I-87026PW
Command Sets

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1. Introduction

1.1. Default Settings

Default settings:

- Module address: 01
- Analog input type: Type 08, -10V to 10V
- Analog output type: Type 33, -10V to 10V
- Baud Rate: 115200 bps
- Checksum disabled
- Engineering unit format
- Filter set at 60Hz rejection

1.2. Calibration

Warning: *It is not recommended that calibration be performed until the process is fully understood.*

1.2.1 Analog Input

The calibration procedure is as follows:

1. Warm up the module for 30 minutes.
2. Set the type code to the type you want to calibrate. Refer to Section 2.19 for details.
3. Enable calibration. Refer to Section 2.45 for details.
4. Apply the zero calibration voltage/current.
5. Send the zero calibration command. Refer to Section 2.7for details.
6. Apply the span calibration voltage/current.
7. Send the span calibration command. Refer to Section 2.6 for details.
8. Repeat steps 3 to 7 three times.

Notes:

1. Connect the calibration voltage/current to channel 0.
2. When calibrating type 0D, the jumper of channel 0 should be set to the current input position.
3. Calibration voltages and currents are shown below.

Calibration voltages/current:

Type Code	08	09	0A	0B	0C	0D
Zero Input	0V	0V	0V	0mV	0mV	0mA
Span Input	+10V	+5V	+1V	+500mV	+150mV	+20mA

1.2.2 Analog Output

The calibration procedure is as follows:

1. Warm up the module for 30 minutes.
2. Set the type code to the type you want to calibrate. Refer to Section 2.23 for details.
3. Enable calibration. Refer to Section 2.45 for details.
4. Set the zero analog output. Refer to Section 2.5 for details.
5. Check the meter and trim the output until zero output. Refer to Section 2.11 for details.
6. Perform the analog output zero calibration command. Refer to Section 2.8 for details.
7. Set the span analog output. Refer to Section 2.5 for details.
8. Check the meter and trim the output until span output. Refer to Section 2.11 for details.
9. Perform the analog output span calibration command. Refer to Section 2.9 for details.

Notes:

1. Connect the calibration voltage/current to special channel you want.
2. When calibrating type 30 and 31, the jumper should be set to the current input position.
3. Calibration voltages and currents are shown below.

Calibration voltages/current:

Type Code	30	31	32	33	34	35
Zero Input	0mA	4mA	0V	0V	0V	0V
Span Input	+20mA	+20mA	+10V	+10V	+5V	+5V

1.3. Configuration Tables

Baud Rate Setting (CC)

Bits 5:0

Code	03	04	05	06	07	08	09	0A
Baud Rate	1200	2400	4800	9600	19200	38400	57600	115200

Bits 7:6

00: no parity, 1 stop bit
01: no parity, 2 stop bits
10: even parity, 1 stop bit
11: odd parity, 1 stop bit

Note: The data bits are fixed at one start bit, eight data bits

Analog Input Type Setting (TT)

Type Code	Analog Input Type	Range
07	+4 to +20mA	4mA ~ 20mA
08	+/-10V	-10V ~ 10V
09	+/-5V	-5V ~ 5V
0A	+/-1V	-1V ~ 1V
0B	+/-500mV	-500mV ~ 500mV
0C	+/-150mV	-150mV ~ 150mV
0D	+/-20mA	-20mA ~ 20mA
1A	0 to +20mA	0 ~ 20mA

Note:
When type 07, 0D or 1A is selected, the jumper of the corresponding channel should be set to the current input position.

Data Format Setting (FF)

7	6	5	4	3	2	1	0
FS	CS	MS	Reserved			DF	

Key	Description
DF	Data format 00: Engineering unit 01: % of FSR (full scale range) 10: 2's complement hexadecimal
MS	Mode settings 0: Normal mode (16 bits) 1: Fast mode (12 bits)
CS	Checksum settings 0: Disabled 1: Enabled
FS	Filter settings 0: 60Hz rejection 1: 50Hz rejection

Note: The reserved bits should be zero.

Analog Input Type and Data Format Table

Type code	Input Type	Data Format	+F.S	-F.S.
07	+4 to +20 mA	Engineering unit	+20.000	+04.000
		% of FSR	+100.00	+000.00
		2's comp HEX	FFFF	0000
08	-10 to +10 V	Engineering unit	+10.000	-10.000
		% of FSR	+100.00	-100.00
		2's comp HEX	7FFF	8000
09	-5 to +5 V	Engineering unit	+5.0000	-5.0000
		% of FSR	+100.00	-100.00
		2's comp HEX	7FFF	8000
0A	-1 to +1 V	Engineering unit	+1.0000	-1.0000
		% of FSR	+100.00	-100.00
		2's comp HEX	7FFF	8000
0B	-500 to +500 mV	Engineering unit	+500.00	-500.00
		% of FSR	+100.00	-100.00
		2's comp HEX	7FFF	8000
0C	-150 to +150 mV	Engineering unit	+150.00	-150.00
		% of FSR	+100.00	-100.00
		2's comp HEX	7FFF	8000
0D	-20 to +20 mA	Engineering unit	+20.000	-20.000
		% of FSR	+100.00	-100.00
		2's comp HEX	7FFF	8000
		2's comp HEX	7FFF	A99A
1A	0 to +20 mA	Engineering unit	+20.000	+00.000
		% of FSR	+100.00	+000.00
		2's comp HEX	FFFF	0000

Analog Output Type and Data Format Table

Type code	Input Type	Data Format	Max.	Min.
30	0 to 20mA	Engineering unit	+20.000	+00.000
31	4 to 20mA	Engineering unit	+20.000	+04.000
32	0 to 10V	Engineering unit	+10.000	+00.000
33	-10 to 10V	Engineering unit	+10.000	-10.000
34	0 to 5V	Engineering unit	+05.000	+00.000
35	-5 to 5V	Engineering unit	+05.000	-05.000

Analog Output Slew Rate Control

0 Immediate change
1 0.0625V/Second or 0.125mA/Second
2 0.125V/Second or 0.25mA/Second
3 0.25V/Second or 0.5mA/Second
4 0.5V/Second or 1.0mA/Second
5 1.0V/Second or 2.0mA/Second
6 2.0V/Second or 4.0mA/Second
7 4.0V/Second or 8.0mA/Second
8 8.0V/Second or 16mA/Second
9 16V/Second or 32mA/Second
A 32V/Second or 64mA/Second
B 64V/Second or 128mA/Second
C 128V/Second or 256mA/Second
D 256V/Second or 512mA/Second
E 512V/Second or 1024mA/Second

2. DCON Protocol

All communication with I-87K I/O modules consists of commands generated by the host and responses transmitted by the I-87K I/O modules. Each module has a unique ID number that is used for addressing purposes and is stored in non-volatile memory. The ID is 01 by default and can be changed using a user command. All commands to the modules contain the ID address, meaning that only the addressed module will respond. The only exception to this is command ~** (Section 2.35), which are sent to all modules, but in these cases, the modules do not reply to the command.

Command Format:

Leading Character	Module Address	Command	[CHKSUM]	CR

Response Format:

Leading Character	Module Address	Data	[CHKSUM]	CR

CHKSUM A 2-character checksum that is present when the checksum setting is enabled. See Section 1.3 and 2.1 for details.

CR End of command character, carriage return (0x0D)

Checksum Calculation:

1. Calculate the ASCII code sum of all the characters in the command/response string except for the carriage return character (CR).
2. The checksum is equal to the sum masked by 0ffh.

Example:

Command string: $012(CR)

1. Sum of the string = “$”+”0”+”1”+”2” = 24h+30h+31h+32h = B7h
2. Therefore the checksum is B7h, and so CHKSUM = “B7”
3. The command string with the checksum = $012B7(CR)

Response string: !01200600(CR)

1. Sum of the string = “!”+”0”+”1”+”2”+”0”+”0”+”6”+”0”+”0” = 21h+30h+31h+32h+30h+30h+36h+30h+30h = 1AAh
2. Therefore the checksum is AAh, and so CHKSUM = “AA”
3. The response string with the checksum = !01200600AA(CR)

Note:

All characters should be in upper case.

2.1. %AANNTTCCFF

Description:

This command is used to set the configuration of a module.

Syntax:

%AANNTTCCFF[CHKSUM](CR)

%	Delimiter character
AA	The address of the module to be configured in hexadecimal format (00 to FF)
NN	The new address of the module in hexadecimal format (00 to FF)
TT	Not used by the I-87026PW, should be set to 00.
CC	The new Baud Rate code, see Section 1.3 for details. To change the Baud Rate, the module should be in INIT* mode.
FF	The command used to set the data format, checksum, and filter settings (Section 1.3). To change the checksum setting, the module should be in INIT* mode.

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter for a valid command
?	Delimiter for an invalid command (If the Baud Rate or checksum settings are changed without in INIT* mode, the module will return an invalid command.)
AA	The address of the module in hexadecimal format (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: %0102000600 Response: !02

Change the address of module 01 to 02. The module returns a valid response.

Command: %0202000602 Response: !02

Set the data format of module 02 to be 2 (2's complement hexadecimal). The module returns a valid response.

Command: %0101000A00 Response: ?01

Change the Baud Rate of module 01 to 115200bps. The module returns an invalid command, because it is not in INIT* mode.

Command: %0101000A00 Response: !01

Change the Baud Rate of module 01 to 115200bps and the module is in INIT* mode. The module returns a valid response.

Related Commands:

Section 2.10 $AA2

Related Topics:

Section 1.3 Configuration Tables

Notes:

Changes to the address, Type Code, Data Format and Filter settings take effect immediately after a valid command is received. Changes to the Baud Rate and checksum settings take effect on the next power on reset.

2.2. #**

Description:

This command allows every analog input module to read data from every input channels when the command is received and will store the data for later retrieval.

Syntax:

#[CHKSUM](CR)**

#	Delimiter character
**	Synchronized sampling command

Response:

There is no response with this command. To access the data, another command, $AA4, must be sent, see Section 2.12 for details.

Examples:

Command: #** No response
Send the synchronized sampling command.
Command: $014 Response:
>011+025.12+020.45+012.78+018.97+003.24+015.35+00
8.07+014.79
Send the command to read the synchronized data. The status byte of the response is 1, which means that is the first time the synchronized data has been read since the previous #** command.
Command: $014 Response:
>010+025.12+020.45+012.78+018.97+003.24+015.35+00
8.07+014.79
Send the command to read the synchronized data. The status byte of response is 0, which means that it is not the first time the synchronized data has been read since the previous #** command.

Related Commands:

Section 2.12 $AA4

2.3. #AA

Description:

This command is used to read the data from every analog input channel.

Syntax:

#AA[CHKSUM](CR)

#	Delimiter character
AA	The address of the module to be read (00 to FF)

Response:

Valid Response: **>(Data)[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

>	Delimiter character for a valid response
?	Delimiter character for an invalid response
(Data)	The data from every analog input channels, see Section 1.3 for the details of data format.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: #01 Response:
>+025.12+020.45+012.78+018.97+003.24+015.35

Reads module 01 and receives the data in engineering format.

Command: #02 Response:
>4C532628E2D683A20F2ADBA1

Reads module 02 and receives the data in hexadecimal format.

Command: #03 Response:
>-9999.9-9999.9-9999.9-9999.9-9999.9-9999.9

Reads module 03 and the data is under range.

Related Commands:

Section 2.1 %AANNTTCCFF, Section 2.10 $AA2

2.4. #AAN

Description:

This command is read the analog input of channel N.

Syntax:

#AAN[CHKSUM](CR)

#	Delimiter character
AA	The address of the module to be read (00 to FF)
N	The channel to be read, zero based.

Response:

Valid Response: **>(Data)[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

>	Delimiter character for a valid response
?	Delimiter character for an invalid response. An invalid command is returned if the specified channel is incorrect.
(Data)	Analog input data of the specified channel, see Section 1.3 for details of the data format.
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: #032 Response: >+025.13

Reads data from channel 2 of module 03 and return a valid response.

Command: #029 Response: ?02

Reads data from channel 9 of module 02 and returns an invalid response because channel 9 is invalid.

Related Commands:

Section 2.1 %AANNTTCCFF, Section 2.10 $AA2

2.5. #AAN(Data)

Description:

This command is used to set analog output of channel N.

Syntax:

#AAN(Data)[CHKSUM](CR)

#	Delimiter character
AA	The address of the module to be set (00 to FF)
N	The channel to be set, zero based.
(Data)	The analog output value, see the Section 1.3 for details.

Response:

>	Delimiter character for a valid response
?	Delimiter character for the (Data) is out of range, and the output will go to the closest value in the setting of module's range
!	Delimiter character for the module's host Watch Dog flag is set, and the output command will be ignored and the output is set to Safe value.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0190300 Response: !01

Reads the configuration of module 01 and returns output type 0 to 20mA and output change immediate.

Command: #01005.000 Response: >

Outputs the module 01 value 5.0mA of the channel 0 and returns a valid response.

Command: #01025.000 Response: ?

Outputs the module 01 value 25.0mA of the channel 0 and returns an invalid response that means the output value is over range.

Related Commands:

Section 2.1 %AANNTTCCFF, Section 2.10 $AA2

2.6. $AA0

Description:

This command is used to perform a analog input span calibration.

Syntax:

$AA0[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be calibrated (00 to FF)
0	The command for the span calibration

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $010 Response: !01

Performs a span calibration on module 01 and returns a valid response.

Command: $020 Response: ?02

Performs a span calibration on module 02 and returns an invalid command because the “enable calibration” command was not sent in advance.

Related Commands:

Section 2.7 $AA1, Section 2.45 ~AAEV

Related Topics:

Section 1.2.1 Calibration

Notes:

The “enable calibration” command, ~AAEV, must be sent before this command is used, see Section 1.2.1 for details.

2.7. $AA1

Description:

This command is used to perform a analog input zero calibration.

Syntax:

$AA1[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be set (00 to FF)
1	The command for the zero calibration

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $011 Response: !01

Performs a zero calibration on module 01 and returns a valid response.

Command: $021 Response: ?02

Performs a zero calibration on module 02 and returns an invalid command because the “enable calibration” command was not sent in advance.

Related Commands:

Section 2.6 $AA0, Section 2.45 ~AAEV

Related Topics:

Section 1.2.1 Calibration

Notes:

The “enable calibration” command, ~AAEV, must be sent before this command is used, see Section 1.2.1 for details.

2.8. $AA0N

Description:

The command is used to perform the analog output offset calibration of channel N.

Syntax:

$AA1[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be calibrated (00 to FF)
0	Command to perform the offset calibration
N	The channel to be set, zero based

Response:

Valid Command: **!AA[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to 1F)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0101 Response: !01

Perform the analog output channel 1 zero calibration of module 01 and returns a valid response.

Related Commands:

Section 2.9 $AA1N, Section 2.11 $AA3NVV

2.9. $AA1N

Description:

This command is used to perform the analog output span calibration of channel N.

Syntax:

$AA1N[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be calibrated (00 to FF)
1	Command to perform the span calibration
N	The channel to be set, zero based

Response:

Valid Command: **!AA[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command:$0112 Response: !01

Perform the analog output channel 2 span calibration of module 01 and returns a valid response.

Related Commands:

Section 2.8 $AA0N, Section 2.11 $AA3NVV

2.10.$AA2

Description:

This command is used to read the module configuration.

Syntax:

$AA2[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
2	Command to read the module configuration

Response:

Valid Response: !AATTCCFF[CHKSUM](CR)

Invalid Response: ?AA[CHKSUM](CR)

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)
TT	Not used, should be 00.
CC	Baud Rate code of the module, see Section 1.3 for details.
FF	Data format, checksum settings and filter settings of the module, see Section 1.3 for details.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $012 Response: !01000A00

Reads the configuration of module 01.

Command: $022 Response: !02000A02

Reads the configuration of module 02.

Related Commands:

Section 2.1 %AANNTTCCFF

Related Topics:

Section 1.3 Configuration Tables

2.11.$AA3NVV

Description:

This command is used to trim calibration of channel N.

Syntax:

$AA3NVV[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
3	Command to read the module configuration
N	The channel to be set, zero based
VV	Two hexadecimal digits to present the trim calibration value. 00 to 5F to increase 0 to 95 counts, and FF to A1 to decrease 1 to 95 counts.

Response:

Valid Response: !AA [CHKSUM](CR)
Invalid Response: ?AA[CHKSUM](CR)

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01301F Response: !01

Trims module 01 output to increase 31 counts and returns a valid response.

Related Commands:

Section 2.8 $AA0N, Section 2.9 $AA1N

2.12.$AA4

Description:

This command is used to read synchronized data that was obtained from the last #** command.

Syntax:

$AA4[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be set (00 to FF)
4	The command for read synchronized

Response:

Valid Command: **!AAS(Data)[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
S	Status of the synchronized data 1: first reading 0: not the first reading
(Data)	Synchronized data. See Section 1.3 for details of data format.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: #** No response

Sends the synchronized sampling command.

Command: $014 Response:
>011+00.000+00.100+01.000+10.000-01.000+05.000

Reads the synchronized data of module 01 and returns the synchronized data and sets the status byte to 1 to indicate that this is the first time the synchronized data has been read.

Related Commands:

Section 2.2 #**

2.13.$AA4N

Description:

This command is used to set the analog output power-on value for channel N.

Syntax:

$AA4N[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be set (00 to FF)
4	The command for setting power-on value, store the current output value as power-on value
N	The channel to be set, zero based

Response:

Valid Command: **!AA[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: #012+00.000 Response: >

Sets channel 2 output 0.0 of module 01 and returns a valid response.

Command: $0142 Response: !01

Sets channel 2 power-on value of module 01and returns a valid response. The power-on value of channel 2 is set to 0.0 immediately.

Related Commands:

Section 2.5 #AAN(Data)

2.14.$AA5

Description:

This command is used to read the reset status.

Syntax:

$AA5[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
5	Command to read the reset status

Response:

Valid Command: **!AAS[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
S	The reset status of the module 0: This is not the first time the command has been sent since the module was powered on, which denotes that there has been no module reset since the last $AA5 command was sent. 1: This is the first time the command has been sent since the module was powered on.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $015 Response: !011

Reads the reset status of module 01. The response show that is the first time the $AA5 command has been sent since the module was powered on.

Command: #015 Response: !010

Reads the reset status of module 01. The response show that there has been no module reset since last $AA5 command was sent.

2.15.$AA5VV

Description:

This command is used to specify the channel(s) to be enabled.

Syntax:

$AA5VVVV[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be set (00 to FF)
5	Command to set the channel(s) to enabled
VV	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 1 it means that the channel is enabled and 0 means that the channel is disabled.

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response. An invalid command is returned if an attempt is made to enable a channel that is not present.
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0153A Response: !01

Enables channels 1, 3, 4, and 5 and disables all other channels of module 01. The module returns a valid response.

Command: $016 Response: !013A

Reads the channel status of module 01 and returns a response of 3A, meaning that channels 1, 3, 4, and 5 are enabled and all other channels are disabled.

Related Commands:

Section 2.16 $AA6

2.16. $AA6

Description:

This command is used to read the enabled/disabled status of each channel.

Syntax:

$AA6[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
6	Command to read the channel status

Response:

Valid Response: **!AAVV[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)
VV	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 1 it means that the channel is enabled and 0 means that the channel is disabled.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0153A Response: !01

Enables channels 1, 3, 4, and 5 and disables all other channels of module 01. The module returns a valid response.

Command: $016 Response: !013A

Reads the channel status of module 01 and returns a response of 3A, meaning that channels 1, 3, 4, and 5 are enabled and all other channels are disabled.

Related Commands:

Section 2.15 $AA5VV

2.17.$AA6N

Description:

This command is used to read the analog output requisition of channel N.

Syntax:

$AA6N[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
6	Command to read the last output command value
N	The channel to be read, zero based

Response:

Valid Command: **!AA(DATA)[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command or invalid type code
AA	The address of the responding module (00 to FF)
(Data)	The last output command value

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: #011+10.000 Response: !01

Sets the channel 1 output +10.000 of module 01 and returns a valid response.

Command: $0161 Response: !01+10.000

Reads the channel 1 the last output value and returns +10.000

Related Commands:

Section 2.5 #AAN(Data), Section 2.20 $AA8N

2.18.$AA7N

Description:

This command is used to read power-on value of channel N.

Syntax:

$AA7N[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
7	Command to read power-on value
N	The channel to be read, zero based

Response:

Valid command: **!AA(Data)[CHKSUM](CR)**

Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for a invalid command
AA	The address of responding module (00 to FF)
(Data)	The last output command value

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0170 Response: !01+10.000

Reads the channel 0 power-on value of module 01, return +10.000

Related Commands:

Section 2.13 $AA4N

2.19.$AA7CiRrr

Description:

This command is used to set the type code of a channel.

Syntax:

$AA7CiRrr[CHKSUM](CR)

$	Delimiter character
AA	Address of the module to be set (00 to FF)
7C	Command to set the channel range code
i	The channel to be set, zero based
Rrr	rr represents the type code of the channel to be set. Refer to the Analog Input Type Setting table in Section 1.3 for details.

Response:

Valid Response: !AA[CHKSUM](CR)
Invalid Response: ?AA[CHKSUM](CR)

!	Delimiter character for a valid response
?	Delimiter character for an invalid response or invalid type code
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $017C0R08 Response: !01

Sets the type code for channel 0 of module 01 to be 08 (-10~+10V) and the module returns a valid response.

Command: $037C1R09 Response: ?03

Sets the type code for channel 1 of module 03 to be 30 and returns an invalid response because the type code is invalid.

Related Commands:

Section 2.21 $AA8Ci

2.20. $AA8N

Description:

This command is used to read the current analog output value of channel N.

Syntax:

$AA8N[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
8	Command to read current output value
N	The channel to be read, zero based

Response:

Valid Command: **!AA(Data)[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for a invalid command
AA	The address of the responding module (00 to FF)
(Data)	The current output value

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0180 Response: !01+01.000

Reads channel 0 current value of module 01, return +01.000

Related Commands:

Section 2.5 #AAN(Data), Section 2.17 $AA6N

2.21.$AA8Ci

Description:

This command is used to read the type code information of a channel.

Syntax:

$AA8Ci[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
8	Command to read the type code of a channel
Ci	Specifies which channel to access for the type code information

Response:

Valid Response: !AACiRrr[CHKSUM](CR)
Invalid Response: ?AA[CHKSUM](CR)

!	Delimiter character for a valid response
?	Delimiter character for an invalid response or invalid channel
AA	Address of the responding module (00 to FF)
Ci	Specifies which input channel to access to retrieve the type code information.
Rrr	Represents the type code of the specified input channel. Refer to the Analog Input Type Setting table in Section 1.3 for details.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $018C0 Response: !01C0R09

Reads the channel 0 input range of module 01 and returns 09 (-5~+5V).

Related Commands:

Section 2.19 $AA7CiRrr

Related Topics:

Section 1.3 Configuration Tables

2.22.$AA9N

Description:

This command is used to read analog output configuration of channel N.

Syntax:

$AA9N[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
9	Command to read analog output configuration
N	The channel to be read, zero based

Response:

Valid Command: **!AATS[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
T	Analog output type. Refer to the Analog Input Type Setting table in Section 1.3 for details.
S	Analog output slew rate. Refer to the Analog Input Type Setting table in Section 1.3 for details.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0190 Response: !01330

Reads the channel 0 analog output configuration of module 01 and returns +/-10V output and change immediate

Related Commands:

Section 2.23 $AA9NTTS

2.23.$AA9NTTS

Description:

This command is used to set analog output configuration of channel N.

Syntax:

$AA9NTTS[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be set (00 to FF)
9	Command for setting analog output configuration
N	The channel to be set, zero based
T	Analog output type. Refer to the Analog Input Type Setting table in Section 1.3 for details.
S	Analog output slew rate. Refer to the Analog Input Type Setting table in Section 1.3 for details.

Response:

Valid Command: **!AA[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $0191331 Response: !01

Sets the channel 1 analog output configuration of module 01 -10 to 10V output range and slew rate 0.625V/Second and returns a valid response.

Related Commands:

Section 2.22 $AA9N

2.24.$AAB

Description:

This command is used to diagnose the analog outputs for wire opening conditions.

Syntax:

$AAB[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be diagnose (00 to FF)
B	Command to diagnose the analog inputs

Response:

Valid command: **!AANN[CHKSUM](CR)**

Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
NN	Represents the diagnostic results of all the analog output channels (00 to FF), where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 1 it denotes that the channel is enabled and it is in wire opening condition. If the bit is 0 it denotes that the channel is disabled or normal.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01B Response: !0101

Diagnoses the analog outputs of module 01 and returns a valid response denoting that the channel 1 is in wire opening condition.

Note:

This command is only applicable to type 30 (0 to 20mA) and type 31 (4 to 20mA).

2.25.$AAC

Description:
This command is used to clear digital input/output latch.

Syntax:
$AAC[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be clear (00 to FF)
C	Command to clear digital input/output latch

Response:
Valid Command: **!AA[CHKSUM](CR)**
Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:
Command: $01C Response: !01

Clears address 01 latched data and returns a valid response.

Related Commands:
Section 2.33 $AALS

2.26.$AAD

Description:

This command is used to read the enabled/disabled counter status of each channel.

Syntax:

$AAD[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
D	Command to read the counter status of the channel

Response:

Valid Command: **!AAnn[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
nn	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 0, it denotes that the channel is disabled, and 1 denotes that the channel is enabled.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01D3A Response: !01

Enables counters of channel 1, 3, 4, and 5 and disables all other channels on module 01. The module returns a valid response.

Command: $01D Response: !013A

Reads the counter status of module 01 and returns a response “3A”, which denotes that counters of channel 1, 3, 4, and 5 are enabled and all other channels are disabled.

Related Commands:

Section 2.27 $AADnn

2.27.$AADnn

Description:

This command is used to specify the counters of channel to be enabled.

Syntax:

$AADnn[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be configured in hexadecimal format (00 to FF)
D	The command to set the counters of channel to enabled
nn	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 0, it denotes that the channel is disabled, and 1 denotes that the channel is enabled.

Response:

Valid Command: **!AA[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command. An invalid command is returned if an attempt is made to enable a channel that is not present.
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01D3A Response: !01

Enables counters of channel 1, 3, 4, and 5 and disables all other channels on module 01. The module returns a valid response.

Command: $01D Response: !013A

Reads the counter status of module 01 and returns a response “3A”, which denotes that channels 1, 3, 4, and 5 are enabled and all other channels are disabled.

Related Commands:

Section 2.26 $AAD

2.28.$AAE

Description:

This command is used to read the rising/falling edges of each channel.

Syntax:

$AAE[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
E	The command to read the edge status of the channel

Response:

Valid Command: **!AAnn[CHKSUM](CR)**

Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
nn	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 0, it denotes that the counter of the channel is rising edge, and 1 denotes that the counter of the channel is falling edge.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01E3A Response: !01

The counters of channel 1, 3, 4, and 5 are falling edge and all other channels are rising edge module 01. The module returns a valid response.

Command: $01E Response: !013A

Reads the counter status of module 01 and returns a response of 3A, which denotes that counters of channel 1, 3, 4, and 5 are falling edge and all other channels are rising edge.

Related Commands:

Section 2.29 $AAEnn

2.29.$AAEnn

Description:
This command is used to specify the counters of channel to be rising/falling edge.

Syntax:
$AAEnn[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be configured in hexadecimal format (00 to FF)
E	The command to set the counters of channel to enabled
nn	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 0, it denotes that the channel is rising edge, and 1 denotes that the channel is falling edge.

Response:

Valid Command:	**!AA[CHKSUM](CR)**
Invalid Command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01E3A Response: !01

The counters of channel 1, 3, 4, and 5 are falling edge and all other channels are rising edge on module 01. The module returns a valid response.

Command: $01E Response: !013A

Reads the counter status of module 01 and returns a response “3A”, which denotes that channels 1, 3, 4, and 5 are falling edge and all other channels are rising edge.

Related Commands:

Section 2.28 $AAE

2.30.$AAF

Description:

This command is used to read the firmware version.

Syntax:

$AAF[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
F	Command to read the firmware version

Response:

Valid Response: **!AA(Data)[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)
(Data)	A string indicating the firmware version of the module

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01F Response: !01A2.0

Reads the firmware version of module 01 and shows that it is version A2.0.

2.31.$AAI

Description:

This command is used to read the INIT status.

Syntax:

$AAI[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
I	Command to read the module INIT status

Response:

Valid command: **!AAS[CHKSUM](CR)**

Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
S	INIT switch status of the module 0: The INIT switch is moved to the INIT position 1: The INIT switch is moved to the Normal position

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01I Response: !010

Reads the INIT status of module 01 and shows that the INIT switch is moved to the INIT position.

2.32.$AAM

Description:

This command is used to read the name of a module.

Syntax:

$AAM[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
M	Command to read the module name

Response:

Valid Response: !AA(Name)[CHKSUM](CR)
Invalid Response: ?AA[CHKSUM](CR)

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)
(Name)	A string showing the name of the module

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01M Response: !0187026P

Reads the module name of module 01 and shows the name “87026P”.

Related Commands:

Section 2.47 ~AAO(Name)

2.33.$AALS

Description:
This command is used to read digital input/output latch.

Syntax:
$AALS[CHKSUM](CR)

$	Delimiter character
AA	The address of the module to be read (00 to FF)
L	Command to read latched digital input
S	0 = select latch low status 1 = select latch high status

Response:

Valid Command: **!(Data)[CHKSUM](CR)**
Invalid Command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(Data)	Status of the latched digital output/input channels (a four digit hexadecimal value followed by 00)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Example:

Command: $01L1 Response: !030100

Reads address 01 latch-high data and shows that digital output channel 0 and 1 and digital input channel 0 are latched high.

2.34.$AAS1

Description:
This command is used to reload the factory default calibration parameters, including the internal calibration parameters.

Syntax:
$AAS1[CHKSUM](CR)

$	Delimiter character
AA	The address of the module where the default parameters are to be reloaded (00 to FF)
S1	Command to reload the factory default calibration parameters

Response:

Valid Command:	**!AA[CHKSUM](CR)**
Invalid Command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $01S1 Response: !01

Sends a command to reload the factory default calibration parameters for module 01 and returns a valid response.

Related Topics:

Section 1.2 Calibration

2.35.~**

Description:
Informs all modules that the host is OK

Syntax:
~[CHKSUM](CR)**

~ Delimiter character

** Host OK command

Response:
No response.

Examples:
Command: ~** No response

Sends a “Host OK” command to all modules.

Related Commands:
Section 2.36 ~AA0, Section 2.37 ~AA1, Section 2.38 ~AA2, Section 2.39 ~AA3ETT, Section 2.40 ~AA4N, Section 2.43 ~AA5PPSS

2.36.~AA0

Description:

This command is used to read the host watchdog status

Syntax:

~AA0[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be read (00 to FF)
0	Command to read the module status

Response:

Valid Response: **!AASS[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)
SS	Two hexadecimal digits that represent the host watchdog status, where: Bit 2: 0 indicates that no host watchdog time out has occurred and 1 indicates that a host watchdog time out has occurred. The host watchdog status is stored in EEPROM and can only be reset using the ~AA1 command. Bit 7: 0 indicates that the host watchdog is disabled and 1 indicates the host watchdog is enabled,

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~010 Response: !0100

Reads the host watchdog status of module 01 and returns 00, meaning that the host watchdog is disabled and no host watchdog time out has occurred.

Command: ~020 Response: !0204

Reads the host watchdog status of module 02 and returns 04, meaning that a host watchdog timeout has occurred.

Related Commands:

Section 2.35 ~**, Section 2.37 ~AA1, Section 2.38 ~AA2, Section 2.39 ~AA3ETT

2.37.~AA1

Description:

This command is used to reset the host watchdog time out status

Syntax:

~AA1[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
1	Command to reset the host watchdog time out status

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~010 Response: !0104

Reads the host watchdog status of module 01 and shows that a host watchdog time out has occurred.

Command: ~011 Response: !01

Resets the host watchdog time out status of module 01 and returns a valid response.

Command: ~010 Response: !0100

Reads the host watchdog status of module 01 and shows that no host watchdog time out has occurred.

Related Commands:

Section 2.35 ~**, Section 2.36 ~AA0, Section 2.38 ~AA2, Section 2.39 ~AA3EVV

2.38.~AA2

Description:

This command is used to read the host watchdog time out value of a module.

Syntax:

~AA2[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be read (00 to FF)
2	Command to read the host watchdog time out value

Response:

Valid Response: **!AAEVV[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)
E	0: the host watchdog is disabled 1: the host watchdog is enabled
VV	Two hexadecimal digits to represent the time out value in tenths of a second, for example, 01 means 0.1 seconds and FF means 25.5 seconds.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~012 Response: !011FF

Reads the host watchdog time out value of module 01 and returns FF, meaning that the host watchdog is enabled and the host watchdog time out value is 25.5 seconds.

Related Commands:

Section 2.35 ~**, Section 2.36 ~AA0, Section 2.37 ~AA1, Section 2.39 ~AA3EVV

2.39.~AA3ETT

Description:

This command is used to enable/disable the host watchdog and set the host watchdog time out value

Syntax:

~AA3EVV[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
3	Command to set the host watchdog
E	0: disable the host watchdog 1: enable the host watchdog
VV	Two hexadecimal digits to represent the time out value in tenths of a second, for example, 01 means 0.1 seconds and FF means 25.5 seconds.

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~013164 Response: !01

Enables the host watchdog of module 01 and sets the time out value to be 10.0 seconds. The module returns a valid response.

Command: ~012 Response: !01164

Reads the host watchdog time out value of module 01 and returns 164, meaning that the host watchdog is enabled and the host watchdog time out value is 10.0 seconds.

Related Commands:

Section 2.35 ~**, Section 2.36 ~AA0, Section 2.37 ~AA1, Section 2.38 ~AA2

2.40.~AA4N

Description:
This command is used to read analog output safe value of channel N

Syntax:
~AA4N[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be read (00 to FF)
4	Command to read the analog output safe value
N	The channel to be read, zero based

Response:

Valid Command:	**!AA(Data)[CHKSUM](CR)**
Invalid Command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(Data)	Analog output value, see Section 1.3 for the data format.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Example:
Command: $0190 Response: !01+06.000
Reads the channel 0 analog output safe value of module 01 and returns +6.000V.

Related Command:
Section 2.42 ~AA5N

2.41.~AA4V

Description:
This command is used to read digital output power-on/save value.

Syntax:
~AA4V[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be read (00 to FF)
4	Command for read Power-on/safe value
V	P = read the power-on value S = read the safe value

Response:

Valid Command:	**!AA(Data)[CHKSUM](CR)**
Invalid Command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
DD	Power-on digital output value or safe digital output value.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address

Example:

Command: ~014S Response: !0100

Reads the safe value of module 01 and returns the safe digital output value is 00.

Command: ~014P Response: !0103

Reads the power-on value of module 01 and returns the power-on value is 03.

Related Command:

Section 2.35 ~**, Section 2.36 ~AA0, Section 2.37 ~AA1, Section 2.38 ~AA2, Section 2.39 ~AA3EVV, Section 2.43 ~AA5V

2.42.~AA5N

Description:
This command is used to set analog output safe value.

Syntax:
~AA5N[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
5	Command to set analog output safe value
N	The channel to be, zero based

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Example:
Command: ~0151 Response: !01
Sets the current channel 1 analog output to be the safe value and returns a valid response.

Related Command:
Section 2.40 ~AA4N, Section 2.5 #AAN(Data)

2.43.~AA5V

Description:
This command is used to set digital output power-on/safe value.

Syntax:
~AA5V[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
5	Command to set power-on/safe value
V	P = set current output as power-on value S = set current output as safe value

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Example:

Command: ~015P Response: !01

Sets the current digital output value to be power-on value and returns a valid response.

Command: ~015S Response: !01

Sets the current digital output value to be safe value and returns a valid response

Related Command:

Section 2.35 ~**, Section 2.36 ~AA0, Section 2.37 ~AA1, Section 2.38 ~AA2, Section 2.39 ~AA3EVV, Section 2.41 ~AA4V

2.44.~AA5PPSS

Description:
This command is used to set the digital output power on value and safe value.

Syntax:
~AA5PPSS[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
PP	Two hexadecimal digits to represent the digital output power on value
SS	Two hexadecimal digits to represent the digital output safe value

Response:
Valid command: **!AA[CHKSUM](CR)**
Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~0150000 Response: !01

Sets the digital output power on value to be 00 and the safe value to be 00 and returns a valid response.

Command: ~014 Response: !010102

Reads the digital output power on value and safe value of module 01 and returns 0102, which denotes that the digital output power on value is 01 and safe value is 02.

Related Commands:

Section 2.41 ~AA4V

Notes:

Both the power on value and safe value have no effect on the digital output that are associated with alarm outputs.

2.45.~AAEV

Description:

This command is used to enable/disable module calibration.

Syntax:

~AAEV[CHKSUM](CR)

~	Delimiter character
AA	Address of the module to be set (00 to FF)
E	Command to enable/disable calibration
V	0: disable calibration 1: enable calibration

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: $010 Response: ?01

Sends the command to perform a span calibration on module 01 and returns an invalid response because the "enable calibration" command was not sent in advance.

Command: ~01E1 Response: !01

Enables calibration on module 01 and returns a valid response.

Command: $010 Response: !01

Sends the command to perform a span calibration on module 01 and returns a valid response.

Related Commands:

Section 2.6 $AA0, Section 2.7 $AA1

Related Topics:

Section 1.2 Calibration

2.46.~AAI

Description:
This command is used to enable modification of the Baud Rate and checksum setting using software only.

Syntax:
~AAI[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
I	Command to set the soft INIT

Response:

Valid Command:	**!AA[CHKSUM](CR)**
Invalid Command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Example:
Command: ~01I Response: !01
Sets the software INIT of module 01 and returns a valid response.

Related Commands:
Section 2.1 %AANNTTCCFF, Section 2.49 ~AATnn

2.47.~AAO(Data)

Description:

This command is used to set the module name

Syntax:

~AAO(Name)[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
O	Command to set the module name
(Name)	New name of the module (max. 6 characters).

Response:

Valid Response: **!AA[CHKSUM](CR)**

Invalid Response: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid response
?	Delimiter character for an invalid response
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~01O87026P Response: !01

Sets the name of module 01 to be “87026P” and returns a valid response.

Command: $01M Response: !0187026P

Reads the name of module 01 and returns “87026P”.

Related Commands:

Section 2.32 $AAM

2.48.~AARD

Description:
This command is used to read the response delay time.

Syntax:
~AARD[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be read (00 to FF)
RD	Command to read the response delay time

Response:

Valid command: **!AATT[CHKSUM](CR)**
Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
TT	Two hexadecimal digits to represent the response time value in milliseconds. The value must be less than or equal to 1E. For example, 01 denotes 1 millisecond and 1A denotes 26 milliseconds.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~01RD10 Response: !01

Sets the response time to 16 milliseconds and returns a valid response..

Command: ~01RD Response: !0110

Reads the response time and returns a value of 16 milliseconds. The response will be sent after 16 milliseconds have elapsed.

Related Commands:

Section 2.49 ~AARDTT

2.49.~AARDTT

Description:
This command is used to set the response delay time.

Syntax:
~AARDTT[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
RD	Command to set the response delay time
TT	Two hexadecimal digits to represent the response time value in milliseconds. The value must be less than or equal to 1E. For example, 01 denotes 1 millisecond and 1A denotes 26 milliseconds.

Response:

Valid command:	**!AA [CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~01RD10 Response: !01

Sets the response time to 16 milliseconds and returns a valid response..

Command: ~01RD Response: !0110

Reads the response time and returns a value of 16 milliseconds. The response will be sent after 16 milliseconds have elapsed.

Related Commands:

Section 2.48 ~AARD

2.50.~AATnn

Description:
This command is used to set the software INIT time.

Syntax:
~AARDTT[CHKSUM](CR)

~	Delimiter character
AA	The address of the module to be set (00 to FF)
T	Command to set the software INIT time
nn	Two hexadecimal digits to represent the response time value in seconds. The value must be less than or equal to 3C. For example, 01 denotes 1 second and 1A denotes 26 seconds.

Response:

Valid command:	**!AA [CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: ~01T10 Response: !01

Sets the software INIT time to 16 seconds and returns a valid response..

Command: $01I Response: !01

Sets the software INIT enable and returns a valid response.

Command: %0101000600 Response: !01

Sets the baud rate to be 9600bps and returns a valid command.

Related Commands:

Section 2.1 %AANNTTCCFF, Section 2.31 $AAI

2.51.@AACECi

Description:
This command is used to reset the counter of a special channel.

Syntax:
@AACECi[CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be set (00 to FF)
CE	Command to reset the counter
Ci	i specifies the channel to be reset, zero based

Response:

Valid command:	**!AA [CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:
Command: @01CEC1 Response: !01
Resets the counter 1 of module 01 to the preset value and returns a valid response.

Related Commands:
Section 2.65 @AARECi

2.52.@AACH

Description:
This command is used to clear the high latch value of all channels.

Syntax:
@AACH [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be clear (00 to FF)
CH	The command to clear the high latches

Response:
Valid command: **!AA[CHKSUM](CR)**
Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RH0 Response: !01+05.000

Reads the high latch value of channel 0 and returns +05.000.

Command: @01CH Response: !01

Clears the high latch value of channel 0 and returns a valid response.

Command: @01RH0 Response: !01+00.000

Reads the high latch value of channel 0 and returns +00.000.

Related Commands:

Section 2.53 @AACHi, Section 2.66 @AARH, Section 2.67 @AARHi

2.53.@AACHi

Description:
This command is used to clear the high latch value of a specific channel.

Syntax:
@AACHi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be clear (00 to FF)
CH	Command to clear the high latch value
i	The channel to be cleared, zero based

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RH1 Response: !01+06.000

Reads the high latch value of channel 1 and returns +06.000.

Command: @01CH1 Response: !01

Clears the high latch value of channel 1 and returns a valid response.

Command: @01RH1 Response: !01+00.000

Reads the high latch value of channel 1 and returns +00.000.

Related Commands:

Section 2.52 @AACH, Section 2.66 @AARH, Section 2.67 @AARHi

2.54.@AACHCi

Description:
This command is used to clear the high alarm status of a specific channel.

Syntax:
@AACHCi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be clear (00 to FF)
CHC	The command to clear the high alarm status
i	The channel to be cleared, zero based

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:
Command: @01CHC0 Response: !01
Clears the high alarm status of channel 0 and returns a valid response.

Related Commands:
Section 2.52 @AACH, Section 2.66 @AARH, Section 2.67 @AARHi

2.55.@AACL

Description:
This command is used to clear the low latch values of all channels.

Syntax:
@AACL [CHKSUM](CR)
@ Delimiter character
AA The address of the module to be clear (00 to FF)
CL Command to clear the low latch values

Response:
Valid command: **!AA[CHKSUM](CR)**
Invalid command: **?AA[CHKSUM](CR)**
! Delimiter character for a valid command
? Delimiter character for an invalid command
AA The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RL0 Response: !01-05.000

Reads the low latch value of channel 0 and returns -05.000.

Command: @01CL Response: !01

Clears the low latch value of channel 0 and returns a valid response.

Command: @01RL0 Response: !01+00.000

Reads the low latch value of channel 0 and returns +00.000.

Related Commands:

Section 2.56 @AACLi, Section 2.69 @AARL, Section 2.70 @AARLi

2.56.@AACLi

Description:
This command is used to clear the low latch value of a specific channel.

Syntax:
@AACLi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be clear (00 to FF)
CL	Command to clear the low latch value
i	The channel to be cleared, zero based

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RL1 Response: !01-06.000

Reads the low latch value of channel 1 and returns -06.000.

Command: @01CL1 Response: !01

Clears the low latch value of channel 1 and returns a valid response.

Command: @01RL1 Response: !01+00.000

Reads the low latch value of channel 1 and returns +00.000.

Related Commands:

Section 2.55 @AACL, Section 2.69 @AARL, Section 2.70 @AARLi

2.57.@AACLCi

Description:
This command is used to clear the low alarm status of a specific channel.

Syntax:
@AACLCi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be clear (00 to FF)
CLC	Command to clear the low alarm status
i	The channel to be cleared, zero based

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:
Command: @01CHC7 Response: !01
Clears the low alarm status of channel 7 and returns an valid response.

Related Commands:
Section 2.55 @AACL, Section 2.69 @AARL, Section 2.70 @AARLi

2.58.@AADI

Description:
This command is used to read the digital input and digital output status.

Syntax:
@AADI [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
DI	Command to read the DI/O status

Response:

Valid command:	**!AAHHLL[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
HH	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 0, it denotes that DO has not output, and 1 denotes that DO has output.
LL	A two-digit hexadecimal value, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 0, it denotes that DI has not input, and 1 denotes that DI has input.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01DI Response: !010102

Reads the DI/O status of module 01 and returns a response indicating that DO on channel 0 has in the output and DI on channel 1 has in the input.

Related Commands:

Section 2.59 @AADHCi, Section 2.60 @AADLCi, Section 2.61 @AAHI(data)CiT, Section 2.62 @AALO(data)CiT

2.59.@AADHCi

Description:
This command is used to disable the high alarm of a specific channel.

Syntax:
@AADHCi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be set (00 to FF)
DH	Command to disable the high alarm
Ci	The channel where the alarm is to be disabled, zero based

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:
Command: @01DHC0 Response: !01
Disables the channel 0 high alarm of module 01 and returns a valid response.

Related Commands:
Section 2.58 @AADI

2.60.@AADLCi

Description:
This command is used to disable the low alarm of a specific channel.

Syntax:
@AADLCi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be set (00 to FF)
DL	Command to disable the low alarm
Ci	The channel where the alarm is to be disabled, zero based

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:
Command: @01DLC5 Response: !01
Disables the low alarm of channel 5 and returns a valid response.

Related Commands:
Section 2.58 @AADI

2.61.@AAHI(Data)CiTOj

Description:
This command is used to set the high alarm of a specific channel.

Syntax:
@AAHI(data)CiTOj [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be set (00 to FF)
HI	Command to set the high alarm
(data)	The high alarm limit, which should be consistent with the data format. Refer to Section 1.3 for the details.
Ci	The channel to be set, zero based
T	The alarm type: M: Momentary alarm L: Latched alarm
Oj	j specifies the digital output port to be used for the alarm ouput

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01HI+09.000C0MO1 Response: !01

Sets the channel 0 high alarm limit is +09.000, the type is momentary and digital output channel 1 is the high alarm output and returns a valid response.

Command: @01RHC0 Response: !01+09.000MO1

Reads the alarm status and returns a response indicating that the channel 0 high alarm limit is +09.000, the type is momentary and digital output channel 1 is the high alarm output.

Related Commands:

Section 2.68 @AARHCi

2.62.@AALO(Data)CiTOj

Description:
This command is used to set the low alarm of a specific channel.

Syntax:
@AALO(data)CiT [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be set (00 to FF)
LO	Command to set the low alarm
(data)	The low alarm limit, which should be consistent with the data format. Refer to Section 1.3 for the details.
Ci	The channel to be set, zero based
T	The alarm type: M: Momentary alarm L: Latched alarm
Oj	j specifies the digital output port to be used for the alarm ouput

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01LO-03.000C1LO0 Response: !01

Sets the channel 1 low alarm limit is -03.000, the type is latched and the channel 0 digital output is the low alarm output and returns a valid response.

Command: @01RLC1 Response: !010-03.000LO0

Reads the alarm status and returns a response indicating that the channel 1 low alarm limit is -03.000, the type is latched and channel 0 digital output is the low alarm output.

Related Commands:

Section 2.71 @AARLCi

2.63.@AADODD

Description:
This command is used to set digital output status

Syntax:
@AADODD[CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be set (00 to FF)
DO	Command to set the digital output ports
DD	A two-digit hexadecimal value, where bit 0 corresponds to DO0, bit 1 corresponds to DO1, etc. When the bit is 1, it denotes that the digital output port is on, and 0 denotes that the digital output port is off.

Response:

Valid command:	**!AA[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01DO01 Response: !01

Sets DO0 to on, DO1 to off and returns a valid response.

Related Commands:

Section 2.58 @AADI

Notes:

1. If the digital output port is already set to be an alarm output port, then the value written to the port is ignored.

2. When a host watchdog timeout occurs, the module will respond with an invalid command for this command and the DO value that was sent is ignored.

2.64.@AARAOj

Description:
This command is used to read current alarm associated with a digital output port

Syntax:
@AARAOj[CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RA	Command to read the currently activated alarms associated with a digital output port.
Oj	j specifies the digital output port

Response:

Valid Command:	**!AAHHLL[CHKSUM](CR)**
Invalid Command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
HH	A two-digital hexadecimal value to represent the currently activated high alarms associated with the digital output port, where bio 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 1, it denotes that there is an activated high alarm associated with the channel. When the bit is 0, it denotes that there are no activated high alarms associated with the channel.
LL	A two-digital hexadecimal value to respresent the currently activated low alarms associated with the digital output port, where bit 0 corresponds to channel 0, bit 1 corresponds to

channel 1, etc. When the bit is 1, it denotes that there is an activated low alarm associated with the channel. When the bit is 0, it denotes that there are no activated low alarms associated with the channel.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RAO1 Response: !011122

Reads the currently activated alarms associated with the DO1 of module 01, The module responds with 1122, which denotes that there is an activated high alarm associated with channels 0 and 4, and an activated low alarm associated with channels 1 and 5.

Related Commands:

Section 2.72 @AAROOj

2.65.@AARECi

Description:
This command is used to read the count of a special channel

Syntax:
@AARECi[CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RE	Command to read the currently activated alarms associated with a digital output port.
Ci	i specifies the channel to be read, zero based

Response:

Valid Command:	**!AA(Data)[CHKSUM](CR)**
Invalid Command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(Data)	The DI count of the specified channel

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01REC0 Response: !0100000008

Reads data from channel 0 of module 01 and returns the count 00000008 of CH0.

Related Commands:

Section 2.51 @AACECi

2.66.@AARH

Description:
This command is used to read the high latch values of all channels.

Syntax:
@AARH [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RH	Command to read the high latch values

Response:

Valid command:	**!AA(data)[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(data)	The high latch values of all channels, see Section 1.3 for defaults of the data format.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RH Response:
!01+08.000+00.000+00.000+00.000+00.000+00.000+00.000+00.000

Reads the high latch values of module 01 and returns the data in engineering format.

Related Commands:

Section 2.52 @AACH, Section 2.53 @AACHi, Section 2.67 @AARHi

2.67.@AARHi

Description:
This command is used to read the high latch value of a specific channel.

Syntax:
@AARHi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RH	Command to read the high latch value
i	The channel to be read, zero based

Response:

Valid command:	**!AA(data)[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(data)	The high latch value of a specific channel, see Section 1.3 for details of the data format.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RH0 Response: !01+08.000

Reads the high latch value of channel 0 and returns the data +08.000 in engineering format.

Related Commands:

Section 2.52 @AACH, Section 2.53 @AACHi, Section 2.66 @AARH

2.68.@AARHCi

Description:
This command is used to read the high alarm status of a specific channel.

Syntax:
@AARHCi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RH	Command to read the high alarm status
Ci	The channel to be read, zero based

Response:

Valid command: **!AA(data)SOj[CHKSUM](CR)**
Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(data)	The high alarm status of a specific channel, see Section 1.3 for details of the data format.
S	The alarm type: 0: Alarm disabled 1: Momentary alarm 2: Latched alarm
Oj	j specifies the digital output port

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RHC0 Response: !01+08.0002O0

Reads the high alarm status of channel 0 and returns a response indicating that the high alarm limit is +08.000, the type is latched and high alarm output is channel 0 digital output.

Related Commands:

Section 2.59 @AADHCi, Section 2.61 @AAHI(data)CiTOj

2.69.@AARL

Description:
This command is used to read the low latch values for all channels.

Syntax:
@AARL [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RL	Command to read the low latch values of all channels

Response:

Valid command:	**!AA(Data)[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(Data)	The low latch values of all channel, see Section 1.3 for details of the data format.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RL Response: !01 -
02.000+00.000+00.000+00.000+00.000+00.000+00.000+
00.000

Reads the low latch values of module 01 and returns the data in engineering format.

Related Commands:

Section 2.55 @AACL, Section 2.56 @AACLi, Section 2.70 @AARLi

2.70.@AARLi

Description:
This command is used to read the low latch value of a specific channel.

Syntax:
@AARLi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RL	Command to read the low latch value
i	The channel to be read, zero based

Response:

Valid command:	**!AA(Data)[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**
!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(Data)	The high latch value of a specific channel, see Section 1.3 for details of the data format.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RL0 Response: !01-02.000

Reads the low latch value of channel 0 and returns the data -02.000 in engineering format.

Related Commands:

Section 2.55 @AACL, Section 2.56 @AACLi, Section 2.69 @AARL

2.71.@AARLCi

Description:
This command is used to read the low alarm status of a specific channel.

Syntax:
@AARLCi [CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RL	Command to read the low alarm status
Ci	The channel to be read, zero based

Response:
Valid command: **!AA(data)SOj[CHKSUM](CR)**
Invalid command: **?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
(data)	The low alarm status of a specific channel, see Section 1.3 for details of the data format.
S	The alarm type: 0: Alarm disabled 1: Momentary alarm 2: Latched alarm
Oj	j specifies the digital output port

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01RLC0 Response: !01-03.0001O1

Reads the low alarm status of channel 0 and returns a response indicating that the high alarm limit is -03.000, the type is momentary and channel 1 digital output is low alarm output.

Related Commands:

Section 2.62 @AALO(data)CiTOj , Section 2.60 @AADLCi

2.72.@AAROOj

Description:
This command is used to read the alarms associated with a digital output port.

Syntax:
@AARAOj[CHKSUM](CR)

@	Delimiter character
AA	The address of the module to be read (00 to FF)
RO	Command to read the alarms associated with a digital output port.
Oj	j specifies the digital output port.

Response:

Valid command:	**!AAHHLL[CHKSUM](CR)**
Invalid command:	**?AA[CHKSUM](CR)**

!	Delimiter character for a valid command
?	Delimiter character for an invalid command
AA	The address of the responding module (00 to FF)
HH	A two-digit hexadecimal value to represent the high alarms associated with the digital output port, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 1, it denotes that the high alarm of the channel is set. When the bit is 0, it denotes that the high alarm of the channel is disabled.
LL	A two-digit hexadecimal value to represent the low alarms associated with the digital output port, where bit 0 corresponds to channel 0, bit 1 corresponds to channel 1, etc. When the bit is 1, it denotes that the low alarm of the channel is set.

When the bit is 0, it denotes that the low alarm of the channel is disabled.

There will be no response if the command syntax is incorrect, there is a communication error, or there is no module with the specified address.

Examples:

Command: @01ROO1 Response: !011122

Reads the alarms associated with the DO1 of module 01. The module responds with 1122 meaning that the high alarms on channels 0 and 4 and the low alarms on channels 1 and 5 are associated with the DO1.

Related Commands:

Section 2.64 @AARAOj