



# Enigma Explorer

## Digital Radio IP

DAB/DAB+, HD Radio, DMB, T-DMB, FM, AM

Enigma™ Explorer is a family of high performance wireless IP cores, covering wireless connectivity such as Bluetooth and Wi-Fi and television and audio broadcast. Specifically designed to meet the requirements for high performance markets such as Home Entertainment, Personal Computing and Wireless Infrastructure, Enigma Explorer provides a highly flexible platform for solutions requiring both high performance and design flexibility.

The Enigma Explorer Digital Radio platform provides a generic architecture that allows support for the multiple audio broadcast standards in the market today. Proven and efficient platform support tools allow multiple channels of different standards to use the same hardware concurrently. The Digital Radio IP provides flexible configurations to provide both standalone Channel decode functionality or combined with audio decode functionality for a complete and contained system. The demodulation standards are implemented in software while utilising the hardware accelerator features within the hardware platform.

### Broadcast and Connectivity Standards Support

<b>DAB/DAB+</b>	DAB+ prevalent: DAB/DAB+ MRC for automotive MPEG2/ HE-AAC v2 (transform length [tl]=960)DVB-H, T-
<b>DMB/T-DMB</b>	Physical layer common with DAB/DAB+ DAB data service carrying MPEG Transport Stream. MPEG transport stream packets provided for DMB parse. Can use same Tx network as DAB for mobile TV service. DMB BIFS/video capabilities if supported by Receiver
<b>HD Radio</b>	IBOC standard Implemented and Certified by Tessera (DTS /ibiquity) Proprietary audio codec and transport elements coupled to standardized PHY Available support for audio system SRC, blend, HDFM-MRC for automotive
<b>DRM30/DRM+</b>	IBOC standard for AM(DRM30)/FMIDRM+) transmission Hardware proven for DRM capability
<b>FM/FM+RDS</b>	Supported
<b>AM</b>	Supported

### Features

- Multi-standard Demodulation and Connectivity Platform
- Scalable from Single Channel to Multi stream multi standard
- Flexible RF interfaces
- Industry-leading PHY performance
- Choice between Integrated Wi-Fi MAC's

### Benefits

- Complete Multi-standard baseband solution
- Proven solution that minimizes risk and time to market
- Can provide all the required connectivity for a world standard SoC
- Easy integration into an SoC

### Applications

- Digital TV and set-top boxes
- Digital Radio (consumer or automotive)
- Tablets/smartphones
- Connected consumer products
- Internet of Things

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## Enigma Explorer Digital Radio IP

### General Features

- Provides Physical Layer Demod
- Provides PHY API Layer
- Radio Protocol Stack API
- Flexible Tuner Interfaces

- **Enhanced stream mode error protection**, including sync byte detection, convolutional de-interleaving and Reed-Solomon decoding.
- **Reed-Solomon decoding** for enhanced packet mode.

### Ensemble Decode

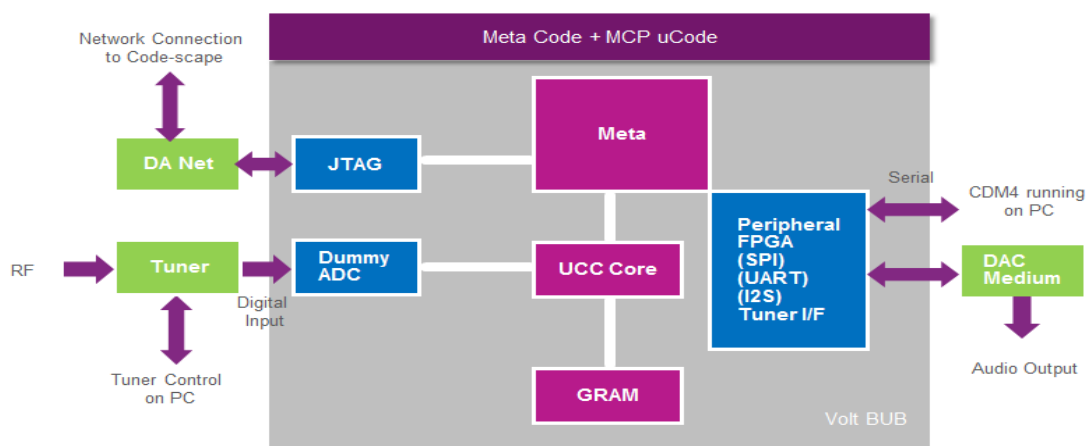
- **Signal conditioning of the incoming signal:** including real to baseband conversion, fine carrier frequency control, sample rate conversion, band limiting and decimation.
- **Autonomous acquisition and tracking of the DAB signal:** includes error metric estimators and control loops for AGC, symbol positioning, sample rate control and carrier frequency control.
- **Control of RF tuner** (via API defined RF control function interface).
- **Detection of Transmitter Identification (TII) codes** from the appropriate received NULL symbols.
- **Estimation of the signal to noise ratio (SNR) of incoming signal.**
- **Demodulation of Fast Information Channel (FIC) and Main Service Channel (MSC) symbols,** time and frequency de-interleaving and the Viterbi decoding of the FIC and MSC sub-channels. Seamless sub-channel reconfigurations supported.

### Radio Protocol Stack

- Band scanning to identify DAB/DMB signals.
- Interpretation of Fast Information Channel (FIC) to create list of available services and the Multiplex Configuration Information (MCI).
- Configures PHY to decode the required sub-channels, based upon MCI and selected services, including seamless sub-channel reconfigurations.
- Indication of changes in service make-up at service reconfigurations.
- Packet service component decoding including enhanced packet mode error protection.

### Software

- Developed in partnership with DTS (Ibiquity) with the core stack and PHY developed by DTS on the RPU.
- Architectural enhancements to add a HD core and peripheral wrappers to support multiple HD channels.



Digital Radio Evaluation Platform

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