

4.5 PT8DIO - DIGITAL INPUTS/OUTPUTS WITH COUNTERS

4.5.1 Description

The PT8DIO module is an 8 channel digital input and 8 channel digital output module.

The inputs are isolated from the logic by bi-directional opto-couplers. The common is connected internally to either the - volts or +volts field power supply terminals using a jumper link which is situated inside the housing.

The counters operate in three modes.

In **mode 0** all the counters are disabled.

In **mode 1** the first eight inputs (1-8) have internal counters associated with them. These counters are 32 bit counters allowing a count value from 0 to 4294967295. The count value can be cleared by writing a zero to the associated registers or preset to any other value using the same method.

In **mode 2** the inputs are connected as up/down counters. Input 1 will increment counter 1 whilst input 2 decrements counter1. In the same way, inputs 3&4 operate counter 2, inputs 5&6 operate counter 3 and inputs 7&8 operate counter 4.



Note: The count values are not battery backed-up and will be lost if power is turned off.

The format of the registers allows the status of the inputs to be read as either single bits or all at once as a single register on the Modbus network.

The 8 digital outputs are open collector (NPN). The outputs may be used to drive lamps or external relays when more drive capability is required. The outputs are isolated from the logic and they share a common negative terminal.

When used as a slave module, the outputs are written to by the Modbus master device such as a PC or PLC. Each output can be individually switched on or off, or all outputs can be set up at the same time by writing a single number to the output register which represents the status of all outputs.

Each PT8DIO Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the PT8DIO Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 169.254.111.111. This address must be changed before the module is added to an existing network.

The web page address for viewing the digital input status parameters is <http://169.254.111.111/index.htm> and the address for viewing the counters is <http://169.254.111.111/counters.htm>.

The web page address for configuring the module is <http://169.254.111.111/ip.htm> and the web page for configuring the counters is <http://169.254.111.111/countcfg.htm>.

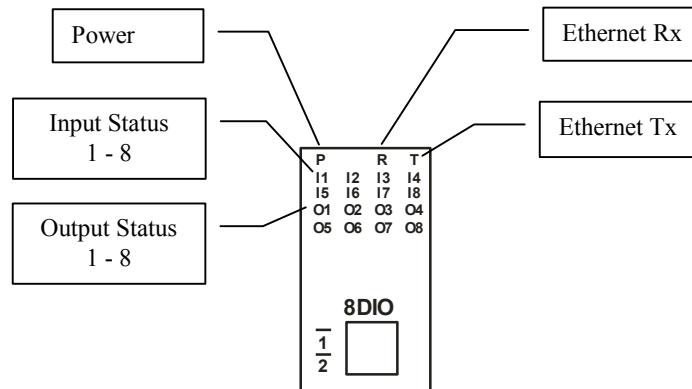
4.5.2 Technical Specification of PT8DIO

Power Supply	Logic Supply Voltage	12 -24 Vdc
	Logic Supply Current	75mA @ 12V / 39mA @ 24V
	Field Supply Voltage	12 -24 Vdc
Digital Inputs	Field Supply Current	6mA @ 12V / 6mA @ 24V
	Input Points	8
	Input Voltage Range	12 -24 Vdc
Digital Outputs	Input Current per input	5mA@12Vdc / 11mA @24Vdc
	Isolation	1500Vrms between field and logic
	Output Points	8
Counters	Maximum Voltage	36 Vdc
	Maximum Current	100 mA per output
	Vceon	1.1V Max.
Ethernet	Isolation	1500Vrms between field and logic
	Inputs	1 to 8
	Resolution	32 Bits
Temperature	Frequency	1KHz (max)
	Pulse Width	500us (min)
	10/100Mbps/s	Twisted pair.
Connectors	Operating Temperature.	-40°C to + 80°C
	Storage Temperature	-40°C to + 85°C
	Logic Power and Comms.	4 Pin Connector on underside of unit
	Inputs	18 Way screw connector on front
	Ethernet	RJ45 on top side of unit.

Note: Inputs 1 to 8 are used as both digital inputs and counter inputs.

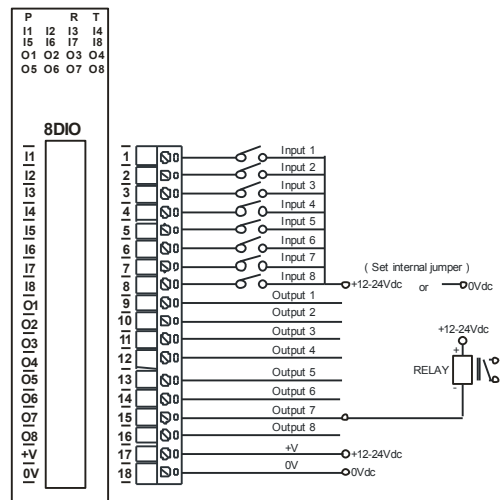
4.5.3 Status Indicators

Power: Flashes to indicate the CPU is running.
RS485 Rx: Flashes to indicate the unit has received a valid Modbus message.
RS485 Tx: Flashes to indicate the unit has sent a Modbus message.
Input Status: "OFF" when the input is off
"ON" when the input is on.
Output Status: "OFF" when the output is off
"ON" when the output is on.

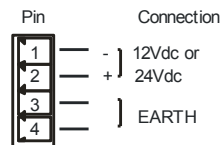


4.5.4 Wiring

The following diagram shows how the digital inputs and outputs are connected.

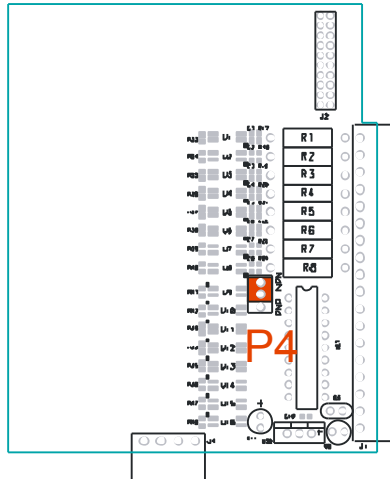


The following diagram shows the wiring for the power.



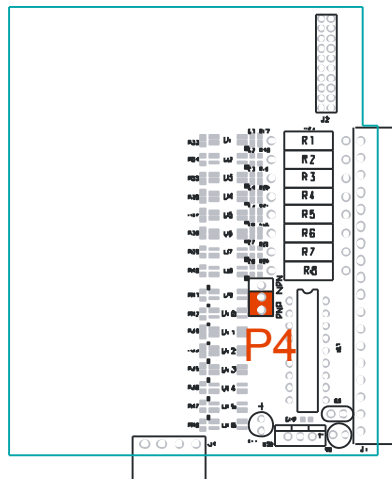
4.5.5 Setting the jumpers for NPN inputs.

The Digital inputs can be configured as NPN inputs. This means that the inputs can be operated by switching to 0V. Change the link **P4** to the NPN position.



4.5.6 Setting the jumpers for PNP inputs.

The Digital inputs can be configured as PNP inputs. This means that the inputs can be operated by switching to +12V to +24V. Change the link **P4** to the PNP position.



4.5.7 Configuration

The Web page address "**169.254.111.111/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows you to change the IP address of the PROMUX TCP Module and to enter a Module Description Name and Input Names for identification/maintenance purposes.

The screenshot shows a web browser window with the address bar displaying "169.254.111.111/ip.htm". The page header includes the PROCON ELECTRONICS logo and the text "PT8DIO" and "8DIO - DIGITAL INPUT/OUTPUT MODULE". The main section is titled "Ethernet Configuration Parameters" and contains a table with the following fields:

Ethernet Configuration Parameters					
Module IP	169	254	111	111	
Default Gateway IP	169	254	111	1	
Subnet Mask	0	0	0	0	
Socket Time Out	90				X 1 second
Module Compatibility	0				0=PT8DIO, 1=MMTCP8DIO

Below the table is a "Submit" button. A warning message is displayed below the Submit button:

Warning: The IP address will not be updated until the power on the module has been switched off and on again. After clicking on the Submit button check that the correct IP address has been entered. If you forget the IP address, refer to the user manual to reset the module back to the default IP value.

Below the warning message are three input fields with "Submit" buttons:

Module Name: PT8DIO [Submit]

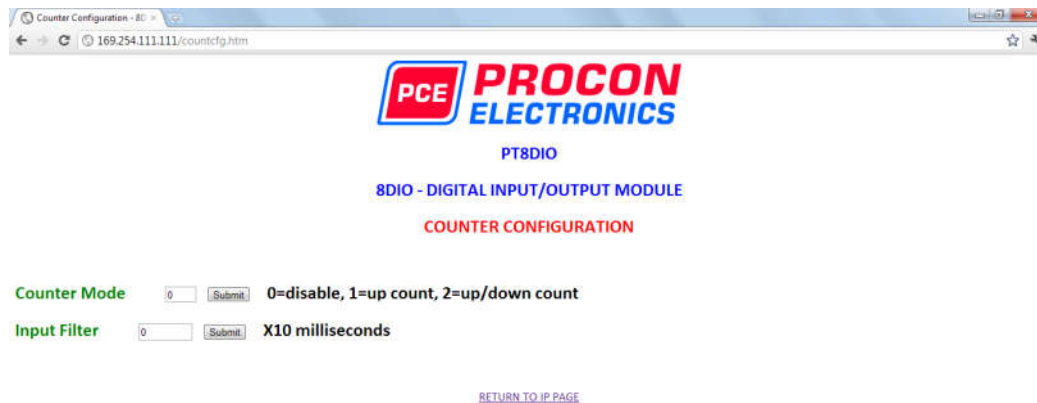
Input 1 Name: INPUT_1 [Submit]

Input 2 Name: INPUT_2 [Submit]

- **IP Address:** The new IP address can be entered into the web page as shown above. After this has been done, you must click the Submit button to send the values to the Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. If the IP address has been entered incorrectly and the power has not been switched off, it is possible to re-enter the correct IP address. If the power has been switched off and back on again, the Module will not communicate until you enter the new IP address into the address line of the browser window.
- **Default Gateway IP Address:** A **default gateway** is a node (a router) on a computer network that serves as an access point to another network. In enterprises, however, the gateway is the computer that routes the traffic from a PC to the outside network that is serving the Web pages. It is only necessary to configure the default gateway IP address if the PC that is accessing the Module is on a different network.
- **Subnet Mask:** In computer networks, a **subnetwork** or **subnet** is a range of logical addresses within the address space that is assigned to an organization. The subnet mask is used to inform the Module that it must send its replies to the gateway if the IP address of the PC is on a different network. When the subnet mask is set to "0.0.0.0" then it is effectively disabled and the default gateway is not used. A typical subnet mask would be "255.255.255.0".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.
- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a PROMUX TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the MOD-MUX TCP modules. This is useful if a new PROMUX TCP module is being used to replace an old MOD-MUX TCP module in an existing system.

- **Module Name:** This field allows you to enter a module description name into the PROMUX TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the PROMUX TCP Module in the system by name or number.
- **Input/Output Names:** These fields allow you to enter an input description name into the PROMUX TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular input/output by name or number.

The Web page address "**169.254.111.111/countcfg.htm**" is entered into the address line of the browser window to access the counter configuration page. This page allows you to enter a Counter Description Name for identification/maintenance purposes.



Counter Configuration - 8D

169.254.111.111/countcfg.htm

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PT8DIO

8DIO - DIGITAL INPUT/OUTPUT MODULE

COUNTER CONFIGURATION

Counter Mode: 0 [Submit] 0=disable, 1=up count, 2=up/down count

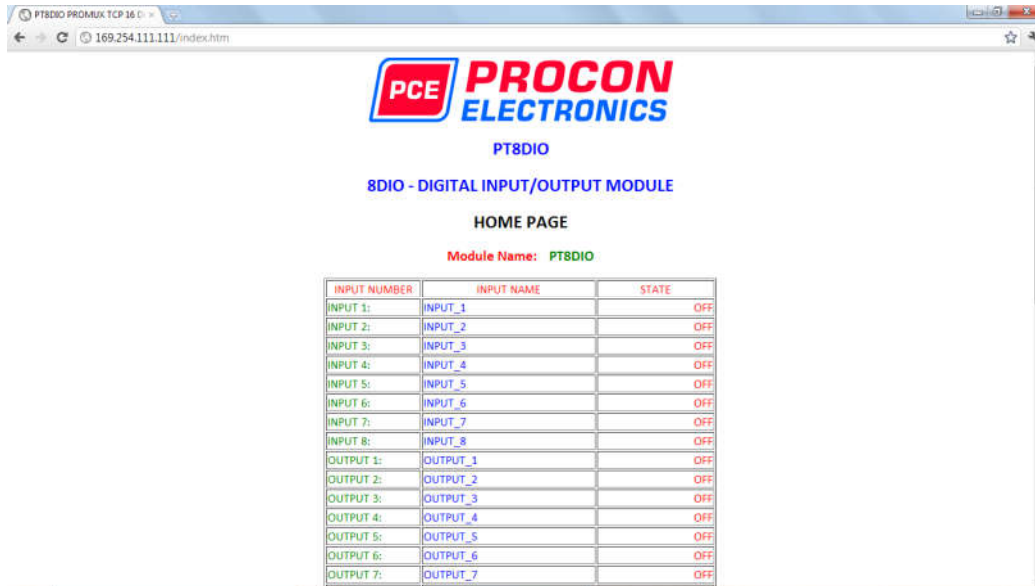
Input Filter: 0 [Submit] X10 milliseconds

[RETURN TO IP PAGE](#)

- **Counter Mode:** Enter 0, 1 or 2 to submit the required mode.
- **Input Filter:** The input filter is used to prevent false inputs and counting due to electrical noise or contact bounce.

4.5.8 Viewing web pages

To view the default Web page in the PROMUX TCP Module, start the Web browser and type "169.254.111.111" into the address line of the browser window. The main page will now be displayed in the browser window.



- **Input Number:** This refers to the actual input number on the terminals of the module.
- **Input Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **State:** This is the current state of the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.
- **Counter filter:** When this value is zero(0) then the inputs are sampled at 0.5ms and there is no filtering. This is used for high speed counting. When the value is greater than 0 then the inputs are debounced to prevent faults counting from relay contacts, etc.
- **Output Watchdog:** This is the time that the outputs will keep their active state after communications has stopped. If the value is zero(0) then the outputs will not time out and the last state will remain as long as power is applied to the module.

To view the Counter Web page in the PROMUX TCP Module, start the Web browser and type "169.254.111.111/counter.htm" into the address line of the browser window.



- **Counter:** This refers to the actual input number on the terminals of the module.
- **Input Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **Count:** This is the current count on the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.
- **Counter Configuration:** This is the mode as described at the beginning of this section.

4.5.9 PT8DIO Data Registers (MODULE TYPE = 132)

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
10001	Digital Input 1	0	1	R	Status of Digital Inputs.
10002	Digital Input 2	0	1	R	"
10003	Digital Input 3	0	1	R	"
10004	Digital Input 4	0	1	R	"
10005	Digital Input 5	0	1	R	"
10006	Digital Input 6	0	1	R	"
10007	Digital Input 7	0	1	R	"
10008	Digital Input 8	0	1	R	"
00017	Digital Output 1	0	1	R/W	Status of Digital Outputs.
00018	Digital Output 2	0	1	R/W	"
00019	Digital Output 3	0	1	R/W	"
00020	Digital Output 4	0	1	R/W	"
00021	Digital Output 5	0	1	R/W	"
00022	Digital Output 6	0	1	R/W	"
00023	Digital Output 7	0	1	R/W	"
00024	Digital Output 8	0	1	R/W	"
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 132
30002	Digital Inputs	N/A	N/A	R	Digital Inputs in lower 8 bits. 8 - 1.
40003	Digital Outputs	N/A	N/A	R/W	Digital Outputs in lower 8 bits. 8 - 1.
40004	Counter 1 MSB	0	65535	R/W	Counter MSB and LSB combine to give a 32 bit
40005	Counter 1 LSB	0	65535	R/W	Counter with range 0 to 4294967295.
40006	Counter 2 MSB	0	65535	R/W	"
40007	Counter 2 LSB	0	65535	R/W	"
40008	Counter 3 MSB	0	65535	R/W	"
40009	Counter 3 LSB	0	65535	R/W	"
40010	Counter 4 LSB	0	65535	R/W	"
40011	Counter 4 LSB	0	65535	R/W	"
40012	Counter 5 MSB	0	65535	R/W	"
40013	Counter 5 LSB	0	65535	R/W	"
40014	Counter 6 MSB	0	65535	R/W	"
40015	Counter 6 LSB	0	65535	R/W	"
40016	Counter 7 MSB	0	65535	R/W	"
40017	Counter 7 LSB	0	65535	R/W	"
40018	Counter 8 MSB	0	65535	R/W	"
40019	Counter 8 LSB	0	65535	R/W	"
40101	Watchdog Timer	0	255	R/W	Timer in seconds. 0 = disabled. 1 - 255 = enabled.
40105	Counter Mode	0	2	R/W	0=Disable, 1=Up Counting, 2=Up/Down Count
40106	Input Filter	0	65535	R/W	0 = Disable, >0 = Enable. (x10ms)