



Speedway® Readers

Superior RAIN RFID Performance Made Easy

Impinj Speedway readers are the #1 selling RAIN RFID readers in the world. Part of the Impinj platform, the Speedway R420 and R220 readers are high-performance, enterprise-class fixed readers that engage RAIN RFID tags to provide Item Intelligence—information about the identity, location, or authenticity of tagged items. The Impinj platform offers the only integrated set of hardware, software, and application interfaces, and is the most comprehensive and widely deployed RAIN RFID platform available. The platform delivers superior performance, interoperability, and the best reliability and data integrity to businesses across a wide array of markets.

Leverage the Impinj platform and Speedway readers for a broad range of applications.



SPEEDWAY READER



RAIN RFID TAGGED ITEMS



Flexible and Extensible Fixed Readers for RAIN RFID Solutions

The Speedway R420 and R220 readers deliver the performance, quality, and reliability necessary for maximum visibility of tagged inventory and assets. Able to maintain high read rates regardless of RF noise or interference as the readers adapt automatically for optimal functionality, Speedway readers are a powerful piece of item visibility platform solutions. Speedway readers are supported by a suite of software, hardware and antennas that deliver application and deployment flexibility, making installation and expansion easier than ever.

Speedway Reader Features and Benefits

- Available in 2 or 4 antenna port configurations, expandable to 32 antennas with Speedway Antenna Hub to deliver lower total cost of ownership and greater application flexibility
- Exclusive, patented Autopilot capability simplifies deployment and delivers more than 1,100 tag reads per second by automatically optimizing settings for best, most reliable, and efficient performance:
 - Autoset: Continuously senses environmental RF noise and interference levels, automatically selecting appropriate reader configuration settings
 - Low duty cycle: Reduces RF interference, power consumption, and energy cost by only transmitting when tags are in field
 - Dynamic antenna switching: senses where tags are in the field and automatically focuses more time on the antennas with the largest tag populations in view
- The industry's highest RF sensitivity (-84dBm) provides greater accuracy and longer read ranges
- Simple deployment via Power over Ethernet (PoE), with enterprise-class management and monitoring
- Field-proven, enterprise-class durability with high mean-time between failure



Software Tools

Our software is built to simplify deployment of Item Intelligence solutions. Impinj **ItemSense** software aggregates and transforms torrents of raw RAIN RFID data from multiple readers into Item Intelligence information that integrates with third-party applications. ItemSense is scalable, flexible, and extensible, adapting to businesses as they grow to connect more items, more readers, and more locations. It facilitates a broad range of solutions for retailers, manufacturers, and healthcare providers.

Other software includes:

- **Speedway Connect** is an on-reader application that enables you to easily set configurations for a single reader and quickly access RAIN RFID data through a simple web-based interface.
- Advanced users can quickly build on-reader applications with the **Speedway Embedded Took Kit (ETK)** or develop hosted applications that access the LLRP toolkit (LTK) through the **Octane Software Development Kit (SDK)**.
- For high-throughput encoding operations, **ItemEncode** software boosts the speed and data quality of RAIN RFID encoding machines while lowering labor and operating costs.

Hardware Accessories

Impinj's **Speedway Antenna Hub** provides a low-cost opportunity to create a large, contiguous RAIN RFID read zone with many antennas connected to a single reader. The Speedway Antenna Hub supports up to 32 antennas connected to a single Speedway Revolution R420 reader for a robust solution to today's popular item monitoring and other antenna-intensive RFID applications, which deliver enhanced business intelligence and customer experience. The Speedway Antenna Hub makes RFID monitoring applications, including smart shelves, interactive marketing displays, and document or item tracking, cost-effective and easy to deploy. Our **GPIO box** provides convenient access to Speedway readers' General Purpose Input/Output ports giving you the ability to add sensors and triggers to your application.

Antennas Optimized for Item-Level Tracking Solutions

Product	Application	Dimensions	Range
Brickyard Antenna 	The Brickyard reader antenna works well for tagged items on a variety of package types, making it an ideal choice for point-of-sale applications.	29.5 cm x 6 cm	Short (30–45 cm) 
Guardwall Antenna 	The Guardwall reader antenna provides a tightly controlled read zone and intense RF field, critical to penetrating deep into packed cases travelling on conveyors or packing lines.	70 x 40 x 10 cm	Long (3 m) alone, shorter (variable) when used in a pair 
MatchBox Antenna 	With its diminutive size, the MatchBox reader antenna is ideally suited for embedded applications that require unobtrusive RAIN RFID capability with short-range, well-defined read zones.	7.3 x 3.3 x 1.1 cm	Very short (3.5 cm) 
Mini-Guardrail Antenna 	The Mini-Guardrail reader antenna, specifically designed for demanding item-level performance, operates very effectively at 7.5 cm or less, with high reliability and a constrained read zone.	13 x 7 x 2 cm	Very short (7 cm) 
Threshold Antenna 	The Threshold antenna provides a consistent and continuous read zone when linearly distributed head-to-tail, with a planar form factor that fits readily into doorways for traffic monitoring.	46 x 9 x 2 cm	Long (4 x 3 m) 

Product Details	Speedway R420	Speedway R220																	
Air Interface Protocol	GS1/EPCglobal UHF Gen2 (ISO 18000-6C) or RAIN RFID																		
Antenna Ports	4 expandable to 32 antennas with Speedway Antenna Hub optimized for Impinj reader antennas (RP TNC connector)	2 monostatic antenna ports optimized for Impinj reader antennas (RP TNC connector)																	
Performance	Optimized for high volume, high concentration scenarios; supports high throughput modes including Max Throughput FMO, Hybrid (m=2), and Max Miller (m=4)	Covers a smaller, more specific area to save on deployment costs																	
Supported Regions or Geographies	FCC (TWYIPJREV), Canada (6324A-IPJREV), Australia, Brazil (Anatel), China (CMIT 2010DJ4065), EU (CE Mark, ETSI EN 408 208 v1.4.1), Hong Kong, India, Japan (920MHz band), Korea (UQC-R420), Malaysia, New Zealand (Z233), Singapore, South Africa (ICASA), Taiwan (CCAF10LP1290T5), Thailand, Uruguay, UAE, Vietnam																		
Transmit Power	+10.0 to +31.5 dBm (PoE) (EU1 limited to +30 dBm) +10.0 to +32.5 dBm (Listed/Certified power supply) (EU1 limited to +31.5 dBm, JP2 limited to 30 dBm)																		
Max Receive Sensitivity	-84 dBm																		
Min Return Loss	10 dB																		
Application Interfaces	- Low Level Reader Protocol (LLRP): C, C++, Java, and C# libraries - OctaneSDK: Java or C# - On-reader Applications via Octane ETK: C, C++																		
Network Connectivity	10/100BASE-T auto-negotiate (full/half) with auto-sensing MDI/MDX for auto-crossover (RJ-45) 802.1x with PEAP/TLS and MD5 support - WPA for Wifi and Ethernet 3rd party Wifi adapters supported via USB interface. Contact Impinj for list. - Speedway Connect (not included in Speedway purchase): HID (keyboard) emulation, TCP Socket, Serial/RS-232, HTTP POST																		
IP Address Configuration	DHCP, Static, or Link Local Addressing (LLA) with Multicast DNS (mDNS)																		
Time Synchronization	Network Time Protocol (NTP)																		
Management Interfaces	- Impinj Web Management UI - Impinj RShell Management Console using serial management console port, telnet, or SSH - SNMP	- FTP - EPCglobal Reader Management v1.0.1 - Syslog																	
Reliable Firmware Upgrade	- Dual image partitions enable smooth transition to new firmware while the reader is still operating - Scalable upgrade mechanism enables simultaneous scheduled upgrades of multiple readers	- USB Flash Drive - Impinj Web Management UI - SSH File Transfer Protocol (SFTP) support																	
Management Console	RS-232 using a standard Cisco-style management cable (DB-9 to RJ-45)																		
USB	- USB Device (Type B) and Host (Type A) ports - USB Virtual COM Serial Port and USB drive support for embedded applications																		
GPIO	4 inputs, optically isolated 3-30V; 4 outputs, optically isolated, 0-30V, non-isolated 5V, 100mA supply (DB-15)																		
Power Sources	- Power over Ethernet (PoE) IEEE 802.3af - Listed/Certified power supply, marked LPS or Class 2, with 24Vdc output, rated minimum 2.5A																		
Power Consumption	<table><thead><tr><th></th><th>Idle</th><th>Typical</th><th>LDC</th></tr></thead><tbody><tr><td>PoE at +30 dBm</td><td>3W</td><td>11.5W</td><td>6W</td></tr><tr><td>Power Supply at +30 dBm</td><td>3W</td><td>13.5W</td><td>6W</td></tr><tr><td>Power Supply at +32.5 dBm*</td><td>3W</td><td>15W</td><td>6W</td></tr></tbody></table>		Idle	Typical	LDC	PoE at +30 dBm	3W	11.5W	6W	Power Supply at +30 dBm	3W	13.5W	6W	Power Supply at +32.5 dBm*	3W	15W	6W	*Maximum is 31.5 dBm for EU1 readers and 30dBm JP2 readers	
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Environmental Sealing	IEC IP52																		
Shock and Vibration	Mil-Std-810G Certified																		
Electrical Safety	UL Listed (US and Canada), EN 60950-1:2006 / A11:2009 / A1:2010 / A12:2011																		
Operating Temperature	-20 °C to +50 °C																		
Humidity	5% to 95%, non-condensing																		
Dimensions & Weight	7.5 in H x 6.9 in W x 1.2 in D (19 x 17.5 x 3 cm); 1.5 lbs (24.5 oz)																		
RoHS	Compliant to European Union directive 2011/65/EU																		
Warranty and Maintenance Options	1 year limited warranty with purchase, option to extend 3 year Enhanced Maintenance upgrade available																		

