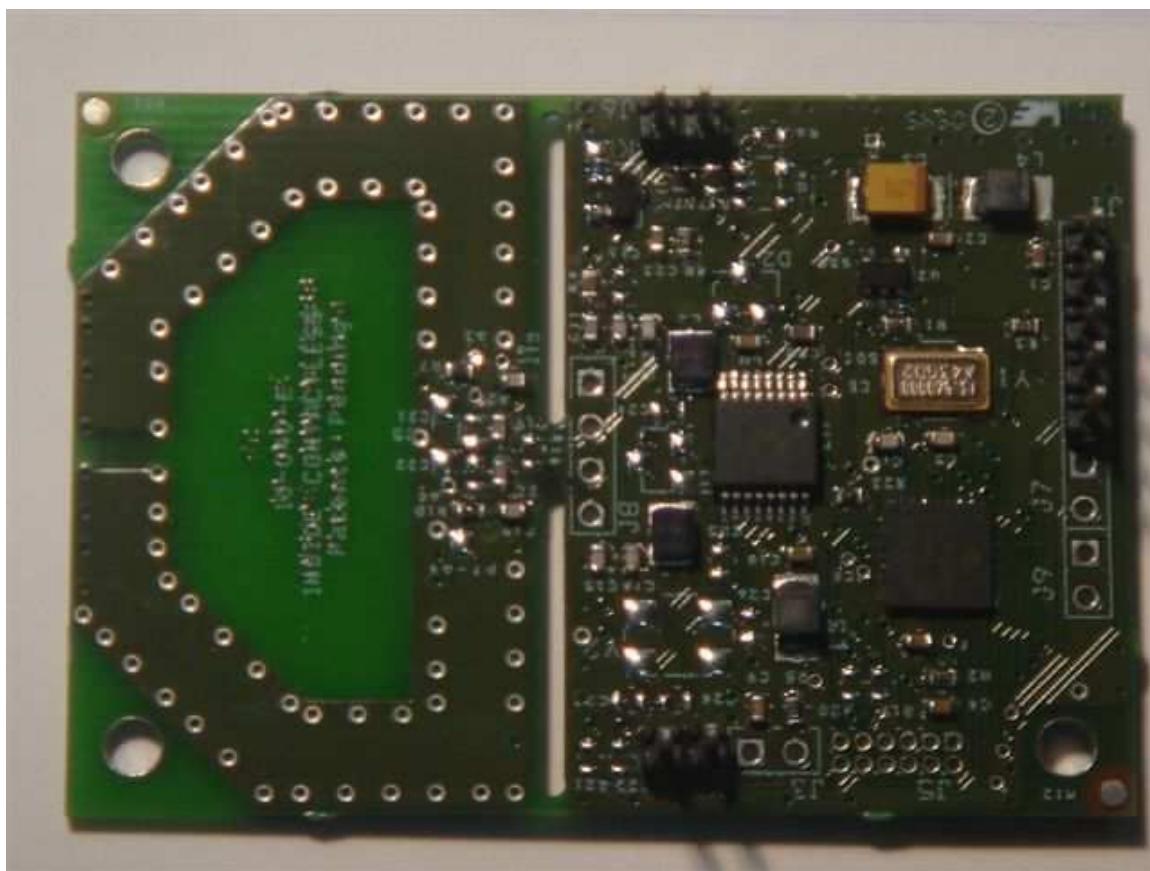


PICOREAD™ CHIPSET Reference Board M210-3G-Rev F

User's Guide



Version 1.3c

Author : OC
Date : November, 28th 2005

Modified: AL
-Added FCC Disclaimer & QI Systems in header
Date: April 4, 2007

Published by:
INSIDE Contactless
11A, Parc Club du Golf
13856 Aix-en-Provence Cedex 3
France
Tel.: +33 (0)4 42 39 63 00 - Fax: +33 (0)4 42 39 63 19
E-mail: info@insidefr.com - Web site: <http://www.insidecontactless.com>

INSIDE Contactless reserves the right to make changes, without notice, to any product herein to improve reliability, functionality, or design. INSIDE Contactless advises its customers to obtain the latest version of device data sheets to verify, before placing orders, that the information being relied upon by the customer is current.

Information furnished by INSIDE Contactless is believed to be accurate and reliable. However, INSIDE Contactless does not assume any liability resulting from the application or use of any product described within.

INSIDE Contactless' products are not authorized for use as critical components in life support devices or systems unless a specific written agreement pertaining to such intended use is executed between the manufacturer and INSIDE Contactless board.

Life support devices or systems are devices or systems that (a) are intended for surgical implant to the body or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.

A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Brand and product names may be registered trademarks or trademarks of their respective holders.

© INSIDE Contactless – 2005 - All rights reserved

CHAPTER 1 : PRODUCT DESCRIPTION.....	4
1.1 Introduction.....	4
1.2 Main features.....	4
1.4 System integration.....	5
CHAPTER 2 : PRODUCT SPECIFICATIONS & INSTALLATION	6
2.1 General.....	6
2.2 Mechanical Information & Connectors (W*L*H): 41,5x60x12mm.....	6
2.3 Supply Connector : J1	7
2.4 Antenna Connector : J8.....	7
2.5 UART (RS232 logic CMOS) Connector : J1.....	8
2.6 Input/Outputs Connector : J2,J3.....	8
2.7 How to reset the coupler.....	9
Software reset.....	9
Hardware reset.....	9
CHAPTER 3 : TECHNICAL DATA	10
3.1 Specification Summary.....	10
3.2 Mechanical Information	10
CHAPTER 4 : REGULATORY, SAFETY AND WARRANTY NOTICES.....	11
4.1 Safety Precautions.....	11
Human safety.....	11
Restrictions.....	11
4.2 Regulatory Notes.....	11

About this manual

This product description is written for PicoRead Chipset Reference Board users and integrators.

Abstract

The PicoRead Chipset reference board is a low-cost, low power, multi-standard 13.56 MHz contactless coupler.

CHAPTER 1 : PRODUCT DESCRIPTION

1.1 Introduction

The Picoread Chipset reference board is a low-cost 13.56 MHz contactless coupler compliant with ISO 14443 A&B and ISO 15693 standards and with capability to communicate with FeliCa™ chips. By operating in transparent mode, the board allows communication with any chip compliant with these standards.

1.2 Main features

- ISO14443 A&B, ISO15693 and FeliCa™
- Operating distance up to 6 cm
- Small size: 6 x 4.2 cm with on board antenna (3 x 4,2 cm when the antenna is removed)
- Low power: 50 mA in active mode / 300 µA in sleep mode
- Automatic card detection from sleep mode
- Cryptographic security management
- Easy system integration
- Serial interface to standard micro controllers
- Extra memory space for application software download
- 250 bytes communication buffer
- Evaluation kit available

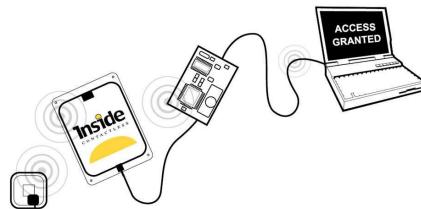
Product Ordering Code

Product	Ordering code	Package	Description
PicoRead Chipset Reference Board	M210-3G U03	PCB	13,56 Mhz coupler
PicoRead Chipset Kit	PicoRead Chipset U03		

1.4 System integration

Two different modes are available:

- Connected mode: the PicoRead Chipset reference board acts as a coupler and process commands requested by a host system (PC, PLC, µC...)
- Stand alone mode: the PicoRead Chipset reference board executes application code from internal flash memory. Refer to the Embedded Software Development Kit (ESDK tool).



CHAPTER 2 : PRODUCT SPECIFICATIONS & INSTALLATION

2.1 General

This chapter provides a description of the product hardware. It also provides the electrical specifications of inputs and outputs.



Important care must be taken during the coupler mounting. Bad connection may damage the coupler or the power supply.
Make sure that the power is switched off during coupler mounting and cable connection.

The product has been designed with easy installation in mind. The following information provides you with any details that you will need to know.

2.2 Mechanical Information & Connectors (W*L*H): 41,5x60x12mm

Mounting is accomplished using the three 3 mm holes located on the module corners.

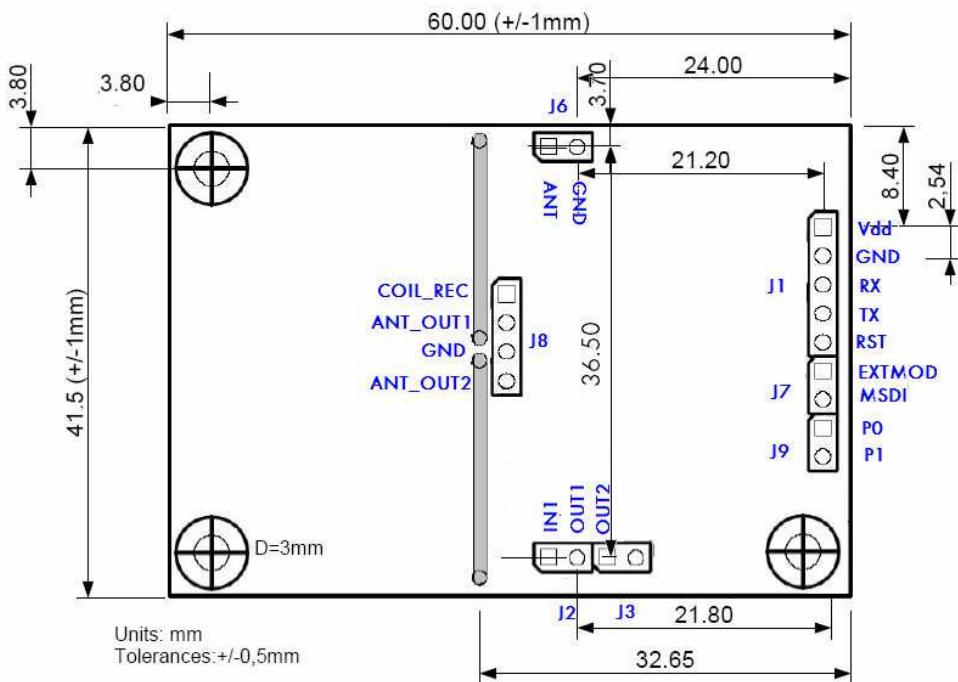


Figure 1

2.3 Supply Connector: J1

The PicoRead chipset reference board must be powered using connector J1.

J1	Pin Name	Description	Notes
1	Vdd	Positive supply voltage VDC	
2	Gnd	0 volts	

Parameter	Min	Typical	Max
Supply voltage VDC	4.5 VDC	5VDC	5.5VDC
Supply Current ICC		50mA	150mA
Ripple			20mV
Sleep mode		300µA	

Table 1: Supply connector specification

CAUTIONS:

- Reversing the power supply may destroy the device
- There is no over current protection on the board itself. Make sure that it exists on the power supply unit.
- If you are using a switch power supply you must ensure that the switching frequency is below 100kHz or above 1Mhz. Such a supply may generate noise, add communication holes and reduce read range.
- Linear power supplied must be used to get the best performances from the reference board.

2.4 Antenna Connector: J8

The PicoRead chipset reference design has been also designed for custom antenna connection using J8 connector.

J8	Pin Name	Description	Notes
1	Coil Rec	Antenna Coil Input	
2	Ant_Out1	PicoRead RF ANT1 output	1
3	Gnd	0 volts	
4	Ant_Out2	PicoRead RF ANT2 output	1

Note 1: A 16Mhz low pass LC Filter is inserted between the PicoRead RF output and this pin.

CAUTIONS:

Refer to the “PicoRead Chipset Datasheet” and Applications Notes for antenna design rules.

Refer to the PicoRead Chipset Reference design Application Note for schematics and components details.

2.5 UART (RS232 logic CMOS) Connector: J1

The PicoRead MCU provides a standard Universal Asynchronous Receiver Transmitter.

It allows configurable High Speed half duplex communication with host through the RX and TX pins.

Refer to the Inside Reference Manual for details regarding the byte and frame format.

J1	Pin Name	Description	Notes
1	Vdd	Positive supply voltage	
2	Gnd	Ground, 0v	
3	Rx	PicoRead MCU UART Input	Receive Data Line (must be connected to the host transmit data line)
4	Tx	PicoRead MCU UART Output	Transmit Data Line (must be connected to the host Receive Data line)
5	RST		

2.6 Input/Outputs Connector: J2,J3

1 digital input (IN1) and 2 outputs (OUT1, OUT2) are available on the Picoread MCU for general purpose use. These I/Os are located on J2 and J3 connectors.

J2	Pin Name	Description	Notes
1	IN1	Logic Input	
2	OUT1	Logic Output	2

J3	Pin Name	Description	Notes
1	OUT2	Logic Output	2
2	1kOhm Pulled up to Vdd	Can be used for led connection	

Note 2: Make sure that current on those pins does not exceed +/- 20mA.

Table 2: Input/outputs electrical specifications

Symbol	Characteristic	Min	Typ	Max	Units	Conditions
V_{IL}	Input Low voltage	V_{ss}		0.15 V_{dd}	V	
V_{IH}	Input High voltage	0.25 V_{dd} +0.8V			V	
V_{OL}	Output Low voltage			0.6	V	$I_{OL} = 8.5 \text{ mA}, V_{dd} = 5V, 0^\circ\text{C} \text{ to } +55^\circ\text{C}$
V_{OH}	Output High voltage	$V_{dd}-0.7$			V	$I_{OH} = -3.0 \text{ mA}, V_{dd} = 3.3V, 0^\circ\text{C} \text{ to } +55^\circ\text{C}$

2.7 How to reset the coupler

Micro controller reset pin. (J1 connector, pin 5)

The RST pin provides a method for triggering an external Reset of the device. A Reset is generated by holding the pin low. This reset is equivalent to a power on reset.

Micro controller Reset to factory settings:

This feature is useful if you can no more exchange data between host and Picoread MCU. It may happen if you download application code into the MCU Flash memory (cf. Code download ESDK).

This action will reset the parameters (speed, disable mode, protocol settings, keys) to the defaults values. All these values are stored in coupler's internal EEPROM.

Software reset

It is possible to reset the coupler's EEPROM by sending 2 commands thanks to the SET STATUS command.

Command = \$80,\$F4,\$80,\$3E,\$01 - Data = \$00
Command = \$80,\$F4,\$80,\$7E,\$01 - Data = \$00

Then the coupler has the default setting: 9600 baud, default protocols....

Hardware reset

In order to reset the PicoRead MCU memory to factory settings, the two pins P0 and P1 must be inter-connected during power up (at least 100 ms after applying vdd) and then left not connected.

These pins must be not connected for normal usage.

J9	Pin Name	Description	Notes
1	P0	PicoRead MCU Reset pin	
2	P1	PicoRead MCU Reset pin	

CHAPTER 3 : TECHNICAL DATA

This chapter provides the technical specifications of the Picoread chipset reference board.

3.1 Specification Summary

Table 3 : Ambient Conditions

Operating temperature	-0°C to +55°C
Storage temperature	-40°C to +85°C

Table 4 : Electrical Data

Supply Voltage	5VDC (typ)
Power Consumption	300µA (Sleep mode), 15 mA (typ. with RF OFF), 50 mA (typ. with RF ON no card in the field), 150mA (max)
Operating Frequency	13,56MHz +/- 7kHz
Transmitter Modulation	10 to 30% Software Adjustable
Interfaces	UART

3.2 Mechanical Information

- **Dimensions (WxLxI)** 60*41,5*12 mm
- **Weight**
- **Material** Printed Circuit Board module.

CHAPTER 4 : REGULATORY SAFETY AND WARRANTY NOTICES

This chapter provides important information about safety precautions and regulatory constraints.

4.1 Safety Precautions

Human safety

WARNING: Customers using this product are responsible for operating their system under implemented power levels against relevant standard for human safety in electronic fields.

Restrictions

WARNING: Make sure that Customers using this product are responsible for operating their system under implemented power levels against relevant standard for human safety in electronic fields.

4.2 Regulatory Notes

An RFID electronic device is subject to national and international regulations.

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.

Before operating the system including this product, the required FCC, UL, CE or relevant approval must be obtained.



CAUTION: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.