Honeywell

IM21-PRT RFID Module

User Guide

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Technical Assistance

To search our knowledge base for a solution or to log into the Technical Support portal to report a problem, go to www.honeywell.com/PSStechnicalsupport.

Product Service and Repair

Honeywell International Inc. provides service for all of its products through service centers throughout the world. Go to www.sps.honeywell.com and select Support to find a service center near you or to get a Return Material Authorization number (RMA #) before returning a product.

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CHAPTER

1 INTRODUCTION

This User Manual specifies the details for a IM21-PRT RFID MODULE. The module is meant for Honeywell products only (Not to be sold outside).

Overview

IM21-PRT RFID Reader Module is designed for quick integration into computers, printers, and any other products that need to be RFID-enabled. The IM21 includes these features:

- Allows the RFID-enabled product to read and write to tags used in most worldwide applications:
- Covers UHF bands from 865 to 928 MHz Supports four channel operation over the 865 to 868 MHz band, support 4 channels as per ETSI 302208.
- Supports 50 channels in the FCC band from 902 to 928 MHz
- Supports the ISO 18000-6c protocol (EPC Class 1, Gen 2)
- Supports the BRI (Basic Reader Interface) host communication protocol.
- Supports 2 RFID Antenna Ports (SISO mode with only one port activate at a time)
- Wide useable range 2dBm up to 30dBm
- Best in class receiver sensitivity of ~ -82.0dBm @ 10% PER.

CHAPTER

2 TECHNICAL SPECIFICATIONS

Below are the details of technical specifications for the IM21-PRT RFID module

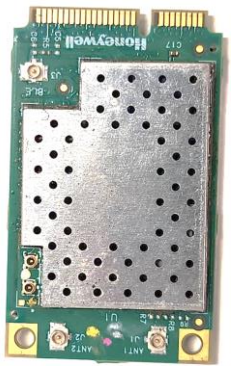
Physical Dimensions

Below are the dimensions & weight for IM21-PRT RFID Modules

Specifications	Length	Width	Height
Physical Dimension	50.85mm	30.43mm	7.18mm

Specifications	Value
Module weight - (carrier + SOM)	12.77 grams

Rear View



Front View

Environmental Specifications

Specification	Details
Operating Temperature	-20 °C to +60 °C
Storage Temperature	-40 °C to +70 °C
Humidity	25 °C to 60 °C, 0% to 95% relative humidity, non-condensing process
Shock	2000 g, 0.5 ms pulse, 10 times on each axis
Vibration	GRMS. 10 to 500 Hz, in 3 axes
ESD	Passes CE mark requirements. 4 kV contact discharge and 8 kV air discharge, while unpowered.

Power Supply

Specification	Min	Nominal	Max	Unit	Remarks
Operating Voltage	2.5	5.0	5.2	V	Buck-Boost converter regulates all internal supply voltages need for the module operation
Standby Current	10	..	..	mA	
Operating Current	..	1.3	..	A	Peak current @ Max Power (~29.5dBm)
Ripple	..	100	..	mV	
Enable to Active	...	5	...	sec	Only at Initial Power up
Standby Active	1.5	2	...	msec	An internal time, not seen by the host
Channel Switching	...	30	...	µs	Tx on a channel to TX on any other channel

Transmitter Specifications

Specification	Details
Output Power Control	29.5 dBm. User adjustable in 1 dBm down to 10.5 dBm. Tolerance drift from +0.5 to -0.7.
Bus Interface (USB or serial)	USB 2.0 compliant client 12 Mbps (full speed) Serial 115.2 Kbps
RF Output Impedance	50 Ohms with better than 10 dB return loss
Modulation	PR-ASK
Data Encoding	DRM
RF Sensitivity	-82 dBm
Tags/Protocols Supported	EPC Class 1 Gen 2, UHF Version 1.2.0 ISO 18000-6C, NXP SL3ICS1002 G2XM, can read 512-bit extended user memory and custom commands Fujitsu FJ64 Kb, Impinj Monza 4QT
Read Range	>6 m (20 ft), provided that the module: • is using DRM operation mode. • Is connected to an antenna system with 9 dBiC gain (circular polarized). • has no occurrence of multipath or other environmental interference.
Read Speed	>700 tags per second
Performance Testing	AD 223 tags on cardboard

Receiver Specifications

Specification	Details
Sensitivity	-82dBm @ 10% PER
Maximum Reverse Input Power	20.0dBm
Adjacent Channel Rejection	Better than -10dBm
Radio Frequency Intermodulation rejection	Better than -10dBm

CHAPTER

3 INTEGRATION

The module communicates either over USB or through serial:

- The USB client communication is USB 2.0-compliant, operating at 12 Mbps (full speed).

- In Serial mode, the module communicates as a standard PC COM port, operating at 115.2 Kbps. It has eight general purpose inputs and outputs for monitoring and controlling external signals.

Power Requirements

The module operates off power input from 2.5 VDC to 5.2 VDC.

The module handles its own power management and goes into Standby mode automatically when there are no outstanding commands.

However, even in Standby mode, the IM21 immediately responds to host activity, eliminating any potential host timeout conditions.

To achieve an even lower power Standby mode, the host needs to support USB suspend and remote wakeup.

To reduce power, the module duty cycles its transmitter. The duty cycling happens according to the read commands that the application executes.

To achieve the lowest power, after all tags are read, the transmitter turns off. After a period of time, the transmitter activates to identify new tags in the field. After all new tags are read, the transmitter turns off for the rest of the period.

Also, the module automatically reduces the power out if the input voltage is too low or the temperature of the module is too high.

Read Power States

Specification	Level of Consumption
Off Condition	0 (3.3 V turned off to the module)
Deep Sleep	3.3 V on • RF enable = Off • < 3 mA
Idle	3.3 V on • About 10 mA
Read	Max current during tag read about 1.5 A

RFID Antenna's /couplers

The module is intended to operate with following RFID couplers.

Sl. No	Coupler	Design	Make	Model	Max Gain (dBi)
1	PCB – RFID Coupler	Microstrip line fed aperture coupler	Laird Technologies*	MAF95123-1 / 234-079-0600	-19.3
		Microstrip line fed aperture coupler	Laird Technologies*	1-971140-001	-24.2
2		Microstrip line fed aperture coupler	Unictron Technologies*	H2B1JH1A1H0200 / 710000068100	-23.0
3		Loop aperture coupler	Honeywell	LUPUS14V2	-14.0
4		stripline coupler	Honeywell	LUPUS32	-27.2
5		Loop aperture coupler	Honeywell	CORVUS10	-20.5

*Custom design for Honeywell Products only

Agency approvals

FCC ID: HD5-IM21

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy. However, there is no guarantee that interference will not occur in a installation. If this equipment does cause harmful interference to radio or reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced technician for help.

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 my cause undesired operation.

Caution:
MODIFICATION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.

INSTALL & OPERATION: The equipment should be installed and operated with minimum distance 20cm between the radiator & your body

HOST Device shall comply to the Regulation of FCC part15 Rules.

Industry Canada

IC: 1693B-IM21

This device complies with Industry Canada RSS standard(s). 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.

INSTALL & OPERATION: The equipment should be installed and operated with minimum distance 20cm between the radiator & your body

Leprésent appareil est conforme aux CNR d'Industrie Canada applicable 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, meme si le brouillage est susceptible d'en compromettre le fonctionnement."

Cet équipement doit être installé et utilisé avec une distance minimale de 20cm entre le radiateur et votre corps.

HOST Device shall comply to the Regulation of ISED Regulations.

Labelling guidelines for product

The proposed FCC IC label format is to be placed on the module. If it is not visible when the module is installed into the system, “Contains FCC ID: HD5-IM21 , Contains IC:1693B-IM21 ” shall be placed on the outside of final host system.

Étiquetage le format proposé de l'étiquette IC de fac doit être placé sur le module.Si le module n'est pas visible lorsqu'il est installé dans le système, contenant l'ID FCC ID: HD5-IM21 , contenant l'IC: 1693B-IM21 doit être placé à l'extérieur du système hôte final.

Integration guidelines

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

- IM21-PRT RFID Module developed by Honeywell is meant to be integrated inside Honeywell Products such as Portable printers & desktop printers, RFD scanners & handheld devices which shall be tested against the applicable safety norms. The module is not meant to be sold as standalone outside Honeywell.

- The integration shall be done at the factory ensuring all applicable safety norms such as Turn off the Printer and all attached peripherals, Use ESD kit when working to avoid electrostatic discharge (ESD) damage while integration & handling.

- Physical inspection and passive tests (Shorts/open) shall be ensured before powering ON & verifying the RF performance.

- As part of integration process, the module RF power stability shall be verified using the factory tuning procedure. The tolerance for RF power shall be within +/-1dB to meet the regulatory norms.

- The module shall also be verified for proper operation when integrated inside the Product

- The module is meant to be used only with the antennas mentioned in this manual. If there is any requirement for any other antennas shall only be used after re-certification with additional antenna.

Honeywell IM21-PRT RFID Module is designed for Honeywell Products, integrated at controlled Factory where no access to user to change or modify the parameters defined for the module