

XADAM Driver Manual

Advantech Adam Series 4000 Data Acquisition Modules Driver



ADAM
Data Acquisition Modules



CPKSoft Engineering Process Monitoring and Industrial Automation Software

Copyright 1990-2008, CPKSoft Engineering. All rights reserved.

Index

1.	Introduction	4
2.	Driver details	5
2.1.	Driver overview.....	5
2.2.	Supported devices.....	5
3.	Command list	6
3.1.	Analog Input Modules Command Set	6
3.1.1.	Set Configuration (4011/4011D/4012/4013/4015/4016/4017/4018/4018M/4019)	6
3.1.2.	Configuration Status (4011/4011D/4012/4013/4015/4016/4017/4018/4018M/4019)	7
3.1.3.	Analog Data In (4011/4011D/4012/4013/4015/4016/4017/4018/4018M/4019)	9
3.1.4.	Read Analog Input from Channel N (4015/4017/4018/4018M/4019).....	10
3.1.5.	Enable/Disable Channels for Multiplexing (4015/4017/4018/4018M/4019).....	10
3.1.6.	Read Enabled/Disabled Channel Status (4015/4017/4018/4018M/4019)....	11
3.1.7.	Span Calibration (4011/4011D/4012/4013/4016/4017/4018/4018M)	12
3.1.8.	Offset Calibration (4011/4011D/4012/4013/4016/4017/4018/4018M)	12
3.1.9.	Synchronized Sampling (4011/4011D/4012/4013/4015/4016/4019)	13
3.1.10.	Read Synchronized Data (4011/4011D/4012/4013/4015/4016/4019)	14
3.1.11.	Read CJC Status (4011/4011D/4018/4018M/4019)	14
3.1.12.	CJC Offset Calibration (4011/4011D/4018/4018M/4019)	15
3.1.13.	Read Digital I/O and Alarm Status (4011/4011D/4012/4014D/4016).....	15
3.1.14.	Set Digital Output Values (4011/4011D/4012/4014D/4016).....	16
3.1.15.	Enable Alarm (4011/4011D/4012/4014D/4016).....	17
3.1.16.	Set High Alarm Value (4011/4011D/4012/4014D/4016)	17
3.1.17.	Set Low Alarm Value (4011/4011D/4012/4014D/4016).....	18
3.1.18.	Disable Alarm (4011/4011D/4012/4014D/4016)	18
3.1.19.	Clear Latched Alarm (4011/4011D/4012/4014D/4016)	19
3.1.20.	Read High Alarm Value (4011/4011D/4012/4014D/4016).....	19
3.1.21.	Read Low Alarm Value (4011/4011D/4012/4014D/4016).....	20
3.1.22.	Read Event Counter (4011/4011D/4012/4014D).....	20
3.1.23.	Clear Event Counter (4011/4011D/4012/4014D)	21
3.2.	Analog Output Modules Command Set.....	21
3.2.1.	Set Configuration (4021)	21
3.2.2.	Analog Data Out (4021)	22
3.2.3.	Start-up Output Current/Voltage Configuration (4021).....	23
3.2.4.	Trim Calibration (4021).....	24
3.2.5.	4 mA Calibration (4021).....	24
3.2.6.	20 mA Calibration (4021).....	25
3.2.7.	Configuration Status (4021).....	25
3.2.8.	Last Value Readback (4021).....	26
3.2.9.	Current Readback (4021).....	27
3.2.10.	Read Reset Status (4021).....	28
3.3.	Digital I/O and Relay Output Modules Command Set	28
3.3.1.	Set Configuration (4050,4051,4052,4053,4055,4060,4068).....	28
3.3.2.	Read Digital Data In as Bytes (4050,4051,4052,4053,4055,4060,4068).....	29
3.3.3.	Read Digital Data In as Bits (4050,4051,4052,4053,4055,4060,4068)	30
3.3.4.	Digital Data Out (4050,4055,4060,4068)	30
3.3.5.	Synchronized Sampling (4050,4051,4052,4053,4055,4060,4068).....	31

3.3.6.	Read Synchronized Data (4050,4051,4052,4053,4055,4060,4068).....	32
3.3.7.	Configuration Status (4050,4051,4052,4053,4055,4060,4068)	32
3.3.8.	Read Reset Status	33
3.4.	Counter/Frequency Modules Command Set.....	33
3.4.1.	Read Counter or Frequency Value (4080/4080D)	33
3.4.2.	Set Maximum Counter Value (4080/4080D).....	34
3.4.3.	Read Maximum Counter Value (4080/4080D).....	35
3.4.4.	Start/Stop Counter (4080/4080D).....	35
3.4.5.	Clear Counter (4080/4080D)	36
4.	Appendices	37
4.1.	Error messages	37
4.2.	Keywords list.....	37

1. Introduction

CPKSoft Engineering assumes no responsibility for any errors that may appear in this document. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

This driver is included with all unlimited licenses of TAS-HMITalk. It is not sold separately. It requires the TAS-HMITalk ActiveX to work, therefore it cannot be used as a stand-alone driver.

If you use this driver in your applications, you need to include the xadam.tlk in the set of files that you distribute. This file must be located in the same folder where the hmitalk.ocx file is registered in order to be found by the activex when the applications are executed.

The source-code for the xadam.tlk driver is available in plain-C language for additional USD 299 if you own a license of TAS-HMITalk 8.04 or higher.

Refer to the following link to visit the xadam driver page at CPKSoft Engineering website: <http://www.cpksoft.com/tabid/55/ProductID/9/PageIndex/1/Default.aspx>.

Visit this link if you want to see a complete list of drivers that are currently available for TAS-HMITak: <http://www.cpksoft.com/Drivers/tabid/55/Default.aspx>.

Also, refer to this link if you are interested in purchasing a license of the most recent version of TAS-HMITalk: <http://www.cpksoft.com/Products/tabid/54/Default.aspx>.

We welcome your comments about this document. You can reach us by e-mail at [contact @ cpksoft.com](mailto:contact@cpksoft.com).

2. Driver details

2.1. Driver overview

The XADAM driver allows you to connect with ADVANTECH ADAM 4000 Series Data Acquisition Modules.

An RS-232/485 converter such as ADAM-4520 or a RS-485 PC-bus board such as PCL-743/745 must be used in the PC side.

When using a PC-bus RS-485 board (old models), it may be necessary to set the property HMITalk1.CommSetRTSWhileTransmitting = True.

<Optional Modules> ADVANTECH ADAM-4510 Repeater Module ADVANTECH ADAM-4520 Isolated RS-232/RS-485 Converter Module

2.2. Supported devices

This driver can communicate with these devices, but is not necessarily limited to this list:

ADVANTECH ADAM 4011 Analog Input Module
ADVANTECH ADAM 4011D Analog Input Module
ADVANTECH ADAM 4012 Analog Input Module
ADVANTECH ADAM 4013 Analog Input Module
ADVANTECH ADAM 4014D Analog Input Module
ADVANTECH ADAM 4015 Analog Input Module
ADVANTECH ADAM 4016 Analog Input/Output Module
ADVANTECH ADAM 4017 8-Channel Analog Input Module
ADVANTECH ADAM 4017+ 8-Channel Analog Input Module
ADVANTECH ADAM 4018 8-Channel Analog Input Module
ADVANTECH ADAM 4018M 8-Channel Analog Input Module
ADVANTECH ADAM 4018+ 8-Channel Analog Input Module
ADVANTECH ADAM 4019 Universal Analog Input Module
ADVANTECH ADAM 4021 Analog Output Module
ADVANTECH ADAM 4050 Digital I/O Module
ADVANTECH ADAM 4051 Digital I/O Module
ADVANTECH ADAM 4052 Digital I/O Module
ADVANTECH ADAM 4053 Digital I/O Module
ADVANTECH ADAM 4055 Digital I/O Module
ADVANTECH ADAM 4060 Relay Output Module
ADVANTECH ADAM 4068 Relay Output Module
ADVANTECH ADAM 4080 Counter/Frequency Input Module
ADVANTECH ADAM 4080D Counter/Frequency Input Module

3. Command list

3.1. Analog Input Modules Command Set

3.1.1. Set Configuration (4011/4011D/4012/4013/4015/4016/4017/4018/4018M/4019)

Description of this command:

Sets the address, input range, baud rate, data format, checksum status and/or integration time for a specified analog input module.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

6

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

20

Values that are sent:

Value in PointValue (0) = Defines the baud rate to be used (3-8).

- 3 = 1200 Bauds
- 4 = 2400 Bauds
- 5 = 4800 Bauds
- 6 = 9600 Bauds
- 7 = 19200 Bauds
- 8 = 38400 Bauds

Value in PointValue (1) = Defines the new address (0-255).

Value in PointValue (2) = Defines the integration time type, where:

- 0 = 50 ms Integration Time.
- 1 = 60 ms Integration Time.

Value in PointValue (3) = Defines if messages must include checksum

- 0 = No checksum in messages
- 1 = Use checksum in messages

Value in PointValue (4) = Defines the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR
- 2 = 2's complement
- 3 = Ohms.

Value in PointValue (5) = Defines the type input range code.

- 0 = +/- 15 mV
- 1 = +/- 50 mV
- 2 = +/- 100 mV
- 3 = +/- 500 mV
- 4 = +/- 1 V
- 5 = +/- 2.5 V
- 6 = +/- 20 mA
- 8 = +/- 10 V
- 9 = +/- 5 V
- 10 = +/- 1 V
- 11 = +/- 500 mV
- 12 = +/- 150 mV
- 13 = +/- 20 mA
- 14 = Type J Thermocouple 0 to 760 C degrees
- 15 = Type K Thermocouple 0 to 1370 C degrees
- 16 = Type T Thermocouple -100 to 400 C degrees
- 17 = Type E Thermocouple 0 to 1370 C degrees
- 18 = Type R Thermocouple 500 to 1750 C degrees
- 19 = Type S Thermocouple 500 to 1750 C degrees
- 20 = Type B Thermocouple 500 to 1800 C degrees
- 32 = Platinum -100 to 100 C degrees, alfa=0.00385
- 33 = Platinum 0 to 100 C degrees, alfa=0.00385
- 34 = Platinum 0 to 200 C degrees, alfa=0.00385
- 35 = Platinum 0 to 600 C degrees, alfa=0.00385
- 36 = Platinum -100 to 100 C degrees, alfa=0.003916
- 37 = Platinum 0 to 100 C degrees, alfa=0.003916
- 38 = Platinum 0 to 200 C degrees, alfa=0.003916
- 39 = Platinum 0 to 600 C degrees, alfa=0.003916
- 40 = Nickel -80 to 100 C degrees
- 41 = Nickel 0 to 100 C degrees
- 42 = Cooper (10 ohms @ 25 C degrees) 0 to 120 C degrees.
- 43 = Cooper (10 ohms @ 0 C degrees) 0 to 120 C degrees.

Important note:

An analog input module requires a maximum of seven seconds to perform auto calibration and ranging after it is reconfigured. During this time span, the module cannot be addressed to perform any other actions.

3.1.2. Configuration Status (4011/4011D/4012/4013/4015/4016/4017/4018/4018M/4019)

Description of this command:

Returns the configuration parameters for the specified analog input module (address, input range, baud rate, data format, checksum status and integration time).

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1-5

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

1

Values that are returned:

Value in PointValue (0) = Indicates the input range type, where:

- 0 = +/- 15 mV
- 1 = +/- 50 mV
- 2 = +/- 100 mV
- 3 = +/- 500 mV
- 4 = +/- 1 V
- 5 = +/- 2.5 V
- 6 = +/- 20 mA
- 8 = +/- 10 V
- 9 = +/- 5 V
- 10 = +/- 1 V
- 11 = +/- 500 mV
- 12 = +/- 150 mV
- 13 = +/- 20 mA
- 14 = Type J Thermocouple 0 to 760 C degrees
- 15 = Type K Thermocouple 0 to 1370 C degrees
- 16 = Type T Thermocouple -100 to 400 C degrees
- 17 = Type E Thermocouple 0 to 1370 C degrees
- 18 = Type R Thermocouple 500 to 1750 C degrees
- 19 = Type S Thermocouple 500 to 1750 C degrees
- 20 = Type B Thermocouple 500 to 1800 C degrees
- 32 = Platinum -100 to 100 C degrees, alfa=0.00385
- 33 = Platinum 0 to 100 C degrees, alfa=0.00385
- 34 = Platinum 0 to 200 C degrees, alfa=0.00385
- 35 = Platinum 0 to 600 C degrees, alfa=0.00385
- 36 = Platinum -100 to 100 C degrees, alfa=0.003916
- 37 = Platinum 0 to 100 C degrees, alfa=0.003916
- 38 = Platinum 0 to 200 C degrees, alfa=0.003916
- 39 = Platinum 0 to 600 C degrees, alfa=0.003916
- 40 = Nickel -80 to 100 C degrees
- 41 = Nickel 0 to 100 C degrees

- 42 = Cooper (10 ohms @ 25 C degrees) 0 to 120 C degrees.
- 43 = Cooper (10 ohms @ 0 C degrees) 0 to 120 C degrees.

Value in PointValue (1) = Indicates the baud rate code, where:

- 3 = 1200 Bauds
- 4 = 2400 Bauds
- 5 = 4800 Bauds
- 6 = 9600 Bauds
- 7 = 19200 Bauds
- 8 = 38400 Bauds

Value in PointValue (2) = Indicates the configured data format, where:

- 0 = Engineering Units.
- 1 = % of FSR.
- 2 = 2's complement.
- 3 = Ohms.

Value in PointValue (3) = Indicates if the module uses checksum in messages

- 0 = No checksum in messages
- 1 = Use checksum in messages

Value in PointValue (4) = Indicates the integration time type, where:

- 0 = Integration Time 50 ms
- 1 = Integration Time 60 ms

3.1.3. Analog Data In (4011/4011D/4012/4013/4015/4016/4017/4018/4018M/4019)

Description of this command:

Returns the input value from a specified analog input module in the currently configured data format.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

0

Meaning of the DriverP3 parameter:

Indicates the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR

- 2 = 2's complement
- 3 = Ohms.

Values that are returned:

Value in PointValue (0) = Input value

**3.1.4. Read Analog Input from Channel N
(4015/4017/4018/4018M/4019)****Description of this command:**

Returns the input value from channel number N of the specified analog input module in the currently configured data format.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

17

Meaning of the DriverP3 parameter:

Indicates the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR
- 2 = 2's complement
- 3 = Ohms.

Meaning of the DriverP4 parameter:

Identifies the channel you want to read (0-7).

Values that are returned:

Value in PointValue (0) = Input value from channel N

**3.1.5. Enable/Disable Channels for Multiplexing
(4015/4017/4018/4018M/4019)****Description of this command:**

Enables/disables multiplexing simultaneously for separate channels of the specified input module.

Type of data handled by this command:

Digital Output

Number of points accepted by this command:

8

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

39

Values that are sent:

Value in PointValue (0) = 0/1 to enable/disable first channel . .

Value in PointValue (n-1) = 0/1 to enable/disable last channel

Important note:

- 0 = Disabled
- 1 = Enabled

3.1.6. Read Enabled/Disabled Channel Status (4015/4017/4018/4018M/4019)

Description of this command:

Asks the specified input module to return the status of its channels (enabled or disabled).

Type of data handled by this command:

Digital Input

Number of points accepted by this command:

1-8

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

18

Meaning of the DriverP3 parameter:

Indicates the first channel to be read (0-7).

Values that are returned:

Value in PointValue (0) = Status of first channel read . .

Value in PointValue (n-1) = Status of last channel read

**3.1.7. Span Calibration
(4011/4011D/4012/4013/4016/4017/4018/4018M)****Description of this command:**

Calibrates the analog input module to correct for gain errors.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages

- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

21

Values that are sent:

Value in PointValue (0) = New gain value

Important note:

An analog input module requires a maximum of seven seconds to perform auto calibration and ranging after it is reconfigured. During this time span, the module cannot be addressed to perform any other actions.

**3.1.8. Offset Calibration
(4011/4011D/4012/4013/4016/4017/4018/4018M)****Description of this command:**

Calibrates the analog input module to correct for offset errors.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

22

Values that are sent:

Value in PointValue (0) = New offset value

Important note:

An analog input module requires a maximum of seven seconds to perform auto calibration and ranging after it is reconfigured. During this time span, the module cannot be addressed to perform any other actions.

3.1.9. Synchronized Sampling (4011/4011D/4012/4013/4015/4016/4019)

Description of this command:

Orders all analog input modules to sample their input values and store them in special registers.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

40

Values that are sent:

Value in PointValue (0) = Not used

3.1.10. Read Synchronized Data (4011/4011D/4012/4013/4015/4016/4019)

Description of this command:

Returns the value that was stored in the specified module's register after the #** command.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1-2

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

3

Meaning of the DriverP3 parameter:

Indicates the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR
- 2 = 2's complement
- 3 = Ohms.

Values that are returned:

Value in PointValue (0) = Read value stored in a special register.

Value in PointValue (1) = Status.

Important note:

If Status = 1, then the data has been sent for the first time since a Synchronized Sampling command was issued. If status = 0, then the data has been sent at least once before.

3.1.11. Read CJC Status (4011/4011D/4018/4018M/4019)

Description of this command:

Returns the value of the CJC (cold junction compensation) for a specified analog input module.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

2

Values that are returned:

Value in PointValue (0) = Value of the CJC

3.1.12. CJC Offset Calibration (4011/4011D/4018/4018M/4019)**Description of this command:**

Calibrates to adjust for offset errors of its CJC sensors. The variable value indicates the "count" value. Each count equals approximately 0.009 C degrees.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

23

3.1.13. Read Digital I/O and Alarm Status (4011/4011D/4012/4014D/4016)**Description of this command:**

Returns the current state of digital I/O and alarm status.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1-4

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

4

Values that are returned:

- Value in PointValue (0) = Digital input.
- Value in PointValue (1) = Digital Output 0.
- Value in PointValue (2) = Digital Output 1.
- Value in PointValue (3) = Alarm state:
 - 0 = Disabled.
 - 1 = Momentary mode enabled.
 - 2 = Latch mode enabled.

3.1.14. Set Digital Output Values (4011/4011D/4012/4014D/4016)**Description of this command:**

Sets the values of the module's digital outputs (ON or OFF).

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

2 (or 4 for 4016)

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

24

Values that are sent:

- Value in PointValue (0) = New status of digital output 0 . .
- Value in PointValue (n-1) = New status of last digital output

3.1.15. Enable Alarm (4011/4011D/4012/4014D/4016)

Description of this command:

Enables the alarm in either latching or momentary mode.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

25

Meaning of the DriverP3 parameter:

Indicates the mode to enable.

- 0 = Momentary mode
- 1 = Latching mode

Values that are sent:

Value in PointValue (0) = Not used

3.1.16. Set High Alarm Value (4011/4011D/4012/4014D/4016)

Description of this command:

Sets the high alarm limit value.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

26

Values that are sent:

Value in PointValue (0) = New high alarm limit value

3.1.17. Set Low Alarm Value (4011/4011D/4012/4014D/4016)**Description of this command:**

Sets the low alarm limit value.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

27

Values that are sent:

Value in PointValue (0) = New low alarm limit value

3.1.18. Disable Alarm (4011/4011D/4012/4014D/4016)**Description of this command:**

Disables all alarm functions.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

28

Values that are sent:

Value in PointValue (0) = Not used

3.1.19. Clear Latched Alarm (4011/4011D/4012/4014D/4016)**Description of this command:**

Resets the module's latch alarm to zero. Both alarm states are set to OFF, no alarm.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

29

Values that are sent:

Value in PointValue (0) = Not used

3.1.20. Read High Alarm Value (4011/4011D/4012/4014D/4016)**Description of this command:**

Obtains the current high alarm limit value.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

5

Values that are returned:

Value in PointValue (0) = High alarm limit value.

3.1.21. Read Low Alarm Value (4011/4011D/4012/4014D/4016)**Description of this command:**

Obtains the current low alarm limit value.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

6

Values that are returned:

Value in PointValue (0) = Low alarm limit value.

3.1.22. Read Event Counter (4011/4011D/4012/4014D)**Description of this command:**

Obtains the current event counter value.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

7

Values that are returned:

Value in PointValue (0) = Event counter value.

3.1.23. Clear Event Counter (4011/4011D/4012/4014D)**Description of this command:**

Resets the module's event counter to zero.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

30

Values that are sent:

Value in PointValue (0) = Not used

[Analog Output Modules Command Set]

3.2. Analog Output Modules Command Set

3.2.1. Set Configuration (4021)**Description of this command:**

Sets address, output range, baud rate, data format, checksum status and slew rate.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

5

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

31

Values that are sent:

Value in PointValue (0) = Defines the baud rate to be used (0-4).

- 3 = 1200 Bauds
- 4 = 2400 Bauds
- 5 = 4800 Bauds
- 6 = 9600 Bauds
- 7 = 19200 Bauds
- 8 = 38400 Bauds

Value in PointValue (1) = Defines the new address (0-255).

Value in PointValue (2) = Defines the output range type, where:

- 0 = 0 .. 20 mA
- 1 = 4 .. 20 mA
- 2 = 0 .. 10 mV

Value in PointValue (3) = Defines if messages must include checksum

- 0 = No checksum in messages
- 1 = Use checksum in messages

Value in PointValue (4) = Defines the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR
- 2 = 2's complement

Value in PointValue (5) = Defines the slew rate type.

- 0 = immediate change
- 1 = 0.0625 V/sec 0.125 mA/sec
- 2 = 0.125 V/sec 0.250 mA/sec
- 3 = 0.250 V/sec 0.500 mA/sec
- 4 = 0.500 V/sec 1 mA/sec
- 5 = 1 V/sec 2 mA/sec
- 6 = 2 V/sec 4 mA/sec
- 7 = 4 V/sec 8 mA/sec
- 8 = 8 V/sec 16 mA/sec
- 9 = 16 V/sec 32 mA/sec
- 10 = 32 V/sec 64 mA/sec
- 11 = 64 V/sec 128 mA/sec

3.2.2. Analog Data Out (4021)**Description of this command:**

Sets the analog output value.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

32

Meaning of the DriverP3 parameter:

Indicates the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR
- 2 = 2's complement

Values that are sent:

Value in PointValue (0) = New analog output value

3.2.3. Start-up Output Current/Voltage Configuration (4021)

Description of this command:

Stores the present value of an analog output in the module's non-volatile register. The output value will take effect upon start-up or after a brownout.

Type of data handled by this command:

Analog Output / Digitalput/DO

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

36

Values that are sent:

Value in PointValue (0) = Not used

3.2.4. Trim Calibration (4021)**Description of this command:**

Trims the analog output a specified number of units up or down. The variable value indicates the "count" value. Each count equals approximately 1.5 uA.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

35

Values that are sent:

Value in PointValue (0) = Number of units

3.2.5. 4 mA Calibration (4021)**Description of this command:**

Store the current output value as 4 mA reference.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

33

Values that are sent:

Value in PointValue (0) = Not used

3.2.6. 20 mA Calibration (4021)**Description of this command:**

Store the current output value as 20 mA reference.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

34

Values that are sent:

Value in PointValue (0) = Not used

3.2.7. Configuration Status (4021)**Description of this command:**

Reads the following parameters: address, output range, baud rate, data format, checksum status, and slew rate.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1-5

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages

- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

8

Values that are returned:

Value in PointValue (0) = Indicates the output range type, where:

- 0 = 0 .. 20 mA
- 1 = 4 .. 20 mA
- 2 = 0 .. 10 mV

Value in PointValue (1) = Indicates the baud rate code, where:

- 3 = 1200 Bauds
- 4 = 2400 Bauds
- 5 = 4800 Bauds
- 6 = 9600 Bauds
- 7 = 19200 Bauds
- 8 = 38400 Bauds

Value in PointValue (2) = Indicates the configured data format, where:

- 0 = Engineering Units.
- 1 = % of FSR.
- 2 = 2's complement.

Value in PointValue (3) = Indicates if the module Use checksum in messages

- 0 = No checksum in messages
- 1 = Use checksum in messages

Value in PointValue (4) = Indicates the slew rate type, where:

- 0 = immediate change
- 1 = 0.0625 V/sec 0.125 mA/sec
- 2 = 0.125 V/sec 0.250 mA/sec
- 3 = 0.250 V/sec 0.500 mA/sec
- 4 = 0.500 V/sec 1 mA/sec
- 5 = 1 V/sec 2 mA/sec
- 6 = 2 V/sec 4 mA/sec
- 7 = 4 V/sec 8 mA/sec
- 8 = 8 V/sec 16 mA/sec
- 9 = 16 V/sec 32 mA/sec -10 = 32 V/sec 64 mA/sec -11 = 64 V/sec 128 mA/sec

3.2.8. Last Value Readback (4021)

Description of this command:

Return the latest output value it received from an analog data out command. If the module hasn't received an analog data out command since startup, it will return its startup output value.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

9

Meaning of the DriverP3 parameter:

Indicates the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR
- 2 = 2's complement

Values that are returned:

Value in PointValue (0) = Latest output value

3.2.9. Current Readback (4021)**Description of this command:**

Return the measured data in the module's configured data format. The value returned may be a rough estimate of the real value.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

10

Meaning of the DriverP3 parameter:

Indicates the data format to be used.

- 0 = Engineering Units
- 1 = % of FSR
- 2 = 2's complement

Values that are returned:

Value in PointValue (0) = Measured data

3.2.10. Read Reset Status (4021)**Description of this command:**

Obtains the current reset status.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

11

Values that are returned:

Value in PointValue (0) = Reset status

[Digital I/O and Relay Output Modules Command Set]

3.3. Digital I/O and Relay Output Modules Command Set

3.3.1. Set Configuration (4050,4051,4052,4053,4055,4060,4068)**Description of this command:**

Sets address, baud rate and checksum status.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

3

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

37

Values that are sent:

Value in PointValue (0) = Defines the baud rate to be used (0-4).

- 3 = 1200 Bauds
- 4 = 2400 Bauds
- 5 = 4800 Bauds
- 6 = 9600 Bauds
- 7 = 19200 Bauds
- 8 = 38400 Bauds

Value in PointValue (1) = Defines the new address (0-255).

Value in PointValue (2) = Defines if messages must include checksum

- 0 = No checksum in messages
- 1 = Use checksum in messages

3.3.2. Read Digital Data In as Bytes (4050,4051,4052,4053,4055,4060,4068)

Description of this command:

Returns the status of its digital input channels and a readback value of its digital output channels.

Type of data handled by this command:

Analog Input

Number of points accepted by this command:

1-2

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

14

Values that are returned:

Value in PointValue (0) = Indicates the outputs value in byte mode.

Value in PointValue (1) = Indicates the inputs value in byte mode.

3.3.3. Read Digital Data In as Bits (4050,4051,4052,4053,4055,4060,4068)

Description of this command:

Returns the status of its digital input channels and a readback value of its digital output channels.

Type of data handled by this command:

Digital Input

Number of points accepted by this command:

1-16

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

16

Meaning of the DriverP3 parameter:

Indicates the first group to be read.

- 0 = Outputs
- 1 = Inputs

Meaning of the DriverP4 parameter:

Indicates the first bit to be read (0-7).

Values that are returned:

Value in PointValue (0) = First bit read . .
Value in PointValue (n-1) = Last bit read

3.3.4. Digital Data Out (4050,4055,4060,4068)

Description of this command:

Sets a single digital output channel or all digital output channels simultaneously.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

38

Meaning of the DriverP3 parameter:

Indicates write type.

- 0 = Write all channels simultaneously.
- 1 = Write single channel.

Meaning of the DriverP4 parameter:

If HMITalk1.DriverP3 = 1, indicates the output number to be written (0-7).

Values that are sent:

Value in PointValue (0) = New digital output status

3.3.5. Synchronized Sampling (4050,4051,4052,4053,4055,4060,4068)**Description of this command:**

Orders all analog input modules to sample their input values and store the values in special registers.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

40

Values that are sent:

Value in PointValue (0) = Not used

3.3.6. Read Synchronized Data (4050,4051,4052,4053,4055,4060,4068)

Description of this command:

Obtains the value that was stored in its register by a synchronized sampling command.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

13

Values that are returned:

Value in PointValue (0) = Indicates the outputs value in byte mode.

Value in PointValue (1) = Indicates the inputs value in byte mode.

Value in PointValue (2) = Indicates the status value.

3.3.7. Configuration Status (4050,4051,4052,4053,4055,4060,4068)

Description of this command:

Reads the following parameters: baud rate and checksum status.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1-2

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

12

Values that are returned:

Value in PointValue (0) = Indicates the baud rate code, where:

- 3 = 1200 Bauds
- 4 = 2400 Bauds
- 5 = 4800 Bauds
- 6 = 9600 Bauds
- 7 = 19200 Bauds
- 8 = 38400 Bauds

Value in PointValue (1) = Indicates the configured data format, where:

- 0 = ADAM 4050 module.
- 1 = ADAM 4060 module.

Value in PointValue (2) = Indicates if the module Use checksum in messages

- 0 = No checksum in messages
- 1 = Use checksum in messages

3.3.8. Read Reset Status

Description of this command:

Obtains the current reset status information.

Type of data handled by this command:

Analog Input / Digital Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

15

Values that are returned:

Value in PointValue (0) = Reset status

[Counter/Frequency Modules Command Set]

3.4. Counter/Frequency Modules Command Set

3.4.1. Read Counter or Frequency Value (4080/4080D)

Description of this command:

Returns the value of counter 0 or counter 1 from a specified counter/frequency module.

Type of data handled by this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

19

Meaning of the DriverP3 parameter:

Counter to be read (0 or 1)

Values that are returned:

Value in PointValue (0) = Counter value

3.4.2. Set Maximum Counter Value (4080/4080D)

Description of this command:

Sets the maximum value of counter 0 or counter 1 from a specified counter/frequency module.

Type of data handled by this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages
- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

41

Meaning of the DriverP3 parameter:

Counter to be set (0 or 1)

Values that are sent:

Value in PointValue (0) = New maximum counter value

3.4.3. Read Maximum Counter Value (4080/4080D)**Description of this command:**

Returns the maximum value of counter 0 or counter 1 from a specified counter/frequency module.

Type of data handled by this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages

- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

20

Meaning of the DriverP3 parameter:

Counter to be read (0 or 1)

Values that are returned:

Value in PointValue (0) = Maximum counter value

3.4.4. Start/Stop Counter (4080/4080D)**Description of this command:**

Orders the specified counter counter/frequency module to start or stop counting.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages

- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

42

Meaning of the DriverP3 parameter:

Counter to be started/stopped (0 or 1)

Values that are sent:

Value in PointValue (0) = 0 to Stop, 1 to Start.

3.4.5. Clear Counter (4080/4080D)

Description of this command:

Clears counter 0 or counter 1 of the specified counter module.

Type of data handled by this command:

Analog Output / Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Module Address (0-255).

Meaning of the DriverP1 parameter:

Indicates if messages must include checksum

- 0 = Use checksum in messages

- 1 = No checksum in messages

Meaning of the DriverP2 parameter:

43

Meaning of the DriverP3 parameter:

Counter to be cleared (0 or 1)

Values that are sent:

Value in PointValue (0) = Not used.

4. Appendices

4.1. Error messages

The following list shows all the possible error messages that can be returned by the protocol driver during a failed communication in the 'DriverStatus' property.

This list does not include some error messages that can be returned by the activex component while attempting to establish a connection.

- [1005] DRIVER (Internal): Invalid driver stage
- [1300] PROTOCOL (Timeout): No answer
- [1410] PROTOCOL (Format): Invalid device id in response
- [1433] PROTOCOL (Format): Validation error in device response
- [2106] CONFIG (NumValues): Invalid number of channels (max=4)
- [2107] CONFIG (NumValues): Invalid number of channels (min=2)
- [2109] CONFIG (NumValues): Invalid number of channels (must be 3)
- [2111] CONFIG (NumValues): Invalid number of channels (must be 6)
- [2112] CONFIG (NumValues): Invalid number of channels (must be 8)
- [2147] CONFIG (NumValues): Only one value can be read or written
- [2189] CONFIG (NumValues): Too many values (max=16)
- [2194] CONFIG (NumValues): Too many values (max=2)
- [2206] CONFIG (NumValues): Too many values (max=3)
- [2216] CONFIG (NumValues): Too many values (max=4)
- [2223] CONFIG (NumValues): Too many values (max=5)
- [2235] CONFIG (NumValues): Too many values (max=8)
- [3014] CONFIG (P0): Invalid device address (0-255)
- [3023] CONFIG (P0): Invalid device address (-1-255)
- [4030] CONFIG (P2): Invalid command
- [4528] CONFIG (P3): Invalid counter number (0 or 1)
- [4530] CONFIG (P3): Invalid data format
- [4539] CONFIG (P3): Invalid first channel number (0-7)
- [4540] CONFIG (P3): Invalid first group (0-1)
- [4543] CONFIG (P3): Invalid mode
- [4584] CONFIG (P3): Invalid write mode
- [5004] CONFIG (P4): Invalid channel number (0-7)
- [5011] CONFIG (P4): Invalid first channel (0-7)
- [5012] CONFIG (P4): Invalid first output
- [8060] CONFIG (Remote): Command is invalid or not supported
- [8248] CONFIG (Remote): Operation is not supported

4.2. Keywords list

The following list shows a set of words directly related to this driver.

"4000, 4011, 4011D, 4012, 4013, 4014D, 4015, 4016, 4017, 4017+, 4018, 4018+, 4018M, 4019, 4021, 4050, 4051, 4052, 4053, 4055, 4060, 4068, 4080, 4080D, 8Channel, Acquisition, ADAM, ADVANTECH, Analog, Counter, Data, Frequency, Modules, Relay, Series, Universal".