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1. Introduction

Aport-212PG is a programmable serial to Ethernet gateway which includes Cortex-M3 CPU, 64KB SRAM and 512KB flash. Aport-212PG is designed for users who are looking for a tiny but mighty computing platform which has FreeRTOS and lwIP pre-installed. The tool chain, Sourcery CodeBench Lite can be downloaded from mentor website or you can also use Keil from ARM. A tiny web server is also available for web-based application such as ajax. A demo web page source code is available for user’s reference.

The key features are as follow:

- NXP LPC1768 ARM Cortex-M3 100MHz
- 512KB on-chip flash, 64KB SRAM
- Two configurable RS-232/422/485 serial ports
- One 10/100Mbps Ethernet ports
- One serial console port
- Support lwIP and BSD socket library
- Support tiny Web server and AJAX application
- Windows configuration utility included
- Support Telnet and serial console command
- Toolchain: Sourcery CodeBench Lite (download from www.mentor.com)

1.1 Specification

- **System:**
  - CPU: NXP LPC1768 Cortex-M3 100MHz

- **Serial port:**
  - Port1: RS-232/422/485
  - Port2: RS-232/485
  - 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

- **Serial console port:**
  - RS-232: 115200 baud rate, None flow control, 8 bits data, 1 stop bit

- **Power:**
  - 9~40VDC power jack and terminal block

- **Dimension:**
  - 108 x 78 x 25 mm (H x W x D)

- **Operating Temperature:**
  - 0~70°C

- **Storage Temperature:**
  - -20~85°C
1.2 Packing List
- Aport-212PG programmable device server
- Software toolchain (download from Artila FTP)
- Manager Utility (download from Artila FTP)

1.3 Optional Accessory
- CB-RJ2CON-100 (91-RJCON-100): Console Cable (RJ45 to DB9 Female, 100cm)
- DK-35A (36-DK35A-000): DIN RAIL Mounting Kit
- PWR-12V-1A (31-62100-000): 110~240VAC to 12VDC 1A Power Adaptor
2. Layout

![Diagram of Aport 212PG layout with labeled ports: Power Jack, Power TB, Ethernet, Serial Console, Serial Port 1, Serial Port 2.]
3. Pin Assignment and Definition

3.1 Power Connector
Connecting 9~40VDC power line with the Aport-212PG terminal block or the power jack. If the power is properly supplied, the Power LED will keep solid yellow color.

3.2 Serial Port Connector
Serial Port uses a Male DB9 connector and it includes RS-232, RS-422 or RS485 signal and pin assignments are described as follow:

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>RS-232</th>
<th>RS-422</th>
<th>RS-485</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD*</td>
<td>TXD-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
<td>TXD+</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
<td>RXD+</td>
<td>DATA+</td>
</tr>
<tr>
<td>4</td>
<td>DTR*</td>
<td>RXD-</td>
<td>DATA-</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>DSR*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3.3 LED Status
The LED provides the Aport-212PG operation information. The LED status is described as follow:

- **Power LED**: Power LED keeps ON if power (+9VDC to +40VDC) is correctly input to Aport-212PG.
- **Ready LED**: Ready LED keeps ON when Aport-212PG firmware is ready for operation.
- **Link/Act LED**: Link and Activity LED will turn ON when the Ethernet cable is connected. When there is network data traffic, this LED will flash.
- **RX/TX LED**: The RX/TX LED is a dual color LED that indicates the serial data traffic. The Yellow LED stands for receiving data and Green LED means transmitting data.

3.4 Factory Default Settings
**IP Address**: 192.168.2.127
**Netmask**: 255.255.255.0
**Serial Port**: RS-232
  - Baud rate: 115200
  - Data: No parity, 8 bits, 1 stop bit
  - Flow control: None
**Serial Console port**: RS-232
  - Baud rate: 115200
  - Data: No parity, 8 bits, 1 stop bit
  - Flow control: None
Telnet console: telnet 192.168.2.127 5001
4. Artila Utility Software

4.1 Install Manager Utility Software
You can find many useful software utilities from Artila FTP. You need to install Manager Utility first in order to configure the Aport-212PG. To install the Manager Utility, please find the `ManagerUtilitysetup.exe` as shown following:

![Manager Utility Setup](image)

4.2 Broadcast Search
Once start Manager utility, you can click telescope icon to search the Aport-212PG in the network.

![Manager Utility](image)

Click the device to configure its settings.
Click the upgrade to upload the new firmware *user_main.aff*.

### 4.3 Install Software Toolchain

The toolchain, Sourcery CodeBench Lite ARM EABI Release is available at:


Configure the environment to add the path of the toolchain. After installing toolchain, 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 toolchain as follow:

### 4.4 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.
4.5 Start Your First Project

Run eclipse and select a workspace: **BSDrls\Examples**. You can find the path of the example program on Artila FTP with path: **BSDrls\Examples**.

Choose C/C++ in the Workbench.
Modify the make file to compile the program as follow:

![Modify Make Target](image1)

Use make file to build target.

![Eclipse Build Target](image2)

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**