# User Manual

## IA-2660-Ui

Isolated USB port

96 Digital I/O 3.3V/5V

Pluggable Terminal Blocks

Version 0418
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We at Intelligent-Appliance highly value your opinion. Please feel free to contact us with your impression on any subject, or with any question or comment you may have.

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## Introduction

The IA-2660-Ui is a flexible, most featured 96 Digital I/O channels device that is based on an Isolated USB port and includes easy-to-use Pluggable Screw Terminals.

The IA-2660-Ui Outputs are capable of sinking or sourcing up to 24mA, each, while the Input range supports both TTL and LVTTL level.

The IA-2660-Ui is capable of handling both Positive and Negative Logic Input signals, while the input pull-ups might be switched to Positive or GND, by software, in order to fit the attached devices.

Each Byte can be set to become an Input Byte or an Output Byte.

The IA-2660-Ui internal circuits are set to operate by 5V supply voltage or by 3.3V, software selected, in order to best fit customer's needs.

The on board Pluggable Screw Terminal blocks includes 8 signal bits each, providing an easy wiring, easy rewiring, easy interchanging and most efficient space managed without the need for additional cables and wiring boards.

The IA-2660-Ui software support includes DOT.net library, open source examples and software utilities for fast system implementation.

## Features

- Isolated USB port
- 96 Digital I/O channels
- Each Bite can be defined as Input or Output
- Enhanced Software Support package
- TTL/LVTTL Level signal handling
- High current output
- "Dry-Contact" Inputs are supported
- Positive and Negative Logic are supported
- Selectable Input pull-ups source
- Onboard watchdog protection
- High noise immunity
- Pluggable terminal blocks
- Din-Rail mounting ready

## Specifications

| | |
|---|---|
| **Communication Port** | |
| COM version | Isolated USB port |
| COM Speed | 1200-230.4K BR |
| Default BR | 19200 |
| **Digital Output** | |
| Channels | 96 |
| Structure | Tri-State Buffered Outputs |
| Rated Current | +/- 24 mA |
| Rated Voltage | 3.3V / 5V software controlled |
| **Digital Inputs** | |
| Channels | 96 |
| Input Voltage Range | 3.3V / 5V software controlled |
| Pull-up Resistor | 22K OHM |
| Pull-up Source | +3.3V / +5V / GND - Software controlled |
| **General** | |
| Total I/O Lines | 96 |
| Supply Voltage | 24VDC (19.2VDC~32VDC) |
| Supply Current | 0.3Amp |
| Operation Temperature | 0~60˚C. |
| Module Size | 170x115x45 mm |
| Weight | 330gr |

## Ordering Information

| | |
|---|---|
| **IA-2660-Ui** | 96-ch, Digital I/O, Isolated USB |
| **IA-2660-E** | 96-ch, Digital I/O, Ethernet |

## Warning & Safety

Intelligent Appliance products are NOT authorized for use as components in life support devices or systems.

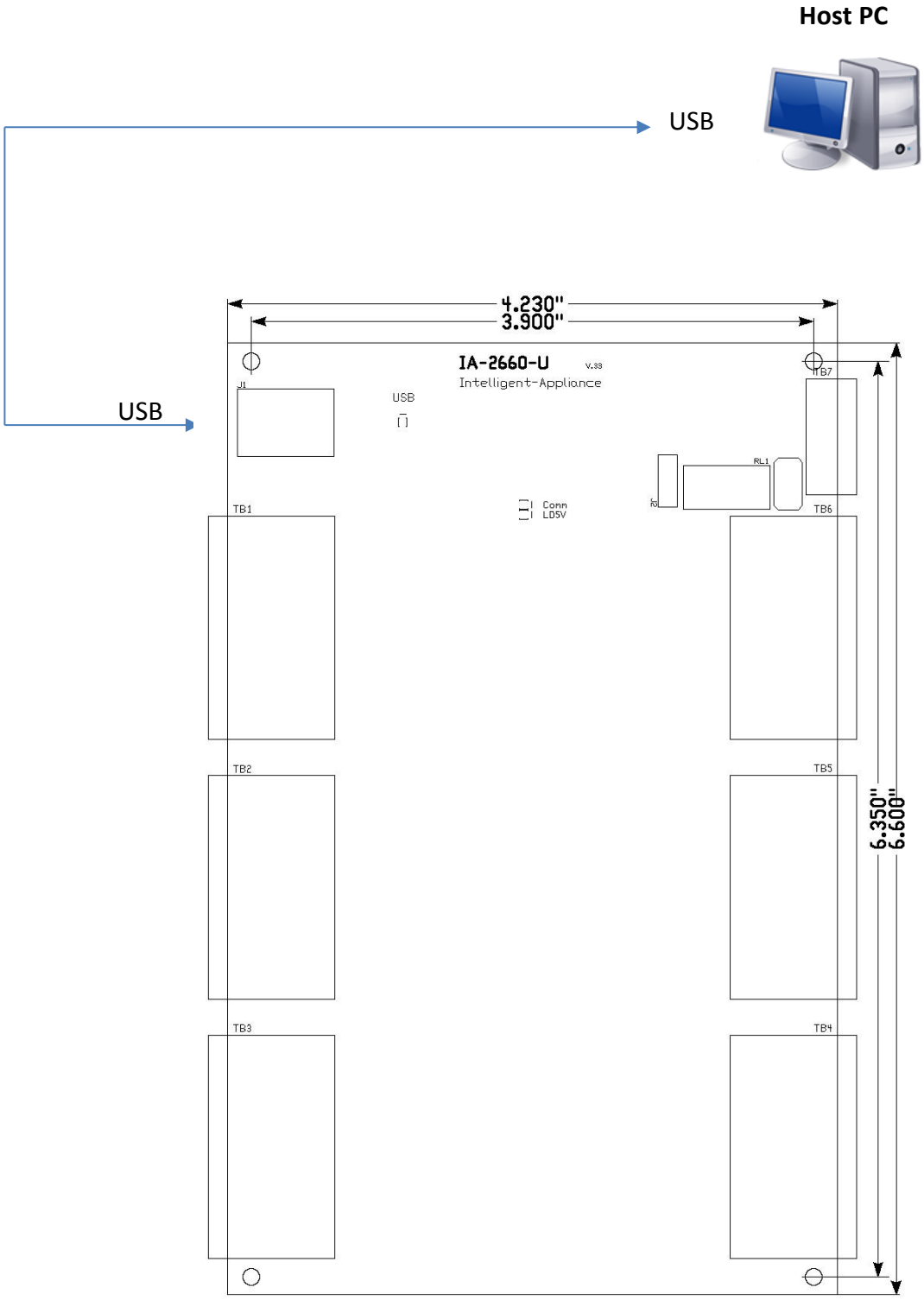
Do not operate the device in a manner not specified in the documentation. Misuse of the device may result in injury and/or damage equipment.

When wiring the device disconnect it from the power source and turn OFF all connected devices.

Not doing so may result in electric shock, injury and/or damage your equipment.

## Installation

### System Wiring



## Pin Assignment

**J1** – Main Port (USB)

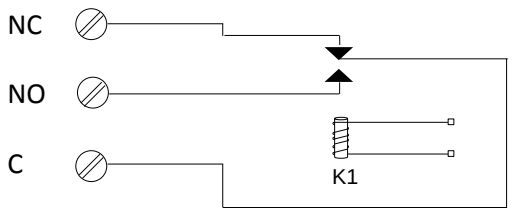
**TB1, TB2, TB3**

**TB4, TB5, TB6 -** Digital Input/ Output signals

**TB7** – Power Supply and Relay

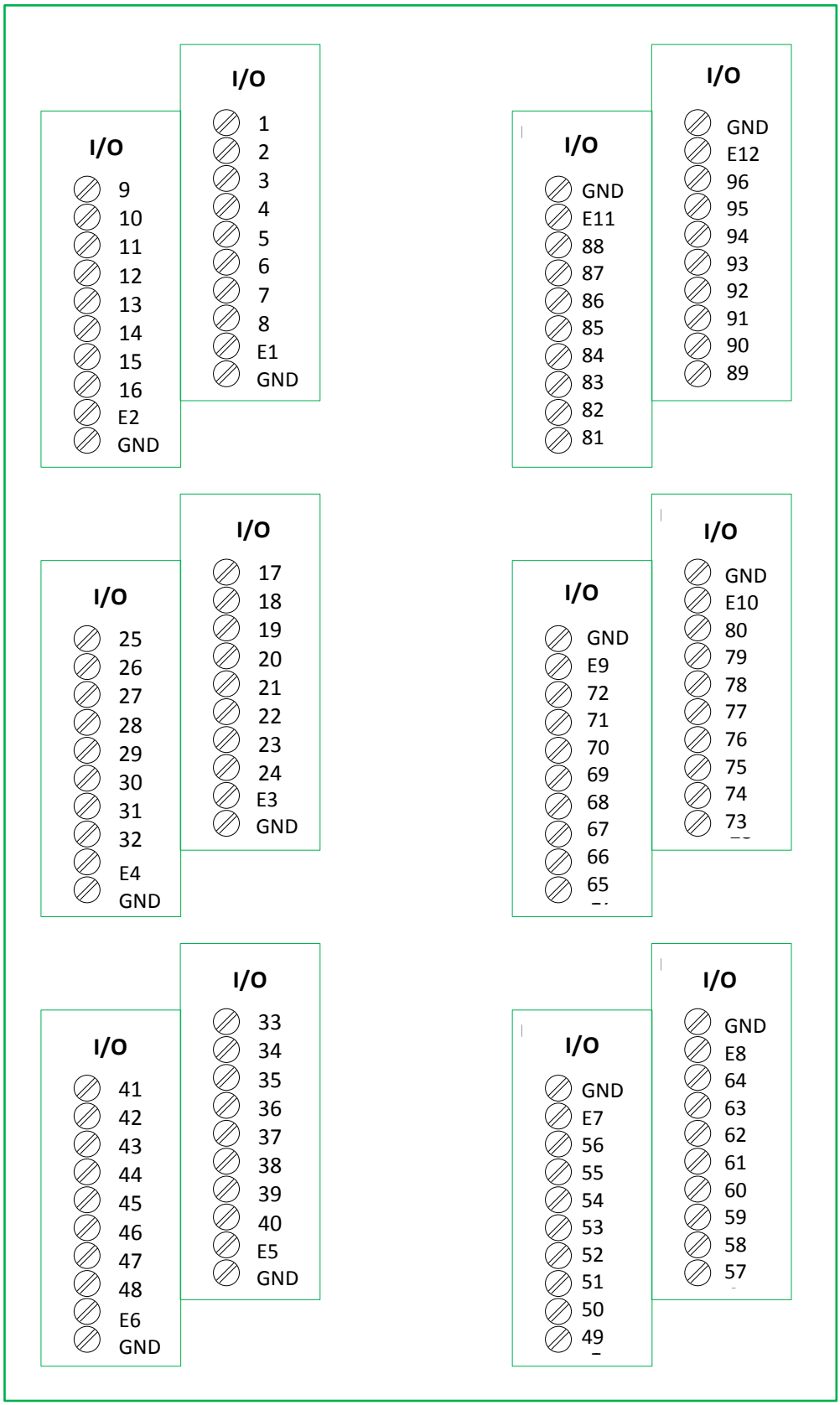
## Auxiliary Relay Contact Layout

**SPDT, Form C**

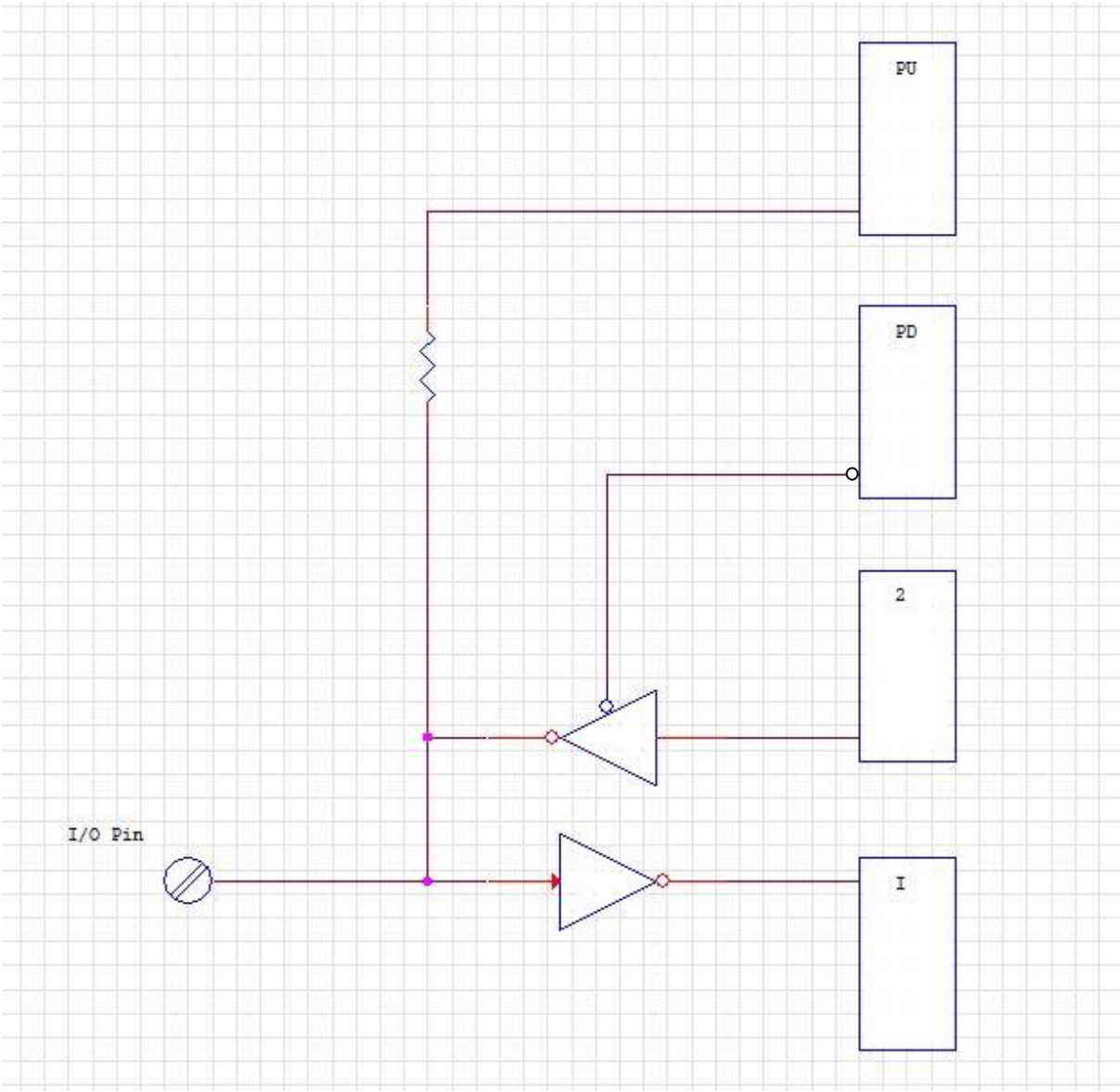



In order to activate Auxiliary Relay, refer to !aaSdd <CR> command.

## Digital Input / Output Terminal Block



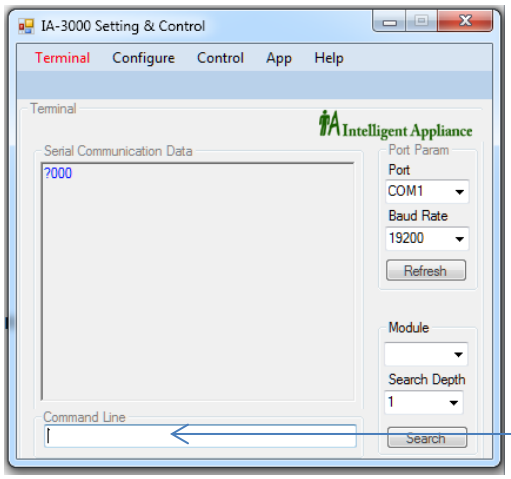
## Internal Circuits



## Software Installation

### USB Port setup

Connect USB A/B Cable between the device to the host computer.
The computer informs on locating a new USB device, and asks for S/W drivers.
Kindly choose the USB-Drivers directory on the IA-3000 CD or from our website: www.intelligent-appliance.com, and complete the task by pressing 'Next' and 'Finish' while asked for.
Job done will be accomplished by a steady lilting of the USB led on the device unit, and by a creation of new Serial COM that can be easily found on the Device Manager screen.
At this stage you can easily control the device I/O's by either any serial control software, or by the IA3000Util Utility, provided in the IA-3000 CD (see next page).




IA3000Util Command Line

### Locating the new COM port

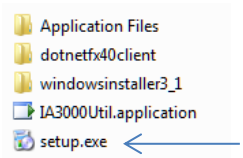
Start the 'Device Manager' utility. (Usually by selecting 'My Computer', Right Clicking the mouse button, choosing manage, Left Clicking and then double Left clicking on the Device Manager will list hardware items).

Select the '+' character to the left of the 'Ports (COM&LPT)', and you'll get a line that will define for example: 'USB Serial Port (COM4)'.

This line informs us that we should refer to COM4, in this case, in order to control the device while connected to this computer through its USB port.

## IA-3000 Utility

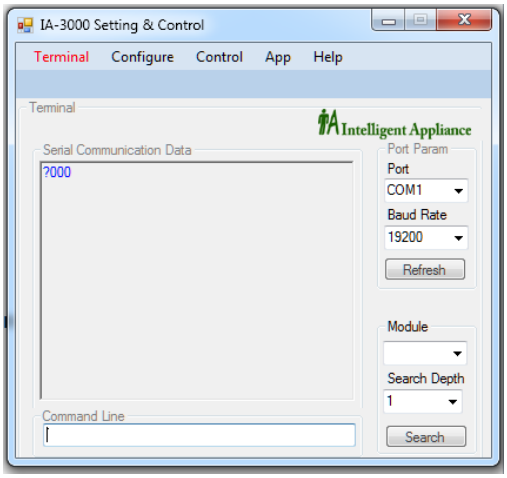
Install the IA3000Util Utility in your computer by clicking on the 'Setup' icon in the 'IA-Utility' directory, on the IA-3000 CD.




Or download it from our online Knowledge Base. (www.intelligent-appliance.com)

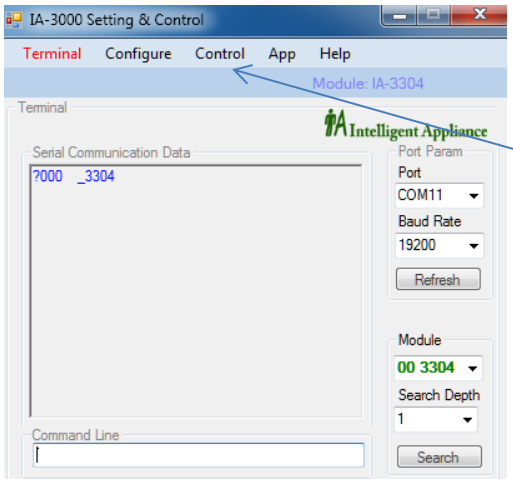
**Handling IA-3000 Utility**

1. Start the IA3000Util Utility by pressing 'Start Manu' on the computer's main screen, select 'All Programs', and finally 'IA3000Util'.
2. Select the appropriate COM




3. Select '19200' to fit into the right of the 'Baud' label (in case that the device is at its default setting stage).
4. Press the 'Search' button and wait for the utility to list all chained items.
5. Select the desired device out of the Module list that appears above the 'Search' button.

6. Once the device is selected, its form will be shown on the control panel label.




7. Left clicking the buttons will activate or dis-activate the appropriate I/O.

## Command Set

The following table is a quick reference table for the IA-2660-Ui, A host computer / PLC may control the IA-2660-Ui by simply sending ASCII commands though a standard COM port. Each command is structured from a delimiter character, modules address, command character, data if any carriage returns character. All commands must use UPPER CASE characters.

## ?aa0 – Get device name

**Description** Request the Device model name. Can be used to identify the connected module type at the specified address.

**Syntax** ?aa0<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| 0 | Get device Model command |
| <CR> | Carriage Return - End of command |

**Response** _nnnn<CR> if the command was valid

| | |
|---|---|
| _ | Response delimiter |
| nnnn | A string containing the device name |
| <CR> | Carriage Return - end of response |

**Example**

Command: ?010<CR>
Response: _2660<CR>

Request the device at address 01Hex to send its model name.
The response indicates that the command was successful and that the device at this address is IA-2660-Ui

## ?aa1 – Get device firmware version

**Description** Request the Device version

**Syntax** ?aa1<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| 1 | Get device Version command |
| <CR> | Carriage Return - End of command |

**Response** _nnnn<CR> if the command was valid

| | |
|---|---|
| _ | Response delimiter |
| nnnn | A string containing the device version |
| <CR> | Carriage Return - end of response |

**Example**

Command: ?001<CR>
Response: _A106<CR>

Request the device at address 00 Hex to send its version.
The response indicates that the command was successful and that the device version at this address is A1.06

## ?aa2 – Get Digital output status

**Description** Read Digital outputs Register status

**Syntax** ?aa2<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| 2 | Read outputs status |
| <CR> | Carriage Return - End of command |

**Response** _ABCDEFGHIJKLMNOPQRSTUVWX<CR> if the command was valid

_ Delimiter character

| | |
|---|---|
| A | 1st output nibble |
| B | 2nd output nibble |
| C | 3rd output nibble |
| D | 4th output nibble |
| E | 5th output nibble |
| F | 6th output nibble |
| G | 7th output nibble |
| H | 8th output nibble |
| I | 9th output nibble |
| J | 10th output nibble |
| K | 11th output nibble |
| L | 12th output nibble |
| M | 13th output nibble |
| N | 14th output nibble |
| O | 15th output nibble |
| P | 16th output nibble |
| Q | 17th output nibble |
| R | 18th output nibble |
| S | 19th output nibble |
| T | 20th output nibble |
| U | 21st output nibble |
| V | 22nd output nibble |
| W | 23rd output nibble |
| X | 24th output nibble |

**Output Bit Table**

| Value | 8 | 4 | 2 | 1 |
|---|---|---|---|---|
| Bit | 3 | 2 | 1 | 0 |
| I/O | 95 | 94 | 93 | 92 |
| Nibble | A | | | |

| 8 | 4 | 2 | 1 |
|---|---|---|---|
| 3 | 2 | 1 | 0 |
| 91 | 90 | 89 | 88 |
| B | | | |

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| 8 | 4 | 2 | 1 |
|---|---|---|---|
| 3 | 2 | 1 | 0 |
| 3 | 2 | 1 | 0 |
| X | | | |


Bit 0 refers to input Pin #1
Bit 95 refers to input Pin #96

**Examples**

Command: ?002<CR>
Response: _ 10000000000000000000005<CR>

Input #1, #3 and #93 are activated.

## ?aa3nn – Get Bit State

**Description** This command Picks defined Bit State

**Syntax** ?aa3nn<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| 3 | Acquiring defined Bit DATA command |
| nn | Bit location. '00' for Pin #1, '01' for Pin #2 and '5F' for Pin #96. |
| <CR> | Carriage Return - End of command |

**Response** _nn b<CR> if the command was valid

| | |
|---|---|
| nn | Bit location |
| b | Bit value. May be '0' or '1'. |
| <CR> | Carriage Return - End of response |

**Example** Command: ?00300<CR>
Response: _00 1<CR>

In this example Bit 0 that represent Pin #1 shows Logic '1' level
That means that there is a Positive Level at this Pin.

## ?aa5 – Get Device mode (Register #50)

**Description** This command reads the module operation mode

**Syntax** ?aa5<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| 5 | System Mode command |
| <CR> | Carriage Return - End of command |

**Response** _dd<CR> if the command was valid

| | |
|---|---|
| dd | Mode (00-FF) |
| 82 | Enable BR change |
| 02 | Report on command errors |
| 00 | Normal |
| <CR> | Carriage Return - End of command |

**Example** Command: ?005<CR>
Response: _82<CR>

In this example the module operation mode enables baud rate change. It will also send error messages for invalid commands.


‘82’ Value must be changed to ‘Normal’ right after BR or Address are changed.
‘Normal’ can be ‘00’ or ‘02’ or any other preferred value except ‘82’, as otherwise both the BR or Address might be changed by mistake.

## ?aa51 – Get Device mode (Register #51)

**Description** This command reads the device mode register #51 data.

**Syntax** ?aa51<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| 51 | Mode register #51 command |
| <CR> | Carriage Return - End of command |

| **bit** | | **Value** (dd) | **Function** |
|---|---|---|---|
| | | | Internal Voltage |
| 4 | 1 | 10 | 3.3V |
| | 0 | 00 | 5V (**Red Led**) **(Factory default)** |

**Response** _dd<CR> if the command was valid

| | |
|---|---|
| dd | Mode register #51 |
| <CR> | Carriage Return - End of command |

**Example** Command: ?0051<CR>
Response: _10<CR>

In this example the Logic Circuit Internal Voltage is 3.3V

## ?aaI – Get Digital inputs status

**Description** Read Digital inputs present status

**Syntax** ?aaI<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| I | Read inputs status |
| <CR> | Carriage Return - End of command |

**Response** _ABCDEFGHIJKLMNOPQRSTUVWX<CR> if the command was valid

| | |
|---|---|
| _ | Delimiter character |
| A | 1st inputs nibble |
| B | 2nd inputs nibble |
| C | 3rd inputs nibble |
| D | 4th inputs nibble |
| E | 5th inputs nibble |
| F | 6th inputs nibble |
| G | 7th inputs nibble |
| H | 8th inputs nibble |
| I | 9th inputs nibble |
| J | 10th inputs nibble |
| K | 11th inputs nibble |
| L | 12th inputs nibble |
| M | 13th inputs nibble |
| N | 14th inputs nibble |
| O | 15th inputs nibble |
| P | 16th inputs nibble |
| Q | 17th inputs nibble |
| R | 18th inputs nibble |
| S | 19th inputs nibble |
| T | 20th inputs nibble |
| U | 21st inputs nibble |
| V | 22nd inputs nibble |
| W | 23rd inputs nibble |
| X | 24th inputs nibble |

**Output Bit Table**

| Value | 8 | 4 | 2 | 1 |
|---|---|---|---|---|
| Bit | 3 | 2 | 1 | 0 |
| I/O | 95 | 94 | 93 | 92 |
| Nibble | A | | | |

| 8 | 4 | 2 | 1 |
|---|---|---|---|
| 3 | 2 | 1 | 0 |
| 91 | 90 | 89 | 88 |
| B | | | |

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| 8 | 4 | 2 | 1 |
|---|---|---|---|
| 3 | 2 | 1 | 0 |
| 3 | 2 | 1 | 0 |
| X | | | |

**Note**

Bit 0 refers to input Pin #1
Bit 95 refers to input Pin #96

**Examples**

Command: ?00I<CR>
Response: _ 10000000000000000000005<CR>

Input #1, #3 and #93 are activated.

## ?aaID – Get module's ID number

**Description** This command reads the Device ID

**Syntax** ?aaID<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| ID | Command for read ID |
| <CR> | Carriage Return - End of command |

**Response** _ID nnnnnnnn

**Example** Command: ?00ID<CR>
Response: _ID 00412534<CR>

In this example we read S/N of device #00

## ?aaPD – Get Device I/O Structure settings

**Description** This command reads the module's I/O Structure settings

**Syntax** ?aaPD<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| PD | Get Device I/O Structure settings |
| <CR> | Carriage Return - End of command |

**Response** _0ddd<CR> if the command was valid

| | |
|---|---|
| _0ddd | I/O Structure (0000-0FFF) |
| <CR> | Carriage Return - End of response |

**Example** Command: ?00PD<CR>
Response: _0001<CR>

In this example the entire module is set to INPUT except the lowest Byte.

| | |
|---|---|
| _0000 | All Device Bytes are set to INPUT |
| _0FFF | All Device Bytes are set to OUTPUT |
| _0800 | All Bytes are set to INPUT except the highest one, that is set to output (Pin 89-96) |

## ?aaPU – Get Pull-ups settings

**Description** This command reads the module's Pull-ups settings

**Syntax** ?aaPU<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| PU | Get Pull-ups settings |
| <CR> | Carriage Return - End of command |

**Response** _dd<CR> if the command was valid

| | |
|---|---|
| _dd | I/O Structure (00-3F) |
| <CR> | Carriage Return - End of response |

**Example** Command: ?00PD<CR>
Response: _01<CR>

In this example all Pull-ups are set to GND except the lowest Word. Two lowest Bytes Pull-up source is Positive.

| | |
|---|---|
| _00 | All Device Pull-ups are set to GND |
| _3F | All Device Pull-ups are set to the Positive Voltage. |
| _20 | All Pull-ups are set to GND except the highest two Bytes. |

## ?aaS – Get Relay state

**Description** This command reads the status of the relay.

**Syntax** ?aaS<CR>

| | |
|---|---|
| ? | Delimiter character |
| aa | Hexadecimal address of the device |
| S | Read relay status |
| <CR> | Carriage Return - End of command |

**Response** _dd<CR> if the command was valid

| | |
|---|---|
| _ | Delimiter character |
| dd | Relay state |
| <CR> | Carriage Return - End of response |

**Example** Command: ?00S<CR>
Response: _10<CR>

In this example Relay is Activated

## !aa2ddddddddddddddddddddddddd – Set output status

**Description** This command defines module's output state.

**Syntax** !aa2ddddddddddddddddddddddddd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| 2 | System control command |
| d | Digital output activation command data for each nibble in hex format |
| <CR> | Carriage Return - End of command |

**Response** | ddddddddddddddddddddddddd
if the command was valid and if FB messages are enabled

**Example** Command: !0021000000000000000000000028<CR>
Response: |1000000000000000000000028<CR>

This command will activate digital outputs #4, #6, #93.

**Output Bit Table**

| Value | 8 | 4 | 2 | 1 | 8 | 4 | 2 | 1 | | 8 | 4 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit | 3 | 2 | 1 | 0 | 3 | 2 | 1 | 0 | | 3 | 2 | 1 | 0 |
| I/O | 95 | 94 | 93 | 92 | 91 | 90 | 89 | 88 | ● ● ● | 3 | 2 | 1 | 0 |
| Nibble | A | | | | B | | | | | X | | | |

### !aa3dd – Activate output N (00-5F)

**Description** This command activates a single output.

**Syntax** !aa3dd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| 3 | Single output activation command |
| dd | N Output ID in hex format |
| <CR> | Carriage Return - End of command |

**Response** |Sdd if the command was valid

**Example** Command: !00302<CR>
Response: |S02<CR>

This command will activate Output #3 only (!) all other Outputs will be not changed.

## !aa4dd – De activate Output N

**Description** This command De activates a single output.

**Syntax** !aa4dd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| 4 | De activate output N command |
| dd | N Output ID in hex format |
| <CR> | Carriage Return - End of command |

**Response** |Cdd if the command was valid

**Example** Command: !00402<CR>
Response: |C02<CR>

This command will De activate output #3 only (!) all other outputs state will not be changed.

## !aa5dd – Set device Operation Mode (REG #50)

**Description** This command enables/disables error messages.

**Syntax** !aa5dd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| 5 | System mode command |
| dd | Mode (00-FF) |
| 82 | Enables BR and Address changes |
| 02 | Report on command errors |
| 00 | Normal (**Factory default**) |
| <CR> | Carriage Return - End of command |

**Response** |dd EE OK if the command was valid

**Example** Command: !00582<CR>
Response: |82 EE OK

This command will enable BR changing and enable the device error messages. (Error messages are sent in response to invalid commands) and will disable baud rate changed by mistake.
Make sure setting a normal mode like '00' or '02'' right after changing the BR to disable mistakenly done BR and Address changes.

## !aa51dd – Set Internal circuit Operation Voltage 3V / 5V (REG #51)

**Description** This command defines the Internal Circuit Internal Voltage 3V / 5V.

**Syntax** !aa51dd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| 51 | System mode command |
| *dd* | *Mode register #51* |
| <CR> | Carriage Return - End of command |

| ***bit*** | | ***Value*** *(dd)* | ***Function*** |
|---|---|---|---|
| | | | *Internal Voltage* |
| *4* | *1* | *10* | *3.3V* |
| | *0* | *00* | *5V (**Red Led**) **(Factory default)*** |

**Response** |dd EE OK if the command was valid

**Example** Command: !005110<CR>
Response: |10 EE OK

This command will define 3.3V as the Internal Voltage

**NOTE!** The Internal Operation Voltage will affect the Digital Output Voltage.

## !aa6dd – Set baud rate

**Description** This command defines the devices baud rates.
Mode register #51 must be set to "82" first. (!00582)

**Syntax** !aa6dd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| 6 | Change device baud rate command |
| dd | Two characters representing the desired baud rate: |
| | 12 1200 |
| | 24 2400 |
| | 48 4800 |
| | 96 9600 |
| | 19 19200 (default) |
| | 38 38400 |
| | 57 57600 |
| | 11 115200 |
| <CR> | Carriage Return - End of command |

**Response** |dd<CR> if the command was valid

| | |
|---|---|
| \| | Response delimiter |
| dd | New baud rate |
| <CR> | Carriage Return - End of response |

**Example** Command: !01696<CR>
Response: |96<CR>

Change the baud rate of the device at address 01Hex to 9600

**Note**

1. Mode must be set to "82" first. (!00582)
2. Changes will take effect after the next power up. (Power off)
3. Make sure setting the mode back to normal right after changing the BR.

## !aa7dd – Set module's address

**Description** Each device must have a unique network address.
This command defines a module's address.

**Syntax** !aa7dd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| 7 | Change device baud rate command |
| dd | New Hexadecimal address |
| <CR> | Carriage Return - End of command |

**Response** |dd<CR> if the command was valid

**Example** Command: !00701<CR>
Response: |01<CR>

Change the address of the device at address 0(Hex) to 1(Hex)

**Note**

1. Factory default is 00Hex
2. In products chained system, each product must be set to a unique address.
3. On chainable modules the updated address is displayed on the boards 7 segment led display.

## !aaBndd – Set Relays Status at Level (n=0-B)

**Description** This command sets the status of 8 relays at a time.

**Syntax** !aaBndd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| B | Change Byte Level command |
| n | #Byte to be set.<br>'n' is in the range of 0-3 |
| dd | Byte data in hex format. |
| <CR> | Carriage Return - End of command |

**Response** |n dd<CR> if the command was valid

**Example**
Command: !00B124<CR>
Response: |1 24<CR>

This command will activate relays #11 and #14(!) all other relays will be not changed.

**Example**
Command: !00BB14<CR>
Response: |B 14<CR>

This command will activate relays #91 and #93(!) all other relays will be not changed.

## !aaPDdddd – Set module's I/O Structure

**Description** Each device structure is built of 12 Groups of I/O circuits. This command defines whether a certain group outputs are Enabled, or in other words it defines whether this group should be referred to as an Input or an Output.

**Syntax** !aaPDdddd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| PD | Sets a Group Direction to become an Input or an Output |
| 0ddd | Groups Direction data, '1' for Output '0' for Input. 00 to 0B. |
| <CR> | Carriage Return - End of command |

**Response** |dddd<CR> if the command was valid

**Example**

Command: !00PD0020<CR>
Response: |0020<CR>

Sets the 6th group to output. This means that device Pin #41 to Pin #48 will become Outputs while all others Pins should be handled as Inputs.

**Note**

1. !aa PD0000 **Factory default** (all inputs)
2. Setting device Structure should take place after having the system designed and wired to avoid Output to Output erroneous connection.
3. Whenever using this command please make sure not causing a wrong connection like:
   A. Output to Output connection.
   B. Output to Positive Voltage connection.
   C. Output to GND connection.

## !aaPUdd – Set Pull-up source.

**Description**

The device structure includes 6 groups of 16 Pull-ups each, that can be tied either to +Vcc or to GND. I/O groups Pull-ups are set by pairs.
This command defines whether a Pull-up group is tied to +Vcc or to GND. '1' for +Vcc, '0' for GND.

**Syntax**

!aaPUdd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| PU | Sets Pull-up source. |
| dd | Pull-ups source data, '1' for +Vcc '0' for GND. '00' to '05'. |
| <CR> | Carriage Return - End of command |

**Response**

|dd<CR> if the command was valid

**Example**

Command: !00PU07<CR>
Response: |07<CR>

Sets the lowest 6 I/O groups Pull-ups to +VCC and all others to GND. '07' meaning is that the three lowest Pull-up groups are set to +Vcc. This means that the lowest 6 I/O groups Pull-ups are set to +Vcc as each Pull-up group include two I/O groups.

**Note**

1. !aa PU00 – Factory default
2. The Pull-ups may be tied either to +Vcc or to GND to best fit user logic.
3. The Pull-ups has no effect on an I/O group that is set to "Output".

## !aaSdd – Activate/Deactivate Auxiliary relay

**Description** This command sets the Auxiliary Relay state.

**Syntax** !aaSdd <CR>

| | |
|---|---|
| ! | Delimiter character |
| aa | Hexadecimal address of the device |
| S | Defines the Auxiliary Relay state. |
| dd | Auxiliary relay state. '10' for Active '00' for Off. |
| <CR> | Carriage Return - End of command |

**Response** |dd<CR> if the command was valid

**Example** Command: !00S10<CR>
Response: |10<CR>

This command will activate the relay.

**Note** The default Relay status is OFF.