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□ Medium(中度機密)
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RU00-M08 SensArray RFID Board Specifications

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REV	Change Order	DATE	CHANGE INFORMATION	AUTHOR
A2		03-18-2019	1. Change new doc format and combine cover page.	陳宗正

Document No.: **11-RU00-M08-X001-01**   APPROVED BY   胡錦華

Page No.:   1   OF   **14**

A2		03-18-2019	AS ISSUED	陳宗正
		REVISION HISTORY		
Document No.: **11-RU00-M08-X001-01**		TITLE: **RU00-M08 SensArray RFID Board Specifications**		

台揚企業集團
MTI Group

台 揚 科 技 股 份 有 限 公 司

MICROELECTRONICS TECHNOLOGY INC.

ISO 9001 Certified

RFID High Power SiP

RU00-M08-X001 / X011

Datasheet
Version 1.0.0

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Table of Contents

1.0   Introduction

The RU00-M08 is a RFID Board that comprises a completely in integrated solution for EPC Gen 2 / ISO18000-63 (formerly 18000-6C) application.

This document provides instructions to the end-user to ensure optimal performance in their OEM hardware. Details on the use of the RU00-M08 Development Kit are also included to provide an example of appropriate application.

Model Number	Supported Regions	Operating Frequency
RU00-M08-X001	US	902.75MHz~927.25MHz
	EU	865.7MHz~867.5MHz

Table 1: Band configurations

Regions configuration in different end-use products is limited by an original equipment manufacturer (OEM)

2.0   Regulatory Statement

● Federal Communication Commission Interference Statement

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.

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

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

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 22 cm

between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 22 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as **2** conditions above are met, further <u>transmitter</u> test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE: In the event that these conditions <u>can not be met</u> (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID <u>can not</u> be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 22 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: 2ANPR-M-PWRSENS". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

3.0   Specifications

Item	Description	Specifications
1	RFID Protocol & Profiles	EPCglobal UHF Class 1 Gen 2 / ISO18000-6C
2	Transmit Power	+10dBm to +31.5dBm • Heat sinking or duty cycling required above +30dBm
3	Transmit Power Accuracy	Room Temp. • +/- 0.5dB @ above 30dBm • +/- 0.75dB @ +27~ +30dBm • +/- 1.0dB @ +10dBm ~+27dBm Low/High Temp. • +/- 1.25dB @ above 30dBm • +/- 1.5dB @ +27dBm ~+30dBdBm • +/- 2.0dB @ +10dBm ~+27dBm
4	Transmit Mask DRM Compliance	Compliance at +30 dBm
5	Transmit Spurious Emissions (Conducted)	•Worldwide :+31.5dBm M/N : RU00-M08-X001 • FCC (US): +30 dBm • ETSI (EU):+31.5 dBm
6	Tx ports	4 mono-static ports *1 U.FL *3 RP-SMA Connector Jack
7	Return Loss at ports	12 dB
8	Receive Sensitivity at port	-74dBm. Assumes operation in profle 1, and a 15 dB antenna return loss at 31.5 dBm output power.
9	Interference Rejection at port	+10dBm
10	DC Power Supply	48V +/- 10%
11	DC Power	· Typ. 7.5 W at + 30 dBm · Typ. 8.5 W at +31.5 dBm
12	Power modes	Ready: PA off Standby : R2000, PA off Sleep : Standby, part digital Shutdown : Supply off

Item	Description	Specifications
13	Control Interface	115.2-921.6 kb UART
14	FFC Connector	12pins, Refer the Pin Configurations
16	Dimensions	163.5*63.4*TBDmm
17	Operating Temperature	-20 to +60℃ *FW will reduce RF duty cycling to prevent PA lead temperature to exceed +85℃.
18	Storage Temperature	-40 to +85℃
19	PA lead Temperature	< +85℃
20	Compliance	Certified: FCC and Canada modular operation, RoHS compliant

Table 2: Specifications

4.0   Pin Configurations and Descriptions

The module is 35-pin surface mount package (SMT compatible). The pin configurations are shown in Figure
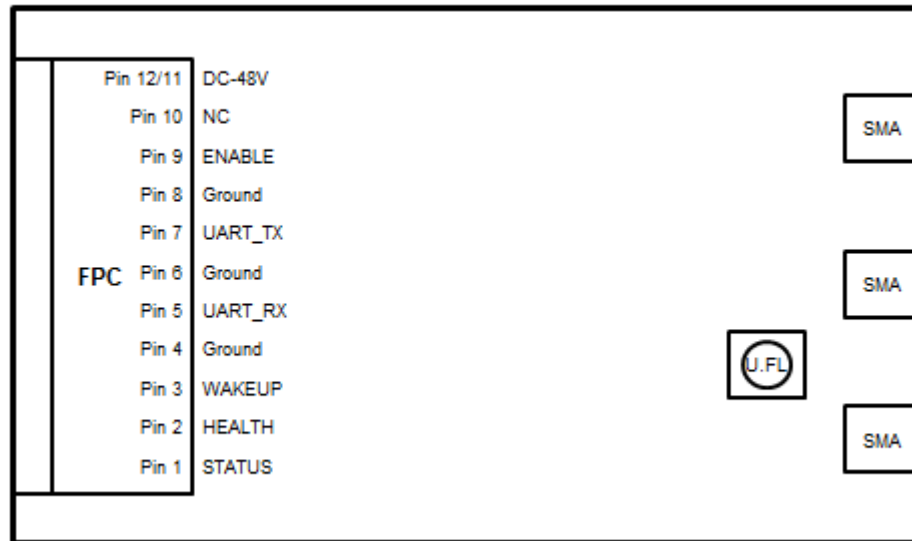

Figure 1: Pin Configurations

Pin Number	Pin Name	Type	Description
1	STATUS	Output	Status Indication
2	HEALTH	Output	Status Indication
3	WAKEUP	Output	Active High Wake up Device
4	GND	Ground	Ground
5	UART_RX	Input	UART Console Receive Data
6	GND	Ground	Ground
7	UART_TX	Output	UART Console Transmit Data
8	GND	Ground	Ground
9	ENABLE	Input	Active High Enable Device
10	NC		
11,12	VDC	Power	Power Supply

Table 3: Pin Configurations

5.0   Package Information
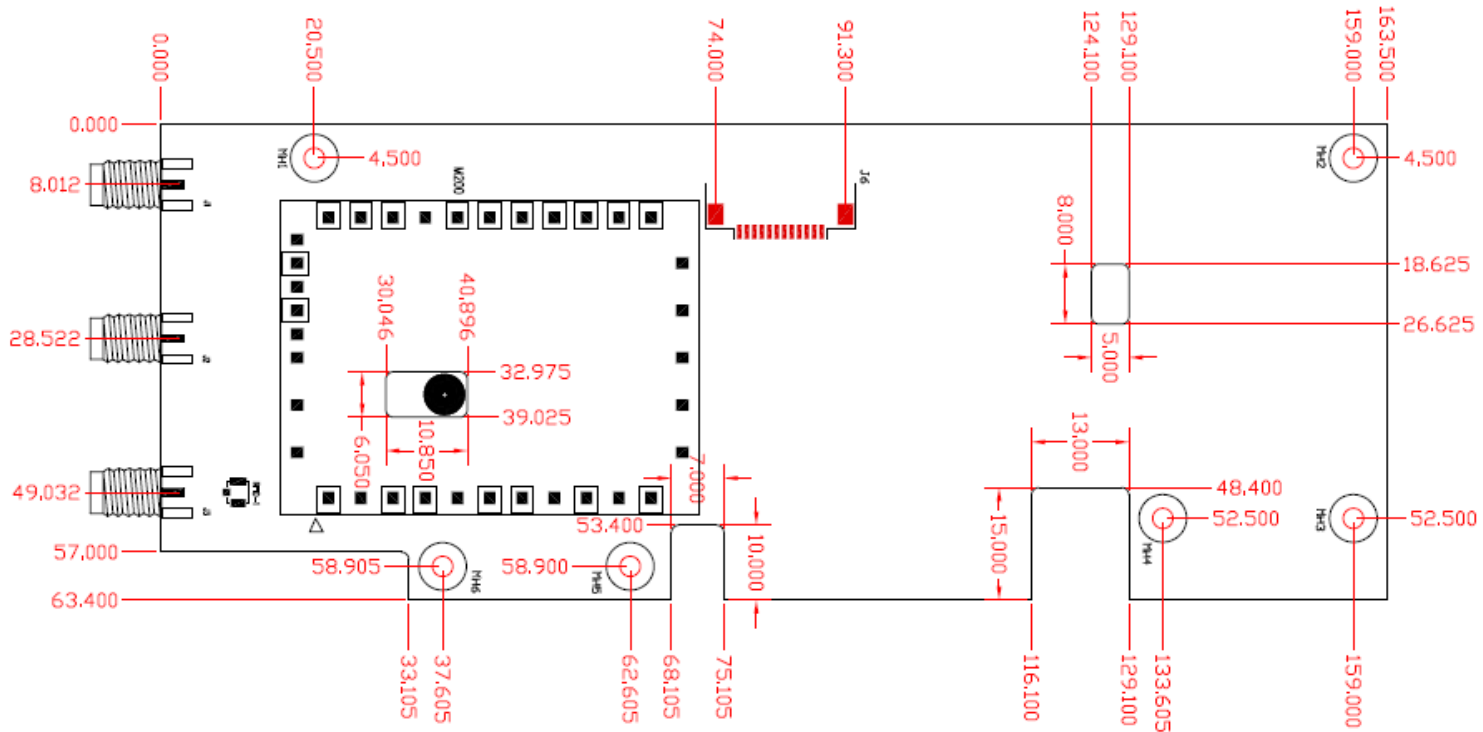## ● Package Mechanical Outline

Figure 2: Package Mechanical Outline

6.0   Interfacing to the RU00-M08

➢ Power and Ground

All circuits on the RU00-M08 are powered from inputs at pin 11 and 12 of J6. The RU00-M08 operates with any supply voltage DC 48V +/- 10%. Because the individual supplies within the part are regulated on the RU00-M08, a large amount of supply filtering is not required.

All 4 available ground pins of J6. Providing a highly conductive path from the M200 ground to a continuous ground plane (by use of numerous vias to the ground plane) and as much ground conductor area as possible on the outer layers of the user PCB will help to reduce the M200 temperature rise during operation.

➢ Communication

The RU00-M08 has one UART ports, each of which utilizes 3.3V CMOS I/O over a pair of pins. The UARTs are compatible with a standard RS-232C serial port through an appropriate level translator IC. The user's host processor issues IRI commands to the HOST UART, which can be configured for any standard UART data rate for 115.2k, 230.4k, 460.8k and 921.6 kbaud. The default rate is set to 115.2 kbaud.

➢ RF

The RU00-M08 is configured for monostatic operation, which requires only a single RF I/O pin for full duplex communication. The output must be routed to the antenna via 50 ohm cable. No coupling capacitor is required given that the RF pin is AC-coupled internal to the RU00-M08. To maximize the radiated power (and corresponding communication range), the length of the transmission line between RU00-M08 and antenna should be made as short as possible.

➢ Enable

Pin9 of J6 on the RU00-M08 comprises the ENABLE signal.

➢ Wakeup

Pin3 of J6 on the RU00-M08 comprises the WAKEUP signal.

➢ Health and Status

Pin1 and Pin2 of J6 is a dedicated digital output that indicates the HEALTH & STATUS of the RU00-M08.

7.0　　　Operating the RU00-M08

Once the required hardware connections are made to the RU00-M08, the unit can be operated with simple software routines running on the OEM's host processor. The host software issues commands to configure the reader, set the reader's idle mode and to start and stop various Gen2 RFID reader operations.

An example of the sequence of events starting at reader power-up is:
1. Apply DC48V +/- 10% power to the RU00-M08.
2. Establish a connection to the device via the host software.
3. Configure the reader. Critical parameters are:
   a. Region of operation
   When configured for a specific region, the RU00-M08 can operate only according to the air interface standards for that region. Key communication parameters are not adjustable by the user but are inherent in the RU00-M08 firmware. The FCC regional operation is the default for the device.
   NOTE: The OEM is strictly forbidden to operate the RU00-M08 in a regional mode other than that in which the device is located. Applicable agency certification must be obtained by the OEM for their product to operate in the region in which it is located. The modular certification of the RU00-M08 in the U.S. may only be utilized by OEM's that follow all guidelines set forth in this document.
   b. RF output power
   The RU00-M08 output power must be set to a level between 10 and 30dBm. The default power is set to the reader's maximum allowable of 30dBm.

4. Initiate an RFID operation.
Gen2 RFID operations including Inventory, Read, Write, Lock and Kill are initiated with a command.

5. Set the RU00-M08 standby mode.

When the RU00-M08 is not executing an RFID operation, it assumes a low power state until another RFID function is initiated by the host.

6. Antenna setup

The module arranges the antenna to use the vertical setting.

8.0　Revision History

Version Number	Description	Revision Date
1.0.0	Initial release	18-Jul-18

Table 4: Revision history