User Manual

IA-3304-U

4-ch Relay
4-ch Isolated Digital Input
1-ch Event Counter
USB powered

Version 0616
www.intelligent-appliance.com

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For Smart Solutions...

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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-3304-U is an industrial Relay controller with 4-ch Isolated Digital Input and an Event Counter, powered and controlled by its USB port.

The Isolated Digital Inputs has a wide voltage input range of 3.3 to 30VDC, a built in Digital Filter and can be set to either Isolated or Non Isolated operational method.

The IA-3304-U, 4th Digital Input channel may be used both as a Digital Input and as an Event Counter, with a counting frequency that depends on the Digital Filter setting. This Event Counter may be used as a Motor Speed reader of up to 6000 RPM using a pulse per revolution signal, it may be used as a Flow Meter counter and more.

The IA-3304-U Relay controller software package includes .Net software driver, Labview driver, software examples and operation utilities for fast and easy system integration.

Features

- USB powered and controlled
- 4-ch Isolated Digital Input
- 4-ch SPST Relays
- Default is N.O. one may be set to N.C.
- Wide Voltage operation Digital Inputs
- Software controlled Digital Filter
- Event Counter
- “Dry-contact” support
- Open Source code samples
- Setting and Operation Utility
- DIN-Rail mounting ready

Specifications

Relays

Channels	4
Contact current	2Amp @ 30VDC
	1/2Amp @ 115VAC
Contact method	SPST, Form A
	Default is N.O.
	Relay #1 may be set to N.C.

Digital Inputs

Channels	4
Operation Mode	Isolated or Non Isolated
	Set by internal Jumpers
	Default – Non Isolated
Voltage operation Range	3.3V to 30VDC
Event Counter	24 bit
Rate	Up to 100Hz

USB port

USB version	2.0, B	
Factory Defaults	Baud Rate	19.2bps
	Data bits	8
	Parity	None
	Stop bits	1
Baud Rate Range	1200-115Kbps	

General

Module Size	265x115x45 mm
Mounting	Din-Rail mounting
Weight	85 gr

Ordering Information

- IA-3304-U:

  4-ch Relay4-ch Isolated Digital Input

  USB powered and controlled

⚠ 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.

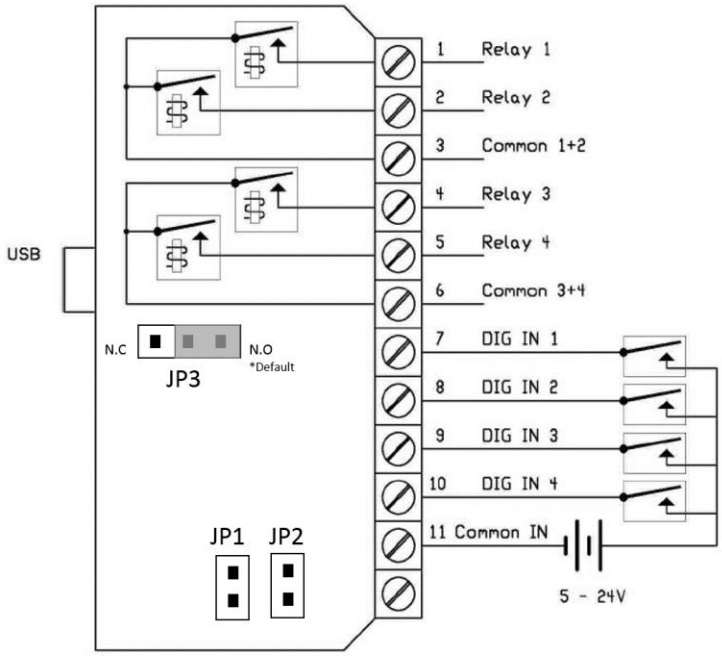
When wiring the device disconnect it from the power source and turn OFF all connected devices.

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

Wiring

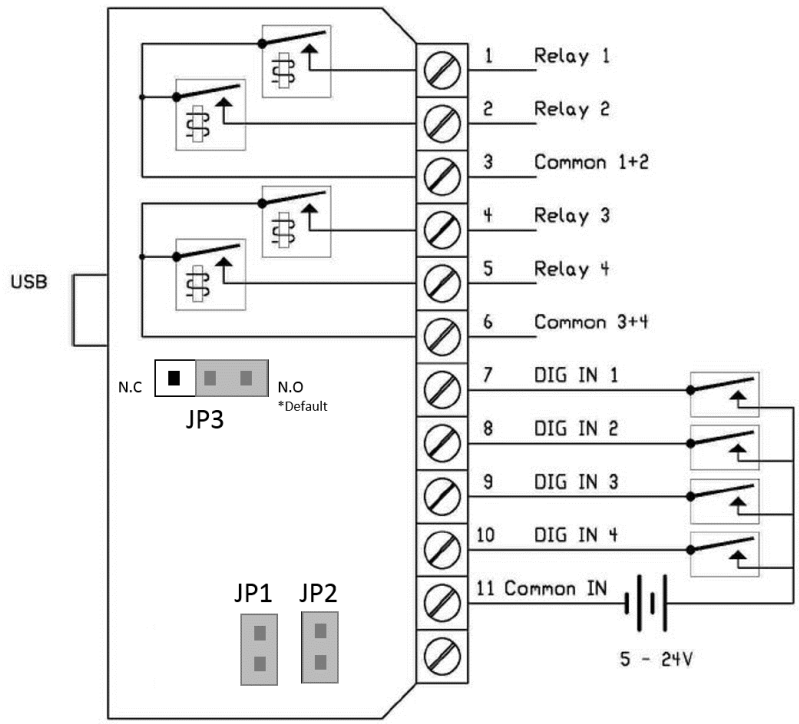
Isolated mode

JP1, JP2 (Jumpers) open



Non-Isolated Mode

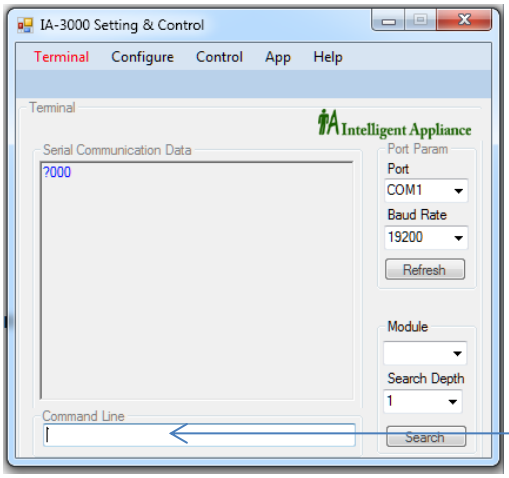
JP1, JP2 (Jumpers) closed



Software Installation

USB Port setup

Connect USB A/B Cable between the IA-3304-U 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-3304-U 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-3304-U I/O's by either any serial control software, or by the IA3000Util Utility, provided in the IA-3000 CD (see next page).



Locating the new COM port

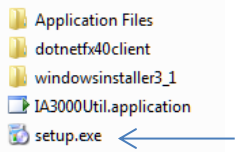
Start the 'Device Manager' utility. (Usually by selecting 'My Computer', Right Clicking the mouse button, choosing manage, Left Clicking and then double Left clicking on the Device Manager will list hardware items).

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-3304-U while connected to this computer through its USB port.

IA-3000 Utility

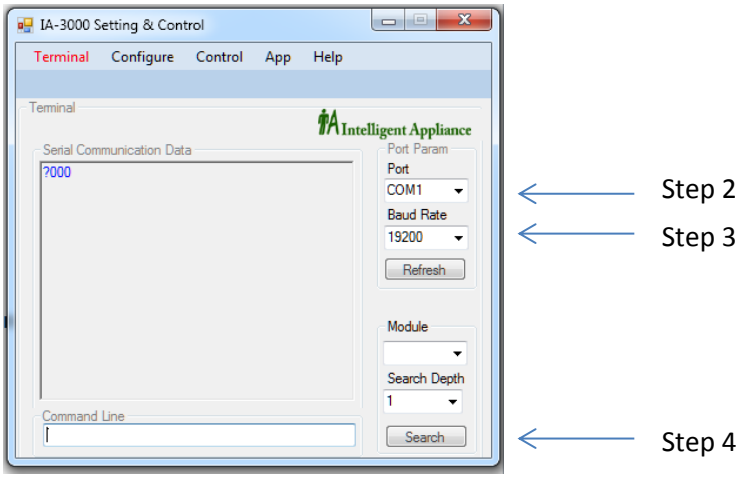
Install the IA3000Util Utility in your computer by clicking on the 'Setup' icon in the 'IA-Utility' directory, on the IA-3000 CD.



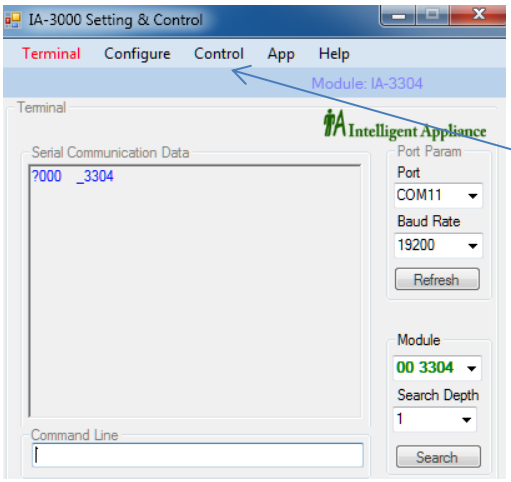
Or download it from our online Knowledge Base. (www.intelligent-appliance.com)

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 IA-3304-U 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' butto
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-3304-U, A host computer / PLC may control the IA-3304-U 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: ?000<CR>
Response: _3304<CR>

Request the device at address 00Hex to send its model name.
The response indicates that the command was successful and that the device at this address is IA-3304-U

?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: _u157<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 u1.57

?aa2 – Get Inputs and Outputs status

Description Read digital inputs an relays present status

Syntax ?aa2<CR>

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

Response _ABCDEFGH<CR> if the command was valid

A	1st Input nibble
B	2nd Input nibble
C	1st Output nibble
D	2nd Output nibble

Input **Output**

3	2	1	0	3	2	1	0	3	2	1	0	3	2	1	0
D7	D6	D5	D4	D3	D2	D1	D0	D7	D6	D5	D4	D3	D2	D1	D0
A				B				C				D			

Example Command: ?002<CR>
Response: _0203<CR>

Input #2 is Active and both relays #1 and #2 are activated

?aa50 – Get Device mode (Register #50)

Description This command reads the module operation mode

Syntax ?aa50<CR>

?	Delimiter character
aa	Hexadecimal address of the device
50	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	Bit 7 & Bit 1
40	Eliminate Response	Bit 6
20	Add device Address to response	Bit 5
10	Bit level Report	Bit 4
04	Board level Report	Bit 2
02	Report on command errors	Bit 1
00	Normal	

<CR> Carriage Return - End of command

Example

Command: ?0050<CR>
Response: _82<CR>

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

?aaCn – Get Counter's data

Description This command collects **Counter's data**

Syntax ?aaCn<CR>

?	Delimiter character
aa	Hexadecimal address of the device
C	Command for getting counter'
n	Counter's Index. n=0. (Zero).
<CR>	Carriage Return - End of command

Response _C0 dddddd

Example Command: ?00C0<CR>
Response: _ID 0000C8<CR>

In this example we read a value of 200. (Dec. or 'C8' in Hex format)

Note

1. The IA-3304-U includes a single Event Counter.
2. The counter is attached to Digital Input #4 located at Pin #10.
3. This is the first (and only) counter, so the selected 'n' should be '0' (Zero).

?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

!aa2dd – Set relay status

Description This command defines module's output state.

Syntax !aa2dd <CR>

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

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

Example

Command: !00201<CR>
Response: |01<CR>

This command will activate relay #1

!aa3dd – Activate relay N

Description This command activates a single relay.

Syntax !aa3dd <CR>

!	Delimiter character
aa	Hexadecimal address of the device
3	Single relay activation command
dd	N Relay 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 relay #3 only (!) all other relays will be not changed.

Relay	7	6	5	4	3	2	1
DATA (dd)	06	05	04	03	02	01	00

!aa4dd – De activate relay N

Description This command De activates a single relay.

Syntax !aa4dd <CR>

!	Delimiter character
aa	Hexadecimal address of the device
4	De activate relay N command
dd	N Relay 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 relay #3 only (!) all other relays state will not be changed.

Relay	7	6	5	4	3	2	1
DATA (dd)	06	05	04	03	02	01	00

!aa50dd – Set device mode Register #50 value

Description This command sets the power-up mode, enables/disables error messages, Address, Baud Rate, Register #51 values change, Bit Level and Digital Input bit level change report.

Syntax !aa50dd <CR>

! Delimiter character
aa Hexadecimal address of the device
50 System mode command
dd Mode (00-FF)

82	Enable BR change	Bit 7 & Bit 1
40	Eliminate Response	Bit 6 *
20	Add device Address to response	Bit 5 *
10	Bit level Report	Bit 4
04	Board level Report	Bit 2
02	Report on command errors	Bit 1
00	Normal	

<CR> Carriage Return - End of command

Response |dd EE OK if the command was valid

Example Command: !005082<CR>
Response: |82 EE OK

This command will enable Address , BR changing and enable the device error messages.
(Error messages are sent in response to invalid commands) and will disable Address and 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 change.

NOTE! * See command !aa2dddd<CR> for more details about bits 5 & 6

!aa6dd – Set baud rate

Description For compatibility with existing devices the IA-3304-U 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

Note

1. Mode must be set to “82” first. (!005082)
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 the module's address.
Mode REG #50 must be set to '82' in order to make use of this command

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. Mode REG 50 must be set to '82' in order to make use of this command !aa5082<CR>
2. Factory default is 00Hex
3. In products chained system, each product must be set to a unique address.
4. The updated address is displayed on the boards 7 segment led display.

!aaCCn – Clear counter's value

Description This command clears counter's value.

Syntax !aaCCn <CR>

!	Delimiter character
aa	Hexadecimal address of the device
CC	System control command (Clear)
n	Relay's Index value. Always n=0. (Zero).
<CR>	Carriage Return - End of command

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

Example

Command: !00CC0<CR>
Response: |CLR 0<CR>

This command will activate relay #1

!aaEdd – Set initial state

Description This command defines relays state at POWER-UP

Syntax !aaEdd <CR>

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

Response |Edddd<CR> if the command was valid

Example Command: !00E12<CR>
Response: |E 12 EE OK<CR>

This command will define the initiate state of all relays and will activate it for user's verification.

Note Factory Default state is !00E00 (All relays are OFF at power up)

^^E – Force initial state at all modules

Description This command forces all modules on present chain into their pre-defined initiate state.

Syntax ^^E<CR>

^^	Delimiter character
E	System control command
<CR>	Carriage Return - End of command

Response No Response massage

Example Command: ^^E<CR>
Response: No Response massage