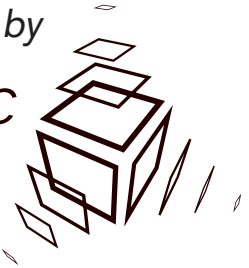
Intelligent. Network Ready. Reads Any Tag.

Mercury4™

powered by ThingMagic



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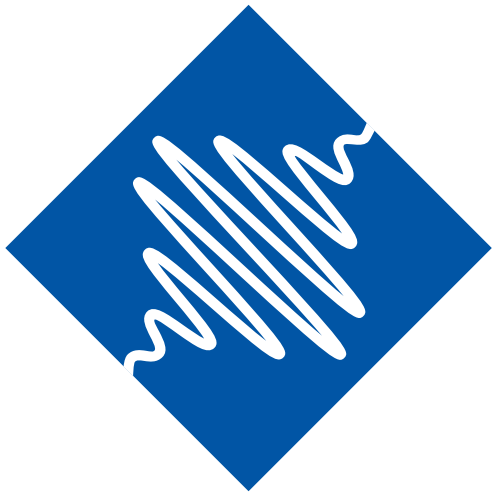

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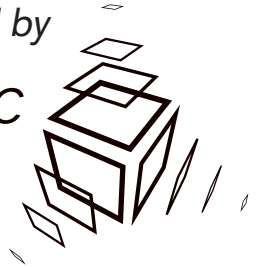

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About Mercury4

Intelligent

Mercury4 does a lot more than turn waves into bits. It is the only RFID reader that features an Intel® processor. It handles data at a blistering 266 million instructions per second, more than 100 times faster than its closest competitor. This on-board intelligence enables Mercury4 to process data as well as capture it, via a user-program- mable, fully functional Linux operating system. And that means vital RFID data can be filtered, managed and even acted upon instantly, in real-time, right at the edge of the network.

Network Ready

All ThingMagic readers are built on one compelling insight. Readers are not just radios. Readers are routers. Reading RFID means more than just finding ID numbers. An enterprise-grade RFID reader must manage a dynamic population of tags, then route the data into networks, databases and business applications. Readers have to be fully-fledged network citizens before they can support mission critical operations. That's why Mercury4 is a pure network device that speaks TCP/IP natively, and fully supports standard network technologies including DHCP, UDP/IP over Ethernet, 802.11x, HTTP, SNMP and remote upgrades.

Reads Any Tag

Mercury4 is more than multi-protocol. It uses advanced Software Defined Radio technology to be able to **read any tag**. Out of the box, Mercury4 reads all variants of EPC Class 1 and 0, rewriteable Class 0+ tags, as well as ISO 18000-6B and UCODE EPC 1.19 simultaneously. And with the TeslaOS (OS 2.3) or later, Mercury4 can now also read the new EPC Generation 2 tags. The digital signal processing software can be instantly upgraded to accept additional as soon as the become available, making it flexible and future-proof. This software radio architecture also enables Mercury4 to suppport multiple frequencies and regional regulatory variations. Mercury4 supports North American UHF regulations. It will be followed by HF, European UHF and Japanese UHF options.

Available From Multiple Sources

The Mercury4 reader is available in products from licensed partners. ThingMagic's open approach to partnership and licensing means Mercury4-based products may also be available from other sources in the future. All ThingMagic-based readers clearly display the words 'powered by ThingMagic'.

All ThingMagic readers are built on one compelling insight. Readers are not just radios. Readers are routers.

About Mercury4

Hardware Specification

Name	– ThingMagic Mercury4 Reader
Processors	– Intel IXP420 266 MHz Network Processor – Texas Instruments TI5502 300 MHz Digital Signal Processor
Memory	– 64 MBytes DRAM – 16 MBytes FLASH
Connectivity	– Serial: RS-232 serial interface – Ethernet: 10/100 Base-T Ethernet interface
Power	– 24V DC, 2A unregulated

Mechanical & Environmental Specification

Dimensions	– 25.4 x 25.4 x 3.8 cm
Temperature	– Operating: 0 to 40 degrees Centigrade – Storage: –20 to 70 degrees Centigrade
Humidity	– Relative humidity 0–90% non-condensing
Weight	- 3lb 10oz / 1.6 kilograms (with 2 analog front ends)

About Mercury4

Radio Frequency Specification

Operating Frequencies	– UHF:	909–928 MHz 868–870 MHz (factory setting) 950–956 MHz (planned)
	– HF:	13.56 MHz (planned)
Air Interface Protocols	– UHF:	EPC Class 0 EPC Class 1 EPC Generation 2 ISO 18000-6B/Ucode 1.19 Rewriteable Class 0+
	– HF:	ISO 15693 (planned)
Antenna Configuration	– UHF:	4 or 8 combined UHF Transmit/Receive antennas with linear or circular polarization 2 or 4 separate Transmit and Receive antennas with linear or circular polarization
	– HF:	2 or 4 antennas (planned)
	– RF Power:	UHF power: +32.5 dBm (1 Watt (30 dBm) per FCC Part 15 + 2.5 dBm due to attenuation loss of 25' cables)
	– Regulatory:	FCC Part 15, UL 60950, CAN/CSA C22.2 No. 60950, Canada RSS 210

About Mercury4

Software Specification

Operating Systems	– Linux (kernel version 2.4.1) – MercuryOS™ real-time tagreader operating system
Networking Protocols	– TCP/IP – UDP/IP – HTTP
Connection Protocol	– ThingMagic's Reader Query Language (RQL)
Servers	– Web-server supporting CGI – Structured Query Language (SQL) server
Daemons	– Dynamic Host Configuration Protocol (DHCP) – Network Time Protocol (NTP)
Reader Management and Synchronization	– Web-based status, configuration, and diagnostics – SNMP – Web-based firmware upgrade – Remote firmware upgrade – Reader-reader synchronized reading

About Mercury4

RQL Summary

Modes	– Automatic event-based operation – Query-based operation
Tag Event	– Tag ID (64 or 96 bits) – Antenna ID – Air Interface protocol – Number of reads – Relative and absolute timestamps
Tag Commands	– Read – Write (when supported by tag) – Lock – Kill – Data read and write (when supported by tag)
Triggered Reads	– Queries can be set up for specified real-world time and at specified intervals – Time is specified in ISO8601format
Stored Queries	– up to 16 RQL cursors may be running simultaneously

About ThingMagic

History

ThingMagic, located in Cambridge, Massachusetts, has a unique history in RFID. Founded in 2000 by 5 MIT Ph.Ds, it created the original agile reader reference design for the Auto-ID Center in 2001, and supplied commercial-grade readers to the Center's Field Test and EPC Evaluation Kits in 2002. Mercury4 is the fourth generation ThingMagic agile reader, building on and substantially enhancing the original platform created for the Electronic Product Code. In addition to designing RFID readers, ThingMagic also provides customized sensor and embedded computing development to clients around the world. The Company has been profitable since its first day, with no outside investment or venture capital.

Management

ThingMagic's management team is made up of the company's 5 founders plus 4 senior executives with deep focused experience in technology:

Tom Grant, Chairman & CEO, is a 28 year veteran of the Boston high-tech and venture capitalist community.

Ravi Pappu, co-founder, is a Physicist specializing in optics and cryptography. In 2003 he was named as one of Technology Review Magazine's top 100 young innovators.

Bernd Schoner, co-founder, is a Mathematician specializing in complex mathematical models.

Matthew Reynolds, co-founder, is an Electrical Engineer specializing in wireless communications systems.

Yael Maguire, co-founder, is a Physicist specializing in Quantum Computing and molecular sensing.

Margaret Wasserman, VP Development, was previously an Engineering Fellow at Nokia Research Center, and Principal Technologist at Wind River Systems. She serves on the Internet Engineering Task Force (IETF) Steering Group and is a member of the Board of Trustees of the Internet Society (ISOC).

Kevin Ashton, VP Marketing, was previously an Associate Director at Procter & Gamble, and co-founder and Executive Director of the Auto-ID Center, headquartered at MIT.

ThingMagic created the original agile reader reference design for the Auto-ID Center in 2001 and has been profitable since its first day, with no outside investment or venture capital.

Partnership Opportunities

End Users

Although ThingMagic rarely sells readers direct to end users, it works closely with the user community to understand needs and requirements. In addition, in some circumstances, ThingMagic makes its engineers and experts available to users on a consultancy basis, to solve hard problems related to RFID, sensing and embedded computing.

Customers

ThingMagic's customers are companies that want to license ThingMagic's readers and reader designs as part of a RFID solution offering. Several different business models are available for obtaining rights to make and/or sell RFID readers powered by ThingMagic.

Software Developers

Reader Query Language (RQL) and the Mercury OS™ real-time embedded operating system are at the heart of Mercury4 and all of our ThingMagic RFID readers. Software developers can get intimate access to this open, extensible architecture via the ThingMagic Developer Community, which holds regularly scheduled training sessions at our facility in Cambridge, Massachusetts.

System Integrators

ThingMagic actively supports integrators who are installing or recommending Mercury4 to their user clients. Integrators are given special, additional training sessions as part of the ThingMagic Developer Community.