

USB2.0-compliant
16bit Multifunction Analog I/O terminal

AIO-160802AY-USB



Drive Library [API-USBP(WDM)]: Included

Features

- Eight 16-bit Analog Input channels, two 16-bit Analog output channels, four LVTTTL digital inputs, four LVTTTL digital outputs
- USB2.0/USB1.1-compliant, high-speed (480Mbps)
- Bus-powered for convenience and portability
- Includes a synchronous control function that is capable of synchronizing control, enabling to start analog inputs/outputs simultaneously
- Contains 1K word buffer memory (FIFO, RING)
- Analog input and output are adjustable via software, no jumper settings required, information depending on user's environment
- Screw-type connector for easy wiring
- Includes "C-LOGGER", a data logging software that provides graphic display, saving to files, dynamic-export to Microsoft Excel

Packing List

- USB terminal [AIO-160802AY-USB]...1
- Interface connector plugs...2
- First step guide...1
- CD-ROM *1 [API-USBP(WDM)]...1
- USB Cable(1.8m)...1
- USB Cable Attachment...1

*1 The CD-ROM contains the driver software and User's Guide.

Optional Cable & Connector

14pin Screw Terminal Connector Set (6 pieces): CN6-Y14

AIO160802AY-USB is an analog I/O terminal for USB 2.0 that can be connected to the USB bus.

This product has analog input (16bit, 8ch), analog output (16bit, 2ch), digital input (LVTTTL x 4), digital output (LVTTTL x 4).

AIO-160802AY-USB includes "C-LOGGER", a data logging software of Windows version. "C-LOGGER" is an easy-to-use yet very flexible tool specifically designed for user's data logging applications.

Users can also use the included driver library "API-USBP(WDM)" to configure the application software for Windows using the programming languages that support Win32AP functions.

Supported Software

Driver Library API-USBP(WDM) (Included)

Users can use the included library software that provides commands for CONTEC hardware to configure high-speed application software with using the programming languages supports Win32A functions. Numerous sample programs and a diagnostic program useful for checking device operation are also provided. CONTEC provides download services (at <http://www.contec.com/apiusbp/>) to supply the updated drivers and differential files.

Further details are provided in the help within supplied CD-ROM or the homepage of our company.

< Operating Environment >

OS: Windows XP, Server 2003, 2000, Me, 98, etc..

Language: Visual C++ .NET, Visual C# .NET, Visual Basic .NET, Visual C++, Visual Basic, Delphi, C++Builder, etc..

Data Logger Software C-LOGGER (Included with the driver library API-USBP(WDM) CD-ROM)

C-LOGGER is fully-featured data logger software that supports the analog I/O devices. Features include graphic display and zoom-in monitoring of collected data, saving to file, and dynamic transfer to Excel spreadsheets. No programming is required. CONTEC provides download services (at <http://www.contec.co.jp/clogger>) to supply the updated drivers.

For details, refer to the C-LOGGER Users Guide or our website.

< Operating Environment >

OS: Windows XP, Server 2003, 2000

Specifications

Item	Specification
Analog input	
Isolated specification	Un-Isolated
Input type	Single-Ended Input
Number of input channels	8ch
Input range	Bipolar $\pm 10V$
Maximum input rating	$\pm 20V$
Input impedance	1M Ω or more
Resolution	16bit
Non-Linearity error	$\pm 12LSB$
Conversion speed	1 μ sec/ch (Max.) *3
Buffer memory	1k Word
Conversion start trigger	Software / external trigger
Conversion stop trigger	Number of sampling times / external trigger/software
External start signal	LVTTL level (Selecting one of the rising / falling / signal edge input to the DI00-pin by the software)
External stop signal	LVTTL level (Selecting one of the rising / falling / signal edge input to the DI01-pin by the software)
External clock signal	LVTTL level (Selecting the rising / falling to the DI02-pin by the software)
Analog output	
Isolated specification	Un-Isolated
Number of output channels	2ch
Output range	Bipolar $\pm 10V$
Absolute max. output current	$\pm 1mA$
Output impedance	1 Ω or less
Resolution	16bit
Non-Linearity error	$\pm 12LSB$
Conversion speed	10 μ sec (Max.) *3
Buffer memory	1k Word
Conversion start trigger	Software / external trigger
Conversion stop trigger	Number of sampling times / external trigger/software
External start signal	LVTTL level (Selecting one of the rising / falling / signal edge input to the DI00-pin by the software)
External stop signal	LVTTL level (Selecting one of the rising / falling / signal edge input to the DI01-pin by the software)
External clock signal	LVTTL level (Selecting the rising / falling to the DI02-pin by the software)
Digital I/O	
Number of input channels	Un-Isolated input 4ch (LVTTL positive logic) *4*5
Number of output channels	Un-Isolated output 4ch (LVTTL positive logic)
USB	
Bus specification	USB Specification 2.0/1.1 standard
USB transfer rate	12Mbps (Full-speed), 480Mbps (High-speed) *6
Power supply	Bus power
Common section	
Connector	14 pin (screw-terminal) plug header
Number of terminals used at the same time	127 terminals (Max.) *7
Power consumption (Max.)	5VDC 450mA
Operating condition	0 - 50°C, 10 - 90%RH(No condensation)
External dimensions (mm)	64(W) x 62(D) x 24(H) (exclusive of protrusions)
Weight	90g (Not including the USB cable, attachment)
Attached cable	USB cable 1.8m
Compatible wires	AWG28 - 16

*1 The non-linearity error means an error of approximately 0.1% occurs over the maximum range at 0°C and 50°C ambient temperature.

*2 When using the signal source equipped with the high-speed operational amplifier

*3 This numerical displays the conversion speed for A/D, D/A converter. The minimum executable sampling cycle depends on the operating condition of the terminal.

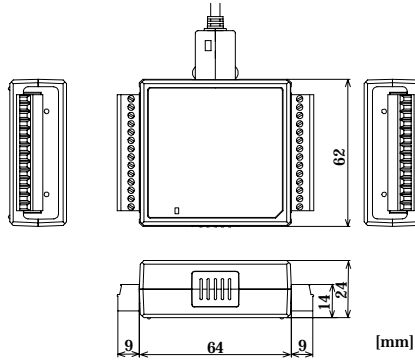
*4 You cannot use both the DI00 / DI01 / DI02-pin of digital input feature and the external start / stop signal / external clock input simultaneously.

*5 Each input accept TTL (5VDC) level signals.

*6 The USB transfer speed depends on the host PC environment used (OS and USB host controller).

*7 As a USB hub is also counted as one device, you cannot just connect 127 USB terminals.

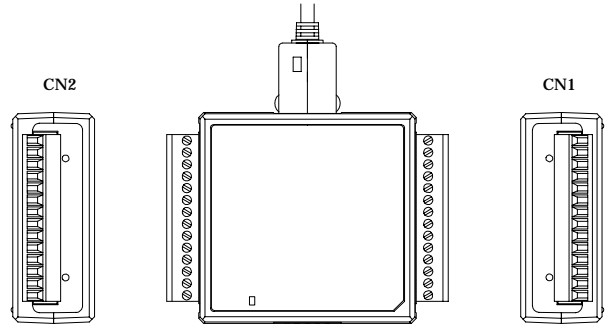
Physical Dimension



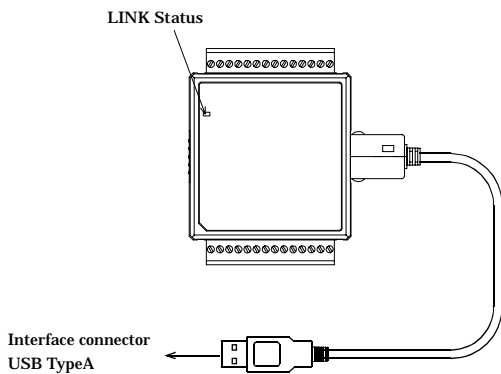
How to Connect the On-terminal Connector

Connecting a terminal to a Connector

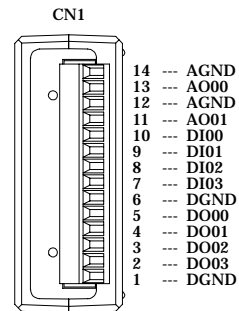
To connect an external device to this terminal, plug the cable from the device into the interface connector (CN1, CN2) shown below.



Name of the each parts

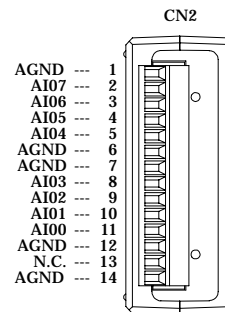


Connector Pin Assignment



Status LED function

Name	Function	Indicator color	LED indicator
LINK Status	USB communication status	GREEN	ON : Communication established
	PC connection status		OFF : Communication unestablished
			ON : PC communication established
			OFF: PCcommunication unestablished



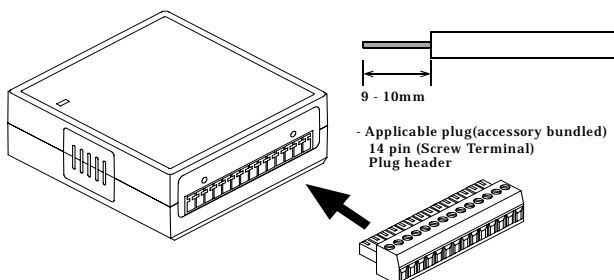
Cable Wiring

When connecting the product to an external device, you can use the supplied connector plug.

For wiring, strip off approximately 9 - 10mm of the covered part of a wire rod and then insert it to the opening. After the insertion, secure the wire rod with screws. Compatible wires are AWG 28 - 16.

⚠ CAUTION

Removing the connector plug by grasping the cable can break the wire.



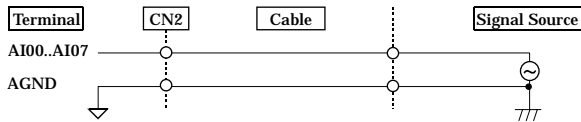
AI00 - AI07	Analog input signal. The numbers correspond to channel numbers.
AO00 - AO01	Analog output signal. The numbers correspond to channel numbers.
AGND	Common analog ground for analog I/O signals.
DI00 - DI03	Digital input signal.
DO00 - DO03	Digital output signal.
DGND	Common digital ground for digital I/O signals

Analog Input Signal Connection

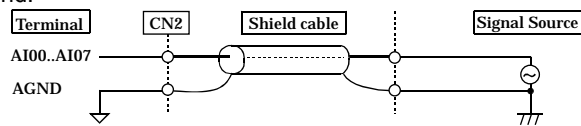
Analog signal input types are divided into single-ended input and differential input. This product uses single-ended input fixed. The following examples show how to connect analog input signals using a flat cable and a shielded cable.

Single-ended Input

The following figure shows an example of flat cable connection. Connect separate signal and ground wires for each analog input channel on CN2.



The following figure shows an example of shield cable connection. Use shielded cable if the distance between the signal source and product is long or if you want to provide better protection from noise. For each analog input channel, connect the core wire to the signal line and connect the shielding to ground.



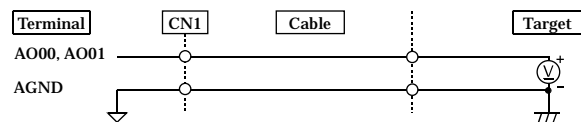
CAUTION

- If the signal source contains over 1MHz signals, the signal may effect the cross-talk noise between channels.
- If the product and the signal source receive noise or the distance between the product and the signal source is too long, data may not be input properly.
- An input analog signal should not exceed the maximum input voltage (relate to the product analog ground). If it exceeds the maximum voltage, the product may be damaged.
- Connect all the unused analog input channels to analog ground.
- The signal connected to an input channel may fluctuate after switching of the multiplexer. In this case, the cable between this product and the signal source can be shortened or a buffer with a high-speed amplifier can be placed between the product and the signal source in order to reduce the fluctuation.

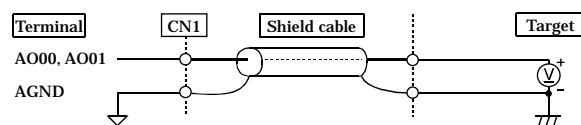
Analog Output Signal Connection

This section shows how to connect the analog output signal by using a flat cable or a shielded cable.

The following figure shows an example of flat cable connection. Connect the signal source and ground to the CN1 analog output.



The following figure shows an example of shield cable connection. Use shielded cable if the distance between the signal source and product is long or if you want to provide better protection from noise. For each analog input channel on CN1, connect the core wire to the signal line and connect the shielding to ground.



CAUTION

- If this product or the connected wire receives noise, or the distance between this product and the target is long, data may not be outputted properly.
- For analog output signal, the current capacity is □1mA (Max.).

Check the specification of the connected device before connecting this product.

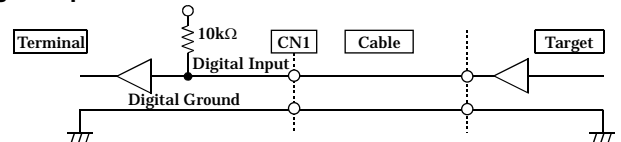
- Do not short the analog output signal to analog ground, digital ground, and/or power line. Doing so may damage this product.
- Do not connect an analog output signal to any other analog output, either on this product or on an external device, as this may cause a fault on this product.

Digital I/O Signal Connection

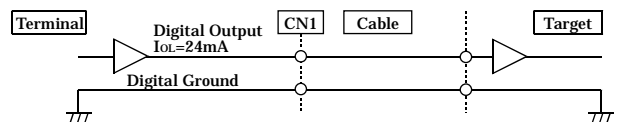
The digital I/O signal can be used as the control signal (external trigger input signal and sampling clock input signal, etc.), too. The following sections show examples.

All the digital I/O signals are LVTTTL (3.3VDC) level signals.

Digital input connection



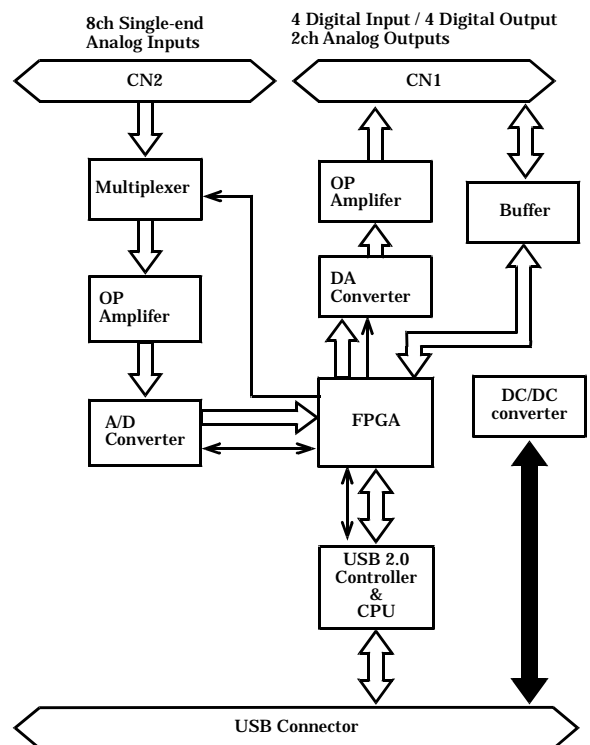
Digital output connection



CAUTION

- Do not short the output signals to analog ground, digital ground, and/or power line. Doing so may damage the terminal. Each input accepts 5V TTL level signals.
- The external trigger signal is fixed to the following signal location when using C-LOGGER.DI00 : External start trigger signal input
* The external stop tripper and external clock cannot be used.

Block Diagram



*Specification, color and design of the products may be changed without notice.