HPSDR History and Philosophy

The High Performance SDR project was started in October, 2005 by Phil Covington (N8VB) as the OpenHPSDR Yahoo group. In November, 2005 another small group, based on the Xylo board product (an FPGA experimenter's board) with SDR applications in mind, evolved and the Xylo-SDR discussion list was formed. On March 1, 2006 the two groups merged to form HPSDR and the two discussion lists were replaced with the present HPSDR list.

Initially a small group of developers, HPSDR has grown to over 1000 members, including hardware, software and firmware developers; system architects; analog and digital designers; RF engineers; planners, executers and users; testers, documenters and technicians; bank presidents and sanitation engineers. While the last two are dubious, the point is that HPSDR is a diverse group. Everyone has something to contribute and all are encouraged to participate.

The rationale behind HPSDR is to break the overall design up into a number of modules. Each module is designed by an individual or group and connects to other modules using a pre-defined and common bus -- rather like plugging boards into a PC motherboard.

This modular approach enables prospective users to incorporate just the modules that interest them as well as designing their own variants if desired. The approach also enables new ideas and circuits to be tested by replacing an existing module. Since the majority of modules will be retained, such experimentation can be done with minimum disruption to an existing, working system.

The modules vary in complexity from simple band-pass filters and input/output interfaces to full blown DSP functions. Such variety enables experimenters with varying degrees of experience to contribute. If you are interested in contributing, you are invited to join in new or ongoing design, development and documentation efforts.

The modules have each been named for easier identification when talking or writing about them. On the HPSDR website, each module has its own web page. Some of the modules are being designed so that they can be either used in conjunction with others or stand-alone. Each module board size (except the Atlas backplane) is typically 100mm by 120mm (optionally up to 220mm) and uses either a 64 pin or 96 pin DIN41612 type connector.

HPSDR – The Future is Here Today!

For More Information about HPSDR

For General HPSDR Project Information

The website includes descriptions of the project modules, links to resource materials, etc. It is kept fairly well up to date and is a good starting place.

http://openHPSDR.org

Presentation by Lyle Johnson, KK7P

Lyle Johnson, KK7P, gave a nice overview presentation to a large audience at the Dayton Hamvention on May 20, 2006. There are three files available (links on openHPSDR.org):

audio and video: **http://openHPSDR.org/kk7p/lyle-dayton.avi**
audio only: **http://openHPSDR.org/kk7p/lyle-dayton.mp3**
slides only: **http://openHPSDR.org/kk7p/lyle-dayton.pdf**

For Technical HPSDR Information

We have a "wiki" (editable web site) at:

http://openHPSDR.org/wiki

The project leaders have direct edit access to the wiki, and it is more current than the module web pages on the website. You'll most likely find the latest information on the design and progress in the wiki. If you don't want to type in the concise URL above, there is a link to the wiki on the main web page (openHPSDR.org).

For HPSDR Group Discussions

The **HPSDR Discussion List (Reflector)** is for anyone who wishes to monitor activity and/or contribute ideas, techniques, experimental results, etc. to the project. Traffic can vary from zero to quite heavy per day, depending on topics being discussed. You can read the archives or sign up to receive the e-mail messages individually or in a daily digest format. Sign up with the "DISCUSSION LIST (REFLECTOR)" button on the left side of the main web page (openHPSDR.org).

There is also a voice forum called **TeamSpeak**. It is a valuable forum for discussing topics that require more interaction among participants. A link to TeamSpeak is on the openHPSDR.org page.

For HPSDR Kit and Board Information

There is another website which has facilities to sign up to show interest in the boards. It is **http://www.hamsdr.com** and you must register on the site in order to get to the "projects" area. This area is used to gauge production interest in new boards. Boards are currently offered (kit or assembled) by TAPR and iQuadLabs. Check here for the status of HPSDR components:

http://www.tapr.org
http://www.iQuadLabs.com

High ***P***erformance ***S***oftware ***D***efined ***R***adio

What is the HPSDR Project?

HPSDR is an open source hardware and software project intended as a "next generation" Software Defined Radio (SDR) for use by Radio Amateurs and Short Wave Listeners. It is being designed and developed by a group of SDR enthusiasts with representation from interested experimenters worldwide. The hardware is typically licensed under the new TAPR OHL/NCL (either www.tapr.org/OHL or www.tapr.org/NCL) and software is typically licensed under GPL.

The discussion list membership currently stands at over 900 and includes many notable SDR enthusiasts.

http://openHPSDR.org

HPSDR is supported by AMSAT and TAPR

HPSDR: Current Modules

As of September 2011, nineteen (19) different modules have been reduced to actual hardware. Thirteen of these are available now.

Atlas

Atlas is a **six-slot backplane** that connects all of the modules together. It gets its power from a PC ATX-type connector and can mount in an ATX computer case. Atlas boards and parts kits are available from TAPR.

Magister (Ozy replacement)

Magister is an FPGA-based **interface controller** board. It contains a high-speed USB 2.0 interface, LEDs and local digital I/O, as well as an Atlas bus interface. Magister runs the same FPGA code as the obsolete Ozy board, but has no SDR-1000 port. Assembled and tested Magister boards are available from iQuadLabs.

Janus

Janus is a very high performance dual, full-duplex, **A/D and D/A converter** board. Janus can be used in place of a sound card for the SDR-1000. Assembled and tested Janus boards, blank PCBs and partial kits are available from TAPR.

Pinocchio

Pinocchio is a **passive extender** board. It is used with one of the other active modules to “extend” it above the rest of the system for individual board debugging. Pinocchio kits are available from TAPR.

Pennylane (Penelope replacement)

Penelope is a **½ Watt transmitter/exciter** board that covers 160m-6m. It uses Digital Up Conversion (DUC) techniques and directly processes base band I & Q signals. Assembled and tested Penelope boards are available from iQuadLabs.

Mercury

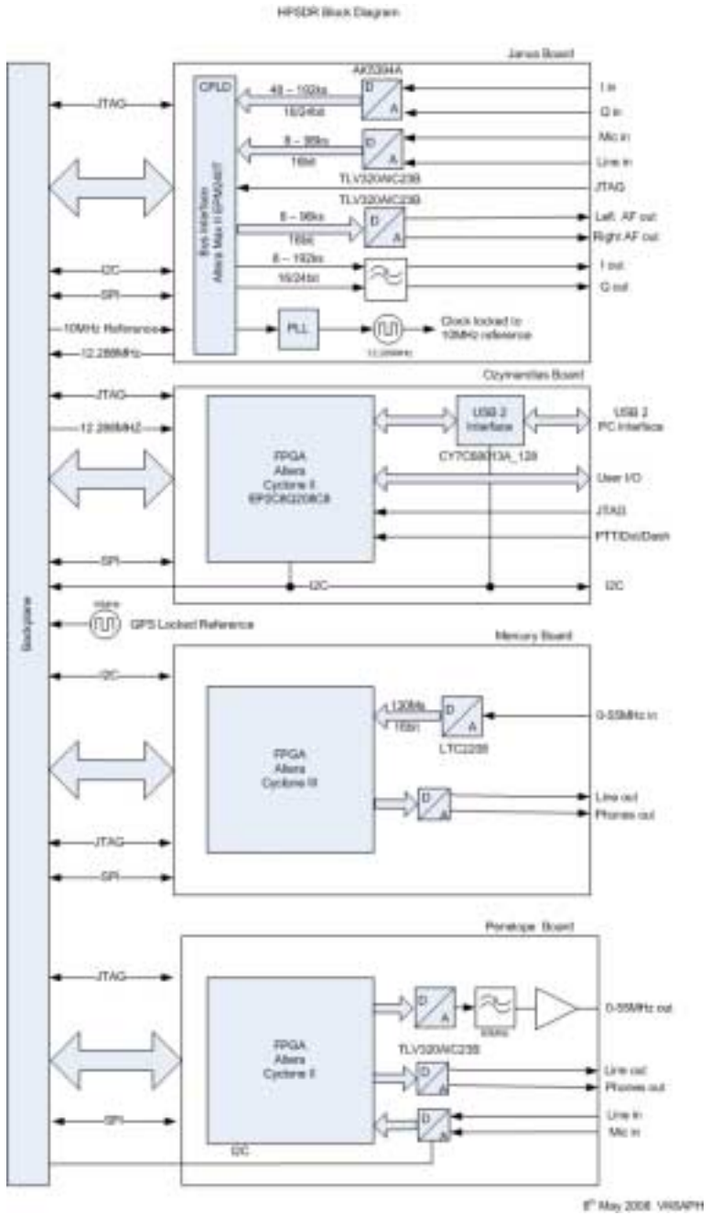
Mercury is a **high speed direct sampling front end** board that covers 160m-6m. It contains a 130 MSPS A/D converter and an FPGA based Digital Down Converter (DDC). Assembled and tested Mercury boards are available from iQuadLabs.

Alexiares

Alex is an **RF preselector** board set. It can be used with Mercury or any other SDR. Assembled and tested Alex-RX, Alex-TX and Alex enclosures are available from TAPR.

Linear Power Unit (LPU)

LPU is a set of **linear power regulators** that can supply regulated +12V, +5V, +3.3V and -12V from a +13.8V station supply. The positive regulators are all linear, providing a small, low-power, low-noise solution until Demeter is completed. LPU kits are available from TAPR.



HPSDR: More Current Modules

Pandora

Pandora is a custom **enclosure** for HPSDR components, including a full complement of six boards in an Atlas backplane, LPU, Alex, cooling fan and enough room for a small PA such as Pennywhistle. Pandora is available from TAPR.

Pennywhistle

Pennywhistle is a 19dB gain, **20W power amplifier** covering 160M – 6M. Pennywhistle has been tested and kitted. Kits include the machined heat-sink and are available from TAPR.

Excalibur

Excalibur is a **10MHz reference injector** card that provides an on-board TCXO or allows use of an external GPS-DO. Excalibur has bee tested and kitted. Kits are available from TAPR.

Hercules

Hercules is a 160M – 6M 100W PA/LPF with a monitor for supply current, RF power, SWR and to control fans. Hercules kits are no longer available due to unavailability of the output transistors.

Metis

Metis is a high-speed (**gigabit Ethernet**) interface to the atlas bus. It can be used in place of Magister. Assembled and tested Metis boards are available from TAPR.

HPSDR: Planned or Future Modules

Hermes

Hermes is a 120mm x 160mm size **DUC/DDC transceiver** board covering 160M – 6M. It is a combination of the features or Mercury, Penelope and Pennywhistle with a Gigabit Ethernet interface. Hermes pre-production build and test is currently underway.

Apollo

Apollo is a **15W PA and LPF** intended as a companion for Hermes, and piggy backs onto Hermes. Apollo pre-production PCB update is underway.

Munin

Munin is a 160M – 6M **100W HF power amplifier**. Munin prototypes are currently undergoing testing.

Cyclops

Cyclops is a **1GHz spectrum analyzer and tracking generator**. Cyclops is in the prototyping stage.