D5: INTEGRATING HIGH DEFINITION DIGITAL AMATEUR TELEVISION INTO YOUR HAM STATION

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For Amateur Television

Digital Video Broadcasting Systems Manufacture

Topics...

- What is DVB and why is it being used for DATV?
- PC/USB Dongle TX/RX and software
- Stand-alone Transmitter and Receiver
- Building a DVB interface
- Configuring your station
- Repeater
- On-line resources for DVB-T
- Demo

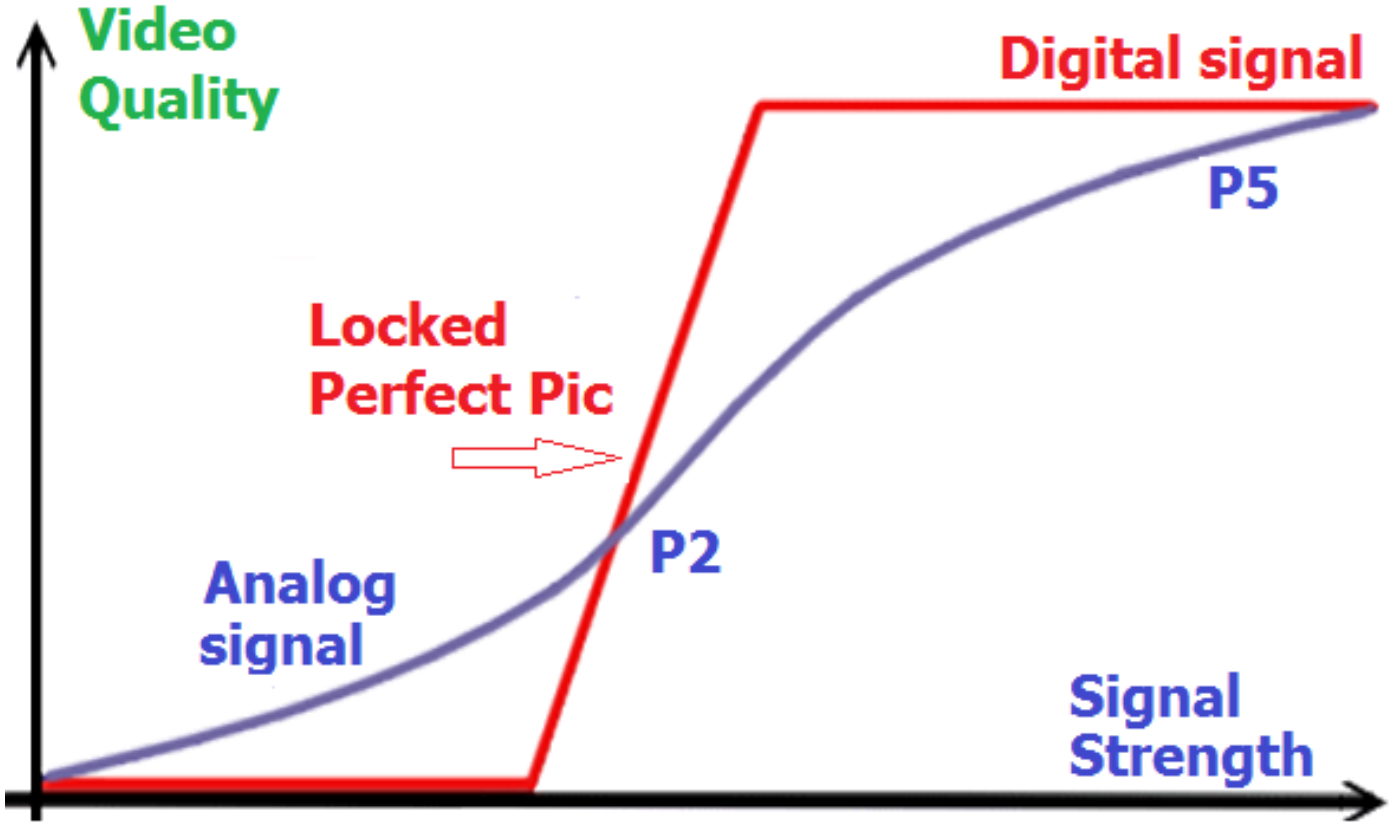
What is DVB?

- **D**igital **V**ideo **B**roadcasting – **T**errestrial is a European developed TV system introduced in the UK (1998)
- Uses modern compression techniques and efficient modulation schemes to deliver SD and HD video

Why use DVB-T and not our US ATSC Standard?

- Lower transmitter cost
- Adjustable bandwidth down to 1MHz
- Adjustable Transmission parameters
- Excellent multi-path performance
- Readily available hardware... Almost Plug-n-Play

DVB-T signal advantage over Analog

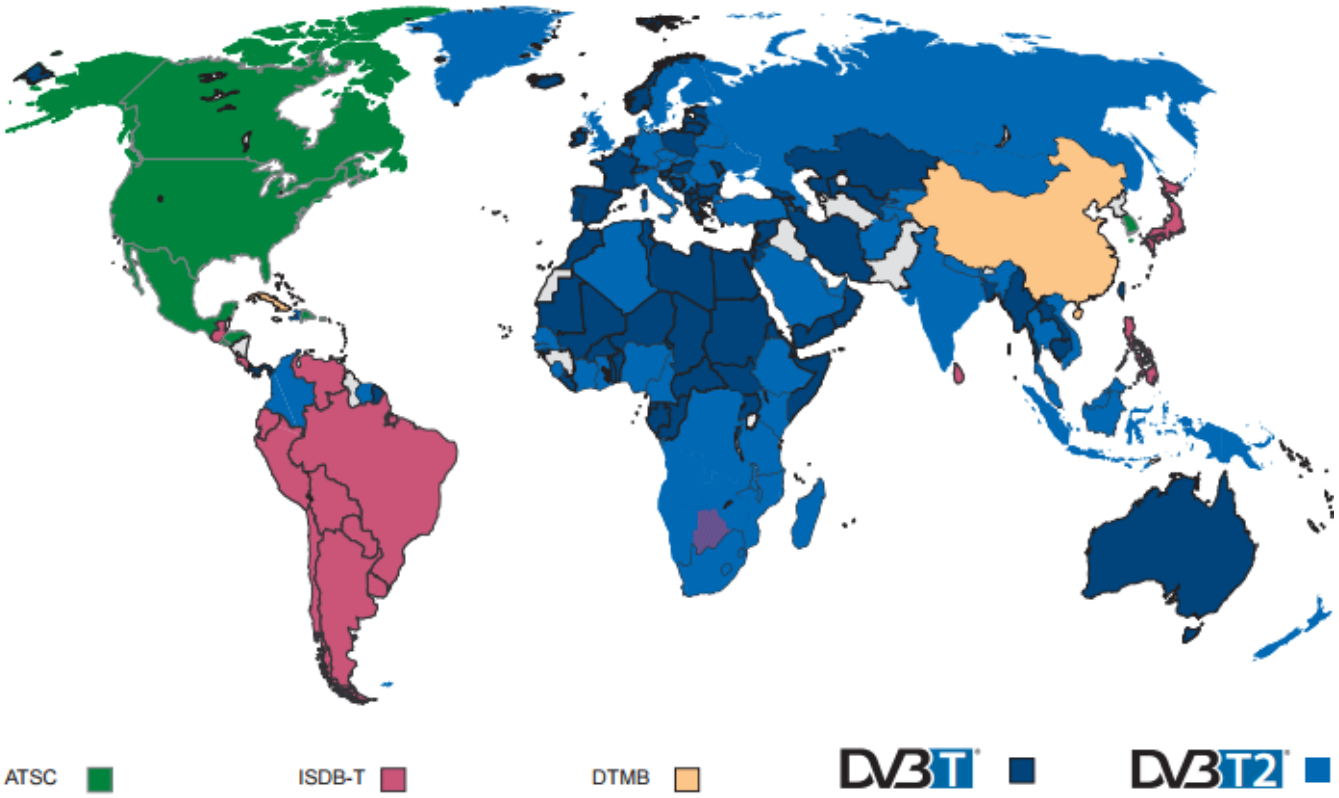


Some DVB history…

- Before the 90s, it was not technically or economically possible to digitize TV
- Japan, Europe and finally U.S. threw a lot of money into developing digital TV/HDTV in the 80s/90s
- **M**otion **P**icture **E**xpert **G**roup compression standards were developed for moving pictures (MPEG 1, later 2, 4)
- Europe's ELG defined and standardized DVB in 1993
- By the late 90s, 3 DVB variants S/M/T were available
- Later MPEG4/H.264/AVC was developed for HDTV

Satellite TV uses DVB-S/S2

DVB-T world wide



ATSC Advanced Television Systems Committee
ISDB-T Integrated Services Digital Broadcasting
DTMB Digital Terrestrial Multimedia Broadcast

DVB has over a billion users worldwide

Basic DVB-T Digital ATV Station

- **Transmitter/Receiver** from HiDes company
- **Amplifier -** Class A 10 watts
- **Antenna Relay** – UHF Coaxial SMA/BNC/N
- **WebCam -** Logitech C920 or built-in a laptop
- **HDMI Camera -** Sony/Cannon Camcorder (optional)
- **Yagi -** 70cm - 10 elements
- **PC -** Win 7, 8, 10 (HDMI video out optional)

Who makes this D-ATV gear and where may I find it?

HiDES

HIDES
About Us
Hot News
Products
Downloads
Contact Us
繁體中文
About Us
Hot News
Products
DVB-T Modulator Adaptor
DVB-T Receiver Adaptor
DVB-T Full HD Modulator Box
DVB-T Full HD receiver Box
ISDB-T/Tb Modulator Adaptor
ISDB-T/-Tb FullHD Modulator
DTV CAM Series
DTV Gap Filler/ Repeater
Down converter
Downloads
Online Shop
Contact Us
Peripheral Transceiver/ Transmitter/ Receiver
DVB-T
Transceiver RxBW: 5~8Mhz
Transceiver RxBW:2/3/4MHz
Transmitter
Receiver, BW:2/3/4Mhz
VHF/UHF
–
–
PT-100(4-Channel)
UT-100D
VHF/UHF, 1.2G(Tx only)
UT-100A
UT-100B
UT-100C
UT-100C Opencastor
–
4-Band
–
–
UT-210
UT-130
ISDB-T/-Tb
Transceiver
Transmitter
VHF/UHF
UT-200AJ
UT-200C
VHF/UHF, 1.2G(Tx only)
UT-200AJH
UT-200CH

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ITE TECH., INTEGRATED TECHNOLOGY EXPRESS

ebay Shop by category Search... All Cat

Back to Store | Listed in category: Computers/Tablets & Networking > Laptops & Netbooks > PC Laptops & Netbooks

UT-100B (DVB-T Tx/Rx Full Duplex, 2/3/4MHz d

Item condition: New

Quantity: 1 3 available / 1 sold

Price: US $230.00 Buy It Now

Add to cart

2 yr warranty + accidents $51.99 from SquareTrade

3 watching Add to watch list

Add to collection

A seller you've bought from | Free shipping | New condition

Shipping: FREE Standard Shipping from outside US |
See details
International items may be subject to customs processing and additional charges.

HiDes UT-100B Transceiver

$230

- Modulator(TX) Demodulator(RX) USB2 PC port connection
- *Full hardware implementation* and Full Duplex capable
- 2-4 MHz RX and 1-8 MHz TX bandwidth
- 50-950 MHz RX, 50-950/1200-1350 MHz TX 1KHz Steps
- Up to 1080p HD H.264/MPEG-4 Advanced Video Coding

Free Windows Software...

- **BDA* (MS Std) Viewer Plus:** Receive/Record/View
- **TS Player:** TX Transport Stream (TS) Files Player
- **Media2TS:** Video File converter to TS file

Others…

PC2TV: TX/Record Cameras and PC desktop

Digital TV: Receive/Record/View

TS Capture: Record TS files

VLC** Media Player and **Win10 Cam** software

*Broadcast Driver Architecture

*Video LANClient

***TS =** Packetized Elementary Streams + FEC/Sync

Logitech C920 USB WebCam

$60

amazon

www.amazon.com/Logitech-Webcam-Widescreen-Calling-Recording/dp/B006JH8T3S

Supports tripod usage, tripod not included.

Roll over image to zoom in

Logitech HD Pro Webcam C920, 1080p Widescreen Video Calling and Recording

by Generic

4.5 stars 5,246 customer reviews | 1000+ answered questions

#1 Best Seller in Webcams

Was: $67.99
Price: $59.99 Prime
You Save: $8.00 (12%)

In Stock.

Want it Tuesday, May 31? Order within **1 hr 40 mins** and choose **Two-Day Shipping** at checkout. Details
Ships from and sold by Amazon.com. Gift-wrap available.

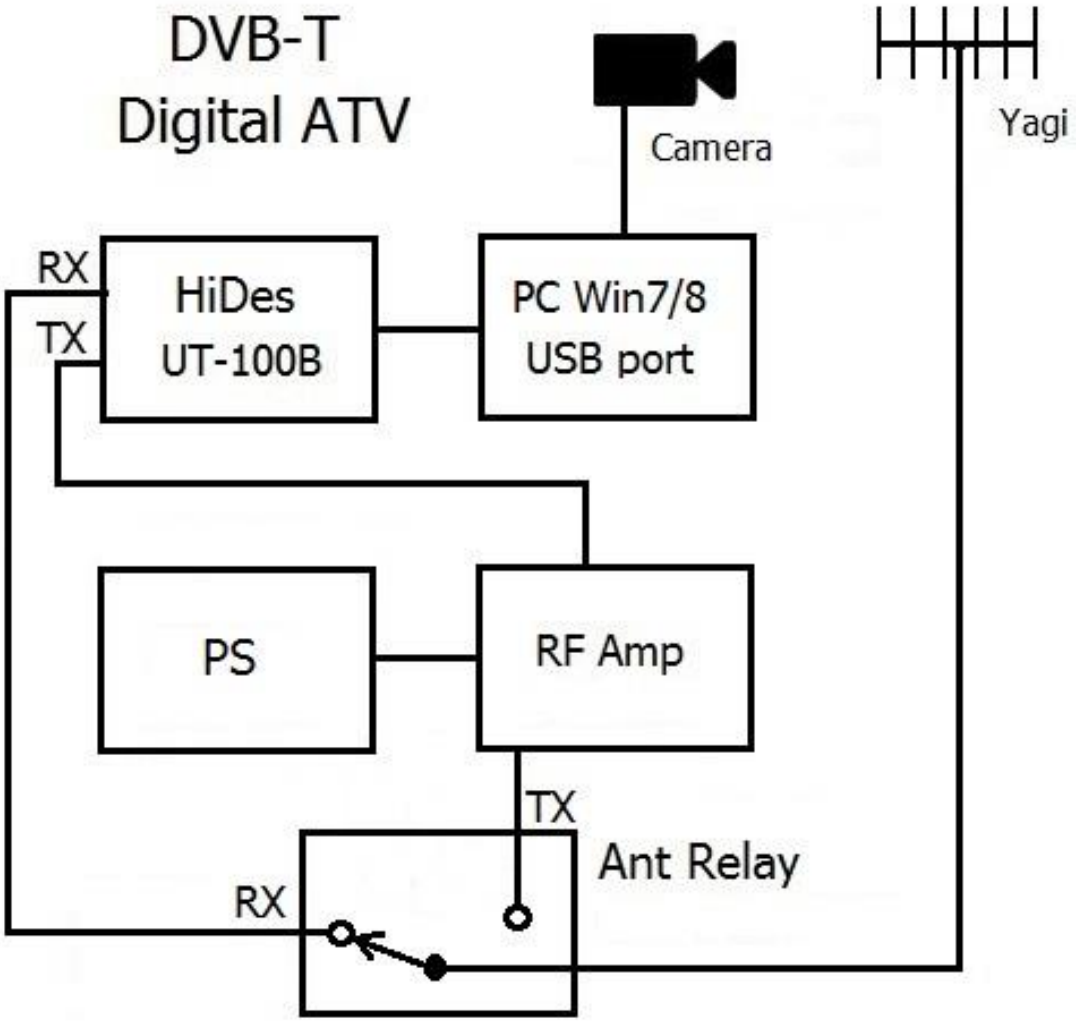
Style: **Webcam Only**

Webcam + Logitech G633 Gaming Headset Bundle

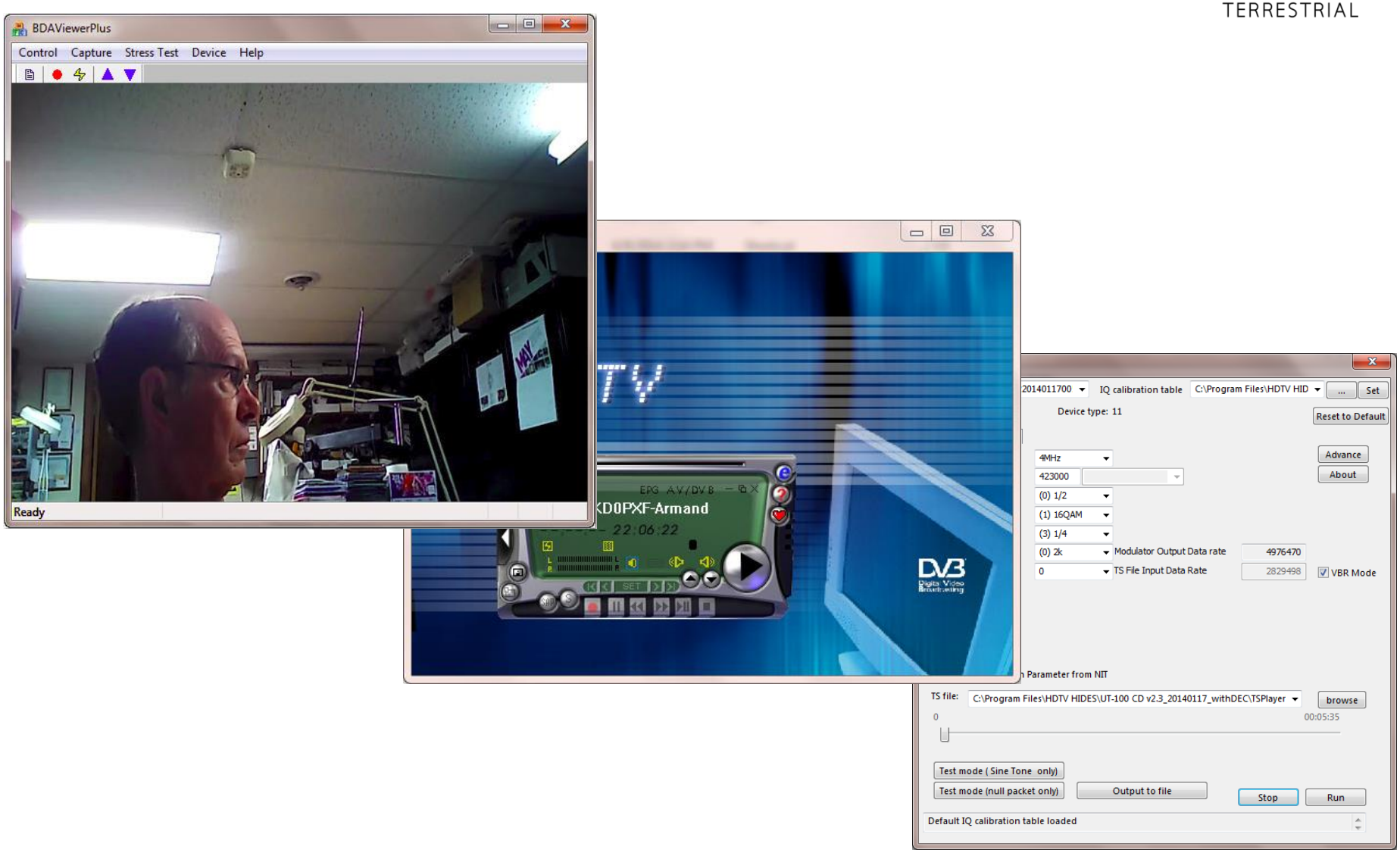
Webcam Only

- Full HD 1080p video calling (up to 1920 x 1080 pixels) with the latest version of Skype for Windows
- 720p HD video calling (up to 1280 x 720 pixels) with supported clients. Full HD video recording (up to 1920 x 1080 pixels)
- H.264 video compression, Built-in dual stereo mics with automatic noise reduction. Automatic low-light correction, Tripod-ready universal clip fits laptops, LCD

HiDes UT100B in USB port


DVB-T
Digital ATV
Camera
Yagi
RX
TX
HiDes
UT-100B
PC Win7/8
USB port
PS
RF Amp
TX
Ant Relay
RX

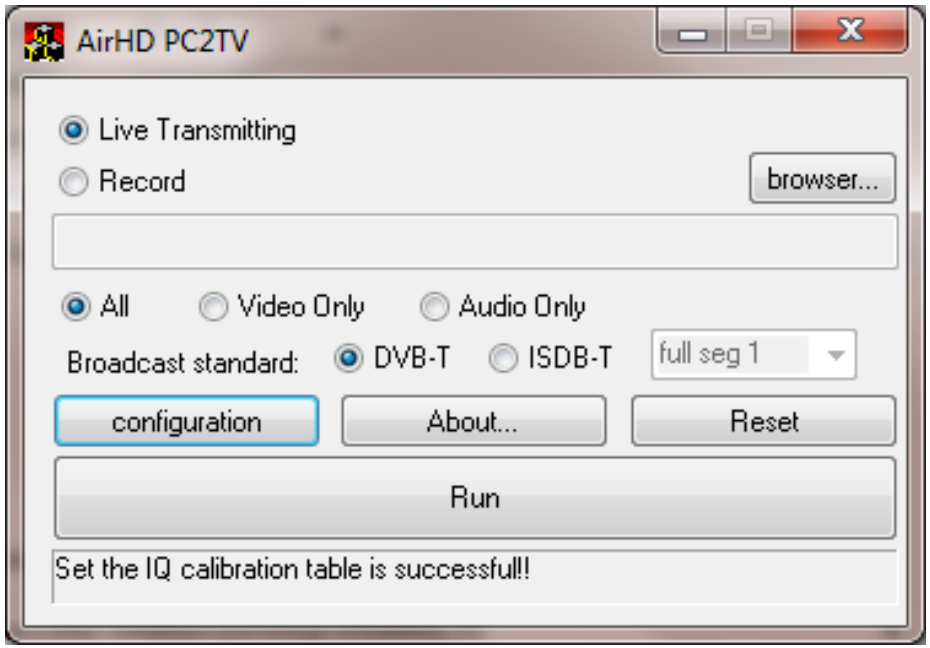
UT-100B TX/RX PC Software

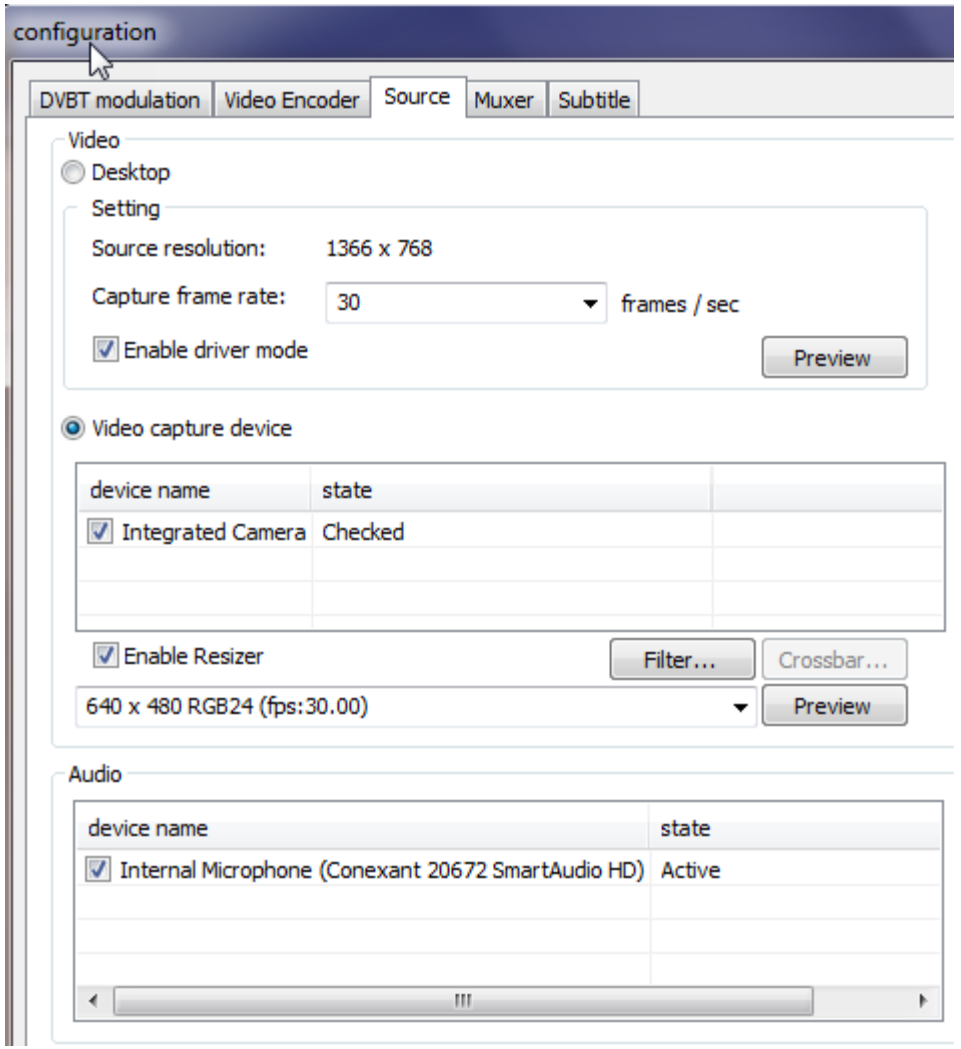


AirHD PC2TV TX software

DVB T TERRESTRIAL

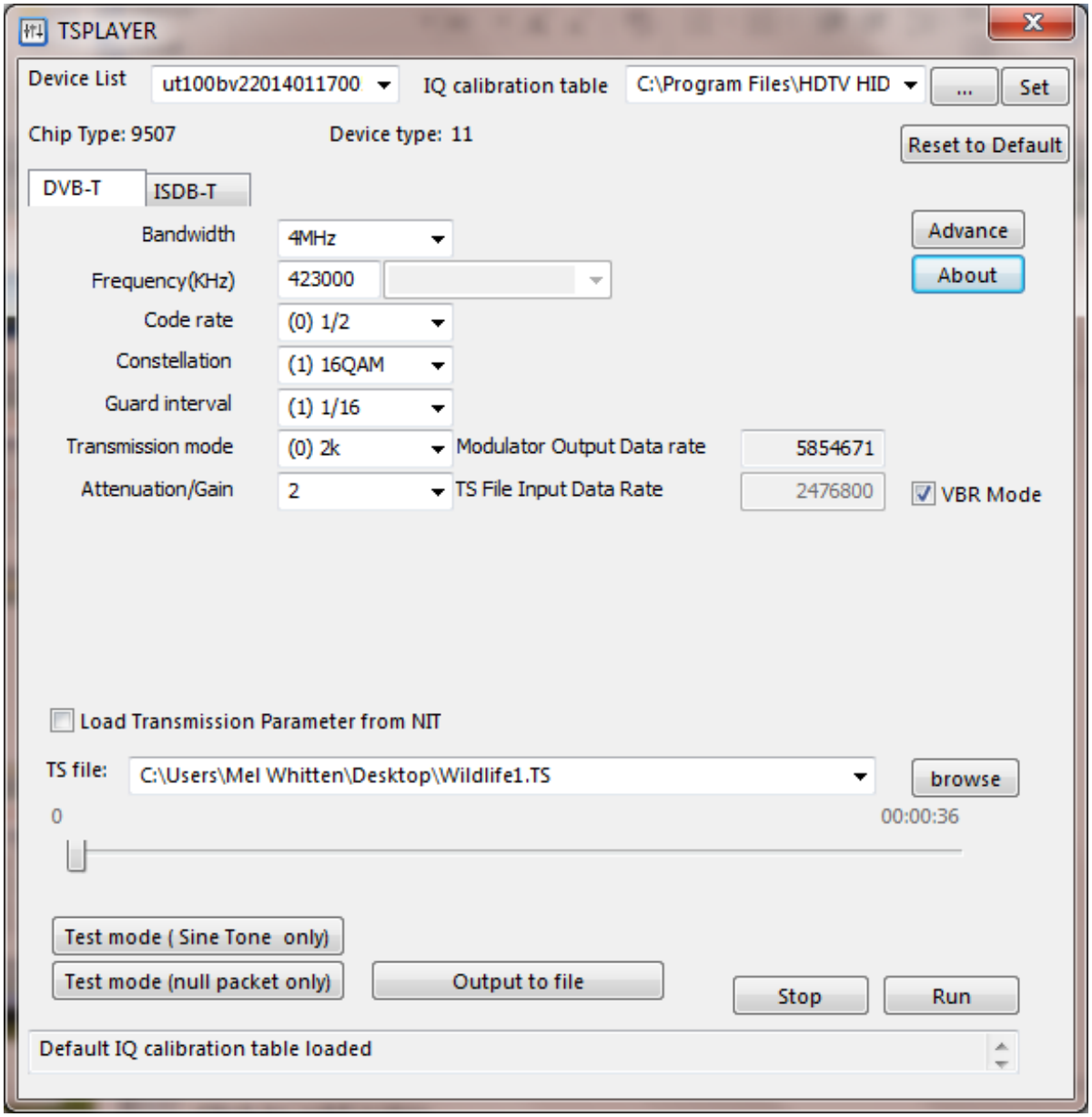
Selects Desktop or Camera



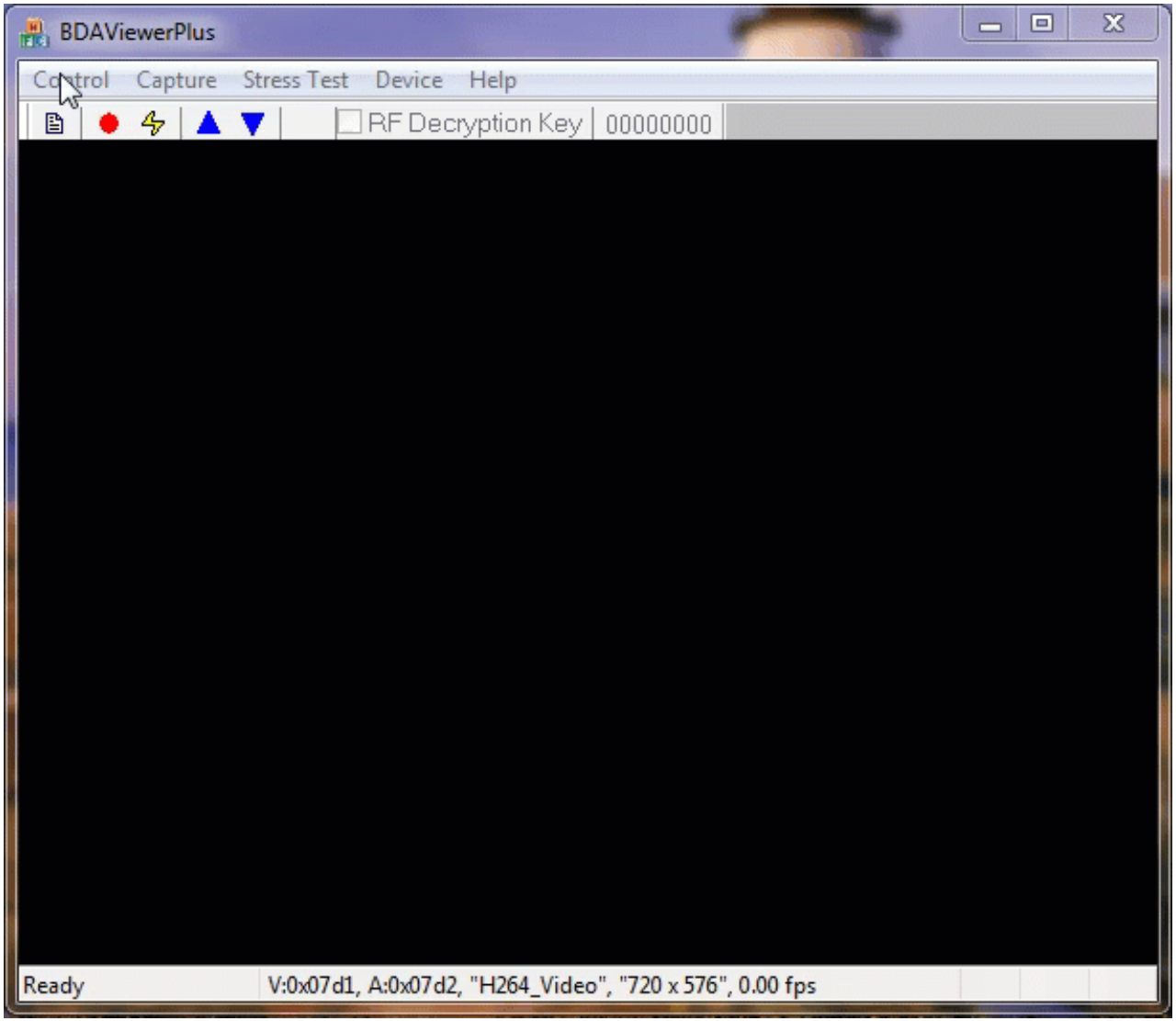


Transport .TS Player for UT-100B

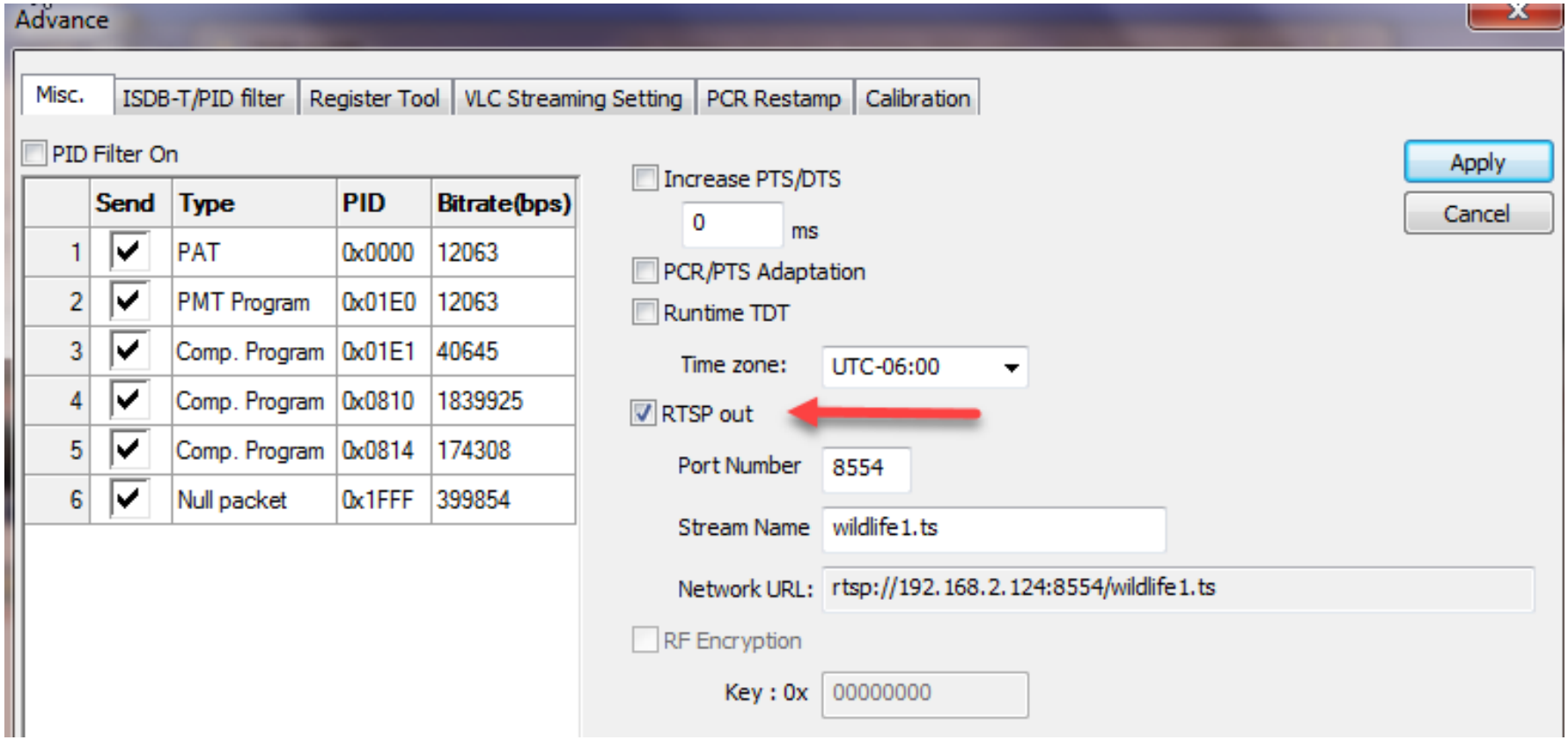
Sets Frequency, Bandwidth and Channel Coding parameters

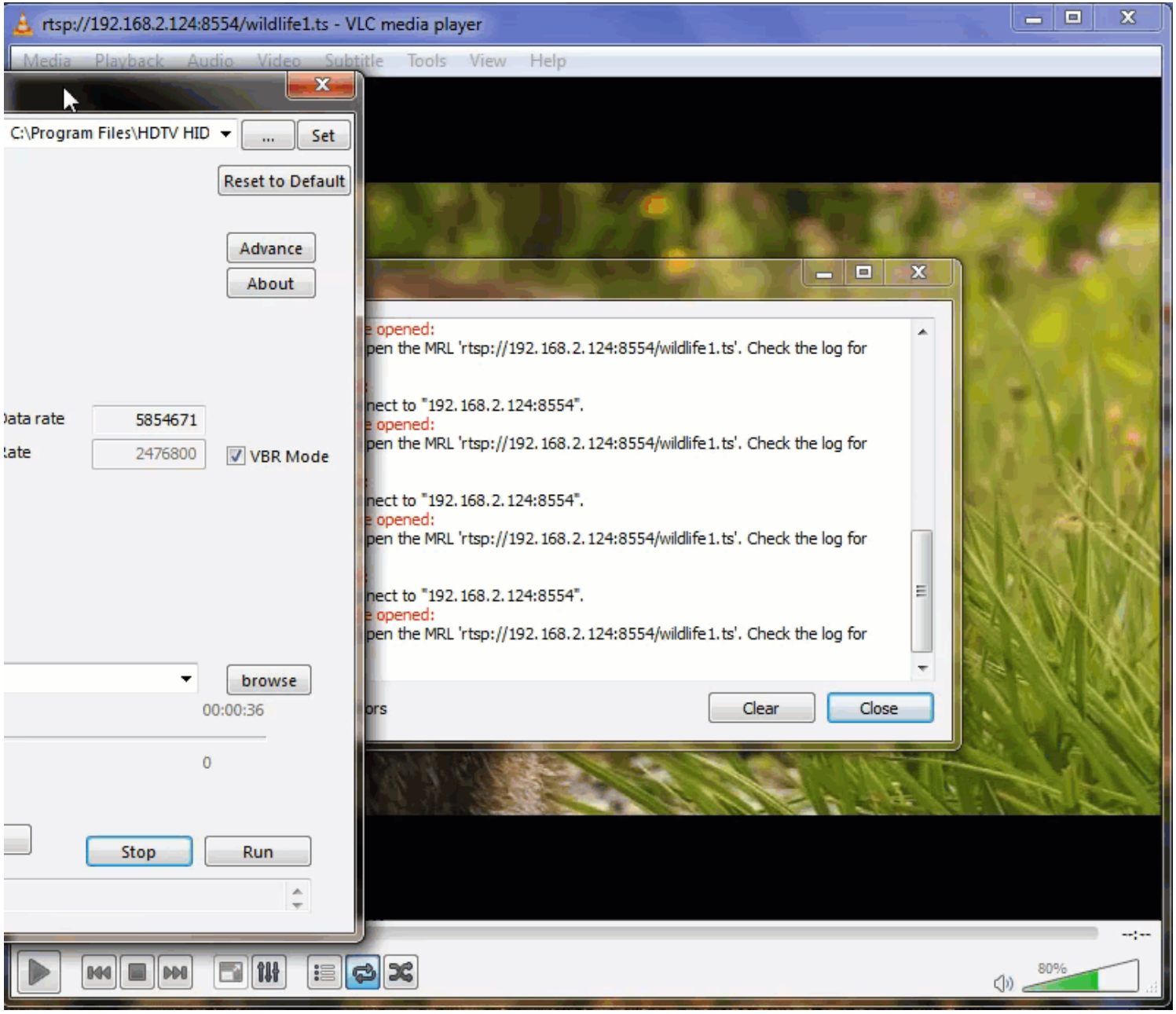


“Scanning” for a Receive Frequency



RTSP with TS Player





VLC Media Player

TS Player streaming over network

The HiDes “T” Line
Separate Transmitter and Receiver

HIDes has over 60 products

ebay Stores

Home > eBay Stores > HiDes168 > **All Categories**

Save this seller | Sign up for Store newsletter

HiDes

HiDes168

Maintained by: hides168 (260 ★)

HiDes has expertise in Full HD broadcasting by DVB-T and ISDB-T/-Tb. Our products are for a variety fields which need cost effective and easy to deploy broadcasting systems, such as video broadcasting in a small area, digital signage, and surveillance by wireless or existing cable deployment.

Store search

Search

in titles & description

Store categories

- Store home
- ISDB-T/Tb Modulator Adapter (4)
- ISDB-T/Tb FullHD Modulator Box (9)
- DVB-T Receiver Adaptor (3)
- DVB-T Modulator Adapter (16)
- DVB-T Full HD Modulator Box (11)

View: **All Items** | Buy It Now

65 results found in **all categories**

View as: List Sort by: Time: ending soonest

Picture [hide]	Item title		Price	Time Left
	HV-102EH HDMI/ SDI/ HD-SDI/ CVBS-in, DVB-T out, w/ 1.2GHz for HAM TV	Buy It Now	$560.00 Free shipping	4h 48m
	HV-110 Full HD Digital HAM TV Receiver(2/3/4 or 5/6/7/8 MHz, selected by switch)	Buy It Now	$169.00 Free shipping	5h 23m

Stand alone TX and RX

HV-120 RX

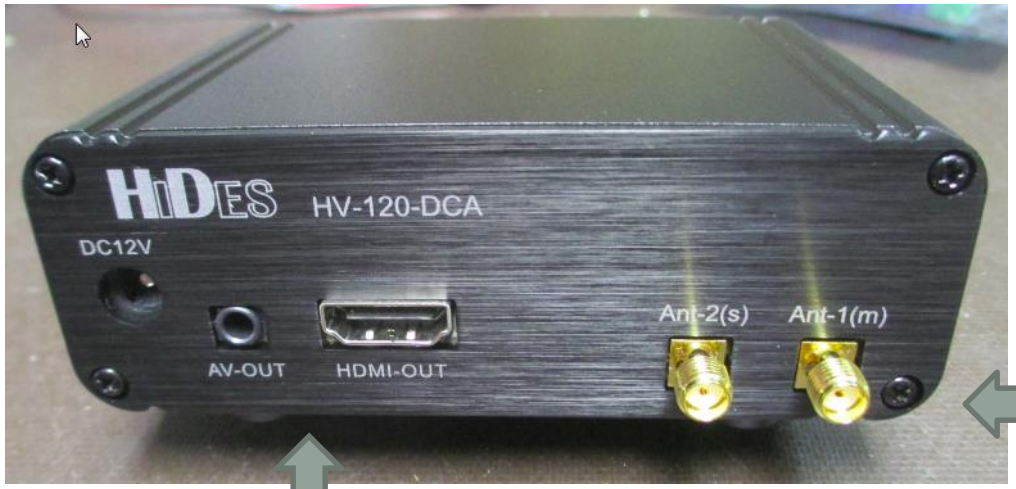
HV-320E TX

REMOTE
OSD

$209

$369

Dual Diversity HV-122 Receiver



For improved Mobility (Doppler) Performance

Connect 1 or 2 Antennas

170-862MHz and 2400-2500MHz 1-8MHz BW
Both CVBS and HDMI + S/Audio out $269

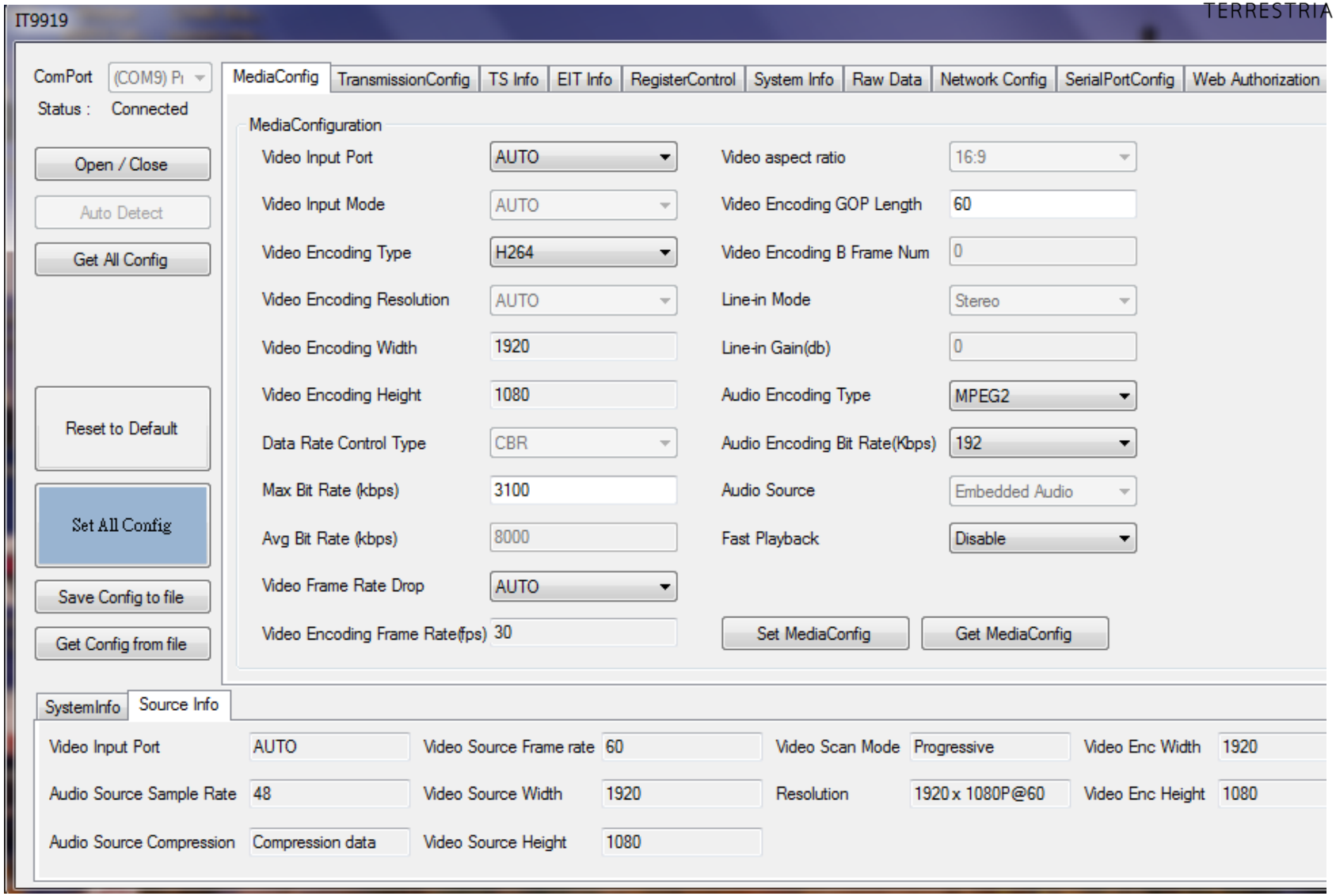
Some RX/TX specs...

- Full 1080x1920p HD using H.264/MPEG-4AVC
- Additional A-D input for NTSC analog camera (480i)
- 1/2/2.5/3/4/5/6/7/8 MHz Spectrum Bandwidth
- 100~950 MHz and 1150~2650 MHz in 1KHz steps
- Channel coding effectively combats multipath/noise
- TX power output up to 5 mW 100mW on board amp
- AAC/MPEG-2 audio compression for hi-fi stereo

TX Configuration

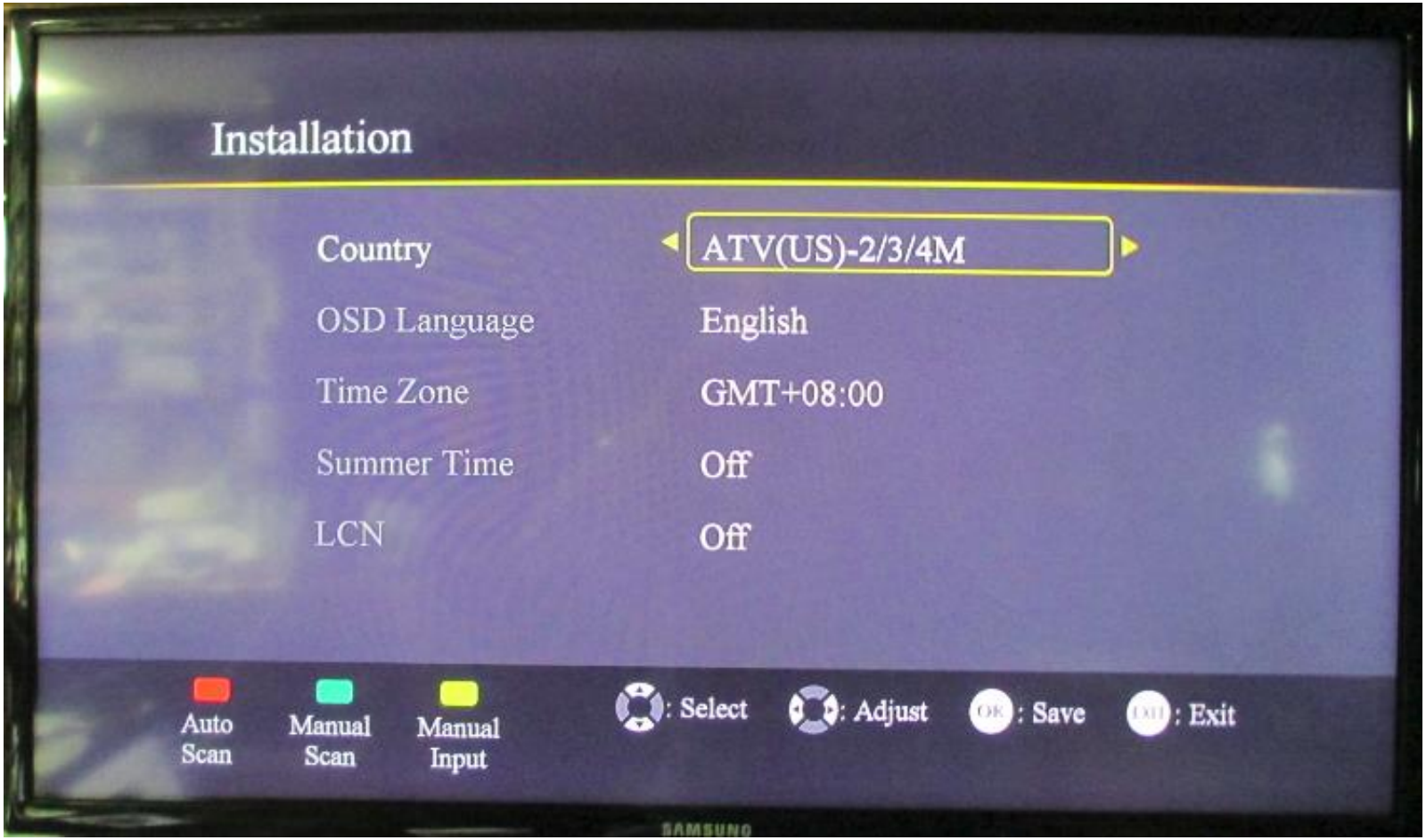
- Signal strength determines not only the reach but smooth frame rate (FPS), resolution and latency.
- For weak signal work, try QPSK and <2 MHz BW 100% FEC and >1kbps bit rate (content with low resolution)
- With a good signal >-90dBm and SNR >12dB, then try QPSK16, 4Kbps and 4MHz for high frame rate, resolution and low latency (1920x1080p, >30FPS, 1 sec latency)
- Typically, 4MHz BW, 16QAM Constellation (modulation), 1/2 Code Rate (FEC), 1/16th Guard interval, 3200bps will give you “metro” reach and full motion 1080p with ~1 sec latency running 10 watts/10+ elements at 30 ft.

AV Sender/Tx Configuration

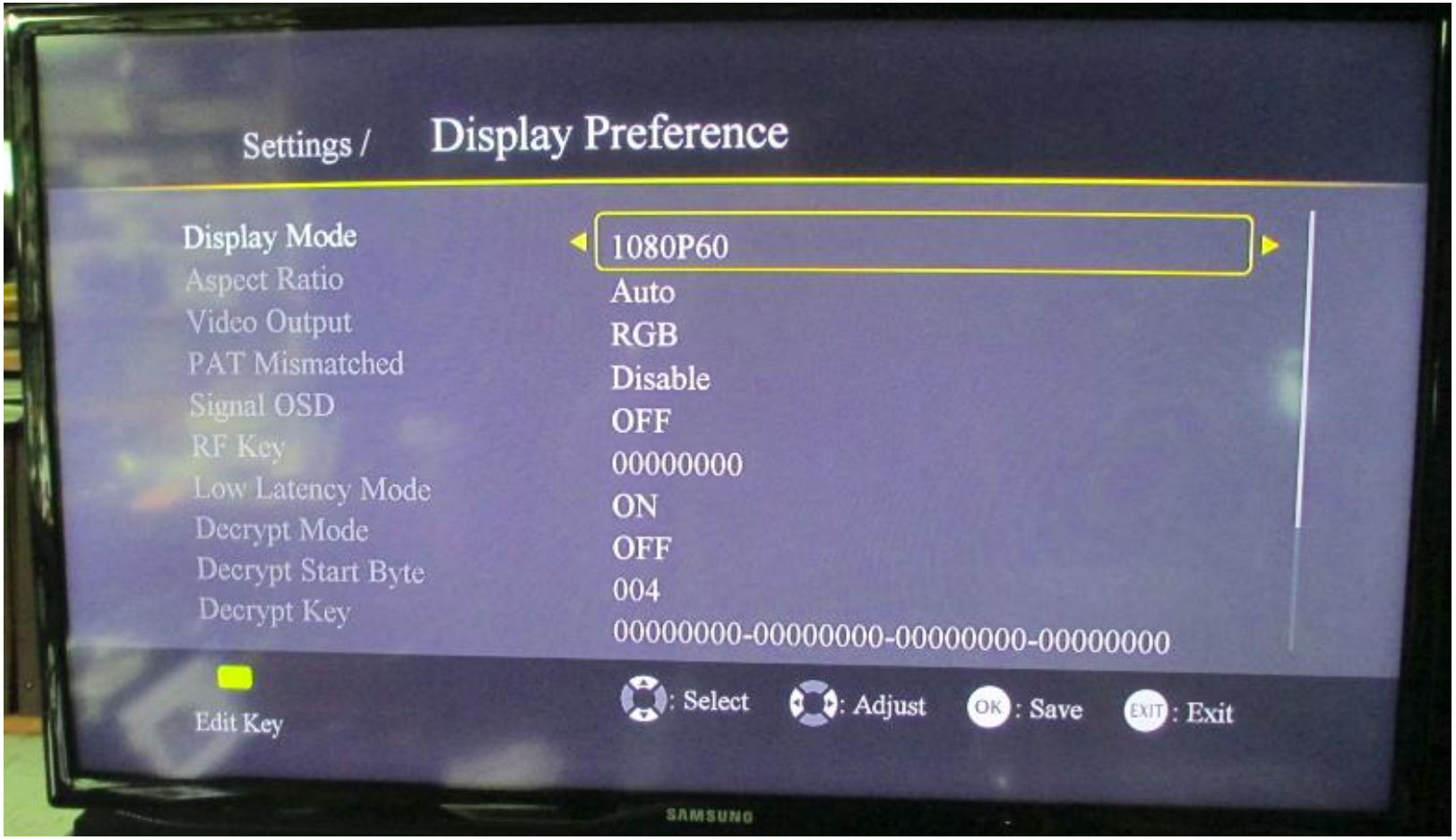


Receiver Configuration **O**n **S**creen **D**isplay

HV110/120 RX OSD Freq Scan

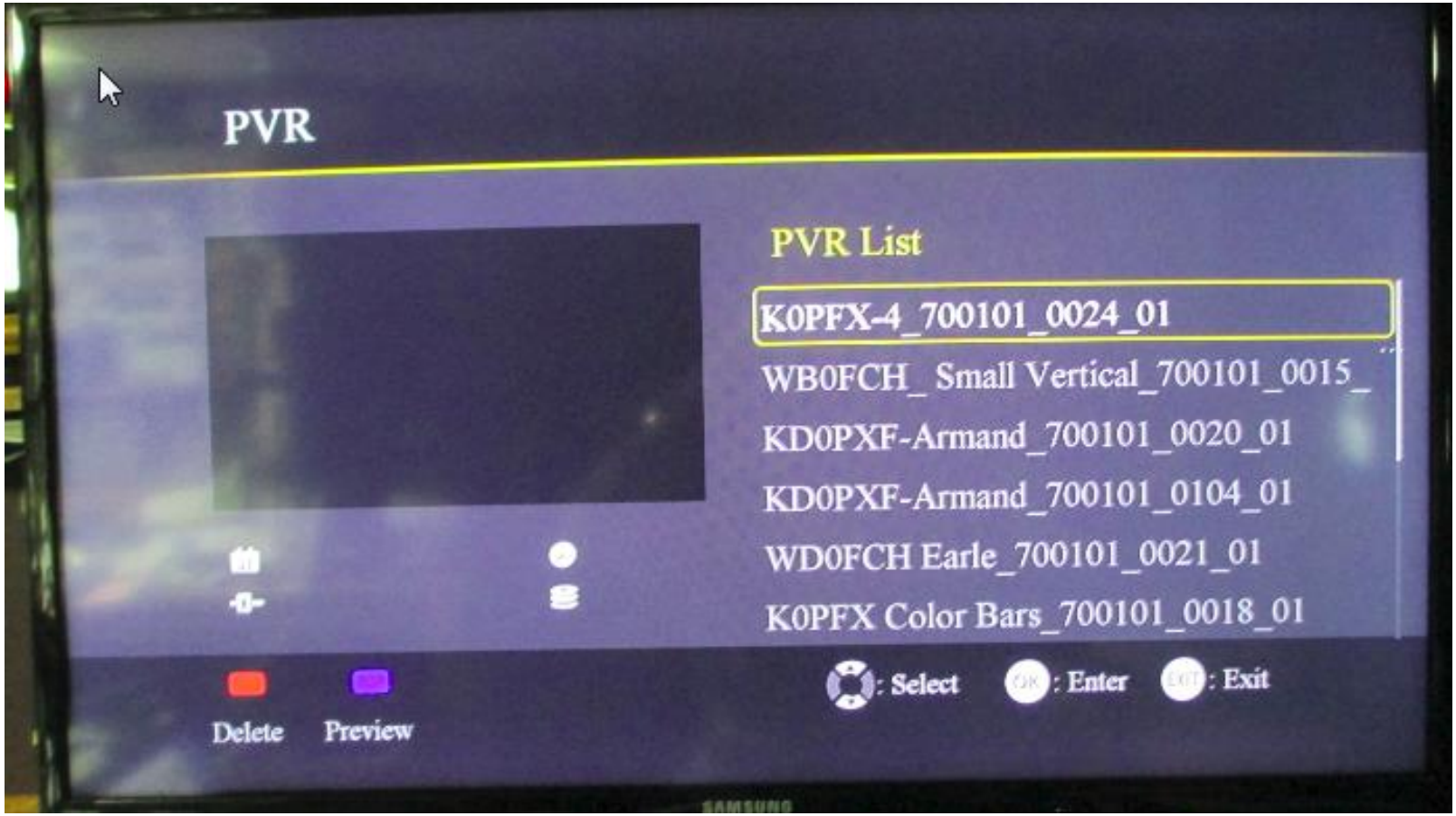


..display settings for TV/Monitor



...saves stations scanned

...records RX transmissions to .TS files



...OSD info sig, call, freq, BW

Received signal information

HDMI out Camcorder to HV-320 Transmitter

DVB T TERRESTRIAL

amazon

Full HD 1080

$90 Video Card with HDMI out

amazon

Transmitter HDMI Switching

"Content is king" - keep ATV interesting!

8 Position
eBay ~$50

HD-SigGen
ColorBars

5 Position Auto Sensing eBay ~$40

HDMI Audio Inserter/Extractor

From MCM Electronics $39

Media Player with HDMI/1080p

Model MP62

ebay $70

HD TVI 1080p cam's video to HDMI out converter

DVB T TERRESTRIAL

Allow use of low cost $39 Security Cameras for High Def ATV

ebay

HiDes DC-105 Camera with 70-1450 MHz DVB-T TXs

$225

Used in high altitude Balloon flights.

$279

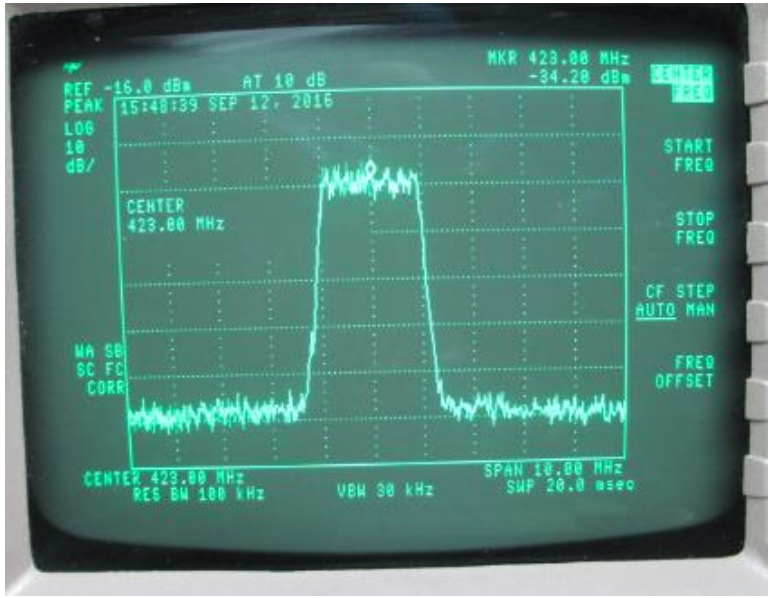
ebay

Full HD 1080

OE7DBH Class A Amplifiers for HiDes

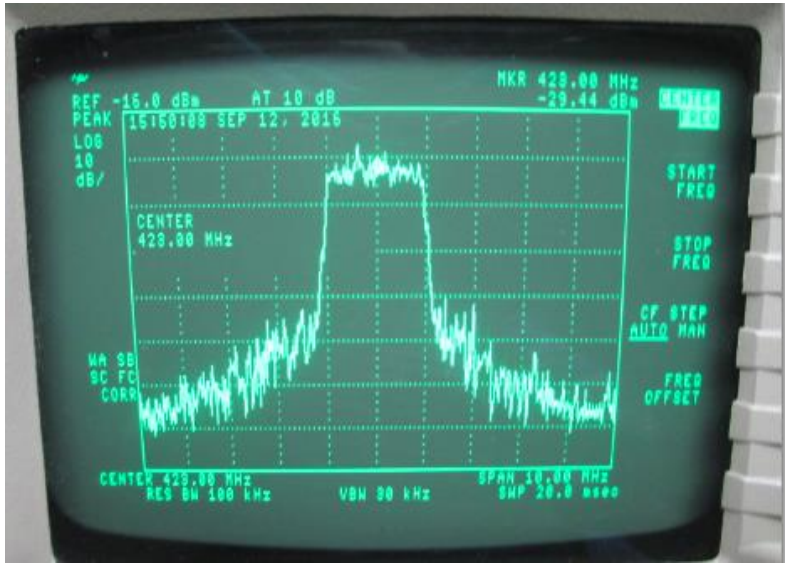
50-55dB gain

DVB-T OFDM Multi-Carrier Signal



Good TX Signal

Bad TX Signal



Orthogonal **F**requency **D**ivision **M**ultiplex

MITSUBISHI ELECTRIC

DVB T TERRESTRIAL

< Silicon RF Power Modules >

RA60H4047M1

RoHS Compliance, 400-470MHz 60W 12.5V, 2 Stage Amp. For MOBILE RADIO

DESCRIPTION

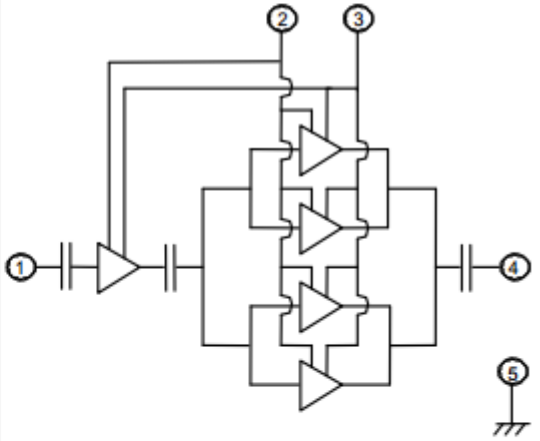
The RA60H4047M1 is a 60-watt RF MOSFET Amplifier Module for 12.5-volt mobile radios that operate in the 400- to 470-MHz range.

The battery can be connected directly to the drain of the enhancement-mode MOSFET transistors. Without the gate voltage (V_{GG}=0V), only a small leakage current flows into the drain and the nominal output signal (P_{out}=60W) attenuates up to 60 dB. The output power and the drain current increase as the gate voltage increases. The output power and the drain current increase substantially with the gate voltage around 0V(minimum). The nominal output power becomes available at the state that V_{GG} is 4V (typical) and 5V (maximum).
At V_{GG}=5V, the typical gate currents are 5mA.This module is designed for non-linear FM modulation, but may also be used for linear modulation by setting the drain quiescent current with the gate voltage and controlling the output power with the input power.

FEATURES

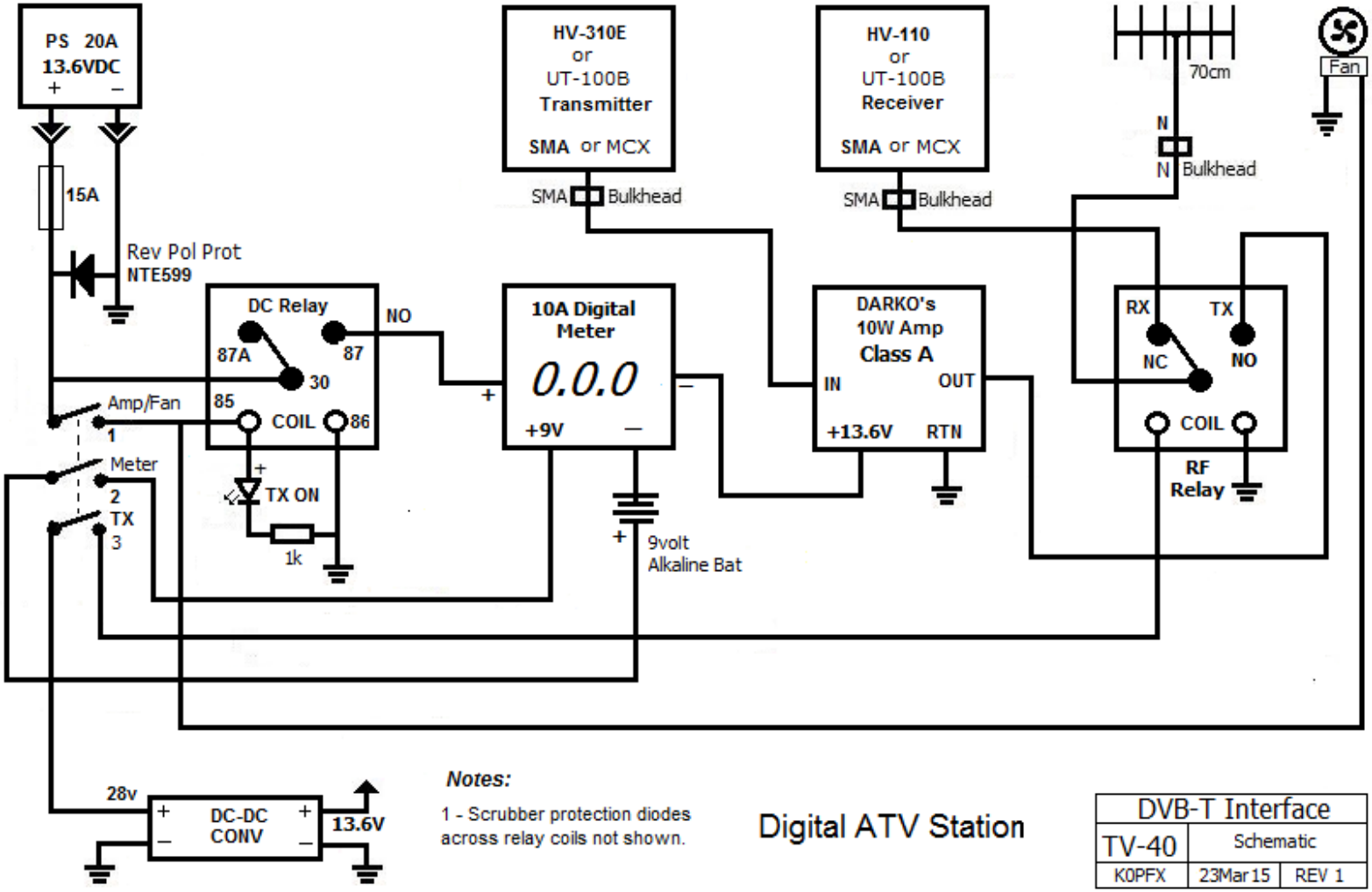
- Enhancement-Mode MOSFET Transistors (I_{DD}≅0 @ V_{DD}=12.5V, V_{GG}=0V)
- P_{out}>60W, η_T>40% @ V_{DD}=12.5V, V_{GG}=5V, P_{in}=50mW
- Broadband Frequency Range: 400-470MHz

BLOCK DIAGRAM



1. RF Input (P_{in})
2. Gate Voltage (V_{GG}), Power Control
3. Drain Voltage (V_{DD}), Battery
4. RF Output (P_{out})
5. RF Ground (Case)

Simple interface to HiDes



Notes:

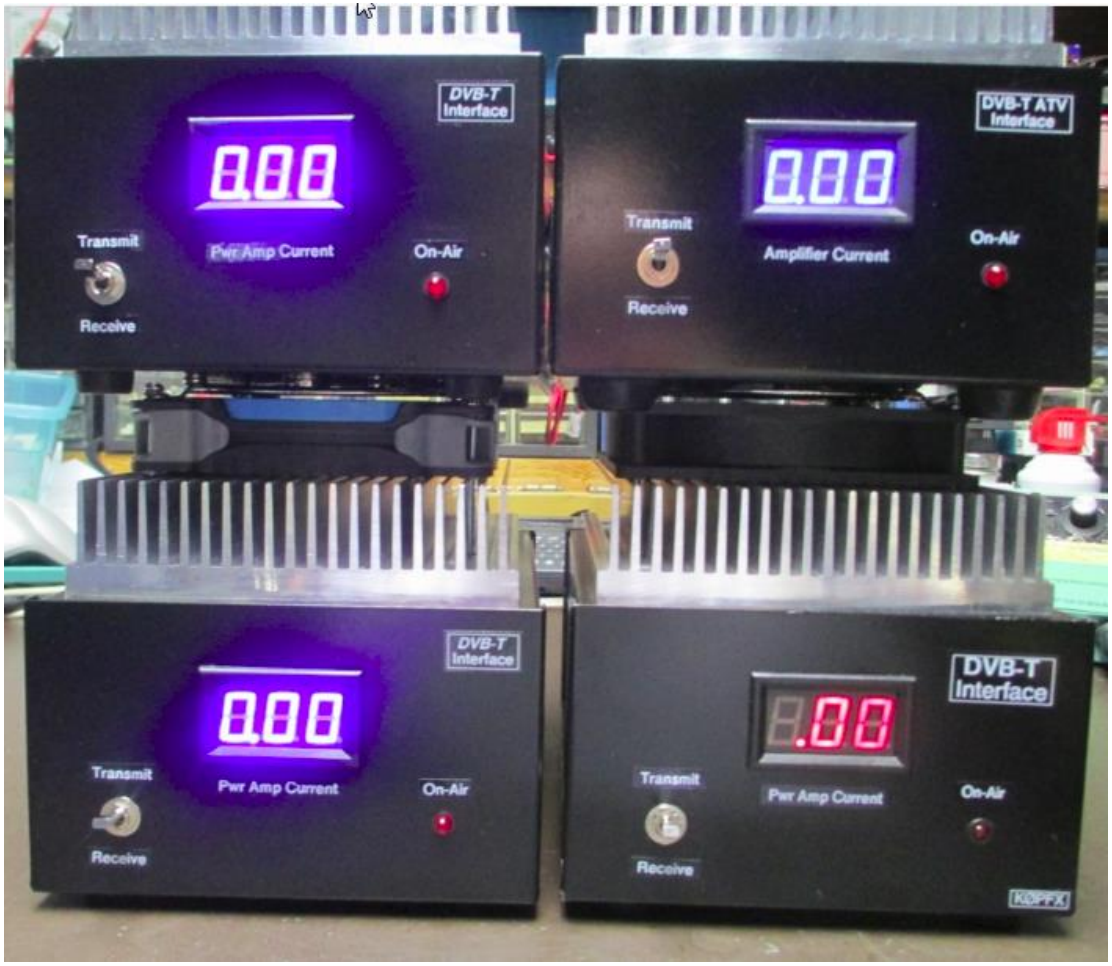
1 - Scrubber protection diodes across relay coils not shown.

Digital ATV Station

DVB-T Interface		
TV-40	Schematic	
K0PFX	23Mar15	REV 1

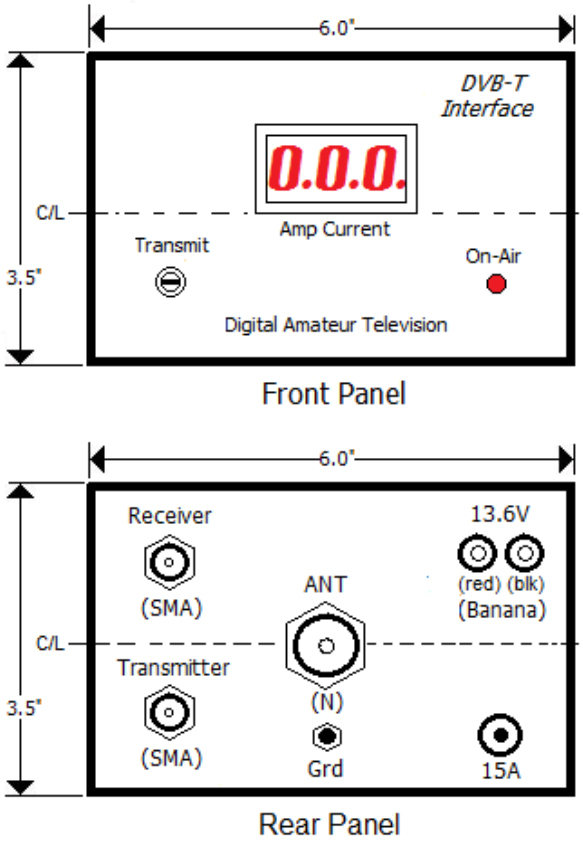
HiDes DVB-T Interface that you can build

Cheaper by the...



Rear view

Front/Rear Panel

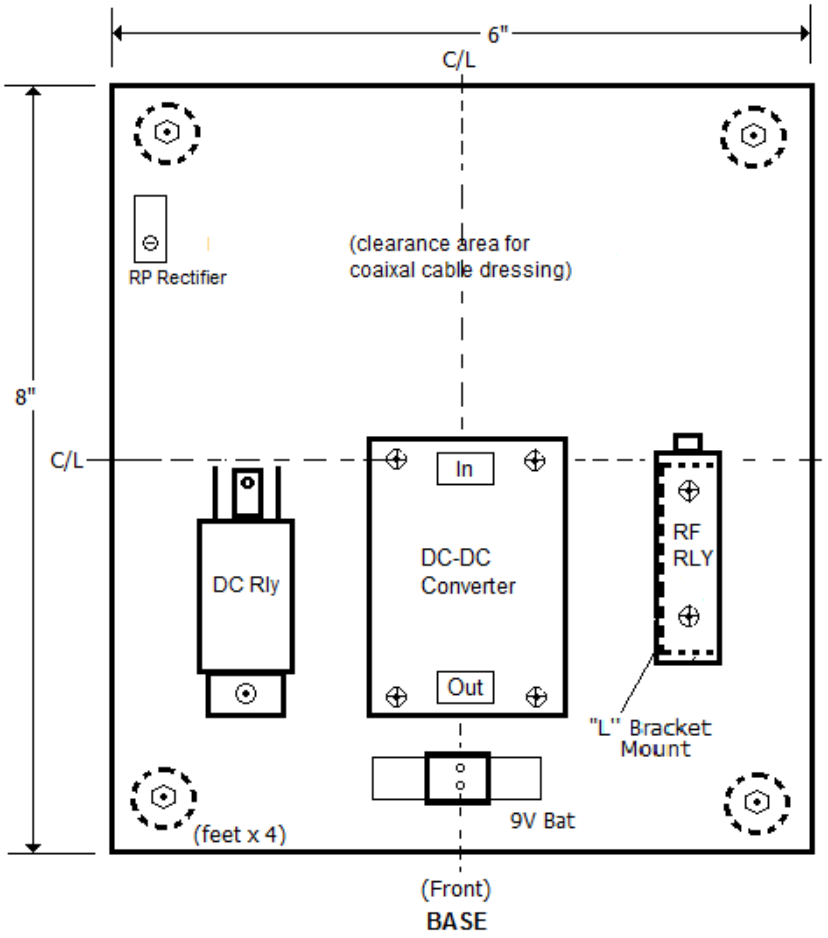


Notes:

1. Not to scale
2. Bud box CU-3009A
3. Paint: Rust-Oleum Self-Etching Primer followed with Krylon ColorMaster Black Satin

DVB-T Interface		
TV-41	Front-Rear Panel Assembly	
K0PFX	23Mar15	Rev 1

Chassis assembly Bud Box



Notes:

1. Not to scale
2. Bud box CU-3009A
3. Hardware is 4-40 screws lock washers and nuts for "L" relay mtg brackets.
4. Feet and DC Relay mounted with 6-32 screws, lockwashers and nuts.
5. Refer to TV-16 "L" bracket dwg for mounting RF relays.
6. Use metric M-3 hardware supplied with DC-DC converter.
7. Mount NTE599 RP Rect with 1/4" nylon 4-40 spacer and 4-40 screws, flat and lock Rectifier must be isolated from the chassis
8. Fasten 9v (#76 case) battery holder with (2) # 2-56 screw/washer/nut.

DVB-T Interface		
TV-43	Chassis Floor Assembly	
K0PFX	23Mar15	Rev 1

Bill of Material (parts listing..)

KØPFX 12Sep15

DVB-T (simple) ATV Interface BOM

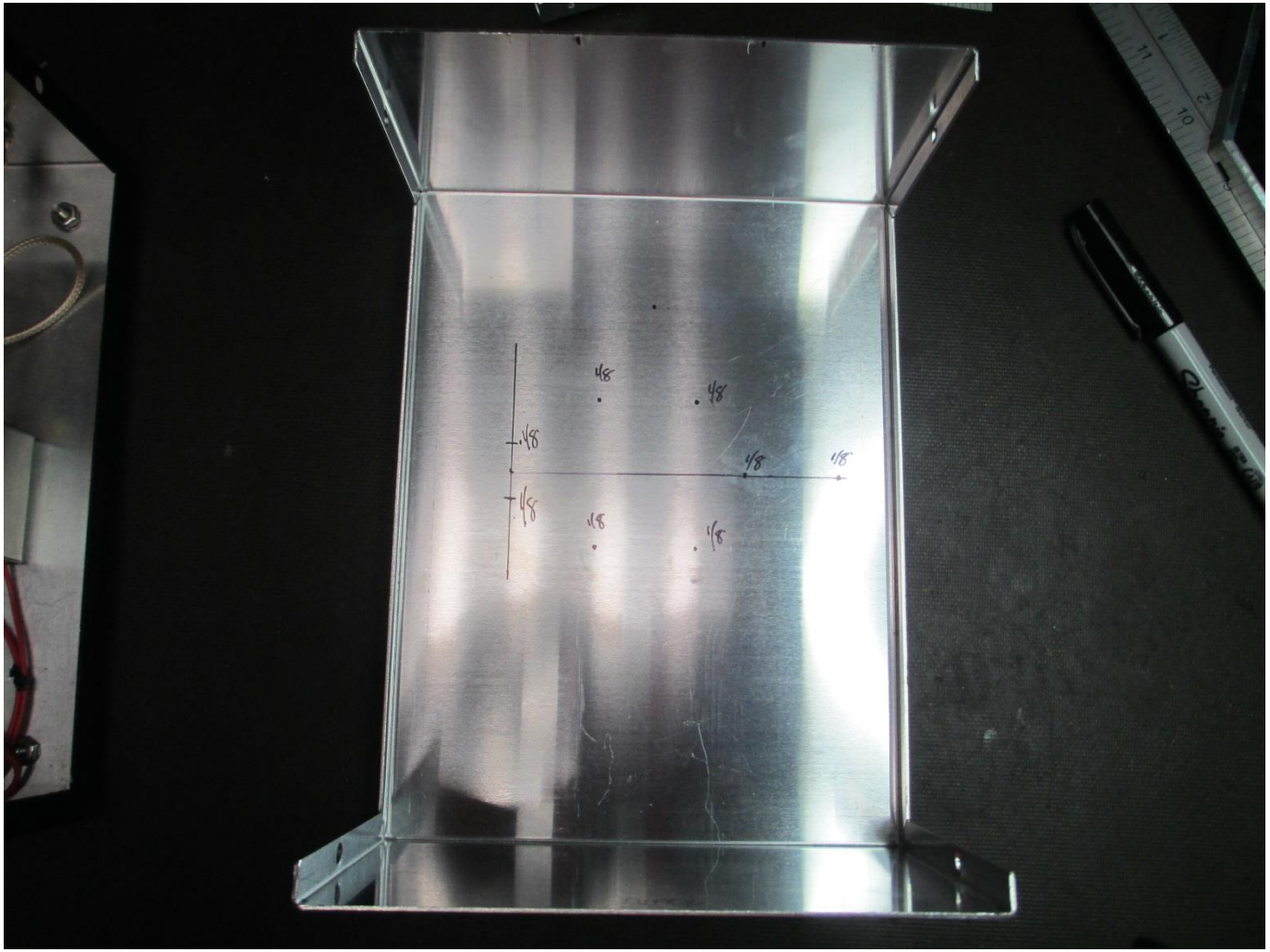
Rev 1

ITEM	QTY	DESCRIPTION	MFR	Part Number	SOURCE
1	1	Cable #1, SMA Male to Female Panel Mount	Various	6" Pigtail RG-316	eBay/Amazon
2	---				
3	---				
4	1	Cable #2, SMA Male to N F			
5	1	Cable #3, SMA Male to Mal			
6	1	Cable #4, SMA Male to N M			
7	1	Cable, PS DC Power, Red/B			
8	2	Cable, SMA Male to Male (			
9	---				
10	1	Conn, Banana Binding post Red/Black			
11	1	Conn, plastic housing, 2 po			
12	1	Conn, plastic housing, 2 po			
13	1	Conn, Contact, crimp, male			
14	1	Conn, Contact, crimp, fema			
15	1	Conn, Stereo, 1/8th in, plast			
16	1	DC 25A Power Supply for R (internally adjusted to 13.(			
17	1	Display, 0-10A, Digital, LED			
18	1	Enclosure, Bud Box, 6D x 8'			

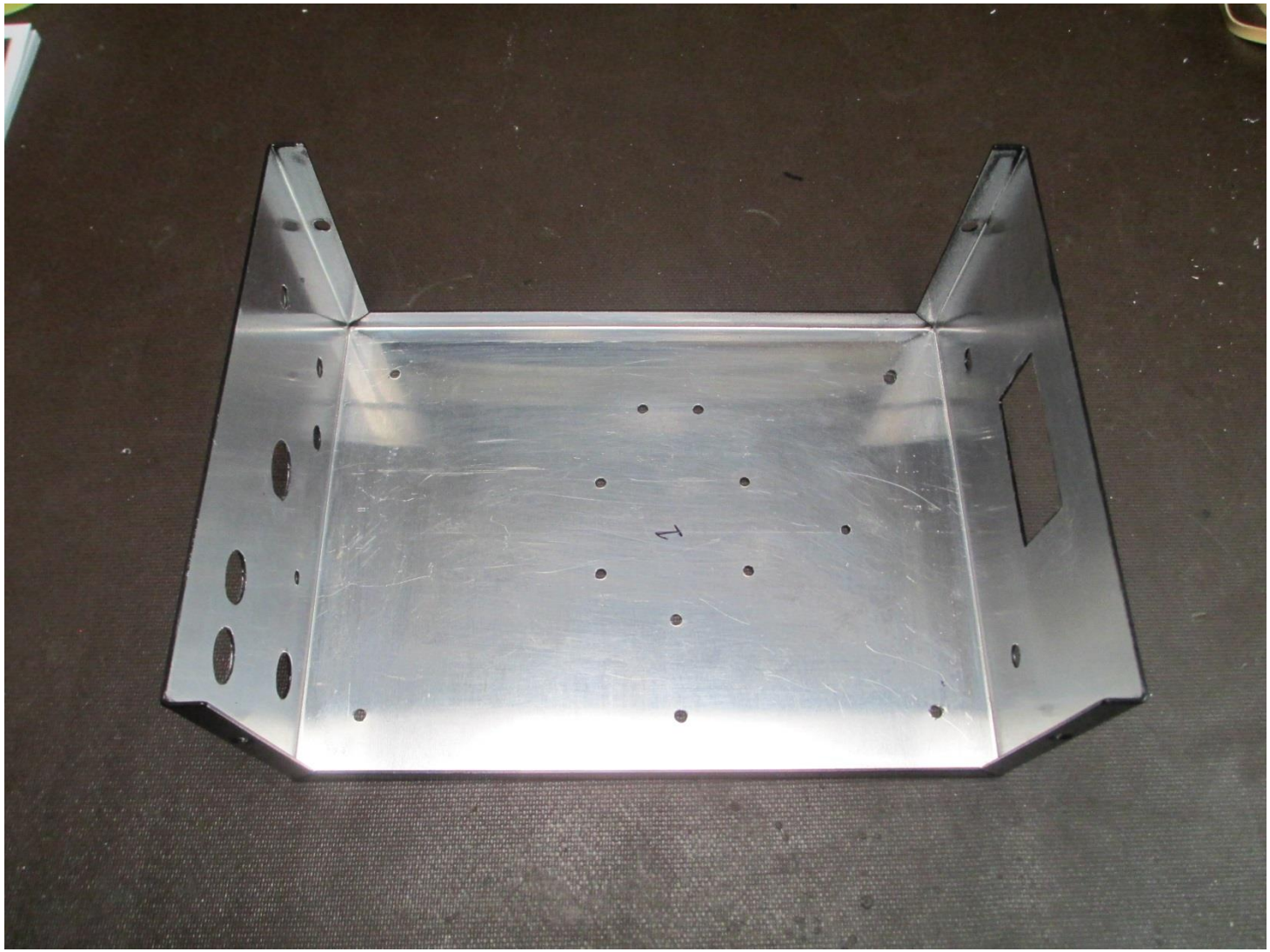
Hardware

ITEM	QTY	DESCRIPTION	MFR	Part Number	SOURCE
64	1	Spacer, nylon, 4-40 threaded 5/16th" standoff (fasten Rev Polarity Rectifier to bottom base)	Keystone	534-1947	Mouser
65	4	Screw, Metric, machine pan head slotted (fasten 10W Amp to heat sink) (see Note 2)	Hillman	M3-.50 x 20	Various
66	4	Screw, Metric, machine pan head slotted (fasten DC-DC Converter Buck Boost Volt PCB)	Hillman	M3-.25 x 20	Various
66	1	Screw, machine, binding, slotted w/washer/nut (fasten 30A DC relay to base)	Various	8-32 x 1/2	Various
68	2	Screw, machine, binding, slotted w/washer/nut (fasten Relay #1 and #2 to chassis floor)	Various	4-40 x 5/16th	Various
69	1	Screw, machine, binding, slotted w/washer/nut (fasten 9volt bat holder to chassis floor)	Various	4-40 x 3/16th	Various
70	2	Screw, machine, binding, slotted w/washer/nut (fasten Relay #1 and #2 to "L" bracket mount	Various	4-40 x ¾"	Various
71	1	Grommet, black rubber, ¼" chassis hole Dia, 1/8th hole ID	Buna-N	3MRG2	Grainger
72	1	Screw, machine, binding, slotted, internal tooth (3) flat washers, and (2) nuts (Ground term)	Various	8-32 x ¾"	Various
73	4	Screw, machine, binding, slotted w/washer/nut (fasten rubber feet to chassis base floor)	Various	6-32 x ½"	Various

Measure and mark the Bud box

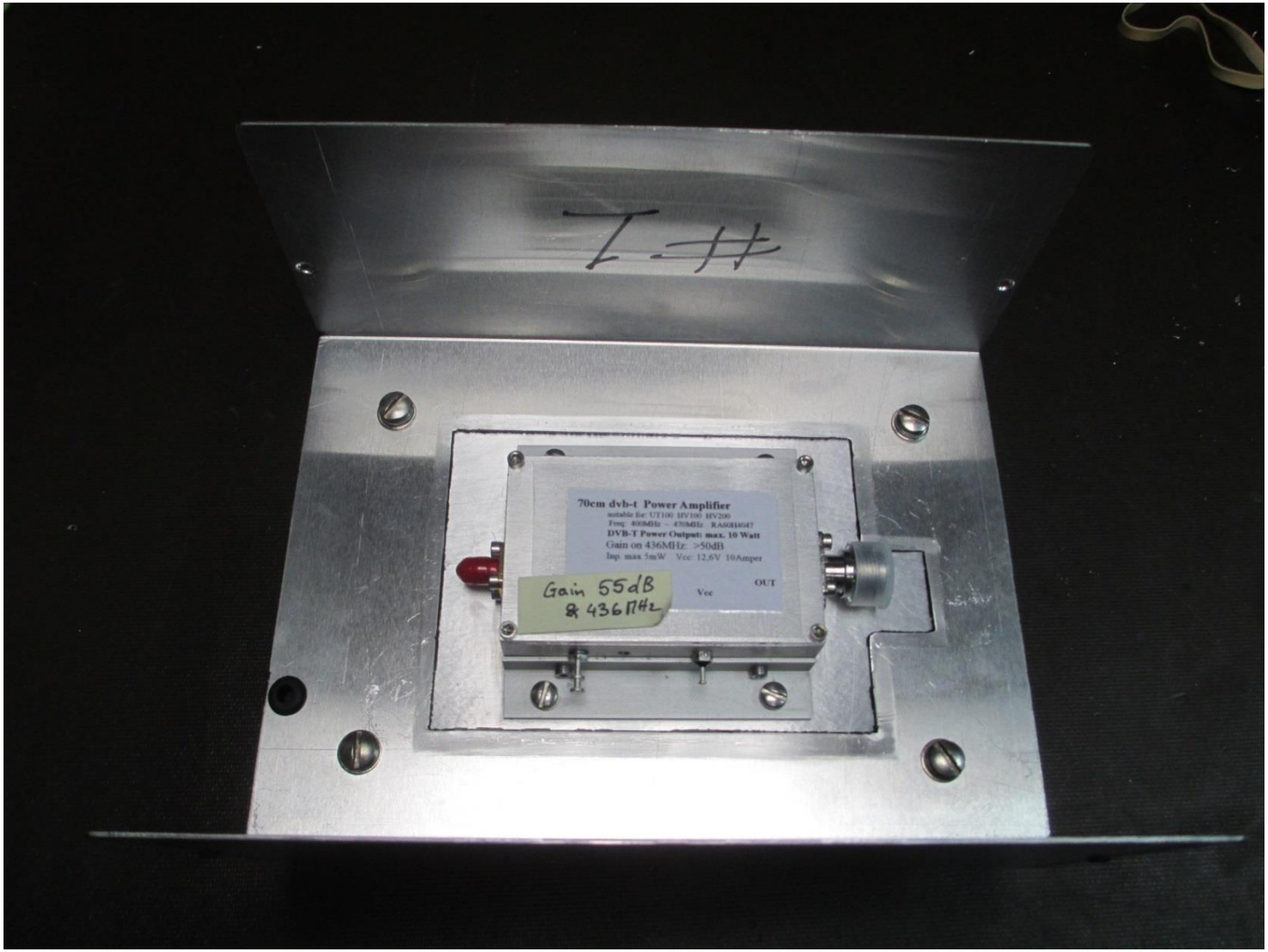


Drill/cut holes out in the Bud box

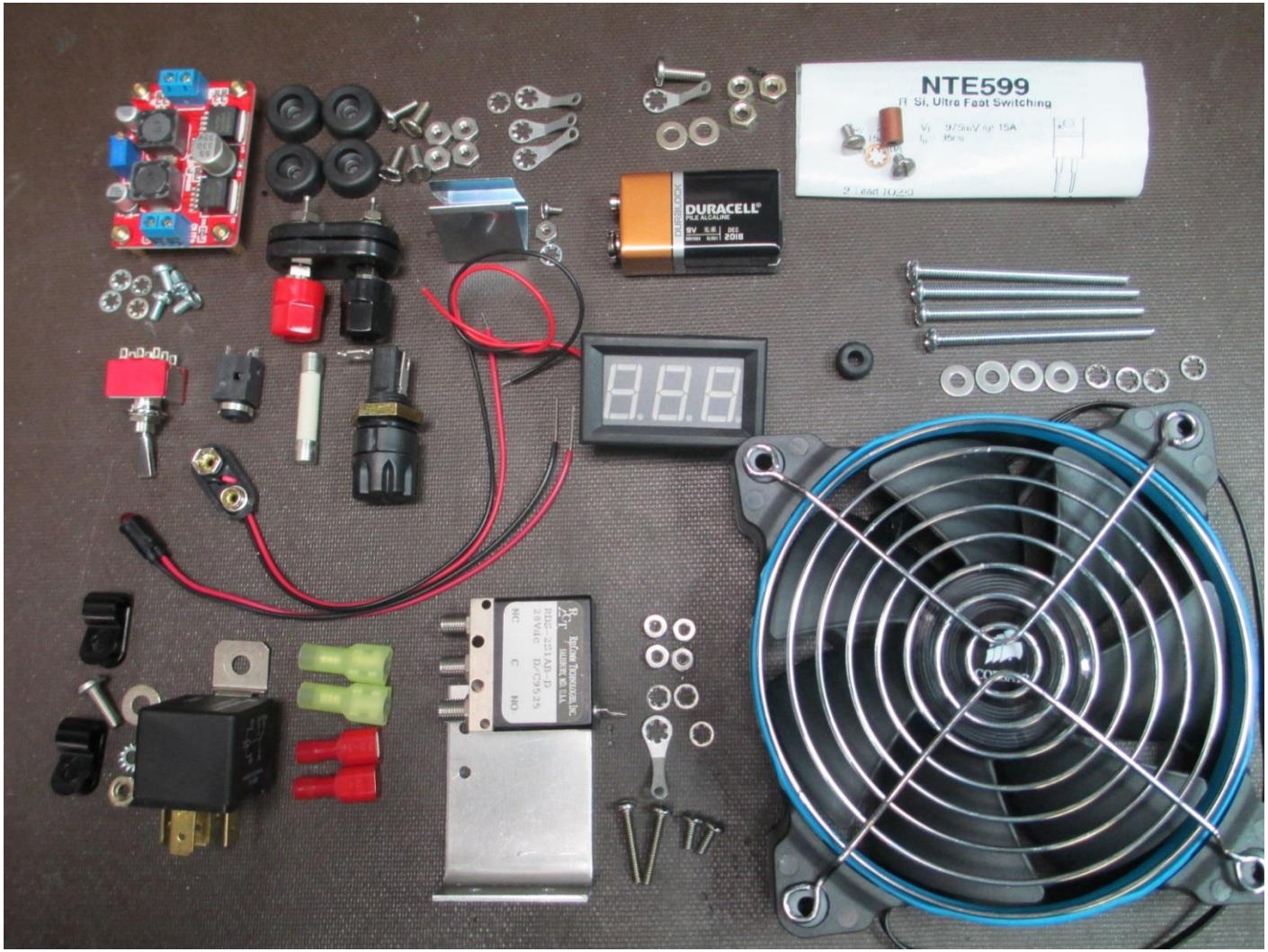


Use OE7DBH's heatsink or your own for the amplifier

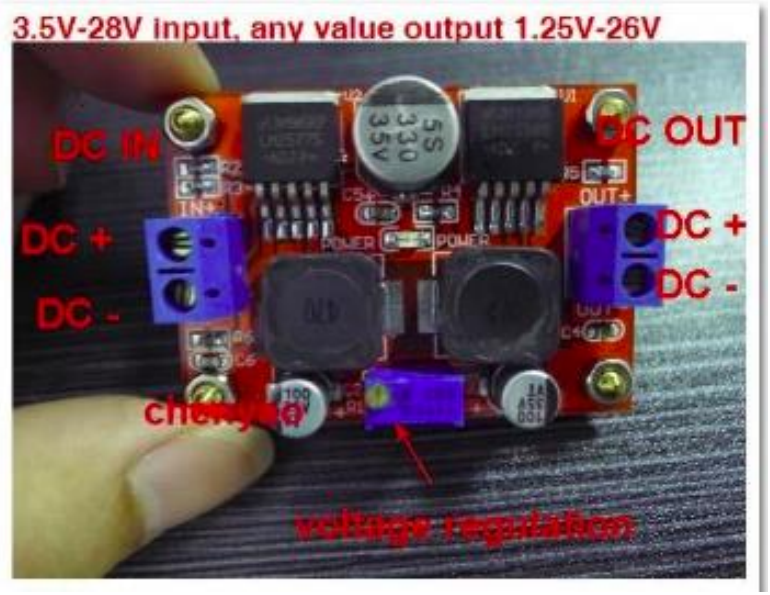
Mount amplifier on Bud Box top



Lay out the parts...



DC-DC Converter for 28v Relays



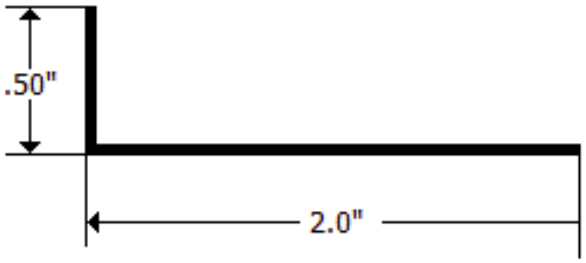
$5

ebay

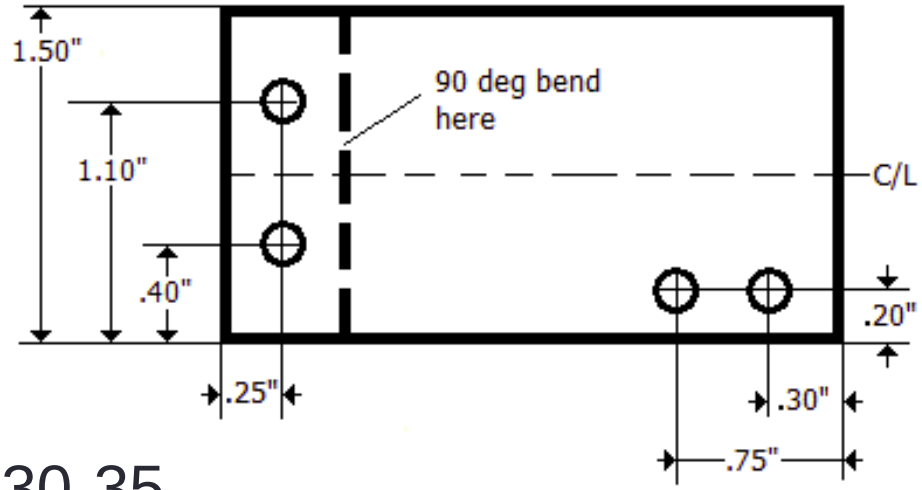
$2

Cable Assemblies MCX, N, SMA

RF Relay... Transco, RLC, Teledyne



Notes:
1- Material 1/16th thick aluminum.
2- All holes .125"
3- Fasten RF Relay #1 (and #3 if same type used) with (2) 4-40 x 3/4 inch screws, flat and lock washers.
4- Fasten L bracket to chassis bottom with (2) 4-40 x 5/16th inch screws, flat and lock washers.
Dwg not to scale.



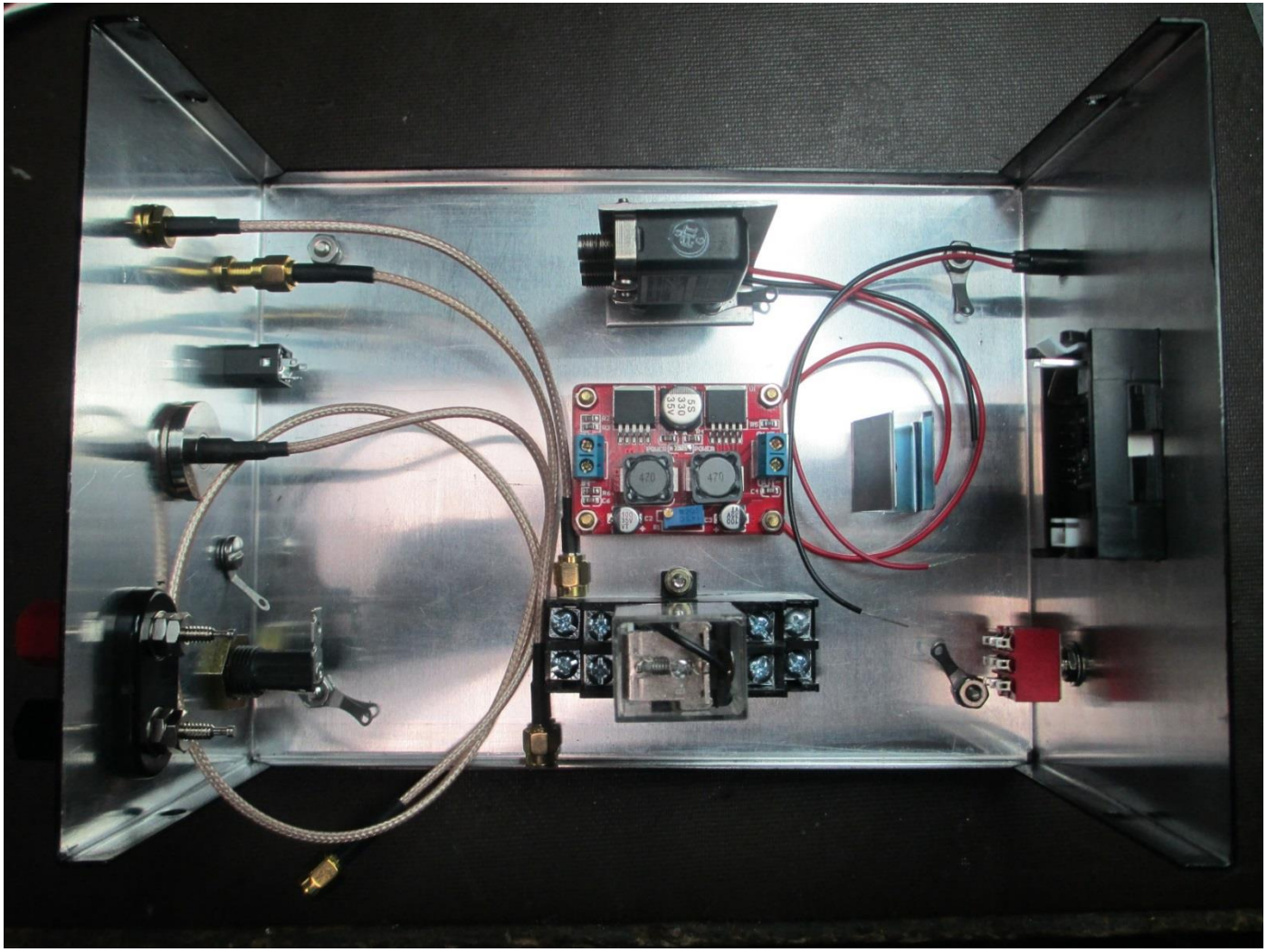
$30-35

ebay

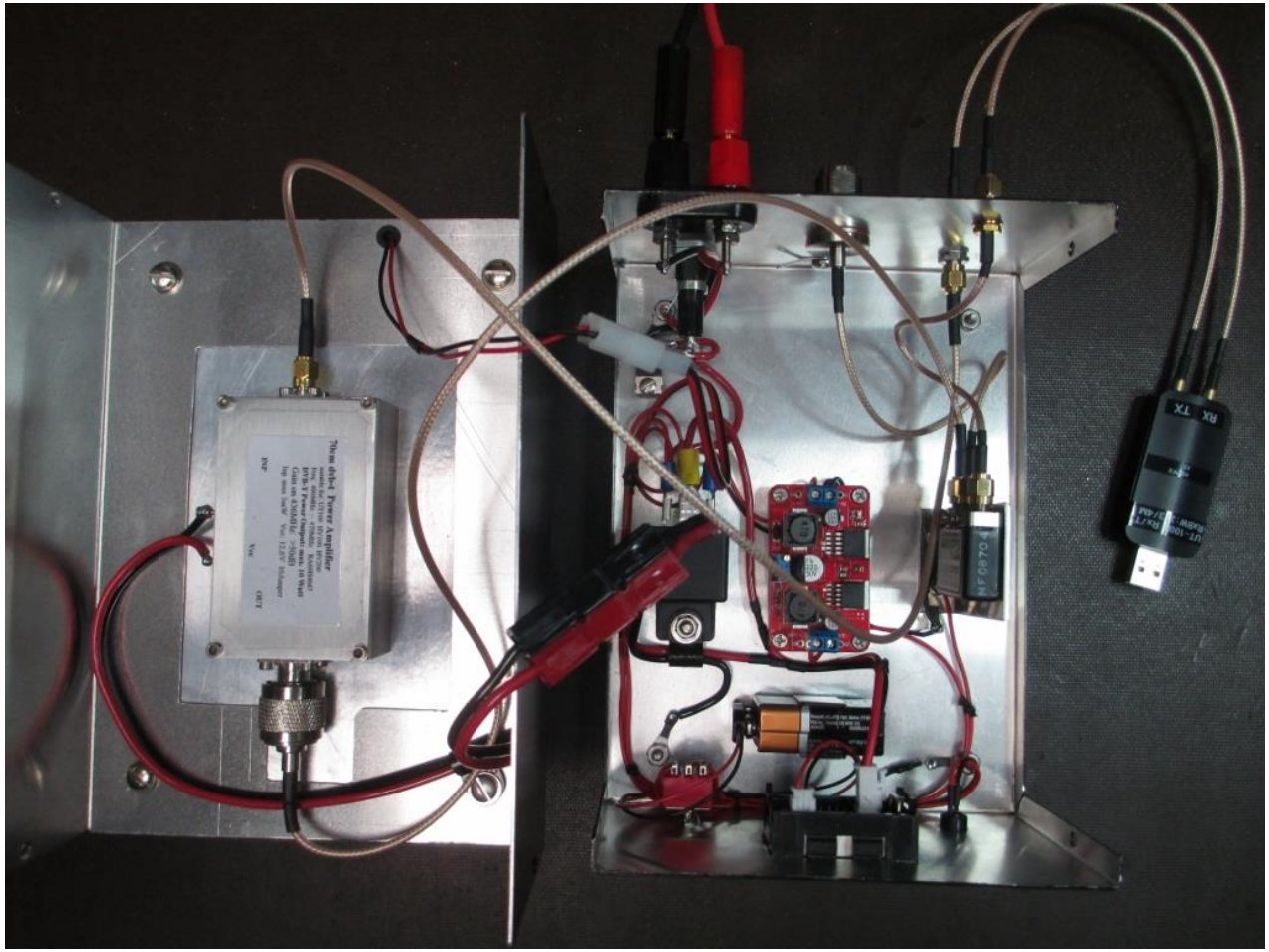
Sht 1 of 2

ADVB-T 10w		
TV-16	Rly Mtg Bracket Drill Drawing	
K0PFX	01Nov14	Rev 2

Mount parts in the Bud box



Wire it up...



Stand-alone RX and TX with HDMI Output/Input

HiDes DVB-T Interface

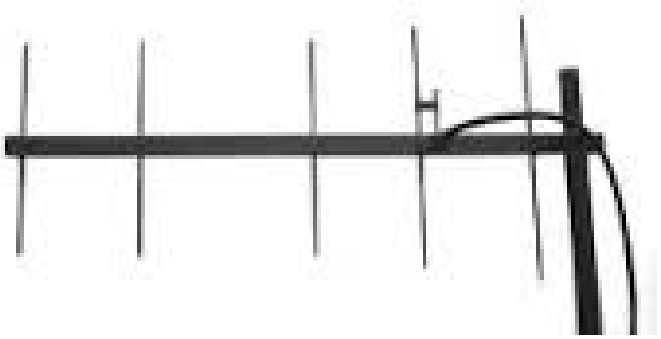
Measuring OFDM Multi-Carrier Power

BIRD 43 – 10w
25w Element

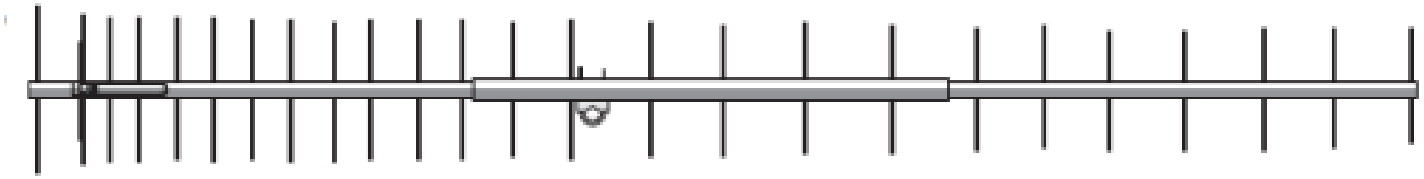
DAIWA – 10W
Average Power

BIRD AMP16 – 5w
Average Power

Yagi Antennas



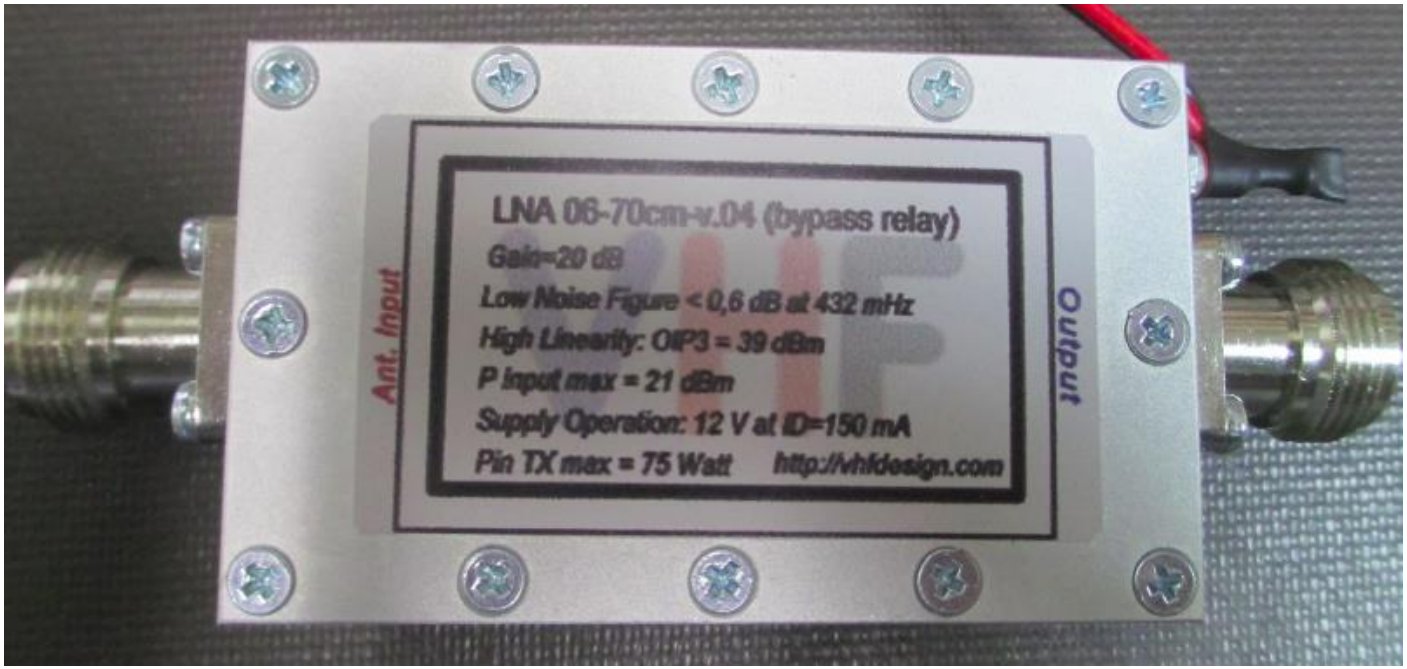
Old Antenna Labs
5L-70cm w/5 or 10 elements



Directive Systems **DSEFO432-25ATV**

423-440Mhz Yagi Ant for DATV

70cm LNA w/Bypass relay



DC Powered w/HiDes
HV-120 built-in Bias-T

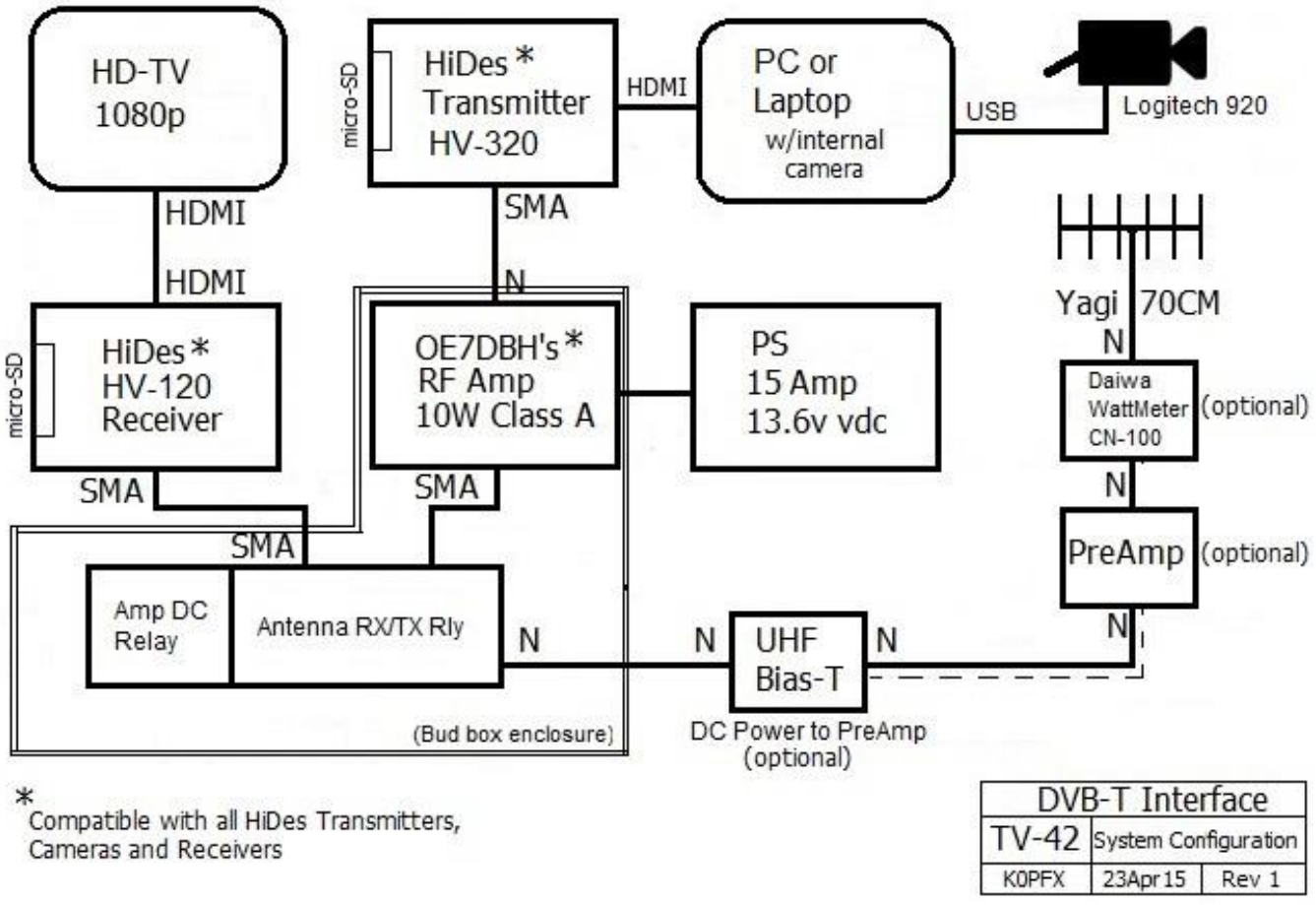
$119

70cm Pre-Amp from DEMI

Use in the ham shack RX line
(no bypass relay) $55 kit
Downeast Microwave Inc

DVB T TERRESTRIAL

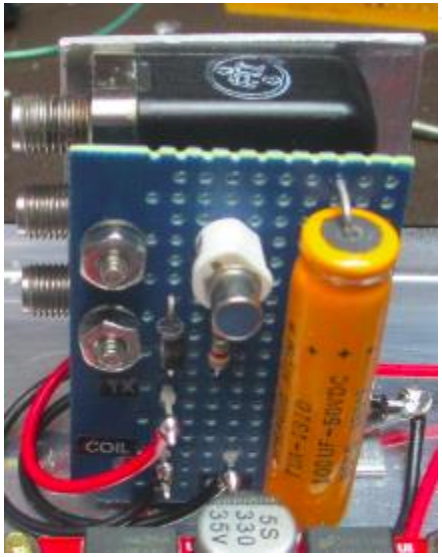
DVB-T Digital ATV Station

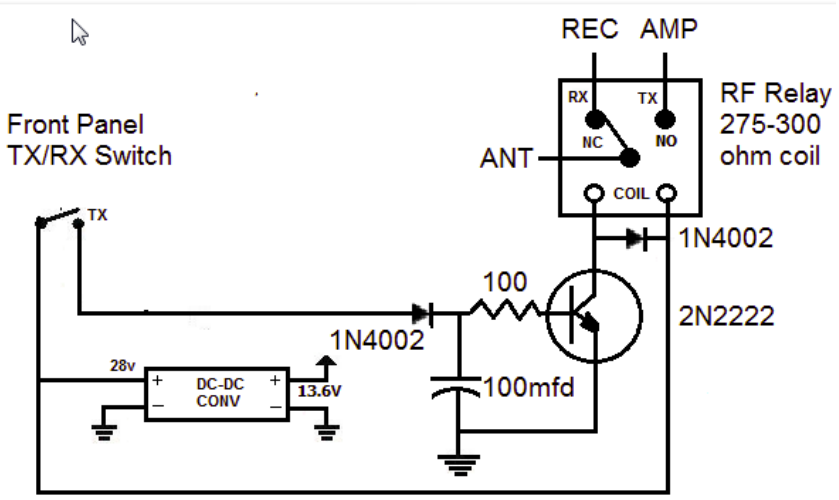


* Compatible with all HiDes Transmitters, Cameras and Receivers

DVB-T Interface		
TV-42	System Configuration	
K0PFX	23Apr15	Rev 1

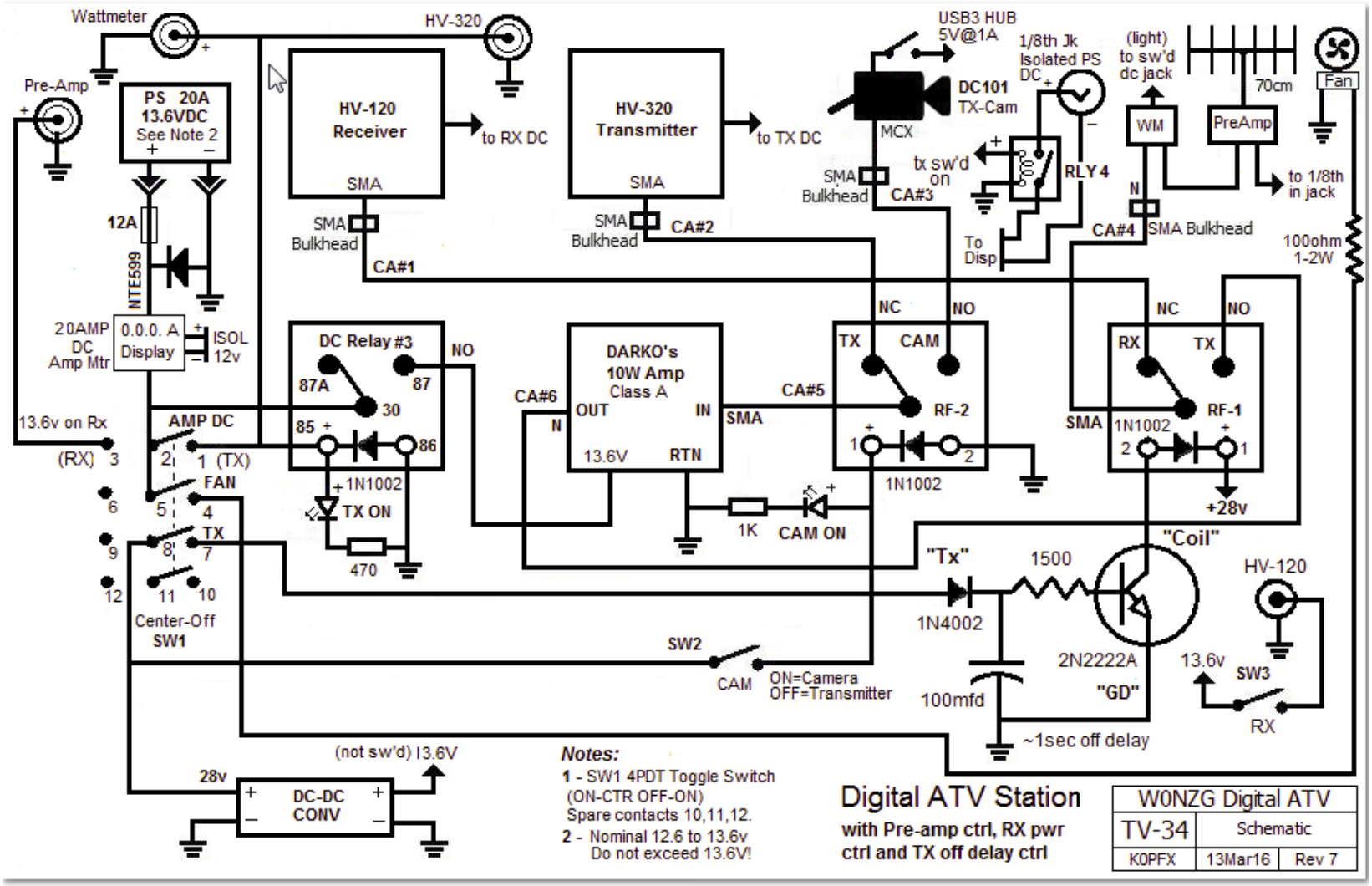
Options for Separate TX and RX to control Pre-amp, RX and TX delay

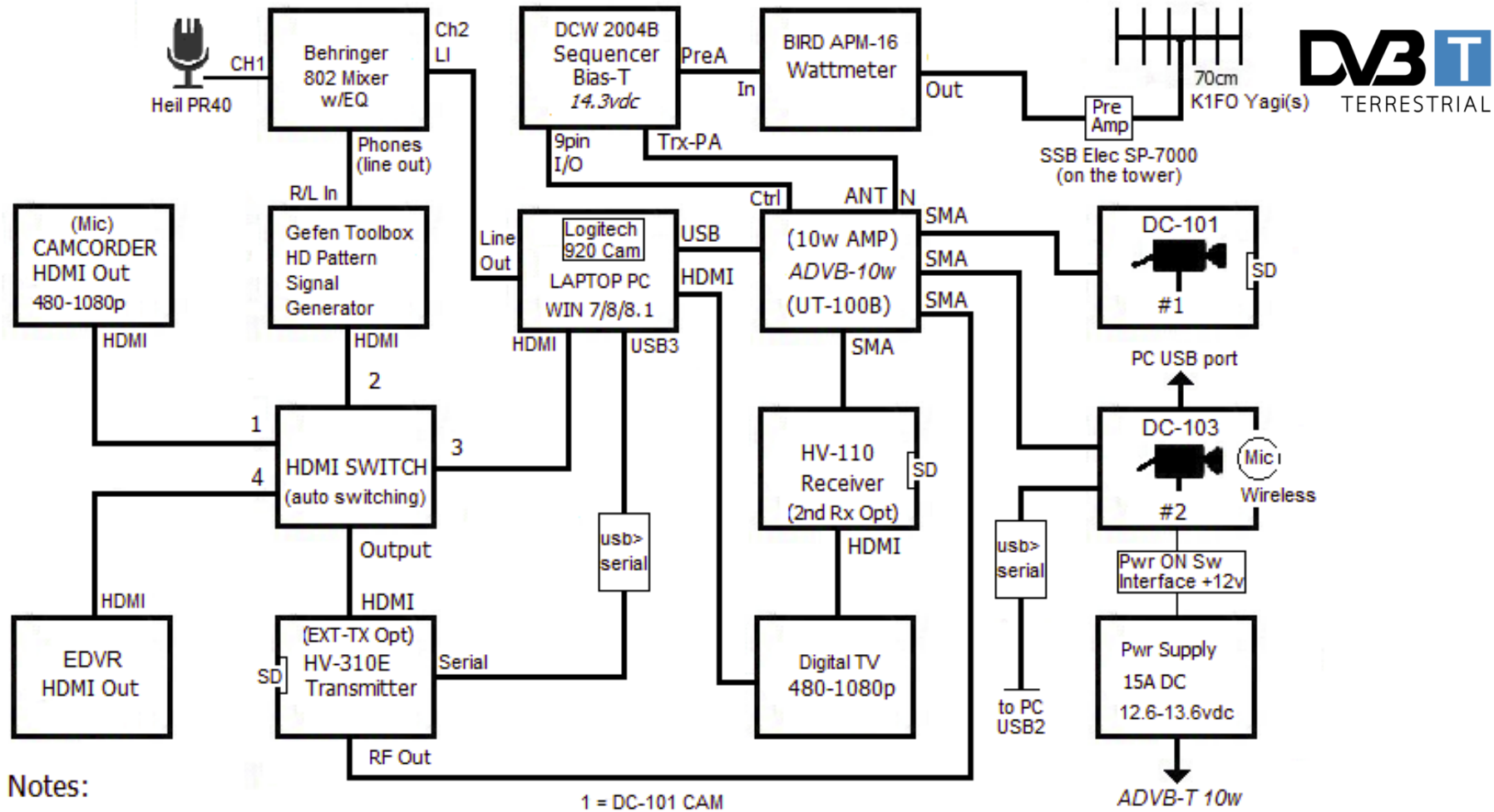




Interface rear panel for separate TX and RX

DVB-T Interface options for Separate TX and RX



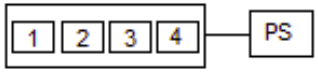


Notes:

USB Powered Cam1, RX and TX controlled using a USB3 HUB w/3amp 5V PS. DC103 is controlled using HUB switch 2 via +12vdc interface.

Second Receiver (HV110) and External-Transmitter (EXT-TX) options are included in this configuration (TV-26 to 31 dwg).

1 = DC-101 CAM
2 = DC-103 CAM via 12v Intf
3 = HV-310E Transmitter
4 = HV-110 Receiver



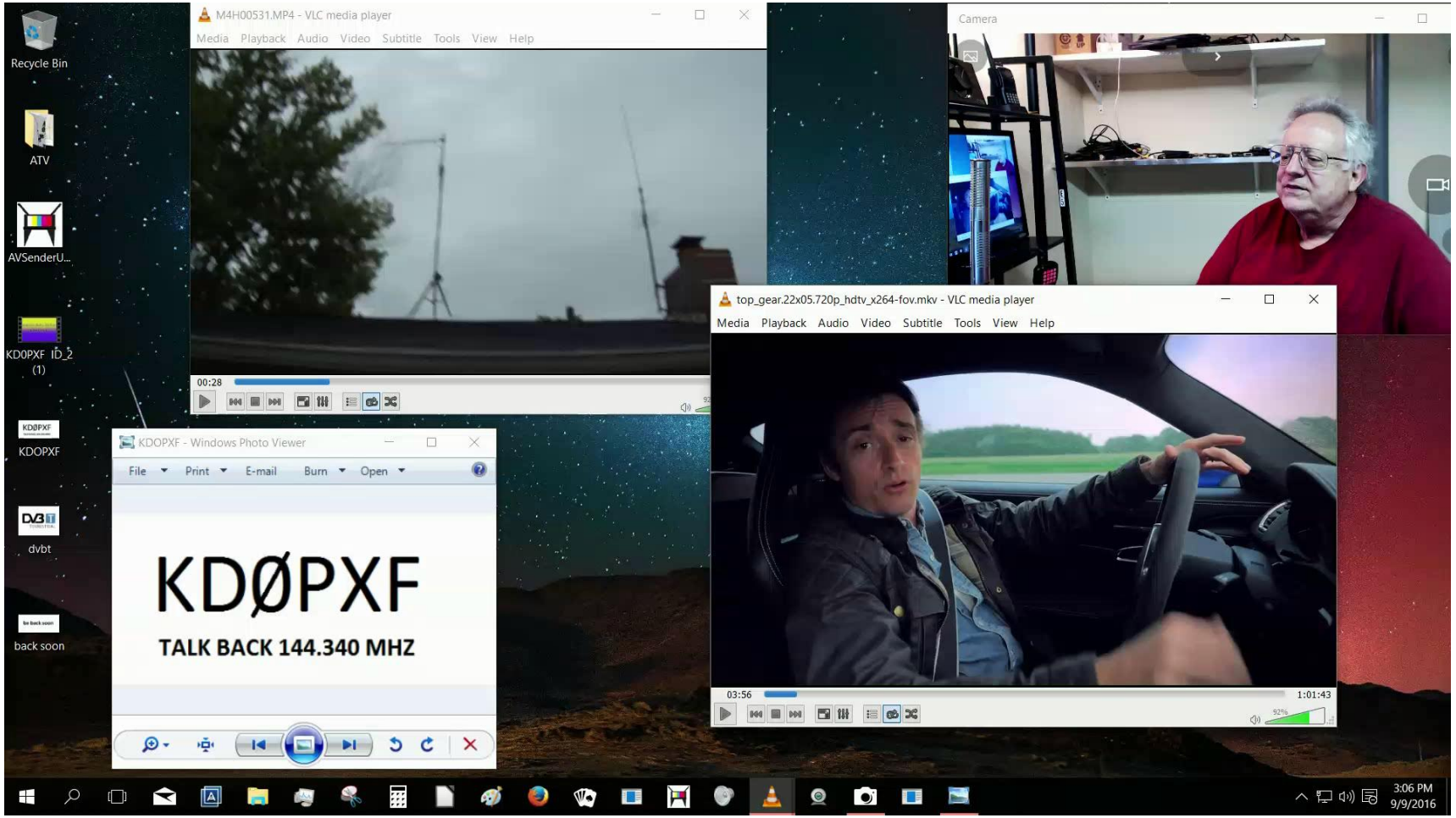
USB3 HUB Pwr Ctrl

ADVB-T 10w		
TV-01	System Block Diagram	
K0PFX	27Dec15	Rev 6

KH6HTV Digital class A 70cm Amp

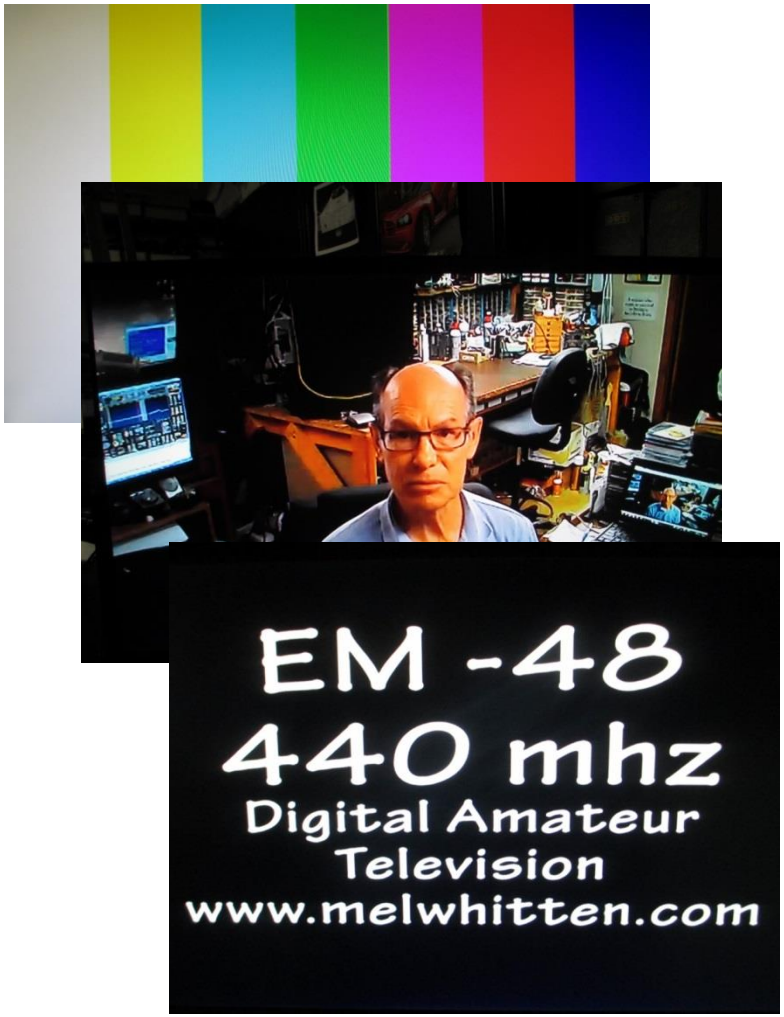
kh6htv.com

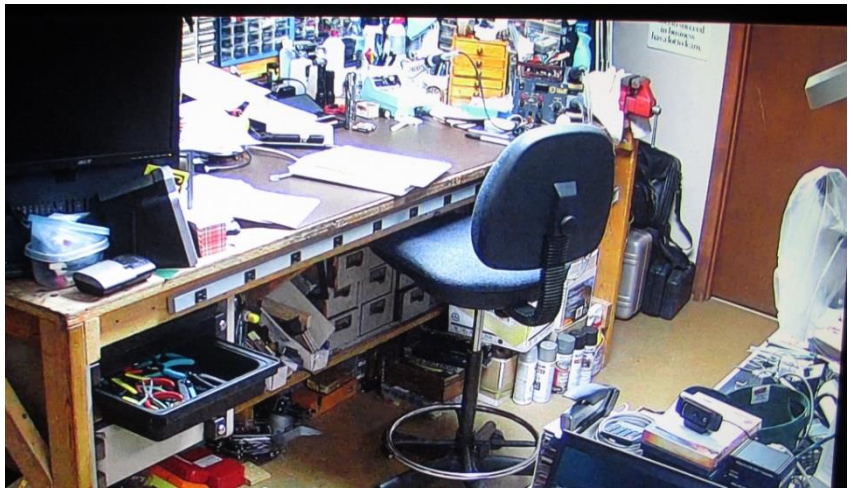
DVB-T On-the-Air



“Always a good picture...”

DVB T TERRESTRIAL





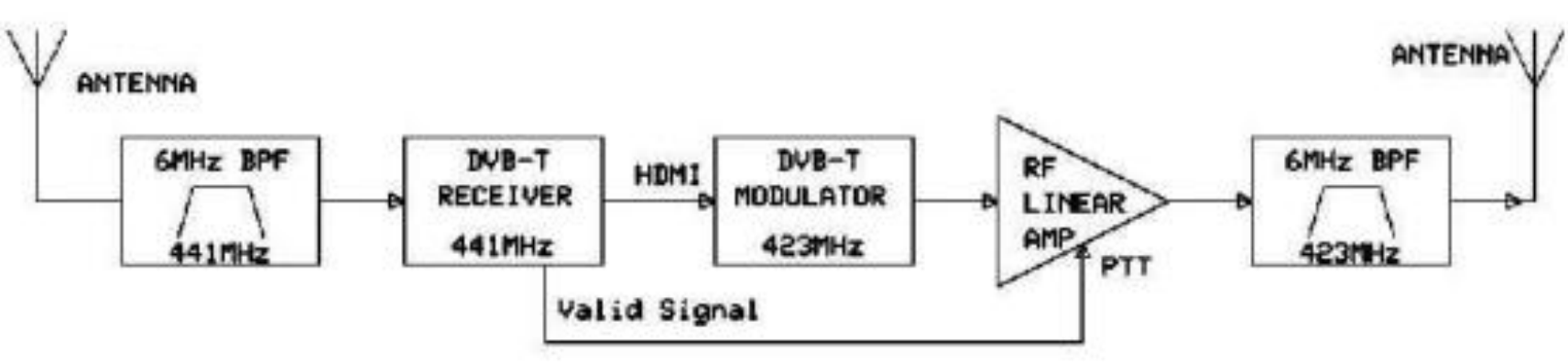
KØPFX Digital-ATV Station

D-ATV on Flight BLT-45 Wharton Texas August 20, 2016

Take off!

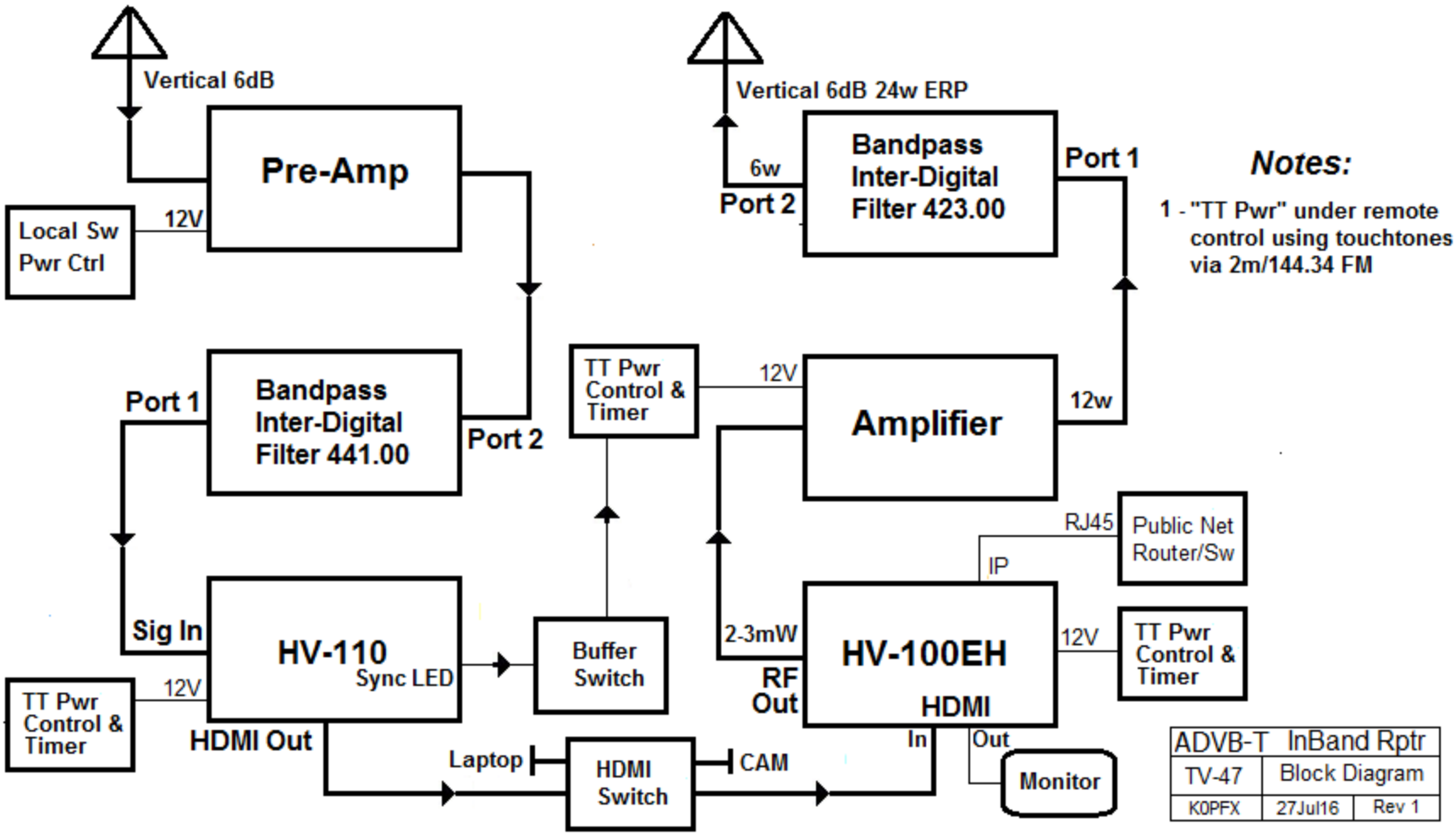
24 minutes in flight...

Digital ATV repeater?
Yes and it is easy to build one...



From Jim, KH6HTV
App note An-23

Block diagram of a DVB-T Repeater



In-Band 70cm Repeater components..

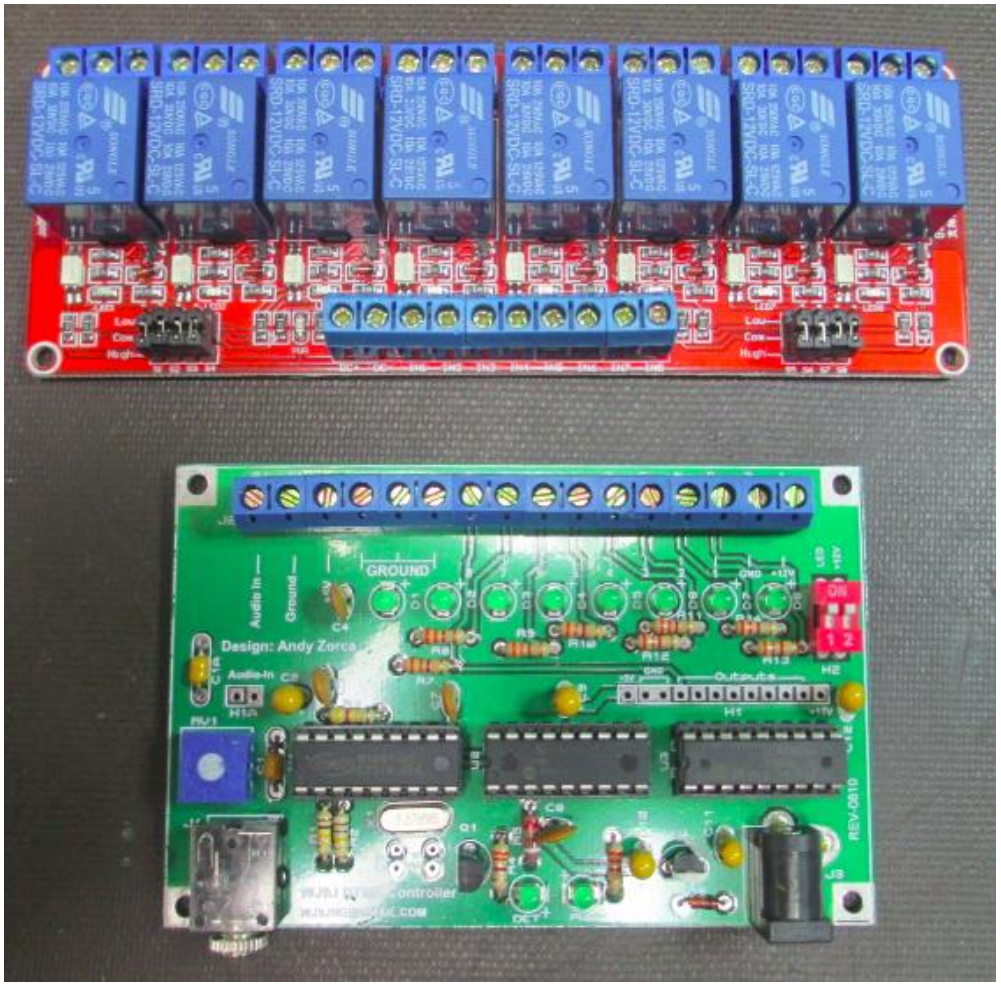
Transmitter with HDMI, Ethernet and USB

423MHz and 441Mhz Band Pass Filters

WJ9J DTMF controller

Chinese import relay board

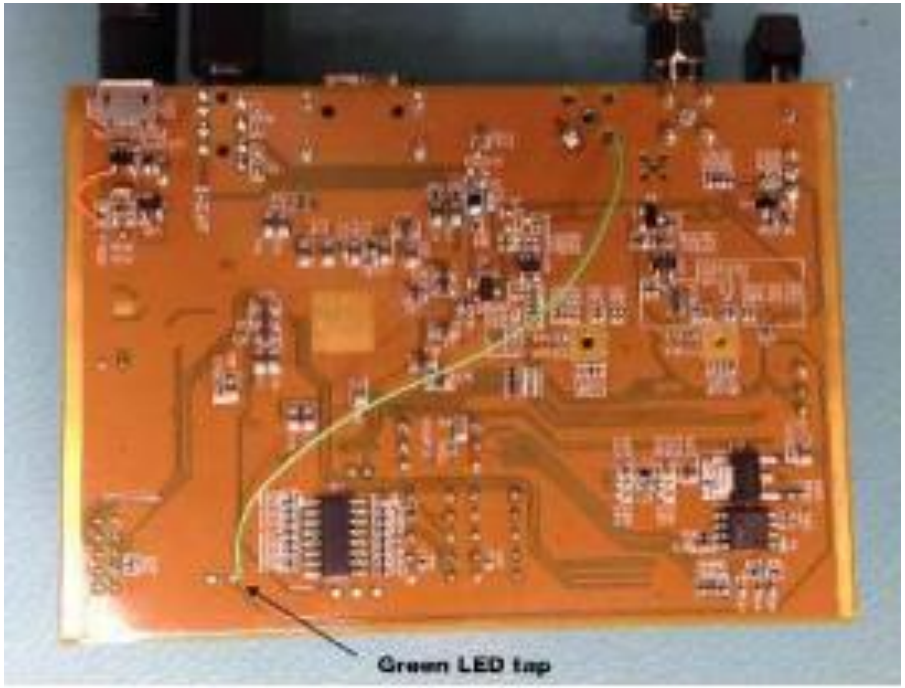
DTMF decoder with 8 outputs for relay control

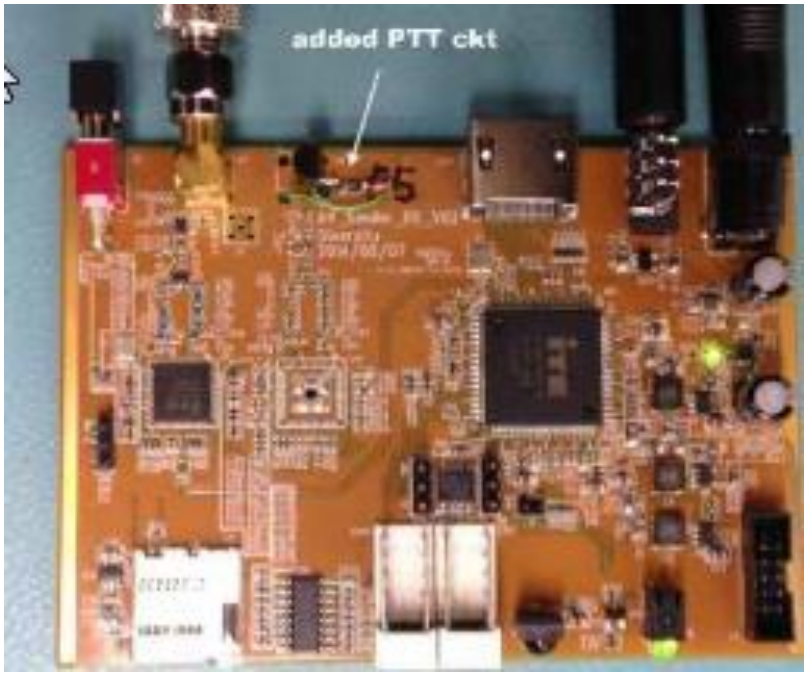


HiDes HV-110/120 RX for Repeater

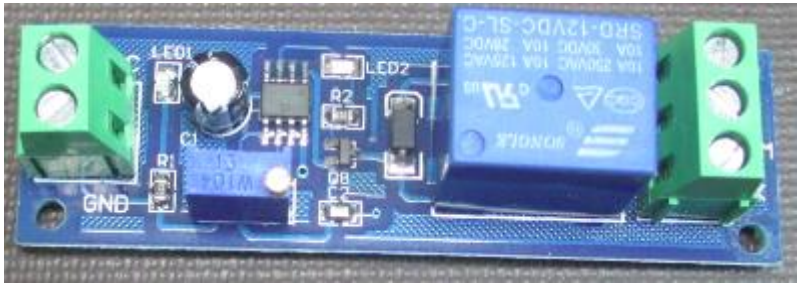
Mod From KH6HDV

VALID Signal
PTT Mod

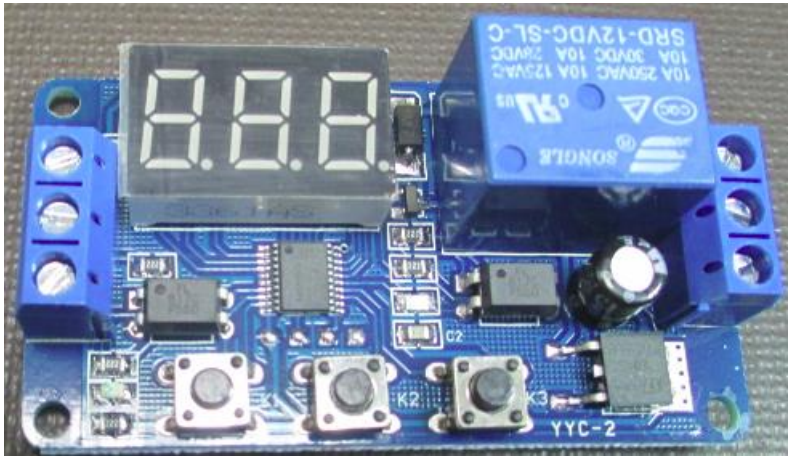




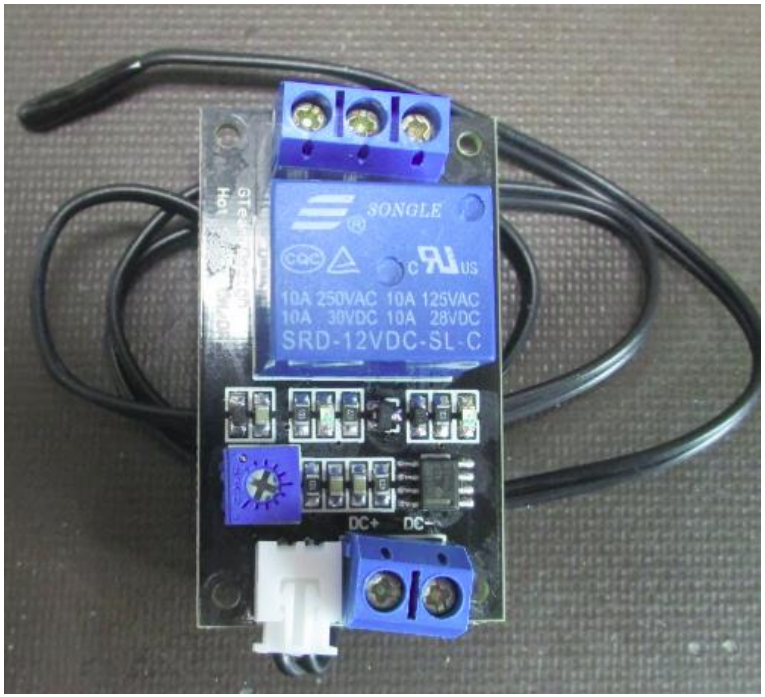
Low cost Relay control modules



1-8 relays, 10Amp rating



With timing control options



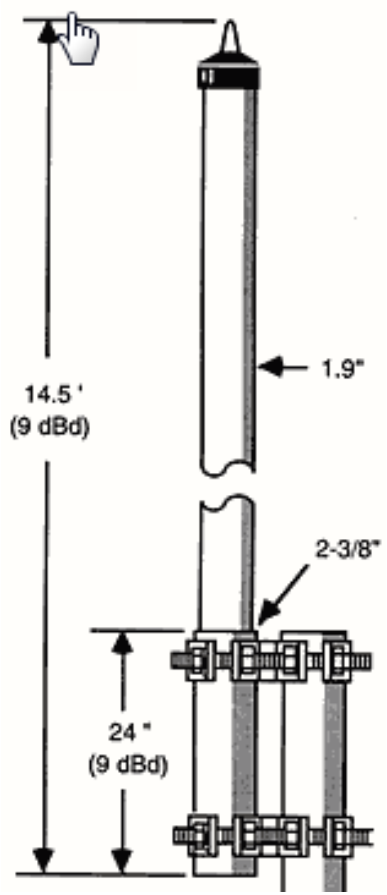
With Temp Sensor for amp

ebay

Repeater antennas for TX and RX

G6 Series 6 dB

Spirit Series 6-9dB



10 dollar DVB-T Receive only dongle

ebay

On the web...

HiDes, Inc. Web Site:
www.hides.com.tw/index_eng.html

OE7DBH Class A RF Amps:
http://dl1mfk.de/Sonstiges/Darko/

Jim Andrews DATV App notes:
http://kh6atv.com

KØPFX, my web site:
www.melwhitten.com/

Operating and Tech Info...

- digitalATV Yahoo Group www.groups.yahoo.com
- ATV Television Quarterly http://ATVQuarterly.com
- British Amateur Television Club www.batc.org.uk
- OE7 Amateur Radio Forum www.oe7.at/index.php
- Digital Amateur TV Primer www.g7lt.com/datv.html
- CQ-DATV ePub www.cq-datv.mobi/ebooks.php
- Digital Video Broadcasting Organization www.dvb.org
- VHF Design 70cm Preamp: http://en/vhfdesign.com/
- *Digital Television* Herve Benoit, 3rd Edition (Amazon)

Thanks
and
C U on D-ATV!