

Features:

- ◆ NXP LPC1768 ARM Cortex-M3 100MHz
- ◆ 512KB on-chip flash, 64KB SRAM
- ◆ One full modem RS-232 and one isolated RS-485 serial port
- ◆ One 10/100 Mbps Ethernet ports
- ◆ One serial console port
- ◆ Support lwIP and BSD socket library
- ◆ Support tiny Web server
- ◆ Windows configuration utility included
- ◆ Tool chain: Sourcery CodeBench Lite (www.mentor.com) or Keil from ARM

Specification:

CPU: NXP LPC1768 Cortex-M3 100MHz

Serial port:

Port1: RS-232 full modem
Port2: RS-485 2500Vrms isolated
Console: RS-232 three wires
Baud rate: 1200 to 921600 bps
Flow control: None/Hardware/Xon_Xoff
Data bit: 5 to 8
Stop bit: 1 to 2
Protection: 15KV ESD

Ethernet:

10/100 Mbps, RJ45
Protection: 1500V Magnetic isolation

Isolation digital input:

Channel number: 16
Photo isolation (AC in): 2500Vrms
Logical High: 5~24Vdc
Logical Low: 0~1.5Vdc
Input resistance: 1.2KOhms @0.5W

Relay output:

Channel number: 8
Contact rating: 30VDC@1A or 125VAC@0.5A

1-Wire port: Three-pin terminals x3 (Maxim 1-Wire)

Power: 9~48 VDC power jack and terminal block

Dimension: 182x118x35.82mm (WxHxD)

Operating Temperature: 0~70°C

Storage Temperature: -20~85°C

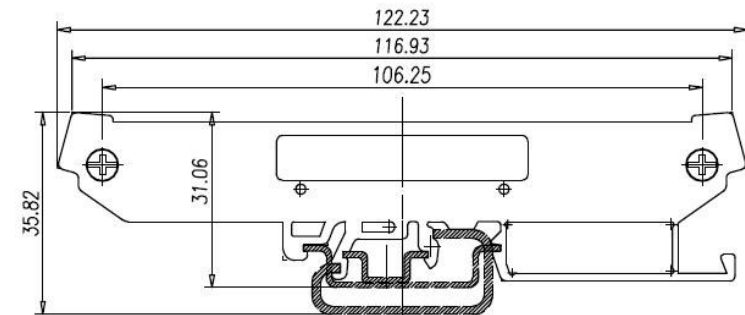
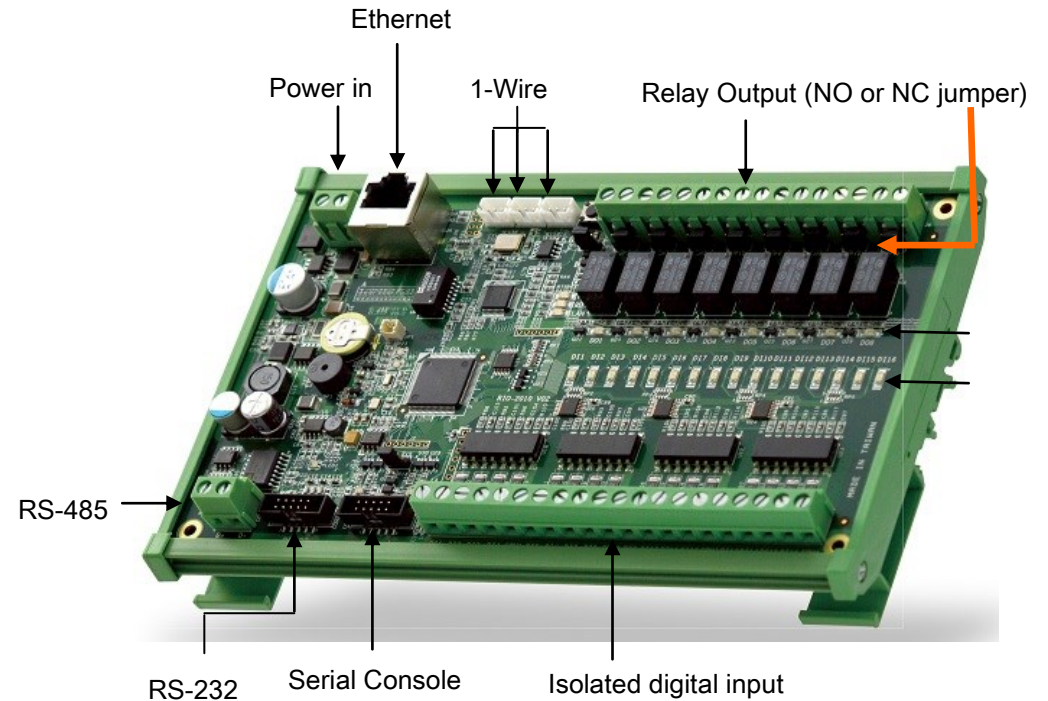
Packing List

1. RIO-2010PG Programmable remote I/O module
2. Software tool chain (download from Artilla cloud)
3. Manager Utility (download from Artilla cloud)

Optional accessory

1. 91-0P9M9-001: Serial Console Cable (10Pin Header to DB9 male)
2. PWR-12V-1A: 110~240VAC to 12VDC 1A Power Adaptor

Layout



Power Connector

Connecting 9~48VDC power line to the Power in terminal block. If the power is properly supplied, the Power LED will keep solid green color and a beep will be heard.

LED Status

The LED provides the RIO-2010 operation information. The LED status is described as follow:

Power (PWR) LED: Power LED keeps ON if power (+9VDC to +48VDC) is correct.

Ready (RDY) LED: Ready LED keeps ON when RIO-2010 firmware is ready for operation.

Link/Act (LAN) LED: Link and Activity LED will turn ON when the Ethernet cable is connected. When there is network data traffic, this LED will flash.

LED 1/2/3: These LED are dual color and they indicates the serial data traffic of RS-485, RS-232 and serial console respectively. The Yellow LED stands for receiving data and Green LED means transmitting data.

LED DO1/DO8: These LEDs indicates the DO status. When the coil of relay is energized, the LED will be ON.

LED DI1/DI16: These LEDs indicates the DI status. When the input is high, the LED will be ON.

Jumper setting of relay output (JP5~JP12)

Normal open: when jumper is shorted to 2-3, the terminal (DOX and COM) is normal open when DO LED is off.

Normal close: when jumper is connect to 1-2, the terminal (DOX and COM) is normal close when DO LED is off.

COM DOX



1 3

Note: JP2 and JP4 are designed for factory usage and should be set to position 2-3

Serial port connector

RS-485:

COM1: RS-485

Data+ Data-



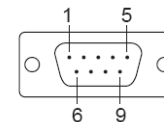
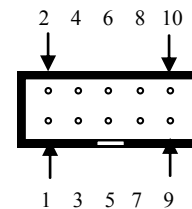
Data+ is pull up to isolated 3.3VDC with 10K Ohm resistor

Data- is pull low to isolated ground

Termination resistor is not included. User can add a termination resistor to pad at position R37 for SMD resistor or dual hole for DIP type resistor

RS-232 and Console port: Serial Port and serial console port use 10-pin header. Please use console cable (91-09PM9-001 to convert it to DB9 male RS-232 interface.

COM2: RS232
COM3: Console



Pin	COM2	COM3
1	DCD	N/C
2	DSR	N/C
3	RXD	RXD
4	RTS	N/C
5	TXD	TXD
6	CTS	N/C
7	DTR	N/C
8	N/C	N/C
9	GND	GND
10	N/C	N/C

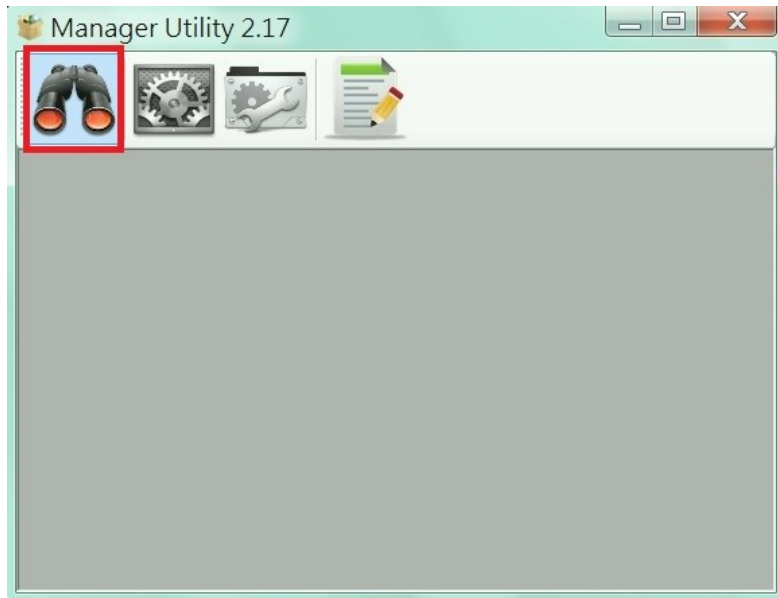
Install Manager Utility Software

RIO-2010PG comes with Manager utility where you can find many useful software utilities. You need to install Manager Utility first prior to configure the RIO-2010PG. To install the Manager Utility, please find the ManagerUtilitysetup.exe as shown following

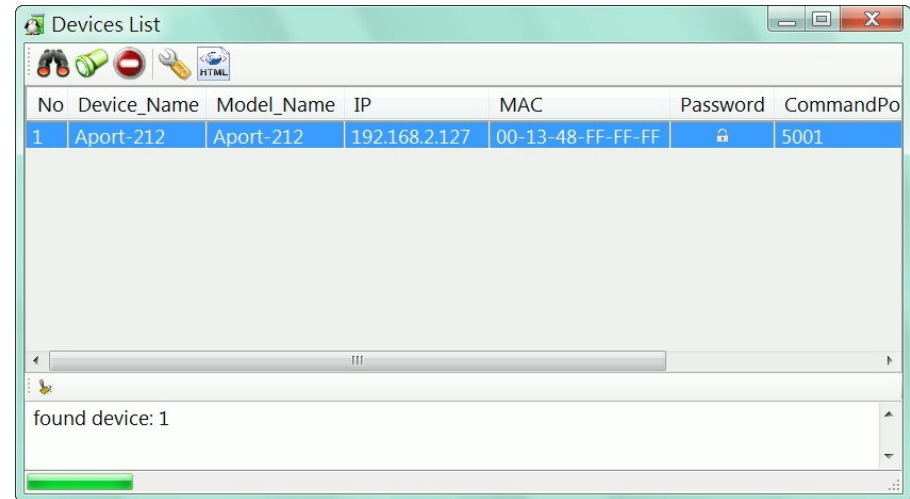


Broadcast search

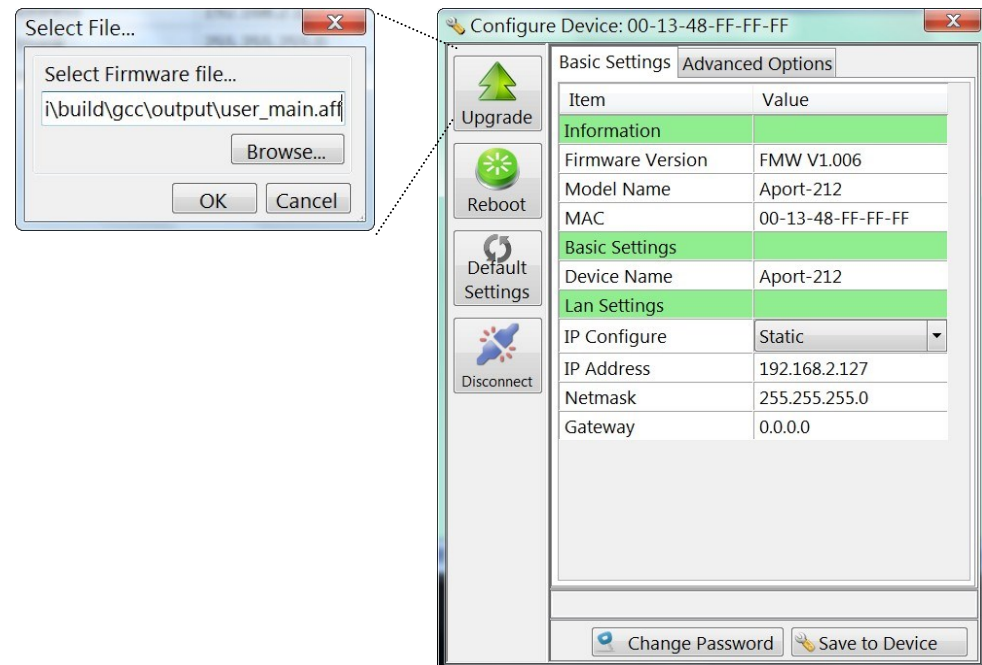
Once start Manager utility, you can click telescope icon to search the RIO-2010PG in the network.



Click the device to configure its settings



Click the upgrade to upload the new firmware *user_main.aff*



Install Software Tool Chain

The Tool Chain, Sourcery CodeBench Lite ARM EABI Release is available at <http://www.mentor.com/embedded-software/sourcery-tools/sourcery-codebench/editions/lite-edition/>

Configure the environment to add the path of the tool chain. After installing tool chain, a new path will be added to Windows Environment i.e.

Sourcery_CodeBench_Lite_for_ARM_EABI\bin

Restart the computer to make the new environment effective. After installation, you can test tool chain as follow:



```
命令提示字元
Microsoft Windows [版本 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Ying>arm-none-eabi-gcc --version
arm-none-eabi-gcc (Sourcery CodeBench Lite 2012.09-63) 4.7.2
Copyright (C) 2012 Free Software Foundation, Inc.
This is free software; see the source for copying conditions. There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
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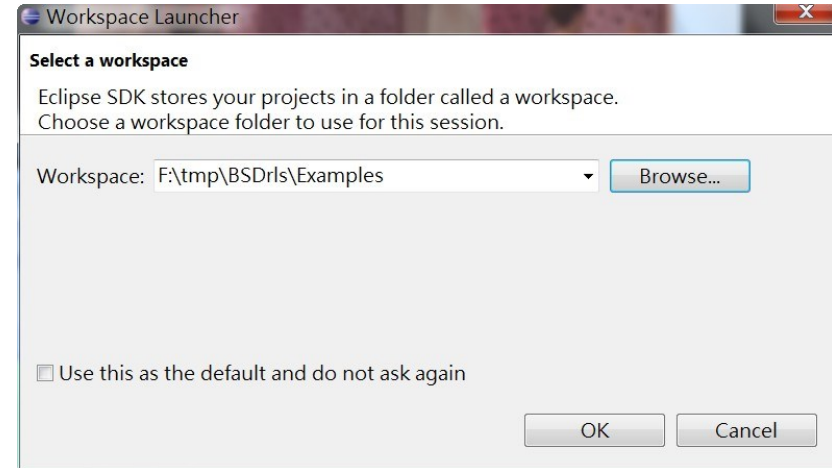
Install Eclipse IDE

If you are interesting in using IDE to develop your program, The eclipse IDE is available at <http://www.eclipse.org/downloads/>

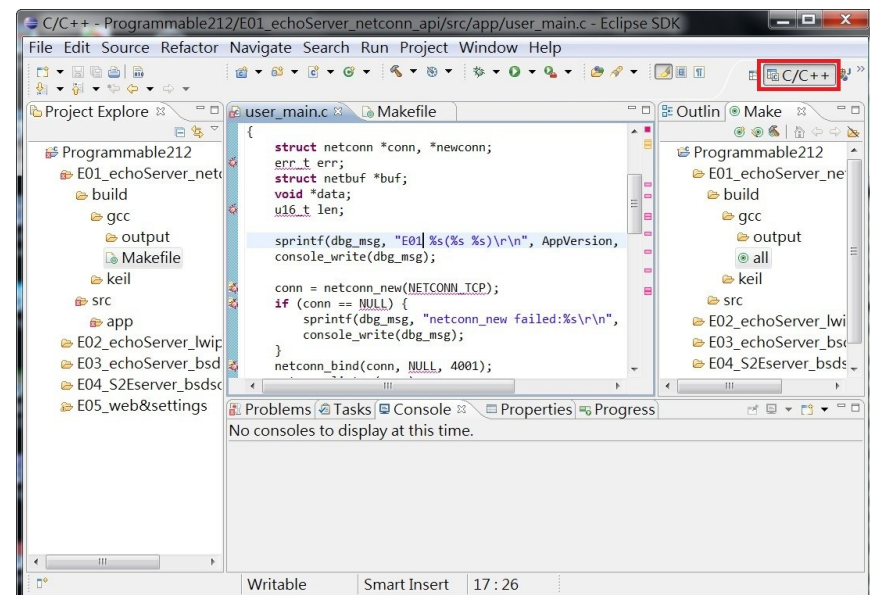
And choose C/C++ compiler option

Start your first project

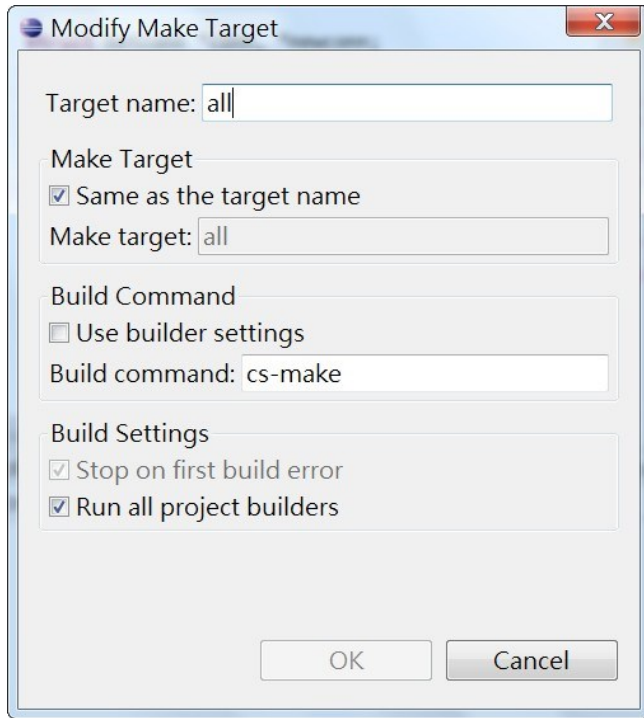
Run eclipse and select a workspace: BSDRls\Examples . You can find the path of the example program at the CD with path: BSDRls\Examples



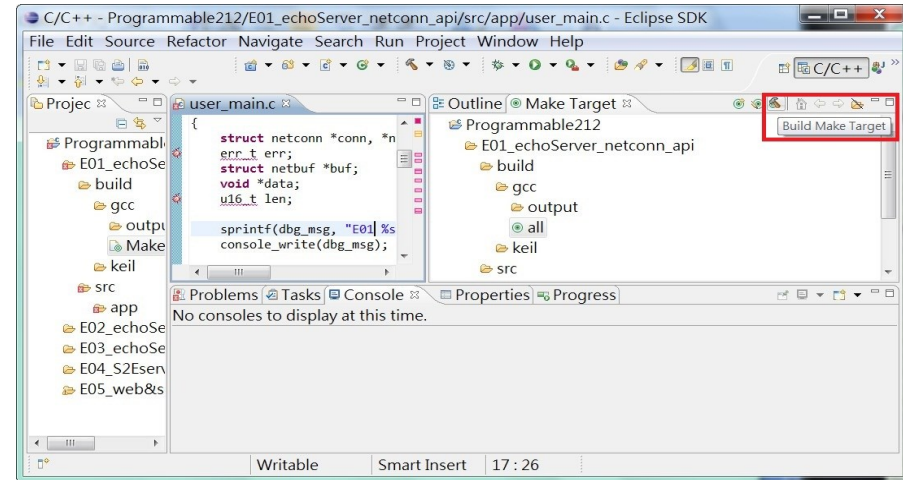
Choose C/C++ in the Workbench



Modify the make file to compile the program as follow



Use make file to build target



Once project is built, you will find the target execution file *user_main.aff* is generated and available at

E01_echoServer_netconn_api\build\gcc\output

