

User Manual

IA-3152-E

48-ch Relay Controller

TCP/IP Ethernet Controlled

With Local Expansion, ready



Version 0218
www.intelligent-appliance.com

Copyright

Copyright © 1985-2017 Intelligent Appliance Ltd. All rights reserved.

The information in this user manual is subject to change without notice.

Microsoft, Windows and Hyper-Terminal are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Service & Support

Providing our customers with easy operated products with a wide software support package and 24/7 support, leads to a growing community of satisfied Intelligent-Appliance product users. Our [website](#) offers a technical database that includes wide and detailed information about our products and the ways of using them that helps Developers, Field Engineers and any other user getting the best and the most of our products. Our KNOWLEDGE BASE directory Includes: 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 expressing your kind view, impression or question on any subject you may have.

Contact

Telephone:	+972-9-8333-022
Fax:	+972-9-8348-965
Support E-mail:	support@intelligent-appliance.com
Sales E-mail:	sales@intelligent-appliance.com
Website:	www.intelligent-appliance.com

.

INTRODUCTION	4
FEATURES	4
OPERATION MODES.....	5
SPECIFICATIONS	6
ORDERING INFORMATION	7
INSTALLATION	8
SYSTEM WIRING	8
<i>Pin Assignment.....</i>	<i>9</i>
<i>Relay Layout.....</i>	<i>10</i>
<i>Address Configuration.....</i>	<i>11</i>
ETHERNET - DEFAULT CONFIGURATION	12
COMMAND SET.....	14
?AA0 – GET DEVICE NAME	15
?AA1 – GET DEVICE FIRMWARE VERSION	16
?AA2 – GET OUTPUTS STATUS.....	17
?AA5 – GET DEVICE MODE	19
?AA51 – GET DEVICE MODE (REGISTER #51).....	20
?AAID – GET MODULE’S ID.....	21
?AAS – GET JUMPER & LED STATUS	22
?AAWDT – GET WD2 COUNT-DOWN VALUE	23
!AA2DDDDDDDDDDDD – SET RELAY STATUS	24
!AA3DD – ACTIVATE RELAY N	26
!AA4DD – DE ACTIVATE RELAY N.....	27
!AA5DD – SET DEVICE MODE	28
!AA51DD – SET DEVICE MODE REGISTER #51 VALUE.....	29
!AA6DD – SET BAUD RATE.....	30
!AA7DD – SET MODULE’S CHAIN ADDRESS.....	31
!AABNDD – SET RELAYS STATUS AT BYTE LEVEL	32
!AAEDDDDDDDDDDDDD – DEFINE POWER-UP STATE	34
!AAMDDDDDDDDDDDDDD – DEFINE MEMORY STATE.....	35
!AASDD – SET USER DEFINED LED	36
!AAWDRDDDDDDDDDDDD – SET RELAY STATUS	37
!AAWDTDD – SET WD2 TIME VALUE.....	39
^^E – GLOBAL FORCE POWER-UP STATE AT ALL MODULES.....	40
^^M – GLOBAL ACTIVATE RELAYS PER MEMORY STATE	41

Introduction

The IA-3152-E is an Industrial Grade TCP/IP Relay Controller, CE and FCC approved, ROHS compliant, most reliable module designed to operate on factory floor in harsh noisy EMI/RFI Environment.

Its TCP/IP Ethernet port includes an onboard server and may be operated in DHCP mode or in a Static IP mode. The port configuration may be done by the built-in web page, by AT commands or by a software configuration utility.

The IA-3152-E includes 48 Relays with a contact rating of 7Amp both at 30VDC and 250VAC. Each relay's contacts are protected by Voltage Suppressor device, keeping low RFI/EMI Noise and long operation life.

The relays are provided in 8 Groups, 4 groups of 8 relays each, and 4 groups of 4 relays each, enabling a total control of up to 7.2KW or up to 60KVA.

MS Studio DOT.net Library, Open source code examples and immediate operation utilities enables fast system integration.

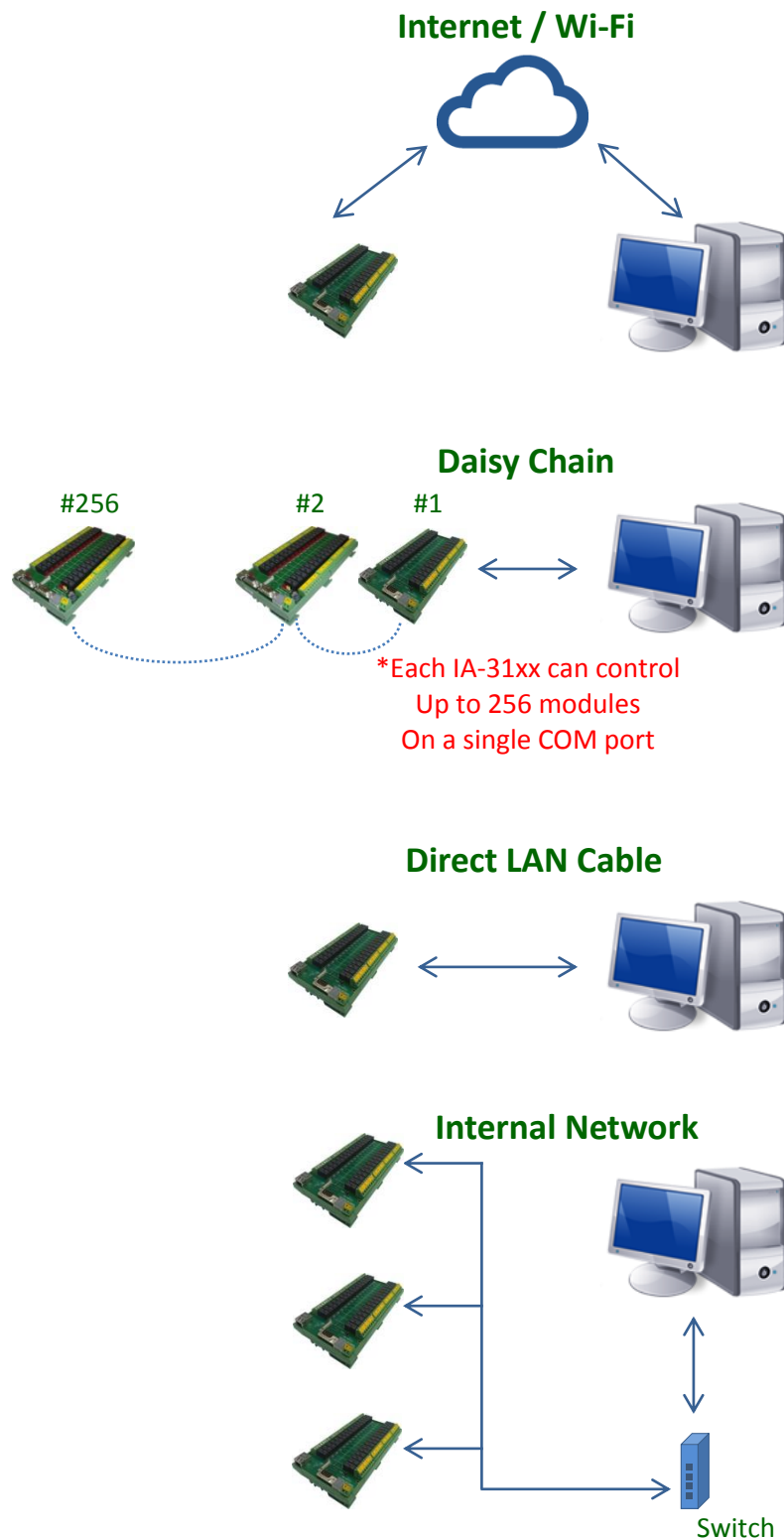
The IA-3152-E Relay Controller 's Ethernet port, enables using it as a Web Controlled Relay board, Factory Floor and Home Control relay controller.

The WD2, system watchdog, improves its system operations performance, enabling setting of relays state at communication failure occurrence, avoiding fatal factory floor damage in case of communication or host crisis.

Features

- 48-ch Relay
- Ethernet/Web Controlled
- Built-in Web Page
- DHCP/Static IP modes
- Virtual COM Control option
- 7 Amp @ 30VDC/250VAC
- DOT.net Software Drivers
- Series-3000 Software Compatible
- Web Page or AT Configuration
- Local Expansion Ready
- DIN-Rail mounting ready

Operation Modes



Specifications

Relays

Channels	48
Method	SPST
Contact Rating	7Amp @ 250VAC
	7Amp @ 30VDC

Communication Port

COM version	Ethernet TCP/IP
LAN	10/100 base-T
Default IP Address	10.1.1.22
Default Port	23
Daisy Rate Range	1200 – 115200
Default Daisy Rate	115.2Kbps
Word Length	8 bit
Parity	none
Stop bit	1
Flow Control	None

Daisy Chain

Chaining cable	DB9 M/F, Direct Pin-to-Pin cable, up to 15 meter long
----------------	--

General

Power Supply	24VDC 1Amp
Module Size	270x115x45 mm
Weight	490gr

Ordering Information

- IA-3152-E:
48-ch Relay Board, TCP/IP, 24VDC.
RJ45 1m cable 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.

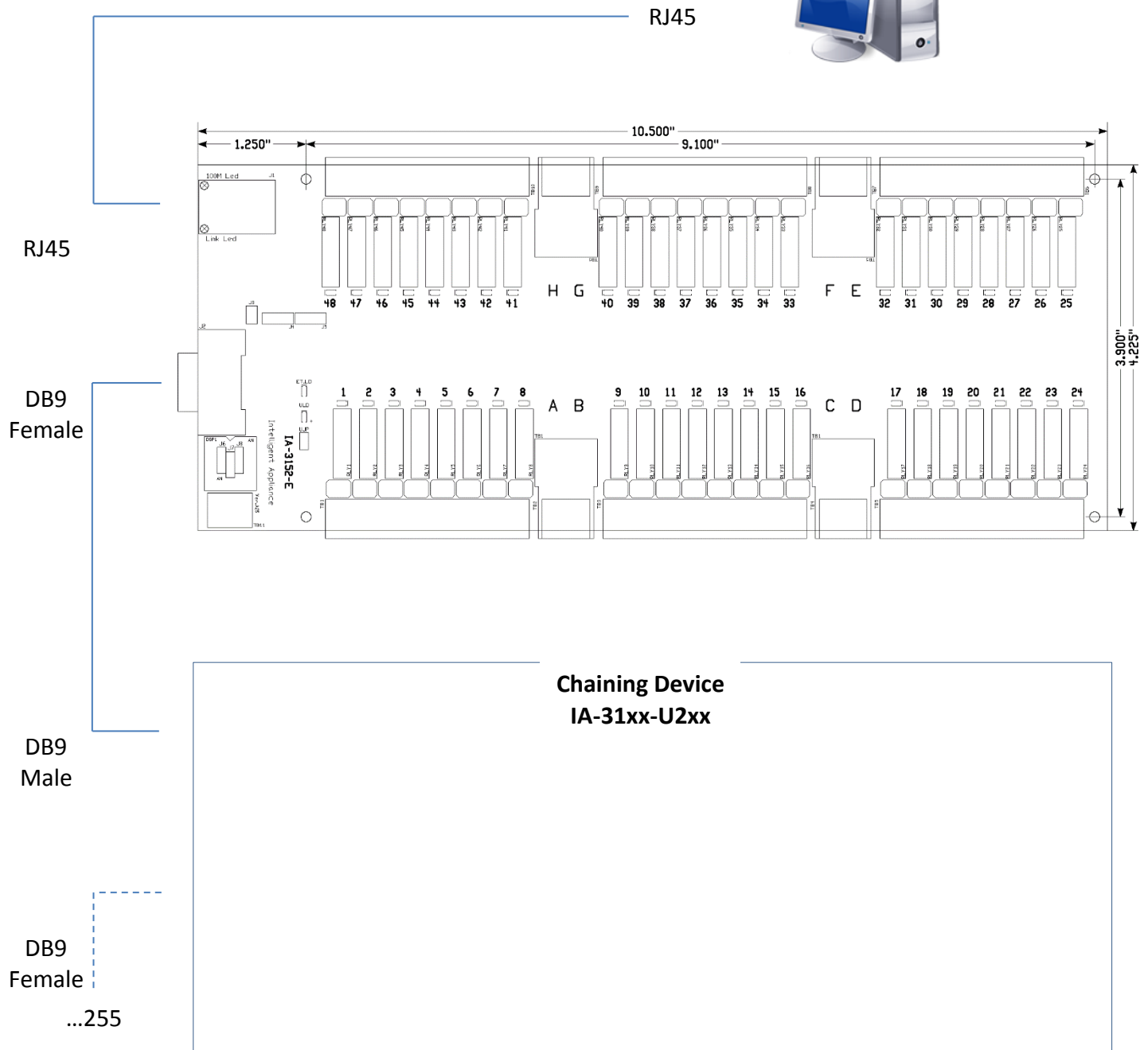
Web Controlled Relay
48 channels, Daisy-Chain
TCP/IP Relay Controller



Installation

System Wiring

Host PC



- IA-3152-Exx Can be used only as the first chain member only!

Pin Assignment

J1 – Main Port Ethernet (TCP/IP)

J2 – Daisy-chain Expansion Port (RS-232, DB9 Male)

Pin	Function
#2	Rx
#3	Tx
#5	GND

TB 1, 3, 5, 6, 8, 10 – Relay #1 to Relay #48

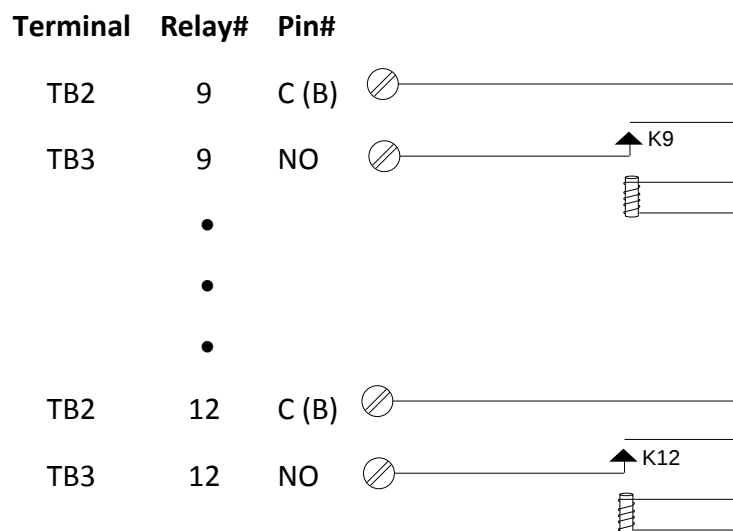
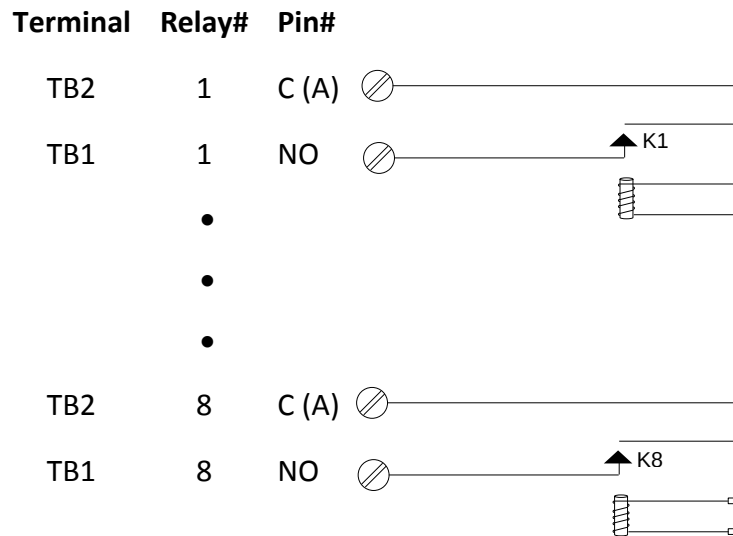
TB 2, 4, 7, 9 – Common

Relay #	Common	QTY Relays
1-8	A	8
9-12	B	4
13-16	C	4
17-24	D	8
25-32	E	8
33-36	F	4
37-40	G	4
41-48	H	8

TB 11 – 24V Power supply input terminal

Relay Layout

SPST, Form A, Channels 1-48



Address Configuration



Warning

Note!

This device has an IP address that may be changed by the user.

In addition to this IP address there is a chain address in the range of '00' to 'FF' that might be used while chaining several RS-232 devices through the IA-3152-E IP device.

In this case, each RS-232 device should have its own unique chain address that it should be set to it while using the IA-3000 configuration utility.

Ethernet - Default Configuration

IA-xxxx-E – Factory Setup

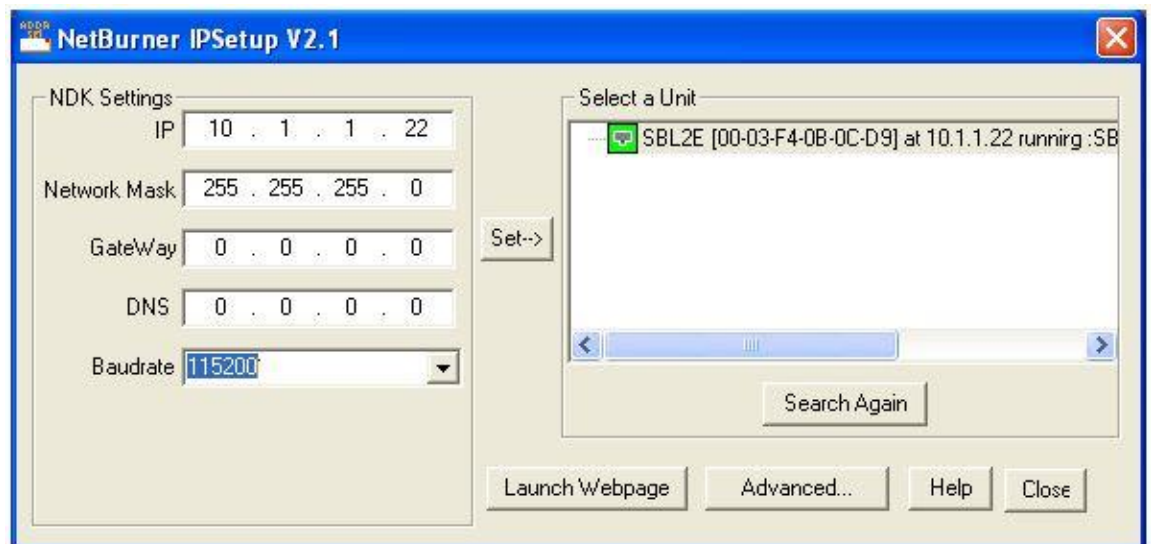
1. Data to be set in the IA-xxxx-E board

IP:	10.1.1.22
Port:	23
Gateway:	10.1.1.1
BR:	115200

2. Factory Default IP: **10.1.1.22**

Note: You may choose any free figure between 1 to 255. Factory Default is 22.

3. Connect the IA-xxxx-E to the PC computer via its Ethernet port while using a crossed cable or a hub.
4. For fastest results set the Host Computer to 10.1.1.1
5. Factory Setup should be made using the **IPSetup** program ver. V2.1 or an updated one.
6. The main screen should look like the following one while all figures in the left tables are originally "0".



7. Set the figures in the left table according to the description on items #1 and #2.
8. Press the Set→ button in the middle, and make sure to get the right results after the new search.
9. Press the “Launch Webpage” button and get the following screen:

NetBurner
Networking in 1 day!

Network | Serial | GPIO | Password

Network

Device name for DHCP:

Addressing mode:

IP Settings	Static Settings	Current Values
Device IP address:	10.1.1.22	10.1.1.22
Device subnet mask:	255.255.255.0	255.255.255.0
Device gateway:	0.0.0.0	0.0.0.0
DNS server:	0.0.0.0	0.0.0.0
Ethernet link:	100BT Half duplex	Physical power cycle required after change

Incoming TCP Settings

	PORT 0	PORT 1
Listen for incoming network connections:	☒	☒
Listening network port:	23	24
Timeout and disconnect after this many seconds of inactivity:	60	60
Allow new connection if the existing connection has been idle for this many seconds:	30	30

Outgoing TCP Settings

Make outgoing connections:	Never	Never
Connect on network port:	1000	1001
Connect/send to this address:	(Enter IP address)	(Enter IP address)
Timeout and disconnect after this many seconds of inactivity:	60	60
Retry failed outgoing connections after this many seconds:	10	10

GPIO TCP Effects

Set the following GPIO pin on connect (the pin must be set as GPIO out):	NA	NA
Make a connection when the following GPIO pin is true (the pin must be set as GPIO in):	NA	NA

UDP Mode Settings

Use UDP instead of TCP:	☐	☐
Learn UDP reply address:	☐	☐
Learn UDP reply port:	☐	☐

Custom Packetization

Enable custom packetization logic:	☐	☐
Number of characters to accumulate before sending TCP/UDP packet (128 max):	50	50
Number of milliseconds to wait for accumulated characters (0=waits forever):	100	100
Flush TCP/UDP frame when this character is received (enter "NA" to disable):	NA	NA

10. Press the **“Serial”** option at the top right corner.

11. Get the following screen:

NetBurner
Networking in 1 day!

[Network](#) | [Serial](#) | [GPIO](#) | [Password](#)

Serial

	PORT 0	PORT 1
Data port settings (DEBUG defaults to port 0 if both are set to DEBUG):	RS-232 ▼	RS-232 ▼
Data baud rate:	115200 ▼	115200 ▼
Custom baud rate:	0	0
Data bits:	8 ▼	8 ▼
Stop bits:	1 ▼	1 ▼
Data parity:	None ▼	None ▼
Flow control:	None ▼	None ▼
Allow AT commands:	☒	☒
AT attention command char:	43 (+)	43 (+)

[Submit New Settings](#)

Command Set

The following table is a quick reference table for the IA-3152-E.

Host Computer, PLC, Robot or any other controller may control the IA-3152-E while using its wide software support package of Net Drivers, Labview Drivers etc. or by sending ASCII String commands through its Ethernet port. Each command is structured from a delimiter character, modules address, command character, data and Carriage Returns character. All commands must use UPPER CASE characters.

?AA0 – GET DEVICE NAME	15
?AA1 – GET DEVICE FIRMWARE VERSION	16
?AA2 – GET OUTPUTS STATUS	17
?AA5 – GET DEVICE MODE	19
?AA51 – GET DEVICE MODE (REGISTER #51)	20
?AAID – GET MODULE’S ID	21
?AAS – GET JUMPER & LED STATUS	22
?AAWDT – GET WD2 COUNT-DOWN VALUE	23
!AA2DDDDDDDDDD – SET RELAY STATUS	24
!AA3DD – ACTIVATE RELAY N	26
!AA4DD – DE ACTIVATE RELAY N	27

!AA5DD – SET DEVICE MODE	28
!AA51DD – SET DEVICE MODE REGISTER #51 VALUE	29
!AA6DD – SET BAUD RATE	30
!AA7DD – SET MODULE'S CHAIN ADDRESS	31
!AABNDD – SET RELAYS STATUS AT BYTE LEVEL	32
!AAEDDDDDDDDDDD – DEFINE POWER-UP STATE	34
!AAMDDDDDDDDDDDD – DEFINE MEMORY STATE	35
!AASDD – SET USER DEFINED LED	36
!AAWDRDDDDDDDDDDDD – SET RELAY STATUS	37
!AAWDTDD – SET WD2 TIME VALUE.	39
^^E – GLOBAL FORCE POWER-UP STATE AT ALL MODULES	40
^^M – GLOBAL ACTIVATE RELAYS PER MEMORY STATE	41

?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: _3152<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-3152-E

?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: _E156<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 E1.56

?aa2 – Get Outputs status

Description Read relays present status

Syntax ?aa2<CR>
? Delimiter character
aa Hexadecimal chain address of the device (default '00')
2 Read I/O status
<CR> Carriage Return - End of command

Response _ABCDEFGHIJKL<CR> if the command was valid
A 1st Output nibble (MSB)
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 (LSB)

Example Command: ?002<CR>
Response: _102240800801<CR>

Relays #1, #12, #24, #31, #34, #38 and #45 are activated

Data Structure

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
Nibble	1 st				2 nd				3 rd				4 th				5 th				6 th			
	A				B				C				D				E				F			

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Nibble	7 th				8 th				9 th				10 th				11 th				12 th			
	G				H				I				J				K				L			

Examples Table

Command	Response Syntax	Description
?002<CR>	_000000000001<CR>	Relay #1 is Active
?002<CR>	_800000000000<CR>	Relay #48 is Active
?002<CR>	_000400000000<CR>	Relay #35 is Active
?002<CR>	_000007000000<CR>	Relay #25, #26, #27 are Active
?002<CR>	_A00000000000<CR>	Relay #46, #48 are Active
?002<CR>	_102240800801<CR>	#1, #12, #24, #31, #34, #38 and #45 are Active

HEX / DEC Conversion Table

DEC	HEX	8	4	2	1
15	F	1	1	1	1
14	E	1	1	1	0
13	D	1	1	0	1
12	C	1	1	0	0
11	B	1	0	1	1
10	A	1	0	1	0
9	9	1	0	0	1

?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
dd Mode (00-FF)
82 Enable BR and device address 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 (82) enables baud rate change (command [!aa6<CR>](#)).
It will also send error messages for invalid commands.



Note

Make sure to cancel '82' mode right after setting the baud rate value by:
[!00502<CR>](#)

?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	
		WD2 Ending state - Force Power-Up State, 5 second after WD2 was activated	
5	20	1	Enabled
	00	0	Disabled
		WD2 - Host communication watchdog	
2	04	1	Enabled
	00	0	Disabled

Response _dd<CR> if the command was valid
 dd Mode register #51
 <CR> Carriage Return - End of command

Example Command: ?0051<CR>
 Response: _04<CR>

In this example watchdog 2 is enabled.
 This host communication protection watchdog, will force all relays to their WD2 special Relay Pattern state.
 In case that no communication will take place to this card for over the time defined in command [!aaWDTdd](#)<CR>

?aalID – Get module's ID

Description	This command reads the Device ID
Syntax	<pre>?aalID<CR></pre> ? Delimiter character aa Hexadecimal address of the device ID Command for read ID <CR> Carriage Return - End of command
Response	_ID nnnnnnnnn
Example	Command: ?00ID<CR> Response: _ID 00412534<CR>
	In this example, we read S/N of device #00

?aaS – Get jumper & led status

Description This command reads the status of JP1 and the LED.

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
 _ Delimiter character
 dd Input Data
 A 1st Input nibble
 B 2nd Input nibble

Value	8	4	2	1	8	4	2	1
Bit	3	2	1	0	3	2	1	0
Function				UJP				ULD
Nibble	1 st				2 nd			
	A				B			

ULD=1 LED is ON
 UJP=1 UJP jumper is CLOSED

Example Command: ?00S<CR>
 Response: _11<CR>

In this example, the LED is ON and JP1 is CLOSE

?aaWDT – Get WD2 Count-down value

Description This command reads the System Communication Watchdog, WD2, Counter Count-down value and sets its value to the Preset value.

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

Response _dd<CR> if the command was valid
_ Delimiter character
dd Output digits in HEX format

Example Command: ?00WDT<CR>

Response: _12<CR>

In case that WD2 is Activated!

Response: _20 WD2 ERR<CR>

In case that WD2 is Not Activated!

In this example WD2 Count-down value is 18 Seconds.

NOTE 1: This command reads the WD2 Counter value. Not the WDT Preset value that is defined by the “[!aaWDTdd<CR>](#)” command.

NOTE 2: In case that WD2 is not operated, this command will yield an error and it will show WDT predefined value.

NOTE 3: This command, in addition to reading WD2 Counter value, sets the WD2 Counter value to its Preset value.

NOTE 4: Each reading might yield a different value as it is depended on the time elapse since previous reading and presetting.

!aa2ddddddddddd – Set relay status

Description This command defines module's relay state.

Syntax !aa2ddddddddddd <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 _ABCDEFGHIJKL<CR> if the command was valid
A 1st Output nibble (MSB)
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 (LSB)

Example Command: !0028008000000000 <CR>
 Response: | 800800000000 <CR>

This command will activate relay #48 and #36
and will deactivate all others.

Data Structure

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
Nibble	1 st				2 nd				3 rd				4 th				5 th				6 th			
	A				B				C				D				E				F			

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Nibble	7 th				8 th				9 th				10 th				11 th				12 th			
	G				H				I				J				K				L			

Examples Table

Command	Response Syntax	Description
!0020000000000001<CR>	00000001<CR>	Activating relay #1
!0028000000000000<CR>	80000000<CR>	Activating relay #48
!0020004000000000<CR>	00040000<CR>	Activating relay #19
!0020000070000000<CR>	00000700<CR>	Activating relay #9, #10, #11
!002A000000000000<CR>	A0000000<CR>	Activating relay #30, #48
!002000000000C022<CR>	0000C022<CR>	Activating relay #2, #6, #15, #16

HEX / DEC Conversion Table

DEC	HEX	8	4	2	1
15	F	1	1	1	1
14	E	1	1	1	0
13	D	1	1	0	1
12	C	1	1	0	0
11	B	1	0	1	1
10	A	1	0	1	0
9	9	1	0	0	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: !0031F<CR>
 Response: |S1F<CR>

This command will activate relay #32.
 all other relays will be not changed.

Data Structure

Relay	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
dd	2F	2E	2D	2C	2B	2A	29	28	27	26	25	24	23	22	21	20	1F	1E	1D	1C	1B	1A	19	18

Relay	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
dd	17	16	15	14	13	12	11	10	0F	0E	0D	0C	0B	0A	09	08	07	06	05	04	03	02	01	00

Examples Table

Command Syntax	Response	Description
!00300<CR>	S00<CR>	Activating relay #1
!0031F<CR>	S1F<CR>	Activating relay #32
!00312<CR>	S12<CR>	Activating relay #19

HEX / DEC Conversion Table

DEC	HEX	8	4	2	1
15	F	1	1	1	1
14	E	1	1	1	0
13	D	1	1	0	1
12	C	1	1	0	0
11	B	1	0	1	1
10	A	1	0	1	0
9	9	1	0	0	1

!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 Relay ID hex format
 <CR> Carriage Return - End of command

Response |Cdd if the command was valid

Example Command: !0041F<CR>
 Response: |C1F<CR>

This command will De activate relay #48 only (!)
 All other relays status will be not changed.

Data Structure

Relay	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
dd	2F	2E	2D	2C	2B	2A	29	28	27	26	25	24	23	22	21	20	1F	1E	1D	1C	1B	1A	19	18

Relay	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
dd	17	16	15	14	13	12	11	10	0F	0E	0D	0C	0B	0A	09	08	07	06	05	04	03	02	01	00

Examples Table

Command Syntax	Response	Description
!00400<CR>	C00<CR>	De activate relay #1
!0041F<CR>	C1F<CR>	De activate relay #48
!00412<CR>	C12<CR>	De activate relay #19

HEX / DEC Conversion Table

DEC	HEX	8	4	2	1
15	F	1	1	1	1
14	E	1	1	1	0
13	D	1	1	0	1
12	C	1	1	0	0
11	B	1	0	1	1
10	A	1	0	1	0
9	9	1	0	0	1

!aa5dd – Set device mode

Description	This command sets the power-up mode and enables/disables error messages								
Syntax	<pre>!aa5dd <CR></pre> ! Delimiter character aa Hexadecimal address of the device 5 System Mode command dd Mode control (00-FF) <table><thead><tr><th>Bit#</th><th>Function</th></tr></thead><tbody><tr><td>1</td><td>Enable Error Messages</td></tr><tr><td>6</td><td>Disable Feedback messages as “!aa2” & “!aaM” Commands if BIT 7 is cleared.</td></tr><tr><td>7</td><td>Enable BR change *Other bits are for future use</td></tr></tbody></table> <CR> Carriage Return - End of command	Bit#	Function	1	Enable Error Messages	6	Disable Feedback messages as “!aa2” & “!aaM” Commands if BIT 7 is cleared.	7	Enable BR change *Other bits are for future use
Bit#	Function								
1	Enable Error Messages								
6	Disable Feedback messages as “!aa2” & “!aaM” Commands if BIT 7 is cleared.								
7	Enable BR change *Other bits are for future use								

Response |dd EE OK<CR> if the command was valid

Example 1 Command: !00582<CR>
 Response: |82 EE OK<CR>

This command will enable changing the baud rate.

Example 2 Command: !00502<CR>
 Response: |02 EE OK<CR>

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



Note

Make sure to cancel '82' mode right after setting the baud rate value by:
!00502<CR>

!aa51dd – Set device mode Register #51 value

Description This command enables/disables the operation of WD2.

Note

- One must set the device mode register #5 ([command !aa5<cr>](#)) value to '82' in order to enable setting of device mode register #51 value.

Syntax !aa51dd <CR>

! Delimiter character
aa Hexadecimal address of the device
51 System mode command
dd Mode register #51

bit	Value (dd)	Function	
		WD2 - Host communication watchdog:	
2	04	1	Enabled
	00	0	Disabled
		WD2 Ending state - Force Power-Up State, 5 second after WD2 was activated	
5	24	1	Enabled
	00	0	Disabled

<CR> Carriage Return - End of command

Response |dd EE OK if the command was valid

Example 1 Command: !005104<CR>
Response: |04 EE OK

This command will activate System Communication Watchdog WD2

Example 2 Command: !005124<CR>
Response: |24 EE OK

This command will activate System Communication Watchdog WD2 for 5 seconds!

NOTE!

- Activating WD2 should be accomplished by polling the device repeatedly in a time period that will not exceed the [WD2 time set](#).
- Exceeding this value will set all relays to WD2 special Relay Pattern, '800000000000':
Relay #48 is activated, all other relays are deactivated.

!aa6dd – Set baud rate

Description For compatibility with existing devices the IA-3152-EP 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
38	38400
57	57600
11	115200 (default)
<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: !00582<CR> to enable BR change
 Command: !00619<CR> defines BR as 19 (19200)
 Response: |19<CR>
 Set the baud rate of the device at address 00Hex to 19200

Must add: Command: !00500<CR> or !00502<CR>
 In order to return to NORMAL State.

!aa7dd – Set module's chain address

Description Each device must have a unique device address (00-FF).
This command defines a module's chain address.

Syntax !aa7dd <CR>
! Delimiter character
aa Hexadecimal address of the device
7 Change device chain address command
dd New Hexadecimal address
<CR> Carriage Return - End of command

Response |dd<CR> if the command was valid

Example Command: !00582<CR> To enable address change
 Command: !00701<CR> Set device address to 01
 Response: |01<CR>
 Change the address of the device at address 00(Hex) to 01(Hex)

Must add: Command: !00500<CR> or !00502<CR>
 In order to return to NORMAL State.



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.

!aaBddd – Set Relays Status at Byte Level

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

Syntax !aaBddd <CR>
! Delimiter character
aa Hexadecimal address of the device
B Change Byte Level command
n #Byte to be set.
 'n' is in the range of 0-5
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 Deactivated.

Data Structure

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
Nibble	High				Low				High				Low				High				Low			
# Byte (n)	5								4								3							

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Nibble	High				Low				High				Low				High				Low			
# Byte (n)	2								1								0							

Examples Table

Command	Response Syntax	Description
!00B001<CR>	0 01<CR>	Activating relay #1
!00B124<CR>	1 24<CR>	Activating relay #11 and #14
!00B388<CR>	3 88<CR>	Activating relay #32 and #28
!00B247<CR>	2 47<CR>	Activating relay #17, #18, #19, #23
!00B1FF<CR>	1 FF<CR>	Activating relay #9 - #16
!00B001<CR>	0 01<CR>	Activating relay #1

HEX / DEC Conversion Table

DEC	HEX	8	4	2	1
15	F	1	1	1	1
14	E	1	1	1	0
13	D	1	1	0	1
12	C	1	1	0	0
11	B	1	0	1	1
10	A	1	0	1	0
9	9	1	0	0	1

!aaEddddddddddd – Define Power-Up state

Description	This command defines relays state at Power-Up operation
Syntax	<pre>!aaEddddddddddd <CR></pre> ! 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 |Eddddddddddd<CR> if the command was valid

Example Command: !00E10001000<CR>
 Response: |E10001000<CR>

This command will define the Emergency state of relays #13 and #29 as “Activated”.



Note

Default state is !00E00000000 (All relays are OFF at Emergency)



Note

Power-Up can be forced by command: [^^E](#)
Or by Watchdog 2

!aaMdddddddddd – Define Memory State

Description	This command defines memory state at ^^M operation event		
Syntax	<pre>!aaMdddddddddd <CR></pre> ! Delimiter character aa Hexadecimal address of the device M System control command d Relay output activation command data for each nibble in hex format <CR> Carriage Return - End of command		
Response	Mdddddddddd<CR> if the command was valid		
Example 1	Command: !00500<CR> (Enable feedback message) Command: !00M80008000<CR> Response: M80000080<CR> This command will set relay #48 and #16 in memory only.		
Example 2	Command: ! 00540<CR> (Disable feedback message) Command: !00M80008000<CR> Response: No feedback message This command will set relay #48 and #16 in memory only.		



Note

Disabling response feedback can improve communication time when many modules are to be updated.

Memory state can be forced by command: [^^M](#)

!aaSdd – Set user defined led

Description This command turns ON or turns OFF the ULD LED (User LED)

Syntax !aaSdd <CR>
! Delimiter character
aa Hexadecimal address of the device
S Set Led status
0d LED status:
 01 On
 00 Off
<CR> Carriage Return - End of command

Response |0d<CR> if the command was valid

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

This command will turn ON the LED



The default LED status is ON.
For ULD deactivation the command should be !00S00<CR>

!aaWDRdddddddddd – Set relay status

Description This command defines module's relay state at WD2 activation event.

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

Response _ABCDEFGHIJKL<CR> if the command was valid
A 1st Output nibble (MSB)
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 (LSB)

Example Command: !00WDR800800000000 <CR>
Response: | 800800000000 <CR>

This command will activate relay #48 and #36 and will deactivate all others.

Data Structure

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
Nibble	1 st				2 nd				3 rd				4 th				5 th				6 th			
	A				B				C				D				E				F			

Value	8	4	2	1	8	4	2	1	8	4	2	1	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	3	2	1	0	3	2	1	0	3	2	1	0
Relay	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Nibble	7 th				8 th				9 th				10 th				11 th				12 th			
	G				H				I				J				K				L			

Examples Table

Command	Response Syntax	Description
!00WDR00000000000001<CR>	00000001<CR>	Activating relay #1
!00WDR80000000000000<CR>	80000000<CR>	Activating relay #48
!00WDR00040000000000<CR>	00040000<CR>	Activating relay #19
!00WDR00000700000000<CR>	00000700<CR>	Activating relay #9, #10, #11
!00WDRA00000000000000<CR>	A0000000<CR>	Activating relay #30, #48
!00WDR000000000C022<CR>	0000C022<CR>	Activating relay #2, #6, #15, #16

HEX / DEC Conversion Table

DEC	HEX	8	4	2	1
15	F	1	1	1	1
14	E	1	1	1	0
13	D	1	1	0	1
12	C	1	1	0	0
11	B	1	0	1	1
10	A	1	0	1	0
9	9	1	0	0	1

!aaWDTdd – Set WD2 Time value.

Description This command Set WD2 Time value

Syntax !aaWDTdd<CR>
! Delimiter character
aa Hexadecimal address of the device
WDT Set WD2 Relays Status
dd 2 Hex characters defines 10 to 256 Seconds.

<CR> Carriage Return - End of command

Response |dd<CR> if the command was valid

Example Command: !00WDT20<CR>
Response: |20<CR>

This command will activate WD2 relays pattern within 32 Seconds.



- The default WD2 time set is “20”. WD2 is NOT Active.
- It is recommended to set each chained device to a different value in order to receive its message.
- Exceeding this value will set all relays to WD2 special Relay Pattern, ‘800000000000’: Relay #16 is activated, all other relays are deactivated.

^^E – Global Force Power-Up state at all modules

Description This command forces all modules of this net into their Power-Up state.
“This net” means all modules that are Daisy-Chained to the same port.

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

Response No feedback message

Example Command: ^^E<CR>
Response: No feedback message



Note

Power-Up state can be defined by command: [!aaE<CR>](#)

^^M – Global Activate Relays per Memory State

Description This is a Global command that forces the pre-defined Memory State on all modules of this net.
“This net” means all modules that are Daisy-Chained to the same port.

Syntax ^^M<CR>
^^ Delimiter character
M 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 feedback message

Command Syntax	Response	Relay status
!00M00000000<CR>	00000001<CR>	00000000
!00M12345678<CR>	M80000080<CR>	00000000
^^M<CR>	None	12345678



Note

Memory state can be defined by command: [!aaM<CR>](#)