

NovaComm

NVC-MDCS72 Datasheet

Ver.1.0

Mar 03, 2012



Copyright © 2011-2012 NovaComm Technologies

All rights reserved.

NovaComm Technologies assumes no responsibility for any errors, which may appear in this document.

Furthermore, NovaComm Technologies reserves the right to alter the hardware, software, and/or specifications detailed herein at any time without notice, and do not make any commitment to update the information contained herein. NovaComm Technologies' products are not authorized for use as critical components in life support devices or systems.

The *Bluetooth* trademark is owned by the *Bluetooth* SIG Inc., USA.

All other trademarks listed herein are owned by their respective owners.

Release Record

Version	Release Date	Comments
1.0	Mar 03, 2012	Release

NovaComm Confidential

Description:

NVC-MDCS72 is a class 2 Bluetooth® 4.0 (Low Energy) Dual module antenna with chip and U.FL port. It is a highly integrated and sophisticated module which contains all the necessary elements from radio to antenna and a fully implemented protocol stack. It is an idea solution for integrating Bluetooth® into various products with limited knowledge of Bluetooth® and RF technologies.

With NovaComm's iNova® Bluetooth low energy stack firmware, designers can easily customize their applications to support different profile .Can be configured, commanded and controlled through simple ASII strings over UART.

Typical Bluetooth applications:

- Pulse Oximeter ,
- Pulse /Heart Rate, Thermometer
- Blood Pressure ,weighing Scale
- Glucose meter ,Cardiovascular Fitness Monitor
- Human interface device (Keyboard Mouse Remote control)

Features:

- Bluetooth V4.0 Low energy single module
- Onboard chip antenna support 300 meters
- Supports master and slave mode
- Including GAP GATT/ATT SMP L2CAP
- UART ,SPI programming and data interfaces
- I2C Master interface or USB Port
- TX (0dbm) 14.3mA RX down to 14.7mA (with TPS62730)
- 12-Bit ADC with Eight channels and configurable Resolution
- 2 I/O LED driving
- Power model(Sleep timer on) 1uA
- 18.10*12.05*2.5mm
- BQB/FCC/CE Certified
- RoHS compliant

Table 1 Ordering Information

Ordering Number	Package	Items in One Package	Comments
NVC-MDCS72A	Plastic tray	100PCS	USB
NVC-MDCS72B	Plastic tray	100PCS	I2C

Please also supply the customer firmware code issued by NovaComm Technologies when you place the order.

Table of Contents

1.	Pinout and Description	5
1.1.	Pin Configuration.....	5
2.	Electrical Characteristic	8
2.1.	Absolute Maximum Rating.....	8
2.2.	Recommend operation conditions.....	8
2.3.	Power consumptions	8
2.4.	ADC characteristics	9
3.	Physical Interfaces	9
3.1.	Power Supply	9
3.2.	Internal Antenna.....	9
3.3.	USART and SPI	9
3.4.	I2C.....	10
4.	Software Stacks	10
5.	Reference Design	10
6.	Layout and Soldering Considerations.....	11
6.1.	Soldering Recommendations.....	11
6.2.	Layout Guidelines	12
7.	Physical Dimensions	12
8.	Package	13
9.	Contact Information	13

List of Tables

Table 1	Ordering Information	3
Table 2	: Pin Definition.....	7
Table 3	: Absolute Maximum Rating Recommended Operating Conditions.....	8
Table 4	: Recommended Operating Conditions	8
Table 5	: Power consumptions.....	8
Table 6	: ADC characteristics	9

List of Figures

Figure 1:	Pinout of NVC-MDCS72.....	5
Figure 2:	Software Stack	10
Figure 3	: Reference Design	11
Figure 4	: Placement of the Module on a Main Board.....	12
Figure 5:	Physical Dimensions and Recommended Footprint (Unit: mm, Deviation:0.02mm)	13

1. Pinout and Description

1.1. Pin Configuration

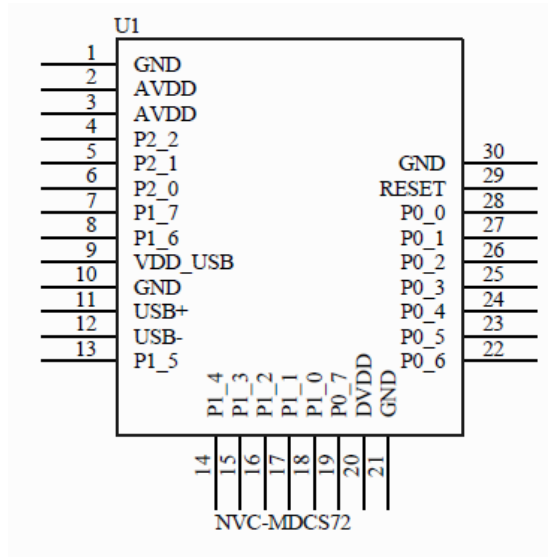


Figure 1: Pinout of NVC-MDCS72

Pin	Symbol	I/O Type	Description
1	GND	Ground	Ground
2	AVDD	Power analogy	Supply voltage
3	AVDD	Power analogy	Supply voltage
4	P2_2	Debugger Clock	Debugger Clock
5	P2_1	Debugger data	Debugger data
6	P2_0	Digital I/O	ADC trigger/ Timer 4 channel 0 capture /compare
7	P1_7	Digital I/O	SPI data input/output /UART data input/Timer 3 channel 1 capture/compare
8	P1_6	Digital I/O	SPI data input/output/UART data output/Timer 3 channel 0 capture/compare
9	VDD_USB	Supply voltage	Supply voltage(NVC-MDCS72A)
	NC	NC	NC(NVC-MDCS72B)
10	GND	Ground	Ground
11	USB+	Digital I/O	USB data plus (NVC-MDCS72A)
	I2C_SCL	Digital I/O	I2C_SCL(NVC-MDCS72B)
12	USB-	Digital I/O	USB data minus(NVC-MDCS72A)

	I2C_SDA	Digital I/O	I2C_SCL(NVC-MDCS72B)
13	P1_5	Digital I/O	SPI data input/output/SPI clock/UART request to send output/UART data output
14	P1_4	Digital I/O	SPI data input/output/SPI slave select/UART data input/UART clear to send input/Timer 3 channel 1 capture/compare
15	P1_3	Digital I/O	SPI clock/ UART request to send output/ Timer 3 channel 0 capture/compare
16	P1_2	Digital I/O	SPI slave select/ UART clear to send input/ Timer 1 channel 0 capture/compare
17	P1_1	Digital I/O	Timer 1 channel 1 capture/compare/ Timer 4 channel 1 capture/compare
18	P1_0	Digital I/O	Timer 1 channel 2 capture/compare/ Timer 4 channel 0 capture/compare
19	P0_7	Digital I/O	Analog to digital converter input/ Timer 1 channel 3 capture/compare
20	DVDD	Digital supply voltage	Digital supply voltage
21	GND	Ground	Ground
22	P0_6	Digital I/O	Analog to digital converter input/ Timer 1 channel 4 capture/compare
23	P0_5	Digital I/O	Analog to digital converter input/ Analog comparator positive input/ SPI clock/ SPI data input / output/ UART request to send output/ UART data input/ Timer 1 channel 3 capture/compare
24	P0_4	Digital I/O	Analog to digital converter input/ Analog comparator negative input/ SPI slave select/ SPI data input / output/ UART clear to send input/ UART data input/ Timer 1 channel 2 capture/compare
25	P0_3	Digital I/O	Analog to digital converter input/ SPI data input / output/ SPI clock/ UART data output/ UART request to send output/ Timer 1 channel 1 capture/compare
26	P0_2	Digital I/O	Analog to digital converter input/ Operational amplifier output/ SPI data

			input / output/ SPI slave select/ UART data input/ UART clear to send input/ Timer 1 channel 0 capture/compare
27	P0_1	Digital I/O	LED1/ Analog to digital converter input/ Operational amplifier negative input/
28	P0_0	Digital I/O	LED1/Analog to digital converter input/ Operational amplifier positive input
29	Reset	Reset PIN	Active low reset.
30	GND	Ground	Ground

Table 2 : Pin Definition

2. Electrical Characteristic

2.1. Absolute Maximum Rating

Rating	Min	Max	Unit
Storage Temperature	-40	+125	°C
Operating Temperature	-40	+85	°C
VDD Voltage	-0.3	+3.9	V
Voltage on any digital PIN	-0.3	+3.9	V
Input RF level		+10	dbm

Table 3 : Absolute Maximum Rating Recommended Operating Conditions

2.2. Recommend operation conditions

Operating Condition	Min	Typical	Max	Unit
VDD Voltage	+2	+3.3	+3.6	V

Table 4 : Recommended Operating Conditions

2.3. Power consumptions

Operating Condition	Typical	Unit
Power mode 1	235	uA
Power mode 2	0.9	uA
Power mode 3	0.4	uA
Timer 1 ,Timer running	90	uA
Timer 2 ,Timer running	90	uA
Timer 3 ,Timer running	60	uA
Sleep timer	0.6	uA
Tx mode (0dbm)	27	mA
RX mode (0dbm)	22	mA

Table 5: Power consumptions

2.4. ADC characteristics

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Conversion time	7bit setting		20		us
	9-bit setting		36		
	10bit setting		68		
	12bit setting		132		
Power consumption			1.2		mA
Internal reference VDD coefficient			4		mV/V
Internal reference temperature coefficient			0.4		mV/10°C
Internal reference voltage			1.15		V

Table 6 : ADC characteristics

3. Physical Interfaces

3.1. Power Supply

The module is power supply voltage 2.0V to 3.6V. The transient response of the regulator is also important. At the start of a packet, power consumption will jump to high levels. See the average current consumption section. The regulator should have a response time of 20s or less; it is essential that the power rail recovers quickly.

The module power supply with TPS62730, TPS62730 is a 2-MHz Step-Down Converter, Extends Battery Lifetime by up to 20%, Reduced Current in All Active Modes, 30-nA Bypass Mode Current to Support, Small Package Allows for Small Solution Size.

3.2. Internal Antenna

The module integrates onboard chip antenna so there's no need to use antenna on customer's PCB. Simply pay attention to leave enough clearance for the antenna.

3.3. USART and SPI

The module USART 0 and USART 1 are each configurable as either an SPI master/slave or a UART. They provide double buffering on both RX and TX and hardware flow control and are thus well suited to high-throughput full-duplex applications. Each USART has its own high-precision baud-rate generator, thus leaving the ordinary timers free for other uses. When configured as SPI slaves, the USARTs sample the input signal using SCK directly instead

of using some oversampling scheme, and are thus well-suited for high data rates.

3.4. I2C

The module I2C provides a digital peripheral connection with two pins and supports both master and slave operation. I2C support is compliant with the NXP I2C specification version 2.1 and supports standard mode (up to 100 kbps) and fast mode (up to 400 kbps). In addition, 7-bit device addressing modes are supported, as well as master and slave modes.

Note:

The NVC-MDCS72 module is pin-compatible with the NVC-MDCS71 module, if the USB is not used on the NVC-MDCS71 module and the I2C/extra I/O is not used on the NVC-MDCS72 module. Compared to the NVC-MDCS71 module, the NVC-MDCS71 module provides lower RF current consumption. The NVC-MDCS72 module does not have the USB interface of the NVC-MDCS71 module, and provides lower maximum output power in TX mode. The NVC-MDCS72 module also adds a HW I2C

4. Software Stacks

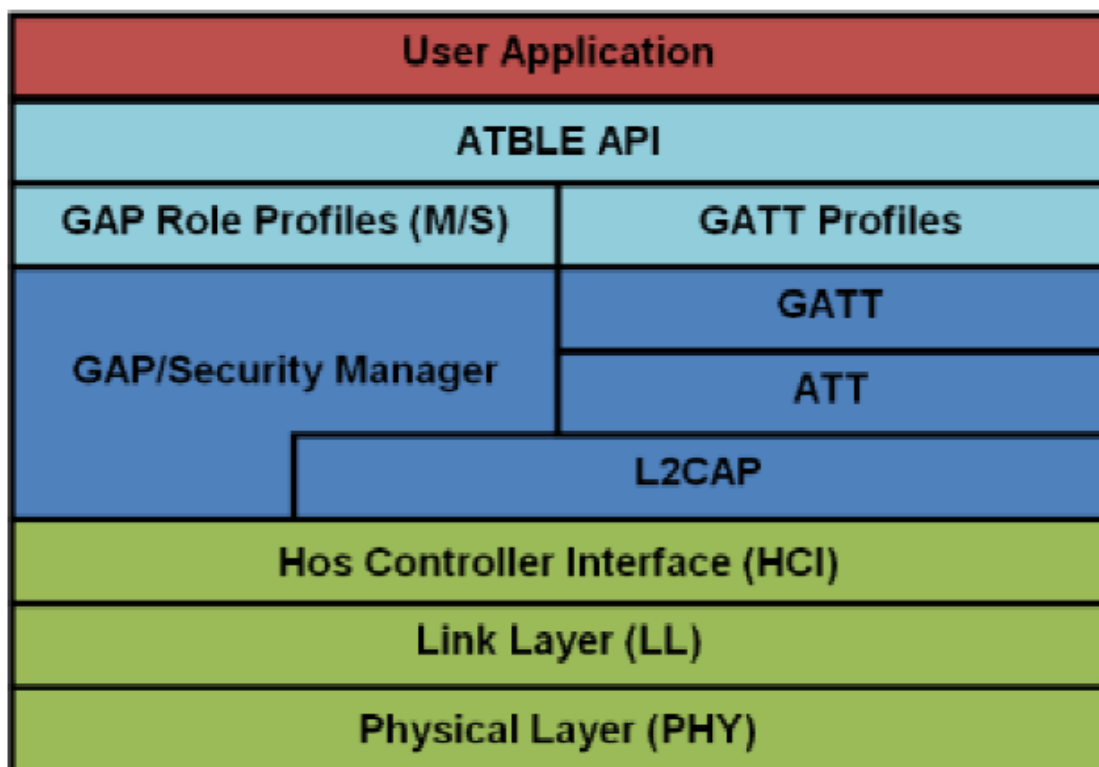


Figure 2: Software Stack

5. Reference Design

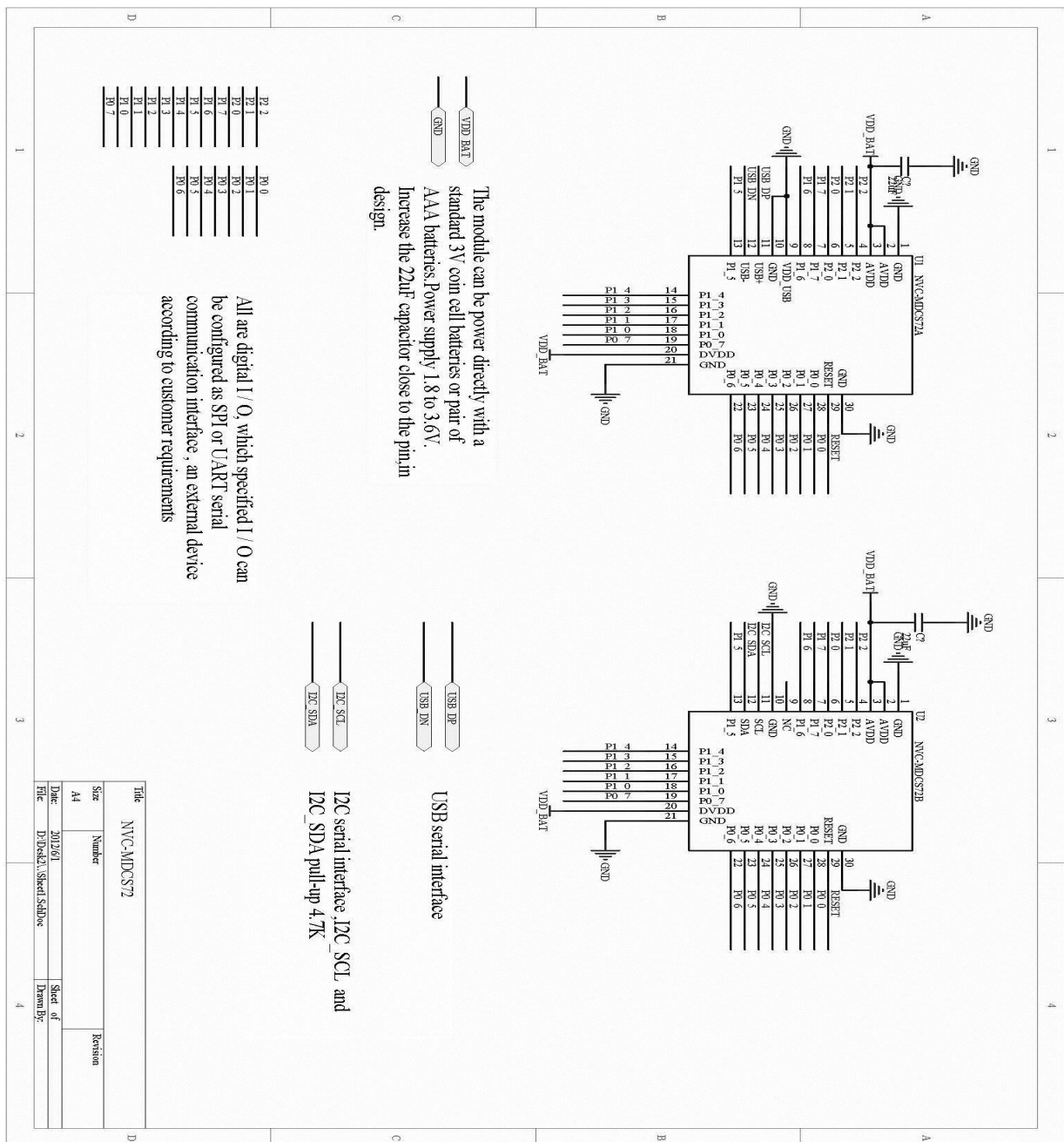


Figure 3 : Reference Design

6. Layout and Soldering Considerations

6.1. Soldering Recommendations

NVC-MDCS72 is compatible with industrial standard reflow profile for Pb-free solders. The

reflow profile used is dependent on the thermal mass of the entire populated PCB, heat transfer efficiency of the oven and particular type of solder paste used. Consult the datasheet of particular solder paste for profile configurations.

NovaComm Technologies will give following recommendations for soldering the module to ensure reliable solder joint and operation of the module after soldering. Since the profile used is process and layout dependent, the optimum profile should be studied case by case. Thus following recommendation should be taken as a starting point guide.

- Refer to technical documentations of particular solder paste for profile configurations
- Avoid using more than one flow.
- Reliability of the solder joint and self-alignment of the component are dependent on the solder volume. Minimum of 150mm stencil thickness is recommended.
- Aperture size of the stencil should be 1:1 with the pad size.
- A low residue, “no clean” solder paste should be used due to low mounted height of the component.

6.2. Layout Guidelines

Strongly recommended that the display module designed in accordance with the antenna copper in the following figure 1.2 , the preferred antenna design 1, does not recommend the use of antenna design 3 . For the protection module RF distance in the copper when the size of the design in accordance with the following figure , Place the GND vias as close to the GND pins as possible. Use good layout practices in order to avoid any excessive noise coupled to the signal line or power supply voltage line.

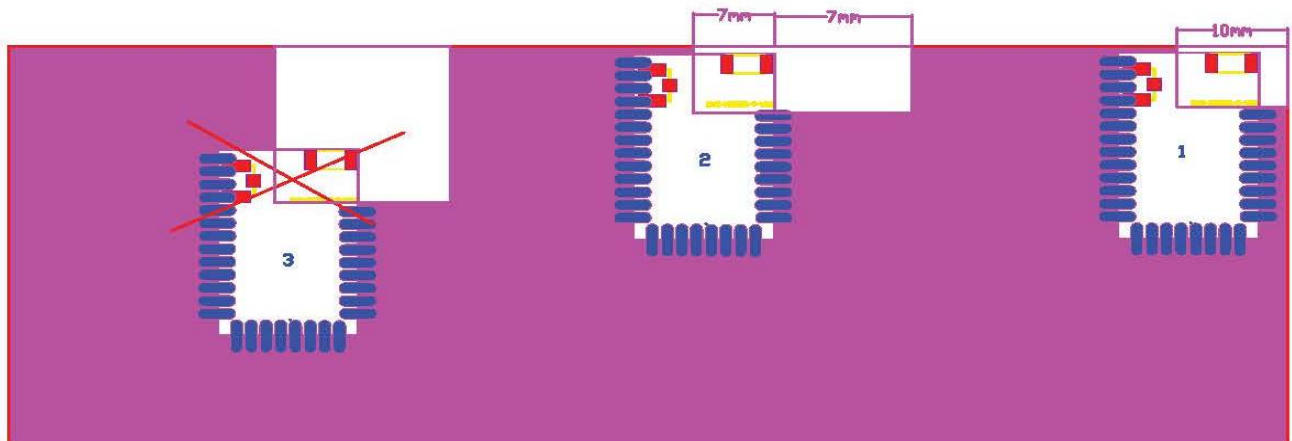


Figure 4 : Placement of the Module on a Main Board

7. Physical Dimensions

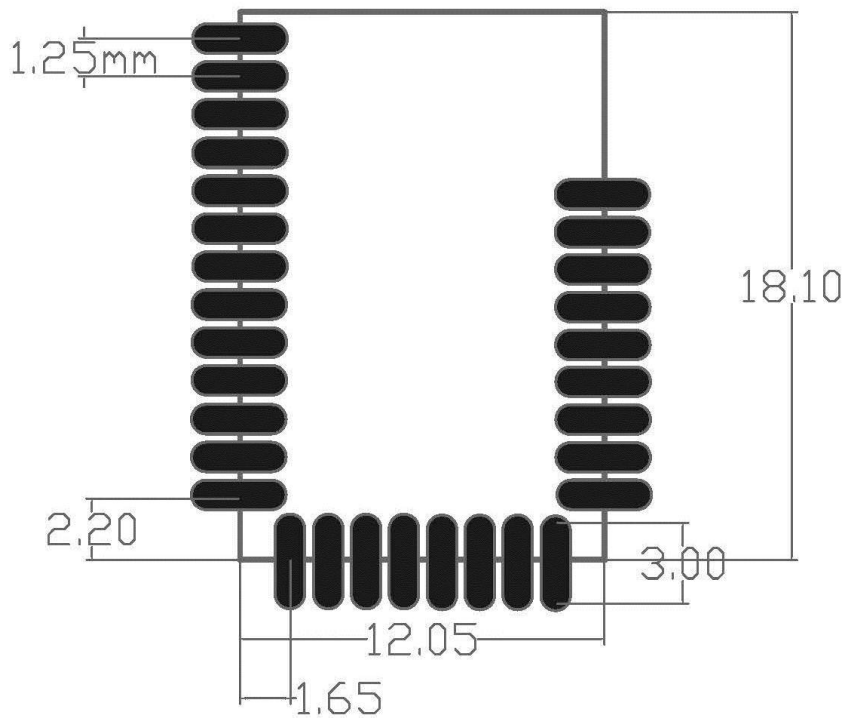


Figure 5: Physical Dimensions and Recommended Footprint (Unit: mm, Deviation:0.02mm)

8. Package

9. Contact Information

Sales: sales@novacomm.cn

Technical support: support@novacomm.cn

Orders: orders@novacomm.cn

Phone: +86 21 60453799

Fax: +86 21 60453796

Address: 902A, #560 Shengxia Rd., ZJ Inno Park, Shanghai 201203,
China