

**AWC**

# **NetPorter DAQ Data Acquisition Board**

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AWC

310 Ivy Glen

League City, TX 77573

[stamp@al-williams.com](mailto:stamp@al-williams.com)

<http://www.al-williams.com/awc/awce.htm>

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# Overview

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The NetPorter DAQ is a sophisticated data acquisition system on a PC board. You can connect a NetPorter DAQ to any RS232-capable device including PCs or microcontrollers.

Based on the popular GPMPU28 board, NetPorter DAQ is especially well-suited for use with NetPorter software for providing data over the Internet.

The DAQ features:

- 5 10-bit analog input (0 to 5V)
- 8 digital inputs
- Raw counts or engineering units (1/100V)
- Simple ASCII data transfer at 19,200 baud
- Easy configuration via terminal program
- External triggering or timed data transmission
- Supports RTS/CTS flow control
- Configurable data channels

## Hardware

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The Netporter DAQ is based on the GPMPU28 board. Please refer to the documentation for this board for further details. The board requires 5V regulated unless fitted with the optional regulator circuit. The serial port is DCE and operates at 19,200 baud, 8 bits, no parity, and one stop bit. RTS must be enabled for the board to send data.

You can also obtain the DAQ as a single chip to integrate into your own designs.

There are no modifications necessary to use the GPMPU28 board in the DAQ application. Of course, the NetPorter DAQ IC must be used for IC1.

Most connections necessary for the board's operation are available on the JP1 connector.

<b>JP1 Pin</b>	<b>Signal</b>
<b>1</b>	<b>Ground</b>
<b>2</b>	<b>Digital input 2</b>
<b>3</b>	<b>Digital Input 1</b>
<b>4</b>	<b>Digital Input 0</b>
<b>5</b>	<b>Analog input 4</b>
<b>6</b>	<b>Program Enable</b>
<b>7</b>	<b>Analog input 3</b>
<b>8</b>	<b>Analog Input 2</b>
<b>9</b>	<b>Analog Input 1</b>
<b>10</b>	<b>Analog Input 0</b>
<b>11</b>	<b>5V regulated</b>

In addition, the hole marked RC4 is used as the optional external trigger input.

Normally, pin 6 is tied to 5V. This places the board in DAQ mode. It will send data according to the programmed parameters stored in EEPROM. If you tie pin 6 to ground and reset the board (or cycle the power) the board will start in program mode.

In manual mode, the onboard LED lights when it detects a trigger event, and extinguishes when it has sent the data requested. In timed mode, the LED alternates on each frame of data.

# Configuration

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In program mode, you should have a terminal program (such as Windows Hyperterm) connected to the board. Set the terminal program to operate at 19,200 baud, 8 bits, no parity, 1 stop bit, and hardware handshaking. You should set the terminal to use local echo so that you can see what you are typing.

The board will reset and print a sign on message. You will have 10 seconds to press a key or the board will resume DAQ mode.

Assuming you press a key, the board will print its current status and ask you if you want to change the parameters. Here are the parameters you can change:

- Hex format – If set, the board emits a fixed line for all data, using three ASCII hex digits for each analog channel and two hex digits for the digital channel. Only selected channels are output. If clear, the board uses the ASCII decimal format.
- Continuous data – If set, the board sends data as quickly as it can repeating it (subject to the RTS handshaking line from the host computer). If this option is set, the next three options will not appear.
- Manual trigger – If set, data is only sent when the manual trigger input (RC4) is asserted. If not set, the board operates on a timed delay, sending data at an interval you specify.
- Trigger on logic 1 – This option only appears if you set manual triggering. You can set RC4 to be active high or active low with this option. The actual data is sent on the falling edge of the trigger. So if you set the trigger to logic 1, the data is sent when the trigger goes from 0 to 1 and then back to 0.
- Time between samples – The number of seconds to delay between samples. The maximum number is 65535. This option only appears if manual triggering is off.
- Number of A/D – You can select from 0 to 5 A/D channels to send. The board sends the lowest numbered channels first, so if you select 1 A/D, you will use analog input 0.

- Voltage in 1/100V units – If this option is set, the board reports voltages in 1/100V units, so 452 is 4.52 volts. If this option is not set, the voltage is reported in raw counts (0-1023). This option only appears if you have at least one A/D channel active.
- Use digital inputs – If this option is set, the board will report the status of its digital inputs with each data frame.

These settings are saved in EEPROM, so you only need to configure the settings once. The factory defaults are to send data every 10 seconds, with all A/Ds active, the digital inputs enabled, and A/D data in raw counts.

## Software

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In DAQ non-hex mode, the board outputs data frames in ASCII with the following format:

```
A0=125  
A1=352  
D0=131
```

Of course, depending on configuration, you may have as many as 5 analog channels (A0-A4). There may be blank lines sent ahead of each packet.

Depending on configuration, the analog numbers represent either 0 to 1023 (for 0 to 5V) or 0 to 500 (for 0 to 5V). All numbers are in decimal.

This format is perfect for use with NetPorter. You can also download a NetPorter DAQ ActiveX control that makes it easy to process this data from programs like Visual Basic.

You can find examples of using NetPorter DAQ with NetPorter or the ActiveX control on our Web site at <http://www.al-williams.com/netporter.htm>.

You can also set hex mode to make the board emit a fixed three characters for each analog input and two characters for the digital channels. So in the above example, the line would be:

```
07D16083
```

So A0=07D (125), A1=160 (352) and the digitals are 83 (131).