11
Considerations
for EMBEDDED SYSTEM RFID READERS

Radio-frequency identification (RFID) is widely used for user identification and access control for applications ranging from doors to secure printers to self-service ticketing kiosks. RFID is a simple, secure and convenient access control solution for end users and original equipment manufacturers.

RFID readers/writers come with a broad range of form factors, capabilities and configurations. When choosing a reader to embed into a system or device, it is important to make sure it fully meets all of your design specifications. You also need to make sure it will continue to meet your needs for years to come as device specification and end user requirements change.

Here are 11 considerations for product managers, embedded system engineers and solution architects when choosing an RFID design-in module solution.

Questions to Ask	ELATEC Options
Does the reader support all of the card technologies used by your customers? **How much diversity exists in card technologies used by your client base?** **How many clients need to support multiple card technologies across their organizations?**	• Single- and multi-frequency devices available • "Universal" multi-frequency devices work with 60+ card technologies • Read and write to LF (125 kHz) and HF (13.56 Mhz) tags and/or labels • Supports all major transponders from suppliers including ATMEL, EM, ST, NXP, TI, HID, LEGIC, etc.

**1
Transponder Technologies**

	Questions to Ask	ELATEC Options
2 **Mobile Device Access**	**Does the reader support smartphone authentication for users wanting mobile device access?** **Do you anticipate your client base shifting to smartphone authentication in the future?**	• Multi-frequency readers can be configured for both Near-Field Communication (NFC) and Bluetooth® Low Energy (BLE) technologies • Readers available with Integrated BLE module 2.4 GHz for data communication and authentication, Bluetooth® v4.2, upgradable
3 **Adding Transponder Technologies**	**Do you anticipate needing to add new transponder technologies in coming years?** **Does the reader support addition of new transponder technologies after installation?**	• Multi-frequency readers can be easily reconfigured for new transponder technologies • Contactless updates reduce labor requirements for adding technologies to installed base
4 **Post-Installation Reconfiguration**	**How easy is it to reconfigure the reader after installation?** **Does the reader support contactless upgrades and configuration in installed devices?** **Does the reader support remote configuration?**	• Supports quick remote (re) configuration over network and with wireless interface with CONFIG Card

5 **Customization**	**Does the reader have reconfiguration flexibility for integration?**
	
	How does the reader integrate with hardware systems or back-end software
	
	Can the communication or security protocols be customized
	
	Does the reader have the ability to control user feedback (e.g., lights or sounds)
		• ELATEC readers are customizable; firmware writeable. The open API's are available to create custom C-based apps
		• 10 universal comms interface capabilities
		• BLE can also function as a communications channel
		• Extensive modes of operation options:
		  + Keyboard wedge
		  + CDC
		  + CCID/PCSC
		  + Host controlled

6 **Hardware Communication Interface**	**Is the communication interface for the reader compatible with the requirements of your system?**
	
	How much flexibility do you have in choosing a hardware interface?
		• Readers available with commonly used interfaces globally, including:
		  + USB
		  + RS-485 (OSDP protocol available)
		  + RS-232
		  + Wiegand
		  + Clock/Data
		  + I^2C
		  + SPI

	Questions to Ask	ELATEC Options

7 Form Factor

Does the reader fit into the form factor of your device?

Will the size or form factor of the reader require design alternations to accommodate?

- ELATEC readers are available in a range of sizes and form factors for easy integration into many device types and applications
- Full-featured antenna-less TWN4 MultiTech Nano just 31 x 17.8 x 2.7 mm / 1.22 x 0.7 x 0.12 inch
- Readers available with or without housing
- Housing options for wall-mount and panel-mount with or without lighting

8 Internal vs. External Antenna

Do you intend to develop your own external antenna with an RFID engine/module or do you need a finished product with embedded antennas?

When do you choose a device that has integrated antennas over developing an external custom RF antenna?

How can RFID modules without antennas be integrated?

- ELATEC readers are available both with and without an integrated antenna
- Readers with integrated antennas already have certifications available, whereas external antennas enable control over read range and other form factor considerations but will require certification
- Devices without antennas must be installed on the PCB or connected with a cable. Ideal when there are special requirements for installation area or higher security requirements

9 Operating Power and Consumption Requirements

Does the reader meet voltage requirements for your device?

How much power does the reader consume when in use?

How much power does the reader consume when not active?

- Very low operating power requirements
- 3.3 V or 4.3 V - 5.5 V. There's also products that support 9-30 V voltage levels
- Very low current consumption (~140 mA when RF field on)
- Sleep mode setting curtails power consumption to as low as 500uA when not active

Questions to Ask	ELATEC Options

10 Security

Does the reader support advanced encryption to reduce the risk of card cloning or data interception?

Are encryption keys stored securely?

Is the API customizable for my evolving security requirements?

- ELATEC readers contain popular encryption engines such as AES, DES & 3DES that can be accessed by means of high-level APIs
- Allows implementation of custom encryption schemes through C based applications that execute on the reader
- Secure portion of memory in flash. Once programmed, config data and keys cannot be read out or tampered with
- Communicates to host with encrypted data
- Can perform MFA on readers, eg DESFire and SAM AV2 for authentication

11 Certifications and Compliance

What kinds of certifications and standards must your device meet to sell into your target markets?

Does the reader meet all certification and compliance requirements?

- Meets ISO standards ISO14443A/B (T=CL), ISO15693, ISO18092 / ECMA-340 (NFC)
- Modular certification in as many as 110 countries globally

ELATEC specializes in advanced, contactless user authentication and access control solutions. The company is an international leader in the field of multi-frequency/multi-standard RFID / NFC / BLE readers. The company was founded in 1988 and has seventeen locations worldwide. ELATEC GmbH headquarters are in Munich, Germany and ELATEC Inc headquarters are in Palm City, Florida, USA.

SELECTION OF ELATEC'S PRODUCTS
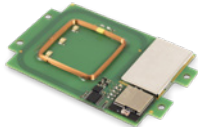
TWN4 MULTITECH 2 OEM PCB

Powerful and flexibly programmable all-in-one reader for LF, HF, NFC and optional Bluetooth.

TWN4 MULTITECH HF MINI

Compact and flexible OEM board to add RFID capabilities to machines, handheld computers or any other human interface devices.

TWN4 MULTITECH 3 BLE

Space-saving design combined with support for all three RFID frequencies and Bluetooth (BLE).

TWN4 PALON COMPACT

TWN4 based reader with BLE and enhanced interfaces (RS485, RS232, Wiegand, Clock/Data) for OEM integration, i.e. front panels for access control, time and attendance.

TWN4 MULTITECH CORE MODULE

Compact OEM board to add RFID capabilities to electronic components, devices and systems.

TWN4 MULTITECH NANO

Extremely small and compact board to add RFID capabilities to any OEM products and therefore ideal for all mobile and battery operated applications.

TWN4 MULTITECH 2 DESKTOP READER

This all-in-one proximity reader can be connected through UART, USB and Ethernet. Available as PCB and with Desktop housing.

TWN4 USB FRONT READER

Flexible, convenient and cost-effective reader which can be easily connected to an external USB port.

TWN4 SLIM

Extremely slim and small full TWN4 reader for stand-alone operation, printer integration and industry applications as well.

For the complete ELATEC product catalogue, visit elatec.com.

OPEN UP A WHOLE NEW WORLD OF ACCESS CONTROL

Machine authentication

Driver identification

Physical access

Secure printing

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EV charging

Vending and ticketing

Fitness equipment

Single sign-on

Time and attendance

Fleet management

Gaming

Bike/car sharing

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