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Service manual of HCE-IOV-102 and HCE-IOV-201

Overview

Please read and understand this document before using the products, save this document for later use. Product specifications and accessories may be changed at any time, some specifications of the products may be changed without any notice. This is a generic manual, it's possible that your system is different: follow the instructions in this manual and in other user guides and schematics shipped with your vision system. For further information contact the technical assistance.

The information in this document has been carefully checked and is believed to be accurate. However, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Copyright

Warranty

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Tables of contents

1. General features of the modules HCE-IOV-102 and HCE-IOV-201

The modules HCE-IOV-102 and HCE-IOV-201 permits an interface between PC and 8 inputs and 8 digital outputs via USB port.
Is possible to mount the module HCE-IOV-102 on DIN rail.
The outputs and inputs of the module HCE-IOV-102 are optoisolated; the outputs have a temporary overcurrent protection with LED signal up to 400% of output current for up to 2 sec.
The modules are used (depending on version) for the control of a strobe light source, the commands allow to put some outputs in parallel in order to increase their power.

2. Specifications of the HCE-IOV-102 module

Power: 24VDC 2A
Input: 8 optoisolated digital inputs, a voltage between 10VDC and 30VDC (3-10 mA) is recognized as logical 1, while a voltage between 0 and 3VDC is considered as logical 0. The voltages must be considered respect the 0V which supplies the device. Input filters are programmable from 0.25 mSecs up to 255mSecs
ATTENTION: in the communication protocol, inputs and outputs are numbered from 0, also in the label, while on the PCB of the device the numbers starts from 1.

N. input	0	1	2	3	4	5	6	7
Clamp HCE-IOV-102	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8
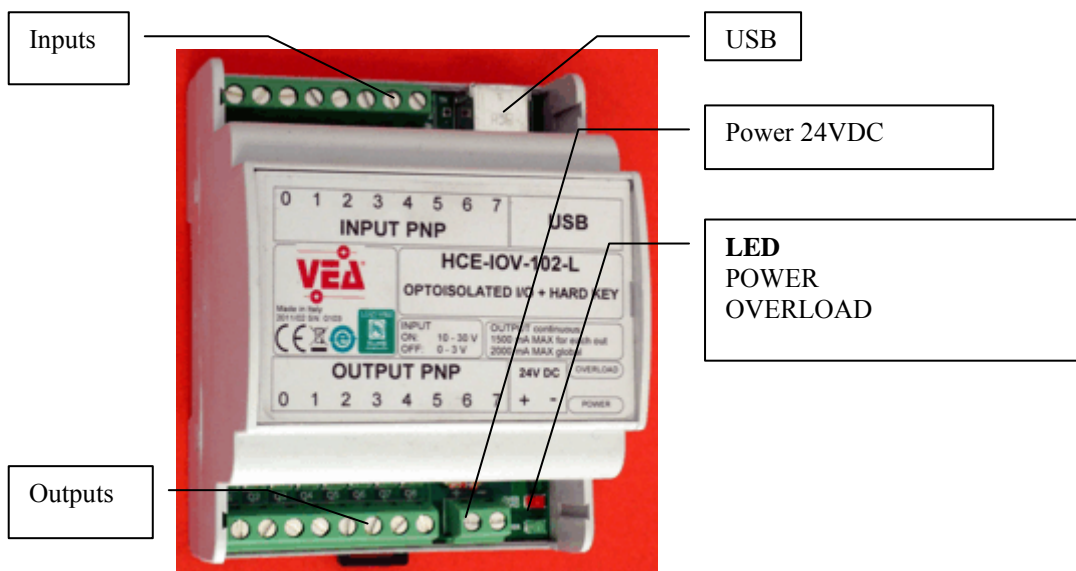
N. output	0	1	2	3	4	5	6	7
Clamp HCE-IOV-102	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8

Output: 8 optoisolated digital outputs (PNP transistor) protected from temporary overcurrent, resistive and inductive load allowed (voltage 24V DC), max current for a single output: 500mA, max current for each output with all outputs turned on: 200mA.

3. **Specifications in strobe mode HCE-IOV-102-S(H).**

The device permits to supply power to LED lamps in strobe mode, also with high current using multiple parallel outputs.

With the MLH command can be configured the high-speed strobe connected directly to the rising edge of an input, the scanning timings of a non filtered input are 0.25mSecs, the minimum duration of a pulse is 200 µSecs.

For maximum supportable current look at the table below

ATTENTION: the HCE-IOV-102-S module is protected from temporary overcurrent, a continuous overcurrent (more than 2 sec) or a short circuit will irreparably damage the module. These damages are not covered by warranty. The use of the module in overcurrent mode, with variable duty cycles, is under the responsibility of the user.

ATTENTION: **the HCE-IOV-102-SH module is NOT protected from overcurrent and short circuits.** These damages are not covered by warranty.

Duty cycle (cycle duration <1 sec)	HCE-IOV-102-S Max current on a single output (all other off, or with currents <50 mA)	HCE-IOV-102-S Max global supportable current	HCE-IOV-102-SH Max current on a single output (all other off, or with currents <50 mA)	HCE-IOV-102-SH Max global supportable current
> 50%	3 A	3 A	6 A	6 A
20% < 50%	4 A	4 A	8 A	8 A
< 20%	6 A	6 A	10 A	10 A

4. **Specifications of the HCE-IOV-201 module**
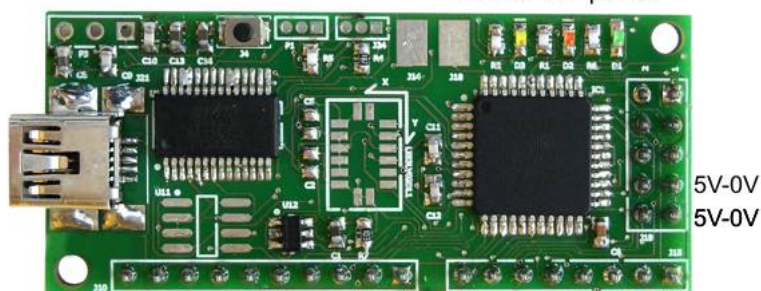
Power: from USB

    Input: 8 TTL digital inputs, input filters are programmable from 0.25 mSecs up to 255mSecs.

    Output: 8 TTL digital outputs (10mA).

    ATTENTION: the HCE-IOV-201 is not optoisolated and is sold as electronic component, damages caused by electrostatic discharges or wrong connections are not covered by warranty. The terminals of the module have in sharing the 0V of the ground with the 0V of the USB port. Without an inside insulation, these terminals expose the PC to potential risks, because there is a direct connection.

In case of unexpected return of voltages there can be damages to the module and the PC.

5. Power supply of the HCE-IOV-102-S(H) module.

HCE-IOV-102-S and HCE-IOV-102-SH modules may also work with USB unplugged.

ATTENTION: When the product is used with the USB port connected, remove the jumpers OVER and JPOWER, otherwise malfunctions may occur to the PC, a temporary use is accepted by the pc for a few minutes..

ATTENTION: **If JPOWER jumper is connected also the OVER jumper must be connected**, otherwise malfunctions may occur to the PC and the module. These damages are not covered by warranty.
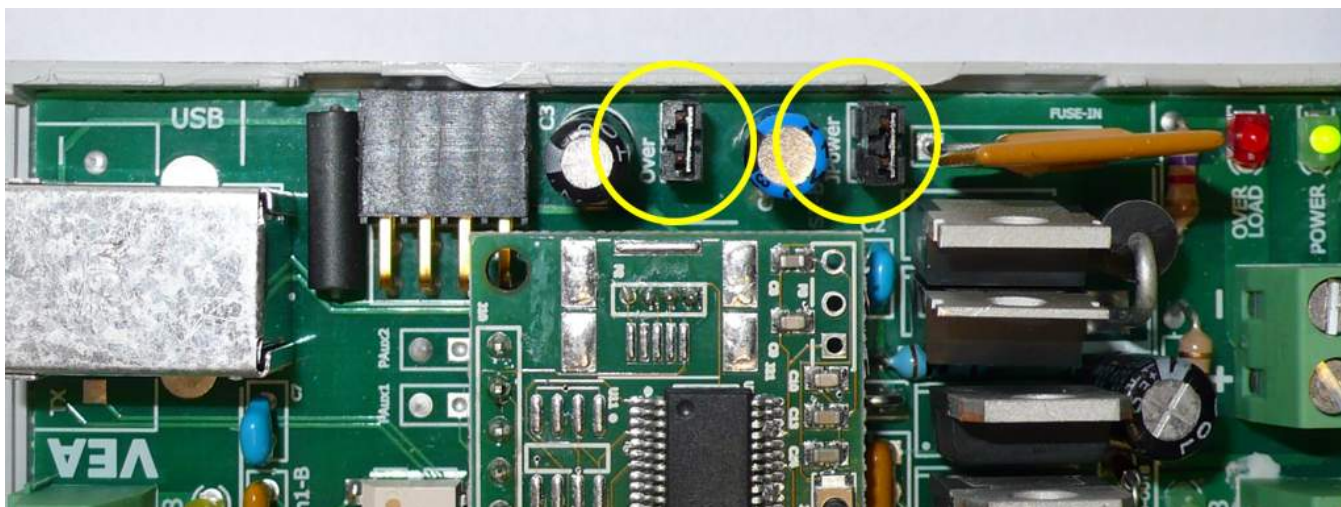
6. Insulation of the HCE-IOV-102 module

Is possible to remove the optoisolation between the external 0V and the 0V of the PC by connecting the *OVER* jumper. This will reduce the problems of interference in case there are large and instable differences of potential between external 0V and the 0V of the PC.

7. Summary table of the jumpers.

The *OVER* jumper connects the internal 0V (PC-USB) to the external 0V (24V DC).
The *JPOWER* jumper supplies the power to the microprocessor module when USB port isn't connected to the PC.
Below there is a table of the combination of jumpers.

Description	Factory Settings	OVER	JPOWER
The device is optoisolated and the CPU is powered by PC	HCE-IOV-102-L	NO	NO
The device isn't optoisolated (USB 0V is connected to external 0V) and the CPU is powered by PC		YES	NO
The device isn't optoisolated (USB 0V is connected to external 0V) and the CPU is powered by external 24V (lowered to 5V)	HCE-IOV-102-S(H)	YES	YES
WRONG AND DANGEROUS COMBINATION		NO	YES

8. Drivers install and electronic connections.

Download the updated drivers from site: www.vea.it.
The driver can be found on products/optics and other/IO device menu
(In english: http://www.vea.it/sito2010/prodotti/varie/IO/io_en.htm).
Unzip the files in a temporary directory (e.g.: "c:\temp").
ATTENTION: **follow the steps below in the right order:**
   1. connect the device to the power supply unit (24V), connecting the negative terminal first (0V)
   2. connect the device to the PC with a USB cable (not included in the product).

The connection between PC and the device needs an USB cable. This cable is like that used in printers, namely: Type A connector on the PC side and Type B connector on the IO side.

In factory automation we recommend using the cable HAC-IOV-180 with double-ferrite, with high impedance, which reduces the signal losses caused by electromagnetic interference.

ATTENTION: **tips to reduce interference for industrial use.**
In factory automation, there may be devices that emit electromagnetic interference.
For this reason, for a continuous operation of the product we give the following advice:
- Do not route the USB cable along with outgoing cables from the inverter, motor drives, robots, and other power devices
- do not put the HCE-IOV device near inverters, motor drives, power robots**.**
- Do not use USB cables for PC office.
- Do not use USB cables longer than 2 m
- in case of heavy and unstable potential differences between the PC and 0V external, can cause interference, you can put the OVER jumper (see Chapter 6).

Type A connector of the USB cable. Connect to the Vision System
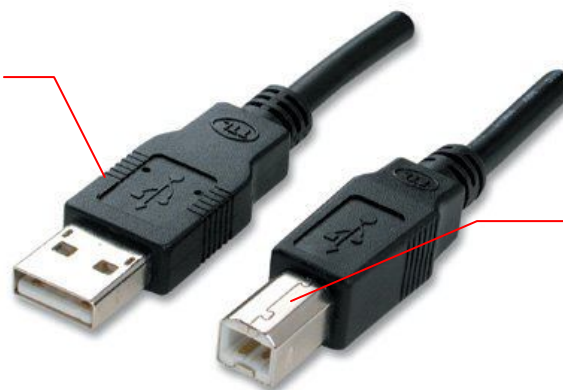
Type B connector of the USB cable. Connect to the **HCE-IOV-101** module

Wait for device detection.
On Windows XP, the following screens will appear, respond as indicated in the yellow ovals.
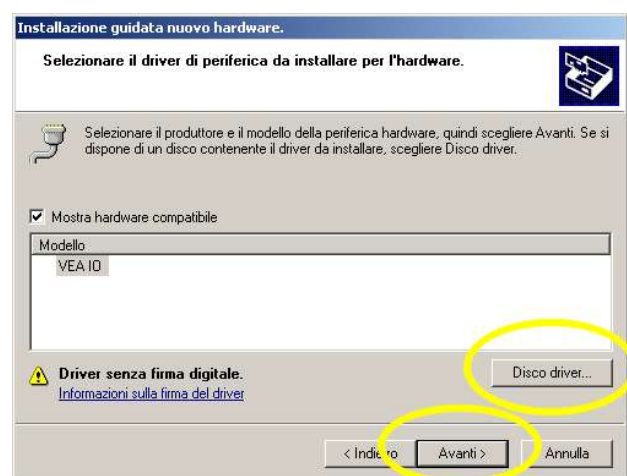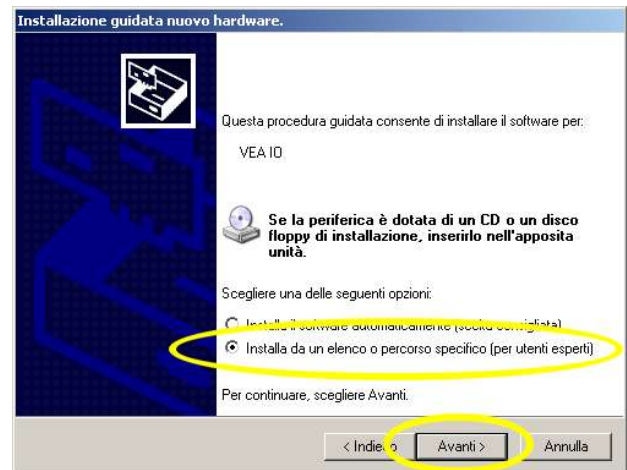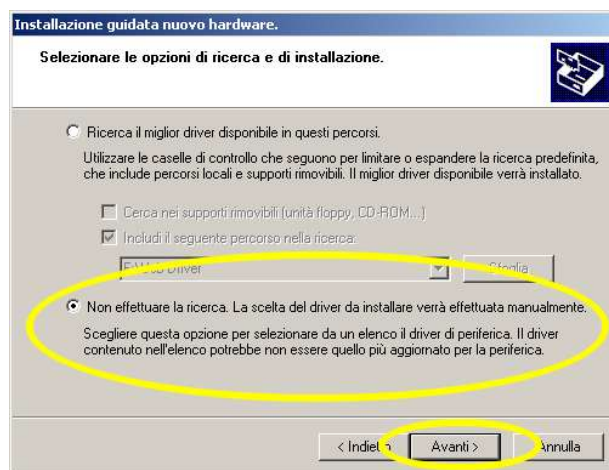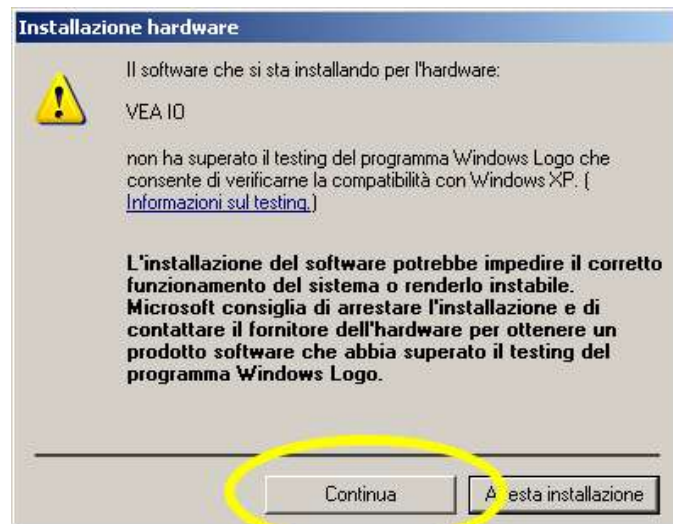
Everything should be done two times, once for the driver and once for the physical emulation of the serial port.

9. Serial port configuration

The module emulates a serial port of your PC, for know which "COM " is emulated go on the "My Computer " icon, right click on this icon, "properties", "Hardware", "Device Manager" button.
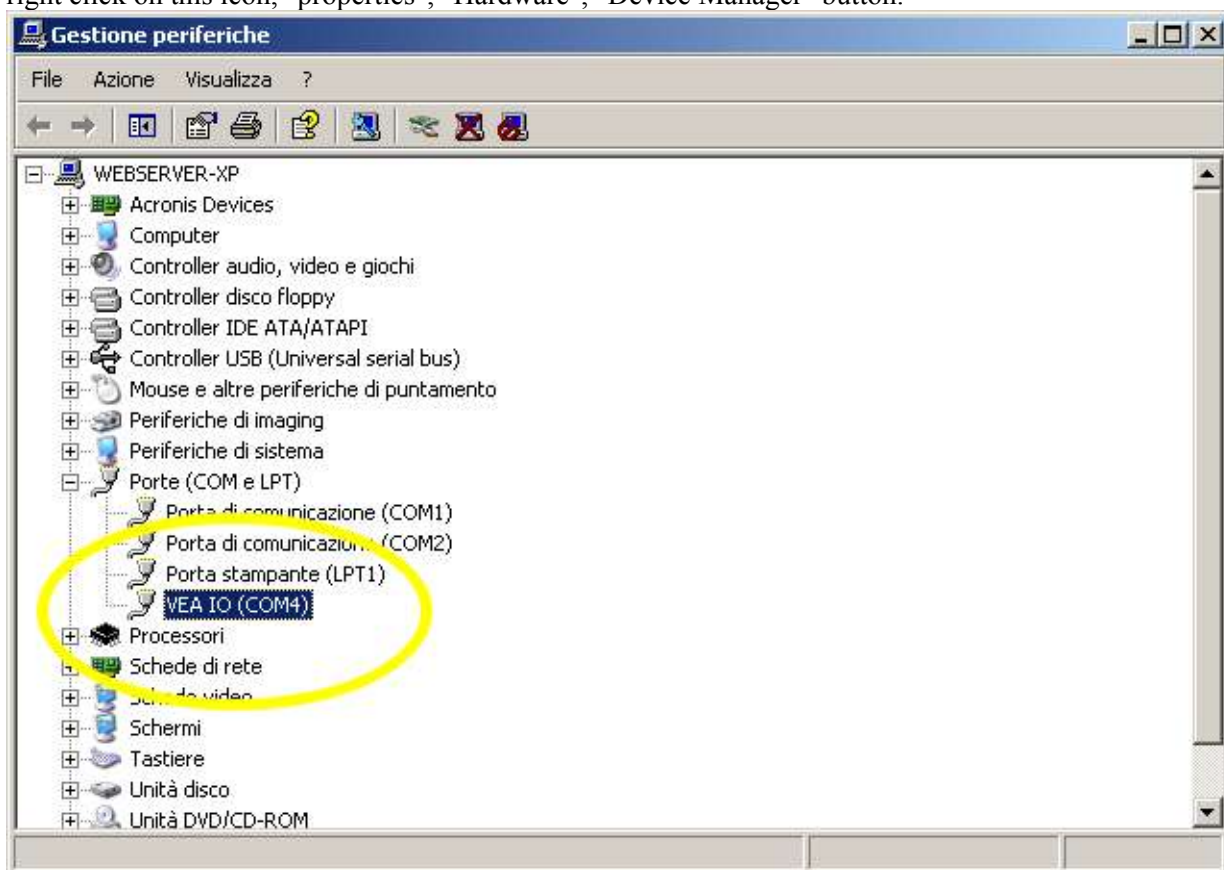
ATTENTION: every new device is detected with a different COM number; this is done to allow the connection of multiple IO devices. To force the number of COM go on th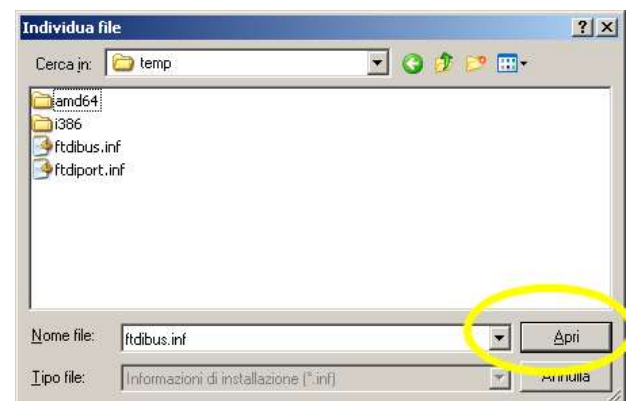e "VEA I / O ", double click of the mouse, on the window select "Port Settings", "Advanced" button and select the COM number, then click OK. We recommend forcing the port number if you do not plan future expansions, in this way, if there will be a module replacement, the COM port number will remain the same.

In case of a new install of the device or an additional module install, the computer will require new drivers, so it's good to keep them always available, we suggest using our driver and do not perform the automatic search of the driver of Windows, it is possible that compatible drivers, but with different features than the drivers provided, will be installed.

The device operates at **115200 baud 8N1 without flow control**.

10.   Use of HyperTerminal

To test the module I / O can use Windows HyperTerminal (in Windows XP is under Programs / Accessories / Communications, does not exist in Vista and Windows 7, can be downloaded from internet) configure it in this way:

Menu "File> Properties" "Connect To"and select the modem port of the device.
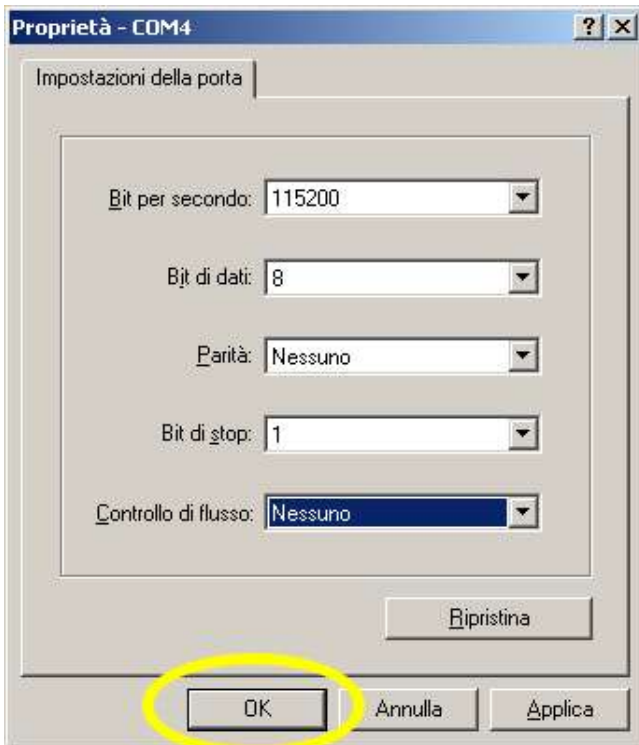
Press the "Configure" and set the fields as in the picture, then press OK

Go to "Settings " and press the "ASCII Setup"as described in the picture below.
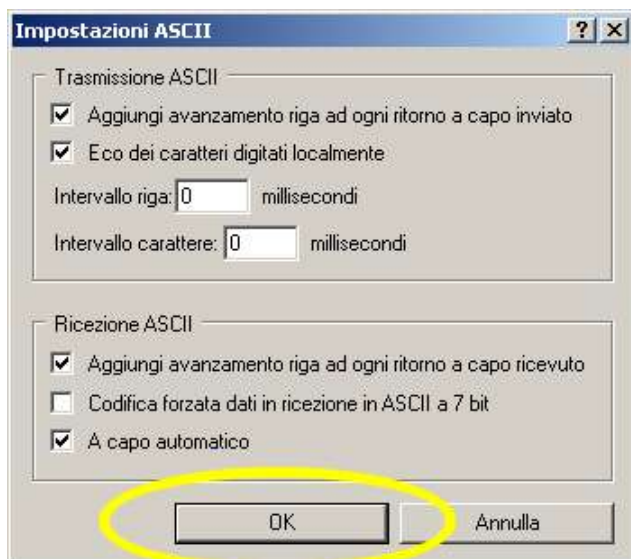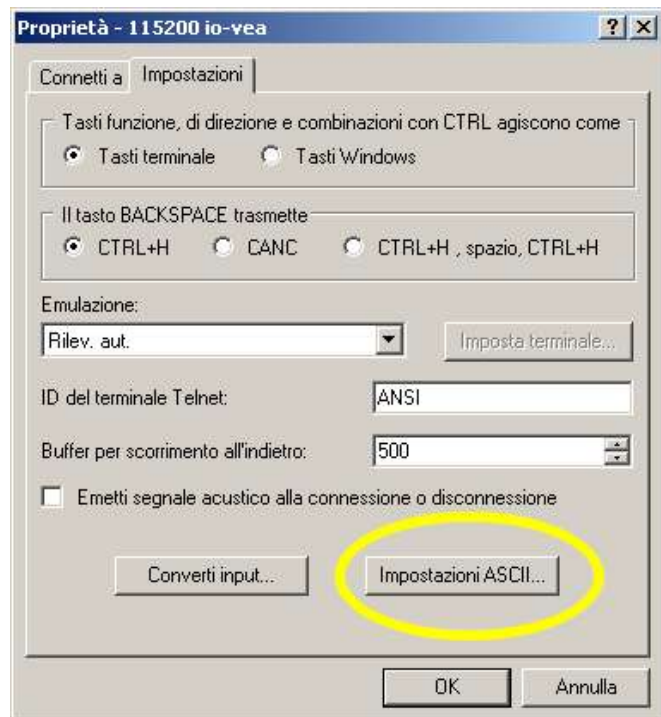
Set the fields as in Figure on the left, then press OK

11.   I/O Protocol

Legend:
<CR>: control character equivalent to code ASCII=13
 [n]:   variable code, usually "n" is a number
"standard replies": $ = ok ? = error (if [ASCII mode = on] must be followed by <CR>)

Note: in ASCII MODE=ON every number is readable otherwise must be considered as ASCII code,
tutti i numeri sono leggibili altrimenti sono da intendersi come codice ascii, for example the same command (in
BASIC string):
ASCII=on   "w26"+chr$(13)
ASCII=off   "w" + chr$(26)

Note: commands that start with M are always considered as ASCII = on, also in ASCII=off mode.

Command	Description	Return
?	Device identification	V1.13 VEA USB I/O<CR>
MA[n] <CR>	n=0 : ASCII mode OFF, n=1: ASCII mode ON (default ascii=1)	standard
MDDI<CR>	Return the number of digital inputs	[n]<CR> e.g.: 8 [CR])
MDDO<CR>	Return the number of digital outputs.	[n]<CR> e.g.: 8 [CR])
MER <CR> (from ver. 1.13)	The following commands are read from the EEPROM: MA, MF, MI, MKIW, MLH, MMIW	standard
MEW <CR> (from ver. 1.13)	The following commands are written to EEPROM: MA, MF, MI, MKIW, MLH, MMIW ATTENTION: Writing to EEPROM takes about 300 mSecs, in the meantime, the module will not process any command	standard
MF[f] <CR>	Inputs filter, [f] set me mSecs of the filter e.g.: MF100<CR> sets a filter on the inputs of 100 mSecs Max value: 255 mSecs Min value: 0 mSecs (equivalent to approximately 0.25 mSecs)	standard
MI	Interrupt mask (also with (ascii=off)) MI[p(nnn)]/[d(nnn)]<CR>: set the interrupt mask for each port, e.g.: « MI0/255<cr> » ensures that all inputs on port 0 (first port) generate an interrupt default: no interrupts for inputs	standard return to the command every change of state of an input contained in the interrupt mask (ascii=off) ![d] 2 bytes (ascii=on) ![d(nnn)]<CR> for the meaning of [d] see command "w"

Command	Description	Return
MKN[n] <CR>	Internal numerical key [n]= integer number to be converted returns an unambiguous number (the coding is the same for all modules) e.g.: "MKN541<CR>" (upon request, the numerical key can be customized)	[n]<CR> es: 49847891 [CR])
MKIW[n] <CR>	Writes a configurable numerical key [n]= integer number to store e.g.: "MKIW1234<CR>" ATTENTION: the key will be saved in EEPROM	standard
MKIR[n] <CR>	Configurable numerical key [n]=integer number to be converted returns an unambiguous number (the coding depends on the number stored with the function MKIW) e.g.: "MKIR541<CR>"	[n]<CR> es: 112822816 [CR]
MLH[i][p][u] <CR>	High speed strobe (in microseconds) [i]= trigger input for the pulse [p]=byte of the port 0 (0= strobe disabled) [u]=impulse duration in microSecs (range from 200 to 200000) e.g.: "MLH 4 15 500<CR>" when the input 4 switches to high, the outputs 0,1,2,3, corresponding to the decimal number 15, turn on for 0.5 mSecs ATTENTION: This instruction has priority over any other function of the module; during the pulse the module can not perform any action, so other commands can not operate correctly during the pulse.	standard
MLR <CR>	Turns off all flashing/strobe	standard
MLS[n][u][d] <CR>	Flashing or strobe [n]=output number 0 – 71 [u]=time ON in mSecs (0= turns off the flashing or the pulse) [d]=time OFF in mSecs (0= unique pulse) e.g.: "MLS 2 1000 1000<CR>" flashing on output 2	standard
MLGS[n1][n2][u][d] <CR>	Flashing/strobe group [n1]=first output number (0 – 71) [n2]=last output number (0 – 71) [u]= time ON in mSecs (0= turns off the flashing or the pulse) [d]= time OFF in mSec (0= unique pulse) e.g.: "MLGS 0 7 10 0<CR>" strobe pulse on outputs from 0 to 7, duration 10 mSecs	standard

To use the codes of the keys is recommended to store a number of sequences "number to be transformed", "number transformed" and build a program that requires them randomly.

Command	Description	Return
MMIR <CR>	Reads an integer number without sign Returns the number memorized with function MMIW	[n]<CR> e.g.: 1234 [CR]
MMIW[n]<CR>	Writes an integer number without sign e.g.: "MMIW1234<CR>"	standard

MMDRESET<CR> (from ver. 1.13)	Restores the default values except the numerical keys. ATTENTION: the values stored in the EEPROM will not be modified	standard
MRIG[n1][n2] <CR>	Reads the input associated to an interrupt for a group of port Returns the actual values in interrupt format [n1]=number of the first port (0 – 8) [n2]=number of the last port (0 – 8) e.g.: "MRIG 0 2<CR>" reads the input linked to interrupt on the ports 0,1,2	for each input contained in the interrupt mask (ascii=off) ![d] 2 bytes (ascii=on) ![d(nnn)]<CR> for the meaning of [d] see the command "w"
MTR<CR>	Time from power on, in mSecs	[n]<CR> e.g.: 3451234 [CR]
MTT<CR>	Returns the number of the pulse per second used in the high speed mode	[n]<CR> e.g.: 1430615[CR]

Comando	Descrizione	Risposta
W	Writes a byte on the outputs (ascii=off) W[p][d]: writes a byte (p=port, d=data) 3 bytes total. (ascii=on) W[p(nnn)]/[d(nnn)]<CR>: writes a byte ego. « W0/23<cr> » writes 23 on the port 0 (the first port) note: separator "/" can also be a space	standard
w	Writes an output (ascii=off) w[d=(0-127)]: set 0 on the corresponding output (up to 15 ports: 0-7 port 0, 8-15 port 1, etc) 2 bytes total (ASCII=off) w[d=(128-255)]: set 1 on the corresponding output (up to 15 ports: 128-135 port 0, 136-143 port 1, etc.) (ASCII=on) w[d=(0-127)]<CR>: set 0 on the corresponding output (up to 15 ports: 0-7 port 0, 8-15 port 1, etc.) (ASCII=on) w[d=(128-255)] <CR>: set 1 on the corresponding output (up to 15 ports: 128-135 port 0, 136-143 port 1, etc.)	standard
R	Reads the input one byte at a time (ascii=off) R[p]: reads one byte (p=port) 2 bytes total. (ascii=on) R[p(nnn)]<CR>: reads one byte (p=port) e.g. « R1<cr> » reads from port 1 (the second port)	(ascii=off) [d] the data in one byte (ascii=on) [d(nnn)]<CR>
r	Reads an input (ASCII=off) r[d=(0-127)]: reads the corresponding input (up to 15 port: 0-7 port 0, 8-15 port 1, etc.) 2 bytes total (ASCII=on) r[d=(0-127)]<CR>: reads the corresponding input (up to 15 ports: 0-7 port 0, 8-15 port 1, etc.)	0 (off) 1 (on)

Please Note: The module is sold in various versions depending on the country and uses, it is possible that some commands are not available for the version you purchased.

12. **Summary Specifications HCE-IOV-102.**

product type	industrial optoisolated usb i/o
fixing	din rail
number of inputs	8 PNP (0V common)
number of outputs	8 PNP (0V common)
optoisolation	1000V
maximum current for a single output ON(the others OFF) ver. L	1,5 A
maximum current for a single output ON (the others OFF) ver. S	3 A
maximum current for a single output ON (the others OFF) ver. SH	6 A
maximum current for a single output ON (all outputs ON) ver. L	250 mA at 30º - 200 mA at 50º
maximum current for a single output ON (all outputs ON) ver. S	375 mA at 30º - 250 mA at 50º
maximum current for a single output ON (all outputs ON) ver. SH	750 mA at 30º - 500 mA at 50º
supply voltage	12 – 30 V (typical 24V)
PC interface	USB 1.1
dimension	70 x 91 x h 63 mm
weight	123 g
operating temperature range	0º 55º
storage temperature range	-30º 70º
relative humidity	max 90% at 25ºC (77°F)

13. **Summary specification HCE-IOV-201.**

product type	usb i/o microcircuit
fixing	pin or 2 holes
number of inputs	8 TTL
number of outputs	8 TTL
maximum current on a single output	10 mA
supply voltage	USB (5V)
PC interface	USB 1.1
dimension	54,7(without USB connector) x 24,2 x h 7,5 (13,5 with pin connector) mm
weight	9 g
operating temperature range	0º 55º
storage temperature range	-30º 70º
relative humidity	max 90% a 25º

Features may change without notice.