

"Stateoftheart"

## SDR transceivers

**ANAN**the **APACHE LABS**The

Transceivers Series ANAN are presently one of the most advanced radios built for SDRs hams and incorporamcaracteristicas that fit a higher level of "state art."

The partnership between the group and the Apache Labs OpenHPSDR (Open HighPerformance Software Defined Radio - <http://openhpsdr.org/>) has allowed easier access to high performance equipment as are these SDRs last generation.



The equipment of the series NANA, NANA and NANA-10-100 based board and HERMES ANAN-100D based on features that board ANGELIA commune analyzed below. Basically these Connecting devices operate by a gate ethernet may be integrated into a computer IP network and therefore be accessible from any location, be it a home network, ie through internet. The ANAN-100D brings additional advantages including the possibility of receiving By using space diversity when two different antennas, two ADCs (analog converters media) for receipt configuration allowing up to 14 simultaneous reception and data come equipped a very powerful FPGA, prevendon future the possibility to come to incorporate *software / firmware* that would enable the autonomous operation.

There is a handful of available software (Windows, Linux, MAC) among which the most used and known PowerSDR version HPSDR but also ocuSDR, and customer via internet QTRADIO.

As to *hardware* itself, I will say that radios are extremely rugged, placed inside the box Typical military equipment, allowing optimal dissipation and high technical performance.



The ANAN-10 has a rugged aluminum extrudidoe relatively small for incorporating beyond the plate Hermes amplifier 10W.



The NANA-100 incorporates a plate HERMES PA and 100W, and the 100D (D Diversity) ANGELIA plate and incorporates an amplifier 100 W identical to the previous one. The aluminum housing extrudate is identical for both models.



Alongside the *hardware* is manufactured in India there are discussion groups / forums (<http://groups.yahoo.com/group/apache-labs/>; <https://apache-labs.com/forum/>) and also OM'sque actively collaborate in this project and allow us to be available and developments improvements at the level of *software* and *firmware* and tuning to improve the performance day by day these machines.

Well quantoás technical characteristics confine myself to insert the text of the translation of some features available in the catalog information:

For ANAN-10 (PA includes 10W):

### HERMES (ANAN and NANA-10-100)



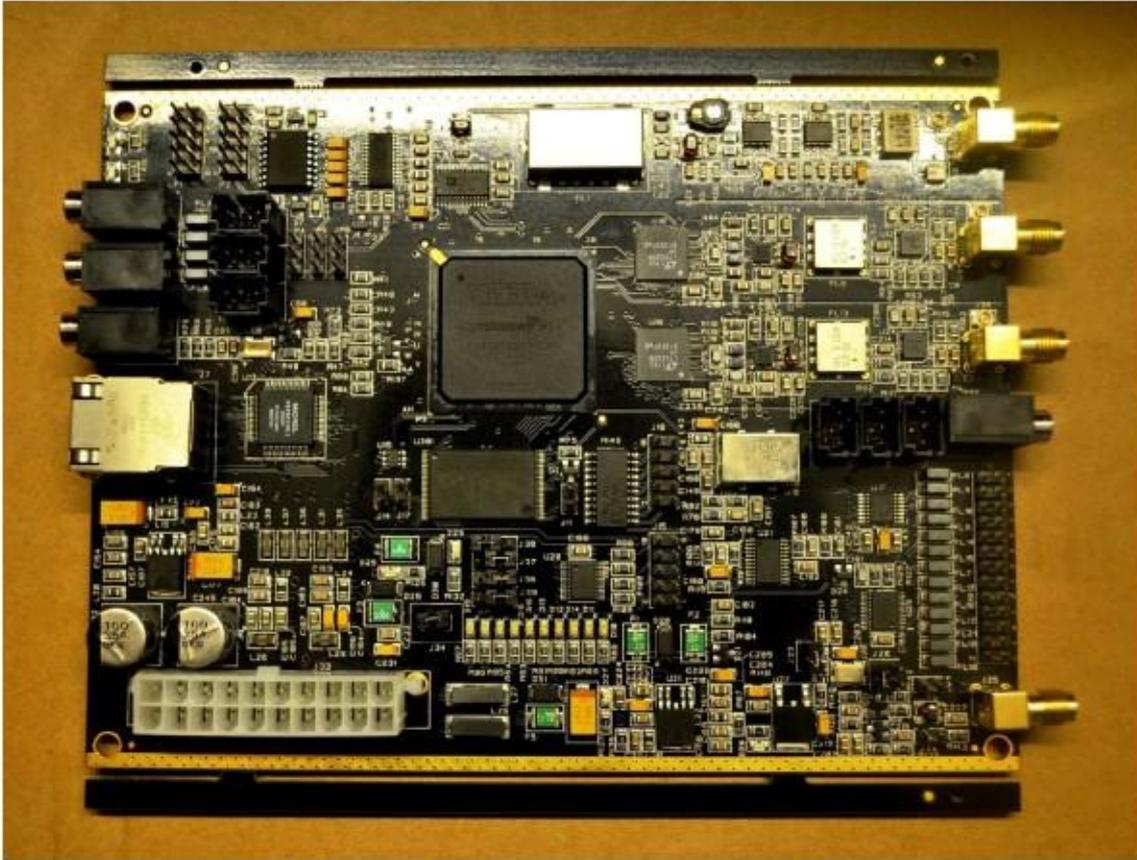
Specifications and Highlights ::

- Receiving continuous and unbroken between 10KHz and 55MHz.——
- Support real-time visualization of the entire spectrum width of 0-55 MHz (with appropriate software)
- Supports 7 receptors completely independent (sharing the same antenna and appropriate software)  
Each receiver can display 48/96/192kHz spectrum
- Blocking Dynamic Range Method (ARRL) no gain compression detected below the overload ADC
- Image rejection in the receiver and transmitter than 110dB
- Operation *full duplex*com any *splitsobre* ranges from 160m to 6 meters.
- Transmitter "two-tone 3rd order IMD " of-50dBc at 20m to 400mW output
- 500mW RF output power on board Hermes in amateur bands from 160 to 10 m and 350mW at 6m (with 10 W linear amplifier (NANA-10) and 100W (NANA-100)
- Preamplifier of high performance, with a typical noise level to-135dBm for a width of 500 Hz
- Receiver high performance (the same as the *HPSDR Mercury*) ie typically umagama 125dB dynamic
- The code of the FPGA can be updated by connecting *EthernetTCP / IP*
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- Seven outputs emcolector open user-configurable and selectable per band TX and RX (to control external equipment, ex. linear switches antennas, etc.).
- Separate output open collector PTT for interconnection and control amplifier and external sequencer
- *Jumpers* para selección de tipo de micrófono and PTT Mic asociados a sheet panel front
- Tension *Bias* para Condenser microphones operation via *jumper interno*
- Possibility of user configuration of 4 analog inputs of 12 bits (for LAC SWR, etc.)
- Three digital inputs configurable by the user (for example for the sensor a linear amplifier temperature)
- Can operate with a power source of 13.8 V DC or 12v and 5v source
- Connector *Bus/2C* to control external equipment
- Operation "full QSK" (depending on PC performance and associated software)
- Low power output for interconnection transverters, user selectable via attenuator
- Stereo audio output line and also, as for the audio level
- headphones
- Integrated audio amplifier with 1 W for direct connection to speakers
- Link to key Morse ("*Straight or lambic*") and PTT
- Low phase noise (-137dBc/Hz @ 1kHz) 122.88MHz clock pattern, can be synchronized with the 10MHz TCXO internal or external source of reference
- Interface for direct connection to power amplifier 15 W interface control of low-pass filters and ATU
- Interface *ethernet standard TCP / IP* supporting static IP, or APIPA IP address by DHCP
- The board HERMES responde the command *pendant ARP* and is sensitive to the speed of auto network connection
- *PCB of design* Professional 8 layers,
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For NANA-100D:

### ANGELIA (ANAN-100D)

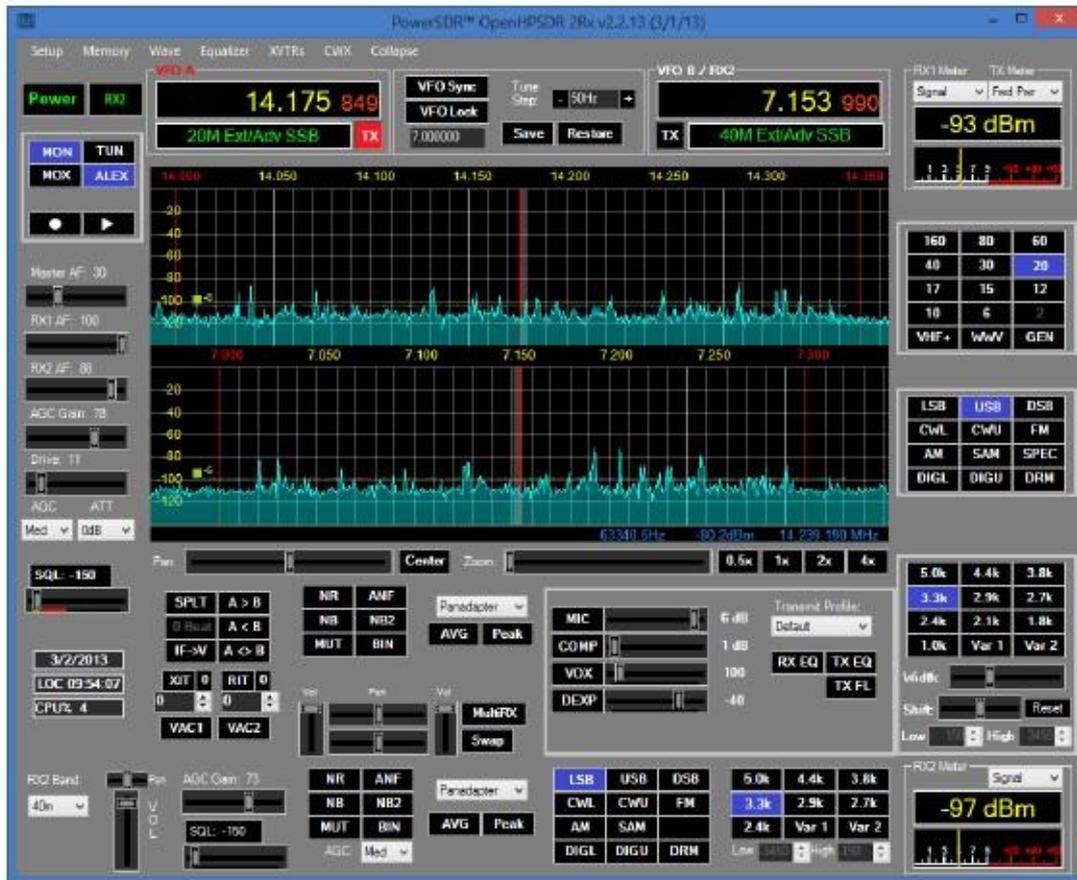


Heart ANAN-100D is the board SDR ANGELIA: ANGELIAé the "state-of-the-art" integrating 4th generation of DDC / DUC, (Ditto for HERMES). The board incorporates a ANGELIA FPGAAltera Cyclone IV and doisADCs LTC2208. The large capacity of the FPGA and the two ADCs provide exceptional versatilidadee high performance.

- Amplificador linear 100W robust and based on the MOSFETs RD100HHF1 160M - 6M
- Box extruded aluminum, weight: 4.5kgs approx., Dimensions: 265.5mm (L) x 220mm (D) x 80mm (A)
- Combination of a set of seven LPF (low pass filters) set and a 5 HPF (filters high pass) filters for RF signals, user configurable
- LNA (low noise amplifier) dedicated to the band of 6 meters
- LTC2208 16-bit ADCs (Dual Phase Synchronous)
- FPGA 115K (EP4CE115) Cyclone IV
- Supports 7 Receptors high performance independent of each ADC
- Supports 2 Receptores independent ADCs using antennas and independent reception diversity
- The FPGA provides space to be added in the future other processing for example for the purpose of autonomous operation
- It has a built-in flash memory of 128MB
- It has a built-in RAM 32Mbit
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The operation of an RDS radio that uses for example PowerSDR is quite simple even for a layman, becomes after a few days something much more intuitive than the functions normally suggested through menus and sub-menus of conventional equipment. The graphic display is admittedly a big plus.

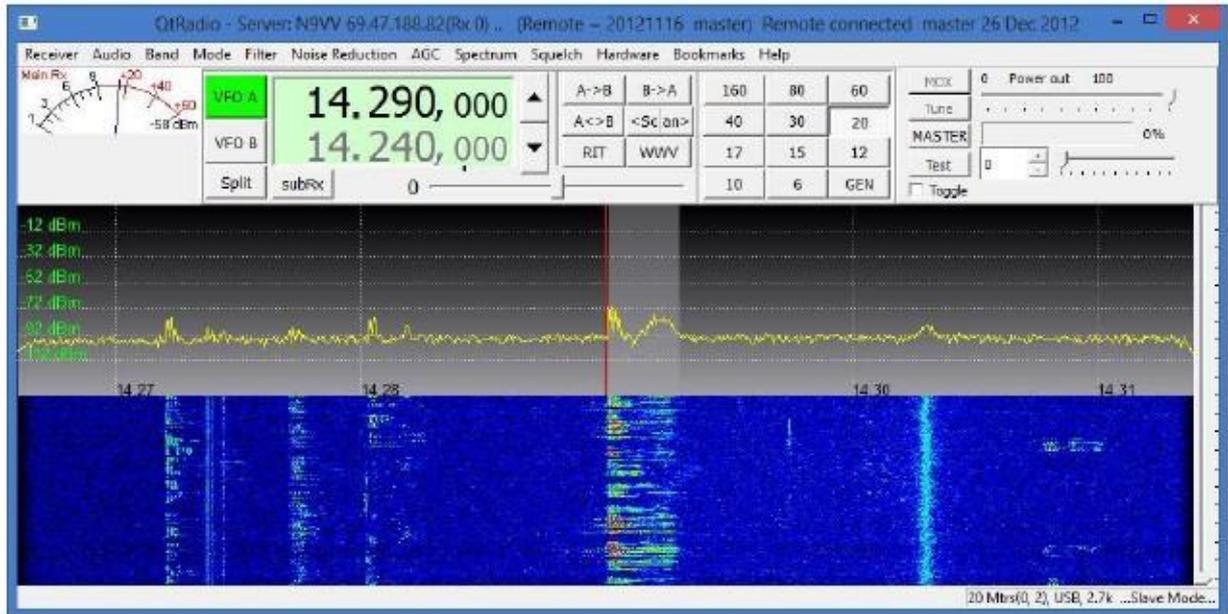
PowerSDR of OpenHPSDR V2Rx



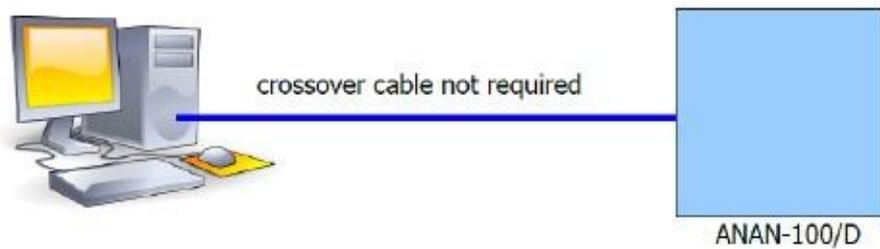
CuSDR program simultaneously with 7 receptors



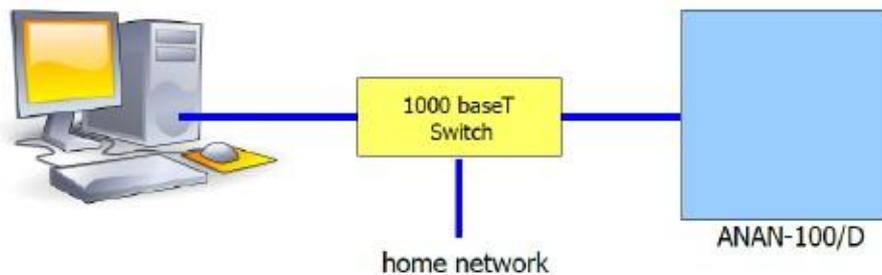
### QTRadio program for remote operation via Internet



#### Interconnection to PC



#### Interconnection Network



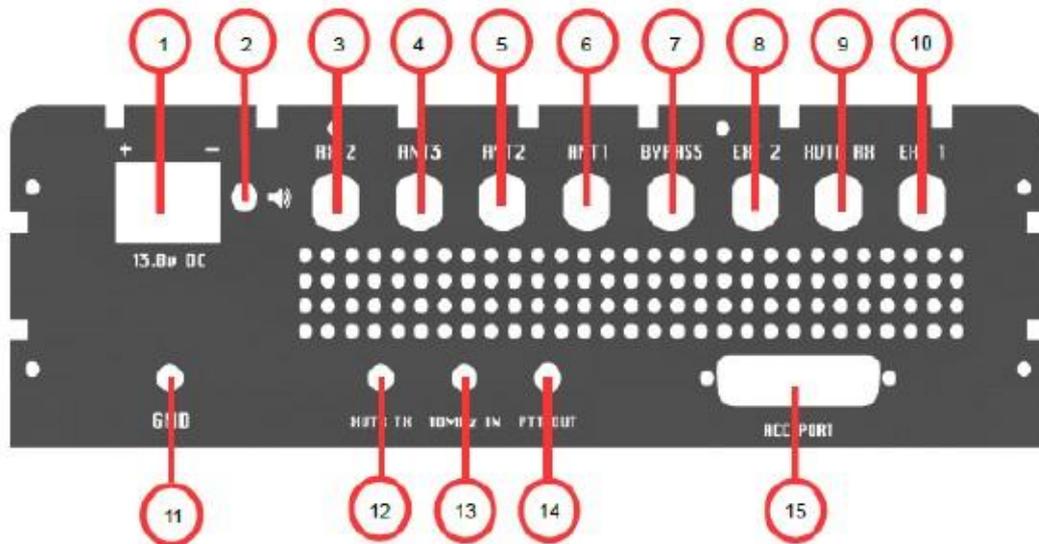
The benefits of having the connection *IP* directly to the radio, allows us immediately with activation of VAC (Virtual *AudioCable*) through a simple "click" audio available to receive and transmit from a computer place our remote. For those who like buttons seriously can always connect one

DJ console as well as there are applications and *drives* for this (eg Hercules *DJ Console*). I normally use with the mouse *roll*, or how much the accessory *PowerMate* for the media *Griffin*.

In front, common to ANAN series, there are chips *jacks* microphone (any type, from the Condenser microphones fed by the transceiver to dynamic), and headphones Morse key, in addition to record *ethernet* for connection to PC or to the network IP.



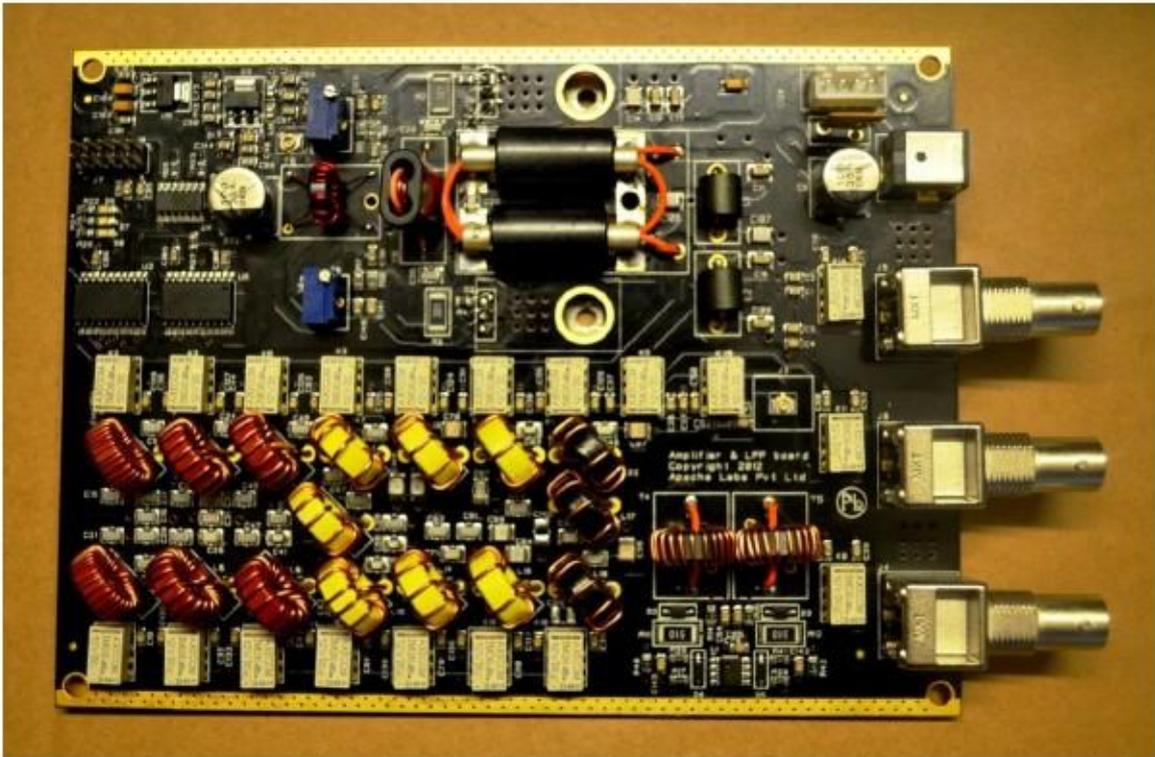
Asopções connections to the rear panel are several ANAN-100/100D and it seems nothing was forgotten:



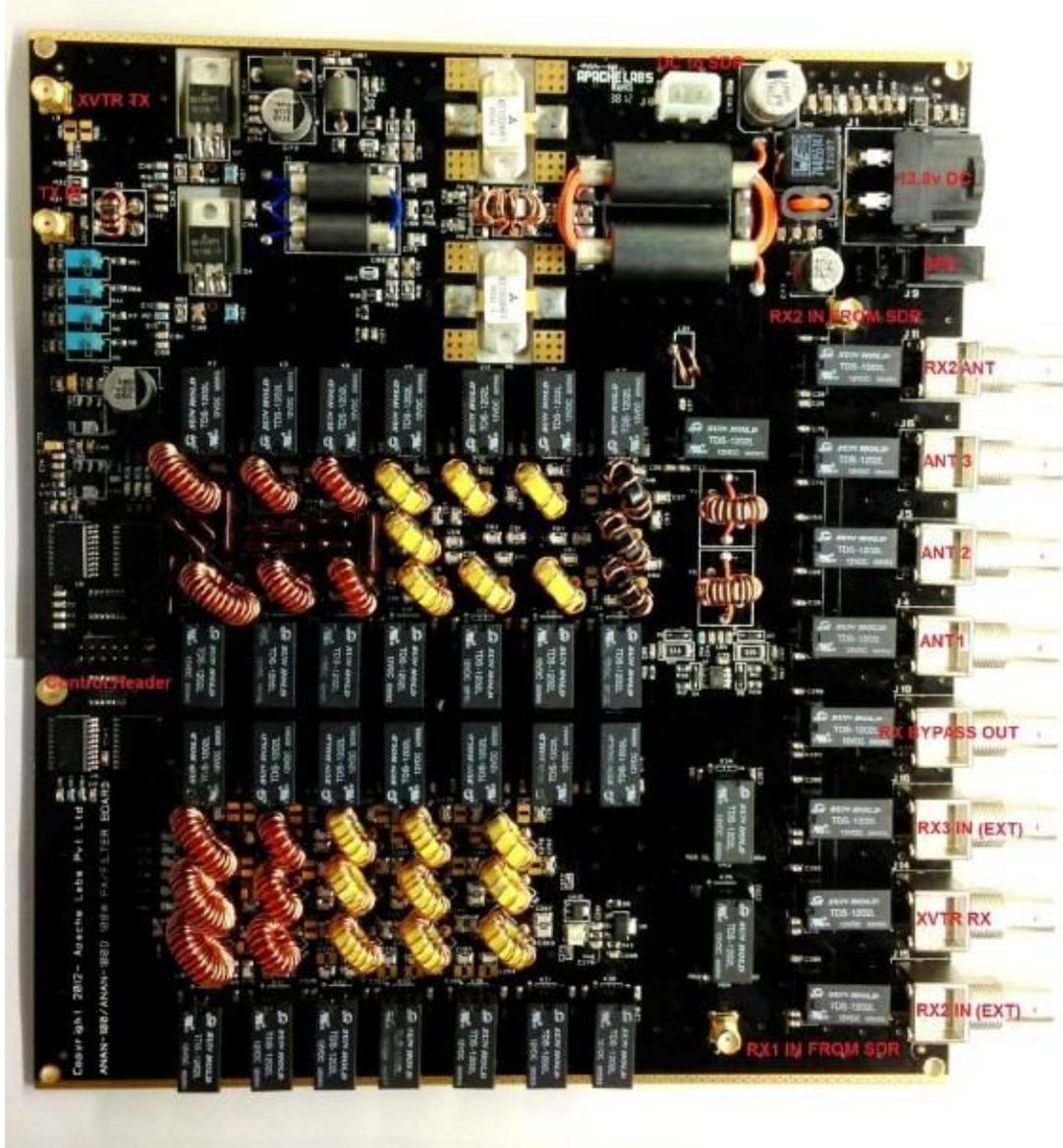
- |                            |                             |
|----------------------------|-----------------------------|
| 1. 13.8VDC Power connector | 9. Transverter Rx           |
| 2. Balanced Speaker Out    | 10. Ext-1                   |
| 3. Rx-2                    | 11. Ground Lug              |
| 4. ANT-1                   | 12. Transverter Tx          |
| 5. ANT-2                   | 13. 10Mhz input             |
| 6. ANT-3                   | 14. Push to Talk OUT        |
| 7. Bypass                  | 15. Accessory I/O connector |
| 8. Ext-2                   |                             |

The DB25's "ACC Port " has a wide range of options ranging from audio RX input line TX audio control, linear matrix for selection of external filters, PTT, etc..

10W PA



100W PA



Much more was there to say, this approach aims to publicize the options available on what, in my view, is considered the best taking into account the quality / price ratio in the current technology of SDR transceivers amateur.

There is much information that if interest can be found on page [www.apache-labs.com](http://www.apache-labs.com) page of Ken N9VV <http://www.n9vv.com>, any questions or information provided to My [alcancedisponhamct1bpt@netcabo.pt](mailto:alcancedisponhamct1bpt@netcabo.pt).

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