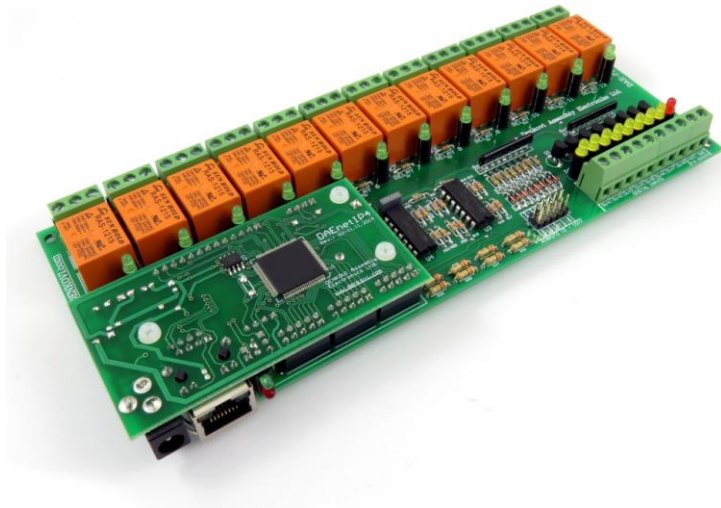


DAEnetIP4 SNMP 12 Channel I/O Relay Module

User's Manual
Date: 19 June 2018



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1. About this document

This document describes only the specific features of the device [DAenetIP4 Internet/Ethernet 12 Channel Relay Board - I/O, SNMP, Web](#). This module consist of [DAenetIP4](#) controller and extension I/O relay board which is the main object of this document. For full description of the all **DAenetIP4** features, you can refer to [DAenetIP4 user's manual](#).

2. Overview

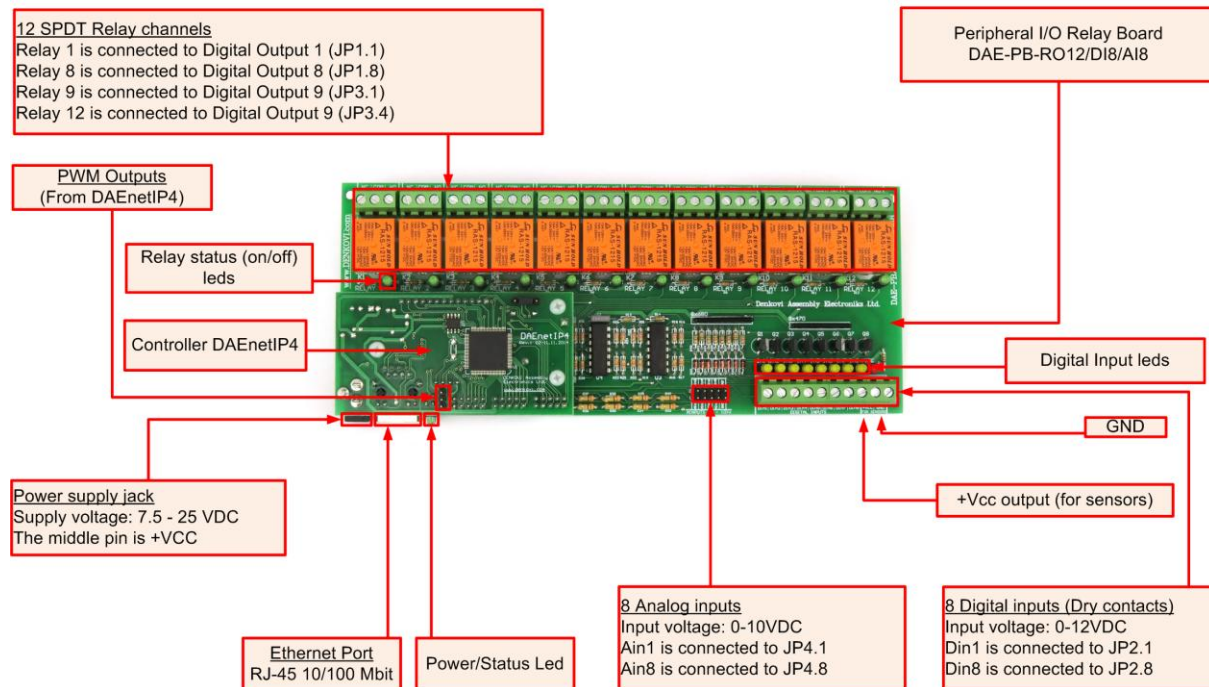


Figure 1. Module overview

Features:

- 12 x SPDT relays (NO,C,NC) - 10A / 250VAC, 15A / 120VAC, 10A / 28VDC;
- 8 x digital inputs port with schmitt trigger (0-12VDC or 0-24VDC). The inputs are combined with 16 bit cyclic counters as well;
- 8 x analog inputs (0-10VDC)
- 2 x PWM outputs (coming from DAEnetIP4)
- Led indicators for: relays, digital inputs, power on
- Sensor supply output
- Some of the above parameters can be changed by request

MPN reference (ordering codes):

- DAE-PB-RO12-12V/DI8/AI8+DAEnetIP4 (for 12V version)
- DAE-PB-RO12-24V/DI8/AI8+DAEnetIP4 (for 24V version)

3. Relay Outputs

The module provides 12 SPTD relays (NO, C, NC) and for every relay there is led indicator showing the relay state. When the led is ON, that means the relay is activated and when OFF, the relay is not activated.



Figure 2. Location of the relays

Table 1. Relays electrical characteristics

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

Table 2. Mapping to DAEnetIP4 JP1/JP3 digital output port

Digital output pin # (DAEnetIP4 JP1 and JP3)	Relay # (from peripheral board)
Digital Output #1 (JP1.1)	Relay 1
Digital Output #2 (JP1.2)	Relay 2
Digital Output #3 (JP1.3)	Relay 3
Digital Output #4 (JP1.4)	Relay 4
Digital Output #5 (JP1.5)	Relay 5
Digital Output #6 (JP1.6)	Relay 6
Digital Output #7 (JP1.7)	Relay 7
Digital Output #8 (JP1.8)	Relay 8
Digital Output #9 (JP3.1)	Relay 9
Digital Output #10 (JP3.2)	Relay 10
Digital Output #11 (JP3.3)	Relay 11
Digital Output #12 (JP3.4)	Relay 12

3.1. How to control the relays

3.1.1. Web browser

The relays states can be changed from the "Monitoring and Control" web page up on changing the dropdown combo-boxes (On/Off) in the section "Digital Outputs":

Monitoring & Control

Digital Outputs (1..8)							
Relay1	Relay2	Relay3	Relay4	Relay5	Relay6	Relay7	Relay8
Off ▾	On ▾	On ▾	On ▾	On ▾	On ▾	Off ▾	Off ▾

Digital Outputs (9..16)							
Relay9	Relay10	Relay11	Relay12	-	-	-	-
Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾

Digital Inputs							
Sensor1	Contact	Switch1	Switch2	DI5	DI6	DI7	DI8
1 (On)	0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)
0	0	0	0	0	0	0	0

Analog Inputs							
Lm35	Lm335	T_Sens3	HumSens	DSens	AI6	AI7	AI8
106	109	488	16	356	0	263	126

Figure 3. Monitoring and Control web page - digital outputs control

3.1.2. Example SNMP commands

○ **SNMP GET COMMANDS**

Get Relay 1 State

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.3.1.11.0  
DENKOVI-MIB::DigitalOutputState.0 = INTEGER: off(0)
```

Get Relay 12 State

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.3.1.11.11  
DENKOVI-MIB::DigitalOutputState.11 = INTEGER: on(1)
```

Get all relays states with single command

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.3.2.0  
DENKOVI-MIB::DigitalOutputsState.0 = INTEGER: 65535
```

○ **SNMP SET COMMANDS**

Set Relay 1 State OFF

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.3.1.11.0 i 0  
DENKOVI-MIB::DigitalOutputState.0 = INTEGER: off(0)
```

Set Relay 12 State

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.3.1.11.11 i 1  
DENKOVI-MIB::DigitalOutputState.11 = INTEGER: on(1)
```

Set all relays states with single command

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.3.2.0 i 65535  
DENKOVI-MIB::DigitalOutputsState.0 = INTEGER: 65535
```

3.2. How to use the relays

3.2.1. Controlling lamp

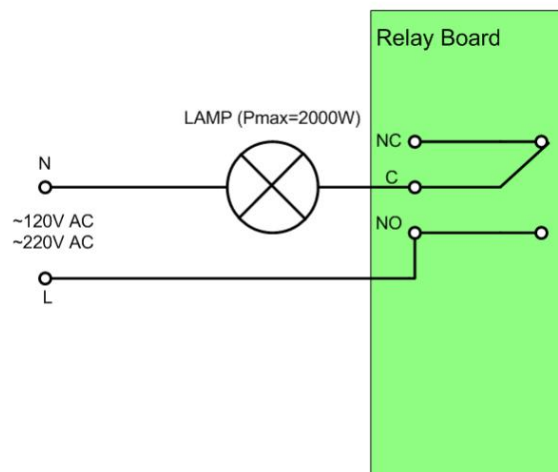


Figure 4. Controlling lamp

3.2.2. Controlling inductive load

You can read our article how to handle inductive loads for more information:
<http://denkovi.com/controlling-inductive-devices>

4. Digital Inputs (counters)

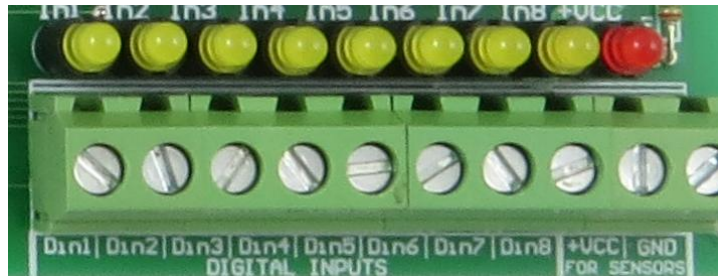


Figure 5. Location of the digital inputs

DAEnetIP4 IP controller (the core of the current module) supports 8 digital inputs every of which is combined with 16 bit cyclic counter. These inputs are extended with Schmitt triggers in this module so they are able to handle voltages from 0 up-to 30V DC. Moreover every digital input can control digital output (relay) and send traps up-on falling and/or rising edge of the input signal. For more information please refer to the **DAEnetIP4's** documentation here:

<http://denkovi.com/Documents/DAEnetIP4/Current-Version/UserManual.pdf>

Table 3. Digital inputs electrical characteristics

Type			Peripheral board
Digital inputs count			8
Nominal value of inputs	Voltage Current	VDC mA	12 5.2
Max non destructive voltage		VDC	30.0
Input switching limit values	From 0 to 1 Voltage Current From 1 to 0 Voltage Current	VDC mA VDC mA	>7.6 >3.2 <4.5 <1.8
Input impedance at state 1		kΩ	2.2
Sensor compability	2-wire 3-wire		Yes PNP No
Input type			Resistive with Schmitt trigger
Isolation	Between supply and inputs Between inputs		No No
Protection	Against reverse polarity		Yes

Table 4. Mapping to **DAEnetIP4** JP2 digital inputs (counters) port

Digital input pin # (DAEnetIP4 JP2)	Digital Input # (peripheral board)
Digital Input #1 (JP2.1)	Din1
Digital Input #2 (JP2.2)	Din2
Digital Input #3 (JP2.3)	Din3
Digital Input #4 (JP2.4)	Din4
Digital Input #5 (JP2.5)	Din5
Digital Input #6 (JP2.6)	Din6
Digital Input #7 (JP2.7)	Din7

Digital Input #8 (JP2.8)	Din8
--------------------------	------

4.1. How to read the digital inputs (counters)

4.1.1. Web browser

The inputs states and counter values can be monitored from the "Monitoring and Control" web page and they are located in the section "Digital Inputs".

Monitoring & Control

Digital Outputs (1..8)							
Relay1	Relay2	Relay3	Relay4	Relay5	Relay6	Relay7	Relay8
Off ▾	Off ▾	Off ▾	On ▾	On ▾	On ▾	Off ▾	Off ▾

Digital Outputs (9..16)							
Relay9	Relay10	Relay11	Relay12	-	-	-	-
Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾

Digital Inputs							
Sensor1	Contact	Switch1	Switch2	DI5	DI6	DI7	DI8
0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)	1 (On)	0 (Off)	0 (Off)
1	0	0	0	0	27	0	0

Analog Inputs							
Lm35	Lm335	T_Sens3	HumSens	DSens	AI6	AI7	AI8
107	109	488	16	357	0	263	126

Figure 6. Monitoring and Control web page - digital inputs/counters monitoring

4.1.2. Example SNMP commands

Get Din1 Value
 snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.1.1.7.0
 DENKOVI-MIB::DigitalInputState.0 = INTEGER: off(0)

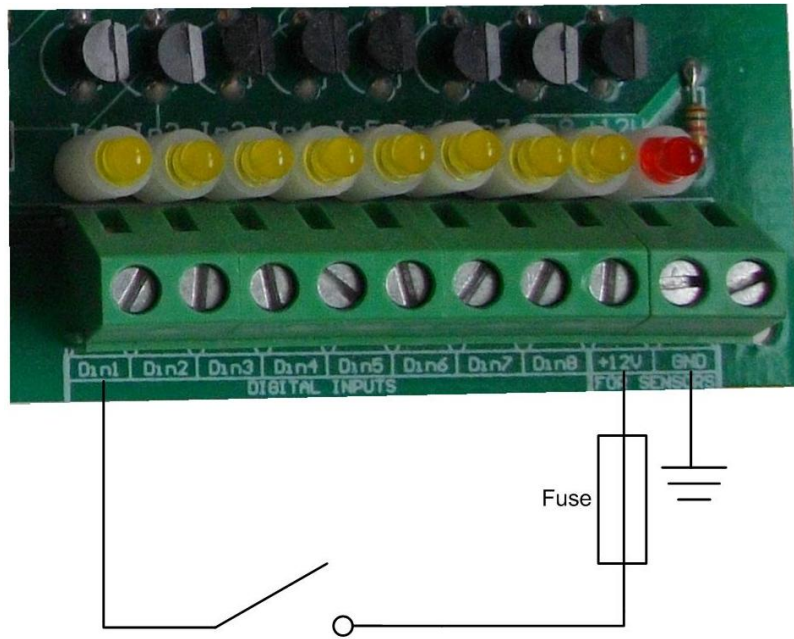
Get Counter1 Value
 snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.1.1.7.0
 DENKOVI-MIB:: DigitalInputCounter.0 = INTEGER: 12345

Get Din8 Value
 snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.1.1.3.0
 DENKOVI-MIB::DigitalInputState.0 = INTEGER: on(1)

Get Counter8 Value
 snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.1.1.7.7
 DENKOVI-MIB:: DigitalInputCounter.7 = INTEGER: 12345

Get all digital inputs values with single command
 snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.3.1.7
 DENKOVI-MIB::DigitalInputsState.0 = INTEGER: 255

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 7. How to use digital inputs

5. Analog Inputs

The analog inputs are extended to 0-10V DC. Currently there is 270K resistor connected in sequence of the ADC, so the resistor divisor is calibrated to work in the 0-10V DC range.

💡 The input voltage range of 0-10V DC can be changed up-on request.

💡 The resistors used for building the module are +-5%. The ADC of the **DAEnetIP4** also have some tolerance, so additional software calibration may be necessary.

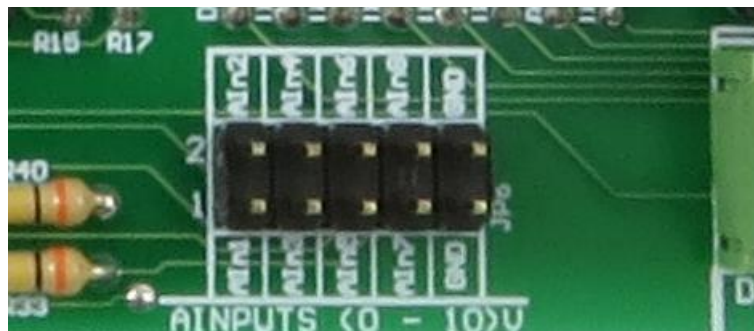


Figure 8. Location of the analog inputs port

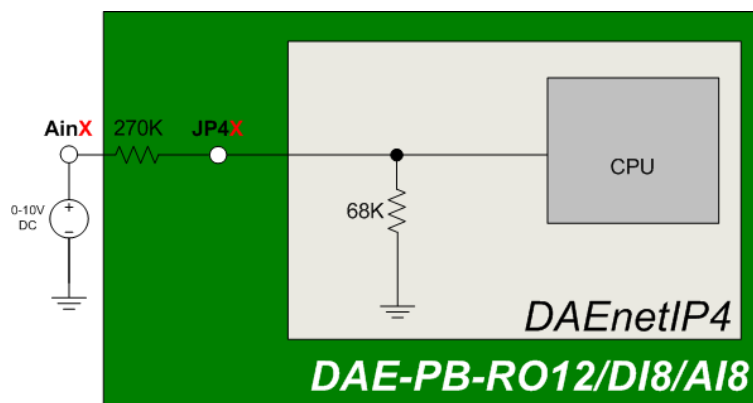


Figure 9. Analog inputs extension schematic

Table 5. Analog inputs electrical characteristics

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

Table 6. Mapping to DAEnetIP4 JP4 analog input port

Analog input pin # (DAEnetIP4 JP4)	Analog Input # (peripheral board)
Analog Input #1 (JP4.1)	Ain1
Analog Input #1 (JP4.2)	Ain2
Analog Input #1 (JP4.3)	Ain3
Analog Input #1 (JP4.4)	Ain4
Analog Input #1 (JP4.5)	Ain5
Analog Input #1 (JP4.6)	Ain6
Analog Input #1 (JP4.7)	Ain7
Analog Input #1 (JP4.8)	Ain8

5.1. How to read the analog inputs

The analog inputs values can be monitored from the "Monitoring and Control" web page and they are located in the section "Analog Inputs".

5.1.1. Web browser

Monitoring & Control

Digital Outputs (1..8)							
Relay1	Relay2	Relay3	Relay4	Relay5	Relay6	Relay7	Relay8
Off ▾	Off ▾	Off ▾	On ▾	On ▾	On ▾	Off ▾	Off ▾

Digital Outputs (9..16)							
Relay9	Relay10	Relay11	Relay12	-	-	-	-
Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾	Off ▾

Digital Inputs							
Sensor1	Contact	Switch1	Switch2	DI5	DI6	DI7	DI8
0 (Off)	0 (Off)	0 (Off)	0 (Off)	0 (Off)	1 (On)	0 (Off)	0 (Off)
1	0	0	0	0	27	0	0

Analog Inputs							
Lm35	Lm335	T_Sens3	HumSens	DSens	AI6	AI7	AI8
106	109	488	16	356	0	263	126

Figure 10. Monitoring and Control web page - Analog Inputs monitoring

5.1.2. Example SNMP commands

Get Ain1 Level

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.2.1.6.0
DENKOVI-MIB::AnalogInputValue.0 = INTEGER: 107
```

Get Ain8 Level

```
snmpget -v1 -c read 192.168.1.100 .1.3.6.1.4.1.42505.1.2.2.1.6.7
DENKOVI-MIB::AnalogInputValue.7 = INTEGER: 555
```

6. PWM Outputs

The PWM outputs are those from **DAEnetIP4**. For more information please refer to the **DAEnetIP4** documentation:

<http://denkovi.com/Documents/DAEnetIP4/Current-Version/UserManual.pdf>

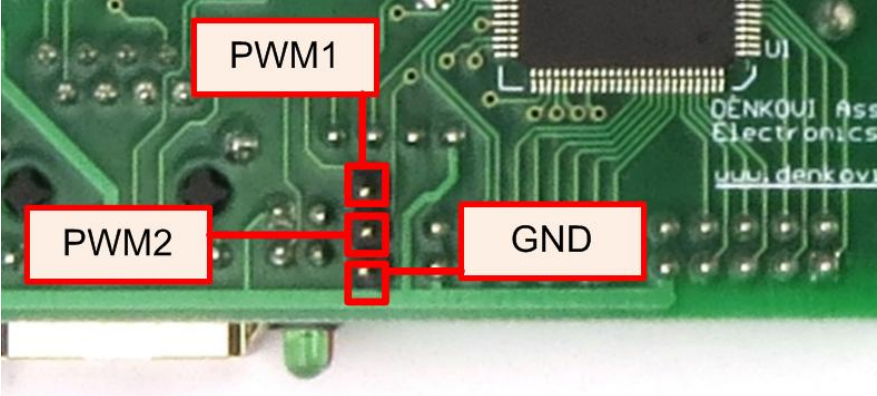


Figure 11. PWM outputs location

7. Installation

7.1. Connect

- This device must be installed by qualified personnel;
- This device must not be installed directly outdoors;
- Installation consists of mounting the device, connecting to an IP network, connecting the I/O, providing power and configuring via a web browser.

7.2. Power supply requirements

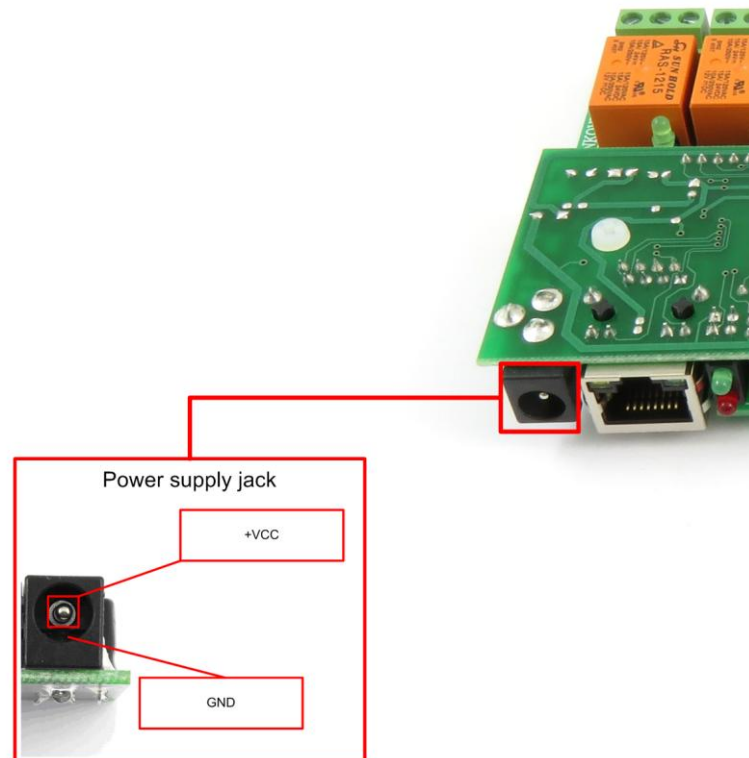


Figure 12. Location of **DAEnetIP4 12 Relay Module** power jack

The whole module has the following current consumption:

- **400mA** at 24V DC (and all relays are ON)
- **700mA** at 12V DC (and all relays are ON)

It is recommended the supply source for **DAEnetIP4 12 Relay Module** to be with the following parameters:

- Supply voltage: 7.5V - 25V DC;
- Current: minimum 700mA;
- It must be stabilized and filtered;
- Type: center positive (the inner pin of the power supply adaptor jack must be +VCC).



Figure 13. How the power supply cable must look like

Additionally, you can check if the supply adaptor has this sign:

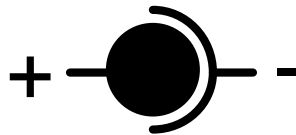


Figure 14. The power supply must be marked with this sign

- ❗ **DAEnetIP4 12 Relay Module** has protection against reverse polarity which is actually diode in parallel of the supply jack but it is still **not recommended** to reverse the voltage polarity!
- ❗ **DAEnetIP4 12 Relay Module** does not accept AC supply voltage. It is highly recommended to check the power supply source parameters before turning on the module.
- ❗ The power supply equipment shall be resistant to short circuit and overload in secondary circuit.
- ❗ When in use, do not place the equipment so that it is difficult to disconnect the device from the power supply.

7.3. Network connection

DAEnetIP4 12 Relay Module supports AUTO-MDIX so either "crossover" or "straight-through" network cable can be used.



Figure 15. UTP Cable



Figure 16. Connecting **DAEnetIP4 12 Relay Module** to a computer directly (recommended initial connection)

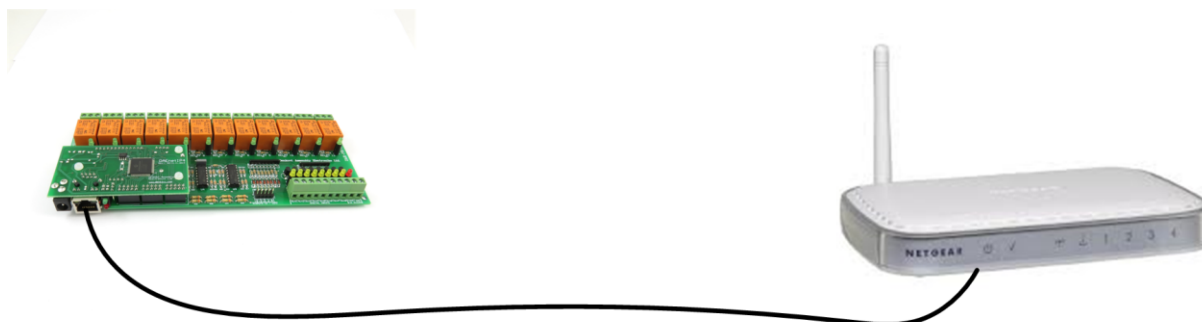


Figure 17. Connecting **DAEnetIP4 12 Relay Module** to a wireless router.

7.4. Communication setup

DAEnetIP4 is shipped with the following default parameters:

- IP address: **192.168.1.100**
- Subnet mask: **255.255.255.0**
- Gateway: **192.168.1.1**
- Web password: **admin**

Initially it is recommended to connect the module directly to the computer.

Next you have to change your PC's IP address.

💡 You can Google how to change you computer IP settings or just visit this web page: <http://www.howtochangeipaddress.com/changeip.php>

For Windows 7 OS for example you can do that in the following way:
Navigate to *Control Panel -> Network and Internet -> View network and status tasks -> Change adapter settings*

Then just select the local area connection with right click and select *Properties*:

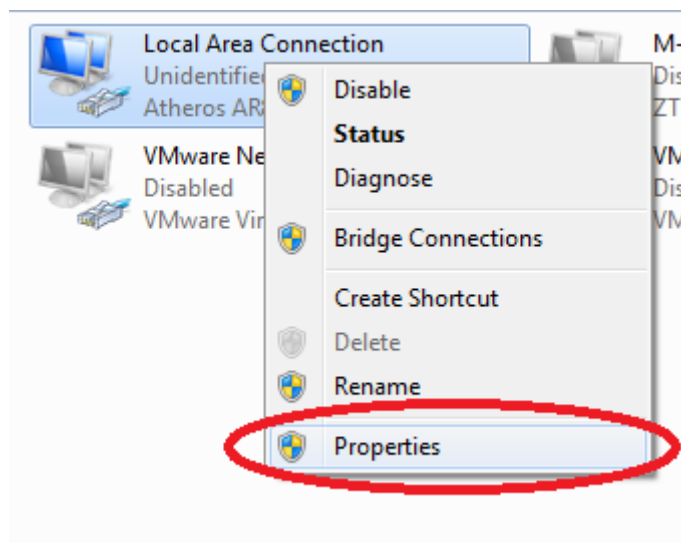


Figure 18. LAN card properties

The next step is to enter into IPv4 properties.

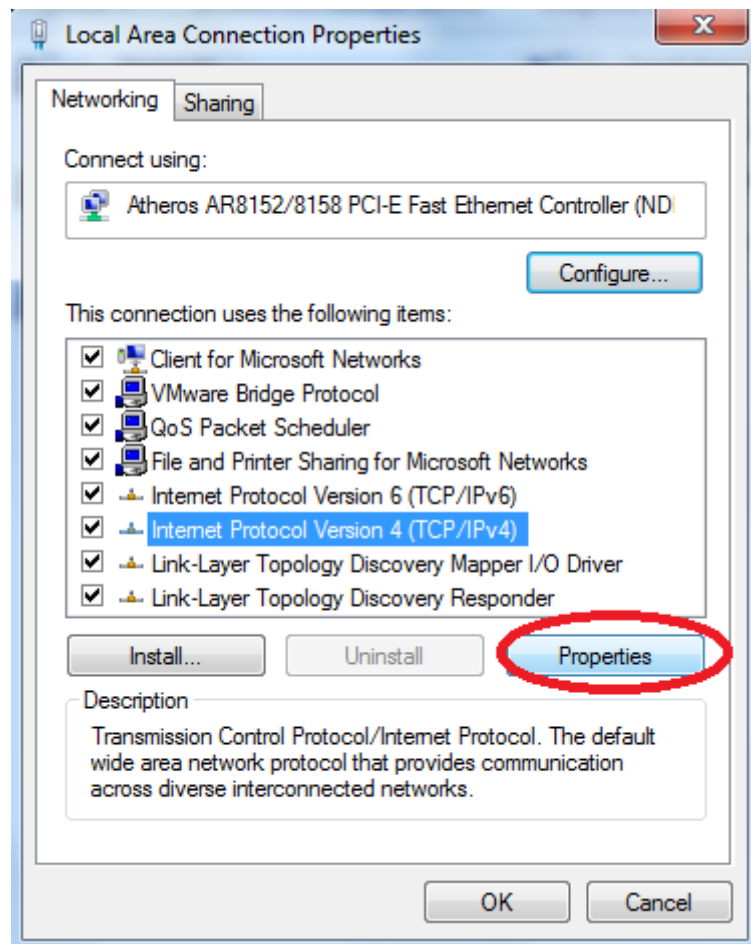


Figure 19. Enter in IPv4 properties section

Set the IP address of your PC to be in the same network.

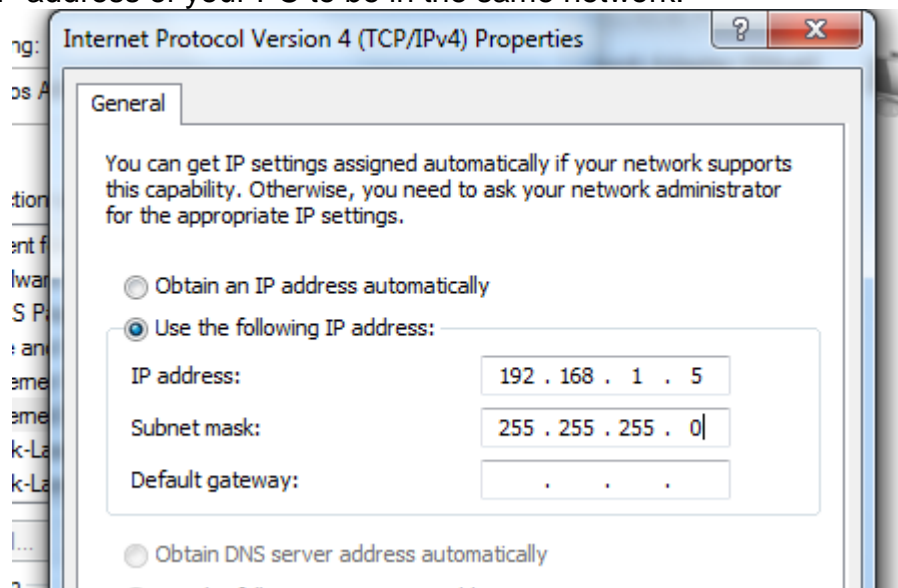


Figure 20. Set the IP address

Finally, in order to access **DAenetIP4 12 Relay Module** just type in your browser 192.168.1.100

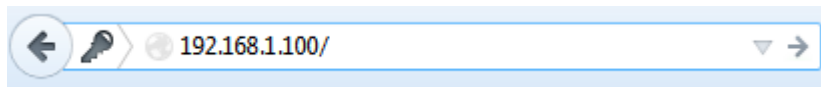
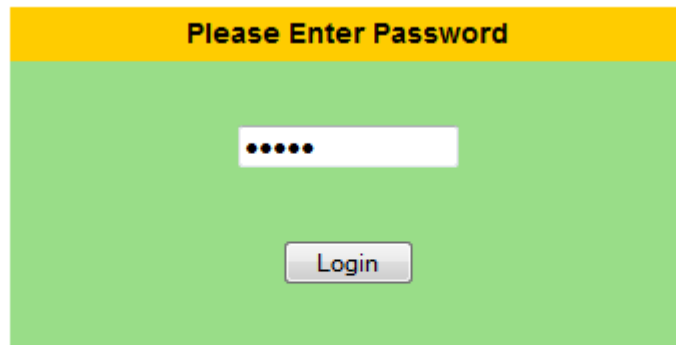



Figure 21. Open the device via browser

If the network settings are O’K, the log-in page should appear:



Logged out

Figure 22. Login page

 **DAenetIP4** modules connected locally can be easily scanned and found via the tool [Denkovi Finder](#) as well.

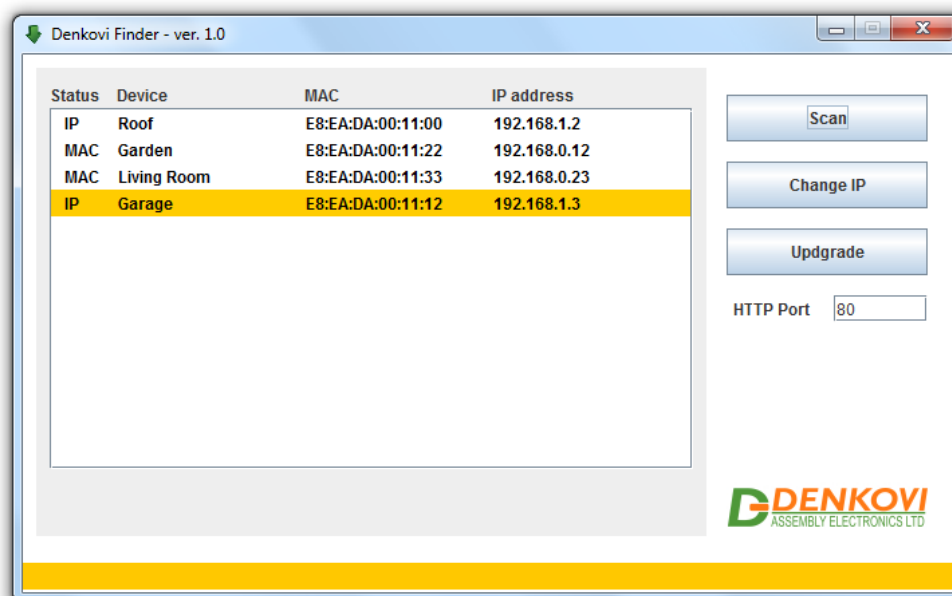


Figure 23. Denkovi Finder

8. Loading the default (factory) settings

When necessary, the factory (default settings) may be applied so the **DAEnetIP4** parameters will be loaded back.

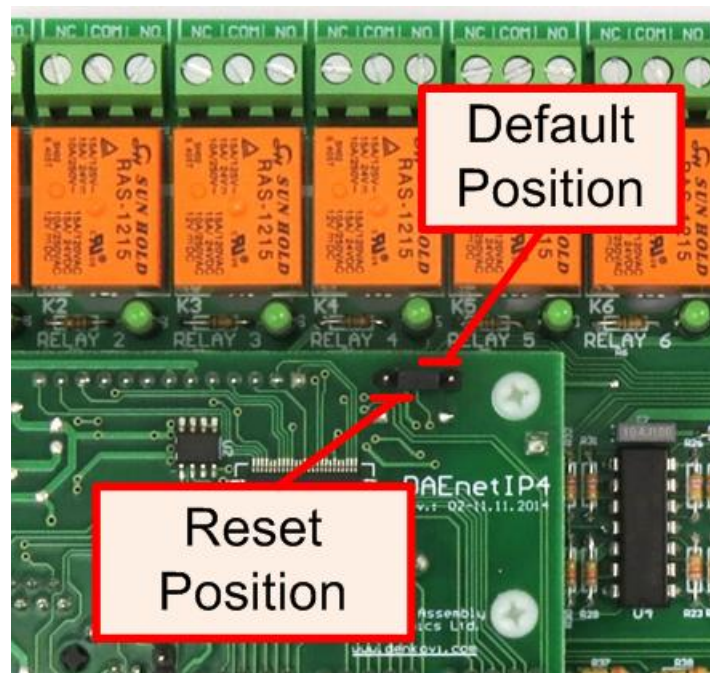


Figure 24. System port JP5

When **DAEnetIP4** is shipped from the factory, the jumper is placed on JP5 pins 2 and 3.

1. Turn off the power supply of the device;
2. Move the jumper to the **Default Position** (between pin 1 and 2);
3. Turn on the power supply of the device;
4. Wait until the status led become ON (approximately 10 sec);
5. Remove the jumper from the **Default Position**;
6. Turn off the power supply of the device;
7. Move back the jumper to the middle position (between pin 2 and 3);
8. The module is configured with default settings.

9. Restart the module

The module may be restarted via one of the ways described bellow:

- Unplug the power supply, wait 10 seconds and plug it again;
- Move the jumper to **Reset Position** (Figure 24), wait 10 seconds and then get it back to it's old position. This option is most suitable when the controller is embedded in larger system and the JP5 jumper must be extended with buttons or switches.

10. PCB dimensions

