# iMCU7100EVB User's Guide

**Version 1.0**

© 2011 WIZnet Co., Inc. All Rights Reserved.

For more information, visit our website at http://www.wiznet.co.kr

©Copyright 2011WIZnet Co., Inc. All rights reserved.

# Table of Contents

1 Overview ..... 3
1.1 Introduction ..... 3
1.2 Specification ..... 4

2 Getting Started ..... 5
2.1 Power On ..... 5
2.2 Ping Test ..... 5
2.3 Programming ..... 6
2.4 TCP Server Demonstration ..... 6

3 Product Description ..... 10
3.1 Package and Contents ..... 10
3.2 Board Layout ..... 11
3.3 Hardware Description ..... 12
3.4 Physical Specification ..... 16

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

# 1 Overview

iMCU7100EVB is an Evaluation Board where the function and performance of W7100A can be tested. In this document, basic ping and TCP serer test will be tested.

## 1.1 Introduction

iMCU7100EVB is an Evaluation Board made for testing whole functions of internet embedded MCU W7100A.iMCU7100EVB can easily build serial-to-Ethernet communication environment by using RS-232 port and LAN port; W7100A can also use supported Character LCD and other added ports to control and test the all functions of theW7100A chip.

The list of Application notes from WIZnet website is as followed.

- ✓ TCP server, client
- ✓ UDP
- ✓ DHCP
- ✓ DNS client
- ✓ DDNS
- ✓ HTTP server, client
- ✓ Telnet
- ✓ Serial to Ethernet server, client, UDP
- ✓ IPRAW
- ✓ MACRAW
- ✓ UART
- ✓ Timer
- ✓ LCD
- ✓ $I^2C$

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

## 1.2 Specification

**<Table 1.1> Lists of Items Contained in the EVB**

| Item | Details | Note |
|---|---|---|
| MCU | Internet Embedded MCU - W7100A | 8051 compatible |
| Memory | 64KBytes Data Memory (RAM)<br>64KBytes Code Memory (ROM)<br>2KBytes Boot code Memory<br>256Bytes Data Flash | Embedded in W7100A |
| Serial | On board RS-232C 1Port with DB9 Connector | |
| Ethernet | On board RJ-45 with Transformer | |
| LCD | 16Character * 2Line Character LCD | |
| LED | General purpose LED 3Ea<br>Network Status LED 8Ea | |
| Button | Reset Switch 1Ea | |
| Debugger | On board Debugger Socket | |
| Expansion Port | MCU port expansion<br>- 32Pin (8pin * 4) 2.54mm Pitch Pin-Header Hole<br>- 14Pin (7pin * 2) 2.54mm Pitch Pin-Header Hole<br>- 32Pin (8pin * 4) 2.00mm Pitch Pin-Header Hole<br>- 14Pin (7pin * 2) 2.00mm Pitch Pin-Header Hole<br>Dummy Hole<br>- 167Pin 2.54mm Pitch Dummy Hole<br>- 236Pin 2.00mm Pitch Dummy Hole | |
| Power | DC 5V / 2A Adapter | Built-in |

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

# 2 Getting Started

## 2.1 Power On

Connect Character LCD, UTP cable,RSR232,andthe power cable to the iMCU7100EVB.

**<Fig. 2.1> iMCU7100EVB**

Power on the iMCU7100EVB board, and check the following.

1. Check whether POWER LED(D13) is ON.
2. Check whether "iMCU7100 EVB" and "192.168.001.002" appears on the Character LCD.

If the above two are checked iMCU7100EVB board is normally working.

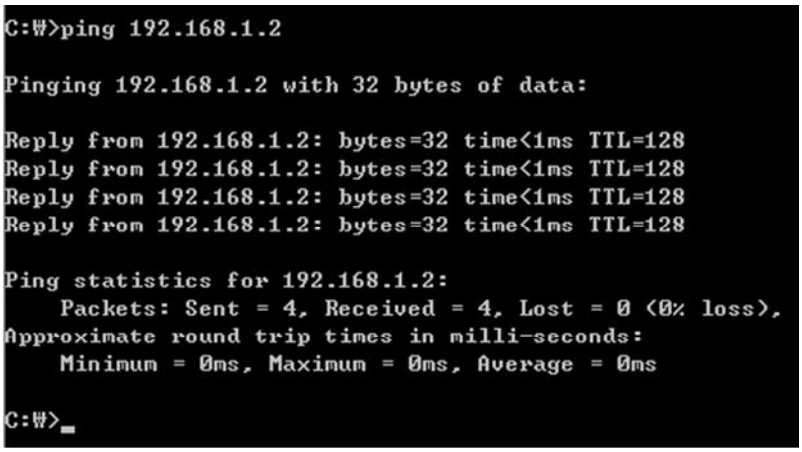
## 2.2 Ping Test

Run the command prompt at thetest PC, and execute the ping command to the IP of the test PC. Send the ICMP ping request and check the ICMP ping reply from the PC. Note: the test PC and the iMCU7100EVB board must be placed on the same sub-network.

1. Confirm the network information of Test PC as the following
   Source IP Address : 192.168.1.xxx
   Gateway IP Address : 192.168.1.1
   Subnet Mask : 255.255.255.0

2. Execute ping command as the following
   "C:\> ping 192.168.1.2"

© Copyright 2011 WIZnet Co., Inc. All rights reserved.




**<Fig 2.2> Ping test**

## 2.3 Programming

The iMCU7100EVB uses the WizISP program or W7100A debugger to program the compiled binary image(firmware). Please refer to the WizISP program guide and W7100A debugger guide for more detailed information.

## 2.4 TCP Server Demonstration

The document for TCP server application note and the sample code are included in the bundle CD. The application note can also be downloaded from the WIZnet website. User can easily test the TCP loopback server demonstration by using the sample code.

Lets test a simple TCP server demonstration as followed.

1. Confirm the testing environment.
   - Connect test PC to iMCUW7100EVB by using UTP cable directly.
   - Connect test PC to iMCUW7100EVB by using Serial able directly.
   - Connect 5V power adaptor to test PC

2. Confirm the network information of test PC as fallows
   - Source IP Address : 192.168.0.2
   - Gateway IP Address : 192.168.0.1
   - Subnet Mask : 255.255.255.0

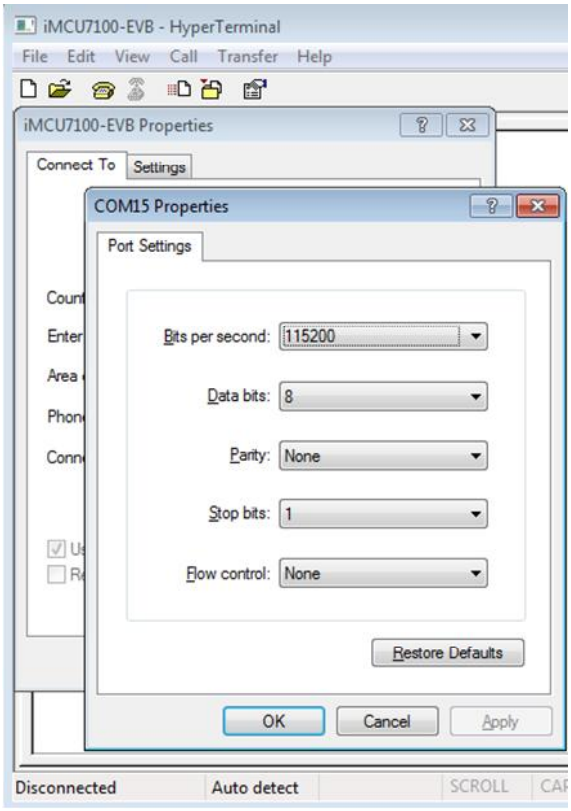
3. After executing serial terminal program (ex: HyperTerminal),
   set up the properties as followed.

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

**<Table 2.1> Setting of Terminal program**

| Properties | Setting Value |
|---|---|
| Bits Per second (Baud Rate) | 115200 bps |
| Data Bits | 8 Bits |
| Stop Bits | 1 Bits |
| Parity | No |
| Flow Control | None |

The serial message that indicates the operation of the TCP server is shown on the HyperTerminal. In order to check serial messages, the settings for HyperTerminal connection information must be done as shown in Figure 2.3. Check the COM port since it differs depending on the user's settings.



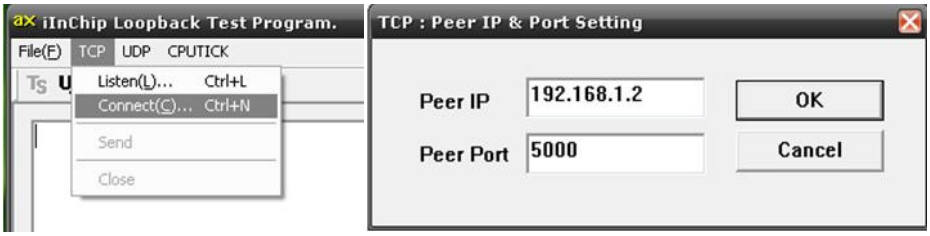

**<Fig 2.3> Setting of HyperTerminal program**

4. Turn on the iMCU7100EVB and check the power LED.

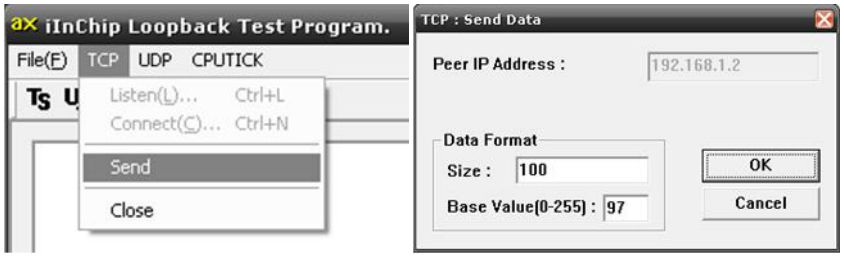
5. Run AX1 as in the order below. (Please refer to AX1 user's manual for more details)

   Execute AX1 as shown in Fig 2.4

© Copyright 2011 WIZnet Co., Inc. All rights reserved.




(a) Connecting (b)set IP and Port




(c) Send data (d) set data format

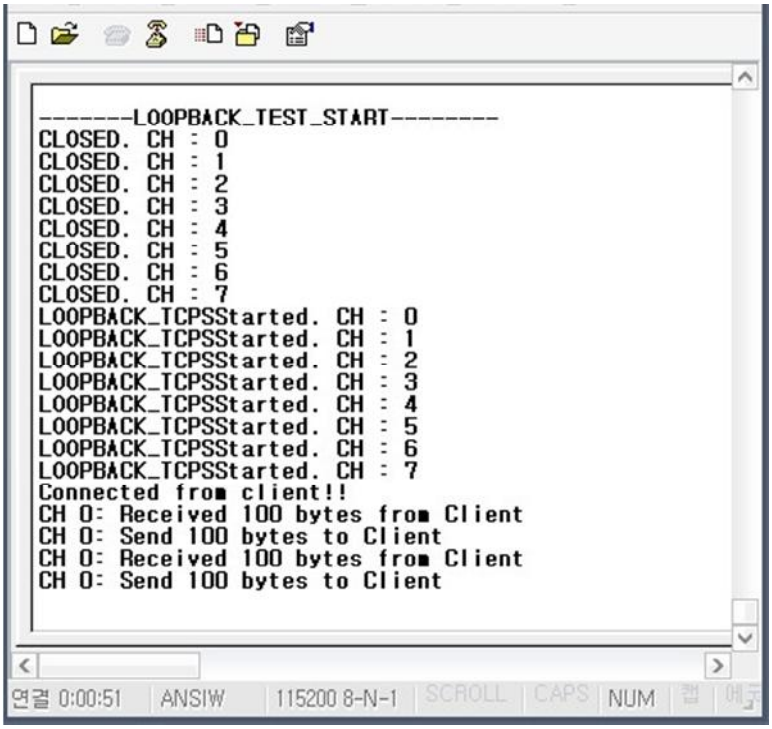
**<Fig 2.4> Execute AX1**

Since iMCU7100EVB is operating in TCP server mode, select 'TCP Connect' from AX1 program and connect to the board. Enter the IP address and Port number of the iMCU7100EVB; the 'connected' message will show and connect to TCP server. If 'send' button is clicked, the loopback test will start. The data size and base value for the loopback test can be set by user.

## 6. Loopback server Result

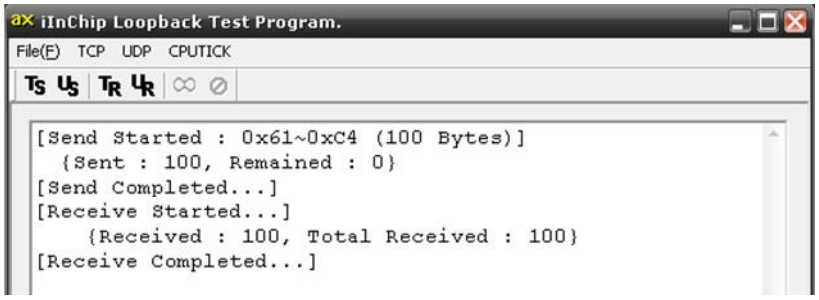
(a) Loopback server Result (HyperTerminal)

© Copyright 2011 WIZnet Co., Inc. All rights reserved.




**<FIG 2.5>Result of LOOPBACK server Demonstration on HyperTerminal**

(b) Loopback server Result(AX1)




**<Fig 2.6> Result of LOOPBACK server Demonstration on AX1**

If the loopback test successfully starts, the message that was sent from AX1 to iMCU7100EVB will be sent back to AX1. Continuous loopback test can be operated if user wishes to.

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

# 3 Product Description

## 3.1 Package and Contents

**<Table> 3.1 List of items contained in the iMCU7100EVB**

| | Item | Quantity |
|---|---|---|
| **Board** | iMCU7100EVB Board | 1 |
| | 16 x 2 Character LCD | 1 |
| **Accessory** | Power adapter (DC 5V / 2A) | 1 |
| | UTP Cable | 1 |
| | Serial Cable | 1 |

- Sample codes and documents are available on WIZnet website.

  The H/W version of iMCU7100EVB board can change for performance/function improvement.
- The fine parts of the component might differ depending on the manufacturer.

**<Table> 3.2 Web Contents**

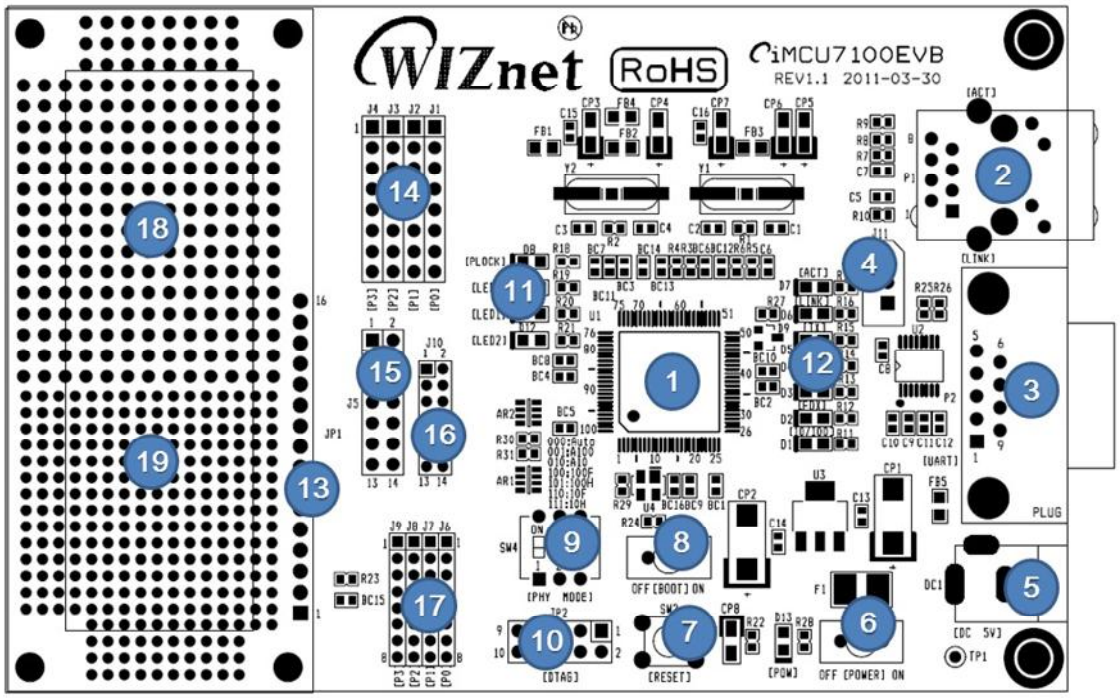
| Directory | | | Contents |
|---|---|---|---|
| iMCU7100EVB | Documents | Manual | User's Manual |
| | | Datasheet | Datasheet of Main Parts |
| | | App Note | Application Notes |
| | Hardware | Schematics | iMCU7100EVB Hardware Schematic |
| | | Parts List | iMCU7100EVB Parts List |
| | Software | Firmware | iMCU7100EVB Firmware |
| | | Tools | AX1, WizISP |

- The content of software might differ depending on the version.

  Download the latest version of firmware, software, and documents at WIZnet website.

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

## 3.2 Board Layout




**<Fig 3.1> Layout of iMCU7100EVB**

- The description of each Part is shown inthe Table 3.3 is as below.

**<Table 3.3> Parts Description of iMCU7100EVB**

| No | Description | No | Description |
|---|---|---|---|
| 1 | WIZnetiMCUW7100A | 2 | RJ-45 Jack (integrated transformer) |
| 3 | RS-232C DB9 Connector | 4 | RS-232C 3Pin Header Hole (TTL) |
| 5 | DC 5V / 2A Adapter Jack | 6 | Power Switch |
| 7 | Reset Switch | 8 | Enable Boot Switch |
| 9 | PHY mode selection Switch | 10 | W7100ADebugger Connector |
| 11 | User LED * 3Ea | 12 | Network Status Indicate LED * 8Ea |
| 13 | Character LCD Connector | 14 | MCU Port Expansion Pin Header Hole<br>32Pin (8pin * 4) 2.54mm Pitch |
| 15 | MCU Port Expansion Pin Header Hole<br>14Pin (7pin * 2) 2.54mm Pitch | 16 | MCU Port Expansion Pin Header Hole<br>14Pin (7pin * 2) 2.00mm Pitch |
| 17 | MCU Port Expansion Pin Header Hole<br>32Pin (8pin * 4) 2.00mm Pitch | 18 | Dummy Pin Header Hole<br>236Pin 2.00mm Pitch Dummy Hole |
| 19 | Dummy Pin Header Hole<br>167Pin 2.54mm Pitch Dummy Hole | | |

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

## 3.3 Hardware Description

### iMCUW7100A (U1)

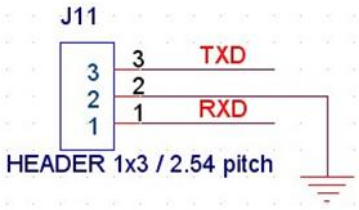
The W7100A is the one chip solution that includes a hardwired TCP/IP core and an 8-bit internet microcontroller unit (iMCU), which is 100% compatible to standard embedded 8051 compatible MCU core.Please refer to the W7100A datasheet for more detailed information.

### Ethernet Port (P1)

Ethernet Port (P1) is the connector that connects the UTP cable; and the RJ-45 connector internally includes a transformer to connect iMCU7100EVB board to the network.

### RS-232C Serial Port (P2, J11)

RS-232C Serial Port (P2, J11) is a serial interface supported by W7100A. RS-232C Serial Port is basically structured to use DSUB 9Pin Male type connector (P2). But the RS-232C Serial Port is also structured to independently connect three pins of TX/RX/GND which are TTL signals, with the Pin header; allowing the user to use user-produced cable. Fig 2.2 shows the structure.




**<Fig 3.2> Simple RS-232C Serial Port**

### DC Power Input Connector (DC1)

DC Power Input Connector (DC1) is supported by 5V/2A Adaptor of iMCU7100EVB. DC Power Input Connector (DC1) is structured for a safe and stable environmentby applying Poly_Fuse(F1); to prevent board damage from excessive electric current caused from misusing the adaptor.

### Power Switch (SW1)

Power Switch (SW1) is a Toggle switch for turning on/off DC.

### Reset Switch (SW2)

Reset Switch (SW2) is for manual reset to provide users the ability to reset whenever they want (ex: during the system is running).

### Boot Enable Switch (SW3)

Boot Enable Switch (SW3) is used to select the W7100A booting mode and provides the

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

following modes.

<Table 3.4> Description of Boot Enable switch

| SW3 | Description |
|---|---|
| On | Boot Enable. To program by using the WIZISP |
| Off | Boot Disable. To run the application programmed by the WIZISP |

## PHY Mode Switch (SW4)

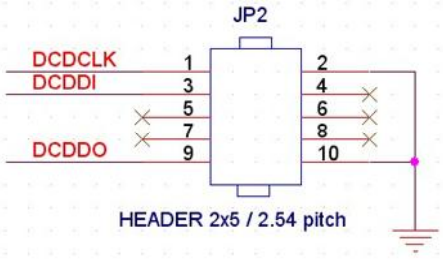
PHY Mode Switch(SW4) is for setting the mode of PHY block inside W7100A.PHY Mode Switch(SW4) provides the following modes.

<Table 3.5> Description of PHY Mode selection switch

| SW4 | | | Mode | Description |
|---|---|---|---|---|
| 1 | 2 | 3 | | |
| OFF | OFF | OFF | Auto | Normal Operation Mode<br>Auto-negotiation enable with all capabilities |
| OFF | OFF | ON | A100 | Auto-negotiation with 100 BASE-TX FDX/HDX ability |
| OFF | ON | OFF | A10 | Auto-negotiation with 10 BASE-T FDX/HDX ability |
| OFF | ON | ON | - | Reserved |
| ON | OFF | OFF | 100F | Manual selection of 100 BASE-TX FDX |
| ON | OFF | ON | 100H | Manual selection of 100 BASE-TX HDX |
| ON | ON | OFF | 10F | Manual selection of 10 BASE-T FDX |
| ON | ON | ON | 10H | Manual selection of 10 BASE-T HDX |

## W7100A Debugger Connector (JP2)

W7100A Debugger Connector (JP2) is for monitoring and changing various registers and internal memory inside W7100A. User can write applications in the Code memory, therefore allowing efficient debugging of software made by user.




<Figure 3.3> W7100A Debugger Connector

- Please refer to W7100A Debugger Guide for more details on W7100A Debugger.

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

## General purpose LEDs

There are three User LEDs for the user to control/test the Port and Debugging.

**<Table 3.6> Description of User debugging LED**

| LED Name | W7100A Pin Name | Direction |
|---|---|---|
| LED0 | P0_3 | O |
| LED1 | P0_4 | O |
| LED2 | P0_5 | O |

## Network Status Indicate LEDs

Table 3.7 lists the descriptions for Indicate LEDs that tell the network status.

**<Table 3.7> Description of Status indicate LED**

| LED Name | W7100A Pin Name | DIR. | Description |
|---|---|---|---|
| 10/100 | SPDLED | O | Network speed indicate LED<br>Low : 100Mbps , High : 10Mbps |
| FDX | FDXLED | O | Full / Half duplex indicate LED<br>Low : Full duplex , High : Half duplex |
| COL | COLLED | O | Collision detect LED<br>Low : Collisions occurred (only in half duplex mode) |
| RX | RXLED | O | Active Low. Receive activity LED |
| TX | TXLED | O | Active Low. Transmit activity LED |
| LINK | LINKLED | O | Active Low. Network link status indicate LED |
| ACT | ACTLED | O | Active Low. Rx or Tx activity LED |
| PLOCK | PLOCK | O | Active High. It notifies when internal PLL is locked. |

## Character LCD Connector (JP1)

Character LCD Connector (JP1) is for Debugging and showing the system status. Pin descriptions of the Character LCD Interface are as followed.

**<Table 3.8> Character LCD Interface Pin Description**

| PIN# | iMCU7100EVB Board PIN NAME / Character LCD PIN NAME | DIR. | Description |
|---|---|---|---|
| 1 | GND / VSS | | Signal Ground |
| 2 | 5V / VDD | I | LCD Power Supply |
| 3 | V0 / V0 | I | Voltage for LCD drive |
| 4 | P0_0 / RS | I | Data / Instruction register select |
| 5 | P0_1 / RW | I | Read / Write |

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

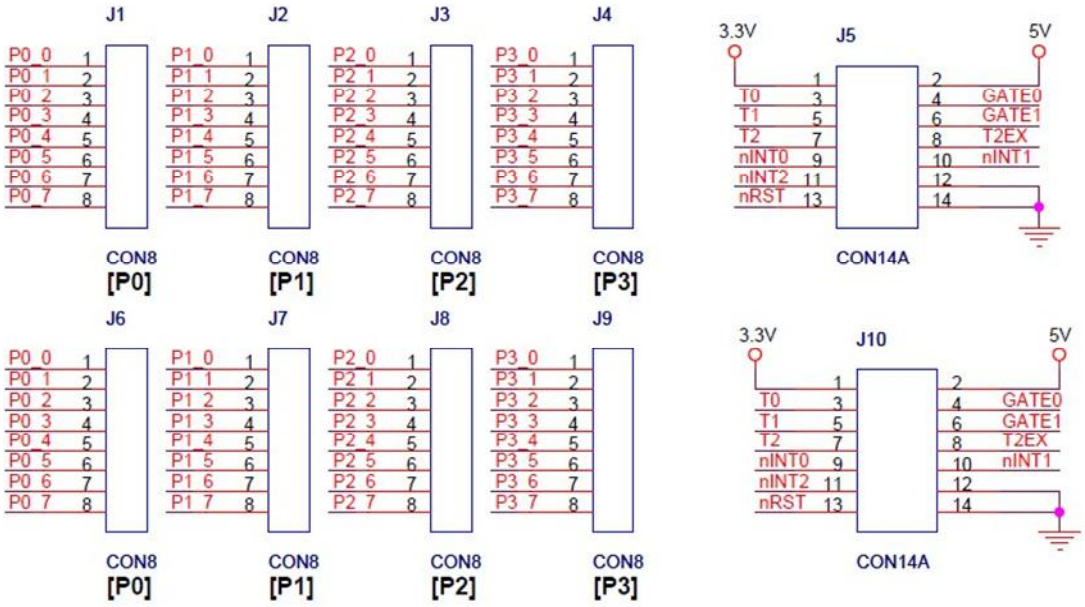
| | | | |
|---|---|---|---|
| 6 | P0_2 / E | I | Enable signal,start data read / write |
| 7 ~ 14 | P2_0 ~ P2_7 / DB0~ DB7 | I/O | Data Bus Line |
| 15 | Not Connect / LED A | O | LED Anode, power supply+ |
| 16 | Not Connect / LED K | O | LED Cathode,ground 0V |

- Please refer to LCD Datasheet (LC1624-R2.pdf) for more details on driving Character LCD.

## MCU Port Expansion Pin header Hole (J1 … J10)

W7100A provides two types of pitches from the total of 32pin (8bit x 4Port) IO pin. User can select according to their needs between 2.54mm Pin pitch and 2.00mm Pin pitch.

iMCU7100EVB board provides four ports of IO to allow users to use with the general pin header.The description of port expansion is as followed.



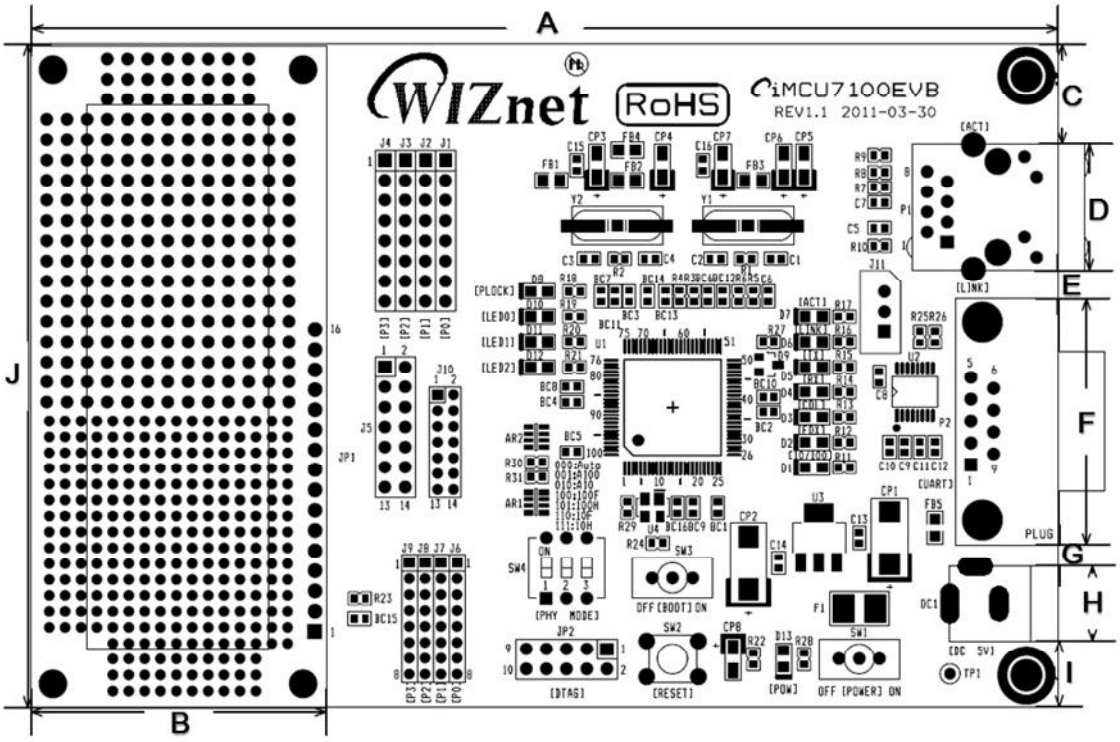

**<Figure 3.4> Port Expansion Connector**

## Dummy Pin Header Hole

Dummy pin header holes are not connected with system circuits. The dummy pin header hole is provided into two types: 2.54mm Hole pitch and 2.00mm Hole pitch. By using dummy hole, users can test external devices that are in need of additional tests.

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

## 3.4 Physical Specification




<Figure 3.5> iMCU7100EVB Dimension

<Table 3.9> iMCU7100EVB Board Dimension

| Symbols | Dimensions (mm) | Symbols | Dimensions (mm) |
|---|---|---|---|
| A | 129.2 | F | 31.1 |
| B | 37.2 | G | 2.7 |
| C | 12.6 | H | 9.4 |
| D | 15.9 | I | 8.3 |
| E | 3.6 | J | 83.6 |

© Copyright 2011 WIZnet Co., Inc. All rights reserved.

# Document History Information

| Revision | Data | Description |
|---|---|---|
| Ver. 0.9 | Aug 17, 2009 | Beta release |
| Ver. 1.0 | May 12, 2011 | Modified and added contents with iMCU7100EVB Rev. 1.1 lunching |
| | | |

# Copyright Notice

Copyright 2011 WIZnet, Inc. All Rights Reserved.

Technical Support: support@wiznet.co.kr
Sales & Distribution: sales@wiznet.co.kr

For more information, visit our website at http://www.wiznet.co.kr

Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** sales@st-electron.ru

**Адрес:** 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331