DAEnetIP2 v2

Web enabled IP Controller

*User Manual
Date: 21 Apr 2020*

Content

1. Features

    DAEnetIP2 v2 is a multifunctional Ethernet device (IP controller) for management and control. It could be used for industrial and home automation, access control, fire and security systems or embedding in other systems. It is also suitable for controlling relay boards and tracking different sensors via internet.

    DAEnetIP2 v2 is the newer and improved version of the popular DAEnetIP2.

- 10/100 Mb Ethernet interface with Link/Activity Led
- Auto-MDIX
- Power supply 7.5 - 25VDC
- Low power consumption (<50mA/12V)
- 8 analog inputs with 10 bit resolution (0-3.3VDC) (no pull-up or pull-down resistors)
- 16 (2x8) bit configurable digital I/O port (0-3.3VDC)
- Standard protocols: ARP, IP, ICMP (ping), DHCP
- Supports snmp v1 (snmpset, snmpget, snmptrap), HTTP (web server with authorization)
- Configurable ports numbers for SNMP (161) and HTTP (80)
- Two MAC addresses configurable for access protection
- Configuration via SNMP requests or web browser
- Integrated WEB server for all functions/parameters access
- Reset of the digital outputs on incoming/outgoing ping timeout
- Function "load outputs states from EEPROM on boot"
- Each I/O line can be named by user via web browser
- It can send traps according analog ADC level
- An analog inputs may be referred to control one digital output according its input level
- Working temperature range: 0ºC to 70ºC

2. Technical parameters

Table 2.1. Technical parameters

Parameter	Value
Size	43x55mm
Power supply voltage	7.5 - 25VDC
CPU power supply (output level 3.3VDC)	3.3V
Digital I/O count	2x8
Analog inputs count	8 (10bit ADC, Vref=3.3V)
Digital inputs count [1]	8
Default settings jumper	Yes
LED (Link, Activity, Power On, Status)	Yes
Save I/O states	Yes
DHCP	Yes
Network parameters	IP/Mask/Default gateway
MAC lock (protection)	Yes
SNMPv1	Yes (snmpget, snmpset)
Read-Write Community String	Yes
Read-Only Community String	Yes
SNMP traps	Yes
SNMP I/O access commands	Yes
Web server for configuration/access	Yes

1) These digital inputs are the analog inputs, but the input voltage is software converted to 1 or 0

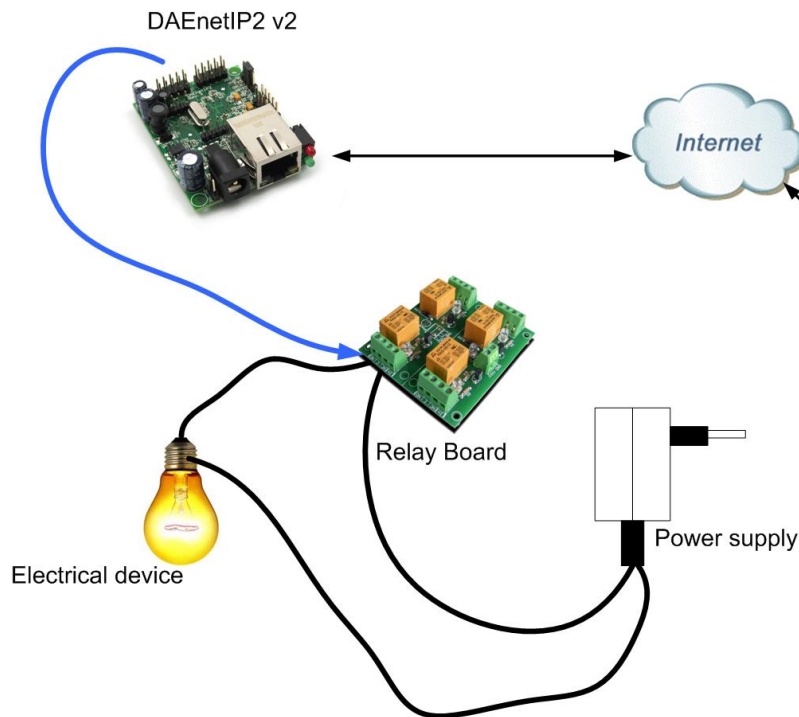# 3. Application examples

3.1. Remote control

Figure 3.1. Example 1

3.2. Data acquisition
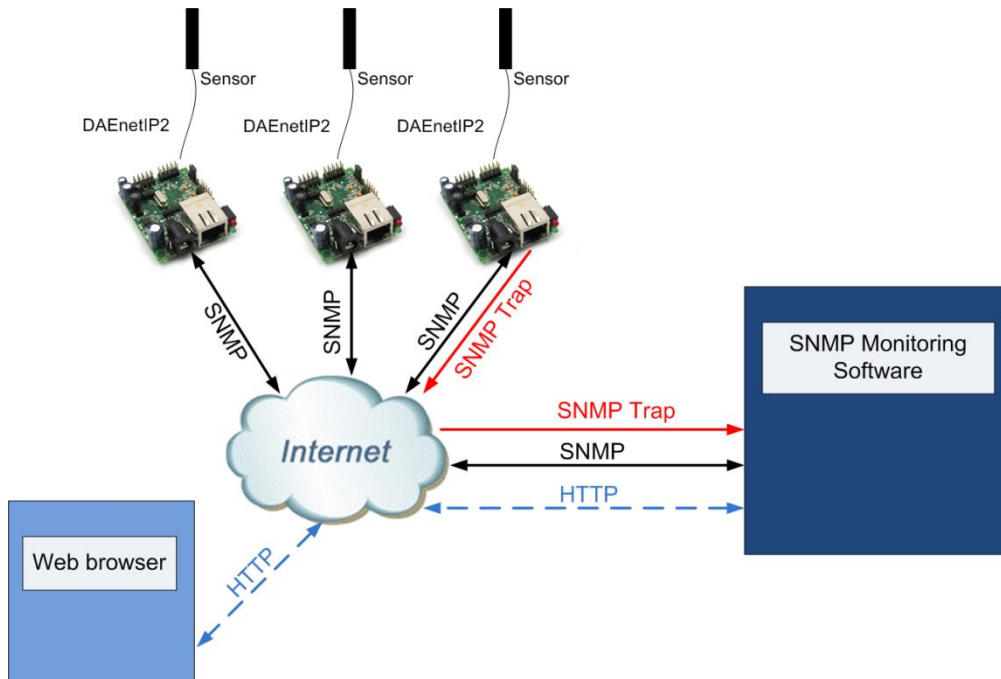
Figure 3.2. Example 2

3.3. Watchdog function

Monitored equipment

Send or receive ping over some interval (timeout)

The monitored equipment is reset

Check if the monitored equipment is "alive". If it is not – send reset signal.
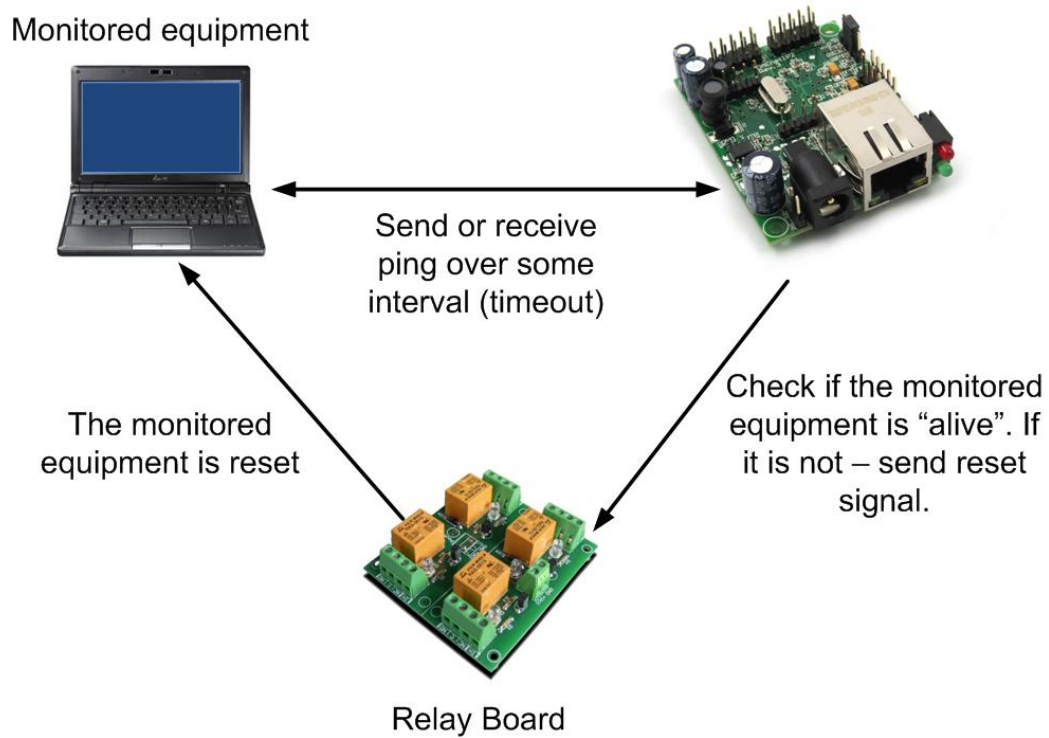
Relay Board

Figure 3.3. Example 3

4. Default settings

4.1. Table with default settings

These are the default (factory) settings of **DAEnetIP2 v2**. When you buy the module, you will receive it with these settings. If not, you can load the default settings (see **point 4.2**).

Table 4.1. Default settings

Parameter (according Web pages)	Value
DHCP	Disabled
IP	192.168.1.100
Mask	255.255.255.0
Gateway	192.168.1.1
Access MAC 1,2	000000000000
SNMP access to IP	Enabled
SNMP listen UDP port	161
SNMP Read-only community string	000000000000
SNMP RW community string	private
SNMP/Web Access network IP	192.168.1.1
SNMP/Web Access network Mask	0.0.0.0 (disabled)
Ping Timeout	6
Restart on incoming ping timeout	Disabled
Restart on remote IP timeout	Disabled
Remote monitor IP	192.168.1.1
I/O ports settings	P3,P5 - Outputs
Pull-up for inputs	Enabled
Reset I/O ports on restart	Disabled
Digital filter for ADC	Enabled
Web Server	Enabled
Web Server TCP port	80
SNMP traps target host	192.168.1.1
SNMP traps community	public
Low/High Analog Trap Threshold	0/1023 (disabled)
Analog Events – Low, High, Acc	None
Web user/password	admin/admin

4.2. Steps for loading default settings

In case the access of the module is lost, factory (default settings) may be applied and the module parameters will be returned back as those in **point 4.1** from the current document.
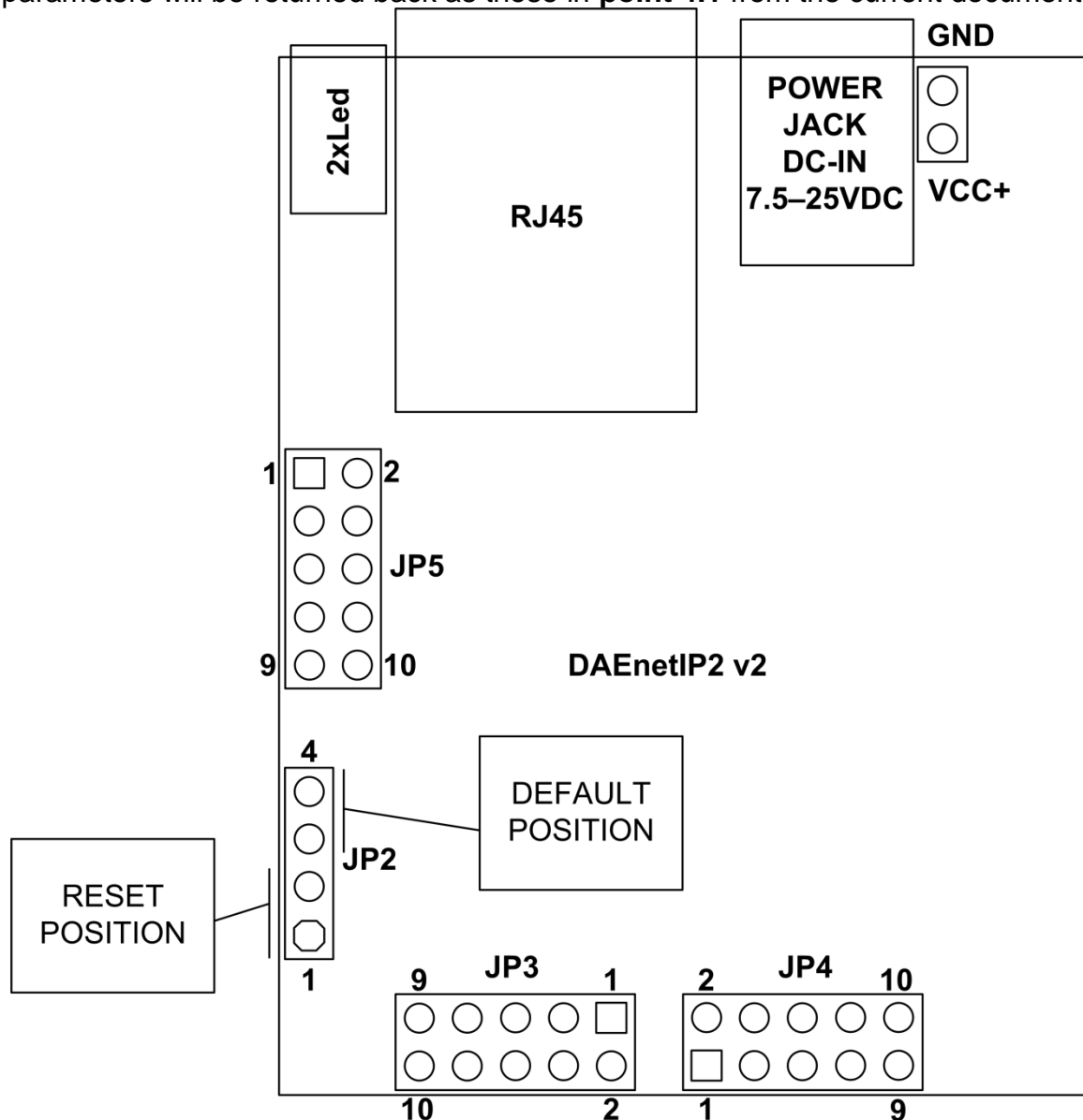

Figure 4.1. Loading default settings

1. Turn off the power supply of the device;
2. Move the jumper to the **DEFAULT** position (between pin 3 and 4 of JP2);
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 of JP2);
   The module is configured with default settings.
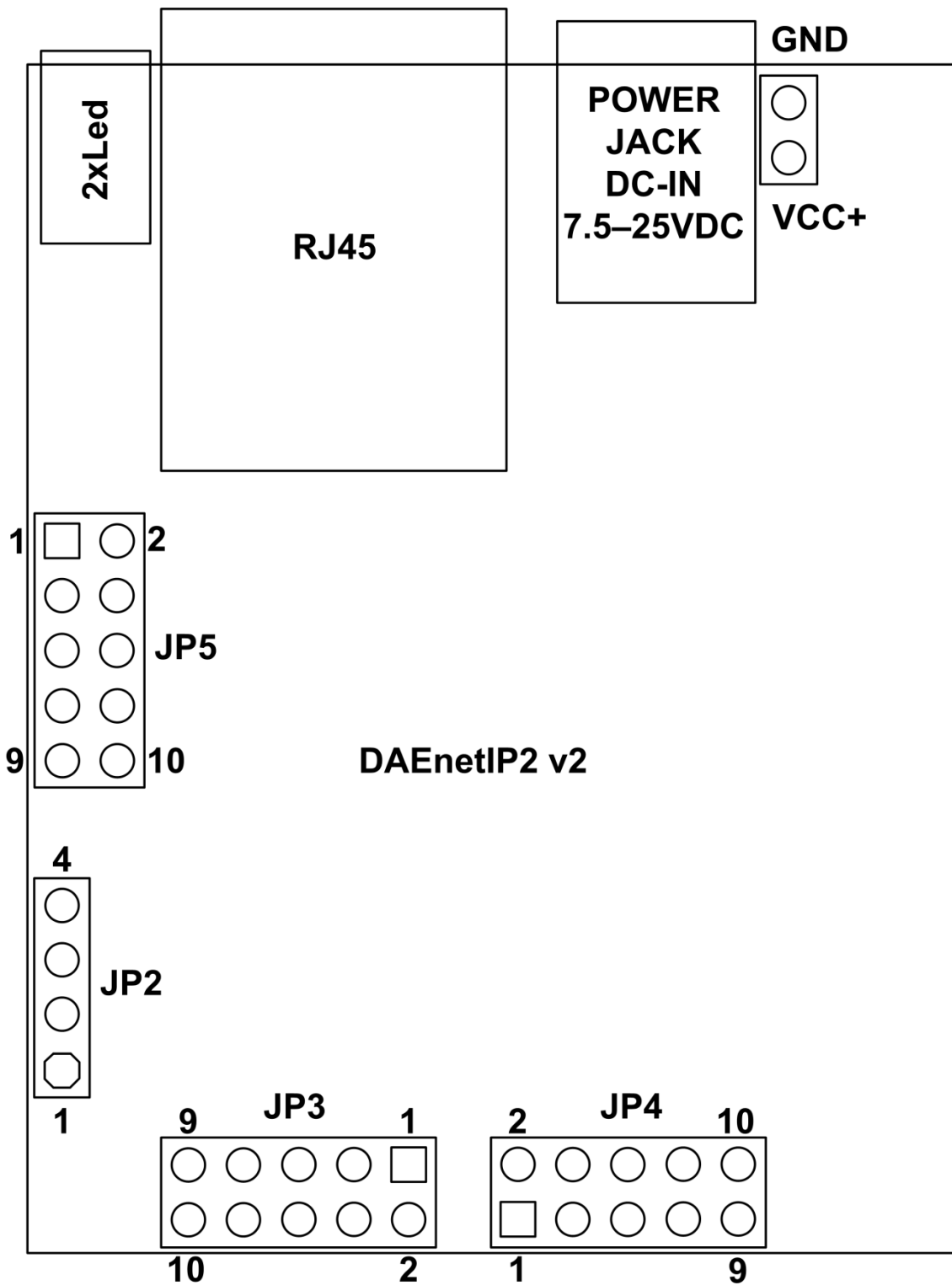
5. Connectors and ports

5.1.   DAEnetIP2 v2 ports

Figure 5.1. DAEnetIP2 v2 ports

5.2. DAEnetIP2 v2 ports description

Table 5.1. I/O Ports

Pin N	Bit	Func	Dir	Bit	Func	Dir	Bit	Func	Dir
	Port JP3 (P3) **digital outputs**			**Port JP4 (P5)** **digital outputs**			**Port JP5 (P6)** **(digital/analog inputs)**		
1	1	Free	I/O	1	Free	I/O	1	Free	Ain
2	2	Free	I/O	2	Free	I/O	2	Free	Ain
3	3	Free	I/O	3	Free	I/O	3	Free	Ain
4	4	Free	I/O	4	Free	I/O	4	Free	Ain
5	5	Free	I/O	5	Free	I/O	5	Free	Ain
6	6	Free	I/O	6	Free	I/O	6	Free	Ain
7	7	Free	I/O	7	Free	I/O	7	Free	Ain
8	8	Free	I/O	8	Free	I/O	8	Free	Ain
9	-	GND	PWR	-	+3.3V	PWR	-	+3.3V(Vref)	PWR
10	-	GND	PWR	-	GND	PWR	-	GND	PWR

Legend:

o "Free" – the pin is free to be used by user.
o "XXXXXX" - the pin is reserved for special function – cannot be accessed.
o "In" – the pin is digital input
o "Out" – the pin is digital output
o "I/O" – the pin is digital input or output depending the settings
o "Ain" – analog input

6. Web access

Figure 6.1. Web access

To access the setup pages, run a web browser (Internet Explorer, Mozilla Firefox or similar), and enter the **DAEnetIP2 v2** IP address, for example: http://192.168.1.100
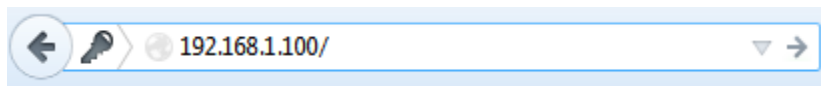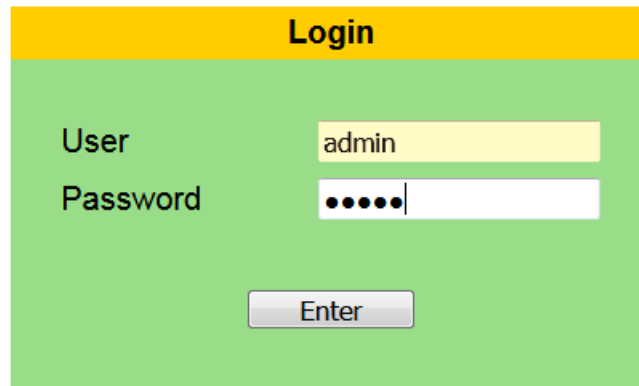

Figure 6.2. Open via browser

Note: You will need to have *JavaScript* enabled in your browser.

6.1. Login

Figure 6.3. Login page

   Enter the password and click "Login" button. This will bring you to the **DAEnetIP2 v2** main configuration page which contains details for the current firmware version and build date and provides buttons and links to obtain further details.

Note: The default username and password are *admin / admin* (passwords are case sensitive).

Note: When the password is entered, it is transmitted across the network in encrypted form, so eavesdropping on the data transmission will not reveal the username and password.

Note: In order to prevent setup/control conflicts, at any given moment, only one user can be logged in.

Note: If there is no data traffic between the Web-browser and the **DAEnetIP2 v2** for time, specified by *Session Timeout* parameter, the session "times out" and a new login is required.

6.2. Menu

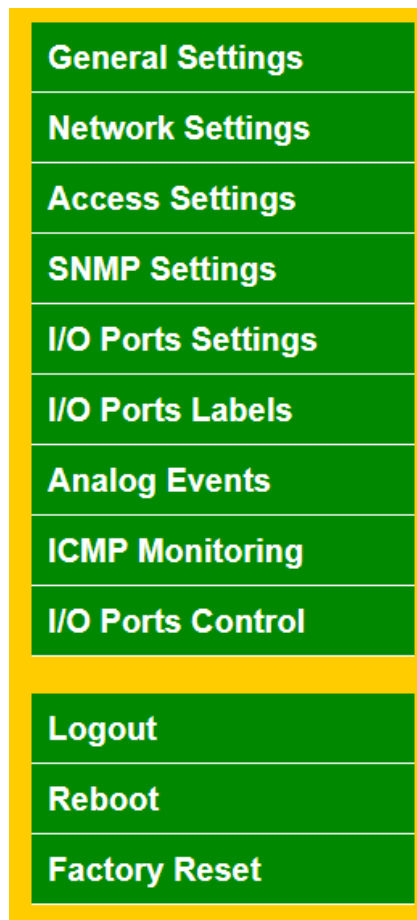The main menu consists of the following items, located in the left window frame:

Figure 6.4. Navigation Menu

6.3. General Settings

Figure 6.5. General Settings

- **Inputs Pull-ups -** enable pull-up resistors for P3/P5 ports when they are configured as digital inputs;

SNMP: cfgPortPullUps.0

- **Save Outputs -** when checked, each time the relays state is changed, it will be saved in non-volatile memory (EEPROM), so after reboot/restart it will be restored;

> ⚠️ *This option should be used with care in dynamic systems because of restriction in maximum write cycles of the EEPROM (usually 100 000 write/erase cycles).*

- **Digital Inputs Filter, ms** – digital inputs filter constant. The range is from 0 up to 200 ms. The filter is disabled when its value is set to 0;

> 💡 *This parameter sets a low pass software filter that removes the short-term fluctuations from the input signal and reduces the effect of occasional spikes. Note that the higher filter constants give a slower response to changes.*

- **Analog Inputs Filter, sec** – analog inputs filter constant. The range is from 0 up to 30 sec. The filter is disabled when its value is set to 0;

> 💡 *This parameter sets a low pass software filter that removes the short-term fluctuations from the input signal and reduces the effect of occasional spikes. Note that the higher filter constants give a slower response to changes.*

6.4. Network Settings

Network Settings

Network Settings	
MAC Address	E8:EA:DA:00:3C:C3
Enable DHCP	☐
IP Address	192.168.1.65
Gateway	192.168.1.1
Subnet Mask	255.255.255.0

Save   Reload

Figure 6.6. Network Settings

This menu lets you configure the network settings of **DAEnetIP2 v2** module:
- **MAC Address -** the MAC address of the module;
- **Enable DHCP -** This option allows DHCP to be enabled or disabled. If DHCP is set to Enabled, the Network page must be saved and **DAEnetIP2 v2** must be rebooted before obtaining an IP address;

SNMP: Change its bit in cfgNewMode.0

- **IP address -** This is the IP address of the **DAEnetIP2 v2**. It needs to be manually assigned only if DHCP is disabled. With DHCP enabled, this field displays the currently assigned address;
- **Gateway -** This specifies the IP address of the gateway router;
- **Subnet Mask -** This is the subnet mask for the network on which the **DAEnetIP2 v2** is installed.

SNMP: cfgIP.0, cfgNetMask.0, cfgDefGW.0

⊙ *You have to reboot the device for these settings to apply.*

6.5. Access Settings

Figure 6.7. HTTP & XML/JSON Access

These settings let you configure the Web and SNMP access parameters of **DAEnetIP2 v2:**
- **Web Server** - enable/disable the web server. If the server is disabled, then it can be enabled again either via SNMP either via factory settings loading;
- **Web Server Port -** port that the Web server listens for HTTP requests (default port is 80). The port must be 80 or in the range from 1025 up to 65535;
- **Session Timeout, min -** specifies the timeout period for HTTP sessions in minutes (1..99);
- **User Name -** the username used for web login authentication (max 12 symbols);
- **Password -** the password used for web login authentication (max 12 symbols);
- **Access MAC Address 1/2 - DAEnetIP2 v2** has MAC protection. This means that if it is enabled it can be accessed from one/two MAC addresses. To disable the MAC protection, the MAC Address 1/2 must be 000000000000;

SNMP: cfgMACLock1.0, cfgMACLock2.0

💡 *When using MAC filtering please note that while accessing from external networks to the **DAEnetIP2 v2** module arrive packets with MAC address of the Default Gateway. In this way it must be always one of the both protected MAC addresses.*

- **Network IP -** this field can be used to restrict the SNMP access by specifying the IP address of the remote client;
- **Network Mask -** this field can be used to restrict the SNMP access by specifying the Network mask of the remote client.

💡 *MAC Access protection is with higher priority than SNMP/Web access protection.*

🔴 *You have to reboot the device for these settings to apply.*

🔴 *It is highly recommended to log out from the web server after finishing the parameters setup.*

💡 *If you don't want to restrict the SNMP access by IP address, set the **Access Mask** to 0.0.0.0.*

💡 *If you don't want to restrict the access by MAC address, set the MAC **Address 1/2** to 00:00:00:00:00:00.*

💡 *Setting the **Access Mask** to 255.255.255.255 allows the SNMP access only from the exactly specified **Access IP Address**.*

💡 *You can allow the SNMP access to a range of IP addresses by setting an appropriate value for **Access Mask**. For example setting the **Access IP Address** to 192.168.1.0 and **Access Mask** to 255.255.255.0 allows the access from IP addresses in range from 192.168.1.0 to 192.168.1.255.*

6.6. SNMP Settings

Figure 6.8. SNMP Settings

6.6.1. SNMP Agent

These settings let you configure the SNMPv1 (Simple Network Management Protocol) (Version 1) access to the **DAEnetIP2 v2:**

- **Agent Port** - UDP port number the SNMP agent receives requests on (default port is 161). The port must be 161 or in the range from 1025 up to 65535;

SNMP: Change of cfgSNMPport.0

- **Read-only Community** - community string for client's authentication, used in read operations (max 12 symbols);

SNMP: cfgReadOnlyPassword.0

- **Read-write Community** - community string for client's authentication, used in read/write operations (max 12 symbols);

SNMP: cfgReadOnlyPassword.0

- **Access to IP Configuration** - if disabled, there is an access only to the I/O ports of the module;

SNMP: Change its bit in cfgMode.0

6.6.2. SNMP Traps

- **Trap Receiver IP Address** - the IP address of the trap server;
- **Trap Receiver Port** - determines the UDP port the trap message will be sent to;
- **Trap Community** - the trap community.

🔴 *You have to reboot the device for these settings to apply.*

💡 *The controller generates traps each 2-3 seconds when it is in alarm zone. This is because the SNMP trap is UDP based message and the receiving is not guaranteed.*

6.7. I/O Ports Settings

DAEnetIP2 v2 has 8+8 digital I/O (P3/P5) and 8 analog inputs (P6). The analog inputs may be used also for digital inputs (software conversion).

Figure 6.9. I/O Settings

When Input is selected, that means this pin is an input, otherwise it is configured as output.

SNMP: Change its bit in cfgP3Dir.0, cfgP5Dir.0 (1=Out, 0=In)

6.8.   I/O Ports Labels

I/O Ports Labels

Port 3 (I/O)		Port 5 (I/O)		Port 6 (ADC)	
1	P3.1	1	P5.1	1	ADC.1
2	P3.2	2	P5.2	2	ADC.2
3	P3.3	3	P5.3	3	ADC.3
4	P3.4	4	P5.4	4	ADC.4
5	P3.5	5	P5.5	5	ADC.5
6	P3.6	6	P5.6	6	ADC.6
7	P3.7	7	P5.7	7	ADC.7
8	P3.8	8	P5.8	8	ADC.8

Save   Reload

Figure 6.10. I/O Ports Labels

Identification string (max 7 chars) for all the I/O ports.

6.9. Analog Events

Analog Events

Analog Input	Low Threshold	High Threshold	P5 Set at			
			LOW	HIGH	REG	INV
Input 1	< 0	> 1023	☐	☐	☐	☐
Input 2	< 0	> 1023	☐	☐	☐	☐
Input 3	< 0	> 1023	☐	☐	☐	☐
Input 4	< 0	> 1023	☐	☐	☐	☐
Input 5	< 0	> 1023	☐	☐	☐	☐
Input 6	< 0	> 1023	☐	☐	☐	☐
Input 7	< 0	> 1023	☐	☐	☐	☐
Input 8	< 0	> 1023	☐	☐	☐	☐

Save   Reload

Figure 6.11. Analog Events

SNMP traps can be generated from Analog inputs if its level crosses the given limits. If the limits are 0 and 1023 then there will not be any traps from this input. The message gives information from which input is this trap and what is the input level value. If several events are generated, **DAEnetIP2 v2** sends their traps in order they have been generated. The controller generates traps each 2-3 seconds when it is in alarm zone. This is because the SNMP trap is UDP based message and the receiving is not guaranteed.

- **Mode "LOW"** - the output will become "1" if the input level is less than Low Threshold and sets the previous state when the input level is over Low Threshold;
- **Mode "HIGH"** - the output will be set if the input level is higher than High Threshold;
- **Mode "LOW/HIGH"** - the output will be set if the input level is out of the range with High and Low Threshold;
- **Mode "REG"** - the output will be set if the input level is less than Low Threshold and will be in old state after input level is over High Threshold. This function does not affect to SNMP traps but the same threshold values are used for sending SNMP traps.
- **Mode "INV"** - it reverse the signal level which is generated to P5 (if the regular was to set in "1" during INV it will be "0". For example if temperature sensor is used - this option allows to be done automatic switch ON of load when the temperature is higher than the threshold HIGH (and switch OFF when the temperature is lower than the threshold LOW). And it is possible the opposite (without "INV") it is possible heating during low temperatures (for instance antennas) - the output is ON when level is lower than LOW and OFF when the level is higher than HIGH.

SNMP: Changing the value in respective bit of aevPinX.0. The possible values are: None, Low, High, LowHigh, Acc

6.10. ICMP Monitoring

   DAEnetIP2 v2 supports two-way (incoming/outgoing) mode for monitoring via receiving/sending ICMP echo request and ICMP echo reply packets. With this function, the **DAEnetIP2 v2** module can be used as a device for active monitoring of networks and networks devices. The **DAEnetIP2 v2** module performs also restart pulse if there is not answer.

ICMP Monitoring

ICMP Monitoring Settings		
Incoming ICMP Monitoring	Enabled ▾	
Outgoing ICMP Monitoring	Disabled ▾	
Timeout, min	6	
Remote IP to Ping	172.16.100.1	Test
Max. Consecutive Restarts	255	0 restart(s) so far
Restart Settings		
Restart External Device	Disabled ▾	
Restart Pulse Width, sec	15	
Port P5 Restart Pins	**8 7 6 5 4 3 2 1** ☐ ☐ ☐ ☑ ☐ ☐ ☐ ☑	
Reset I/O Ports on Restart	Enabled ▾	

Save   Reload

Figure 6.12. ICMP Monitoring

6.10.1.   ICMP Monitoring Settings

- **Incoming ICMP Monitoring** - when the incoming ICMP monitoring mode is enabled, the **DAEnetIP2 v2** module expects ping in the given timeout;

SNMP: Changing its bit in cfgMode.0

> ⚠️ *If there is very big traffic in the network, it is possible the incoming ping to be not received. That is why it must be sent 5-10 ping requests.*

- **Outgoing ICMP Monitoring** - during outgoing monitoring the **DAEnetIP2 v2** module generates ping to the given IP address and expects answer within the given timeframe;

SNMP: cfgMonitorIP.0

- **Remote IP to Ping** - remote IP address to monitor via ICMP echo requests;

SNMP: Changing its bit in cfgNewMode.0

- **Max. Consecutive Restarts** - number of consecutive resets to perform when ping timeout is active. Value 255 disables counting (unlimited);

SNMP: cfgResetCount.0

6.10.2. ICMP Monitoring Settings

- **Timeout, min** - the time (in minutes) since last ping request to reboot system and target. The both ICMP modes use this shared parameter however they have separate timers;

SNMP: cfgPingTime.0 (in minutes)

- **Restart External Device** - global flag for enable/disable the two ICMP modes. Does not affect to the manual restart;

SNMP: Changing its bit in cfgMode.0

- **Restart Pulse Width, sec** - defines the time of the RST pulse in seconds

SNMP: cfgResetPulse.0

- **Port P5 Restart Pins** - bit mask to select some of P5 pins as external device restart pins. Pins must be outputs in cfgP5Dir;

SNMP: cfgP5DupRST.0

- **Reset I/O Ports on Restart** - if this option is enabled **DAEnetIP2 v2** will set in logical "0" all the outputs P3 and P5;

SNMP: Change its bit in cfgNewMode.0

6.11. I/O Ports

I/O Ports Control

Port 3 (I/O)		
1	P3.1	☐
2	P3.2	☐
3	P3.3	☐
4	P3.4	☐
5	P3.5	☐
6	P3.6	☐
7	P3.7	☐
8	P3.8	☐

Port 5 (I/O)		
1	P5.1	☐
2	P5.2	☐
3	P5.3	☐
4	P5.4	☐
5	P5.5	☐
6	P5.6	☐
7	P5.7	☐
8	P5.8	☐

Port 6 (ADC)		
1	ADC.1	40 / 0.129V L
2	ADC.2	0 / 0.000V L
3	ADC.3	34 / 0.110V L
4	ADC.4	475 / 1.532V L
5	ADC.5	475 / 1.532V L
6	ADC.6	0 / 0.000V L
7	ADC.7	0 / 0.000V L
8	ADC.8	0 / 0.000V L

Force External Device Restart

Figure 6.13. I/O Ports Control

P3 and P5 are configurable digital I/O port (0-3.3VDC). It is possible to be configured by the user for its own purposes - digital inputs or outputs.

P6 is an 8-channel 10-bit analog input port.

7. Digital outputs setting priorities

DAEnetIP2 v2 digital outputs can be controlled in the following ways:
- Manual (via SNMP, web browser)
- Using two ICMP monitoring modes
- Analog events

The ICMP monitoring modes have the highest priority. If there is a manual setting request, it will be ignored. If there is analog events setting request, it will be ignored.

The next priority level are the analog events. If there is a manual setting request, it will be ignored as well (but the output will toggle for very small period of time - milliseconds).

The smaller priority has the manual setting control.

8. HTTP API

   DAEnetIP2 v2 i/o lines can be controlled/accessed via HTTP API commands and basic access authentication is required to do that.

8.1.   Control the digital outputs P3/P5

http://admin:admin@device.ip.address/iochange.cgi?ref=re-io&01=00&02=FF

- **admin:admin** - the username:password
- **device.ip.address** - the **DAEnetIP2 v2** IP address (by default it is 192.168.1.100)
- **01=00** - the state of P3 DO
- **02=FF** - the state of P5 DO

For example:

http://admin:admin@192.168.1.100/iochange.cgi?ref=re-io&01=00&02=FF

8.2.   Retrieve the P3/P5/P6 i/o status

http://admin:admin@device.ip.address/ioreg.js

it will be received javascript file with several variables and one of them is:

var IO=new Array (0xFF, 0xFF, 0x80, 0x00AB, 0x0049, 0x0118, 0x014A, 0x012F, 0x003E, 0x0029, 0x01DD)

Bytes 0 and 1 are the digital I/O states (in hex format)

Bytes 3...10 are the analog inputs values (in hex format)

For example:

http://admin:admin@192.168.1.100/ioreg.js

9. SNMP access

    DAEnetIP2 v2 supports SNMPv1 protocol – snmpget and snmpset. It may be configured/read all the parameters via these commands. Read-only community string is used for reading and Read-Write Community String is used for changing the parameters. Note that it is not possible using of snmpwalk. Parameters that can be changed are grouped according to their functions in the tables below. To obtain a valid OID number it is necessary to replace the "x" symbol with the prefix ".1.3.6.1.4.1.42505". Also all the snmp commands are described in the [MIB](#) file**.** All the functions can be accessed via SNMP and WEB

> ❗ *During SNMP access, it must be used snmpget and snmpset only to one OID and not to group of OIDs. Other commands (snmpwalk for instance) are not supported.*

> 💡 *Because of the specific of the SNMP protocol supported by **DAEnetIP2 v2** (it is not possible to access several OIDs), the initial setting of IP/MASK/Gateway must be done via Web. Otherwise, the **DAEnetIP2 v2** module may become not reachable, because of the limitation of only one OID accessing per a time via snmp.*

9.1. Configuration settings

Table 9.1. Configuration settings

OID	Name	Access	Description	Syntax
x.9.1.1.0	cfgIP	read-write	IP Address of **DAEnetIP2 v2** module	IpAddress
x.9.1.2.0	cfgMAC	read-only	MAC address of **DAEnetIP2 v2** module	PhysAddress
x.9.1.4.0	cfgPassword	read-write	Read-Write community string (password)	OCTET STRING (SIZE (4..12))
x.9.1.5.0	cfgMACLock1	read-write	MAC address of first remote machine allowed to access **DAEnetIP2 v2** module	PhysAddress
x.9.1.6.0	cfgMACLock2	read-write	MAC address of second remote machine allowed to access **DAEnetIP2 v2** module	PhysAddress
x.9.1.7.0	cfgPingTime	read-write	The time (in minutes) since last ping request to reboot system and target	INTEGER(0..255)
x.9.1.8.0	cfgVersion	read-only	Firmware version, LSB=VER_MINOR, MSB=VER_MAJOR	INTEGER(0..65535)
x.9.1.9.0	cfgMode	read-write	Contains different bit flags for **DAEnetIP2 v2** operating modes: SNMP_access_to_IP_configuration _BIT0	INTEGER(0..255)

			Restart_on_incoming_ping_timeout _BIT4 Restart_TargetRST _BIT6 Disable_Digital_filter_for _ADC _BIT7	
x.9.1.10.0	cfgReset	read-only	Read of this OID causes rest of **DAEnetIP2 v2** module	INTEGER
x.9.1.11.0	cfgNewMode	read-write	Contains additional bit flags for **DAEnetIP2 v2** operating modes Save_outputs_at_reboot _BIT0 Reset_IO_ports_on_ping_restart _BIT2 DHCP_client _BIT4 Restart_on_remote_IP_timeout _BIT5 Web_server_enable _BIT6	INTEGER(0..255)
x.9.1.12.0	cfgResetPulse	read-write	Defines the time ot the RST pulse, seconds	INTEGER(0..32767)
x.9.1.13.0	cfgResetCount	read-write	Number of consecutive resets to perform when ping timeout is active. Value 255 disables counting.	INTEGER(0..255)
x.9.1.14.0	cfgDefGW	read-write	IP Address of Default Gateway	IpAddress
x.9.1.15.0	cfgNetMask	read-write	IP Network Subnet Mask	IpAddress
x.9.1.16.0	cfgMonitorIP	read-write	Remote IP address to monitor via ICMP echo requests	IpAddress
x.9.1.17.0	cfgReadOnlyPassword	read-write	Read-only community string (password)	OCTET STRING (SIZE (4..12))
x.9.1.18.0	cfgTrapServerIP	read-write	Remote IP address of TRAP manager	IpAddress
x.9.1.19.0	cfgTrapPassword	read-write	Community string for trap messages	OCTET STRING (SIZE (4..12))
x.9.1.20.0	cfgAccessIP	read-write	IP address of network class allowed to access **DAEnetIP2 v2**	IpAddress
x.9.1.21.0	cfgAccessMask	read-write	Mask of network class allowed to access **DAEnetIP2 v2**	IpAddress
x.9.1.22.0	cfgHTTPport	read-write	(fw>=4.094) Defines	

			listen port for Web server. Allowed values 80 and >1024	INTEGER(0..65535)
x.9.1.23.0	cfgSNMPport	read-write	(fw>=4.094) Defines listen port for SNMP server. Allowed values 161 and >1024	INTEGER(0..65535)
x.9.1.25.0	cfgP3Dir	read-write	Bit mask with direction of P3 pins. 1-Output, 0-Input	INTEGER(0..255)
x.9.1.26.0	cfgP5Dir	read-write	Bit mask with direction of P5 pins. 1-Output, 0-Input	INTEGER(0..255)
x.9.1.27.0	cfgPortPullUps	read-write	Disable/Enable pull-ups for P3 and P5 I/O pins. 0-Disable, 1-Enable	INTEGER(0..1)
x.9.1.29.0	cfgP5DupRST	read-write	Bit mask showing on which P5 pins to duplicate TargetRST signal. Pins must be outputs in cfgP5Dir. Available from v.4.097	INTEGER(0..255)
x.9.1.30.0	cfgDefault	read-only	Reading this OID will load factory default settings of **DAEnetIP2 v2**and restart **DAEnetIP2 v2**.	INTEGER
x.9.1.31.0	cfgDigitalInputsFilter	read-write	Digital Inputs Filter (0..200), ms. Value 0 disables the filter.	INTEGER (0..200)
x.9.1.32.0	cfgAnalogInputsFilter	read-write	Analog Inputs Filter (0..30), sec. Value 0 disables the filter.	INTEGER (0..30)

9.2. Analog traps

Table 9.2. Analog traps

OID	Name	Access	Description	Syntax
x.9.1.122.1.0	atrPin1Low	read-write	Pin low threshold	INTEGER(0..1023)
x.9.1.122.2.0	atrPin1High	read-write	Pin high threshold	INTEGER(0..1023)
x.9.1.122.3.0	atrPin2Low	read-write	Pin low threshold	INTEGER(0..1023)
x.9.1.122.4.0	atrPin2High	read-write	Pin high threshold	INTEGER(0..1023)
x.9.1.122.5.0	atrPin3Low	read-write	Pin low threshold	INTEGER(0..1023)
x.9.1.122.6.0	atrPin3High	read-write	Pin high threshold	INTEGER(0..1023)
x.9.1.122.7.0	atrPin4Low	read-write	Pin low threshold	INTEGER(0..1023)
x.9.1.122.8.0	atrPin4High	read-write	Pin high threshold	INTEGER(0..1023)
x.9.1.122.9.0	atrPin5Low	read-write	Pin low threshold	INTEGER(0..1023)

x.9.1.122.10.0	atrPin5High	read-write	Pin high threshold	INTEGER(0..1023)
x.9.1.122.11.0	atrPin6Low	read-write	Pin low threshold	INTEGER(0..1023)
x.9.1.122.12.0	atrPin6High	read-write	Pin high threshold	INTEGER(0..1023)
x.9.1.122.13.0	atrPin7Low	read-write	Pin low threshold	INTEGER(0..1023)
x.9.1.122.14.0	atrPin7High	read-write	Pin high threshold	INTEGER(0..1023)
x.9.1.122.15.0	atrPin8Low	read-write	Pin low threshold	INTEGER(0..1023)
x.9.1.122.16.0	atrPin8High	read-write	Pin high threshold	INTEGER(0..1023)

9.3. Anolog-to-P5 Events

Table 9.3. Analog-to-P5 Events

OID	Name	Access	Description	Syntax
x.9.1.121.1.0	aevPin1	read-write	Defines reaction on respective P5 output pin when voltage is compared to thresholds	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }
x.9.1.121.2.0	aevPin2	read-write	Defines reaction on respective P5 output pin when voltage is compared to thresholds	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }
x.9.1.121.3.0	aevPin3	read-write	Defines reaction on respective P5 output pin when voltage is compared to thresholds	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }
x.9.1.121.4.0	aevPin4	read-write	Defines reaction on respective P5 output pin when voltage is compared to thresholds	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }
x.9.1.121.5.0	aevPin5	read-write	Defines reaction on respective P5 output pin when voltage is compared to thresholds	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }
x.9.1.121.6.0	aevPin6	read-write	Defines reaction on respective P5 output pin when voltage is compared to thresholds	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }
x.9.1.121.7.0	aevPin7	read-write	Defines reaction on respective P5 output pin when voltage is compared to thresholds	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }
x.9.1.121.8.0	aevPin8	read-write	Defines reaction on respective P5 output	INTEGER { None(0), Low(1), High(2), LowHigh(3), Acc(4) }

			pin when voltage is compared to thresholds	
x.9.1.121.9.0	aevPin1Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.9.1.121.10.0	aevPin2Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.9.1.121.11.0	aevPin3Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.9.1.121.12.0	aevPin4Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.9.1.121.13.0	aevPin5Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.9.1.121.14.0	aevPin6Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.9.1.121.15.0	aevPin7Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.9.1.121.16.0	aevPin8Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }

9.4. Control port P3 (Digital outputs)

Table 9.4. Control port P3

OID	Name	Access	Description	Syntax
x.9.2.1.1.0	pctrlP3pin1	read-write	Port3 pin1 data	INTEGER { High(1), Low(0) }
x.9.2.1.2.0	pctrlP3pin2	read-write	Port3 pin2 data	INTEGER { High(1), Low(0) }
x.9.2.1.3.0	pctrlP3pin3	read-write	Port3 pin3 data	INTEGER { High(1), Low(0) }
x.9.2.1.4.0	pctrlP3pin4	read-write	Port3 pin4 data	INTEGER { High(1), Low(0) }
x.9.2.1.5.0	pctrlP3pin5	read-write	Port3 pin5 data	INTEGER { High(1), Low(0) }
x.9.2.1.6.0	pctrlP3pin6	read-write	Port3 pin6 data	INTEGER { High(1), Low(0) }
x.9.2.1.7.0	pctrlP3pin7	read-write	Port3 pin7 data	INTEGER { High(1), Low(0) }
x.9.2.1.8.0	pctrlP3pin8	read-write	Port3 pin8 data	INTEGER { High(1), Low(0) }
x.9.2.1.33.0	pctrlP3byte	read-write	I/O port data as single	INTEGER(0..255)

			byte	

9.5.   Control port P5 (Digital outputs)

Table 9.5. Control port P5

OID	Name	Access	Description	Syntax
x.9.2.2.1.0	pctrlP5pin1	read-write	Port5 pin1 data	INTEGER { High(1), Low(0) }
x.9.2.2.2.0	pctrlP5pin2	read-write	Port5 pin2 data	INTEGER { High(1), Low(0) }
x.9.2.2.3.0	pctrlP5pin3	read-write	Port5 pin3 data	INTEGER { High(1), Low(0) }
x.9.2.2.4.0	pctrlP5pin4	read-write	Port5 pin4 data	INTEGER { High(1), Low(0) }
x.9.2.2.5.0	pctrlP5pin5	read-write	Port5 pin5 data	INTEGER { High(1), Low(0) }
x.9.2.2.6.0	pctrlP5pin6	read-write	Port5 pin6 data	INTEGER { High(1), Low(0) }
x.9.2.2.7.0	pctrlP5pin7	read-write	Port5 pin7 data	INTEGER { High(1), Low(0) }
x.9.2.2.8.0	pctrlP5pin8	read-write	Port5 pin8 data	INTEGER { High(1), Low(0) }
x.9.2.2.33.0	pctrlP5byte	read-write	I/O port data as single byte	INTEGER(0..255)

9.6.   Returned values are from 10bit Analog to Digital Converter

Table 9.6. Returned values from ADC

OID	Name	Access	Description	Syntax
x.9.2.3.1.0	pctrlP6pin1	read-only	ADC Channel 1	INTEGER(0..1023)
x.9.2.3.2.0	pctrlP6pin2	read-only	ADC Channel 2	INTEGER(0..1023)
x.9.2.3.3.0	pctrlP6pin3	read-only	ADC Channel 3	INTEGER(0..1023)
x.9.2.3.4.0	pctrlP6pin4	read-only	ADC Channel 4	INTEGER(0..1023)
x.9.2.3.5.0	pctrlP6pin5	read-only	ADC Channel 5	INTEGER(0..1023)
x.9.2.3.6.0	pctrlP6pin6	read-only	ADC Channel 6	INTEGER(0..1023)
x.9.2.3.7.0	pctrlP6pin7	read-only	ADC Channel 7	INTEGER(0..1023)
x.9.2.3.8.0	pctrlP6pin8	read-only	ADC Channel 8	INTEGER(0..1023)

10. Appendix 1. Power supply

The minimal power supply is **7.5VDC**. The maximum voltage is **25VDC**. The optimal voltage is **12VDC**

The voltage polarity is tip "center positive"!

The device does not protection against reverse polarity voltage!

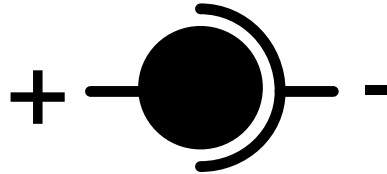Other supply voltages than described may damage the device!

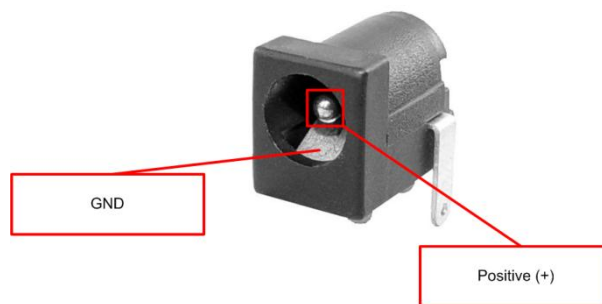
Figure 10.1. Power supply polarity

Figure 10.2. DAEnetIP2 v2 power supply jack

11. Appendix 2. DAEnetIP2 v2 installation

Note these steps are for power on only **DAEnetIP2 v2**. For installation **DAEnetIP2 v2** + relay board (kit), first you must do the steps from **Appendix 3** and then do the steps from **point 11.1** or **point 11.2**.

11.1. Connect DAEnetIP2 v2 to computer for first time

- Connect the **DAEnetIP2 v2** device with your computer via **UTP crossover cable**. (note that the device does not support AUTO MDIX)
- Supply with voltage in the allowed range. For example - 12VDC stabilized filtered power source.
- Your initial computer IP should be in the device network. So it may be 192.168.1.2. Change it.
- Open web browser and type 192.168.1.100 – default username/password are "admin"/"admin"
- Now you can access all the parameters via your web browser
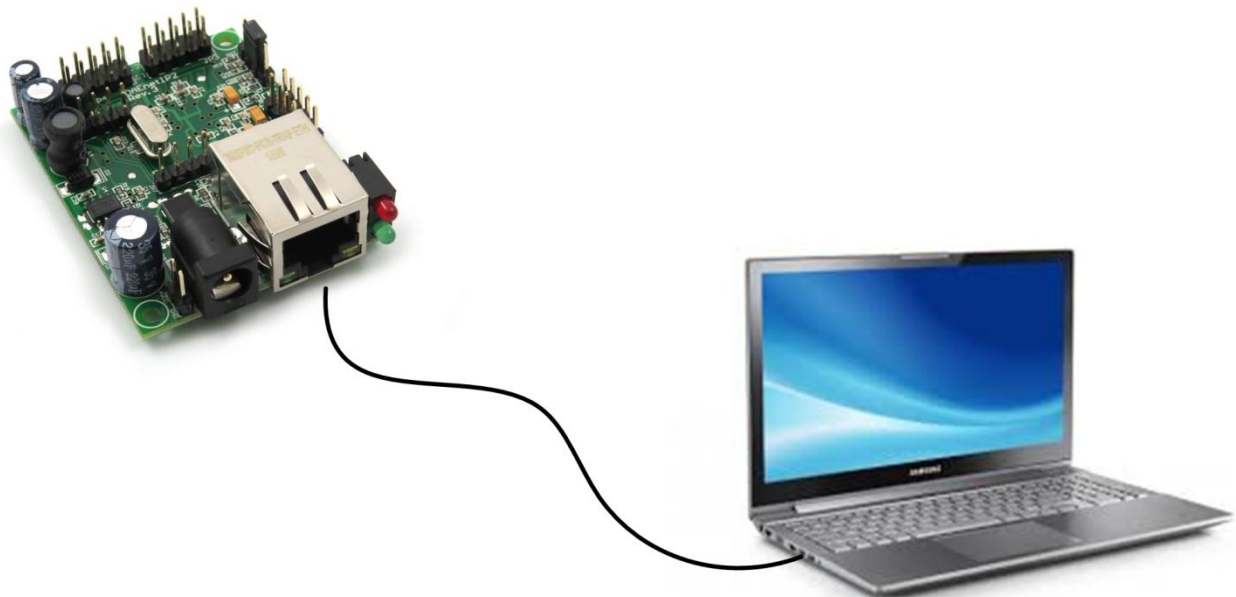
Figure 11.1. DAEnetIP2 v2 connected directly to computer

11.2. Connect DAEnetIP2 v2 to router

1. Do all the steps from **point 11.1**
2. Adjust the network parameters from *Setup page*:
   2.1. IP - must be in same network as your router. (For example if router IP is 192.168.1.1, **DAEnetIP2 v2** IP may be 192.168.1.2)
   2.2. Mask
   2.3. Gateway - usually this is the IP of your router
3. Click submit and wait about 5 seconds
4. Power off the device
5. Now you may disconnect the UTP crossover cable from the **DAEnetIP2 v2** and your computer
6. Connect the **DAEnetIP2 v2** module and the network router with **UTP straight cable**.
7. Adjust the IP of your computer to be again in the router network
8. Open the web browser and enter the new IP of the module.

Figure 11.2. DAEnetIP2 v2 connected to router

12. Appendix 3. Install and power on DAEnetIP2 v2 + denkovi relay board (kit)

DAEnetIP2 v2 can be used successfully in combination with relay boards. Bellow are given instructions how to connect and power on kits (**DAEnetIP2 v2** + cable + relay board). You can view the kits with **DAEnetIP2 v2** www.denkovi.com. The steps (instructions) are valid for only for kits with **DAEnetIP2 v2** + cable + relay board from Denkovi Assembly Electronics LTD without matter how many relays is the kit.

1. Connect **DAEnetIP2 v2 UTP crossover cable** (if it will be connected to computer) or UTP stright-through (if it will be connected to router)
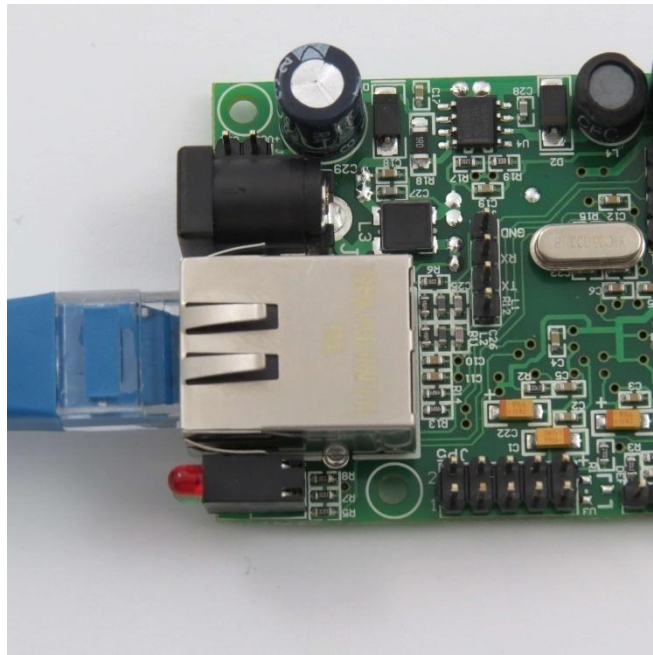
Figure 12.1. Connecting UTP cable to **DAEnetIP2 v2**

2. Connect the other end of the cable to your computer LAN card or router

Figure 12.2. Connecting UTP cable to Computer

Figure 12.3. Connecting UTP cable to router

3. Connect the flat cable IDC connector to **DAEnetIP2 v2** ports. By default when you receive the denkovi kit you should have the **DAEnetIP2 v2** connected with the cable. If not please contact with us.

   3.1. **Internet/Ethernet 16 Channel relay board.** The relay board is connected to ports P3 and P5.
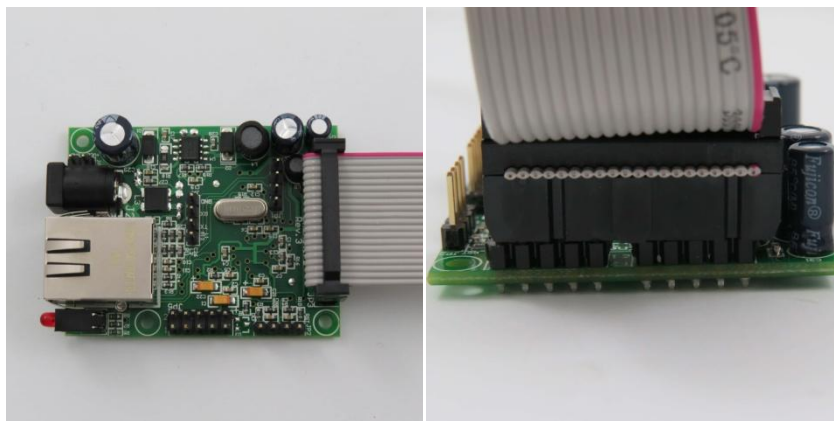

Figure 12.4. Connecting cable for 16 channel relay board

   3.2. **Internet/Ethernet 8 Channel relay board.** The relay board is connected to port P5.
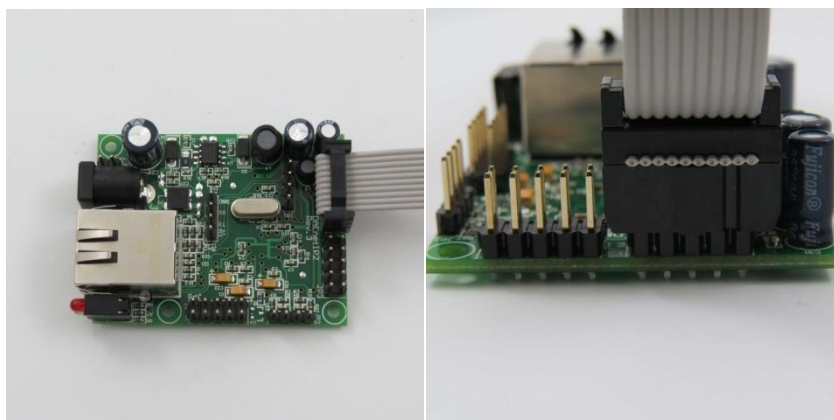
Figure 12.5. Connecting cable for 8 channel relay board

3.3. **Internet/Ethernet 2 Channel relay board.** The relay board is connected to P5.7 and P5.8 pins.
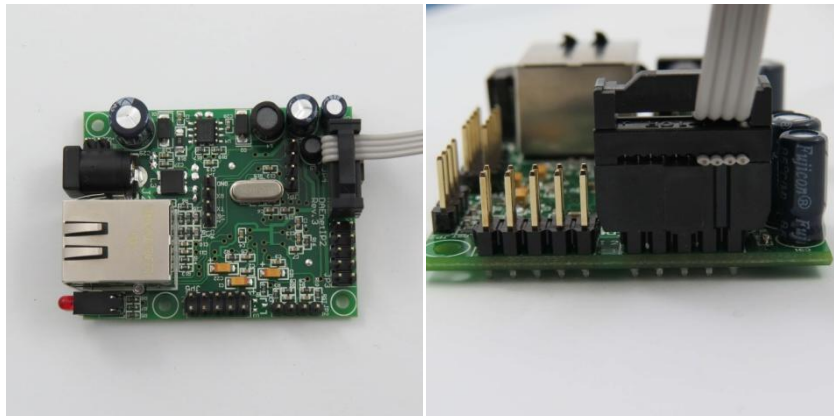
Figure 12.6. Connecting cable for 2 channel relay board

4. Connect each "In" labeled wire into the referred screw terminal of the relay board. For example "In 1" wire goes into Relay 1 In screw terminal, "In 2" wire goes into Relay 2 screw terminal and so on.
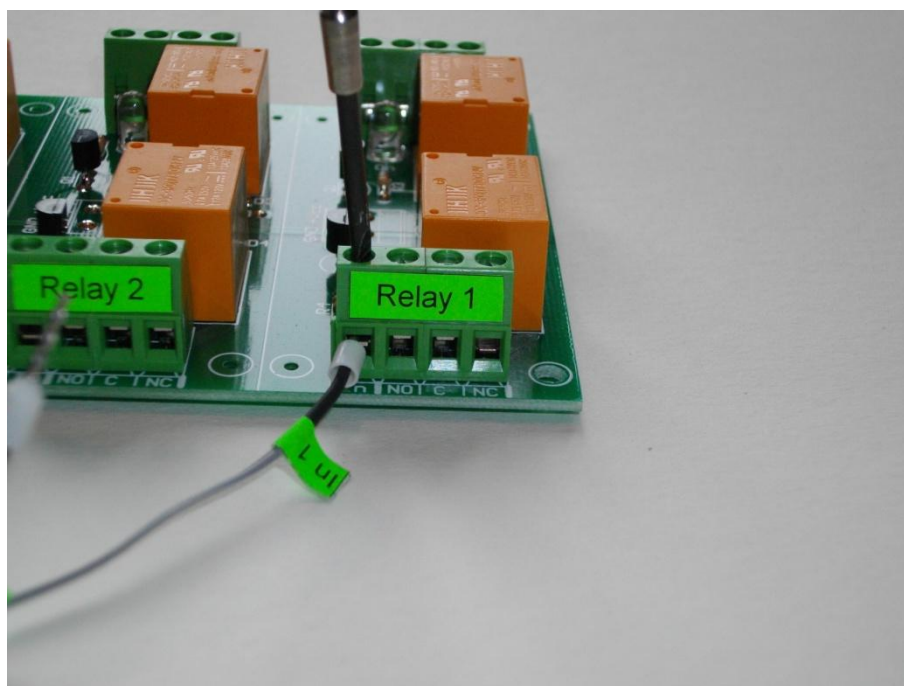

Figure 12.7. Connecting "In" wires into the screw terminals

5. Connect the GND wire of the flat ribbon cable into the GND screw terminal of the relay board. For example bellow it is shown 8 channel relay board. The same is for the rest relay boards.
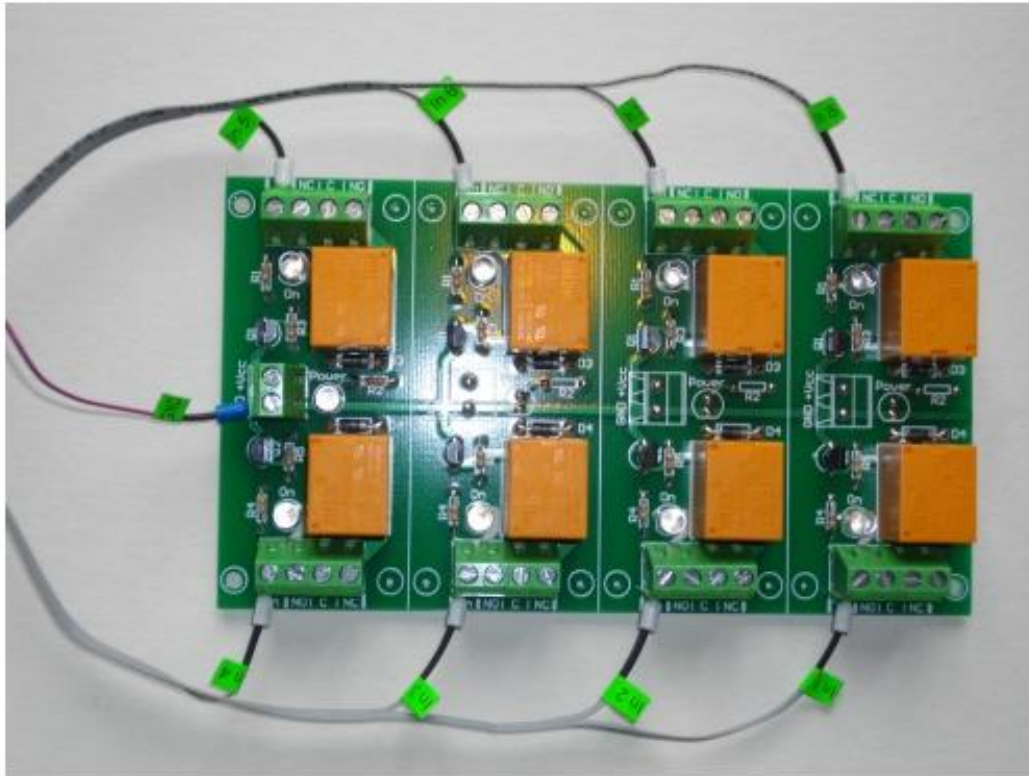
Figure 12.8. Connecting the GND wire to the relay board

6. Connecting power supply

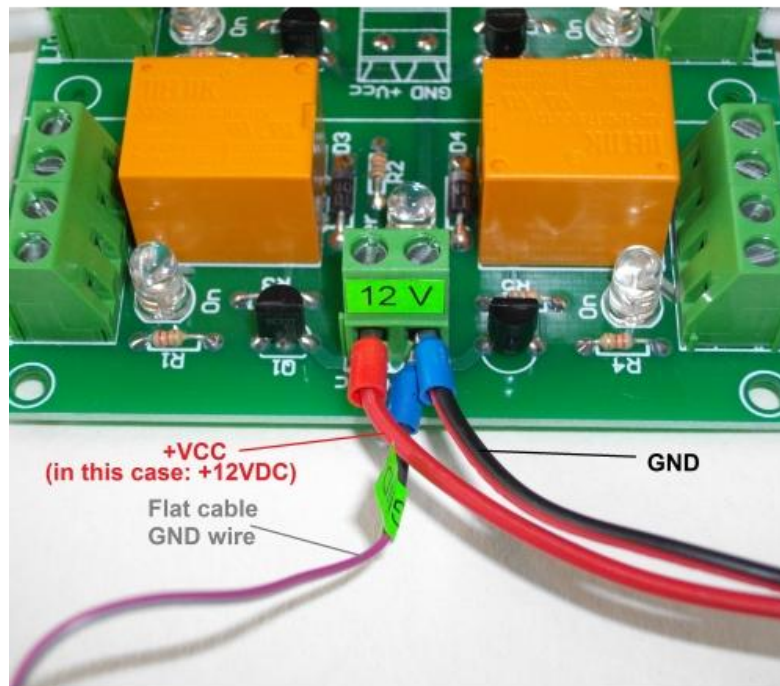**Figure 12.9.** Plug the power supply jack into **DAEnetIP2 v2**

Figure 12.10. Connect the +Vcc and GND wires into the relay board power supply screw terminal as it is shown on the image above.

6.1. Single power supply. You can supply the kit with single power supply source. In this case it is 12VDC. If you have 24V relay board version, then you must use 24VDC single power supply source (**DAEnetIP2 v2** accept from 7.5V - 25V)
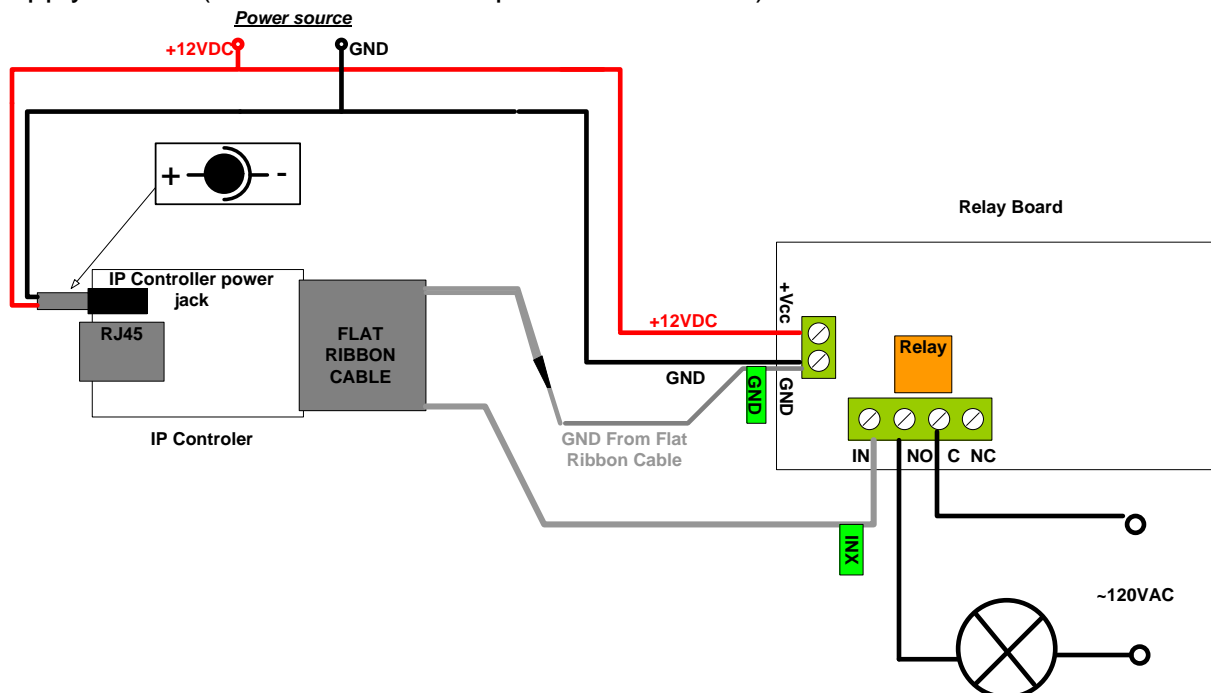

Figure 12.11. Single power supply source.

6.2.2 Separate power supplies. You can also supply the kit with 2 separate power supply sources. If the relay board is 24VDC version, then <u>Power supply source 2 (for the relay board)</u> is 24VDC. <u>Power supply source 1 (for **DAEnetIP2 v2**)</u> may be from 7.5VDC up to 25VDC.
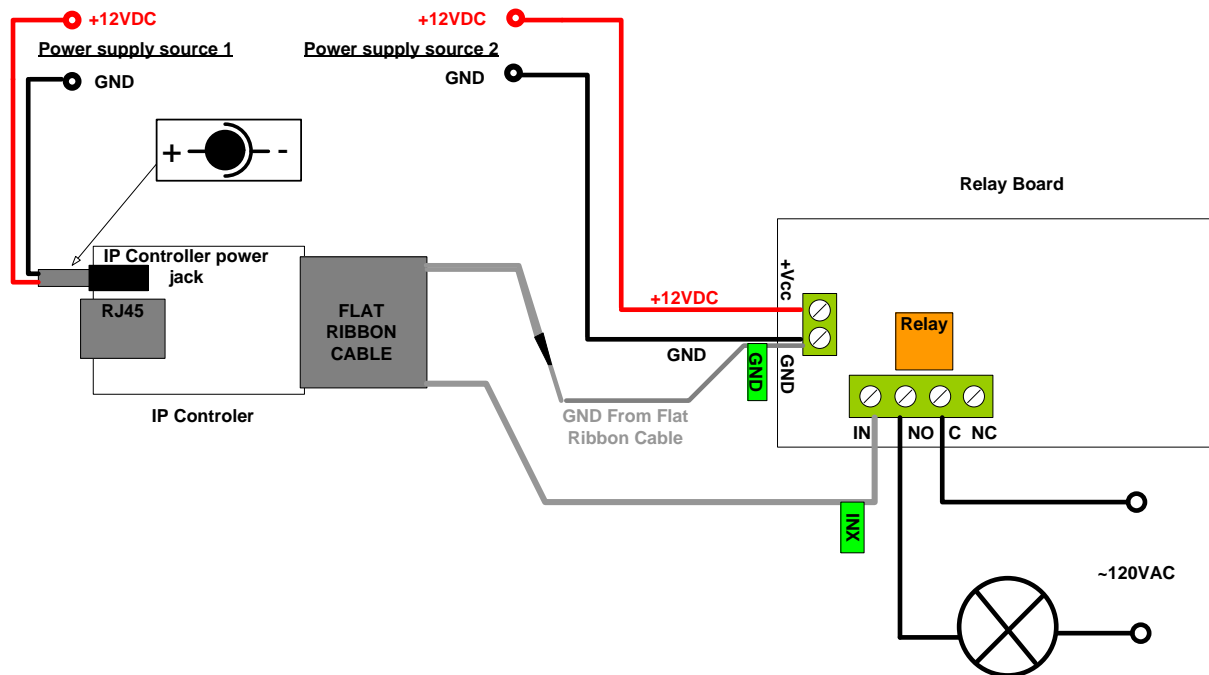

Figure 12.12. 2 separate power supply sources

To calculate what currency rate power supply you need, you will have to make a sum with **DAEnetIP2 v2** current consumption + relay board current consumption. **DAEnetIP2 v2** current consumption is 50mA at 12VDC. If we have for example 16 channel relay board 12VDC the consumption is 600mA. So you will need power supply which can provide more than 600+50=650mA at 12VDC. Or 2 supply sources - one >50mA and another >600mA at 12VDC. You can see the other relay boards current consumptions on their referenced page - http://www.denkovi.com/category/1/relay-boards.html. You just have to find your model.

7. Now you can power on the devices (for example plug the adaptor into the electricity network)
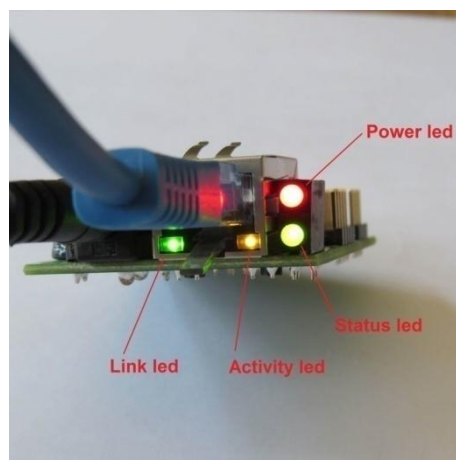8. In case of success you have to see this when you power on the kit

Figure 12.13. DAEnetIP2 v2 leds. The link led (top) is blinking and the bottom led by default shows the power on and it is constantly on.
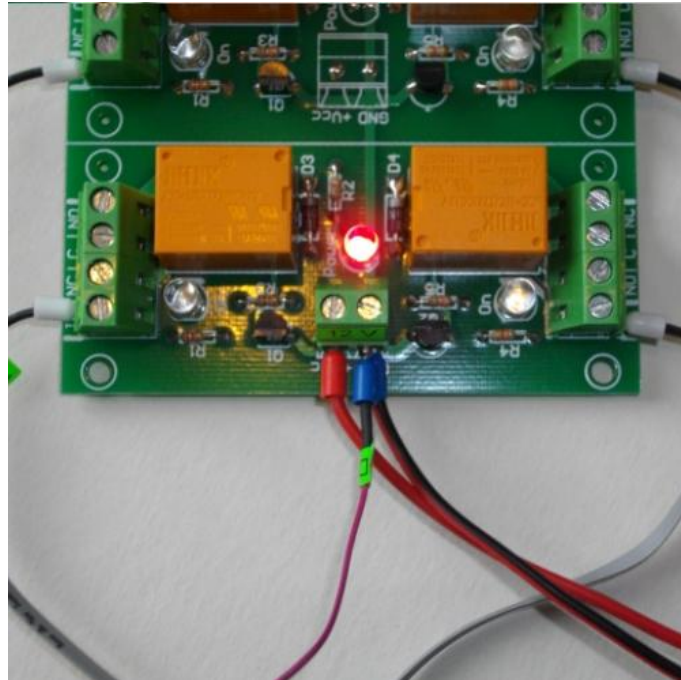
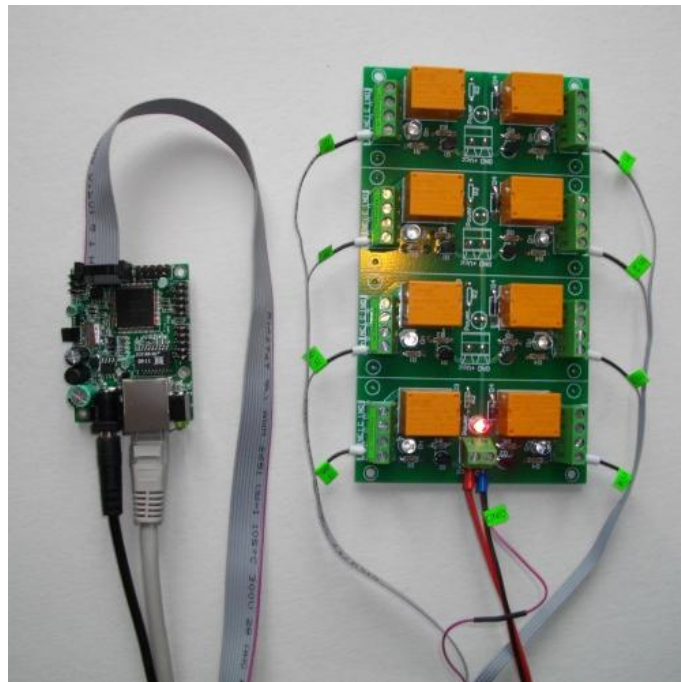**Figure 12.14.** Relay board power led is on constantly.

Figure 12.15. The kit in working condition. The same is for the other kits.

13.   Appendix 4. Port forwarding - for advanced users

This appendix describes how to access the **DAEnetIP2 v2** over the Internet. The demonstration is done with router "TP-Link **TL-WR340G**", but it may be done with any other router supporting "Port Forwarding" function. Bellow are given the steps you have to go through to make "Port Forwarding".

1. Adjust **DAEnetIP2 v2** network ports. These ports are:
   o SNMP port, by default 161
   o HTTP port, by default 80

DAEnetIP2 v2 will accept any valid integer number for port >1025 and <65535. Port numbers from 0 to 1024 will be accepted as 161. The same is with port 80.

Let's say we would like to adjust for example:
   o Port 10080 for HTTP
   o Port 10161 for SNMP

This may easily be done from the **DAEnetIP2 v2** web server -> Setup page

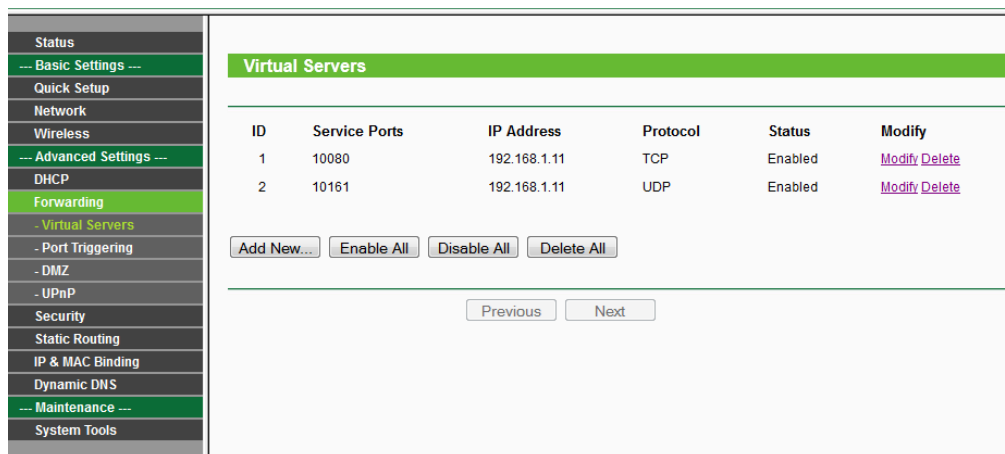2. These ports must be set in the forwarding rules inside the router as it is shown on the figure bellow

Figure 13.1. Port forwarding

The IP address 192.168.1.11 is actually the internal address of the **DAEnetIP2 v2***.*

3. Now it is possible to access the **DAEnetIP2 v2** from everywhere outside the LAN (including over the Internet).

xxx.xxx.xxx.xxx:10080 - is the web server of the module
snmpget -v1 -c 000000000000 xxx.xxx.xxx.xxx:10161 .1.3.6.1.4.1.42505.9.1.1.0 - snmp command for accessing the module (get the IP)
xxx.xxx.xxx.xxx - the public IP of the router or it's DNS name.

Good online guide for port-forwarding is the bellow link:
http://portforward.com/english/routers/port_forwarding/

14. Appendix 5. Software

14.1. Denkovi Software

We provide several application that may be used for testing, demonstrations, configurations and very simple automation projects.

14.1.1. DRM Software

Denkovi Relay Manager (DRM) is universal software for easy controlling all kinds of Denkovi USB, VCP and SNMP and TCP/IP relay boards. It may be used with **DAEnetIP2 v2**+relay board.
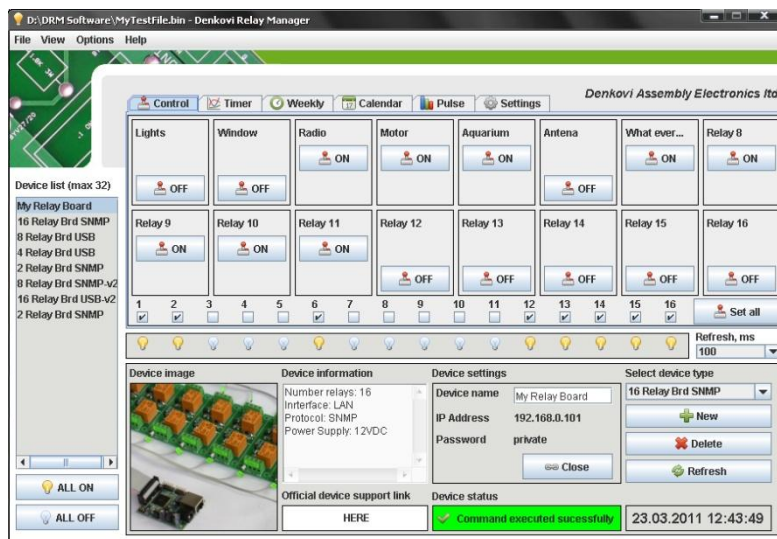

Figure 14.1. DRM software

Software web page - here

14.1.2. Mobile apps

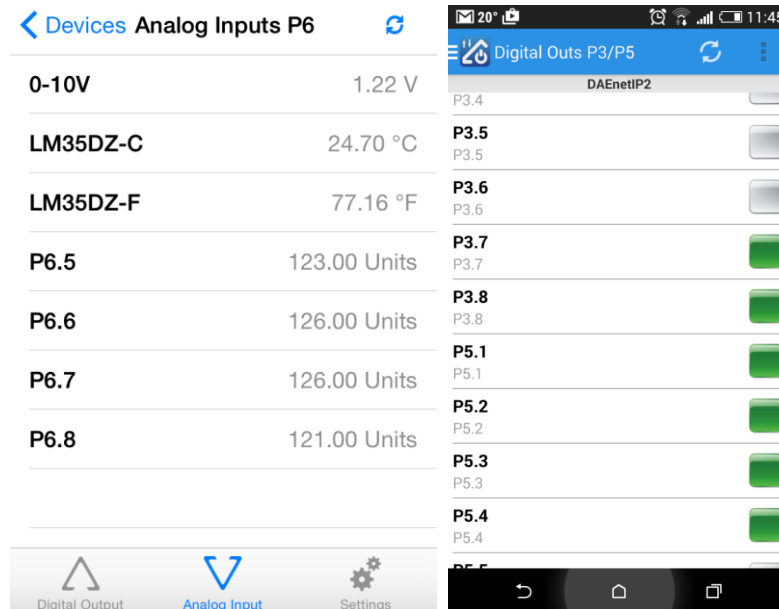It is possible to access the module from our DAE-aModules app (android) and DAE-iModules app (iOS)

Figure 14.2. Mobile applications

14.2. Control from command line

14.2.1. Windows

Net-snmp is command line tool for accessing SNMP based network devices under windows console. By default it is not included in Windows OS. **DAEnetIP2 v2** can be easily accessed by the net-snmp tool. This is very useful when the snmp commands must be executed from batch file for example.

Bellow are the steps for installing **net-snmp** tool on windows OS.
1. Download the last version net-snmp binary for windows from http://net-snmp.sourceforge.net/download. The file must look like net-snmp-X.X.X.X-X.win32.exe
2. Install the downloaded file. Leave the default options. The packet will be install in c:\usr by default.
3. Download the **DAEnetIP2 v2** MIB file from here
4. Copy the mib file here c:\usr\share\snmp\mibs
5. Add new line in the file c:\usr\etc\snmp\snmp.conf with the "mibs all" directive.
6. Now you can test different commands for OID access, supported by this module. Their names you may see in the **DAEnetIP2 v2**.mib file.

A simple test may be done to be sure if the tool is installed successfully:
run->cmd->
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.1.1.0
answer: SNMPv2-SMI::enterprises.19865.1.1.1.0 = IpAddress: 192.168.1.100

For creating batch files, you may use the following steps:
1. Open new file and save it as ON.bat
2. Enter the following code:

snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.1.0 i 0
PING 1.1.1.1 -n 1 -w 5000
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.1.0 i 1

1. Save the file
2. Run it.

14.2.2.   Linux

Usually most of Linux OS come with snmp tool installed.
1. To check out if snmp is installed, just open one terminal and type:

snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.1.1.0
(Of course with your network settings)

If you get some message like this: "snmp is not function" or "snmp not found", it seems that snmp is not installed and you have to follow the hints that the command line gives you. After that repeat step 1.

2. Create bash file for example ON.vim and enter the following commands in it:

#!/bin/bash
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.1.0 i 0
sleep 5s
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.1.0 i 1

3. Save the file
4. Run it.

14.2.3.   Example commands

- SNMPGET examples

   Get DAEnetIP2 v2 IP address
   snmpget -v1 -c 000000000000 192.168.1.100 Denkovi.**DAEnetIP2 v2**.Configuration.cfgIP.0
   snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.1.1.0

   Get the MAC Address
   snmpget -v1 -c 000000000000 192.168.1.100 Denkovi.**DAEnetIP2 v2**.Configuration.cfgMAC.0
   snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.1.2.0

   Get P6.1 - This will read analog input 1 level. The rsult is from 0 up to 1023.
   snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.3.1.0

Get P6.8 This will read analog input 8 level. The rsult is from 0 up to 1023.
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.3.8.0

Get the whole P6 (This will return a byte number. Each bit is converted analog input value. This can be used for digital inputs reading of P6)
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.3.33.0

Get P3.1 - This will read digital output P3.1 level
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.1.1.0

Get P3.8 - This will read digital output P3.8 level
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.1.8.0

Get the whole P3
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.1.33.0

Get P5.1 - This will read digital output P5.1 level
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.1.0

Get P5.8 - This will read digital output P5.8 level
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.8.0

Get the whole P5
snmpget -v1 -c 000000000000 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.33.0

- SNMPSET examples

Set DAEnetIP2 v2 IP address
snmpset -v1 -c private 192.168.1.100 Denkovi.**DAEnetIP2 v2**.Configuration.cfgIP.0 a 172.16.100.3
snmpget -v1 -c private 172.16.100.3 .1.3.6.1.4.1.42505.9.1.1.0 a 172.16.100.3

Set P3.1 - This will set pin 1 from digital output port P3 in '0' (Low level)
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.1.1.0 i 0

Set P3.8 - This will set pin 1 from digital output port P3 in '1' (High level)
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.1.8.0 i 1

Set the whole P3 - This will set all the 8 pins from digital output port P3 in '1'
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.1.33.0 i 255

Set P5.1 - This will set pin 1 from digital output port P5 in '0' (Low level)
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.1.0 i 0

Set P5.8 - This will set pin 1 from digital output port P5 in '1' (High level)
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.8.0 i 1

Set the whole P5 - This will set all the 8 pins from digital output port P5 in '1'
snmpset -v1 -c private 192.168.1.100 .1.3.6.1.4.1.42505.9.2.2.33.0 i 255

14.3. Appendix 6. Software examples

Software examples can be found on this link

14.4. Third Party Software

Since **DAEnetIP2 v2** supports SNMPv1 and HTTP API protocols, it is possible to be integrated in third party applications like:
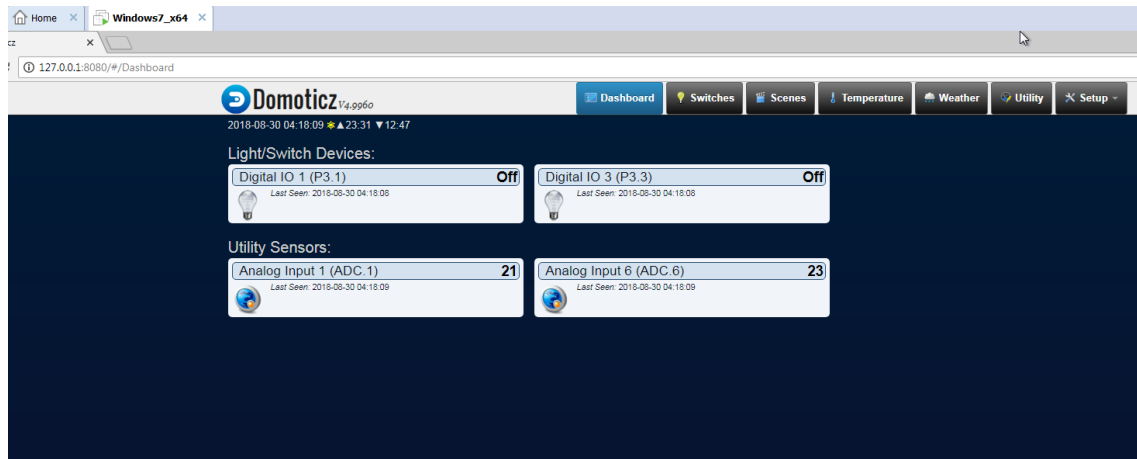
14.4.1. Domoticz

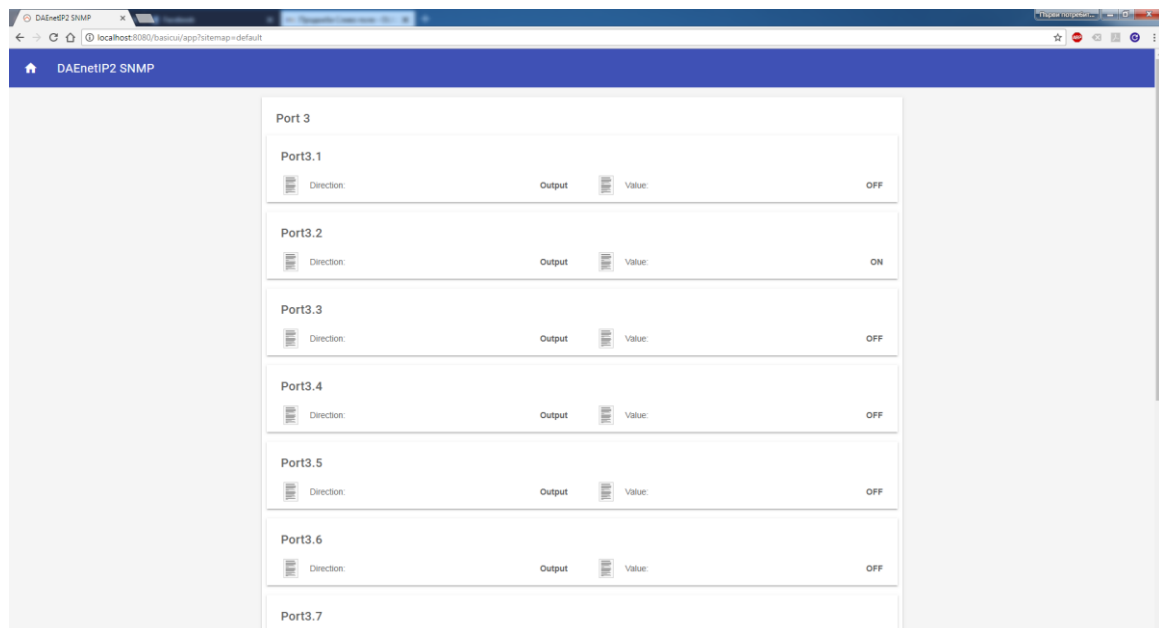**Figure 14.3.** Domoticz

14.4.1. OpenHAB

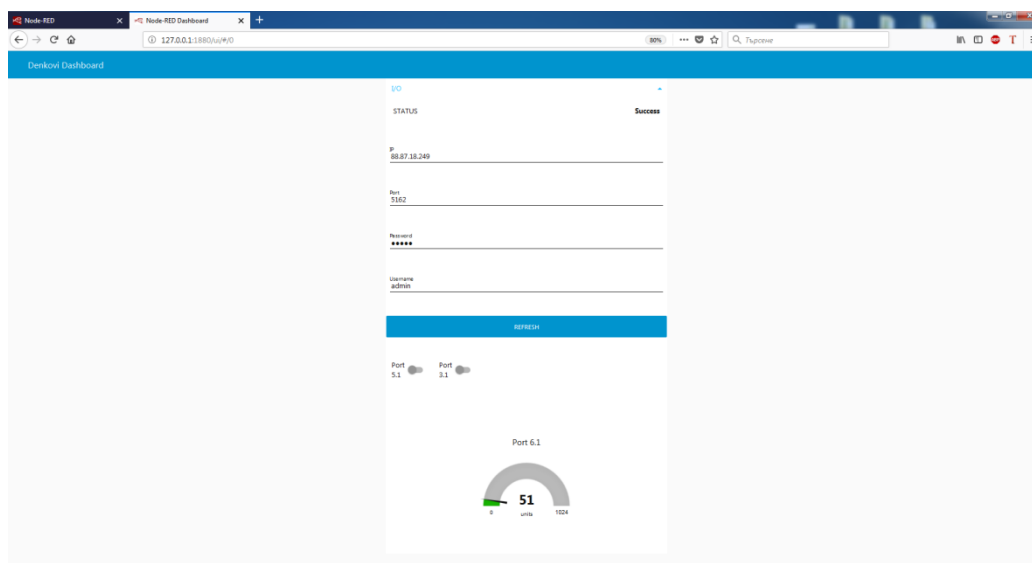**Figure 14.4.** OpenHAB

14.4.2. Node-RED

Figure 14.5. Node-RED

15. Appendix 9. Digital I/O ports (P3/P5)

This section describes how to use **DAEnetIP2 v2** P3/P5 - 8 bit TTL IO port lines. **They are not buffered and you should very carefully otherwise the MCU could be damaged.** They are digital inputs/outputs. The output level voltage is "1" (3.3VDC) or "0" (0.25VDC) with consumption < 1.5mA. All inputs/outputs have protection diodes to GND and +3.3VDC.

Below are given sample examples of I/O ports connections to external devices. The first figure shows how to connect digital output to 12V relay. The second shows example for 5V TTL signal input. R2 is recommend because sometimes the input signals are 'tri-state'.
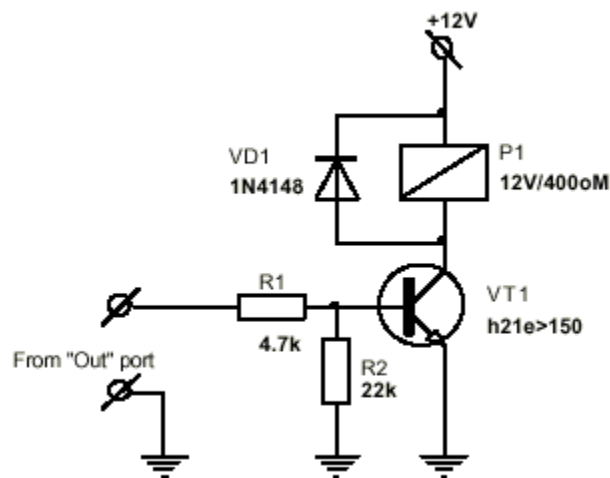

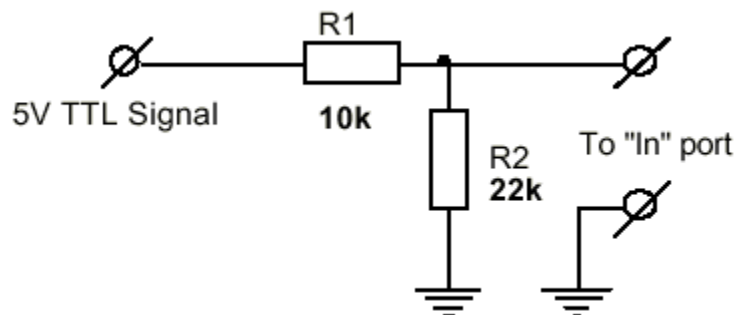**Figure 15.1.** Connecting relay to digital output

Figure 15.2. Using digital I/O pin as input

16. Appendix 10. Using analog inputs port (P6)

Each Analog input from port (P6) have two protection internal diodes shown on figure 40. However they are useless if the resistor R1 is not connected in the way shown on the figure. In order to protect each analog input and the whole **DAEnetIP2 v2** it is **strongly recommend** to connect R1 resistor (with value 22K for example) to each analog input (P6.x). Using analog input without such resistor may cause easy overvoltage or reverse voltage and damage of the controller
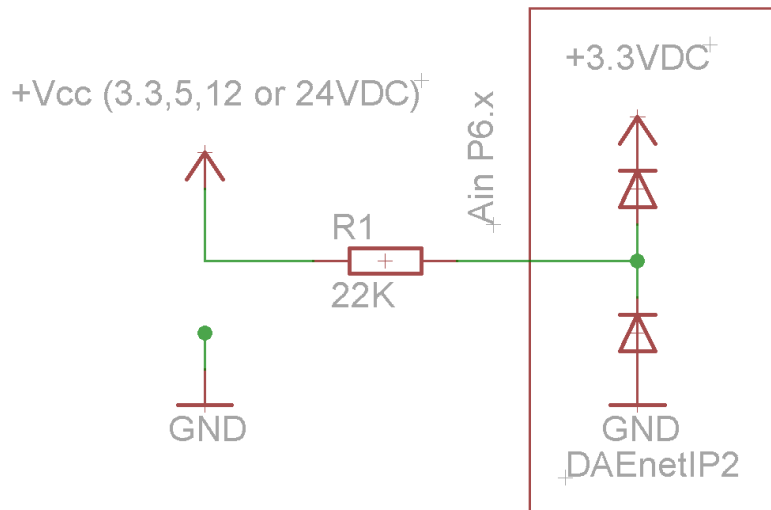

Figure 16.1. Using analog inputs port P6

17. Appendix 11. Using analog temperature sensors

Below are given just small number of example schematics. You can find more example schematics on our **DAEnetIP2 v2** tutorial web page: http://denkovi.com/connecting-analog-sensors-to-DAEnetIP2 v2
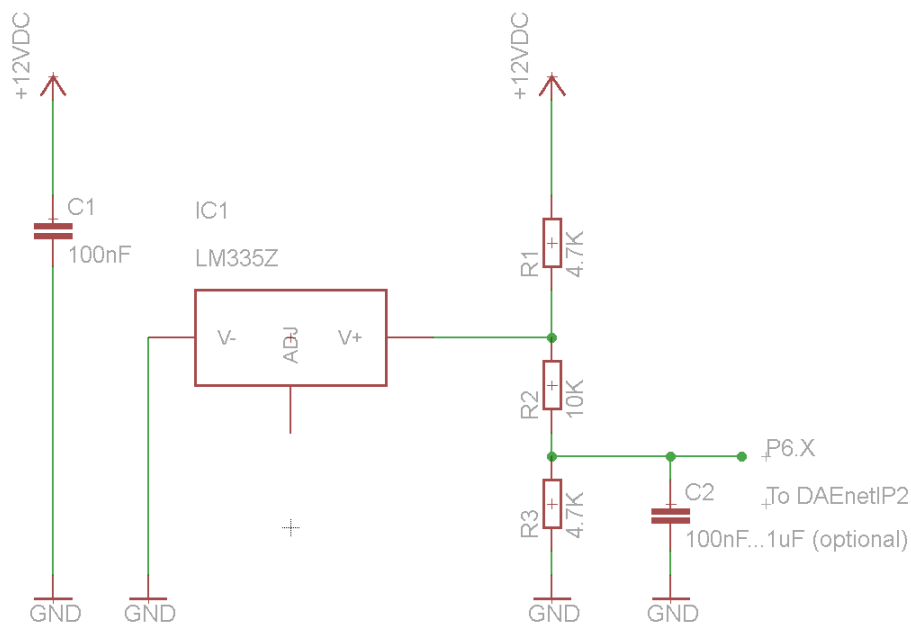
17.1. LM335Z

Figure 17.1. DAEnetIP2 v2 and LM335Z

On the figure above it is shown LM335Z connection to **DAEnetIP2 v2** with several resistors. LM335 may be assumed as zener diode it is necessary to limit the current (that's why the 4.7K resistor is added). The biggest disadvantage of LM335 is the high output voltage during 25°C – 3V. As **DAEnetIP2 v2** ADC works in range of 0-3.3V, actually with directly connected LM335 it is not possible to measure temperatures over 57°C. Moreover, the output of LM335Z can exceed 3.3V and damage the ADC channel.

The easiest solution is using simple resistor divisor – 3:1 so the output voltage during 25°C to be 1V. It is important the divisor resistance to be smaller because this improves the ADC accuracy (but on the other hand it must be taken in mind also the current in the sensor resistor). However the resistor divisor makes also the ADC conversion bigger.
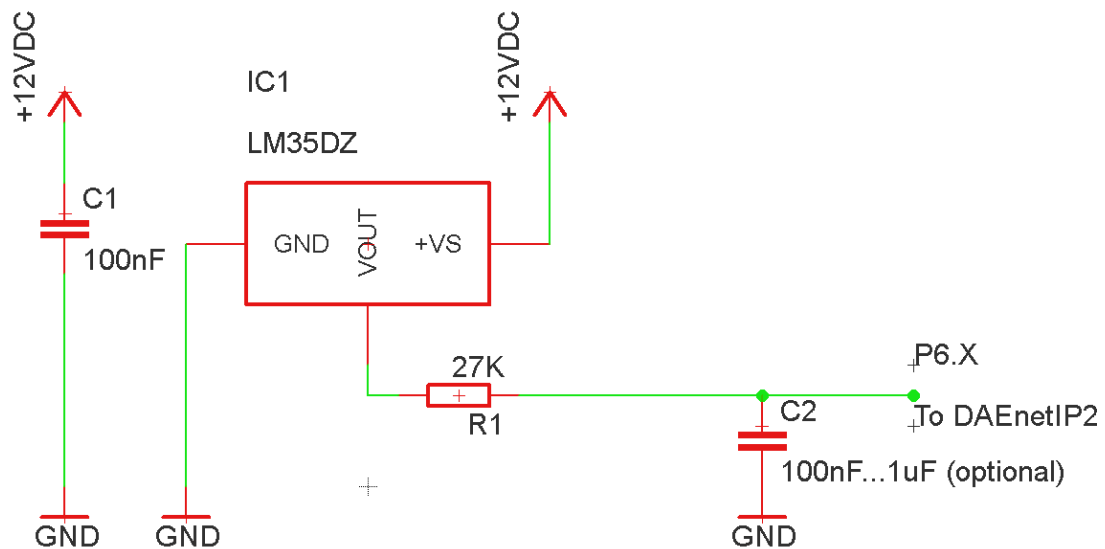
17.2. LM35DZ

Figure 17.2. DAEnetIP2 v2 and LM35DZ/LM34DZ

When using LM35DZ all the disadvantages of LM335 are avoided – there is no need of current resistor (as this sensor does not work as zener diode) neither output divisor. Also its initial error is better than LM335. The only disadvantage is the minimal voltage is 4VDC and this makes the connection to **DAEnetIP2 v2** more difficult (it cannot be connected directly with only single IDC connector to P6). The 27K resistor acts like protection of the analog input P6.X and it is strongly recommend.
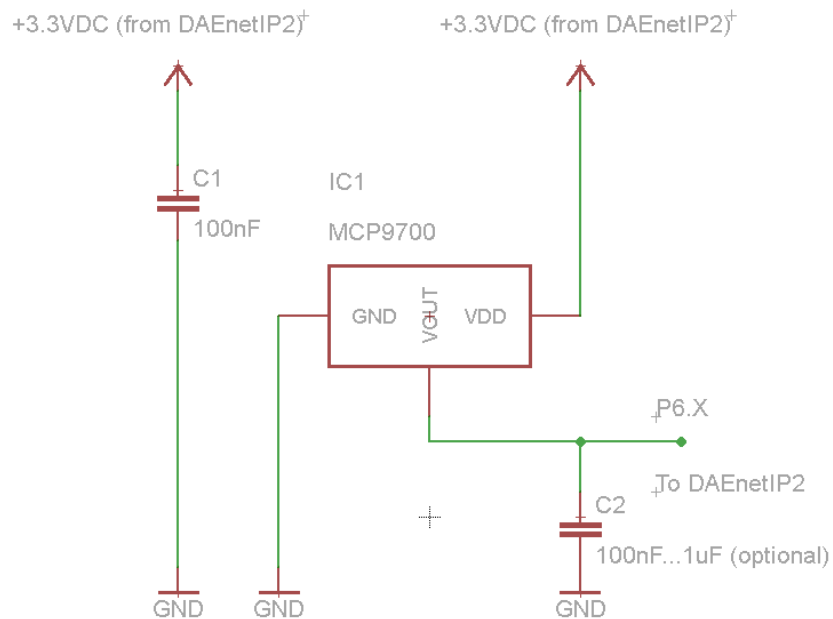
17.3. MCP9700A

Figure 17.3. DAEnetIP2 v2 and MCP9700A

This sensor – MCP9700A works in range 2.3 – 5.5V and that allows to be supplied from 3.3V pin which is mapped to P6 jumper. Generally its parameters are better than the LM335Z and LM35DZ.
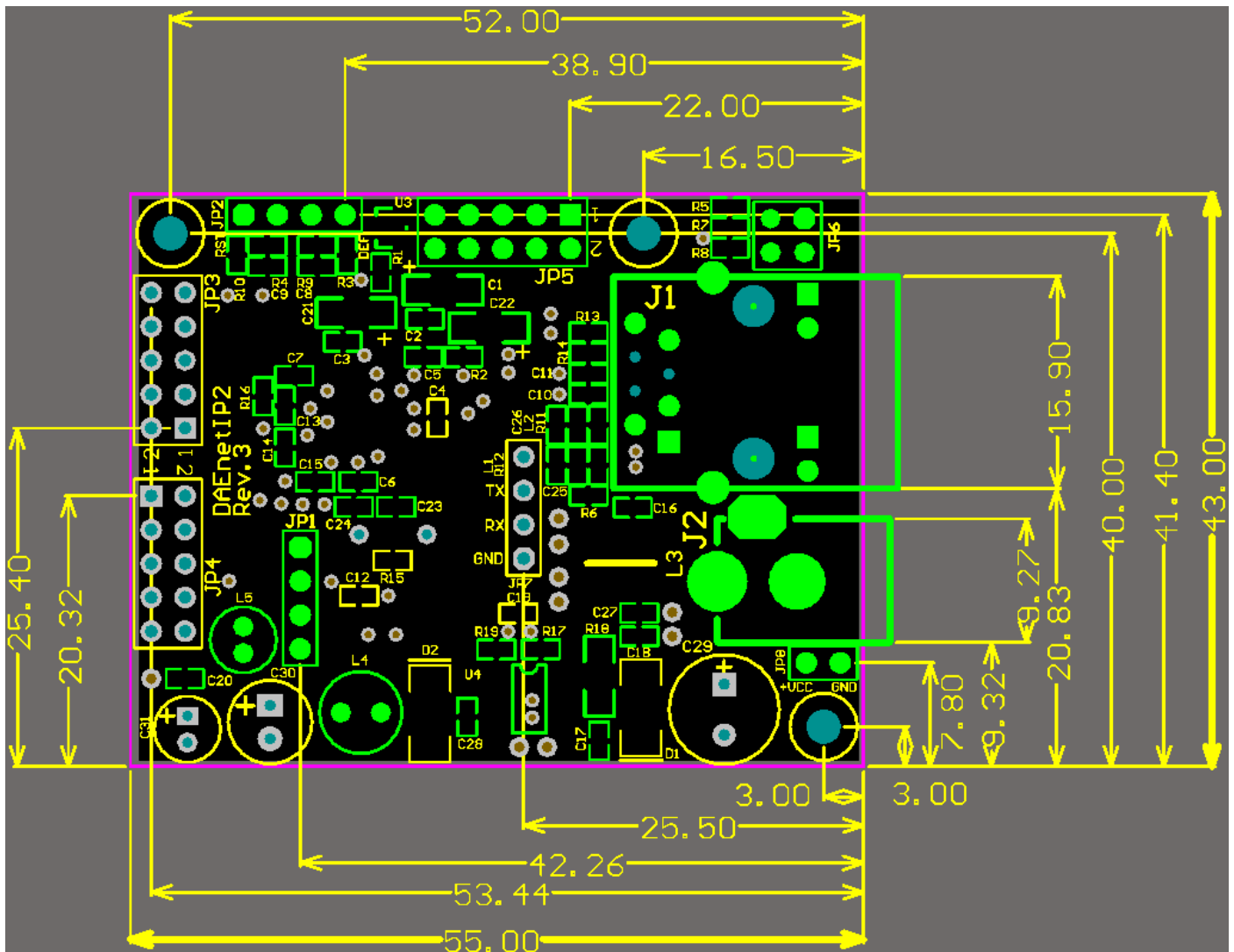
18.   Appendix 12. Mechanical drawing

Figure 17.4. Mechanical drawing

19. Appendix 12. Differences between DAEnetIP2, DAEnetIP2 rev2 and DAEnetIP2 v2

Please take a look at this link: http://denkovi.com/comparison-between-daenetip2-controllers for more information.

20. Disclaimer

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