# SpringSeed M519
OEM RFID/NFC HF Module

High-end & Versatile

OEM RFID/NFC HF MODULE

SpringSeed M519 is SpringCard's newest **OEM RFID/NFC HF module**. **High-end** and **versatile**, it is designed to be integrated with an **external antenna** in systems or other equipment and communicate with contactless cards, RFID tags, NFC tags as well as NFC smartphones.

It is part of the new OEM range and like its counterparts it is a **multi-role** module that can be very easily configurable on our **Companion** software. The **SpringSeed M519** is also able to read and retrieve NFC pass information from **Apple and Google Wallet apps**.
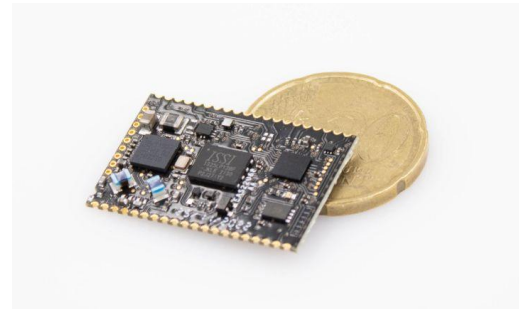
SOME TYPICAL APPLICATIONS

- Fidelity & traceability,
- Inventory management, logistics, security,
- Physical access and company badge,
- Transport terminals, mobility,
- Vending machines, kiosks, checkouts,
- Leisure entrances: amusement park, theater, stadium, sport etc.
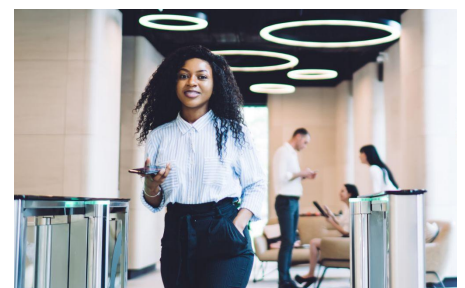
And even more … see our use cases.

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FEATURES

- Small size (max) : 26.7 x 17.78 x 2.7 mm, 1.27mm pitch,

- Great Hardware Integration Flexibility : all components on top-side, pads on bottom-side optimized for direct soldering on PCB, half-holes on both sides optimized for through-hole mounting on headers,

- Energy efficiency: single 3.3V or 5V power supply (direct USB power supply possible), consumption < 500µA in active standby (wake up < 10ms when approaching a card), consumption < 200µA in deep standby, only 50 to 80mA when active (in eco mode) depending on antenna size,

- Compatible with a wide range of balanced antennas, practical range of 2 cm to 12 cm depending on antenna choice, 2W output RF power allowing a greater operating range and/or a smaller antenna than competition,

- Automatic and dynamic adaptation of power and waveforms according to antenna characteristics and environment, high sensitivity receiver with improved immunity against electromagnetic noise (especially when installed near a TFT display),

- Compliant with all NFC & RFID HF standards (ISO/IEC 14443, ISO/IEC 15693), support for all standard cards (NXP MIFARE® Ultralight, NTAG, MIFARE® DESFire, NXP ICODE-SLI, Infineon, …),

- Designed for EMV CL, NFC Forum, CEN/TS 167984 (RCTIF) compliance,

- Supports Apple Enhanced Contactless Polling (ECP1 & ECP2),

- Optimized architecture for secure transactions: Secure Element ECC for secure reading of Apple VAS (PassKit) and Google Smart Tap, random number generator (TRNG), AES Accelerator, protected storage for MIFARE® DESFire®keys, MIFARE Plus®…

- Card emulation mode with active back-modulation for optimized range against smartphones,

- ISO/IEC 7816 smart card interface for 1 to 4 ID-000 SIM/SAM slots and/or one ID-1 slot,

- 100% configurable operation: Coupler (reader/encoder) or Smart Reader (stand-alone reader) able to extract the relevant data for the application,

- USB: CCID PC/SC profile on USB directly supported by Windows, Linux and macOS, HID profile (keyboard emulation), CDC profile (virtual serial port)

- Serial link: SpringProx and RDR profiles compatible with previous SpringCard products generations, innovative and scalable serial CCID profile

- Complete software suite and SDK available 100% free of charge,

- Fast in-the-field firmware update through main communication interface, requiring no hardware manipulation,

- Reconfiguration possible with a configuration Master Card directly via NFC/RFID HF interface

- Fast and powerful MCU making M519 a future-proof solution.

ABOUT SPRINGCARD

Designed and manufactured in France by experts whose sole mission is to improve the identification of people, SpringCard products are reliable and innovative. These same experts anticipate the identification needs of tomorrow every day thanks to their know-how in the field of contactless technology. With over 23 years of expertise in RFID/NFC technologies, SpringCard is the right partner for your project.

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TECHNICAL DATA

NFC/RFID HF interface in Coupler or Smart Reader mode	
Main features	Carrier frequency 13.56MHz Max power 2W (Imax = 250mA) Ultra-Low Power Card Detection (U-LPCD)
Standards	ISO/IEC 14443 A & B (PCD) / NFC-A and NFC-B ISO/IEC 15693 (VCD) and ISO/IEC 18000-3M1 / NFC-V ISO/IEC 18000-3M3 (RFID HF) / EPC HF JIS X 6319-4 / NFC-V
Other protocols	Innovatron (Calypso cards) ? MIFARE Classic® with CRYPTO1, all MIFARE® & NTAG range NFC Forum types 1, 2, 3, 4 and 5 FeliCa Lite Inside Secure PicoPass / HID iClass (ID only)
Card/tag baudrate	26, 53, 106, 212, 424, 848 kbit/s depending on the protocol
Supported protocols and cards	Innovatron (Calypso cards) NFC Forum types 1, 2, 3, 4 and 5 MIFARE Classic® with CRYPTO1, all NXP MIFARE® range, MIFARE Plus®, MIFARE® DESFire®, NTAG, ICODE… STMicroElectronics SR & LR… Infineon SLE44, SLE66, SRF55… Texas Instrument Tag-it Sony FeliCa Lite Apple ECP, Apple VAS, Google Smart Tap and other NFC applications Inside Secure PicoPass / HID iClass (ID only)
HF NFC/RFID interface in emulation and peer-to-peer mode	
Standards	ISO/IEC 18092 (NFCIP-1) ISO/IEC 14443 A (PICC) / NFC Forum Type 4A
Card/tag baudrate	106 kbit/s (PICC) 106, 212 ou 424 kbit/s (P2P)
Compatible antennas	
SpringCard antennas SCxxxx (69 x 45 mm), SCxxxx (80 x 80 mm), SCxxxx (25 x 25 mm) Max distance module/antenna = 20 cm subject to suitable routing / shielding Possibility to design a custom balanced antenna	
Smart card interface	
Standards	ISO/IEC 7816-2, -3 et -4, protocols T=0 et T=1 HSP (SAM Calypso)
Clock	4 MHz
Bauds	De TA1=11 à TA1=97 (500kbps @ 4MHz)

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Compatible smart card accessories
SCxxx (1 slot ID-000 SIM/SAM) or SCxxx (1 slot ID-1 contact card + 4 slots ID-000 SIM/SAM) expansion cards Possibility to drive - directly : 1 SAM in class B (3.3V) - via NXP TDA8035 interface : 1 SAM in class A/B/C (5V, 3.3V or 1.8V) - via NXP TDA8026 interface : 1 contact card + 4 SAM in class A/B/C (5V, 3.3V or 1.8V)

Interfaces to the host system

Serial	RS link at 3.3V level tolerant to 5V (CMOS / TTL) Data rates: 9600, 38400, 115200 and 500000 bps Protocols: SpringProx, CCID over Serial, RDR MK1, $SCRDR, JSON
USB	Standard USB 2 (compatible 3) full speed (12Mbit/s) CCID, HID, CDC-ACM, SpringCore Direct profiles CCID usage: PC/SC 2 Use on HID: keyboard Usage on CDC: SpringProx or RDR MK1 protocol, $SCRDR, JSON Usage on SpringCore Direct: configuration, update (DFU), RDR TLV
Others	SPI slave (RFU) Data+Clock or Wiegand on GPIO 5 and 6

Peripherals, connectivity and scalability

6 GPIO inputs/outputs at 3.3V level
I2C master bus to drive TDA8035 / TDA8026 smart card interfaces, LCD display or other peripherals
Auxiliary serial port

Electrical and environmental features

Power supply	3.3V or 5V, powered possible by USB VBUS
Current consumption	*with 69 x 45mm reference balanced antenna* *Typical value = average over one second, excluding peripherals and accessories*

	@ 3.3V		@ 5V	
	Typ.	Max	Typ.	Max
Deep sleep	100µA	250µA	100µA	250µA
Active watch (LPCD)	500µA	4mA	500µA	4mA
RF active, eco mode	80mA	300mA	80mA	300mA
RF active, normal mode	160mA	300mA	160mA	300mA
RF active, boost mode	240mA	300mA	240mA	300mA

Temperature	Operating: -25°C à +80°C Storage : -40°C à +85°C
Humidity	0 à 95% (non condensing)

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Dimensions (max)	26.67 x 17.78 x 2.7 mm
Pin	40 pins Ø 0.6 pitch 1.27 mm (1.05mm pellets) Edge plated pads for easy and reliable PCB mounting
Poids	Approx. 1.4 g
MTBF	500 000 hours

Standards and certifications
Module only: REACH, RoHS-III, WEEE Module + 69 x 45 mm reference antenna: CE/RED, FCC Depending on antenna and on request: EMV CL L1, CEN/TS16794, RCTIF, NFC Forum CR13

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