

**Introducing the Digital Broadcasting Receiver Accelerator**

The ClearSignal-Accel™ is a novel solution for adding multi-standard DAB/DAB+/DMB receiver capability to existing devices or designing new devices with such feature included. The Accelerator comprises of two parts: a low-cost FPGA and a software application designed to be ported to an existing processor or DSP, such as a multimedia processor or the customer’s application ARM, and using a minimal amount of resources; ClearSignal-Accel includes the porting services.

Hence, using ClearSignal-Accel, ODM and OEM consumer electronic devices’ designers, such as of Internet Radios or MP3 players, can easily add DAB or DMB receiver and later Mobile TV features to their devices, while keeping low power consumption and low cost for both the development cycle and the end product.

ClearSignal-Accel also enables manufactures of complimentary products, such as multimedia processors, to offer a complete solution, by partnering with Etherwaves.

**A Smart Paradigm**

The paradigm of ClearSignal-Accel is deceptively simple:

- Split the tasks between
  - an FPGA - for executing all the specialized tasks that consume high power or otherwise excessively load a serial processor
  - a CPU - for the “intelligent” tasks
- As CPU use the existing system processor

This way, the designer enjoys the advantages of soft defined radio (both the software and the FPGA), without having to pay the penalty of high power consumption and costly processors. Furthermore, there is no need to invest in a new processor learning curve.

However, is the implementation of these ideas which is the challenging part. The challenges solved by ClearSignal-Accel include:

- an intelligent mix and distribution of tasks between the software and the FPGA, for minimizing:
  - the size/cost of the FPGA
  - the required processor resources
  - the transfer data rate between the FPGA and the processor
- a processor-agnostic software, optimized for minimum resource use while executing together with the customer’s applications

**Key Features**

- Uses the existing processor or DSP and adds only an off-the-shelf low-cost FPGA
- Includes the porting services at the customer’s site
- Compatible to all de-facto multimedia and radio Digital Broadcasting standards
- Strong fading channel algorithms for mobile and automotive applications
- Interfaces to most industry standard RF tuners
- Based on ClearSignal’s proven pure-software, in use in high-end digital radios
- Supported by extensive testing and verification services and data

**Broadcasting Standards currently Supported**

- DAB (Europe, Australia, etc. - ETSI EN 300 401)

Using the parallel processing and the programmability of the FPGA brings unique advantages, such as receiving simultaneously two programmes. The choice of the broadcasting standards that ClearSignal-Accel receives is also programmable, by loading the appropriate parameters into the FPGA at power-on. The software includes the APIs for controlling the receiver.

Input interface is for most RF tuners on the market - both IF and ZIF (zero-IF), as well as for various ADC sample rates. The output is a digital audio stream for DAB and a TS stream for DMB.

Built upon the proven pure-software ClearSignal technology, the ClearSignal-Accel can integrate readily and cost effectively into existing designs, for adding the digital receiver functionality.

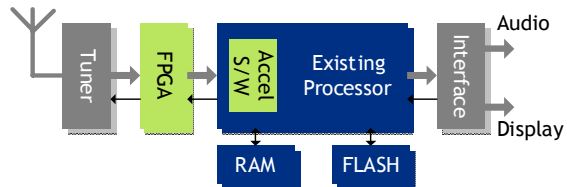


Figure 1 - Example of building a digital receiver using ClearSignal-Accel

- DAB+ (ETSI TS 102 563 v1.1.1)
- T-DMB (Korea TTAS.KO-07.0026 and Europe ETSI TS 102 427 / 428)
- DRM (ETSI TS 101 980).
- HD Radio - ITU-R BS.1114

**Main Benefits**

- Reduces drastically development time and cost, especially the learning time and resources associated with a new processor
- Enables the use of same hardware for various Digital Broadcasting standards
- Enables dual programmes’ reception
- Extendable to imminent COFDM based Digital Broadcasting standards
- Cost-effective and high performance end product
- Downloadable updates and upgrades

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