Application Note-002

CIE-H10 I/O Ports

Version 1.0

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2 Overall

CIE-H10 is a device that monitors and controls the 8 digital input and output ports with TCP/IP. Each Port is monitored and controlled by Modbus/TCP and HTTP. CIE-H10 outputs port information to its output ports after calculating the pre-defined algebraic equations (Macro) according to input ports' values. In addition, you can make them operate as an Internet Switch by using two CIE-H10s.

Input ports and output ports are not operated same way. There are a lot of questions that if the input and output ports are dependently operated each other. This technical document is for description of form and performance of the input ports and notification of the easy way to practical use with CIE-H10 as shows an example.

3 Digital I/O Ports

3.1 Independence of I/O ports

CIE-H10 has 8 input ports and output ports each and the names of them are listed on the table 3-1.

Table 3-1 Names of I/O ports of CIE-H10

Division	1	2	3	4	5	6	7	8
Input ports	DI 0	DI 1	DI 2	DI 3	DI 4	DI 5	DI 6	DI 7
Output ports	DO 0	DO 1	DO 2	DO 3	DO 4	DO 5	DO 6	DO 7

User can easily think that the input and output ports are connected, because the number of input and output ports are same. An example is that the DI 0 forwards its signal to DO 0. Actually, this is possible by using the Macro option. However, CIE-H10 is not operated only this way. I hope to say that it is just only one case. The numbers on the table 3-1 are just named to distinguish each port and the ports are independently operated. For help to understand this, we'll look into the Input and input ports in next chapter.

3.2 Input Ports

8 input ports of CIE-H10 are isolated with photo coupler interface. Photo coupler is element transfer electric input signal to its output ports using the light. Between the input ports and output ports are completely isolated. This is used for the case like forwarding signal between two circuits with different voltage level. This means CIE-H10's input ports are received electric signals and decide between 0 and 1. Thus, it is impossible that set the ports to high with normal switch which didn't have any voltage difference. Form of the each input port is shown in Fig. 3-1.
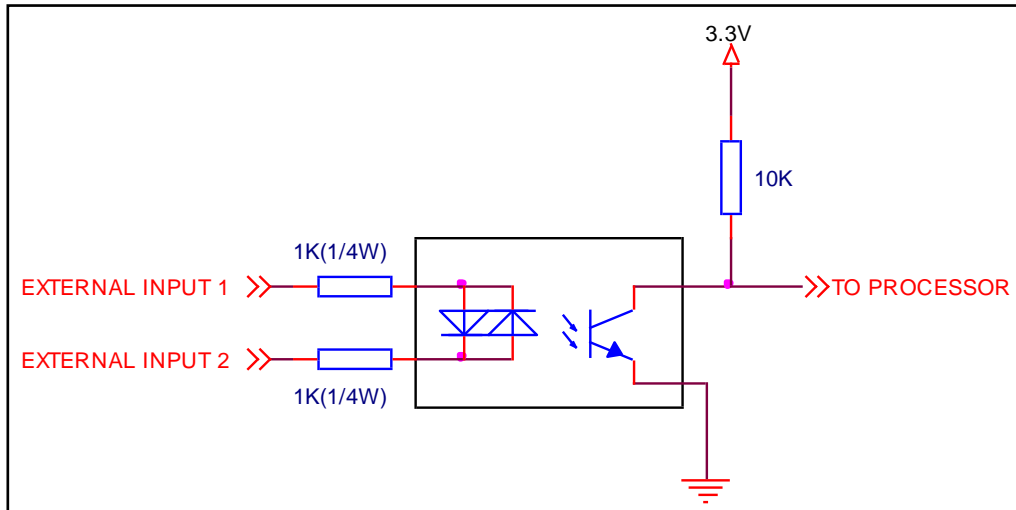
Fig. 3-1 Form of an input port of CIE-H10

In figure 3-1, [EXTERNAL INPUT 1] and [EXTERNAL INPUT 2] are parts of interfacing with user device.

We know input ports need voltage difference. If so, can we input a signal with 100 volt to the ports? What is the basis for deciding between 0 and 1? Maximum value of input ports is 24 V and CIE-H10 decides the signal as 0 in case of lower voltage then 1.2V and decides as 1 in case of higher voltage then 1.8V. Input ports are terminal blocks with 5mm spaces, so user can use them with screwdriver of (-) shape.

Table 3-2 Voltage of input ports

Max Input Voltage	DC 24V		
Input Voltage(H)	Min 1.8V	HIGH	1
Input Voltage(L)	Max 1.2V	LOW	0

CIE-H10 recognizes input port signals that last for [Valid Time] which is set by user. If the signal is not maintained for the time, the input signal will be ignored.

This [Valid Time] is used for Modbus/TCP, Macro, HTTP and other functions provided by CIE-H10. The unit of [Valid Time] is 1 millisecond. However, since the accuracy is only guaranteed in 10 ms, the designated values will round down in units of 10 ms according to the values set by the users.
  ex) 15 ms -> 10 ms, 31 ms -> 30 ms

3.3 Output Port

Output ports of CIE-H10 consist of relay. This is a switch. This means the output ports do not make any signal with voltage difference but connect or disconnect the terminal so as to turn

on/off their devices. Therefore a device needed to be supplied power does not work even though it is connected with output ports of CIE-H10. The making of output ports is followed.
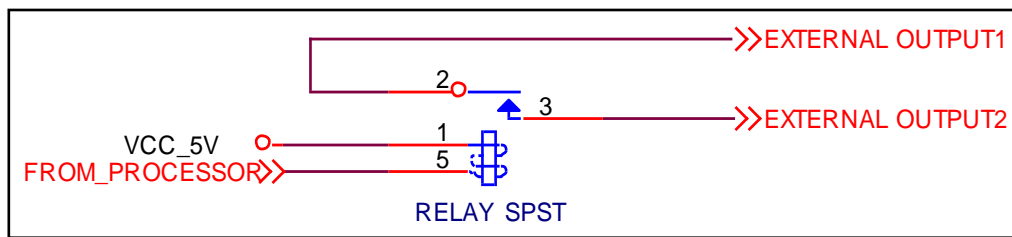

Fig. 3-2 Form of an output port of CIE-H10

As see the figure 3-2, [EXTERNAL OUTPUT 1], [EXTERNAL OUTPUT 2] are parts interfaced with user's devices. These are made of terminal blocks same as input ports, so you could use of this with screwdriver a (-) shape.

The output port functions as short or open circuit like a switch. Thus, devices needed to be supplied power have to be provided voltage input irrespective of CIE-H10's power. Because the output ports just connect or disconnect two wires. In values of output ports, 0(OFF) means open circuit, 1(ON) means short circuit. A permissible range of current in each output port's condition is followed.

Condition	DC 28V	AC 125V	AC 250V
Permissible current	5A	10A	5A

Values are reflected in the output ports after delayed as optional time. Besides, the signal has to be maintained for [Delay] time. If it's doesn't, CIE-H10 does not recognize the signal as valid input. However, in case of setting [Delay] to 0, CIE-H10 operates its output ports right after the input signal is detected. The unit of [Delay] is 1 millisecond. However, since the accuracy is only guaranteed in 10 ms, the designated values will round down in units of 10 ms according to the values set by the users.

4 Practical use of CIE-H10

4.1 A Device of detecting and controlling digital I/O

CIE-H10 is a device of detecting and controlling digital Input and output remotely. User can make this by using Modbus/TCP and HTTP (Web). There are so many application examples of CIE-H10 like Internet Switch. Let's make sure functions of CIE-H10 with an example in this paper. This example may help users to understand the product easily.
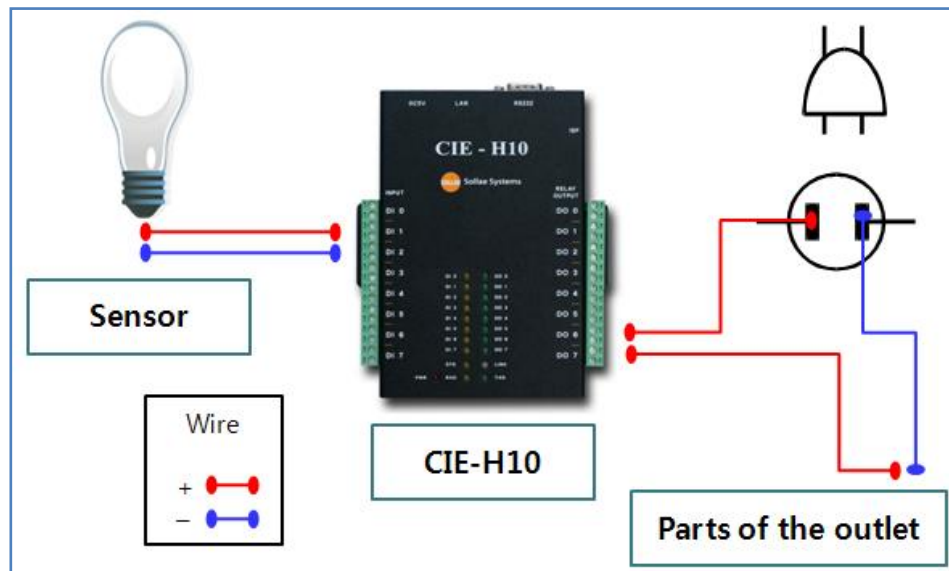
4.2 The Diagram

그림 4-1 The diagram of this example

We'll know about the functions of input and output ports. Stuffs used this experiment are listed on the table 4-1.

Table 4-1 Stuffs used the experiment

Stuffs	pieces	Purpose
CIE-H10	1	For the experiment
CSW-H80	1	For checking that power is supplied
Sensor	1	For input to the input port
Power Supply(5V)	3	For supplying power to each device
Outlet	1	For checking that output port is working

Look at the figure 4-2. A difference of voltage caused by the sensor being operated as input signal in first input ports named Di 0. This signal has been maintained for [Valid Time] and then, CIE-H10 has recognized the signal as valid input. Using Macro option, the last output ports named Do 7 has been connected automatically. In case of open circuit, (+) wire of the outlet is disconnected, so any devices plug in the outlet would be not supplied power. However, in case of short circuit, (+) wire is connected, so a device plug in the outlet would be supplied power.

Macro option allows users to control the output ports by simple Boolean Algebra. This experiment uses 'Di 0 = Do 7', line of Boolean Algebra. This line means if there is an input signal on Di 0, set Do7 to connect. For more information about the macro function, please refer to the user's manual.

 In the outlet of figure 4-2, CSW-H80 device for converting serial to wireless LAN has been connected to check if the output port works on. In the situation of recognizing valid input, CSW-H80 would be supplied power and turned on the PWR LED.
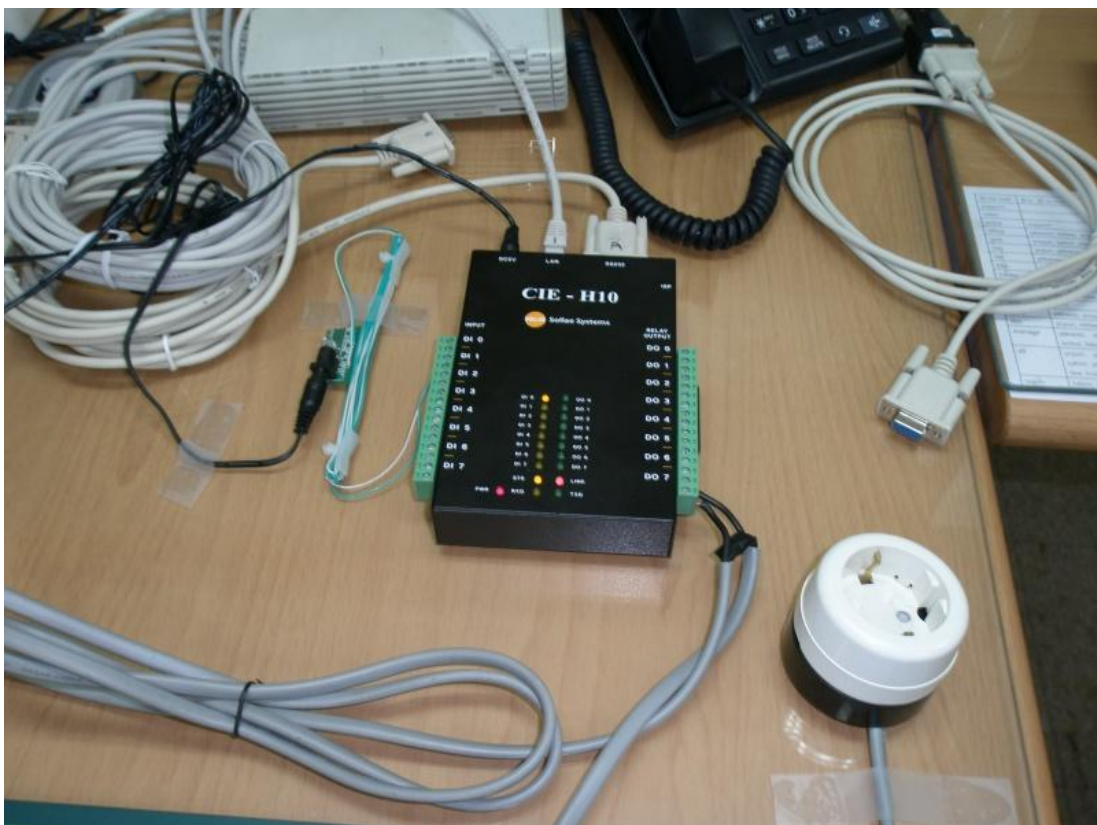

Fig. 4-2 Overall of the experiment

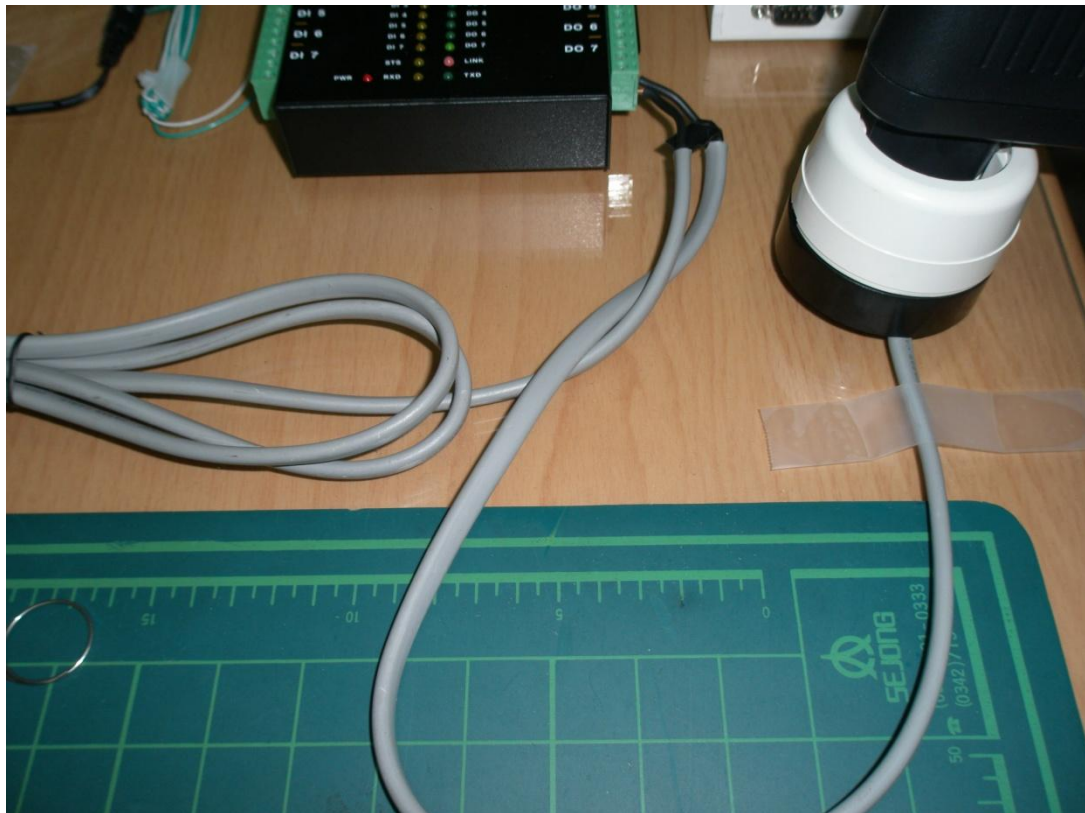Fig 4-3 A Parts of inout ports

Fig 4-4 A parts of outlets and its wire

Fig. 4-5 Status of full connecting

Fig. 4-6 A parts of the CSW-H80

Look at the figure 4-6. In input and output LEDs of CIE-H10, the first input port (Di 0) and the last output port (Do 7) are turned on. As I mentioned above, this could be handled by user with macro option. This figure shows that CSW-H80 is supplied power through the outlet.

5 Revision History

Date	Version	Comments
Mar. 25. 2009	1.0	Initial Release