

# DAEnetIP3 Ethernet 12 Relay I/O Module

*User's Manual*  
*Date: 02 Nov 2017*



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## 1. About this document

This document describes the device [DAEnetIP3 Ethernet TCP/IP Data Acquisition I/O Module](#) respectively [DAEnetIP3 Wi-Fi 802.11 b/g Data Acquisition I/O Module](#). This consist of [DAEnetIP3-Ex](#) or [DAEnetIP3-Wx](#) controller but the extension I/O relay board is the main object of this document. For full description of the all features, you can refer to [DAEnetIP3 user's manual](#).

## 2. Overview

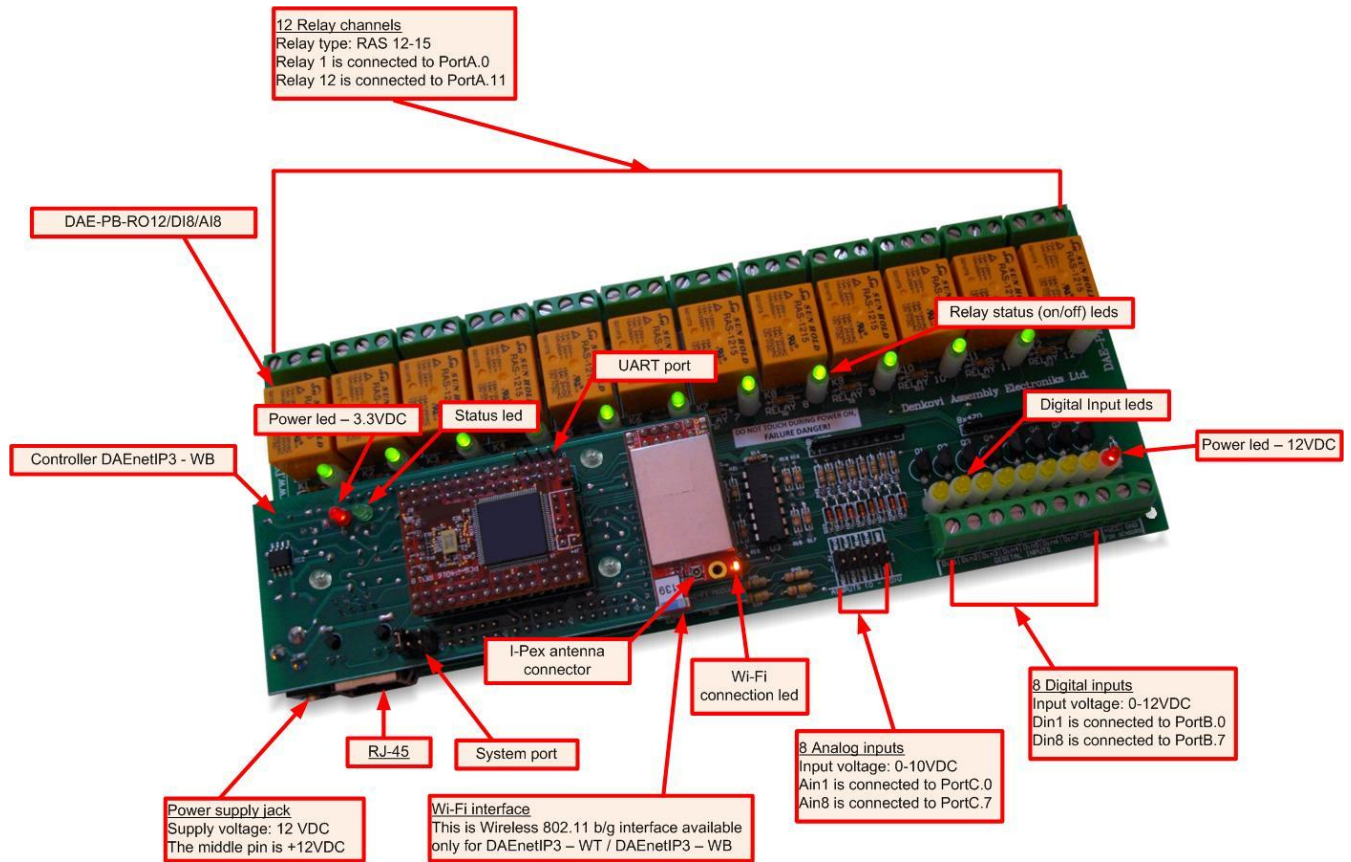


Figure 1. Module overview

The module has:

- 12 x SPDT relays (NO,C,NC) - 10A / 250VAC, 15A / 120VAC, 10A / 28VDC;
- 8 x digital inputs (0-12VDC)
- 8 x analog inputs (0-10VDC)
- Leds for: relays, digital inputs, power on
- 12VDC sensor supply output

MPN reference:

- DAE-PB-RO12-12V/DI8/AI8 + DAEnetIP3-EB
- DAE-PB-RO12-24V/DI8/AI8 + DAEnetIP3-EB
- DAE-PB-RO12-12V/DI8/AI8 + DAEnetIP3-WB
- DAE-PB-RO12-24V/DI8/AI8 + DAEnetIP3-WB

### 3. Relay outputs

Table 1. Relays electrical characteristics

<b>Relay outputs count</b>		12
<b>Contact type</b>		NO, NC
<b>Current consumption</b>	mA	15
<b>Switching parameters</b>	A	10 (28 VDC)
	A	15 (120 VAC)
	A	10 (250 VAC)
	A	

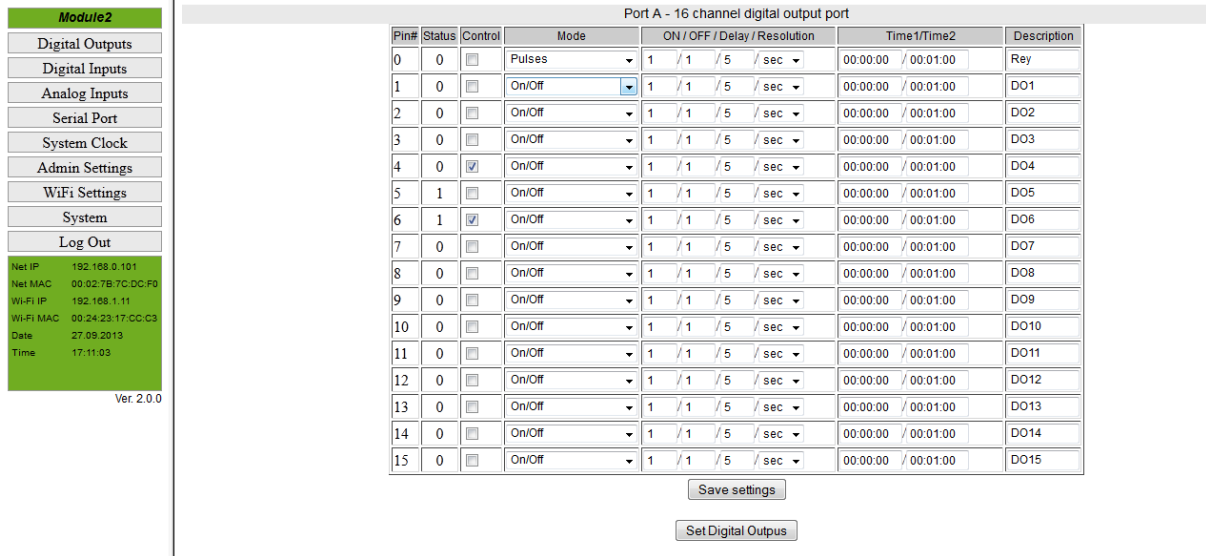
Table 2. Mapping to DAEnetIP3 PortA digital output port

<b>Digital output pin # (DAEnetIP3 PortA)</b>	<b>Relay # (from peripheral board)</b>
PortA.0	Relay 1
PortA.1	Relay 2
PortA.2	Relay 3
PortA.3	Relay 4
PortA.4	Relay 5
PortA.5	Relay 6
PortA.6	Relay 7
PortA.7	Relay 8
PortA.8	Relay 9
PortA.9	Relay 10
PortA.10	Relay 11
PortA.11	Relay 12

#### 3.1. How to control the relays

DAEnetIP3 has 16 digital outputs working in 19 different modes. However the peripheral board DAE-PB/RO12/DI8/AI8 has only 12 relay outputs. So to set the relays you need to change DO0 - DO11. When the output level is 0, the relay is OFF. When it is 1, the relays is ON.

### 3.1.1. Web browser



Port A - 16 channel digital output port

Pin#	Status	Control	Mode	ON / OFF / Delay / Resolution	Time1/Time2	Description
0	0	<input type="checkbox"/>	Pulses	1 / 1 / 5 / sec	00:00:00 / 00:01:00	Rey
1	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO1
2	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO2
3	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO3
4	0	<input checked="" type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO4
5	1	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO5
6	1	<input checked="" type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO6
7	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO7
8	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO8
9	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO9
10	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO10
11	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO11
12	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO12
13	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO13
14	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO14
15	0	<input type="checkbox"/>	On/Off	1 / 1 / 5 / sec	00:00:00 / 00:01:00	DO15

Save settings  
Set Digital Output

Figure 2. PortA web page

### 3.1.2. HTTP API

**Get all relays states**

*http://your.ip.address/command.html?P=admin&ASG=?&*

**Set all relays ON at a time**

*http://your.ip.address/command.html?P=admin&ASG=FFFF&*

**Get Relay 1 State**

*http://your.ip.address/command.html?P=admin&AS0=?&*

**Get Relay 9 State**

*http://your.ip.address/command.html?P=admin&AS8=?&*

**Set Relay 2 OFF**

*http://your.ip.address/command.html?P=admin&AS1=0&*

**Set Relay 12 OFF**

*http://your.ip.address/command.html?P=admin&ASB=0&*

### 3.1.3. TCP/IP (Virtual Serial Port)

**Get all relays states**

*00ASG=?;*

**Set all relays ON at a time**

*00ASG=FFFF;*

**Get Relay 1 State**

*00AS0=?;*

**Get Relay 9 State**

*00AS8=?;*

**Set Relay 2 OFF**  
*00AS1=0;*

**Set Relay 12 OFF**  
*00ASB=0;*

### 3.1.4. Serial commands

**Get all relays states**  
*00ASG=?;*

**Set all relays ON at a time**  
*00ASG=FFFF;*

**Get Relay 1 State**  
*00AS0=?;*

**Get Relay 9 State**  
*00AS8=?;*

**Set Relay 2 OFF**  
*00AS1=0;*

**Set Relay 12 OFF**  
*00ASB=0;*

### 3.1.5. Telnet

**Get all relays states**  
*ASG=?;*

**Set all relays ON at a time**  
*ASG=FFFF;*

**Get Relay 1 State**  
*AS0=?;*

**Get Relay 9 State**  
*AS8=?;*

**Set Relay 2 OFF**  
*AS1=0;*

**Set Relay 12 OFF**  
*ASB=0;*

## 3.2. How to use the relays

### 3.2.1. Controlling lamp

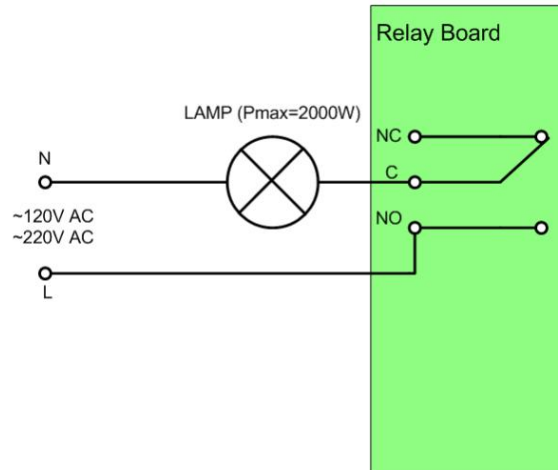


Figure 3. Controlling lamp

### 3.2.2. Controlling inductive loads

More information how to control inductive loads it is possible to be found on this link: <http://denkovi.com/controlling-inductive-devices>



## 4. Digital Inputs

Table 3. Digital inputs electrical characteristics

Type			Peripheral board
<b>Digital inputs count</b>			8
<b>Nominal value of inputs</b>	Voltage Current	VDC mA	12 5.2
<b>Max non destructive voltage</b>		VDC	24.0
<b>Input switching limit values</b>	From 0 to 1 Voltage Current From 1 to 0 Voltage Current	VDC mA VDC mA	>7.6 >3.2 <4.5 <1.8
<b>Input impedance at state 1</b>		kΩ	2.2
<b>Sensor compability</b>	2-wire 3-wire		Yes PNP No
<b>Input type</b>			Resistive with Schmitt trigger
<b>Isolation</b>	Between supply and inputs Between inputs		No No
<b>Protection</b>	Against reverse polarity		Yes

Table 4. Mapping to DAEnetIP3 PortB digital input port

Digital input pin # (DAEnetIP3 PortB)	Digital Input # (peripheral board)
PortB.0	Din1
PortB.1	Din2
PortB.2	Din3
PortB.3	Din4
PortB.4	Din5
PortB.5	Din6
PortB.6	Din7
PortB.7	Din8

### 4.1. How to read the digital inputs

DAEnetIP3 has 8 digital inputs working in 3 different modes. The DAEnetIP3 PortB.0 DI is connected with DAE-PB/RO12/DI8/AI8 Din1, PortB.7 is connected with Din8. When the PortB.X is 1, this means there is high level signal in DinX. When it is 0, this means DinX is not connected or there is low level signal. The input may be tracked only, may control some PortA digital output by rising/falling edge or it may control even output from another DAEnetIP3 controller (connected in the same Wireless / Ethernet network).

### 4.1.1. Web browser

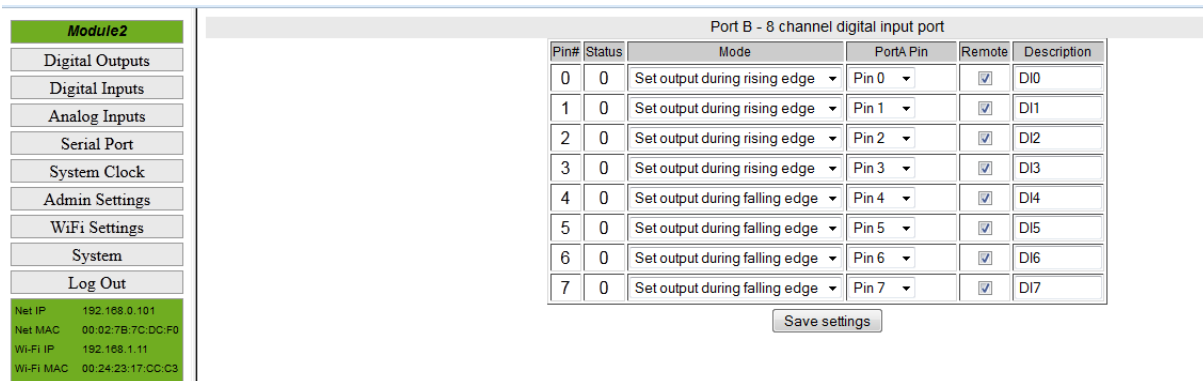


Figure 4. PortB web page

### 4.1.2. HTTP API

**Get all digital inputs levels at a time**

*http://your.ip.address/command.html?P=admin&BVG=?&*

**Get digital input 1 level (PortB.0)**

*http://your.ip.address/command.html?P=admin&BV0=?&*

**Get analog input 8 level (PortB.7)**

*http://your.ip.address/command.html?P=admin&BV7=?&*

### 4.1.3. TCP/IP (Virtual Serial Port)

**Get digital input 1 level (PortC.0)**

*00BV0=?;*

**Get digital input 8 level (PortC.7)**

*00BV7=?;*

### 4.1.4. Serial commands

**Get digital input 1 level (PortC.0)**

*00BV0=?;*

**Get digital input 8 level (PortC.7)**

*00BV7=?;*

### 4.1.5. Telnet

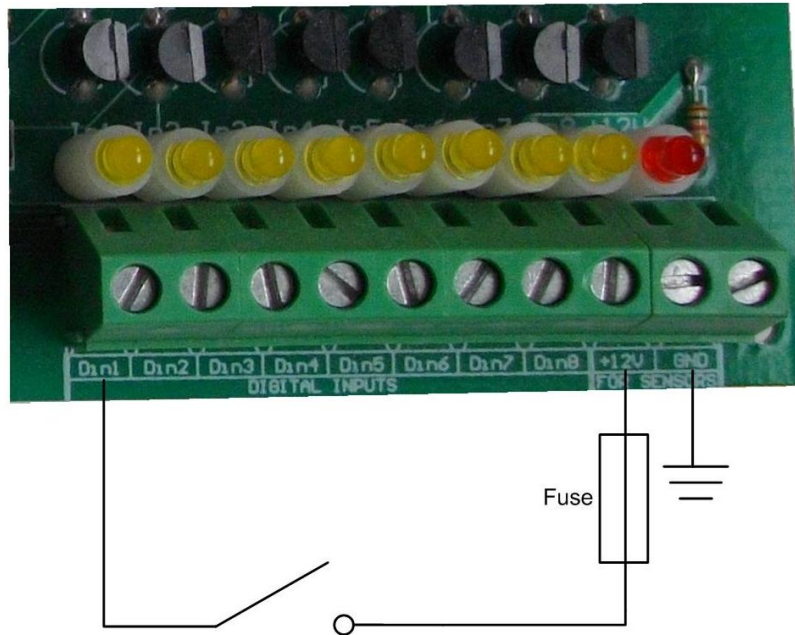
**Get digital input 1 level (PortC.0)**

*BV0=?;*

**Get digital input 8 level (PortC.7)**

*BV7=?;*

## 4.2. How to use the digital inputs



Switch button connected to Din1  
When the contact is closed Din1 level is logical 1  
When the contact is opened Din1 level is logical 0

Figure 5.Using digital inputs

Generally DAEnetIP3's digital input port (PortB) accepts levels from 0 up to 3.3V DC. On the current device, this port is extended with Schmitt trigger and it accepts levels **0 - 12V DC**.

## 5. Analog Inputs

Table 5. Analog inputs electrical characteristics

Type			Peripheral board
Analog inputs count			8
Input range		VDC	0...10
Input impedance		KΩ	270
Max non destructive voltage		V	24
Value of LSB		mV	10
Input type			Common mode
Conversion	Resolution Conversion time Precision Repeat accuracy	V Sec V mA	10 bits at maximum voltage 0.8...79.2 determined by parameter determined by parameter
Isoation	Beteen analog channel and supply		No
Protection	Against reverse polarity		Yes

Table 6. Mapping to DAEnetIP3 PortC analog input port

Analg input pin # (DAEnetIP3 PortC)	Analog Input # (peripheral board)
PortC.0	Ain1
PortC.1	Ain2
PortC.2	Ain3
PortC.3	Ain4
PortC.4	Ain5
PortC.5	Ain6
PortC.6	Ain7
PortC.7	Ain8

### 5.1. How to read the analog inputs

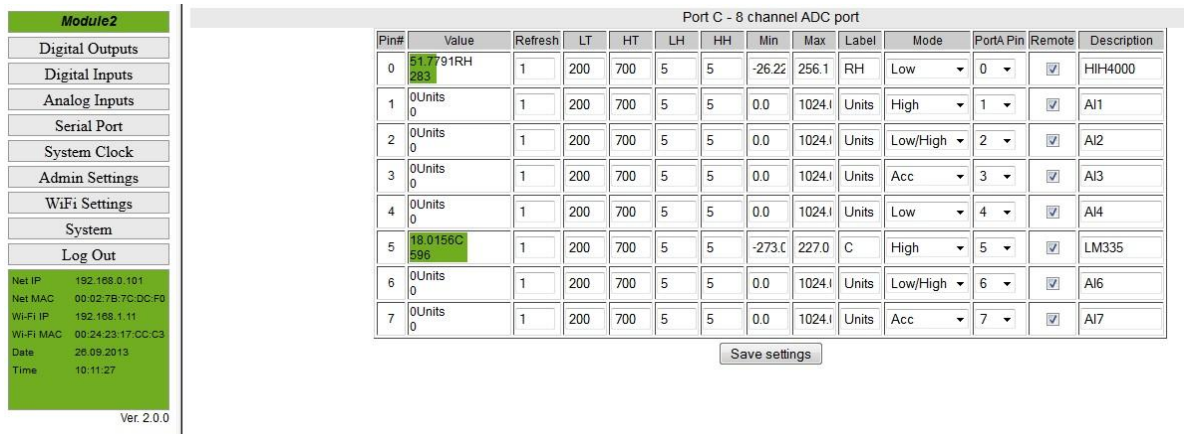
DAEnetIP3 has 8 analog inputs with 2.048 VDC reference voltage source and 10 bit resolution. The DAE-PB/RO12/DI8/AI8 peripheral board extends the input voltage to be from 0 to 10VDC. The DAEnetIP3 PortC.0 AI is connected with DAE-PB/RO12/DI8/AI8 Ain1, PortC.7 is connected with Ain8. The input voltage may be calculated by the following formula:

$$V\_Ain(X) = (\text{PortC}(X-1) / 1023) * 10,$$

where  $V\_Ain(X)$  is the input voltage of the DAE-PB/RO12/DI8/AI8 Ain channel with number X (X is from 1 to 7).  $\text{PortC}(X-1)$  is the DAEnetIP3 analog input channel with number X-1 (X-1 is from 0 to 7). So for example if we have  $\text{PortC}.0 = 512$ , this means the input voltage is 5.00V. If we have 742, the input voltage is 7.253V.

The input may be tracked only, may control some PortA digital output by crossing threshold or it may control even output from another DAEnetIP3 controller (connected in the same Wireless / Ethernet network).  
It is possible also each analog input to be linearized (i.e. to be retrieved directly desirable units).

### 5.1.1. Web browser



Pin#	Value	Refresh	LT	HT	LH	HH	Min	Max	Label	Mode	PortA Pin	Remote	Description
0	51.7791RH 283	1	200	700	5	5	-26.22	256.1	RH	Low	0	<input checked="" type="checkbox"/>	HIH4000
1	0Units 0	1	200	700	5	5	0.0	1024.1	Units	High	1	<input checked="" type="checkbox"/>	AI1
2	0Units 0	1	200	700	5	5	0.0	1024.1	Units	Low/High	2	<input checked="" type="checkbox"/>	AI2
3	0Units 0	1	200	700	5	5	0.0	1024.1	Units	Acc	3	<input checked="" type="checkbox"/>	AI3
4	0Units 0	1	200	700	5	5	0.0	1024.1	Units	Low	4	<input checked="" type="checkbox"/>	AI4
5	18.0156C 596	1	200	700	5	5	-273.0	227.0	C	High	5	<input checked="" type="checkbox"/>	LM335
6	0Units 0	1	200	700	5	5	0.0	1024.1	Units	Low/High	6	<input checked="" type="checkbox"/>	AI6
7	0Units 0	1	200	700	5	5	0.0	1024.1	Units	Acc	7	<input checked="" type="checkbox"/>	AI7

Figure 6. PortC web page

### 5.1.2. HTTP API

**Get all analog inputs levels at a time**

*http://your.ip.address/command.html?P=admin&CV0=?&CV1=?&CV2=?&CV3=?&CV4=?&CV5=?&CV6=?&CV7=?&*

**Get analog input 1 level (PortC.0)**

*http://your.ip.address/command.html?P=admin&CV0=?&*

**Get analog input 8 level (PortC.7)**

*http://your.ip.address/command.html?P=admin&CV7=?&*

### 5.1.3. TCP/IP (Virtual Serial Port)

**Get analog input 1 level (PortC.0)**

*00CV0=?;*

**Get analog input 8 level (PortC.7)**

*00CV7=?;*

### 5.1.4. Serial commands

**Get analog input 1 level (PortC.0)**

*00CV0=?;*

**Get analog input 8 level (PortC.7)**

*00CV7=?;*

### 5.1.5. Telnet

Get analog input 1 level (PortC.0)

CV0=?;

Get analog input 8 level (PortC.7)

CV7=?;

## 5.2. How to use the analog inputs

Bellow is shown schematic diagram how to use the analog inputs of the module to measure temperature from LM35DZ sensor. As it is shown on the image bellow the DAEnetIP3's analog inputs are extended to **0-10V DC** via resistor divisor (R1 and R2). So they can accept any level within this 0-10V DC voltage range.

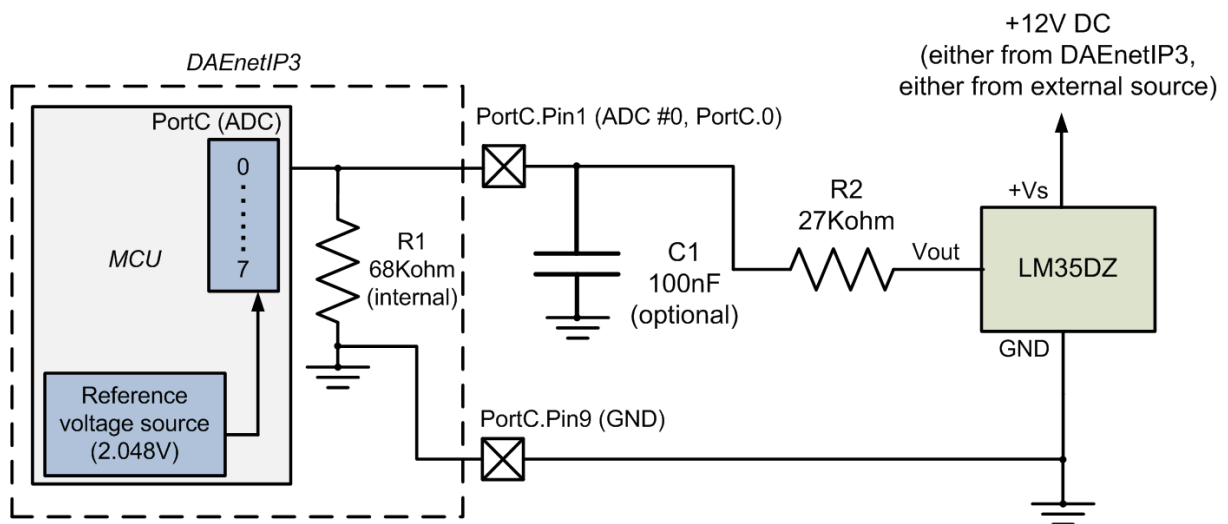


Figure 7. Using analog inputs

## 6. Power supply

- Power supply: DC 12 V / 1000 mA or DC 24V / 700mA (stabilized and filtered);
- Polarity: Center positive, the inner pin of the power supply adaptor jack must be +12VDC or +24VDC;
- DAEnetIP3 does not have reverse polarity and overvoltage protection!

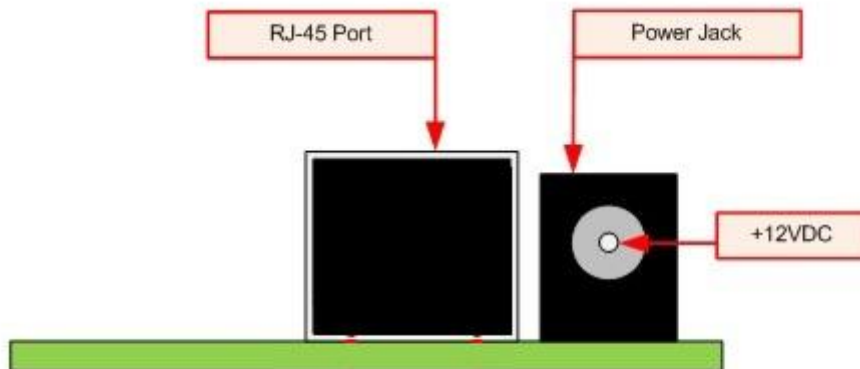


Figure 8. DAEnetIP3 power supply

## 7. Installation instructions

### 7.1. UTP cable connection with PC for first time

1. Connect the module RJ45 port with UTP (doesn't matter crossover or straight) cable.
2. Connect the PC with the other side of the UTP cable.
3. Change the IP of the PC. It may be for example 192.168.0.1. (DAEnetIP3 is shipped with 192.168.0.100)
4. Supply DAEnetIP3 with power supply 12 VDC or 24 VDC (the middle pin of DAEnetIP3 power jack is +12VDC or +24VDC). The power led (with red color) must be on.
5. Open your browser (IE, Firefox, Opera) and type 192.168.0.100 in the address bar.
6. Use **admin** for password.

### 7.2. UTP cable connection with router

1. Connect DAEnetIP3 RJ45 port with UTP (doesn't matter crossover or straight) cable.
2. Connect PC with the other side of the UTP cable.
3. Remember or write down the IP of the PC (for example we accept it is 192.168.1.2).
4. Change the IP of the PC. It may be for example 192.168.0.1. (DAEnetIP3 is shipped with 192.168.0.100).
5. Supply DAEnetIP3 with power supply 12 VDC or 24 VDC (the middle pin of DAEnetIP3 power jack is +12VDC or +24VDC). The power led (with red color) must be on.
6. Open your browser (IE, Firefox, Opera) and type 192.168.0.100 in the address bar.
7. Use **admin** for password.
8. Open admin settings.
9. Change the Eth IP address of DAEnetIP3. Make it to be in one network with your router and PC. For example if your router is with IP 192.168.1.1 and PC with 192.168.1.2, make DAEnetIP3 with 192.168.1.100. Eth mask must be 255.255.255.0 and Eth gateway 192.168.1.1 (router IP)
10. Unplug the power supply.
11. Disconnect the UTP cable from PC and connect it to the router.
12. Supply again the DAEnetIP3
13. Give back the old IP of the PC (192.168.1.2)
14. Open browser and type 192.168.1.100.
15. Now you may access the DAEnetIP3 controller with router via router from PC.



### 7.3. Wi-Fi connection with PC for first time

1. Create ad-hoc Wi-Fi network with your PC. Your OS must support this. For example Microsoft Windows 7 supports this function. We accept the name of Ad-Hoc (SSID) is **Network**, the encryption type is **WEP – 64** and the password is **admin**.
2. Make the IP of this wireless interface of your PC for example 192.168.1.1 and mask 255.255.255.0
3. Connect DAEnetIP3 RJ45 port with UTP (doesn't matter crossover or straight) cable.
4. Connect PC with the other side of the UTP cable.
5. Change the IP of LAN card of the PC. It may be for example 192.168.0.1. (DAEnetIP3 is with 192.168.0.100).
6. Supply DAEnetIP3 with power supply 12 VDC or 24 VDC (the middle pin of DAEnetIP3 power jack is +12VDC or +24VDC). The power led (with red color) must be on.
7. Open your browser (IE, Firefox, Opera) and type 192.168.0.100 in the address bar.
8. Use **admin** for password.
9. Open Wi-Fi settings.
10. Change the WIn IP address of DAEnetIP3. Make it to be in one network with your PC Ad-Hoc network. We accepted the IP of the PC Ad-Hoc is 192.168.1.1. So the WIn IP of the DAEnetIP3 Wi-Fi interface may be 192.168.1.2. WIn Mask = 255.255.255.0 and WIn gateway is 192.168.1.1.
11. Click "Save" button.
12. Unplug the power supply.
13. Remove the UTP cable from the PC and controller.
14. Supply again the DAEnetIP3.
15. The orange Wi-Fi status led of DAEnetIP3 must blink initially and then must be on constantly. This means the controller is connected to the Wireless network. If the led is off then DAEnetIP3 is not connected to the Wireless network because some settings are not correct. If so you need to check out the settings again.
16. If the DAEnetIP3 is connected properly, open browser and type 192.168.1.2.
17. Now you may access the DAEnetIP3 controller over Wi-Fi.

#### 7.4. Wi-Fi connection with router

1. Connect DAEnetIP3 RJ45 port with UTP (doesn't matter crossover or straight) cable.
2. Connect PC with the other side of the UTP cable.
3. Change the IP of LAN card of the PC. It may be for example 192.168.0.1. (DAEnetIP3 is with 192.168.0.100).
4. Supply DAEnetIP3 with power supply 12 VDC or 24 VDC (the middle pin of DAEnetIP3 power jack is +12VDC or +24VDC). The power led (with red color) must be on.
5. Open your browser (IE, Firefox, Opera) and type 192.168.0.100 in the address bar.
6. Use admin for password.
7. Open Wi-Fi settings.
8. Change the WIn IP address of DAEnetIP3. Make it to be in one network with your Wi-Fi network. We accepted the IP of the Wi-Fi network is 192.168.1.X. So the WIn IP of the DAEnetIP3 Wi-Fi interface may be 192.168.1.2. WIn Mask = 255.255.255.0 and WIn gateway is 192.168.1.1 (The IP of your router). Set the SSID and WEP password.
9. Click "Save" button.
10. Unplug the power supply.
11. Remove the UTP cable from the PC and controller.
12. Supply again the DAEnetIP3 with 12VDC or 24VDC.
13. The orange Wi-Fi status led of DAEnetIP3 must blink initially and then must be on constantly. This means the controller is connected to the Wireless network. If the led is off then DAEnetIP3 is not connected to the Wireless network because some settings are not correct. If so you need to check out the settings again. Also you may restart your router (just in case).
14. If the DAEnetIP3 is connected properly, open browser and type 192.168.1.2.
15. Now you may access the DAEnetIP3 controller over Wi-Fi.

## 8. PCB Dimensions

