

# Module Integration Guide

HF RFID Reader Module  
#70152029 PH RADIO MODULE IQR3-FP  
FCC ID: IREIQR3FP  
IC ID: 7037A-IQR3FP

|                                                                                                          |                                        |         |                  |
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# 1 General Description

## 1.1 Module description

The module operates in the 13.56MHz HF frequency range and is optimized for use in industrial applications involving high distances. The device reads and writes passive tags in line with ISO 15693. The module can be used in the United States and Canada. The module is compliant with the relevant transmission regulations. The user can add LEDs to monitor the status of the module. The module has a typical detection range of around 30cm. This range is determined by the tag used and can be adjusted by configuring the transmission power. Other range influencing factors include the transponder size, the setup and installation of the specific application and the surrounding materials, particularly metal. For the actual read and write distances under real conditions, the combination of module and tag must be tested in the desired application. The radio module can be interfaced to various industrial busses by host product.

## 1.2 Module features

- Flexible HF read/write module with high distance detection range
- Integrated coil antenna (magnetic near field)
- Multi-tag reading of up to 20 tags ensures increased productivity
- Provides simple interface for host products

## 1.3 Qualified personnel

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation. Prior to using the product make yourself familiar with it. Read the document carefully.

## 1.4 Environmental conditions

Operating or storing the module outside the specified range may damage the module. Also this could lead to incorrect operation of desired module functionality. To reach full temperature range a potting will be needed for end product, which allows better cooling of electronic.

Table 1 Environmental operating conditions

| Absolute maximum rating                               | Value         |
|-------------------------------------------------------|---------------|
| Operation temperature (with non-transmission periods) | -25 ... +70°C |
| Operation temperature (Continuous transmission mode)  | -25 ... +55°C |
| Storage temperature                                   | -40 ... +85°C |

|                                                                                                          |                                        |         |                  |
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1.5 Module components

The radio module consist of 2 assembled PCBs with the electronic components and integrated coil antenna. On the electronics PCB are multiple shields used to cover RF sensitive parts. The host system is connected via 2x8Pin connector. Additional LEDs may be connected to module for visualization of module state.

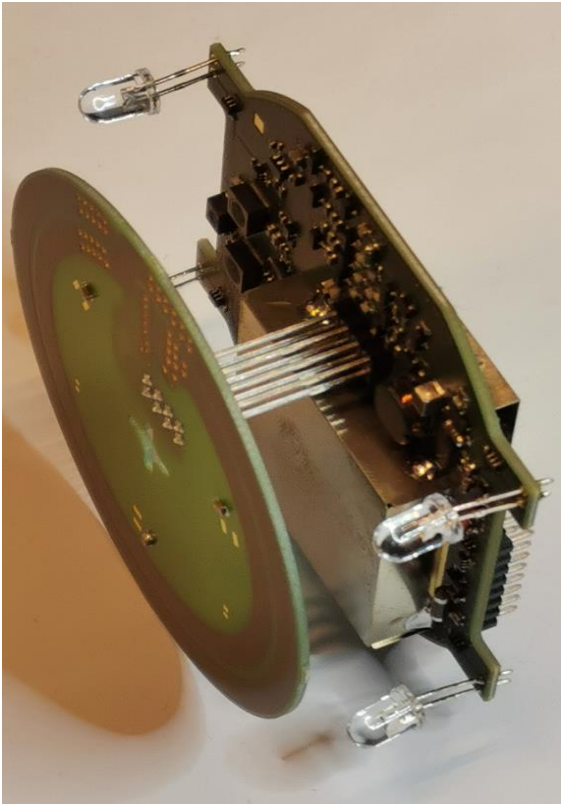


Figure 1 stack up of radio module

|                                                                                                                      |                                        |         |                  |
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## 1.6 Interfacing of module

The interfacing of module is made in host product, which provides the typical 24V supply to the module. Also the digital interface of RFID reader is interfaced via serial interface at CMOS Levels. The housing of module is designed to be able to contain the host product as well and a variable amount of external connectors.

## 1.7 Labeling

**#70152029**  
**FCC ID: IREIQR3FP**  
**IC ID: 7037A-IQR3FP**  
**PMN: IQR3FP**  
**HVIN: IQR3FP**

*Figure 2 labeling of module*

The labeling of the module is applied on the shielding of module.

## 1.8 Mounting module inside host

### 1.8.1 PCB outline of module for host integration

A 3D model of module can be requested by module integrator under a non-disclosure agreement.

### 1.8.2 Position of host interface connector

A 3D model of module containing position of interface connector can be requested by module integrator under a non-disclosure agreement.

|                                                                                                          |                                        |         |                  |
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## 2 Electrical characteristics

### 2.1 Maximum Ratings

Table 2 Electrical operating conditions

| maximum ratings                 | Value                                                       |
|---------------------------------|-------------------------------------------------------------|
| Supply voltage                  | typical 24V DC,<br>range of 8 ... 33V DC (absolute maximum) |
| All digital interfacing signals | 3.3V LVCMOS                                                 |

### 2.2 Pin definition

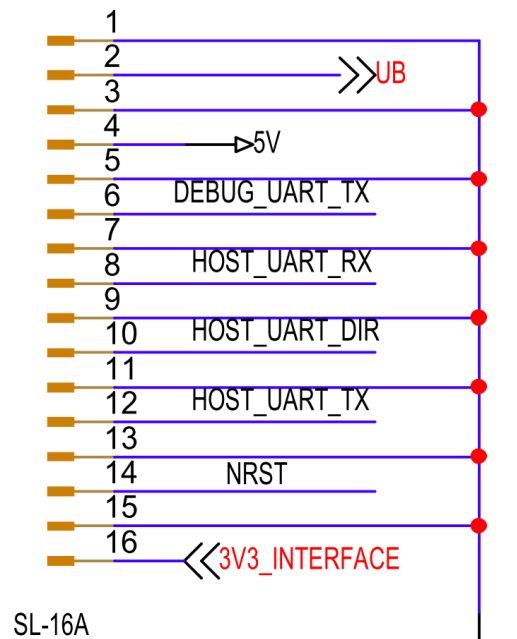


Figure 3 Pinning of module to host connection

Table 3 Pinning of module to host connection

| Pin | Usage radio module         | Direction     | Usage host                         | Level        |
|-----|----------------------------|---------------|------------------------------------|--------------|
| 1   | GROUND                     | Bidirectional | GROUND                             |              |
| 2   | Supply voltage into module | To module     | Provide supply here                | 8 ... 33V DC |
| 3   | GROUND                     | Bidirectional | GROUND                             |              |
| 4   | 5V supply output           | To host       | max 100mA supply for host          | 5V           |
| 5   | GROUND                     | Bidirectional | GROUND                             |              |
| 6   | Reserved                   |               | DO NOT CONNECT                     |              |
| 7   | GROUND                     | Bidirectional | GROUND                             |              |
| 8   | UART                       | To module     | Serial data from host to module    | 3.3V LVCMOS  |
| 9   | GROUND                     | Bidirectional | GROUND                             |              |
| 10  | UART direction             | To host       | Low = RX/ High = TX is active      | 3.3V LVCMOS  |
| 11  | GROUND                     | Bidirectional | GROUND                             |              |
| 12  | UART                       | To host       | Serial data from module to host    | 3.3V LVCMOS  |
| 13  | GROUND                     | Bidirectional | GROUND                             |              |
| 14  | RESET input                | To module     | Pull to low level, to reset module | 3.3V LVCMOS  |
| 15  | GROUND                     | Bidirectional | GROUND                             |              |
| 16  | 3V3 supply output          | To host       | max 50mA supply for host           | 3.3V         |

|                                                                                                          |                                        |         |                  |
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## 2.3 Supply voltage

Nominal power supply voltage is 24 VDC; voltage range is 8 ... 33 VDC (absolute maximum).  
Supply must be SELV (Safety Extra Low Voltage).  
The current consumption is  $\leq 700\text{mA}$  at nominal voltage 24 VDC.  
The average power consumption is  $\leq 5\text{W}$ .

## 2.4 Data Interface

UART interface is used for module configuration and RFID data transfer.

## 2.5 ESD sensitivity

The digital interfacing signals must be protected against electro static discharge on host side, if made available to end user.

|                                                                                                          |                                        |         |                  |
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### 3 Firmware characteristics

#### 3.1 Description of air interface

For detailed information about the air interface protocol please refer to ISO15693-3 and ISO15693-2.

#### 3.2 Indicator Elements

The module has option to connect 4 LEDs. The basic indicators denote:

- Green LED: Power on
- Blue LED: Transmission mode
- Yellow LED: Read/write operation successful
- Red LED: Error state

#### 3.3 Available UART commands and parameters

The full command and parameter set can be requested under a non-disclosure agreement.

#### 3.4 Special test modes needed for certification

For certification a firmware including test modes can be requested by test laboratory under a non-disclosure agreement. This firmware will not be available for end user.

|                                                                                                          |                                        |         |                  |
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# 4 FCC Regulatory Information

## 4.1 User Guide Requirements

### FCC Information

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### FCC Notice

To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

### FCC Exposure Information

This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas être placé au même endroit ou utilisé simultanément avec un autre transmetteur ou antenne.

### Warning!

#### Malfunctions with pacemakers

This device does not exceed the permissible limits for electromagnetic fields. Maintain a minimum distance of 30 cm between the device and your pacemaker. Inadequate distance from the transmitter antenna can result in inhibitions, reprogramming, or incorrect stimulation pulses.

## 4.2 Labeling Requirements

Contains FCC ID: IREIQR3FP

## 4.3 Approved Antennas

Only module internal antenna can be used.

|                                                                                                          |                                        |         |                  |
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# 5 IC Regulatory Information

## 5.1 User Guide Requirements

### IC Information

This device complies with Industry Canada license exempt RSS standard(s) and with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause interference, and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### IC Exposure Information

This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas être placé au même endroit ou utilisé simultanément avec un autre transmetteur ou antenne.

### Warning!

#### Malfunctions with pacemakers

This device does not exceed the permissible limits for electromagnetic fields. Maintain a minimum distance of 30 cm between the device and your pacemaker. Inadequate distance from the transmitter antenna can result in inhibitions, reprogramming, or incorrect stimulation pulses.

#### Dysfonctionnement du stimulateur cardiaque

Cet appareil ne dépasse pas les limites admissibles pour les champs électromagnétiques. Maintenez une distance minimale de 30 cm entre l'appareil et votre stimulateur cardiaque. Si la distance à la tête d'émetteur est trop courte, des impulsions d'inhibition, de reprogrammation ou de stimulation incorrecte peuvent se produire.

## 5.2 Labeling Requirements

Contains IC: 7037A-IQR3FP

## 5.3 Approved Antennas

Only module internal antenna can be used.

|                                                                                                          |                                        |         |                  |
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## 6 Change history

| Version  | Date       | Author         | Remarks                      |
|----------|------------|----------------|------------------------------|
| 14-4772  | 2023-01-03 | Martin Schmitt | Initial released version     |
| 14-4772A | 2023-03-31 | Martin Schmitt | Updated exposure Information |
|          |            |                |                              |
|          |            |                |                              |
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