

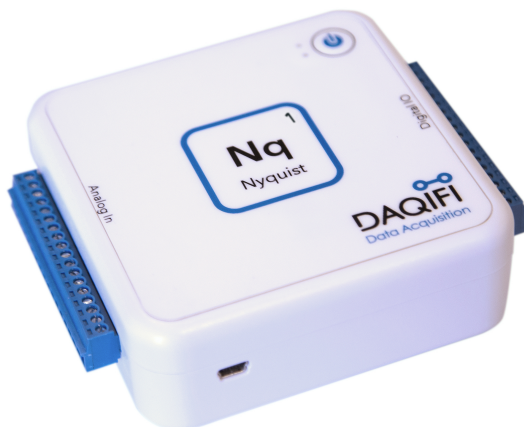
# Nyquist 1

## 1 DESCRIPTION

The DAQiFi Nyquist 1 (Nq1) is an open-source, general-purpose, mobile, wireless data acquisition device intended to connect analog or digital sensors to the PC, mobile device, or cloud services.

The Nq1 features 16 analog voltage inputs, 16 digital input/outputs (capable of SPI, I2C, RS-232, etc.), and provides dual 5V supplies (AVDD and DVDD). Connectivity is provided via 802.11 WiFi and USB (power/data) with on-board logging (micro SD card slot) storage optional. An internal Li-Ion cell provides hours of continuous operation at full speed with a low-power highly extended run-time option.

With the DAQiFi app for Windows or Android, data is viewable in real-time for quick analysis or exportable as CSV. Third-party software interfacing is available via Java and C# APIs. LabView device drivers and Wolfram Mathematica API are also available.



## 2 FEATURES

- Open-source
- Factory calibrated
- 802.11 WiFi and USB connectivity
- Java, C#, NI LabVIEW APIs
- Open Windows and Android apps
- 16 analog inputs
  - 0-5V, 12 bit
  - 10kHz aggregate streaming
  - 160kHz+ aggregate logging
  - Up to 4 differential inputs
  - Over-voltage and ESD protection
- 16 digital I/O
  - 5V output, 3.3V input compatible
  - Active 30mA+ source/sink drivers
  - Individually configurable direction
  - Serial protocols: I2C, SPI, RS-232
  - Over-voltage and ESD protection
  - 4x optional SPST mechanical or solid-state relays
- Built-in 4000mAh Lilon battery
- Micro SD card slot for data logging
- 2x regulated 5V power outputs - analog and digital rails
- Pluggable screw terminals for fast swapping between projects
- Compact profile (4" x 4" x 1.6")

### 3 APPLICATIONS

The Nyquist 1 is able to connect directly to virtually any analog (voltage-based) sensor or transducer. Additionally, the digital interface will allow serial enabled devices to communicate with the Nyquist. A sample list of compatible sensors is shown below:

- Force and strain
- Pressure
- Temperature
- Mass flow
- Current
- Voltage
- Luminosity
- Velocity
- Weight
- pH
- Angular velocity
- Position

### 4 ELECTRICAL SPECIFICATIONS

The input and output electrical specifications for the Nyquist 1 are listed in the table below.

Table 1: Electrical Specifications

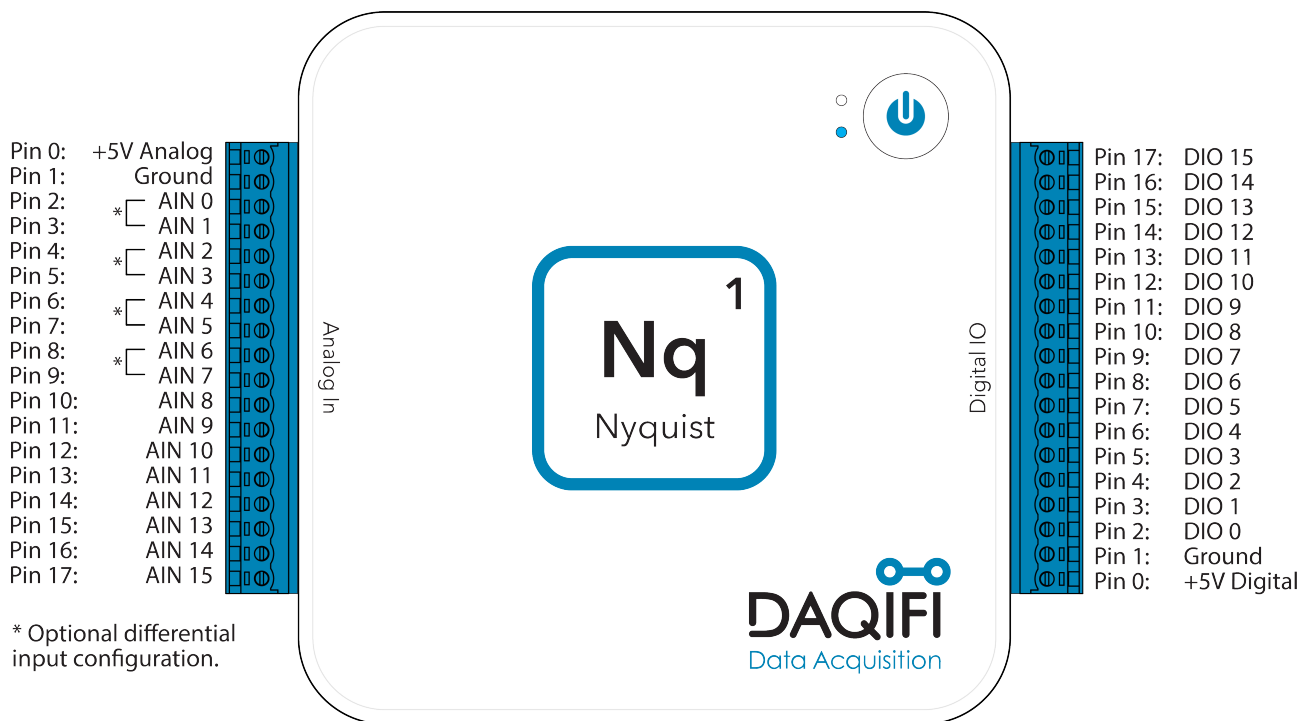
Parameter	Min	Typ	Max	Unit
<b>Power Characteristics</b>				
USB supply voltage	4.5	5	5.5	VDC
5V output voltage (AVDD, DVDD)	4.9	5	5.1	VDC
5V output current (AVDD+DVDD)	-	-	800	mADC
Full-speed operating current	300	350	-	mADC
Maximum operating current (charging active)	-	-	2000	mADC
<b>ADC Characteristics</b>				
Resolution	-	12	-	bit
Input voltage	0	-	5	V
Input impedance	-	20	-	kΩ
Integral nonlinearity	-	±0.1	-	%
Differential nonlinearity	-	±0.5	-	%
Gain error (pre-calibration)	-	±1.0	-	%
Gain error (post-calibration)	-	±0.1	-	%
Offset error (pre-calibration)	-	±0.5	-	%
Offset error (post-calibration)	-	±0.1	-	%
Bandwidth (-3dB)	-	28	-	kHz
<b>DIO Characteristics</b>				
Output high	4.9	5	5.1	V
Output low	-	0	-	V

*Continued on next page*

Table 1 – Continued from previous page

Parameter	Min	Typ	Max	Unit
High-level input voltage	2.7	-	5.5	V
Low-level input voltage	0	-	1.0	V
High-level source current	32	32	50	mA
Low-level sink current	32	32	50	mA
Input impedance	-	280	-	k $\Omega$

## 5 PINOUT



### Nyquist Signal Headers

Pluggable screw terminal, J6 provides analog input connectivity to the Nyquist 1. Likewise, J6 provides digital IO connectivity. An additional 0.10" header is supplied underneath each to allow a standard header strip to be soldered for board-to-board applications.

Table 2: Pinout - Analog Signal Connector

Pin	Name	Description
0	5V	Analog VDD output
1	GND	Ground
2	AIN 0	Single-ended analog input 0 or differential input 0 positive
3	AIN 1	Single-ended analog input 1 or differential input 0 negative
4	AIN 2	Single-ended analog input 2 or differential input 1 positive
5	AIN 3	Single-ended analog input 3 or differential input 1 negative
6	AIN 4	Single-ended analog input 4 or differential input 2 positive
7	AIN 5	Single-ended analog input 5 or differential input 2 negative
8	AIN 6	Single-ended analog input 6 or differential input 3 positive
9	AIN 7	Single-ended analog input 7 or differential input 3 negative
10	AIN 8	Single-ended analog input 8
11	AIN 9	Single-ended analog input 9
12	AIN 10	Single-ended analog input 10
13	AIN 11	Single-ended analog input 11
14	AIN 12	Single-ended analog input 12
15	AIN 13	Single-ended analog input 13
16	AIN 14	Single-ended analog input 14
17	AIN 15	Single-ended analog input 15

Table 3: Pinout - Digital Signal Connector

Pin	Name	Description
0	5V	Digital VDD output
1	GND	Ground
2	DIO 0	Digital input/output 0
3	DIO 1	Digital input/output 1
4	DIO 2	Digital input/output 2
5	DIO 3	Digital input/output 3
6	DIO 4	Digital input/output 4
7	DIO 5	Digital input/output 5
8	DIO 6	Digital input/output 6
9	DIO 7	Digital input/output 7
10	DIO 8	Digital input/output 8
11	DIO 9	Digital input/output 9
12	DIO 10	Digital input/output 10
13	DIO 11	Digital input/output 11
14	DIO 12	Digital input/output 12
15	DIO 13	Digital input/output 13
16	DIO 14	Digital input/output 14
17	DIO 15	Digital input/output 15

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