DOTR-221 READER MODULE USER GUIDE

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Note: FCC Section 15.21

"Changes or modifications not expressly approved by the party responsible for compliance

could void the user's authority to operate the equipment."

Chapter 1

INTRODUCTION

The DOTR-221 module is a compact UHF RFID reader module which is compliant with the ISO-18006C (EPC class1 Gen2) protocol. It is intended to be used in conjunction with the accompanying antenna and a host computer (not supplied). The small physical size allows the module to be easily integrated with a mobile host computer, such as a Personal Digital Assistant. The module is designed to be operated off a single cell lithium ion battery, and has two host interface options: USB and UART.

WARNING

1. ESD precautions: This module contains electrostatic sensitive components. Handle the product at a static-free workstation, and wear a static grounding strap always. Observe standard ESD precautions.

2. This module does not contain fuses or other protective devices. Be extra careful when applying power to make sure voltage and polarity are correct.

3. Do not attempt to open the cover. There are no serviceable parts inside.

4. Provide good thermal conduction of the module or good ventilation around the module. As the module consumes around 4 watts of power, it can be hot when operated continuously. Adequate cooling should be provided to ensure reliability.

5. Do not operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.

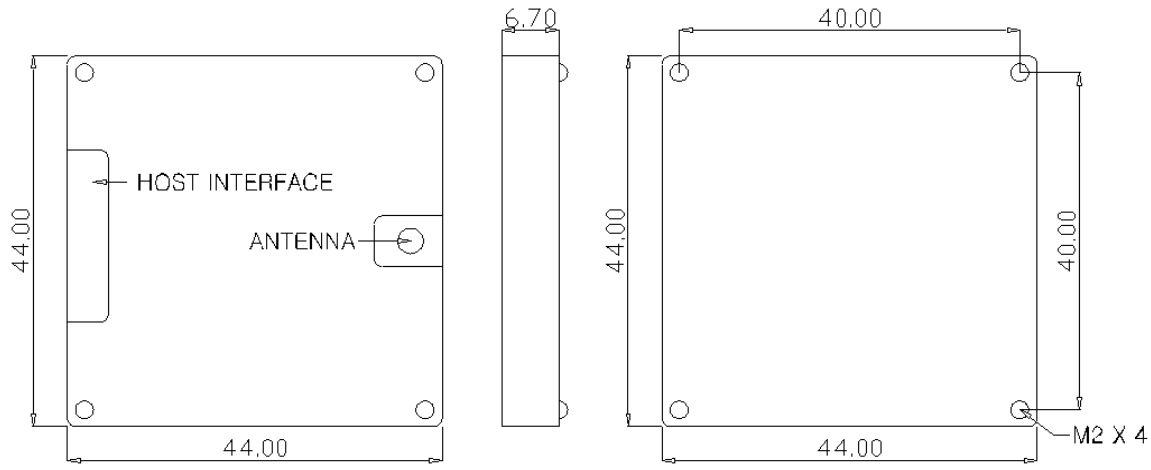
Chapter 2

Specifications

Mechanical Characteristics

Dimension: 44mm X 44mm X 8.1mm
Weight: 20g approx.

Mounting holes: M2 (4 places)



Electrical Specifications

ABSOLUTE MAXIMUM RATING:
Power Supply Voltage: 4.2V DC max
Control / UART port voltage: -0.3 ~ +3.9VDC
USB pin Voltage; -0.3 ~ +5.3VDC
Operating Temperature: 55 deg C
Storage Temperature: -40 to 70 deg C (non-operating)

Note: Stress above the maximum rating may cause permanent damage. Exposure to the maximum rating for extended periods may degrade reliability.

Performance Characteristics Summary

Power Supply Voltage: 3.4V to 4.2V DC
Power Consumption: 1.2A max.
RF Output Power: 0.6W (27.8dBm) ± 1dB
RF Frequency: 902.75MHz to 927.5MHz (50 frequency hopping channels)
Antenna Port Impedance: 50 Ω Unbalanced
Recommended Return Loss of Antenna: 20dB
Air Interface Protocol: ISO-18006C (EPC C1 Gen2)
Host Interface: USB (Full speed 12Mbps)
UART(115.2kbps, 8N1, No Flow Control)
Logic Level 3.3V nominal

Electrical Connector
Manufacturer: Molex
Part Number on Reader Module: 53261-1271
Mating Connector: 51021-1200 (with 50125 terminals)

Antenna Connector: Hirose U.FL

DETAILED ELECTRICAL SPECIFICATIONS

1. RF FREQUENCY CHANNELS

CHANNEL	FREQ (MHz)	CHANNEL	FREQ (MHz)
1	902.75	26	915.25
2	903.25	27	915.75
3	903.75	28	916.25
4	904.25	29	916.75
5	904.75	30	917.25
6	905.25	31	917.75
7	905.75	32	918.25
8	906.25	33	918.75
9	906.75	34	919.25
10	907.25	35	919.75
11	907.75	36	920.25
12	908.25	37	920.75
13	908.75	38	921.25
14	909.25	39	921.75
15	909.75	40	922.25
16	910.25	41	922.75
17	910.75	42	923.25
18	911.25	**43**	**923.75**
19	911.75	**44**	**924.25**
20	912.25	**45**	**924.75**
21	912.75	46	925.25
22	913.25	47	925.75
23	913.75	48	926.25
24	914.25	49	926.75
25	914.75	50	927.25

CHAPTER 3

HOST INTERFACE

3.1 CONNECTION

PIN	NAME	I/O	Description
1	BAT	In	VCC SUPPLY , +3.7V input
2	BAT	In	VCC SUPPLY , +3.7V input
3	USB_M	I/O	USB Interface
4	USB_P	I/O	USB Interface
5	GND	Common	Ground
6	GND	Common	Ground
7	GND	Common	Ground
8	TXD	Out	UART TX Data
9	RXD	In	UART RX Data
10	GP0	In	Enable (Applying 3.3V will enable the module)
11	GP1	In	Reserved for FACTORY USE. DO NOT CONNECT TO ANYTHING.
12	USB 5V	In	USB Vbus Voltage (+5V). This pin is for sensing the USB Host only. The module is not powered from this voltage.

Notes:

1. All of the supply pins (Pins 1,2, 5, 6, and 7) must be used in order to minimize voltage drop at the connector junctions.
2. TX / RX and I/O classification is from the module's point of view.
3. Leave pin 11 open. Do not apply any voltage, or the module will become non-functional.

3.2 TTL INTERAFACE

UART communication is provided on the TXD and RXD lines. Baud rate is

fixed at 115.2kbps and no handshaking (8 data bits, no parity, 1 stop bit).
Details for communication protocols are described in the software chapter.

3.3 USB Interface

The module provides full speed compliant USB interface (12Mbps).
Note: The module is set to communicate via UART port at the factory.

CHAPTER 4

Operation

4.1 Antenna Connection

A good antenna must be connected before applying power. The antenna must have a low VSWR value (less than 1.25) in the entire frequency range of 902 through 928MHz to ensure maximum read range performance. Care should be taken when connecting the antenna cable to the antenna connector, as the antenna connector is very small and fragile.

4.2 Power Supply

The reader module is designed to operate off 3.7V nominal supply voltage which is typically available from a single cell lithium ion battery. Other power sources can be used as long as it is within the specified voltage range of 3.4V to 4.2V. Care must be excersized for correct polarity. Pins 5, 6, 7 and the housing are ground while Pins 1 and 2 should be connected to +3.7V.

4.3 GP0 and GP1 ports.

GP0 (Pin 10) port is an active high enable control to power up the reader module. A logic voltage above 2.5V (?) will turn on the reader while level below 0.5V (?) will turn off the reader. GP1 (Pin 11) should be left open for internal pull-down to work. Pulling the GP0 and GP1 ports to a high level will erase entire contents of internal flash memory. This mode is used at the factory. Consult with the manufacturer to use this function.

4.4 TXD and RXD ports

TXD (Pin 8) and RXD (pin 9) are UART communication ports and TX/RX notation is from the reader module's point of view. These ports provide a single speed (115.2kbps) serial communication without flow control, and the nominal logic level is 3.3V. While the module has a provision for USB

interface, UART communication is the default mode of communication with the host.

4.5 USB port

Pin 3 (USB-M), Pin 4 (USB-P) and Pin 12 (USB +5V) provide connection to a USB host at full speed. USB +5V line is used to detect the USB host and does not consume power.

4.6 Installation of software

4.6.1 Application software package

The application software consists of several dlls and applications.

These are rfidhost.inv.exe, rfidhost.test.exe, cpl.dll, rfidtx.dll, rfid.dll and profiler.dll. Also USB device driver is included

4.6.2 Installing the USB Communication-Bus Driver on Windows XP

The RFID Radio Module is a USB Plug-and-Play device. Installation of the driver on Windows XP is a simple procedure:

1. Plug the RFID Radio Module into a USB port on the machine where you have installed the application software.
2. When asked to specify additional locations to search for driver software, enter APP_DIR\USB.Driver.
3. When shown a list of devices to select, select the device labeled: UsbHarve.Sys for Intel Harve RFID MAC
4. This driver has not been signed by Microsoft; When asked, continue with installation of the unsigned driver

CHAPTER 5

Quality Policy

D.O.Tel's quality policy is that we are committed to meet and exceed our customer's requirements and expectations of all our products and services. We strive to understand, maintain, communicate and continually improve our quality management system.

CUSTOMER SERVICE CENTER

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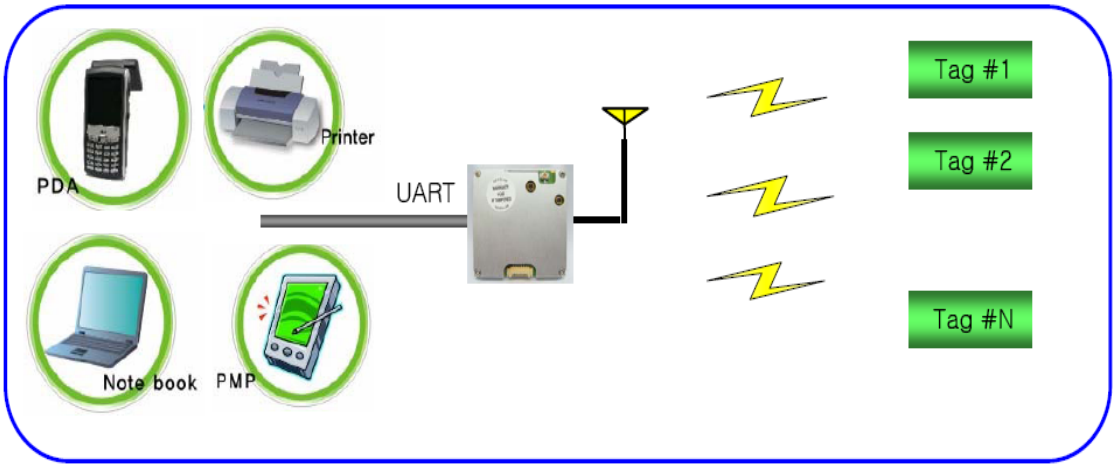
♦ Introduction ♦

• The DOTR-221 is an compact size RFID reader module developed for the embedded reader market, which comprises printers, industrial PDA , and similar devices.

•Target Application

- PDA type RFID Reader
- RFID PRINTER
- OEM Module
- Other application

♦ System composition diagram ♦



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Cautions

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC compliance Information

This device complies with part 15 of 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.

Information to User

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 and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television 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 radio/TV technician for help.

FCC WARNING:

This equipment may generate or use radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

FCC RF EXPOSURE:

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.