frame camera, probably one of the Sony range, as I like small body cameras.

I have complaints - it crops on high resolution video filming which annoys me as I like the lens to produce wide angle pictures to improve camera work when moving the camera on shot, such as walking shots. It's also impossible to turn the auto focus off in video filming mode. I have a lens adaptor so I can use my old Olympus OM1 lenses, they then become manual lenses, when fitted on the Samsung, so I can stop it moving focus, I just lose auto exposure.

It's also a brilliant stills camera and able to shoot RAW images which can be worked on in Photoshop. There was initially a problem getting Photoshop to accept the images as there is apparently no standard for RAW images. One of the advantages to a legal copy is free updates which solved the problem (thanks Adobe).

The Samsung will shoot at some very high resolution and uses H265 coding to compresses the data in order to get it onto a memory card.

Not every editing solution will cope with H265, so I use Pavtube to transcode it. Its not free software but it was under £20 and when I changed the PC, I thought I would have to replace it with a new copy as the password is long gone. The software company were surprisingly helpful and supplied a new password FOC. Pleased I did business with such a helpful company.

Before the Samsung I had a Cannon S95 it still works and out performs the family camcorder, so the advice from CQ-DATV 1 still holds up and bridge cameras (stills cameras that also film in movie mode) are still my favourite and represent good value for money. The Cannon still appears on e-Bay, just be careful if you turn it on by accident, the lens extends and if impeded will damage it, I.E. don't put it in your pocket.

Back in CQ-DATV 1 I recommended having the lens on its widest setting and using a good stable tripod so that you don't spend all of the time holding the camera, that advice still holds, but keep the tripod low, eye level is more attractive than the top of head shots, but beware of obstructions, which are much more prevalent at this level.

Check that you have a fully charged battery and plenty of room on the memory card. If you are using the sound on the camera remember the person holding it or persons near to the camera it will be very dominant, so keep quiet near the camera unless you want your voice to dominate the shoot.

The higher resolution of the Samsung does allow the camera to be used portrait and cut into two pictures in edit. So, we could have a child sat on an adult's knee and get reaction shots from both the adult and child and cut between them in the edit. Unfortunately the Canon S95 did suffer a little using this technique.

I also talked about mixed colour temperature lighting, assuming your subjects have delayed opening presents until the day light is coming through the window, if not you might be shooting fully under artificial light and the camera will need colour balancing accordingly.

Other advice was do not shoot the whole scene from a single camera position as it starts to look like CCTV, but a locked off sequence of an adult assembling one of the more complex presents can be given the time lapse treatment in post production and always adds to the event.

If a bike is involved or pedal car, when you have filmed its first outing try to recreat some of the passage with the camera in a position that will deliver POV shots (Point Of View), they really do add to the first bike ride, so think of a camera mount in advance of the event so these can easily be replicated after the shoot. Filming them on a different day rarely works in the UK as the weather will almost certainly be different.

It's not all about the children. It's often-party time or dinner guests from the family or extended family and a wide tripod shot of the dinner table can often be given the camera trick treatment E.G. edit together clips of the table and guest(s) taking their place, so every mix adds another person to the table. Just make sure the camera is positioned so it does not get knocked and spoil the effect.

Editing it all together comes down to software and that is always changing, there is still lots of free software to experiment with, most of it is cut down versions of software they would like to sell you the full version of and you need to be wary of software that will introduce watermarks. I have put three links at the end to usable cut-downs, but ones that do not watermark the result.

A word of warning, simple cuts and mixes to join your clips together are nearly always the way to go, pictures that zoom off with the next clip appearing as a spinning ball and unfolding across the screen, never look attractive, but I am sure there will be effects that do work, just use them sparingly.

Finally check the web for free animations that can be used for titles, there will be lots you can buy, but there are often free one's to be found too.

If you go down the Davinci 16 route you need to download it now and start practising now. It is complex but rewarding, but only once you can drive it.

https://fxhome.com/hitfilm-express

http://www.videosoftdev.com/

https://www.blackmagicdesign.com/products/davinciresolve/

A Quarter Kilowatt Amplifier for 420-440 MHZ

Written by John Gebuhr - WB0CMC
Reprinted from Boulder Amateur Television Club TV Repeater's REPEATER November, 2019 by kind permission

I built one for our ATV repeater about two years ago. It has had good service with only one failure. One of the 5.6pF caps blew up and dropped the power and linearity by quite a bit. I chalk it up to "infant mortality" of the cap.

The amp will do 300 Watts CW but to maintain good linearity I'm running it at 200 Watts sync power. Sync clips pretty well at 250-300 watts.

The device will do 400 watts but it needs the full 50 volts and a bit more drive. Gain of the amp is 28 dB and efficiency about 50%. It uses an MRF6VP3450H transistor using the layout recommended by the manufacturer.

It was originally a Motorola device but others now also make it, NXP, for one. DC components are per the manufacturers values. Those in the RF sections differ for the lower frequency in both placement and values.

For the input: C1, C2 are 27pf, C3 is a 3-18pf trimmer, C4 is a 25pf trimmer moved as close to the gates as possible. The two are somewhat inter- dependent so I kept them variable.

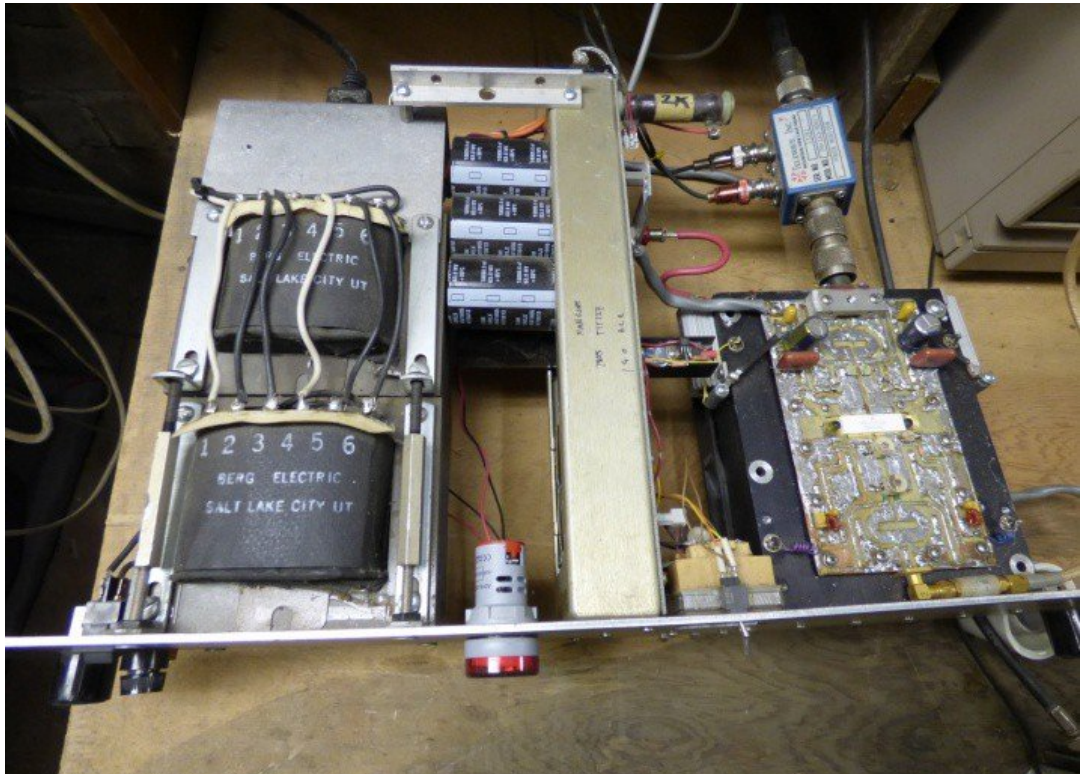
All else is per the Mfr. For the output: C5 and C6 not used, C7 and 8 are an uncased mica of 25pf as are C9 and 10, case on drain Cu, tab to balun. C11 and 12 not used. C13 and 14 are 12pf and are located exactly midway along the ground copper to the left of C13 and 14 as shown by mfr. C22 and 23 are 5.6pf.

There are 2 330pf caps where the drain lead goes around the corner at the end of the straight section from the supply and the left corner of the ground copper, one on either side of the +line to ground.

All chip caps must be hi-Q, low loss and able to operate in a 50 volt DC system. See diagram below. ATC recommended. Values are for 421.250 MHz, some are slightly less for 434.000.

Other than the one cap failure it has been in ICAS for over two years. Circuit board is Rogers 4003C 1e/1e 0320.

It is a good idea to use a 2 or 3dB attenuator on the input to keep any back feed from damaging the exciter. ½ a watt or so will drive it to 250 watts.



Entire amp and power supply

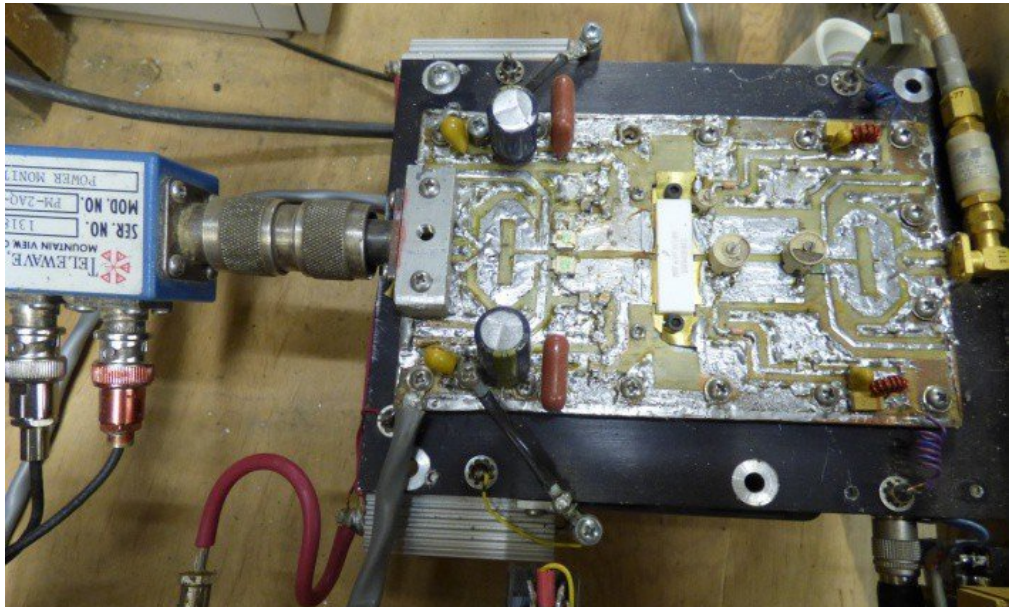
For the power supply I used a 36volt and 10 volt secondary with a split primary (useful if one wants to run it on 240VAC). The 36volt should have at least 10A capacity, the 10 volt at least 2A.

Other parts are: 35A full wave bridge rectifier, 6 18000 microfarad/63 volt electrolytics, 4 10000 microfarad/at least 16volts, 7805 TO220 regulator, 8 amp fuse and holder, power switch and whatever indicators you may want.

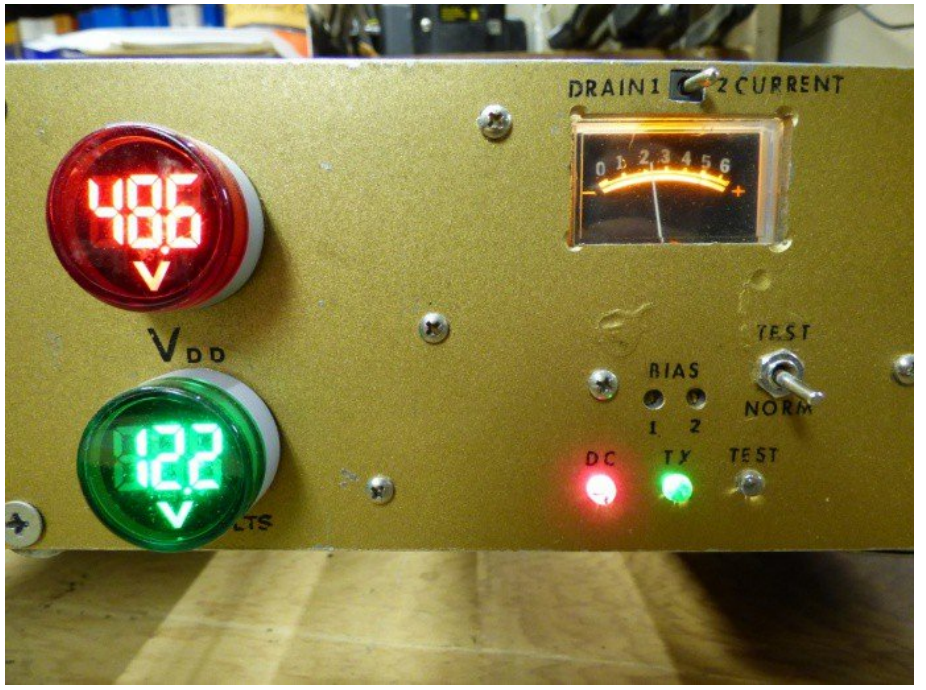
STBY voltage is about 52 volts, TX is 48. 12.5 and 11 if the 12 volts runs the exciter.

I had two of the transformers but they must have been less than 10 A because one on the original model got rather warm under continuous operation. Paralleling the two, they run cool.

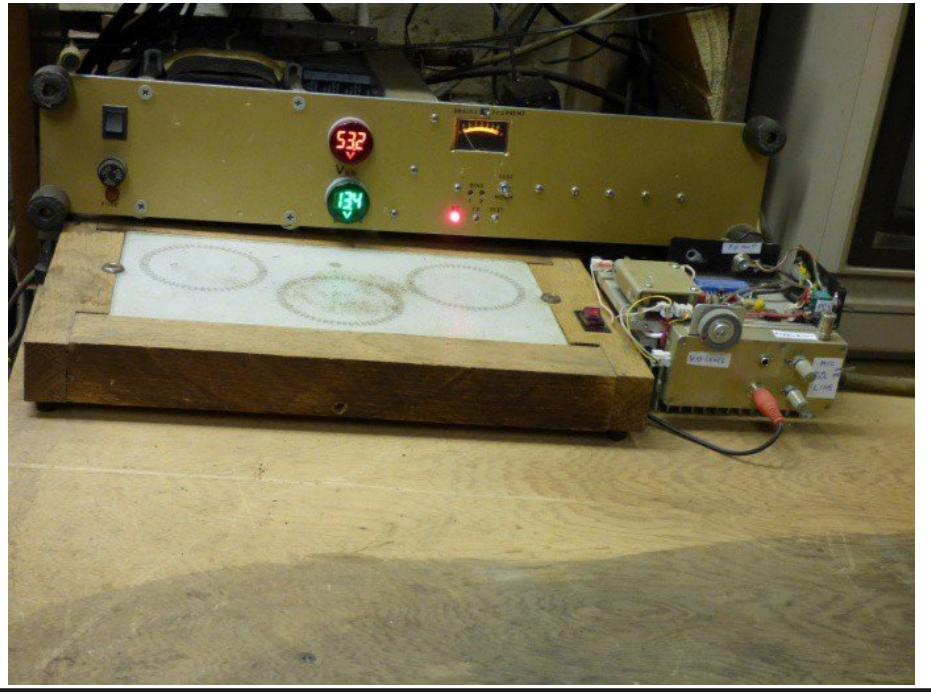
The meters came from M P Jones for $3 each. They draw about 10-15 ma from the source. Drain current meter came from the junk box.

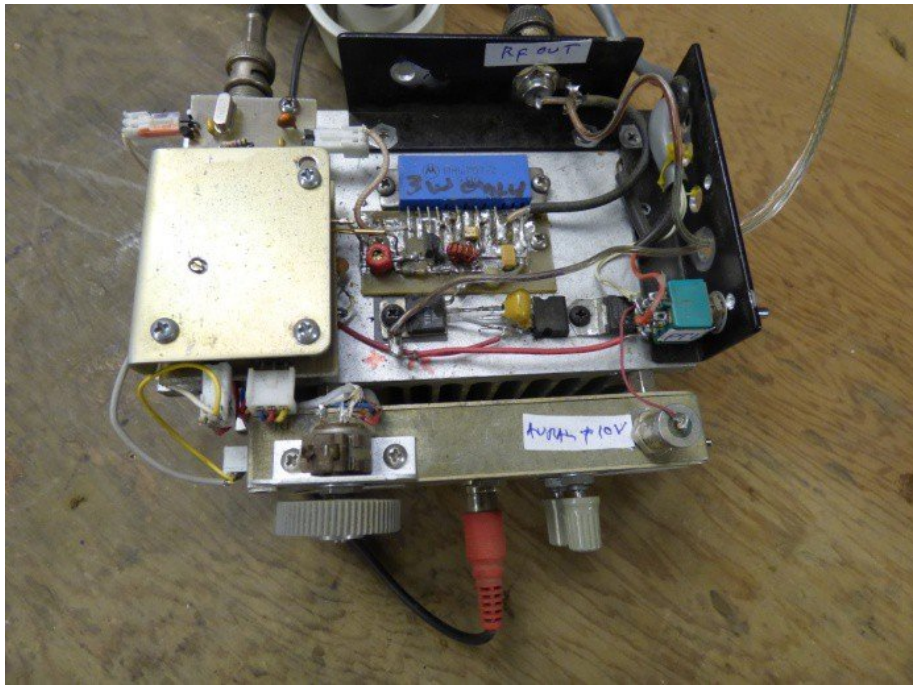


Close up of amp

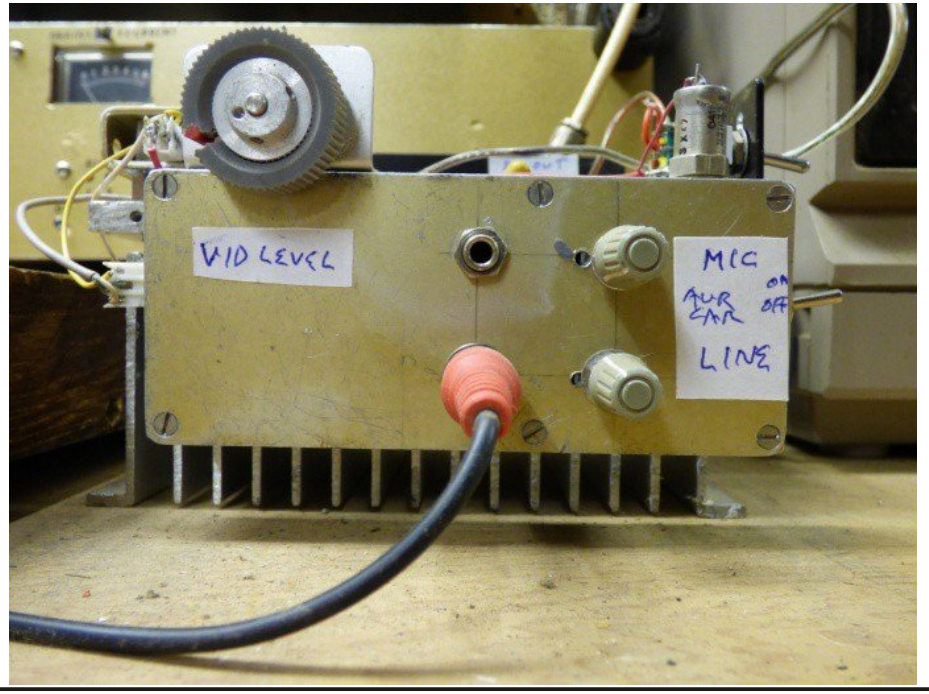


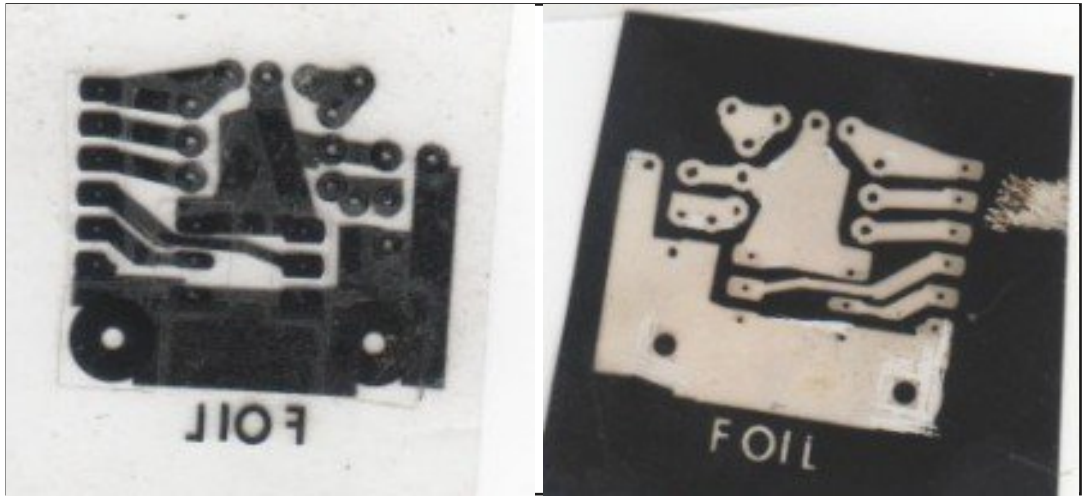
Top: Front of amp in transmit with color bars(2¼ A)
Bottom: Amp in STBY with exciter & coffee warmer



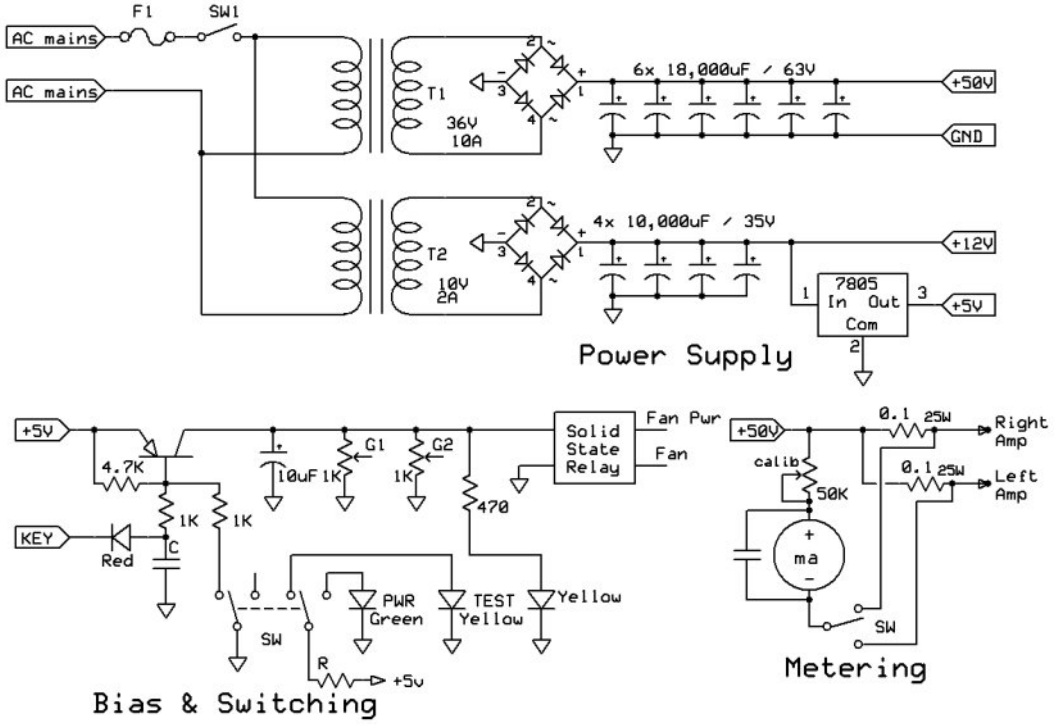


Top: Top of exciter, original prototype on 434 MHz
Bottom: Front of exciter, audio & FM mod circuits in box





Bias Layout



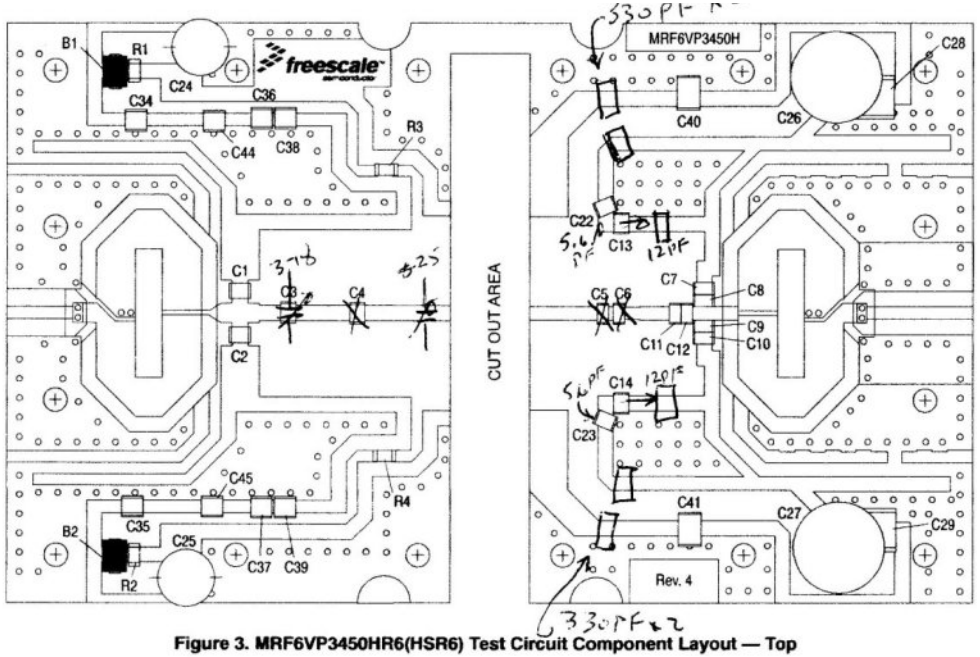


Figure 3. MRF6VP3450HR6(HSR6) Test Circuit Component Layout — Top

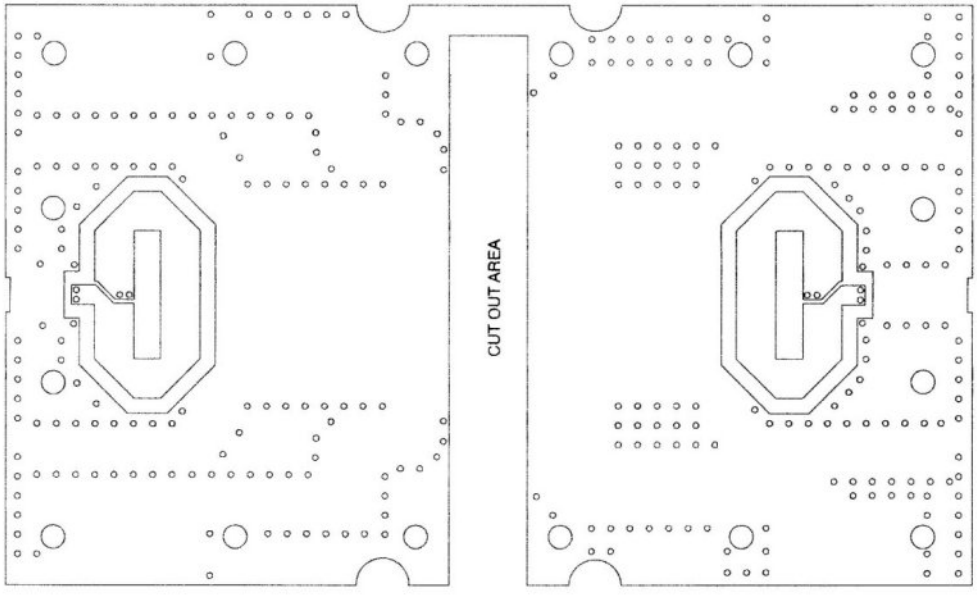


Figure 3a. MRF6VP3450HR6(HSR6) Test Circuit Component Layout — Bottom

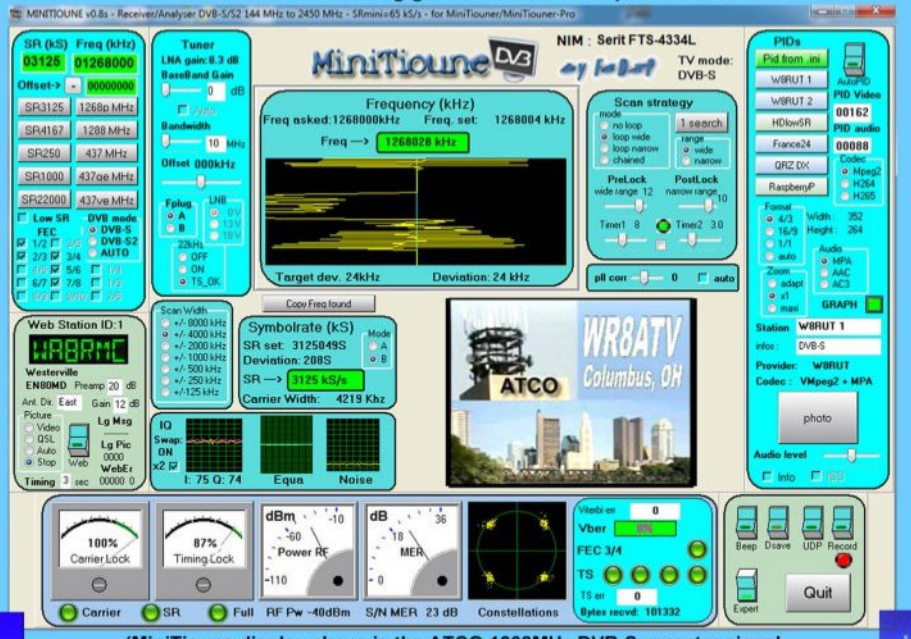
MiniTiouner-Express

Digital Amateur Television DVB-S/S2 Receiver / Analyzer

Available at DATV-Express.com

- Operates with Windows PC using free MiniTioune software from Jean-Pierre F6DZP
- Smaller than a stack of 2 decks of cards (picture above is full size)
- Two independent simultaneous RF inputs with internal preamps
- High sensitivity -100dBm @1288MHz – at 1/2 FEC
- Fully assembled/tested in aluminum enclosure
- Covers 144-2420MHz (ideal for Space Station DATV reception)
- Symbol rates from 75 KSymb/s to >20 MSymbols/sec
- Uses external 8-24VDC supply or +5V from USB-3 port (with small modification)
- Real time signal modulation constellation & dBm signal strength display
- Price: US $75 + shipping – order with PayPal

For details & ordering go to www.DATV-Express.com

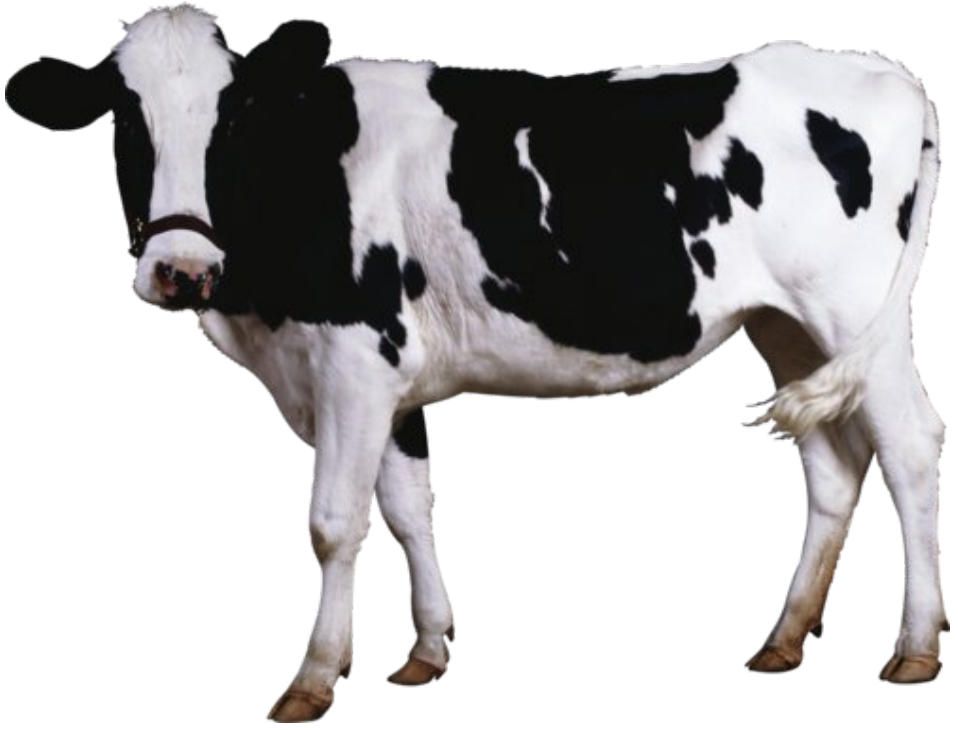


(MiniTioune display above is the ATCO 1268MHz DVB-S repeater signal at WA8RMC QTH 15 miles away).

First published in issue 40

Great Cow Basic Compiler Quick Overview

Mike Stevens G7GTN



I was recently looking for a Microcontroller software compiler solution that had a robust set of commands and additional libraries but with a free cost. I found an excellent solution in the form of Great Cow Basic.

If we can ignore the somewhat strange choice of name for a moment we get some really excellent software that can target both the PIC and AVR Microcontroller range of processors that we are already quite familiar with in our project designs. On the PIC side we can go up to the 18F range, at present not sure on any expansion plans the author & developers might have for higher end devices such as 24F, 32F or dsPIC.

I suspect very radical & significant changes would need to be in place within the compiler code to see this actually any time soon.

You can download this totally free package from http://gcbasic.sourceforge.net/
Installation was as simple as unpacking the ZIP file in to a directory of your choice.

Of course many will see this as a kind of cop-out when we should be programming at the assembler level. This is basic (no pun intended) and allows quick proof of concept things to be very easily put together.

To me the biggest benefit is the ability for others to take some source I have written and re purpose and then compile freely without having to reach into your wallet and purchase sometimes very expensive software or struggle with some unfamiliar language that makes you have to go through a learning process to make even minor changes you wish the original author had actually thought of.

I fully recommend that others also download this software and see what you can then go and create. A very friendly support forum is also run where help and advice is freely available to get you over any programming issues on your own particular project.

I have a simple TV Testcard control project with the magazine editor to show a practical usage example of this software in a practical context. I will certainly be making more use of this for additional projects in the future and believe is worth you exploring for yourself. Remember you can target over 900 devices from the PIC & Atmel range using the exact same compiler – so sure to be something for everyone.

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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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