ADAM 4000 Driver Configuration Manual

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1. ADAM 4000 Configuration

1.1 ADAM 4000

The ADAM-4000 Distributed I/O Systems from Advantech are supported by the ADAM4K **Device Type** driver in WebAccess. There are other manufacturers, which use "ADAM 4000" protocol compatible devices that are also supported by this driver.

The ADAM4K Device driver reads the IO Modules of the ADAM-4000 directly.

The modules contain a RS-485 port. It only has the data+ and data- connectors. If you want to connect it to an RS-232 port on your computer

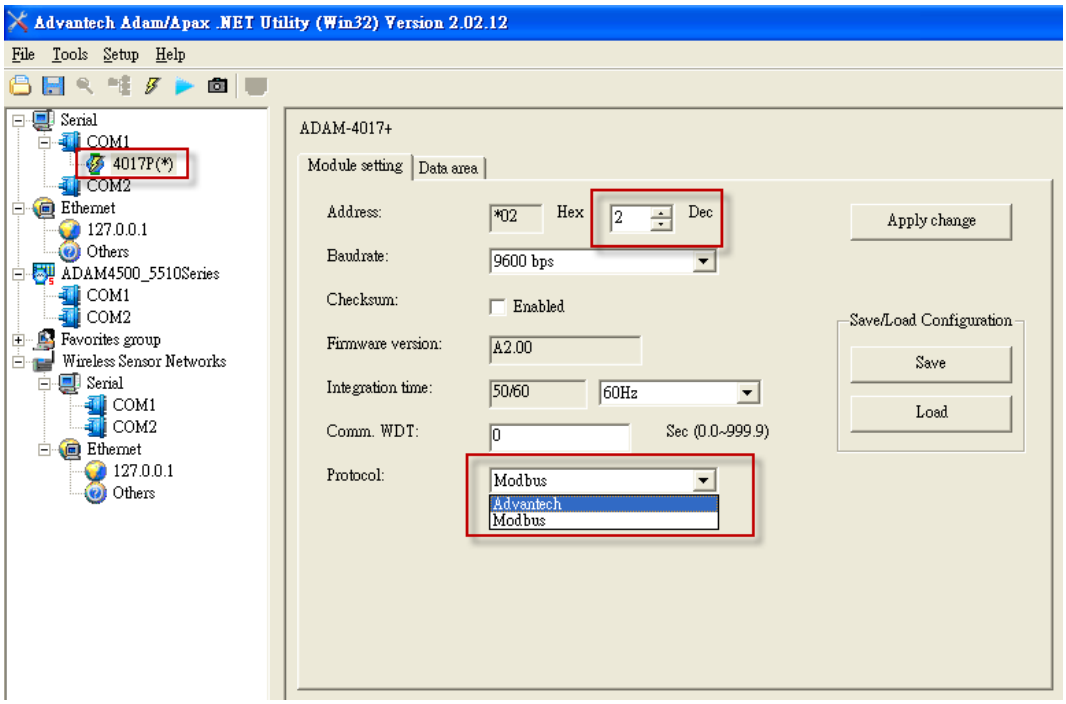
please use a converter. The ADAM 4520 is a RS-422/485 to RS-232 converter module.

Note that when you use a converter the baud rate of the converter must be set to 9600bps and the handshaking of the converter should match the handshaking setting on your computer.

1.2 Module Settings

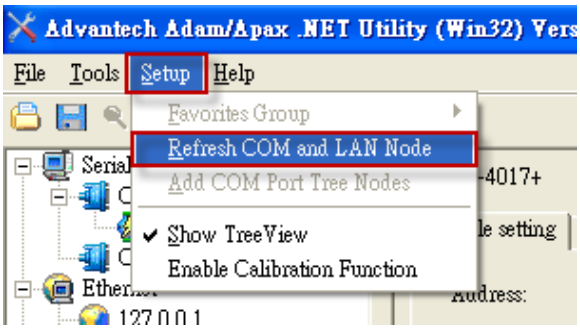
Start your module while linking the init connector to the ground (to enable the initial mode) and connect it to the computer.

On the computer start the Adam/Apax .NET Utility



The module will automatically appear in the left tree under the serial port it is connected to.

If you are using virtual com port from (EKI serial server) or USB to serial adapters you need to refresh the com port list first and then the module list.



The * next to the module name means it is in initial mode. Make sure that the protocol is Advantech and note the Address, baud rate and checksum as they will be required in WebAccess settings.

Then close the utility and restart the module.

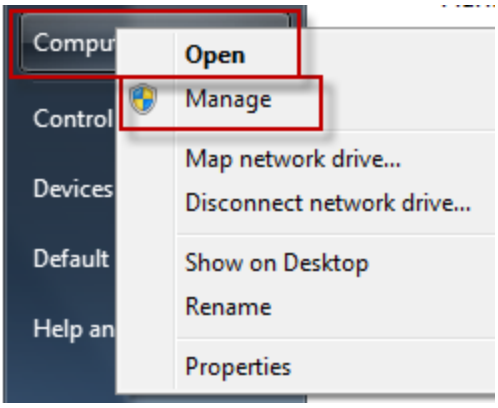
2. WebAccess Configuration

2.1 Port

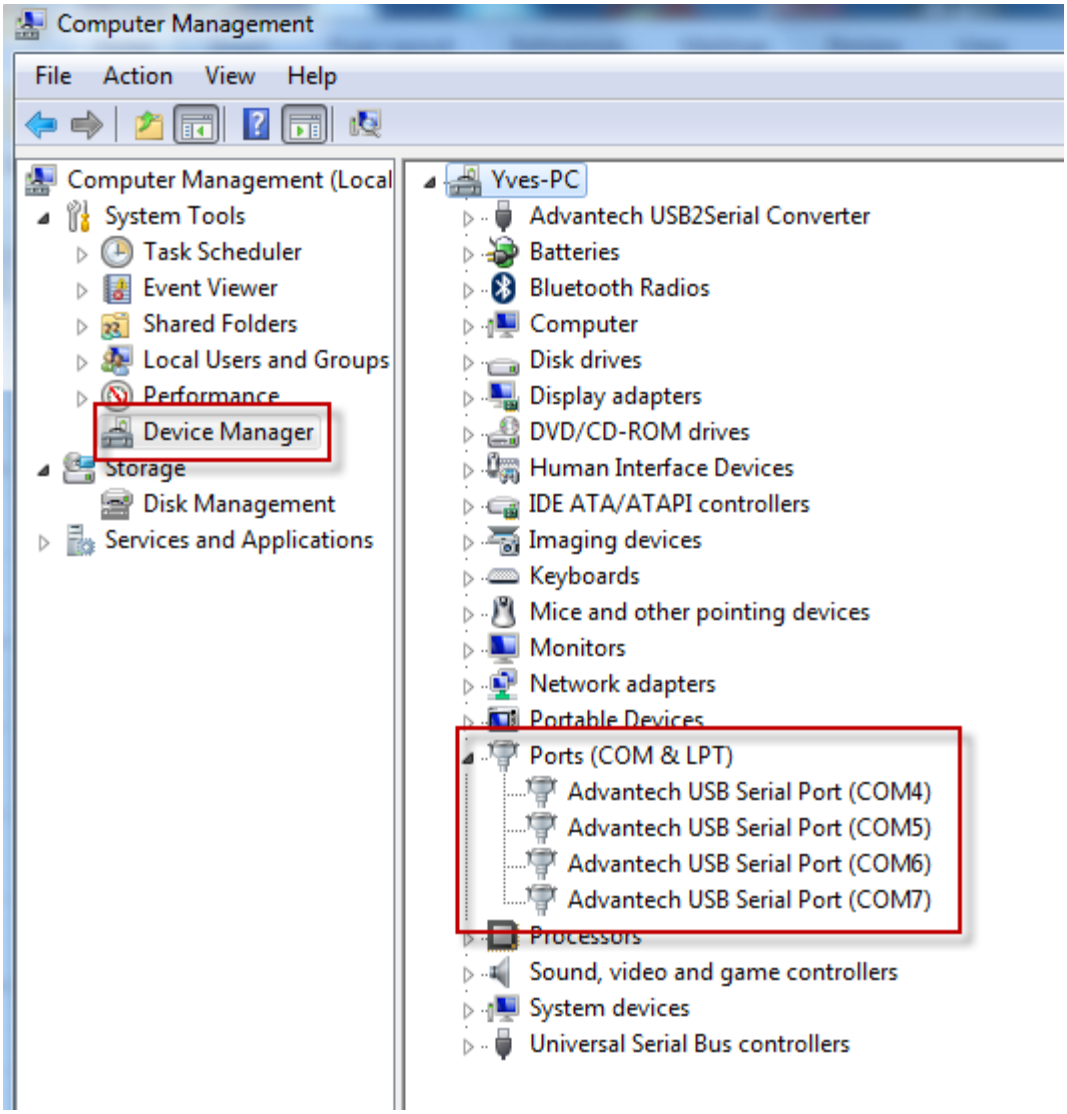
The ADAM4K protocol uses a serial port. Even if you use a serial port server or a USB to serial converter the apparent port in your computer (and therefore the port to select in WebAccess) is a serial port.

2.1.1 Check the port number

If you are using a comport emulator and you do not know the port number then open the "Start Menu" and right click on "Computer" and select "Manage"



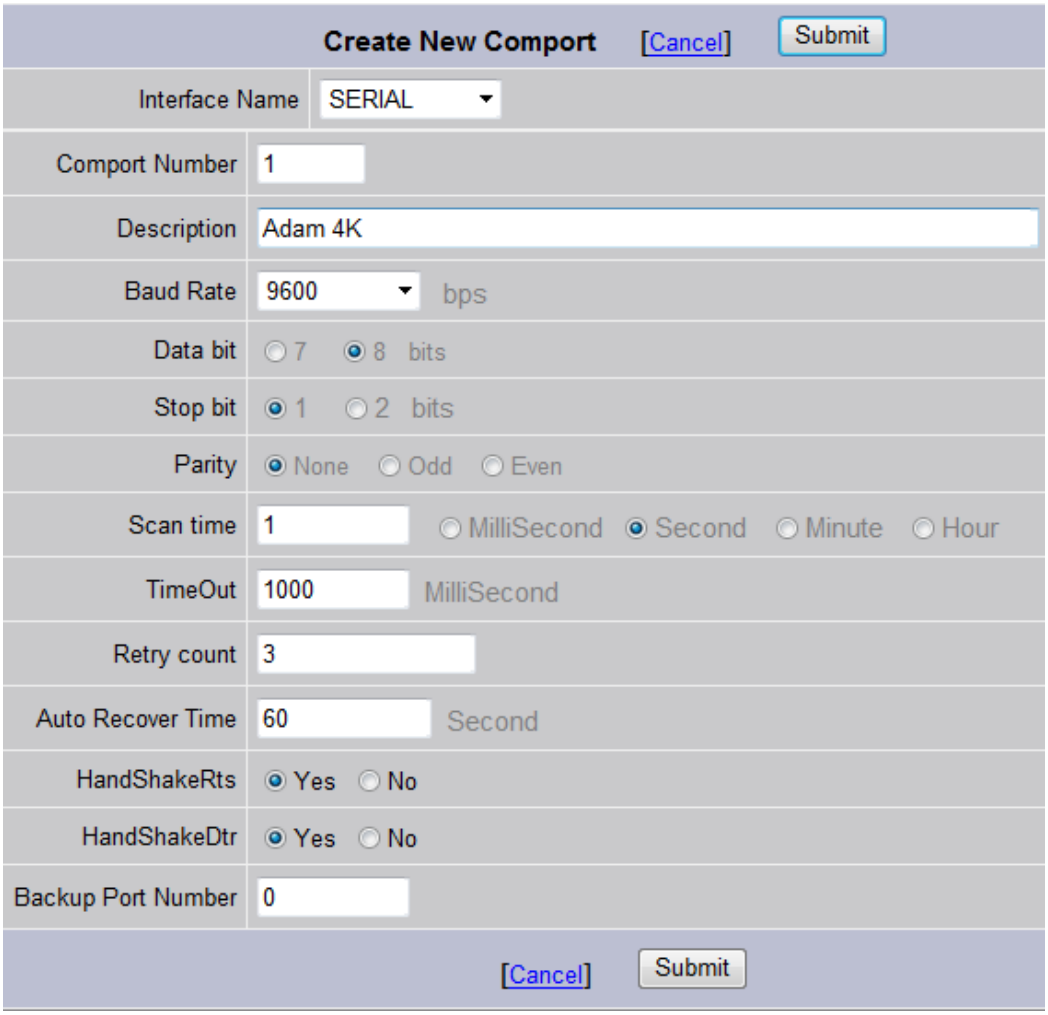
In the device manager section you can see the list of COM ports on your computer and recognize the virtual port by its driver name


Computer Management
File Action View Help
Computer Management (Local
System Tools
Task Scheduler
Event Viewer
Shared Folders
Local Users and Groups
Performance
Device Manager
Storage
Disk Management
Services and Applications
Yves-PC
Advantech USB2Serial Converter
Batteries
Bluetooth Radios
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Imaging devices
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Portable Devices
Ports (COM & LPT)
Advantech USB Serial Port (COM4)
Advantech USB Serial Port (COM5)
Advantech USB Serial Port (COM6)
Advantech USB Serial Port (COM7)
Processors
Sound, video and game controllers
System devices
Universal Serial Bus controllers

2.1.2 WebAccess Comport Page

Open your WebAccess Configuration and select the SCADA node you want to add the device to. Then select "Add a new Comport"

All the settings in this page must match the settings in all the modules attached to the port. So all the modules attached to the same comport must have the same settings.



2.1.3 Comport Number

The Serial Comport requires the comport number to match that of the physical interface (e.g. COM1, COM2, COM3, etc) on the SCADA Node.

2.1.4 Description

This is an optional field used for user reference.

2.1.5 Baud Rate

For the Adam 4K modules the typical baud rate is 9600.

This must match the baud rate configured in the module and the eventual RS-485 to RS-232 converter.

2.1.6 Data Bits

The packets can have 7 or 8 Data Bits. The typical setting for Adam 4K is **8 bits.**

2.1.7 Stop Bits

The packets can have 1 or 2 Stop Bits. The typical setting for Adam 4K is **1 Stop bit.**

2.1.8 Parity

The Parity can be None, Odd, Even or Disabled. The typical setting for Adam 4K is **Parity = None.**

2.1.9 Scan Time

This is the time in milliseconds to scan the Devices. This must match the ability of the device to respond. **A typical scan rate is 1 per second**.

If the Device cannot respond as fast as the SCAN Time entered, WebAccess will scan at a slower rate.

2.1.10 Timeout

With a 1 second scan rate, **a typical Time Out = 200 Milliseconds**.

Timeout is the time waited before re-sending a communications packet that did not have a reply.

Timeout specifies how long the software waits for a response to a data request, specifically to wait for a reply from one packet. A recommended value is one-fifth the scan rate, longer if the communication device is slow.

Combined with Retry count, Timeout also determines time to consider a device or port as BAD. Timeout is the time to wait since last communication packet sent without a reply. Time is in milliseconds. Slow or poor quality communications require longer timeout. The faster the communications, the shorter the timeout required. Shorter timeouts result in faster reconnects after communication failures.

2.1.11 Retry Count

A typical Retry count = 3.

Number of times to retry communications if no reply is received from a device. Combined with Timeout, also determines time to consider a device or port as BAD.

This is the number of times after the first attempt has failed that communication should be attempted before indicating a failure. (If Retry count is 3, a total of 4 failed requests have occurred before tags are marked bad). Specifically, this is how many times to send a single packet after the field device fails to respond to the first packet. After the retry count is exceeded, all the tags in the packet are marked with asterisks and the next packet of requests is sent. A reasonable value is 3 to 5 times. After this number of tries, the tags in this packet are marked as "fail to respond" (i.e. asterisks) and are disabled. In reality, increasing the number of retries hides failures on the part of the field device to respond to a request. Essentially, increasing the retries gives the field device more chances to reply.

2.1.12 Auto Recover Time

A typical Auto Recover Time = 60 Seconds.

Auto Recover Time is the time to wait before attempting to re-establish communications with a BAD device or port.

If communications to the PLC is unusually slow due to hardware, communications or network issues, you might consider increasing this value. If communications to the PLC or RTU fails frequently, you may want to decrease this number in order to have WebAccess try to re-establish communications sooner.

If communications to the PLC, RTU or device Fails (i.e. exceeds Timeout) WebAccess will wait the Auto Recover Time before trying to re-establish communications.

2.1.13 Hand Shake RTS

The typical setting for Adam 4K is **HandShakeRts = No**.

The RTS (Request To Send) signal is raised and lowered on the Serial Communications Port if this value set to Yes. RTS is determined by settings in the field device. *Refer to your device interface manual to determine the value for this field and the type of cable used.*

2.1.14 Hand Shake DTR

The typical setting for Adam 4K is **HandShakeDtr = No**.

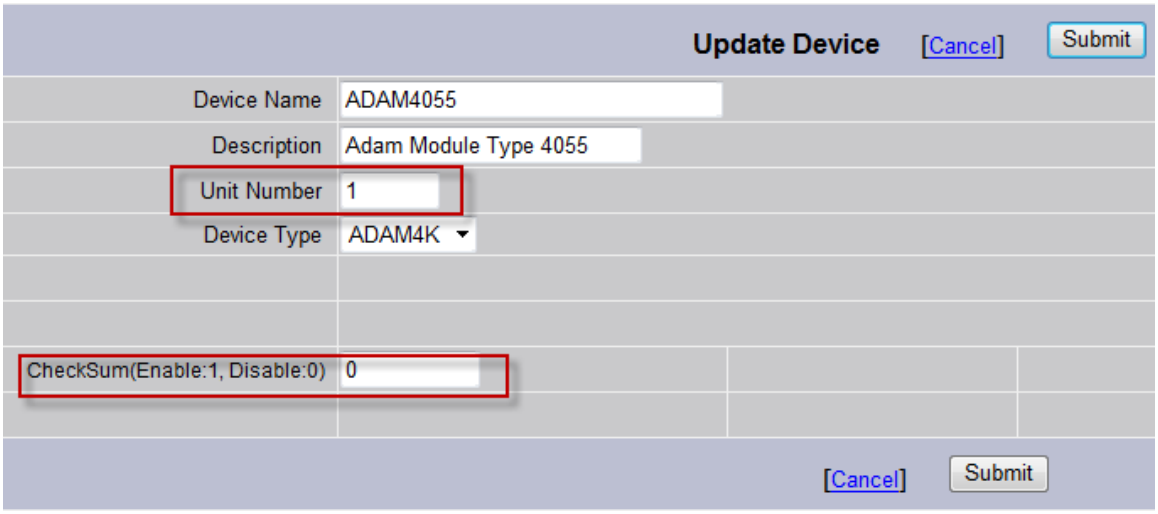
The DTR (Data Terminal Ready) signal raised and lowered on the Serial Communications Port if this value is set to Yes. DTR is determined by settings in the field device and the type of cable used.

2.1.15 Backup Port

The Backup Port has not been tested for Adam 4K

2.2 Device

Then Go to the port page and select "Add a new device". Select the ADAM4K device Type.



2.2.1 Unit Number

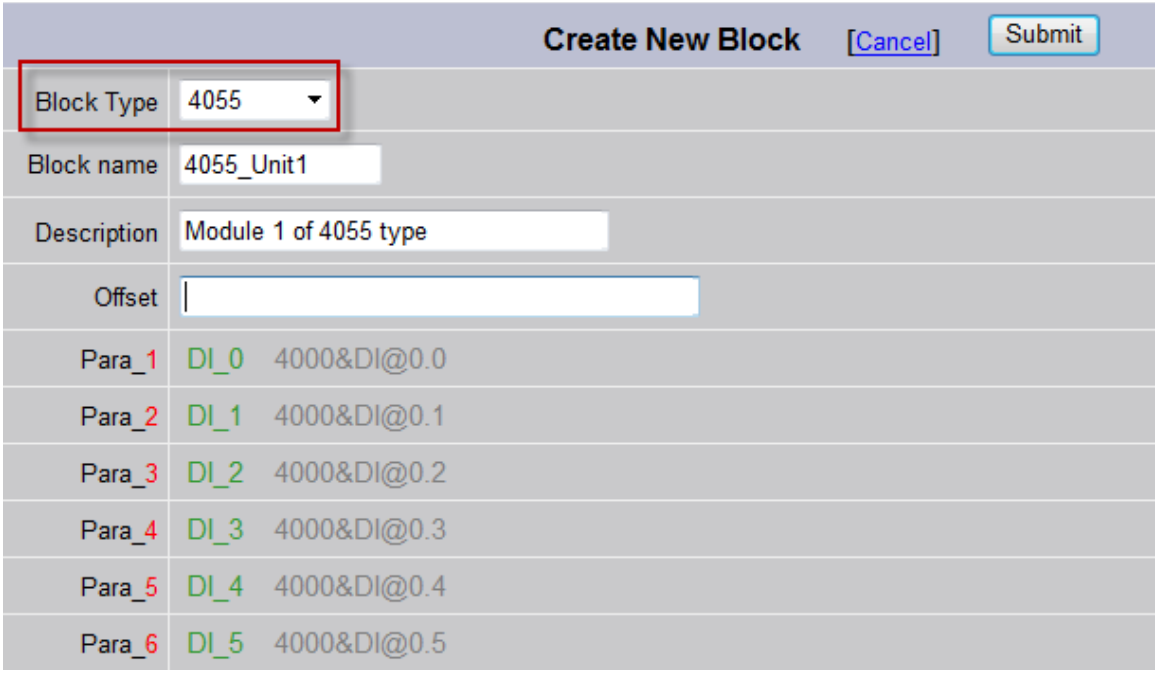
The Unit number must match the "unit number" (or "address") set in the module.

2.2.2 Checksum

Modules can add a checksum to the transactions to confirm the integrity of the data. The checksum setting must match the one in the module.

2.3 Block

To allow users to add Adam 4K modules easily in WebAccess we created a block for each module. The block contains all the tags of the module and will allow an easy access and display.



2.3.1 Block Type

The block type allows you to select which group of parameters you want to import (Counter, PID, I/O …).

For Adam 4K select the module type. It will add all the channels and parameters available in the device.

2.3.2 Offset

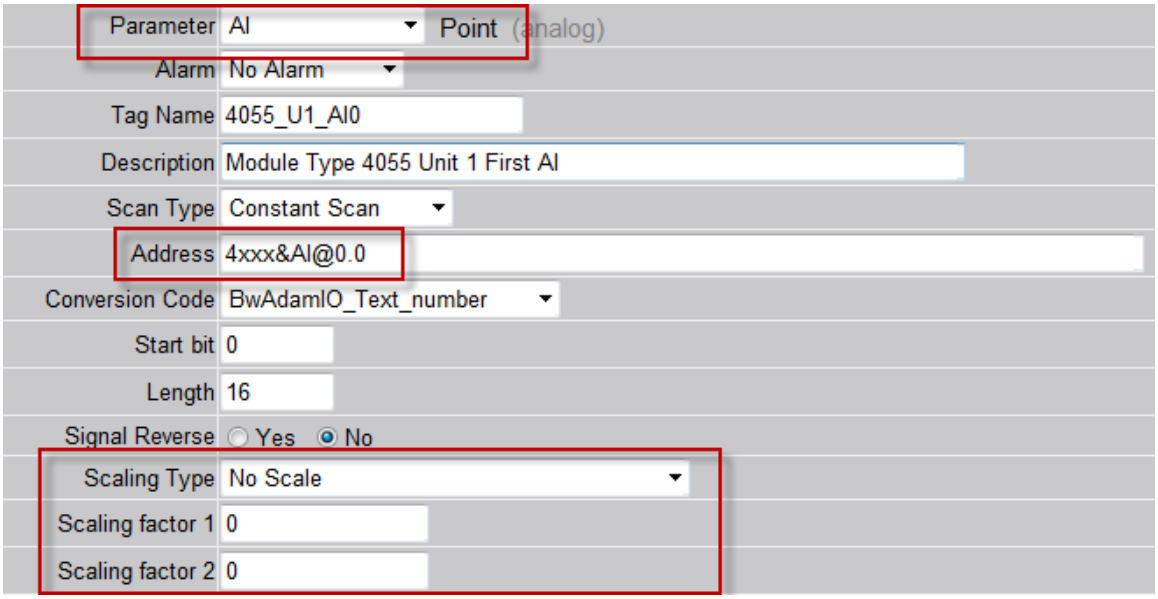
The offset should correspond to the address of the first parameter of the block. All the other parameters addresses will then be calculated based on the first one.

In the ADAM4K driver the offset format is: 4055,1,0

The first number should correspond to the device type and the second one to the unit ("address" in Adam .NET utility) leave the third one to 0.

2.4 Tag

If you do not use all the channels in the device and you want to reduce your tag count you can add the parameters one by one using "Add tag".



2.4.1 Parameter

The parameter gives the type of tag you want to import. Try to select a parameter as close to the tag type as possible because it will fill the other option with the default parameters.

In Adam 4K almost all the available tags have been put to the parameter list so by choosing the correct one all the other fields are set automatically.

2.4.2 Address

For Adam 4K the address starts with the module type (replace 4xxx by 4055) followed by the parameter type (here AI) and then the unit number ("address" field in Adam .NET utility). The last number should correspond to the sub-channel number (0 for the AI 0).

2.4.3 Scaling Type

If the data sent by the module is not in a human readable unit you can use the scaling to change the unit and display a more convenient unit in the node. In most cases a linear scaling type will be sufficient.

2.5 Supported Block List

There is a block for each ADAM module. The block contain all the possible parameters in the module. Here are a few of our most used blocks.

2.5.1 4011

1-Channel Thermocouple Input Module

Parameter	Description	Address	Start Bit	Length

Parameter	Description	Address	Start Bit	Length
AI_0	Analog Input	4xxx&AI@0.0	0	16
ALM_CLR	Clear alarm	4xxx&ALM:CLR@0.0	0	1
ALM_CLRH	Clear high alarm	4xxx&ALM:CLR_H@0.0	0	1
ALM_CLRL	Clear low alarm	4xxx&ALM:CLR_L@0.0	0	1
ALM_M	Read alarm mode (0=Disable,1=Enable, 2=Momentary, 3=Latching)	4xxx&ALM:M@0.0	0	1
ALM_H	High alarm	4xxx&ALM:M_H@0.0	0	1
ALM_L	Low alarm	4xxx&ALM:M_L@0.0	0	1
ALM_OFF	Disable alarm	4xxx&ALM:OFF@0.0	0	1
ALM_OFFH	Disable high alarm	4xxx&ALM:OFF_H@0.0	0	1
ALM_OFFL	Disable low alarm	4xxx&ALM:OFF_L@0.0	0	1
ALM_ON_H	Enable high alarm	4xxx&ALM:ON_H@0.0	0	1
ALM_ON_L	Enable low alarm	4xxx&ALM:ON_L@0.0	0	1
ALM_ONLA	Enable Latching alarm	4xxx&ALM:ON_LAT@0.0	0	1
ALM_ONMO	Enable momentary alarm	4xxx&ALM:ON_MOM@0.0	0	1
ALM_S	Read alarm status (0=OFF, 1=ON)	4xxx&ALM:ON_S@0.0	0	1
ALM_S_H	Read high alarm status (0=No alarm; 1=Alarm occurred)	4xxx&ALM:ON_S_H@0.0	0	1
ALM_S_L	Read low alarm status (0=No Alarm; 1=Alarm occurred)	4xxx&ALM:ON_S_L@0.0	0	1
CNT_CLR	Clear counter	4xxx&CNT:CLR@0.0	0	1
CNT_OFF	Stop counter	4xxx&CNT:OFF@0.0	0	1
CNT_ON	Start counter	4xxx&CNT:ON@0.0	0	1
CNT_R	Read counter value	4xxx&CNT:R@0.0	0	1
CNT_S	Read counter start/stop	4xxx&CNT:S@0.0	0	1

Parameter	Description	Address	Start Bit	Length
	status (S=0,stops counting; S=1,starts counting)			
DI_0	Digital Input	4xxx&DI@0.0	0	1
DO_0	Digital Output	4xxx&DO@0.0	0	1
DO_1	Digital Output	4xxx&DO@0.1	0	1

2.5.2 4012

1-Channel Analog Input Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1

2.5.3 4013

1-Channel RTD Input Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16

2.5.4 4015

6-Channel RTD Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AI_1	Analog Input	1	4xxx&AI@0.1	0	16
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16

Parameter	Description	Channel	Address	Start Bit	Length
AI_4	Analog Input	4	4xxx&AI@0.4	0	16
AI_5	Analog Input	5	4xxx&AI@0.5	0	16

2.5.5 4015T

6-Channel Thermistor Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AI_1	Analog Input	1	4xxx&AI@0.1	0	16
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16
AI_4	Analog Input	4	4xxx&AI@0.4	0	16
AI_5	Analog Input	5	4xxx&AI@0.5	0	16

2.5.6 4016

1-Channel Analog Input/Output Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AO_0	Analog Output	0	4xxx&AO@0.0	0	16
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1

2.5.7 4017

8-Channel Analog Input Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16

Parameter	Description	Channel	Address	Start Bit	Length
AI_1	Analog Input	1	4xxx&AI@0.1	0	16
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16
AI_4	Analog Input	4	4xxx&AI@0.4	0	16
AI_5	Analog Input	5	4xxx&AI@0.5	0	16
AI_6	Analog Input	6	4xxx&AI@0.6	0	16
AI_7	Analog Input	7	4xxx&AI@0.7	0	16

2.5.8 4018

8-Channel Thermocouple Input Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AI_1	Analog Input	1	4xxx&AI@0.1	0	16
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16
AI_4	Analog Input	4	4xxx&AI@0.4	0	16
AI_5	Analog Input	5	4xxx&AI@0.5	0	16
AI_6	Analog Input	6	4xxx&AI@0.6	0	16
AI_7	Analog Input	7	4xxx&AI@0.7	0	16

2.5.9 4019P

8-Channel Universal Analog Input Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AI_1	Analog Input	1	4xxx&AI@0.1	0	16

Parameter	Description	Channel	Address	Start Bit	Length
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16
AI_4	Analog Input	4	4xxx&AI@0.4	0	16
AI_5	Analog Input	5	4xxx&AI@0.5	0	16
AI_6	Analog Input	6	4xxx&AI@0.6	0	16
AI_7	Analog Input	7	4xxx&AI@0.7	0	16

2.5.10 4021

1-Channel Analog Output Module

Parameter	Description	Channel	Address	Start Bit	Length
AO_0	Analog Output	0	4xxx&AO@0.0	0	16

2.5.11 4022T

2-Channel Serial Based Dual Loop PID Controller

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AI_1	Analog Input	1	4xxx&AI@0.1	0	16
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16
AO_0	Analog Output	0	4xxx&AO@0.0	0	16
AO_1	Analog Output	1	4xxx&AO@0.1	0	16
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1

2.5.12 4024

4-Channel Analog Output Module

Parameter	Description	Channel	Address	Start Bit	Length
AO_0	Analog Output	0	4xxx&AO@0.0	0	16
AO_1	Analog Output	1	4xxx&AO@0.1	0	16
AO_2	Analog Output	2	4xxx&AO@0.2	0	16
AO_3	Analog Output	3	4xxx&AO@0.3	0	16
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1
DO_2	Digital Output	2	4xxx&DO@0.2	0	1
DO_3	Digital Output	3	4xxx&DO@0.3	0	1

2.5.13 4050

15-Channel Digital Input Output Module

Parameter	Description	Channel	Address	Start Bit	Length
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DI_2	Digital Input	2	4xxx&DI@0.2	0	1
DI_3	Digital Input	3	4xxx&DI@0.3	0	1
DI_4	Digital Input	4	4xxx&DI@0.4	0	1
DI_5	Digital Input	5	4xxx&DI@0.5	0	1
DI_6	Digital Input	6	4xxx&DI@0.6	0	1
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1
DO_2	Digital Output	2	4xxx&DO@0.2	0	1
DO_3	Digital Output	3	4xxx&DO@0.3	0	1

Parameter	Description	Channel	Address	Start Bit	Length
DO_4	Digital Output	4	4xxx&DO@0.4	0	1
DO_5	Digital Output	5	4xxx&DO@0.5	0	1
DO_6	Digital Output	6	4xxx&DO@0.6	0	1
DO_7	Digital Output	7	4xxx&DO@0.7	0	1

2.5.14 4051

16-Channnel Isolated Digital Input Module

Parameter	Description	Channel	Address	Start Bit	Length
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DI_2	Digital Input	2	4xxx&DI@0.2	0	1
DI_3	Digital Input	3	4xxx&DI@0.3	0	1
DI_4	Digital Input	4	4xxx&DI@0.4	0	1
DI_5	Digital Input	5	4xxx&DI@0.5	0	1
DI_6	Digital Input	6	4xxx&DI@0.6	0	1
DI_7	Digital Input	7	4xxx&DI@0.7	0	1
DI_8	Digital Input	8	4xxx&DI@0.8	0	1
DI_9	Digital Input	9	4xxx&DI@0.9	0	1
DI_10	Digital Input	10	4xxx&DI@0.10	0	1
DI_11	Digital Input	11	4xxx&DI@0.11	0	1
DI_12	Digital Input	12	4xxx&DI@0.12	0	1
DI_13	Digital Input	13	4xxx&DI@0.13	0	1
DI_14	Digital Input	14	4xxx&DI@0.14	0	1
DI_15	Digital Input	15	4xxx&DI@0.15	0	1

2.5.15 4052

8-Channel Isolated Digital Input Module

Parameter	Description	Channel	Address	Start Bit	Length
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DI_2	Digital Input	2	4xxx&DI@0.2	0	1
DI_3	Digital Input	3	4xxx&DI@0.3	0	1
DI_4	Digital Input	4	4xxx&DI@0.4	0	1
DI_5	Digital Input	5	4xxx&DI@0.5	0	1
DI_6	Digital Input	6	4xxx&DI@0.6	0	1
DI_7	Digital Input	7	4xxx&DI@0.7	0	1

2.5.16 4053

16-Channel Digital Input Module

Parameter	Description	Channel	Address	Start Bit	Length
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DI_2	Digital Input	2	4xxx&DI@0.2	0	1
DI_3	Digital Input	3	4xxx&DI@0.3	0	1
DI_4	Digital Input	4	4xxx&DI@0.4	0	1
DI_5	Digital Input	5	4xxx&DI@0.5	0	1
DI_6	Digital Input	6	4xxx&DI@0.6	0	1
DI_7	Digital Input	7	4xxx&DI@0.7	0	1
DI_8	Digital Input	8	4xxx&DI@0.8	0	1
DI_9	Digital Input	9	4xxx&DI@0.9	0	1
DI_10	Digital Input	10	4xxx&DI@0.10	0	1
DI_11	Digital Input	11	4xxx&DI@0.11	0	1

Parameter	Description	Channel	Address	Start Bit	Length
DI_12	Digital Input	12	4xxx&DI@0.12	0	1
DI_13	Digital Input	13	4xxx&DI@0.13	0	1
DI_14	Digital Input	14	4xxx&DI@0.14	0	1
DI_15	Digital Input	15	4xxx&DI@0.15	0	1

2.5.17 4055

15-Channel Isolated Digital Input Output Module

Parameter	Description	Channel	Address	Start Bit	Length
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DI_2	Digital Input	2	4xxx&DI@0.2	0	1
DI_3	Digital Input	3	4xxx&DI@0.3	0	1
DI_4	Digital Input	4	4xxx&DI@0.4	0	1
DI_5	Digital Input	5	4xxx&DI@0.5	0	1
DI_6	Digital Input	6	4xxx&DI@0.6	0	1
DI_7	Digital Input	7	4xxx&DI@0.7	0	1
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1
DO_2	Digital Output	2	4xxx&DO@0.2	0	1
DO_3	Digital Output	3	4xxx&DO@0.3	0	1
DO_4	Digital Output	4	4xxx&DO@0.4	0	1
DO_5	Digital Output	5	4xxx&DO@0.5	0	1
DO_6	Digital Output	6	4xxx&DO@0.6	0	1
DO_7	Digital Output	7	4xxx&DO@0.7	0	1

2.5.18 4080

2-Channel Counter/Frequency Module

Parameter	Description	Address	Start Bit	Length
ALM_CLR	Clear alarm	4xxx&ALM:CLR@0.0	0	1
ALM_CLRH	Clear high alarm	4xxx&ALM:CLR_H@0.0	0	1
ALM_CLRL	Clear low alarm	4xxx&ALM:CLR_L@0.0	0	1
ALM_M	Read alarm mode (0=Disable,1=Enable, 2=Momentary, 3=Latching)	4xxx&ALM:M@0.0	0	1
ALM_H	High alarm	4xxx&ALM:M_H@0.0	0	1
ALM_L	Low alarm	4xxx&ALM:M_L@0.0	0	1
ALM_OFF	Disable alarm	4xxx&ALM:OFF@0.0	0	1
ALM_OFFH	Disable high alarm	4xxx&ALM:OFF_H@0.0	0	1
ALM_OFFL	Disable low alarm	4xxx&ALM:OFF_L@0.0	0	1
ALM_ON_H	Enable high alarm	4xxx&ALM:ON_H@0.0	0	1
ALM_ON_L	Enable low alarm	4xxx&ALM:ON_L@0.0	0	1
ALM_ONLA	Enable Latching alarm	4xxx&ALM:ON_LAT@0.0	0	1
ALM_ONMO	Enable momentary alarm	4xxx&ALM:ON_MOM@0.0	0	1
ALM_S	Read alarm status (0=OFF, 1=ON)	4xxx&ALM:ON_S@0.0	0	1
ALM_S_H	Read high alarm status (0=No alarm; 1=Alarm occurred)	4xxx&ALM:ON_S_H@0.0	0	1
ALM_S_L	Read low alarm status (0=No Alarm; 1=Alarm occurred)	4xxx&ALM:ON_S_L@0.0	0	1
CNT_CLR	Clear counter	4xxx&CNT:CLR@0.0	0	1
CNT_OFF	Stop counter	4xxx&CNT:OFF@0.0	0	1
CNT_ON	Start counter	4xxx&CNT:ON@0.0	0	1
CNT_R	Read counter value	4xxx&CNT:R@0.0	0	1

Parameter	Description	Address	Start Bit	Length
CNT_S	Read counter start/stop status (S=0,stops counting; S=1,starts counting)	4xxx&CNT:S@0.0	0	1
DO_0	Digital Output	4xxx&DO@0.0	0	1
DO_1	Digital Output	4xxx&DO@0.1	0	1

2.5.19 4117

Robust 8-Channel Analog Input Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AI_1	Analog Input	1	4xxx&AI@0.1	0	16
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16
AI_4	Analog Input	4	4xxx&AI@0.4	0	16
AI_5	Analog Input	5	4xxx&AI@0.5	0	16
AI_6	Analog Input	6	4xxx&AI@0.6	0	16
AI_7	Analog Input	7	4xxx&AI@0.7	0	16

2.5.20 4118

Robust 8-Channel Thermocouple Input Module

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AI_1	Analog Input	1	4xxx&AI@0.1	0	16
AI_2	Analog Input	2	4xxx&AI@0.2	0	16
AI_3	Analog Input	3	4xxx&AI@0.3	0	16
AI_4	Analog Input	4	4xxx&AI@0.4	0	16

Parameter	Description	Channel	Address	Start Bit	Length
AI_5	Analog Input	5	4xxx&AI@0.5	0	16
AI_6	Analog Input	6	4xxx&AI@0.6	0	16
AI_7	Analog Input	7	4xxx&AI@0.7	0	16

2.5.21 4150

Robust 15-Channel Digital Input Output Module

Parameter	Description	Channel	Address	Start Bit	Length
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DI_2	Digital Input	2	4xxx&DI@0.2	0	1
DI_3	Digital Input	3	4xxx&DI@0.3	0	1
DI_4	Digital Input	4	4xxx&DI@0.4	0	1
DI_5	Digital Input	5	4xxx&DI@0.5	0	1
DI_6	Digital Input	6	4xxx&DI@0.6	0	1
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1
DO_2	Digital Output	2	4xxx&DO@0.2	0	1
DO_3	Digital Output	3	4xxx&DO@0.3	0	1
DO_4	Digital Output	4	4xxx&DO@0.4	0	1
DO_5	Digital Output	5	4xxx&DO@0.5	0	1
DO_6	Digital Output	6	4xxx&DO@0.6	0	1
DO_7	Digital Output	7	4xxx&DO@0.7	0	1

2.5.22 4501

Ethernet-enabled Communication Controller with 8-Channel Digital Input Output

Parameter	Description	Channel	Address	Start Bit	Length
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DI_2	Digital Input	2	4xxx&DI@0.2	0	1
DI_3	Digital Input	3	4xxx&DI@0.3	0	1
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1
DO_2	Digital Output	2	4xxx&DO@0.2	0	1
DO_3	Digital Output	3	4xxx&DO@0.3	0	1

2.5.23 4502

Ethernet-enabled Communication Controller with 2-Channel Analog Input Output and 4-Channel Digital Input Output

Parameter	Description	Channel	Address	Start Bit	Length
AI_0	Analog Input	0	4xxx&AI@0.0	0	16
AO_0	Analog Output	0	4xxx&AO@0.0	0	16
DI_0	Digital Input	0	4xxx&DI@0.0	0	1
DI_1	Digital Input	1	4xxx&DI@0.1	0	1
DO_0	Digital Output	0	4xxx&DO@0.0	0	1
DO_1	Digital Output	1	4xxx&DO@0.1	0	1
DO_2	Digital Output	2	4xxx&DO@0.2	0	1

2.6 Main Parameter List

Parameter	Description	Address	Start Bit	Length
AI	Analog Input	4xxx&AI@0.0	0	16

Parameter	Description	Address	Start Bit	Length
AI_0	Analog Input	4xxx&AI@0.0	0	16
AI_1	Analog Input	4xxx&AI@0.1	0	16
AI_2	Analog Input	4xxx&AI@0.2	0	16
AI_3	Analog Input	4xxx&AI@0.3	0	16
AI_4	Analog Input	4xxx&AI@0.4	0	16
AI_5	Analog Input	4xxx&AI@0.5	0	16
AI_6	Analog Input	4xxx&AI@0.6	0	16
AI_7	Analog Input	4xxx&AI@0.7	0	16
AO	Analog Output	4xxx&AO@0.0	0	16
AO_0	Analog Output	4xxx&AO@0.0	0	16
AO_1	Analog Output	4xxx&AO@0.1	0	16
AO_2	Analog Output	4xxx&AO@0.2	0	16
AO_3	Analog Output	4xxx&AO@0.3	0	16
AO_4	Analog Output	4xxx&AO@0.4	0	16
AO_5	Analog Output	4xxx&AO@0.5	0	16
AO_6	Analog Output	4xxx&AO@0.6	0	16
AO_7	Analog Output	4xxx&AO@0.7	0	16
ALM_CLR	Clear alarm	4xxx&ALM:CLR@0.0	0	1
ALM_CLRH	Clear high alarm	4xxx&ALM:CLR_H@0.0	0	1
ALM_CLRL	Clear low alarm	4xxx&ALM:CLR_L@0.0	0	1
ALM_M	Read alarm mode (0=Disable,1=Enable, 2=Momentary, 3=Latching)	4xxx&ALM:M@0.0	0	1
ALM_H	High alarm	4xxx&ALM:M_H@0.0	0	1
ALM_L	Low alarm	4xxx&ALM:M_L@0.0	0	1
ALM_OFF	Disable alarm	4xxx&ALM:OFF@0.0	0	1
ALM_OFFH	Disable high alarm	4xxx&ALM:OFF_H@0.0	0	1

Parameter	Description	Address	Start Bit	Length
ALM_OFFL	Disable low alarm	4xxx&ALM:OFF_L@0.0	0	1
ALM_ON_H	Enable high alarm	4xxx&ALM:ON_H@0.0	0	1
ALM_ON_L	Enable low alarm	4xxx&ALM:ON_L@0.0	0	1
ALM_ONLA	Enable Latching alarm	4xxx&ALM:ON_LAT@0.0	0	1
ALM_ONMO	Enable momentary alarm	4xxx&ALM:ON_MOM@0.0	0	1
ALM_S	Read alarm status (0=OFF, 1=ON)	4xxx&ALM:ON_S@0.0	0	1
ALM_S_H	Read high alarm status (0=No alarm; 1=Alarm occurred)	4xxx&ALM:ON_S_H@0.0	0	1
ALM_S_L	Read low alarm status (0=No Alarm; 1=Alarm occurred)	4xxx&ALM:ON_S_L@0.0	0	1
CNT_CLR	Clear counter	4xxx&CNT:CLR@0.0	0	1
CNT_OFF	Stop counter	4xxx&CNT:OFF@0.0	0	1
CNT_ON	Start counter	4xxx&CNT:ON@0.0	0	1
CNT_R	Read counter value	4xxx&CNT:R@0.0	0	1
CNT_S	Read counter start/stop status (S=0,stops counting; S=1,starts counting)	4xxx&CNT:S@0.0	0	1
DI	Digital Input	4xxx&DI@0.0	0	1
DI_0	Digital Input	4xxx&DI@0.0	0	1
DI_1	Digital Input	4xxx&DI@0.1	0	1
DI_2	Digital Input	4xxx&DI@0.2	0	1
DI_3	Digital Input	4xxx&DI@0.3	0	1
DI_4	Digital Input	4xxx&DI@0.4	0	1
DI_5	Digital Input	4xxx&DI@0.5	0	1
DI_6	Digital Input	4xxx&DI@0.6	0	1
DI_7	Digital Input	4xxx&DI@0.7	0	1

Parameter	Description	Address	Start Bit	Length
DI_8	Digital Input	4xxx&DI@0.8	0	1
DI_9	Digital Input	4xxx&DI@0.9	0	1
DI_10	Digital Input	4xxx&DI@0.10	0	1
DI_11	Digital Input	4xxx&DI@0.11	0	1
DI_12	Digital Input	4xxx&DI@0.12	0	1
DI_13	Digital Input	4xxx&DI@0.13	0	1
DI_14	Digital Input	4xxx&DI@0.14	0	1
DI_15	Digital Input	4xxx&DI@0.15	0	1
DO	Digital Output	4xxx&DO@0.0	0	1
DO_0	Digital Output	4xxx&DO@0.0	0	1
DO_1	Digital Output	4xxx&DO@0.1	0	1
DO_2	Digital Output	4xxx&DO@0.2	0	1
DO_3	Digital Output	4xxx&DO@0.3	0	1
DO_4	Digital Output	4xxx&DO@0.4	0	1
DO_5	Digital Output	4xxx&DO@0.5	0	1
DO_6	Digital Output	4xxx&DO@0.6	0	1
DO_7	Digital Output	4xxx&DO@0.7	0	1
DO_8	Digital Output	4xxx&DO@0.8	0	1
DO_9	Digital Output	4xxx&DO@0.9	0	1
DO_10	Digital Output	4xxx&DO@0.10	0	1
DO_11	Digital Output	4xxx&DO@0.11	0	1
DO_12	Digital Output	4xxx&DO@0.12	0	1
DO_13	Digital Output	4xxx&DO@0.13	0	1
DO_14	Digital Output	4xxx&DO@0.14	0	1
DO_15	Digital Output	4xxx&DO@0.15	0	1
DO_R	Digital output read back	4xxx&DO:R@0.0	0	1