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				PRELIMINARY ISSUE	8-9-2007	EH
				UPDATE	8-27-2007	EH
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				UPDATE	3-28-2008	EH
				UPDATE	6-24-2008	EH

THIS DRAWING INCOMPLETE WITHOUT ECN'S

None

AWID PROPRIETARY INFORMATION

ALL PAGES ARE ON ORIGINAL ISSUE (-) EXCEPT AS NOTED	CONTRACT NO:		 Applied Wireless IDentifications APPLIED WIRELESS ID Morgan Hill, CA USA			
	ISSUED	DATE				
	PREP BY: V. LTV		Design Specification for MPR-1712 Reader Module			
	CHK BY:					
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			SIZE A	FSCM NO.	DWG NO. 1712RM-041354	REV 2.11c3
	APPVL (PPOJ):		SCALE			
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Revision Records:

Enter all revision records by stating "Paragraph Numbers," revision "From" and "To", "Revision Level" and "Time of Revision."

3.1.3 – Changed from 2.0 amps to 1.5 amps – 8/27/2007

Changed product name from 1710 to 1712 denoting the dual frequency (HF and UHF) feature – 9/12/2007

3.0 – Mechanical drawing (of precise dimension) from Vadim, Output Power data for HF – 9/20/2007

6.0 – Part number update – 3/28/2008

Editorial update prior to FCC testing – 6/24/2008



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MPR-1712 RFID Reader Module

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1.0 Scope

This specification describes the electrical, mechanical and environmental requirements for multiple protocol RFID reader modules for data collection, data programming and other embedded RFID enable systems or sub-systems.

2.0 Applicable Documents

The following documents of the exact issue shown, form a part of this specification to the extent specified herein. In the event of conflict between this document and the documents referenced herein, the contents of this document shall prevail.

Specifications

Handbooks

Mil-HDBK-217E Reliability Prediction for Electronic Equipment

Standards

ISO-18000-6B/C	ISO/IEC FCD 18000-6 (ISO/IEC JTC 1/SC 31/WG 4/SG 3)
EPC C1G2	EPC RFID Protocols Class-1 Generation-2 UHF RFID, V1.0.1
ISO-14443 A/ B	ISO/IEC 14443 (ISO/IEC JTC1/SC17)
ISO-15693	ISO/IEC FCD 15693 (ISO/IEC JTC 1/SC17)
Mifare Standard 1K	NXP – MF1 IC S50 Functional Specification
Mifare Standard 4 K	NXP – Mifare Standard 4 Kbyte Card IC S70; Functional Specification
Mifare Ultralight	NXP - MF0 IC U1 Functional specification contactless single-trip Ticket IC

3.0 Requirements

This RFID module shall transmit a CW or command signals to activate RFID tags in its zone of surveillance and this RFID module shall also decode the backscattered signal from RFID tags.

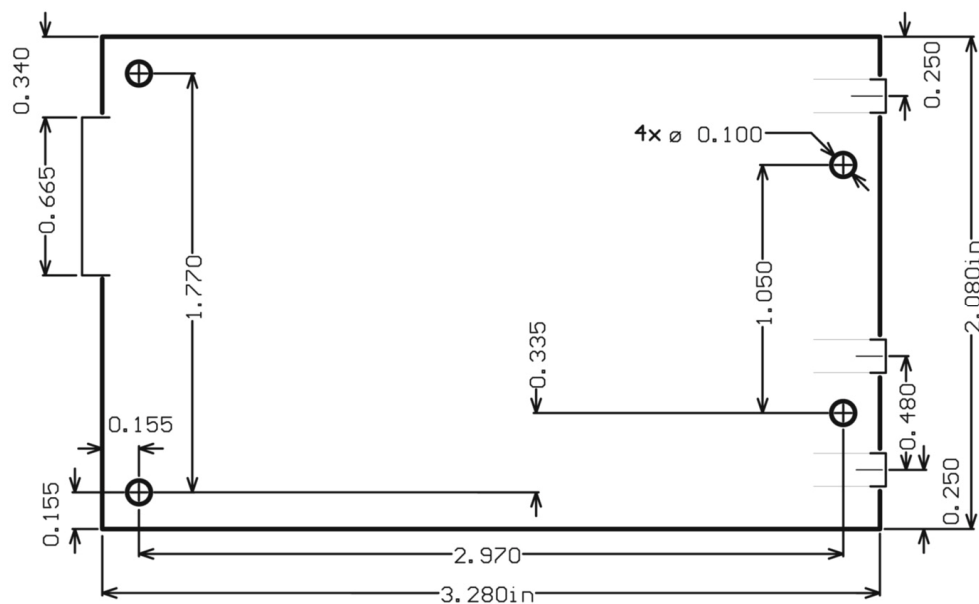


Figure 1, Mechanical Dimensions

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3.1 Common Requirements

3.1.1 Form factor

The outline dimensions of the RFID module are shown in Figure 1. The RFID module shall be 3.25”L x 2”W x 0.25”H.

3.1.2 Weight

This RFID module shall weigh less than 1.8 oz. (50 gram)

3.1.3 Power Supply and Consumption

This RFID module shall operate between the following voltages:

5.5 VDC $\pm$ 5% @ 1.5 amps

Maximum Ripple: 200 mV P-P, Ripple frequency: Above 500 kHz

Maximum Ripple: 5 mV P-P, Ripple frequency: Below 500 kHz

Overall power consumption shall not exceed 7.5 watts under any combination of environmental and input/output signal conditions.

3.1.4 Multi-protocol operations

This reader is designed to read/write EPC C1 Gen 2 (64 bit, 96 bit and 256 bit), EPC 1.19 and ISO-18000-6B in UHF mode and to read/write ISO-14443 A/B, ISO-15693 and Mifare in the HF mode.

3.2 Environmental Characteristics

3.2.1 General

This RFID module is intended for use in a fixed and/or mobile environment.

3.2.2 Cooling

This RFID module shall be designed to conduct its heat into its chassis mounting walls. The temperature of the chassis wall may be assumed to be constant and less than 20 °c above the ambient.

3.2.3 Temperature Change

The receiver must be capable of functioning during a temperature change

-30 °C to +65 °C

3.2.4 Humidity

The RFID module shall withstand the following humidity extremes:

Minimum -- 0% RH

Maximum -- 95% RH

3.2.5 Random Vibration -- TBD

3.2.6 Shock -- TBD

3.3 Electromagnetic Compatibility

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This reader module shall be designed to operate within the environment of barcode printers, handheld data collection terminals, portable printers and other embedded applications.

3.4 Warm up time

Less than 150 millisecond for power level stability

3.5 Reliability Requirement

- | | | |
|-------|-------------------------------|--|
| 3.5.1 | Component Selection -- | MIL-HDBK-338B |
| 3.5.2 | De-Rating -- | AWID's component de-rating guide.
DWG # 0412324 |
| 3.5.3 | MTBF | 27,154 hour
MIL-HDBK-217F
Ground, Sheltered Benign |

4.0 RFID Module Electrical Requirement

4.1 Output Signal Characteristic

- | | | |
|-------|------------------------------|---|
| 4.1.1 | Output Frequency -- | UHF: 902 to 928 MHz frequency
HF: 13.56 MHz |
| 4.1.2 | Frequency Accuracy -- | Standard: ± 10 ppm, |
| 4.1.3 | Channel Spacing -- | UHF only: region dependent |
| 4.1.4 | Regional Code -- | North America – 902 to 928 MHz
Taiwan – 922 to 928 MHz
Singapore – 920 to 925 MHz
Thailand – 920 to 925 MHz
Hong Kong – 920 to 925 MHz
Korea – 910 to 914 MHz
China – 920 to 925 MHz
Malaysia – 919 to 923 MHz
Philippines – 918 to 920 MHz
Australia – 920 to 926 MHz
South Africa – 917 to 921 MHz
Brazil – 915 to 928 MHz |
| 4.1.5 | Modulation -- | ASK |
| 4.1.6 | Output Power -- | UHF: +24 dBm Max

HF: +20 dBm |
| 4.1.7 | Output Power Range – | UHF: 0~24 dBm, 0.5 dBm Step
HF: N/A |

- 4.1.8 **Power Control Format** – Digital, user programmable
- 4.1.9 **Output Impedance** – 50 Ohms
- 4.1.10 **Output Flatness** -- +/- 0.5 dB
- 4.1.11 **Harmonic Content** –
2nd harmonic: -65 dBc
3rd harmonic: -75 dBc
- 4.1.12 **Antenna VSWR** – Peak performance: 1.2:1 maximum
Antenna return loss controls the signal reflected to the receiver port. For VSWR higher than 1.2, system performance will start to degrade.

4.2 Input Signal Requirement

- 4.2.1 **Input Frequency** – **UHF:** 902 to 928 MHz frequency
HF: 13.56 MHz
- 4.2.2 **Channel Spacing** -- **UHF only:** region dependent
- 4.2.3 **Frequency Stability** -- Standard -- +/- 10 ppm
- 4.2.4 **Min. Detectable Signal** -- -85 dBm
- 4.2.5 **Input VSWR** – 1.5:1 Maximum
- 4.2.6 **Modulation** – ASK/PR-ASK
- 4.2.7 **Input Impedance** – 50 Ohms
- 4.2.8 **Input Connector** -- MMCX female

4.3 Interface with External Systems

4.3.1 Connector and PIN Assignment

Pin #	Function description
1	USB
2	USB D-
3	USB D+
4	+5.5 V
5	+5.5 V
6	GND
7	+3V Aux Data
8	+3V TTL Rx
9	+3V TTL Tx
10	GND

- 4.3.2 **Serial Interface** – +3V TTL Level
- 4.3.3 **Input Interface** – +3V TTL Level

4.3.4 Output Interface – +3V TTL Level

5.0 Self-Test

Memory check sum and temperature monitoring capability

6.0 Marking

Reader module shall be marked with part name/number, hardware revision level and serial number. Part name/number for this RFID module is MPR-1712.



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