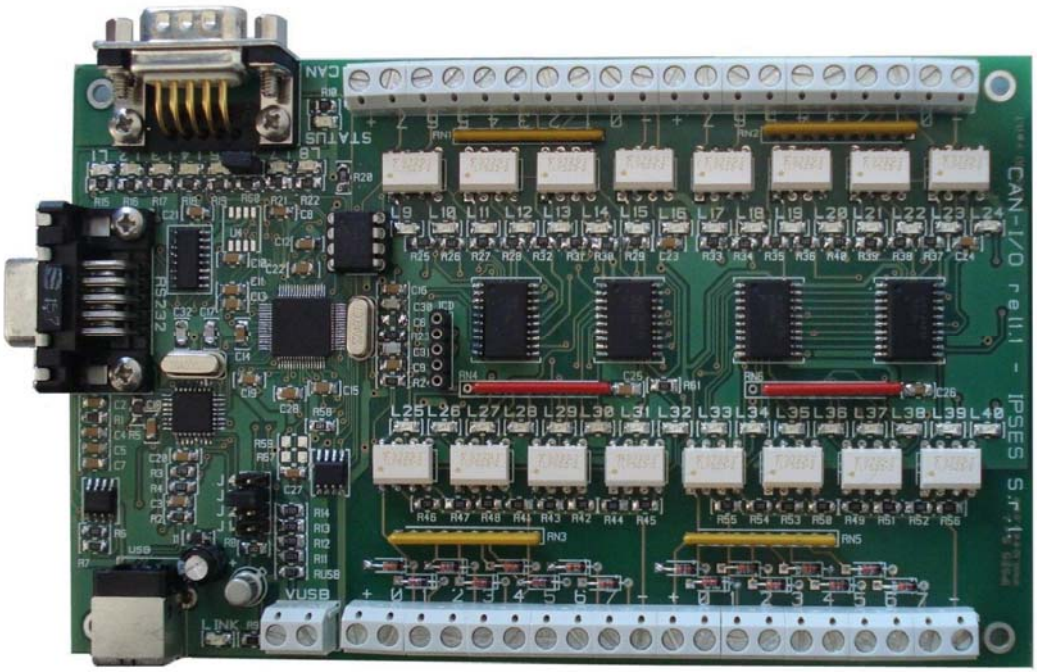
CAN-IO Control Unit
USER MANUAL

Rel. 01.02.0001
(Hardware code: CAN-IO)



CONCEIVING
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DEVELOPMENT
IN SCIENTIFIC
ELECTRONICS

This manual in English is the original version.

Printed in Italy

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WARNING!
ELECTRICAL DEVICES COULD DAMAGE EQUIPMENT OR PROPERTY OR CAUSE PERSONAL INJURY

This guide contains instructions and technical features of the CAN-IO Control Unit.
Read with attention before attempting to install.
It is the responsibility of the technician to undertake all the safety rules provided by the law during the installation and the use of this device.
For any information which is not contained in this guide, please contact:

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REVISION HISTORY

Manual revision history

Revision/ Date	Change description	Author
01.00.0000 January 2009	First version Released	Zancanato A.
01.00.0001 January 2011	Modified driver installation chapter and added new available I/O cards	Zancanato A.
01.00.0002 April 2011	Added chapter with description of communication protocol	Zancanato A.
01.00.0003 April 2014	Minor changes	Mancuso C.
01.00.0004 June 2015	Update document layout	Bottaccioli M.
01.02.0000 February 2016	Modified document structure. Operating system compatibility update.	Bottaccioli M.
01.02.0001 August, 2016	Added ISO 9001:20015 logo	Bottaccioli M.

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GENERAL FEATURES

CAN-IO is a control unit, integrated on European Card Format (160 x 100 mm – 6.30 x 3.94 inches) equipped with CAN, USB and RS232 interfaces.
The card can work as stand-alone device on CAN BUS. Its configuration is achieved either through USB (in this case the board is self-powered) or through RS232 interface.
CAN-IO can manage sixteen optocoupled inputs and sixteen optocoupled outputs which are reciprocally isolated in two groups of eight.
A driver to for USB is provided with the card. Besides, a configuration software is also provided with: this software allows to control the board either through USB and RS232 and allows to configure CAN working parameters (such as baudrate, frame format, filters on ID messages, etc...).

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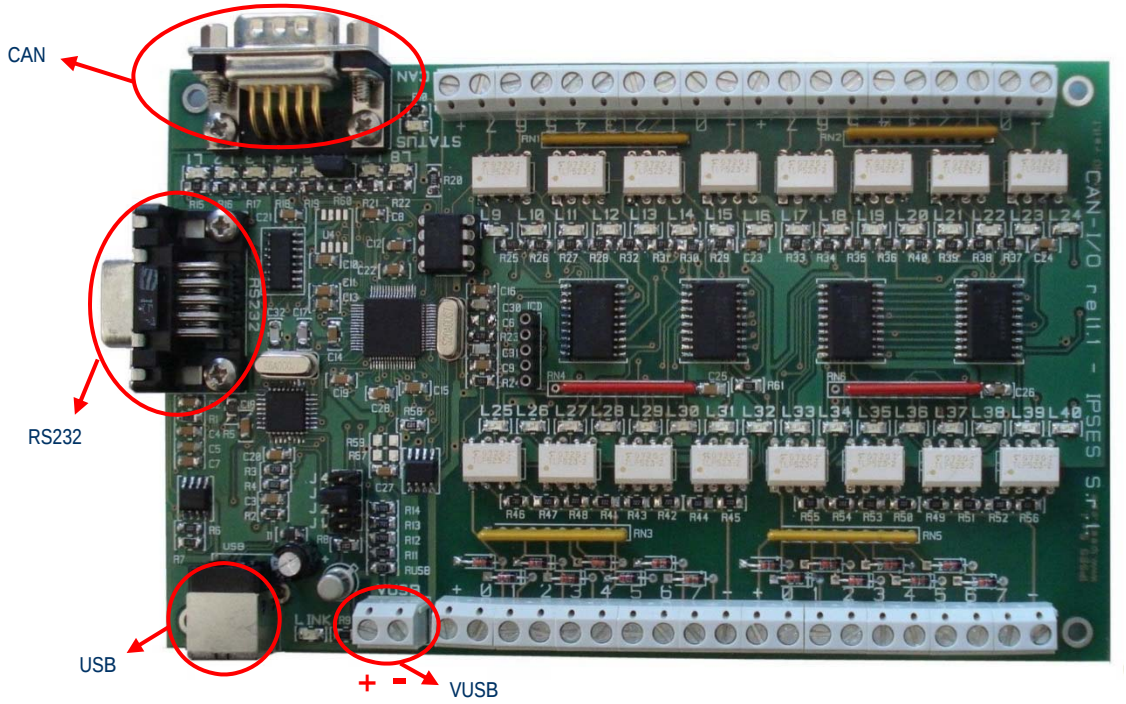
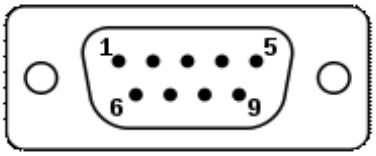
CARD DESCRIPTION

Connections

In Picture 1 are shown CAN-IO connections.



Picture 1: CAN-IO board connections

USB	USB slot. By USB connection the CAN-IO card is powered on and linked to the computer. To communicate with the PC in USB mode, J2 jumper MUST NOT be inserted. If the board is powered by USB and J2 jumper is inserted, CAN-IO works in stand-alone mode. In case of USB power supply DO NOT USE the VUSB connector to power supply the board. In this mode, VSUB connector can only be used as +5V_{dc} output to power supply external devices.
VUSB	Auxiliary power supply connector. In case of USB power supply, VUSB connector can only be used as +5V_{dc} output to power supply external devices. If the card is linked to the computer through RS232, VUSB connector must be used to power the board with +5V_{dc}. In this mode, J2 jumper must be inserted and the board can be used in stand-alone mode too. In case of VUSB power supply DO NOT USE the USB connector to power supply the board.
CAN	CAN connector: 

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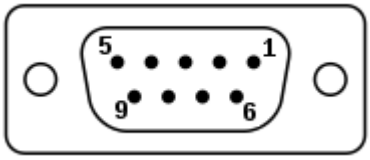
<table>
<tr><td></td><td>
<table>
<tr><th>PIN</th><th>Description</th></tr>
<tr><td>2</td><td>CAN-L</td></tr>
<tr><td>3</td><td>GND</td></tr>
<tr><td>7</td><td>CAN-H</td></tr>
<tr><td>Chassis</td><td>GND</td></tr>
</table>
</td></tr>
<tr><td>RS232</td><td>RS 232 connector:
 

<table>
<tr><th>PIN</th><th>Description</th></tr>
<tr><td>2</td><td>TX: Transmission PC pin (Receive pin board)</td></tr>
<tr><td>3</td><td>RX: Receive PC pin (Transmission pin board)</td></tr>
<tr><td>5</td><td>GND</td></tr>
<tr><td>7</td><td>RTS</td></tr>
<tr><td>8</td><td>CTS</td></tr>
<tr><td>Chassis</td><td>GND</td></tr>
</table>
</td></tr>
</table>

ATTENTION: IN ORDER TO PRECLUDE MALFUNCTIONING OR DAMAGE DO NOT CONNECT EXTERNAL POWER SUPPLY AND USB AT THE SAME TIME

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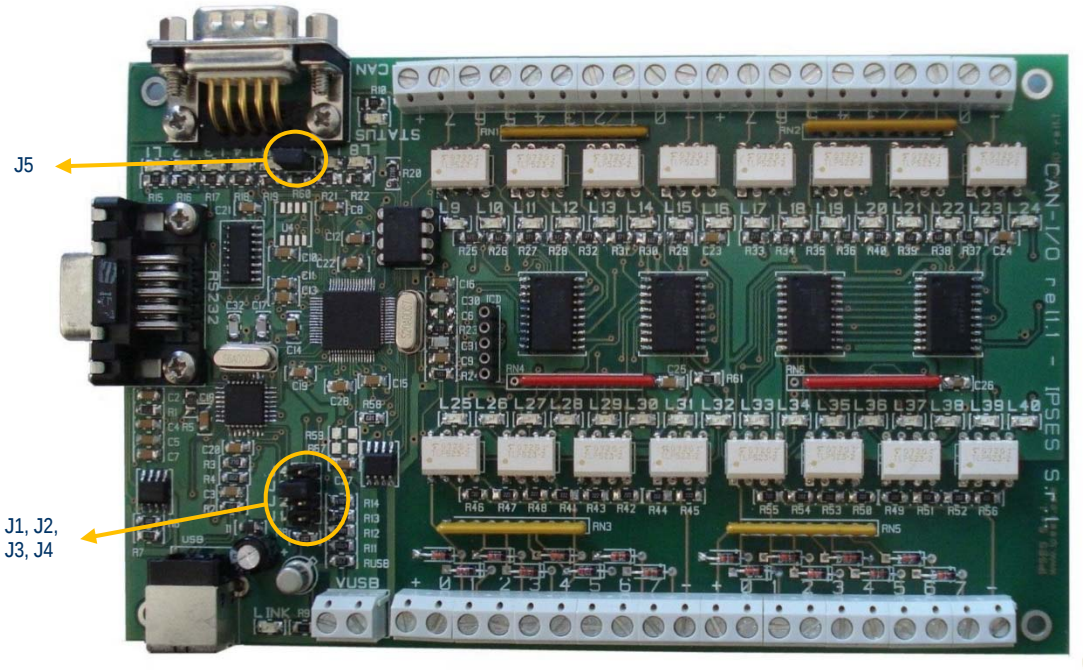
Jumpers



Picture 2: CAN-IO board jumpers

Jumpers (Picture 2) implement the following features:

J1	If it is inserted before power on, it sets the device in firmware update mode.
J2	If it is inserted it enables external power supply and allows you to control the device via RS232 or to use it in stand-alone mode
J3	Reserved (DO NOT USE).
J4	Reserved (DO NOT USE).
J5	Enables the CAN BUS terminate 120Ω resistor (between CAN-H and CAN-L).

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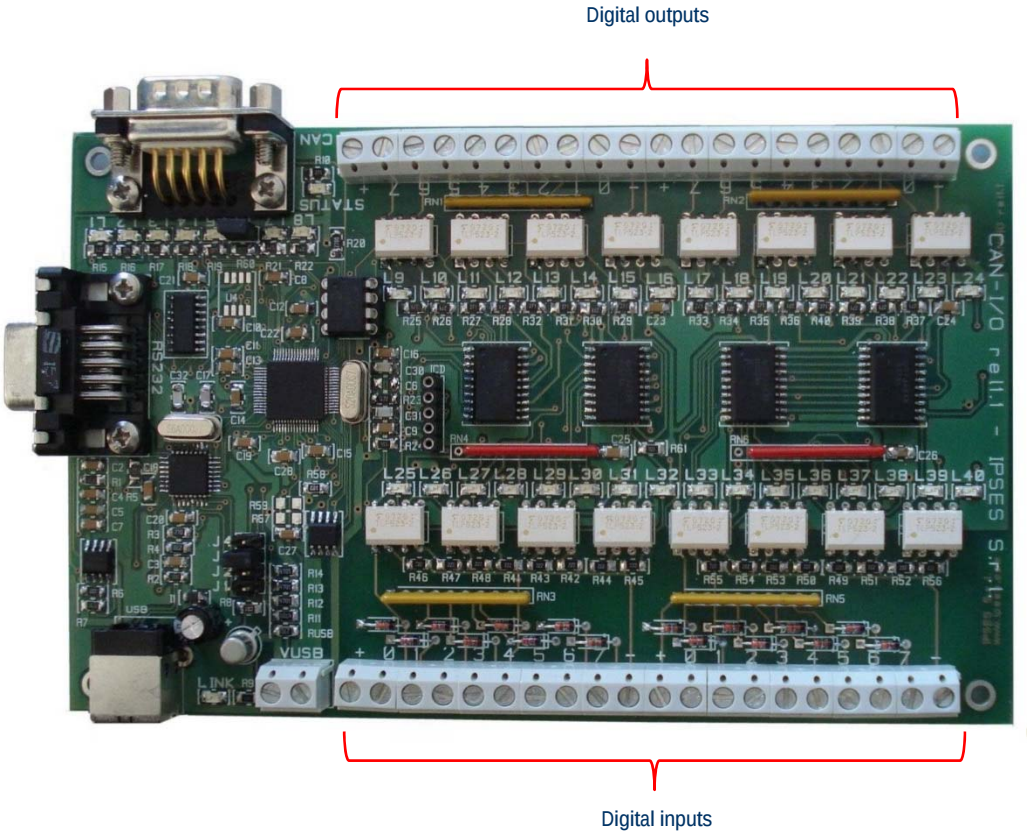
Inputs and outputs

In Picture 3 are shown the digital inputs and outputs.



Picture 3: CAN-IO card, inputs and outputs

Output

The sixteen outputs are completely isolated both between them in two groups of eight and with other signals on the device. Here below there are the diagrams of two typical connections of external device to CAN-IO card: in the first case, the card will manage directly some loads (with maximal current of 150mA). In the second case, the card is connected to a high impedance device (i. e. the inputs of a PLC).

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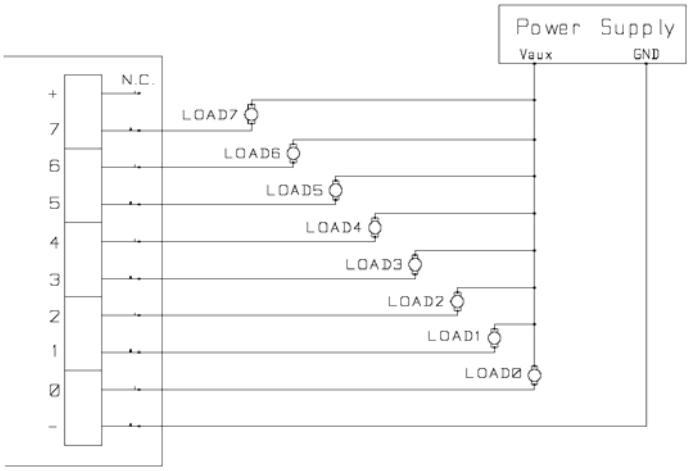
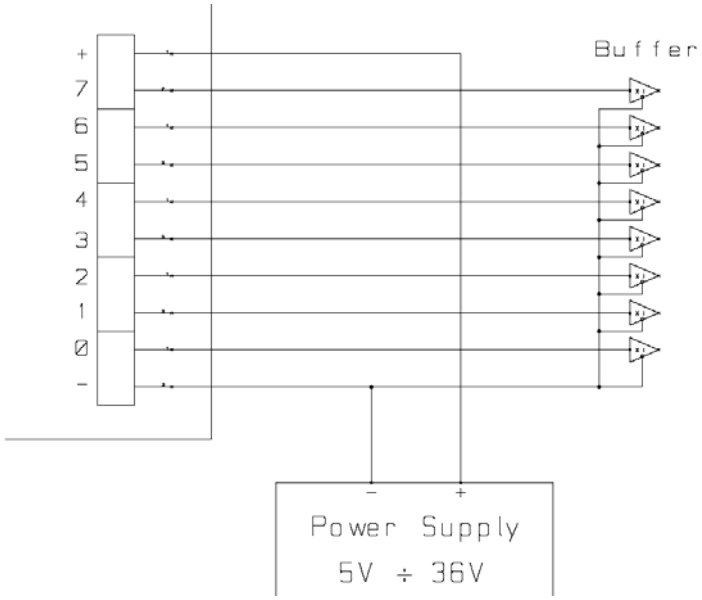


Picture 4: diagram of the output connections.



Picture 5: diagram of the output connections.

Output status is displayed by LED placed near every connector (LED from L9 to L24).

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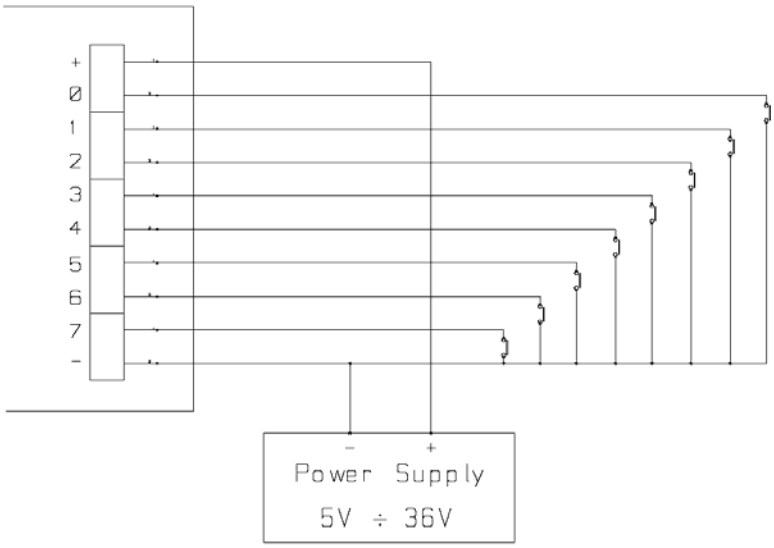
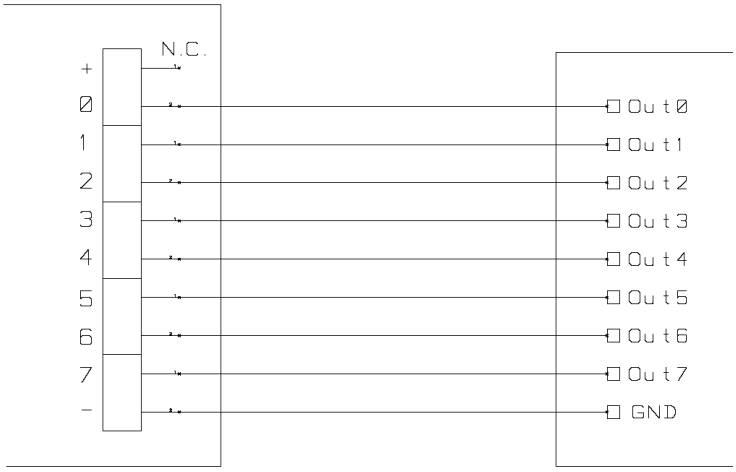
Input

The sixteen inputs are completely isolated both between them in two groups of eight and toward other signals on the device.
We suggest to connect inputs following one of the two diagrams displayed below:
-picture 3a: in case inputs have to detect the pression of a switch or an open collector output.
-picture 3b: in case inputs are directly controlled by a voltage.



Picture 6: diagram of input implementation.



Picture 7: diagram of input implementation.

Input status is displayed by LEDs placed near every connector (LED form L25 to L40).

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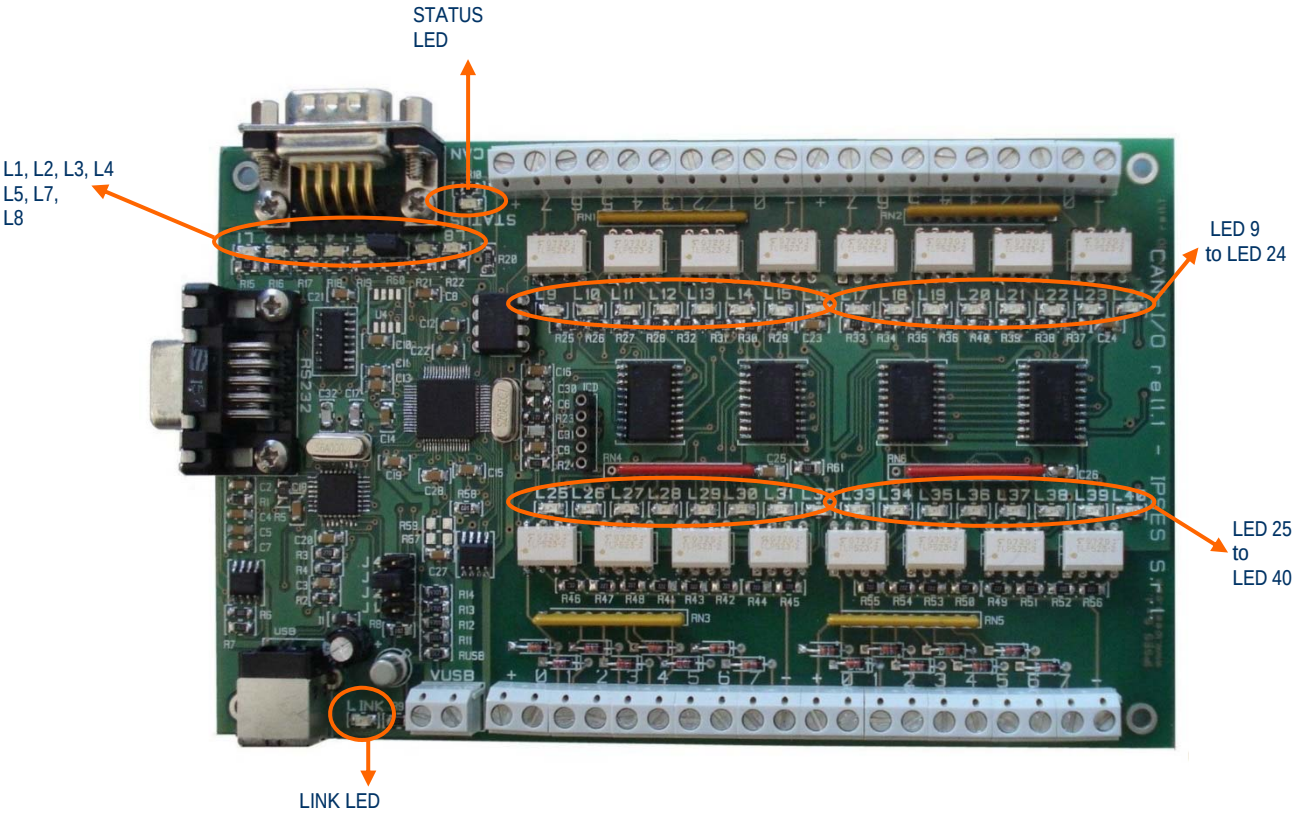
LEDs

Picture number 8 shows LEDs position:



Picture 8: CAN-IO card, LEDs

LEDs are:

LINK	Green LED on: the device is powered by USB and is recognized and can communicate
STATUS	Green LED on: CAN enabled
L1	Red LED on: RS232 enabled (if it is off ,USB is enabled)
L2	Red LED: reserved
L3	Red LED: reserved
L4	Red LED: reserved
L5	Red LED: reserved
L7	Red LED on: firmware update mode
L8	Red flashing LED: transceiver CAN auto test in progress. Red LED: transceiver CAN initialization failed.
L9	Red LED on: OUT 1 enabled
L10	Red LED on: OUT 2 enabled
L11	Red LED on: OUT 3 enabled
L12	Red LED on: OUT 4 enabled
L13	Red LED on: OUT 5 enabled
D14	Red LED on: OUT 6 enabled

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L15	Red LED on: OUT 7 enabled
L16	Red LED on: OUT 8 enabled
L17	Red LED on: OUT 9 enabled
L18	Red LED on: OUT 10 enabled
L19	Red LED on: OUT 11 enabled
L20	Red LED on: OUT 12 enabled
L21	Red LED on: OUT 13 enabled
L22	Red LED on: OUT 14 enabled
L23	Red LED on: OUT 15 enabled
L24	Red LED on: OUT 16 enabled
L25	Green LED on: V_{high} applied at IN 1
L26	Green LED on: V_{high} applied at IN 2
L27	Green LED on: V_{high} applied at IN 3
L28	Green LED on: V_{high} applied at IN 4
L29	Green LED on: V_{high} applied at IN 5
L30	Green LED on: V_{high} applied at IN 6
L31	Green LED on: V_{high} applied at IN 7
L32	Green LED on: V_{high} applied at IN 8
L33	Green LED on: V_{high} applied at IN 9
L34	Green LED on: V_{high} applied at IN 10
L35	Green LED on: V_{high} applied at IN 11
L36	Green LED on: V_{high} applied at IN 12
L37	Green LED on: V_{high} applied at IN 13
L38	Green LED on: V_{high} applied at IN 14
L39	Green LED on: V_{high} applied at IN 15
L40	Green LED on: V_{high} applied at IN 16

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BOARD POWER SUPPLY AND CONNECTION

CAN-IO board can work in three modes:

- USB
- RS232
- STAND ALONE

USB mode

Board can be powered and linked to computer by USB connector (Picture 1 at page 8).

In USB mode the CAN LOG board is powered by USB connector.
DO NOT POWER the board by VUSB connector.

ATTENTION: IN ORDER TO PRECLUDE MALFUNCTIONING OR DAMAGE DO NOT CONNECT EXTERNAL POWER SUPPLY AND USB AT THE SAME TIME

During the USB connection it is possible to use VUSB connector to power supply external devices with $+5V_{dc}$ as auxiliary output electric voltage.

To link and operate the board you have to install USB driver (see DRIVER INSTALLATION at page 19).

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RS232 mode

CAN LOG board can be connected by RS232 interface.

To allow the RS232 link you have to connect the RS232 cable (male connector) to the board's RS232 connector (see page 9 for pinout).
You must supply the board with +5V_{dc} using VUSB connector or using USB connector.

ATTENTION: IN ORDER TO PRECLUDE MALFUNCTIONING OR DAMAGE DO NOT CONNECT EXTERNAL POWER SUPPLY AND USB AT THE SAME TIME

When the board is supplied by USB connector, it is possible to use VSUB connector as auxiliary output to power external devices with +5V_{dc} electric voltage.

To link the board and the computer using RS232, J2 jumper must be inserted (Page 10).

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Stand-alone mode

In the stand-alone mode you can control board inputs and outputs using CAN messages.

After configured the CAN BUS using software (page 26) and inserted J2 jumper (page 10) to operate in stand-alone mode, you need to power on the CAN-IO board by VUSB connector with a voltage of $5V_{dc}$, or by USB connector.

ATTENTION: IN ORDER TO PRECLUDE MALFUNCTIONING OR DAMAGE DO NOT CONNECT EXTERNAL POWER SUPPLY AND USB AT THE SAME TIME

When the board is supplied by USB connector, it is possible to use VSUB connector as auxiliary output to power external devices with $+5V_{dc}$ electric voltage.

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DRIVER INSTALLATION

We recommend to execute the automatic software installation from CD before connect the device to PC. By this way software and USB driver for CAN-IO are installed, allowing the PC to automatically identify the device once you connect it.
If you use the recommend automatic software installation from CD, do not follow all the others indications contained in this chapter.

If you DO NOT install the software CAN Manager and you use the card CAN-IO you need to install only the USB IPSES driver that is certified for the most recent Microsoft operating systems:

- Microsoft Windows 2000 family
- Microsoft Windows XP family, x86
- Microsoft Windows Server 2003 family, x86
- Microsoft Windows Server 2003 family, x64
- Microsoft Windows XP family, x64
- Microsoft Windows Vista family, x86
- Microsoft Windows Vista family, x64
- Microsoft Windows Server 2008 family, x86
- Microsoft Windows Server 2008 family, x64
- Microsoft Windows 7
- Microsoft Windows 7 x64
- Microsoft Windows Server 2008 Release 2 family, x64
- Microsoft Windows 8 and 8.1
- Microsoft Windows 8 and 8.1 x64
- Microsoft Windows 10
- Microsoft Windows 10 x64

If your PC has an internet connection, you should follow the automatic Windows Update procedure, otherwise follow the manual installation procedure from CD.

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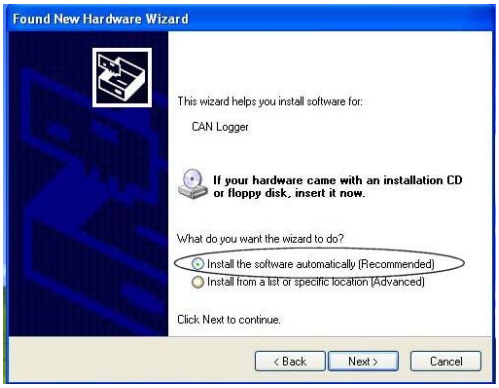
Automatic Windows Update procedure

1) Connect the CAN-IO to PC using a USB cable. *Windows* operating system will detect a new device, showing a message similar to:

2) In the following windows “found new hardware wizard” chose “Yes, this time only” and then “Next”.



3) Then choose “install the software automatically (Recommended)” and then “Next”. Wait for downloading of the driver and its installation.

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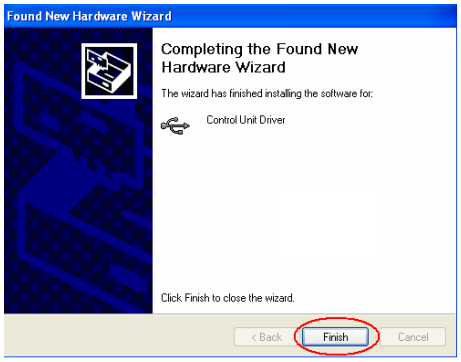

4) Installation is completed when the window on the left is displayed. Choose “Finish” to exit.

5) After a window with the message “Found New Hardware. USB Serial Port” is displayed. Follow again instruction from point 2)

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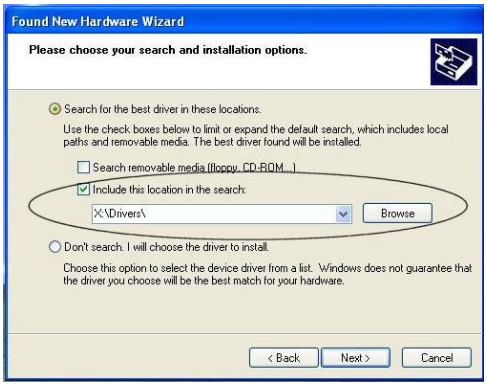
Manual driver installation procedure

1) Connect the CAN I/O to PC using a USB cable. *Windows* operating system will detect a new device, showing a message similar to:

2) In the following windows “found new hardware wizard” chose “No, not this time” and then “Next”.

3) Then choose “install from a list or specific location (Advanced)” and “Next”. Then Set the driver folder path on the CD provided with.



4) The Successful of the installation is indicated by the message of completing the found new hardware wizard. To end, click "Finish".

5) After installation of the hardware described above, the new device "USB Serial Port" is detected. Follow again instruction from point 2).

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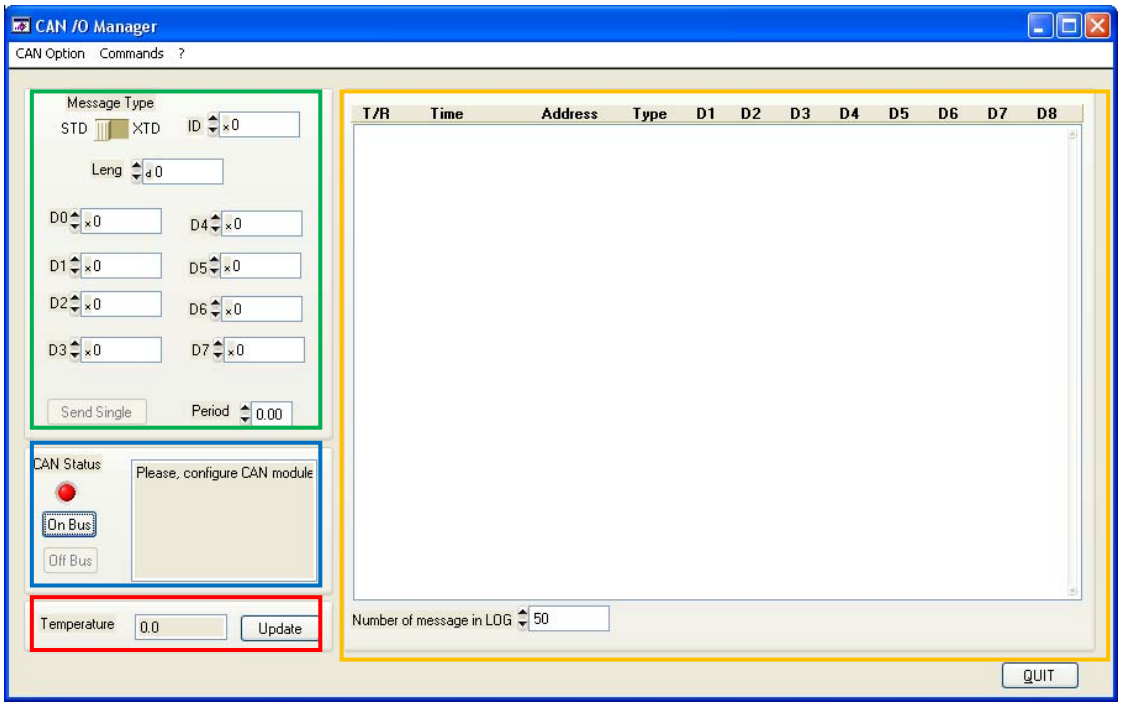
SOFTWARE

A CD with a demo software is provided with the card. This software allows to manage CAN-IO main functions.

Main window description

In the picture below there is a *snapshot* of the software main window.



Picture 9: Main window

The main windows is divided in four zone which, in the picture above, are surrounded respectively in blue, yellow, green and red.

The blue surrounded zone includes commands to enable or to disable CAN interface using the available button. When CAN interface is enabled, the CAN Status LED turns green and CAN settings are shown

If CAN interface is enabled, the device executes a BUS scan. CAN messages appear in the yellow surrounded area. The number of messages shown in the text box can be changed using the *indicator number* which is in the lower part of the window. The CAN log can be saved as ASCII file choosing *Save CAN log* from *CAN Option* menu (Picture 10).

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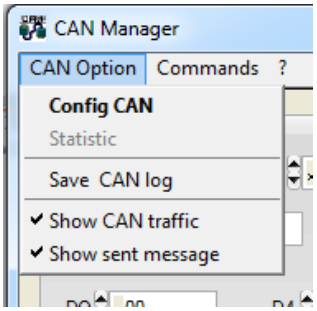

Picture 10: CAN option menu

The device can send customizable messages in the following modes: standard or extended, single or periodic.
The green surrounded zone allows the user to insert: CAN address, message length and data to be sent.
To send a single message, set the period at zero; in case of periodic messages, set the period value.

The device is also equipped with a temperature sensor. Push the button in the red surrounded zone to read the board measured temperature.

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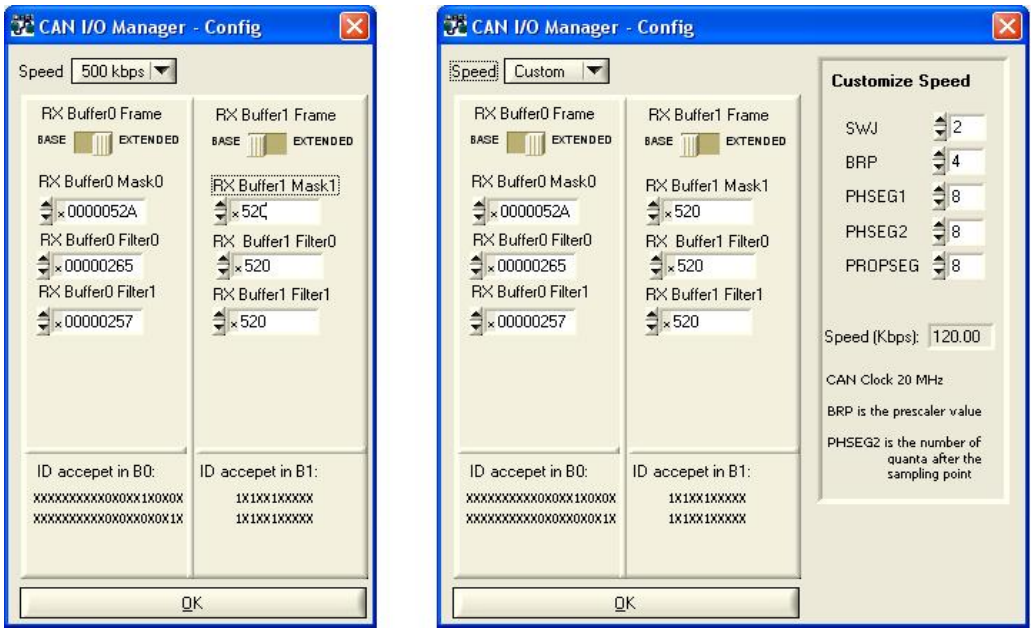
Configuration Panel description

Before using CAN interface, the device must be configured.
The configuration is made through the Config panel (Picture 11). To enable it, select *Config CAN* from *CAN Option* menu (Picture 10 at page 24).



Picture 11: Config Panel.

Configuration panel allows to set: speed, mask, filters and activation of CAN Commands.

By the drop down menu *Speed* is possible to choose the speed of CAN bus. Speed can be chosen among those already calculated or can be customize. In custom mode the new panel *Customize Speed* is opened. In this panel registers values must be set.
CAN-IO board is set with 500 kbps speed by default and filters and masks are disabled.

RX Buffer0 Frame and *RX Buffer1 Frame* panels allow to set masks and filters for CAN bus data filtering.
It is possible to apply up to two masks with two filters each on IDs, coded in base or extended mode.
In *RX Buffer0 Mask0* and *RX Buffer1 Mask1* you can set one or two independent masks to select bits to be considered for the application of filters.
By setting *RX Buffer0 Filter0, RX Buffer0 Filter1, RX Buffer1 Filter 0* and *RX Buffer1 Filter1*, it is possible to apply up to four filters (two on mask 0 and two on mask 1) on bits selected by each mask.

Warning: CAN-IO board considers for each mask both filters with the OR logical operator (it's enough that a message ID complies with one filter to be considered). If you want to apply only one filter you have to set the second filter like the first one.

Masks and filters must be written in hexadecimal format.

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Filters can be used to choose IDs that will be received. It isn't possible to use filters to choose IDs to be discarded.

In the bottom of the panel each filter applied to his mask is represented in binary format. X symbolizes a discarded bit, instead 0 and 1 are values that the ID must have to be considered or not.

Picture 11 examples:

	RX Buffer0 Frame	Approved ID
ID type	*EXTENDED*	
Mask	0 0000 0000 0000 0000 0101 0010 1010	
Filter0	0 0000 0000 0000 0000 0010 0110 0101	XXXXXXXXXXXXXXXXXX0X0XX1X0X0X
Filter1	0 0000 0000 0000 0000 0010 0101 0111	XXXXXXXXXXXXXXXXXX0X0XX0X0X1X

In this example, ID values 0x1FFFF8E4 (1 1111 1111 1111 1111 1000 1110 0100 in binary format) and 0x00000007 (0 0000 0000 0000 0000 0000 0000 0111 in binary format) are approved because comply respectively with the first and the second filter.
ID value 0x00000400 (0 0000 0000 0000 0000 0100 0000 0000 in binary format) isn't considered because the 11th bit complies with none of the filters.

	RX Buffer1 Frame	Approved ID
ID type	*BASE*	
Mask	101 0010 0000	
Filter0	101 0010 0000	1X1XX1XXXXX
Filter1	101 0010 0000	1X1XX1XXXXX

ID value 0x7FF (111 1111 1111 in binary format) is approved because complies with both filter (in this case the two filter are the same because they must be considered like one).
ID value 0x064 (000 0100 0000) isn't considered because the 7th bit doesn't comply with filters.

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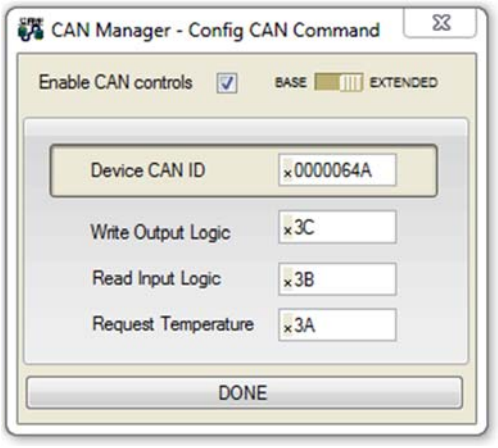
Command Configuration Window

The *CAN Command Windows* allows to set card address and *CAN Commands*.
You can access to command configuration window closing the *Control Panel*.
The *CAN Commands* are: *read input*, *write output*, *read temperature*. Thanks to these commands it is possible to communicate through CAN.
To configure CAN commands, it is necessary to assign an address to CAN-IO and to configure command data (the first bytes of CAN messages).
Default configuration is 500 kbps speed with no filters.

The Command Configuration Window (Picture 12) can be opened from *Command* menu choosing *Config CAN Command*.



Picture 12: Command Configuration Window

Default configuration is 500 Kbps speed with the following parameters:

ADDRESS:..... 64A *(hex)*
READ TEMPERATURE COMMAND: ..... 3A *(hex)*
READ INPUT COMMAND: ..... 3B *(hex)*
WRITE OUTPUT COMMAND:..... 3C *(hex)*

CAN Command Description

CAN message to write CAN I/O Output must contain:

1. CAN-IO address (defined by users)
2. The first byte which is the *write output command* (defined by users)
3. The second byte which is the output state (from 1 up to 8)
4. The third byte which is the output state (from 9 up to 16)

OTHER BYTES WILL BE IGNORED
If this type of CAN message is correctly received, the board answer with an express acknowledge package.

Example
CAN message to enable the fourth and the eleventh output are:

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Direction	Address	Byte 1	Byte 2	Byte 3	Other Byte
IN[2]	5D8(hex)	1(hex)	8(hex)	4(hex)	IGNORE
OUT[3]	5D8(hex)	41(hex)	8(hex)	4(hex)	Not present

CAN message to get CAN I/O input state must contain:
1 - CAN I/O address (defined by users)
2 – The first byte which is the *read input command* (defined by users)

OTHER BYTES WILL BE IGNORED

Example (ref. Picture 6):
CAN message to read the CAN I/O input state. The reply shows the fourth and eleventh inputs are high.

Direction	Address	Byte 1	Byte 2	Byte 3	Other Byte
IN	5D8(hex)	2(hex)	IGNORE	IGNORE	IGNORE
OUT	5D8(hex)	42(hex)	8(hex)	4(hex)	Not present

CAN message to get board measured temperature must contain:
1 - CAN I/O address (defined by users)
2 – The first byte which is the read *temperature command* (defined by users)

OTHER BYTES WILL BE IGNORED

Example (ref. Picture 6):
CAN message to read temperature: the reply shows a temperature of 21.19°C calculate as follows:

153(hex)*0.0625(dec)°C=21.1875°C

Direction	Address	Byte 1	Byte 2	Byte 3	Other Byte
IN	5D8(hex)	3(hex)	IGNORE	IGNORE	IGNORE
OUT	5D8(hex)	43(hex)	1(hex)	53(hex)	Not present

[2] Message received by CAN-IO
[3] Message sent by CAN-IO

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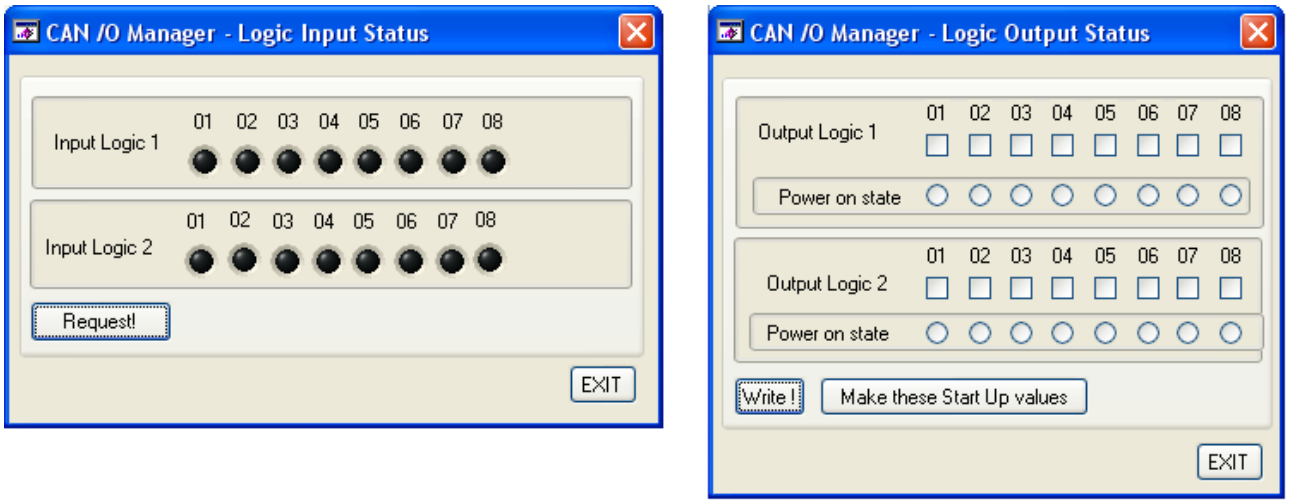
Check inputs and outputs using software

Through software it is possible to read input status or to write the output status using the relevant window (Picture 13) which can be opened choosing *Read Input Logic* or *Write Output Logic* from *Command* menu.



Picture 13: Logic Input/Output Windows.

Trhough Logic Output Status windows it is possible to configure CAN I/O output start up status. To do this, write the values and then push *Make these Start Up values* button, the start up output values are shown under the check box.

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Stand Alone Mode

CAN-IO can work on a CAN BUS with no PC and software. To enable the stand-alone mode it is enough to connect CAN interface, J2 jumper and power supply the card either from USB or from an external power supply.

ATTENTION: IN ORDER TO PRECLUDE MALFUNCTIONING OR DAMAGE DO NOT CONNECT EXTERNAL POWER SUPPLY AND USB AT THE SAME TIME

Default configuration is 500 Kbps speed with the following parameters:

ADDRESS:.....64A *(hex)*
READ TEMPERATURE COMMAND: .....3A *(hex)*
READ INPUT COMMAND .....:3B *(hex)*
WRITE OUTPUT COMMAND: 3C *(hex)*

CAN default configuration can be modified and saved when you exit form the software. The device reloads the parameters automatically at the start up.

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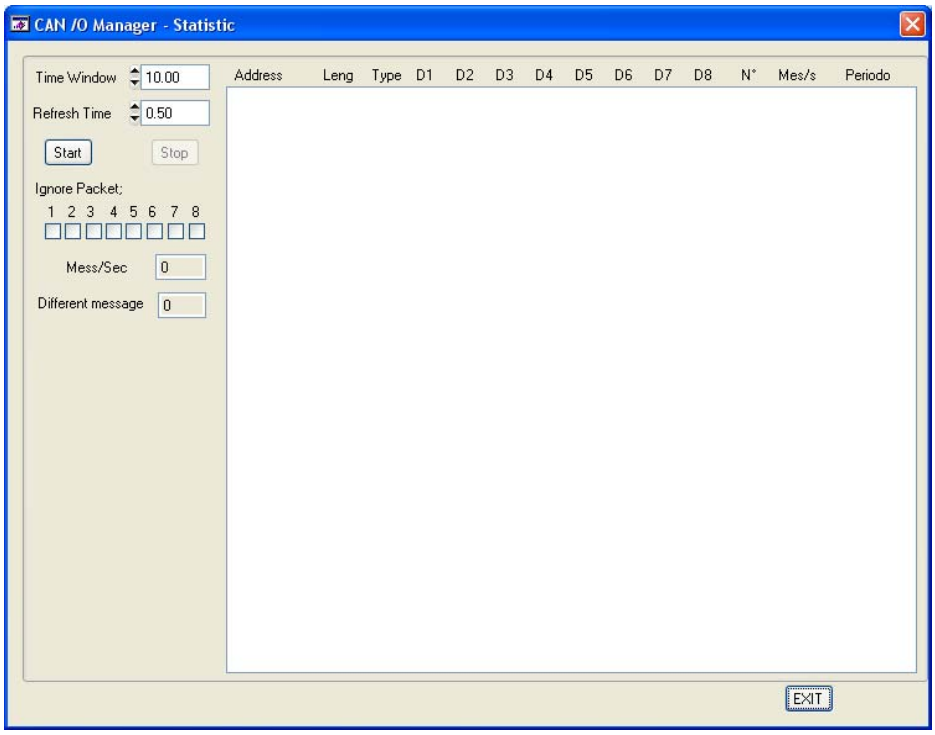
Statistic Window Description

The software can find the period of different CAN messages on the BUS. This feature is available in *CAN Option* menu when CAN interface is enabled.



Picture 14: Statistic Window.

The user can customize the watching time window, the refresh period and he can filter one or more bytes from the CAN message.

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COMMUNICATION PROTOCOL

Is possible to use some features of the board through a direct communication with RS232 or USB interfaces.
If you want use the USB interface you need to install the driver supply with the board and include the dynamic library FTD2XX.dll.
Otherwise, if you use the RS232 interface, no drivers installation is required.

ATTENTION: IN ORDER TO PRECLUDE MALFUNCTIONING OR DAMAGE DO NOT CONNECT EXTERNAL POWER SUPPLY AND USB AT THE SAME TIME

Every command sent to the board must be formatted in the following way:

<FRMDELM> <CMD> <Data> <FRMDELM>

Where <FRMDELM> is the byte that delimit the command frame "0x20", <CMD> is the byte that identify the command and <Data> are the command parameters.
The board response format is:

<CMD> <Data>

Where <CMD> is the command executed and <Data> are the requested parameters.
The available commands are:

- The output write command (<CMD>=0x51) followed by two byte which bits represent the 16 outputs status.
  The board respond only <CMD> byte
  Example: *command:* *0x20 0x51 0x81 0x18 0x20*
  reply: *0x51*
  effect: *the outputs 0, 7 of the first block and the outputs 3, 4 of the second block are now active.*

- The command that set the current output status as start-up status (<CMD>=0x48).
  The board respond only <CMD> byte
  Example: *command:* *0x20 048 0x20*
  reply: *0x48*
  status: *The current output status is set as Start-Up status*

- The read input command (<CMD>=0x52).
  The board respond with <CMD> byte followed by two byte which bits represent the 16 inputs status.
  Example: *command:* *0x20 0x52 0x20*
  reply: *0x52 0x81 0x18*
  status: *the inputs 0, 7 of the first block and the inputs 3, 4 of the second block are active*

- The read temperature command (<CMD>=0x50.
  The board respond with <CMD> byte followed by two byte that represent a 16 bit integer number. You can find the temperature multiply this number for 0.0625.
  Example: *command:* *0x20 0x50 0x20*
  reply: *0x50 0x01 0x93*
  interpretation: *The 16 bit number is -> 0x0193=403*
  *the temperature is 403*0.0625=25.19°C*

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FTD2XX.dll USAGE EXAMPLE

This example show the usage of the USB dynamic library FTD2XX.dll for a direct board communication. The example was write in C but you can use this library with any program language.

```
/*****************************************************************************/
// Open Device Communication
/*****************************************************************************/
        if ((*FT_Open_Ptr) (0, &Handle_device))
        {
                MessagePopup ("ERROR",OPEN_ERROR_MSG );
                goto Error;
        }

/*****************************************************************************/
// Read temperature
/*****************************************************************************/
        //send command
        buffer=malloc(3);
        buffer[0]=FRAME;
        buffer[1]=CMD_READ_TEMPERATURE;
        buffer[2]=FRAME;

        if ((*FT_Write_Ptr) (Handle_device, buffer, 3, &ByteWrite))
        {
                MessagePopup ("ERROR",WRITE_ERROR_MSG );
                free(buffer);
                goto Error;
        }
        //read answer
        if ((*FT_Read_Ptr) (Handle_device, buffer, 3, &ByteRead))
        {
                MessagePopup ("ERROR",READ_ERROR_MSG );
                free(buffer);
                goto Error;
        }
        if (*buffer!=CMD_READ_TEMPERATURE)
        {
                MessagePopup ("ERROR",READ_ERROR_MSG );
                free(buffer);
                goto Error;
        }
        temperature = ((buffer[1]<<8)+buffer[2])*0.0625;
        free(buffer);
        buffer=malloc(50);
        sprintf (buffer, "Temperature: %f", temperature);
        MessagePopup ("ERROR", buffer);
        free(buffer);
```


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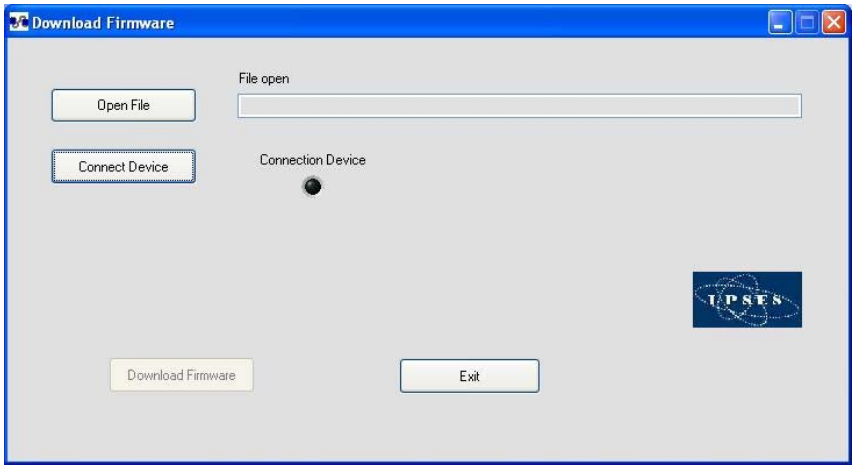
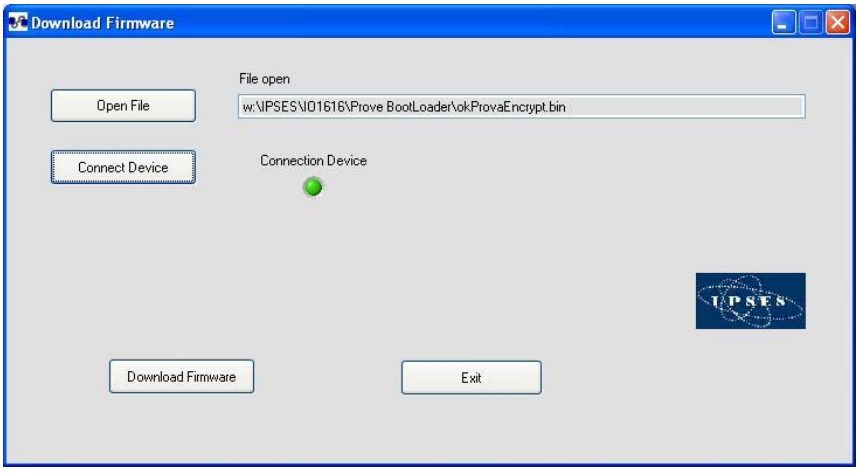
FIRMWARE UPGRADE FUNCTIONALITY

CAN I/O is provided with a Boot Loading for firmware update by USB. To set the unit in firmware upgrade mode, select jumper J1 before switching on the device. To do firmware Upgrade a specific software shown in figure 9 must be used. Firmware upgrading is not possible through RS232 or CAN.



Picture 8: Firmware upgrade software start-up.

Open the new firmware file pushing *Open File* button, then activate connection choosing *Connect Device* button (if the connection is disabled the LED stays off), then push *Download Firmware* and wait for the pop-up message (fail or pass).



Picture 10: file loaded.

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PRODUCT CODE

Code	Description
CAN-IO	CAN I/O control card
CAN-IO-DIN	CAN I/O control card mounted on a universal support for DIN rail
Euro-DIN	DIN universal rail for I/O cards (Eurocard format)
RS232-DB9	RS232 cable with DB9 female connector
USB-A-B	USB cable to connect USB cards
USB-A-B-ill	USB cable with light end to connect USB cards

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TECHNICAL FEATURES

Power supply:	USB configuration mode: self-powered through USB Stand-alone mode: 5V external supply or self-powered through USB RS232 configuration mode: 5V external supply
Working temperature:	From 0°C up to +60°C
Storage temperature:from	-40°C up to +85°C
Interface toward:	USB port type B, compatible with USB2.0 and RS232 (DB9)
Card dimensions:	160 x 100 x 15 mm (6.30 x 3.94 x 0.59 inches)
Inputs:	Sixteen optocoupled inputs, reciprocally isolated in two groups of eight, which Can support a max voltage of 36V Low level: lower then 1V High level: higher then 2,5V Impedance: about 2,5 kΩ
Outputs:	Sixteen optocoupled outputs, reciprocally isolated in two groups of eight, which can support a max voltage of 36V and max current of 150mA.
CAN interface:	Compatible with standard *CAN 2.0B Active Specification* ISO 11898-2 physical layer compliance Programmable *Baud rate* (up to 1MB/s) Programmable reception filters (available for *extended* and *standard frame*)
Protection:	Optocouplers with operative isolation voltage of 2.500 max RMS
Thermal sensor:	Resolution: 0,0625°C Accuracy: ±1°C (max) from 25°C to 65°C ±2°C (max) from -40°C to 25°C and from 65°C to 85°C ±3°C (max) from -55°C to -40°C and from 85°C to 125°C

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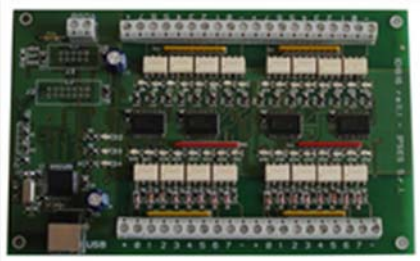
IPSES I/O CARD AVAILABLE MODELS

IO-69: Input/output Card with 6 inputs and 9 relay outputs and USB interface

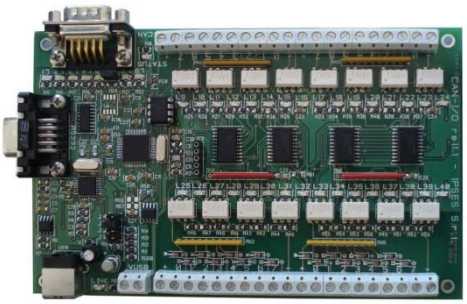
IO-69-USB is a self-powered card to manage six optocoupled inputs and nine relay outputs with USB interface.
A timeout control allows to protect the connecting devices, turning off all the outputs if it does not receive commands from the host within a time configurable through software.
Furthermore, there is the possibility to program all the outputs so that each one will activate only when inputs reach assigned conditions: in this case, IO- 69 acts like a programmable logic controller (PLC).
The card is produced in two versions: with single pole double throw relay (SPDT) and with single pole single throw relay (SPST).

IO-1616: Input/output Card with 16 inputs and 16 outputs and USB or RS232 interface



IO1616 is a self-powered card to manage sixteen optoisolated inputs and sixteen optoisolated outputs with USB interface. The model is available also with RS232 interface, in this case the card needs external power supply.
IO1616 can be directly connected to PLC, to input devices from operator and to other I/O systems. the status of each input
On request, an integrated temperature sensor allows to know in real time the temperature of the system IO1616 is placed in.

CAN-I/O: Input/output Card with 16 inputs and 16 outputs with CAN, USB and RS232 interface



CAN-IO is a control unit equipped with CAN, USB and RS232 interfaces to manage sixteen optocoupled inputs and outputs. The card can work as standalone device on CAN BUS. Its configuration is achieved either through USB (in this case the board is self-powered) or through RS232 interface. Easy to use and to configure, thanks to the provided software, CAN-IO is the right answer to the need to acquire and to drive digital signals through already existing CAN bus.
CAN-IO can be directly connected to PLC, to input devices by operator and to other I/O systems.
Each input and output status can be read by a field bus at any moment. Besides, thanks to LEDs fixed on, the status is shown directly on the board. An integrated temperature sensor allows to know in real time the temperature of the system CAN-IO is placed in.

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WEB-IO: Input/output Card with 16 inputs and 16 outputs, Ethernet interface, integrated web, telnet and SNMP servers and SMTP client.

WEB-IO is a card to manage sixteen optocoupled inputs and sixteen optocoupled outputs with Ethernet interface, equipped with a web, a telnet and an SNMP servers, and an SMTP client. The web server allows to connect and to manage the card using any web browser (i. e. Internet Explorer or Firefox), with no needs to install a software on your PC. Besides, the card can be connected directly to a switch or to a router with no need to use a PC. It is also possible to develop a customized software managed by telnet service or SNMP client. The SMTP client allows to send alert email based on inputs status change events.

WEB-IO can be directly connected to PLC, to input devices from operator and to other I/O systems. Each input and output status can be read by a web browser or a telnet client at any moment, besides it is shown directly on the board thanks to LEDs fixed on. On request, the card can be equipped with an integrated temperature sensor which allows to monitor in real time the temperature around the regulator voltage module. Through expansion connectors the card can be interfaced to a RTCLOG (Real Time Clock and Logger) optional module: by this way, it can perform a log of the I/O states on a dedicated memory.

WEB-IO is available also in box version, it is provided with a demo software for Windows environment, based on telnet service.

WEB-IO-WiFi: Input/output Card with 16 inputs and 16 outputs, Ethernet and WiFi interfaces, integrated web, telnet and SNMP servers

WEB-IO-WiFi is a card to manage sixteen optocoupled inputs and sixteen optocoupled outputs with Ethernet and WiFi interfaces, equipped with a web, a telnet and an SNMP servers. The web server allows to connect and to manage the card using any web browser (i. e. Internet Explorer or Firefox), with no needs to install a software on your PC. Besides, the card can be connected directly to a switch or to a router, by this way it can be accessed by any PC connected to Internet. It is also possible to develop a customized software managed by telnet service or SNMP protocol. The board is available with built-in antenna or with ultra-miniature coaxial (U.FL) connector for external antenna connection.

WEB-IO-WiFi can be directly connected to PLC, to input devices from operator and to other I/O systems. Each input and output status can be read by a web browser or a telnet client at any moment, besides it is shown directly on the board thanks to LEDs fixed on. On request, the card can be equipped with an integrated temperature sensor which allows to monitor in real time the temperature around the regulator voltage module.

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WEB-ADIO: Input/output Card with 8 analogical inputs, 8 digital inputs, 8 analogical outputs and 8 digital outputs, Ethernet interface, integrated web, telnet and SNMP servers

WEB-ADIO is a card to manage 8 optocoupled digital inputs, 8 analogical inputs, 8 optocoupled digital outputs and 8 analogical outputs with Ethernet interface, equipped with a web, a telnet and an SNMP servers. The WEB server allows to connect and to manage the card using any web browser (i. e. Internet Explorer and Firefox), with no needs to install a software on your PC Beside, the card can be connected directly to a switch or to a router with no need to use a PC.
It is also possible to develop a customized software managed by telnet service.
WEB-ADIO can be directly connected to PLC or to analogical transducer, to input devices from operator and to other I/O systems.
The analogical inputs and outputs have an operative voltage from 0V to 10V, with a resolution of 10mV and are calibrated one by one. Each input and output status can be read by a web browser or a telnet client at any moment, besides, the status of digital inputs and outputs it is shown directly on the board thanks to LEDs fixed on.

WEB-ADIO-WiFi: Input/output Card with 8 analogical inputs, 8 digital inputs, 8 analogical outputs and 8 digital outputs, Ethernet and WiFi interfaces, integrated web, telnet and SNMP servers

WEB-ADIO-WiFi is a card to manage 8 optocoupled digital inputs, 8 analogical inputs, 8 optocoupled digital outputs and 8 analogical outputs with Ethernet and WiFi interfaces, equipped with a web, a telnet and an SNMP servers. The web server allows to connect and to manage the card using any web browser (i. e. Internet Explorer and Firefox), with no needs to install a software on your PC Beside, the card can be connected directly to a switch or to a router with no need to use a PC. The board is available with built-in antenna or with ultra-miniature coaxial (U.FL) connector for external antenna connection.
It is also possible to develop a customized software managed by telnet service.
The analogical inputs and outputs have an operative voltage from 0V to 10V, with a resolution of 10mV and are calibrated one by one.
WEB-ADIO-WiFi can be directly connected to PLC or to analogical transducer, to input devices from operator and to other I/O systems.
Each input and output status can be read by a WEB browser or a telnet client at any moment, besides, the status of digital inputs and outputs it is shown directly on the board thanks to LEDs fixed on.

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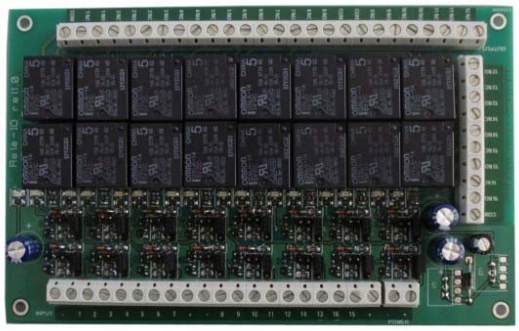
RELE' I/O: Interface module with16 digital inputs that can control 16 SPDT relay outputs 5A



RELAY I/O(-SEL) is an expansion module with16 digital inputs that can control 16 SPDT relay outputs 5A @ 250VAC or 5A @ 24VDC each

These modules can be used as an expansion for ant I/O card, transforming the TTL or contact freedmen open-collector type outputs (up to a maximum of 16 ones) in 16 relay outputs with NO and/or NC contact.

IPSES provides two board models, based on different relay output tipology:

- RELÈ-IO board: the sixteen outputs are divided in two groups of eight with common COM contact and both NC and NO contacts available on output connectors.
- RELÈ-IO-SEL board: each output is independent and each relay provides COM contact and one contact selectable between NC and NO according dedicated selector configuration.

To operate the cards require an external power supply. Two version are available: RELE'-IO(-SEL)-5 which requires an external power supply of $5V_{dc}$ or RELE'-IO(-SEL)-24 which requires an external power supply from $7V_{DC}$ up to $24V_{DC}$.

The card is in standard Eurocad format (100 x 160 mm - 3,94 x6,30 inches) and can be supplied mounted on opened DIN rail.

N8-USB: *Input Card with 8 inputs and USB interface*

IN8 is a low size auto powered control unit equipped with USB interface. IN8 can check eight galvanic isolated inputs: on each input it is possible to apply voltages regardless form the USB ground, with a maximum voltage of 30V.

Easy to use, thanks to the driver provided with and to the LabVIEW library available on demand, IN8 also reduce installation costs.

The board low size to be easily integrated in several systems. Besides, IN8 has its inputs galvanically isolated to protect from electromagnetic disturbances and ground loops, improving its reliability and quality.

IN8 is the right answer to the need to acquire digital signals from a PC in an industrial environment.

LabVIEW Library for I/O cards:

A complete library for LabVIEW, giving the feasibility of I/O devices remote control, is available on request. The Library allows to implement a LabVIEW application without knowing the details of the communication protocol, making the development quick and easy. Each library is provided with a help file which explains deeper each function included with.

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CONTACTS

IPSES S.r.l. conceives, projects and markets electronic and scientific instruments. The customized planning of our devices allows us to answer specific necessities for customers asking for embedded systems. IPSES clients enjoy access to a dedicated project engineering team, available as needed.
Our pool consists of highly competent professionals whose experience in this field is extremely strong. Thanks to constant updating and technical development, IPSES is a leading company, combining the dynamism of a young group into the competence and reliability of a qualified staff.

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SUPPORT INFORMATION

The customer is at liberty to contact the relevant engineer at IPSES S.r.l. directly.

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PROBLEM REPORT

The next page is a standard template used for reporting system problems. It can be copied and send as a fax. Alternative bugs may be reported by emails, in this case please insure that the mail contains similar information listed in the *Engineering Problem Report* form.

ENGINEERING PROBLEM REPORT

Problem describer

Name			**IPSES s.r.l.** **Via Suor Lazzarotto, 10** **Cesate (MI)** **Italy** **Fax (+39) 02 700403170** **e-mail *support@ipses.com***
Company			
Date	Tel.	Fax	

Product

Name	Version	Serial No.

Report Type (bug, change request or technical problem)

Major bug	☐	Urgency:	
Minor bug	☐	High	☐
Change request	☐	Medium	☐
Technical problem	☐	Low	☐

Problem Description

Reproduction of Problem

IPSES s.r.l. Action notes

Received by	Date	Report No.	Action

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(Product code CAN I/O Rel. 01.02.0001)

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