

IMPINJ[®]
SPEEDWAY[®] READER
OVERVIEW, SOFTWARE TOOLS, ACCESSORIES,
AND SPECIFICATIONS

TABLE OF CONTENTS

1	Overview	1
2	specifications	1
2.1	Operation	1
2.2	UHF RFID Specifications	1
2.3	Software Tools	3
3	Hardware Accessories	4
4	regulatory information	4
5	Maintenance and Support	5
6	Notices	5

1 OVERVIEW

Impinj Speedway readers are high-performance fixed readers used across a diverse range of applications. Impinj Speedway readers deliver proven performance with a choice of different readers to match your requirements.

2 SPECIFICATIONS

2.1 Operation

Impinj Speedway fixed readers deliver item visibility with the performance, quality, and reliability necessary for robust solutions. Impinj gateways, reader chips, and readers enable bidirectional, wireless communications between applications and everyday items. With numerous form and deployment options, Impinj RAIN RFID connectivity devices offer flexible implementations to meet your unique needs.

2.2 UHF RFID Specifications

PRODUCT DETAILS	IMPINJ SPEEDWAY R420	IMPINJ SPEEDWAY R220
Operating Frequencies *Refer to country-specific regulations for channel allocation within the band	FCC: 902-928 MHz EU1: 865-868 MHz EU2: 915-921 MHz GX1: 902-928 MHz GX2: 902-925 MHz GX3: 920-926 MHz JP2: 916-921 MHz	FCC: 902-928 MHz EU1: 865-868 MHz GX1: 902-928 MHz GX2: 902-925 MHz
Transmit Power (dBm max conducted) *Refer to regulations for country-specific limitations	FCC, GX1, GX2, GX3: 32.5 AC/31.5 PoE EU1: 31.5 AC/30.0 PoE EU2: 33.0 AC/33.0 PoE+ JP2: 30.0 AC/30.0 PoE	FCC, GX1, GX2: 32.5 AC/31.5 PoE EU1: 31.5 AC/30.0 PoE
Antenna Ports	4	2
Maximum Read Rate	1100 tags/s	200 tags/s
Gen2 Reader Modes	10	5
Antenna Hub Support	YES	YES
Read Zones (maximum)	32 (with 4 hubs)	16 (with 2 hubs)
Regulatory Certifications	www.impinj.com/supported_regions	

Power Sources	AC-DC power supply: all models IEEE 802.3af PoE: all models except EU2 IEEE 802.3at PoE+: EU2 model	AC-DC power supply: all models IEEE 802.3af PoE: all models
Air Interface Protocol	GS1/EPCglobal UHF Gen2 (ISO 18000-6C) or RAIN RFID	
Receive Sensitivity*	Ideal: -87 dBm Typical: -84 dBm Challenging: -84 dBm	
Return Loss (minimum)	10dB	
Antenna Impedance	50 ohm	
Network Connectivity	10/100BASE-T Ethernet	
USB Ports	1 device, 1 host	
Management Console Port (RS-232)	RJ-45	
GPIO Serial Port	YES	
Factory Reset	YES	
Operating Temperature	-4F to +122F (-20C to 50C)	
Storage Temperature	-4°F to 140°F (-20°C to 60°C)	
Humidity	5% to 95% non-condensing	
Environmental Sealing	IEC 60529: IP52	
Environmental Air Handling Space	NEC section 300-22(a)	
Shock and Vibration	MIL-STD-810G	
Dimensions (H x W x D)	19 x 17.5 x 3 cm (7.5 x 6.9 x 1.2 in)	
Weight	0.7 kg (1.5 lb)	
RoHS Compliant	YES, certification available here	
Network Protocols	SSH, HTTP, HTTPS, NTP, DHCP, SFTP, mDNS	
Networking Stack	IPv4, IPv6	
Management	SNMPv1, v2, v3	

Security	802.1x (Port Security), TLS 1.2 for Secure LLRP
Host Interface	LLRP with Impinj Extensions
Custom Application Partition	YES
Management Console Port	RS-232 using a standard Cisco-style management cable (DB-9 to RJ-45)
Development Libraries	Octane SDK (.NET and Java), LTK (C, C++, .NET, Java), ETK (C, C++)
Software supported (Impinj)	Impinj ItemTest, Impinj Speedway Connect
IP Address Configuration	DHCP, Static, or Link Local Addressing (LLA) with Multicast DNS (mDNS)

* Device sensitivity measured using CISC, 90% PSR, DRM M8 RF mode, @ 30 dBm. Conditions described below

CONDITION	TIME DELAY (NS)	RETURN LOSS (DB)
Ideal	4.5	22+
Typical	6.0	15
Challenging	38.2	12

2.3 Software Tools

Impinj provides software options to enable application development, reader management, and tuning for deployment optimization.

SOFTWARE	DESCRIPTION
Application Development	<ul style="list-style-type: none"> • Impinj Speedway Connect • Impinj Octane Software Development Kit (SDK) • Impinj Octane Embedded Tool Kit (ETK) • Impinj Octane LLRP Toolkit (LTK)
Reader Management	<ul style="list-style-type: none"> • Impinj Speedway Connect • Impinj Rshell Management Console and Management UI • SNMPv2 MIB II • EPCglobal Reader Management v1.0.1 • Syslog
Performance Optimization	<ul style="list-style-type: none"> • Impinj ItemTest

3 HARDWARE ACCESSORIES

Impinj Speedway Readers are supported by a suite of hardware accessories and antennas that deliver deployment flexibility, streamline installation, and expansion.

HARDWARE	DESCRIPTION
Impinj Speedway Antenna Hub	The Impinj Speedway Antenna Hub provides a low cost opportunity to create a large, contiguous RAIN RFID read zone. Connect up to 32 antennas to a single Impinj Speedway R420.
GPIO Adapter for Antenna Hub	The GPIO Adapter and cable for Antenna Hub provides control of up to 4 Antenna Hubs. Each hub supports up to 8 antennas for a maximum of 32 antennas per Impinj Speedway R420 (4 hubs/R420 x 8 antennas/hub).
GPIO Box	The GPIO Box interfaces with the reader via a supplied HD15 cable, and separates each input and output signal to easy-access screw terminals. The GPIO box connects to peripherals to facilitate reader control and indicate status.
AC Power Supply (without AC power cord)	For readers and gateways and GPIO box, the universal power supply and specific regional power cord are optional, depending on whether or not the Power over Ethernet (PoE) option is used. If the PoE option is not used, you must order a universal power supply and specific regional power cord.
Impinj Matchbox Antenna	The Impinj Matchbox antenna is a very small RAIN RFID antenna suited for embedded applications needing strong performance in a tight read zone. Requires 1 SMA to R-TNC cable (not included)
Impinj Mini-Guardrail Antenna	The Impinj Mini-Guardrail antenna has a short-read zone and fits easily into small enclosures. The small form factor and mounting holes support a multitude of use cases. Requires 1 SMA to R-TNC cable (not included)
Reader Antenna RF Cables	For connecting antennas to Impinj Speedway readers, the, Mini-Guardrail, and Matchbox antennas. The LL400 flex cables minimizes Tx/Rx power loss.

4 REGULATORY INFORMATION

For a list of the regions and geographies that the Impinj Speedway readers support, go to www.impinj.com/supported_regions.

5 MAINTENANCE AND SUPPORT

All readers and gateways are covered by a Limited Hardware Warranty.

Extended warranty adds 1, 2, or 3 years of warranty benefits to the initial limited hardware warranty for an Impinj reader or gateway. For example, if a 3-year extended warranty is included when purchasing a new Impinj reader or gateway, you will receive 4 years of warranty benefits (1-year Initial Limited Hardware Warranty + 3-year extension). An extended warranty must be purchased at least 90 days prior to the expiration of an existing initial limited hardware or extended warranty. For more information, please visit, [Product warranty options](#).

6 NOTICES

Copyright © 2023 Impinj, Inc. All rights reserved.

Impinj gives no representation or warranty, express or implied, for the accuracy or reliability of information in this document. Impinj reserves the right to change its products and services and this information at any time without notice.

EXCEPT AS PROVIDED IN IMPINJ'S TERMS AND CONDITIONS OF SALE (OR AS OTHERWISE AGREED IN A VALID WRITTEN INDIVIDUAL AGREEMENT WITH IMPINJ), IMPINJ ASSUMES NO LIABILITY WHATSOEVER AND IMPINJ DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY RELATED TO THE SALE AND/OR USE OF IMPINJ PRODUCTS, INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY OR INFRINGEMENT.

NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY PATENT, COPYRIGHT, MASKWORK RIGHT, OR OTHER INTELLECTUAL PROPERTY RIGHT IS GRANTED BY THIS DOCUMENT.

Impinj assumes no liability for applications assistance or customer product design. Customers should implement adequate design and operating safeguards to minimize risks.

Impinj products are not designed, warranted or authorized for use in any product or application where a malfunction may reasonably be expected to cause personal injury or death, or property or environmental damage ("hazardous uses"), including but not limited to military applications; life-support systems; aircraft control, navigation or communication; air-traffic management; or in the design, construction, operation, or maintenance of a nuclear facility. Customers must indemnify Impinj against any damages arising out of the use of Impinj products in any hazardous uses.

Trademarks

Impinj, Monza, Speedway, xArray are trademarks or registered trademarks of Impinj, Inc. All other product or service names are trademarks of their respective companies. For a complete list of Impinj Trademarks visit: www.impinj.com/trademarks.

Patents

The products referenced in this document may be covered by one or more U.S. patents. See www.impinj.com/patents for details.