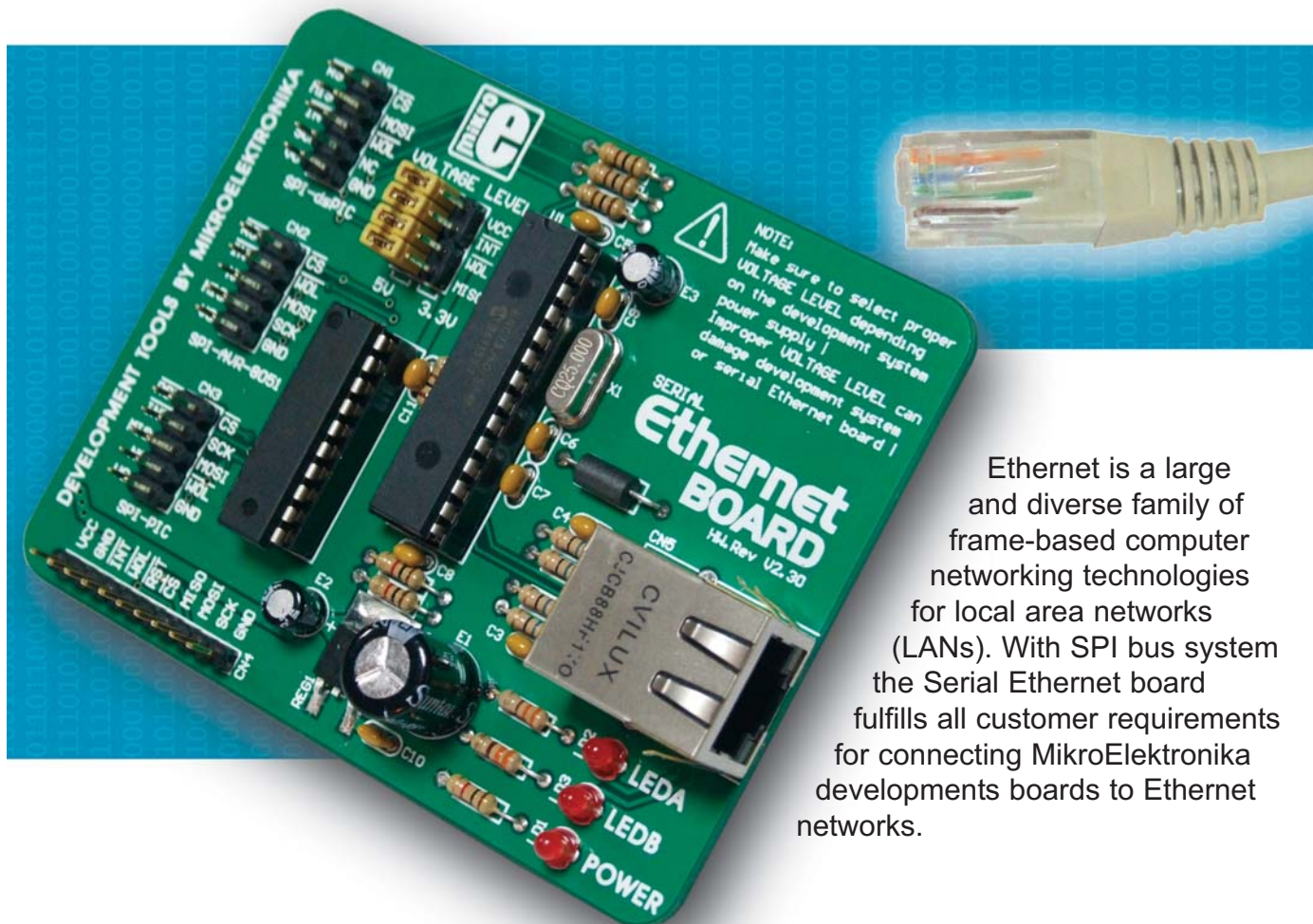


SOFTWARE AND HARDWARE SOLUTIONS FOR THE EMBEDDED WORLD

MikroElektronika
Development tools - Books - Compilers

Serial Ethernet User's Manual



Ethernet is a large and diverse family of frame-based computer networking technologies for local area networks (LANs). With SPI bus system the Serial Ethernet board fulfills all customer requirements for connecting MikroElektronika developments boards to Ethernet networks.

Software and Hardware
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About Serial Ethernet Board

Ethernet is the most common Local Area Network (LAN) technology in use today. On top of the physical layer Ethernet stations communicate to each other by sending each other data packets. Each Ethernet station is given a single 48-bit MAC address, which is used both to specify the destination and the source of each data packet.

Serial Ethernet board has 28-pin ENC28J60 10BASE-T Ethernet Controller with on board Media Access Control and Physical Layer (MAC &PHY), 8 Kbytes of Buffer RAM and Serial Peripheral Interface (SPI) communication.

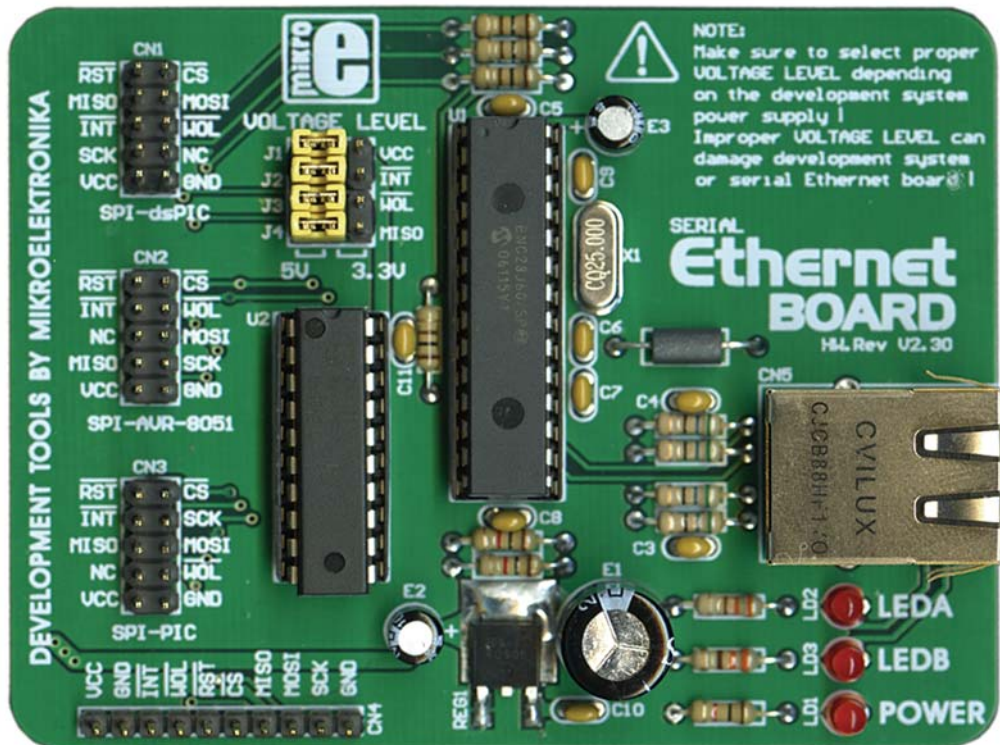


Figure 1. Serial Ethernet add-on board

Board Schematic

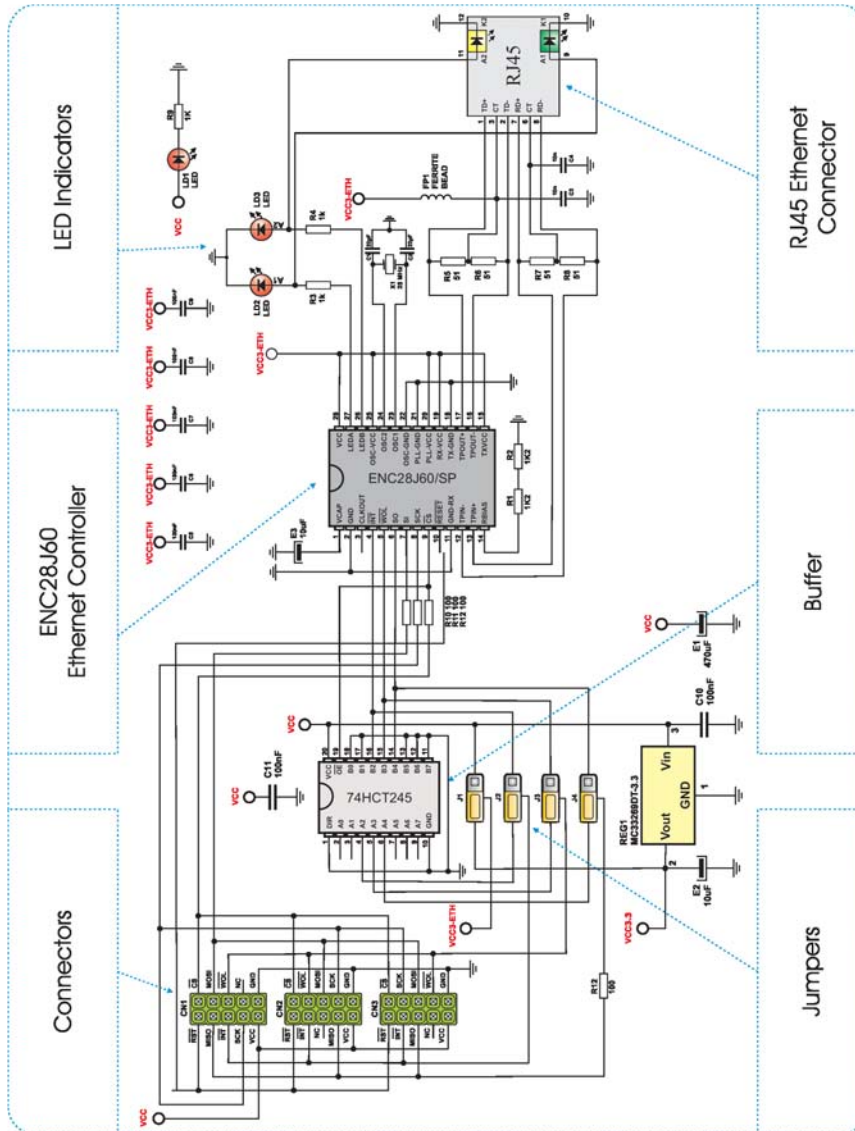


Figure 2. Serial Ethernet add-on board schematic

BOARD SCHEMATIC

Power Supply

As an add-on board, the Serial Ethernet board uses power supply from the development board. The Serial Ethernet board is connected to development board through one of the connectors (CN1, CN2 or CN3). If the Serial Ethernet board is connected to development board with 5V voltage level, the Serial Ethernet board reduces voltage to 3.3V using MC33269DT-3.3 voltage regulator as shown in Figure 3. In that case all four jumpers (J1, J2, J3 and J4) must be set in the left hand position marked as 5V (Fig. 4). If the Serial Ethernet board is connected to development system board with 3.3V voltage level, then all four jumpers must be set in right hand position to avoid the voltage regulator (Fig. 5. and 6.) .

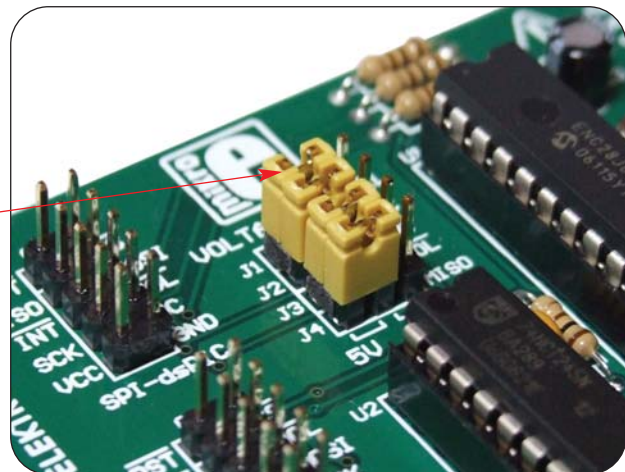
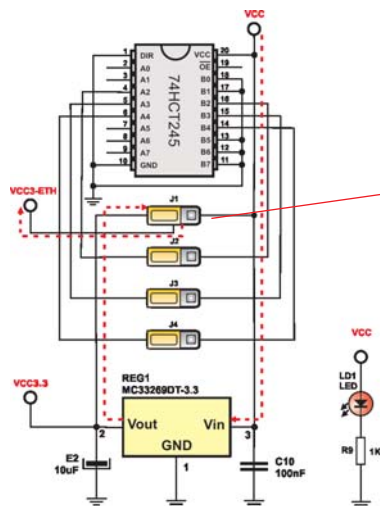


Figure 4. J1 in 5V position

Figure 3. Power supply schematic for 5V power supply



Note: All four jumpers must be in the same position (left or right).

Figure 5. Power supply schematic for 3.3V

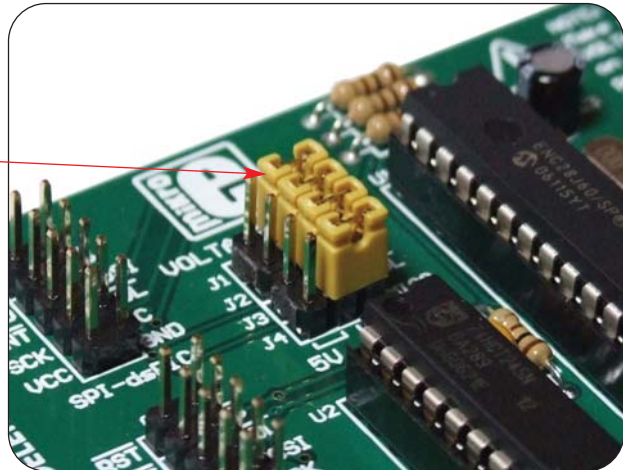
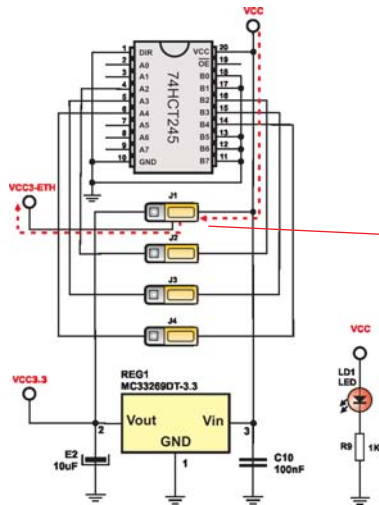


Figure 6. J1 in 3.3V position



Note: Make sure to select proper VOLTAGE LEVEL depending on the development system power supply!
Improper VOLTAGE LEVEL can damage development system or Serial Ethernet board!

Output Buffer

ENC28J60 has 5V tolerant inputs. The signals from the MCU can be brought directly to the input pins of the ENC28J60 Ethernet controller. Voltage level on output pins of the ENC28J60 Ethernet controller is 3.3V. If the the Serial Ethernet board is connected to development system board with 5V voltage level, output buffer 74HCT245 is used to increase output voltage level from 3.3V to 5V.

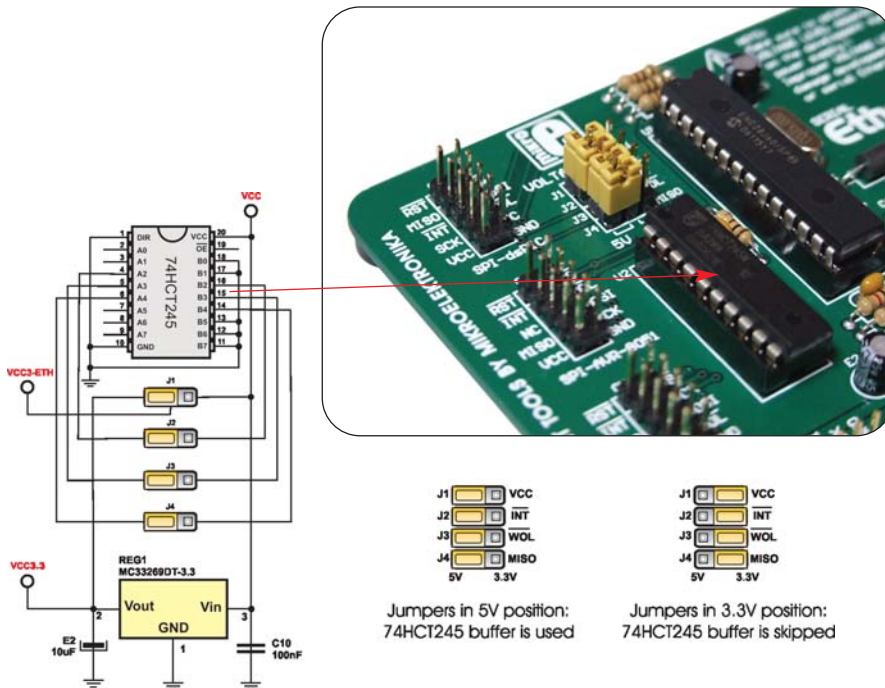


Figure 7. Output buffer

LED Indicators

There are three Light Emitting Diode (LED) indicators on Serial Ethernet board. POWER LED (LD1) indicates whether the board is powered on or not.

The LEDA is configured to show the link state. It shows whether the Ethernet cable is plugged into the RJ45 connector.

LEDB is configured to indicate network activity. Each time packets are received or sent the LEDB turns on.

As shown in Figure 8, the LEDA and LEDB have corresponding LEDs on the RJ45 Ethernet connector.

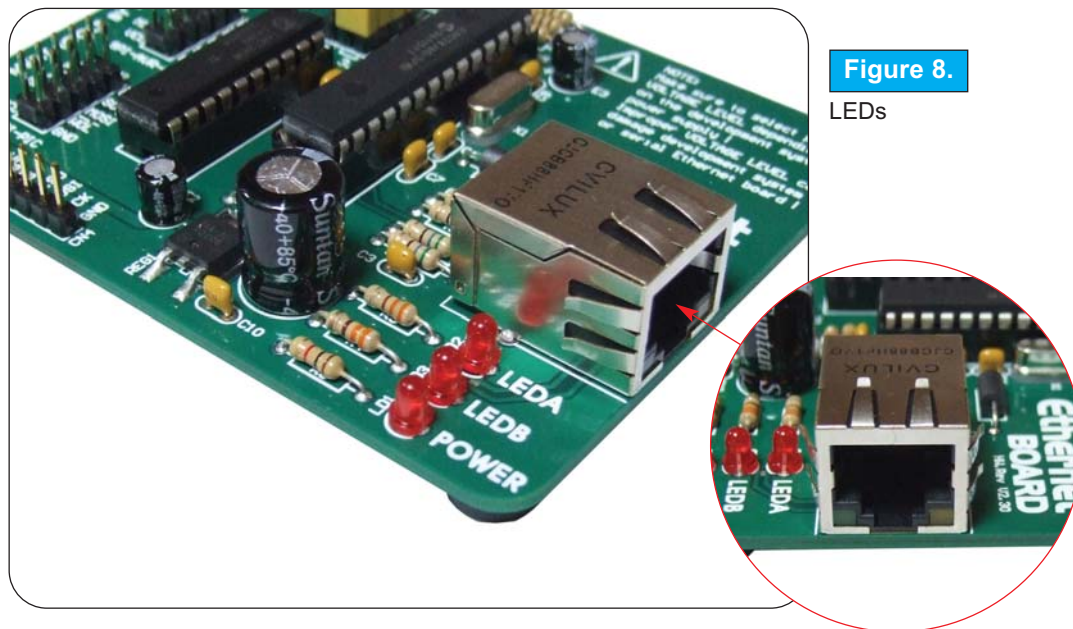


Figure 8.

LEDs

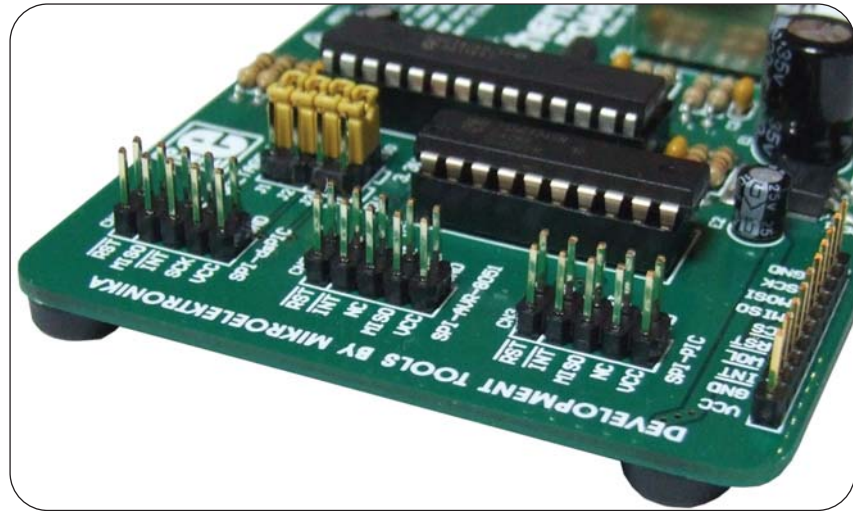


Note: The LEDA and LEDB are software configurable. For more detail refer to ENC28J60 datasheet.

Connecting development board

Figure 9

Connectors

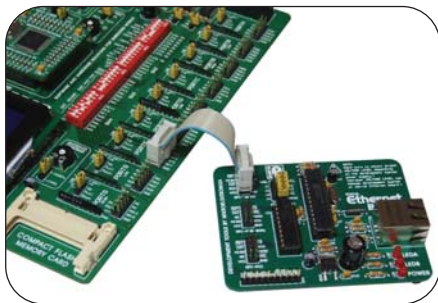


Serial Ethernet board has three connectors for connecting with different development boards. Only one connector can be used at the time. The table below shows how to connect various development boards to the Serial Ethernet board.

Connector	Development Board	Port
CN1	dsPIC	PORTF
CN2	AVR or 8051	PORTB
CN3	PIC	PORTC

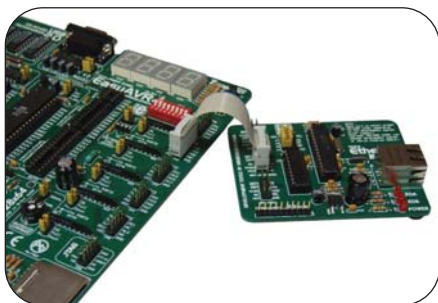
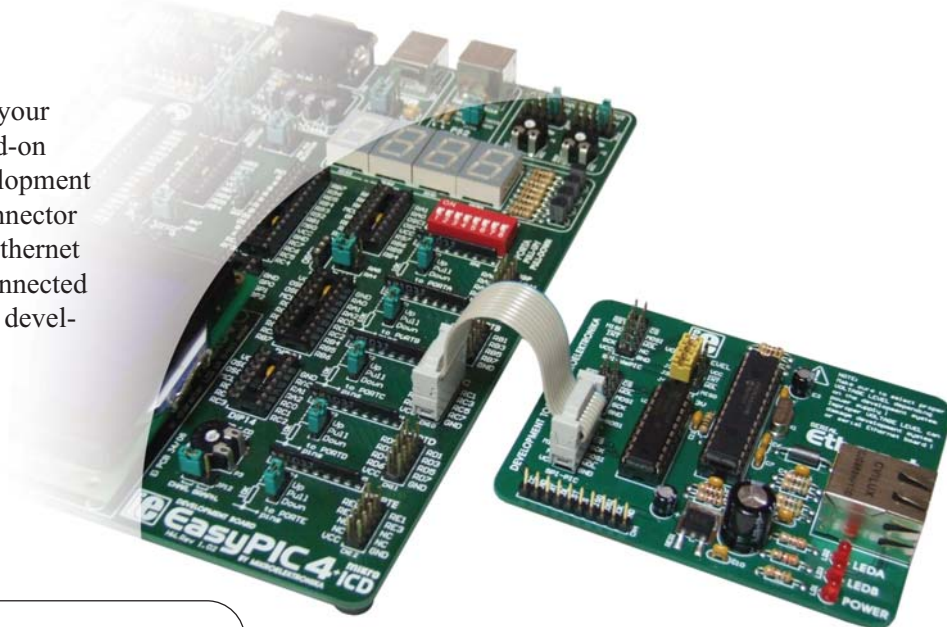


Note: Make sure to select the proper connector depending on the development system that you are connecting Serial Ethernet board to!



When connecting your Serial Ethernet add-on board to dsPIC development board, you use connector CN1. The Serial Ethernet board has to be connected to PORTF on dsPIC development board.

When connecting your Serial Ethernet add-on board to PIC development board, you use connector CN3. The Serial Ethernet board has to be connected to PORTC on PIC development board.



When connecting your Serial Ethernet add-on board to AVR or 8051 development board, you use connector CN2. The Serial Ethernet board has to be connected to PORTB on the development board.

If you are experiencing problems with any of our products or you just want additional information, please let us know. We are committed to meeting your every need.

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