



# Enigma Explorer

## Series 5 Radio Processing Unit

### IP Hardware Core

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.

Enigma™ Series5 Radio Processing Units (RPU) is the fifth generation of Explorer Radio Processing IP. It is designed to support the high-performance requirements of wireless applications that require radio processors with higher scalability, programmability and debug capabilities. The Series 5 RPU maintains backward-compatibility to the Series4 generation, providing a fast upgrade path for current Explorer customers.

Series5 RPUs offer several updates and improvements to the existing hardware blocks. In addition it introduces a MIPS-based Embedded Control Unit (ECU) which functions as a layer 1 controller. The Series 5 architecture allows multiple slices of the ECU, facilitating easy scalability to higher bandwidths and data rates. The ECU can be programmed in high level language such as C, giving the Series 5 RPU the flexibility to support and adapt to any next-generation connectivity standard.

### Broadcast and Connectivity Standards Support

<b>TV Broadcast</b>	DVB-T2, DVB-T, ISDB-T, SBTVD, ATSC, GB20600-2006 (CTTB) DVB-S2, DVB-S, ISDB-S DVB-C2, DVB-C, J.83B, ISDB-C DVB-H, T-DMB, 1-Seg ISDB-T
<b>Audio Broadcast</b>	DAB/DAB+, HD Radio, 3-seg, ISDB-T, ISDB-Tmm DRM, FM, AM
<b>Connectivity</b>	IEEE 802.11a/b/g/n/ac up to 4x4 MIMO Complete, Fully Embedded or Thin MAC options With simultaneous Bluetooth LTE

### Features

- Multi-standard Demodulation and Connectivity Platform
- Scalable from Single Channel to Multi stream multi standard
- Flexible Baseband and RF interfaces
- Industry-leading performance
- Low power consumption
- Small die area

### Benefits

- Complete Multi-standard IP solution
- Flexibility in programming and scalability
- 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 Series 5 Radio Processing Unit

### General Features

- Backward Compatibility to Enigma Series 4 RPU
- Multi-standard Demodulation and Connectivity Platform
- Scalable from single channel/stream to multi standard
- Flexible RF Interfaces
- Industry Leading PHY Performance
- Easy Integration to SoC
- Easy to program

### Series 5 Key Metrics

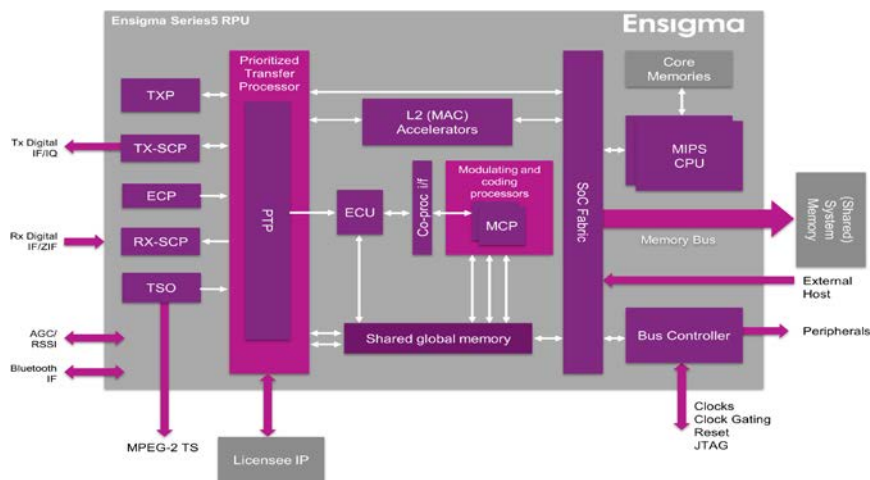
- MIPS Embedded Control Unit (ECU)
- ECU as Modulation and Coding process (MCP) controller
  - Coprocessor to interface with MCP
  - Shadow registers for performance
  - New programming model
- MCP flow programmed in C
- Improved debug support
  - RPU logging
  - Memory protection

### Modulation and Coding Processor

- Wide SIMD
  - Powerful (4, 8,16, 32 wide)
  - Scalable Code (write once)
- MCP does vector processing
  - Control Code offloaded to ECU
  - Register setup done in ECU
  - Code size reduced (24, 48, 96-bit instructions)
- Co Pro Interface
  - Low latency
  - Custom Instruction Execution
  - Helps increase Execution Speed and Code Density
  - Single or duplicated MCP registers

### Logging Capabilities

- Logging tools cover all of RPU
  - DMA Channel Co Processor (DCP)
  - MCU / ECU
  - MCP (including job schedule/start/end from Copro)
  - Memory protection unit
- Can be used to build a logic analyser type trace of all events within RPU.



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