Bi-Directional Digital I/O
Terminal for USB2.0
DIO-24DY-USB
User’s Guide
Check Your Package

Thank you for purchasing the CONTEC product.
The product consists of the items listed below.
Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List
- USB terminal [DIO-24DY-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 (this guide)
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1. Before Using the Product

About the Product

This product is a USB2.0-compatible terminal that allows your PC to expand the bidirectional I/O functionality of digital signals. The terminal comes with 24 channels of non-insulated LVTTL-level inputs/outputs. Inputs and outputs can be switched in blocks of eight by software. Its compact appearance makes it suitable for PC application. In addition, no external power supply is required, as the terminal operates on the USB bus power.

Possible to be used as a data recording device for LabVIEW, with dedicated libraries.

Features

- Non-insulated LVTTL-level inputs/outputs (Positive)

The product is provided with 24 non-insulated LVTTL-level I/O ports with a response speed of 200 nsec (positive logic). This allows you to use a total of up to 24 channels of I/O digital signals in three sets of eight.

- Compatible to USB1.1/USB2.0 and not necessary to power this product externally as the bus power is used.

Compatible to USB1.1/USB2.0 and capable to achieve high speed transfer at HighSpeed (480 Mbps). Not necessary to power this product externally as the bus power of USB is used.

- Easy-to-wire terminal connector adopted

Adoption of terminal connector (with screws) enables to achieve easy wiring.

- Windows compatible driver libraries are attached.

Using the attached driver library API-USBP(WDM) makes it possible to create applications of Windows. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

- LabVIEW is supported by a plug-in of dedicated library VI-DAQ.

Using the dedicated library VI-DAQ makes it possible to create each application for LabVIEW.
1. Before Using the Product

Support Software
You should use CONTEC support software according to your purpose and development environment.

Windows version of digital I/O driver **API-DIO(WDM)**
[Stored on the bundled CD-ROM driver library API-USBP(WDM)]

It is the library software, and which supplies command of hardware produced by our company in the form of standard Win32 API function (DLL). Using programming languages supporting Win32API functions, such as Visual Basic and Visual C++ etc., you can develop high-speed application software with feature of hardware produced by our company.

In addition, you can verify the operation of hardware using Diagnostic programs.

< Operating Environment >
OS Windows 7, Vista, XP, Server 2003, 2000, Me, 98
Adaptation language Visual Basic, Visual C++, Visual C#, Delphi, C++ Builder

Data acquisition VI library for LabVIEW **VI-DAQ** (Available for downloading (free of charge) from the CONTEC web site.)

This is a VI library to use in National Instruments LabVIEW.
VI-DAQ is created with a function form similar to that of LabVIEW's Data Acquisition VI, allowing you to use various devices without complicated settings.
See http://www.contec.com/vidaq/ for details and download of VI-DAQ.

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

Accessories (Option)
Bracket for USB I/O Terminal products : BRK-USB-Y

* Check the CONTEC’s Web site for more information on these options.
Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

Web Site

Japanese  http://www.contec.co.jp/
English    http://www.contec.com/
Chinese    http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information
Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited One-Year Warranty

CONTEC products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization Number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.
Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

| ☢ DANGER | DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
| ☢ WARNING | WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| ☢ CAUTION | CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage. |

Handling Precautions

☢ DANGER

Do not use the product where it is exposed to flammable or corrosive gas. Doing so may result in an explosion, fire, electric shock, or failure.

☢ CAUTION

- Do not strike or bend the converter. Otherwise, the converter may malfunction, overheat, cause a failure or breakage.
- Do not touch the converter's pin parts (USB connector, GPIB connector) with your hands. Otherwise, the converter may malfunction, overheat, or cause a failure. If the pin parts are touched by someone's hands, clean the parts with industrial alcohol.
- Do not touch the external connector (14 pin plug header) when the power is on. Otherwise this may malfunction, overheat, cause a failure due to static electricity.
- Make sure that your PC or expansion unit can supply ample power to all the products installed. Insufficiently energized products could malfunction, overheat, or cause a failure.
- The specifications of this product are subject to change without notice for enhancement and quality improvement. Even when using the product continuously, be sure to read the manual and understand the contents.
- Do not modify the product. CONTEC will bear no responsibility for any problems, etc., resulting from modifying this product.
- Regardless of the foregoing statements, CONTEC is not liable for any damages whatsoever (including damages for loss of business profits) arising out of the use or inability to use this CONTEC product or the information contained herein.
1. Before Using the Product

- It may cause a trouble in recognizing and operating the device according to the kind of USB hub. If you use the USB hub, we encourage you to take advantage of the CONTEC’s product loan service to confirm operation before purchasing.

FCC PART 15Class A Notice

**NOTE**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

**WARNING TO USER**

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.
1. Before Using the Product

**Environment**

Use this product in the following environment. If used in an unauthorized environment, the converter may overheat, malfunction, or cause a failure.

Operating temperature

0 - 50°C

Humidity

10 - 90%RH (No condensation)

Corrosive gases

None

Floating dust particles

Not to be excessive

**Inspection**

Inspect the product periodically as follows to use it safely.

- Check that the connector has no dust or foreign matter adhering.

**Storage**

When storing this product, keep it in its original packing form.

(1) Put the product in the storage bag.

(2) Wrap it in the packing material, then put it in the box.

(3) Store the package at room temperature at a place free from direct sunlight, moisture, shock, vibration, magnetism, and static electricity.

**Disposal**

When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.
2. Setup

This chapter explains how to set up the product.

What is Setup?

Setup means a series of steps to take before the product can be used. Different steps are required for software and hardware.

Installing the driver

This section enables you to prepare the software and hardware by operating in accordance with each step in this chapter using the bundled CD-ROM. Taking the following steps sets up the software and hardware. You can use the diagnosis program later to check whether the software and hardware function normally.

- Step 1 Setting the Hardware
- Step 2 Installing the Software
- Step 3 Installing the Hardware
- Step 4 Checking Operations with the Diagnosis Program

Uninstall the driver and then set it up again if it cannot be set up properly.
2. Setup

Step 1 Setting the Hardware
This section describes how to set up the product and how to connect it to a PC.

Name of each parts

LED indicator

![Image of LED indicator and interface connector]

Figure 2.1. Name of each parts (Front side)

Table 2.1. List of Status LED Functions

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
<th>Indicator color</th>
<th>LED indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINK Status</td>
<td>USB communication status</td>
<td>GREEN</td>
<td>ON : Communication established</td>
</tr>
<tr>
<td></td>
<td>PC connection status</td>
<td></td>
<td>OFF : Communication unestablished</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ON : PC communication established</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OFF : PC communication unestablished</td>
</tr>
</tbody>
</table>

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DIO-24DY-USB
Step 2 Initializing the Software

Connect with the product, and install following software if USB driver has been installed. The following description assumes the operating system as Windows XP. Although some user interfaces are different depending on the OS used, the basic procedure is the same.

Points
- If you are using Windows XP or Windows 2000, please log on as Administrator (authorized account) before proceeding to the following steps.

The following shows the basic flow for installing product.

![Diagram showing the flow of installing product]

Illustration of Menu Screen

- Install the Development Environment such as sample programs and online help, etc.
- Install the utility.
- Refer to the user's guide.
- Refer to the description about CD-ROM.
- Install the C-LOGGER.

*Cannot be used for this product.

Points
- Please set up the supplied CD-ROM if it has not been set up. The menu starts automatically.
- If the menu do not start, launch X:AUTORUN.EXE(X:CD-ROM drive) from [Run…] in Start menu.
- The screen design may be different.
2. Setup

Installation of API-USBP(WDM) Development Environment

Installation of development environment is namely installing supplied online help and sample program in all language in order to use API function.

(1) Clicking on “Install Development or Execution Environment”. [API-USBP(WDM) Installer] dialog box displays.

(2) Selecting “Advanced Digital I/O driver”.

(3) Clicking on “Install” Button.

Please perform installation following the directions on the screen. And thus the installation is completed.

* The screen design may be different.
Step 3 Installing the Hardware

Under Windows, information about the converter needs to be detected by the OS. This is called hardware installation. **To use more than one of this product, make sure to install them one by one, setting each unit after completing the previous one.**

Connecting the Product

(1) Turn on the power to the PC before connecting the product.
(2) When the PC has been up and running, plug the USB interface connector to a USB port in the PC. The converter can also be connected to the PC via a USB hub.

![Connecting the PC](image)

**CAUTION**

It may cause a trouble in recognizing and operating the device according to the kind of USB hub. If you use the USB hub, we encourage you to take advantage of the CONTEC’s product loan service to confirm operation before purchasing.

(3) USB cable can be attached firmly to the main unit by using a USB cable attachment.

![Attaching a USB Attachment](image)

**CAUTION**

The USB cable attachment cannot be used excluding an attached cable.
Setting with the Add New Hardware Wizard

(1) The “Found New Hardware Wizard” will be started.
   In Windows Vista, because the driver's installation is completed by "Installing the Software", it is not necessary to operate it about the Hardware Wizard.

(2) Select “Install from a list or specific location”, then click on the [Next] button.
   Detect setup information from supplied CD automatically for installing USB driver.

   ![Found New Hardware Wizard]
   * The name of the connected product will be displayed.
     - DIO-24DY-USB

Point
Please specify the path for supplied CD as follows in the case of failure in detecting automatically.
X:\INF\WDM\DIO (X: CD-ROM drive)

(3) Click on [Finish] button to complete the installation of USB driver.

   ![Found New Hardware Wizard]
   * The name of the connected product will be displayed.
     - DIO-24DY-USB
Setting Properties Using Device Manager

After connecting product with a PC and completing driver installation, open Device Manager and set properties.

1) Starting Device Manager.

   From [Start] menu, click on [Settings]-[Control Panel]-[System] and then click on [Device Manager] button in [Hardware] tab.

![Device Manager Screenshot]

* The name of the connected product will be displayed.
  - DIO-24DY-USB

- In the case of Windows 98
  
  Right-click on [My Computer] and select [Properties] to start device manager.
2. Setup

(2) Setting the Device Name.
Right-clicking on the product name and selecting [Properties] displays [Product Properties].
Open [Common Settings] tab and enter arbitrary name in the editing box for device name. (Default name also can be used.)

* The product-specific number will be displayed as the serial number.

⚠️ CAUTION
USB driver can not be used without settings. Settings must be performed.

(3) Clicking on [OK] button.
Device name is set by clicking [OK] button.

Points
- When the application developed by users is running on another PC, please perform foregoing operation on the target computer. (No need to install software introduced on next page)
- Please use the device name specified in last step for initialization function when initialization is performed using API function. When running on other PC, it can run without changing the application for the same device name being specified.
Step 4 Checking Operations with the Diagnosis Program

Use the diagnosis program to check that the product and driver software work normally, thereby you can confirm that they have been set up correctly.

What is the Diagnosis Program?

The diagnosis program diagnoses the states of the product and driver software.
It can also be used as a simple checker when an external device is actually connected.
Using the “Diagnosis Report” feature reports the driver settings, the presence or absence of the product, I/O status, and interrupt status.

Using the Diagnosis Program

Starting the Diagnosis Program
Click [Diagnosis] on the Properties page to start the diagnosis program.

* The name of the connected product will be displayed. - DIO-24DY-USB
Checking Digital Inputs and Outputs

The main panel of the Diagnosis Program appears.

You can check the current operation states of the Product in the following boxes:

“Input Port”: Displays input values bit by bit at fixed time intervals.
“Output Port”: Mouse operation allows the data to output or display.

To use the function execution time measurement feature, click on the [Measurement Time] button. Enter the I/O start port and the number of ports, then press the measurement button. The time for each execution of a function will be measured.

* The name of the connected product will be displayed.
- DIO-24DY-USB
Diagnosis Report

(1) Clicking on the [Show Diagnosis Report] button displays detailed data such as product settings and the diagnosis results while saving them in text format. The Diagnosis Program performs “Product presence/absence check”, “driver file test”, “product setting test”, and so on.

⚠️ CAUTION
Before executing diagnosis report output, unplug the cable from the Product.

(2) A diagnosis report is displayed as shown below.
2. Setup
3. External Connection

This chapter describes the interface connectors on the product. Check the information available here when connecting an external device.

Using the On-terminal Connectors

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.

Figure 3.1. Interface Connectors and Mating Connectors
Connector Pin Assignment

![Image of CN1 and CN2 connector pin assignments]

Figure 3.2. Pin Assignment of CN1  Figure 3.3. Pin Assignment of CN2

Table 3.1. Signal name of CN1 and CN2

| PA00 - PA07, PB00 - PB07, PC00 - PC07 | Digital I/O signals |
| DGND | Common digital ground for digital I/O signals |

Relationships between Logical Ports/Bits and Connector Signal Pins

The following table lists the relationships between the connector signal pins and the logical port/bit numbers used for I/O functions.

Table 3.2. Logical Ports, Logical Bits, and Connector Signal Pins

<table>
<thead>
<tr>
<th>D7</th>
<th>D6</th>
<th>D5</th>
<th>D4</th>
<th>D3</th>
<th>D2</th>
<th>D1</th>
<th>D0</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA7</td>
<td>PA6</td>
<td>PA5</td>
<td>PA4</td>
<td>PA3</td>
<td>PA2</td>
<td>PA1</td>
<td>PA0</td>
</tr>
<tr>
<td>[7]</td>
<td>[6]</td>
<td>[5]</td>
<td>[4]</td>
<td>[3]</td>
<td>[2]</td>
<td>[1]</td>
<td>[0]</td>
</tr>
<tr>
<td>PB7</td>
<td>PB6</td>
<td>PB5</td>
<td>PB4</td>
<td>PB3</td>
<td>PB2</td>
<td>PB1</td>
<td>PB0</td>
</tr>
<tr>
<td>PC7</td>
<td>PC6</td>
<td>PC5</td>
<td>PC4</td>
<td>PC3</td>
<td>PC2</td>
<td>PC1</td>
<td>PC0</td>
</tr>
<tr>
<td>[23]</td>
<td>[22]</td>
<td>[21]</td>
<td>[20]</td>
<td>[19]</td>
<td>[18]</td>
<td>[17]</td>
<td>[16]</td>
</tr>
</tbody>
</table>

Note: PAx, PBx, PCx represents an I/O signal of CN1
[xx] represents a logical bits

⚠️ CAUTION

The logical port and logical bit numbers are virtual port and bit numbers that enable programming independent of board I/O addresses or board types.

© CONTEC
Cable connection

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.

---

Figure 3.4. Connecting an Interface Connector and Connectors That Can Be Used
Connecting I/O Signals

As I/O signals are LVTTL (3.3V) level signals, the total cable length should be within 1.5 m.

The input is provided with an input protective resistor (33Ω). GND is common to all I/O pins.

If the signal source is affected by noise or distant from the product, the product may fail to input accurate data depending on the connection.

I/O signals are LVTTL-level active high signals. When the external input signal is LVTTL level, the Low level represents logic 0 and the High level represents logic 1. When the program outputs 0 and 1, the product outputs the Low and High level signals, respectively.
4. Application Development

Please reference to online help and sample program when developing applications.

Reference to Online Help

Click on [Programs]-[CONTEC API-USBP(WDM)]-[API-USBP(W32) Help] from [Start] menu.

The information for application development, such as function reference is provided in [API-USBP(W32) Help].

Detailed introduction to search method for help should be found from [How to navigate Help] in the help.

Printing Function Reference

Clicking on Print button from online help prints the page being displayed. It can be printed entirely as follows in the case of referencing to printing function.

As figure shown on the right, selecting mark and clicking on Print button prints all the topics under the mark selected at a time.
Sample Program

To run a sample program, click on [Programs] - [CONTEC API-USBP(WDM)] - [DIO] - [Sample Name] from [Start] menu.

Distributing Developed Application

Please distribute the developed application with USB driver in supplied CD-ROM.
4. Application Development

Returning to Initial State

This is the method of returning to initial state. It is suggested that you should return to initial state and perform installation again when the operation is losing stabilization.

Moreover, the method of returning to the initial state is different depending on OS. Please initialize it by the method of suitable for OS used.

**Step 1 Uninstalling Driver and the development environment**

- Uninstall procedure for Windows 7, Vista

<Uninstall of device driver>

1. Run Device Manager. From [My Computer] - [Control Panel], select [System] and then select the [Device Manager] tab. (You can also open Device Manager by right clicking on My Computer and selecting Properties.)

2. All of the hardware that uses the API-TOOL (WDM) driver is registered under the CONTEC Devices tree.
   Open the device tree, select the hardware to uninstall, and then right-click the hardware. From the popup menu, select [Uninstall].

3. A dialog box opens asking you to confirm whether to uninstall. Select the [Delete the driver software for this device] checkbox, and then click [OK].
<Uninstall of development environment>
Use [My Computer] - [Control Panel] - [Programs and Features] to uninstall the development environment. Select [CONTEC API-*** (WDM) VerX.XX (development environment)] and then click [Uninstall].

* *** contains the driver category name (AIO, CNT, DIO, etc.).

- Uninstall procedure for Windows XP and Windows 2003 Server

<Uninstall of device driver>
Use [My Computer] - [Control Panel] - [Add and Remove Programs] to uninstall the device driver. Select [Windows driver package - CONTEC (****)] and then click [Change/Remove].

* *** contains the driver category name (caio, ccnt, cdio, csmc, etc.).

<Uninstall of development environment>
Use [My Computer] - [Control Panel] - [Add and Remove Programs] to uninstall the development environment. Select [CONTEC API-*** (WDM) VerX.XX (development environment)] and then click [Change/Remove].

* *** contains the driver category name (AIO, CNT, DIO, etc.).
- Uninstall procedure for Windows Me

<Uninstall of device driver>
Use [My Computer] - [Control Panel] - [Add and Remove Applications] to uninstall the device driver.
Select [CONTEC API-*** (WDM) driver] and then click [Add/Remove].
* "***" contains the driver category name (AIO, CNT, DIO, etc.).

<Uninstall of development environment>
Use [My Computer] - [Control Panel] - [Add and Remove Programs] to uninstall the development environment.
Select [CONTEC API-*** (WDM) VerX.XX (development environment)] and then click [Add/Remove].
* "***" contains the driver category name (AIO, CNT, DIO, etc.).

- Uninstall procedure for Windows 98, 98SecondEdition

<Uninstall of device driver>
Use [My Computer] - [Control Panel] - [Add and Remove Applications] to uninstall the device driver.
Select [CONTEC API-*** (WDM) driver] and then click [Add/Remove].
* "***" contains the driver category name (AIO, CNT, DIO, etc.).

<Uninstall of development environment>
Select [CONTEC API-*** (WDM) VerX.XX (development environment)] and then click [Add/Remove].
* "***" contains the driver category name (AIO, CNT, DIO, SMC, etc.).

**Step2 Drawing USB cable from a PC**

![USB cable](image)

**Step3 Restarting**
5. Functions

This section describes the functions of the product.

I/O Function

The product can input/output a total of 24 channels of LVTTL-level active-high digital signals. There are three sets (8-bit) of I/O ports, which can be controlled by a program to input/output data.
6. About Hardware

Hardware specification

Table 6.1. Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O</td>
<td></td>
</tr>
<tr>
<td>Number of I/O channels</td>
<td>24 channels</td>
</tr>
<tr>
<td>I/O format</td>
<td>LVTTL-level (Positive logic)</td>
</tr>
<tr>
<td>Input resistance</td>
<td>33Ω</td>
</tr>
<tr>
<td>Output rating</td>
<td>3.3VDC 8mA</td>
</tr>
<tr>
<td>Response time</td>
<td>Within 200nsec *1</td>
</tr>
<tr>
<td>USB</td>
<td></td>
</tr>
<tr>
<td>Bus specification</td>
<td>USB Specification 2.0/1.1 standard</td>
</tr>
<tr>
<td>USB transfer rate</td>
<td>12Mbps(Full-speed), 480Mbps(High-speed) *1</td>
</tr>
<tr>
<td>Power supply</td>
<td>Bus power</td>
</tr>
<tr>
<td>Common</td>
<td></td>
</tr>
<tr>
<td>Connector</td>
<td>14 pin (screw-terminal) plug header</td>
</tr>
<tr>
<td>Number of terminals used at the same time</td>
<td>127 terminals (Max.) *2</td>
</tr>
<tr>
<td>Current consumption (Max.)</td>
<td>5VDC 250mA</td>
</tr>
<tr>
<td>Operating conditions</td>
<td>0 - 50°C, 10 - 90%RH (No condensation)</td>
</tr>
<tr>
<td>Allowable distance of signal extension</td>
<td>Approx. 1.5m (depending on wiring environment)</td>
</tr>
<tr>
<td>Physical dimensions (mm)</td>
<td>64(W) x 62(D) x 24(H) (exclusive of protrusions)</td>
</tr>
<tr>
<td>Weight</td>
<td>70g (Not including the USB cable, attachment)</td>
</tr>
<tr>
<td>Attached cable</td>
<td>USB cable 1.8m</td>
</tr>
<tr>
<td>Compatible wires</td>
<td>AWG28 - 16</td>
</tr>
</tbody>
</table>

*1 Actual throughput is hundreds of μ seconds (This depends on the host PC environment used (OS and USB host controller).)

*2 As a USB hub is also counted as one device, you cannot just connect 127 USB terminals.
6. About Hardware

Physical dimensions

Figure 6.1. Physical dimensions

Block Diagram

Figure 6.2. Block Diagram