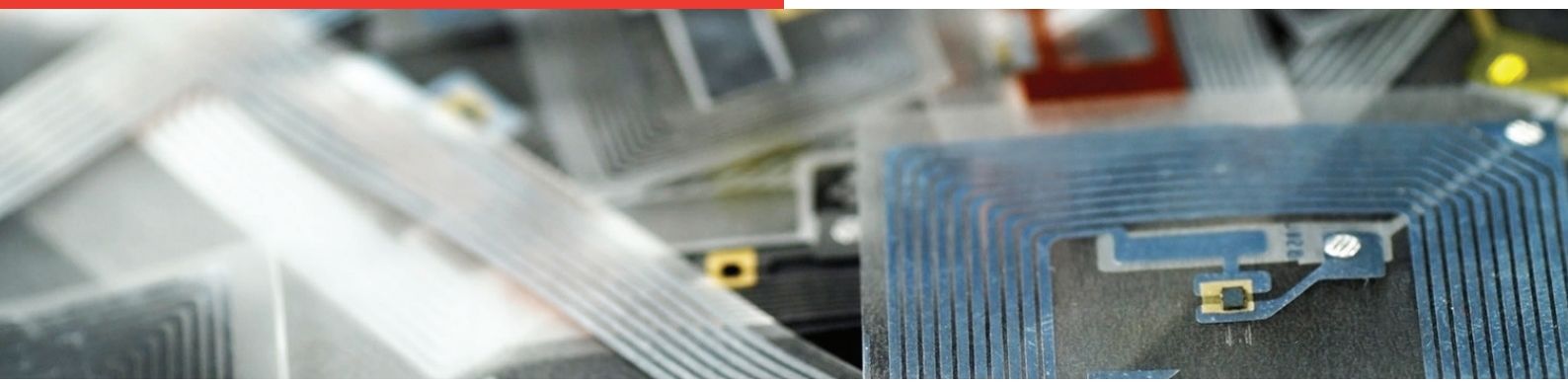
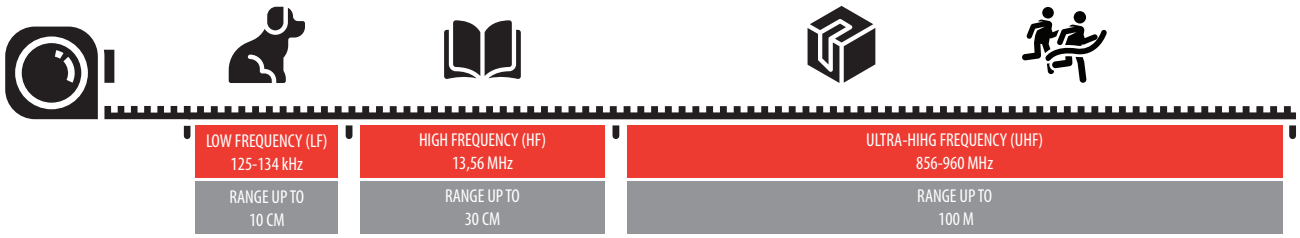
RFID
Radio Frequency Identification



RFID (Radio Frequency Identification) is a term for set of **technologies that use radio waves to identify objects**. The technology uses electromagnetic waves and associated radio systems. The basic components of RFID are tags, a reader module (consisting of a transmitter and a receiver), a service computer that manages communication between all tags within the range of the readers and controls the processing of the transferred data. The tags contain a combination of a chip and an antenna, and a dedicated battery for active tags.

RFID System Components

RFID Frequency Ranges



RFID Technology

PASSIVE

NO INTERNAL POWER SOURCE, POWERED BY THE ELECTROMAGNETIC ENERGY TRANSMITTERD FROM AN RFID READER.
RANGE UP TO 3 M

ACTIVE

BATTERY-POWERED RFID TAGS THAT CONTINUOUSLY BROADCAST THEIR OWN SIGNAL.
RANGE UP TO 100 M

Fields of application

- Logistics
- Goods monitoring
- Shopping centres
- Construction
- Rentals
- Hotels and spas
- Manufacturing
- Food industry
- Healthcare
- Animals monitoring
- Sport
- Attendance system
- Libraries

Advantages

- **Ease of communication between the tags and the reader.** Compared to barcodes, RFID works even without the direct visibility and no matter the rotation and angle of the tag. Commonly used barcodes, except few exceptions offers readability within few centimeters up to one meter. Readability of the RFID tags can be limited or extended in the range from few centimeters up to more than 10 m by setting up the antenna transmission power and choosing the right frequency range.

- **Read speeds and data storage capability.** While the barcodes must be scanned one by one, RFID tags can be read in large quantities in the matter of seconds.

- **Security.** In the active tags with dynamic memory the stored information can be updated, added, deleted and most importantly encrypted or password protected. Commonly used barcodes can be copied, modified or corrupted. These safety features minimize the risk of the theft by customers or employees.

- **Roughness and lifetime.** Miniature size tags can be placed directly inside the object to provide extra protection. The whole concept of the RFID is designed around the use in rough conditions with protection against higher temperatures, high pressure or chemical effects.

- **Savings.** In the field of logistics and commerce RFID offers effective way to manage stock with fast and simple localization of the objects. RFID also reduces the workforce and eliminates the errors generated by human fault.

Disadvantages

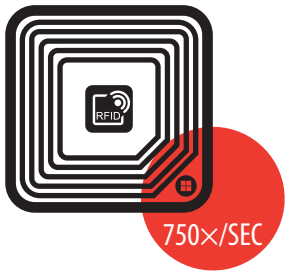
- **Initial costs** is one of the reasons that are limiting factors in wide application in the area of consumer goods, where cheaper barcodes are still widely used. RFID is currently used in limited scenarios, especially on more expensive objects and goods.

- **Interference with other radio systems**, that are operating in the same frequency ranges as RFID. There are several problems with radio transmission, especially in the UHF ranges. As communication range increases, signal attenuation and distortion occur. The deformation and attenuation of a signal propagated by the so-called surface wave often occurs due to multipath propagation, Doppler effect, polarization losses, shading and presence of electrically conductive elements along its propagation path.

Use cases

- **Visitor Identification (ID)** – children's parks, bobsleds, ski resorts, water parks, etc.
- **Logistics center** – monitoring of goods, pallets, racks, trolleys
- **Goods monitoring** – overview of goods location during transport, logistics
- **Shopping centers** – Anti-theft tags and reaching customers during repeated purchases. (in-clothing RFID tags, customized offers, connection with CMS and customer / benefit cards.)
- **Power tools and constructions** – construction tool rental, construction tool registration, etc.
- **Hotels and wellness** – sport equipment rental, towels, bathrobes, scooters
- **Automated production** – Belt conveyors – information about what is produced and what components to use
- **Industrial production** - monitoring the frequency of tool usage and location in real time
- **Transport of food or medical supplies** - monitoring the temperature range during transport
- **Animals monitoring** - farms, animal rescue stations
- **Competition timekeeping** - including the recording of intermediate times of each track check point
- **Employee attendance systems** - working hours monitoring, documents for wage calculation, records of work tools
- **Libraries** - automatized borrowing process and book logistics

ThingMagic SARGAS 2-Port UHF RFID Reader



The ThingMagic® Sargas reader is a high-performance, 2-antenna-port, UHF reader in a low profile enclosure. Built around the ThingMagic Micro reader module, the device reads more than 750 tags per second at distances over 9 meters (30 feet).

Powerful Processor

- Sargas is outfitted with a powerful ARM Cortex processor running Linux and generous amounts of DDR and FLASH memory, allowing complex on-reader programs to be loaded and written with the aid of ThingMagic's MercuryAPI.

RAINstream Compatible

- All settings, including those for RAINstream, can be configured via a web interface sourced by the reader. This interface also permits the administrator to view status, upgrade firmware, run diagnostic tests, and test reading ability.

"Tagnostic"

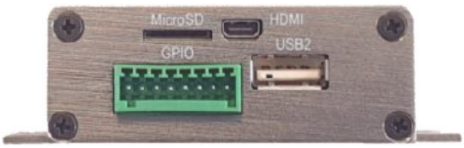
- ThingMagic Sargas supports the entire suite of RAIN UHF RFID tag functionality, including Gen2V2 security. It also supports custom features from a wide variety of tag vendors, enhancing functionality for specialized applications. Optional, non-RAIN tag protocols are also available, including ISO 18000-6B, and read-only support for IP-X and AEI ATA.

Common Language

- Mercury API, ThingMagic's universal programming interface, permits easy software portability across the entire ThingMagic product line – between finished readers and embdedded modules.

Multiple Data interfaces

- Multipurpose client and host USB Ports, an SD card slot, and high voltage, opto-isolated general purpose I/O ports allow Sargas to support a wide variety of applications.



RAIN RFID

Technical parameters

Physical					
Dimensions (no connectors)	87 mm (D) × 80 mm (W) × 24 mm (H) (3.4 × 3.1 × 0.94 in)				
Weight	270 g				
Tag / Transponder Protocols					
RFID Protocol Support	EPCglobal Gen 2V2 (ISO 18000-63); ISO 18000-6B (optional) IP-X (optional, read-only); AEI ATA (optional, read-only)				
RF Interface					
Antenna Connectors	2× RP-SMA				
RF Power Output	Read and write levels adjustable from 0 to +30 dBm				
Frequency Range per Region	ETSI 865-868 MHz (EU), FCC 902-928 MHz (Americas), MCITT 865-867 MHz (India), MIC 916.8-920.8 MHz (Japan)				
Data and Control Interfaces					
Control/Data Interfaces	RJ45 (10/100 Base-T Ethernet), USB Type B (client console, memory stick and RNDIS port), USB Type A (accessory port), Micro SD and Micro HDMI				
GPIO Sensors and Indicators	8-Pin connector provides: 2× opto-isolated Inputs, 2× opto-isolated Outputs, 5V Source, Isolated and chassis grounds, DC input to set output levels				
User Indicators	Bi-color status LED, Power LED, 2 LAN LEDs				
Power					
Consumption	10 W (15 W max)	External DC power	5 V +/-5 %	AC adaptor	100-240 V, 1A max, 50-60 Hz
Certifications					
Certificates	EU (ETSI EN 302 208 v 3.1.1, RED 2014/53/EU), USA (FCC 47 Part 15), Canada (RSS-210), India (MCITT), Japan (MIC) and China (SRRC). FCC Class B for incidental emissions (EMI) Other regional certifications may be available through reseller partners.				
Safety & Other	ROHS compliant, IEC 60950-1 (ed. 2), CA-10430-UL				
Temperature	Operating -40° C do +60 °C, Storage -40° C do +85 °C				
Humidity	5%-95% non-condensing				
Performance					
Max. read rate	>750 tags / second				
Max. read range	>9 meters (30 ft) with 9 dBiC or 6 dBiL antenna				
API					
Direct Communication	Low Level Reader Protocol (LLRP) v1.1				
Host API	Mercury API: Java, C, C#/.NET				
On-Reader API	Range of languages compiled with C/Java API				
Communication Channels	USB Keybord emulator, Streaming to USB COM port, Network Telnet, Network HTTP port				
Mercury OS Features					
Networking	DHCP and DNS-based configuration and firmware management, TCP/IP networking stack, optional Wi-Fi support through external 3rd party USB adapter				
Security	SSL/SSH-based security				
Web-based management	Configuration, monitoring and reading from web browser via HTTP (HTTPS)				
Architecture					
O/S	Debian Linux kernel v3.8				
Processor	1 GHz TI ARM Cortex-A8 (AM335x)	RAM	512 MB	Flash memory	4 GB

CZ: +420 556 621 030
INT: +420 556 621 020

CZ: obchod@sectron.cz
INT: sales@sectron.cz

SECTRON s.r.o.
Josefa Šavla 12, 709 00 Ostrava, Czech Republic