Software Defined Radio (SDR) Signal Chain Block Diagram – Overview

EPIQ

Antenna, RF Distribution → Down-conversion (optional) → [SDR: RF Front End → Digitizer → FPGA → Accessible CPU → GPU (optional)] → Application Software

1. **Downconverter** takes a section of spectrum and shifts it all to a lower band

2. **RF Front End** varies widely in sophistication from the integrated filtering in an integrated RFIC to extremely high-performance superheterodyne architectures containing thousands of components.

Tuners — RF or IF In/ Out

3. A **tuner** selects and conditions a signal before passing it on as an analog IF signal. Can include filtering, gain control etc. all in the analog RF domain.

Streaming Radios — VITA 49 / JESD (X4) — 1,0,1

4. **Streaming radios** include digitization and output in standard digital formats such as VITA 49. They often have Digital Down Converters (DDCs) that can convert, filter and reduce the amount of digital data output. Frequently not designed to be user-customizable.

SDRs — User Accessible FPGA — 1,0,1

5. **SDRs** can process digital data on-board using an FPGA. Useful for latency-sensitive applications where a radio is required to process signals in with clock cycle accuracy. Some SDRs have FPGA resources that are customer-accessible.

SDRs with Accessible CPU — User Accessible FPGA / User Accessible CPU — 1,0,1

6. These SDRs integrate a processor that can run an operating system and application, allowing standalone operation.

RF In/ Out

SDRs with Accessible CPU & GPU — User Accessible FPGA / User Accessible CPU / User Accessible GPU — 1,0,1

7. GPU to allow applications such as AI signal classification to be run entirely at the edge.

EPIQ

SDR Signal Chain

| Antenna, RF Distribution | ↔ | Down-conversion (optional) | ↔ | RF Front End | ↔ | Digitizer | ↔ | FPGA | ↔ | Accessible CPU | ↔ | GPU (optional) | ↔ | Application Software |

NDR505 *Coming Soon*

NDR504

Tuners
NDR888 *Coming Soon* · VPX410 · NDR585 · NDR664

Streaming Radios
NDR818 *Coming Soon* · NDR358 · NDR551 · NDR562

VITA 49
JESD (X4)

Sidekiq NV800* · NDR364 · NDR318 · NDR374 · Sidekiq X4**

SDRs
Sidekiq NV100 · VPX400

User Accessible FPGA

Sidekiq MiniPCIe · Sidekiq M.2 · Sidekiq NVM2 · Sidekiq Stretch

SDRs with Accessible CPU
Matchstiq Z2 · Sidekiq Z2

User Accessible FPGA | User Accessible CPU

Matchstiq Z3u · NDR325#

SDRs with Accessible CPU & GPU
Matchstiq G20/40 · Matchstiq X40

User Accessible FPGA | User Accessible CPU | User Accessible GPU

Consistent Software API: Libsidekiq PDK

NDR325 is not supported by Libsidekiq
* NV800 can act as a VITA 49 streaming radio but also offers the flexibility to customize an accessible FPGA through a PDK.   ** X4 is frequently supplied on a carrier card which includes an FPGA, (Sidekiq X4 PCIe blade) so in that form it would then be classed as a full SDR.