






UHF GEN 2 RFID TRANSCIEVERS

# Indy<sup>®</sup> Reader Chip Family

# Indy Reader Chip Family—Performance and Flexibility

## Key Building Blocks Address All Market Segments

The Impinj UHF RFID product line includes the **Indy reader** chip family, based on award winning technology acquired from Intel Corporation. These highly integrated, high-performance reader chips and supporting software deliver the key building blocks for a wide spectrum of UHF RFID readers. By reducing the complexity of reader designs while delivering unprecedented capabilities, Indy reader chips drive down the cost of design and manufacturing. And with a price/performance range encompassing good performance for the most cost-sensitive applications to the highest performance reader chip available, the Indy reader chip family addresses all reader segments.

	 <b>Indy R500</b>	 <b>Indy R1000</b>	 <b>Indy R2000</b>
Impinj UHF Reader Chip	<b>Indy R500</b>	<b>Indy R1000</b>	<b>Indy R2000</b>
Performance	<i>Good</i> <ul style="list-style-type: none"> <li>Up to 180 tags/sec read rate</li> </ul>	<i>Better</i> <ul style="list-style-type: none"> <li>Up to 700 tags/sec read rate</li> </ul>	<i>Best</i> <ul style="list-style-type: none"> <li>Up to 900 tags/sec read rate</li> </ul>
Design Overview	<ul style="list-style-type: none"> <li>Integrates up to 90% of the components in a traditional discrete reader design</li> <li>Incorporates the complete transmit, receive, demodulation, and baseband functions of the UHF Gen 2 standard</li> <li>Includes integrated DRM support</li> <li>Improved Tx phase noise to ease support for global regulatory requirements</li> </ul>	<ul style="list-style-type: none"> <li>Includes integrated and flexible DRM support</li> <li>Integrates up to 90% of the components in a traditional discrete reader design</li> <li>Incorporates the complete transmit, receive, demodulation, and baseband functions of the UHF Gen 2 standard</li> </ul>	<ul style="list-style-type: none"> <li>Integrates up to 90% of the components in a traditional discrete reader design</li> <li>Incorporates the complete transmit, receive, demodulation, and baseband functions of the UHF Gen 2 standard</li> <li>Enhanced read accuracy and range via carrier cancellation technology</li> <li>Increased protocol configurability and access to advanced radio features</li> <li>Improved transmit phase noise to ease support for global regulatory requirements</li> </ul>
Application	Basic handhelds, desktop readers, and embedded applications	Handhelds and embedded applications	Fixed and advanced handheld applications

### Common Attributes

**Performance and flexibility:** Indy reader chips have all of the performance and flexibility needed to enable the full range of UHF RFID applications and reader form factors, all based on a common Indy platform.

**Simplicity and cost:** High integration lowers design complexity, reduces reader size, cuts manufacturing costs, and increases reliability.

**Support for worldwide standards:** Reader chip and firmware support EPCglobal UHF Gen 2 and ISO 18000-6C specifications, regional regulatory requirements and the full 840-960 MHz band.

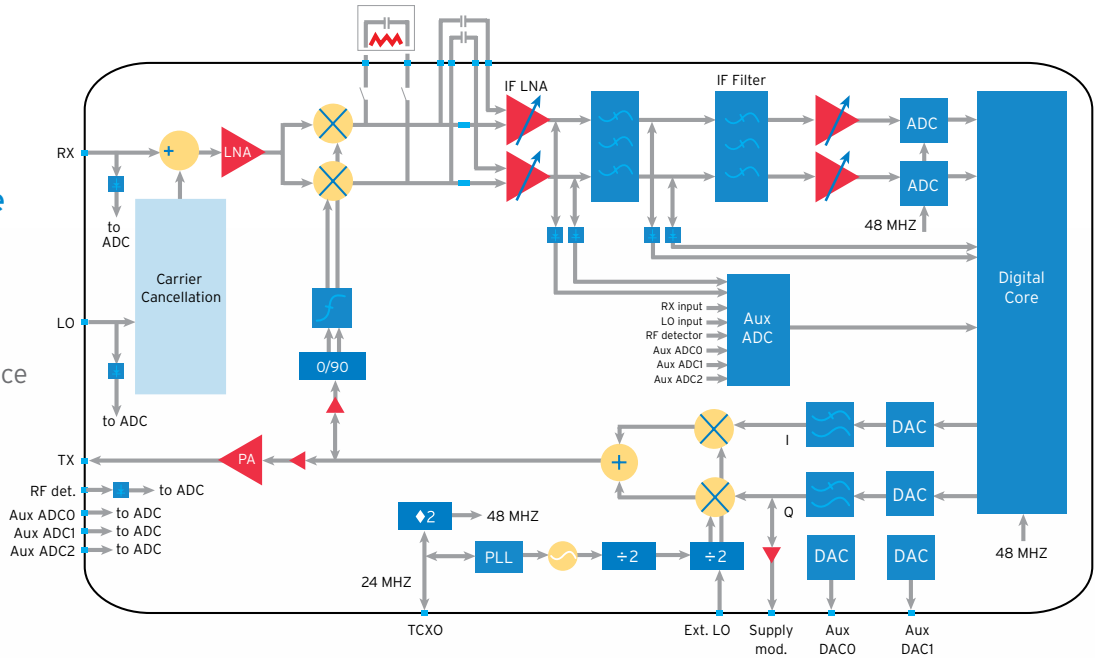
**Ease of deployment:** Reader chip and software enable low-level diagnostics, remote management and provisioning, and easy integration.

**Breakthrough development tools:** Protocol firmware, programming tools, radio drivers, and schematics all enable quick time-to-market.



## Representative Block Diagram

The block diagram shown is for the highest performance Indy R2000.

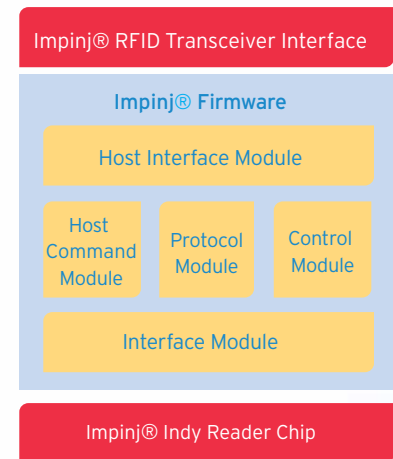


## Rich Development Environment Eases Reader Development

Impinj provides a rich development environment to help reader manufacturers get to market quickly; to enable broad compatibility with enterprise software applications; and to improve reader deployment, provisioning and management for end users, including:

- > A development platform that provides a low-cost reference design and supplies necessary hardware and software for demonstration, evaluation, and development
- > Protocol firmware supporting worldwide standards
- > RFID-specific drivers for low-level register access, radio control, and protocol access
- > Impinj RFID transceiver interface software allowing host processor plug and play compatibility, including remote radio access, provisioning, configuration, and fault handling
- > A multi-platform Software Development Kit (SDK) supporting Windows® XP and Windows® CE
- > Example RF board schematics to enable quick layout and design
- > Robust design collateral kit including datasheets, interface specifications, application notes and sample code
- > Graphical user interface for development and debug

## Software Stack Diagram



To ease reader deployment, the Indy development environment includes low-level diagnostic and device management support. The Impinj RFID transceiver interface also supports plug-in compatibility between the low-level Impinj reader radio software and higher level software applications.

## Indy Reader Chip Features

	Indy R500	Indy R1000	Indy R2000
<b>Air Interface Protocols</b>	EPCglobal UHF Class 1 Gen 2 / ISO 18000-6C <ul style="list-style-type: none"> <li>• DSB and PR-ASK transmit modulation modes</li> <li>• Dense reader mode (DRM)</li> </ul>	EPCglobal UHF Class 1 Gen 2 / ISO 18000-6C <ul style="list-style-type: none"> <li>• DSB, SSB, and PR-ASK transmit modulation modes</li> <li>• Dense reader mode (DRM)</li> </ul>	EPCglobal UHF Class 1 Gen 2 / ISO 18000-6C <ul style="list-style-type: none"> <li>• DSB, SSB, and PR-ASK transmit modulation modes</li> <li>• Dense reader mode (DRM)</li> <li>• Configurable for other protocols</li> </ul>
<b>Integrated Power Amplifier</b>	Configurable. External power amplifier supported for high performance applications	Configurable. External power amplifier supported for high performance applications	Configurable. External power amplifier supported for high performance applications
<b>Modem</b>	Configurable digital baseband	Configurable digital baseband	Configurable digital baseband
<b>Operating Frequencies</b>	840–960 MHz	840–960 MHz	840–960 MHz
<b>Package</b>	64-pin 9 mm <sup>2</sup> QFN	56-pin 8 mm <sup>2</sup> QFN	64-pin 9 mm <sup>2</sup> QFN
<b>Power</b>	Advanced power management	Advanced power management	Advanced power management
<b>Process</b>	0.18 μm SiGe BiCMOS	0.18 μm SiGe BiCMOS	0.18 μm SiGe BiCMOS
<b>RSSI</b>	Configurable	Configurable	Configurable
<b>Sensitivity</b>	-68 dBm (DRM)	-95 dBm (DRM) -75 dBm (DRM) with a 5 dBm carrier at Rx port	-95 dBm (DRM) -82 dBm (DRM) with a 10 dBm carrier at Rx port
<b>Transmit Phase Noise (at 250 KHz offset)</b>	-126 dBm/Hz	-116 dBm/Hz	-126 dBm/Hz
<b>Supported Regions</b>	US, Canada and other regions following US FCC Part 15 regulations  Europe and other regions following ETSI EN 302 208  China, India, Japan, Korea, Malaysia, Taiwan	US, Canada and other regions following US FCC Part 15 regulations  Europe and other regions following ETSI EN 302 208  China, India, Japan, Korea, Malaysia, Taiwan	US, Canada and other regions following US FCC Part 15 regulations  Europe and other regions following ETSI EN 302 208  China, India, Japan, Korea, Malaysia, Taiwan

### About Impinj

Impinj®, Inc. is the world's leading provider of UHF Gen 2 RFID solutions. Impinj draws on its technical expertise and industry partnerships to deliver a wide range of products and solutions comprising high-performance tag chips, readers, reader chips, software, antennas, and systems integration. Impinj products provide unprecedented performance, integration, and cost effectiveness to a global customer base in applications across numerous vertical markets, including inventory management, asset tracking, authentication, and serialization.

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