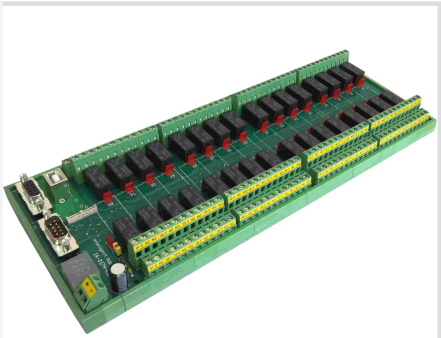
User Manual



IA-3174-U2

32 Relays
USB or RS-232 Controlled
IA Dazy-Chain Series

Intelligent Appliance

Version 1012

Copyright

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 FAQ knowledge database, user friendly search engine and an efficient interface to submit questions and problem report to our support department.
The download area provides software updates, drivers and manuals.

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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 you may have.

Warning

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.

Contents

Introduction

The IA-3174-U2i is an Industrial Relay Controller Board that includes 32 DPDT relays with a complete 6 contact support on each of them, featuring a wide range of wiring combinations, including differential and dual differential multiplexing. The board is supported by the rich Series-3000 commands list, with two new additional commands, for a smart single and twin relay operation, with an on board "Break-before-Make" facility.
The IA-3174-U2i Relay Controller supports a Daisy-Chain operation. It includes a buffered output port communication method, enabling a simple and a transparent control over a massive amount of boards.
The IA-3174-U2i Software Support package includes USB software drivers, open source code samples as well as setup and configuration utilities for fast product implementation.

Features

- 32 Relays
- Simple operation
- 6 Lines wired, DPDT
- 2Amp @ 30VDC, 0.5 @ 115VAC
- 1, 2, 8, 32 Relays control commands
- Thousands relays global commands
- High speed communication
- Bundled software utilities
- Open source examples
- Daisy-chain enabled
- Built-in watchdog
- DIN rail mounting ready

Ordering Information

- IA-3174-U2i
  32-ch DPDT Relay Board, USB or RS-232 controlled,
  Multi-Drop Expandable.
- IA-3174-2
  32-ch DPDT Relay Board, RS-232 controlled,
  Multi-Drop Expandable.
- P
  Pluggable version

Specifications

Relays	
Channels	32
Contact current	2Amp @ 30VDC 1Amp @ 115VAC
Contact method	DPDT, 6 wired contact
Communication	
Main COM	USB or RS-232 *
Expansion COM	RS-232
Defalt BR	19200bps
COM Rate	1200-115000bps
COM input	USB or DB9 Female
COM output	DB9 Male
Expansion Unit	IA-3131-2, IA-3131-U2i
Wiring	
Host/Module cable:	USB or DB9 M/F pin-to-pin
Module/Module cable:	DB9 M/F pin-to-pin Up to 15m between each module.
General	
Power supply:	24VDC, 0.6Amp
Module size:	305x115x45 mm
Weight:	572 gr

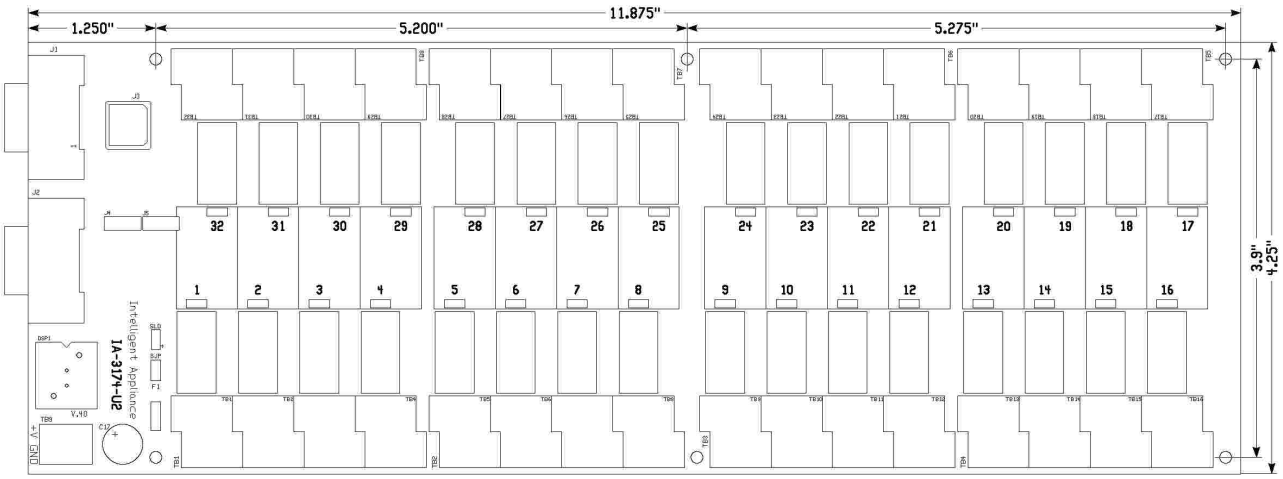
* Main COM Method should be chosen between USB to RS-232. Only one method may be used at a time.

Wiring

DB9 Female or USB

Host PC

DB9 Male or USB



DB9 Female

DB9 Male

Next Device

DB9 Female

...255

Pin Assignment

J1 - INPUT - DB9 COM Port (Female)

PIN #	FUNCTION
2	Transmit
3	Receive
5	GND

J2 - OUTPUT COM (DB9, Male) RS-232

PIN #	FUNCTION
2	Rx
3	Tx
5	GND

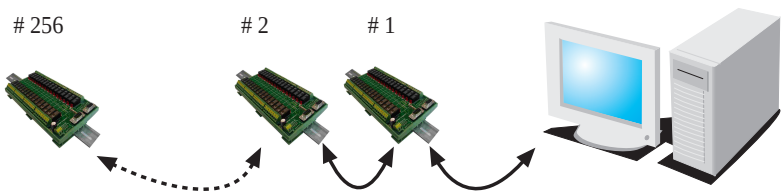
J3 - INPUT - USB

TB1 Relay 1-4 Terminal
TB2 Relay 5-8 Terminal
TB3 Relay 9-12 Terminal
TB4 Relay 13-16 Terminal
TB5 Relay 17-20 Terminal
TB6 Relay 21-24 Terminal
TB7 Relay 25-28 Terminal
TB8 Relay 29-32 Terminal
TB9 Power Connector (24V)

SLD - User LED
LD1-LD32 - Relay LED Status

Jumpers Settings

SJP - User general use Jumper



Software Installation

USB Port setup

1. Connect a 24 VDC, power supply, to TB9 on the IA-3174-U2.
2. Turn on the 24 VDC power supply.
3. The IA-3174-U2 address is shown on the dual character led display on the IA-3174-U2 unit.
4. Connect USB A/B Cable between the IA-3174-U2 to the host computer.
5. The computer informs on locating a new USB device, and asks for S/W drivers.
6. Kindly choose the USB-Drivers directory on the IA-3000 CD and complete the task by pressing 'Next' and 'Finish' while asked for.
7. Job done will be accomplished by a steady lilting of the USB led on the IA-3174-U2 unit, and by a creation of new Serial COM that can be easily found on the Device Manager screen.
8. At this stage you can easily control the IA-3174-U2 relays by either any serial control software, or by the IA-3000 Utility, provided in the IA-3000 CD.

Locating the new COM port

1. 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).
2. 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)'.
3. This line inform us that we should refer to COM4, in this case, in order to control the IA-3174-U2 while connected to this computer through its USB port.

Setup IA-3000 Utility

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

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 'COM4' to fit into the right of the 'Port' label (in case that this is the COM shown on item 2 of 'Locating the new COM port', earlier at this page).
3. Select '19200' to fit into the right of the 'Baud' label (in case that the IA-3174-U2 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 disactivate the appropriate relay.

Software Installation

Address Configuration

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. Search then Select the desired IA-3174-U2 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 indicates '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-3174-U2 , A host computer / PLC may control the IA-3174-U2 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 return character. All commands must use UPPER CASE characters

Command	Description
?aa0	Get Device Name
?aa1	Get Device Firmware Version
?aa2	Get Relays status
?aa5	Get Device Mode (1st Byte)
?aa51	Get device mode (2nd Byte)
?aaID	Get Device ID
?aaS	Get User Jumper, LED and Power Status
!aa2dddddd	Set Relays Status
!aa3dd	Activate Relay N
!aa4dd	De Activate Relay N
!aa5dd	Set Device Mode (1st Byte)
!aa51dd	Set Device Mode (2nd Byte)
!aa6BB	Set Baud Rate
!aa7AA	Set Module's Address
!aaBndd	Set Relays Status @ Byte Level
!aaEddddddd	Set Initial State
!aaMddddddd	Set Temporary Memory State
!aaSdd	Set User defined LED
^^E	Force Initial State at all Modules
^^M	Activate Relays per Memory Status

?aa0(cr)

Function 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: _3174(cr)

Request the device at address 01 Hex to send its model name.
The response indicates that the command was successful and that the device at this address is IA-3174

?aa1(cr)

Function 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: _A104(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 A1.04

?aa2 (cr)

Function

Get relays status

Description

Read relays present status.

Syntax

?aa2(cr)

?	Delimiter character
aa	Hexadecimal address of the device
2	Read relays status
(cr)	Carriage Return - End of command

Response

_DDDDDDDD(cr) If the command was valid

_	Delimiter character
D	Output Command: 8 Nibbles in hex format each nibble represents 4 relays. Most left nibble is the most significant one. Most right is the least significant one.

Example

Command: ?002(cr)
Response: _00010001 (cr)

All relays are off except #17 and #1.

?aa5(cr)

Function 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

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.

?aa51(cr)

Function Get Device Mode (2nd Byte)

Description This command reads the module expansion mode

Syntax ?aa51(cr)
! Delimiter character
aa Hexadecimal address of the device
51 Mode register, 2nd Byte
(cr) Carriage Return - End of command

Response _dd(cr) if the command was valid

Example Command: ?0051(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(cr)

Function Get Device ID

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 (cr)

Example Command: ?00ID(cr)
Response: _ID 00412534 (cr)

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

?aaS (cr)

Function

Get User Defined Jumper Setting, User LED

Description

Read Jumper Setting, User LED

Syntax

?aaS(cr)

?	Delimiter character
aa	Hexadecimal address of the device
S	Read Jumper Setting
(cr)	Carriage Return - End of command

Response

_dd(cr) If the command was valid

Example

Command: ?00S(cr)
Response: _11(cr)
In this example the jumper JP1 setting is **"close",** User LED **"ON"**

!aa2DDDDDDDD(cr)

Function Set relays status

Description This command define's module's output state.
!aa2DDDDDDDD (cr)

Syntax

!	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 |DDDDDDDD(cr) if the command was valid and if FB messages are enabled.

Example Command: !00280008000(cr)
Response: | 80008000(cr)

This command will activate relay #32 and #16

!aa3DD(cr)

Function Activate relay N

Description This command activate a single relay.

Syntax !aa3DD(cr)

!	Delimiter character
aa	Hexadecimal address of the module
3	Single relay activation command
DD	N Relay ID in hex format
(cr)	Carriage Return - End of command

Response |SDD(cr) if the command valid

Example Command: !0031F(cr)
Response: |S1F(cr)

This command will activate relay #32 only (!) all other relays will be not changed.

!aa4DD(cr)

Function De activate relay N

Description This command De activate a single relay.

Syntax !aa4DD(cr)

!	Delimiter character
aa	Hexadecimal address of the module
4	De activate relay N command
DD	Relay ID hex format
(cr)	Carriage Return - End of command

Response |CDD(cr) if the command valid

Example Command: !0041F(cr)
Response: |C1F(cr)

This command will De activate relay #32 only (!) all other relays status will be not changed.

!aa5DD(cr)

Function Set Device Mode

Description This command sets the power-up mode and enables/disables error messages

Syntax !aa5DD(cr)

!	Delimiter character
aa	Hexadecimal address of the device
5	System Mode command
DD	8 mode control bits (00-FF)

Bit#	Function
1	Enable Error Messages
6	Disable Feedback messages on “!AA2” & “!AAM” Commands if BIT 7 is cleared.
7	Enable BR change
	*Other bits are for future use
(cr)	Carriage Return - End of command

Response |DD EE OK if the command was valid

Example Command: !00502 (cr)
Response: |02 EE OK

This command will enable the device error messages (error messages are sent in response to invalid commands) and will disable baud rate by mistake.

!aa51dd(cr)

Function Set Device Mode (2nd Byte)

Description This command changes relay operation settings

Syntax !aa51dd(cr)

!	Delimiter character
aa	Hexadecimal address of the device
51	System Mode command
dd	Mode register, 2nd Byte (00-FF)

Bit#	Function
1	Relay multiplexing mode. (A single or dual relay operates at a time.) Depending on bit 0 settings.
0	In relay multiplexing mode(Defined by Bit 1) Bit 0 defines weather a single or dual relays will operate
(cr)	Carriage Return - End of command

Response |dd EE OK if the command was valid

Value	Description
00	Normal mode (Default)
01	N.A
02	Single relay multeplexing mode
03	Dual relay multiplexing mode

Example1

Command: !005102 (cr)
Response: |02 EE OK
This command will define **single** relay multiplexing mode

Note: The Relay should be activated by **!aa3dd(cr)** command.
dd Range is 00(H)-17(H)

Example2

Command: !005103 (cr)
Response: |03 EE OK
This command will define **dual** relay multiplexing mode

Note: The Relay should be activated by **!aa3dd(cr)** command.
dd Range is 00(H)-0B(H)

!aa6BB(cr)

Function Set Baud Rate

Description For compatibility with existing devices the IA-3174-U2 can be set to other standard baud rates

Syntax

!aa6BB(cr)

?	Delimiter character
aa	Hexadecimal address of the device
6	Change device baud rate command
BB	Two characters representing the desired baud rate:
	12 1,200
	24 2,400
	48 4,800
	96 9,600
	19 19,200 (default)
	38 38,400
	57 57,600
	11 115,200
(cr)	Carriage Return - End of command

Response

|BB(cr) if the command was valid

|	Response delimiter
BB	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

Notes:

1. BIT 7 of the device mode must be set first.
2. Changes will take effect after the next power up.

!aa7AA(cr)

Function Set module's address

Description Each device must have a unique network address. This command defines a module's address. Factory default is 00Hex.

Syntax !aa7AA(cr)

!	Delimiter character
aa	Hexadecimal address of the device
7	Get device Version command
AA	New Hexadecimal address
(cr)	Carriage Return - End of command

Response | AA(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: Factory default address is "00" and it should be change before installing it into a present operation net.
Kindly make sure that each module is set to a different address!

!aaBndd(cr)

Function Set Relays Status @ Byte Level

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

Syntax !aaBndd(cr)

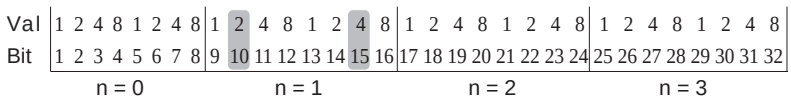
!	Delimiter character
aa	Hexadecimal address of the module
B	8 relays activation command
n	#Byte to be set. n is in the range 0-3.
dd	Byte data in hex format.
(cr)	Carriage Return - End of command

Response |n dd(cr) if the command valid

Example Command: !00B124(cr)
Response: |1 24(cr)

This command will activate relays #10 and #15(!) all other relays will be not changed.

Sample



!aaEDDDDDDDD(cr)

Function Set initiate state

Description This command defines relays state on power-up.

Syntax !aaEDDDDDDDD(cr)

!	Delimiter character
aa	Hexadecimal address of the device
E	System control command
D	Relay output activation command data for each nibble in hey format.
(cr)	Carriage Return - End of command

Response |EDDDDDDDD (cr) if the command was valid

Example Command: !00E10001000(cr)
Response: |E10001000(cr)

This command will define the initiate state of relays #13 and #29 as "No Active".

!aaMDDDDDDDD(cr)

Function Set temporary memory state

Description This command defines the temporary memory state.

Syntax !aaMDDDDDDDD(cr)

!	Delimiter character
aa	Hexadecimal address of the device
M	System control command
D	Relay output activation command data for each nibble in hey format.
(cr)	Carriage Return - End of command

Response MDDDDDDDD (cr) if the command was valid and if FB messages are enabled.

Example 1

Command: !00500 (cr) (Enable FB message)
Command: !00M80008000 (cr)
Response: |M80008000(cr)

This command will set relay #32 and #16 in memory only.

Example 2

Command: !00540 (cr) (Disable FB message)
Command: !00M80008000(cr)
Response: No FB message

This command will set relay #32 and #16 in memory only.

!aaSdd(cr)

Function Set User Defined LED

Description This command defines user LED activation.
!aaSdd (cr)

Syntax

!	Delimiter character
aa	Hexadecimal address of the device
S	Set User Defined LED
dd	LED Activation Command.
(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.
For LD1 deactivation the command should be !00S00(cr).

^^E(cr)

Function Force initiate state at all modules

Description This command forces all modules of this net into their pre defined initiate state.

Syntax ^^E(cr)

^^	Delimiter character
E	Force initiate state command.
(cr)	Carriage Return - End of command

Response No FB message

Example Command: ^^E (cr)
Response: No FB message

^^M(cr)

Function Activate Relays per Memory Status

Description This command forces Activate Relays per Memory Status

Syntax

^^M(cr)

^^	Delimiter character
E	Activate Relays per Memory Status
(cr)	Carriage Return - End of command

Response Relay state is set to memory state, no feedback message is returned

Example

Command: ^^M (cr)
Response: No FB message

!00M10000001 (cr)	Sets memory - no change in relay's state
^^M	Actives relays #29 and #1.