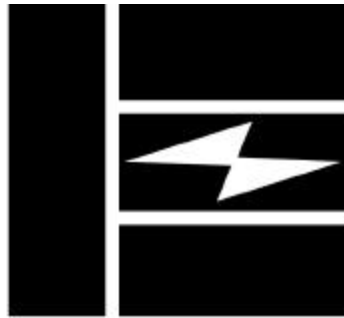


*AXIMA Software Connectivity  
Reference Manual*



**EMERSON**  
**MOTION CONTROL**

P/N 400265-00

Revision: A3

Date: August 14, 2000

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# AXIMA Software Connectivity Reference Manual

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Product version number, found by choosing **About** from the **Help** menu.

The type of controller or product you are using.

Exact wording of any messages that appear on your screen.

What you were doing when the problem occurred.

How you tried to solve the problem.

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Authorized EMERSON Motion Control distributors may place orders directly with our Order Processing department by calling the number listed above. For information on your local distributor, call EMERSON Motion Control.

## Document Conventions

Manual conventions have been established to help you learn to use this manual quickly and easily. As much as possible, these conventions correspond to those found in other Microsoft® Windows®<sup>1</sup> documentation.

Menu names and options are printed in bold type: the **File** menu.

Dialog box names begin with uppercase letters: the Axis Limits dialog box.

Dialog box field names are in quotes: “Field Name”.

Button names are in italic: *OK* button.

Source code is printed in Courier font: Case ERMS .

In addition, you will find the following typographic conventions throughout this manual.

This	Represents
<b>bold</b>	Characters that you must type exactly as they appear. For example, if you are directed to type <b>a:setup</b> , you should type all the bold characters exactly as they are printed.
<i>italic</i>	Place holders for information you must provide. For example, if you are directed to type <i>filename</i> , you should type the actual name for a file instead of the word shown in italic type.
ALL CAPITALS	Directory names, file names, key names, and acronyms.
SMALL CAPS	Non-printable ASCII control characters.
KEY1+KEY2 example: (Alt+F)	A plus sign (+) between key names means to press and hold down the first key while you press the second key.
KEY1,KEY2 example: (Alt,F)	A comma (,) between key names means to press and release the keys one after the other.

Special nomenclature is provided for people working with these products, as follows:



---

### Warning

For the purpose of this manual and product, “Warning” indicates death, severe personal injury or substantial property damage CAN result if proper precautions are not taken.

---



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### Caution

For the purpose of this manual and product, “Caution” indicates minor personal injury or property damage CAN result if proper precautions are not taken.

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---

### Note

For the purpose of this manual and product, “Note” indicates information about the product or the respective part of the manual which is essential to highlight.

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Throughout this manual, the word “drive” refers to an E Series drive.

1. See page ii of the preface.

# Safety Instructions

## General Warning

Failure to follow safe installation guidelines can cause death or serious injury. The voltages used in the product can cause severe electric shock and/or burns, and could be lethal. Extreme care is necessary at all times when working with or adjacent to it. The installation must comply with all relevant safety legislation in the country of use.

## Qualified Person

For the purpose of this manual and product, a “qualified person” is one who is familiar with the installation, construction and operation of the equipment and the hazards involved. In addition, this individual has the following qualifications:

- Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.
- Is trained in the proper care and use of protective equipment in accordance with established safety practices.
- Is trained in rendering first aid.



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# Introduction

## Overview

There are two connectivity options provided with the *AXIMA* controller; Modicon's Modbus® or Allen Bradley's Data Highway Plus® (DH+). These options are implemented with additional hardware and AX-WIN features.

- Modbus provides a master/slave communications interface typically used for operator interface panels. EMERSON Motion Control's Motion Interface panel comes with an Modbus master communications driver.

Modbus slave (RS-232 and RS-485) support is provided by adding a Connectivity Processor (CP) card to the *AXIMA* controller.

The *AXIMA* controller follows the Modbus specification outlined in the *Modicon Modbus Protocol Reference Manual*, PI-MBUS-300, Revision G, November 1994.

- DH+ is a peer to peer network that is typically used for control purposes. Specifically, this interface will allow the networking of any products (including PLC's, operator panels, etc.) which support DH+.

DH+ support requires the addition of a DH+ interface card to the *AXIMA* controller. This provides the electrical and protocol support specifically for DH+. This card is used with the CP card.

The *AXIMA* controller emulates a PLC-5 type of device.

AX-WIN version 1.6 or later and *AXIMA* firmware version A5 or later are required to support these options.

## Connectivity Card Firmware Compatibility

The connectivity firmware is burnt into the PROM chip which is installed on the connectivity card. The following information summarizes the connectivity firmware revisions:

Revision	Features
A1	<ul style="list-style-type: none"><li>• Initial release.</li></ul>
A2	<ul style="list-style-type: none"><li>• Modbus address offset for local bits was changed so that it is not off by one.</li><li>• Send message immediately sends out the entire message so that other Modbus devices will not time out between bytes.</li><li>• User assignable Pre-defined Variables above 4095 are now defined as floating point (FP32).</li></ul>

Revision	Features
A3	<ul style="list-style-type: none"> <li>• Now can establish DH+ communications even if a device is constantly attempting to query the AXIMA controller over DH+ during power-up.</li> </ul>
A4	<ul style="list-style-type: none"> <li>• Read of Expanded Inputs Bank 1 and read/write of Expanded Outputs Bank 1 are supported in Modbus and DH+.</li> <li>• Read of Limit CW, Limit CCW, Drive Status, Positive Direction Limit, Negative Direction Limit, Direction Limit Activate, Direction Limit Tripped added to DH+.</li> <li>• Local bits are set with -1 over Modbus and DH+.</li> <li>• Message commands over DH+ will find the addresses for user defined bits even if the first bit in a 16-bit register is not used.</li> </ul>

## Connectivity Operation

This section is an overview of the operation of the connectivity interfaces which includes the user setup, required hardware, variables information, downloading and diagnostic information.

The connectivity interface setup is accomplished using the Modbus Setup or DH+ Setup dialog boxes. These dialog boxes define the node address, baud rate and other protocol specific data.

---

### Modbus Hardware

---

For Modbus, only the CP card is needed and it provides the intelligence between the Modbus slave communications interface and the AXIMA controller.

The CP card contains firmware that monitors Modbus requests and accesses the controller variables through the controller's internal ISA bus.

---

### Data Highway Plus (DH+) Hardware

---

For DH+, the CP card provides the intelligence between the DH+ interface card and the AXIMA controller. The DH+ interface card provides the DH+ electrical and protocol support.

---

## Data Addresses

---

Both Modbus and DH+ access data by address. The *AXIMA* data is represented by several kinds of variables: Local, Global and Pre-Defined. They may be comprised of Integers, Bits or Floating Points and be single values or arrays.

The *AXIMA* variables are mapped to Modbus or DH+ addresses. This mapping is in the form of pre-assigned or user-assigned variable.

Pre-assigned addresses are provided to simplify the setup required to access *AXIMA* data using Modbus or DH+. Pre-assigned addresses apply only to the Pre-defined Variables within AX-WIN. Not all Pre-defined Variables have pre-assigned addresses. You cannot change pre-defined addresses.

Most variables that do not have a pre-assigned address may be user assigned. Generally this includes all Local and Global Variables. These variables are assigned by the user in the Variable List or Variable Definition dialog boxes.

Changing or disabling the connectivity option in AX-WIN will clear out all user-assigned variable addresses.

---

## Connectivity Processor Initialization

---

Downloading an Application to the *AXIMA* controller will temporarily terminate the connectivity interface if previously in use. When the download is complete, the connectivity interface will be automatically reset and operational. The CP card will use the latest variable assignment information (defined by the variables) to connect *AXIMA* data to the communications interface.

Uploading or Online operations do not effect the operation of the connectivity interface.

Diagnostic data (when online) for the connectivity interface is accessed by selecting the connectivity option in the hierarchy view and using Tools | Diagnostics from the menu.

## Controller Setup Dialog Box

Controller Options dialog box is accessed by highlighting Controller Options in the hierarchy view, then double-clicking on any item in the details view.

The connectivity options are enabled (and disabled) from the Controller Options dialog box by clicking on the *Connectivity Type* radio button. The default setting is None (disabled).

When either the Modbus or DH+ connectivity option is enabled, the selected connectivity interface will be added the Application hierarchy.

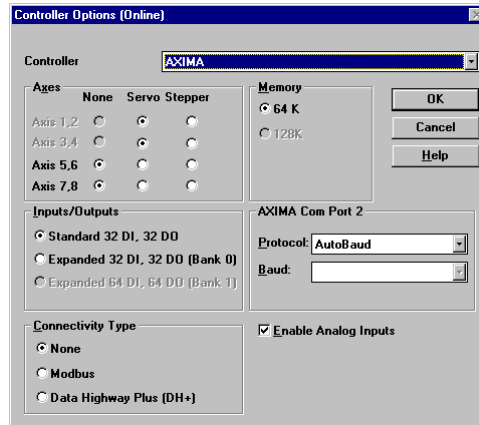


Figure 1 Controller Options Dialog Box

## Modbus Interface Setup Dialog Box

After enabling Modbus in the *Connectivity Type* group on the Controller Options dialog box, select *Modbus* in the hierarchy view (left side of the Application editing window). Next, double-click on any item in the details view (right side of the Application editing window) to display the Modbus Interface Setup dialog box which allows modification of the Set Hardware Interface, Baud Rate and Node Address.

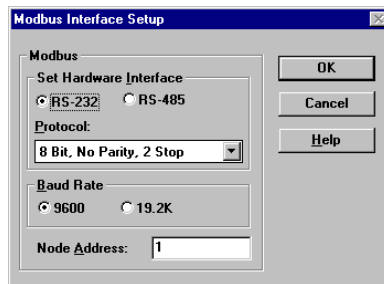


Figure 2: Modbus Interface Setup Dialog Box

---

### Set Hardware Interface

---

Select the type of electrical interface to be used by the Modbus interface, either RS-232 or RS-485.

RS-232 is used in most cases, which is when you have one operator interface (master) and one *AXIMA* controller (slave).

RS-485 protocol supports a multi-drop configuration which is not standard per the Modbus specification but is supported by *AXIMA*. RS-485 support allows one operator interface to be used with multiple *AXIMA* controllers (each controller requires a unique node address). For multi-drop applications, broadcast message support is provided by *AXIMA*.

---

### Baud Rate

---

Select the baud rate for the Modbus interface, either 9600 or 19.2 K baud.

---

### Node Address

---

This is the Modbus node number assigned to the *AXIMA* controller. This address is typically set to one (1) and must match the operator interface panel configuration.

## Modbus Data Addresses

*AXIMA* variables must be assigned an address to be accessed using the Modbus interface. Most Pre-defined Variables have pre-assigned addresses. These pre-assigned addresses conform to the Modbus protocol standard for bit and analog data. Variables which are not pre-assigned may be user assigned. User assigned addresses must also use the Modbus standard for addressing.

User assigned addresses are assigned using either the Variable List or Variable Define dialog boxes.

Modbus addresses are defined by a five digit numeric address, the first digit indicates the data and access types and the next four digits indicates the item number. Items are either input bits (read only bits), coils (read/write bits), or registers (analog data 32 bits). Input bits and coils correspond to *AXIMA* bit variables, while registers correspond to *AXIMA* integer and floating point variables.

0xxxx	Coils	Read/Write	Bit
1xxxx	Input Bits	Read Only	Bit
3yyyy	Registers	Read Only	32 Bits
4yyyy	Registers	Read/Write	32 Bits

Where

xxxx is valid from 1 to 9999

yyyy is valid from 1 to 9999 odd numbers only.

For register data (analog) there are conversions between the *AXIMA* controller and the Modbus interface. Modbus registers are 16 bit and *AXIMA* controller integer data is 32 and floating point is either 32 or 64 bit.

All *AXIMA* 64 bit floating point data is converted to 32 bit floating point data for the Modbus interface (either read or write), so there is some loss of precision (32 floating point provides 7 significant digits). After this conversion all *AXIMA* controller analog data is 32 bits. In all cases, each 32 bit analog value is assigned to two consecutive Modbus registers. Since two registers are used, only odd Modbus addresses are assigned to an *AXIMA* integer or floating point variables.

**AXIMA Modbus Bit Variables:**

Pre-defined bits are all pre-assigned.

Global bits are all pre-assigned.

Local bits are user-assigned (08001 - 09999).

**AXIMA Integer and Floating Point Variables:**

Pre-Defined integer and floating point variables are pre-assigned.

Global integer and floating point variables are user assigned (40001 - 49997).

Local integer and floating point variables are user assigned (40001 - 49997).

## Modbus Diagnostics Tab (*AXIMA* Analyzer)

Modbus diagnostics are provided to diagnose cable, noise, or other Modbus specific errors. To access the diagnostics you must:

- Be online with an *AXIMA* controller equipped with the Modbus option (hardware).
- Have the *Modbus* option enabled in the Controller Options dialog box when the Application was downloaded.
- Highlight *Modbus* item in the hierarchy view and then select Diagnostics from the Tools menu.



The Modbus connectivity diagnostic data is divided into four groups. Each group and its information is explained below, along with the *Clear* and *Reset* buttons.

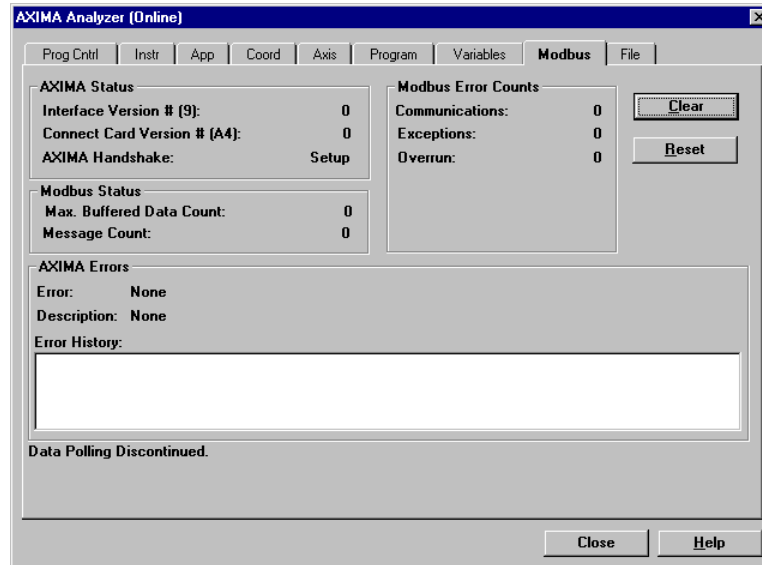


Figure 3: Modbus Tab

#### Clear Button

This button clears the *Error Counters* and *Error History* data.

#### Reset Button

This button resets the Modbus interface. It also resets all *Error Counters*, *Error History* and *AXIMA Status* counters to zero. The Reset also clears out the AXIMA Error History Box in this dialog.

## AXIMA Status

The *AXIMA Status* area displays information regarding the interface version number of the handshake mode.

---

### Interface Version # (9)

---

Displays the connectivity card's connectivity interface version. The interface version is for factory use only. The (9) indicates the AX-WIN connectivity interface version. These must match. The Modbus will not run if there is a mismatch.

---

**Connect Card Version # (A4)**

---

Displays the connectivity card’s version number. The (A4) indicates AX-WIN supports up to A4. The Modbus will run if there is a mismatch. This revision indicates non-critical differences. In most cases this is additional pre-assigned addresses, and support for accessing new *AXIMA* Pre-defined Variables.

See “Connectivity Card Firmware Compatibility” on page 1.

---

**AXIMA Handshake**

---

Displays the handshake mode status which can be any of the following:

Handshake	Set by	Purpose
OK	CP card	Indicates last handshake was processed with no errors or warnings.
Setup	AXIMA Power-up AXIMA Download AXIMA Diagnostics	Handshake indicating that new setup data is available.
Update	AXIMA Diagnostics	Handshake request for diagnostic data update.
Clear	AXIMA Diagnostics	Handshake requesting a clear of all diagnostics counters.
Offline	AXIMA Download AXIMA Diagnostics	Handshake request to shutdown the connectivity interface.
Warning	CP card	Indicates last handshake was processed with a warning. An warning indicates the Modbus interface is operational but is using defaults or has not mapped the variable that caused the warning.
Error	Connectivity Firmware	Indicates last handshake was processed with an error. An error indicates the Modbus interface is not operational.

An unchanging handshake of Setup, Update, Clear or Off-line indicates that the CP card is not responding.

## Modbus Status

The Modbus Status displays information regarding the Modbus interface messages. These counters are incremented by the CP card.

---

**Max. Buffered Data Count**

---

Contains the greatest number of input buffer elements (bytes) used by the processor card since the last restart, clear counters operation or power-up.

---

**Message Count**

---

Contains the number of messages (addressed directly or broadcast) processed since the last reset, clear counters operation or power-up. The counter wraps around to zero when it overflows at 65535 counts.

## Modbus Error Counts

The Modbus Error Counts displayed includes the number of *Communication Errors*, *Exceptions* and *Overrun Errors* (addressed directly or broadcast) processed since the last reset, clear counters operation or power-up.

---

**Communications**

---

This is the number of CRC (Cyclical Redundancy Check) errors. The CRC validates the data for errors. Messages with an invalid CRC are not processed by *AXIMA*. CRC errors are an indication of poor signal integrity usually caused by electrical noise, poor grounding, or broken cables.

---

**Exceptions**

---

This is the number of Modbus exception responses. If a Modbus message is received without a communications error, but cannot be handled by *AXIMA*, an exception response is returned to the operator interface (master) and this counter is incremented. Exceptions are caused by either an Illegal Data Address, Illegal Function, a Slave Device Failure.

**Illegal Data Address**

The data address received in the query is not defined. This exception only applies to Modbus registers in the 4xxx range or Modbus coils in the 08000-09999 range. The exception will occur only if the Local Variable mapped to the Modbus register has not been created because its program has not been run.

**Illegal Function**

The function code received in the message is not supported.

**Slave Device Failure**

An unrecoverable error occurred while attempting to perform the requested action (no response from the controller board).

The number of directly addressed messages for which no response at all was returned. This may occur if the response to a message is not ready before a second message is received.

---

### Overrun

---

The number of character or message overruns. An overrun can occur if data characters arrive at the hardware port faster than they can be processed, or if additional characters are received while processing a previously received message. If the overrun is due to the software input buffer being filled, the buffer will be cleared and the processing will wait for a new message.

## AXIMA Errors

AXIMA Errors are interface errors that occur between the CP card and the *AXIMA* controller. This includes interface setup and variable assignment errors. If an *AXIMA* error is detected when the Diagnostic dialog box is displayed, an error description will be displayed and appended to the Error field. The Error field is cleared out when the dialog box is closed, or either the *Clear* or *Reset* button is pressed.

The following is a list of error types and their descriptions that can occur:

Error	Description
Invalid Setup Data	<i>AXIMA will display the specific Modbus error. The possibilities are:</i> Communications Protocol Handshake Node address Baud rate
Duplicate Modbus Assignment	Assign: <i>number</i> Var: <i>name</i> .
AXIMA Connectivity Processor Not Initialized	Cannot respond until initialized.
Invalid AXIMA Firmware	Rev. A5 or later required.

---

### Error History

---

The Error list contains all *AXIMA* Errors observed since launching this dialog or since the last time either the *Clear* or *Reset* button was clicked. The messages are numbered in the order in which they were observed. “Error” or “Warning” indicates that the device was in the Handshake mode when the error was observed. The history is only updated when the message changes.

## Modbus Interface Operation

This section describes the details of the EMERSON Motion Control's Modbus implementation. It is provided for those users who are creating a custom Modbus driver (master) to interface with the *AXIMA* controller.

### Bit Data

Bit data includes; coils (0xxxx) and input bits (1xxxx). To provide access to this data the following function codes are supported:

- Read function code 01 = (Read coil status)
- Read function code 02 = (Read input bit status)
- Write function code 05 = (Force single coil)
- Write function code 15 = (Force multiple coils)

If the read address is not assigned, the data that is returned is meaningless and unknown. If a write address is not assigned, the data will not be written to the register.

### Registers

Register data includes; read only (3xxxx) and read/write (4xxxx). The Modbus specification defines 16 bit registers and 16 bit data access. All *AXIMA* integer and floating point data is 32 bits (64 bit floats are truncated). *AXIMA* data is always assigned to two consecutive Modbus registers.

- Read function code 04 = (Read registers 3xxxx)
- Read function code 03 = (Read registers 4xxxx)
- Write function code 06 = (Preset single register 4xxxx)
- Write function code 16 = (Preset multiple registers 4xxxx)

If the read address is not assigned, the data that is returned is meaningless and unknown. If a write address is not assigned, the data will not be written to the register.

### Diagnostics/Exceptions

The EMERSON Motion Control's Modbus interface supports function code eight. This function code uses a two-byte sub-function code field to define the type of data to be returned. The Modbus interface supports the following diagnostic subfunction codes:

00	Return Query Data (loopback)
10	Clear Counters and Diagnostics Registers
12	Return Bus Communication Error Count
13	Return Bus Exception Error Count
14	Return Slave Message Count
18	Return Bus Character Overrun Count

If a Modbus message is received without a communications error, but the message cannot be processed an exception code is returned.

- Exception code 01, **ILLEGAL FUNCTION CODE**: The function code received in the message is not supported.
- Exception code 02, **ILLEGAL DATA ADDRESS**: The data address received in the message is not assigned. This exception only applies to Modbus registers in the 4xxxx range or Modbus coils in the 08000-09999 range. This exception will occur only if the local variable assigned to the Modbus register has not been created because its program has not been run.
- An unrecoverable error occurred while attempting to perform the requested action (no response from the multi-axis controller). Return an exception code 04, **SLAVE DEVICE FAILURE**.

## Data Handling

No data values are considered out of range and no odd register boundary checking is done on read or write. If most/least significant half of a 32 bit register is written, the least/most significant half of the data will be masked.

## Broadcast Messages

The EMERSON Motion Control's Modbus interface supports broadcast messages. A broadcast message is received and processed by multiple slaves. There is no response generated by the *AXIMA* controller to broadcast messages. Only write function codes should be broadcast.

## Data Highway Plus Interface Setup Dialog Box

After enabling *Data Highway Plus (DH+)* in the Controller Options dialog box, select Data Highway Plus in the hierarchy view. Next, double click on any item in the details view to display the Data Highway Plus Interface Setup dialog box which allows modification of the Baud Rate and Node Address.

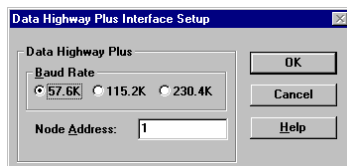


Figure 4: Data Highway Plus Interface Setup Dialog Box

---

### Baud Rate

---

Select the baud rate for the DH+ connection. Either 57.6K, 115.2K or 230.4K baud.

---

## Node Address

---

This is the DH+ node number assigned to *AXIMA* controller. This address must be unique on the DH+ network and has a range of 1 to 63.

## Data Highway Plus Addresses

*AXIMA* variables must be assigned an address to be accessed using the DH+ interface. Some Pre-defined Variables have pre-assigned addresses. These pre-assigned addresses conform to the DH+ protocol standard for bit, integer, and floating point data. Variables which are not pre-assigned may be user assigned. User assigned addresses must also use the DH+ standard for addressing. This section describes the addressing details.

User assigned addresses are assigned using either the Variable List or Variable Define dialog boxes.

DH+ defines addresses by file and index number. Supported addresses are shown below.

File: Index Range	Data Type	Access
I:1-4	Bit	Read Only
O:1-4	Bit	Read/Write
B3:Ø - B3:999	Bit	Read/Write
N7:Ø - N7:999	Integer (16 bits)	Read/Write
F8:Ø - F8:999	Floating Point (32 bits)	Read/Write

*AXIMA* digital inputs are pre-assigned as to the DH+ inputs (File I1), *AXIMA* digital outputs pre-assigned as DH+ outputs (File OØ). All other pre-assigned bit variables are accessed from file B3. *AXIMA* Global Variables are not pre-assigned for DH+.

For user assigned variables the valid ranges are; B3:2ØØ - B3:999, N7:Ø - N7:999, F8:Ø - F8:999. If more DH+ files are needed for large data applications the DH+ interface supports file numbers of 10 or greater. Any one file (number > 10) must have only one data type. For example, file number 10 must contain integer and only integer data, floating point and bit data may not be mixed.

*AXIMA* variables (including arrays) cannot cross over DH+ files. An array variable must be entirely contained within one DH+ file. Arrays may have a maximum of 1000 elements. only bits in the following ranges are pre-assigned; I:1-4, O:1-4, B3:1-56.

Any Pre-defined Variables with pre-assigned address can not be reassigned by the user.

## Data Highway Plus Translation

AXIMA allows certain mixed type assignments -- the processor DH+ firmware converts to the desired DH+ type as shown in the table below. Mixed type assignments that are not allowed will generate a warning. Any loss of precision during type conversion is ignored. The DH+ bit number field is ignored for integer and floating point types.

Read/Write	DH+	Controller	Bits	Comments
R or W	Bx:y/z	Global bit	1	OK
R or W	Bx:y/z	Local bit (LV)	1	Data in LV: 0=0; non-zero=1
R or W	Bx:y/z	Pre-assigned bits	1	OK
R or W	Fx:y	Bits	1	Not allowed
R or W	Nx:y	Bits	1	Not allowed
R or W	Bx:y/z	Floats, Ints	---	Not allowed
R or W	Fx:y	Floats (SV, SA)	32	OK
R or W	Fx:y	Floats (DV, DA, Global P)	32	OK, but floats are 64 bit internal to controller yet r/w as 32 bit floats
R	Nx:y, Nx:y+1	Floats (DV, DA, SV, SA, Global P)	32	Translated: Bad data if $> 2^{**31}$ ; Rounding
W	Nx:y, Nx:y+1	Floats (DV, DA, SV, SA, Global P)	32	Translated: May lose resolution (e.g., if data $> 2^{**23}$ )
R	Nx:y	Floats (DV, DA, SV, SA, Global P)	16	Return zeros
W	Nx:y	Floats (DV, DA, SV, SA, Global P)	16	Do not write, but respond OK
R or W	Nx:y, Nx:y+1	Ints (LA, LV)	32	OK, but must be handled in PLC (additional overhead)
R	Fx:y	Ints (LA, LV)	32	Translated: May lose resolution (e.g., if data $> 2^{**23}$ )
W	Fx:y	Ints (LA, LV)	32	Translated: Bad data if $> 2^{**31}$ ; Rounding
R	Nx:y	Ints (LA, LV)	16	Only proper 16 bits of integer is read
W	Nx:y	Ints (LA, LV)	16	Written into proper 16 bits

\* We will support 32 bit integers.  
 For Nx:y, Nx:y+1 -- the low order 16 bits are in Nx:y  
 (y can be odd or even)  
 For Fx:y -- 32 bit elements only.



## DH+ Diagnostics Tab (AXIMA Analyzer)

Data Highway + (DH+) diagnostics are provided to diagnose cable, noise, or other DH+ specific errors. To access the diagnostics you must:

- Be online with an *AXIMA* controller equipped with the DH+ option (hardware).
- Have the *DH+* option enabled in the Controller Options dialog box when the application was downloaded.
- Highlight *DH+* item in the hierarchy view and then select Diagnostics from the Tools menu.

The DH+ connectivity diagnostic data is divided into eight groups. Each group and its information is explained below, along with the *Clear* and *Reset* buttons.

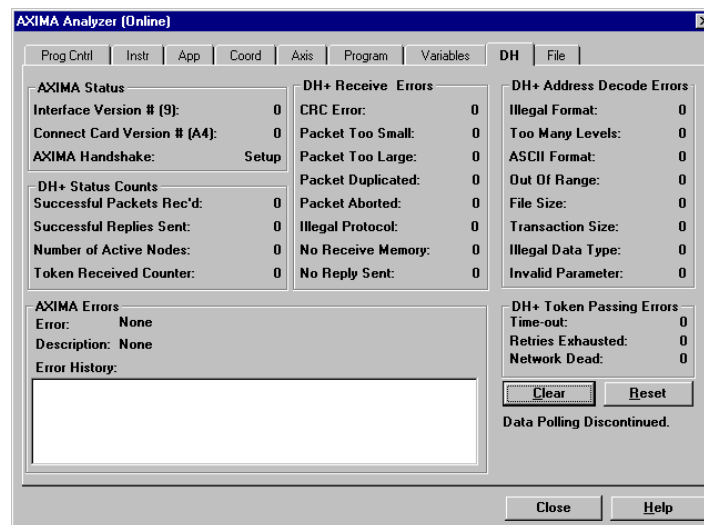


Figure 5 Data Highway Plus (DH+) Tab

### Clear Button

This button clears the *Error Counters* and Error History data.

### Reset Button

This button resets the DH+ interface. It also resets all *Error Counters*, *Error History* and *AXIMA Status* counters to zero. The *Reset* button also clears out the Error History Box in this dialog.

## AXIMA Status

The AXIMA Status area displays status information pertaining to the firmware version number and the current handshaking mode status.

---

### Interface Version # (9)

---

Displays the connectivity card's connectivity interface version. The interface version is for factory use only. The (9) indicates the AX-WIN connectivity interface version. These must match. The DH+ will not run if there is a mismatch.

---

### Connect Card Version # (A4)

---

Displays the connectivity card's version number. The (A4) indicates AX-WIN supports up to A4. The DH+ will run if there is a mismatch. This revision indicates non-critical differences. In most cases this is additional pre-assigned addresses, and support accessing new AXIMA Pre-defined Variables.

See "Connectivity Card Firmware Compatibility" on page 1.

---

### AXIMA Handshake

---

Displays the handshake mode status which can be any of the following:

Handshake	Set by	Purpose
OK	CP card	Indicates last handshake was processed with no errors or warnings.
Setup	AXIMA Power-up AXIMA Download AXIMA Diagnostics	Handshake indicating that new setup data is available.
Update	AXIMA Diagnostics	Handshake request for diagnostic data update.
Clear	AXIMA Diagnostics	Handshake requesting a clear of all diagnostics counters.
Offline	AXIMA Download AXIMA Diagnostics	Handshake request to shutdown the connectivity interface.

Handshake	Set by	Purpose
Warning	CP card	Indicates last handshake was processed with a warning. An warning indicates the Modbus interface is operational but is using defaults or has not mapped the variable that caused the warning.
Error	Connectivity Firmware	Indicates last handshake was processed with an error. An error indicates the Modbus interface is not operational.

An unchanging handshake of Setup, Update, Clear or Offline indicates that the CP card is not responding.

## DH+ Status Counts

The following are diagnostic counters and not error counters:

---

### Successful Packets

---

The number of packets successfully received and processed.

---

### Successful Replies Sent

---

The number of replies successfully generated and transmitted.

---

### Number of Active Nodes

---

This is the total number of active nodes on the DH+ network, including this node.

---

### Token Received Counter

---

The number of tokens claimed by this node. This value will be consistently incrementing.

## DH+ Receive Errors

The following counters increment whenever a NAK (Negative Acknowledge) is transmitted by this node.

---

**CRC Error**

---

The number of packets received with an invalid CRC.

---

**Packet Too Small**

---

The number of packets received with too few bytes.

---

**Packet Too large**

---

The number of packets received with too many bytes.

---

**Packet Duplicated**

---

The number of packets received with the same transaction number as the previous message. The packet is discarded.

---

**Packet Aborted**

---

The number of packets aborted before the packet was completely received. This is usually caused by the sender aborting the packet.

---

**Illegal Protocol**

---

The number of packets received with less than the minimum number of bytes.

---

**No Receive Memory**

---

The number of packets not processed because no buffer memory was available.

---

**No Reply Sent**

---

The number of packets which could not be transmitted because the destination node is not on DH+ network.

## **DH+ Address Decode Errors**

The following are DH+ address decoding errors.

---

**Illegal Format**

---

Host has a problem and will not communicate. *AXIMA* does not respond. The request must be a PLC-5 typed write, typed read, read-modify-write, word read, or word write.

---

**Too Many Levels**

---

More address levels (4) specified than *AXIMA* supports.

---

**ASCII Format**

---

The ASCII address received was not an valid format. Word read and word write expect ASCII format.

---

**Out Of Range**

---

The data at the address specified in the packet is not available. This may be caused by the:

- File number being greater than 999.
- Local variable not assigned (does not know size of data to return).
- Local variable assigned but not created or the file is not defined.

---

**File Size**

---

The address specified is outside of the file range. This may be caused by attempting to access file elements greater than 999.

---

**Transaction Size**

---

Transaction size plus word address too large. Tried to read or write element greater than 999.

---

**Illegal Data Type**

---

The data type in the packet does not match the data in the *AXIMA*. This may be caused by the:

- File defined previously as a different type that cannot be converted.
- Typed read or typed write must be integers or floats.
- Typed write of integers must be two byte integers.

---

**Invalid Parameter**

---

The data in this packet is invalid and may be caused by any of the following errors:

- Word read or write must be integer; float, input, output, or bit type.
- Typed read or write must be integer or float.
- Typed write of floats must be four byte floats.
- Word read message length invalid.

- Typed write message format is incorrect.
- Word read or write cannot be more than 240 bytes.
- Typed read of integers cannot be more than 120 words.
- Typed read of floats cannot be more than 60 four byte floats.

## DH+ Token Passing Errors

DH+ determines network access privileges based on passing a token. Only the node with the token may transmit. These counters increment if there are problems with the token passing.

---

### Time-out

---

The number of times this node generated a token which did not result in communication activity. Three retries are generated by this node.

---

### Retries Exhausted

---

The card retries the token pass up to three times, then increments this counter. It also takes the destination out of the active station list and tries to pass the token to its successor.

---

### Network Dead

---

The number of times this node detected no communications activity (including no tokens).

## AXIMA Errors

AXIMA Errors are interface errors that occur between the CP card and the AXIMA controller. This includes interface setup and variable assignment errors. If an AXIMA error is detected when the Diagnostic dialog box is displayed, an error description will be displayed and appended to the Error History box. The Error History is cleared out when the dialog box is closed, or either the *Clear* or *Reset* button is pressed.

The following is a list of error types and their descriptions that can occur:

Error	Description
Invalid Setup Data	AXIMA will display the specific Modbus error. The possibilities are: Node address Baud rate
Duplicate DH+ Assignment	Asgn: <i>number</i> Var: <i>name</i> .
AXIMA Connectivity Processor Not Initialized	Cannot respond until initialized.
Invalid AXIMA Firmware	Rev. A5 or later required.

---

## Error History

---

The Error list contains all *AXIMA* Errors observed since launching this dialog or since the last time either the *Clear* or *Reset* button was clicked. The messages are numbered in the order in which they were observed. “Error” or “Warning” indicates that the device was in the Handshake mode when the error was observed. The history is only updated when the message changes.

## Assigning Connectivity Addresses

This section describes the connectivity extensions to the Variable Definition and Variable List dialog boxes.

Modbus registers and DH+ file elements may be assigned to *AXIMA* variables when you define a new variable using the Variable Definition dialog box, or to an existing variable in the Variables List dialog box.

Most Pre-defined Variables have a pre-assigned connectivity address (either Modbus or DH+). Any variable that is pre-assigned may not be reassigned by the user to a different address.

All Local, Global and some Pre-defined Variables are user assigned.

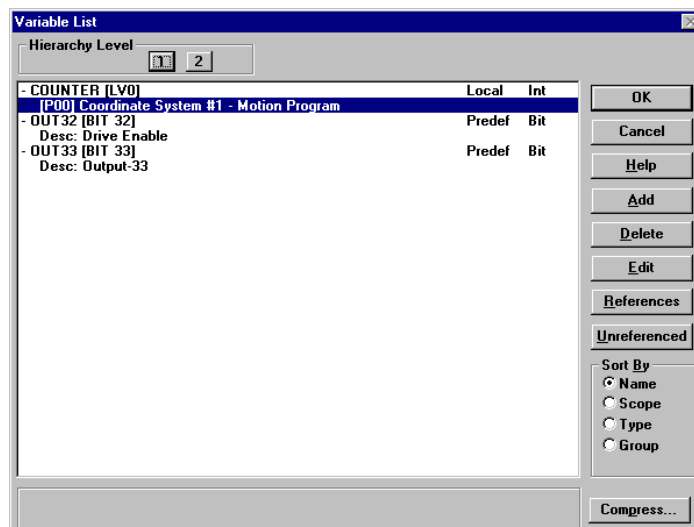


Figure 6 Variable List Dialog Box

### Assign Button

This button assign the currently displayed connectivity address to the highlighted variable. This button is grayed if the highlighted variable has a pre-assigned Modbus or DH+ address.

In the Variable List dialog box, the *Assign* button contains the next available Modbus address (40023). Available addresses must support the complete data for the variable (including arrays). Pressing the *Assign* button will assign the address shown to the variable.

### Clear Button

Clears the Modbus or DH+ address of the highlighted variable. This button is grayed if the highlighted variable has a pre-assigned Modbus or DH+ address.

---

### Address Data Box

---

The Address data box may be empty if the highlighted variable does not have a connectivity address assigned. After you click the *Assign* button, the assigned Modbus or DH+ address will be displayed.

If the highlighted variable is pre-assigned, it's Modbus or DH+ address is displayed (grayed) in the address data box.

If the highlighted variable is user assigned, you can change the address by typing over the data.

**NOTE: If your system is configured for Data Highway Plus, in the Controller Options dialog box, the field name "Modbus Address" will be changed to "DH+ Address".**

## Procedure

From the Variables List dialog box, the following procedure may be used to assign Modbus or DH+ addresses.

1. Highlight a variable in the Variable List dialog box.
2. Next, type in a connectivity address (Modbus or DH+) in the *Address* data box or click on the *Assign* button.
3. Select another variable.

Repeat steps 2 and 3 to assign Modbus or DH+ addresses to more variables.

Modbus and DH+ addresses are incremented to the next available address when the *Assign* button is clicked. You can override the address by entering a new address.

To un-assign a Modbus or DH+ address, highlight the variable, then click on the *Clear* button.



# Pre-defined Variable Connectivity Addresses

When using generic parameter and bit references, care should be taken to determine the correct axis and coordinate system reference numbers. Notice that coordinate system and axis numbers range from 0 to 7 and program numbers range from 0 through 14. AX-WIN assigns numbers in the order they are created. Since you can assign any encoder and DAC number to an axis, the axis numbers (0 to 7) do not necessarily correspond directly to the axis connector numbers (1 to 8).

To determine the generic parameter reference number, select the Advanced option from the Options menu then print out your Application. The reference numbers for user variables can also be found in the Variable dialog box after selecting the Advanced option.

The following conventions are used in the address and flag tables:

AXIMA reference addresses are in **BOLD** type.

(U/A) = User Assigned.

## Modbus Addresses

### Bit Identifiers

#### Inputs

P4096

Bit Description	AXIMA Classic	AXIMA 2000/4000
Input # 00	10001	
Input # 01	10002	10001
Input # 02	10003	10002
Input # 03	10004	10003
Input # 04	10005	10004
Input # 05	10006	10005
Input # 06	10007	10006
Input # 07	10008	10007
Input # 08	10009	10008
Input # 09	10010	10009
Input # 10	10011	10010
Input # 11	10012	10011

## AXIMA Connectivity Manual

Input # 12	10013	10012
Input # 13	10014	10013
Input # 14	10015	10014
Input # 15	10016	10015
Input # 16	10017	10016
Input # 17	10018	
Input # 18	10019	
Input # 19	10020	
Input # 20	10021	
Input # 21	10022	
Input # 22	10023	
Input # 23	10024	
Input # 24	10025	
Input # 25	10026	
Input # 26	10027	
Input # 27	10028	
Input # 28	10029	
Input # 29	10030	
Input # 30	10031	
Input # 31	10032	

## Outputs

**P4097**

AXIMA Classic		AXIMA 2000/4000	
Output # 32	00033		
Output # 33	00034		
Output # 34	00035		
Output # 35	00036		
Output # 36	00037	Output # 01	00037
Output # 37	00038	Output # 02	00038
Output # 38	00039	Output # 03	00039
Output # 39	00040	Output # 04	00040
Output # 40	00041	Output # 05	00041
Output # 41	00042	Output # 06	00042
Output # 42	00043	Output # 07	00043
Output # 43	00044	Output # 08	00044
Output # 44	00045	Output # 09	00045
Output # 45	00046	Output # 10	00046
Output # 46	00047	Output # 11	00047
Output # 47	00048	Output # 12	00048

### Pre-defined Variable Connectivity Addresses

Output # 48	00049		
Output # 49	00050		
Output # 50	00051		
Output # 51	00052		
Output # 52	00053		
Output # 53	00054		
Output # 54	00055		
Output # 55	00056		
Output # 56	00057		
Output # 57	00058		
Output # 58	00059		
Output # 59	00060		
Output # 60	00061		
Output # 61	00062		
Output # 62	00063		
Output # 63	00064		

## Dedicated I/O

Dedicated I/O Bits	Axis Number			
	1	2	3	4
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Drive Enable*	00033 32	00034 33	00035 34	00036 35
Limit CW*	11825 1824	11826 1825	11827 1826	11828 1827
Limit CCW*	11829 1828	11830 1829	11831 1830	11832 1831
Drive Status*	11837 1836	11838 1837	11839 1838	11840 1839

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

## Coordinate System

P4112 - P4119

Status Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Accelerating	10513 512	10545 544	10577 576	10609 608	10641 640	10673 672	10705 704	10737 736
Decelerating	10514 513	10546 545	10578 577	10610 609	10642 641	10674 673	10706 705	10738 737
Stopping	10515 514	10547 546	10579 578	10611 610	10643 642	10675 674	10707 706	10739 738
In S-Curve	10516 515	10548 547	10580 579	10612 611	10645 643	10676 675	10708 707	10740 739
In Motion	10517 516	10549 548	10581 580	10613 612	10646 644	10677 676	10709 708	10741 740
Move Buffered	10518 517	10550 549	10582 581	10614 613	10647 645	10679 677	10710 709	10742 741
Feedholding	10519 518	10551 550	10583 582	10615 614	10648 646	10680 678	10711 710	10743 742
In Feedhold	10520 519	10552 551	10584 583	10616 615	10649 647	10681 679	10712 711	10744 743

## Pre-defined Variable Connectivity Addresses

Control Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Feedhold Request	00521 520	00553 552	00585 584	00617 616	00649 648	00681 680	00713 712	00745 744
Cycle Start Request	00522 521	00554 553	00586 585	00618 617	00650 649	00682 681	00714 713	00746 745
Kill Move Request	00523 522	00555 554	00587 586	00619 618	00651 650	00683 682	00715 714	00747 746
Stop Move Request	00524 523	00556 555	00588 587	00620 619	00652 651	00684 683	00716 715	00748 747
Final Velocity Zero Pending	10525 524	10557 556	10589 588	10621 620	10653 652	10685 684	10717 716	10749 748
Final Velocity Zero Active	10526 525	10558 557	10590 589	10622 621	10654 653	10686 685	10718 717	10750 749
Feedrate Override Lock Pending	10527 526	10559 558	10591 590	10623 622	10655 654	10687 686	10719 718	10751 750
Feedrate Override Lock Active	10528 527	10560 559	10592 591	10624 623	10656 655	10688 687	10720 719	10752 751

Limit Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Not In Position Band	10529 528	10561 560	10593 592	10625 624	10657 656	10689 688	10721 720	10753 752
Not Following Error	10530 529	10562 561	10594 593	10626 625	10658 657	10690 689	10722 721	10754 753
Within Travel Limit A	10531 530	10563 562	10595 594	10627 626	10659 658	10691 690	10723 722	10755 754
Not Within Travel Limit B	10532 531	10564 563	10596 595	10628 627	10660 669	10692 691	10724 723	10756 755
Not Command Limit	10533 532	10565 564	10597 596	10629 628	10661 660	10693 692	10725 724	10757 756
Not In Command Band	10534 533	10566 565	10598 597	10630 629	10662 661	10694 693	10726 725	10758 757

Sequence Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Set Decrement Move Count	10537 536	10569 568	10601 600	10633 632	10665 664	10697 696	10729 728	10761 760

## AXIMA Connectivity Manual

Sequence Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Set Increment Move Count	10538 537	10570 569	10602 601	10634 633	10666 665	10698 697	10730 729	10762 761
Trigger ISA AT Bus Interrupt On Move	10539 538	10571 570	10603 602	10635 634	10667 666	10699 698	10731 730	10763 762
Move Trigger Pending	10540 539	10572 571	10604 603	10636 635	10668 667	10700 699	10732 731	10764 763
Start Move Inhibit	10541 540	10573 572	10605 604	10637 636	10669 668	10701 700	10733 732	10765 764
Encoder Match Request	10542 541	10574 573	10606 605	10638 637	10670 669	10702 701	10734 733	10766 765
Cycle Start Lockout	10543 542	10575 574	10607 606	10639 638	10671 670	10703 702	10735 734	10767 766

## Axis

## P4120 - P4127

Limit Bits	Axis Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Not In Position	10769 768	10801 800	10833 832	10865 864	10897 896	10929 928	10961 960	10993 992
Not Following Error	10770 769	10802 801	10834 833	10866 865	10898 897	10930 929	10962 961	10994 993
Within Travel Limit A	10771 770	10803 802	10835 834	10867 866	10899 898	10931 930	10963 962	10995 994
Not Within Travel Limit B	10772 771	10804 803	10836 835	10868 867	10900 899	10932 931	10964 963	10996 995
Not Command Limit	10773 772	10805 804	10837 836	10869 868	10901 900	10933 932	10965 964	10997 996
Not In Command Band	10774 773	10806 805	10838 837	10870 869	10902 901	10934 933	10966 965	10998 997

Status Bits	Axis Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Not Marker	10777 776	10809 808	10841 840	10873 872	10905 904	10937 936	10969 968	11001 1000
Encoder Captured	10778 777	10810 809	10842 841	10874 873	10906 905	10938 937	10970 969	11002 1001

## Pre-defined Variable Connectivity Addresses

Status Bits	Axis Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Registration Move Captured	10779 778	10811 810	10843 842	10875 874	10907 906	10939 938	10971 970	11003 1002
Registration Move Aborted	10780 779	10812 811	10844 843	10876 875	10908 907	10940 939	10972 971	11004 1003
Sinusoidal Mode	10781 780	10813 812	10845 844	10877 876	10909 908	10941 940	10973 972	11005 1004
Gear Lock	10782 781	10814 813	10846 845	10878 877	10910 909	10942 941	10974 973	11006 1005
Gear At Speed	10783 782	10815 814	10847 846	10879 878	10911 910	10943 942	10975 974	11007 1006
Gear Stopping	10784 783	10816 815	10848 847	10880 879	10912 911	10944 943	10976 975	11008 1007

Control Bits	Axis Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Clamp Output Signal	10785 784	10817 816	10849 848	10881 880	10913 912	10945 944	10977 976	11009 1008
Open Servo Loop	10786 785	10818 817	10850 849	10882 881	10914 913	10946 945	10978 977	11010 1009
Filter Activate	10787 786	10819 818	10851 850	10883 882	10915 914	10947 946	10979 978	11011 1010
Encoder Match Request	10788 787	10820 819	10852 851	10884 883	10916 915	10948 947	10980 979	11012 1011
Gear Activate	10789 788	10821 820	10853 852	10885 884	10917 916	10949 948	10981 980	11013 1012
Gear Active	10790 789	10822 821	10854 853	10886 885	10918 917	10950 949	10982 981	11014 1013
Cam Activate	10791 790	10823 822	10855 854	10887 886	10919 918	10951 950	10983 982	11015 1014
Ball screw Activate	10792 791	10824 823	10856 855	10888 887	10920 919	10952 951	10984 983	11016 1015

Jog Bits	Axis Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Jog Active	10793 792	10825 824	10857 856	10889 888	10921 920	10953 952	10985 984	11017 1016
Jog Direction	10794 793	10826 825	10858 857	10890 889	10922 921	10954 953	10986 985	11018 1017

## AXIMA Connectivity Manual

Jog Bits	Axis Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Jog At Speed	10795 794	10827 826	10859 858	10891 890	10923 922	10955 954	10987 986	11019 1018
Jog Stopping	10796 795	10828 827	10860 859	10892 891	10924 923	10956 955	10988 987	11020 1019
Jog Forward	10797 796	10829 828	10861 860	10893 892	10925 924	10957 956	10989 988	11021 1020
Jog Reverse	10798 797	10830 829	10862 861	10894 893	10926 925	10958 957	10990 989	11022 1021
Jog Limit Check	10799 798	10831 830	10863 862	10895 894	10927 926	10959 958	10991 990	11023 1022
Jog Lockout	10800 799	10832 831	10864 863	10896 895	10928 927	10960 959	10992 991	11024 1023

### Secondary Axis

**P4168 - P4175**

Control Bits	Axis Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Positive Direction Limit*	12305 2304	12337 2336	12369 2366	12401 2400	12433 2432	12465 2464	12497 2496	12529 2528
Negative Direction Limit*	12306 2305	12338 2337	12370 2369	12402 2401	12434 2433	12466 2465	12498 2497	12530 2529
Direction Limit Activate*	12307 2306	12339 2338	12371 2370	12403 2402	12435 2434	12467 2466	12499 2498	12531 2530
Direction Limit Tripped*	12308 2307	12340 2339	12372 2371	12404 2403	12436 2435	12468 2467	12500 2499	12532 2531

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

### Program: 0... 7

**P4128 - P4135**

Status Bits	Program Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Program Running	11025 1024	11057 1056	11089 1088	11121 1120	11153 1152	11185 1184	11217 1216	11249 1248
Program Dwelling	11026 1025	11058 1057	11090 1089	11122 1121	11154 1153	11186 1185	11218 1217	11250 1249



Pre-defined Variable Connectivity Addresses

Status Bits	Program Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Program Inhibited	11027 1026	11059 1058	11091 1090	11123 1122	11155 1154	11187 1186	11219 1218	11251 1250
Move Pending	11028 1027	11060 1059	11092 1091	11124 1123	11156 1155	11188 1187	11220 1219	11252 1251
Program Timeout	11029 1028	11061 1060	11093 1092	11125 1124	11157 1156	11189 1188	11221 1220	11253 1252
Program Modified	11030 1029	11062 1061	11094 1093	11126 1125	11158 1157	11190 1189	11222 1221	11254 1253

Control Bits	Program Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Run Request	11033 1032	11065 1064	11097 1096	11129 1128	11161 1160	11193 1192	11225 1224	11257 1256
Halt Request	11034 1033	11066 1065	11098 1097	11130 1129	11162 1161	11194 1193	11226 1225	11258 1257

**Program: 8... 15**

**P4136 - P4143**

Status Bits	Program Number							
	8	9	10	11	12	13	14	15
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Program Running	11281 1280	11313 1312	11345 1344	11377 1376	11409 1408	11441 1440	11473 1472	11505 1504*
Program Dwelling	11282 1281	11314 1313	11346 1345	11378 1377	11410 1409	11442 1441	11474 1473	11506 1505
Program Inhibited	11283 1282	11315 1314	11347 1346	11379 1378	11411 1410	11443 1442	11475 1474	11507 1506
Move Pending	11284 1283	11316 1315	11348 1347	11380 1379	11412 1411	11444 1443	11476 1475	11508 1507
Program Timeout	11285 1284	11317 1316	11349 1348	11381 1380	11413 1412	11445 1444	11477 1476	11509 1508
Program Modified	11286 1285	11318 1317	11350 1349	11382 1381	11414 1413	11446 1445	11478 1477	11510 1509

\* AXIMA is Initializing.

Control Bits	Program Number							
	8	9	10	11	12	13	14	15
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Run Request	11289 1288	11321 1320	11353 1352	11385 1384	11417 1416	11449 1448	11481 1480	11513 1513
Halt Request	11290 1289	11322 1321	11354 1353	11386 1385	11418 1417	11450 1449	11482 1481	11514 1514

**PLC**

**P4144 - P4151**

PLC Bits	PLC Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Running	11537 1536	11569 1568	11601 1600	11633 1632	11665 1664	11697 1696	11729 1728	11761 1760
First Scan	11538 1537	11570 1569	11602 1601	11634 1633	11666 1665	11698 1697	11730 1729	11762 1761
Run Request	11539 1538	11571 1570	11603 1602	11635 1634	11667 1666	11699 1698	11731 1730	11763 1762
Halt Request	11540 1539	11572 1571	11604 1603	11636 1635	11668 1667	11670 1699	11732 1731	11764 1763

**Command Outputs**

**P4144 - P4151**

Stepper Bits	PLC Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Stepper Direction*	11545 1544	11577 1576	11609 1608	11641 1640	11673 1672	11705 1704	11737 1736	11769 1768
Stepper Low Power*	11546 1545	11578 1577	11610 1609	11642 1641	11674 1673	11706 1705	11738 1737	11770 1769

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

**Expanded Inputs****P4104 and P4106**

Bit Description	Expansion I/O Board Number	
	Input Bank 0	Input Bank 1*
Expanded # 00	10257 256	10321 320
Expanded # 01	10258 257	10322 321
Expanded # 02	10259 258	10323 322
Expanded # 03	10260 259	10324 323
Expanded # 04	10261 260	10325 324
Expanded # 05	10262 261	10326 325
Expanded # 06	10263 262	10327 326
Expanded # 07	10264 263	10328 327
Expanded # 08	10265 264	10329 328
Expanded # 09	10266 265	10330 329
Expanded # 10	10267 266	10331 340
Expanded # 11	10268 267	10332 341
Expanded # 12	10269 268	10333 342
Expanded # 13	10270 269	10334 343
Expanded # 14	10271 270	10335 343
Expanded # 15	10272 271	10336 344
Expanded # 16	10273 272	10337 345
Expanded # 17	10274 273	10338 346
Expanded # 18	10275 274	10339 347
Expanded # 19	10276 275	10340 348
Expanded # 20	10277 276	10341 349
Expanded # 21	10278 277	10342 350

Bit Description	Expansion I/O Board Number	
	Input Bank 0	Input Bank 1*
Expanded # 22	10279 278	10343 351
Expanded # 23	10280 279	10344 352
Expanded # 24	10281 280	10345 353
Expanded # 25	10282 281	10346 354
Expanded # 26	10283 282	10347 355
Expanded # 27	10284 283	10348 356
Expanded # 28	10285 284	10349 357
Expanded # 29	10286 285	10350 358
Expanded # 30	10287 286	10351 359
Expanded # 31	10288 287	10352 360

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

## Expanded Outputs

## P4105 and P4107

Bit Description	Expansion I/O Board Number	
	Output Bank 0	Output Bank 1*
Expanded # 32	00289 288	10353 352
Expanded # 33	00290 289	10354 353
Expanded # 34	00291 290	10355 354
Expanded # 35	00292 291	10356 355
Expanded # 36	00293 292	10357 356
Expanded # 37	00294 293	10358 357
Expanded # 38	00295 294	10359 358
Expanded # 39	00296 295	10360 359
Expanded # 40	00297 296	10361 360

## Pre-defined Variable Connectivity Addresses

Bit Description	Expansion I/O Board Number	
	Output Bank 0	Output Bank 1*
Expanded # 41	00298 297	10362 361
Expanded # 42	00299 298	10363 362
Expanded # 43	00300 299	10364 363
Expanded # 44	00301 300	10365 364
Expanded # 45	00302 301	10366 365
Expanded # 46	00303 302	10367 366
Expanded # 47	00304 303	10368 366
Expanded # 48	00305 304	10369 367
Expanded # 49	00306 305	10370 368
Expanded # 50	00307 306	10371 369
Expanded # 51	00308 307	10372 370
Expanded # 52	00309 308	10373 371
Expanded # 53	00310 309	10374 372
Expanded # 54	00311 310	10375 373
Expanded # 55	00312 311	10376 374
Expanded # 56	00313 312	10377 375
Expanded # 57	00314 313	10378 376
Expanded # 58	00315 314	10379 377
Expanded # 59	00316 315	10380 378
Expanded # 60	00317 316	10381 379
Expanded # 61	00318 317	10382 380
Expanded # 62	00319 318	10383 381
Expanded # 63	00320 319	10384 382

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

## Other

	MB AXIMA
Enable Drives*	11836 1835
AXIMA is Initializing*	11505 1504

## Integer and Floating Point Identifiers

### Encoders/Analog Inputs/ Command Outputs

P6144 - P6527

Encoder Identifiers	Type	Encoder Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Encoder Position	Int	36001 6144	36033 6160	36065 6176	36097 6192	36129 6208	36161 6224	36193 6240	36225 6256
Encoder Velocity	Int	36003 6145	36035 6161	36067 6177	36099 6193	36131 6209	36163 6225	36195 6241	36227 6257

Command Output Identifiers	Type	Command Output Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Command Output # Output	FP32	36513 6400	36545 6416	36577 6432	36609 6448	36641 6464	36673 6480	36705 6496	36737 6512
Reserved	FP32	36515 6401	36547 6417	36579 6433	36611 6449	36643 6465	36675 6481	36707 6497	36739 6513
Command Output # Gain	FP32	36517 6402	36549 6418	36581 6434	36613 6450	36645 6466	36677 6482	36709 6498	36741 6514
Command Output # Offset	FP32	36519 6403	36551 6419	36583 6435	36615 6451	36647 6467	36679 6483	36711 6499	36743 6515

Pre-defined Variable Connectivity Addresses

Analog Input Identifiers	Type	Analog Input Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Analog Input # Input	FP32	36529 6408	36561 6424	36593 6440	36625 6456	36659 6472	36689 6488	36723 6504	36753 6520
Reserved	FP32	36531 6409	36563 6425	36595 6441	36627 6457	36661 6473	36691 6489	36725 6505	36755 6521
Analog Input # Gain	FP32	36533 6410	36565 6426	36597 6442	36629 6458	36663 6474	36693 6490	36727 6506	36757 6522
Analog Input # Offset	FP32	36535 6411	36567 6427	36599 6443	36631 6459	36665 6475	36695 6491	36729 6507	36759 6523

\* Encoder numbers and DAC numbers 0 through 7 correspond to the AXIMA controller axis connector numbers 1 through 8.

Coordinate System

P8192 - P10000

Position Identifiers	Type	Coordinate System Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Distance Into Move	FP32	30001 8192	30257 8448	30513 8704	30769 8960	31025 9216	31281 9472	31537 9728	31793 9984
Vector Velocity	FP32	30003 8193	30259 8449	30515 8705	30771 8961	31027 9217	31283 9473	31539 9729	31795 9985
Vector Acceleration	FP32	30005 8194	30261 8450	30517 8706	30773 8962	31029 9218	31285 9474	31541 9730	31797 9986
Vector S-Curve	FP32	30007 8195	30263 8451	30519 8707	30775 8963	31031 9219	31287 9475	31543 9731	31799 9987
Vector Length	FP32	30009 8196	30265 8452	30521 8708	30777 8964	31033 9220	31289 9476	31545 9732	31801 9988
Target Velocity	FP32	30011 8197	30267 8453	30523 8709	30779 8965	31035 9221	31291 9477	31547 9733	31803 9989
Target Acceleration	FP32	30013 8198	30269 8454	30525 8710	30781 8966	31037 9222	31293 9478	31549 9734	31805 9990
Reserved	FP32	30015 8199	30271 8455	30527 8711	30783 8967	31039 9223	31295 9479	31551 9735	31807 9991
Distance To Go	FP32	30017 8200	30273 8456	30529 8712	30785 8968	31041 9224	31297 9480	31553 9736	31809 9992
Feedrate Override	FP32	(U/A) 8201	(U/A) 8457	(U/A) 8713	(U/A) 8969	(U/A) 9225	(U/A) 9481	(U/A) 9737	(U/A) 9993
Manual Vector	FP32	30021 8202	30277 8458	30533 8714	30789 8970	31045 9226	31301 9482	31557 9738	31813 9994
Total Distance	FP32	(U/A) 8203	(U/A) 8459	(U/A) 8715	(U/A) 8971	(U/A) 9227	(U/A) 9483	(U/A) 9739	(U/A) 9995

## AXIMA Connectivity Manual

Position Identifiers	Type	Coordinate System Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Distance Squared	FP32	30025 8204	30281 8460	30537 8716	30793 8972	31049 9228	31305 9484	31561 9740	31817 9996
Velocity Squared	FP32	30027 8205	30283 8461	30539 8717	30795 8973	31051 9229	31307 9485	31563 9741	31819 9997
Fraction Into Move	FP32	30029 8206	30285 8462	30541 8718	30797 8974	30053 9230	31309 9486	31565 9742	31821 9998
Distance Into Path	FP32	30031 8207	30287 8463	30543 8719	30799 8975	31055 9231	30311 9487	31567 9743	31823 9999
Move Counter	Int	30033 8208	30289 8464	30545 8720	30801 8976	31057 9232	31313 8488	31569 9744	31825 10000

## Axis

## P12288 - P14143

Position Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Profiler Command Position	Int	33001 12288	33257 12544	30513 12800	33769 13056	34025 13312	34281 13568	34537 13824	34793 14080
Target Position	Int	33003 12289	33259 12545	33515 12801	33771 13057	34027 13313	34283 13569	34539 13825	34795 14081
Actual Position	Int	33005 12290	33261 12546	33517 12802	33773 13058	34029 13314	34285 13570	34541 13826	34797 14082
Following Error	Int	33007 12291	33263 12547	33519 12803	33775 13059	34031 13315	34287 13571	34543 13827	34799 14083
Hardware Capture	Int	33009 12292	33265 12548	33521 12804	33777 13060	34033 13316	34289 13572	34545 13828	34801 14084
Software Capture	Int	33011 12293	33267 12549	33523 12805	33779 13061	34035 13317	34291 13573	34547 13829	34803 14085
Primary Setpoint	Int	33013 12294	33269 12550	33525 12806	33781 13062	34037 13318	34293 13574	34549 13830	34805 14086
Secondary Setpoint	Int	33015 12295	33271 12551	33527 12807	33783 13063	34039 13319	34295 13575	34551 13831	34807 14087

Offset Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Gear Command Position	Int	33017 12296	33273 12552	33529 12808	33785 13064	34041 13320	34297 13576	34553 13832	34809 14088



Pre-defined Variable Connectivity Addresses

Offset Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Jog Command Position	Int	33019 12297	33275 12553	33531 12809	33787 13065	34043 13321	34299 13577	34555 13833	34811 14089
Cam Command Position	Int	33021 12298	33277 12554	33533 12810	33789 13066	34045 13322	34301 13578	34557 13834	34813 14090
Ballscrew Compensation	Int	33023 12299	33279 12555	33535 12811	33791 13067	34047 13323	34303 13579	34559 13835	34815 14091
Backlash Compensation	Int	33025 12300	33281 12556	33537 12812	33793 13068	34049 13324	34305 13580	34561 13836	34817 14092

Servo Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Proportional Gain	FP32	(U/A) 12304	(U/A) 12560	(U/A) 12816	(U/A) 13072	(U/A) 13328	(U/A) 13584	(U/A) 13840	(U/A) 14096
Integral Gain	FP32	(U/A) 12305	(U/A) 12561	(U/A) 12817	(U/A) 13073	(U/A) 13329	(U/A) 13585	(U/A) 13841	(U/A) 14097
Integral Limit	FP32	(U/A) 12306	(U/A) 12562	(U/A) 12818	(U/A) 13074	(U/A) 13330	(U/A) 13586	(U/A) 13842	(U/A) 14098
Integral Delay	FP32	(U/A) 12307	(U/A) 12563	(U/A) 12819	(U/A) 13075	(U/A) 13331	(U/A) 13587	(U/A) 13843	(U/A) 14099
Derivative Gain	FP32	(U/A) 12308	(U/A) 12564	(U/A) 12820	(U/A) 13076	(U/A) 13332	(U/A) 13588	(U/A) 13844	(U/A) 14100
Derivative Sample	FP32	(U/A) 12309	(U/A) 12565	(U/A) 12821	(U/A) 13077	(U/A) 13333	(U/A) 13589	(U/A) 13845	(U/A) 14101
Feedforward Velocity	FP32	(U/A) 12310	(U/A) 12566	(U/A) 12822	(U/A) 13078	(U/A) 13334	(U/A) 13590	(U/A) 13846	(U/A) 14102
Feedforward Acceleration	FP32	(U/A) 12311	(U/A) 12567	(U/A) 12823	(U/A) 13079	(U/A) 13335	(U/A) 13591	(U/A) 13847	(U/A) 14103

Monitor Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Proportional Term	FP32	33049 12312	33305 12568	33561 12824	33817 13080	34073 13336	34329 13592	34585 13848	34841 14104
Integral Term	FP32	33051 12313	33307 12569	33563 12825	33819 13081	34075 13337	34331 13593	34587 13849	34843 14105
Derivative Term	FP32	33053 12314	33309 12570	33565 12826	33821 13082	34077 13338	34333 13594	34589 13850	34845 14106
Velocity Term	FP32	33055 12315	33311 12571	33567 12827	33823 13083	34079 13339	34335 13595	34591 13851	34847 14107

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Monitor Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Acceleration Term	FP32	33057 12316	33313 12572	33569 12828	33825 13084	34081 13340	34337 13596	34593 13852	34849 14108
Summation Point	FP32	33059 12317	33315 12573	33571 12829	33827 13085	34083 13341	34339 13597	34595 13853	34851 14109
Filter Output Signal	FP32	33061 12318	33317 12574	33573 12830	33829 13086	34085 13342	34341 13598	34597 13854	34853 14110
Axis Command Output Signal	FP32	33063 12319	33319 12575	33575 12831	33831 13087	34087 13343	34343 13599	34599 13855	34855 14111

Limit Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Following Error Limit Max	FP32	33065 12320	33321 12576	33577 12832	33833 13088	34089 13344	34345 13600	34601 13856	34857 14112
Following Error Limit Min	FP32	33067 12321	33323 12577	33579 12833	33835 13089	34091 13345	34347 13601	34603 13857	34859 14113
In Position Band Max	FP32	33069 12322	33325 12578	33581 12834	33837 13090	34093 13346	34349 13602	34605 13858	34861 14114
In Position Band Min	FP32	33071 12323	33327 12579	33583 12835	33839 13091	34095 13347	34351 13603	34607 13859	34863 14115
Within Travel Limit A Max	FP32	33073 12324	33329 12580	33585 12836	33841 13092	34097 13348	34353 13604	34609 13860	34865 14116
Within Travel Limit A Min	FP32	33075 12325	33331 12581	33587 12837	33843 13093	34099 13349	34355 13605	34611 13861	34867 14117
Within Travel Limit B Max	FP32	33077 12326	33333 12582	33589 12838	33845 13094	34101 13350	34357 13606	34613 13862	34869 14118
Within Travel Limit B Min	FP32	33079 12327	33335 12583	33591 12839	33847 13095	34103 13351	34359 13607	34615 13863	34871 14119
Command Limit Max	FP32	33081 12328	33337 12584	33593 12840	33849 13096	34105 13352	34361 13608	34617 13864	34873 14120
Command Limit Min	FP32	33083 12329	33339 12585	33595 12841	33851 13097	34107 13353	34363 13609	34619 13865	34875 14121
Command Band Max	FP32	33085 12330	33341 12586	33597 12842	33853 13098	34109 13354	34365 13610	34621 13866	34877 14122
Command Band Min	FP32	33087 12331	33343 12587	33599 12843	33855 13099	34111 13355	34367 13611	34623 13867	34879 14123
Backlash Setting	FP32	33089 12332	33345 12588	33601 12844	33857 13100	34113 13356	34369 13612	34625 13868	34881 14124
Reserved	FP32	33091 12333	33347 12589	33603 12845	33859 13101	34115 13357	34371 13613	34627 13869	34883 14125
Jog Limit Max	FP32	33093 12334	33349 12590	33605 12846	33861 13102	34117 13358	34373 13614	34629 13870	34885 14126
Jog Limit Min	FP32	33095 12335	33351 12591	33607 12847	33863 13103	34119 13359	34375 13615	34631 13871	34887 14127

## Pre-defined Variable Connectivity Addresses

Jog Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Jog Velocity - Current	FP32	33117 12346	33373 12602	33629 12858	33885 13114	34141 13370	34397 13626	34653 13882	34909 14138
Jog Acceleration - Current	FP32	33119 12347	33375 12603	33631 12859	33887 13115	34143 13371	34399 13627	34655 13883	34911 14139
Jog Velocity Setting	FP32	33121 12348	33377 12604	33633 12860	33889 13116	34145 13372	34401 13628	34657 13884	34913 14140
Jog Acceleration Setting	FP32	33123 12349	33379 12605	33635 12861	33891 13117	34147 13373	34403 13629	34659 13885	34915 14141
Jog Deceleration Setting	FP32	33125 12350	33381 12606	33637 12862	33893 13118	34149 13374	34405 13630	34661 13886	34917 14142
Jog S-Curve Setting	FP32	33127 12351	33383 12607	33639 12863	33895 13119	34151 13375	34407 13631	34663 13887	34919 14143

## Data Highway Plus Addresses

### Bit Identifiers

#### Inputs

**P4096**

Bit Description	AXIMA Classic	AXIMA 2000/4000
Input # 00	I:1/0	
Input # 01	I:1/1	I:1/0
Input # 02	I:1/2	I:1/1
Input # 03	I:1/3	I:1/2
Input # 04	I:1/4	I:1/3
Input # 05	I:1/5	I:1/4
Input # 06	I:1/6	I:1/5
Input # 07	I:1/7	I:1/6
Input # 08	I:1/10	I:1/7
Input # 09	I:1/11	I:1/10
Input # 10	I:1/12	I:1/11
Input # 11	I:1/13	I:1/12
Input # 12	I:1/14	I:1/13
Input # 13	I:1/15	I:1/14
Input # 14	I:1/16	I:1/15
Input # 15	I:1/17	I:1/16

## AXIMA Connectivity Manual

Input # 16	I:2/0	I:1/17
Input # 17	I:2/1	
Input # 18	I:2/2	
Input # 19	I:2/3	
Input # 20	I:2/4	
Input # 21	I:2/5	
Input # 22	I:2/6	
Input # 23	I:2/7	
Input # 24	I:2/10	
Input # 25	I:2/11	
Input # 26	I:2/12	
Input # 27	I:2/13	
Input # 28	I:2/14	
Input # 29	I:2/15	
Input # 30	I:2/16	
Input # 31	I:2/17	

## Outputs

**P4097**

AXIMA Classic		AXIMA 2000/4000	
Output # 32	O:1/0		
Output # 33	O:1/1		
Output # 34	O:1/2		
Output # 35	O:1/3		
Output # 36	O:1/4	Output # 01	O:1/4
Output # 37	O:1/5	Output # 02	O:1/5
Output # 38	O:1/6	Output # 03	O:1/6
Output # 39	O:1/7	Output # 04	O:1/7
Output # 40	O:1/10	Output # 05	O:1/10
Output # 41	O:1/11	Output # 06	O:1/11
Output # 42	O:1/12	Output # 07	O:1/12
Output # 43	O:1/13	Output # 08	O:1/13
Output # 44	O:1/14	Output # 09	O:1/14
Output # 45	O:1/15	Output # 10	O:1/15
Output # 46	O:1/16	Output # 11	O:1/16
Output # 47	O:1/17	Output # 12	O:1/17
Output # 48	O:2/0		
Output # 49	O:2/1		
Output # 50	O:2/2		

## Pre-defined Variable Connectivity Addresses

Output # 51	O:2/3		
Output # 52	O:2/4		
Output # 53	O:2/5		
Output # 54	O:2/6		
Output # 55	O:2/7		
Output # 56	O:2/10		
Output # 57	O:2/11		
Output # 58	O:2/12		
Output # 59	O:2/13		
Output # 60	O:2/14		
Output # 61	O:2/15		
Output # 62	O:2/16		
Output # 63	O:2/17		

## Dedicated I/O

Dedicated I/O Bits	Axis Number			
	1	2	3	4
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Drive Enable*	O:1/0 32	O:1/1 33	O:1/2 34	O:1/3 35
Limit CW*	B3:65/0 1824	B3:65/1 1825	B3:65/2 1826	B3:65/3 1827
Limit CCW*	B3:65/4 1828	B3:65/5 1829	B3:65/6 1830	B3:65/7 1831
Drive Status*	B3:65/12 1836	B3:65/13 1837	B3:65/14 1838	B3:65/15 1839

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

## Coordinate System

P4112 - P4119

Status Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Accelerating	B3:1/0 512	B3:3/0 544	B3:5/0 576	B3:7/0 608	B3:9/0 640	B3:11/0 672	B3:13/0 704	B3:15/0 736
Decelerating	B3:1/1 513	B3:3/1 545	B3:5/1 577	B3:7/1 609	B3:9/1 641	B3:11/1 673	B3:13/1 705	B3:15/1 737

## AXIMA Connectivity Manual

Status Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Stopping	B3:1/2 514	B3:3/2 546	B3:5/2 578	B3:7/2 610	B3:9/2 642	B3:11/2 674	B3:13/2 706	B3:15/2 738
In S-Curve	B3:1/3 515	B3:3/3 547	B3:5/3 579	B3:7/3 611	B3:9/3 643	B3:11/3 675	B3:13/3 707	B3:15/3 739
In Motion	B3:1/4 516	B3:3/4 548	B3:5/4 580	B3:7/4 612	B3:9/4 644	B3:11/4 676	B3:13/4 708	B3:15/4 740
Move Buffered	B3:1/5 517	B3:3/5 549	B3:5/5 581	B3:7/5 613	B3:9/5 645	B3:11/5 677	B3:13/5 709	B3:15/5 741
Feedholding	B3:1/6 518	B3:3/6 550	B3:5/6 582	B3:7/6 614	B3:9/6 646	B3:11/6 678	B3:13/6 710	B3:15/6 742
In Feedhold	B3:1/7 519	B3:3/7 551	B3:5/7 583	B3:7/7 615	B3:9/7 647	B3:11/7 679	B3:13/7 711	B3:15/7 743

Control Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Feedhold Request	B3:1/8 520	B3:3/8 552	B3:5/8 584	B3:7/8 616	B3:9/8 648	B3:11/8 680	B3:13/8 712	B3:15/8 744
Cycle Start Request	B3:1/9 521	B3:3/9 553	B3:5/9 585	B3:7/9 617	B3:9/9 649	B3:11/9 681	B3:13/9 713	B3:15/9 745
Kill Move Request	B3:1/10 522	B3:3/10 554	B3:5/10 586	B3:7/10 618	B3:9/10 650	B3:11/10 682	B3:13/10 714	B3:15/10 746
Stop Move Request	B3:1/11 523	B3:3/11 555	B3:5/11 587	B3:7/11 619	B3:9/11 651	B3:11/11 683	B3:13/11 715	B3:15/11 747
Final Velocity Zero Pending	B3:1/12 524	B3:3/12 556	B3:5/12 588	B3:7/12 620	B3:9/12 652	B3:11/12 684	B3:13/12 716	B3:15/12 748
Final Velocity Zero Active	B3:1/13 525	B3:3/13 557	B3:5/13 589	B3:7/13 621	B3:9/13 653	B3:11/13 685	B3:13/13 717	B3:15/13 749
Feedrate Override Lock Pending	B3:1/14 526	B3:3/14 558	B3:5/14 590	B3:7/14 622	B3:9/14 654	B3:11/14 686	B3:13/14 718	B3:15/14 750
Feedrate Override Lock Active	B3:1/15 527	B3:3/15 559	B3:5/15 591	B3:7/15 623	B3:9/15 655	B3:11/15 687	B3:13/15 719	B3:15/15 751

Limit Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Not In Position Band	B3:2/0 528	B3:4/0 560	B3:6/0 592	B3:8/0 624	B3:10/0 656	B3:12/0 688	B3:14/0 720	B3:16/0 752
Not Following Error	B3:2/1 529	B3:4/1 561	B3:6/1 593	B3:8/1 625	B3:10/1 657	B3:12/1 689	B3:14/1 721	B3:16/1 753

Pre-defined Variable Connectivity Addresses

Limit Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Within Travel Limit A	B3:2/2 530	B3:4/2 562	B3:6/2 594	B3:8/2 626	B3:10/2 658	B3:12/2 690	B3:14/2 722	B3:16/2 754
Not Within Travel Limit B	B3:2/3 531	B3:4/3 563	B3:6/3 595	B3:8/3 627	B3:10/3 669	B3:12/3 691	B3:14/3 723	B3:16/3 755
Not Command Limit	B3:2/4 532	B3:4/4 564	B3:6/4 596	B3:8/4 628	B3:10/4 660	B3:12/4 692	B3:14/4 724	B3:16/4 756
Not In Command Band	B3:2/5 533	B3:4/5 565	B3:6/5 597	B3:8/5 629	B3:10/5 661	B3:12/5 693	B3:14/5 725	B3:16/5 757

Sequence Bits	Coordinate System Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Set Decrement Move Count	B3:2/8 536	B3:4/8 568	B3:6/8 600	B3:8/8 632	B3:10/8 664	B3:12/8 696	B3:14/8 728	B3:16/8 760
Set Increment Move Count	B3:2/9 537	B3:4/9 569	B3:6/9 601	B3:8/9 633	B3:10/9 665	B3:12/9 697	B3:14/9 729	B3:16/9 761
Trigger ISA AT Bus Interrupt On Move	B3:2/10 538	B3:4/10 570	B3:6/10 602	B3:8/10 634	B3:10/10 666	B3:12/10 698	B3:14/10 730	B3:16/10 762
Move Trigger Pending	B3:2/11 539	B3:4/11 571	B3:6/11 603	B3:8/11 635	B3:10/11 667	B3:12/11 699	B3:14/11 731	B3:16/11 763
Start Move Inhibit	B3:2/12 540	B3:4/12 572	B3:6/12 604	B3:8/12 636	B3:10/12 668	B3:12/12 700	B3:14/12 732	B3:16/12 764
Encoder Match Request	B3:2/13 541	B3:4/13 573	B3:6/13 605	B3:8/13 637	B3:10/13 669	B3:12/13 701	B3:14/13 733	B3:16/13 765
Cycle Start Lockout	B3:2/14 542	B3:4/14 574	B3:6/14 606	B3:8/14 638	B3:10/14 670	B3:12/14 702	B3:14/14 734	B3:16/14 766

**Axis**

**P4120 - P4127**

Limit Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Not In Position	B3:17/0 768	B3:19/0 800	B3:21/0 832	B3:23/0 864	B3:25/0 896	B3:27/0 928	B3:29/0 960	B3:31/0 992
Not Following Error	B3:17/1 769	B3:19/1 801	B3:21/1 833	B3:23/1 865	B3:25/1 897	B3:27/1 929	B3:29/1 961	B3:31/1 993
Within Travel Limit A	B3:17/2 770	B3:19/2 802	B3:21/2 834	B3:23/2 866	B3:25/2 898	B3:27/2 930	B3:29/2 962	B3:31/2 994

## AXIMA Connectivity Manual

Limit Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Not Within Travel Limit B	B3:17/3 771	B3:19/3 803	B3:21/3 835	B3:23/3 867	B3:25/3 899	B3:27/3 931	B3:29/3 963	B3:31/3 995
Not Command Limit	B3:17/4 772	B3:19/4 804	B3:21/4 836	B3:23/4 868	B3:25/4 900	B3:27/4 932	B3:29/4 964	B3:31/4 996
Not In Command Band	B3:17/5 773	B3:19/5 805	B3:21/5 837	B3:23/5 869	B3:25/5 901	B3:27/5 933	B3:29/5 965	B3:31/5 997

Status Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Not Marker	B3:17/8 776	B3:19/8 808	B3:21/8 840	B3:23/8 872	B3:25/8 904	B3:27/8 936	B3:29/8 968	B3:31/8 1000
Encoder Captured	B3:17/9 777	B3:19/9 809	B3:21/9 841	B3:23/9 873	B3:25/9 905	B3:27/9 937	B3:29/9 969	B3:31/9 1001
Registration Move Captured	B3:17/10 778	B3:19/10 810	B3:21/10 842	B3:23/10 874	B3:25/10 906	B3:27/10 938	B3:29/10 970	B3:31/10 1002
Registration Move Aborted	B3:17/11 779	B3:19/11 811	B3:21/11 843	B3:23/11 875	B3:25/11 907	B3:27/11 939	B3:29/11 971	B3:31/11 1003
Sinusoidal Mode	B3:17/12 780	B3:19/12 812	B3:21/12 844	B3:23/12 876	B3:25/12 908	B3:27/12 940	B3:29/12 972	B3:31/12 1004
Gear Lock	B3:17/13 781	B3:19/13 813	B3:21/13 845	B3:23/13 877	B3:25/13 909	B3:27/13 941	B3:29/13 973	B3:31/13 1005
Gear At Speed	B3:17/14 782	B3:19/14 814	B3:21/14 846	B3:23/14 878	B3:25/14 910	B3:27/14 942	B3:29/14 974	B3:31/14 1006
Gear Stopping	B3:17/15 783	B3:19/15 815	B3:21/15 847	B3:23/15 879	B3:25/15 911	B3:27/15 943	B3:29/15 975	B3:31/15 1007

Control Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Clamp Output Signal	B3:18/0 784	B3:20/0 816	B3:22/0 848	B3:24/0 880	B3:26/0 912	B3:28/0 944	B3:30/0 976	B3:32/0 1008
Open Servo Loop	B3:18/1 785	B3:20/1 817	B3:22/1 849	B3:24/1 881	B3:26/1 913	B3:28/1 945	B3:30/1 977	B3:32/1 1009
Filter Activate	B3:18/2 786	B3:20/2 818	B3:22/2 850	B3:24/2 882	B3:26/2 914	B3:28/2 946	B3:30/2 978	B3:32/2 1010
Encoder Match Request	B3:18/3 787	B3:20/3 819	B3:22/3 851	B3:24/3 883	B3:26/3 915	B3:28/3 947	B3:30/3 979	B3:32/3 1011
Gear Activate	B3:18/4 788	B3:20/4 820	B3:22/4 852	B3:24/4 884	B3:26/4 916	B3:28/4 948	B3:30/4 980	B3:32/4 1012



Pre-defined Variable Connectivity Addresses

Control Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Gear Active	B3:18/5 789	B3:20/5 821	B3:22/5 853	B3:24/5 885	B3:26/5 917	B3:28/5 949	B3:30/5 981	B3:32/5 1013
Cam Activate	B3:18/6 790	B3:20/6 822	B3:22/6 854	B3:24/6 886	B3:26/6 918	B3:28/6 950	B3:30/6 982	B3:32/6 1014
Ballscrew Activate	B3:18/7 791	B3:20/7 823	B3:22/7 855	B3:24/7 887	B3:26/7 919	B3:28/7 951	B3:30/7 983	B3:32/7 1015

Jog Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Jog Active	B3:18/8 792	B3:20/8 824	B3:22/8 856	B3:24/8 888	B3:26/8 920	B3:28/8 952	B3:30/8 984	B3:32/8 1016
Jog Direction	B3:18/9 793	B3:20/9 825	B3:22/9 857	B3:24/9 889	B3:26/9 921	B3:28/9 953	B3:30/9 985	B3:32/9 1017
Jog At Speed	B3:18/10 794	B3:20/10 826	B3:22/10 858	B3:24/10 890	B3:26/10 922	B3:28/10 954	B3:30/10 986	B3:32/10 1018
Jog Stopping	B3:18/11 795	B3:20/11 827	B3:22/11 859	B3:24/11 891	B3:26/11 923	B3:28/11 955	B3:30/11 987	B3:32/11 1019
Jog Forward	B3:18/12 796	B3:20/12 828	B3:22/12 860	B3:24/12 892	B3:26/12 924	B3:28/12 956	B3:30/12 988	B3:32/12 1020
Jog Reverse	B3:18/13 797	B3:20/13 829	B3:22/13 861	B3:24/13 893	B3:26/13 925	B3:28/13 957	B3:30/13 989	B3:32/13 1021
Jog Limit Check	B3:18/14 798	B3:20/14 830	B3:22/14 862	B3:24/14 894	B3:26/14 926	B3:28/14 958	B3:30/14 990	B3:32/14 1022
Jog Lockout	B3:18/15 799	B3:20/15 831	B3:22/15 863	B3:24/15 895	B3:26/15 927	B3:28/15 959	B3:30/15 991	B3:32/15 1023

Secondary Axis

P4168 - P4175

Control Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Positive Direction Limit*	B3:57/0 2304	B3:58/0 2336	B3:59/0 2366	B3:60/0 2400	B3:61/0 2432	B3:62/0 2464	B3:63/0 2496	B3:64/0 2528
Negative Direction Limit*	B3:57/1 2305	B3:58/1 2337	B3:59/1 2369	B3:60/1 2401	B3:61/1 2433	B3:62/1 2465	B3:63/1 2497	B3:64/1 2529
Direction Limit Activate*	B3:57/2 2306	B3:58/2 2338	B3:59/2 2370	B3:60/2 2402	B3:61/2 2434	B3:62/2 2466	B3:63/2 2498	B3:64/2 2530

## AXIMA Connectivity Manual

Control Bits	Axis Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Direction Limit Tripped*	B3:57/3 2307	B3:58/3 2339	B3:59/3 2371	B3:60/3 2403	B3:61/3 2435	B3:62/3 2467	B3:63/3 2499	B3:64/3 2531

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

**Program: 0... 7**

**P4128 - P4135**

Status Bits	Program Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Program Running	B3:33/0 1024	B3:34/0 1056	B3:35/0 1088	B3:36/0 1120	B3:37/0 1152	B3:38/0 1184	B3:39/0 1216	B3:40/0 1248
Program Dwelling	B3:33/1 1025	B3:34/1 1057	B3:35/1 1089	B3:36/1 1121	B3:37/1 1153	B3:38/1 1185	B3:39/1 1217	B3:40/1 1249
Program Inhibited	B3:33/2 1026	B3:34/2 1058	B3:35/2 1090	B3:36/2 1122	B3:37/2 1154	B3:38/2 1186	B3:39/2 1218	B3:40/2 1250
Move Pending	B3:33/3 1027	B3:34/3 1059	B3:35/3 1091	B3:36/3 1123	B3:37/3 1155	B3:38/3 1187	B3:39/3 1219	B3:40/3 1251
Program Timeout	B3:33/4 1028	B3:34/4 1060	B3:35/4 1092	B3:36/4 1124	B3:37/4 1156	B3:38/4 1188	B3:39/4 1220	B3:40/4 1252
Program Modified	B3:33/5 1029	B3:34/5 1061	B3:35/5 1093	B3:36/5 1125	B3:37/5 1157	B3:38/5 1189	B3:39/5 1221	B3:40/5 1253

Control Bits	Program Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Run Request	B3:33/8 1032	B3:34/8 1064	B3:35/8 1096	B3:36/8 1128	B3:37/8 1160	B3:38/8 1192	B3:39/8 1224	B3:40/8 1256
Halt Request	B3:33/9 1033	B3:34/9 1065	B3:35/9 1097	B3:36/9 1129	B3:37/9 1161	B3:38/9 1193	B3:39/9 1225	B3:40/9 1257

Pre-defined Variable Connectivity Addresses

**Program: 8... 15**

**P4136 - P4143**

Status Bits	Program Number							
	8	9	10	11	12	13	1	15
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Program Running	B3:41/0 1280	B3:42/0 1312	B3:43/0 1344	B3:44/0 1376	B3:45/0 1408	B3:46/0 1440	B3:47/0 1472	1504*
Program Dwelling	B3:41/1 1281	B3:42/1 1313	B3:43/1 1345	B3:44/1 1377	B3:45/1 1409	B3:46/1 1441	B3:47/1 1473	1505
Program Inhibited	B3:41/2 1282	B3:42/2 1314	B3:43/2 1346	B3:44/2 1378	B3:45/2 1410	B3:46/2 1442	B3:47/2 1474	1506
Move Pending	B3:41/3 1283	B3:42/3 1315	B3:43/3 1347	B3:44/3 1379	B3:45/3 1411	B3:46/3 1443	B3:47/3 1475	1507
Program Timeout	B3:41/4 1284	B3:42/4 1316	B3:43/4 1348	B3:44/4 1380	B3:45/4 1412	B3:46/4 1444	B3:47/4 1476	1508
Program Modified	B3:41/5 1285	B3:42/5 1317	B3:43/5 1349	B3:44/5 1381	B3:45/5 1413	B3:46/5 1445	B3:47/5 1477	1509

\* AXIMA is Initializing.

Control Bits	Program Number							
	8	9	10	11	12	13	14	15
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Run Request	B3:41/8 1288	B3:42/8 1320	B3:43/8 1352	B3:44/8 1384	B3:45/8 1416	B3:46/8 1448	B3:47/8 1480	1508
Halt Request	B3:41/9 1289	B3:42/9 1321	B3:43/9 1353	B3:44/9 1385	B3:45/9 1417	B3:46/9 1449	B3:47/9 1481	1509

**PLC**

**P4144 - P4151**

PLC Bits	PLC Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Running	B3:49/0 1536	B3:50/0 1568	B3:51/0 1600	B3:52/0 1632	B3:53/0 1664	B3:54/0 1696	B3:55/0 1728	B3:56/0 1760
First Scan	B3:49/1 1537	B3:50/1 1569	B3:51/1 1601	B3:52/1 1633	B3:53/1 1665	B3:54/1 1697	B3:55/1 1729	B3:56/1 1761

PLC Bits	PLC Number							
	0	1	2	3	4	5	6	7
	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Run Request	B3:49/2 1538	B3:50/2 1570	B3:51/2 1602	B3:52/2 1634	B3:53/2 1666	B3:54/2 1698	B3:55/2 1730	B3:56/2 1762
Halt Request	B3:49/3 1539	B3:50/3 1571	B3:51/3 1603	B3:52/3 1635	B3:53/3 1667	B3:54/3 1699	B3:55/3 1731	B3:56/3 1763

## Command Outputs

P4144 - P4151

Stepper Bits	PLC Number							
	0	1	2	3	4	5	6	7
	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA	MB AXIMA
Stepper Direction*	B3:49/8 1544	B3:50/8 1576	B3:51/8 1608	B3:52/8 1640	B3:53/8 1672	B3:54/8 1704	B3:55/8 1736	B3:56/8 1768
Stepper Low Power*	B3:49/9 1545	B3:50/9 1577	B3:51/9 1609	B3:52/9 1641	B3:53/9 1673	B3:54/9 1705	B3:55/9 1737	B3:56/9 1769

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

**Expanded Inputs****P4104 and P4106**

Bit Description	Expansion I/O Board Number	
	Input Bank 0	Input Bank 1*
Expanded # 00	I:3/0 256	I:5/0 320
Expanded # 01	I:3/1 257	I:5/1 321
Expanded # 02	I:3/2 258	I:5/2 322
Expanded # 03	I:3/3 259	I:5/3 323
Expanded # 04	I:3/4 260	I:5/4 324
Expanded # 05	I:3/5 261	I:5/5 325
Expanded # 06	I:3/6 262	I:5/6 326
Expanded # 07	I:3/7 263	I:5/7 327
Expanded # 08	I:3/10 264	I:5/10 328
Expanded # 09	I:3/11 265	I:5/11 329
Expanded # 10	I:3/12 266	I:5/12 330
Expanded # 11	I:3/13 267	I:5/13 331
Expanded # 12	I:3/14 268	I:5/14 332
Expanded # 13	I:3/15 269	I:5/15 333
Expanded # 14	I:3/16 270	I:5/16 334
Expanded # 15	I:3/17 271	I:5/17 335
Expanded # 16	I:4/0 272	I:6/0 336
Expanded # 17	I:4/1 273	I:6/1 337
Expanded # 18	I:4/2 274	I:6/2 338
Expanded # 19	I:4/3 275	I:6/3 339
Expanded # 20	I:4/4 276	I:6/4 340
Expanded # 21	I:4/5 277	I:6/5 341

Bit Description	Expansion I/O Board Number	
	Input Bank 0	Input Bank 1*
Expanded # 22	I:4/6 278	I:6/6 342
Expanded # 23	I:4/7 279	I:6/7 343
Expanded # 24	I:4/10 280	I:6/10 344
Expanded # 25	I:4/11 281	I:6/11 345
Expanded # 26	I:4/12 282	I:6/12 346
Expanded # 27	I:4/13 283	I:6/13 347
Expanded # 28	I:4/14 284	I:6/14 348
Expanded # 29	I:4/15 285	I:6/15 349
Expanded # 30	I:4/16 286	I:6/16 350
Expanded # 31	I:4/17 287	I:6/17 351

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

## Expanded Outputs

## P4105 and P4107

Bit Description	Expansion I/O Board Number	
	Output Bank 0	Output Bank 1*
Expanded # 32	O:3/0 288	O:5/0 352
Expanded # 33	O:3/1 289	O:5/1 353
Expanded # 34	O:3/2 290	O:5/2 353
Expanded # 35	O:3/3 291	O:5/3 354
Expanded # 36	O:3/4 292	O:5/4 355
Expanded # 37	O:3/5 293	O:5/5 356
Expanded # 38	O:3/6 294	O:5/6 357
Expanded # 39	O:3/7 295	O:5/7 358
Expanded # 40	O:3/10 296	O:5/10 359

## Pre-defined Variable Connectivity Addresses

Bit Description	Expansion I/O Board Number	
	Output Bank 0	Output Bank 1*
Expanded # 41	O:3/11 297	O:5/11 360
Expanded # 42	O:3/12 298	O:5/12 361
Expanded # 43	O:3/13 299	O:5/13 362
Expanded # 44	O:3/14 270	O:5/14 363
Expanded # 45	O:3/15 271	O:5/15 364
Expanded # 46	O:3/16 272	O:5/16 365
Expanded # 47	O:3/17 273	O:5/17 366
Expanded # 48	O:4/0 274	O:6/0 367
Expanded # 49	O:4/1 275	O:6/1 368
Expanded # 50	O:4/2 276	O:6/2 369
Expanded # 51	O:4/3 277	O:6/3 370
Expanded # 52	O:4/4 278	O:6/4 371
Expanded # 53	O:4/5 279	O:6/5 372
Expanded # 54	O:4/6 280	O:6/6 373
Expanded # 55	O:4/7 281	O:6/7 374
Expanded # 56	O:4/10 282	O:6/10 375
Expanded # 57	O:4/11 283	O:6/11 376
Expanded # 58	O:4/12 284	O:6/12 377
Expanded # 59	O:4/13 285	O:6/13 378
Expanded # 60	O:4/14 286	O:6/14 379
Expanded # 61	O:4/15 287	O:6/15 380
Expanded # 62	O:4/16 288	O:6/16 381
Expanded # 63	O:4/17 289	O:6/17 382

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

## Other

	MB AXIMA
Enable Drives*	B3:65/11 1835
AXIMA is Initializing*	1504

\* Added for AXIMA A6 firmware and Comm Processor A4 firmware.

## Integer and Floating Point Identifiers

### Encoders/Analog Inputs/ Command Outputs

P6144 - P6527

Encoder Identifiers	Type	Encoder Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Encoder Position	Int	(U/A) 6144	(U/A) 6160	(U/A) 6176	(U/A) 6192	(U/A) 6208	(U/A) 6224	(U/A) 6240	(U/A) 6256
Encoder Velocity	Int	(U/A) 6145	(U/A) 6161	(U/A) 6177	(U/A) 6193	(U/A) 6209	(U/A) 6225	(U/A) 6241	(U/A) 6257

Command Output Identifiers	Type	Command Output Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Command Output # Output	FP32	(U/A) 6400	(U/A) 6416	(U/A) 6432	(U/A) 6448	(U/A) 6464	(U/A) 6480	(U/A) 6496	(U/A) 6512
Reserved	FP32	(U/A) 6401	(U/A) 6417	(U/A) 6433	(U/A) 6449	(U/A) 6465	(U/A) 6481	(U/A) 6497	(U/A) 6513
Command Output # Gain	FP32	(U/A) 6402	(U/A) 6418	(U/A) 6434	(U/A) 6450	(U/A) 6466	(U/A) 6482	(U/A) 6498	(U/A) 6514
Command Output # Offset	FP32	(U/A) 6403	(U/A) 6419	(U/A) 6435	(U/A) 6451	(U/A) 6467	(U/A) 6483	(U/A) 6499	(U/A) 6515



Pre-defined Variable Connectivity Addresses

Analog Input Identifiers	Type	Analog Input Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Analog Input # Input	FP32	(U/A) 6408	(U/A) 6424	(U/A) 6440	(U/A) 6456	(U/A) 6472	(U/A) 6488	(U/A) 6504	(U/A) 6520
Reserved	FP32	(U/A) 6409	(U/A) 6425	(U/A) 6441	(U/A) 6457	(U/A) 6473	(U/A) 6489	(U/A) 6505	(U/A) 6521
Analog Input # Gain	FP32	(U/A) 6410	(U/A) 6426	(U/A) 6442	(U/A) 6458	(U/A) 6474	(U/A) 6490	(U/A) 6506	(U/A) 6522
Analog Input # Offset	FP32	(U/A) 6411	(U/A) 6427	(U/A) 6443	(U/A) 6459	(U/A) 6475	(U/A) 6491	(U/A) 6507	(U/A) 6523

\* Encoder numbers and DAC numbers 0 through 7 correspond to the AXIMA controller axis connector numbers 1 through 8.

Coordinate System

P8192 - P10000

Position Identifiers	Type	Coordinate System Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Distance Into Move	FP32	(U/A) 8192	(U/A) 8448	(U/A) 8704	(U/A) 8960	(U/A) 9216	(U/A) 9472	(U/A) 9728	(U/A) 9984
Vector Velocity	FP32	(U/A) 8193	(U/A) 8449	(U/A) 8705	(U/A) 8961	(U/A) 9217	(U/A) 9473	(U/A) 9729	(U/A) 9985
Vector Acceleration	FP32	(U/A) 8194	(U/A) 8450	(U/A) 8706	(U/A) 8962	(U/A) 9218	(U/A) 9474	(U/A) 9730	(U/A) 9986
Vector S-Curve	FP32	(U/A) 8195	(U/A) 8451	(U/A) 8707	(U/A) 8963	(U/A) 9219	(U/A) 9475	(U/A) 9731	(U/A) 9987
Vector Length	FP32	(U/A) 8196	(U/A) 8452	(U/A) 8708	(U/A) 8964	(U/A) 9220	(U/A) 9476	(U/A) 9732	(U/A) 9988
Target Velocity	FP32	(U/A) 8197	(U/A) 8453	(U/A) 8709	(U/A) 8965	(U/A) 9221	(U/A) 9477	(U/A) 9733	(U/A) 9989
Target Acceleration	FP32	(U/A) 8198	(U/A) 8454	(U/A) 8710	(U/A) 8966	(U/A) 9222	(U/A) 9478	(U/A) 9734	(U/A) 9990
Reserved	FP32	(U/A) 8199	(U/A) 8455	(U/A) 8711	(U/A) 8967	(U/A) 9223	(U/A) 9479	(U/A) 9735	(U/A) 9991
Distance To Go	FP32	(U/A) 8200	(U/A) 8456	(U/A) 8712	(U/A) 8968	(U/A) 9224	(U/A) 9480	(U/A) 9736	(U/A) 9992
Feedrate Override	FP32	(U/A) 8201	(U/A) 8457	(U/A) 8713	(U/A) 8969	(U/A) 9225	(U/A) 9481	(U/A) 9737	(U/A) 9993
Manual Vector	FP32	(U/A) 8202	(U/A) 8458	(U/A) 8714	(U/A) 8970	(U/A) 9226	(U/A) 9482	(U/A) 9738	(U/A) 9994
Total Distance	FP32	(U/A) 8203	(U/A) 8459	(U/A) 8715	(U/A) 8971	(U/A) 9227	(U/A) 9483	(U/A) 9739	(U/A) 9995

## AXIMA Connectivity Manual

Position Identifiers	Type	Coordinate System Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Distance Squared	FP32	(U/A) 8204	(U/A) 8460	(U/A) 8716	(U/A) 8972	(U/A) 9228	(U/A) 9484	(U/A) 9740	(U/A) 9996
Velocity Squared	FP32	(U/A) 8205	(U/A) 8461	(U/A) 8717	(U/A) 8973	(U/A) 9229	(U/A) 9485	(U/A) 9741	(U/A) 9997
Fraction Into Move	FP32	(U/A) 8206	(U/A) 8462	(U/A) 8718	(U/A) 8974	(U/A) 9230	(U/A) 9486	(U/A) 9742	(U/A) 9998
Distance Into Path	FP32	(U/A) 8207	(U/A) 8463	(U/A) 8719	(U/A) 8975	(U/A) 9231	(U/A) 9487	(U/A) 9743	(U/A) 9999
Move Counter	Int	(U/A) 8208	(U/A) 8464	(U/A) 8720	(U/A) 8976	(U/A) 9232	(U/A) 8488	(U/A) 9744	(U/A) 10000

## Axis

## P12288 - P14143

Position Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Profiler Command Position	Int	(U/A) 12288	(U/A) 12544	(U/A) 12800	(U/A) 13056	(U/A) 13312	(U/A) 13568	(U/A) 13824	(U/A) 14080
Target Position	Int	(U/A) 12289	(U/A) 12545	(U/A) 12801	(U/A) 13057	(U/A) 13313	(U/A) 13569	(U/A) 13825	(U/A) 14081
Actual Position	Int	(U/A) 12290	(U/A) 12546	(U/A) 12802	(U/A) 13058	(U/A) 13314	(U/A) 13570	(U/A) 13826	(U/A) 14082
Following Error	Int	(U/A) 12291	(U/A) 12547	(U/A) 12803	(U/A) 13059	(U/A) 13315	(U/A) 13571	(U/A) 13827	(U/A) 14083
Hardware Capture	Int	(U/A) 12292	(U/A) 12548	(U/A) 12804	(U/A) 13060	(U/A) 13316	(U/A) 13572	(U/A) 13828	(U/A) 14084
Software Capture	Int	(U/A) 12293	(U/A) 12549	(U/A) 12805	(U/A) 13061	(U/A) 13317	(U/A) 13573	(U/A) 13829	(U/A) 14085
Primary Setpoint	Int	(U/A) 12294	(U/A) 12550	(U/A) 12806	(U/A) 13062	(U/A) 13318	(U/A) 13574	(U/A) 13830	(U/A) 14086
Secondary Setpoint	Int	(U/A) 12295	(U/A) 12551	(U/A) 12807	(U/A) 13063	(U/A) 13319	(U/A) 13575	(U/A) 13831	(U/A) 14087

Offset Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Gear Command Position	Int	(U/A) 12296	(U/A) 12552	(U/A) 12808	(U/A) 13064	(U/A) 13320	(U/A) 13576	(U/A) 13832	(U/A) 14088

## Pre-defined Variable Connectivity Addresses

Offset Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Jog Command Position	Int	(U/A) 12297	(U/A) 12553	(U/A) 12809	(U/A) 13065	(U/A) 13321	(U/A) 13577	(U/A) 13833	(U/A) 14089
Cam Command Position	Int	(U/A) 12298	(U/A) 12554	(U/A) 12810	(U/A) 13066	(U/A) 13322	(U/A) 13578	(U/A) 13834	(U/A) 14090
Ballscrew Compensation	Int	(U/A) 12299	(U/A) 12555	(U/A) 12811	(U/A) 13067	(U/A) 13323	(U/A) 13579	(U/A) 13835	(U/A) 14091
Backlash Compensation	Int	(U/A) 12300	(U/A) 12556	(U/A) 12812	(U/A) 13068	(U/A) 13324	(U/A) 13580	(U/A) 13836	(U/A) 14092

Servo Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Proportional Gain	FP32	(U/A) 12304	(U/A) 12560	(U/A) 12816	(U/A) 13072	(U/A) 13328	(U/A) 13584	(U/A) 13840	(U/A) 14096
Integral Gain	FP32	(U/A) 12305	(U/A) 12561	(U/A) 12817	(U/A) 13073	(U/A) 13329	(U/A) 13585	(U/A) 13841	(U/A) 14097
Integral Limit	FP32	(U/A) 12306	(U/A) 12562	(U/A) 12818	(U/A) 13074	(U/A) 13330	(U/A) 13586	(U/A) 13842	(U/A) 14098
Integral Delay	FP32	(U/A) 12307	(U/A) 12563	(U/A) 12819	(U/A) 13075	(U/A) 13331	(U/A) 13587	(U/A) 13843	(U/A) 14099
Derivative Gain	FP32	(U/A) 12308	(U/A) 12564	(U/A) 12820	(U/A) 13076	(U/A) 13332	(U/A) 13588	(U/A) 13844	(U/A) 14100
Derivative Sample	FP32	(U/A) 12309	(U/A) 12565	(U/A) 12821	(U/A) 13077	(U/A) 13333	(U/A) 13589	(U/A) 13845	(U/A) 14101
Feedforward Velocity	FP32	(U/A) 12310	(U/A) 12566	(U/A) 12822	(U/A) 13078	(U/A) 13334	(U/A) 13590	(U/A) 13846	(U/A) 14102
Feedforward Acceleration	FP32	(U/A) 12311	(U/A) 12567	(U/A) 12823	(U/A) 13079	(U/A) 13335	(U/A) 13591	(U/A) 13847	(U/A) 14103

Monitor Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Proportional Term	FP32	(U/A) 12312	(U/A) 12568	(U/A) 12824	(U/A) 13080	(U/A) 13336	(U/A) 13592	(U/A) 13848	(U/A) 14104
Integral Term	FP32	(U/A) 12313	(U/A) 12569	(U/A) 12825	(U/A) 13081	(U/A) 13337	(U/A) 13593	(U/A) 13849	(U/A) 14105
Derivative Term	FP32	(U/A) 12314	(U/A) 12570	(U/A) 12826	(U/A) 13082	(U/A) 13338	(U/A) 13594	(U/A) 13850	(U/A) 14106
Velocity Term	FP32	(U/A) 12315	(U/A) 12571	(U/A) 12827	(U/A) 13083	(U/A) 13339	(U/A) 13595	(U/A) 13851	(U/A) 14107

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Monitor Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Acceleration Term	FP32	(U/A) 12316	(U/A) 12572	(U/A) 12828	(U/A) 13084	(U/A) 13340	(U/A) 13596	(U/A) 13852	(U/A) 14108
Summation Point	FP32	(U/A) 12317	(U/A) 12573	(U/A) 12829	(U/A) 13085	(U/A) 13341	(U/A) 13597	(U/A) 13853	(U/A) 14109
Filter Output Signal	FP32	(U/A) 12318	(U/A) 12574	(U/A) 12830	(U/A) 13086	(U/A) 13342	(U/A) 13598	(U/A) 13854	(U/A) 14110
Axis Command Output Signal	FP32	(U/A) 12319	(U/A) 12575	(U/A) 12831	(U/A) 13087	(U/A) 13343	(U/A) 13599	(U/A) 13855	(U/A) 14111

Limit Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Following Error Limit Max	FP32	(U/A) 12320	(U/A) 12576	(U/A) 12832	(U/A) 13088	(U/A) 13344	(U/A) 13600	(U/A) 13856	(U/A) 14112
Following Error Limit Min	FP32	(U/A) 12321	(U/A) 12577	(U/A) 12833	(U/A) 13089	(U/A) 13345	(U/A) 13601	(U/A) 13857	(U/A) 14113
In Position Band Max	FP32	(U/A) 12322	(U/A) 12578	(U/A) 12834	(U/A) 13090	(U/A) 13346	(U/A) 13602	(U/A) 13858	(U/A) 14114
In Position Band Min	FP32	(U/A) 12323	(U/A) 12579	(U/A) 12835	(U/A) 13091	(U/A) 13347	(U/A) 13603	(U/A) 13859	(U/A) 14115
Within Travel Limit A Max	FP32	(U/A) 12324	(U/A) 12580	(U/A) 12836	(U/A) 13092	(U/A) 13348	(U/A) 13604	(U/A) 13860	(U/A) 14116
Within Travel Limit A Min	FP32	(U/A) 12325	(U/A) 12581	(U/A) 12837	(U/A) 13093	(U/A) 13349	(U/A) 13605	(U/A) 13861	(U/A) 14117
Within Travel Limit B Max	FP32	(U/A) 12326	(U/A) 12582	(U/A) 12838	(U/A) 13094	(U/A) 13350	(U/A) 13606	(U/A) 13862	(U/A) 14118
Within Travel Limit B Min	FP32	(U/A) 12327	(U/A) 12583	(U/A) 12839	(U/A) 13095	(U/A) 13351	(U/A) 13607	(U/A) 13863	(U/A) 14119
Command Limit Max	FP32	(U/A) 12328	(U/A) 12584	(U/A) 12840	(U/A) 13096	(U/A) 13352	(U/A) 13608	(U/A) 13864	(U/A) 14120
Command Limit Min	FP32	(U/A) 12329	(U/A) 12585	(U/A) 12841	(U/A) 13097	(U/A) 13353	(U/A) 13609	(U/A) 13865	(U/A) 14121
Command Band Max	FP32	(U/A) 12330	(U/A) 12586	(U/A) 12842	(U/A) 13098	(U/A) 13354	(U/A) 13610	(U/A) 13866	(U/A) 14122
Command Band Min	FP32	(U/A) 12331	(U/A) 12587	(U/A) 12843	(U/A) 13099	(U/A) 13355	(U/A) 13611	(U/A) 13867	(U/A) 14123
Backlash Setting	FP32	(U/A) 12332	(U/A) 12588	(U/A) 12844	(U/A) 13100	(U/A) 13356	(U/A) 13612	(U/A) 13868	(U/A) 14124
Reserved	FP32	(U/A) 12333	(U/A) 12589	(U/A) 12845	(U/A) 13101	(U/A) 13357	(U/A) 13613	(U/A) 13869	(U/A) 14125
Jog Limit Max	FP32	(U/A) 12334	(U/A) 12590	(U/A) 12846	(U/A) 13102	(U/A) 13358	(U/A) 13614	(U/A) 13870	(U/A) 14126
Jog Limit Min	FP32	(U/A) 12335	(U/A) 12591	(U/A) 12847	(U/A) 13103	(U/A) 13359	(U/A) 13615	(U/A) 13871	(U/A) 14127

## Pre-defined Variable Connectivity Addresses

Jog Identifiers	Type	Axis Number							
		0	1	2	3	4	5	6	7
		DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA	DH+ AXIMA
Jog Velocity - Current	FP32	(U/A) 12346	(U/A) 12602	(U/A) 12858	(U/A) 13114	(U/A) 13370	(U/A) 13626	(U/A) 13882	(U/A) 14138
Jog Acceleration - Current	FP32	(U/A) 12347	(U/A) 12603	(U/A) 12859	(U/A) 13115	(U/A) 13371	(U/A) 13627	(U/A) 13883	(U/A) 14139
Jog Velocity Setting	FP32	(U/A) 12348	(U/A) 12604	(U/A) 12860	(U/A) 13116	(U/A) 13372	(U/A) 13628	(U/A) 13884	(U/A) 14140
Jog Acceleration Setting	FP32	(U/A) 12349	(U/A) 12605	(U/A) 12861	(U/A) 13117	(U/A) 13373	(U/A) 13629	(U/A) 13885	(U/A) 14141
Jog Deceleration Setting	FP32	(U/A) 12350	(U/A) 12606	(U/A) 12862	(U/A) 13118	(U/A) 13374	(U/A) 13630	(U/A) 13886	(U/A) 14142
Jog S-Curve Setting	FP32	(U/A) 12351	(U/A) 12607	(U/A) 12863	(U/A) 13119	(U/A) 13375	(U/A) 13631	(U/A) 13887	(U/A) 14143



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