NET-AIO11

User Manual

Version 1.0

Contents

1. Introduction

NET-AIO11 is the High function Signal Processing board to support Analog Input and Digital Output. The 8-channel A / D converted data by applying TI TMS320C55xx DSP chip analog signal can be obtained the high speed data via USB 2.0 interface and Ethernet interface.

The device can be used to support the power over Ethernet cable(UTP). There are no separate power devices because the power is supported through the Injector or PoE(Power over Ethernet) Hub.

1-1 Function

- **8-Ch 16-bit Sigma-Delta ADC**
- **Isolated 8-bit Digital Input/Output**
- **USB 2.0 FS Interface**
- **10/100Mbps Ethernet TCP/IP Interface**
- **PoE(Power over Ethernet) PD(Power Device) Circuit**

1-2 Internal Block Diagram
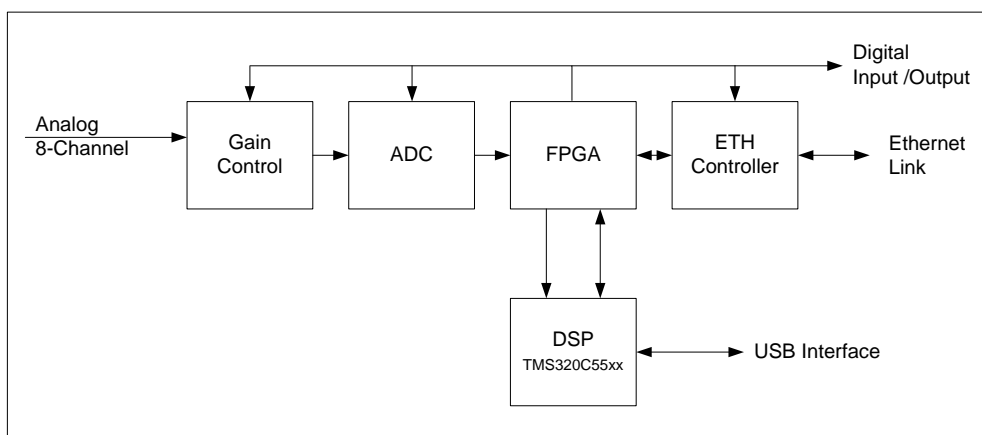
[Figure 1-1. Internal Block Diagram]

1-3 Operation Mode

1-3-1   Continuous Mode

Continuous Mode is that continuously collect the data from board.

Setting the Sampling Rate by selected Interface (USB/NET) is collecting the data continuously.

1-3-2   Delay Mode

Delay Mode, via set the Sampling Rate after a certain time, is that total 524,288(512k) data store in the memory, and read the data when the user want.

2. **Product Features**

[Table 1. NET-AIO11 Specification]

List	Specification
Interface	USB B-type Connector
	RJ-45 Ethernet Connector
	Header Pin Connector for Analog Input
	Header Pin Connector for Digital Input/Output
	5VDC Power Connector
Analog Input(ADC)	Channel : 8
	Maximum Input Range : ±10V
	Resolution : 16-bit
	Maximum Sampling :
	Ethernet 32,768 Sample/sec
	USB 16,384 Sample/sec
Digital Input/Output	Channel : 8 Inputs, 8 Outputs
	Input/Output Signal Level : 12/24VDC, Isolated
USB	USB 2.0 Full Speed(12Mbps)
Ethernet	10/100Mbps
	Auto cable detection
	Can be set Board Network Information (etc. IP)
	Support only fixed IP
DSP	TI TMS320C55xx
	On-chip USB 2.0
Option	PoE PD
Size	160x100mm
Operation Temperature	
Operation Moisture	
Power	5VDC±5%, 600~800mA
Support S/W	Kernel mode WDM Driver/User mode DLL
Support OS	Windows 2K/XP/7 32-bit
Component	NET-AIO11 Board, Install CD(include Sample Program)

3. **Hardware Device**

In this chapter, board jumper set and connector for interfaced the PC or other operation equipment is described.

Ethernet Connector

POWER Connector

USB-B Connector

LED (PWR,RUN)

AIN Connector

DSP Mode Setup Jumper

Reset Switch
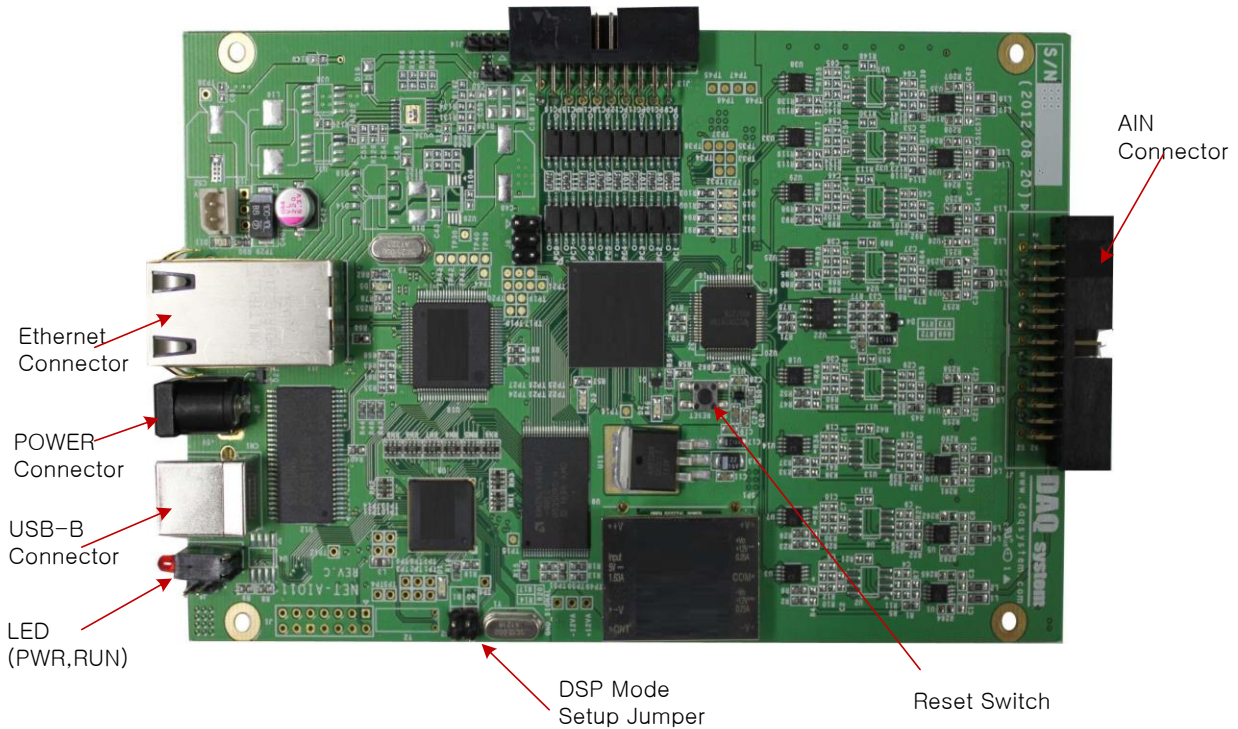
[Figure 3-1. Connector, Switch Placement]

3-1 **DSP Mode Setup Jumper (J2)**

The execution mode of the board is the USB boot mode and flash boot mode. The Flash boot mode (jumper OFF) is the general board operation. On the other hand, the USB boot mode is used when frequent firmware updates or develops flash memory program.
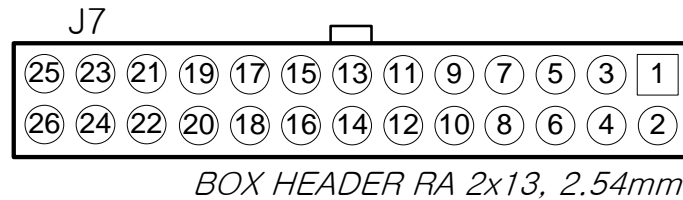
3-2 **USB-B Connector (CN1)**

It is a B-type USB connector. It is connected to a PC and is done a data transmission.

3-3 **LED(PWR, RUN) (D22)**

The power and status of board is displayed. When connecting the power, the red led light on. When collecting the data, the green led light on.

3-4 AIN(Analog Signal Input) Connector (J7)

Analog input signals are received an input the range of ± 10V differential (Differential) signal and a single (Single-ended) signals. In a single signal, an AINxN pin connects to the Ground of input signal, an AINxP pin connects to the input signal.

J7

```
25 23 21 19 17 15 13 11  9  7  5  3  1
26 24 22 20 18 16 14 12 10  8  6  4  2
```

BOX HEADER RA 2x13, 2.54mm

[Table 2. AIN Connector Description]

Pin No.	Pin Name	Description	Remark
1	AGND	Analog Ground, GROUND	
2	AIN1P	Analog Input CH1, Positive	
3	AIN1N	Analog Input CH1, Negative	
4	AGND	Analog Ground, GROUND	
5	AIN2P	Analog Input CH2, Positive	
6	AIN2N	Analog Input CH2, Negative	
7	AGND	Analog Ground, GROUND	
8	AIN3P	Analog Input CH3, Positive	
9	AIN3N	Analog Input CH3, Negative	
10	AGND	Analog Ground, GROUND	
11	AIN4P	Analog Input CH4, Positive	
12	AIN4N	Analog Input CH4, Negative	
13	AGND	Analog Ground, GROUND	
14	AIN5P	Analog Input CH5, Positive	
15	AIN5N	Analog Input CH5, Negative	
16	AGND	Analog Ground, GROUND	
17	AIN6P	Analog Input CH6, Positive	
18	AIN6N	Analog Input CH6, Negative	
19	AGND	Analog Ground, GROUND	
20	AIN7P	Analog Input CH7, Positive	
21	AIN7N	Analog Input CH7, Negative	
22	AGND	Analog Ground, GROUND	
23	AIN8P	Analog Input CH8, Positive	
24	AIN8N	Analog Input CH8, Negative	
25	AGND	Analog Ground, GROUND	
26	AGND	Analog Ground, GROUND	

3-5 Ethernet Connector (J11)

It connects to the Ethernet Hub or Ethernet Adapter. It automatically is detected Cross/Direct cable.

3-6 POWER Connector (J6)

It is a power of the board, input over +5VDC, 1A.
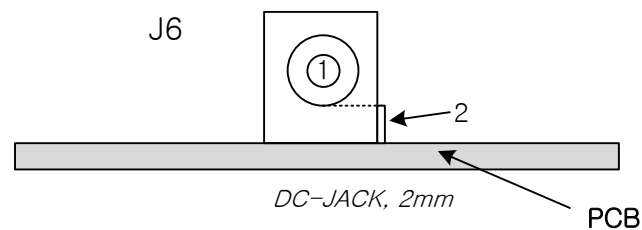
[Table 3 POWER Connector Description]

Pin No.	Pin Name	Description	Remark
1	+5VDC	Power 5V	
2	GND	Power Ground	

3-7 Digital Signal Input/Output Connector (J13)

It connects to each 8-bit Digital Input/Output signals. The isolated 12/24VDC signals can be input or output. The circuit is as [Figure 3-2].
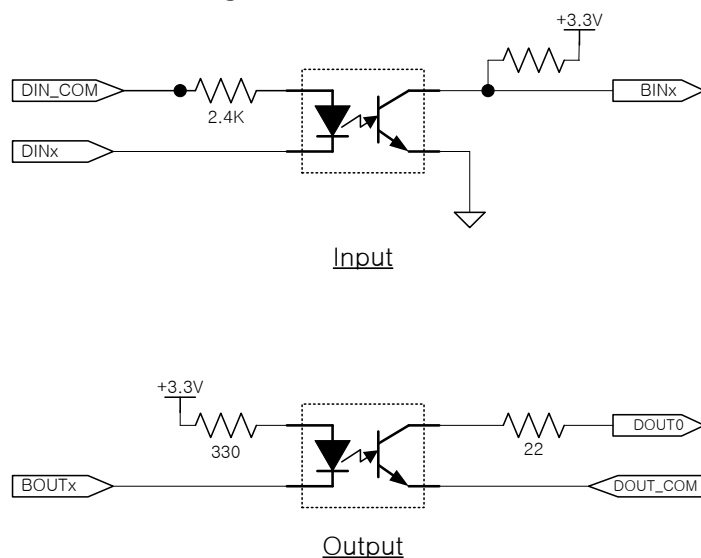
[Figurer 3-2. Digital Input/Output Circuit]

J13

BOX HEADER RA 2x10, 2.54mm

[Table 4. Digital Signal Output Connector Description]

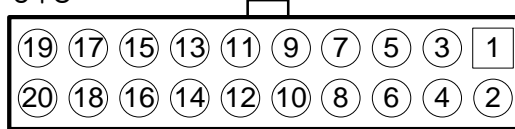| Pin No.	Pin Name	Description	Remark
1	DIN_COM	Digital Input Common Terminal,	
2	DOUT_COM	Digital Output	
3	DIN0	Digital Input 0	
4	DOUT0	Digital Output 0	
5	DIN1	Digital Input 1	
6	DOUT1	Digital Output 1	
7	DIN2	Digital Input 2	
8	DOUT2	Digital Output 2	
9	DIN3	Digital Input 3	
10	DOUT3	Digital Output 3	
11	DIN4	Digital Input 4	
12	DOUT4	Digital Output 4	
13	DIN5	Digital Input 5	
14	DOUT5	Digital Output 5	
15	DIN6	Digital Input 6	
16	DOUT6	Digital Output 6	
17	DIN7	Digital Input 7	
18	DOUT7	Digital Output 7	
19	EGND	External Ground, External Ground	
20	+12V	External Input Power	+12VDC

4. Software

NET-AIO11 board can easily access many of the features of the library (API) to implement, and the sample program is provided to the user.

4-1 Sample Program

The library is used to implement the sample program, it is organized as follows.
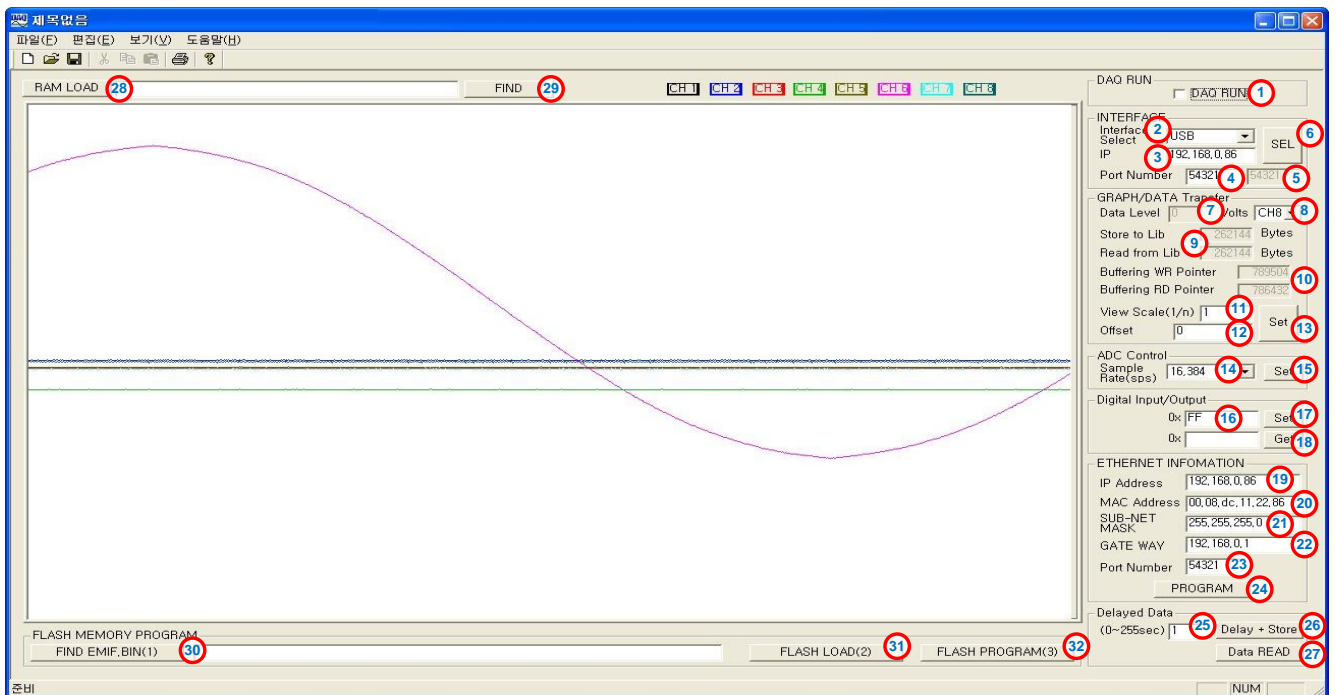
[Figure 4-1.   Sample Program]

4-1-1 Program Description

[Table 5. Sample Program Function Description]

No.	Control	Function
1	DAQ RUN	Board Initialization and continuous mode data collection run.
2	Interface Select	Select the interface to connect host (PC). USB/Ethernet.
3	IP	It is an Ethernet IP of the board for TCP/IP connection.
4	Port Number	It is a port number to use TCP/IP connection.
5	Port Number	It is a port number that was obtained on the board by "SEL" command.
6	SEL	Execute the host interface connection.

7	Data Level	Collected Data for the selected channel is converted to a voltage level.
8	Graph Channel	Select the channel to display the section 7.
9	Store to Lib	It displays that the number of bytes of received data from the board.
	Read from Lib	It displays that the number of data bytes of read from the library buffer in application.
10	Buffering WR Pointer Buffering RD Pointer	It displays a saving pointer of library buffer. It displays a reading pointer of library buffer.
11	View Scale	A scaling factor displays on the graph.
12	Offset	It is an offset to set the up/down position of graph.
13	Set	View Scale and Offset is applied to the graph.
14	Sample Rate	It selects an Analog data sampling rate.
15	Set	It sets the Sampling rate.
16	0x	It enters the digital output value.
17	Digital Out	It sets the digital output value.
18	Digital In	It confirms the Digital Input value. Displayed Data, the value of low 0~7 bits are a DIN value, and 8~11 bits value are setup value of DIP switch.
19	IP Address	It enters an IP address to be stored the board.
20	MAC Address	It enters a MAC information to be stored the board.
21	SUB-NET MASK	It enters a MASKING information to be stored the board.
22	GATE WAY	It enters an address of Network Gateway to be stored the board.
23	Port Number	It enters a port numbers to be stored the board.
24	PROGRAM	The section of 20~24 saves in the flash memory. The stored data will be reflected in the firmware when the board is reset. Be careful of the confliction to set the same information. This function is only available with the USB interface, so No. 2) "USB" selection and this function can use when the No. 6) "SEL" run.
25	sec	It enters a delay time of Delay Mode Data collection.
26	Delay + Store	After a delay time of Delay Mode, it executes a data collection.
27	Data READ	It reads a data that is collected in the Delay Mode. When you run it that is not the end of delay and data collection, the Beep sound occurs. Otherwise, the data is displayed on

		the right side of the graph.
28	RAM LOAD	At right in the path of the editor, USB booting binary loads the device. First, the running mode should be selected as the USB.
29	FIND	It searches the USB load image.
30	FIND EMIF.BIN	It searches an execution image to be stored in the flash memory.
31	FLASH LOAD	Searched File image is loaded into the board memory. Run 2~3 times more.
32	FLASH PROGRAM	Saved an image saves into the flash memory.

Appendix

A-1 Repair Regulations

Thank you for purchasing a DAQSYSTEM product. Please refer to the following regarding Customer Service regulated by DAQSYSTEM.

(1) Read the user manual before using the DAQSYSTEM product and follow the instructions..

(2) When returning the product to be repaired, please write down the symptoms of the failure and send it to the head office.

(3) The warranty period for all DAQSYSTEM products is one year.
  -. Warranty period counts from the date the product is shipped from DAQSYSTEM.
  -. Peripherals and third-party products not manufactured by DAQ SYSTEM are covered by the manufacturer's warranty.
  -. If you need repairs, please contact the Contact Point below.

(4) Even during the warranty period, repairs will be charged in the following cases.
  ① Failure or damage caused by use without following the user's manual
  ② Breakdown or damage caused by customer's negligence during product transportation after purchase
  ③ Failure or damage due to natural phenomena such as fire, earthquake, flood, lightning, pollution, or power supply exceeding the recommended range
  ④ Failure or damage caused by inappropriate storage environment (eg, high temperature, high humidity, volatile chemicals, etc.)
  ⑤ Breakdown or damage due to unfair repair or modification
  ⑥ Products whose serial number has been changed or deliberately removed
  ⑦ If DAQ SYSTEM determines that it is the customer's fault due to other reasons

(5) Customer is responsible for shipping costs for returning the repaired product to DAQSYSTEM.

(6) The manufacturer is not responsible for any problems caused by incorrect use, regardless of our warranty terms.

References

1. USB 2.0 System Architecture

-- Don Anderson, USB SIG(www.usb.org)

2. Universal Serial Bus Specification

-- Compaq/Intel/Microsoft/NEC, MindShare Inc. (Addison Wesley)

3. AN201 How to build application using API

-- DAQ system

4. AN342 NET-AIO11 API Programming

-- DAQ system

MEMO

Contact Point

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