DAEnetIP2

User Manual
Date: 18 Nov 2013

Describes the features of DAEnetIP2 with firmware version 4.097

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1. Features

DAEnetIP2 is 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 suitable also for controlling relay boards and tracking different sensors via internet.

- 10 Mb Ethernet interface with Link/Activity Led
- Power supply 7.5 - 25VDC
- Low power consuption (<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)
- Standart protocols: ARP, IP, ICMP (ping), DHCP
- Supports snmp v1 (snmpset, snmpget, snmptrap), HTTP (web server with autorization) , TFTP (for firmware upgrade)
- Ports for SNMP (161) and HTTP (80) can be changed
- Two MAC addresses protection
- It can be configured with SNMP requests or web browser
- Integrated WEB server for all functions/parameters access. I/O lines labels can be changed via browser.
- 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
- One analog inputs may be referred to control one digital output according its input level
- Working temperature range: 0ºC to 70ºC

2. Technical parameters

Table 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)	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
TFTP client for remote firmware update	Yes
Command for TFTP update (Web,SNMP)	Yes
Enable/Disable TFTP update	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

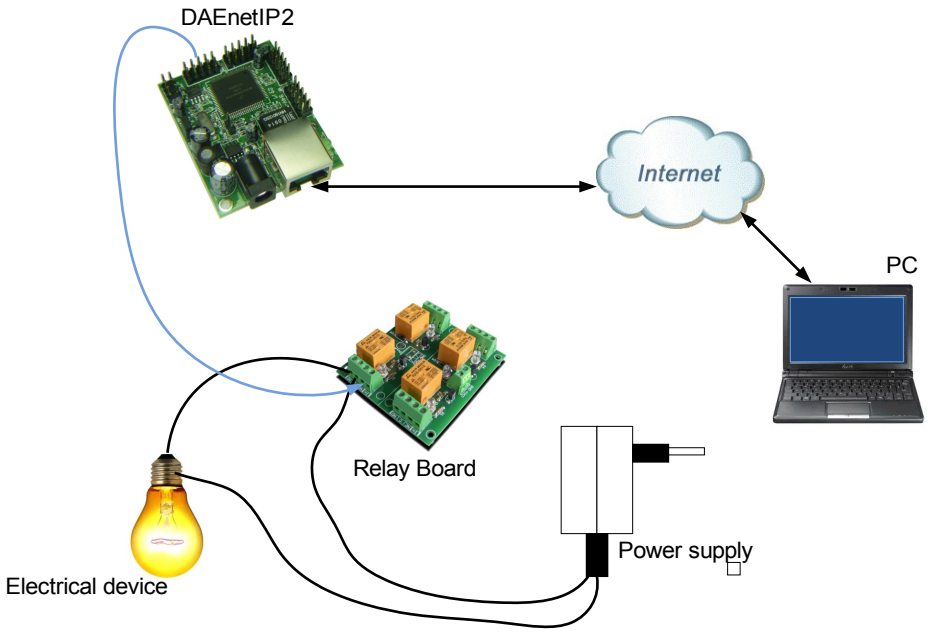

Figure 1. Example 1

3.2. Data acquisition

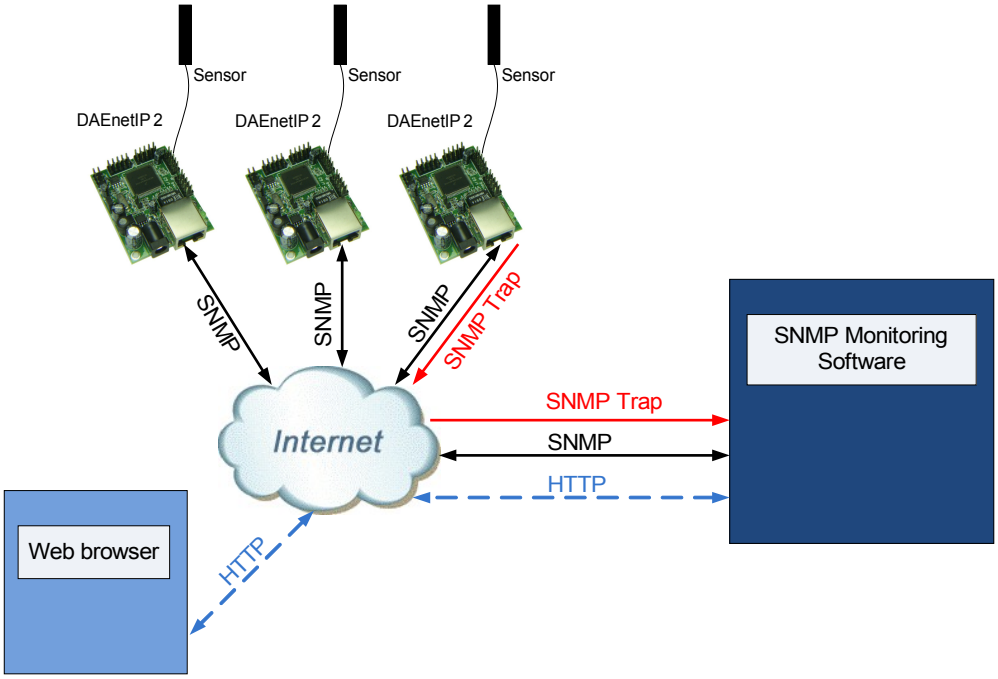

Figure 2. Example 2

3.3. Watchdog function

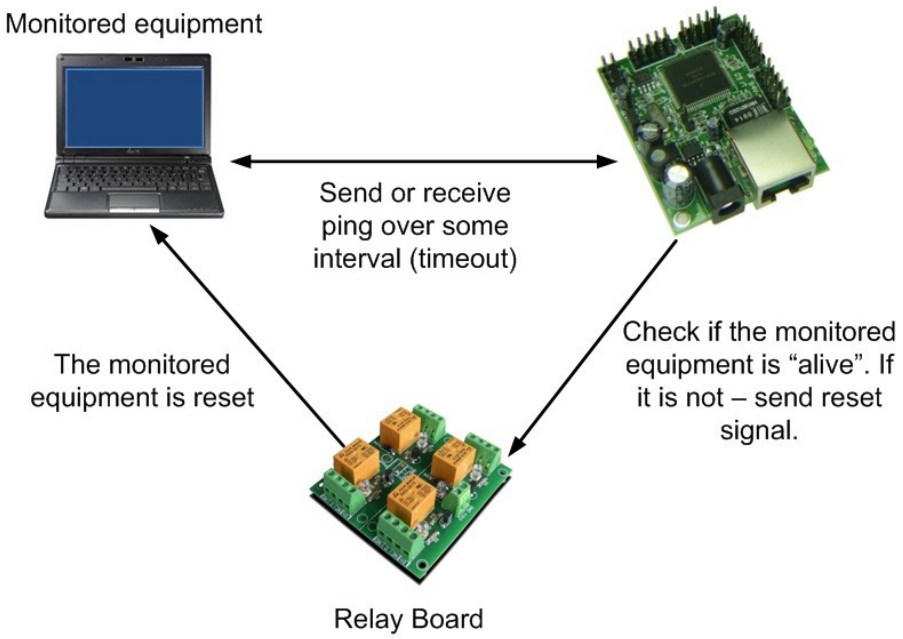

Figure 3. Example 3

4. Default Settings

4.1. Table with default settings

These are the default (factory) settings of DAEnetIP2. 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 2. Default settings

Parameter (according Web pages)	Value
DHCP	Disabled
IP	172.16.100.2
Mask	255.255.255.0
Gateway	172.16.100.1
VLAN ID	1
VLAN mode	Disabled
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	172.16.100.1
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	172.16.100.1
I/O ports settings	P3,P5 - Outputs
Pull-Up/Pull-Down	All “pull-down”
Pull-up/down for inputs	Enabled
Reset I/O ports on restart	Disabled
Digital filter for ADC	Enabled
TFTP update	Enabled
TFTP Server IP	172.16.100.1
Broadcast Frames	Parse
Web Server	Enabled
Web Server TCP port	80
SNMP traps target host	172.16.100.1
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.

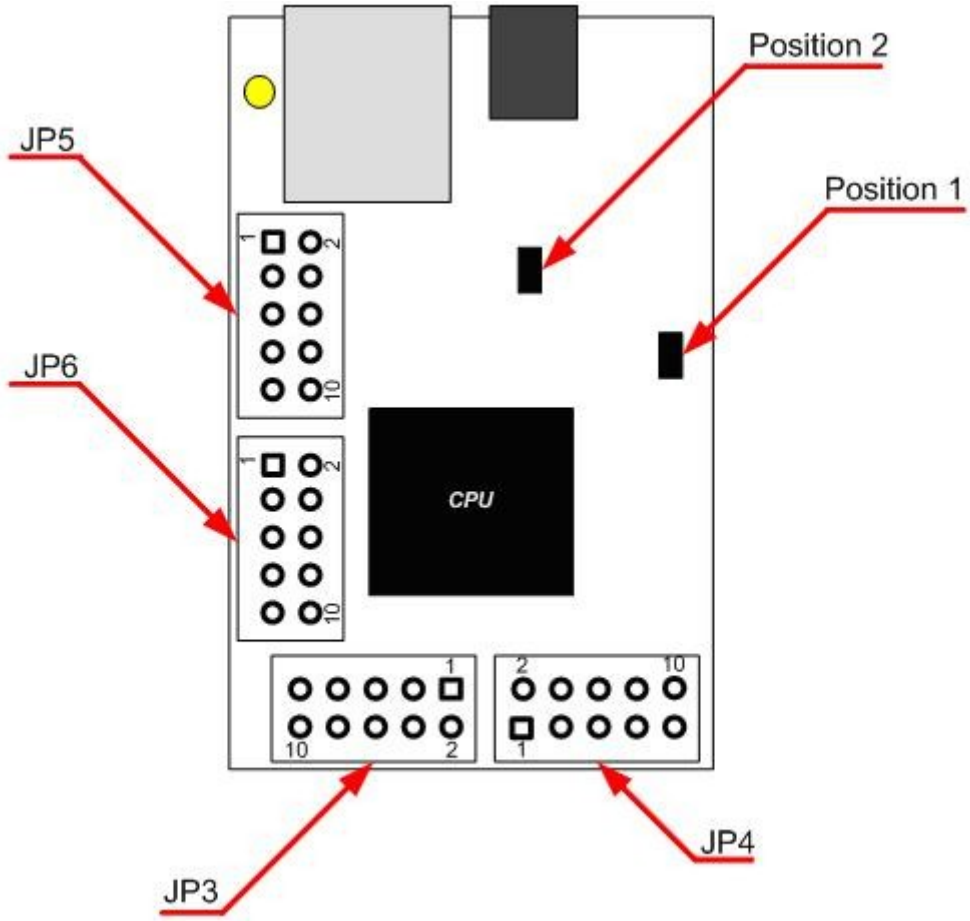

Figure 4. Loading default settings

1. Turn off the power supply of the device
2. Move the jumper from position 1 to position 2
3. Turn on the power supply of the device
4. Move the jumper from position 2 to position 1
5. Turn off the power supply of the device
6. Turn on the power supply of the device

5. Connectors and ports

5.1. DAEnetIP2 ports

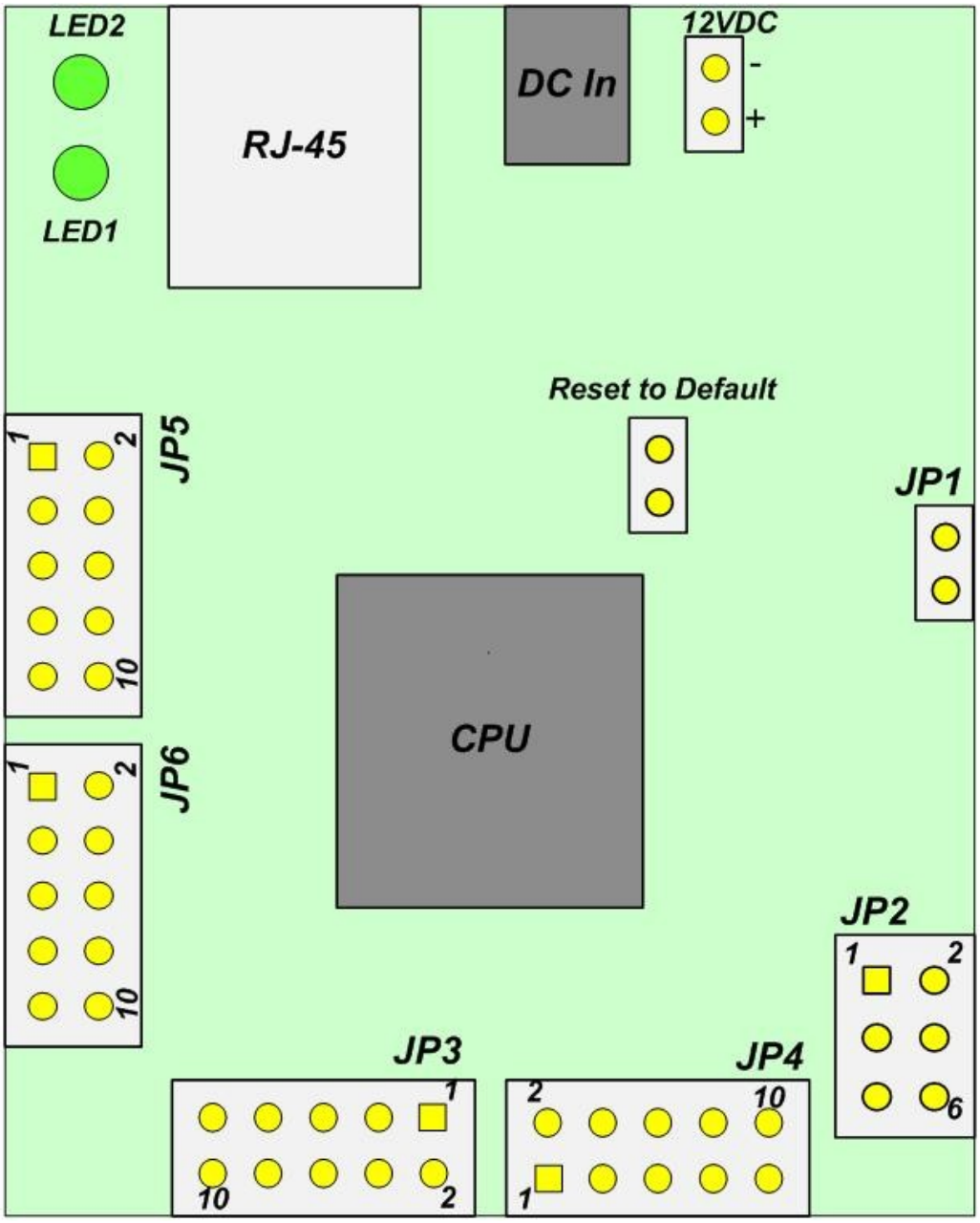

Figure 5. DAEnetIP2 ports

5.2. DAEnetIP2 ports description

Table 3. I/O Ports

	Port JP3 (P3) digital outputs			Port JP4 (P5) digital outputs			Port JP5 (P6) (digital/analog inputs)		
Pin N	**Bit**	**Func**	**Dir**	**Bit**	**Func**	**Dir**	**Bit**	**Func**	**Dir**
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

Table 4. System port

	DAEnetIP2 System Port JP6 (reserved, not used)		
Pin N	**Bit**	**FUNC**	**Dir**
1	-	+3.3V	PWR
2	-	+3.3V	PWR
3	-	Reserved	-
4	-	Ping Led	Out
5	-	Reserved	-
6	-	Target RST	Out
7	-	Reserved	-
8	-	Reserved	-
9	-	Reserved	-
10	-	GND	PWR

Legend:

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

6. Web access

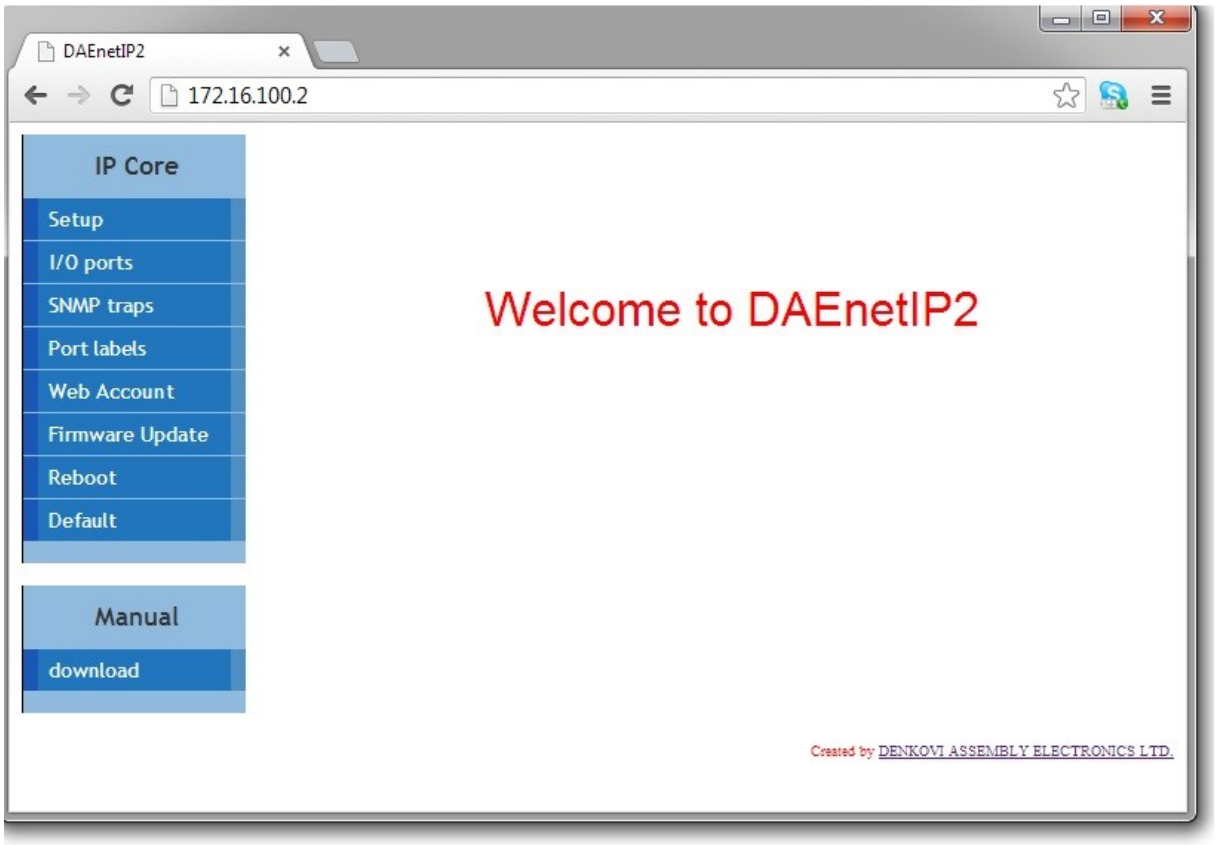

Figure 6. Web access

It is possible to configure DAEnetIP2 via IE, Chrome, Mozilla or other browser. The browser must support JavaScript. There is username and password (Basic Authentication). The web server has only one session – only one user can access the DAEnetIP2 via web at a time. The session has timeout 60 seconds if there is not access from the browser. After that another user can access the module. This is done because of security reasons.

6.1. Setup page

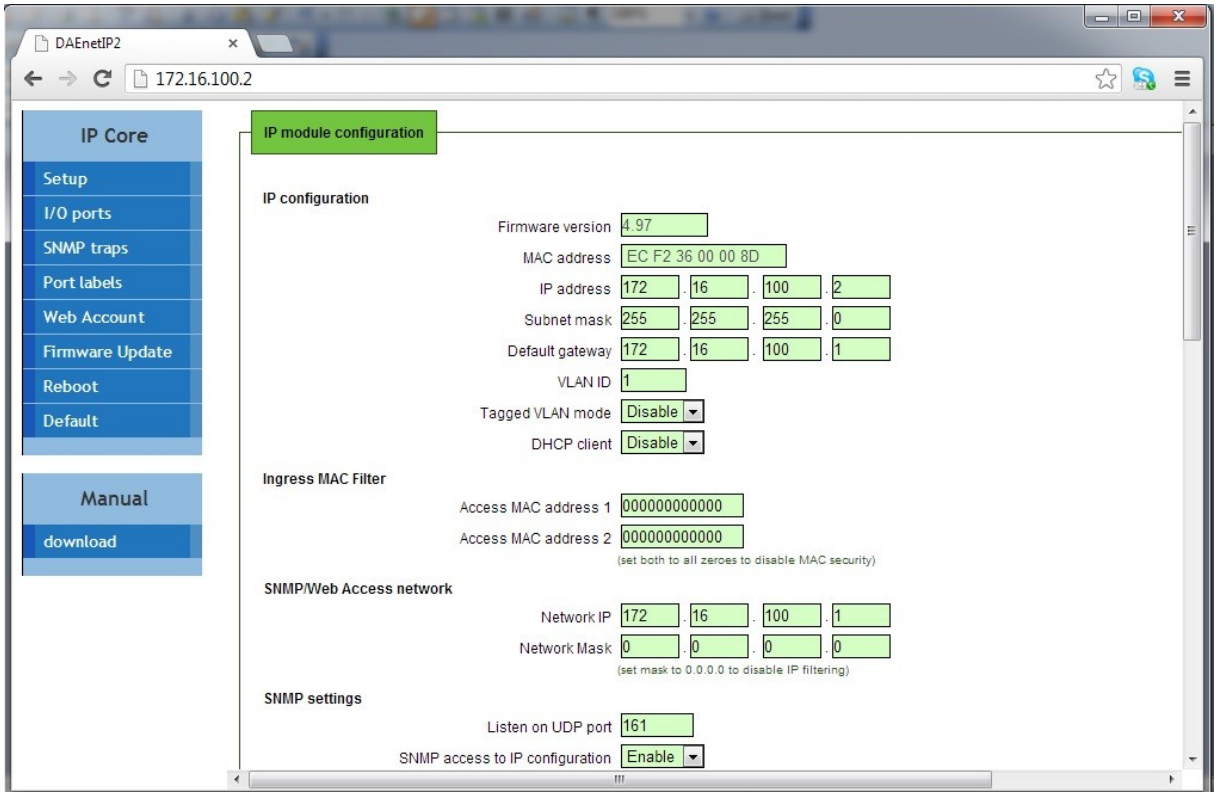

Figure 7. Setup page

6.1.1. Firmware version

This is the current firmware version. Can not be changed

6.1.2. MAC address

The MAC address of the module. Can not be changed

6.1.3. IP address

The IP address of the module.

6.1.4. Subnet Mask

The subnet mask of the module.

6.1.5. Default Gateway

The Default gateway of the module.

SNMP: cfgIP.0, cfgNetMask.0, cfgDefGW.0
Web: Menu „Setup->IP address”, „Setup->Subnet Mask”, „Setup->Default Gateway”

NOTE! The static parameters are stored in the EEPROM of the device. They are not changed by DHCP server. When accessing Web and enabled DHCP mode, the IP, Mask and Gateway are those fetched by the DHCP server and not the static.

6.1.6. VLAN

DAEnetIP2 can work with normal or tagged packets (IEE 802.11q). It supports the whole set of 12bit VLAN tags.

SNMP: Chagne the bit cfgMode.0 and setting the VLAN tag in cfgVLANTag.0
Web: Menu „Setup->Tagged VLAN mode" and „Setup->VLAN ID"

6.1.7. DHCP

The IP,MASK and Gateway can be brought by DHCP server.

SNMP: Change its bit in cfgNewMode.0
Web: Menu „Setup-> DHCP client"

IMPORTNAT! Allowing DHCP client when there is not available DHCP server (or network issue) may make DAEnetIP2 module not to load the network settings and in this way the access may be lost. To avoid this DAEnetIP2 module waits about 40 sec to receive its network settings. In case of failure, DAEnetIP2 module loads the last saved static parameters and begins to work with them and meanwhile continues searching the DHCP server. If there is answer from the DHCP server, the DAEnetIP2 accepts immediately the new settings and reconfigures its network interface.

6.1.8. MAC filtering

DAEnetIP2 has MAC protection. This means that if it is enabled it can be accessed from one/two MAC addresses. For disable the MAC protection, the MAC must be 000000000000.

SNMP: cfgMACLock1.0, cfgMACLock2.0
Web: Menu „Setup-> Access MAC address 1" and „Setup-> Access MAC address

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

6.1.9. SNMP/Web Access network

This function allows to define only one network which have to access the DAEnetIP2 module via SNMP or Web. The function is for access filtering and protection not only MAC addresses level, but and for IP addresses level.
The filtering is only for SNMP and WEB access. All the rest protocols ARP, ICMP, DHCP are not filtered.

NOTE! MAC protection is with higher priority than SNMP/Web access protection.

6.1.10. SNMP settings

This section is for enable/disable SNMP access and SNMP community strings. It is also possible to change the SNMP port from this page.

SNMP: Change of cfgSNMPport.0
Web: Menu „Setup->SNMP settings/Listen on UDP port ”
SNMP: Change its bit in cfgMode.0
Web: Menu „Setup-> SNMP access to IP configuration”

SNMP: cfgPassword.0 and cfgReadOnlyPassword.0
Web: Menu „Setup-> SNMP read-write community string” and „Setup-> SNMP readonly community string”

NOTE! The SNMP password for read/write can not be accessed via SNMP.

6.1.11. ICMP monitoring modes

The DAEnetIP2 module supports two way (incoming/outgoing) mode for monitoring via receiving/sending ICMP Echo Request and ICMP Echo Reply packets. With this function the DAEnetIP2 module can be used as a device for active monitoring of networks and networks devices. The DAEnetIP2 module performs and restart pulse if there is not answer. The common parameter "Timeout" (in minutes) must be given to determine the timeframe when the request/answer must be received. If the timeout elapses then the i/o ports are reset.

Incoming ICMP monitoring When the incoming ICMP monitoring mode is enabled, the DAEnetIP2 module expects ping in the given timeout.

IMPORTANT! If there is very big traffic in the network it is absolutely possible the incoming ping to be not received. That's why it must be sent 5-10 ping requests.

Outgoing ICMP monitoring During outgoing monitoring the DAEnetIP2 module generates ping to the given IP address and expects answer within the given timeframe. The request generating is performed several times in minute.

The both ICMP modes use one shared parameter "timeout" however they have separate timers.

Restart Target Device To restart external device (via relay driver) during monitoring mode it is used special pin "Target RST" (look at the i/o port table). In this way it is possible restarting of different electrical appliances (120/220VAC including). From firmware version 4.097 it is possible to copy that signal to DAEnetIP2 - P5. The restart of external devices may be started/stopped by the user. The restart pulse with may be set by the user: (from 0 up to 32767)x250ms.

The restart may be done manually via the following commands:

SNMP: Changing bit cfgMode.0; cfgResetPulse.0, pctrlRestart.0 (read-only), cfgP5DupRST.0
Web: Menu „Setup->Restart external device”, „Setup->External device restart pulse width”, „I/O ports -> Force TargetRST”, „Setup->Duplicate 'TargetRST' on P5 pins”

IMPORTANT! The setting of pulse width greater than “Ping Timeout” will make the non-definition (possible infinity) increasing of the restart pulse when there is not ping request or answer within the given timeout. The reason is in the cyclic start of the pulse most frequently than it's width!

Setting low level the I/O lines while monitoring restart If this option is enabled DAEnetIP2 will set in logical "0" all the outputs P3 and P5 (look figure 5 and table 3)

SNMP: Change its bit in cfgNewMode.0
Web: Menu „Setup-> Reset I/O ports on ping restart”

Incoming Ping request indicator "Ping LED" Activating this mode will allow DAEnetIP2 module to become in simple network analyzer (with set network parameters), which can indicate "ping" requests to its IP address. Each received request performs change of output "Ping LED" (see the i/o table description). The schematic bellow shows how to connect this pin to LED.

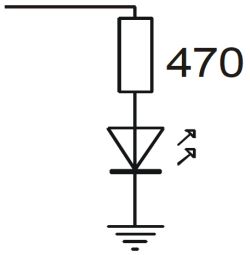

Figure 8. Connecting Ping LED

SNMP: Change its bit in cfgNewMode.0
Web: Menu „Setup-> Toggle JP6.4 on outgoing ping request”

Second LED indicator. This indicator may show: „Power ON”, “Ping IN”, “Ping OUT”, “Ping BOTH”, “DHCP valid IP”.

SNMP: Change its bit in cfgLED2mode.0
Web: Menu „Setup-> Second LED mode”

6.1.12. IO Ports settings

DAEnetIP2 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)

Port	Mode	Pin							
		8	7	6	5	4	3	2	1
P3	Input Pull-up	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
P5	Input Pull-up	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

Figure 9. I/O ports

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

SNMP: Change its bit in cfgP3Dir.0, cfgP5Dir.0 (1=Out,2=In)
Web: Menu „Setup-> I/O ports settings”

When Pull-up is selected, that means there is pull-up resistor of about 50kOhm. When the pin is selected to work as output these pull-up/down resistors are not connected.

From this section also it is possible to:

- enable/disable save outputs at reboot. By default the output states are set to 0. However if this option is set, the output states will be loaded from the EEPROM (where they are recorded the states of the last change before reboot). As each EEPROM has limited read/write cycles, it is not recommend to enable this option when high rate of changing is available.

SNMP: Change its bit in cfgNewMode.0
Web: Menu „Setup-> Save I/O ports' states"

- pull-up/down for inputs (global enable/disable)

SNMP: Global stop/start of the mode: change its bit cfgMode.0 (NO_PULL-UP/DOWN _BIT3)
The individual direction of each input: Change its bit in cfgP3Pull.0 and cfgP5Pull.0 (1=Pull-down, 0=Pull-up.)
Web: Menu „Setup-> Pull-up/down for inputs" and table „I/O ports settings"

- digital filter for the ADC. When this option is activated, the analog inputs returns the measured value slower, but more clear.

SNMP: Change bit (DISABLE_ANALOG_FILTER) in cfgMode.0
Web: Menu „Setup-> Digital filter for ADC "

6.1.13. TFTP firmware update

DAEnetIP2 has TFTP client for firmware update. When the command is initiated, the DAEnetIP2 module connects to the TFTP server and starts downloading the firmware version. After checking if there is connection with the TFTP server and if the file is correct the firmware will be updated and the module will be rebooted.
When there is not connection to the TFTP server, the module makes several attempts before stop executing the command without firmware upgrade.

SNMP: Change its bit in cfgNewMode.0 to allow upgrade via TFTP; cfgTFTPServerIP.0 and cfgUpdateFirmware.0 (read-only)
Web: Menu „Setup-> TFTP firmware update", „Setup->TFTP server IP address", „Firmware Update"

IMPORTANT! It is recommend the firmware upgrade not to be done in real environment. The power supply failure during firmware upgrade will make DAEnetIP2 unusable.
IMPORTANT! When it is done downgrade (it is loaded lower version of firmware), the default settings must be loaded.

For detailed firmware upgrade information please see Appendix 5.

6.1.14. Broadcast frames

In this mode DAEnetIP2 does not response of frames with MAC address FF-FF-FF-FF-FF-FF. This allows DAEnetIP2 to hide from the world because it doesn't respond to ARP requests.

6.1.15. Web server

Enable/disable web access.

SNMP: Change its bit in cfgNewMode.0
Web: Menu „Setup-> Web server"

IMPORTANT! The WEB access may be allowed only after SNMP command (and of course after loading the default settings). If however the SNMP access is disabled, then the allowing of the WEB server may be done only after hardware loading of the default settings.

From this section the web port may be changed also. The port must be in range from 1025 up to 65535. The attempt to assign port from 1-1024 will be accepted as 80. After setting this parameter, the DAEnetIP2 module will be restarted. After changing this port, the url address must be something like this:
http://172.16.100.2:port

SNMP: Change cfgHTTPport.0
Web: Menu „Setup->Miscellaneous/ Web server ...on port "

6.2. SNMP traps

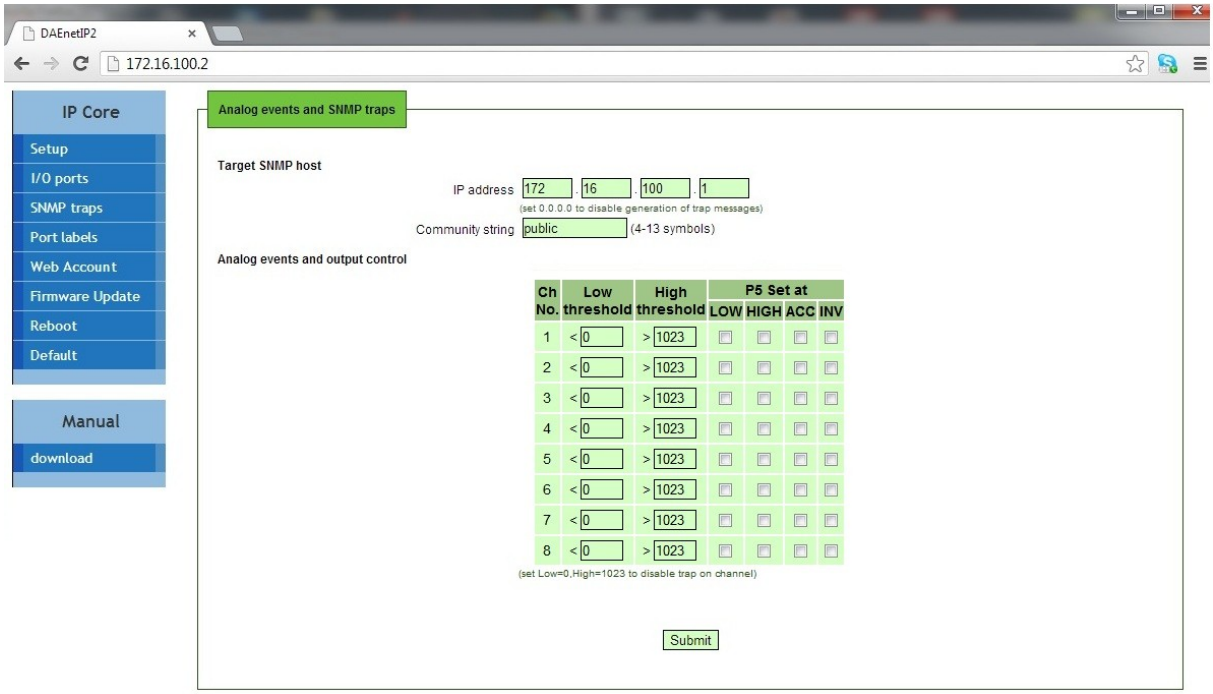

Figure 10. SNMP traps

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 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.

6.3. Analog events

DAEnetIP2 Analog inputs could be attached to P5 digital output port. When analog input is changed the corresponding digital output can react. There are 4 modes:

6.3.1. 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.

6.3.2. Mode “High”

The output will be set if the input level is higher than High.

6.3.3. Mode “Low/High”

The output will be set if the input level is out of the range with High and Low Threshold.

6.3.4. Mode “Acc”

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.

Additionally in firmware ver. 4.097 there is option "INV" (Inversion) - 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 ромяна aevPinX.0. The possible values are: None, Low, High, LowHigh, Acc

Web: Menu „SNMP traps-> P5 set at”

6.4. I/O Ports

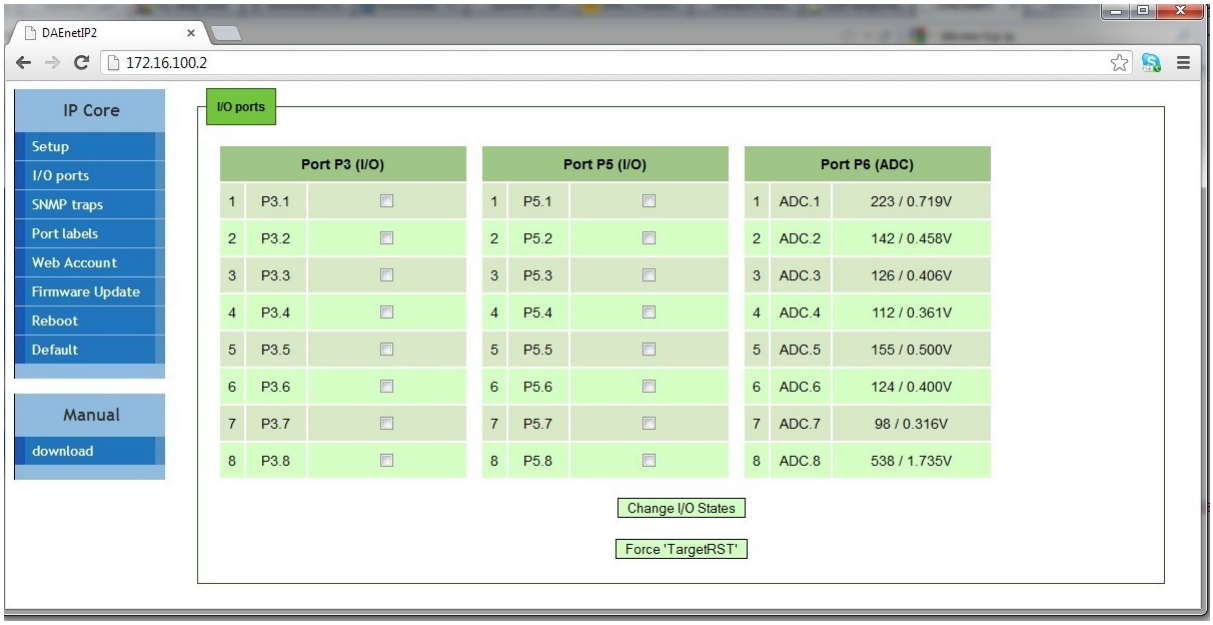

Figure 11. I/O ports web page

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 8 channel 10 bit analog input port. The reference voltage is 3.3VDC (from power supply source)

6.5. Port Labels

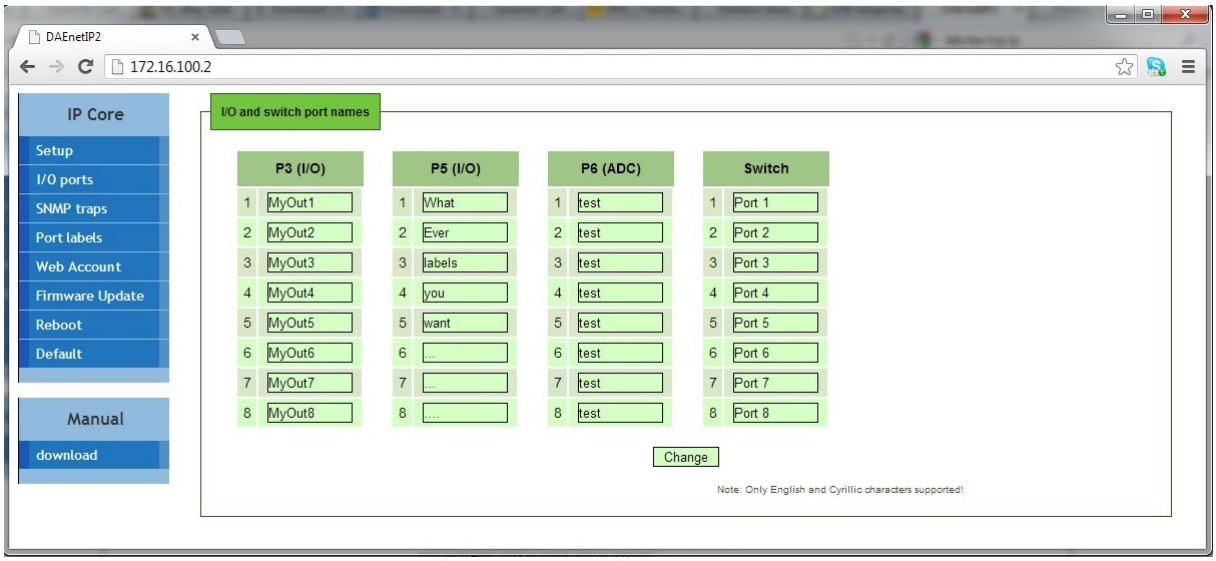

Figure 12. Port Labels

From this web page it is possible to change the name for each I/O pin. Note this is possible to be done only via web and not via snmp.

6.6. Account

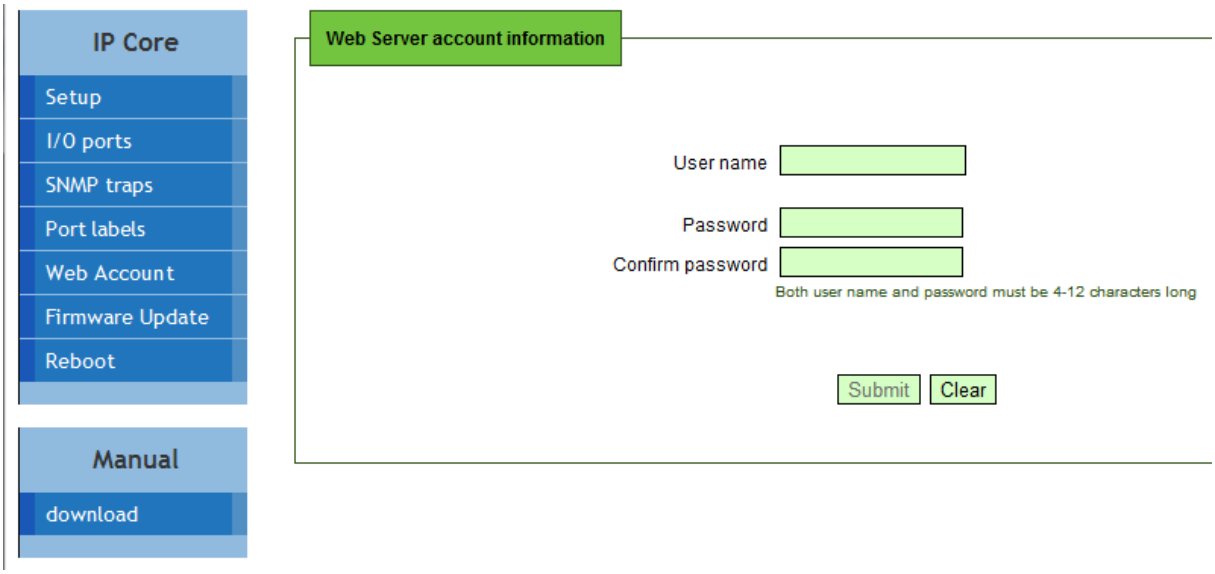

Figure 13. Account settings

6.7. Firmware Update

This command starts firmware update. The DAEnetIP2 will download the firmware file from the TFTP server given in Setup section. After that the device will be rebooted.

6.8. Reboot

Reboots DAEnetIP2.

7. SNMP access

DAEnetIP2 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 ".1.3.6.1.4.1.19865". Also all the snmp commands are described in the MIB file**.** All the functions can be accessed via SNMP and WEB

IMPORTANT! 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.

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

7.1. Configuration settings

Table 5. Configuration settings

OID	Name	Access	Description	Syntax
x.1.1.1.0	cfgIP	read-write	IP Address of DAEnetIP2 module	IpAddress
x.1.1.2.0	cfgMAC	read-only	MAC address of DAEnetIP2 module	PhysAddress
x.1.1.3.0	cfgVLANTag	read-write	VLAN ID (12bit) in VLANEnabled mode	INTEGER(0..4095)
x.1.1.4.0	cfgPassword	read-write	Read-Write community string (password)	OCTET STRING (SIZE (4..12))
x.1.1.5.0	cfgMACLock1	read-write	MAC address of first remote machine allowed to access DAEnetIP2 module	PhysAddress
x.1.1.6.0	cfgMACLock2	read-write	MAC address of second remote machine allowed to access DAEnetIP2 module	PhysAddress
x.1.1.7.0	cfgPingTime	read-write	The time (in minutes) since last ping request to reboot system and target	INTEGER(0..255)
x.1.1.8.0	cfgVersion	read-only	Firmware version, LSB=VER_MINOR, MSB=VER_MAJOR	INTEGER(0..65535)
x.1.1.9.0	cfgMode	read-write	Contains different bit flags for DAEnetIP2	INTEGER(0..255)

			operating modes: ENABLED_BIT – bit0, BROADCAST_DISABLE-bit1, VLAN_TAG_ENABLE-bit2, NO_LARGE_PACKETS-bit3, PINGRESTART_ENABLE-bit4, SWITCH_CONTROL-bit5, SECONDARY_TARGET-bit6, USE_ANALOG_PINS-bit7 (Disable_Analog_Filter for ver >4.094)	
x.1.1.10.0	cfgReset	read-only	Read of this OID causes rest of DAEnetIP2 module	NULL
x.1.1.11.0	cfgNewMode	read-write	Contains different bit flags for DAEnetIP2 operating modes: SAVE_IOPORTS – bit0, PING_LED – bit1, PING_TIMEOUT_IORESET – bit2, TFTP_UPDATE – bit3, DHCP_CLIENT – bit4. MONITOR_TIMEOUT_RESTART – bit5, WEB_SERVER – bit6, SWITCH_RESTART – bit7	INTEGER(0..255)
x.1.1.12.0	cfgResetPulse	read-write	(fw>=4.066) Defines the time ot the RST pulse: value * 250ms	INTEGER(0..32767)
x.1.1.13.0	cfgResetCount	read-write	(fw>=4.066) Number of consecutive resets to perform when ping timeout is active. Value 255 disables counting. Actual count is this value + 1	INTEGER(0..255)
x.1.1.14.0	cfgDefGW	read-write	IP Address of Default	IpAddress

			Gateway	
x.1.1.15.0	cfgNetMask	read-write	IP Network Subnet Mask	IpAddress
x.1.1.16.0	cfgMonitorIP	read-write	Remote IP address to monitor via ICMP echo requests	IpAddress
x.1.1.17.0	cfgReadOnlyPassword	read-write	Read-only community string (password)	OCTET STRING (SIZE (4..12))
x.1.1.18.0	cfgTrapServerIP	read-write	Remote IP address of TRAP manager	IpAddress
x.1.1.19.0	cfgTrapPassword	read-write	Community string for trap messages	OCTET STRING (SIZE (4..12))
x.1.1.20.0	cfgAccessIP	read-write	IP address of network class allowed to access DAEnetIP2	IpAddress
x.1.1.21.0	cfgAccessMask	read-write	Mask of network class allowed to access DAEnetIP2	IpAddress
x.1.1.22.0	cfgHTTPport	read-write	(fw>=4.094) Defines listen port for Web server. Allowed values 80 and >1024	INTEGER(0..65535)
x.1.1.23.0	cfgSNMPport	read-write	(fw>=4.094) Defines listen port for SNMP server. Allowed values 161 and >1024	INTEGER(0..65535)
x.1.1.24.0	cfgLED2mode	read-write	(fw>=4.094) Defines LED2 behaviour	INTEGER { PowerOn(0), PingIn(1), PingOut(2), PingBoth(3), ValidIP(4) }
x.1.1.25.0	cfgP3Dir	read-write	Bit mask with direction of P3 pins. 1-Output, 0-Input	INTEGER(0..255)
x.1.1.26.0	cfgP5Dir	read-write	Bit mask with direction of P5 pins. 1-Output, 0-Input	INTEGER(0..255)
x.1.1.27.0	cfgP3Pull	read-write	Bit mask with pull-up/down mode P3 pins. 1-Pull-down, 0-Pull-up. Doesn't reflect on output pins	INTEGER(0..255)
x.1.1.28.0	cfgP5Pull	read-write	Bit mask with pull-up/down mode P5 pins.	INTEGER(0..255)

			1-Pull-down, 0-Pull-up. Doesn't reflect on output pins	
x.1.1.29.0	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.1.1.30.0	cfgDefault	read-only	Reading this OID will load factory default settings of DAEnetIP2and restart DAEnetIP2.	NULL
x.1.1.32.0	cfgTFTPServerIP	read-write	Remote IP address of TFTP server for firmware update	IpAddress
x.1.1.33.0	cfgUpdateFirmware	read-only	Read of this OID causes initiation of firmware update procedure, according to system settings	NULL

7.2. Analog traps

Table 6. Analog traps

OID	Name	Access	Description	Syntax
x.1.1.122.1.0	atrPin1Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.2.0	atrPin1High	read-write	Pin high threshold	INTEGER(0..1023)
x.1.1.122.3.0	atrPin2Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.4.0	atrPin2High	read-write	Pin high threshold	INTEGER(0..1023)
x.1.1.122.5.0	atrPin3Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.6.0	atrPin3High	read-write	Pin high threshold	INTEGER(0..1023)
x.1.1.122.7.0	atrPin4Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.8.0	atrPin4High	read-write	Pin high threshold	INTEGER(0..1023)
x.1.1.122.9.0	atrPin5Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.10.0	atrPin5High	read-write	Pin high threshold	INTEGER(0..1023)
x.1.1.122.11.0	atrPin6Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.12.0	atrPin6High	read-write	Pin high threshold	INTEGER(0..1023)
x.1.1.122.13.0	atrPin7Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.14.0	atrPin7High	read-write	Pin high threshold	INTEGER(0..1023)
x.1.1.122.15.0	atrPin8Low	read-write	Pin low threshold	INTEGER(0..1023)
x.1.1.122.16.0	atrPin8High	read-write	Pin high threshold	INTEGER(0..1023)

7.3. Anolog-to-P5 Events

Table 7. Analog-to-P5 Events

OID	Name	Access	Description	Syntax
x.1.1.121.1.0	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.1.1.121.2.0	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.1.1.121.3.0	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.1.1.121.4.0	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.1.1.121.5.0	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.1.1.121.6.0	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.1.1.121.7.0	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.1.1.121.8.0	aevPin8	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.1.1.121.9.0	aevPin1Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.1.1.121.10.0	aevPin2Inv	read-write	Invert respective pin	INTEGER {

			for P5 on analog event	None(0), Inverted(1) }
x.1.1.121.11.0	aevPin3Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.1.1.121.12.0	aevPin4Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.1.1.121.13.0	aevPin5Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.1.1.121.14.0	aevPin6Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.1.1.121.15.0	aevPin7Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }
x.1.1.121.16.0	aevPin8Inv	read-write	Invert respective pin for P5 on analog event	INTEGER { None(0), Inverted(1) }

7.4. Control port P3 (Digital outputs)

Table 9. Control port P3

OID	Name	Access	Description	Syntax
x.1.2.1.1.0	pctrlP3pin1	read-write	Port3 pin1 data	INTEGER { High(1), Low(0) }
x.1.2.1.2.0	pctrlP3pin2	read-write	Port3 pin2 data	INTEGER { High(1), Low(0) }
x.1.2.1.3.0	pctrlP3pin3	read-write	Port3 pin3 data	INTEGER { High(1), Low(0) }
x.1.2.1.4.0	pctrlP3pin4	read-write	Port3 pin4 data	INTEGER { High(1), Low(0) }
x.1.2.1.5.0	pctrlP3pin5	read-write	Port3 pin5 data	INTEGER { High(1), Low(0) }
x.1.2.1.6.0	pctrlP3pin6	read-write	Port3 pin6 data	INTEGER { High(1), Low(0) }
x.1.2.1.7.0	pctrlP3pin7	read-write	Port3 pin7 data	INTEGER { High(1), Low(0) }
x.1.2.1.8.0	pctrlP3pin8	read-write	Port3 pin8 data	INTEGER { High(1), Low(0) }
x.1.2.1.33.0	pctrlP3byte	read-write	I/O port data as single byte	INTEGER(0..255)

7.5. Control port P5 (Digital outputs)

Table 10. Control port P5

OID	Name	Access	Description	Syntax
x.1.2.2.1.0	pctrlP5pin1	read-write	Port5 pin1 data	INTEGER { High(1), Low(0) }
x.1.2.2.2.0	pctrlP5pin2	read-write	Port5 pin2 data	INTEGER { High(1), Low(0) }
x.1.2.2.3.0	pctrlP5pin3	read-write	Port5 pin3 data	INTEGER { High(1), Low(0) }
x.1.2.2.4.0	pctrlP5pin4	read-write	Port5 pin4 data	INTEGER { High(1), Low(0) }
x.1.2.2.5.0	pctrlP5pin5	read-write	Port5 pin5 data	INTEGER { High(1), Low(0) }
x.1.2.2.6.0	pctrlP5pin6	read-write	Port5 pin6 data	INTEGER { High(1), Low(0) }
x.1.2.2.7.0	pctrlP5pin7	read-write	Port5 pin7 data	INTEGER { High(1), Low(0) }
x.1.2.2.8.0	pctrlP5pin8	read-write	Port5 pin8 data	INTEGER { High(1), Low(0) }
x.1.2.2.33.0	pctrlP5byte	read-write	I/O port data as single byte	INTEGER(0..255)

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

Table 11. Returned values from ADC

OID	Name	Access	Description	Syntax
x.1.2.3.1.0	pctrlP6pin1	read-only	ADC Channel 1	INTEGER(0..1023)
x.1.2.3.2.0	pctrlP6pin2	read-only	ADC Channel 2	INTEGER(0..1023)
x.1.2.3.3.0	pctrlP6pin3	read-only	ADC Channel 3	INTEGER(0..1023)
x.1.2.3.4.0	pctrlP6pin4	read-only	ADC Channel 4	INTEGER(0..1023)
x.1.2.3.5.0	pctrlP6pin5	read-only	ADC Channel 5	INTEGER(0..1023)
x.1.2.3.6.0	pctrlP6pin6	read-only	ADC Channel 6	INTEGER(0..1023)
x.1.2.3.7.0	pctrlP6pin7	read-only	ADC Channel 7	INTEGER(0..1023)
x.1.2.3.8.0	pctrlP6pin8	read-only	ADC Channel 8	INTEGER(0..1023)

8. 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!

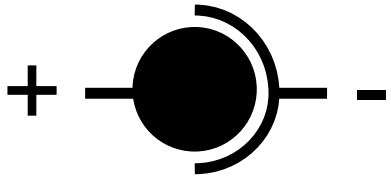

Figure 14. Power supply polarity

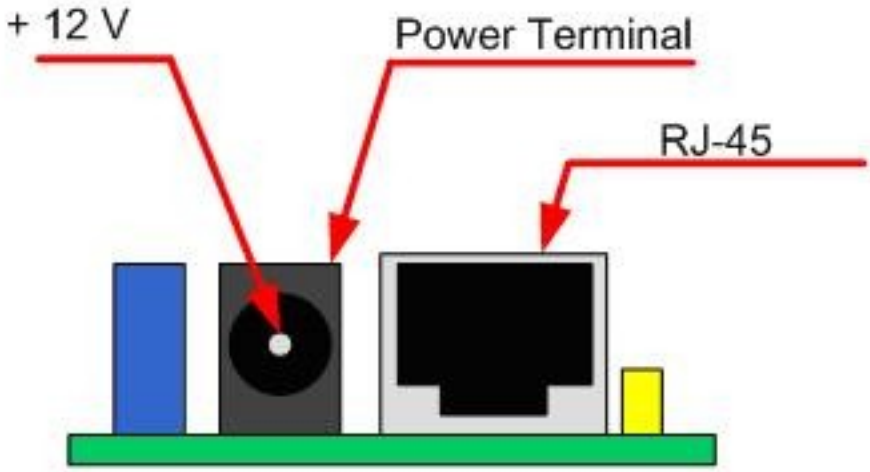

Figure 15. DAEnetIP2 power supply jack

9. Appendix 2. DAEnetIP2 installation

Note these steps are for power on only DAEnetIP2. For installation DAEnetIP2 + relay board (kit), first you must do the steps from **Appendix 3** and then do the steps from **point 9.1** or **point 9.2**.

9.1. Connect DAEnetIP2 to computer for first time

1. Connect the DAEnetIP2 device with your computer via **UTP crossover cable**. (note that the device does not support AUTO MDIX)
2. Supply with voltage in the allowed range. For example - 12VDC stabilized filtered power source.
3. Your initial computer IP should be in the device network. So it is recommend to be 172.16.100.1. Change it.
4. Open web browser and type 172.16.100.2 – default username/password are “admin”/”admin”
5. Now you can access all the parameters via your web browser

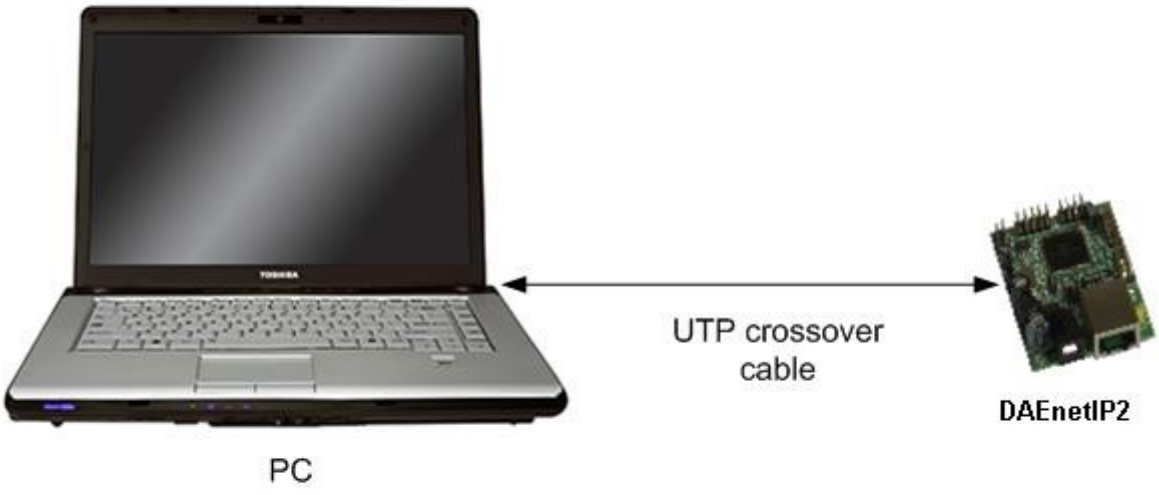

Figure 16. DAEnetIP2 connected directly to computer

9.2. Connect DAEnetIP2 to router

1. Do all the steps from **point 9.1**
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 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 and your computer
6. Connect the DAEnetIP2 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.

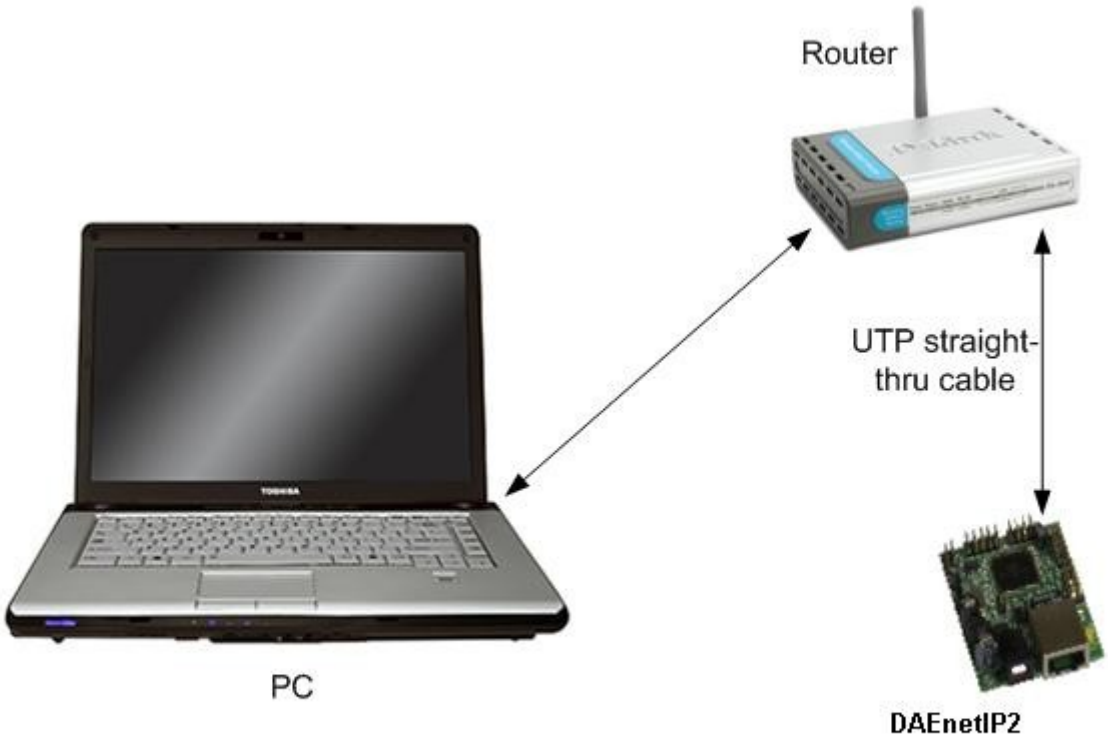

Figure 17. DAEnetIP2 connected to router

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

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

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

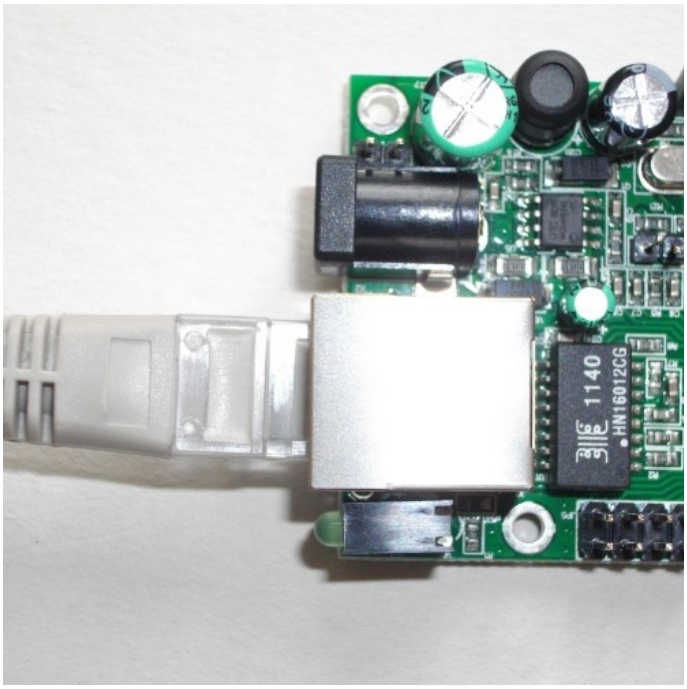

Figure 18. Connecting UTP cable to DAEnetIP2

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

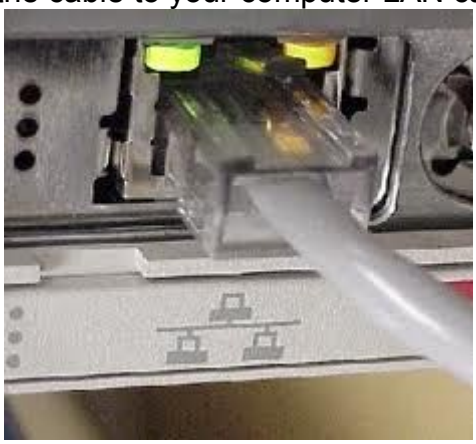

Figure 19. Connecting UTP cable to Computer

Figure 20. Connecting UTP cable to router

3. Connect the flat cable IDC connector to DAEnetIP2 ports. By default when you receive the denkovi kit you should have the DAEnetIP2 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.

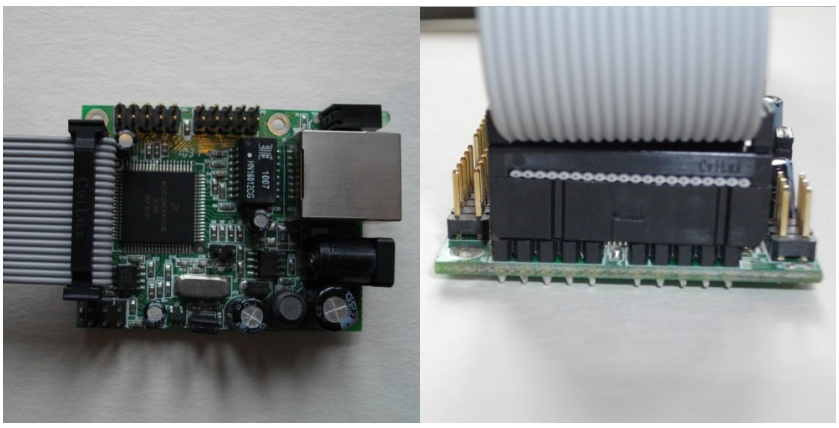

Figure 21. Connecting cable for 16 channel relay board

   3.2. **Internet/Ethernet 8 Channel relay board.** The relay board is connected to port P5.

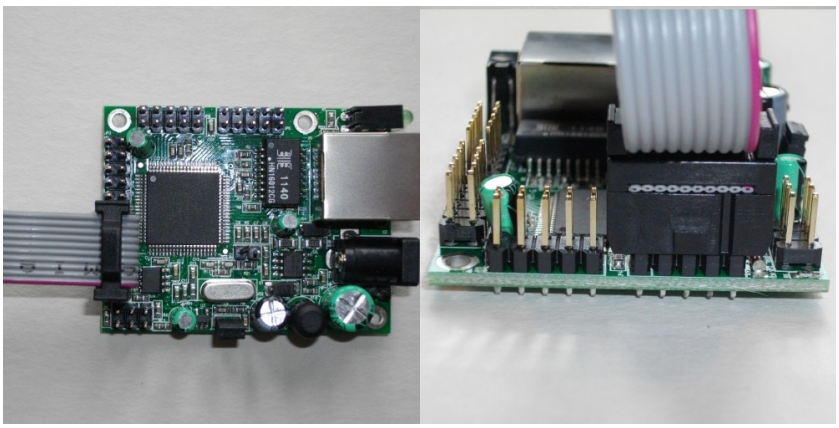

Figure 22. Connecting cable for 8 channel relay board

3.3. **Internet/Ethernet 2 Channel relay board.** The relay board is connected to P5.7 and P5.8 pins.

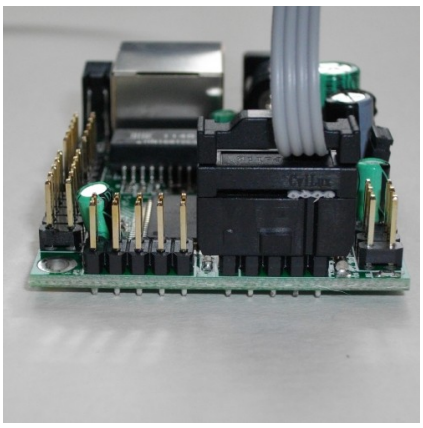

Figure 23. Connecting cable for 2 channel relay board

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.

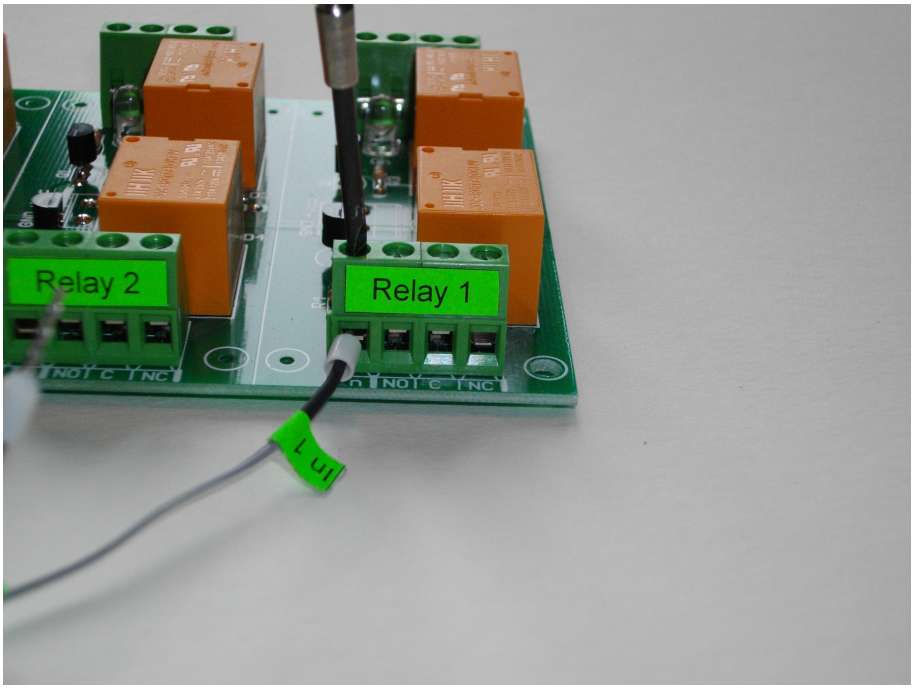

Figure 24. Connecting "In" wires into the screw terminals

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.

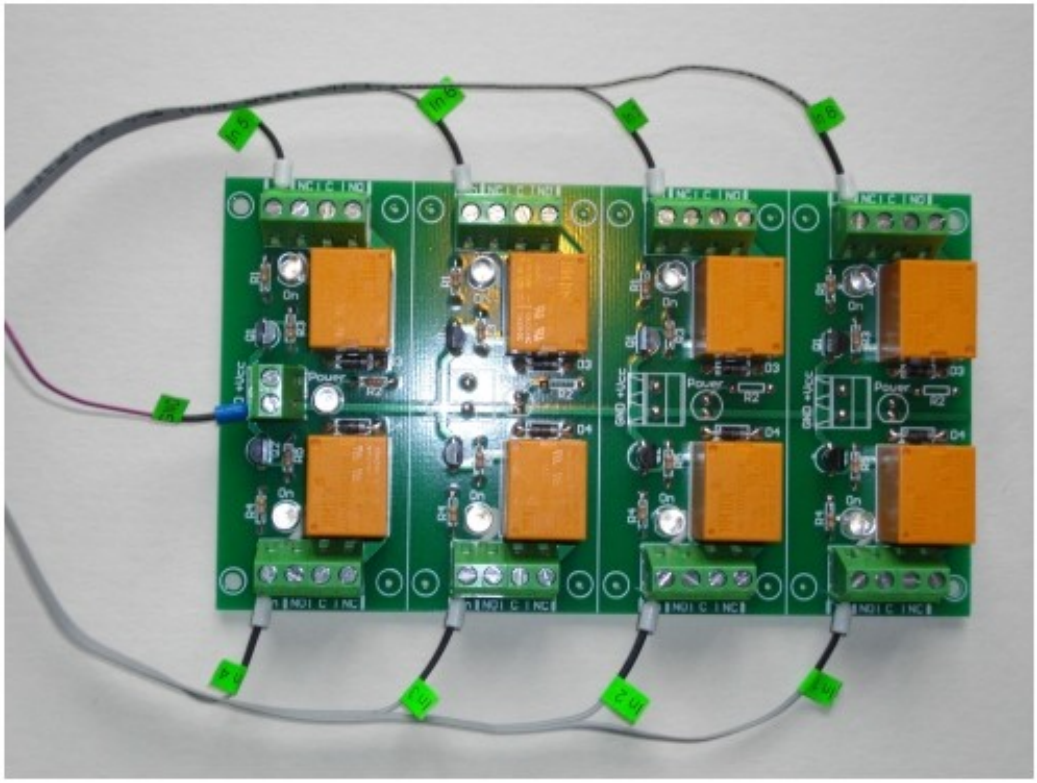

Figure 25. Connecting the GND wire to the relay board

6. Connecting power supply

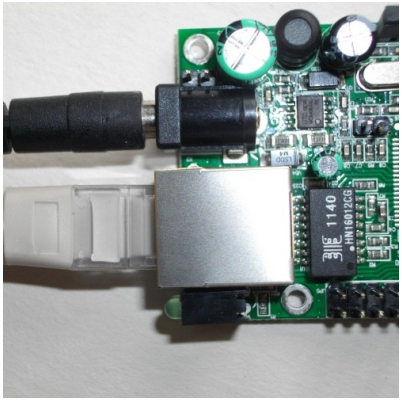

Figure 26. Plug the power supply jack into DAEnetIP2

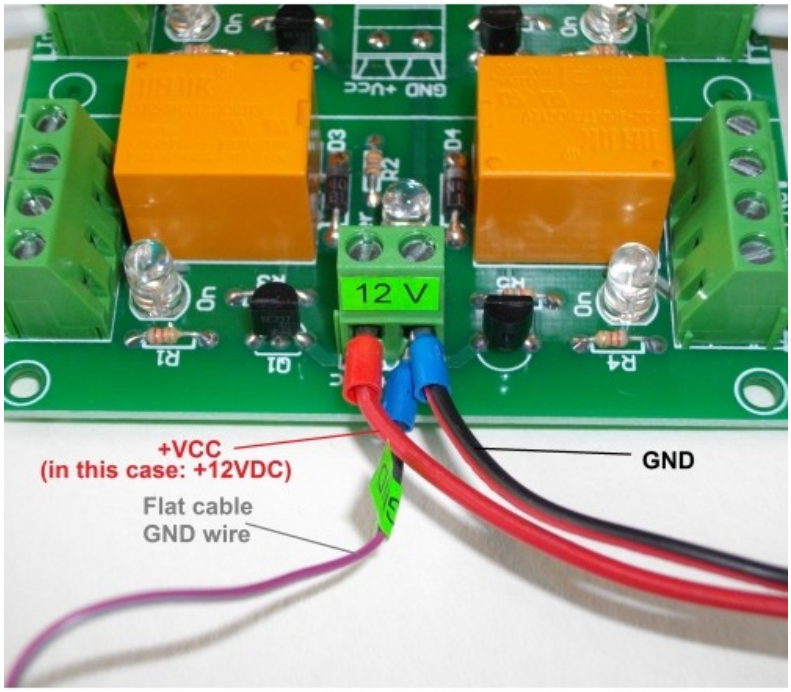

Figure 27. Connect the +Vcc and GND wires into the relay board power supply screw terminal as it is shown on the image above.

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 accept from 7.5V - 25V)

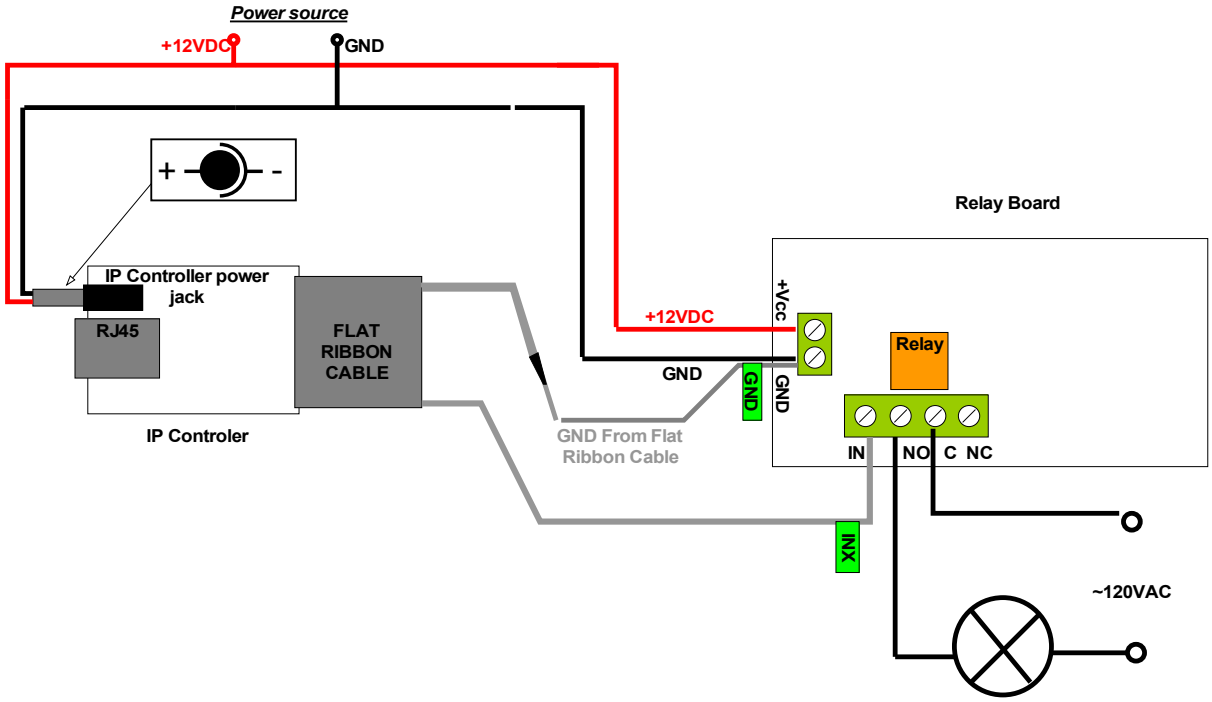

Figure 28. Single power supply source.

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 Power supply source 2 (for the relay board) is 24VDC. Power supply source 1 (for DAEnetIP2) may be from 7.5VDC up to 25VDC.

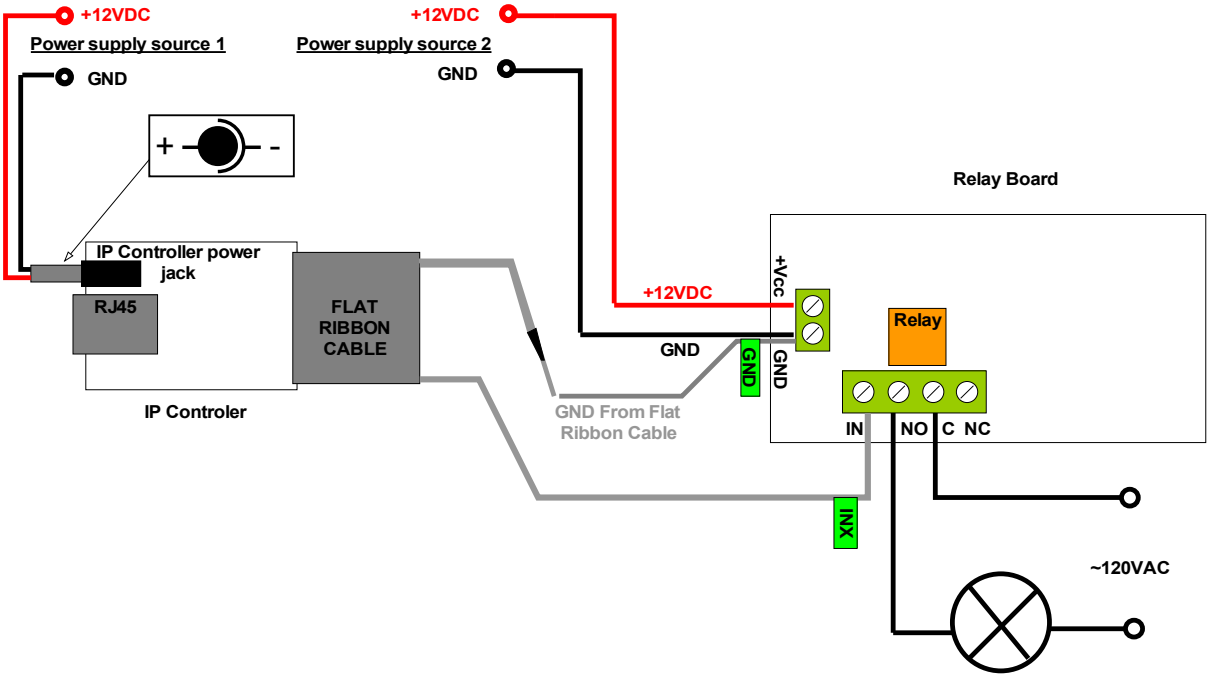

Figure 29. 2 separate power supply sources

To calculate what currency rate power supply you need, you will have to make a sum with DAEnetIP2 current consumption + relay board current consumption. DAEnetIP2 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

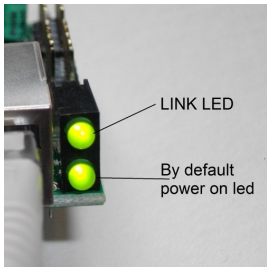

Figure 30. DAEnetIP2 leds. The link led (top) is blinking and the bottom led by default shows the power on and it is constantly on.

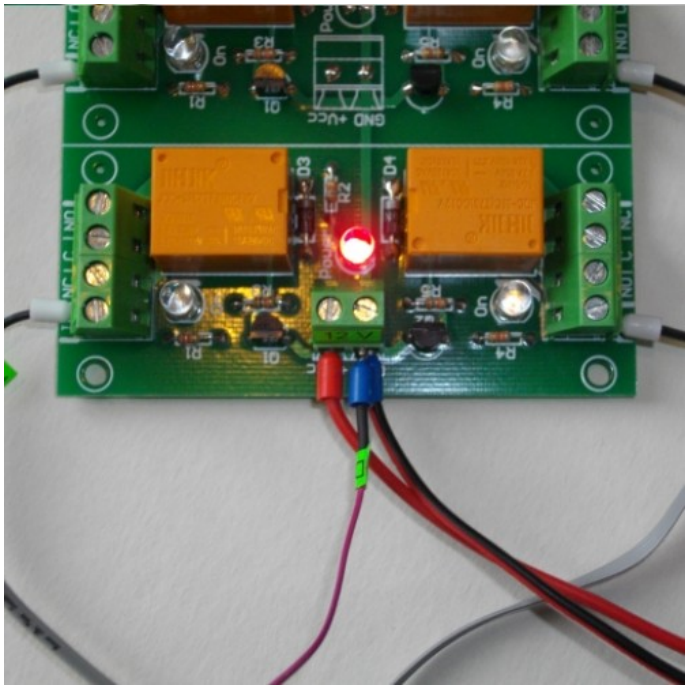

Figure 31. Relay board power led is on constantly.

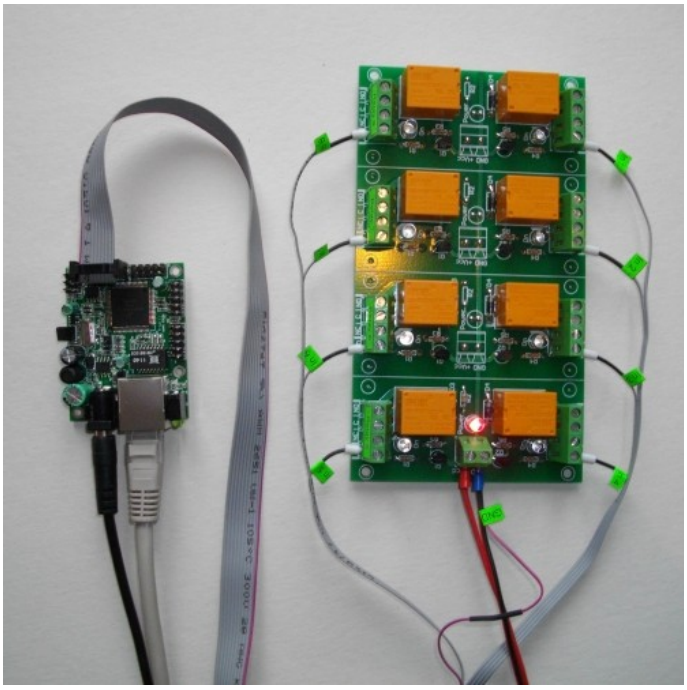

Figure 32. The kit in working condition. The same is for the other kits.

11. Appendix 4. Port forwarding - for advanced users

This appendix describes how to access the *DAEnetIP2* 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 network ports. These ports are:

- SNMP port, by default 161
- HTTP port, by default 80

DAEnetIP2 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:

- Port 10080 for HTTP
- Port 10161 for SNMP

This may easily be done from the DAEnetIP2 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

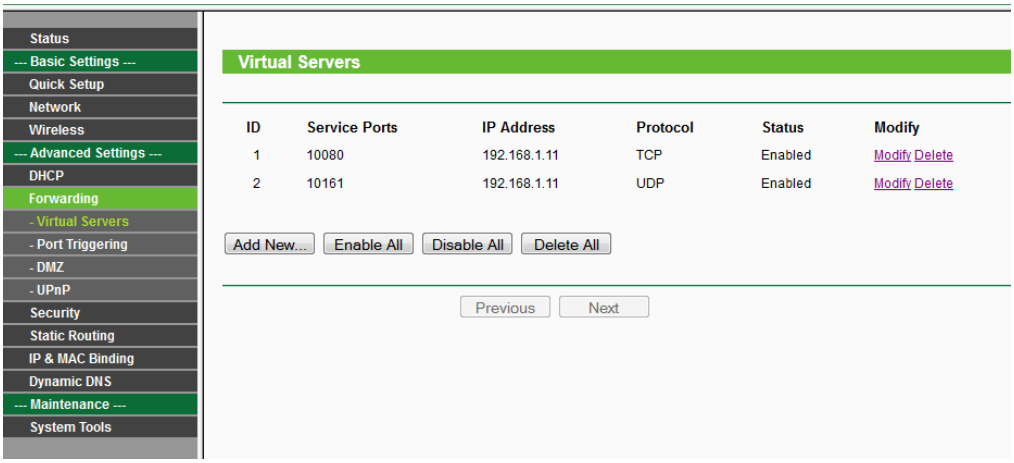

Figure 33. Port forwarding

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

3. Now it is possible to access the ***DAEnetIP2*** 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 .1.3.6.1.4.1.19865.1.1.1.0 - 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/

12. Appendix 5. Software

Denkovi Assembly Electronics LTD provides several application that may be used for testing, demonstrations, configurations and very simple automation projects.

You can see also what else 3rd parity software is available for DAEnetIP2 on this link http://denkovi.com/page/43/the-3rd-parity-software-for-denkovi-devices-.html

12.1. 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+relay board.

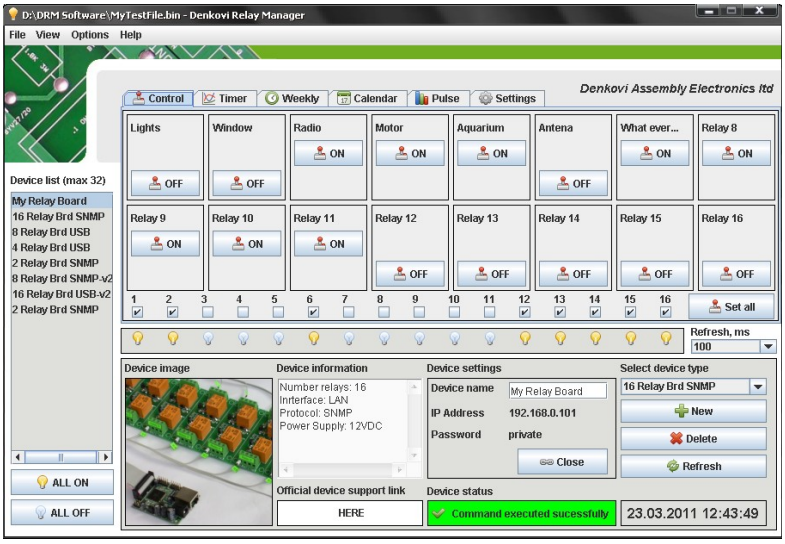

Figure 34. DRM software

Software web page - here

12.2. DAEnetIP2 Manager

DAEnetIP2 Manager is configuration utility for Denkovi DAEnetIP2 controller.

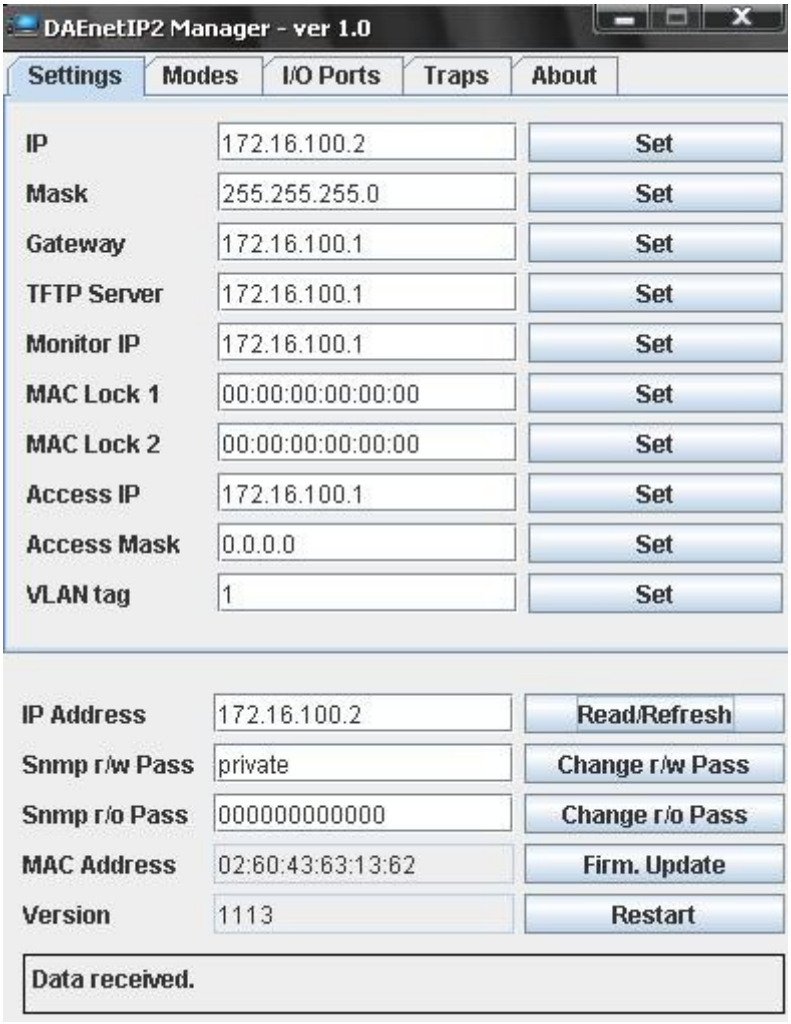

Figure 35. DAEnetIP2 Manager

Download link - here

12.3. Android Software by iSwitch, LLC

The featured Android application is offered to extend control of the DAEnetIP2 controller and relay board to your Android phone. This application is designed to work on an Android Smartphone or Tablet, however screens are optimized for Smartphones.

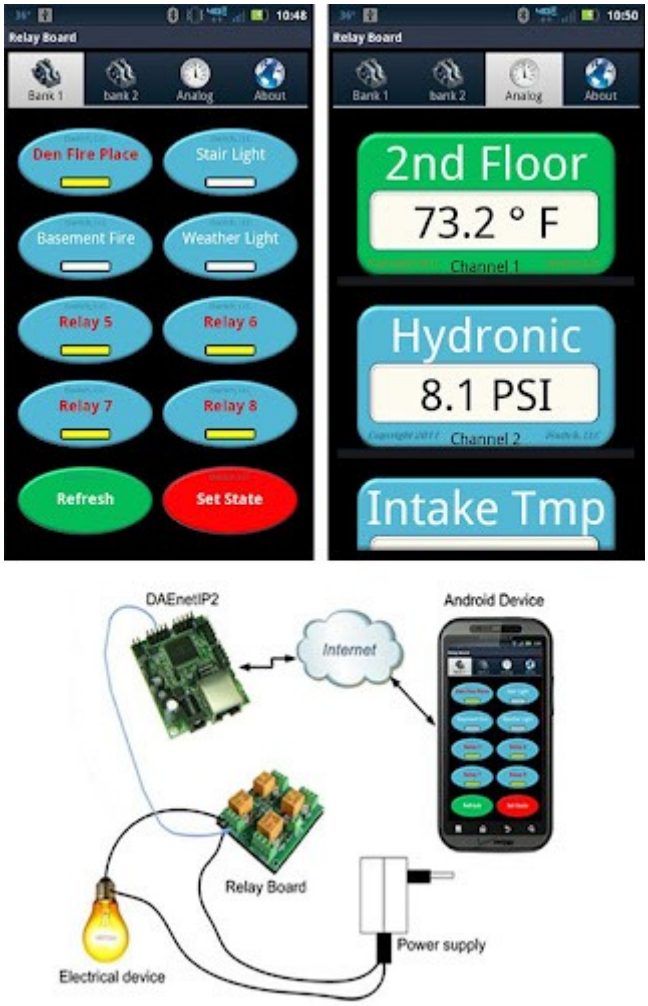

Figure 36. Android application from iSwitch, LLC

Download link - here

12.4. Control from command line

12.4.1. 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*** 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 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.mib file.

A simple test may be done to be sure if the tool is installed successfully:
run->cmd->
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.1.1.0
answer: SNMPv2-SMI::enterprises.19865.1.1.1.0 = IpAddress: 172.16.100.2

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 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.1.0 i 0
PING 1.1.1.1 -n 1 -w 5000
snmpset -v1 -c private 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.1.0 i 1

1. Save the file
2. Run it.

12.4.2. 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 192.168.1.11 .1.3.6.1.4.1.19865.1.1.1.0
(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 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.1.0 i 0
sleep 5s
snmpset -v1 -c private 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.1.0 i 1

3. Save the file
4. Run it.

12.4.3. Example commands

- SNMPGET examples

Get DAEnetIP2 IP address
snmpget -v1 -c 000000000000 172.16.100.2 Denkovi.DAEnetIP2.Configuration.cfgIP.0
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.1.1.0

Get the MAC Address
snmpget -v1 -c 000000000000 172.16.100.2 Denkovi.DAEnetIP2.Configuration.cfgMAC.0
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.1.2.0

Get P6.1 - This will read analog input 1 level. The rsult is from 0 up to 1023.
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.3.1.0

Get P6.8 This will read analog input 8 level. The rsult is from 0 up to 1023.
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.3.8.0

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 172.16.100.2 .1.3.6.1.4.1.19865.1.2.3.33.0

Get P3.1 - This will read digital output P3.1 level
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.1.1.0

Get P3.8 - This will read digital output P3.8 level
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.1.8.0

Get the whole P3
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.1.33.0

Get P5.1 - This will read digital output P5.1 level
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.1.0

Get P5.8 - This will read digital output P5.8 level
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.8.0

Get the whole P5
snmpget -v1 -c 000000000000 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.33.0

- SNMPSET examples

Set DAEnetIP2 IP address
snmpset -v1 -c private 172.16.100.2 Denkovi.DAEnetIP2.Configuration.cfgIP.0 a 172.16.100.3
snmpget -v1 -c private 172.16.100.3 .1.3.6.1.4.1.19865.1.1.1.0 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 172.16.100.2 .1.3.6.1.4.1.19865.1.2.1.1.0 i 0

Set P3.8 - This will set pin 1 from digital output port P3 in '1' (High level)
snmpset -v1 -c private 172.16.100.2 .1.3.6.1.4.1.19865.1.2.1.8.0 i 1

Set the whole P3 - This will set all the 8 pins from digital output port P3 in '1'
snmpset -v1 -c private 172.16.100.2 .1.3.6.1.4.1.19865.1.2.1.33.0 i 255

Set P5.1 - This will set pin 1 from digital output port P5 in '0' (Low level)
snmpset -v1 -c private 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.1.0 i 0

Set P5.8 - This will set pin 1 from digital output port P5 in '1' (High level)
snmpset -v1 -c private 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.8.0 i 1

Set the whole P5 - This will set all the 8 pins from digital output port P5 in '1'
snmpset -v1 -c private 172.16.100.2 .1.3.6.1.4.1.19865.1.2.2.33.0 i 255

13. Appendix 6. Software examples

Software examples can be found on this link

14. Appendix 7. HTTP API commands

DAEnetIP2 i/o lines can be controlled/accessed via HTTP API commands and basic access authentication is required to do that. The controller supports only 2 HTTP API commands: for read and write all the i/o lines.

The digital outputs (P3 and P5) can be controlled by sending this HTTP command:

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

admin:admin are the username:password
device.ip.address is the DAEnetIP2 IP address (by default it is 172.16.100.2)
01=00 is the state of P3 DO
02=FFis the state of P5 DO

For example:
http://admin:admin@172.16.100.2/iochange.cgi?ref=re-io&01=00&02=FF

The i/o states (P3, P5, P6) can be retreived by sending this HTTP command:

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@172.16.100.2/ioreg.js

15. Appendix 8. Firmware upgrade

Bellow are given the steps for **firmware** upgrade of the ***DAEnetIP2*** with ***DAEnetIP Burner:***

1. Download and save the version you need for upgrading the. The binary (.bin) file must be downloaded from this link
2. Navigate the DAEnetIP Burner application to this file by clicking button with label "…".
3. From the **Device list** select DAEnetIP2.
4. In the **IP address field** type the IP address of the DAEnetIP2 controller that must be upgraded. By default it is 172.16.100.2.
5. In the **Port field** type the target port on that DAEnetIP2 can be reached. This is the SNMP port. By default it is 161.
6. In the **Password field** type the SNMP password used in this DAEnetIP2 controller. By default it is "private"
7. Check if the settings are correct by clicking button "**Check device**". After successful connection under this button it must appears text with the DAEnetIP2 version. If this not happens it means the connection is not successful and you must repeat again steps 3-7.
8. Set the **TFTP Server.** This is usually the IP of the user's computer.
9. Set the **maximum retries field.** This field shows how many times the *DAEnetIP Burner* will try to reconnect with the DAEnetIP2 controller if the connection is lost for a moment. A value of 5-10 is reasonable.
10. Start update by clicking **Burn button.** If everything is correct, a new line must appear in the event log and the progress bar must starts moving on.

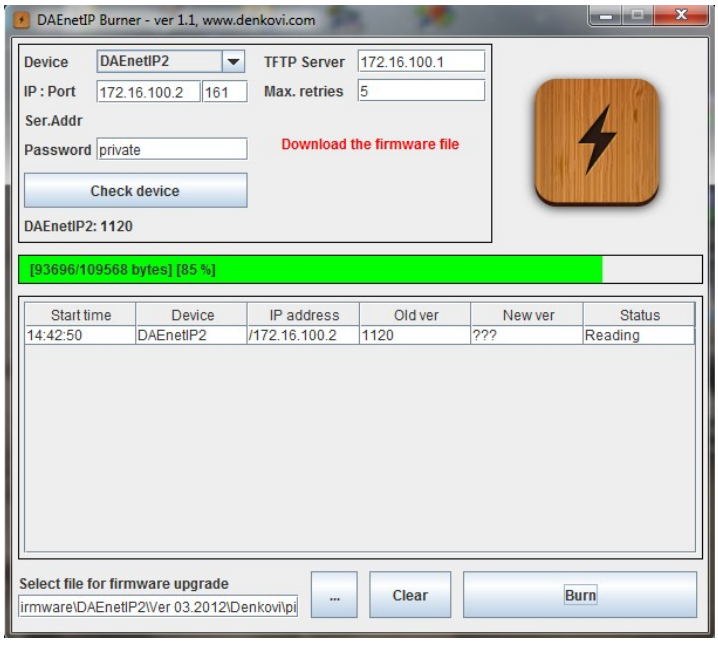

Figure 37. DAEnetIP Burner

11. Wait until the file is uploaded. This will be indicated when the **New version** field is not ??? but some value – form example 1.50. Then the **Status field** must be with value “File is uploaded successfully”.
12. Your DAEnetIP2 controller is upgraded successfully with the desired firmware version. Now when you click button “**Check device**”, the new version must appear.

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

This section describes how to use DAEnetIP2 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".

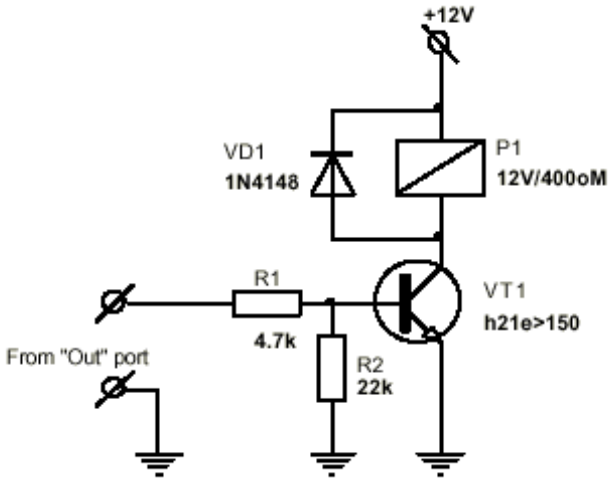

Figure 38. Connecting relay to digital output

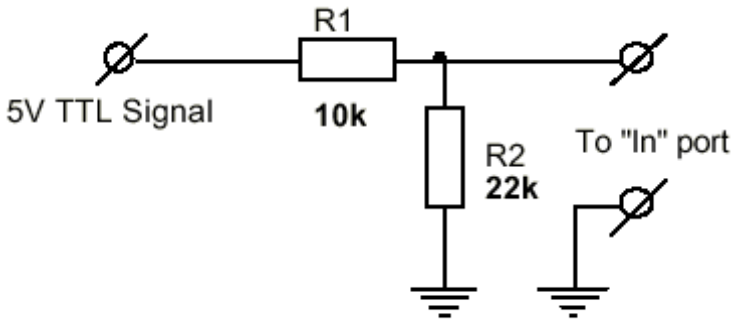

Figure 39. Using digital I/O pin as input

17. 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 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.

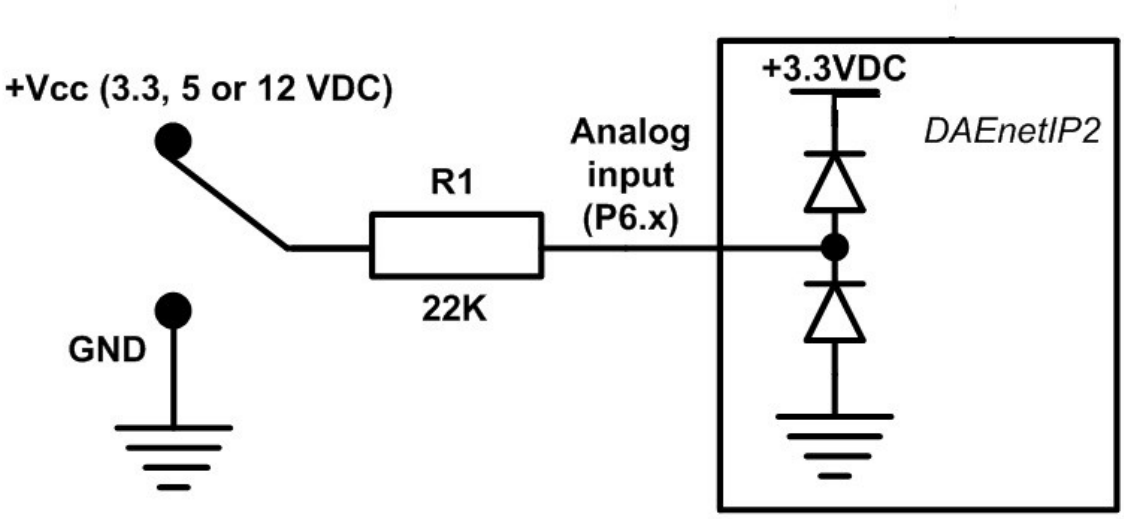

Figure 40. Using analog inputs port P6

18. Appendix 11. Using analog temperature sensors

18.1. LM335Z

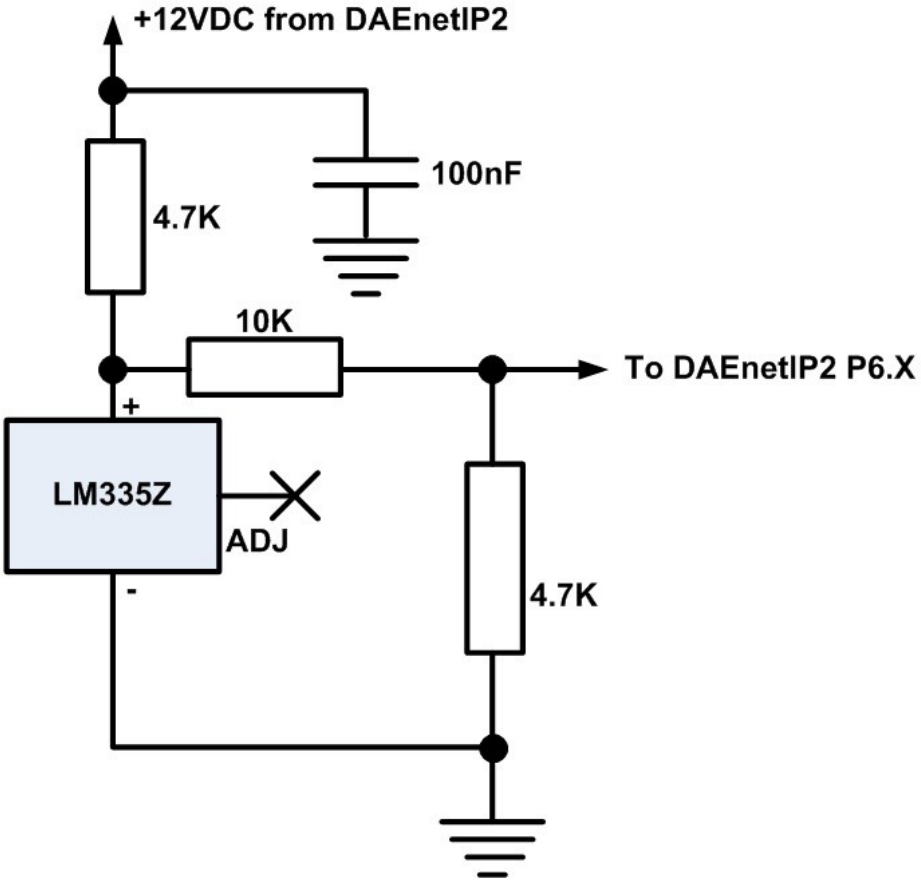

Figure 41. DAEnetIP2 and LM335Z

On the figure above it is shown LM335Z connection to DAEnetIP2 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 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.

18.2. LM35DZ

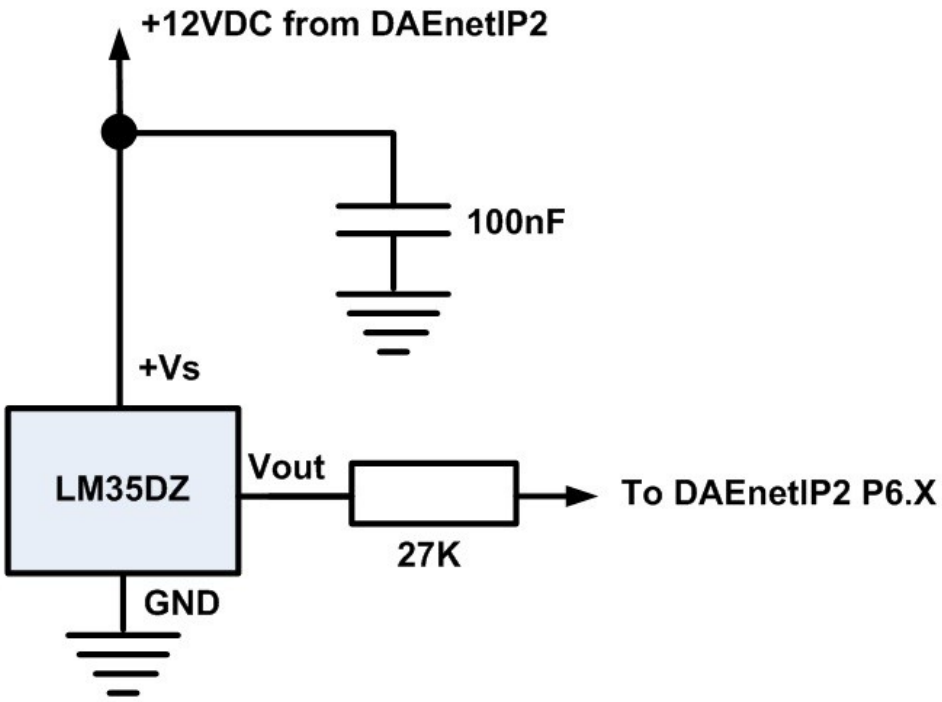

Figure 42. DAEnetIP2 and LM35DZ/LM34DZ

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 more difficult (it can not 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.

18.3. MCP9700A

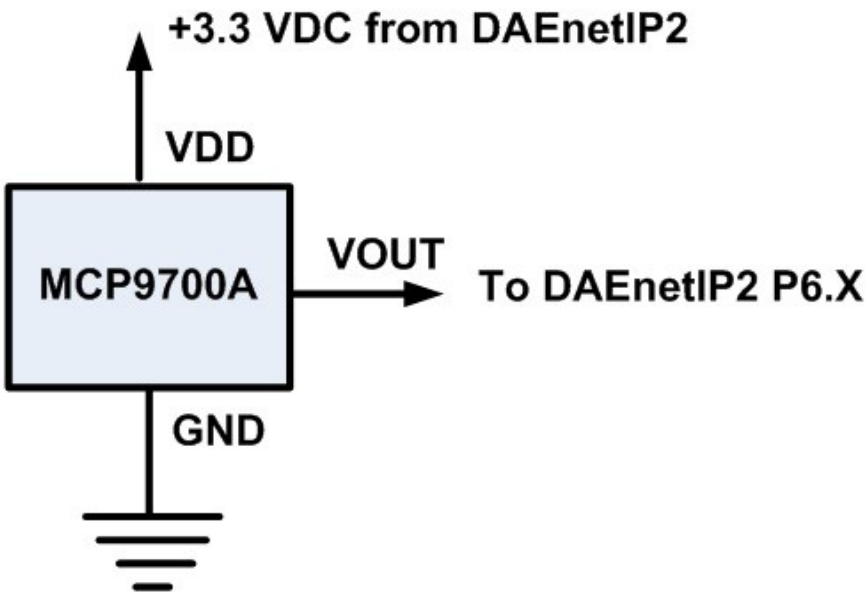

Figure 43. DAEnetIP2 and MCP9700A

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.

19. Appendix 12. Mechanical drawing

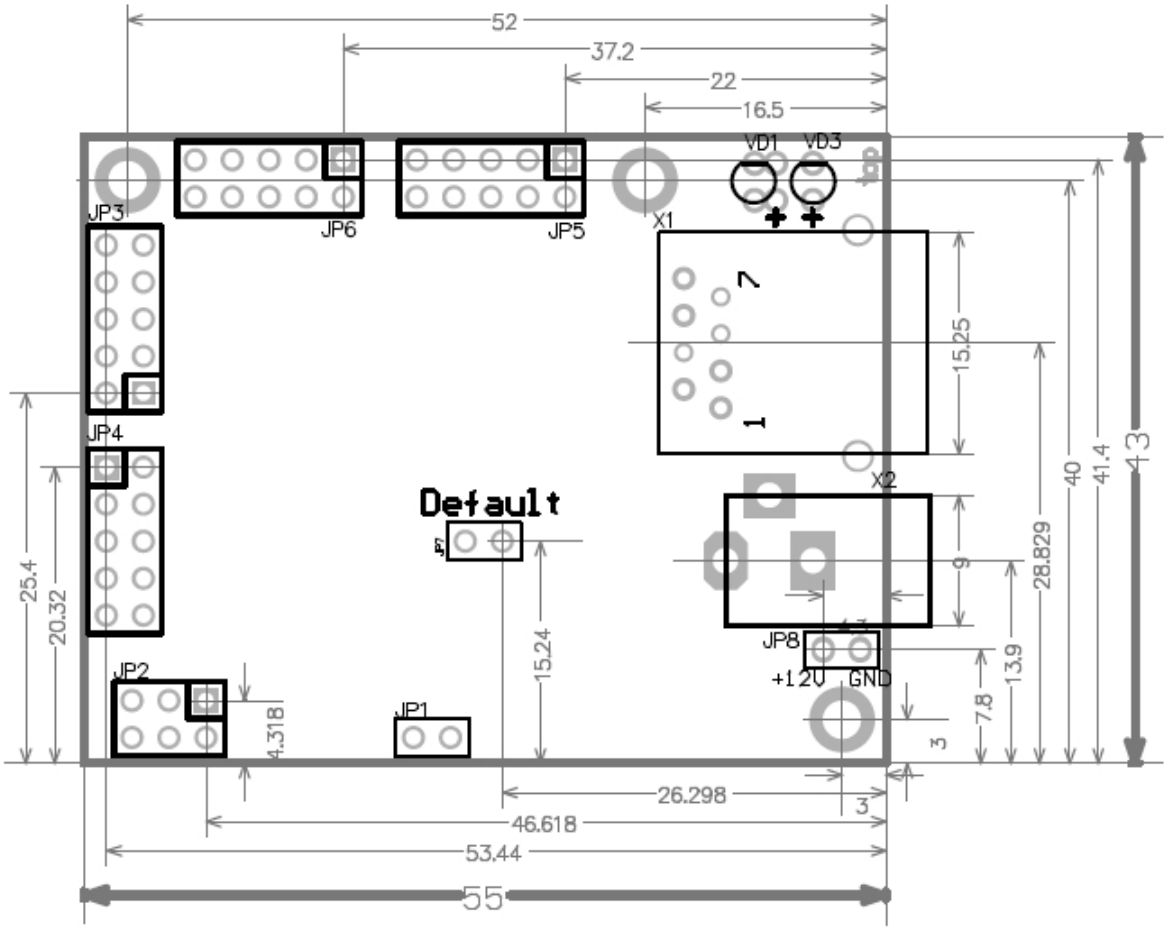

Figure 44. Mechanical drawing

20. Document revisions

- 22.03.2012 - First official document version (for firmware version 4.084)
- 11.02.2013 - Update with the new features of DAEnetIP2 regarding firmware version 4.097
- 08.04.2013 - Wiring diagram for LM335Z- correction
- 12.09.2013 - Added appendix: Using analog inputs (P6)
- 18.11.2013 - Port P3 and P5 control all pins via SNMP, correction of the OIDs.