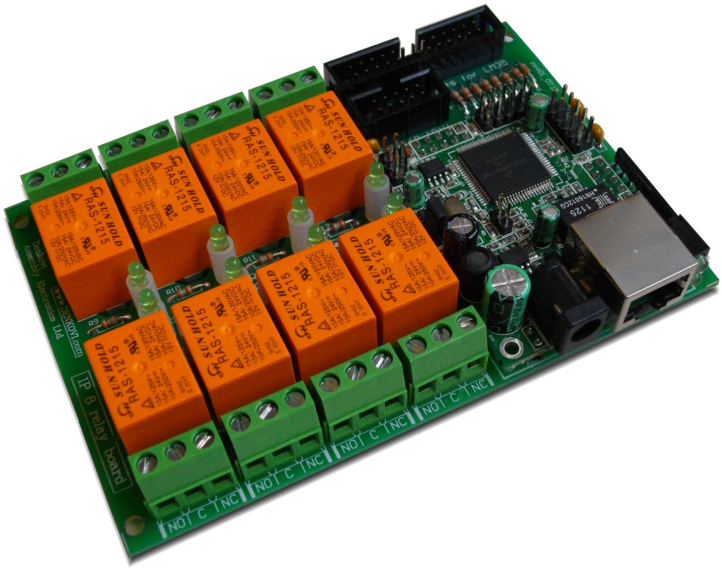
DAEnetIP2 Eight Relay Module

(optimized for temperature measurement with LM35DZ)

User Manual
Date: 18 Nov 2013



Content

1. Features

This is multifunctional standalone device for management, control and sensor monitoring (especially suitable for LM35DZ temperature sensor) over the LAN and WAN. It could be used for home automation, industrial automation, access control, fire and security systems.

- 10 Mb Ethernet interface with Link/Activity Led
- Power supply 12VDC or 24VDC - selectable by user
- Maximal power consumption:
  - 300 mA / 12VDC
  - 200 mA / 24VDC
- 8 SPDT Relay channels - selectable by user:
  - JQC-3FC/T73 (7A / 250VAC, 10A / 125VAC, 12A / 120VAC, 10A / 28VDC)
  - RAS-12-15 (10A / 250VAC, 15A / 120VAC, 15A / 24VDC)
  - RAS-24-15 (10A / 250VAC, 15A / 120VAC, 15A / 24VDC)
- 8 analog inputs with 10 bit resolution. Can be used for one from the both applications:
  - either LM35DZ temperature sensor monitoring (over voltage and inverse voltage protection). Temperature range: 0°C - 100°C
  - either 0-10VDC industrial voltage measurement (over voltage and inverse voltage protection)
- 8 bit configurable digital TTL I/O port
- Standart protocols: ARP, IP, ICMP (ping), DHCP
- Supports snmp v1 (snmpset, snmpget, snmptrap), HTTP, TFTP
- Ports for SNMP (161) and HTTP (80) can be changed
- Two MAC addresses protection
- It can be configured with SNMP requests or web browser
- Reset of the relays on incoming/outgoing ping timeout
- Function "load outputs states from EEPROM on boot"
- The ADC web page shows Temperature (°C and °F) and Voltage (0-10V)
- It can send traps according analog ADC level
- Analog Inputs may be referred to control the relay according their levels
- PCB parameters : FR4 / 1.5mm / two layers / metallized holes / HAL / white stamp / solder mask / Extra PCB openings for better voltage isolation / Doubled PCB tracks for better voltage isolation
- Dimensions suitable for mounting into DIN enclosures - 122 x 82 x 20 (mm)

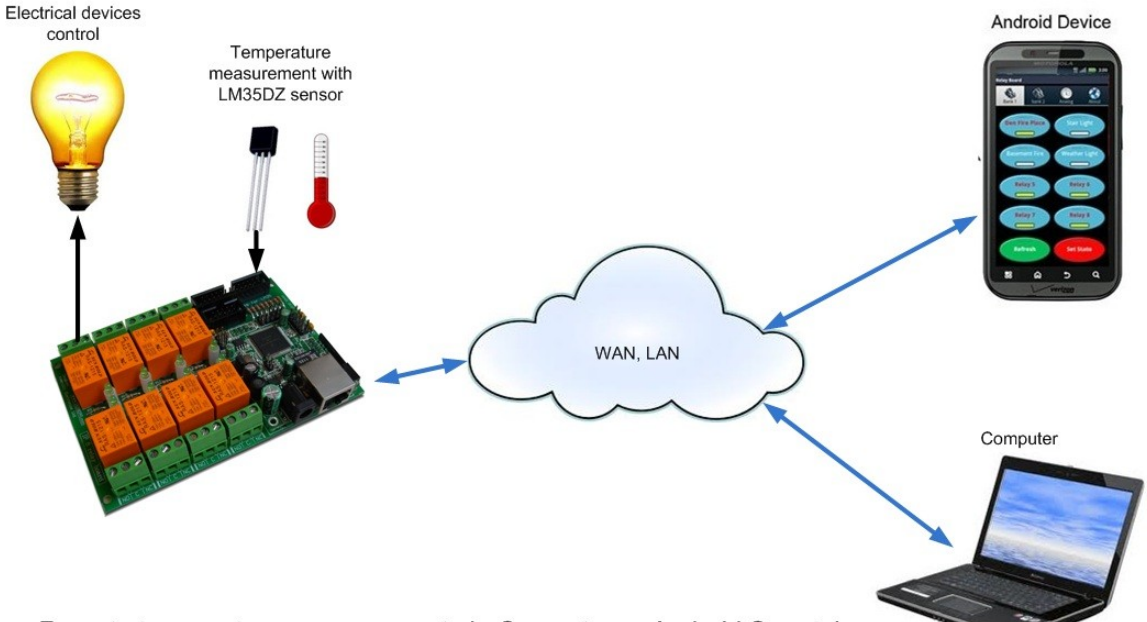
2. Technical parameters

Table 1. Technical parameters

Parameter	Value
Size	122mm x 825mm
Power supply voltage	12 VDC or 24 VDC
CPU power supply (output level 3.3VDC)	3.3V
Relay channels count	8
Digital I/O count (0-3.3V, when output - max current is 1mA)	8
Analog inputs count	8 (10bit ADC, Vref=1.2VDC - external source)
Digital inputs count [1)]	8
LM35DZ sensor inputs count [2)]	8
Inputs (0-10VDC) count [3)]	8
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

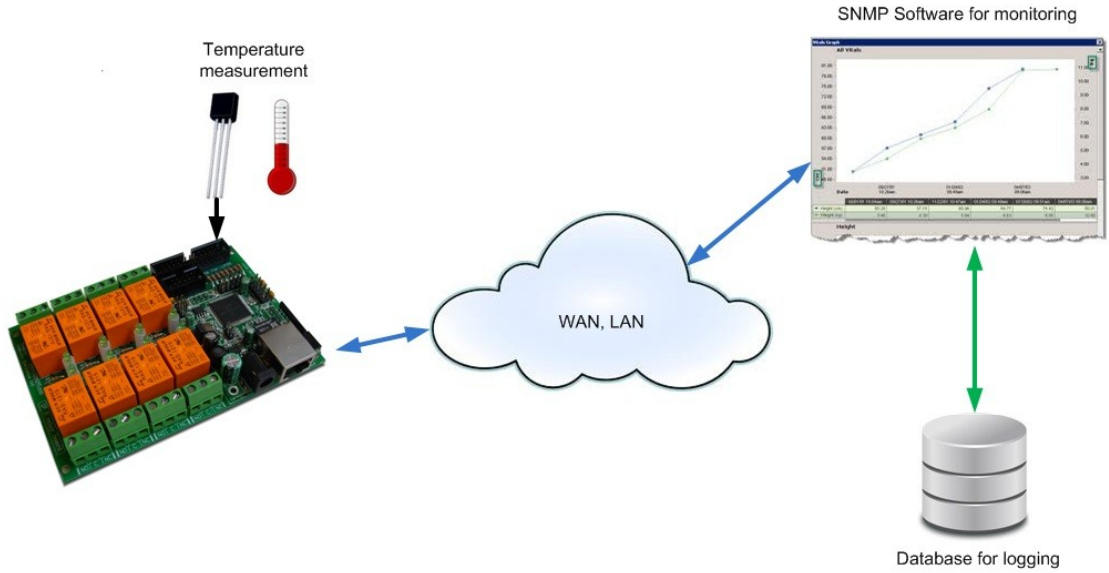
1) Digital inputs are the analog inputs, but the input voltage is software converted to 1 or 0
2) This port (JP1) is connected to the analog inputs port of DAEnetIP2
3) This port (JP3) is connected to the analog inputs port of DAEnetIP2 (note it is possible to use only one pin of analog input port of DAEnetIP2 at a time - either LM35DZ sensor pin either 0-10V pin). Otherwise the analog input port may be damaged.

3. Application examples



- Remote temperature measurement via Computer or Android Smartphone
- Remote electrical devices control
- Management/monitoring for industrial
- Remote lock/unlock doors
- Home automation

Figure 1. Application example 1



- Monitoring and logging temperature or humidity. As DAEnetIP2 is not data logger, the logging must be done by the snmp manager.

Figure 2. Application example 2

4. Product installation

4.1. Connect DAEnetIP2 Eight Relay Module to computer for first time

1. Connect the device with your computer via **UTP crossover cable**. (note that the device does not support AUTO MDIX)
2. Supply with 12VDC or 24VDC (depending on selected model) 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.
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

4.2. Connect DAEnetIP2 Eight Relay Module to router

1. Do all the steps from 4.1
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.

5. Default Settings

5.1. 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, please load the default settings (see 5.2).

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 IP to ping	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

5.2. 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 5.1 from the current document

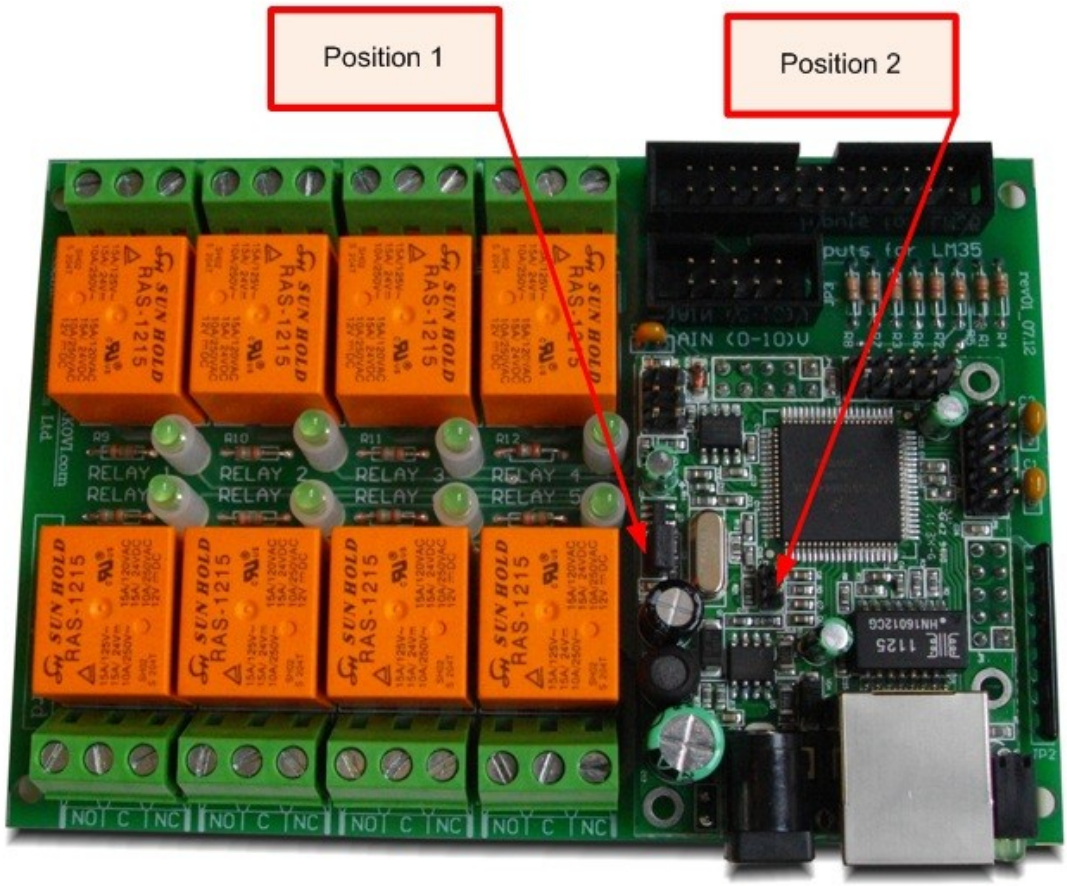


Figure 3. Loading default settings

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

6. Connectors and ports

6.1. DAEnetIP2 Eight Relay Module block diagram

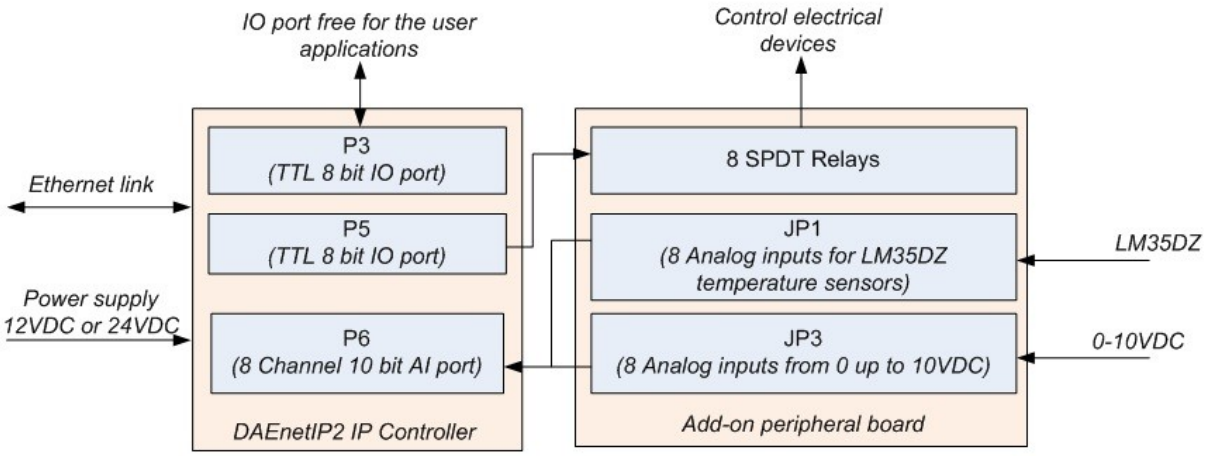


Figure 4. Block diagram

6.2. DAEnetIP2 Eight Relay Module Ports

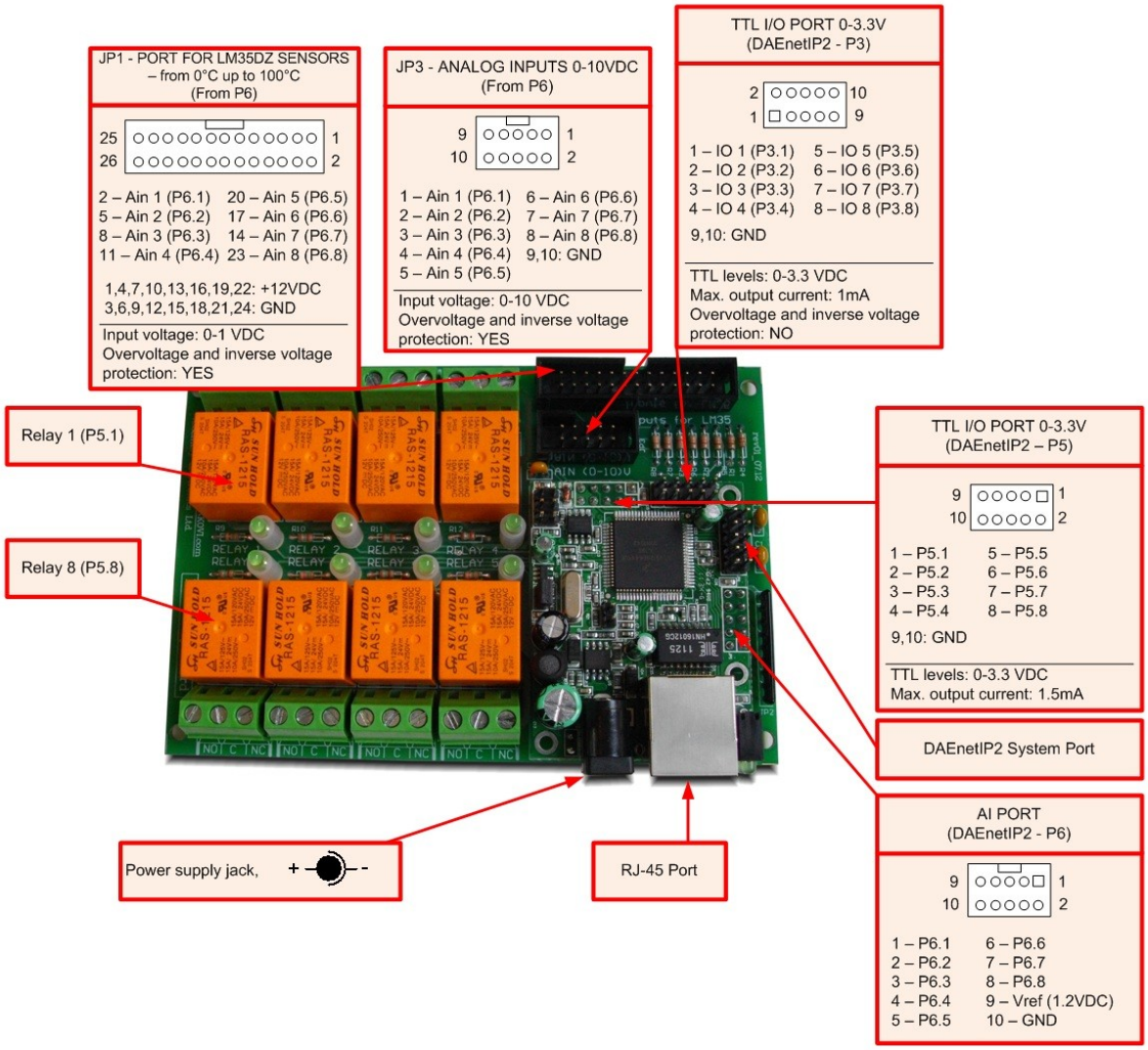


Figure 5. Ports

Note that it is strongly recommend to use only one port at a time - either **JP1 - Analog Inputs (0-10VDC)** either **JP3 - Port for sensors.** Otherwise the device may be permanently damaged !

6.3. DAEnetIP2 ports description

Table 3. I/O Ports

	Port P3 (digital outputs)			Port P5 (digital outputs)			Port 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		
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 input
- “Out” – the pin is output
- "I/O" – the pin is input or output depending the settings
- “Ain” – analog input

7. 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.

7.1. Setup page

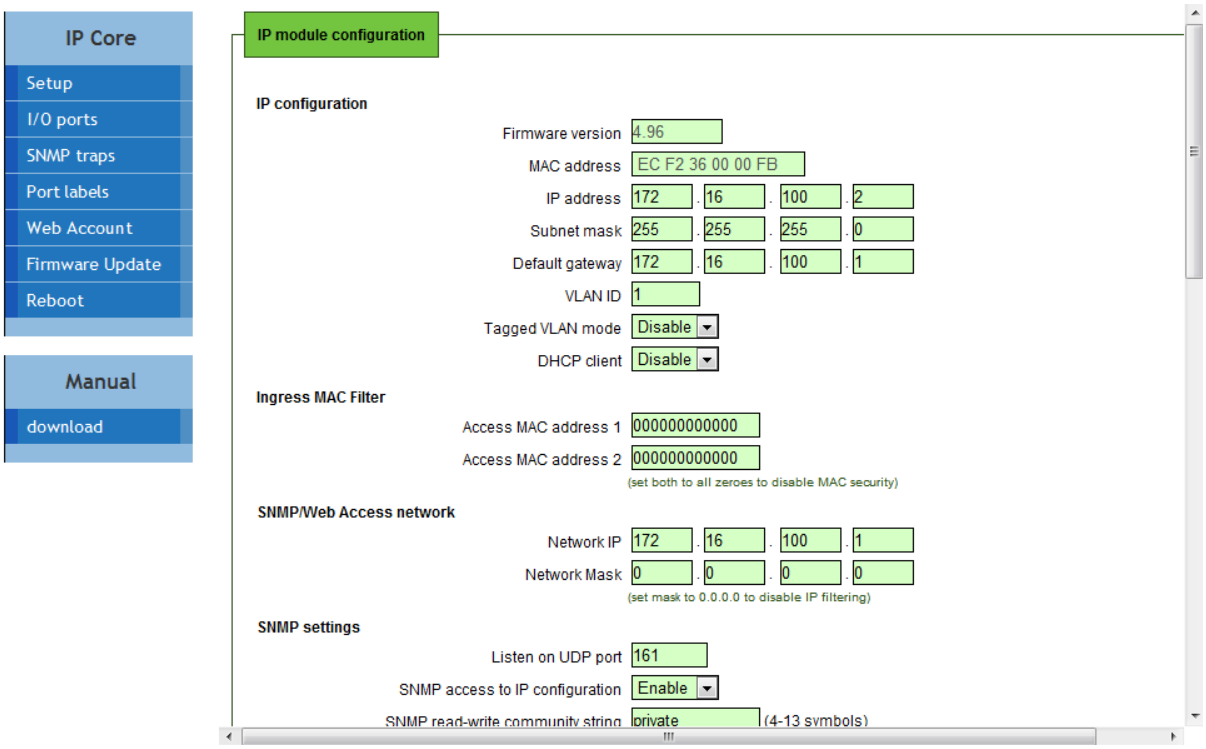


Figure 7. Setup page

7.1.1. Firmware version

This is the current firmware version. Can not be changed

7.1.2. MAC address

The MAC address of the module. Can not be changed

7.1.3. IP address

The IP address of the module.

7.1.4. Subnet Mask

The subnet mask of the module.

7.1.5. 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.

7.1.6. 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"

7.1.7. 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 the DHCP server. If there is answer from the DHCP server, the DAEnetIP2 accepts immediately the new settings and reconfigures its network interface.

7.1.8. 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.

7.1.9. 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.

7.1.10. 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.

7.1.11. 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 (or that is the port controlling the relays of the current module). The restart of external devices may be started/stopped by the user. The restart pulse with may be set by the user: (from 0 upto 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.

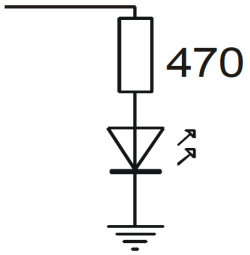


Figure 8. Connecting Ping LED

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”

7.1.12. IO Ports settings

DAEnetIP2 has 8+8 digital I/O and 8 analog inputs. 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.

IMPORTANT! The relays are connected to P5 and this port must works as output!

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 "

7.1.13. 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.

7.1.14. 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.

7.1.15. 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 accepte 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 "

7.2. SNMP traps

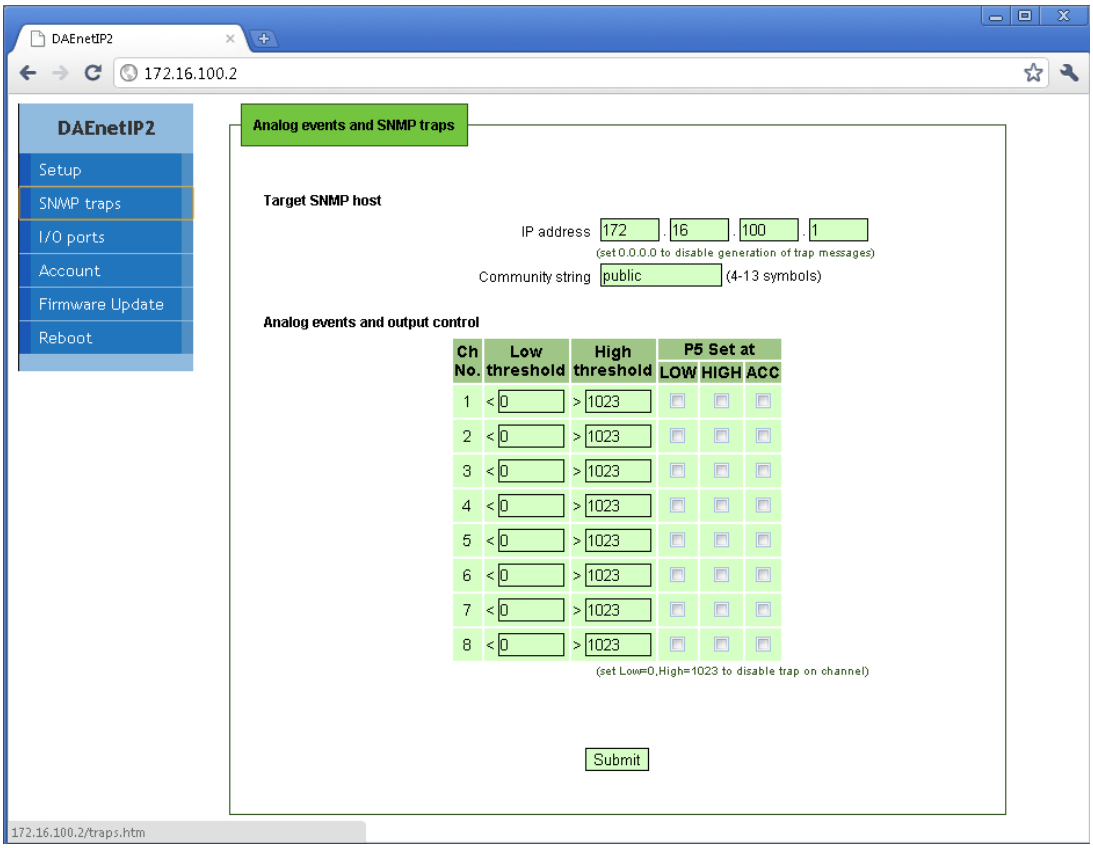


Figure 10. SNMP traps

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.

7.3. 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:

7.3.1. 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.

7.3.2. Mode “High”

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

7.3.3. Mode “Low/High”

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

7.3.4. 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 pin value aevPinX.0. Possible values are: None, Low, High, LowHigh, Acc

Web: Меню „SNMP traps-> P5 set at”

7.4. I/O Ports

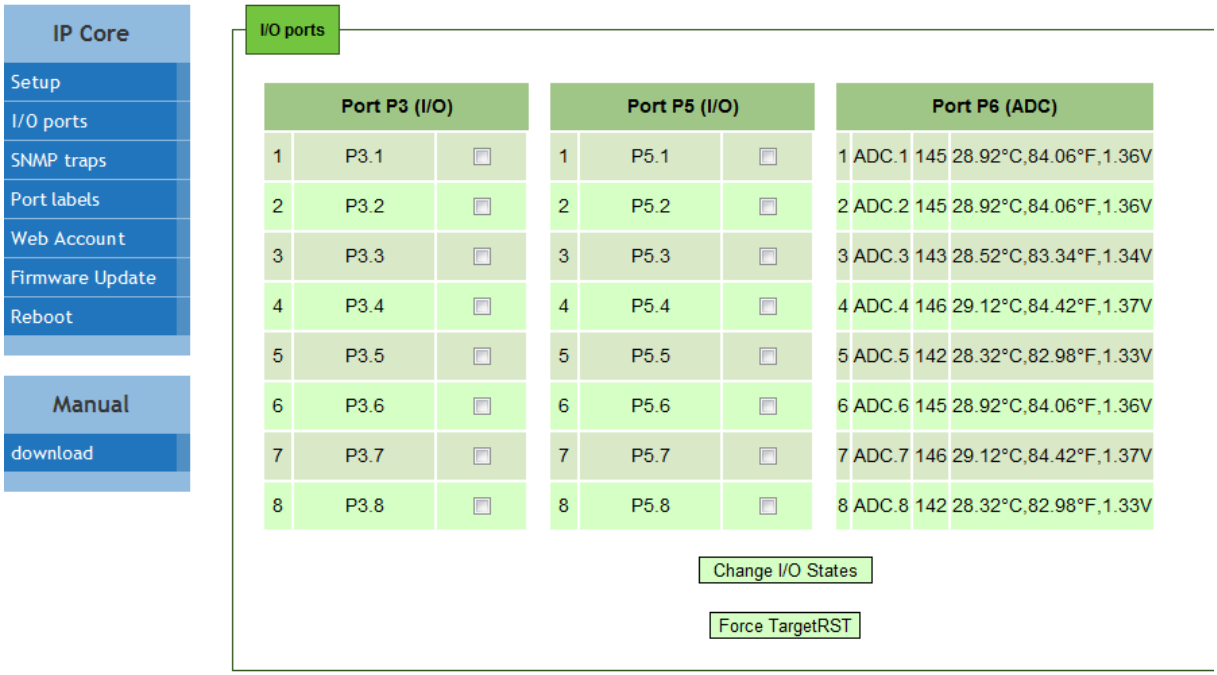


Figure 11. I/O ports web page

P3 is configurable digital TTL I/O port. It is possible to be configured by the user for its own purposes.

P5 is also configurable TTL I/O port. However the relays are connected to this port and that's why it must work as output port.

P6 is 8 channel 10 bit analog input port. The reference voltage Vref=1.2VDC (from external source). The web page is optimized to show:

- The returned ADC value - from 0 to 1023
- The temperature in C and F (valid only if LM35DZ sensor is connected to JP1)

$$Tc = Vref * \frac{ADCvalue}{1024} * \frac{8.0}{4.7} * 100[°C]$$

- The temperature in F (valid only if LM35DZ sensor is connected to JP1)

$$Tf = \left(Vref * \frac{ADCvalue}{1024} * \frac{8.0}{4.7} * \frac{9}{5} * 100 \right) + 32[°F]$$

- The value from the 0-10V AI port - JP3 (valid when there are not any connected LM35DZ sensors and voltage from 0 to 10VDC is supplied to JP3). To convert in voltage, you may use the following formula:

$$Ujp3 = Vref * \frac{ADCvalue}{1024} * \frac{37.7}{4.7}[V]$$

7.5. Port Labels

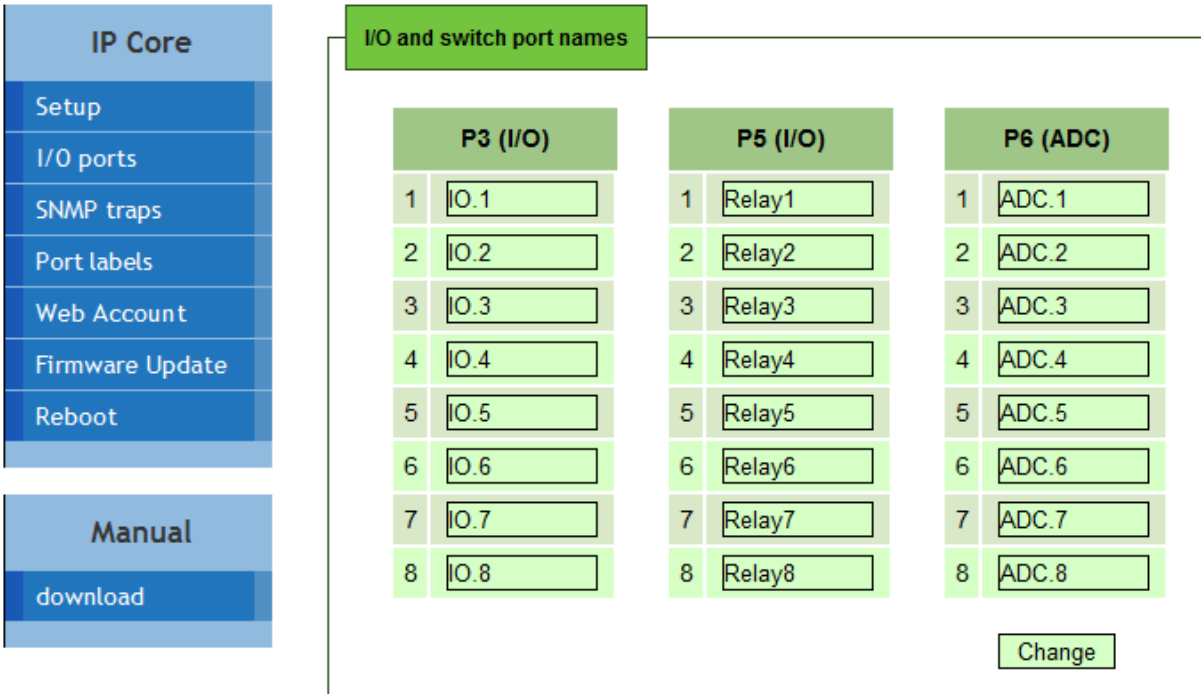


Figure 12. Port Labels

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.

7.6. Account

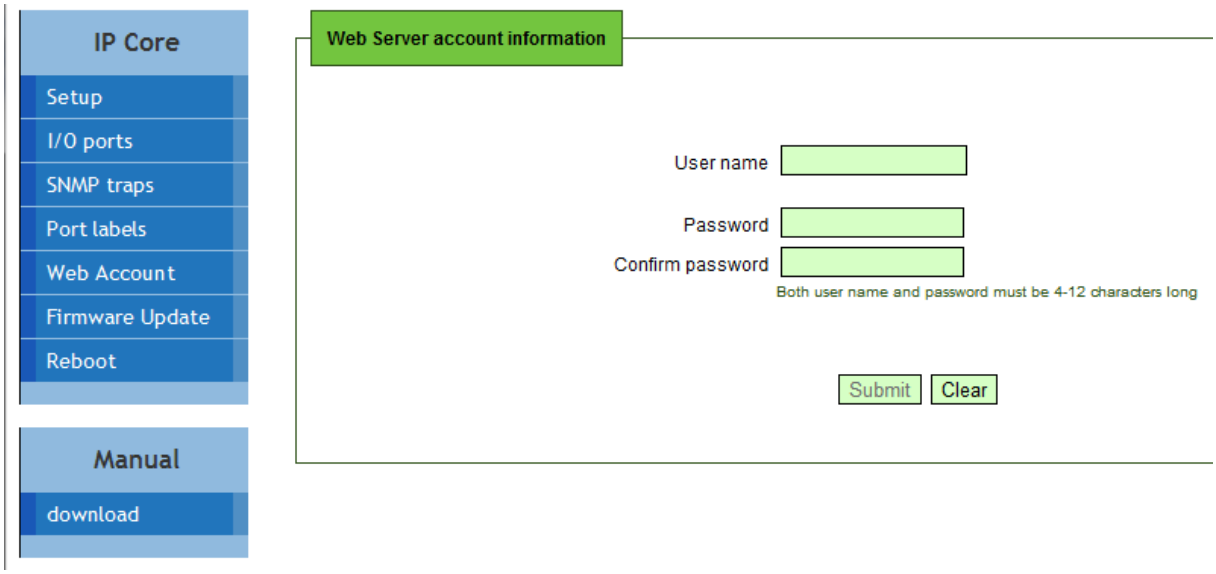


Figure 13. Account settings

7.7. 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.

7.8. Reboot

Reboots DAEnetIP2.

8. 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.

8.1. 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

8.2. 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)

8.3. 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) }

8.4. 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)

8.5. 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)

8.6. 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)

9. Appendix 1. Power supply

The power supply of the ***DAEnetIP2 Eight Relay Module (LM35DZ)*** may be selected during purchase - **12VDC** or **24VDC**.

Other supply voltages may damage the device!

The voltage polarity is tip "center positive"!

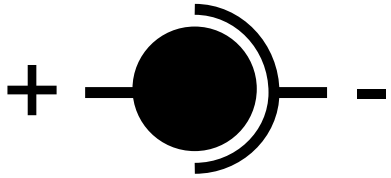


Figure 14. Power supply polarity

The device does not protection against reverse polarity voltage!

10. Appendix 2. Port forwarding - for advanced users

This appendix describes how to access the *DAEnetIP2 Eight Relay Module (LM35DZ)* 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 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

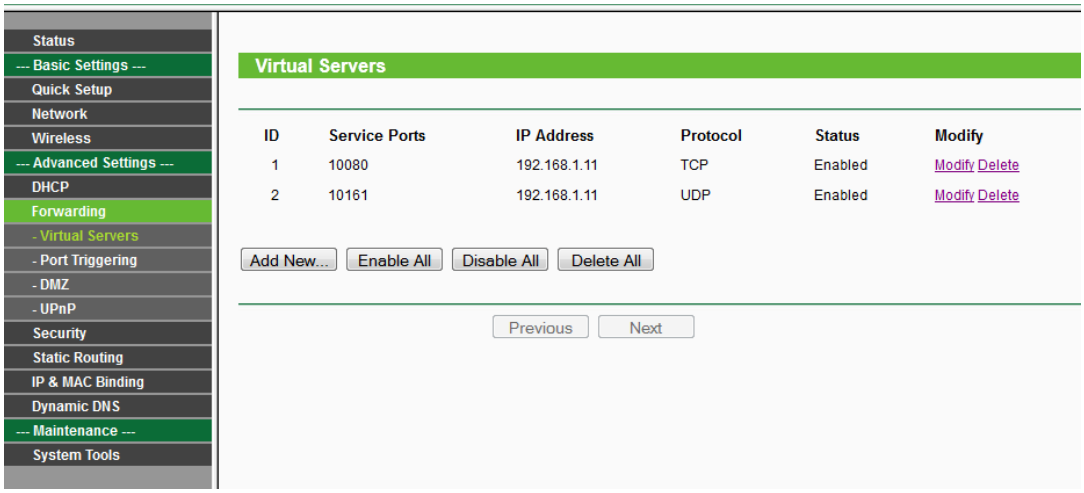


Figure 15. Port forwarding

The IP address 192.168.1.11 is actually the internal address of the ***DAEnetIP2 Eight Relay Module (LM35DZ).***

3. Now it is possible to access the ***DAEnetIP2 Eight Relay Module (LM35DZ)*** from everywhere outside the LAN.

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.

11. Appendix 3. Software

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

11.1. 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.

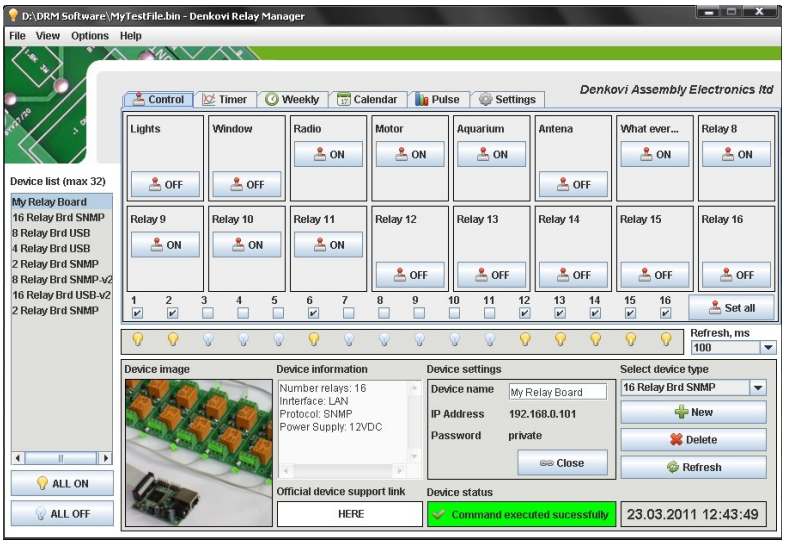


Figure 16. DRM software

Download link - here
Software web page - here

If the device ***DAEnetIP2 Eight Relay Module (LM35DZ)*** is not listed, you may use ***8 Relay Brd SNMP - v2***. Note also that this software does not read the I/O states or sensors values of the device, it just control the relays.

11.2. DAEnetIP2 Manager

DAEnetIP2 Manager is configuration utility for Denkovi DAEnetIP2 controller.

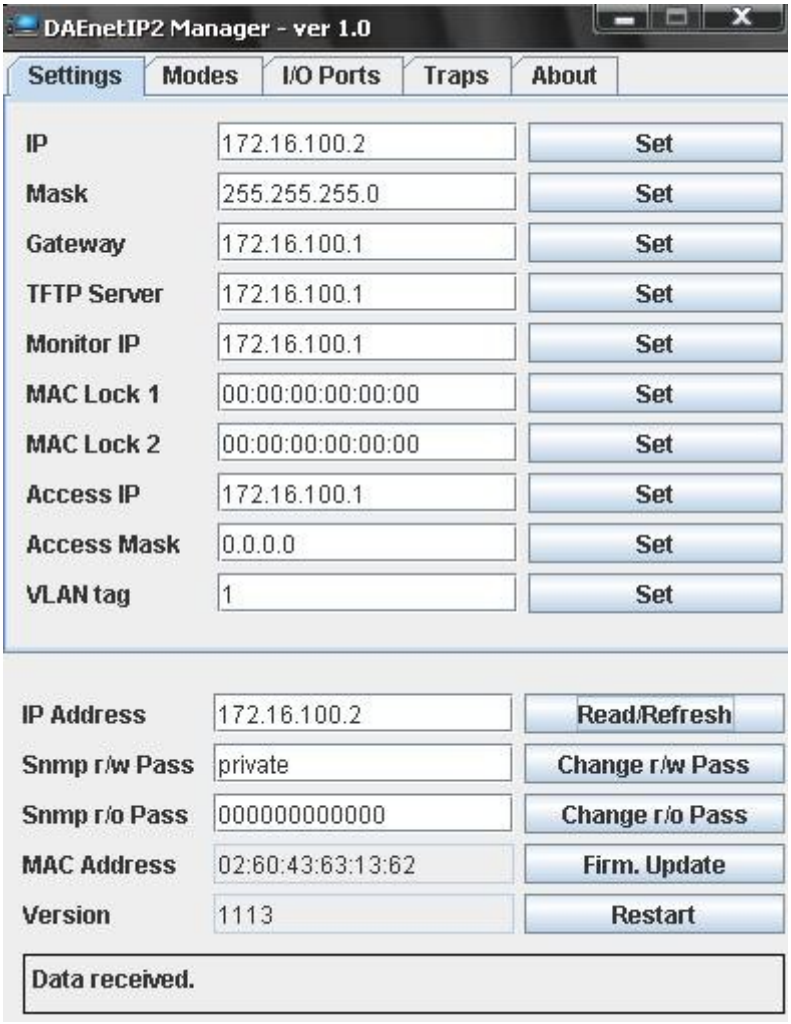


Figure 17. DAEnetIP2 Manager

Download link - here

11.3. 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.

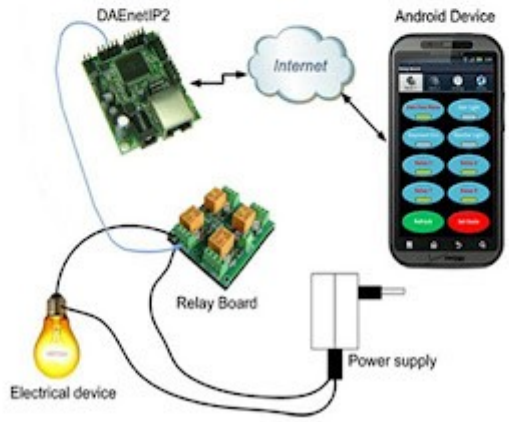


Figure 18. Android application from iSwitch, LLC

Download link - here

Example settings for Android Software by iSwitch, LLC **when use the** *DAEnetIP2 Eight Relay Module (LM35DZ)* **analog inputs with LM35DZ temperature sensor connected to Ain1:**

- Temperature in **Celsuis**:
  - Analog -> Channel 1 ->pressing continuously:
    - Value at 0 volts: 0
    - Value at 3.3 volts: 204.25
    - Units: °C
    - Save Settings

  - Analog -> Channel 1 ->pressing continuously->Configure Gauge for this Channel
    - Pick a Gauge: 0-100 °C
    - Gauge Title: Temp
    - Save Settings
- Temperature in **Farenheith**:
  - Analog -> Channel 1 ->pressing continuously:
    - Value at 0 volts: 32
    - Value at 3.3 volts: 399.65
    - Units: °F
    - Save Settings
  - Analog -> Channel 1 ->pressing continuously->Configure Gauge for this Channel
    - Pick a Gauge: 0-120 °F
    - Gauge Title: Temp
    - Save Settings

11.4. Control from command line

11.4.1. 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 Eight Relay Module (LM35DZ)*** 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. In this way you will be able to set Relay 1 ON for 5 seconds and the Turn it OFF

11.4.2. 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. In this way you will be able to set Relay 1 ON for 5 seconds and the Turn it OFF

11.4.3. 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

12. Appendix 4. Software examples

1.1. Java

Download the Netbeans project (RAR file for Windows) from here

1.2. .NET

Download the project (C #) from here

1.3. PHP

Download the file (in .txt format) from here. The php server must support snmp. It is tested with WAMP (with snmp lib activated).

13. Appendix 5. Firmware upgrade

Bellow are given the steps for **firmware** upgrade of the ***DAEnetIP2 Eight Relay Module (LM35DZ)*** with ***DAEnetIP Burner:***

1. Download and save the version you need for upgrading the ***DAEnetIP2 Eight Relay Module (LM35DZ)***. The binary (.bin) file must be downloaded from this link (note the firmware file is different that the firmware file for DAEnetIP2)
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.
5. In the **Port field** type the 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 3-6.
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.

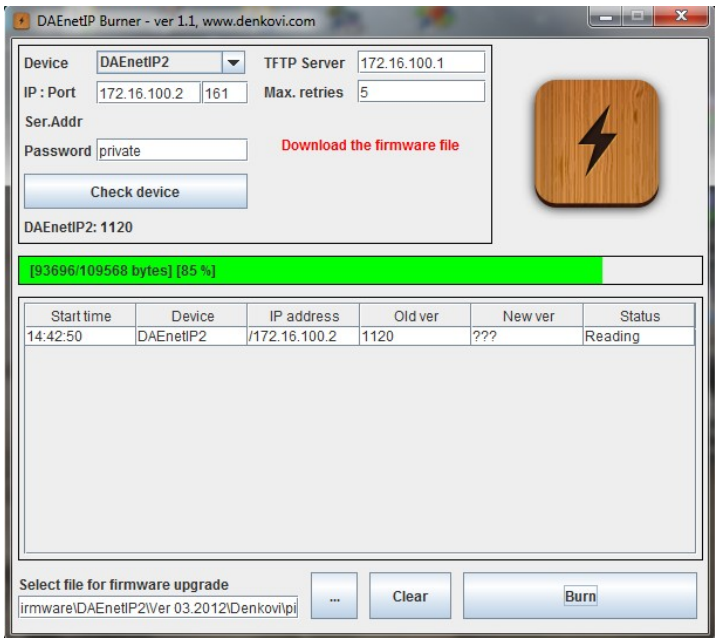


Figure 19. DAEnetIP Burner

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.

14. Appendix 5. I/O Ports (DAEnetIP2 P3)

This section describes how to used DAEnetIP2 P3 - 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 connection with 12V relay. The second shows example for 5V TTL signal input. R2 is recommend because sometimes the input signals are ‘tri-state”.

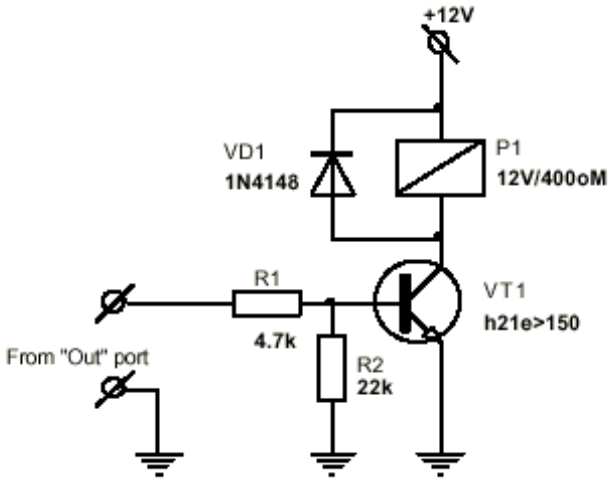


Figure 20. Connecting relay to I/O pin

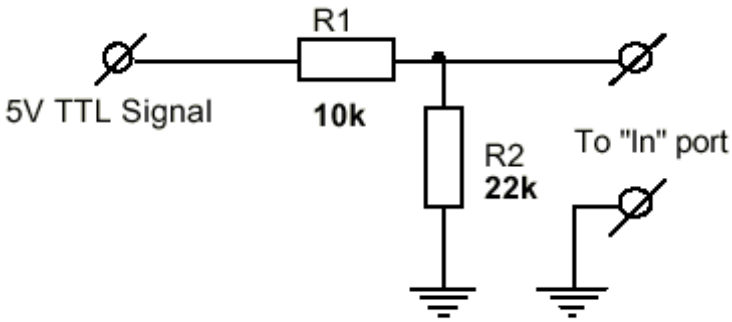


Figure 21. Using digital I/O pin as input

15. Appendix 4. LM35DZ sensor connection

Bellow it is shown the internal connections between the extended ports (JP1, JP3) of the module and the DAEnetIP2 P6 pins.

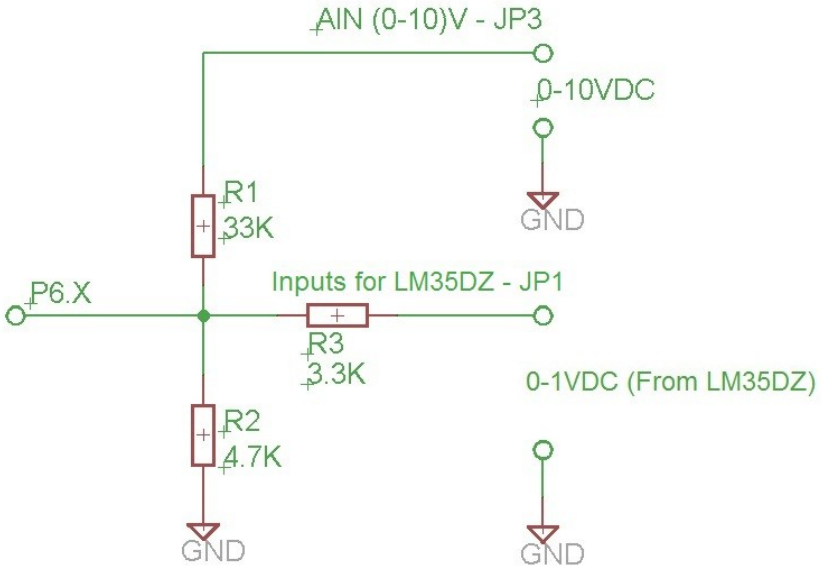


Figure 22. Internal connection of DAEnetIP2-P6 to JP1 and JP3 (All used resistors are with +-5% tolerance)

The DAEnetIP2 ADC is with 10 bit resolution and Vref=1.2VDC. This allows you temperature measurement with resolution about 5 division per degree.

To connect LM35DZ sensor to ***DAEnetIP2 Eight Relay Module (LM35DZ),*** you have to use the shown bellow schematic:

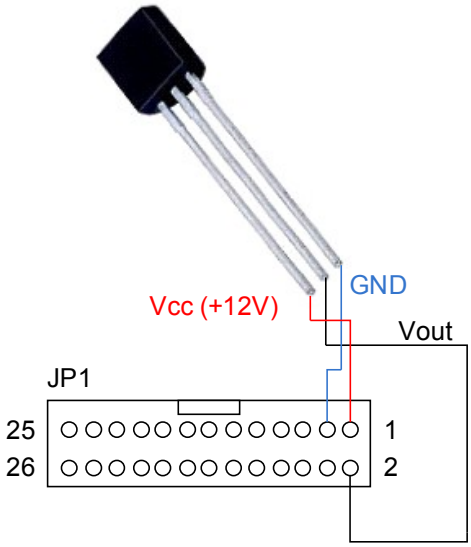


Figure 23. How to connect LM35DZ to JP1

Here it is shown example only for the first analog channel. Keeping in mind the JP1 pins shown on **Figure 5** you may connect the rest 7 LM35DZ sensors the same way.

16. Appendix 5. Mechanical draw

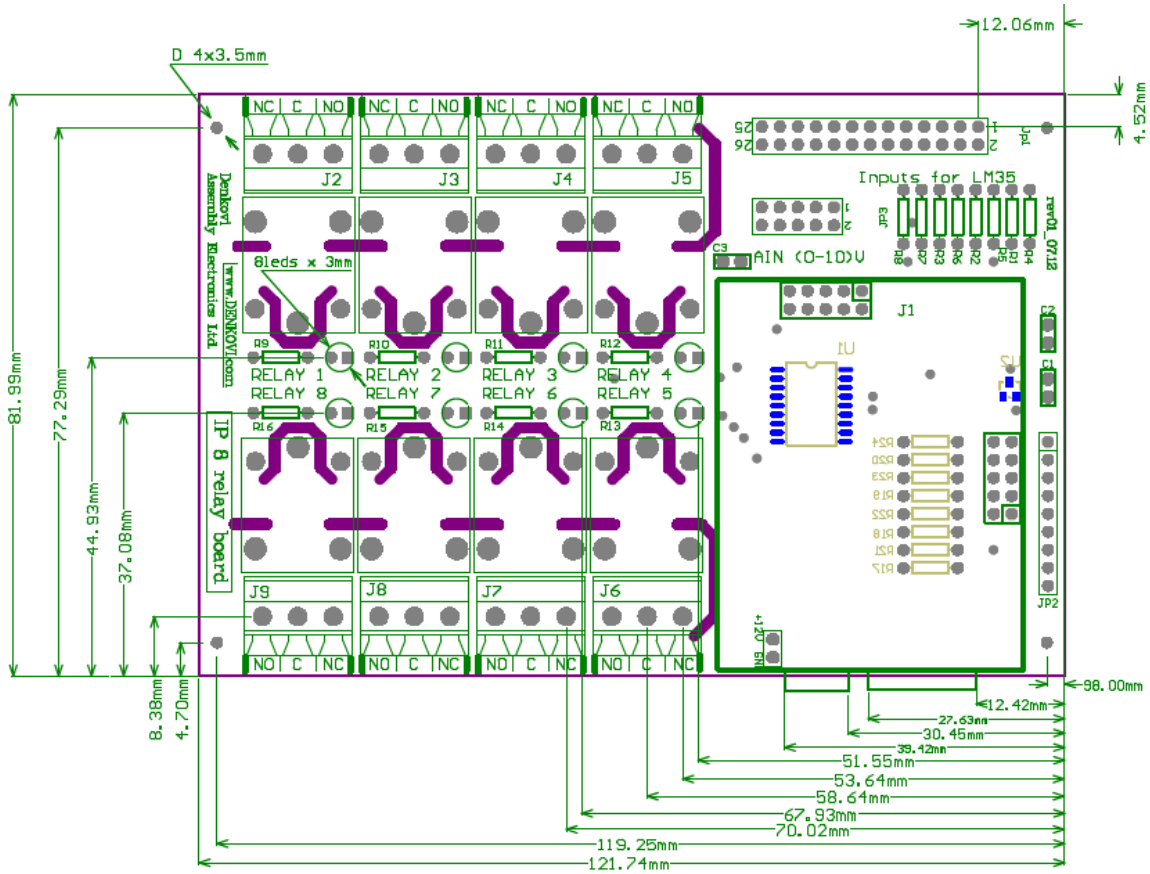


Figure 24. Mechanical dimensions

17. Document revisions

- 03.10.2012 - First document version
- 05.10.2012
  - Fixed formulas errors on page 21
  - Added extra information on page 44
- 05.12.2012
  - Replaced the incorrect temperature sensor type LM35 with the correct supported one – LM35DZ
- 11.03.2013
  - Fixed ports diagram error on page 10
- 18.11.2013 - Port P3 and P5 control all pins via SNMP, correction of the OIDs.