ANAN-100/D DDC/DUC Transceiver

**This document uses the words Apache ANAN-10, ANAN-100 and ANAN-100/D
in reference to the Apache Labs Transceiver products**

Apache Labs – http://www.apache-labs.com

In cooperation with VK6APH and the Open Source Hardware and Software Project
http://openhpsdr.org

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Note: Customer is responsible for FEDEX shipping and all local Customs, Tariff, VAT, Taxes and incidental charges within their delivery (address) Country. Please contact Apache Support <support@apach-labs.com> for details regarding your order or shipping charges.

Apache Labs LLC, Inc.

<u>Declarations of Conformity</u>

The ANAN-100/D complies with FCC Part 97 rules for the Amateur Radio Service.

It has been confirmed by the relevant authorities that the ANAN-10/100/100D DO NOT require FCC certification of any sort

Under rule 97 Amateur radio equipment with the exception of amplifiers and scanning receivers are exempt from certification, however, must conform to rule 97 which states that harmonic and spurious emissions must be below 43dB of the transmitted out up to 30MHz and 60dB beyond that.

Important Operation tips

1. **IMPORTANT: install the supplied 4 rubber feet on bottom of case for proper cooling**

2. Do **not** short rear speaker jack

3. Do not cover rear or bottom ventilation holes. Proper air circulation throughout the ANAN-100/D is necessary to prevent possible overheating and failure.

4. Calibrate power output to 100W using a 50 ohm Dummy Load. Operating SSB/CW at higher levels will damage the radio.

5. Data/AM/FM and other continuous duty modes must be operated at 30W or less to remain within the operational limits of the ANAN-100/D

6. Input voltage must be 13.8 +/- 5%, well regulated at higher amperages and proper POLARITY must be observed.

7. DISCONNECT the Antenna during Thunderstorms or when not in use.

8. Please ensure that you select the correct model during software setup.

Heat Dissipation

Apache has stated that "The ANAN-10/100/100D use the [heavy duty] Aluminum extruded housing to dissipate heat just like most military equipment, the 100W extruded section weighs around 2.2Kgs and has [a generous] 1515 sq cms of surface area".

The design specifications for the ANAN-100 and ANAN-100D have been upgraded since the introduction of the ANAN-10. The "Hermes" Transceiver board has a small Switching Mode Power supply on-board the PCB. The SMPS provides a convenient and efficient way to drop from the 13.8vdc supply voltage to the 3.3vdc needed by several of the Integrated Circuit chips.

In the new ANAN-100 and ANAN-100D, a more conventional voltage regulator was selected to minimize any SMPS radio frequency noise (birdies), however this also created an additional heat load that needs to be properly dissipated.

Ventilation holes in the bottom and back panel of the ANAN-100 and ANAN-100D must be clear of obstructions so that the internal fan can circulate cooling air through the unit.

The ANAN-100 and ANAN-100D should not be operated at greater than 30% of their rated power when used for extended duty cycles such as digital operation.

The Power Amplifier MOSFET transistors have characteristics that far exceed the needs of normal Transceiver operation. They are quite rugged. However, other internal components such as the Filters, Integrated Circuits, and some small SMT parts must also be considered when modes with high duty cycles are in use.

Introduction

ANAN-100/D is a 100W Amateur Radio direct-down-conversion (DDC) and direct-up-conversion (DUC) Software Defined HF transceiver plus 6 Meters. The ANAN-100/D has a proud heritage from the ANAN-10 DDC/DUC 10W Transceiver introduced in 2012. The ANAN-10 was cooperatively designed by the OpenHPSDR Team and Apache Labs. Kevin Wheatley M0KHZ and the OpenHPSDR group developed the original "Hermes" brand Transceiver board as an integrated version of three of their original backplane PCB's (Mercury + Metis + Penelope).

The Apache Labs ANAN equipment includes the Hermes design in a series of new transceivers. The ANAN-100/D provides a Gigabit (1000 baseT) Ethernet interface to the host PC.   The ANAN-100/D does not use a Firewire™, or USB interface.

Future ANAN-100/D firmware updates can be easily downloaded via the Transceiver standard Ethernet connection, eliminating the need for special programming adapters.

ANAN-100/D can be used with a number of different PC Software Defined Radio programs including those written for Windows®, Linux and MacOS/X® operating systems.

Note: Please see the Apache Labs ANAN Transceivers webpage:
         https://apache-labs.com/1001/Ham-Radio-Products.html

         OpenHPSDR software webpage: http://openhpsdr.org/download.php

         and a volunteer website http://www.n9vv.com with loads of Apache product information.

Minimum Requirements

Computer basic requirements
1. Intel Pentium 4, 3 Ghz (bare minimum), or Intel i3, 2.8Ghz or better (recommended).

2. 4GB Ram, or 6GB Ram (recommended).

3, 1280x1024 display screen (or higher) resolution recommended

4. Windows XP or newer (**Win7 recommended**). It is possible some older machines will not give satisfactory performance, regardless of processor speed.

5.   Computer with Full Duplex Ethernet NIC card capable of 1000 baseT/Gigabit Ethernet.

6.   **Full Duplex Ethernet switch** or router with 1 free 1000Mbs Ethernet port.

7.   CAT5E or CAT6 (recommended) Ethernet patch cable to connect ANAN-100/D to Ethernet switch, router or computer.

Older and slower computers may require considerable optimization before they can provide necessary performance for trouble free SDR operation. This optimization may require that certain applications and services be stopped in order for Hermes to operate correctly. It is possible some older machines will not give satisfactory performance, regardless of processor speed.

Neal Campbell K3NC shared this optimization link: http://www.blackviper.com/service-configurations/

(Neal's web page: http://www.abrohamnealsoftware.com/)

Suitable routers or LAN Network switches:

A Full Duplex wired or wireless Ethernet Router with sufficient ports to connect the host computer and the ANAN-100/D at 1000 baseT required to handle 80Mbps. Optional Full Duplex Ethernet 5 port **switch** with 1000 baseT Internet connectivity may be required if additional Ethernet ports are needed. Ethernet **HUBS** will **NOT** work properly for this application.

Ethernet Connection

crossover cable not required
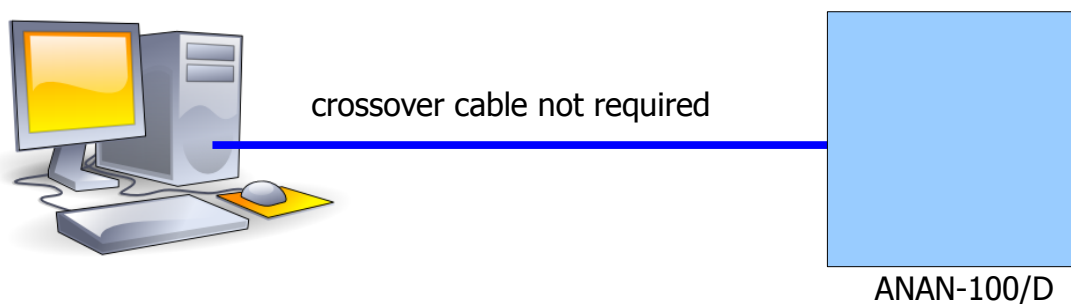
ANAN-100/D

ANAN-100/D must be connected directly to a dedicated Ethernet port on the host PC or to a port on a suitable Ethernet router or switch. Connection to a dedicated Ethernet port is shown above

1000 baseT
Switch

ANAN-100/D

home network
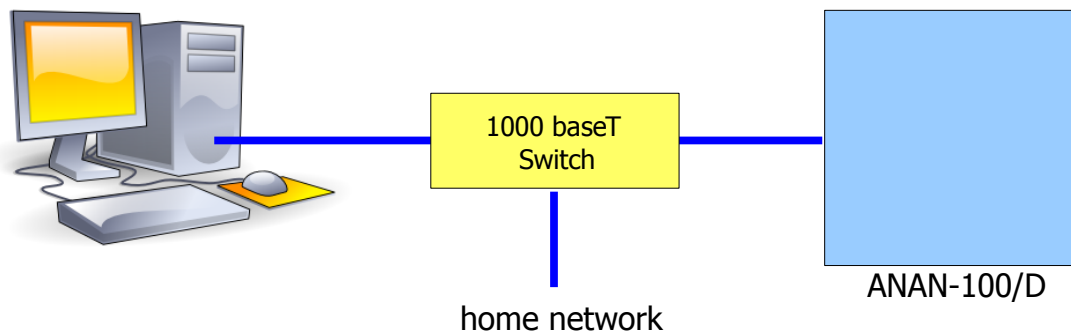
Ethernet switch is shown above

For direct connection of ANAN-100/D to a dedicated Ethernet port, a CAT 5 Ethernet cable is used. Note that a 'crossover' cable is **not** necessary.

IMPORTANT: The Ethernet switch must be capable of operating in **full duplex** mode at 1000 baseT. The initial release of ANAN-100/D FPGA code operates at 100 baseT, but future releases will run at 1000 base-T. For this reason, a 100 baseT Ethernet switch may be used in the interim, but if a new purchase is planned then a **1000 baseT switch is recommend**ed.

An Ethernet "HUB" will not work properly and is **not** recommended.

Simple network setup

The OpenHPSDR Hermes/Angelia, ANAN-10/ANAN-100/ANAN-100D radios are designed to work via Ethernet cabling on a "Local Area Network" or "LAN". Ethernet simplifies the installation, and configuration of hardware and software on a PC, making the installation basically plug and play. No sound card interface wiring, no Firewire cards or drivers, no USB ports or drivers needed. It just works!

How simple does it get? This simple:
  1. For the most basic network, you don't need any external hardware other than a CAT5 or CAT6 network/Ethernet cable between your OpenHPSDR Hermes/ANAN-* LAN port and your computer's LAN port.
  2. Done. Nothing more to do. It just works, but it may take a while to connect each time unless you assign static IP addresses.

OK, how do I hook my brand new OpenHPSDR Hermes/ANAN-* to my home WiFi (wireless network) router?
  1. Connect a CAT5 or CAT6 network/Ethernet cable between the OpenHPSDR Hermes/ANAN-* LAN port and a free LAN port on your Linksys/Belkin/NetGear/DLink 802.11n wireless router.
  2. Done. Nothing more to do. It just works.

Note : Direct connection between ANAN-* and PC is not recommended due to the excessive time which may be required for an IP address to be assigned.

Note : CAT5 and CAT6 Ethernet cables have 8 pin male modular connectors on both ends. The Hermes/Angelia ANAN-* radios have a corresponding female 8 pin modular LAN port on the front panel.

Author KC9XG

Here is what you need to get started with the ANAN-100/D

ANAN-100/D Hardware Requirements

1. **13.8vdc minimum, 25A**
   Note: some switching DC supplies create objectionable EMI/RFI which may degrade performance of the ANAN-100/D transceiver.

2. Ham band resonant 50 ohm **HF antenna** and **Dummy Load** required for calibration.

3. PC microphone terminated in 3.5mm - 1/8" plug, optional.

4. CW key or keyer terminated in 3.5mm - 1/8" Stereo plug, optional.

5. A set of stereo speakers or stereo headphones with a 3.5mm - 1/8" stereo plug should be connected to the front panel headphone jack. The rear panel speaker jack should NOT be used for speaker or headphone connections! The rear panel speaker jack provides a balanced, **Left channel** speaker output only and will not work as expected with stereo speakers. The rear panel audio was designed for someone working in the field where they might have a simple portable 2-wire speaker.

WARNING: If a mono plug or a shorted stereo plug is inserted into the rear panel Speaker jack, damage will occur to the audio output IC. Do NOT short these stereo pins or connect either side to ground!

6. DO NOT TURN THE ANAN-100/D RADIO ON until P*SDR software is properly installed and configured.

ANAN-100/D Recommended Software requirements:

1. Windows XP or later – Win7 recommended.

2. Microsoft .NET 4.0 Framework or later.

3. OpenHPSDR/P*SDR mRx 3.0.XX or OpenHPSDR/P*SDR 2.2.XX 2Rx version

** please see OpenHPSDR Software and download information http://openhpsdr.org/download.php.

ANAN-100/D Front Panel

Power on

FPGA Activity

MIC

Headphones

Key

Ethernet

Power Switch
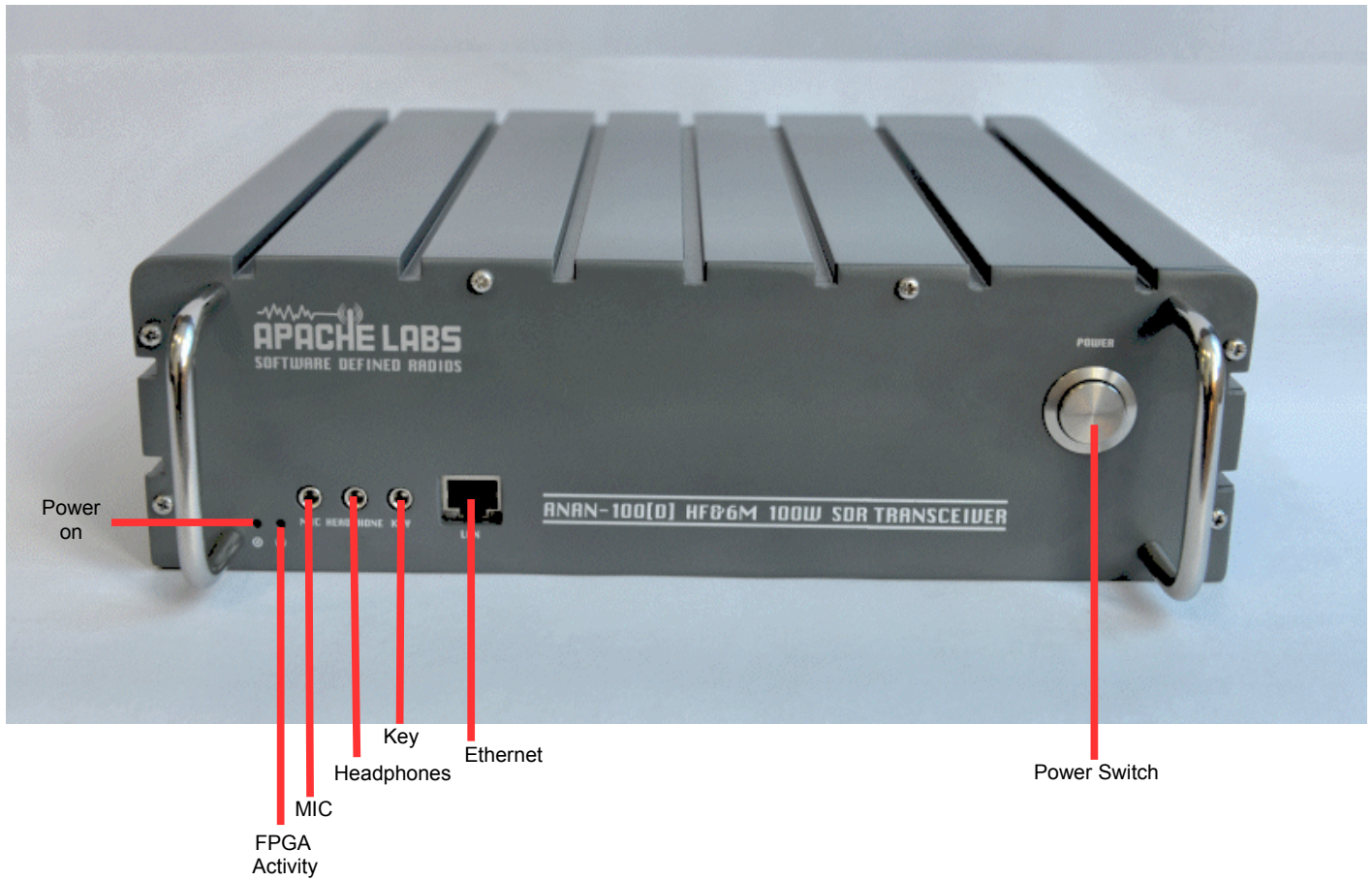
ANAN-100/D back panel
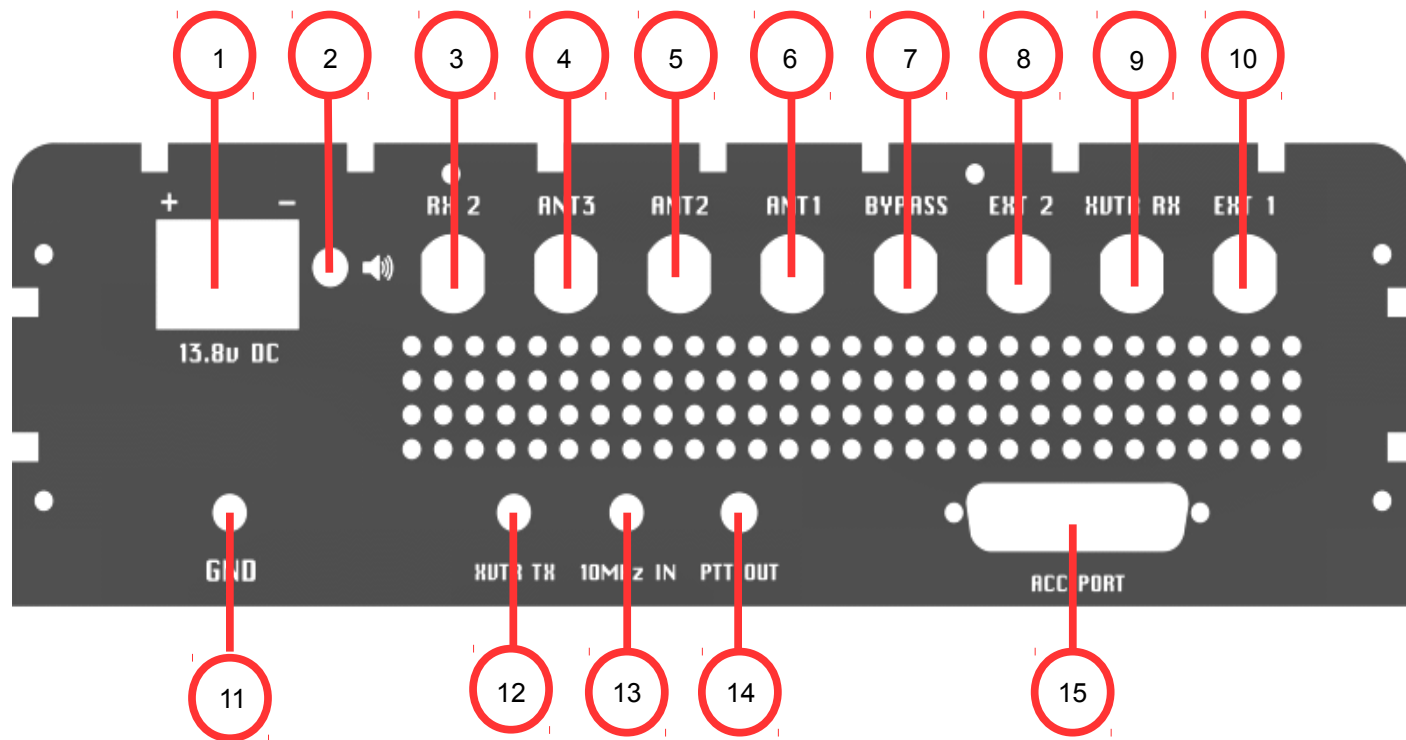
1. 13.8VDC Power connector
2. Balanced Speaker Out
3. Rx-2
4. ANT-3
5 ANT-2
6. ANT-1
7. Bypass
8. Ext-2
9. Transverter Rx
10. Ext-1
11. Ground Lug
12. Transverter Tx
13. 10Mhz input
14. Push to Talk OUT
15, Accessory I/O connector

Quick Start Instructions
please refer to front and back panel illustrations above

Warning: these "Quick Start" instructions only apply to the ANAN-100/D Apache Transceiver board with the jumpers set to the factory defaults.

Please refer to the OpenHPSDR webpage for the most recent documentation by Phil Harman VK6APH for details of the TAPR Hermes Transceiver **http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation**

also put this in your bookmarks as an excellent resource site: **http://openhpsdr.org/wiki/index.php?title=HPSDRwiki:Community_Portal**

Hardware Setup

Note: DO NOT TURN ON THE RADIO AT THIS! TIME The ANAN-100/D Apache Radio will not operate without properly configured software.

WARNING: If a mono plug or a shorted stereo plug is inserted into the rear panel Speaker jack, damage will occur to the audio output IC. Do NOT short these stereo pins or connect either side to ground!

DO NOT TURN THE ANAN-100/D RADIO ON until P*SDR software is properly installed.

The following connection instructions assume the ANAN-100/D jumper settings are at factory defaults.

1. Install the 4 supplied rubber feet.

The ANAN-100/D transceiver should be placed to allow unobstructed airflow around and beneath the housing. Damage can occur if the ventilation openings on the bottom or rear panel of the ANAN-100/D are blocked. Allow room for airflow between the housing and other equipment.

2. Connect the supplied 13.8VDC cable to the rear panel power connector and to a filtered 13.8VDC +/- 5%, power supply capable of providing up to 25A.

3. Connect a suitable ground cable to the rear panel ground terminal and to a suitable RF ground, in accordance with good amateur practices.

4. Connect a 50 ohm transmission line between the rear panel ANT1 BNC connection and a 50 ohm dummy load capable of dissipating 100 watts for at least 5 minutes.

5. Connect powered stereo speakers, or a stereo headset to the front panel 1/8"/3.5mm stereo jack. Note: Do NOT connect powered stereo speakers or headsets to the rear panel speaker jack! This is a balanced output and damage can result if either tip or ring is connected to ground.

6. Optional. Connect a dynamic PC microphone equipped with a 1/8"/3.5mm mono plug into the front panel mic jack. See appendix for interfacing other mics.

7. Connect a CAT 5 Ethernet cable between the front panel RJ45 LAN jack and your router or PC Ethernet port.

Note: find minimum detailed Ethernet requirements beginning on page 8 of this document.
Do Not install a microphone or CW key at this time. DO NOT TURN THE RADIO AT THIS TIME!.
Insure that your PC is properly connected and communicating over your network (LAN) to the Internet.

Software Setup

Go to the OpenHPSDR download page and download the P*SDR_mRX Installer software:
ttp://openhpsdr.org/download.php

scroll down to the WINDOWS section and look for the **latest** W5WC software

Windows

PowerSDR_mRX_v3.0.2.0_Setup (Compiled with MS VS 2010), **More ...**
        Code at SVN: http://svn.tapr.org/repos_sdr_hpsdr/trunk/W5WC/PowerSDR_HPSDR_2

PowerSDR_RX2_v2.2.14.0_(W5WC)_Setup (Compiled with MS VS 2010), **More ...**
        Code at SVN: http://svn.tapr.org/repos_sdr_hpsdr/trunk/W5WC/PowerSDR_HPSDR_2_RX2
        Note: Code has recently been updated to comply with the LGPL license

PowerSDR 2.2.3 Diversity
        This code is maintained off the openHPSDR.org web site by Joe, K5SO, it is based on the PowerSDR 2.2.3 code above.
        Code at SVN: 2.2.3 Diversity code. See website for ZIP files.

KISSKonsoleSetup (Compiled with MS VS 2010), **More ...**
        Code at SVN: http://svn.tapr.org/repos_hpsdr_kiss/trunk/StableRelease/KK_Unified/Latest/Unified/bin/Release

HermesVNASetup Version 1.6.0 16-11-2012 (Compiled with MS VS 2010), **More ...**

cuSDR32_MSVS (Compiled with VS 2010), **More ...**
        Code at SVN: http://svn.tapr.org/repos_sdr_hpsdr/trunk/DL3HVH/cuSDR32/

cuSDR64_MSVS (Compiled with VS 2010), **More ...**
        Code at SVN: http://svn.tapr.org/repos_sdr_hpsdr/trunk/DL3HVH/cuSDR64/

example of OpenHPSDR Download webpage

Windows

For example: On the OpenHPSDR Download webpage http://openhpsdr.org/download.php you will see: P*SDR mRx (compiled with MS VS 2010) the current version of P*SDR mRX 3.0.X.XX will have a current build number inserted in the place of "XX". click on P*SDR mRX 3.0..XX and select "RUN" to install the application. Alternatively, you can SAVE the application in the directory of your choice.

Execute (RUN) to start the Installer at this time.

Note: You may be asked to install the full Microsoft .NET 4.x Framework at this time if the Installer determines that your PC does not have the necessary .NET full 4.0 version installed. If you receive this message, chose "O.K." then you will get a dialogue that will indicate that P*SDR installation failed at this point. If you have reached this point, you must install the Microsoft .NET 4.0 Framework from HERE
http://www.microsoft.com/en-us/download/details.aspx?id=17851

Once you have Microsoft .NET 4.0 installed successfully, you can run the P*SDR installer again to complete this process. See the example above:
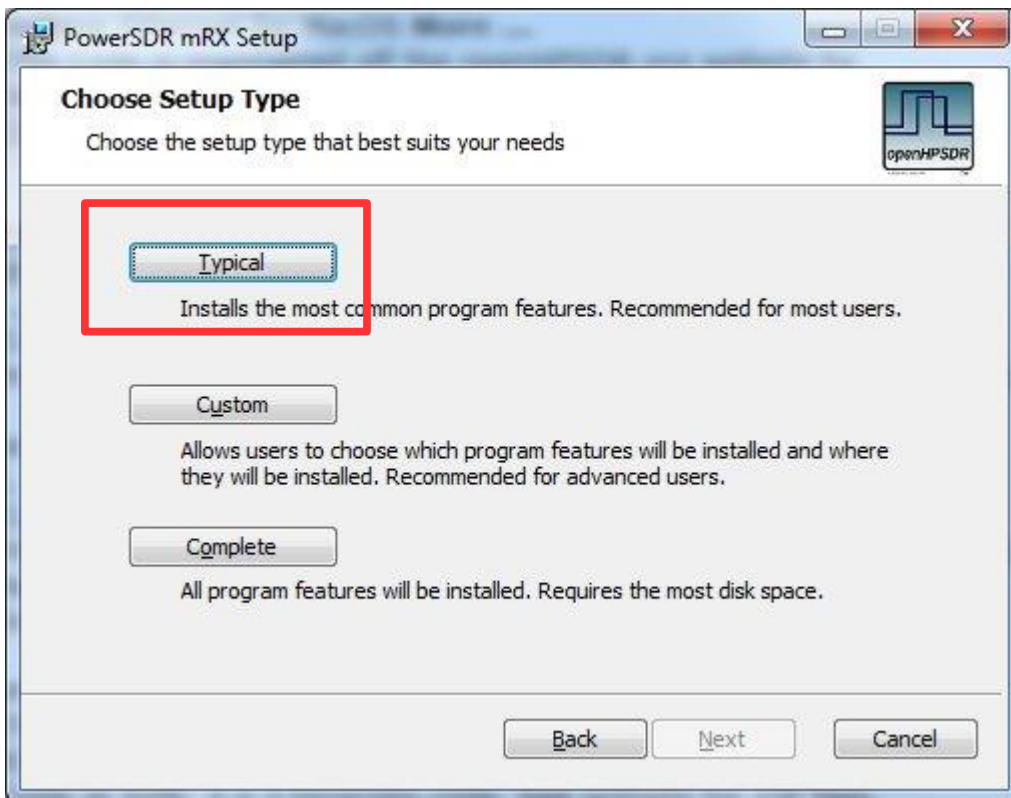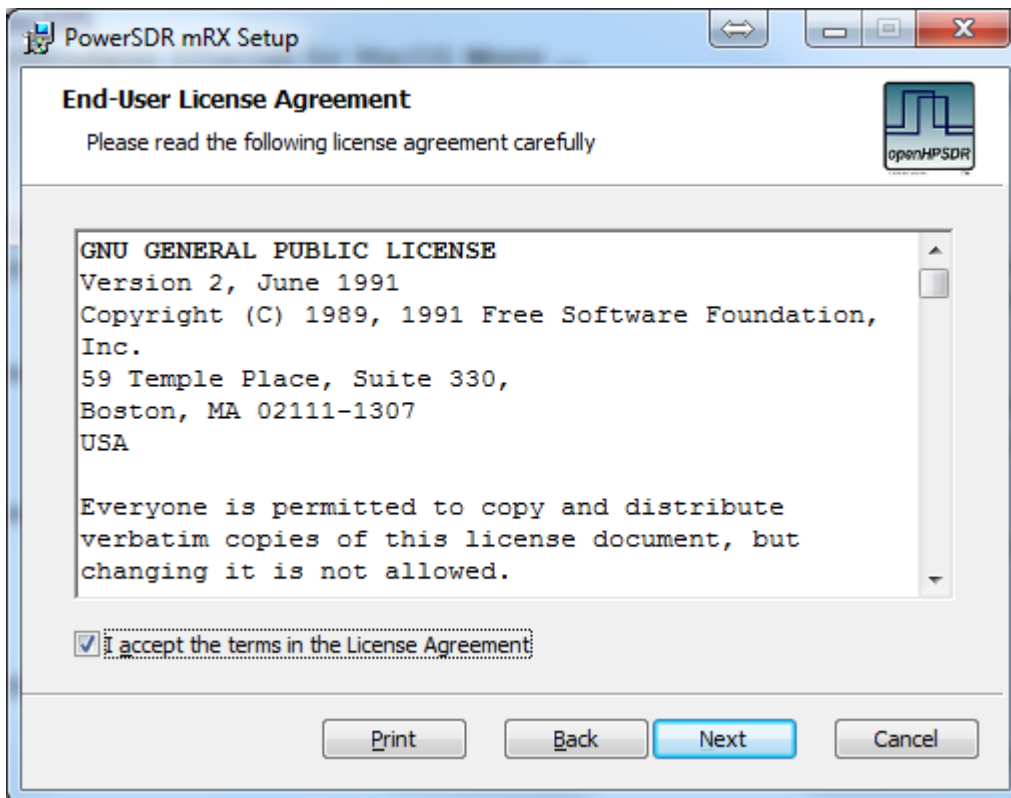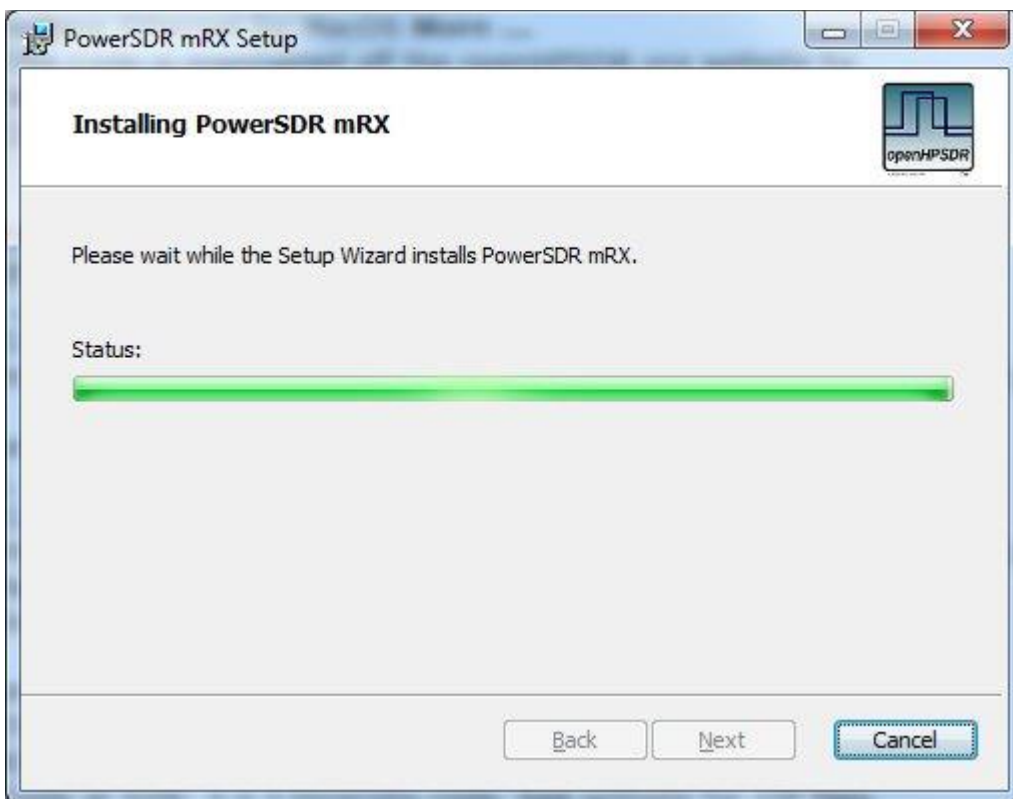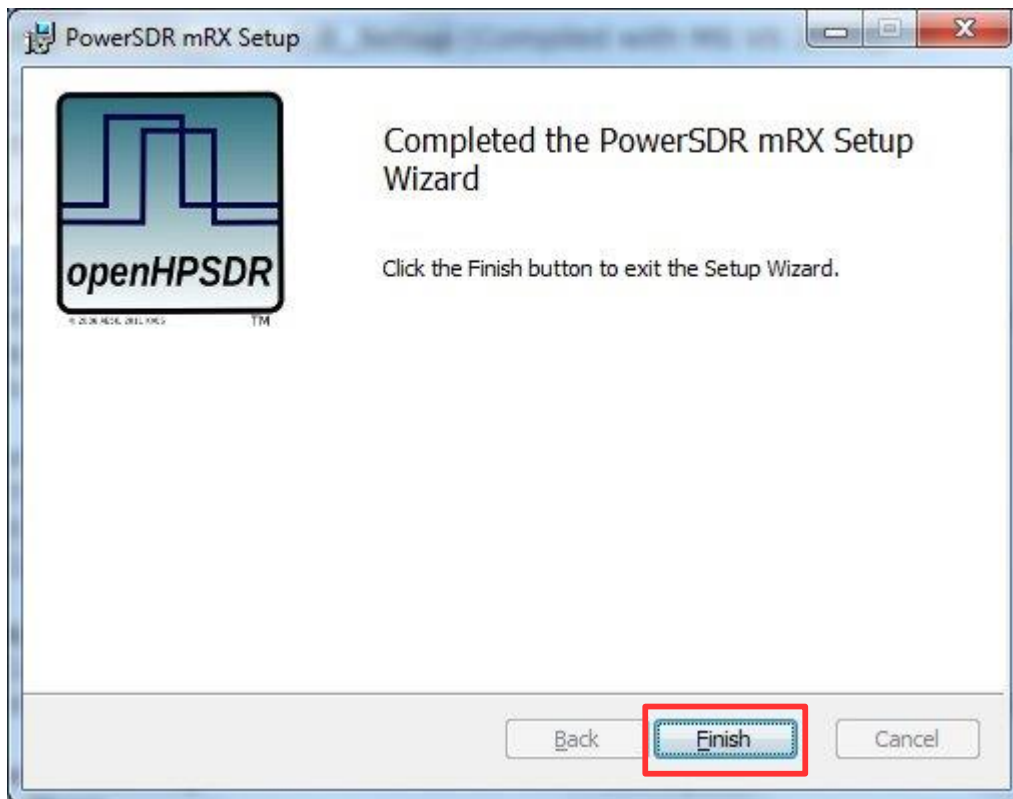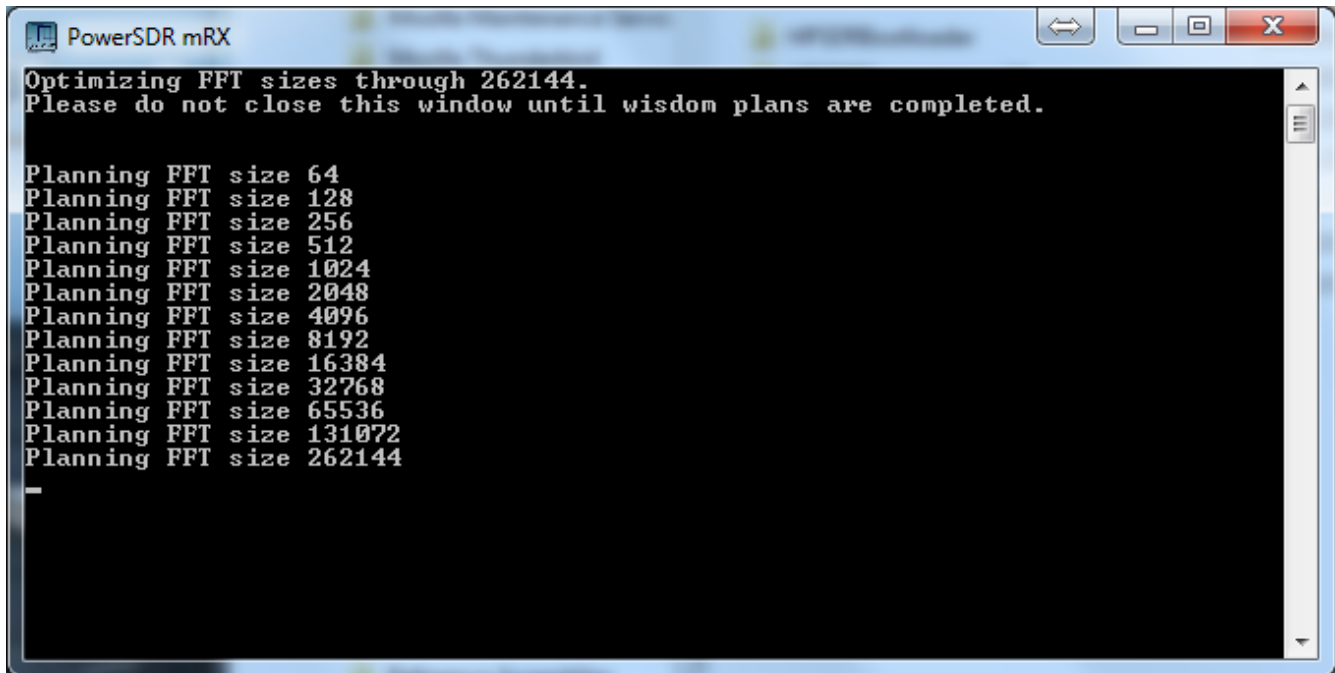
Click on the desktop ICON to start P*SDR-mRX.
If a P*SDR_mRX icon is not clearly apparent on your screen, use your start menu to locate the program.

The program will begin with the "WISDOM" optimization.
A one time DOS FFT optimization screen will appear. Wait for this process to finish and the DOS screen will disappear.
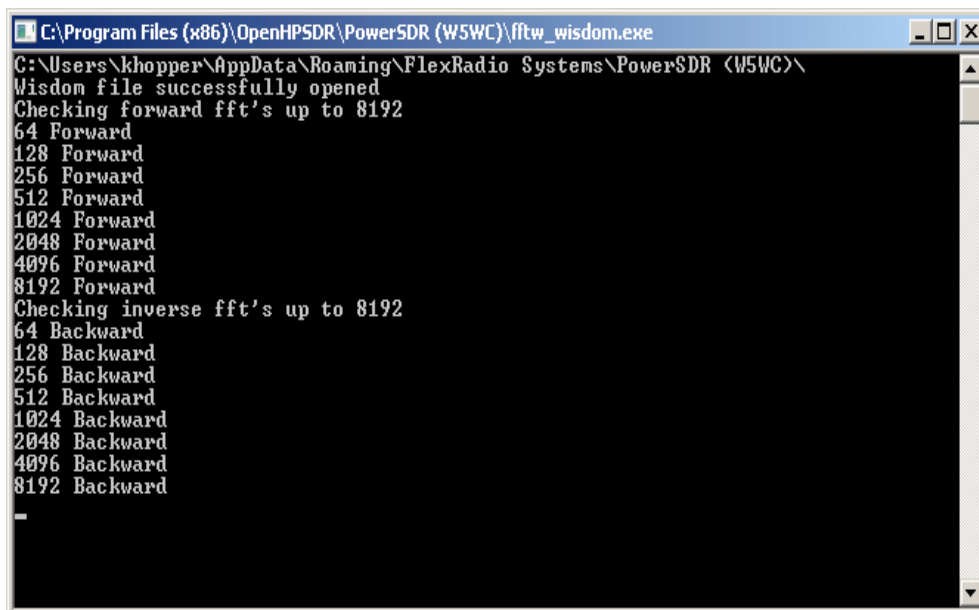
Optimization DOS Screen

A second Wisdom screen will appear which continues the optimization through a lengthy calculation.

```
PowerSDR mRX                                                    ⇔  ─  ▣  ✕

Optimizing FFT sizes through 262144.
Please do not close this window until wisdom plans are completed.


Planning FFT size 64
Planning FFT size 128
Planning FFT size 256
Planning FFT size 512
Planning FFT size 1024
Planning FFT size 2048
Planning FFT size 4096
Planning FFT size 8192
Planning FFT size 16384
Planning FFT size 32768
Planning FFT size 65536
Planning FFT size 131072
Planning FFT size 262144
_
```

This may take 10 minutes or more to complete the extended FFT calculation trough 262144.

Wait for the message that it is OK. select "OK" to finish.

Turn on your power supply. Push the **POWER ON** button on the ANAN-100/D.

Then press the **POWER** button on P*SDR™.

Wait a few seconds and then click on the Setup Menu selection.

Click on the "SETUP" menu selection to configure the P*SDR software.
P*SDR basic display screen
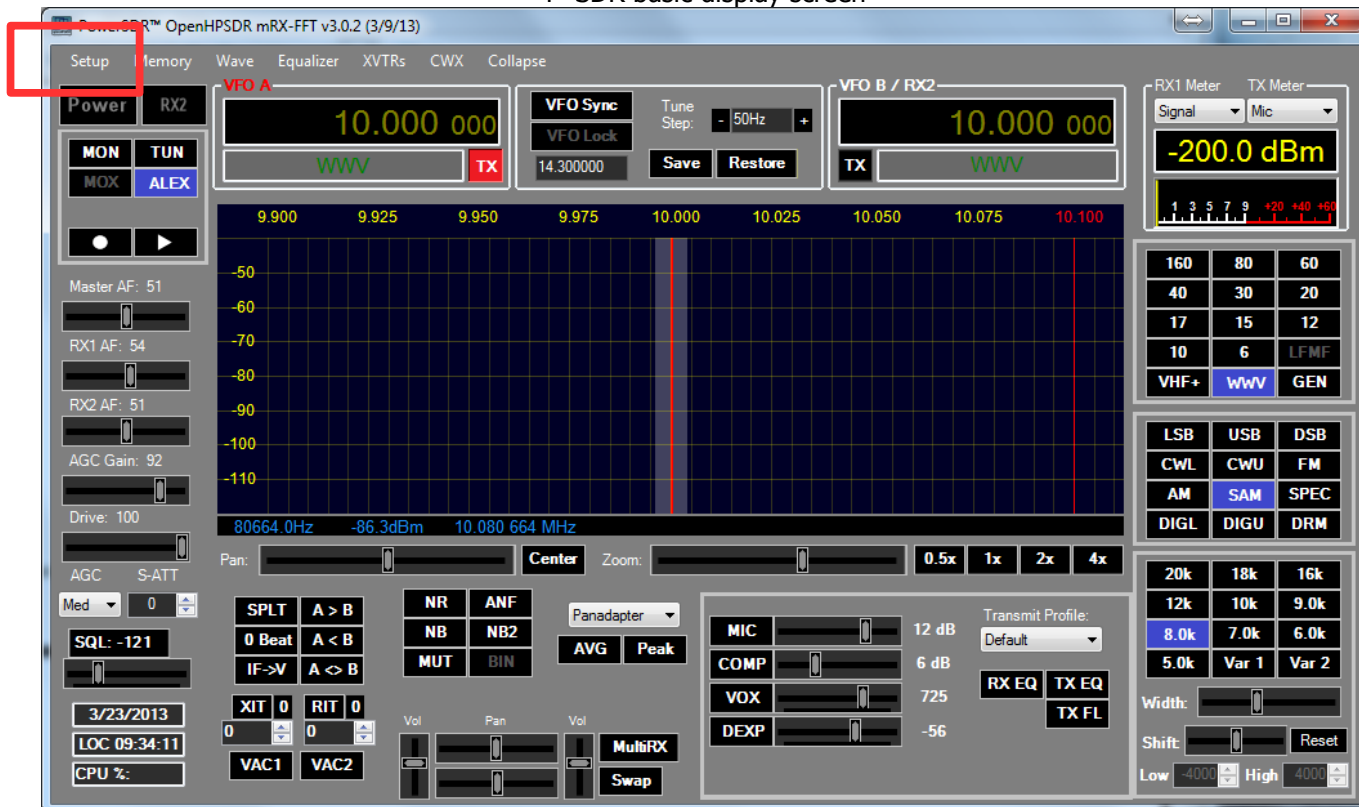
Go to → GENERAL → Hardware Configuration tab and note the IP Address and MAC address that are read from the ANAN-100/D Transceiver.

Note: if the IP ADDRESS is 0.0.0.0
- 🌐 you must check your LAN connection.
- 🌐 P*SDR/OpenHPSDR software has not been started
- 🌐 Power button on the rig has not been activated

Also check your LAN connector on the ANAN-100/D to insure that the Link Light on the LEFT side of the LAN connector is illuminated.
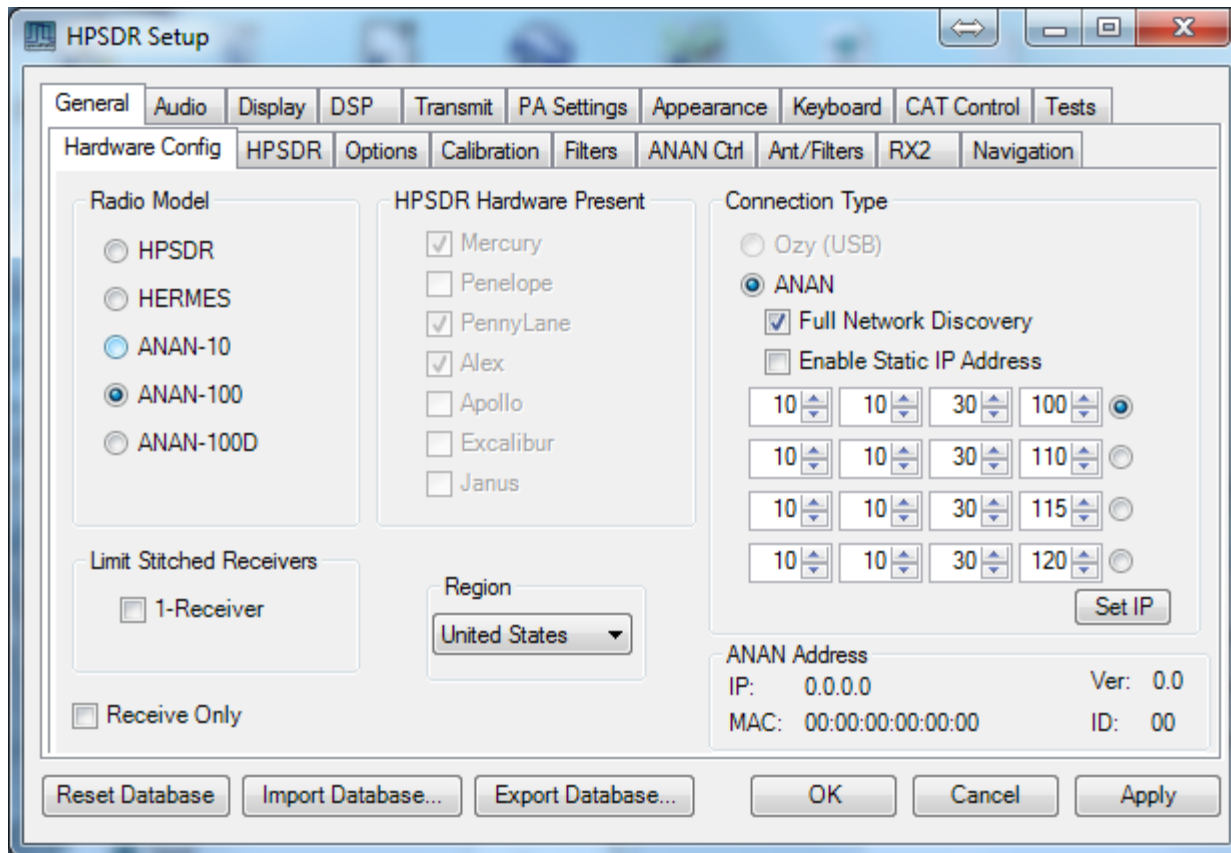
Make a note of your ANAN-100/D Transceiver unique MAC address since this will be useful if there is a need for network problem-solving in the future.

WARNING: Make sure you have selected the proper radio model from the selections on the LEFT side of the Hardware Configuration box. Failure to do so will result in an improper set of menu options and displays.

The Static IP Addresses are available to point your instance of P*SDR/OpenHPSDR to a particular Apache Transceiver. There may be several Transceivers on your LAN and the Static IP address is a convenience for pointing this software to a particular unit – where each unit has it's own IP address.
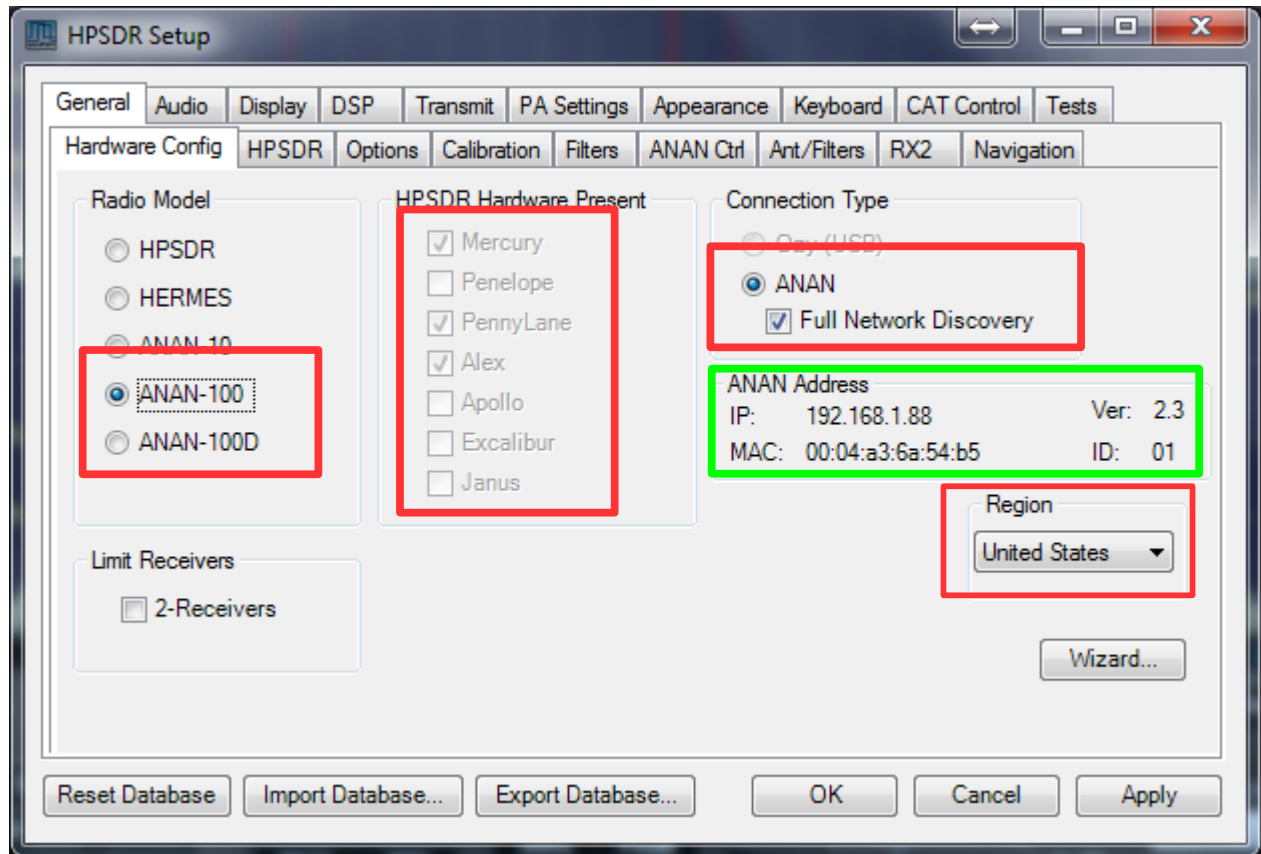
Setup ---> General tab ---> Hardware Config tab, the Radio Model should have ANAN-100/D selected. Connection Type "**ANAN**" and "**Full Network Discovery**" should both be checked. In the "**Region**, select the Country in which you reside.

 The ANAN IP address and Firmware version number in the green box highlighted above will be set automatically by your network router DHCP server, or if connected directly to your PC, the IP address will be assigned by the "APIPA" process – WHICH MAY TAKE UP TO SEVERAL MINUTES TO ASSIGN AN IP ADDRESS.

> If your LAN is properly configured, the ANAN-100/D board IP ADDRESS and MAC ADDRESS should be automatically be detected and assigned. An incorrect default value is 169.254.1XX.XXX. P*SDR™ will display the currently assigned IP address and MAC address of the ANAN-100/D Hermes board if the LAN connection is properly connected and configured. If the ANAN-100/D IP ADDRESS remains 0.0.0.0 then you must determine if P*SDR and your PC network connection is operating correctly. Some typical problems could be that the Ethernet connection to your PC or LAN connector is disabled in Windows. The Ethernet connector may not be properly seated in your PC or Router. DHCP addressing must be properly enabled on your router. The new HPSDRProgrammer V2 utility allows you to assign a STATIC IP ADDRESS if you wish.
>
> Please see APIPA appendix on page 67 of this document for more information.

Please select a Sample Rate of 384khz, for the Panadapter display width, at this time (running P*SDR/OpenHPSDR 3.0.2.x)
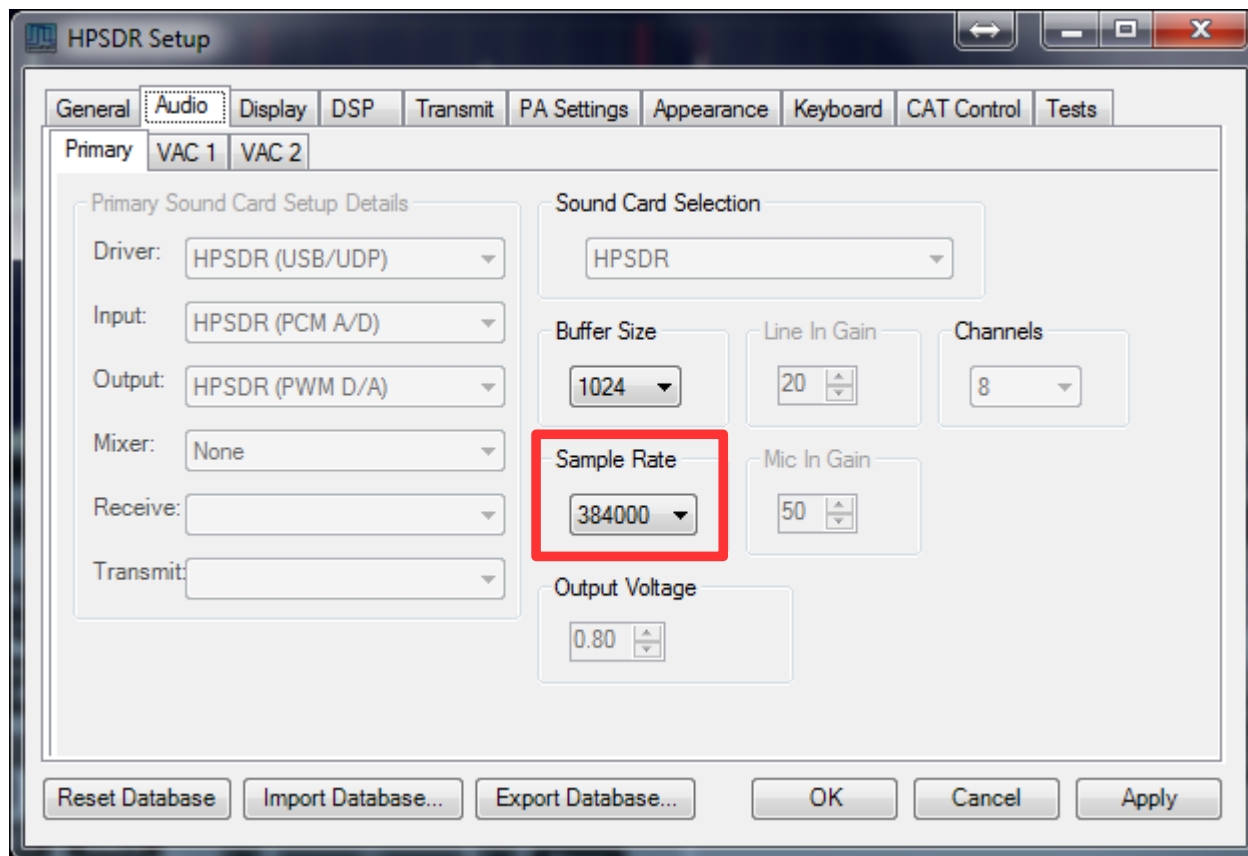
example 384khz panadapter single receiver display (entire 20M band) using the COLLAPSED display option
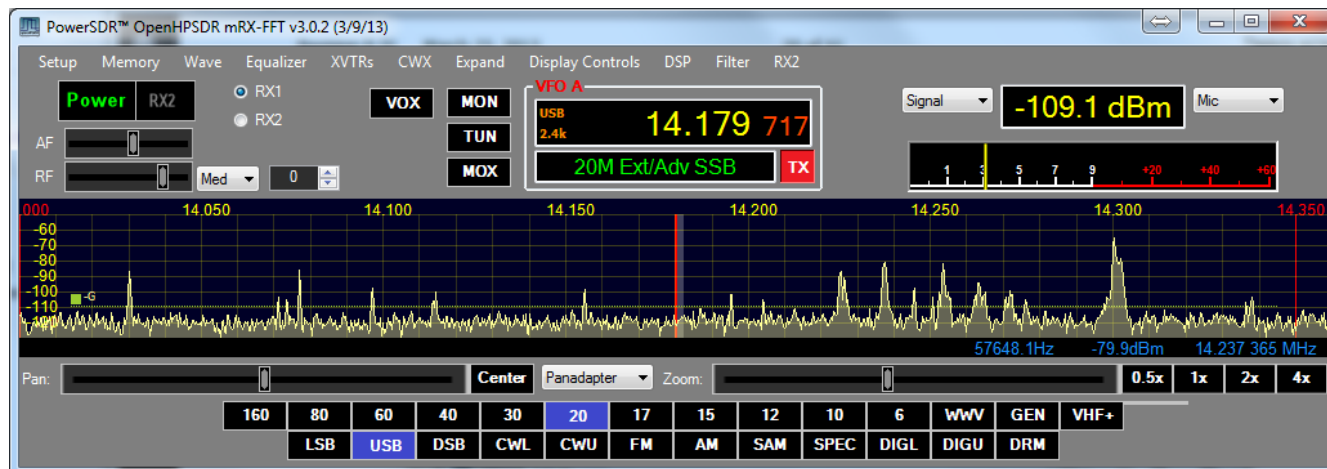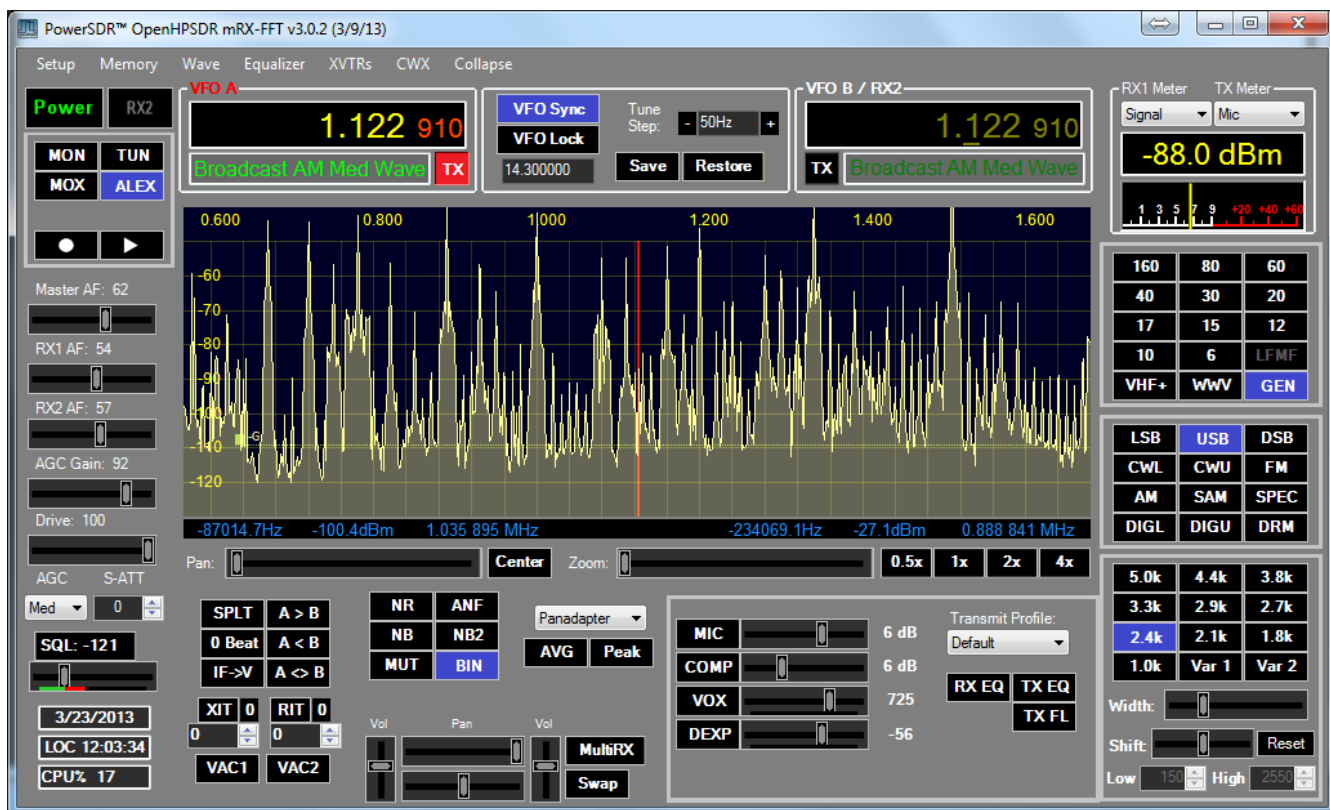
The cluttered and dense entire Chicago AM Broadcast band
shown using 3 x 384khz for RX1

General tab ---> APPEARANCE tab, and you should be able to change the graphical appearance of P*SDR by selecting different "skins".
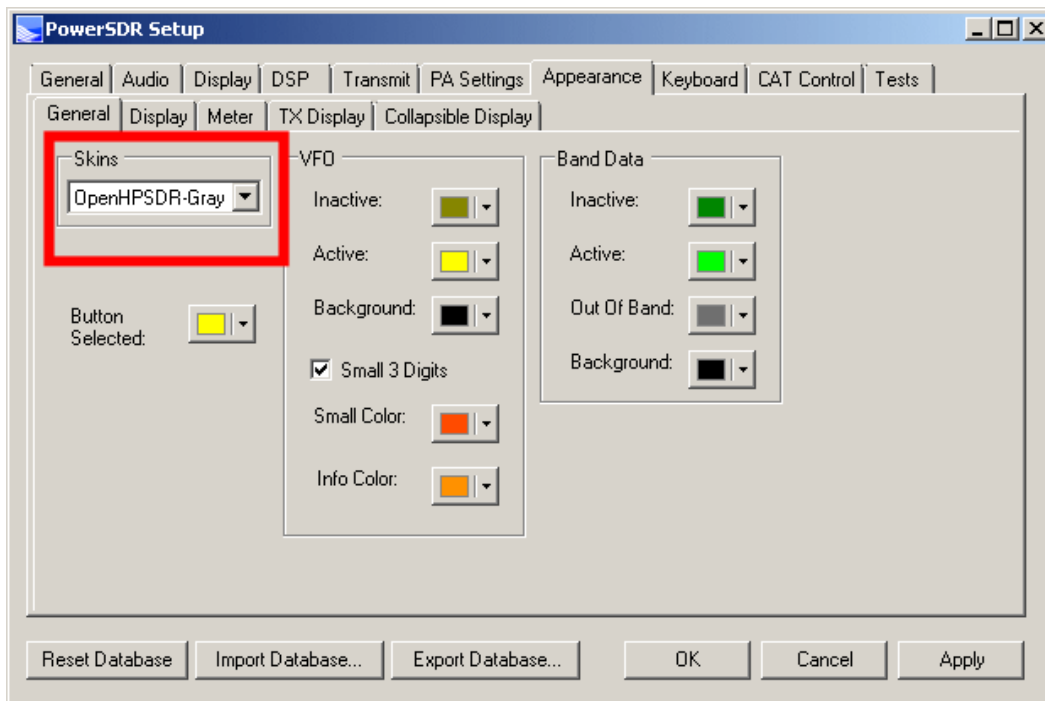
CW Key Selection and Wiring
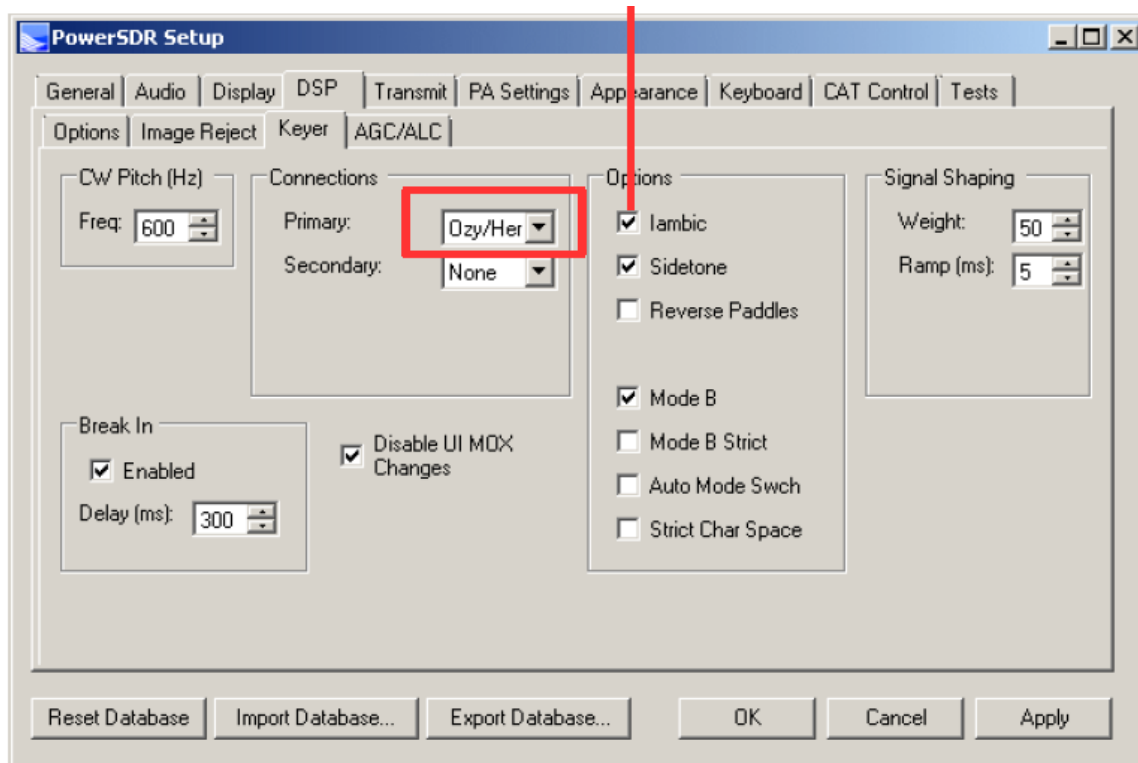
Select Iambic Paddles or straight key

To use a CW key with P*SDR™ you will need to enable it in the menu. To do so, click on Setup → DSP tab followed by the Keyer tab.

Provides connection for a CW key, either straight, single-paddle or Iambic. If using dual-paddle or Iambic mode, the common connection of the key should be made to the sleeve of a 3.5mm 1/8" stereo plug, the "dot" side to the ring and the "dash" side to the tip. If a straight key is used, this should be connected between the sleeve and the tip of the plug. Some PC SDR Software enables the dot and dash connections to be reversed via a menu selection (above). The dot and dash connections are connected to a 3.3vdc via a 1k resistor.

Antenna use and switching in ANAN-100/D

There are many Antenna switching options for the Apache Labs ANAN-100/D. Below you see a screen picture of the Setup,General Ant/Filters, Antenna tab.

The 1, 2, 3 selections correspond to the rear panel ANT1, ANT2, and ANT3 BNC connectors. You can select different antennas for receive and transmit on each band. As you change bands, the selected antenna ports will automatically change according to the settings on this form.

You can also optionally select EXT1, EXT2, or XVTR to receive on the selected port while transmitting on ANT(N). These correspond to the EXT1, EXT2 and XVTR BNC connectors on the ANAN-100/D back panel. When you select EXT1, EXT2, or XVTR, the receive path from ANT(n) switches from the HPF and receiver to the rear panel ByPass connector.
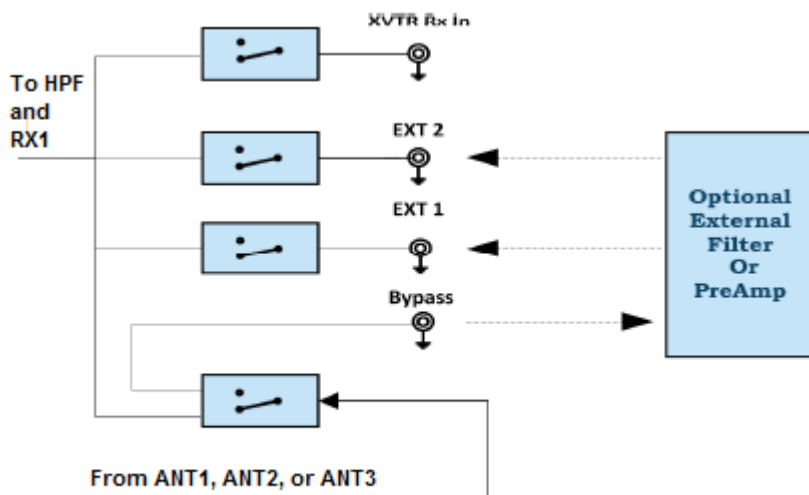
If you select EXT1, EXT2, or XVTR you can modify the received signal path by:
     1. Connecting an external filter or pre-amp between the ByPass connector and the selected EXT1, EXT2 or XVTR connector. The signal would then pass thru the HPF to the receiver.
2. Attaching an external receive antenna to the EXT1, EXT2, or XVTR connector. The selected antenna would then be routed thru the HPF to the receiver. <u>If EXT1, EXT2, or XVTR is selected, ANT1-3 would no longer be used for receiving.</u>

> WARNING: During transmit, the selected EXT1, EXT2, or XVTR antenna could experience high levels of RF which could result in damage to the receiver. An external T/R switch should be configured to protect the receiver input while transmitting.
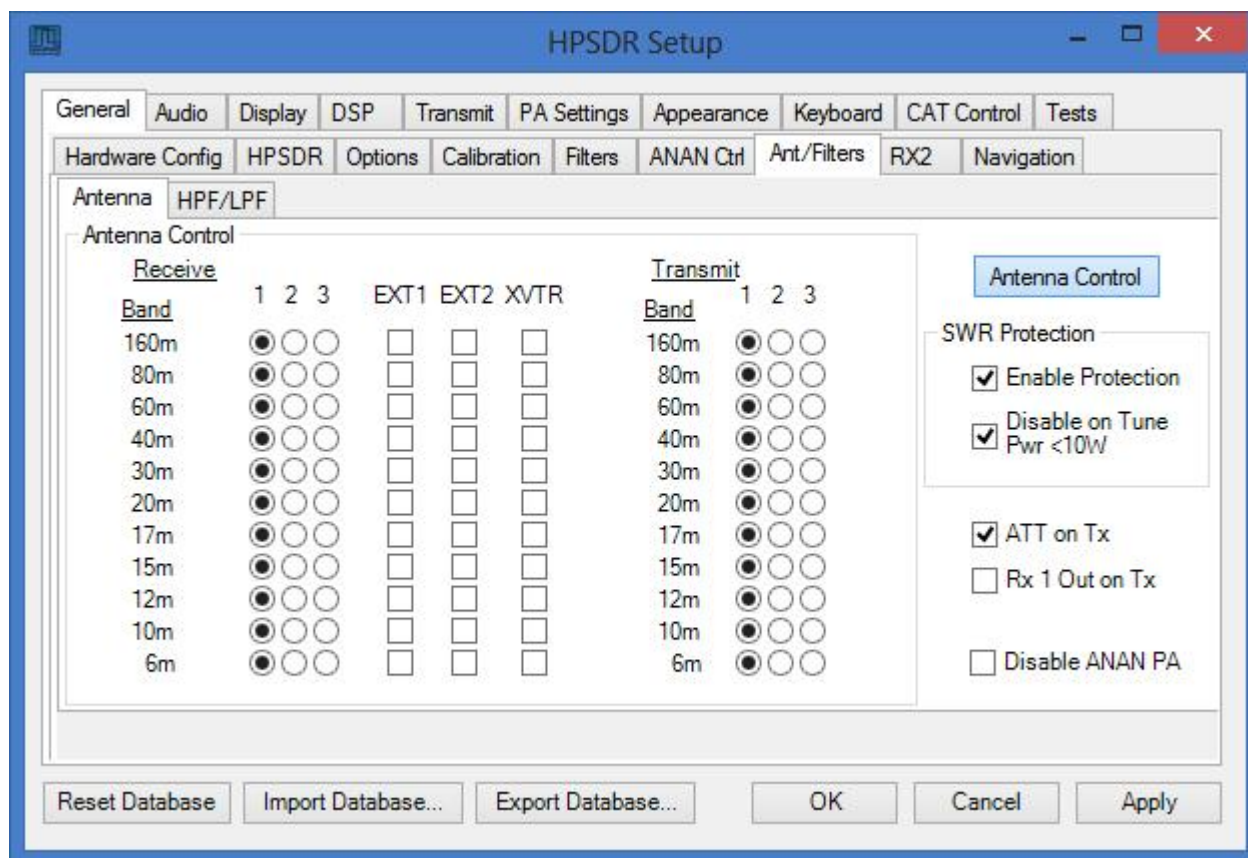
Note the Antenna Control box on the right allows you to control the following options:

1. Software SWR Protection.
   Enabling this option will reduce power output when high SWR levels are detected.
2. Disable on Tune Pwr < 10W.
   Enabling this option will disable Software SWR protection when the Tune power level is less than 10 watts. The Tune power level can be set on the Setup, Transmit tab.
3. ATT on TX. This option inserts attenuation in the receiver when the ANAN-* is transmitting. This can prevent or reduce the ADC/Receiver overload warnings during transmit.
4. RX 1 Out of Tx
5. Disable ANAN PA

HPF/LPF Filters and switching in ANAN-100/D

The ANAN-100/D have a very effective set of High Pass Filters (HPF) and Low Pass Filters (LPF), available on the Setup, General, Ant/Filters/HPF/LPF tab. The HPF and LPF are automatically selected as you change bands, according to the settings on this form.

The ByPass check box on the left side of the HPF/LPF tab, when checked, removes the selected high pass filter from the receive path.

The values in the up/down boxes control the frequency ranges when these filters are automatically selected.

The 6m BPF/LNA bypass check mark controls the 6 meter low noise amplifier and filtering.

The ByPass/55mhz HPF check mark, when enabled bypasses all high pass filters.

The active buttons displayed between the HPF and LPF show which filters are currently active.

The Auto/Manual radio buttons should be left in Auto mode for most operations. Selecting manual will allow you to see what receive filters are selected when you bypass or change receiver frequency ranges etc.
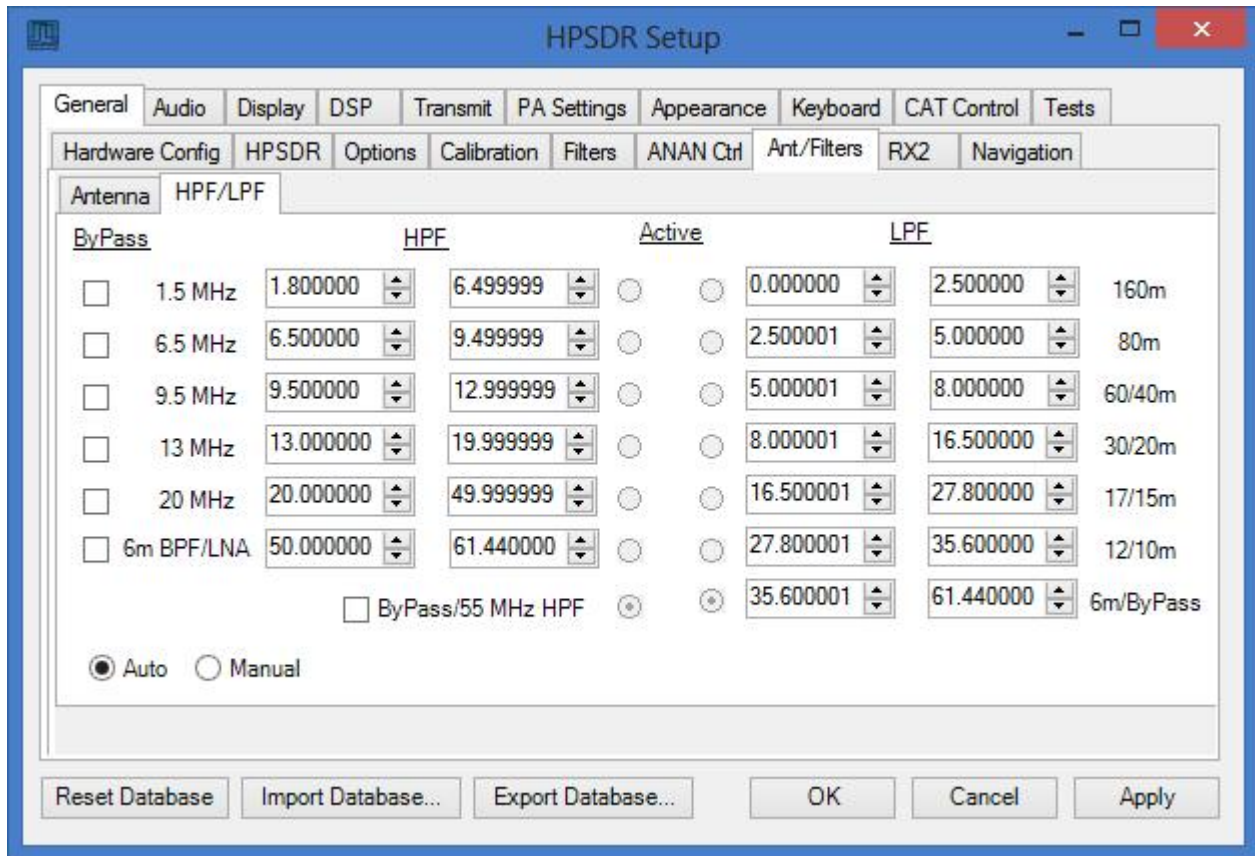
OpenCollector BCD example by VK6APH

This is an example provided by Phil Harman VK6APH of how to code the
P*SDR/OpenHPSDR Power_mRX program to give a BCD (binary coded decimal) output for
control of external equipment (such as band information for a Linear Amplifier).
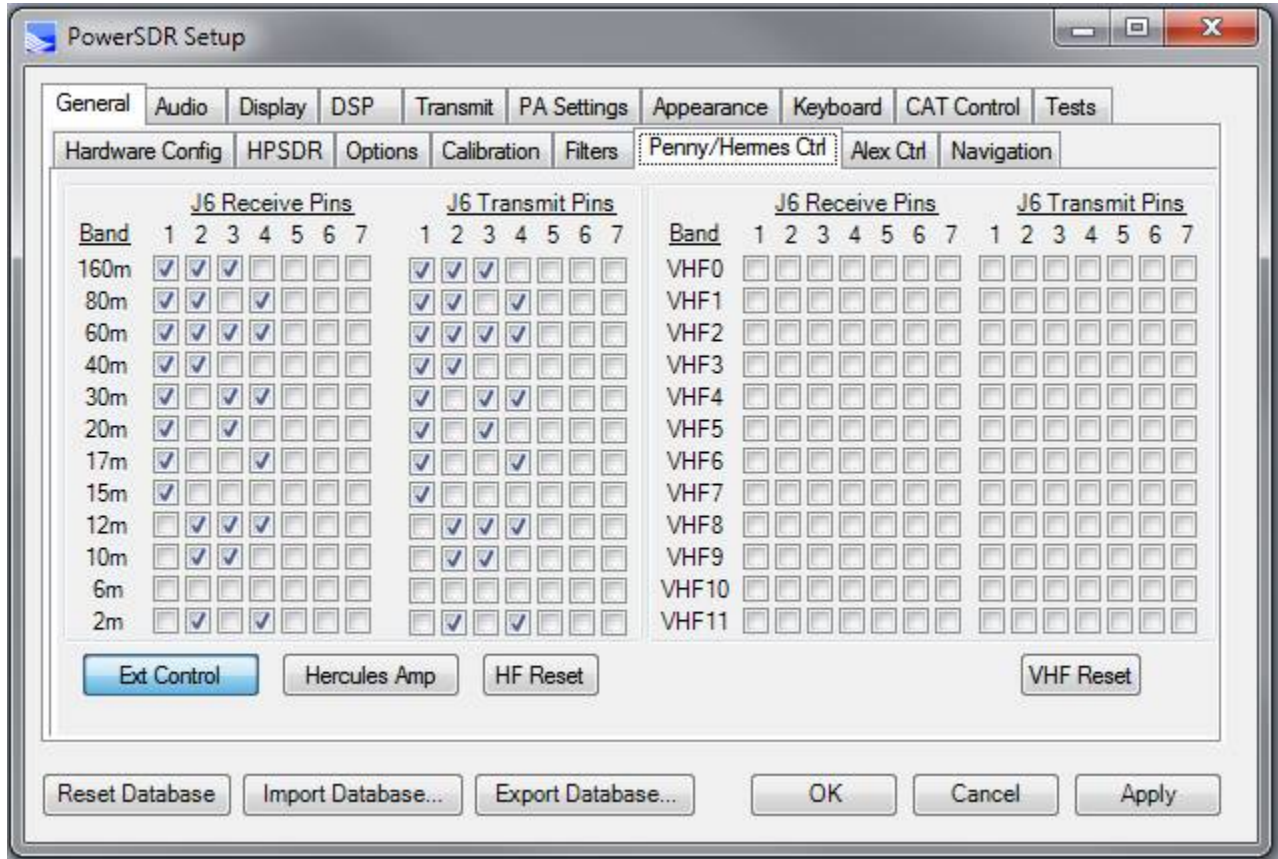
Manual PA Calibration
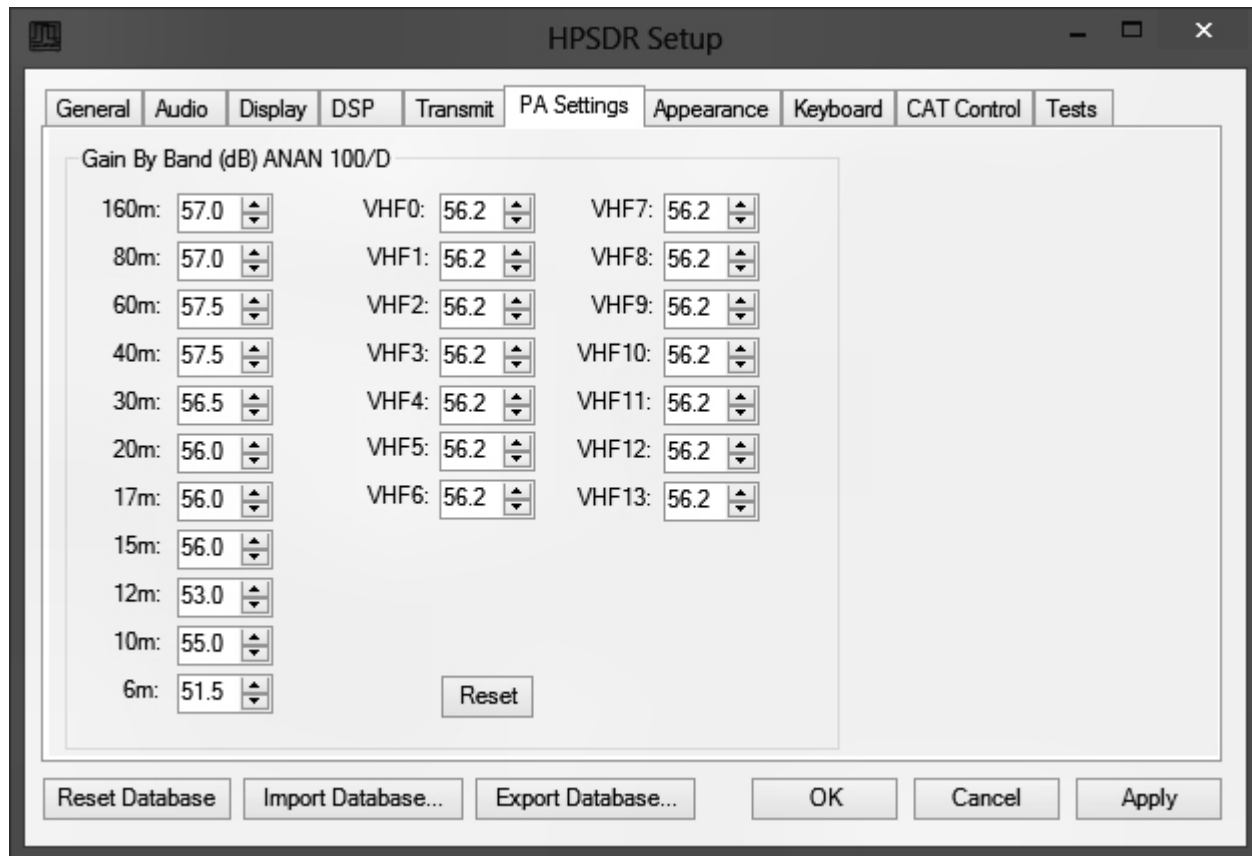
Each ANAN-100/D user needs to manually calibrate the Transmitter Power Output settings within P*SDR™. P*SDR/OpenHPSDR allow a slight touch-up of transmitter power output.

Use the following manual calibration procedure to properly set/calibrate your ANAN-100/D power output into a dummy load:

1. Connect a suitable Dummy Load to ANT1 BNC port on the back panel of the Transceiver.

2. Click on menu selection, Setup, Transmit.

3. Set "TUNE" (left side of window), Power (W) to 100

4. Select "FWD Pwr" from the "TX Meter" upper right corner of the main P*SDR/OpenHPSDR window.

5. Enable the Antenna window by clicking on Setup ---> General ---> ANT/FILTERS tab to access the antenna settings.

6. Select the Transmit antenna ANT1 where you connected the Dummy Load.

7. Select the PA settings TAB on the Setup menu window.
The PA Settings TAB allows you to set (calibrate) the ANAN-100/D Power Amplifier gain by band (dB – Power Output per Band) for each of the available Ham Bands. There is an up/down gain control for each band, which regulates the Power Amplifier output for that band. **As you <u>increase</u> the Gain By Band, power output will <u>decrease</u>. Conversely,<u> decreasing</u> Gain By Band will <u>increase</u> Power Amplifier output**.

Maximum power output per band can be reached at the <u>lowest</u> value in this menu.

Setup PA settings Band:

8. Select one of the bands on the PA settings TAB.

9. Ensure you have the Setup ---> Transmit tab ---> Tune control set to 100 and a **150W** or larger **Dummy Load** connected to the selected antenna port on the ANT/FILTERS setup tab.

10. Press "TUN" (Tune) on the upper left side of the P*SDR™ main display form on your computer.

11. Adjust the band gain value for a **MAXIMUM** TX Meter "FWD PWR" output reading of 100 watts while using your suitable Dummy Load. Do NOT use an Antenna for this calibration adjustment.

12. Press "TUN" button again to unkey the radio.

Repeat the above procedure for each Ham Band to properly calibrate the RF CW power output for a **MAXIMUM** 100 watts.

13. When all bands have been calibrated, remove the Dummy Load and select the antenna of your choice in the ANT/FILTERS setup Tab.

14. Remember to reduce the "TUN" power wattage setting on the Setup ---> Transmit tab to approximately 9W.

Microphone Settings

Adjusting mic gain.

The ANAN-100/D microphone gain must be adjusted for each microphone used with the radio. The internal jumpers JP4, JP5, and JP6 on the Hermes board must be set properly for the type of microphone used. See the reference section of this document for the jumper settings, or refer to the document by Phil Harman VK6APH: http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation
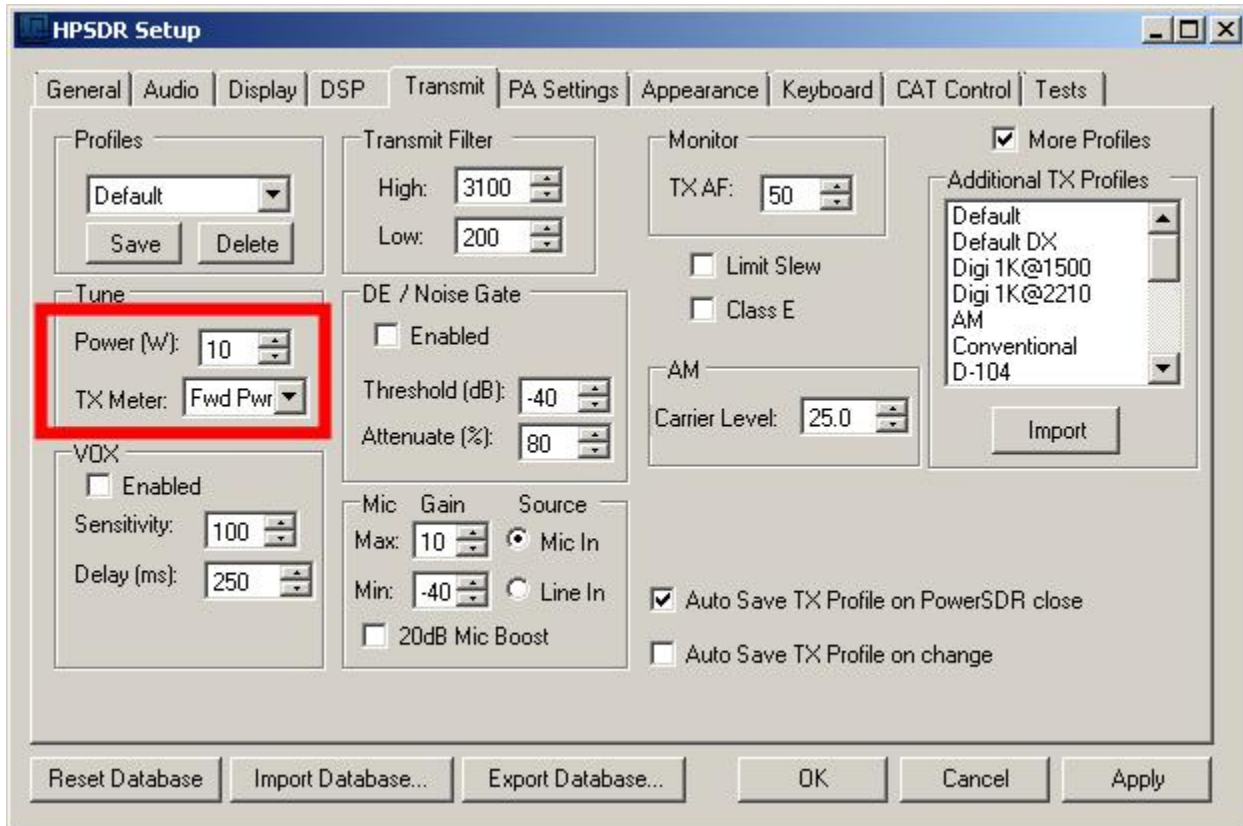
1. You should make all microphone adjustments into a **Dummy Load**.

2. Select P*SDR menu Setup ---> DSP ---> AGC/ALC tab. The "Leveler" and "ALC" enabled check boxes must be checked or enabled before the Microphone gain can be properly set.

3. Select Setup, transmit tab and at lower left, Set "Mic Gain Max" to 20 and select Source as "Mic In".

4. On the P*SDR main window, use the "TX meter" (Upper right corner) dropdown box to select "Mic".

5. Select modulation mode of USB or LSB at the right, center of the P*SDR window.
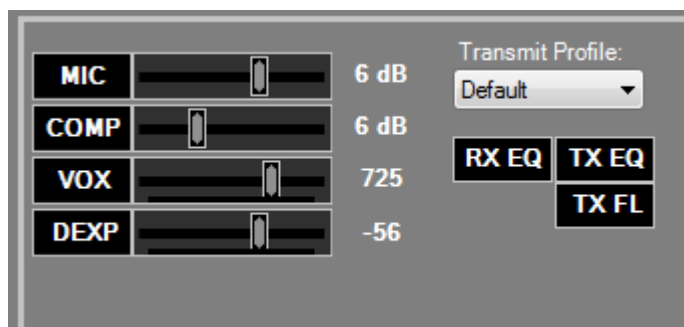
6. Locate the "MIC" gain control slider. It is located at lower right, below the panadapter. The present mic gain setting is shown just to the right of the MIC gain slider.

7. Press your mic PTT button or click the "MOX" button on the main form to key the radio. With the radio keyed and while speaking into the mic in a normal voice adjust mic gain for peaks at 0db

8. If 0 db voice peaks cannot be achieved with the slider at the extreme right, go to the Setup, transmit tab

(lower left), check "**20db mic boost**" and try again to adjust the "MIC" gain control on the main P*SDR window for 0 db on voice peaks.

If you are still unable to achieve 0 db on voice peaks you can try increasing the Setup, Transmit tab "Mic Gain Max" to 30 db and try again to adjust the "MIC" gain control on the main P*SDR window for 0 db on voice peaks.

9. If you are still unable to achieve 0 db on voice peaks:

    (a) Check your JP4, JP5 and JP6 jumper settings on the Hermes board.

    (b) Try a different mic.

10. To enable or disable COMPRESSION you click on the COMP button. We recommend that you set COMPRESSION to no more than 6dB.

Transmit – Author Bill KC9XG

The Setup, Transmit tab is used to set various transmit parameters.

The "Profiles" drop down menu allows you select various transmit profiles. The default profile is "Default".

You can modify profile settings on this tab and save them to a profile name you select, or you can just modify the included profiles to your liking. You can recall saved profiles at a later time.

Tune:
1. The "Tune Power(W)" spinner allows you to select the power output used when the "TUN" button is pressed on the main P*SDR window. In some versions of P*SDR, this is actually a percentage of power output rather than output in Watts. The "Tun" button places P*SDR in CW mode and keys the transmitter using the specified power output level.
2. The "TX Meter:" drop down selects what the TX Meter on the main form displays when the "Tun" button is pressed.

VOX:
1. Click the "enabled" button to enable "Voice Operating Transmit" if you want to cause the transmitter to key when you speak.
2. Set the sensitivity spinner to a higher value if your wish to have a higher voice level cause the transmitter to key.
3. Set the delay to cause the VOX to de-key the transmitter after not hearing voice for "Delay (ms)" milliseconds.
4. Use this with care. Local noises (dog barking, TV playing, door bell, computer sounds) can cause your transmitter to key when you do not want this to happen. Extreme cases can cause your transmitter to key for excessive periods of time resulting in damage to your radio and attached power amplifier.

Transmit Filter:
1. This filter tailors the transmitting frequency response in voice modes.

2. The default for high is 3100hz in some versions of P*SDR.

3. This value exceeds the frequency response allowed on 60 meters in some regions.

4. You can modify this and other values as needed before hitting the "Save" profile button to save to disk
    for later recall.

Mic Gain:
This was covered previously in the previous paragraphs.

Tuning the P*SDR receiver.

Author Bill KC9XG

Your ANAN-100/D is a "knobless" radio. Most functions are performed on a PC with the mouse or via keyboard commands.

Preliminary receiver setup:

1. On the left side of the P*SDR window, locate the "AGC Gain" control and set the slider to 90. This control works similar to an RF gain control, but actually controls the level where the "Automatic Gain Control" adjusts your receiver gain for best dynamic range. The Panadapter displays a green G and a dotted line showing the current "AGC Gain" setting. This should be set just above the noise floor displayed on the panadapter.

2. the "ATT" or Attenuator dropdown box (lower left, below the "AGC Gain" control, should be set to 0db. Note that some versions of P*SDR have some attenuator settings that may not work as expected.

Changing frequency:

The mouse can be used to tune signals on the Waterfall or Panadapter. Select an active amateur band by clicking on one of the band buttons located just below the "S Meter" in the upper right portion of the P*SDR window.

1. If you press and hold the left mouse button you can "drag" the frequency of interest into the panadapter highlighted filter area.

2. If you right click the mouse on the Panadapter you can go into "click tune" mode. Left clicking with the mouse will then QSY the receiver to that frequency. You can right click again to revert from "click tune" mode to "drag" tuning mode.

3. The "Zoom" slider and the "0.5x, 1x, 2x and 4x" buttons can be used to modify the frequency range displayed in the Panadapter. These controls are located just below the Panadapter/waterfall display. The "Pan" button can be used to move the displayed frequencies within the selected range.

PowerSDR "Dup" button

The PowerSDR "DUP" (DUPLEX) button enables RX1 reception during transmit, allowing the user to view the transmitted RF signal in the Panadapter. The ANAN-* transceivers switch the selected antenna (ANT1, ANT2, or ANT3) to ground during transmit, thereby protecting the receiver from damage due to high RF levels. Monitoring of the RF transmission using the "DUP" feature is only possible in Pandapter and Panafall modes.

PowerSDR "CTUN" button

The PowerSDR "CTUN" button enables "Click Tuning" while using the panadapter and waterfall displays. "Click tuning" when active, allows you to click within the pandapter or waterfall to QSY without shifting the Panadapter or Waterfall display. When "CTUN" is inactive, clicking on the Panadapter re-centers the panapadapter, thereby shifting the entire panadapter. Note that the "CTUN" function only works within a frequency range equal to the sample rate. IOW, if the selected sample rate is 384khz and RX1 panadapter is 1 mhz, wide, CTUN will only function within the center 384khz of the panadapter or waterfall display.

Attaching a PC microphone

TIP — SLEEVE — RING
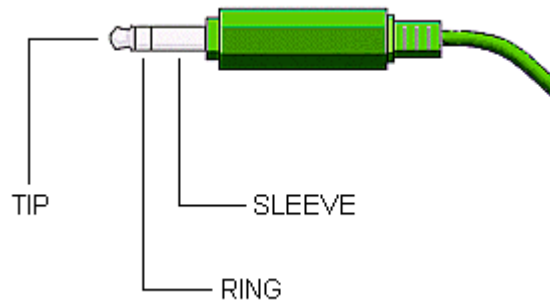
Updated 10/31/12

Hermes / ANAN-100/D+ SDR's have a 1/8" or 3.5mm stereo jack for microphone input. The following instructions outline methods for interfacing PC microphones to Hermes / ANAN-100/D. Garden variety PC microphones can give surprisingly good results when used with the P*SDR or external mic equalizers. Since I don't have a Hermes / ANAN-100/D+ I am unable to test these instructions with a working radio. Use at your own risk.

These instructions assume the user has properly installed and configured a P*SDR version compatible with Hermes and installed the appropriate Hermes firmware for this version.

WARNING:
The FPGA and other components on the Hermes PCB can be damaged by Electrostatic Discharge (ESD). When handling the PCB, you should take ESD precautions (i.e.
use a work bench with an antistatic mat on it and wear a grounded wrist strap).

WARNING:
Remove DC power before opening housing to change jumpers. Failure to remove DC power could result in damage to circuit boards.

Adapting typical (NON-USB) PC microphone for use with Hermes / ANAN-100/D+:

1. Obtain PC type microphone equipped with 1/8" or 3.5mm mono plug.

    NOTE: USB terminated microphones will not work with these instructions.

2. Obtain Radio Shack RS 274-375 dual 1/8" or 3.5mm mono jack to 1/8" or 3.5mm stereo plug adapter or equivalent.

    NOTE: Do NOT use a 1/8" stereo Y adapter!

3. Remove DC power from Hermes / ANAN-100/D+.
4. Ensure that Hermes Jumpers JP4, JP5, and JP6 are set for intended use.
    Open Hermes / ANAN-100/D+ housing using a grounded wrist strap and an anti-static mat. Locate the following jumpers and change as needed:
    JP4, Mic audio on Tip, jumper pins JP4-2 and JP4-3 (Hermes Default).
    JP5, Electret mic, Do not install jumpers (Hermes Default).
    JP6, No PTT, Do not install jumpers (Hermes Default).
     or, Alternately,
    JP6, Separate PTT switch connected between stereo plug Ring

and ground, install jumpers between pins JP6-1 and JP6-2.
Close Hermes / ANAN-100/D+ housing.

Refer to
http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation/Hermes_User_Manual_V1.9.pdf
to set jumpers for other intended uses.

5. Connect radio to dummy load or suitable antenna.
Power up radio.
6. Plug PC mic into one side of RS 274-375.
Left and right, or tip and ring are not marked on RS adapter.
7. If radio keys up or no mic audio is seen with mic plugged
in,move PC Mic to other mono jack on adapter.
8. Adjust modulation level as needed using P*SDR equalizer or
equivalent.
Note: P*SDR keyboard commands could be used to key
Hermes / ANAN-100/D+ and to adjust modulation.
P*SDR must have Windows focus or these
commands will not work.

Toggle MOX (PTT) or space bar   CTRL + M

Mic gain increase   ALT + up arrow
Mic gain decrease   ALT + down arrow

VOX Threshold increase   ALT + right arrow
VOX Threshold decrease   ALT + Left arrow

Adding a Hand or foot operated Push-To-Talk switch for use with a PC
microphone:

Standalone Push-To-Talk (PTT) switches are available from a
number of Vendors and suppliers. Several hand and foot
operated switches are available. Most can be supplied with
1/4" male plugs.

Some PTT Switch suppliers:

http://www.pttpro.com/
http://heilsound.com/amateur/products/index.php
http://www.mfjenterprises.com/Product.php?productid=MFJ-1709

1. Obtain either a hand held, or foot operated Push To Talk
Switch. Typical PTT switches come with 1/4" mono plugs,
or RCA plugs. The following assumes the PTT switch is
equipped with a 1/4" mono plug.
2. Obtain RS274-047 1/4" mono female to 1/8" Mono Male adapter.
Plug the 1/4" PTT plug into the RS 274-047 adapter and then
plug 1/8" plug into RS 274-375 mono to stereo adapter used
for the PC microphone as outlined above for PC microphones.
3. Remove DC power from Hermes / ANAN-100/D+.
4. Open Hermes / ANAN-100/D+ housing using grounded wrist
strap and an anti-static mat. Locate jumper JP6.
5. Install jumpers between JP6-1 and JP6-2 to enable PTT on
the stereo plug Ring. Close Hermes / ANAN-100/D housing.
6. Connect radio to dummy load or suitable antenna. Power
up radio.
7. Plug adapter into Hermes / ANAN-100/D+ Stereo mic plug.
8. Plug PTT switch into one side of RS 274-375.

Left and right, or tip and ring are not marked on
RS adapter.
9. If radio keys up with mic plugged in, exchange PC Mic and
PTT plugs in adapter.
Note that JP6 has no jumpers by default, thereby disabling PTT.

Modular Microphone connections

Updated 09/07/2012

Hermes / ANAN-100/D+ SDR's have a 1/8" or 3.5mm stereo jack for microphone input and PTT. The following instructions outline methods for interfacing common 8 Pin Modular microphones available from Kenwood, Yaesu and others to Hermes / ANAN-100/D+. Since I don't have a Hermes / ANAN-100/D+ I am unable to test these instructions with a working radio. Use at your own risk.

These instructions assume the user has properly installed and configured a P*SDR version compatible with Hermes and installed the appropriate Hermes firmware for this version.

WARNING:
The FPGA and other components on the Hermes PCB can be damaged by Electrostatic Discharge (ESD). When handling the PCB, you should take ESD precautions (i.e.. use a work bench with an antistatic mat on it and wear a grounded wrist strap).

WARNING:
Remove DC power before opening housing to change jumpers. Failure to remove DC power could result in damage to circuit boards.

Adapting some existing 8 pin modular Ham Microphones to Hermes 1/8" or 3.5mm stereo plugs without using a soldering iron:

CalRad adapters:
CalRad (http://www.calradstore.com/72-173.html) makes several modular (RJ-45 or 8 pin Modular) to 8 pin terminal block adapters which can be used to easily interface modular microphones to a 3.5mm / 1/8" stereo plug required by Hermes / ANAN-100/D+ Cal Rad adapters are also available at http://www.markertek.com/Connectors-Adapters/Data-Connectors-Adapters/RJ45-Adapters/Calrad-Electronics/72-173.xhtml The Calrad 72-173 CAT5/CAT6 solderless R-45 Female to Terminal block provides a very simple way to interface a Stereo jack to a RJ45 modular connector.

The CalRad 72-173 has a terminal block with 8 screw terminals on one end and a female 8 pin modular or RJ45 jack on the other end. It is just a matter of connecting 3.5mm / 1/8" stereo plug wires to the Calrad adapter using a small screw driver. No soldering required.

A very good source of information for microphone pin-outs is http://homepage.ntlworld.com/rg4wpw/date.html . This site was used in the following modular microphone adaption schemes.

WARNING: The CalRad adapters numbering scheme is the reverse from
http://homepage.ntlworld.com/rg4wpw/date.html pin-outs for Yaesu and Kenwood radios.

The following pin assignments use the CalRad pin numbering scheme, not the mic numbering scheme.

Example adaptation:
Adapting a Yaesu MH-31A8J (FT-817) microphone for use with Hermes 1/8" / 3.5mm jack:

1. Obtain a Yaesu MH-31A8J 8 pin modular microphone. Used by Yaesu FT-817 and others.

2. Obtain a 1/8" / 3.5mm stereo plug with attached shield, and 2 stranded wires, neoprene covered, typical. RS 4202497 or equivalent. Tin wire ends before use.

3. Obtain CalRad 72-173 adapter or equivalent.

4. See http://homepage.ntlworld.com/rg4wpw/date.html for details on the pinout of MH-31A8J microphone.

Note that the CalRad numbering scheme is different than the numbering on the above web page.

5. Using an ohm meter on the stereo plug wires, identify which wire colors correspond to the stereo plug tip and stereo plug ring.

6. Connect the Stereo Plug Tip wire to CalRad pin 5 (Mic Audio).

7. Connect the Stereo Plug Ring to CalRad pin 6 (PTT).

Microphone Connector Database
http://www.qsl.net/g4wpw/date.html
 1.
8. Connect the Stereo Plug shield to Cal Rad pin 7.

The Hermes Jumpers JP4, JP5, and JP6 must now be configured to accept the Yaesu MH-31A8J mic as wired above.

1. Remove DC power from Hermes ANAN-100/D+.

2. Open Hermes / ANAN-100/D+ housing using a grounded wrist strap and an anti-static mat. Locate the following jumpers and change as needed:

3. JP4, Mic audio on Tip, jumper pins JP4-2 and JP4-3 (Hermes Default).

4. JP5, Electret mic, Do not install jumpers (Hermes Default).

5. JP6, install jumpers between pins JP6-1 and JP6-2 placing PTT on ring.

6. Close Hermes / ANAN-100/D+ housing.

Refer to http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation/Hermes_User_Manual_V1.6.pdf to set jumpers for other intended uses.

Note: The CalRad 72-RJ45-T CAT6 Solderless RJ45 to terminal block pigtail is similar but requires the addition of a double female RJ45 adapter. The terminal block end has a rather nice shroud and tie down facility for attaching your stereo plug cable.

WARNING: The CalRad adapters numbering scheme is the reverse from http://homepage.ntlworld.com/rg4wpw/date.html pin-outs for Yaesu and Kenwood radios.

The following pin assignments use the CalRad pin numbering scheme, not the mic numbering scheme
See http://www.calradstore.com/72-172.html for details.
Microphone Pin-outs for use with CalRad 72-173, 72-172 or similar Adapters and the Hermes / ANAN-100/D+
1/8" or 3.5mm stereo plug:

http://homepage.ntlworld.com/rg4wpw/date.html has a large number of pin out drawings and related info. Use
at your own risk. The following info was derived from this page.

The Hermes Jumpers JP4, JP5, and JP6 must be configured to accept the desired microphones:

1. Remove DC power from Hermes ANAN-100/D+.

2. Open Hermes / ANAN-100/D+ housing using a grounded wrist strap and an anti-static mat. Locate the
following jumpers and change as needed:

3. JP4, Mic audio on Tip, jumper pins JP4-2 and JP4-3 (Hermes Default).

4. JP5, Electret mic, Do not install jumpers (Hermes Default).

5. JP6, install jumpers between pins JP6-1 and JP6-2 placing PTT on ring

6. Close Hermes / ANAN-100/D+ housing.
Refer to http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation/Hermes_User_Manual_V1.5.pdf to
set jumpers for other intended uses.

WARNING: The CalRad adapters numbering scheme is the reverse from
http://homepage.ntlworld.com/rg4wpw/date.html

The following pin assignments use the CalRad pin numbering scheme, not the mic numbering scheme.

USE AT YOUR OWN RISK!

Kenwood Modular RJ45 TS480, TM-710, TM 710A and other Stereo CalRad terminal block.
Plug
Shield : Pin 6 Ground
Ring : Pin 5 PTT See Hermes JP6
note! Pin 4 Mic ground, no connection.
Tip : Pin 3 Mic audio

Yaesu Modular RJ45 FT2500M?, FT2400H? 8 pin modular MH-26G8J, MH 27G8J

Stereo CalRad terminal block.
Plug
Ring : Pin 6 PTT See Hermes JP6 note!
Tip : Pin 5 Mic
Shield : Pin 4 Ground

FT-817, 857, 897, 900, 450

Stereo Calrad terminal block
plug
Shield : Pin 7 Ground
Ring : Pin 6 PTT See Hermes JP6 note!
Tip : Pin 5 Mic
: Pin 4 Mic Ground

ICOM Modular (NOTE HERMES JUMPER SETTINGS MUST BE CHANGED FROM DEFAULTS!)
(Connections not verified, use at your own risk!)

IC-703 706MK1, 706MK2, 706Mk3, 2000, 2000h
ICE-208, 2100H, 2725E, 2820, 7000,2800

Stereo Calrad terminal block.
plug
Ring : Pin 4 PTT See Hermes JP6 note!
: Pin 5 Mic Ground
Tip : Pin 6 Mic Hermes JP5 jumper between
pins 2 and 3 for ICOM mics. Remove JP4?
Shield : Pin 7 Ground

MFJ has a Universal Microphone Convertor to convert from
8 Pin Round to modular :
See http://www.mfjenterprises.com/Product.php?productid=MFJ-1251

HTH,
Author Bill Diaz KC9XG
===

ANAN-100/D Rear Panel connections

Author William Diaz KC9XG

ANAN-100/D Antenna connections as shown on 100W_Rev15A.pdf and as built on the back panel.
100W_Rev15A.pdf connector labels differ considerably from the ANAN-100/D back panel labels.
100W_Rev15A.pdf shows 2 separate RX2 in connectors, but they are, in fact, different as indicated by the underline.

Schematic October 12, 2012	ANAN-100/D back panel	Hermes board	Angelia board	PA FILTER BOARD
Rx_Master_In (LPF)	NC, Internal only	NC		
To_RX (HPF)	NC	RX1_In	RX1_In	J13
TX IN		TX Out	TX Out	J2
3.5mm audio Balanced Speaker Output	1/8" 3.5mm stereo jack	J16-14 and J16-15	J16-14 and J16-15	
PTT-IN	Accessory port DB25-13	J16-1	J16-1	
PTT-OUT	Accessory port DB25-1 RCA Jack on back panel	J16-25	J16-25	
XVTR-TX		TX-in		J3 (ØdBm)

Schematic October 12, 2012	ANAN-100/D back panel	Hermes board	Angelia board	PA FILTER BOARD
RX2 IN (No underline)	RX2 (BNC)	NC	RX2 IN	J10
ANT1, ANT2, ANT3	ANT1, ANT2, ANT3 (BNC)			J4, J5, J6
Rx_Bypass_Out	Bypass (BNC)			J18
Rx2_In	EXT1 (BNC)			J15
XVTR Rx In	XVTR RX (BNC)			J14
Rx3_In	EXT2 (BNC)			J16

SEE NOTES BELOW:
Default RX1 Receive Signal path from ANT(n) is ANT(n), LPF, HPF, Hermes/Angelia receiver 1.
Default Transmit signal path from Hermes/Angelia TX-Out is Tx IN, HF TX, LPF, Ant(n).
One connector must be selected from ANT1, ANT2, or ANT3. Default is ANT1
Only one connector can be selected from Ext1, Ext2, or XVrtr RX. Default is none active.

RX_Bypass_Out is optionally used with an external filter or pre-amp connected between Bypass and selected

EXT1, EXT2 or XVTR RX. The receive signal path is then Ant(n), LPF, Bypass, external filter or pre-amp, Ext(n) or Xvrt RX, HPF, To_RX, then to Hermes/Angelia RX1_in.

EXT1, EXT2, or XVTR RX can be used with an external receive antenna, but TX/RX switching/attenuation must be provided to protect the receiver from excessive receive levels which could damage the receiver.

Troubleshooting section:

OpenHPSDR P*SDR is generally a stable application designed specifically for use with Hermes, Angelia and ANAN-* radios. However, when P*SDR or your SDR does not function as expected, it can often be traced to a corrupt database.xml file. The following steps can be used to resolve issues with corrupted or incompatible database.xml files:

Resetting Database.xml:
1. Click on "Setup" menu selection.
2. Click on the "Reset Database" button at lower left.
3. P*SDR will shut down and you must restart it manually.
4. Power Cycle the ANAN-100/D before restarting P*SDR.
5. Follow the prompts to start reconfiguration of P*SDR for your radio.
6. Manually modify settings to your preferred configuration.
7. On the Setup form, click on the "Export Database" to save the new settings to disk for later recall.

If resetting Database.xml did not resolve your issues:
1. Shut down P*SDR.
2. Use windows explorer to navigate to your current P*SDR folder.
3. P*SDR mRX should be located at
   C:\Users\Bill\AppData\Roaming\FlexRadio Systems\P*SDR mRX.
4. Delete database.xml by selected the file and press the delete button your keyboard.
   A. Alternately, rename the file instead of deleting.
5. Power Cycle the ANAN-100/D before restarting P*SDR.
6. Restart P*SDR.
7. Follow the prompts to start reconfiguration of P*SDR for your radio.
8. Manually modify settings to your preferred configuration.
9. On the Setup form, click on the "Export Database" to save the new settings to disk for later recall.

Upgrading P*SDR.
1. When notified of a P*SDR update, please Export your Database before performing the
   upgrade installation.
2. Shut down P*SDR before installing the upgrade.
3. Follow the prompts and wait for P*SDR to finish the install.
4. Start the new P*SDR version.
5. You can attempt to import a previously exported database.xml file to recall your settings.
   A. File should be named something like
       P*SDR_Database_export_4_12_2013_7.46 AM.xml or similar.
   B. The file name should contain the date time the database file was exported.
6. Click Setup menu selection.
7. Press the "Import Database" button to import a previously exported database.
8. If this does not resolve your issues, you may have to manually enter a   new configuration.

Troubleshooting symptom ANAN-100/D receiver deafness:

Improper/unintended settings:
1. Your ANAN-100/D receive signal path is routed to the bypass connector when EXT1, EXT2, or
   XVTR is selected on the Setup, Ant/Filters tab.
2. A pre-amp, or filter must be connected between the bypass connector and   the selected EXT1,
EXT2   or XVTR RX rear panel BNC connector.
3. Alternately, an antenna must be connected to the select EXT1, EXT2, or XVTR IN BNC connector on
       the rear panel.
   a. Suitable external T/R switching must be supplied by the user to protect the receiver during
           transmit.
4. Attenuator active.
5. Wrong antenna selected.

Troubleshooting symptom, no transmit audio.
1. Mic is disabled by default when VAC1 is enabled.
    A. Setup, audio tab has check boxes for enabling PTT etc, while VAC is active.
    B. Alternately, disable VAC when transmitting with the mic.

Trouble shooting Power Output.
1. Ensure Driver level is set to a non-zero value.
2. If the "TUNE" button has insufficient output to activate auto-tuners"
    A. Menu selection, "Setup", "Transmit" tab, increase "Tune" "Power (W)" value.
3. If external autotuner seems to give erratic results, try unchecking "Enable Protection" on "Setup", "Ant/Filters" tab.

Apache Labs International Support

Technical support for ANAN-100/D from the factory is available via the Apache Labs Yahoo Group
http://groups.yahoo.com/group/apache-labs/

or directly via email **<support@apache-labs.com>**

Apache-Labs-Support U.S.A.

Apache Labs is pleased to offer telephone support. In the United States you may contact the Telephone Customer Support Technician in five ways:

(1) Skype ID "**Apache-Labs**" (with voice mail)

(2) Illinois direct phone number 1+630-445-1194 (with voice mail)

(3) **http://groups.yahoo.com/group/apache-labs/**

(4) or directly via email **<support@apache-labs.com>**

Instructions relating to joining the OpenHPSDR Group reflector are here:
http://lists.openhpsdr.org/listinfo.cgi/hpsdr-openhpsdr.org

The OpenHPSDR archives may also be searched here:
http://lists.openhpsdr.org/mmsearch.cgi/hpsdr-openhpsdr.org

The latest version of the OpenHPSDR User Manual can be obtained from
http://openhpsdr.org/documents.php   Revision 1.7 Author Phil Harman VK6APH

Apache-labs Schematic
The current Apache ANAN-100/D schematic can be downloaded from:
https://apache-labs.com/al-downloads/1002/Hermes-Design-Files.html

The current TAPR/OpenHPSDR Hermes Schematic seems to be here:
http://openhpsdr.org/support/Hermes/

Please refer to this webpage for the most recent documentation by Phil Harman VK6APH for the OpenHPSDR version of the Hermes
http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation

also put this in your bookmarks as an excellent resource site:
http://openhpsdr.org/wiki/index.php?title=HPSDRwiki:Community_Portal

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APPENDIX - A – Computer performance

Computer Performance

Processing of streaming data in real-time can be a challenging task for Windows-based applications and device drivers. This is because by design Windows is not a real-time operating system. There is no guarantee that tasks can be executed in a deterministic (timely) manner.

Audio or video data streams transferred from or to an external device are typically handled by a kernel-mode device driver. Data processing in such device drivers is interrupt-driven.

Typically, the external hardware periodically issues interrupts to request the driver to transfer the next block of data. In Windows NT-based systems (Windows 2000 and later) there is a specific interrupt handling mechanism. When a device driver cannot process data immediately in its interrupt routine, it schedules a Deferred Procedure Call (DPC). Microsoft defines them as: A Deferred Procedure Call (DPC) is a queued call to a kernel mode function that will usually be executed at a later time. DPCs are used by drivers to schedule I/O operations that do not have to take place in an ISR at a high IRQL, and can instead be safely postponed until the processor IRQL has been lowered. When you look at Windows Task Manager and sort the running processes by CPU (Processor Utilization), the System Idle Process is almost always at the top of the list. What you may not know is that 'process' is really a roll-up of several things. Among other things included in that CPU number, is hardware interrupts and DPCs. You can see these two items by using the Microsoft "SysInternals" Process Explorer available here: Process Explorer

The sycon's DPC Latency Checker is a free Windows tool that analyzes the capabilities of a computer system to handle real-time data streams properly. It may help you to determine if your personal computer is capable of powering your HPSDR system or to find the cause for interruptions in real-time audio and video streams, also known as 'drop-outs'. The program supports Windows 2000, Windows XP, Windows XP x64, Windows Server 2003, Windows Server 2003 x64, Windows Vista, Windows Vista x64, Windows 7 32 bit and 64 bit and is available here. Latency checker found by N9VV
http://www.resplendence.com/latencymon
and
http://www.thesycon.de/deu/latency_check.shtml

APPENDIX - B – Warranty

WARRANTY:

We warrant that our products are free of defects in material and workmanship and extend this warranty under intended use and normal service conditions to the original owner for a period of one year from the date of purchase. This warranty does not apply to any product that has been repaired (Unauthorized) or altered in any manner and is void if damaged by accident, neglect, unreasonable use, improper installation, lack of proper impedance matching (High SWR), improper tuning, over driving power limits, damage due to use of any third party accessories, or any other cause not arising specifically out of defects in material or workmanship.

Our obligations are limited to repairing or replacing, at our sole discretion, any product or part that is returned to the mailing address, all shipping or transportation charges must be pre-paid, accompanied by proof of purchase and which examination reveals to have been defective within the warranty period stated above.

Our Warranty does not imply any obligation other than herein stated. Any implied warranties, including but not limited to fitness for a particular purpose, are limited in duration for the above one year period.

We shall not be liable under this warranty, or any implied warranty, for loss of use of the product or for any other consequential loss or damage incurred by the purchaser.

Warranty -- Apache Labs website has a link to explain their warranty and other pertinent information: http://www.apache-labs.com/terms-of-use.html under "Terms of Use".

IMPORTANT

The FPGA and other components on the ANAN-100/D PCBs can be damaged by Electrostatic Discharge (ESD). When handling the PCB, you should take ESD precautions (e.g. use a work bench with an antistatic mat on it and wear a grounded wrist strap).

When powered on do not touch the top of any IC in order to determine its temperature. In particular, do not touch the Switch Mode Regulator IC. Touching its leads can change the switching frequency and alter the output voltage.

APPENDIX - C – OpenHPSDR Software

OpenHPSDR P*SDR(tm) modifications
W5WC source code: click here
http://svn.tapr.org/repos_sdr_hpsdr/trunk/W5WC

KD5TFD source code: click here
http://svn.tapr.org/repos_sdr_windows/P*SDR/branches/kd5tfd

W5WC skins with installer here
http://svn.tapr.org/repos_sdr_hpsdr/trunk/W5WC/OpenHPSDR_Skins/

A BIG thank you to Joe, K5SO and Doug, W5WC for adding support for the **100W PA** and other refinements to the code!

K.I.S.S_Konsole from OpenHPSDR team

http://svn.tapr.org/repos_hpsdr_kiss/branches/K9TRV/KISSKonsoleUnified

VK6APH has added new VNA capabilities to FPGA and K.I.S.S. codes.

Hermann, DL3HVH, is experimenting with parallel code using CUDA, OpenGL and OpenCL

https://plus.google.com/107168125384405552048/posts

cuSDR32-VS: cuSDR32_MSVS (Compiled with MS VS 2010 requires .Net 4.0)
Code at SVN: http://svn.tapr.org/repos_sdr_hpsdr/trunk/DL3HVH/cuSDR32/

cuSDR64-VS: cuSDR64_MSVS (Compiled with MS VS 2010 requires .Net 4.0)
Code at SVN: http://svn.tapr.org/repos_sdr_hpsdr/trunk/DL3HVH/cuSDR64

ghpsdr3 - QtRadio from John Melton GØORX/N6LYT
and a new branch by Alex Lee

Heterodyne (MAC/OS) by Jeremy McDermond

OpenHPSDR software repository and information
http://openhpsdr.org/download.php

Appendix – D -- VK6APH DDC/DUC Presentation

HIGHLY RECOMMENDED FOR ALL NEW DDC LEARNERS

To learn all about Digital Down Converter technology, **please purchase DVD #6** from (Amateur Radio Video News) in which Phil Harman VK6APH teaches us the practical details from his wonderful presentation at ARRL/TAPR DCC-2008. The DVD consists of 4 hours of high quality education in DDC by Phil Harman. The ARVN webpage says: Software Defined Radio "Through the Looking Glass"
Phil Harman VK6APH leads you on an entertaining, detailed trip through the design of the Mercury SDR receiver. With the A/D converter preceded only by a bandpass filter, Mercury does everything in software, at a price hams can afford. It is the leading edge in ham radio technology.

http://www.arvideonews.com/dcc2008/
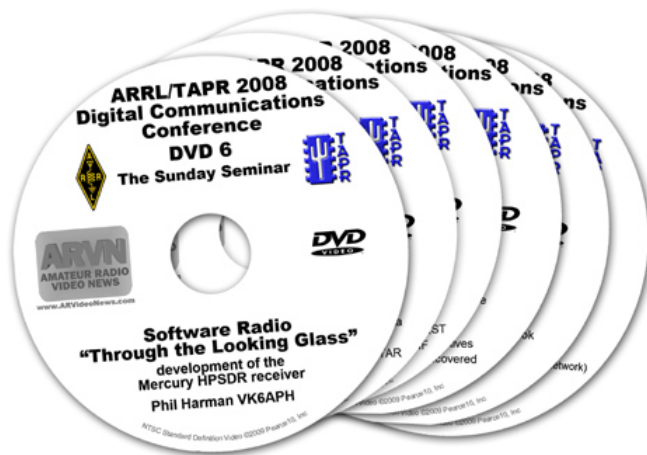
Appendix – E Hermes block diagram (M0KHZ)
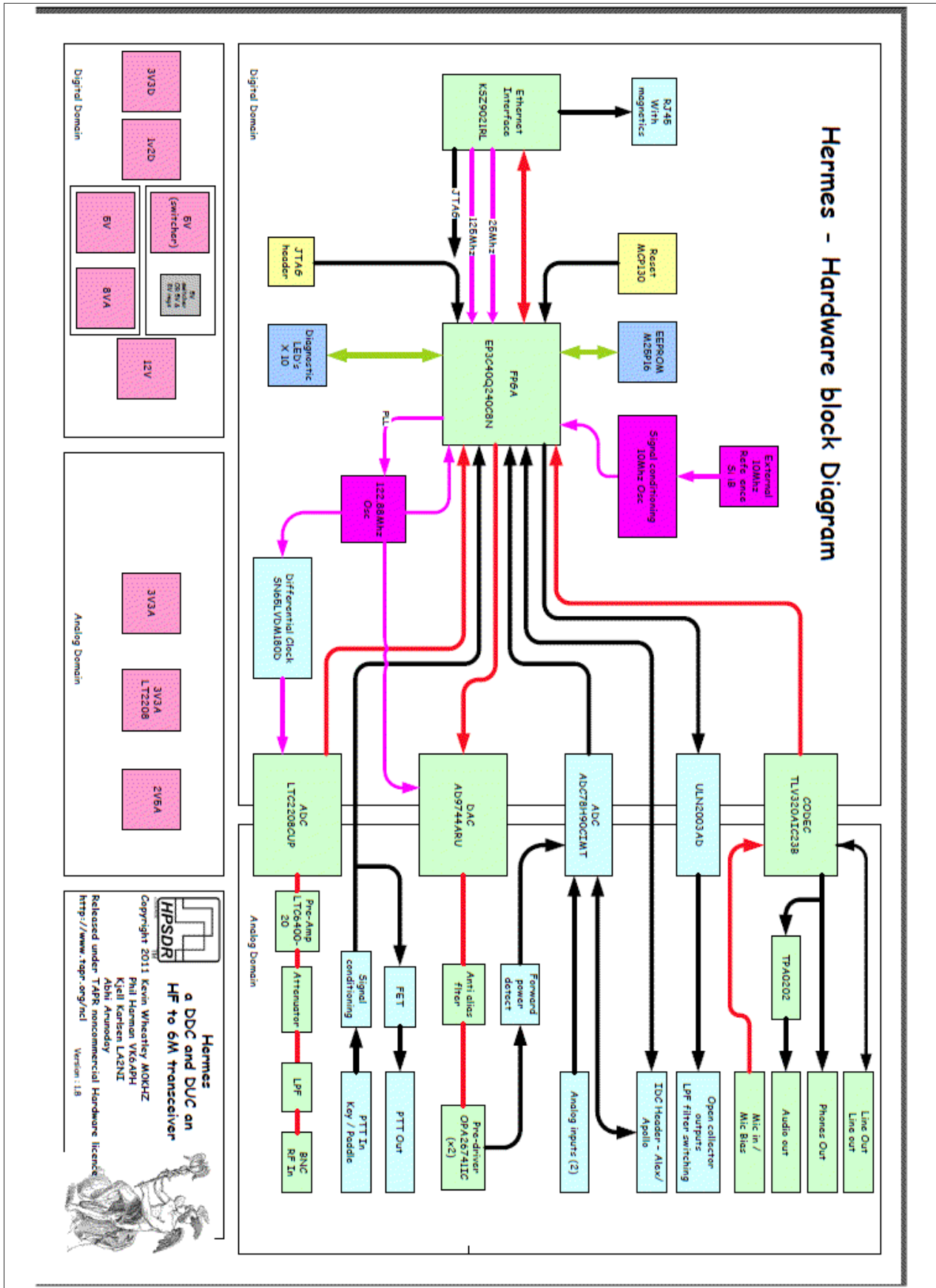
Appendix – F Hermes functional diagram VK6APH

Hermes Architecture
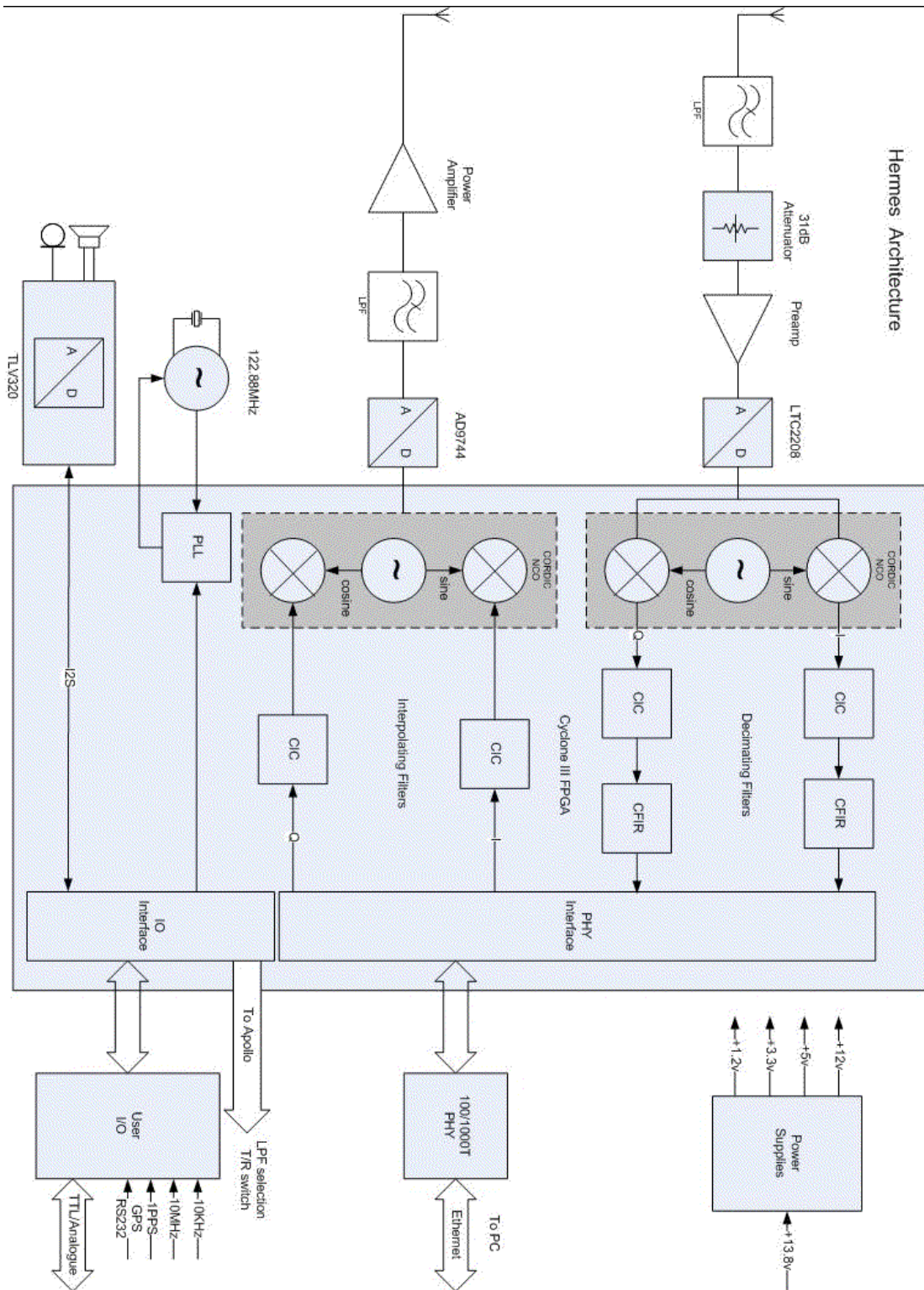
Contributing members to the Hermes project

THANK YOU each for the wonderful gift you have shared with us all

Kevin Wheatley M0KHZ who conceived the Hermes and is the Project Lead

Abhi Arunoday **Managing Director, Apache Labs,** PCB layout, manufacturer

Phil Harman - VK6APH - Software & hardware development, especially the brain wave for maintaining full DAC bits while reducing power.

Bill Tracey - KD5TFD - Component sourcing and kitting

Lyle Johnson - KK7P - significant contributor to hardware development

Scotty Cowling - WA2DFI – Parts procurement

Graham - KE9H - Hermes PA improvements

Doug W5WC for his adaptation of FLEX P*SDR^{TM} to Hermes

Joe K5SO for his many software contributions.

George K9TFD for his installer and other software contributions.

Plus numerous other contributors via the OpenHPSDR reflector.

Apollo, a companion 20W PA, LPF and ATU, was conceived by Kjell Karlsen – LA2NI

Appendix – G   The CORDIC Algorithm

The CORDIC mathematical algorithm used in the Apache-100W Transceiver;

CORDIC - Wikipedia, the free encyclopedia
http://en.wikipedia.org/wiki/CORDIC

CORDIC FAQ
http://www.dspguru.com/dsp/faqs/cordic

CORDIC FAQ-II
http://www.dspguru.com/info/faqs/cordic2.htm

CORDIC for Dummies
http://www.jacques-laporte.org/cordic_for_dummies.htm

The CORDIC Algorithm
http://www.andraka.com/cordic.htm

CORDIC
http://www.nist.gov/dads/HTML/cordic.html

From Hermes VHDL designer Phil Harman VK6APH:

        The CORDIC takes the input samples and multiplies them by the sine and cosine of the phase value we feed to it (i.e. the frequency we want to tune to). The CORDIC is a successive approximation approach to generating the sine and cosine of an angle - since it only uses add and shift logic it was used in the early hand-held calculators. If we use enough bits in the CORDIC then the sine and cosine values it generates are so accurate that we get perfect I & Q signals out in terms of how well the amplitudes are matched and how close to 90 degrees apart they are.
        As I said it is a successive approximation approach so it takes about 20 iterations to get the accuracy we need. In which case there is a delay of 20/122.88MHz from the time the RF appears at its input to the time the I and Q signals appear.
        Because of this delay we use a technique called pipelining - we feed samples into a pipe that is 20 samples long and at the end of the pipe take the result out.
        We decimate and filter at the same time. The CIC is a very simple way to produce a filter (just adds and subtracts) so it is very efficient to implement in the FPGA. But it's frequency response is not ideal so we follow it with a CFIR that compensates for the droop in the CIC passband and cleans up the overall shape.

        The Hermes FPGA Verilog code can be found on the SVN http://openhpsdr.org/download.php

Appendix – H – HPSDRProgrammer

Author 2013 William Diaz KC9XG
Updated 03/07/2013

OpenHpSDR/ Hermes/ANAN-* SDR: Updating firmware and assigning a static IP address.

The OpenHPSDR HPSDRProgrammer_V2 application provided by KV0S can be used to load new firmware and assign or change IP address with properly configured OpenHpSDR Hermes/ANAN-* radios. No jumper changes needed. This assumes initial bootloader code has been installed properly.

Installing OpenHPSDR's K0VS HPSDRProgrammer_V2:

1. Ensure that no applications are currently connected to your Hermes/ANAN-* SDR.

2. Install WinPCap per instructions at http://openhpsdr.org/download.php .
        A. Windows WinPCap available at http://www.winpcap.org
        Note: Win8 users may have to download, then right click downloaded file and select Win7 compatibly mode.
        B. Linux, simply install libpcap from the repository.

3. Download and install HPSDRProgrammer_V2 from http://openhpsdr.org/download.php .
A. Windows version at http://openhpsdr.org/downloads/programs/HPSDRProgrammer_V2.msi
B. Linux, Debian 64 bit at http://openhpsdr.org/downloads/programs/HPSDRProgrammer_V2-debian-64.tgz
C. Linux, Debian 32 bit at http://openhpsdr.org/downloads/programs/HPSDRProgrammer_V2-debian-32.tgz

Using OpenHpSDR HPSDRProgrammer:

1. Run the HPSDRProgrammer application.

2. The HPSDRProgrammer Interface section should now contain the following information:
        A. Computer IP address: x.x.x.x   MAC hh:hh:hh:hh:hh:hh
        Where x indicates numeric values and hh indicates hex values.

3. Connect your OpenHpSDR Hermes/ANAN-* to your LAN or directly to your computer and power up the device.
        A. If you connect your Hermes ANAN-* directly to your PC and an IP address has not been assigned, the unit will be waiting for assignment of a Dynamic IP address, and this process can take up to 20 minutes for APIPA to assign a workable IP address.

        B. If you connect your Hermes/ANAN-* to a LAN router or switch where a DHCP server has been enabled, IP Address assignment should only take a few seconds.

        C. If a static IP address has been previously assigned to your Hermes/ANAN-*, the SDR should be available in a second or so.

4. The Hermes/ANAN-* front Panel LAN connector LED's should indicate if an Ethernet link is available on the left and Ethernet data activity on the right.
        A. If the LED's do not light, check your LAN or PC connection to ensure your Hermes/ANAN-* is connected to your PC or LAN. Ensure your PC TCP/IP capability has been enabled as well.

5. In the OpenHPSDRProgrammer Device section, Press the "Discover" button located at the right center of the HPSDRProgrammer Window.
        A. The "Device" text box should now show something similar to:
                00:04:A3:6A:54:B5 (192.168.1.88) Software version: 2.3 (hermes)

B. If your Hermes/ANAN-* MAC and IP address are not shown as indicated above, your OpenHpSDR Hermes/ANAN-* cannot be found on your network. Please check your Ethernet connections and try again.

Upgrading OpenHPSdr firmware using HPSDRProgrammer:

1. Download new firmware by visiting http://openhpsdr.org/download.php . Find the appropriate .rbf firmware file for your SDR. For example, the current firmware file for Hermes/ANAN-* radios should be listed as Hermes V_2.x.rbf. Download and save the appropriate .rbf for your SDR to a convenient location on your computer, for later recall.

2. Press the "Browse" button in the "Programmer" section of HPSDRProgrammer and locate the *.rbf firmware file you downloaded previously and select it in the browse "Open" dialog and then press the "OK" button.

3. The Hermes_v2.x.rbf or whatever firmware filename you selected previously must now be displayed in the "Programmer", "RBF file" text box.

4. Press the "Program" button to load the .rbf file into your OpenHpSDR Hermes/ANAN-* SDR.

5. HPSDRProgrammer should display the progress of the firmware loading process.

6. Upon successful completion of loading the new firmware, the Device text box should contain the new version number.

Assigning an IP address using HPSDRProgrammer:

1. Click on Menu Selection "Tools", "IP", or simply click on the IP text just below the menu selections.

2. The "Address Dialog window will appear.

3. An IP address can be assigned by placing 8 bit values in each of the 4 text boxes.
        A. 8 bit values are numbers which can range from 0 to 255.
        B. Each of the 4 text boxes must have a valid value entered.
        C. If you do not know what IP address to use, just enter 0's in each box to revert to automatic IP assignment (DHCP).
        D. Press the Write IP button to write the entered IP address to your Hermes/ANAN-*

4. Entering 0's in all 4 text boxes will revert your Hermes/ANAN-* to DHCP or dynamic IP address assignment.

5. After entering a new IP address, close the "Address Dialog" window.

6. Hit the "Discover" button again to verify the IP address you just wrote.

ANAN-100/D block diagram
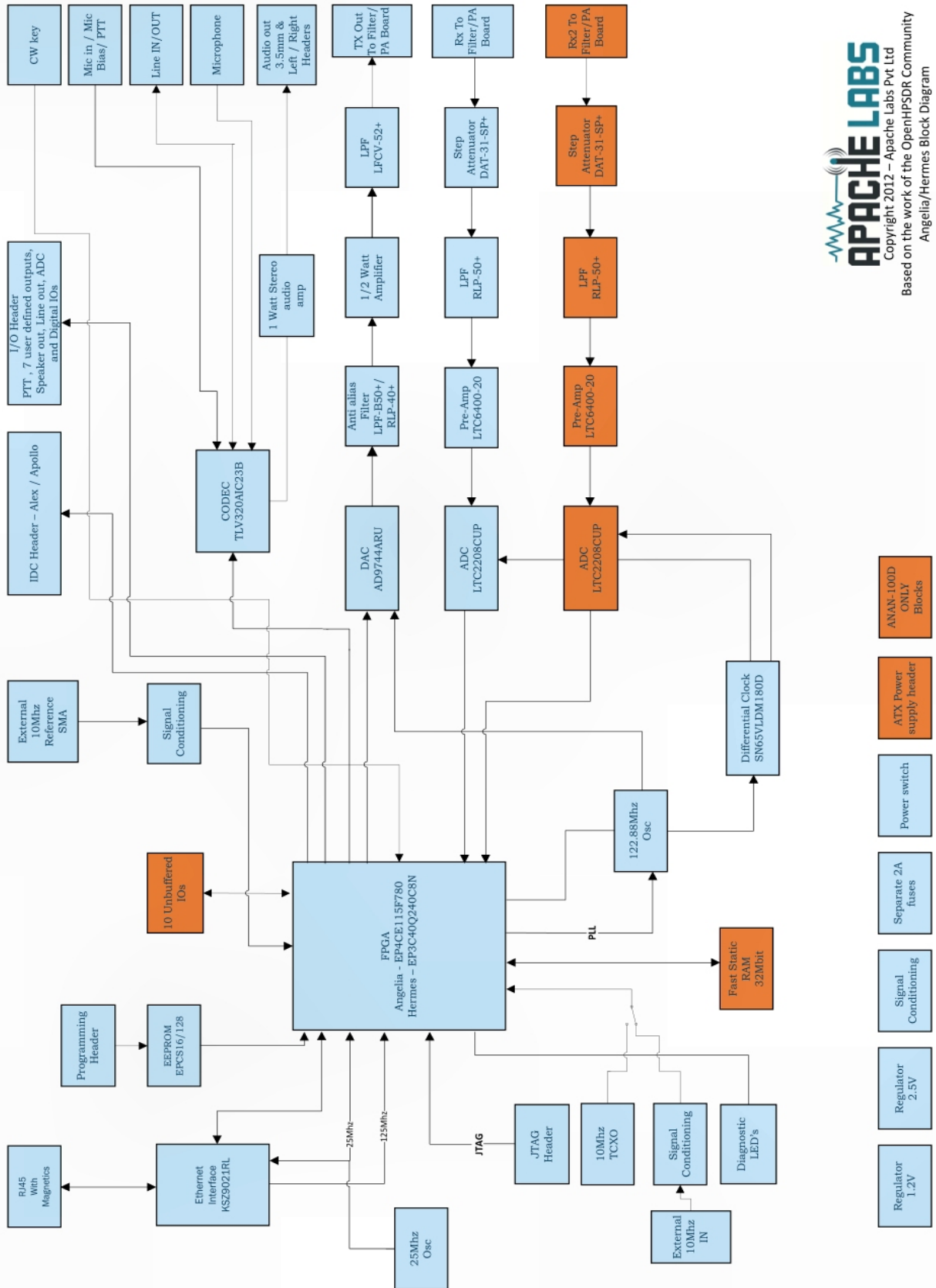
Copyright 2012 – Apache Labs Pvt Ltd
Based on the work of the OpenHPSDR Community
Angelia/Hermes Block Diagram

APACHE LABS

Legend:
- ANAN-100D ONLY Blocks
- ATX Power supply header
- Power switch
- Separate 2A fuses
- Signal Conditioning
- Regulator 2.5V
- Regulator 1.2V

Blocks include:
- CW key
- Mic in / Mic Bias / PTT
- Line IN/OUT
- Microphone
- Audio out 3.5mm & Left / Right Headers
- TX Out To Filter / PA Board
- Rx To Filter/PA Board
- Rx2 To Filter/PA Board
- LPF LFCV-52+
- Step Attenuator DAT-31-SP+
- Step Attenuator DAT-31-SP+
- 1/2 Watt Amplifier
- LPF RLP-50+
- LPF RLP-50+
- Anti alias Filter LPF-B50+ / RLP-40+
- Pre-Amp LTC6400-20
- Pre-Amp LTC6400-20
- I/O Header PTT, 7 user defined outputs, Speaker out, Line out, ADC and Digital IOs
- 1 Watt Stereo audio amp
- CODEC TLV320AIC23B
- DAC AD9744ARU
- ADC LTC2208CUP
- ADC LTC2208CUP
- IDC Header – Alex / Apollo
- Differential Clock SN65VLDM180D
- External 10Mhz Reference SMA
- Signal Conditioning
- 122.88Mhz Osc
- 10 Unbuffered IOs
- FPGA Angelia – EP4CE115F780 Hermes – EP3C40Q240C8N
- Fast Static RAM 32Mbit
- Programming Header
- EEPROM EPCS16/128
- RJ45 With Magnetics
- Ethernet Interface KS29021RL
- 25Mhz Osc
- JTAG Header
- 10Mhz TCXO
- Signal Conditioning
- Diagnostic LED's
- External 10Mhz IN
- PLL
- 25Mhz
- 125Mhz
- JTAG

ANAN-100/D PA and Filters

ANAN-100D PA Filter PCB – installed in cabinet facing down
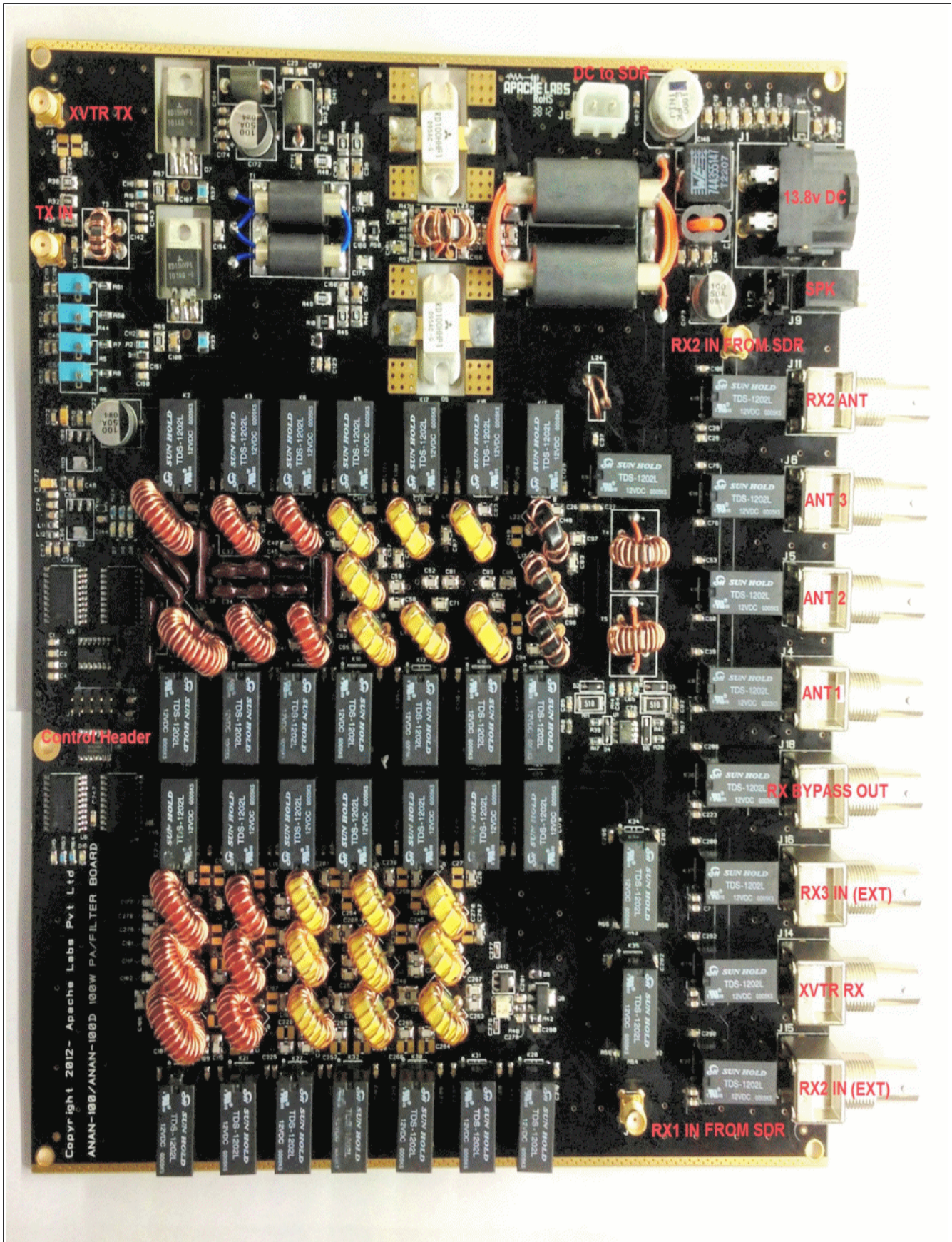
ANAN-100/D Accessory Port (back panel)
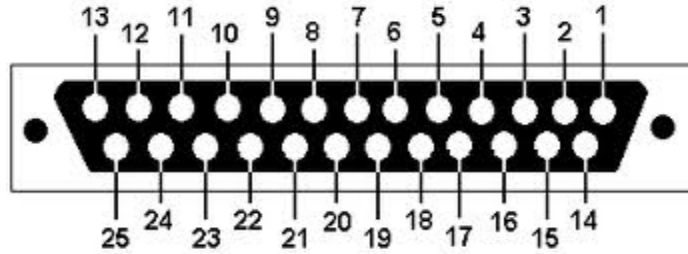
The Hermes/Angelia schematic detail J16 pin numbering does not correspond to keyed IDC ribbon cable numbering conventions. An IDC to DB25 adapter cable further re-arranges the pin numbers.

Pin number Number in parentheses is the J16 pin number shown on the schematic	Apache AN-100/D Aux connector usage
1 (25)	**Open-drain PTT output** (same as rear panel RCA jack)
2 (23)	OC6 User open-collector output 7
3 (21)	OC4 User open-collector output 5
4 (19)	OC2 User open-collector output 3
5 (17)	OC0 User open-collector output 1
6 (15)	Right channel speaker Pair with pin 19 – **see notes below**
7 (13)	User Digital input 4: is connected to 3.3V via 1K pullup resistor
8 (11)	User Analogue input 1: 0-3V max
9 (9)	User Digital input 1: is connected to 3.3V via 1K pullup resistor
10 (7)	Left channel line Out
11 (5)	Right channel phones output
12 (3)	Left channel line-level audio input*
13 (1)	**PTT input, is connected to 3.3V via 1K pullup resistor**
14 (24)	OCREF Open-Collector reference/flyback diodes
15 (22)	OC5 User open-collector output 6
16 (20)	OC3 User open-collector output 4
17 (18)	OC1 User open-collector output 2
18 (16)	User Digital input 2: is connected to 3.3V via 1K pullup resistor
19 (14)	Right channel speaker, pair with pin 6 – **see notes below**
20 (12)	User Analogue input 2: 0-3V max
21 (10)	Analogue Ground
22 (8)	Right channel line Out
23 (6)	Left channel phones output
24 (4)	Right channel line-level audio input
25 (2)	Analogue Ground

The Hermes/Angelia schematic detail J16 pin numbering does not correspond to keyed IDC ribbon cable numbering conventions. An IDC to DB25 adapter cable further re-arranges the pin numbers.

Pin out and connections between 26 pin J16, Modified (shifted) 26 pin IDC ribbon cable and DB 25.

J16	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
IDC	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
DB25	13	25	12	24	11	23	10	22	9	21	8	20	7	19	6	18	5	17	4	16	3	15	2	14	1	

DB25 Acc Port pinout. **Number in parentheses is the J16 pin number shown on the schematic.**

1. Open-drain PTT output (25)

2. OC6 User open-collector output 7 (23)

3. OC4 User open-collector output 5 (21)

4. OC2 User open-collector output 3 (19)

5. OC0 User open-collector output 1 (17)

6. Right channel speaker Pair with pin 19 (15)

7. User Digital input 4: connected to 3.3V via 1K pullup resistor (13)

8. User Analogue input 1: 0-3V max (11)

9. User Digital input 1: Connected to 3.3V via 1K pullup resistor (9)

10. Left channel line Out (7)

11. Right channel phones output(5)

12. Left channel line-level audio input* (3)

13. PTT input, connected to 3.3V via 1K pullup resistor (1)

14. OCREF Open-Collector reference/flyback diodes (24)

15. OC5 User open-collector output 6 (22)

16. OC3 User open-collector output 4 (20)

17. OC1 User open-collector output 2 (18)

18. User Digital input 2: Connected to 3.3V via 1K pullup resistor (16)

19. Right channel speaker, pair with pin 6 (14)

20. User Analogue input 2: 0-3V max (12)

21. Analogue Ground (10)

22. Right channel line Out (8)

23. Left channel phones output (6)

24. Right channel line-level audio input (4)

25. Analogue Ground (2)

*NOTE: Left channel line audio input is the "Line In" source on the Setup, transmit tab. This input can be used instead of the mic jack. Pin 13 is PTT in.
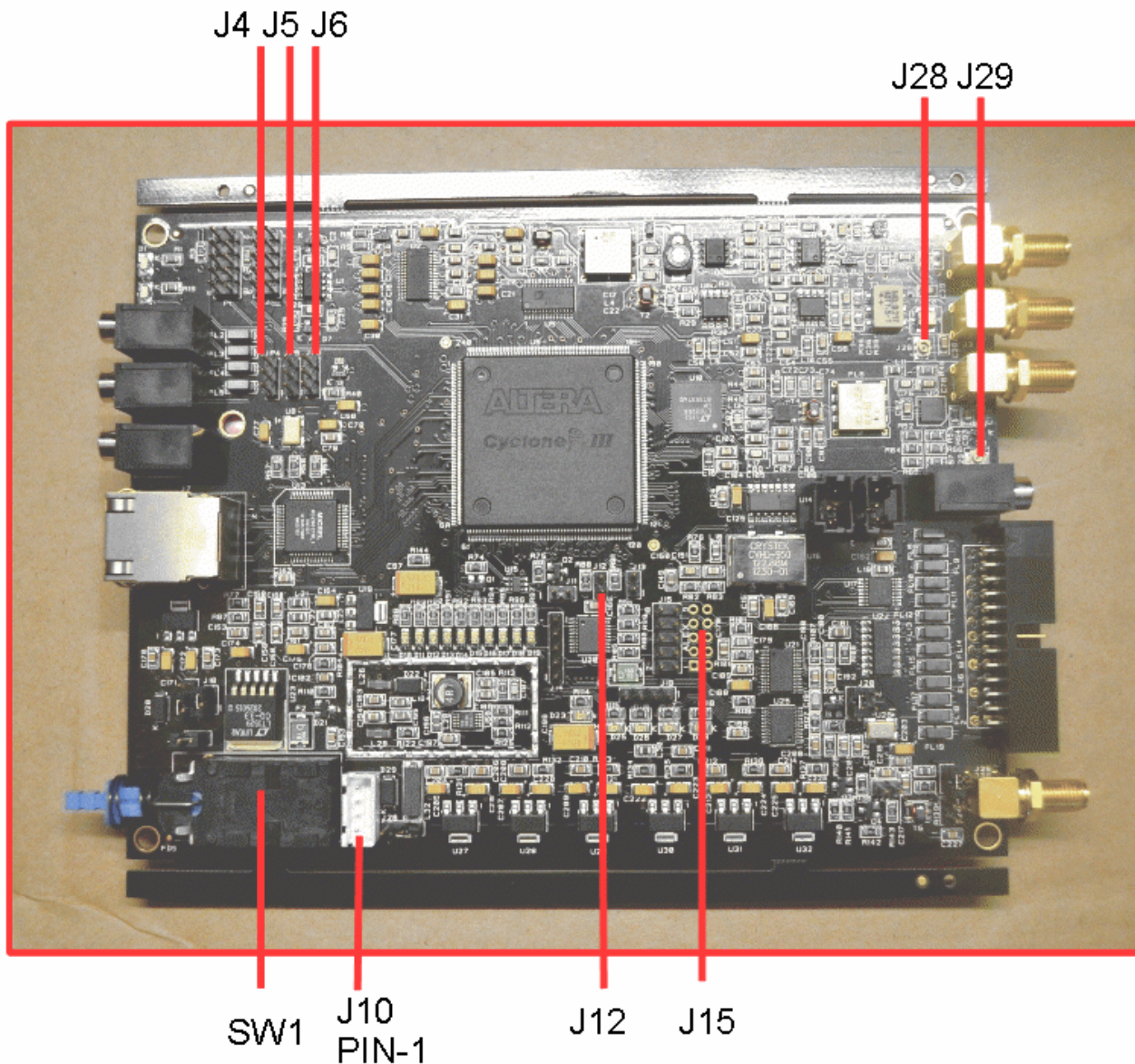
NOTE: The speaker jack contains the Left Channel speaker pair. The Right Channel speaker pair is on pin 6 and Pin 19. These are balanced outputs. Do <u>NOT</u> ground these lines!

The P*SDR Setup, ANAN Ctrl tab numbering scheme for the J16 Receive and transmit pins does not represent the actual pin numbers.

Author William Diaz KC9XG

P*SDR ANAN CTRL Tab as shown	Accessory I/O (female) Port DB25 cable	Hermes/Angelia Schematic J-16
1	5	17 OC0
2	17	18 0C1
3	4	19 OC2
4	16	20 OC3
5	3	21 OC4
6	15	22 OC5
7	2	23 OC6
	14 OC REF	24 OC REF

ANAN-10 Hermes DDC DUC Transceiver PCB

NOTE: Please refer to the excellent Hermes jumper documentation written by Phil Harman VK6APH that can be found on the OpenHPSDR Documentation website:
http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation

10Mhz Oscillator Jumpers

J20: When a jumper is inserted between pins 1 and 3 (the default setting) the internal 10 MHz reference oscillator is selected. When pins 2 and 4 are jumpered, an external 10 MHz reference is selected at J25.

J22: When inserted (the default setting) this jumper terminates an external 10 MHz reference with 50 ohms.

J23: When inserted (the default setting) this jumper enables power to be supplied to the internal 10 MHz TCXO reference oscillator.

J24: When inserted (default) this jumper connects the outer of J25 to the ground of the Hermes board.

Mic Jumpers

JP4: This jumper selects the microphone connection, either tip or ring - see the diagram below. Some microphones come with their element wired between a 3.5 mm jack plug 'tip' and sleeve (ground), whilst on others the element is wired between a 3.5 mm jack plug 'ring' and sleeve (ground). To select the tip, place the jumper on pins 2 and 3 (default); to select the ring, use pins 1 and 2.

JP5: This provides bias if you wish to use an electret microphone. If the microphone is connected between to the 3.5 mm jack plug 'tip' and sleeve (ground), then place a jumper between pins 2 and 3. If the microphone is connected between the 3.5 mm jack plug 'ring' and sleeve (ground), then use pins 1 and 2. If bias is not required then do not fit this jumper (this is the default
setting).

JP6: If your microphone is fitted with a PTT button, then this jumper enables it. If the PTT button is connected between the 3.5 mm jack plug 'tip' and sleeve (ground) then place a jumper between pins 2 and 3. If the PTT is connected between the jack plug 'ring' and sleeve (ground) then place the jumper between between pins 1 and 2. If your microphone is not fitted with a PTT, or you do not wish to use it, then do not fit a jumper to JP6 (this is the default setting).

WARNING: If your microphone plug uses tip and sleeve connections only and you set the PTT jumper to the ring setting, then the PTT will be permanently enabled (i.e. the transmitter will be permanently switched on).

NOTES: Ensure that the jumper on JP6 is NOT connected to the same terminal (tip or ring) that your microphone is connected to. The PTT button should present a voltage-free contact that connects its associated pin to the outer sleeve (ground) of the coaxial microphone cable when pressed. This is the
most common way of wiring a PTT button, but users are advised to check the connections with a multimeter set to the lowest ohms range if unsure of the exact configuration.

An alternative PTT input connection is available via pin 1 of connector J16.

Angelia PCB - "Angelia" ANAN-100D
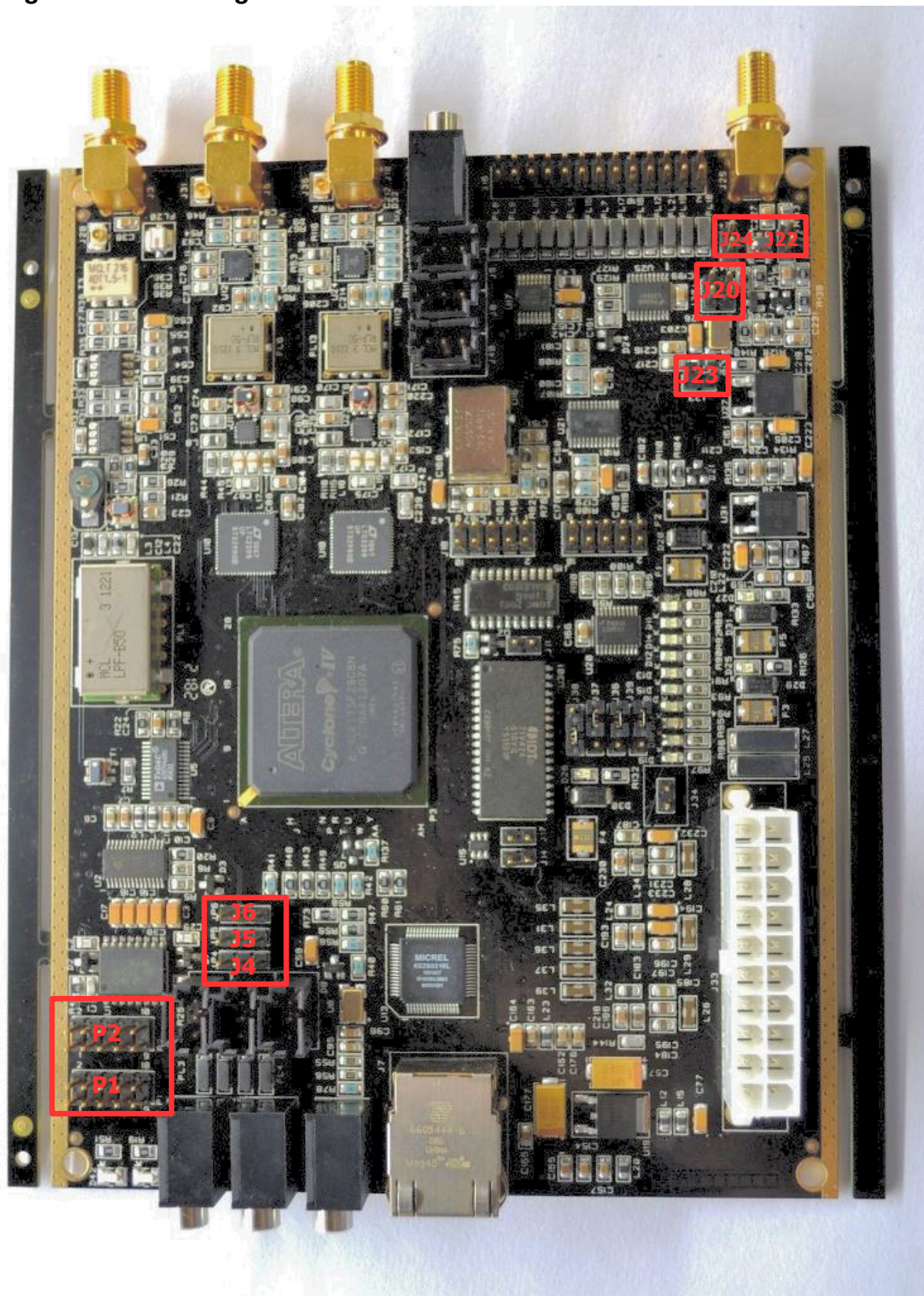
APIPA - Automatic Private IP Addressing

Definition: A feature of Microsoft Windows, **APIPA** is a DHCP failover mechanism for local networks. With APIPA, DHCP clients can obtain IP addresses when DHCP servers are non-functional. APIPA exists in all modern versions of Windows except Windows NT.

When a DHCP server fails, APIPA allocates IP addresses in the private range 169.254.0.1 to 169.254.255.254. Clients verify their address is unique on the network using ARP. When the DHCP server is again able to service requests, clients update their addresses automatically.

In APIPA, all devices use the default network mask 255.255.0.0 and all reside on the same subnet.

APIPA is enabled on all DHCP clients in Windows unless the computer's Registry is modified to disable it. APIPA can be enabled on individual network adapters.

Also Known As**:** Automatic Private IP Addressing; AutoNet
Examples**:**
Because APIPA uses IP addresses in the private Class B space, APIPA is a feature generally only useful on home or other small intranet LANs.

Reference:
http://en.wikipedia.org/wiki/APIPA

Additional reading:

Please refer to this webpage for the most recent documentation by Phil Harman VK6APH for the OpenHPSDR version of the Hermes http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation

http://www.n9vv.com

Software Links:

- http://openhpsdr.org/wiki/index.php?title=HPSDRwiki:Community_Portal

- http://openhpsdr.org/download.php

- http://svn.tapr.org/listing.php?repname=OpenHPSDR+KISS

- http://svn.tapr.org/listing.php?repname=OpenHPSDR+Windows

- http://svn.tapr.org/listing.php?repname=OpenHPSDR+Main

- http://svn.tapr.org/repos_sdr_hpsdr/trunk/

- http://svn.tapr.org/repos_sdr_hpsdr/trunk/W5WC/OpenHPSDR_Skins/

- http://www.w1aex.com/psdr/psdr.html

- Please refer to Phil Harman VK6APH excellent Hermes documentation for the latest information about each of the pin-outs and their restrictions:
http://svn.tapr.org/repos_sdr_hpsdr/trunk/Hermes/Documentation/Hermes_User_Manual_V10.pdf

- Exceptional programmer Warren NV0R publishes explanations of his modifications to PowerSDR/OpenHPSDR:
Warren NRØV http://openhpsdr.org/wiki/images/b/b4/POWERSDR_USER_NOTES.pdf

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