DAEnetIP2

User Manual
Date: 22.03.2012

Content

1. Basic features

DAEnetIP2 is multifunctional device for management and control. It could be used for industrial automatization, access control, fire and security systems. It is suitable also for controlling relay boards and tracking different sensors via internet.

- 10 Mb Ethernet interface with Link/Activity Led
- Low power consuption (<50mA/12V)
- Power supply 7.5 - 25V
- Standart protocols: ARP, IP, ICMP (ping), SNMP v1 (snmpget/snmpset/snmp traps), Web, TFTP (firmware update)
- Two MAC addresses protection
- It can be configurated with SNMP requests
- 2x8 digital outputs
- 1x8 combined analog or digital inputs with 10 bit ADC (0-3.3V)
- Integrated WEB server with authorization for all functions/parameters access
- Size – 43mm x 55mm

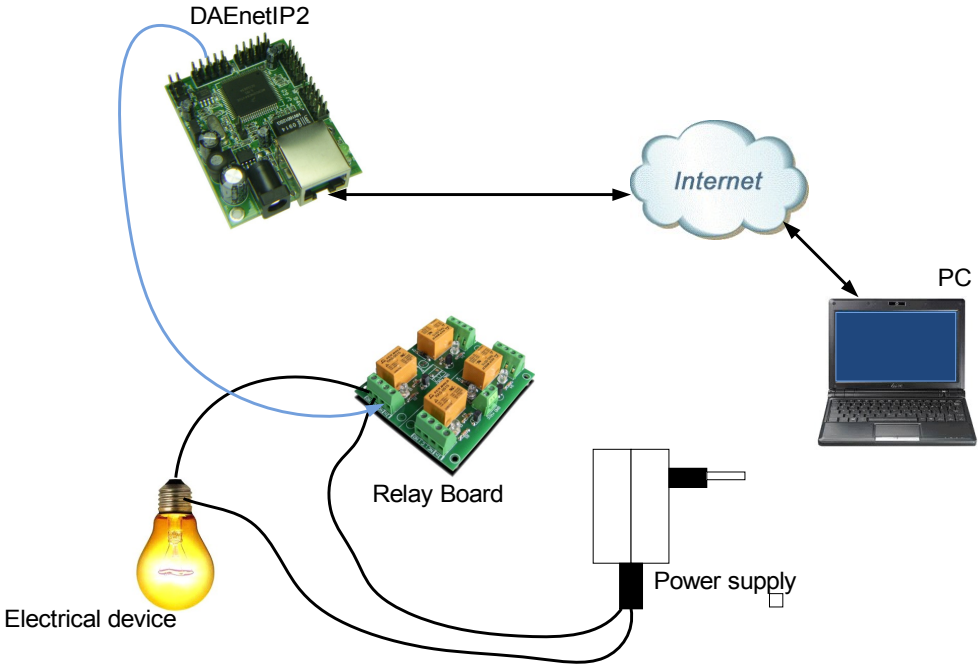
2. Technical parameters

Parameter	Value
Size	43x55mm
Power supply voltage	7.5 - 25VDC
CPU power supply (output level 3.3VDC)	3.3V
Digital outputs count	16
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

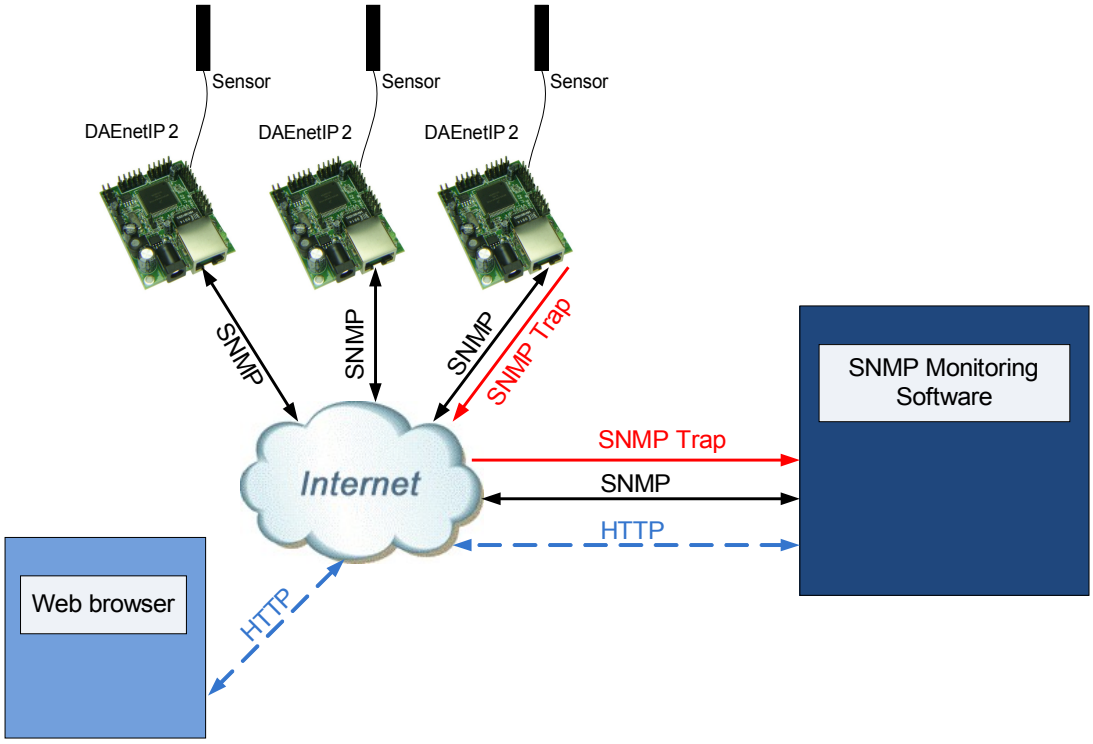
1) Digital inputs are the analog inputs, but the input voltage is converted to 1 or 0

3. Application examples

3.1. Remote control



3.2. Data acquisition



4. Product installation

1. Connect the DAEnetIP2 with PC or router with UTP cable.
2. Supply the DAEnetIP2 controller (12VDC stabilized recommend)
3. Your PC IP should be in the DAEnetIP2 network initially. So it is recommend to be 172.16.100.1. If you have router make the router IP 172.16.100.3
4. Open web browser and type 172.16.100.2 – username/password are “admin”/”admin”
5. Access the module via Web.

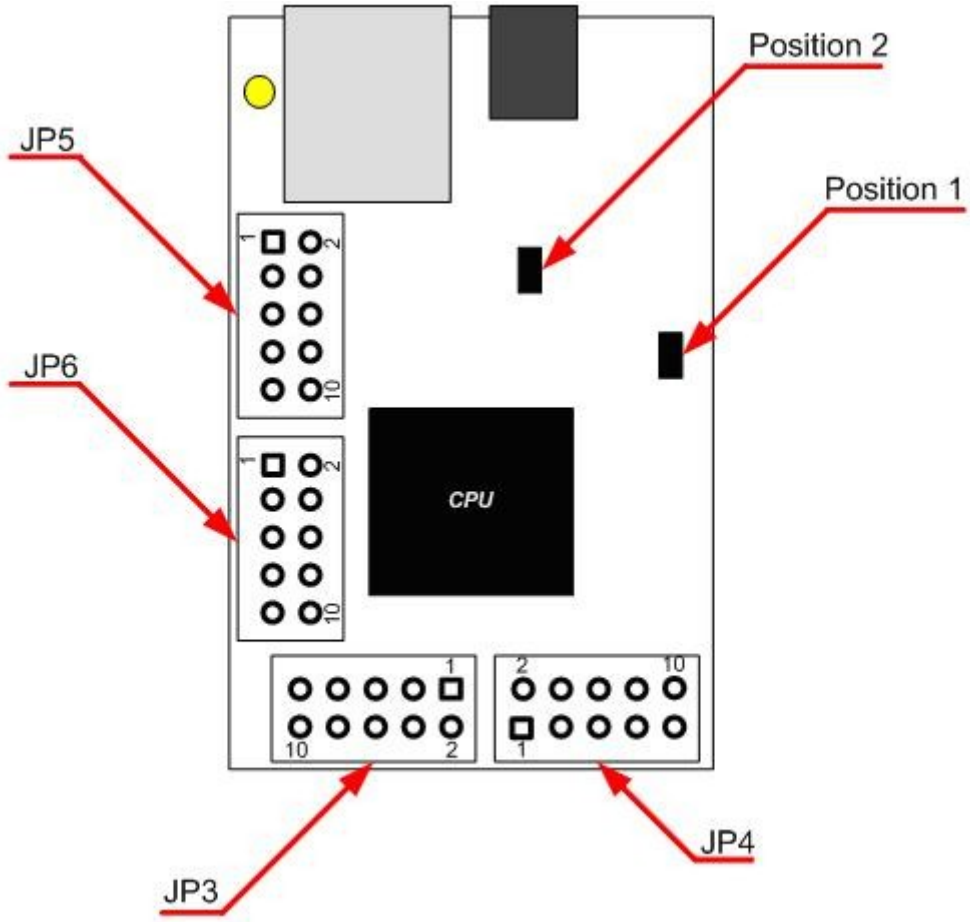
5. Default Settings

5.1. Table with default settings

These are the default (factory) settings of DAEnetIP2. When you buy the controller you will receive it with these 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 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)
Reset I/O ports on restart	Disabled
TFTP update	Enabled
TFTP Server IP	172.16.100.1
Broadcast Frames	Parse
Web Server	Enabled
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

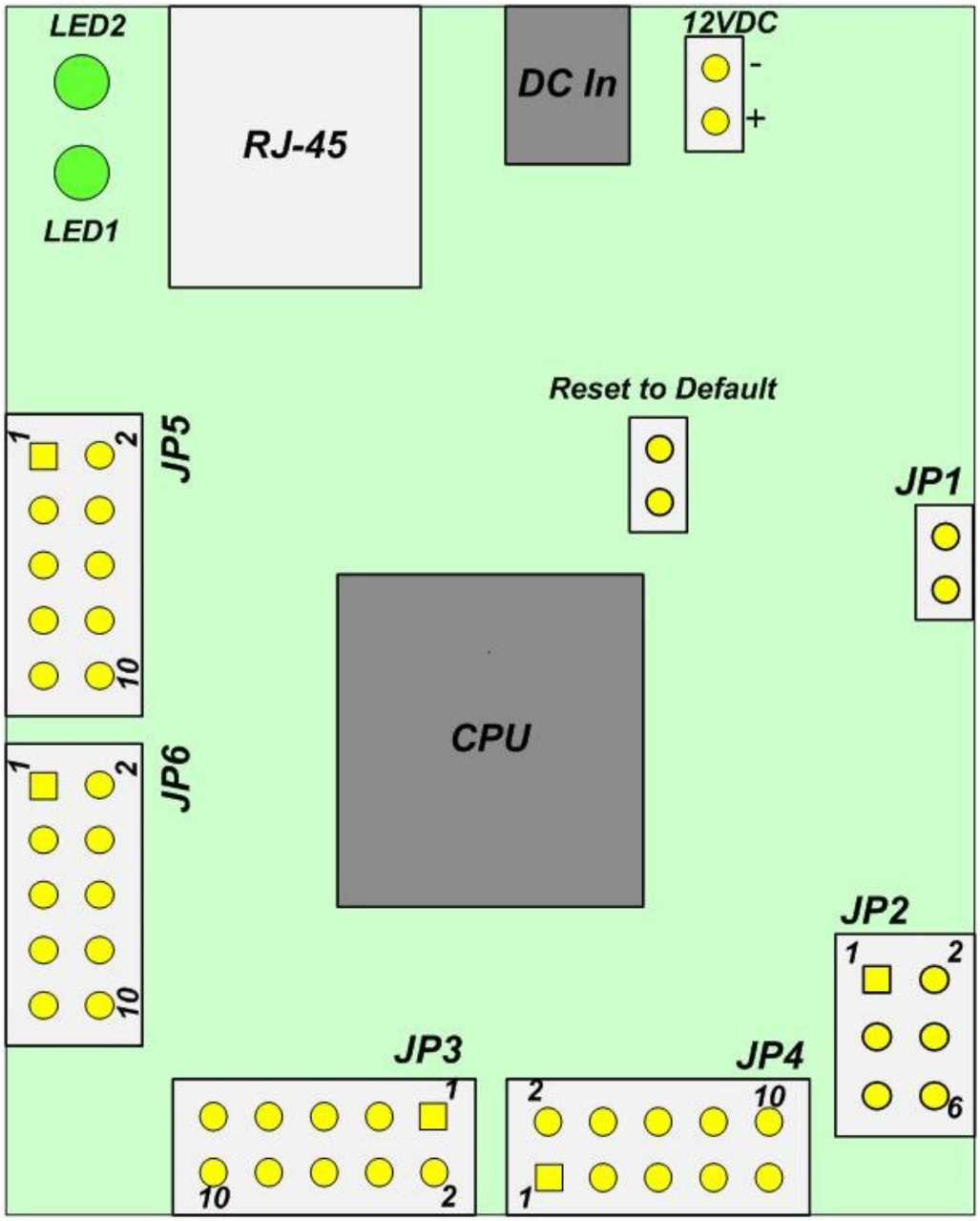
5.2. Steps for loading default settings



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

6. Connectors and LED indicators

6.1. DAEnetIP2 ports view



6.2. DAEnetIP2 ports description

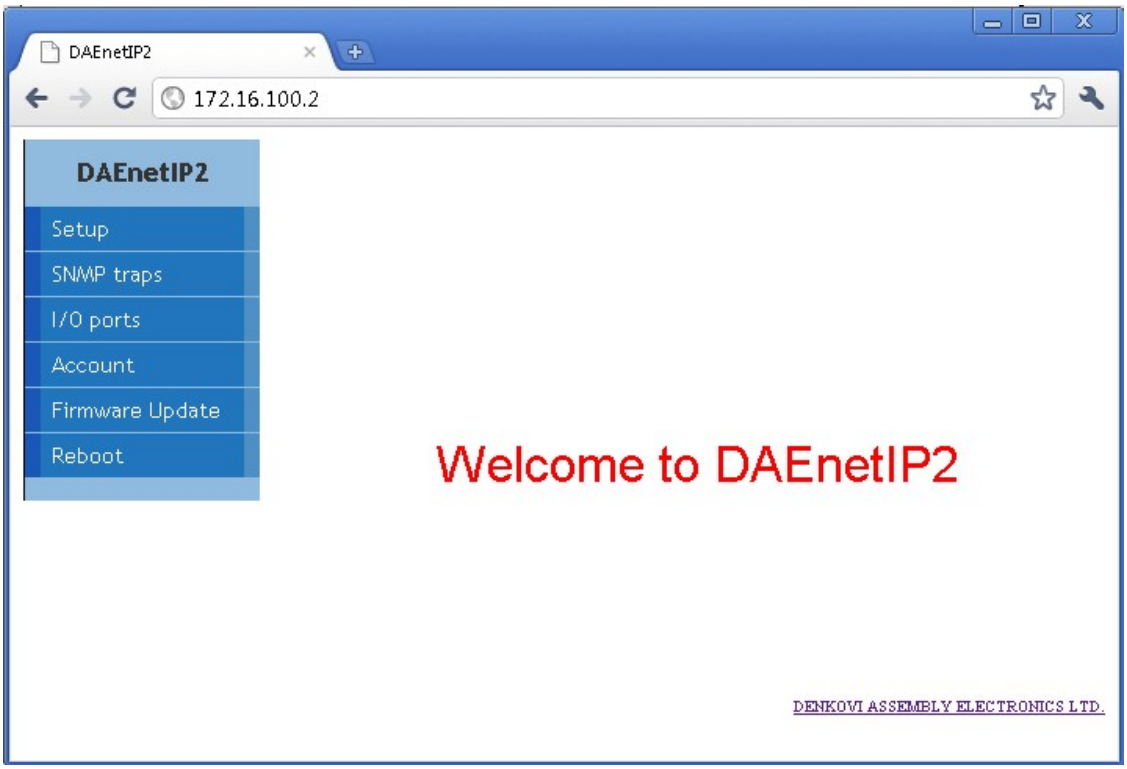
	Port JP3 (P3) (digital outputs)			Port JP4 (P5) (digital outputs)			Port JP5 (P6) (digital/analog inputs)		
Pin N	**Bit**	**Func**	**Dir**	**Bit**	**Func**	**Dir**	**Bit**	**Func**	**Dir**
1	1	Free	Out	1	Free	Out	1	Free	Ain
2	2	Free	Out	2	Free	Out	2	Free	Ain
3	3	Free	Out	3	Free	Out	3	Free	Ain
4	4	Free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

	Port JP6 (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	-	Switch (RST)	Out
8	-	Switch (SCL)	Out
9	-	Switch (SDA)	In/Out
10	-	GND	PWR

Legend:

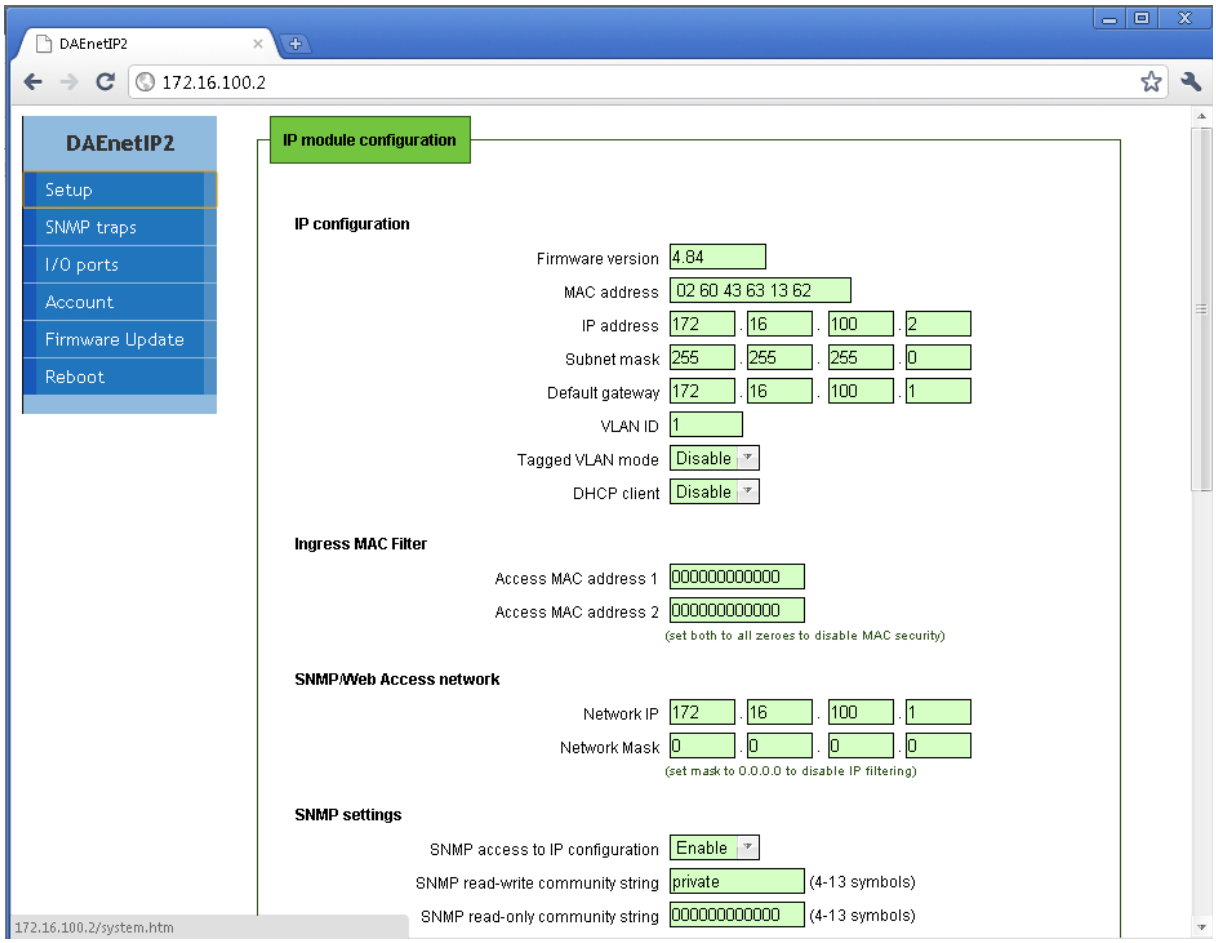
- “Free” – the pin is free to be used by user.
- “XXXXXX” - the pin is reserved for special function – can not be accessed.
- “In” – the pin is input
- “Out” – the pin is output
- “Ain” – analog input

7. Web access



It is possible to configure DAEnetIP2 via IE, Mozilla, Chrome 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 the security.

7.1. Setup



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.

7.1.6. VLAN

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

7.1.7. DHCP

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

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.

7.1.9. SNMP/Web Access network

This function determine which IP/MASK network will access the module through SNMP and Web. The filtering is for SNMP, Web, ARP, ICMP, DHCP. Note that 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.

7.1.11. ICMP monitoring modes

ICMP settings.

7.1.12. 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.

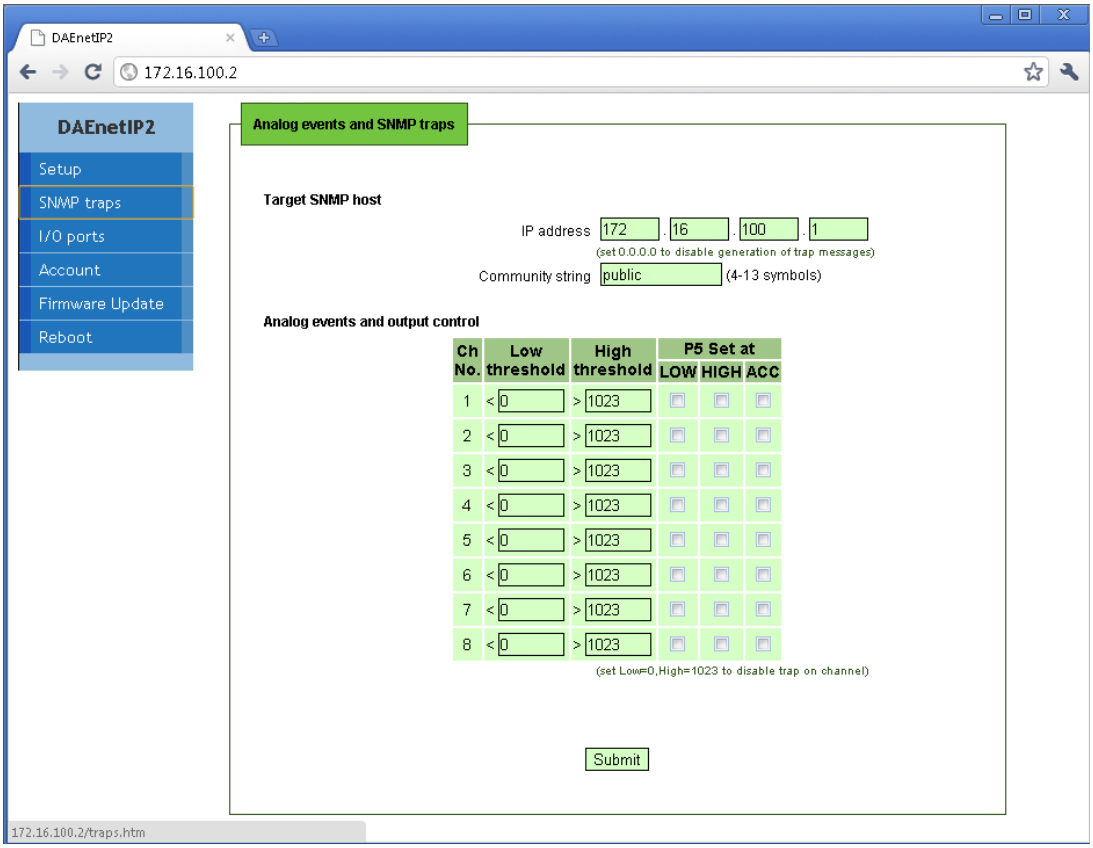
7.1.13. Broadcast frames

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

7.1.14. Web server

Enable/disable web access.

7.2. 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.

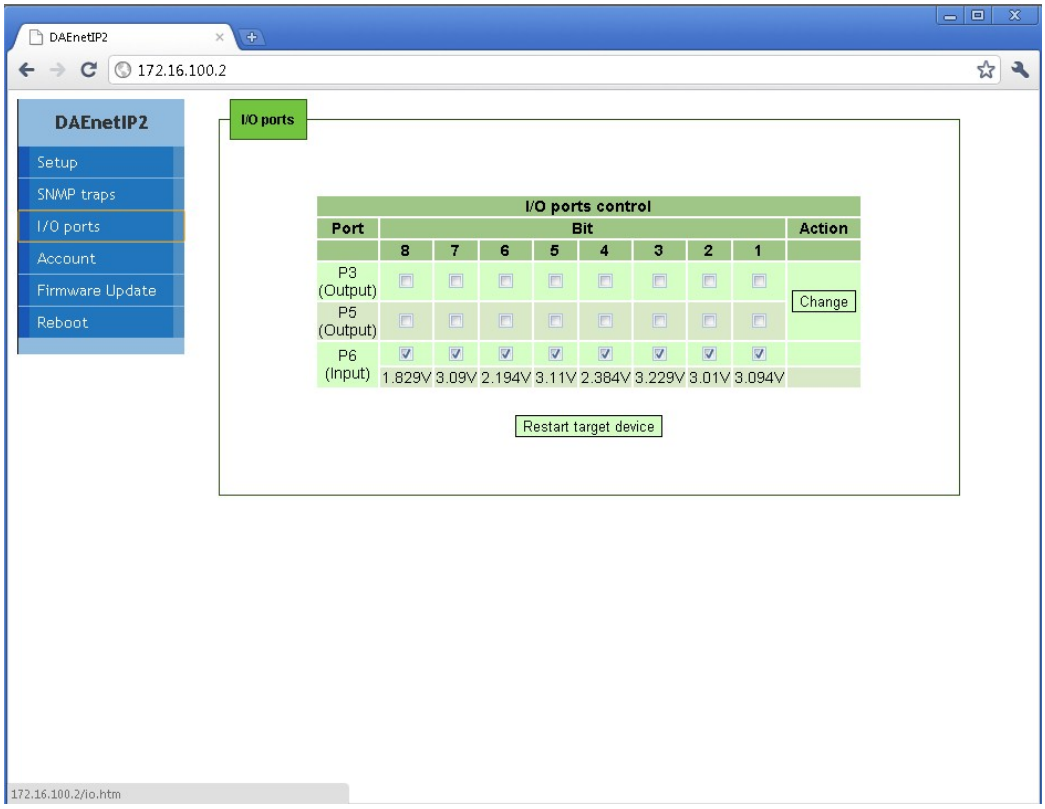
7.3.3. Mode “Low/High”

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

7.3.4. Mode “Acc”

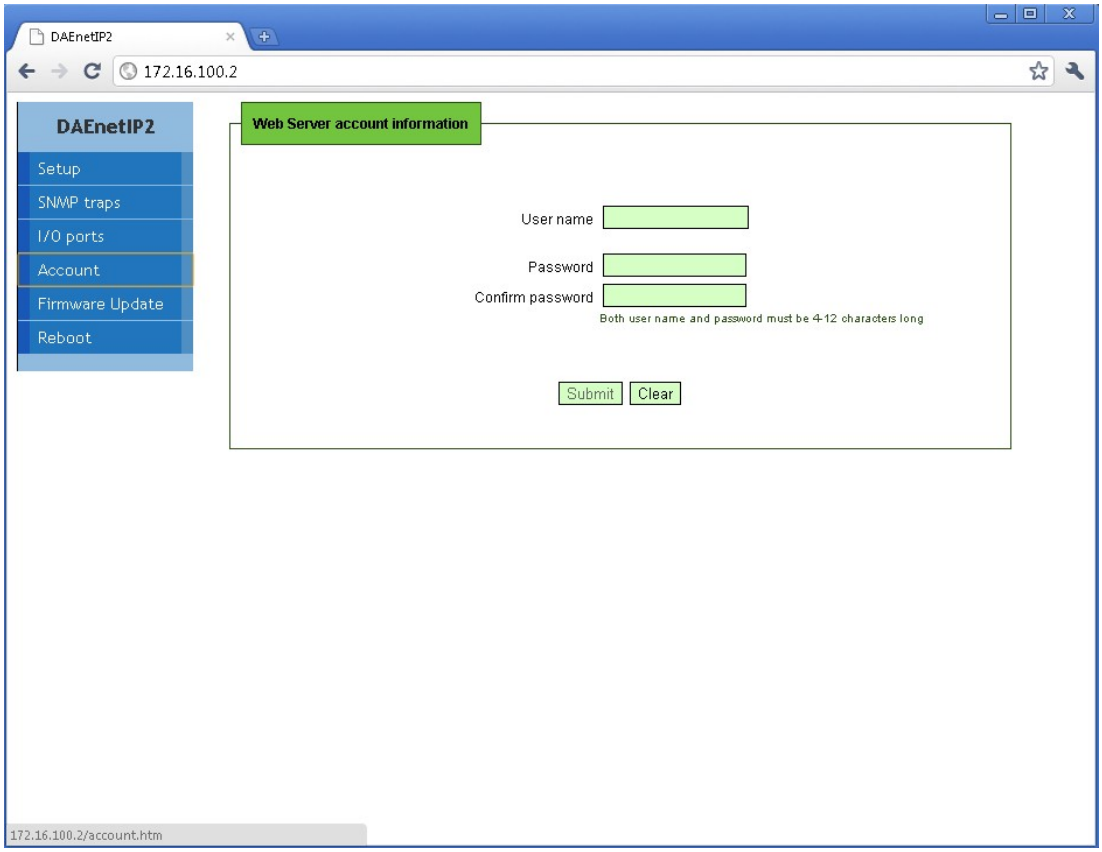
The output will be set if the input level is less than Low Threshold and will be in old state after input level is over High Threshold.
This function does not affect to SNMP traps but the same Threshold values are used for sending SNMP traps.

7.4. I/O Ports



P3 and P5 are two 8 channel digital output ports. P6 is 8 channel 1024 bit analog input port. The reference voltage is 3.3VDC. Also P6 can be used as digital input port. If the value is greather than 1.65V this is “1”, otherwise “0”. Via snmp this is parameter pctrlP6byte.0. When this command is send the module will return one byte with converted analog input values “1” or “0”. In this way the port can be used either as analog either as digital inputs.

7.5. Account



7.6. Firmware Update

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

7.7. 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 descriped in the file **DAEnetIP2.mib.** All the functions can be accessed via SNMP and WEB

8.1. 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.1.1.8.0	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 operating modes: ENABLED_BIT – bit0, BROADCAST_DISABLE-bit1, VLAN_TAG_ENABLE-bit2, NO_LARGE_PACKETS-bit3,	INTEGER(0..255)

			PINGRESTART_ENABLE-bit4, SWITCH_CONTROL-bit5, SECONDARY_TARGET-bit6, USE_ANALOG_PINS-bit7	
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.1.1.14.0	cfgDefGW	read-write	IP Address of Default Gateway	IpAddress
x.1.1.15.0	cfgNetMask	read-write	IP Network Subnet Mask	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.1.1.32.0	cfgTFTPServerIP	read-write	Remote IP address of TFTP server for	IpAddress

			firmware update	
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

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

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 ports

OID	Name	Access	Description	Syntax
x.1.2.1.0	pctrlPort3	read-write	I/O port data	INTEGER(0..255)
x.1.2.2.0	pctrlPort5	read-write	I/O port data	INTEGER(0..255)
x.1.2.3.0	pctrlPort6	read-write	I/O port data	INTEGER(0..255)

8.5. Control port P3 (Digital outputs)

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)

8.6. Control port P5 (Digital outputs)

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	INTEGER(0..255)

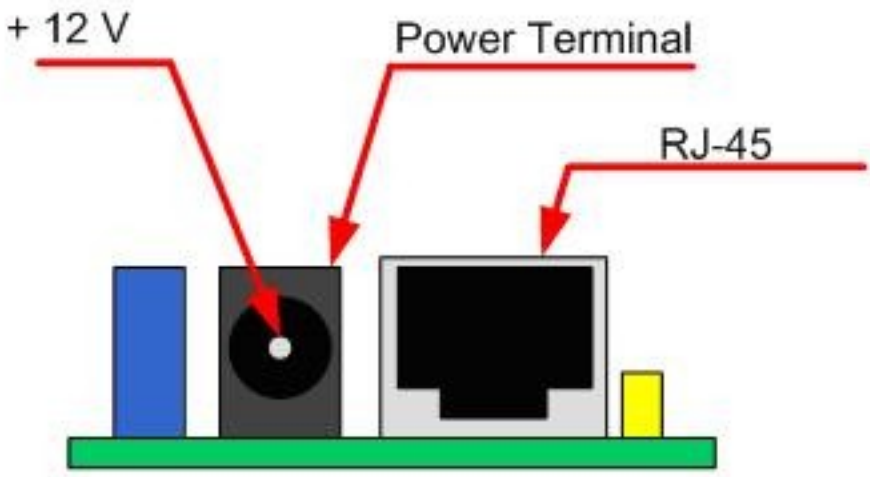
			single byte	

8.7. Returned values are from 10bit Analog to Digital Convertor

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)

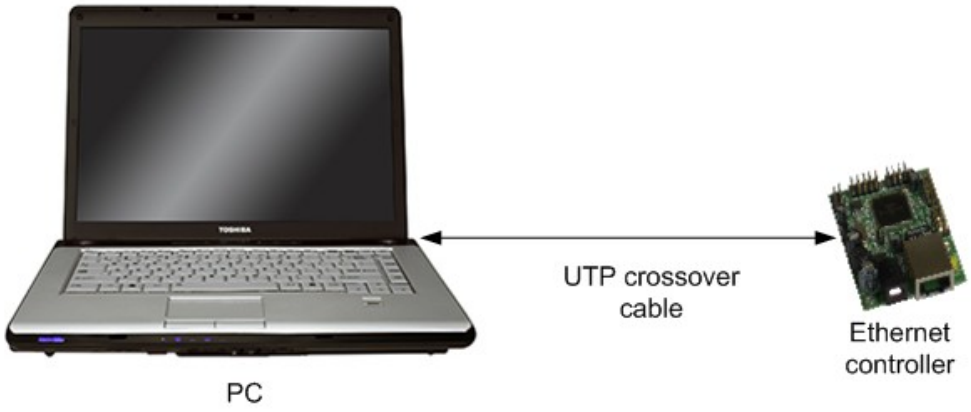
9. Appendix 1. Power supply

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

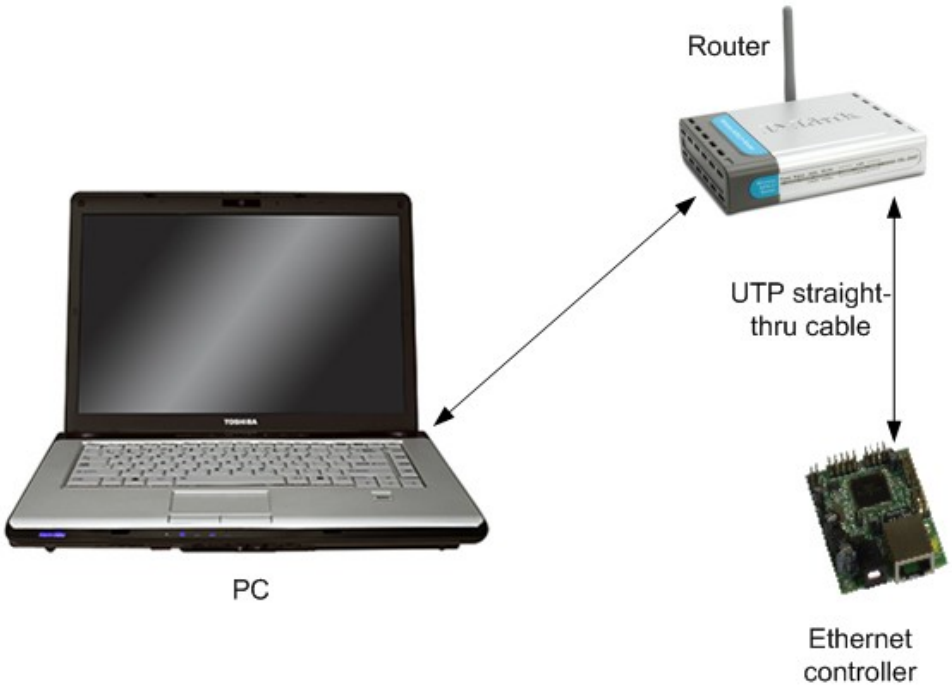


10. Appendix 2. Connections

10.1. Connection to PC

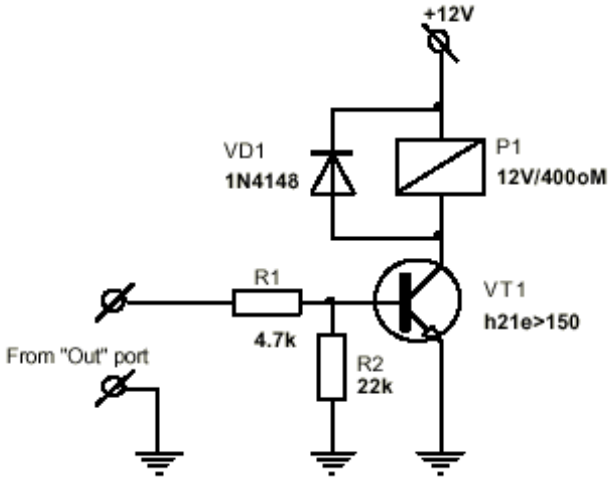


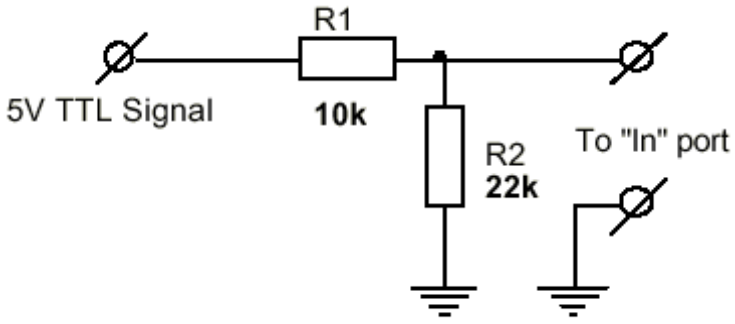
10.2. Connection to router



11. Appendix 3. I/O Ports

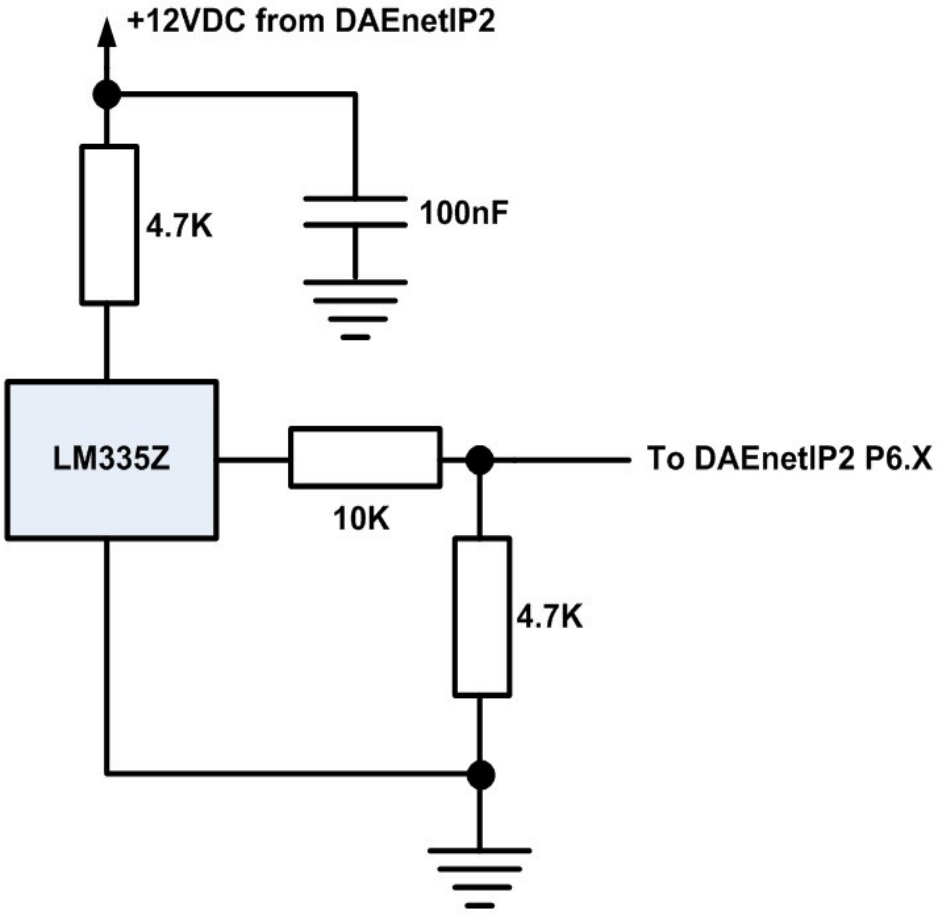
They are not buffered and you should very carefully otherwise the MCU could be damaged. They are digital inputs/outputs. The output level voltage is “1” (3.3VDC) or “0” (0.25VDC) with consumption < 1.5mA. All inputs/outputs have protection diodes to GND and +3.3VDC.
Below are given sample examples of 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”.





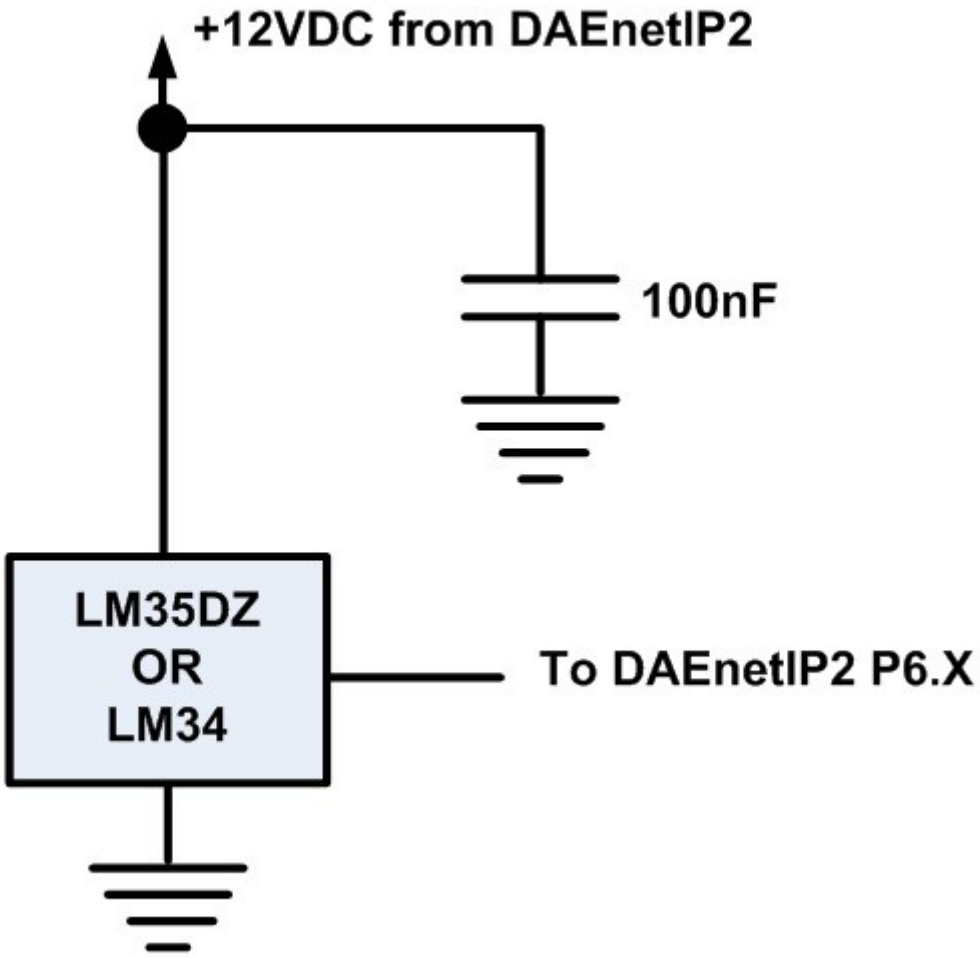
12. Appendix 4. Using analog temperature sensors

12.1. LM335Z



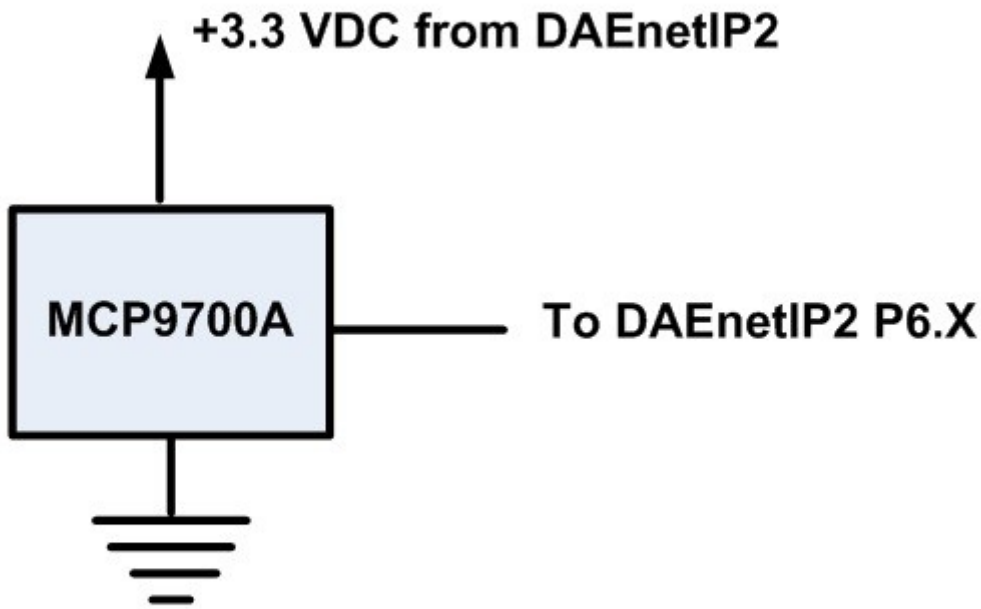
On the figure above it is shown LM335Z connection to DAEnetIP2 with several resistors. LM335 may be assumed as zener diode it is necessary to limit the current (that's why the 4.7K resistor is added). The biggest disadvantage of LM335 is the high output voltage during 25°C – 3V. As DAEnetIP2 ADC works 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 LM 335Z 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.

12.2. LM35Z / LM34



When using LM35DZ / LM34 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 (5VDC for LM34) and this makes the connection to DAEnetIP2 more difficult (it can not be connected directly with only single jumper to P6).

12.3. 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 (LM34).

13. Appendix 5. Mechanical draw