CQ-DATV

dotMOBI

Issue 15 - September 2014

http://cq-datv.mobi

In this issue

The team

- Ian Pawson - G8IQU
- Trevor Brown - G8CJS
- Richard Carden - VK4XRL
- John Hudson - G3RFL
- Dave Kenward G8AJN
- Ken Konechy - W6HHC
- Klaus Kramer - DL4KCK
- Terry Mowles - VK5TM
- Fabrizio Siena - JN53RH
- Mike Stevens - G7GTN

World DATV Party goes ahead

Despite software issues the World DATV Party will go ahead as scheduled.

While most activity in this annual global event is based around Amateur Radio ATV frequencies, Skype is used for Interstate and International connections.

However Skype is currently grandfathering out older versions and the new version does not support import video from USB Dongles such as EzCap. These are used to take the output video as received from the ATV Repeater and send it to the remote anchor station.

Fortunately Peter VK3BFG has found a temporary work around, but it will be depend on the administrators of Skype and their timetable.

The event is on and will take place on Friday August 29 and Saturday August 30 (Melbourne Time) Friday night will be locals and interstate and should start around 8pm. We will make contact with the Brisbane DATV Repeater VK4RMG and also the new DATV Repeater, VK5RDC in Port Pirie.

Saturday will commence at 10am to pick up WR8ATV in Columbus Ohio. This repeater is located on the top of a tall building in downtown Columbus. All antennas are within 15 metres of their corresponding transmitters. WR8ATV has 5 outputs with one on 1268 Mhz DVB-S; it has 4 inputs.

By contrast, VK3RTV has 3 inputs (one U/S at the moment) and two multiplexed outputs. The local anchor in Colombus will be Art WR8RMC. Some may recognise Art as one of the developers of the very innovative DATV Express.

Around lunch time the event moves to the W6ATN network in southern California.

There are nine linked repeaters based around a hub on Santiago Peak. Don, KE6BXT will be the local anchor.

Later in the evening we expect to move to GB3HV and make some contacts into the UK. GB3HV has a Skype input and contacts can be made directly.

There are a number of Melbourne based stations who are preparing for the event. Melbourne always puts on entertaining contacts with lots of show and tell. This year the new WIA supported ATV installation at the Eastern and Mountain Districts Radio Club will be active also.

If you are unable to receive any of these repeaters direct, you can watch the activity on the BATC streaming site for all involved. Remember the dates, August 29 and August 30.

Jim Linton VK3PC

The 2014 ARRL/TAPR DCC

The 2014 ARRL/TAPR DCC will be on Friday, September 5th through Sunday, September 7th at the Austin Marriott South in Austin, Texas.

DATV News

The DCC has two days of technical forums on Friday and Saturday and a concurrent introductory forum on Saturday.

On Saturday night, the banquet will feature an interesting speaker and the Sunday morning seminar will be "Introduction to SoC FPGA Programming for Mixed Signal Systems" by Chris Testa, KD2BMH.

There will be free tables in the demo room to demonstrate projects and vendors to demonstrate products.

Time is running out, so those interested in attending should register for the DCC and make hotel reservations ASAP.

More DCC information is available at: www.tapr.org/dcc

Hello, since summer we are testing with Evariste F5OEO DATV transmission at very low Symbol RAte down to 250 kS/s.

it works very well with the image that is not too ashamed to face our old VHS recordings.

You can see a sample of what I get here:
http://www.vivadatv.org/viewtopic.php?f=72&t=332

It's a start, but it shows that narrowband DATV is also a solution in sight and we can explore this area on our bands. We should be able to get off SR 100 kS/s. These widths as narrow bands induced should concern DX men I guess.

73 to all. Jean Pierre F6DZP

Known DATV DX Records

Known Digital-ATV DX Records
updated 2014-08-23

by Ken W6HHC

24 GHz		
124 KM	JA6DME & JA6EES	2011-11-12
Locations Mont Ten-Zan and Mont Ge-Zan		

10 GHz		
450 KM	HB9JBC & F4CXQ	2005-06-21
Locations JN40CT (Sardinia) and JN12OH (Spain)		

5.7 GHz		
341 KM	JL1BLF & JH1GED	2011-08-06
Locations Mont Chokai-san and Mont Kashimayari-gatake)		

2.4 GHz		
252 KM	JA6SPI & JA5MFY	2009-11-03
Locations ??		

1.2 GHz		
440 KM	G4KLB & G1LPS	2010-10-11
Locations IO90BR and IO94EQ (tropospheric ducting - one-way DATV)		
419 KM	G4KLB & MØDTS	2010-10-11
Locations Bournemouth, England and Yarm, England (tropospheric ducting)		
379 KM	VK3RTV(RPTR) & VK7EM	2011-02-23
Locations Mount Dandenong, Victoria and Penguin, Tasmania (operators VK3BFG, VK3DQ , VK3WWW and VK3TRX)		
252 KM	JA5GYU & JA6JNR	2009-11-03
(1 Watt)		

70 CM		
696 KM	F1FY to G8GTZ	2013-09-24
(DVB-S 2MS/sec FEC=1/2 - - one way reception)		
696 KM	G8GTZ to F1FY	2013-09-25
(DVB-S 2MS/sec FEC=1/2 - - one way reception reported by FM) Locations IO91KH (near Basingstoke) and JN16VB (near Roanne, France)		
528 KM	G3PYB & F5AGO	2013-09-24
(DVB-S 2MS/sec) Locations near W YORKSHIRE and JN06DP (near Poitiers, France)		
501 KM	W4HTB & WB8LGA	2014-07-26
(DVB-T QPSK FEC=1/2 2 MHz Bandwidth) - Tropospheric ducting Locations Bowling Green, KY and Marengo, OH		
373 KM	G8GTZ & F3YX	2013-09-25
(DVB-S 2MS/sec FEC=1/2) Locations IO91KH (near Basingstoke) and JN18AP (near Limours, France)		
290 KM	W4HTB & W8ZCF	2014-04-12
(DVB-T QPSK FEC=1/2 2 MHz Bandwidth) - Tropospheric ducting Locations Bowling Green, KY and Cincinnati, OH		
121 KM	KH6HTV & KØRZ	2011-11-21
(video resolution HDTV 1080i - protocol ITU-T/J.83B QAM-64 - one-way DATV) Locations Cheyenne, Wyoming and Boulder, Colorado		

See more details at www.von-info.ch/hb9afo/records/recordse.htm
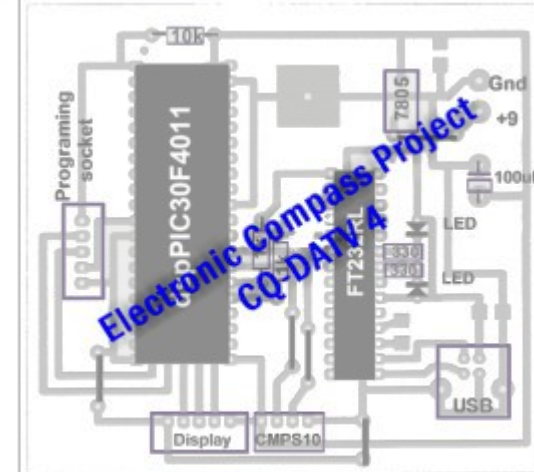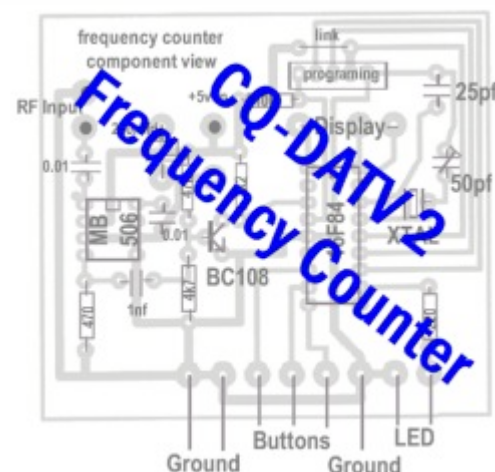
Welcome to CQ-DATV 15

Lots Happening on the DATV scene with a major article from our new recruit Fabrizio Bianchi, IW5BDJ in Siena Italy. CQ-DATV is really evolving into a world ATV magazine, welcome to CQ-DATV Fabrizio, We hope to see more contributions from you in the future.

Mike G7GTN has developed his OSD project to the next level with USB control. He also provides a simple RS232 interface for those that prefer this option, in a seperate article.

Qatar's Es'hail 2 satellite also has interesting connotations for our hobby, geostationary communications that could link amateurs from Brazil to India.

With the number of new satellites launched or scheduled for launch in the near future, this is an exciting time for amateur satellite communications and experimentation.

In the July DATV Express update report, Charles G4GUO has received his ODROID U3 ARM-based micro-PC and reports on it's performance.

Trevor has returned from his heart bypass operation and taken the time to explain what happened with the BATC committee.

CQ-DATV shares a lot of members with BATC. Please try to attend BATC BGM on the 7th September to support our rescue plan. The club has been around since 1949 and is a pillar of support for ATV.

Let's put a new management team in place that will maintain and lead BATC into the future. I know you may not have all had plans to attend the BGM, could these be revised as your support is vital to stop the new constitution being steam rollered through in the first ever BATC BGM.

You have seen us all in action, you know we can deliver, now we need your support for our Plan on 7th of September.

CQ-DATV 16 is being worked on as we speak, but you will see from Trevor's plan we would like to merge CQ-DATV and CQ-TV. The new magazine will remain as a monthly electronic magazine. ATV is fast moving and we need to keep up. CQ-TV has only ever managed three issues a year under the present team, this is not enough, paricularly if you are paying for four paper copies per year.

Please sit back and enjoy CQ-DATV 15.

CQ-DATV back Issues down load from www.cq-datv.mobi/ebooks.php

Calling all BATC members

by Trevor Brown

To say I am unhappy with the BATC would be to put it mildly. I think I have been a member ever since I have held an amateur radio license in the 60's, finally joining the management committee in the early 70's. So what am I unhappy about? Well not the members that's for sure. I think they are all a great bunch. I am unhappy with the present committee, to the point where I have asked the club secretary to add a vote of no confidence in the entire committee at the forthcoming BGM so that they can be removed and replaced by a better team. This falls into two parts, why am I unhappy and how do we implement a solution that takes the Club forward in a positive & focused manner.

The unhappiness started with the electronic distribution of CQ-TV and cyber membership. Many of the committee were unhappy, but it was the only way to beat rising postal costs. Electronic distribution is popular with the members and will now account for around 70% of membership. (sorry I don't have accurate figures, I have asked for them, but alas they never came). The problem is, it is change and change does not sit well with some of the committee members, who would like just to live in the 60's. Not a bad time I liked the music and would love to buy a new mini for £500, but let's face it, the world changes and we need to adapt to it and this is the main reason for a management committee to adapt our club to these changes not to try to hold back the frontiers of time, or we would be looking for a time lord to join committee.

My plan was a club where everyone paid £4 membership, not membership bundled in with paper subscription. Every member to be able to download the electronic version of CQ-TV and if you want a paper magazine then purchase an additional subscription via the shop and pay the correct rate for printing and posting, which should be at cost, seemed fair, if you want a fair run club that is. This meant that all members would pay £4, a club administration charge, and everyone who wanted a paper CQ-TV would buy it in advance at an additional cost via the shop. The problem was the paper members are not paying this £4 rate, their fee does not cover the cost of the magazine let alone the £4 administration charge.

Let's do a little maths (sorry I hate maths too, fingers crossed I have it right) 2013 CQ-TV printing and posting £5,200.88 up nearly (£350 on the previous year) divide it by 250 paper members (just a guess as BATC has not sent the data) and you have £20 per issue, the bulk going to UK members who paid £16 including £4 club membership (EU and worldwide do pay more) ... not really fair, if we had delivered 4 magazines, I will let you do the maths.

Not only can we not buy a mini at 60's prices, we cannot print and post CQ-TV at 60's costs either. Rising printing and more so postage costs will be happening every year.

When committee and I parted, we had 812 members. If they all paid £4 then our income would be £3,244 on top of that the on-line shop delivered £2,369 (2012) £5,613. Sounds a lot but the streamer is expensive in both site rental fees and data charges. The streamer site is sponsored, but I cannot see anywhere in the accounts where this is being collected and the On-line shop only seems to have delivered £262.72 under its current management.

Enter Ian Pawson who came up with an ingenious version of CQ-TV for iBooks which he hoped would expand Cyber membership. Created at no cost using free software. Yes you have got it, a lead balloon to those on committee wanting to expand the 1960's logic and drive everyone back to paper magazines, (perhaps the A5 version to fit in the pockets of their flares) and the audacity of using free software! Really.

They could not argue against the eBook so the fix was buy more expensive software, never mind if it could be created using free software. I think that is the 2012 £450.37 item in the 2012 column in the accounts for InDesign 6, (Just a guess) they never produced the eBook, they stopped Ian from distributing any eBook versions of CQ-TV he made and your current CQ-TV is produced on InDesign 5.5 (bit of a mystery where are the two versions of InDesign 6).

Ian dodged the flak and created CQ-DATV. I contributed to issue 1 as I have to many other issues and other publications from Ham Radio-Today to the RSGB Society Journal Radio Communications. The backlash to my support for Ian was the April 2013 meeting of the BATC committee, which was maneuvered to a date I could not attend, and was unconstitutionally convened in that it did not have two club officers present. I was then removed from my position of chairman, without me being present to defend myself (this is called a kangaroo court. I will let you Google it). I was replaced by Noel Matthews, who said at CAT 13 he would only take the task on if elected unanimously. I understand this involved contacting the absent committee members by telephone....No I was not contacted so it was unanimous only amongst some.

Ok I was hurt, the club has been a very large part of my life and a great number of the members are my personal friends. I have worked hard writing handbooks, creating PCB's, organising events, (even editing CQ-TV when we had no editor available) and of late creating and also running the BATC shop. I decided against calling an EGM and was just thankful I no longer had to work with people that behave in this way, but I would rather they did not run the BATC.

Now we have an EGM to accept a new rather complex constitution, OK the old one was not perfect, the part of this new constitution I love the most is:

No Officer or Committee member shall be removed without first having been given an opportunity to put their case before the Committee.

But that is what they did to me, are they sorry or do they just want to ensure none of them gets the same treatment, so call an EGM so the BGM will have this clause in how it is run. Does this lead us to "do unto others as you would have them do unto you"? Remember the guy with the beard, no not that one, the one who delivered "The Sermon on the Mount"

The new Constitution also has the cronyism clause:

The Committee shall have the power to co-opt additional members of the BATC to serve as Committee members or Officers, but the total number of Committee members and the President shall not exceed 11. All such co-opted Committee members or officers shall retire at the next G.M., but shall be eligible for election at that G.M. Co-opted Committee members have full voting rights.

Full voting rights makes them full committee members for the next 2 years and the BGM has never even seen them, so why is this? and why should they not present themselves for selection.

Do we need a constitution clause "when you hold an election you abide by its outcome" silly really would we do otherwise "well actually we did".

Let me finish with BATC LTD the Vote.

The idea of moving our club into our company BATC LTD was discussed and agreed in committee by all being in favour bar one abstention, me (not quite the CAT 13 explanation), but I could see little value to you the members. But you spoke and voted in favour but were then overruled by the current

committee who seemed to have all had a change of direction for some reason. Perhaps because I did not stand down as a director of BATC LTD when my resignation was forced upon me? Or do I need to look in the accounts for evidence of recent trips to Damascus.

BATC LTD has since been dissolved as a company, without my involvement or consultation. I have yet to sort that one out with Companies House. Its assets have been "brought into the club", not my words, I let you research who said that at CAT 13, but I think the VAT people will be on our case soon, that's why the streamer hardware and the two cameras were owned by BATC LTD a VAT registered company. Transferring around 6K of assets require us to pay VAT. You cannot just write them down to a few pound and sell them on to a non registered club or HRMC will be on your case. The cost of the election that was previously listed at £748.80 on an earlier version of the accounts (yes I know it is not obvious on the published version).
The accounts show little detail of these costs and need to be presented in a more itemised & coherent format for the benefit of the whole membership and how this election cost this needs some justification.

I could go on but enough is enough, space here is limited so lets move to the solution

What is the solution?

Let's remove the present committee at the BGM and select an alternative committee, by adopting my motion of no confidence in the current committee.

Let us also reject the new proposed constitution, at the hastily announced EGM. Its cronyism and its Sermon on the Mount and put in place a team that can deliver and do not need such clauses as they will be pulling together with a single common goal "rescuing BATC".

The New Team

This will be:-

- *Trevor Brown ex BATC Committee (past BATC Secretary, CQ-TV Editor and Chairman)*
- *Ian Pawson ex BATC Committee (past CQ-TV editor) CQ-DATV Editor*
- *Clive Reynolds (ex BATC Committee)*
- *Mike Stevens CQ-DATV Contributor*
- *John Hudson CQ-DATV Contributor*
- *Terry Mowles CQ-DATV Editor*
- *Sue Hale Membership secretary*
- *Richard Carden CQ-DATV Contributor*

How will it function?

The new club will have a monthly electronic publication that will draw on the copy and circulation of CQ-TV and CQ-DATV called CQ-TV (incorporating CQ-DATV) and be a merger of the two magazines.

Continue the paper magazine as a compendium being printed either once or twice a year depending on costs. This will be an additional item to the basic membership cost and can be subscribed to through the BATC online shop. Retain the £4 charge for BATC membership.

Investigate the jump in streamer cost from £2000 in 2012 to £3,688 in 2013, and see if collecting sponsorship can help defer this.

The Online shop needs looking at, it produced £2,369 in 2013 and only £262 in 2014 The existing constitution will remain, no voting members will be joining committee that have not

been voted in by the membership.

The BGM's will remain i.e. the next will be in two years time so we can report back on club progress, membership levels and activity.

- *Put the accounts into a modern package to produce files that can be understood by an accountant and deliver professionally audited accounts that can be understood by all.*
- *Apologise to the VAT for any transgressions and settle any errors*
- *Keep the £4 membership package, but collect this from the paper members too*
- *All other BATC services to be maintained.*

Lets shake off the flares, and face the 21st century with a club that takes advantage of the changing world, meets challenges head on and is run for the benefit of its members, who share cost equally, with a fully elected committee at the helm.

All you have to do is vote in favour of my motion of no confidence in the current committee at the BGM. You can read the full CV of the proposed replacement committee at http://www.cq-datv.mobi/cv/

Thanks for taking the time to read this, whether you agree or disagree please try and get along to the EGM..BGM and any other meetings that suddenly get announced. This is your Club and it needs your input at the meeting.

Trevor Brown

(Sorry, what's that you say Skippy, a BATC meeting, where)

TV Amateur is a German language magazine. It is published 4 times a year. If you would like to subscribe, go to http://www.agaf.de/

MAX7456 OSD Computer USB Controlled

Mike G7GTN

The MAX7456 OSD Modules that we have been using and configuring in different ways can also be easily controlled via USB if you ever had such a requirement to do so. I feature a simple eBay USB interface module and some custom cross platform desktop software. Total cost should be under £1.00 ($1.67 approx) if you use one of the Prolific (PL-2303) chip based Serial to TTL modules.

We need to connect the TX output pin of our USB converter to the RX input pin on our OSD Module also connect the TX pin on the OSD to the RX Pin on the USB. Simply put is just a crossover connection to allow correct communications between the two. We next have to place the control software on the OSD module using our FTDI USB Breakout. The file required is from the OSDUSB.ZIP downloadable from the usual CQ-DATV Magazine additional material location.
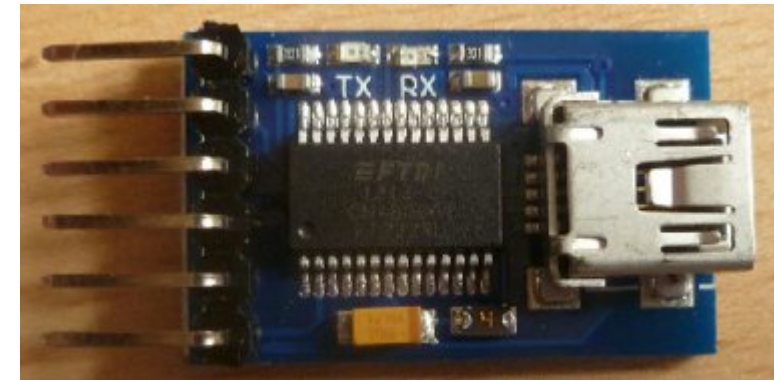
The Desktop Application is but a very simple example of serial communications, which you can of course update with things you would like available. This is written using the free software development package called B4J which is available from http://www.basic4ppc.com/android/b4j.html

The compiler allows you to develop cross platform applications which are compiled down to native Java code which then runs on top of the Oracle Java Runtime Environment (JRE). Depending on what software you have previously run on your machine will determine if this runtime is already installed. If not you need to visit the Oracle website and download & install the following package http://www.oracle.com/technetwork/java/javase/downloads/jre7-downloads-1880261.html

The actual IDE only runs under the Windows operating system. So to further develop the source code provided you will require access to a machine running Windows XP or above until you have completed your modifications and created the final compiled Java runtime file.

My USB Module happened to be based on the PL-2303 Prolific Semiconductors device, but really this is not relevant as long as you can obtain an operating system driver for the chipset that your module is using. I have also tested this with the much more common FTDI FT232RL based modules.

Computer Control Application

The control utility consists of three files, the first being the executable code. This is called OSDUSB.JAR this is launched by double clicking on it. The other two files are firstly a basic HTML help file and lastly a settings file to store and also restore the Brightness White Level of video captions. The source is fully commented with explanations of other files you will need to download to work further on this sample project. This is only required if you wish to expand this code with your own personal modifications.

Serial Terminal Control

if you also wish to just control the OSD module from your favourite Serial Terminal instead of this application then the settings you will need are Baud rate 9600, 8 data bits, No parity, Stop bits 1

The commands shown in FIGURE1 are understood by the control code as presented.

FIG 1 SERIAL TERMINAL COMMANDS	
1 - 8	Display Captions from 1 to 8
0 (ZERO)	Clear Current Caption
?	Project About Screen
X	Clear Whole Eeprom Area
C	Show NVRAM Character Set
R	Soft Reset MAX7456
:	Brightness Level 80%
;	Brightness Level 90%
<	Brightness Level 100%
=	Brightness Level 110%

I hope you will also have some fun with these modules and the possibility that computer control might bring to your Amateur Television station operating.

Two Geostationary Amateur Radio Transponders on Es'hail 2

AMSAT-DL President Peter Guelzow DB2OS at the Qatar National Day Station A71QND

Qatar's Es'hail 2 satellite will provide the first amateur radio geostationary communications that could link amateurs from Brazil to India. The satellite is expected to launch by the end of 2016 and will be positioned at 25.5 degrees East.

AMSAT-DL President, Peter Guelzow DB2OS, has provided the following information:

Es'HailSat-2 will carry two geostationary "Phase 4" amateur radio transponders !!

As a result of a concept proposed by the Qatar Amateur Radio Society, Es'Hailsat, the Qatar Satellite Company, have announced that their new, geostationary, Es'HailSat-2

communications spacecraft will provide transponders for use by radio amateurs. The spacecraft is expected to be ready for launch by the end of 2016.

Es'HailSat-2 will provide a 250 kHz linear transponder intended for conventional analogue operations in addition to another transponder which will have an 8 MHz bandwidth. The latter transponder is intended for experimental digital modulation schemes and DVB amateur television.

Precise uplink and downlink frequencies remain to be finalized but the uplinks will be in the 2.400-2.450 GHz and the downlinks in the 10.450-10.500 GHz amateur satellite service allocations.

Both transponders will have broad beam antennas to provide full coverage over about 1/3rd of the earth's surface. Precise operational plans will be finalised over the coming months but it is anticipated that only quite simple ground equipment will be required to use this satellite.

A team of amateurs, led by Peter Guelzow DB2OS (President of AMSAT-DL) are providing technical support to this ground breaking project which is expected to provide an exciting new phase of activity for radio amateurs for the 21st century.

View from 36192 km above 0° N 25° 30' E

Es'hail-2 coverage area

Digital Repeater TV DVB-S
1200 MHz 10 GHz

By IW5BDJ Fabrizio Siena JN53RH Italia

The DIGILITE project is a system that is based on the transmission of TV amateur type DVB-S.

Transmission from home is usually in the range assigned to us amateurs of the 1,200 Mhz.

In Figure 1 we can see a block diagram of a digital transmitter.
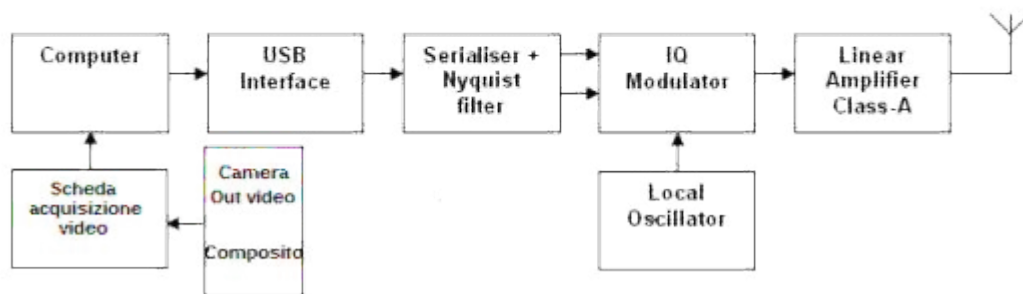
Fig.1 Block Diagram

If we receive an issue that is not in line of sight, we must build a repeater and put it on a mountain that is seen by both correspondents.

The repeater receives 1240 -1290 MHz and converts it to 10440-10490 MHz, see Fig 3. To be able to receive the signals at home, we use a satellite dish, LNB and a satellite type decoder (Fig.4).
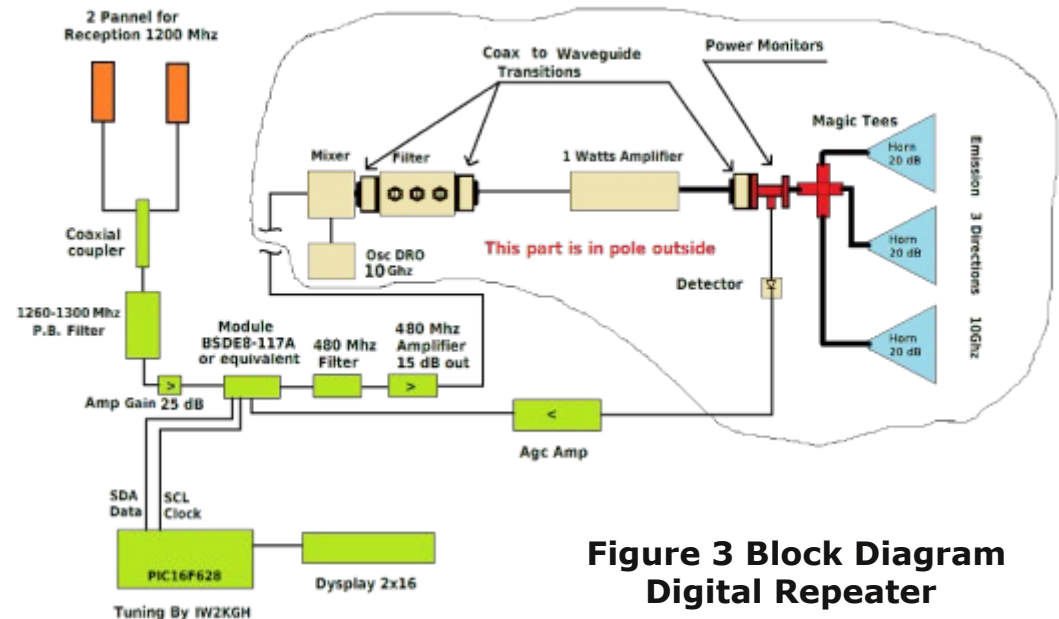
Figure 3 Block Diagram Digital Repeater

Figure 4 Repeater receiver system
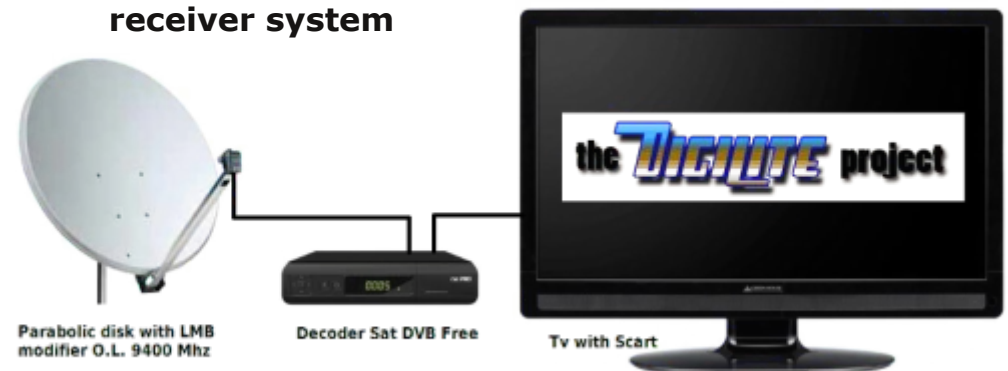
Units of the DIGILITE system (Fig 1) and the DVB-S signal receiver (Fig 4) are well described in other articles, so here we will describe how to repeat the digital signal from the mountain.

Receiving Antennas 1200 Mhz

We can get 2 antennas built on PCB material in four quadrants, coupled with a coaxial coupler with a loss of 3 dB.

The two antennas are mechanically supported by an aluminum sheet, 4 mm thick with dimensions 20 x 40 cm.

Between the pcb antenna's and aluminum base is added a thickness of 18 mm polystyrene foam with high density.

The top antenna is made with the lower antenna properly anchored and glued to the aluminum surface, visible in the photos Fig. 5-6-7-8.

The connections of the 2 antennas are by 75 Ohm television coaxial cables and enter the coupler with coaxial input and output always at 75 ohms.

Fig.6 The aluminum support


Fig.7 The receiving antenna

The antennas have been taken from an article by F5AD, Link: http://f5ad.free.fr/ANT-QSP_F5AD_Double-et-quadruple_Quad_1255.htm
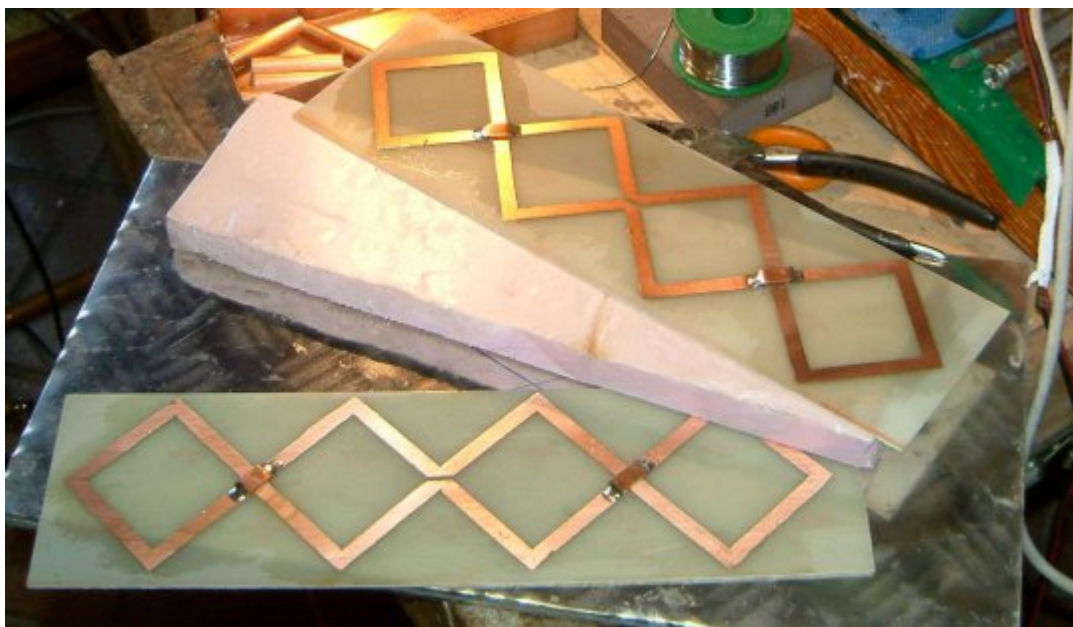
Fig.5 The receiving antennas on FR4 and the polystyrene

Fig.8 The antenna with the lid and support post

Coaxial Coupler

The coaxial coupler is calculated to have an input and output impedance of 75 ohms. It was built with copper plumbing pipes, according to the following formulas:
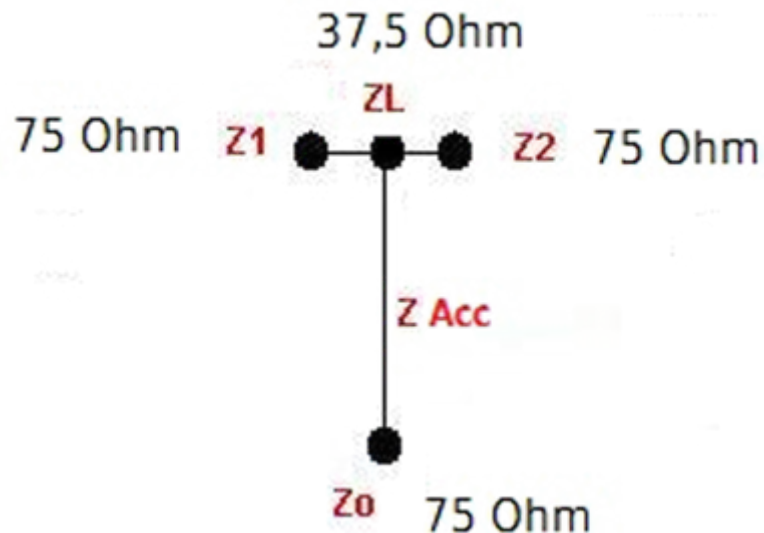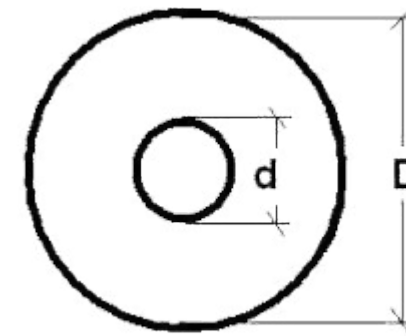

ZL for us will be 37.5, = 75/2, the point of union of the two 75 Ohm cables.

$$Z\,Acc = \sqrt{ZL \times Z0}$$

So ZAcc = the square root of 75 x 37.5 = 53.033 Ohms

Now we need to calculate a long line Lambda \ 4 with impedance of 53.033 Ohm. According to the following formula, we can calculate the ratio between the diameters of the two concentric tubes and then adapt to the trade measures.

ZAcc= 138xLog = (D / d)

Where "D" is the inside diameter of the outer tube and "d" is the outer diameter of the inner tube.
So we have that log (D / d) = ZAcc/138

In our case we have Log (D / d) = 53.033/138 = 0.3843

And yet we have that the ratio of the diameter by 10 raised to 0.3843 D / d = 2.422

If we use a copper tube of 12 mm diameter, "D" inside is 10 mm and dividing by 2.422 "d" will be 10/2.442 = 4.09 mm. Round it down to 4mm.

The construction is shown in Fig.9

Fig.9 The coupler under construction

For the length of the pipe elements simply calculate Lambda \ 4 of the frequency that we want to use.
For example, for 1290 Mhz we have:
          300000/1290/4 = 58 mm

The center tube will then be exactly 58 mm long while the length of the outer tube will be such as to accommodate mechanical connectors which in my case are the type F to be able to adapt to the 75 ohm cable TV.

The Bandpass Filter

The output of the coupler enters a 5-stage bandpass filter with a bandwidth of about 40 MHz (1260-1300 MHz) and a loss of 1.5 dB.

The calculations for the size of the filter were performed with the program "Filtre.exe" and the filter is made with copper sheet of 0.5 / 0.7 mm.

The filter is calculated using an input and output impedance of 75 ohms to match the input of the receiving module, BSDE8-117A.

Details of the construction of the filter are shown in the Fig.9b & 10.
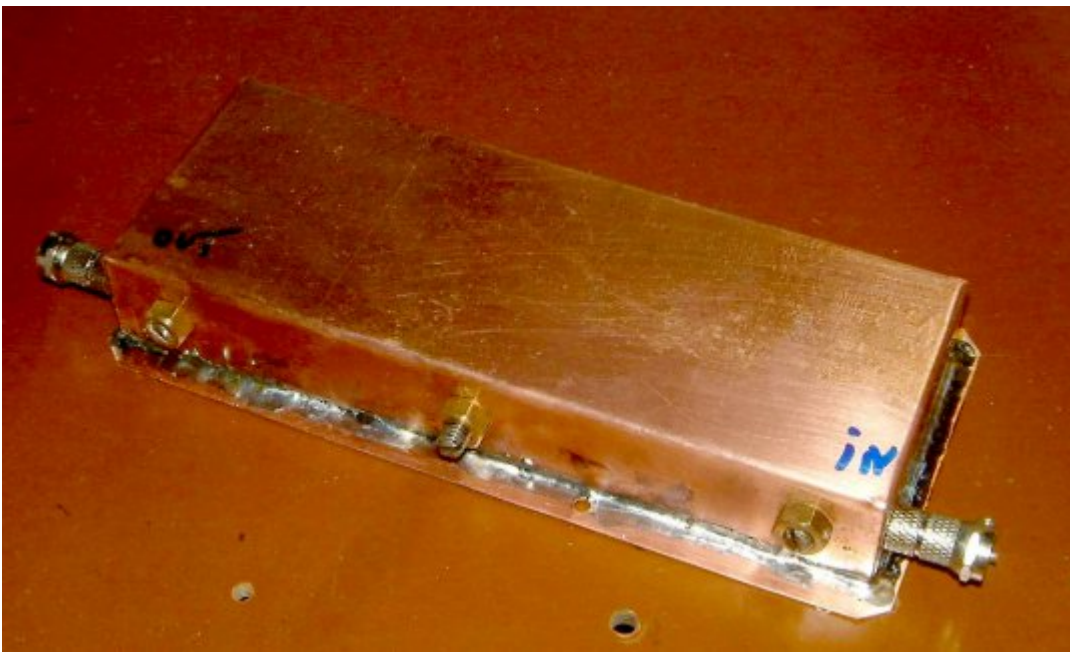

Fig.9b Construction of the filter

Fig.10 The finished Filter

**Fig 12 The receiver module,
950-2150 MHz to 480 MHz IF**

The Receiver Module

The output of the bandpass filter goes to a line preamplifier with a gain of 20-25 dB in the band 1200 MHz and its output feeds the reception module type BSDE8-117A or equivalent. Fig 11 & 12

Figure 11 The line amplifier

The receiver module is driven by an I2C line through the two signals SDA and SLC (data and clock), in addition to the need for a 5 volt power supply and a + 30 volts for the tuning of the varicap.

The module covers a reception band from 950 to 2150 Mhz therefore suitable to receive our band 1240-1300 MHz.

Inside it has a PLL control circuit designed for digital satellite decoders, called SP5659. It has a much higher stability than the previous SP5055 PLL chip.

In order to control the tuning of the module, we used the circuit of IW2KGH. The file "SinSh v2.1", modified to fit the new integrated PLL, is in the link where you will also find all the instructions for construction:
http://www.salpagno.it/ATV/Atv_sinto/AtvSinto.html

In Fig.13 we see the control circuit with the encoder for the tuning and three switches for other functions.

Fig.13 Receiver control module

In addition to all this, the receiver module has a pin for the control of AGC (Automatic Gain Control). Remember that it is very important in digital TV systems to have a very high degree of linearity in amplification and conversion.
The output of this module (on pin 12) is a converted IF signal at 480 MHz.

This IF signal must first be filtered with a filter with a bandwidth of 30 - 40 Mhz and then amplified with a chain of amplifiers to bring its output to a level of 10 - 12 dB.

The 480 MHz Filter

The filter is made of tinplate in a box the size of 72x72 mm. Details are shown in Figure's 14 & 15 .

The 480 Mhz amplification chain

It is made from IF amplifiers found in old analog TV systems as seen in Fig 16. Inside there are Philips hybrid amplifiers (OM336-OM339) with a bandwidth 40-860 Mhz, therefore
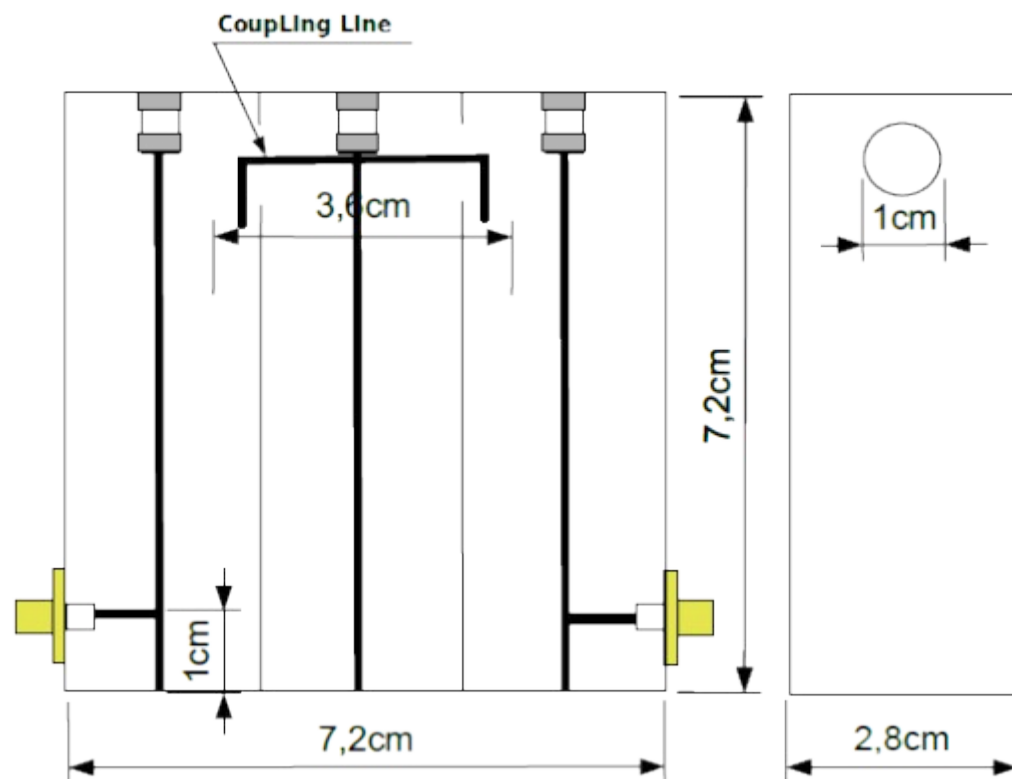
Figure 14 480 Mhz Filter drawing

suitable to amplify 480 MHz signals.

These circuits have a high dynamic range and amplification and are powered by 24 Volt to provide good linearity of the signal.

Furthermore, the chain, composed of two hybrid amplifiers, has a gain adjustment allowing for an output between a minimum of 5 dB and a maximum of 15 dB. This signal is more than sufficient to drive the mixer (Fig.16b).

All the parts so far described are housed in a box that is located in a framework sheltered from the rain.
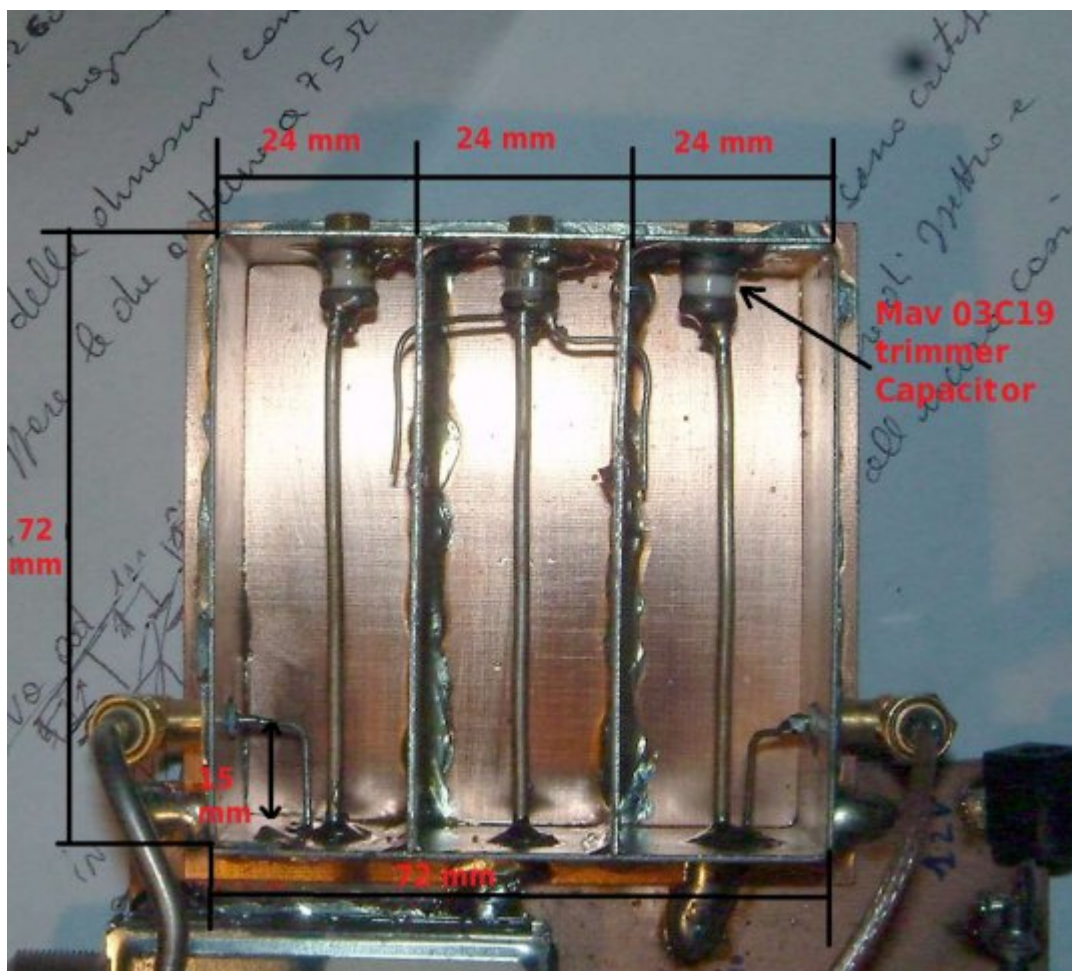
Fig 15 Photo of the 480 MHz filter and further dimensions

(image labels: 24 mm, 24 mm, 24 mm, 72 mm, 15 mm, 72 mm, Mav 03C19 trimmer Capacitor)

From this box, a coaxial cable (75 Ohm) brings the signal and the 12 volt power to the rest of the converter, which is located in a sealed container on an external support pole with antennas for transmission and reception.

External Parts

The Mixer

The mixer is built on PCB laminate, 36x36mm, double-sided of high frequency type 5880 Rogers. Thickness 0.6 mm.

The Mixer is an SMD component from Hittite, type H220 and can work from 5 to 12 GHz, datasheet: http://www.hittite.com/content/documents/data_sheet/hmc220ms8.pdf

At the mixer, in addition to the IF signal, is the local oscillator at a frequency of 10 GHz, generated by a DRO circuit. The resulting output signals are 10000 +480 = 10480 and 10000-480 = 9520 Mhz.

The Mixer output is fed directly into the cavity (see Fig 16b).

The 10 GHz DRO oscillator

The form of the 10 Ghz local oscillator is composed of a transistor by Siemens and a DRO which oscillates at a frequency around 10 GHz.

Again, this circuit is built on PCB laminate, double-sided high frequency type 5880 Rogers. Thickness 0.6 mm.

The circuit is based on an application note of the transistor BFP405 by Infineon.

Left - Figure 16 The 480 MHz amplifier with Philips hybrids recovered from surplus

Link where we can find all the information for construction :

Details in Fig.17 - 18 below.

Fig 17 10 Ghz DRO LO oscillator

Below - Figure 18 Circuit diagram of the DRO oscillator

Out 10 Ghz

Input L.O.

Input If 480 Mhz
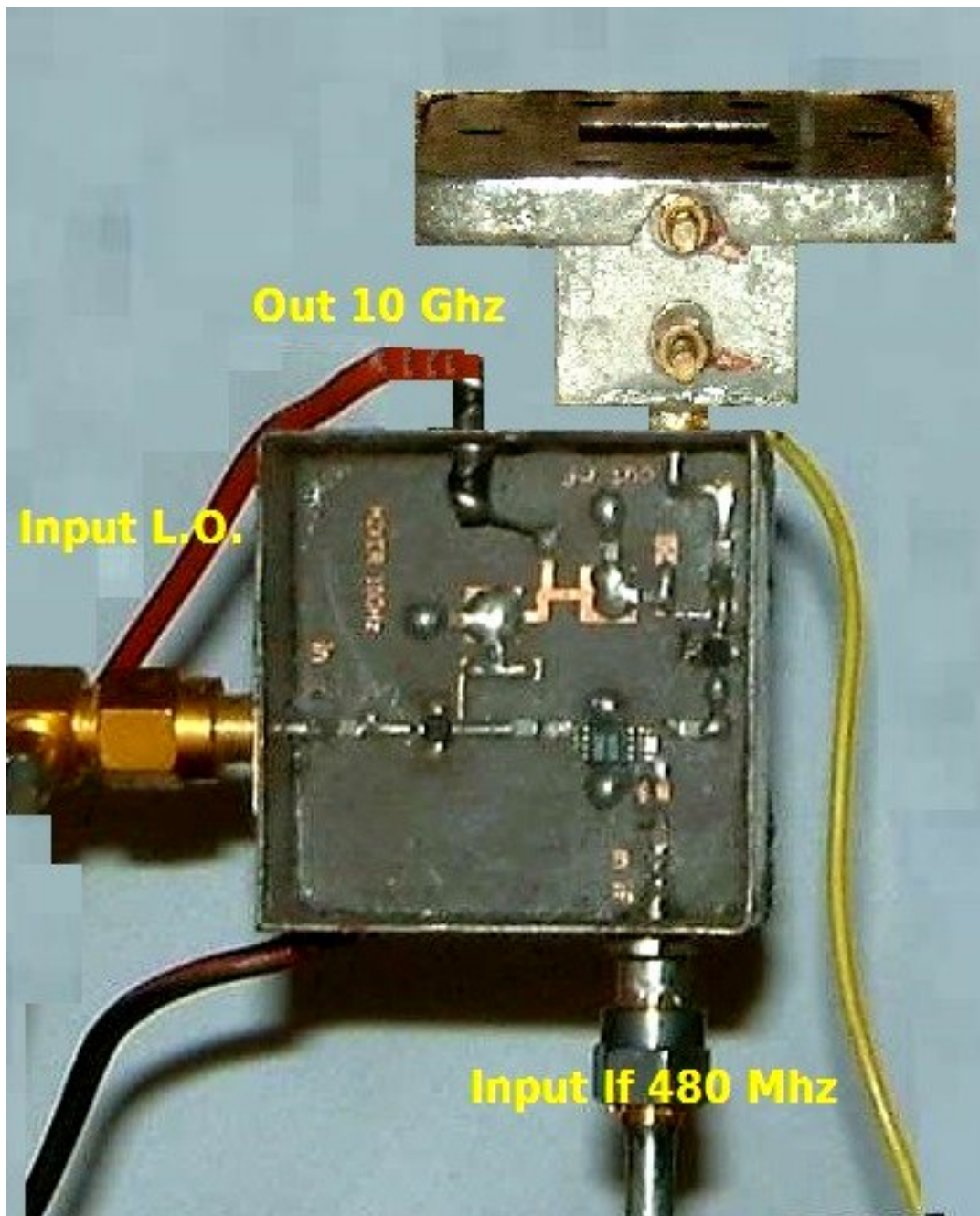
Fig 16b The Mixer with exit directly into the cavity
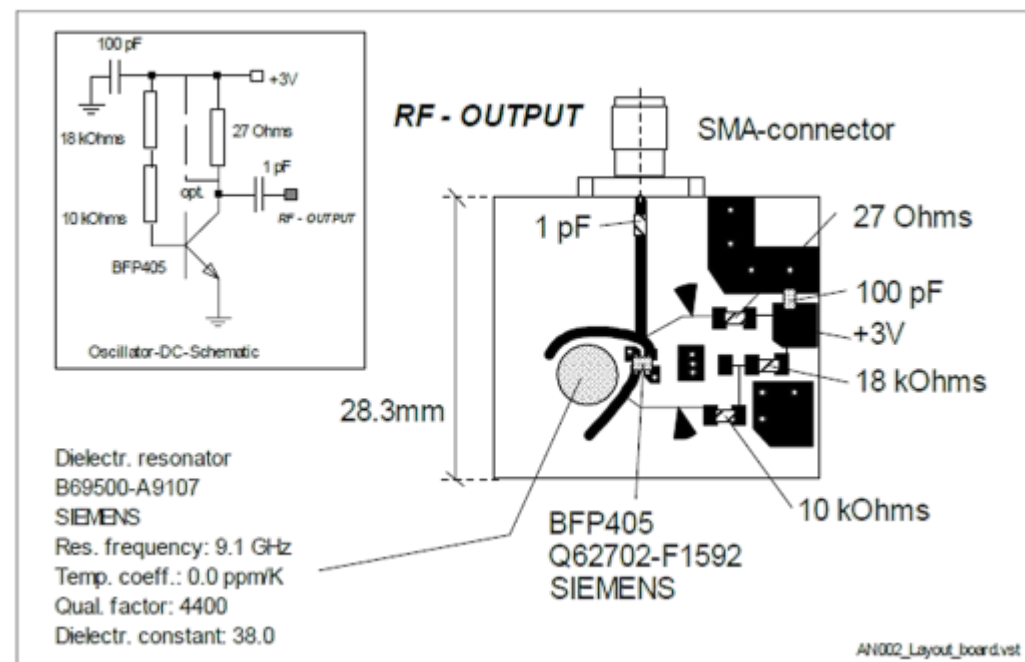
The 10 Ghz filter cavity

At the output of the mixer, we have a product that will be the sum of the conversion between the local oscillator at 10 GHz and 480 MHz IF, but we will also have the difference, something that we do not need and should therefore be eliminated.

We do this with a filter at its output and retain the signal of interest to us and that is the 10 Ghz + 480 Mhz signal.

The filter that we have adopted is a filter of the cavity-type with a bandwidth of 50 MHz and an insertion loss of 3 dB.

This filter was obtained from the notes of G3JVL. Link where you can see the project:
http://www.microwave-museum.org/exhibits/mwm0023.htm

Some details in Figure 19, 20 & 21

Fig 20 Measurements for the 10 GHz filter

We can also use a filter found in old phone bridges as shown in Figure 21.

Figure 21 Surplus Mixer and 10 GHz filter

Figure 19 The filter built with Sma input / output connectors

This filter has the same characteristics as the one built in-house, only with steeper skirt characteristics, as it is studied by an industry and then is completely treated to internal Silver, however the function is the same.

So all output of these filters have a clean signal free from spurii that can reach the amp to be amplified to the desired power.

The Power Amplifier

This has been found in surplus. That is an amplifier that with a few milliwatts of input is capable of giving 800-900 mWatts output in a band from 5.5 GHz to 13 GHz.

This is the Link: http://www.componentsandparts.com/Bible-Belt-/Jca-5-5-TO13-5-ghz-microwave-power-amplfier.idx
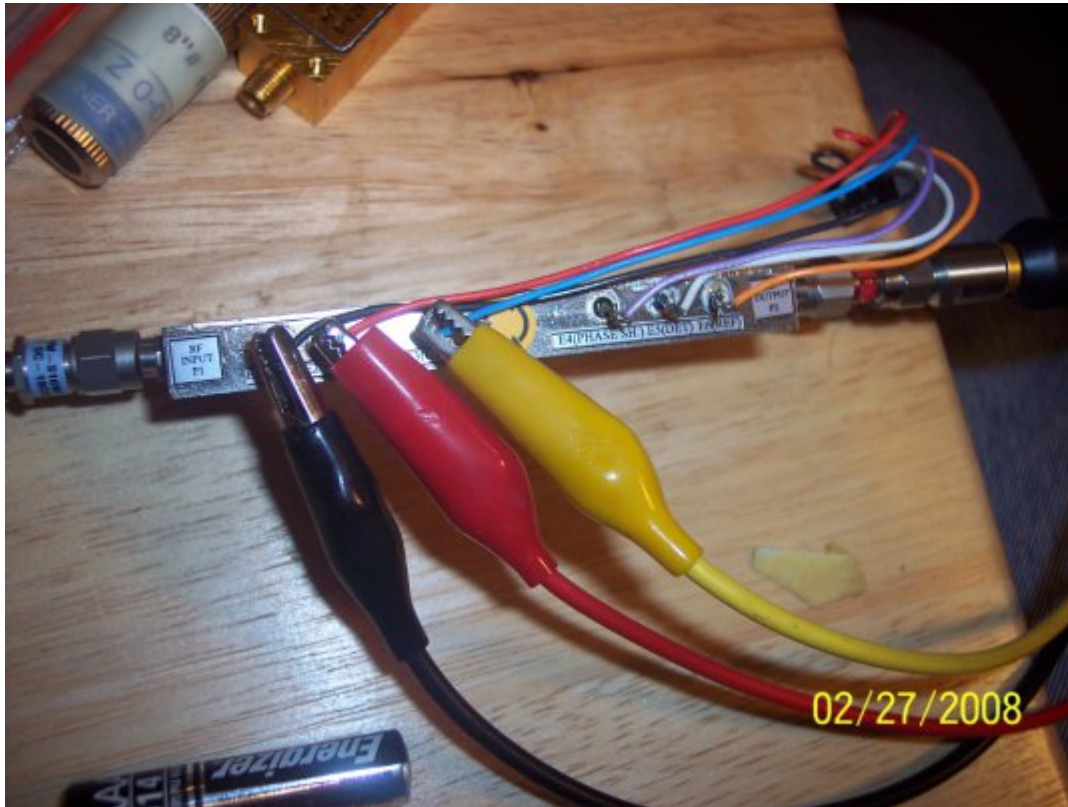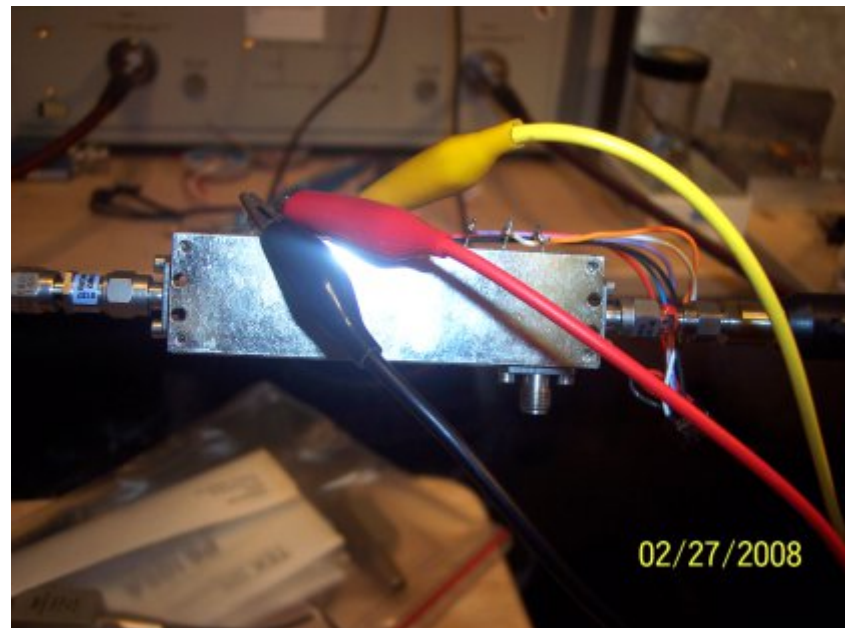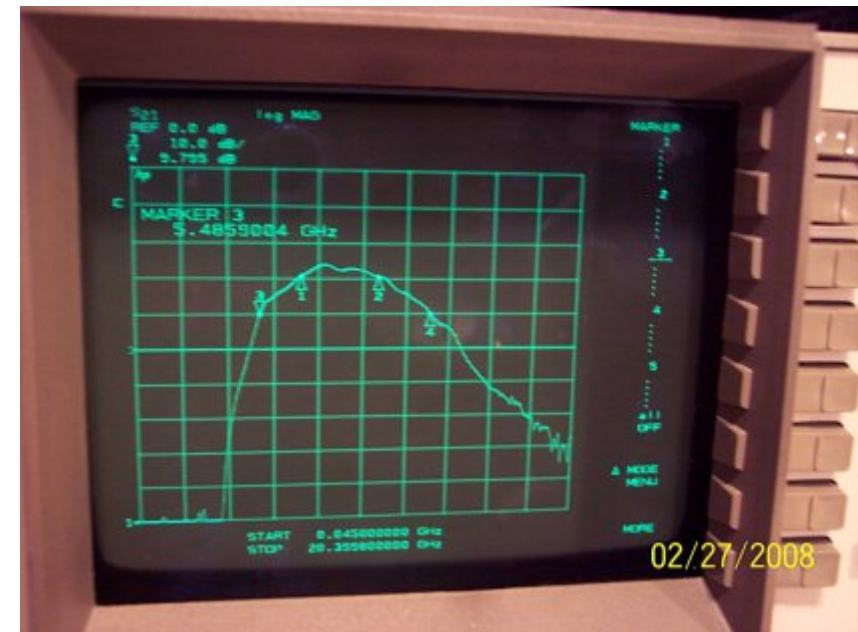
Some photos in Figures 22, 23, 24

Figure 23

Figure 22

Figure 24

The signal from the filter at 10 Ghz makes it's way through a guide / coaxial cable and enters this amplifier, that suitably fed with the 12 volts, provides 800 mWatts output.
This signal, again through a coaxial cable / guide goes into a

power monitor and then to the magic T. It is then divided for the 3 Horns.

In Figure 25 we see the power monitor.

Fig.25 The power monitor with Sma outlet for AGC

In Fig 26, we see a picture of the whole system, Mixer, Filter, Amplifier, Power monitor, magic T, 3 Horn Antennas.

At the output SMA Power monitor, we find a small part of the signal at 10 GHz, which uses a diode appropriate for this frequency and sends it to a circuit that amplifies this signal. It continuously sends out an appropriate phase and amplitude signal to pin 5 (AGC) of the receiver module.
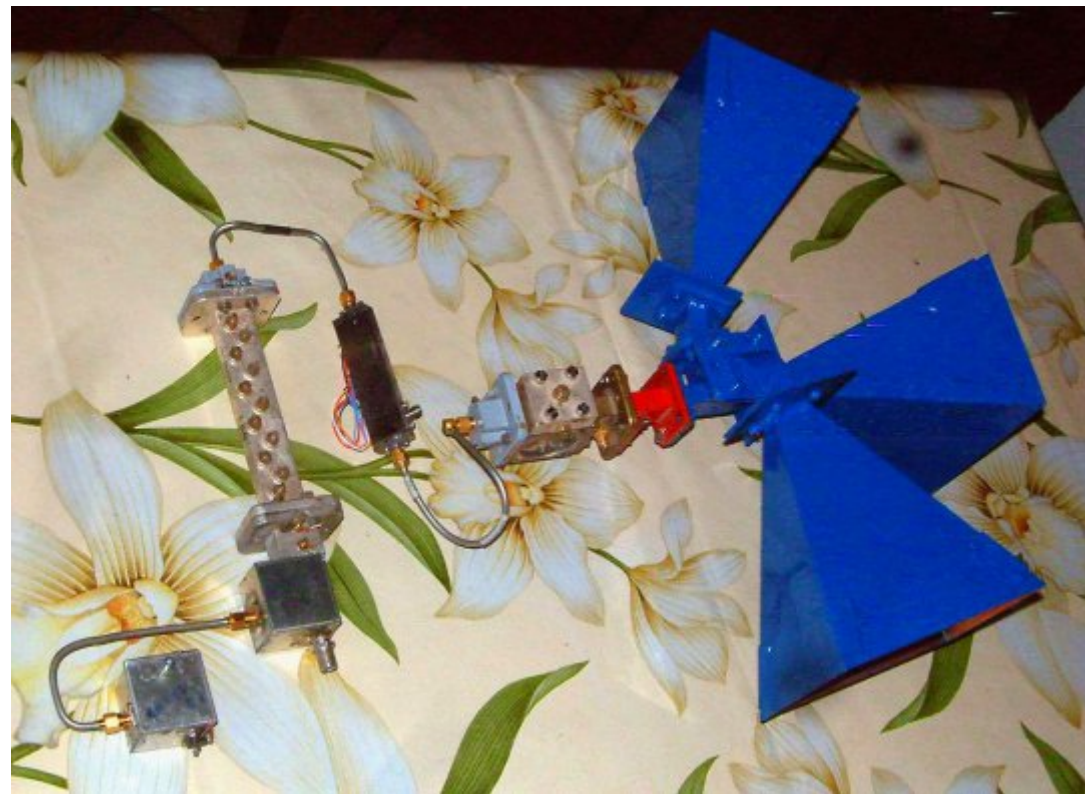

Fig 26 The assembled system

Thus we have control of both the input signal and the output power of the system.

The Magic T

The magic T is fed with the output of the amplifier and splits it into three parts.

A normal magic T with input into mouth 2 splits the power into two parts, mouth 1 and 3. Mouth 4 does not output any signal except for the return of stationary waves from any mismatching of the two outputs 1 and 3. See the Fig 27

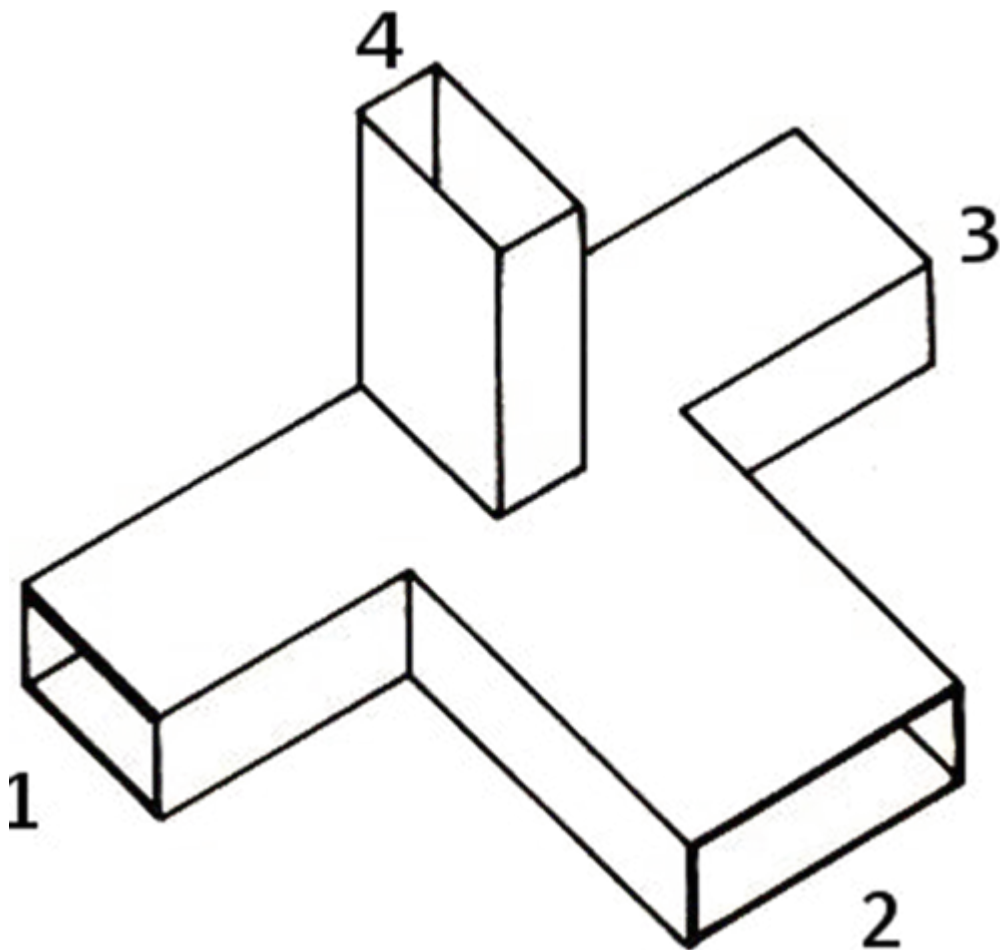So let's see now how do we split the signal into three parts.

Figure 27 Magic T

In this case, suppose we input into mouth 1, we will have that signal divided into three parts roughly equal to the outputs 2, 3, 4.

The equality of the three output signals depends on small mechanical devices that partialize the three outputs of the output 4 with bottlenecks and interference caused by a screw to divide the outputs 2 and 3.

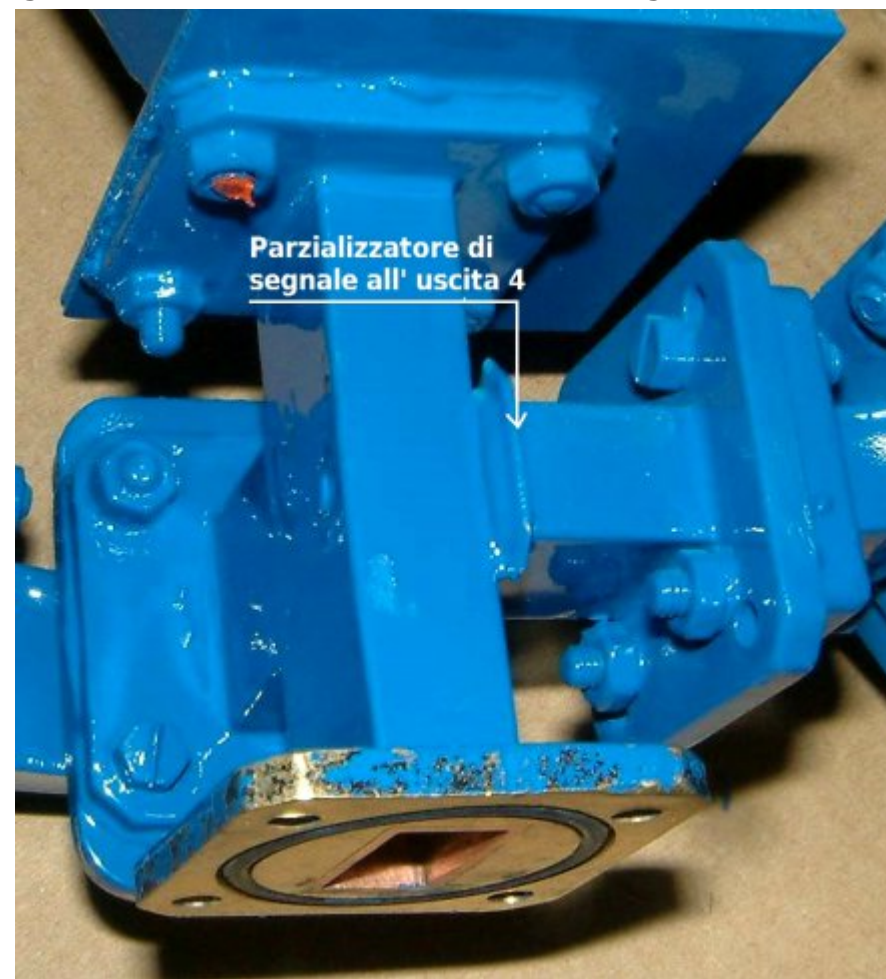In Figure 28 and 29 we see these divisor signal.

Parzializzatore di segnale all' uscita 4

Figure 28 Here you can see a tab that partializes output 4

We said that if we go with the signal into mouth 2 (Fig 27) we will have at outputs 1 and 3 a -3 dB signal and no signal on output 4, which is usually closed with a small ferrite to make any waves from the absorption of stationary waves caused by the mismatch of the antennas present at output 1 and 3, in other words, this output is the function of a circulator.

If we want to split the signal into 3 parts we have to use mouth 1 or 3 as an input.
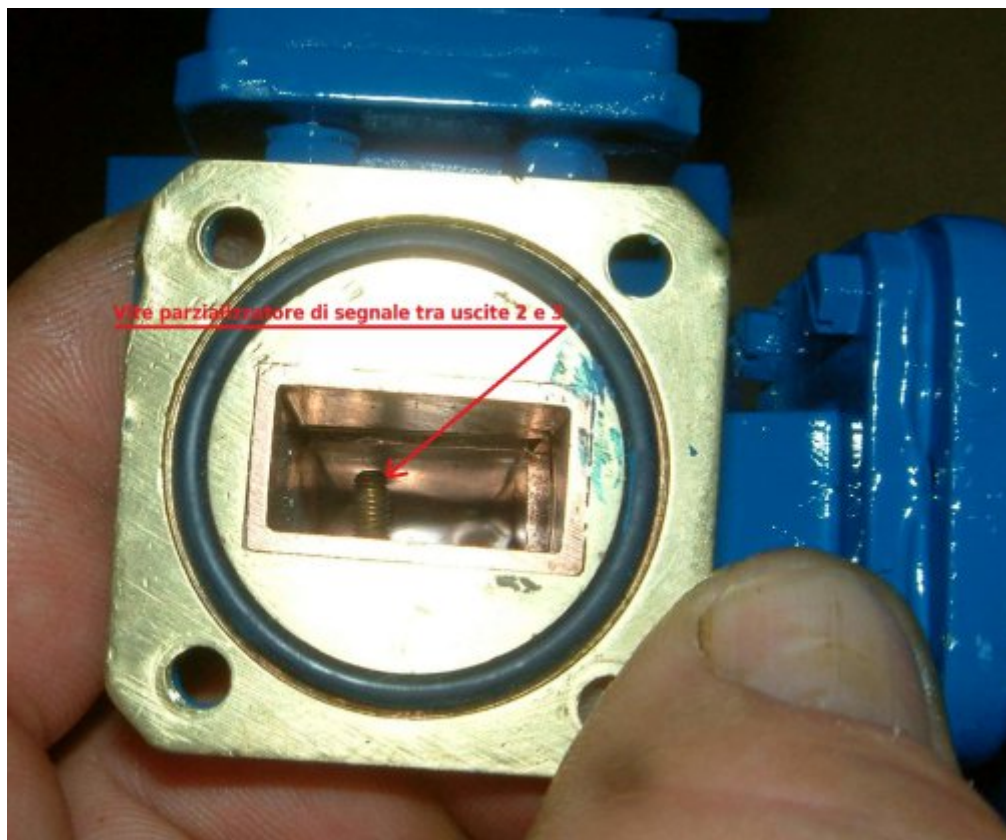
Fig.29 Here see the screw that partializes the signals at the outputs 2 and 3

The construction of the transmit antennas at 10 GHz (Horn)

The three mouths of the magic T suitably partialized go to feed the three antennas at 10 GHz which are of the Horn type with a gain of 20 dB on paper.

For the construction of these Horn we referred to a program called Hdl_3b4, this is the link: http://www.qsl.net/n1bwt/ Look for the line as shown below and select Download.

Third beta test version 3 (11/24/98) of HDLANT program - Download

The Horn can be constructed with double-sided epoxy glass thickness 1.5 mm or with the copper plate of thickness 0.7 - 0.8 mm.

This program calculates the area of the 4 (2 + 2) triangles that make up the Horn given such data as, frequency, size of the waveguide and desired gain.

With these parameters, the program generates an HDL file.Ps Fig. 30 that once you get the printed pieces to glue the paper and cut out the double-sided epoxy glass or copper plate .

Fig.30 The design that comes out of the program Hdl_3b4.exe with the desired data

From the printout, you get horn, as shown in Fig 31-32.

A system like this is already installed on the mountain, Campi Chianti, from May 2014 with an optimal operation even though it has the double conversion as described in this article but does not have an AGC control to ensure the linearity range of the input signals and a constant power output.
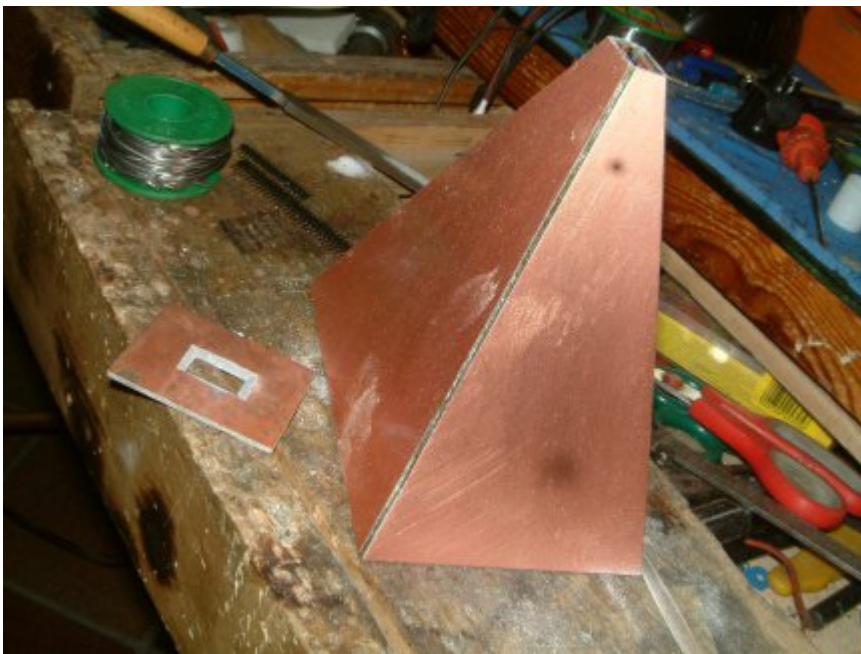
Fig 31 Construction of the Horn

Figure 32 The finished Horn

Figure 33 The current transponder on Mount Campi

The system described in this article is currently under construction in my lab, each piece has been tried tested and put into operation, but the whole set has yet to be tested and assembled.

MAX7456 OSD PC RS232 SERIAL PROGRAMMING INTERFACE

MIKE G7GTN

You may have the requirement to programme these OSD Modules from a PC that has only standard Serial Ports (RS232) available. If so this simple project might be of some interest.

Circuit description

All Electrolytics 1uf 16V
Ceramic Disc 0.1

IC1 Pin 16 +5V
Pin 15 GND

RS232 MAX 0SD MODULE INTERFACE

OSD TX RX RESET

The RS232 voltage level conversion to +5V is handled by a MAX232 (or similar from other manufacturers) part. This requires the 4 x 1UF electrolytic capacitors as shown. R2OUT is designated as the RESET output to the OSD Module. This is the pin marked GRN (DTR) on the physical module. The

automatic reset for downloading would usually have a 100nf capacitor in this line. This is already fitted to the module directly to the processor RESET line and hence we require no duplication on our simple circuit.

Practical Implementation
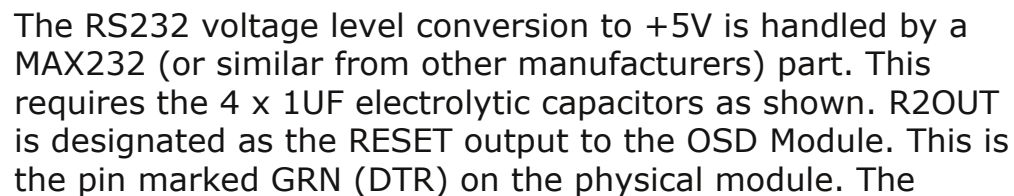
It was easiest for me to construct this simple circuit on a small section of Veroboard. Connections to the OSD TX, RX & DTR pins were made using small female cable headers.
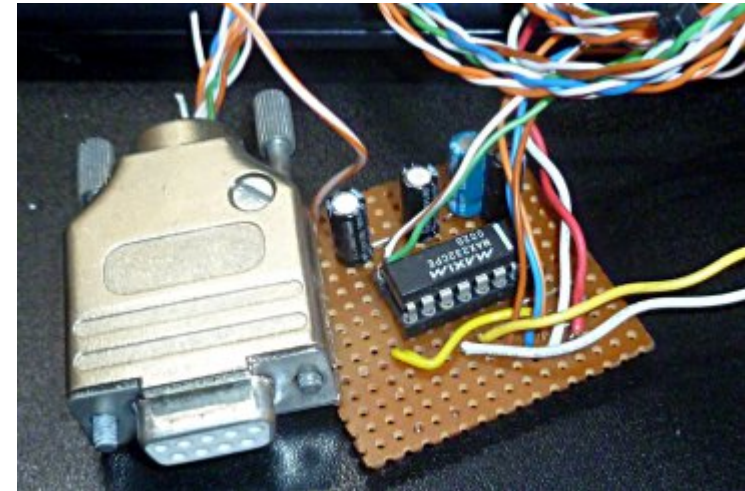
DATV-Express Project

July update report

Charles G4GUO received his ODROID U3 ARM-based micro-PC and began testing. He reported that the quadcore-ARM microprocessor running at 1.7 GHz has plenty of speed (compared to the Raspberry Pi) and the software repository by ODROID team has all the software needed to compile the kernel, etc. You can see in the picture below that the ODROID U3 comes standard with a large heatsink, and Charles reports the unit runs only warm, and there is no need for the optional fan kit. Charles is still learning how to spread out the processing load evenly over the four cores and is currently playing with the priority of the threads. One advantage of the quadcore-ARM on ODROID-U3 is the CPU speed(s) is fast enough to allow performing DVB-T 2 MHz bandwidth with full 4096-point iFFT math so that there are no nearby alias spurs in the spectrum.

Size of quadcore-ARM ODROID-U3 board is about the same size of Raspberry Pi

Charles has been adding code to allow the DATV-Express software to accept video streams using the UDP protocol. There is a lot of complexities involved but the current project preference is to let the video application (like FFMPEG) set-up all the PIDs, bit data-rate, etc. This effort is not completed, yet.
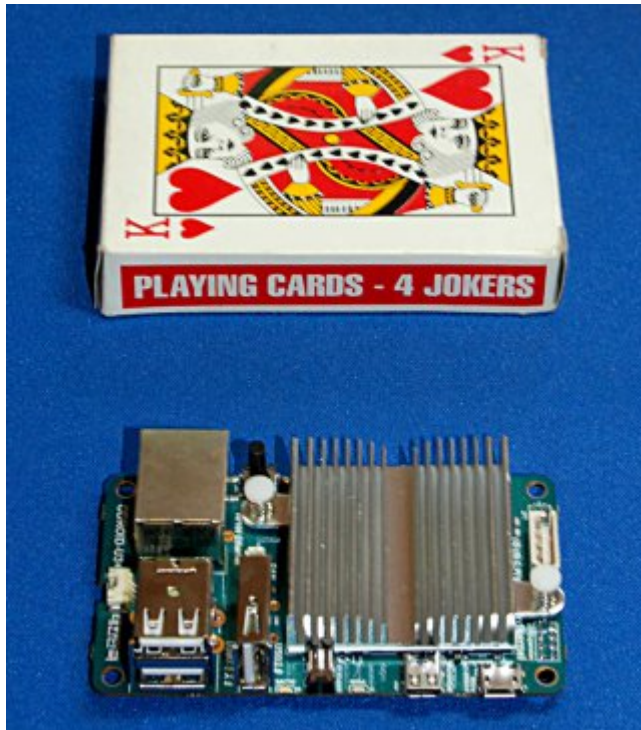
The project team has still not heard of any further progress by Hauppauge on releasing a linux driver for their new HVR-1955/HVR-1975 MPEG2 encoder products. So Charles has looked at an alternative video-capture USB-device to perform the MPEG2 encoding for DATV. The EasyCAP (aka EZCAP) is a product that has been around for a long time. Unfortunately, there are at least five different chip-sets that are being used to manufacture these devices, some work on linux, and others do not work. The chip set by Syntek called STK-1160 works OK, but there is a variation of that chip set that only supplies 8K audio! A chip set called SAA-7113 works well also. The EasyCAP problem is that the sellers on e-bay or Amazon have no idea which chip set is being used in the product they sell. So the buyer has to plug the device into the computer to identify what USB sees as the chip set. At $15 apiece (plus shipping), they are cheap enough to throw away if you get a wrong chip set. But, the project team needs to sort these chip set issues out and see if we can find a good supplier before we release this EasyCAP code.

The project team has decided to not allow further research of EZCAP to hold up the release of the ARM code for DATV-Express for the ODROID-U3. Charles plans to move forward on preparing a Debian package to install the latest code for DATV-Express, including an installation for ARM that has been tested on ODROID-U3. Ken W6HHC has now received his ODROID and will begin testing Debian packages as soon as he returns from vacation towards the end of August. Charles plans to provide a DATV-Express presentation at BATC General Meeting in September. Ken plans to provide a DATV-Express presentation at TAPR Digital Comm Conference in September.

"moderate speed ahead"....de Ken W6HHC

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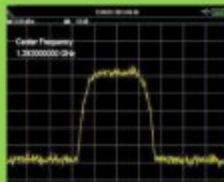
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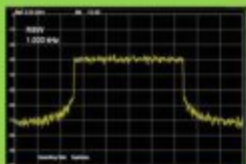
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