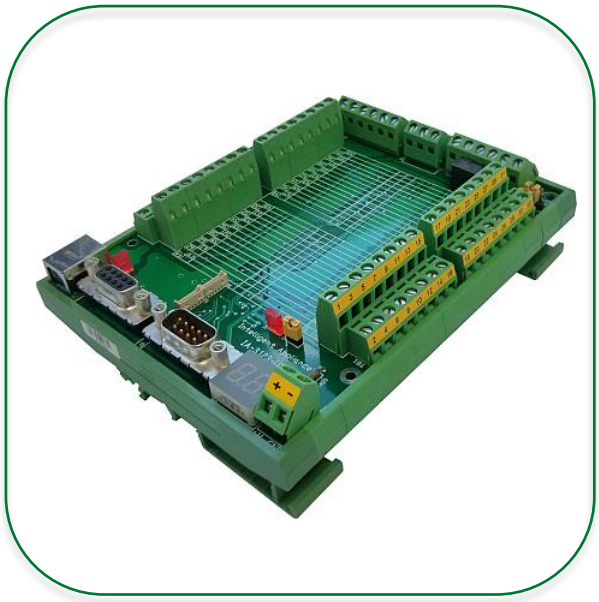
User Manual

IA-3123-U2i

64-ch Digital Input

IA-3000 Daisy-Chain Series



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www.intelligent-appliance.com

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For Smart Solutions...

Service & Support

To provide customers with easy to use and 24/7 technical support, Intelligent-Appliance delivers services via the internet. The dedicated website offers large knowledgebase database that include full information for Development Engineers, Installers in the field and for Software Engineers. This KNOWLEDGE BASE Include: Data sheets, User Manuals, FAQ, Wiring Diagram, Selector Guide and Software section.

Feedback

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-3123-U2i is an Industrial 64-ch Digital Input Module with high noise immunity. The IA-3123-U2i includes an isolated USB port for better Ground Loop handling and better protection the Host PC from factory floor EMI/RFI noise.

The IA-3123-U2i 64-ch Digital Inputs module can be operated by status polling method, making use of its Software Drivers, provided within its software support package, or it can be operated as a Stand-alone device, using its Digital Input Change, “Auto Report” mode, generating a Software Interrupt on any input change.

The IA-3123-U2i is capable of handling both Positive and Negative signals without the need for external components.

Features

- 64-ch Digital Input
- Isolated USB Port
- High Noise Immunity
- Simple Transparent Chaining
- Input Change Auto Report Mode
- Status Reading Polling Mode
- Positive or Negative Logic
- Input Masking Ability
- Watchdog Protected
- DIN-Rail Mounting ready

Specifications

Digital Inputs	
Channels quantity	64
Voltage range	0 to 30VDC
Activation Logic	Positive or Negative
Activation Range	0 to 1.5VDC in Negative Logic 4 to 30VDC in Positive Logic
Relay	
Channels quantity	1
Type	SPDT, single change over
Contact rating	2Amp @ 30VDC
Communication :	
USB	
Connector type	USB type B
Baud-rate range	1200-115200bps
Default BR Value	19200
Host/Module cable	USB A/B, package included
Chain	
Input Connector	DB9 Female
Output Connector	DB9 Female
Chaining cable	DB9 M/F, Direct Pin-to-Pin cable, up to 15 meter long
General	
Supply voltage	10-30VDC
Size	150x120x40mm
Weight	250gr

Ordering Information

- IA-3123-U2i

  64-ch Digital Input

  IA-3000 Daisy-Chain Series

  USB or RS-232 Controlled

  Multi-Drop Expandable.

  USB Cable and installation CD Included

- IA-3123-2

  64-ch Digital Input

  IA-3000 Daisy-Chain Series

  RS-232 controlled

  Multi-Drop Expandable.

  DB9 M/F Cable and installation CD Included

⚠ 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.

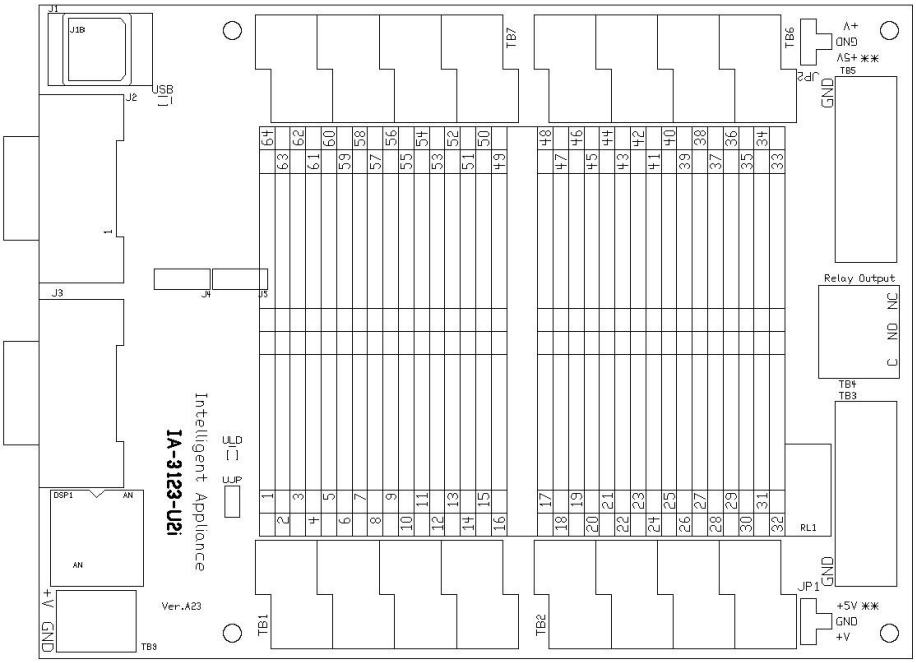
Installation

System Wiring

Host PC

DB9 Female or USB

DB9 Male or USB



DB9 Female

DB9 Male

Chaining Device
IA-3XXX

DB9 Female

...255

Pin Assignment

J1 – Main Port (USB)

J2 - Secondary Port (RS-232, DB9 Female)

Pin	Function
#2	Tx
#3	Rx
#5	GND

J3 – Expansion Port (RS-232, DB9 Male)

Pin	Function
#2	Rx
#3	Tx
#5	GND

Terminal Block #	Function
TB2, TB2, TB6, TB7	64-ch Digital Inputs
TB4	Relay Out
TB3, TB5	6 pin GND
TB8	Power Supply Input (10-30VDC)

Jumpers & Led

UJP Jumper – User defined jumper

ULD Led – User defined led

JP1 – Digital Input (1-32) Level Select – Pull up levels

1. +24
2. GND
3. 5V (Default)

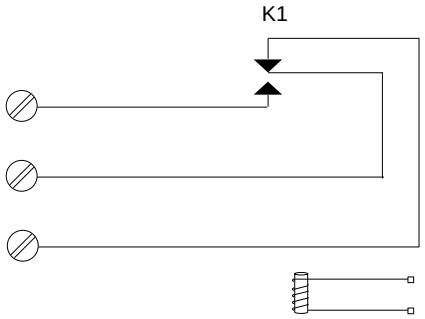
JP2 – Digital Input (33-64) Level Select – Pull up levels

1. +24
2. GND
3. 5V (Default)

Relay Layout

SPDT, Form C

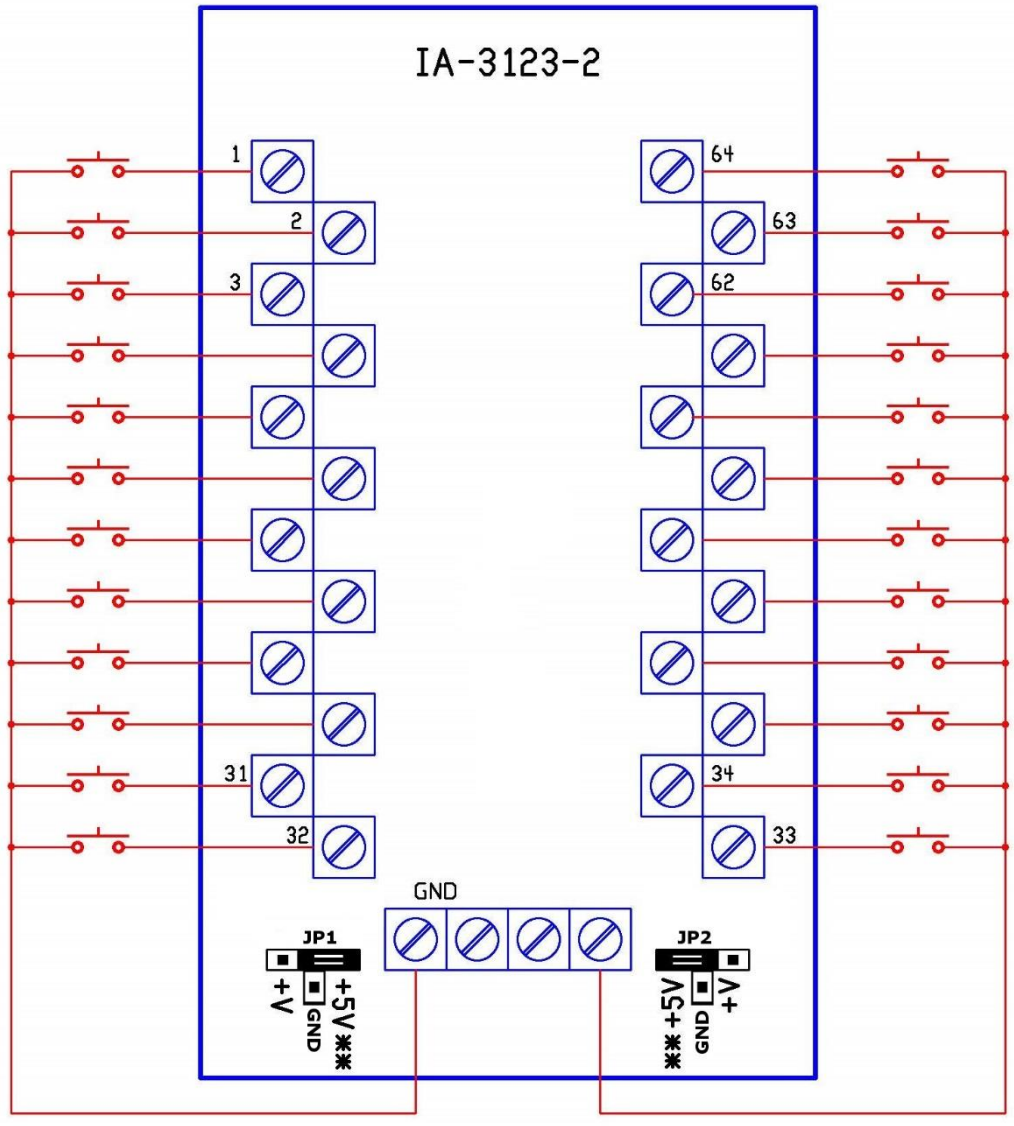
Terminal	Relay#	Pin#
TB4	1	NO
TB4	1	C
TB4	1	NC



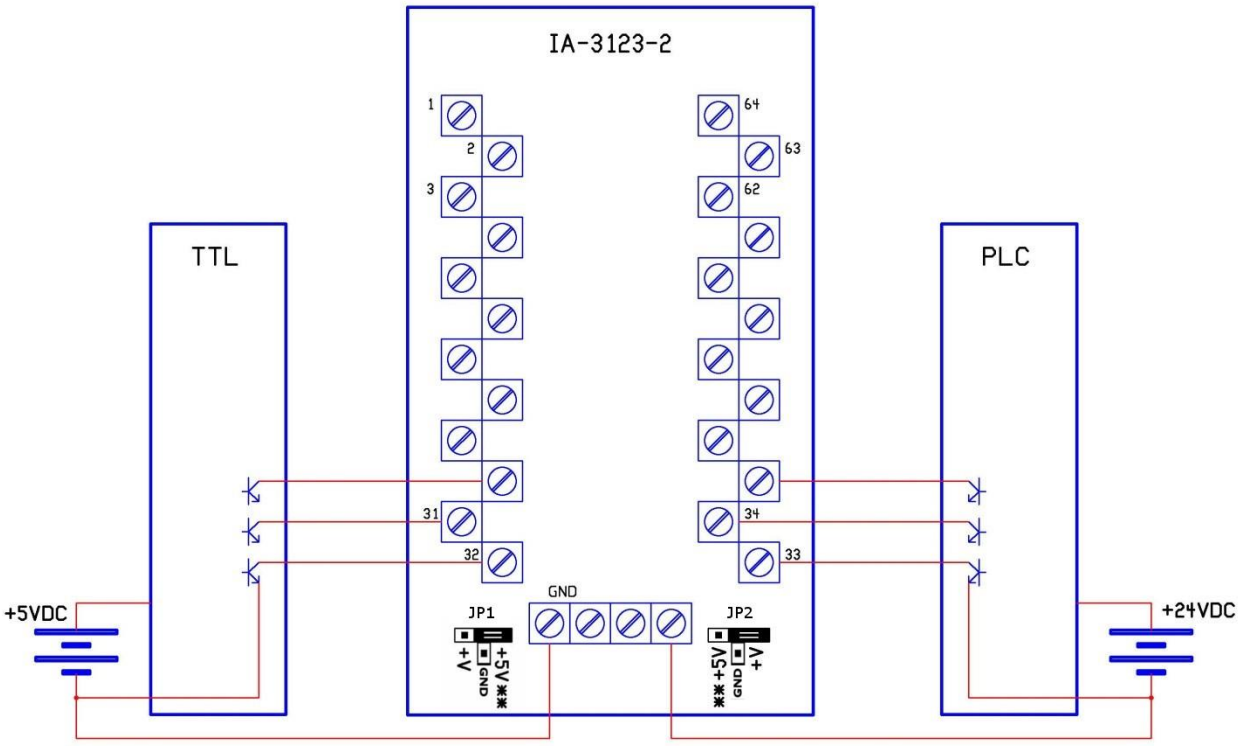
Note +VS Value is the value of the positive +V source voltage attached to TB9 at pin +V

Wiring Examples - Digital Inputs

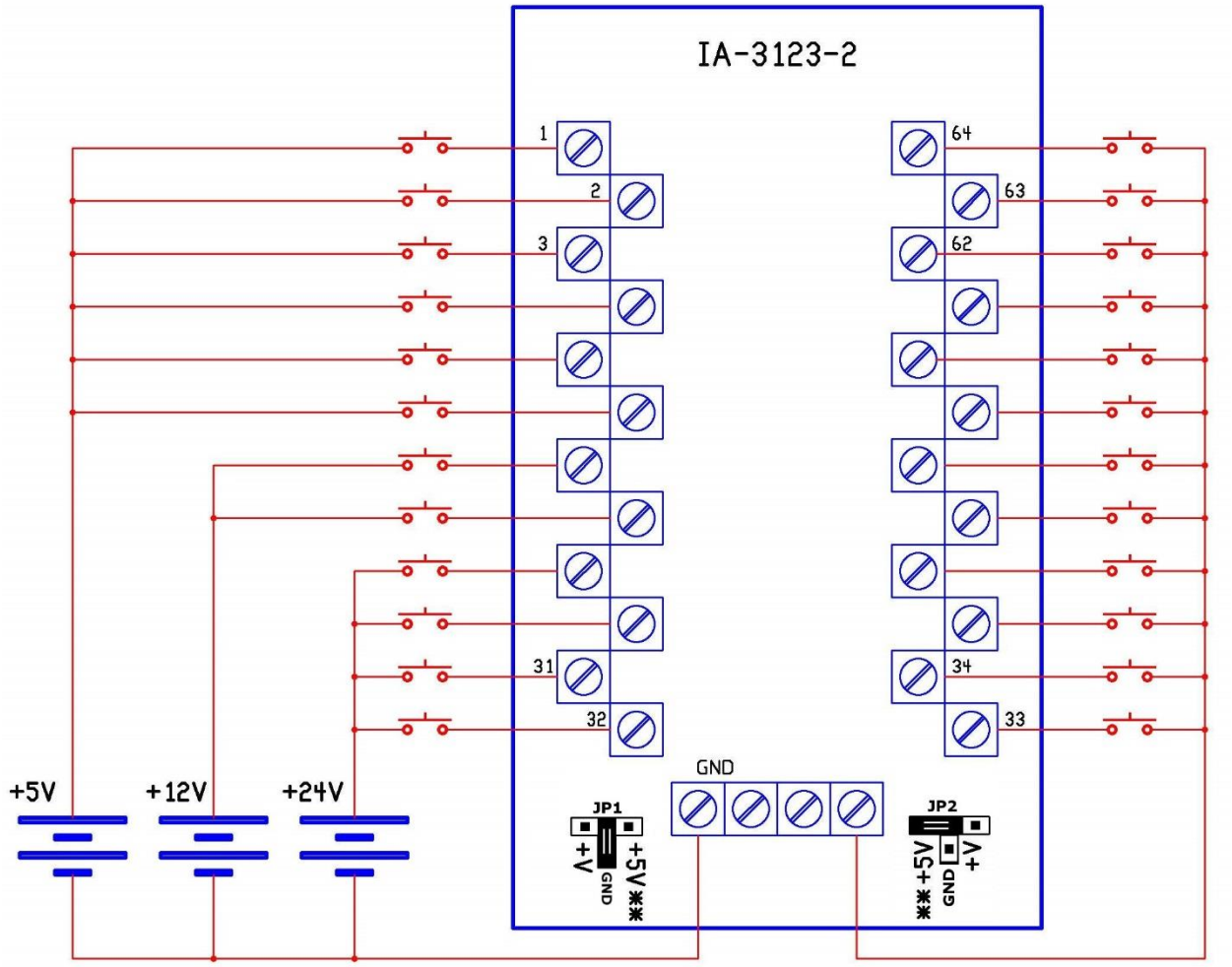
Dry Contact– default



Wet contact

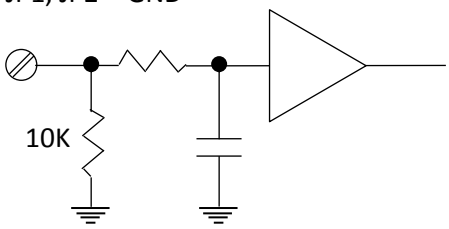

IA-3123-2
TTL
PLC
+5VDC
+24VDC
GND
JP1
JP2
1
2
3
31
32
64
63
62
34
33
+V
+5V***
GND
***+5V
V+
GND

Positive and Negative Logic

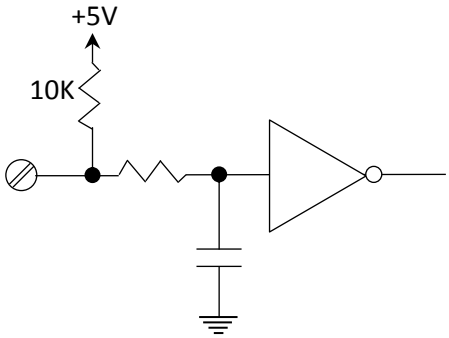


Digital Inputs – Internal Circuit

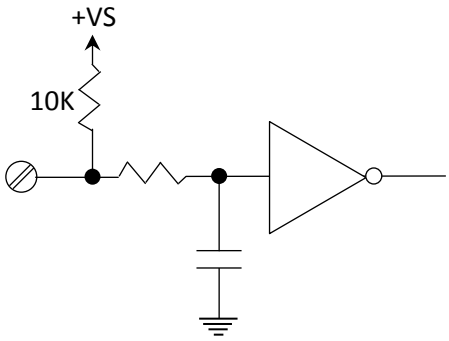
Positive Logic JP1, JP2 – GND



Negative Logic JP1, JP2 – +5V



Negative Logic JP1, JP2 – +V



Software Installation

USB Port setup

Connect a 24 VDC, power supply, to TB9 on the IA-3123-U2i.

Turn on the 24 VDC power supply.

The IA-3123-U2i address is shown on the dual character led display on the IA-3123-U2i unit.

Connect USB A/B Cable between the IA-3123-U2i 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 IA-3123-U2i 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 IA-3123-U2i relays by either any serial control software, or by the IA-3000 Utility, provided in the IA-3000 CD.

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 IA-3123-U2i while connected to this computer through its USB port.

IA-3000 Utility

Install the IA-3000 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.

Handling IA-3000 Utility

1. Start the IA-3000 Utility by pressing 'Start' on the computer's main screen, select 'All Programs', and finally 'IA-3000'.
2. Select the appropriate COM
3. Select '19200' to fit into the right of the 'Baud' label (in case that the IA-3123-U2i is at its default setting stage).
4. Press the 'Search' button and wait for the utility to list all chained items.
5. As soon as all items are listed, you may press the 'Stop Search' button, or you can let the software finish its search by itself.
6. Select the desired device out of the items list that appears beneath the 'Search' button.
7. Once the device is selected, its form will be shown in the right hand of the screen.
8. Left clicking the buttons will activate or dis-activate the appropriate relay.

Address Configuration

Warning

Note!

In case of operating two or more devices in a single chain,

One must make sure that each device has its own unique address!

Never install two devices, of the same address, in the same chain

Note!

All items are set to same default address (‘00’) while delivered

1. Start IA-3000 Utility.
2. Press Search and then select the desired IA module.
3. Choose ‘Config’ at the upper left screen location.
4. Define the desired address right to the ‘Address’ label.
5. Update the module using the ‘Update’ button.
6. ‘Update OK’ message indicates a successful updating
   (Old software versions indicate ‘Fail’ while successfully updating the module).
7. Check the updated address by closing the ‘Configuration’ screen, and running a new ‘Search’.

Command Set

The following table is a quick reference table for the IA-3123-U2i , A host computer / PLC may control the IA-3123-U2i 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: _3123<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-3123-U2i

?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: _A125<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 A1.25

?aa2 – Get Digital inputs status

Description Read Digital inputs present status

Syntax ?aa2<CR>

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

Response _ABCDEFGHIJKLMNOP<CR> if the command was valid

_	Delimiter character
A	1st input nibble
B	2nd input nibble
C	3rd input nibble
D	4th input nibble
E	5th input nibble
F	6th input nibble
G	7th input nibble
H	8th input nibble
I	9th input nibble
J	10th input nibble
K	11th input nibble
L	12th input nibble
M	13th input nibble
N	14th input nibble
O	15th input nibble
P	16th input nibble

Input

3	2	1	0
63	62	61	60
A			

3	2	1	0
59	58	57	56
B			

• • •

3	2	1	0
3	2	1	0
P			

Note

Bit 0 refers to input Pin #1
Bit 63 refers to input Pin #64

Examples Command: ?002<CR>
Response: _1000000000000005<CR>

Input #1, #3 and #61 are activated.

?aa5 – Get device mode

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

Examples 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.

?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

?aaM – Get Mask Register Data

Description Read The Mask Register Value.

Syntax ?aaM<CR>

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

Response _ABCDEFGHIJKLMNOP<CR> if the command was valid

_	Delimiter character
A	1st Mask nibble
B	2nd Mask nibble
C	3rd Mask nibble
D	4th Mask nibble
E	5th Mask nibble
F	6th Mask nibble
G	7th Mask nibble
H	8th Mask nibble
I	9th Mask nibble
J	10th Mask nibble
K	11th Mask nibble
L	12th Mask nibble
M	13th Mask nibble
N	14th Mask nibble
O	15th Mask nibble
P	16th Mask nibble

Input

3	2	1	0
63	62	61	60
A			

3	2	1	0
59	58	57	56
B			

• • •

3	2	1	0
3	2	1	0
P			

Note

Bit 0 refers to input Pin #1
Bit 63 refers to input Pin #64

Examples Command: ?00M<CR>
Response: _1000000000000005<CR>

Input #1, #3 and #61 are Masked.

?aaS – Get User Defined Jumper Setting and User LED Status

Description Read Jumper Setting and Led Status

Syntax ?aaS<CR>

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

Response _dd<CR> if the command was valid

Example Command: ?00S<CR>
Response: _13<CR>

In this example the jumper JP1 setting is "**close**", User LED "**ON**", and relay status is **"ON".**

!aa5dd – Set device mode

Description This command defines the device operation Mode.

Syntax !aa5dd <CR>

!	Delimiter character
aa	Hexadecimal address of the device
5	Device Mode command
dd	Device Mode parameter in HEX format
<CR>	Carriage Return - End of command

Devices Mode Parameter

Bit 7	BR change is Enabled	(80)
Bit 4	Auto Report per input change	(10) *
Bit 3	Timely Input status report (1min)	(08)
Bit 1	Error Reports are Enabled	(02)

Note It is strongly recommended to avoid Setting bit 7 (80) in Normal operation, in order to avoid BR being changed by mistake.

Example 1 !00502<CR>
This command enables Error Report on the
Device that is located at Address 00.

Response 1 |02 EE OK<CR> In case of a valid command.

Example 2 !00508<CR>
Auto Report is Enabled per every 1 min time
Device that is located at Address 00.

Response 2 |08 EE OK<CR> In case of a valid command.
_001000000400000<CR> (Input status Every 1 min)
_000004000000000<CR>

*See Mode 10 Operation next page

* Auto Report per input change - Mode 10 - Operation

Description Reports and optionally sets remote device Output Byte.

Example !aa510<CR>
Response |ppBndd<CR>

|	Delimiter character
pp	Remote Device Address parameter in HEX format **(80 Default)**
B	Byte Output Command
n	Defines Byte Numbers **0-7** in HEX format
dd	Byte Data parameter in HEX format
<CR>	Carriage Return - End of command

Response 1 |**80B008**<CR>

This response will be received by activating Digital Input #4,
While all other inputs within the LSB Byte are deactivated.

Response 2 |**80B040**<CR>

This response will be received by activating Digital Input #7,
While all other inputs within the LSB Byte are deactivated.

Response 3 |**80B201**<CR>

This response will be received by activating Digital Input #17,
While all other inputs within the 3rd Byte are deactivated.

!aa6dd – Set baud rate

Description For compatibility with existing devices the IA-3123-U2i can be set to other standard baud rates

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

1. BIT 7 of the Device Mode must be set first. !00580
2. Changes will take effect after the next power up Power off

!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	Set module's address 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. The updated address is displayed on the boards 7 segment led display.

!aa8pp – Set Remote Address

Description This command defines the "Report to" Address.

Syntax !aa8dd <CR>

!	Delimiter character
aa	Hexadecimal address of the device
8	Remote Address Command
pp	Remote Address parameter in HEX format
<CR>	Carriage Return - End of command

Example !00880<CR>
This command defines auto report Remote Address **80 (Default)**
to the Device that is located at Address **00**.

Response |08 EE OK<CR> In case of a valid command.

Note Auto Report Command supports Peer-to-Peer operation and can easily replace the polling method. Command **"?aa2<CR>"** is disabled!

More Auto Report Mode 10 response is: **!80Bnpp<CR>**
Auto Report Mode 10 supports the IA-3123-2.
Mating devices to Mode 10 are IA-3131, IA-3174, IA-3178 etc.

!aaMdddddddddddddddd – Set Digital Input Mask

Description This command defines the inputs that will be ignored.

Syntax !aaMdddddddddddddddd <CR>

!	Delimiter character
aa	Hexadecimal address of the device
M	System control command
dddddddddddddddd	Mask parameter in HEX
<CR>	Carriage Return - End of command

Mask Data Definition

- Each Nibble defines the Mask of 4 bits.
  16 Nibbles sets the Mask for 64 Digital Inputs.
- A Zero (0) defines NO Mask.
- Make sure of defining 16 zeroes to put all inputs to work.
- The first digit to the left is the MSB Nibble.

Example !00M0000000000000004<CR>
This command disables the operation of input #3.
Input #1 is defined by bit 0, while 2^0=1.
Input #2 is defined by bit 1, while 2^1=2.
Input #3 is defined by bit 2 while 2^2=4, and so on.
This command will affect the Device that is located at Address 00.

Response |0000000000000004 <CR> In case of a valid command.

!aaSdd – Set User Defined LED and Relay status

Description This command defines user LED and relay status.

Syntax !aaSdd <CR>

!	Delimiter character
aa	Hexadecimal address of the device
S	Set User Defined LED and Relay.
<CR>	Carriage Return - End of command

Response |dd<CR> if the command was valid

Example Command: !00S01<CR>
Response: |01<CR>

This command will activate LD1 Led.
And deactivated the Relay in case it was active.

3	2	1	0	3	2	1	0
FU	FU	FU	FU	FU	FU	Relay	Led

	Relay	Led
!aaS00<CR>	OFF	OFF
!aaS01<CR>	OFF	ON
!aaS02<CR>	ON	OFF
!aaS03<CR>	ON	ON