

ANAN SDR Transceivers



History

The ANAN DDC/DUC transceivers are based on the work of the OpenHPSDR community (www.openhpsdr.org)

“HPSDR is an open source (GNU type) hardware and software project intended as a "next generation" Software Defined Radio (SDR) for use by Radio Amateurs ("hams") and Short Wave Listeners (SWLs). It is being designed and developed by a group of SDR enthusiasts with representation from interested experimenters worldwide”

Design Team

- Phil Harman, VK6PH - Hardware Design, FPGA code, KISS Console, VNA
- Doug Wigley, W5WC - OpenHPSDR PowerSDR developer
- Warren C Pratt, NR0V - WDSP DSP Engine, PureSignal (Predistortion Algorithm), OpenHPSDR PowerSDR
- Kjell Karlsen, LA2NI - RF Amplifier and other Hardware
- Abhishek Prakash (Abhi) - Hardware and PCB Design
- Herman Von Hasseln, DL3HVVH - cuSDR
- Kevin Wheatley, M0KHZ - Hermes design conceptualization
- Joe Martin, K5SO - Angelia & Orion FPGA code, Diversity and Radio Astronomy code

ANAN Models

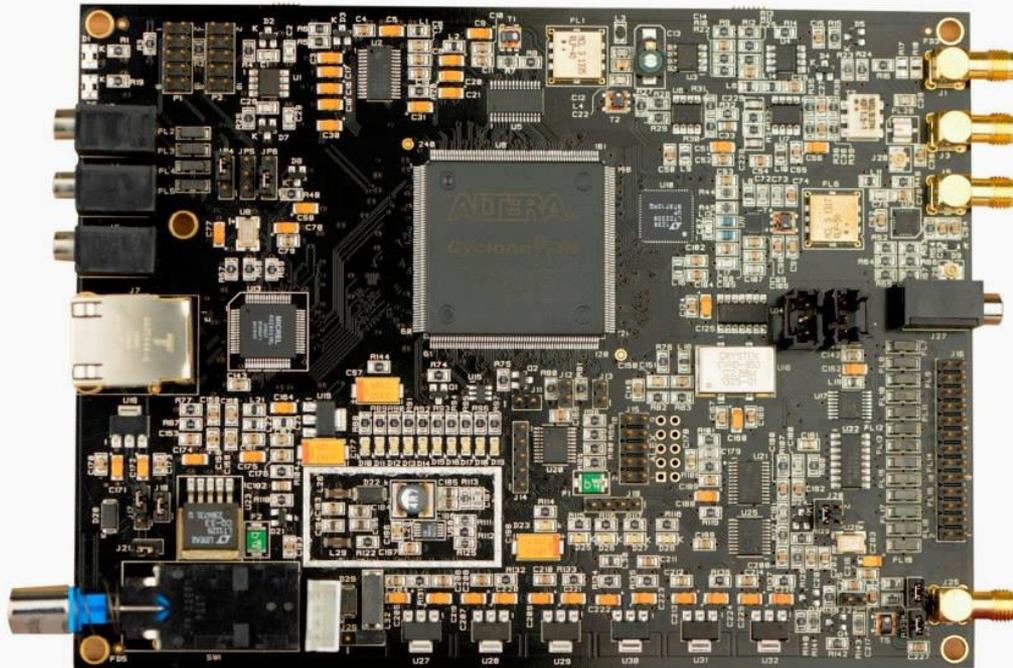
The ANAN series consists of:

- ANAN-10 10W DDC/DUC Transceiver comprising of the OpenHPSDR Hermes and a 10W PA
- ANAN-100 100W DDC/DUC Transceiver comprising of the OpenHPSDR Hermes and a 100W PA with Front end Filtering
- ANAN-100D 100W DDC/DUC Transceiver comprising of the Angelia SDR and a 100W PA with Front end Filtering
- ANAN-200D 100W DDC/DUC Transceiver comprising of the Orion SDR and a 100W PA with Front end Filtering

OpenHPSDR Hermes

The OpenHPSDR Hermes is a single board DDC/DUC full duplex transceiver covering all HF and 6M bands.

Resources: Altera Cyclone III EP3C40 FPGA, LTC2208 16bit ADC, AD9744 14bit DAC, Ethernet Interface



Orion SDR

The Orion SDR is a single board DDC/DUC full duplex transceiver covering all HF and 6M bands.

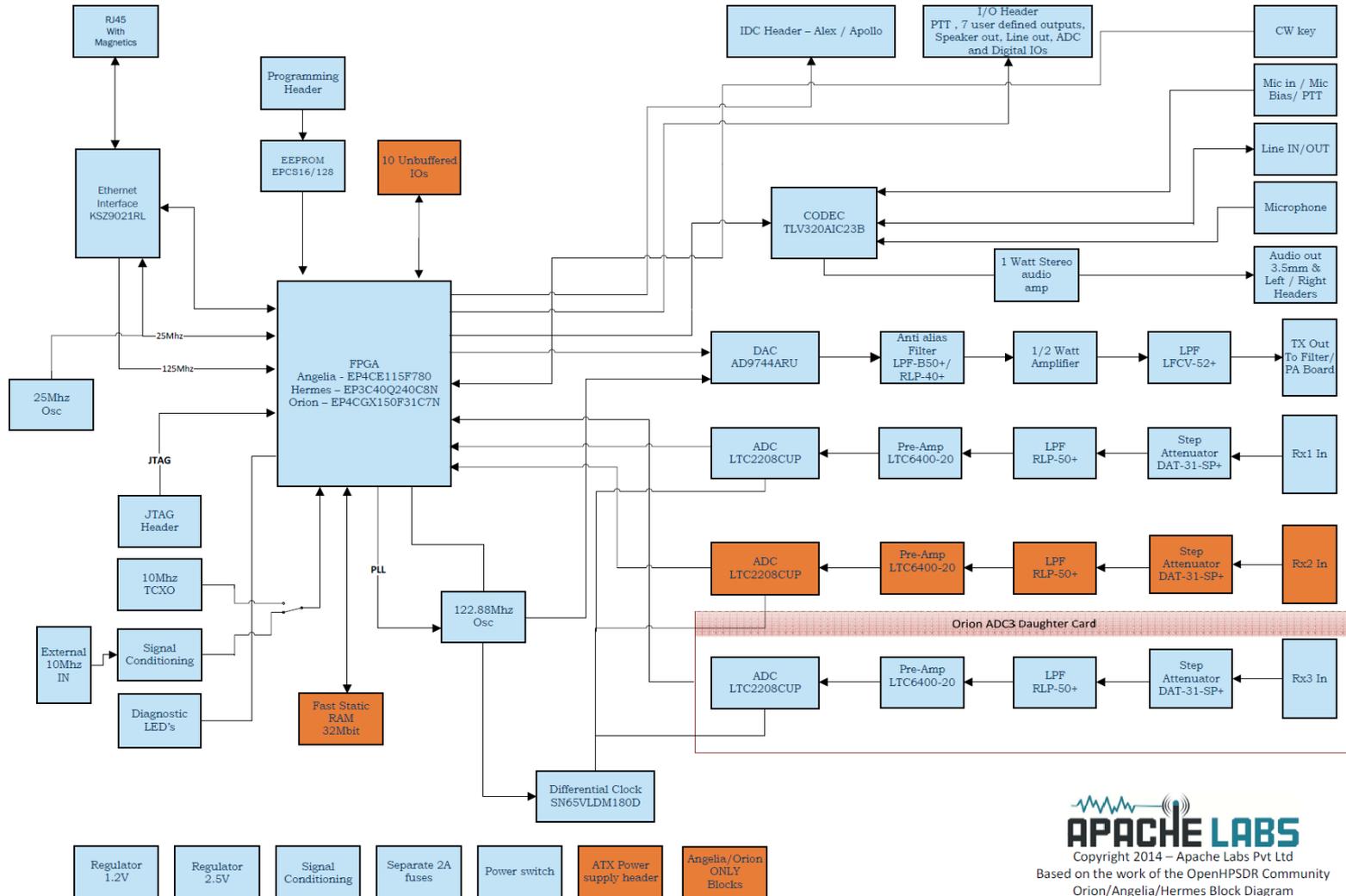
- Resources: Altera Cyclone IV EP4CGX150 FPGA, true phase coherent dual front end comprising of two 16 bit LTC2208 16bit ADCs, AD9744 14bit DAC, Ethernet Interface



SDR Specifications

- Continuous, uninterrupted, receive coverage from 10KHz to 55MHz .
- Supports Real-Time display of entire spectrum from 0-55MHz (with suitable PC software)
- ANAN100D/200D have two phase coherent ADCs which can be used for Diversity reception
- Supports 7 fully independent receivers (sharing the same antenna - and with suitable PC software)
- Each receiver can display 48/96/192kHz of spectrum
- Blocking Dynamic Range (ARRL Method) no detectable gain compression below ADC overload
- Transmit and receiver image rejection > 110dB
- Full duplex operation, any split over entire 160m to 6m range.
- 100W output with IMD3 better than -48dB (PureSignal Enabled)
- Built-in high performance preamp, with a noise floor typically -135dBm in 500Hz
- Software-selectable 31dB input attenuator in 1dB steps
- FPGA code can be updated via the Industry Standard TCP/IP network Ethernet connection
- Seven user-configurable open-collector outputs, independently selectable per band and Tx/Rx (for relay control, etc - with sequencing via PC code)
- Separate open-collector PTT connection for amplifier control, etc, with sequencer
- Four user-configurable 12 bit analogue inputs (for ALC, SWR etc)
- Three user-configurable digital inputs (for linear amplifier over temperature, etc)
- I2C bus connector for control of external equipment
- Full QSK operation (performance dependant on associated PC and control software)
- Low-level transmitter output for transverter use via user-selectable output attenuator
- Stereo audio outputs at line and headphone levels
- In-built 1W stereo audio amplifier for directly driving speakers
- Direct, de-bounced connections for a Morse key (straight or iambic) and PTT
- Low phase noise (-140dBc/Hz @ 1kHz at 14MHz) 122.88MHz master clock, which can be phase-locked to an internal 10MHz TCXO or external frequency reference
- Industry Standard TCP/IP network Ethernet interface supports static, APIPA or DHCP IP address

SDR Block Diagram



Compatible Software Applications

- The OpenHPSDR flavours of PowerSDR
- cuSDR
- Kiss Konsole
- GNURADIO- OpenHPSDR
- John Melton's (G0ORX/N6LYT) android
- application for The OpenHPSDR hardware
- GHPSDR3, GHPSDR3-QT

Applications

- All Mode HF & 6M SDR Transceiver
- HF direction finding (appropriate Software required)
- Rx beam steering using a fixed array of antennas
- Phil Harman, VK6PH's & Alex, VE3NEA's VNA Applications
- Polarization diversity operations (using two ADCs) to remove Faraday Rotation effects and to remove polarization misalignment effects during Rx
- Spatial diversity operation to mitigate/reduce signal fading compared with single antenna operations
- Ultra Linear Transmit capability using PureSignal Predistortion Algorithm