ULTRA LOW POWER IMPULSE RADIO UWB TRANSCEIVER FOR LOCALIZATION AND STREAMING

Imec’s Impulse Radio Ultra-Wideband (IR-UWB) operates in the bandwidth between 6 and 9GHz with worldwide available channels. The radio is compliant to the IEEE802.15.4a, and it features proprietary modes that enhance the low power performance.

The pulse based communication enables a very scalable air interface in terms of data rate, power consumption, latency, etc. Data rates range from 110 kbps to 27 Mbps.

IR-UWB enables very low power transmitter design. In addition, the radio also features a low power implementation of the receiver. A complete radio is offered, including the IC-implementation of the RF front-end and digital baseband, algorithms for low power frequency tracking and synchronization and for localization, proprietary antennas as well as a light weight MAC implementation for demonstration purposes. The radio is available both as a chipset, as well as on a FPGA based platform.

Target applications include medium data rate (up to 27Mbps) data streaming, robust communication in environments that suffer from multipath propagation (such as automotive) and precision real time localization systems (RTLS).
TECHNOLOGY DEMONSTRATOR

A complete IR-UWB demonstrator is available, which consists of the following boards:

- An RF board with the receiver front-end IC and multiple additional components for evaluation and backup (MSP430, PLL ICs, regulator IC, battery management, etc.).

- A dual ADC board with state-of-the-art, proprietary ADCs.

- A receiver baseband mapped on a SMT351 FPGA board.

The 3 boards can be stacked on top of each other as a receiver module. The demonstrator includes proprietary UWB antennas, light-weight MAC for demonstration of data streaming, and software for control and debug.

LOCALIZATION AND AUDIO PLATFORMS

The radio is demonstrated in two setups. In a first demonstrator, high-end audio is being streamed over an IR-UWB wireless link.

In a second demonstrator, the IR-UWB radio is used as part of a localization set-up. The transmitter is located relative to the receiver base stations with an accuracy of well below 10cm over a distance of 15m.

SYSTEM SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
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</thead>
<tbody>
<tr>
<td>FREQUENCY BAND</td>
<td>6-9GHz</td>
<td></td>
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<tr>
<td>DATA RATE</td>
<td>110 kbps - 27 Mbps</td>
<td></td>
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<tr>
<td>STANDARDS</td>
<td>IEEE 802.15.4a and proprietary modes</td>
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<tr>
<td>TECHNOLOGY</td>
<td>90nm CMOS</td>
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<tr>
<td>DIGITAL INTERFACES</td>
<td>SPI, I2S, GPIO</td>
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IP AVAILABLE FOR LICENSING

This technology is available for licensing. A Technology License Agreement (TLA) includes the following:

- ‘White box’ license on imec technology
- Technology transfer: designs, evaluation boards, and documentation
- Support during the transfer phase & the production phase

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