Parker Automation

p/n YPM08120-2

Acroloop Motion Controller User's Guide Part 2

Effective: October 7, 2002

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CHANGE NOTICE

Users Guide AMCS P/N PM08120 Version Change:
From: Version 1.18.04, Dated 6/30/2000
To: Version 1.18.06,Update 15 Dated 9/28/2001

The following changes have been incorporated into Users Guide Version 1.18.06 update 09:

1.	Page 17, Binary Data Packet.	In Binary data pack new groups added to handle 16 axes capability.
2.	Page 30, Binary Move Packet.	Extended the Binary move codes to for for 16 axes.
3.	Page 37, Binary SET and CLR.	Added one more byte if DPCB is used on ACR8020.
4.	Page 39, Binary FOV.	Extended the Binary FOV codes.
5.	Page 40, Binary ROV.	Extended the Binary ROV codes.
6.	Page 42, Application: Binary Global Parameter Access.	Added ACR8020 System Pointer Address.
7.	Page 47, Appendix A, Parameter Overview.	Parameter Overview updated for 16 masters and 16 axes.
8.	Page 60, Appendix A, Object Parameter.	Object parameter for 20 encoders.
9.	Page 62, Appendix A, Miscellaneous Parameter.	Added FSTAT Information parameters and DPCB Stream Parameters
10.	Page 73, Appendix A, FSTAT Setup Paramters.	Added FSTAT Setup Paramters.
11.	Page 74, Appendix A, Master Paramters.	Updated Master Paramters for 16 masters.
12.	Page 81, Appendix A, Axes Paramters.	Updated Axes Paramters for 16 axes
13.	Page 96, Appendix B, Flag Overview.	Flag Overview updated for 16 masters and 16 axes.
14.	Page 105, Appendix B, Master Flags.	Added Master Flags for 16 masters
15.	Page 113 Appendix B, Slave Flags.	Added Slave Flags for 16 axes
16.	Pages 137 Appendix B, Secondary Master Flags.	Added Secondary Master Flags for 16 masters
17.	Page 141 Appendix B, Secondary Slave Flags.	Added Secondary Slave Flags for 16 axes.

18.	Page 144, Appendix B, Encoder Flags.	Added Encoder Flags for 20 encoders.
19.	Page 152, Appendix B, Quaternary Master Flags.	Added Quaternary Master Flags
20.	Page 156, Appendix B, Tertiary Slave Flags.	Added Tertiary Slave Flags
21.	Page 161, Appendix B, DPCB Stream Flags.	Added DPCB Stream Flags
22.	Page 162, Appendix B, FSTAT Flags.	Added FSTAT Flags

CHANGE NOTICE, continued

Users Guide AMCS P/N PM08120-2 Version Change:

From: Version 1.18.04, Dated 6/30/2000

To: Version 1.18.04 Second Edition, Dated 5/27/2001

The following changes have been incorporated into Users Guide Part II Version 1.18.04, Second Edition:

1.	Acroloop Motion Controller User's Guide Part II, Appendix B, Flag Reference	Added Fast/Slow Flag update information to appendix.
2.	Acroloop Motion Controller User's Guide Part II, Appendix B, Flag Reference	Corrected miscellaneous flag parameter codes from 0x01 to 0x10.

CHANGE NOTICE

Users Guide AMCS P/N PM08120 Version Change:
From: Version 1.18.02, Dated 10/21/1999
To: Version 1.18.04, Dated 6/30/2000

The following changes have been incorporated into Users Guide Version 1.18.04:

1. Acroloop Motion Controller User's Guide	Split manual into two (2) sections, Part I and Part II.
2. Page 3, Introduction	Added manual section content information.
3. Page 14, Binary Host Interface – Binary Data Packets	Corrected Program Parameters Group number .
4. Page 21, Binary Host Interface – Binary PEEK	Added reference to Binary Global Parameter Access application.
5. Page 23, Binary Host Interface – Binary POKE	Added reference to Binary Global Parameter Access application.
6. Page 42, Binary Host Interface – Binary Global Parameter Access Application	Clarification of the System Pointer Address for all boards.
7. Page 47, Appendix A – Parameter Overview	Corrected CMT 3 parameter numbering .
8. Page 49, Appendix A – Flag Parameters	Added Tertiary Master, Stepper, DAC, ADC, and Misc Control flag parameters.
9. Page 57, Appendix A – Object Parameters	Added absolute encoder parameters.
10. Page 62, Appendix A – Miscellaneous Parameters	Corrected FPGA ID parameter number.
11. Page 74, Appendix A – Master Parameters	Added parameters for NURB, SPLINE, and TOV.
12. Page 81, Appendix A – Axis Parameters	Added parameters for MAXVEL, GEAR TRG, CAM Velocity, and DGAIN Smoothing
13. Page 96, Appendix B – Flag Overview	Added Tertiary Master, Stepper, DAC, ADC, and Misc Control Flags to overview.
14. Page 110, Appendix B – Master Flags	Corrected Sequence Flag description for "Interrupt On Move" flag.
15. Page 134, Appendix B – Secondary Master Flags	Added MAXVEL flag.

CHANGE NOTICE, continued

Users Guide Version 1.18.04 changes, continued:

16. Page 139, Appendix B – Secondary Axis Flags	Added CAM TRG, GEAR TRG, and Fast Axis Limits flags.
17. Page 144, Appendix B – Encoder Flags	Added absolute encoder flags.
18. Page 147, Appendix B – Tertiary Master Flags	Added Tertiary Master Flags.
19. Page 159, Appendix B – Misc Control Group 1 Flags	Added Misc Control Group 1 Flags.

CHANGE NOTICE, continued

Users Guide AMCS P/N PM08120 Version Change:
From: Version 1.17.07, Dated 5/21/1998
To: Version 1.18.02, Dated 10/21/1999

The following changes have been incorporated into Users Guide Version 1.18.02:

1. Page 42 , Binary Host Interface, Binary Global Parameter Access Application	Added ACR1200/ACR1500/ACR8010 System Pointer Address references
2. Page 47, Appendix A, Parameter Overview	Added CMT parameters and logging parameters
3. Page 59, Appendix A, Parameter Reference, Object Parameters	Added encoder parameters for encoder 8 and 9
4. Page 62, Appendix A, Miscellaneous Parameters	Added COM1/COM2 Startup Mode parameter Added board information parameters and details
5. Page 74, Appendix A, Master Parameters	Added new parameters for INT, SYNC AND TMOV
6. Page 86, Appendix A, CMT Parameters	Added CMT parameters
7. Page 94, Appendix A, Logging Parameters	Added Logging parameters
8. Page 96, Appendix B, Flag Overview	Added encoder flags, stepper flags, commutator flags, DAC flags, ADC flags
9. Page 130 ~ 132, Appendix B, COM1/2 Stream Flags	Changed name of serial communication module control bits. Moved old Appendix C info into here.
10. Page 134 , Appendix B, Secondary Master Flags	Added new Secondary Master Flags for SYNC and TMOV
11. Page 144, Appendix B, Encoder Flags	Added encoder flags
12. Page 146, Appendix B, CMT Flags	Added commutator flags
13. Appendix C, ACR8010/ACR2000 COMM Ports Configuration	Deleted. Moved information to COM1/COM2 Stream Flags and board hardware manuals
14. Page 164, Appendix C, Output Module Software Configuration Examples	Added ACR1200, ACR1500, ACR8010 and additional examples (was Appendix D)

CHANGE NOTICE, continued

Users Guide AMCS P/N PM08120 Version Change:
From: Version 1.17.05, Dated 12/5/97
To: Version 1.17.07, Dated 5/21/98

The following changes have been incorporated into Users Guide Version 1.17.07 and above:

1. Page 17, Binary Host Interface, Binary Data Packets	Added ACR2000 reference.
2. Page 18, Binary Host Interface, Binary Parameter Access	Added usage example.
3. Page 21, Binary Host Interface, Binary Peek Command	Added usage example.
4. Page 23, Binary Host Interface, Binary Poke Command	Added usage example.
5. Page 26, Binary Host Interface, Binary Address Command	Added usage example.
6. Page 27, Binary Host Interface, Binary Parameter Address Command	Added usage example.
7. Page 28, Binary Host Interface, Binary Mask Command	Added usage example.
8. Page 29, Binary Host Interface, Binary Parameter Mask Command	Added usage example.
9. Page 30, Binary Host Interface, Binary Move Command	Added Header Code 0 selection information, based on new Master Secondary Flag – Enable Rapid Move Modes.
10. Page 104, Appendix B, Flag Reference, Master Flags	Changed name of master flags FOV Lock Pending and FOV Lock Active to FOV/ROV Lock Pending and FOV/ROV Lock Active, respectively, to reflect feed and rapid move lockout function.
11. Page 107, Appendix B, Flag Reference, Master Flags	Changed master flags FOV Lock Pending and FOV Lock Active to FOV/ROV Lock Pending and FOV/ROV Lock Active, respectively. Added Kill All Moves and Stop All Move flag mode selection information, based on new Master Secondary Flag – Enable Clear Request.

CHANGE NOTICE, continued

Users Guide Version 1.17.07 changes, continued:

12. Page 139, Appendix B, Flag Reference, Secondary Master Flags	Added Enable Rapid Move Modes and Enable Clear Request Flags.
13. Page 164, Appendix C, Output Module Software Configuration Examples	Added Output Module Software Configuration Example.

CONTENTS

FIGURES

INTRODUCTION

This manual will serve as a reference and programmers guide for the ACR1200, ACR1500, ACR2000, ACR8000, ACR8010 and ACR8020 family of motion controllers.

Please reference the Acroloop Motion Controller User's Guide Part I for additional information.

Acroloop Motion Controller User's Guide Part I (P/N PM08120-1) includes:

Acroloop Motion Controller User's Guide Part II (P/N PM08120-2) includes:

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CHAPTER 6
Binary Host Interface

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Binary Data Transfer

Description:

The binary data transfers in this chapter consist of a control character (Header ID) followed by a stream of data encoded according to the current state of the MODE command. Note that regardless of the mode, the Header ID is never converted during binary data transfer.

During binary transfers to the card, the delay between bytes must be no more than the communications timeout setting for the given channel. If the timeout activates, the transfer is thrown out and the channel goes back to waiting for a normal character or a binary header ID. The default communication timeout is 50 milliseconds.

The following is a list of valid data conversion modes. The default mode for the FIFO channel is 0 and the default for the COM1 and COM2 channels is 1. Note that high bit stripping cannot be done without also activating the control character prefixing mode.

MODE 0	No Conversion
MODE 1	Control Character Prefixing
MODE 2	No Conversion
MODE 3	Control Character Prefixing and High Bit Stripping

Binary Data Transfer

(continued)

Control Character Prefixing:

Control character prefixing follows Kermit communications protocol conventions. The escape code for control character prefixing is the '#' character. The control character prefixing mode prevents valid data within a binary packet from being confused with the serial XON / XOFF flow control codes.

Transmitting:

If the character to be sent is either a 0x7F or a character in the range of 0x00 to 0x1F, the character is 'XORed' with 0x40 and proceeded with a '#' character. Otherwise, the byte is sent normally.

For example, if the character to be sent is 0x01, the character is transmitted as a "#A" string. (0x01 XOR 0x40 = 0x41 = 'A') The special case where the character to be sent is the '#' character is handled with the two character "##" string.

Receiving:

When receiving control prefix encoded data, a '#' character is thrown away and causes the next character to be read from the data stream. If the character is in the range of 0x3F to 0x5F, the character is 'XORed' with 0x40 to decode the true value. Otherwise the character is used exactly as read from the stream.

Binary Data Transfer

(continued)

High Bit Stripping:

High bit stripping follows Kermit communications protocol conventions for 7-bit data paths. The escape code for high bit stripping is the '&' character and must be used in conjunction with the control character prefixing described above.

High bit stripping is for cases in which a 7-bit data path must be used for binary data transfer. This mode introduces a large overhead in the transfer of binary data since over half of the bytes are expanded to two byte sequences and several are expanded to three bytes. If at all possible, an 8-bit data path should be used for binary data transfer.

Transmitting:

If the character to be sent is greater than 0x7F, the character is 'ANDed' with 0x7F and proceeded with the '&' character. Note that the AND may result in a control code which must then handled by control character prefixing. The original character may also need to be sent with control character prefixing.

For example, if the character to be sent is 0xC2, the character is transmitted as a "&B" string. (0xC2 AND 0x7F = 0x42 = 'B') As another example, if character to be sent is 0x83, the character is transmitted as the three character "&#C" string. (0x83 AND 0x7F = 0x03 (control character)) The special case where the character to be sent is the '&' character is handled with the two character "#&" string.

Receiving:

When receiving high bit encoded data, '#' characters are handled as normal control character prefix sequences. If the received character is neither a '#' nor a '&' character, the character is used exactly as read from the stream.

If the received character is the '&' character, it is thrown away and causes the next character to be read from the data stream. This new character may be a '#' character, which will initiate control prefix decoding sequence. The result is a value in the range of 0x00 to 0x7F, which is then 'ORed' with 0x80 to re-establish the high bit in the data.

Binary Data Packets

Description:

Packets allow binary access to system parameters at any time. This method must be used if commands are sitting in the input queue since PRINT statements would also be buffered. The packet is the quickest way to access information such as current position and following error for display in an application program.

Packet Request:

Packets are requested by sending a four byte binary request record. The following is a list of the bytes contained in this record:

Byte 0	Header ID (0x00)
Byte 1	Group Code
Byte 2	Group Index
Byte 3	Isolation Mask

Group Code and Index:

The group code and group index work as a pair to select the data coming back in a data packet. The group code selects a general data grouping and the group index selects a set of eight fields within that group. The isolation mask then selects which of these eight fields is to compose the final data packet.

Isolation Mask:

The isolation mask acts as a filter to select only the specific data required (i.e. actual position for AXIS 2, AXIS 3 and AXIS 5.) If a bit is set in this mask, the corresponding data field is allowed to return in the data packet. In order to return all eight fields, the isolation mask must be 0xFF. Mask BIT0 is used to isolate the first field in a group and BIT7 is used to isolate the last field.

Binary Data Packets

(continued)

Parameter Access:

The following is a list of groups and what the isolation mask will isolate:

Group	Description	Isolation Usage
0x10	Flag Parameters	Eight consecutive parameters
0x18	Encoder Parameters	ENC0-ENC15
0x19	DAC parameters	DAC0-DAC7
0x1A	PLC parameters	PLC0-PLC7
0x1B	Miscellaneous	Eight consecutive parameters
0x1C	Program Parameters	PROG0-PROG15
0x20	Master Parameters	MASTER0-MASTER7
0x21	Master Parameters	MASTER8-MASTER15
0x30	Axis Parameters	AXIS0-AXIS7
0x31	Axis Parameters	AXIS8-AXIS15
0x40	CMT Parameters	CMT0-CMT7
0x50	Logging Parameters	Eight consecutive parameters
0x60	Encoder Parameters	ENC16-ENC23

Group Codes and Indexes:

The following is a list of groups and indexes that can be accessed by using binary data packets. Note that not all of the indexes for the "master" and "axis" groups are included. This information can be located in the Parameter Reference, Appendix B.

Flag Parameters

Group	Index	Type	Description
0x10	0x00	LONG	General Flags
0x10	0x01	LONG	XIO Flags
0x10	0x02	LONG	Master 0.-7 Flags
0x10	0x03	LONG	Axis 0-7 Flags
0x10	0x04	LONG	Prog 0-7 Flags
0x10	0x05	LONG	Prog 8-15 Flags
0x10	0x06	LONG	PLC Flags
0x10	0x07	LONG	Other Flags
0x10	0x08	LONG	Secondary Master 0-7 Flags
0x10	0x09	LONG	Secondary Axis 0-7 Flags
0x10	0x0A	LONG	Encoder 0-7 Flags
0x10	0x0B	LONG	Encoder 8-15 Flags
0x10	0x0C	LONG	Encoder 16-23 Flags
0x10	0x0D	LONG	Reserved
0x10	0x0E	LONG	CMT Flags
0x10	0x0F	LONG	Reserved

Binary Data Packets

(continued)

Flag Parameters, continued

Group	Index	Type	Description
0x10	0x10	LONG	Reserved
0x10	0x11	LONG	Reserved
0x10	0x12	LONG	Reserved
0x10	0x13	LONG	Reserved
0x10	0x14	LONG	Tertiary Master 0-7Flags
0x10	0x15	LONG	Tertiary Master 8-15Flags
0x10	0x16	LONG	Misc Control Flags
0x10	0x17	LONG	Quaternary Master 0-7 Flags
0x10	0x18	LONG	Quaternary Master 8-15 Flags
0x10	0x19	LONG	Tertiary Slave 0-7 Flags
0x10	0x1A	LONG	Tertiary Slave 8-15 Flags
0x10	0x1B	LONG	Quaternary Slave 0-7 Flags
0x10	0x1C	LONG	Quaternary Slave 8-15 Flags
0x10	0x1D	LONG	Master 8-15 Flags
0x10	0x1E	LONG	Slave 8-15 Flags
0x10	0x1F	LONG	Secondary Master 8-15 Flags
0x10	0x20	LONG	Secondary Slave 8-15 Flags
0x10	0x21	LONG	Reserved
0x10	0x22	LONG	PLC Stepper 8-15 Flags

Encoder Parameters

Group	Index	Type	Description
0x18	0x00	LONG	Encoder 0-7 Position
0x18	0x01	LONG	Encoder 0-7 Velocity
0x18	0x08	FP32	Stepper 0-7 Signal
0x18	0x0A	FP32	Stepper 0-7 Gain
0x18	0x0C	LONG	Stepper 0-7 Count
0x18	0x80	LONG	Encoder 8-15 Position
0x18	0x81	LONG	Encoder 8-15 Velocity
0x18	0x88	FP32	Stepper 8-15 Signal
0x18	0x8A	FP32	Stepper 8-15 Gain
0x18	0x8C	LONG	Stepper 8-15 Count
0x60	0x00	LONG	Encoder 16-19 Position
0x60	0x01	LONG	Encoder 16-19 Velocity
0x60	0x08	FP32	Stepper 16-19 Signal
0x60	0x0A	FP32	Stepper 16-19 Gain
0x60	0x0C	LONG	Stepper 16-19 Count
0x60	0x80	LONG	Reserved
0x60	0x81	LONG	Reserved
0x60	0x88	FP32	Reserved
0x60	0x8A	FP32	Reserved

0x60	0x8C	LONG	Reserved

DAC Parameters

Group	Index	Type	Description
0x19	0x00	FP32	DAC 0-7 Output
0x19	0x02	FP32	DAC 0-7 Gain
0x19	0x03	FP32	DAC 0-7 Offset
0x19	0x08	FP32	ADC 0-7 Input
0x19	0x0A	FP32	ADC 0-7 Gain
0x19	0x0B	FP32	ADC 0-7 Offset
0x19	0x80	FP32	DAC 8-15 Output
0x19	0x82	FP32	DAC 8-15 Gain
0x19	0x83	FP32	DAC 8-15 Offset
0x19	0x88	FP32	ADC 8-15 Input
0x19	0x8A	FP32	ADC 8-15 Gain
0x19	0x8B	FP32	ADC 8-15 Offset

PLC Parameters

Group	Index	Type	Description
0x1A	0x00	LONG	Tick Preloads
0x1A	0x01	LONG	Tick Counters
0x1A	0x02	LONG	Reserved
0x1A	0x03	LONG	Reserved
0x1A	0x04	LONG	Timer Preloads
0x1A	0x05	LONG	Timer Counters
0x1A	0x06	LONG	Counter Preloads
0x1A	0x07	LONG	Counter Counters

Binary Data Packets

(continued)

Miscellaneous Parameters

Group	Index	Type	Description
0x1B	0x00	LONG	Sample Parameters
0x1B	0x02	LONG	Reserved
0x1B	0x04	LONG	Reserved
0x1B	0x06	LONG	Reserved
0x1B	0x08	LONG	FIFO Parameters
0x1B	0x0A	LONG	Reserved
0x1B	0x0C	LONG	COM1 Parameters
0x1B	0x0E	LONG	COM2 Parameters
0x1B	0X10	LONG	Board Information Parameters
0x1B	0x12	LONG	FSTAT Information Parameters
0x1B	0x16	LONG	DPCB Parameters

Program Parameters

Group	Index	Type	Description
0x1C	0x00	LONG	PROG0-PROG7 Line Numbers
0x1C	0x80	LONG	PROG8-PROG15 Line Numbers

FSTAT Setup Parameters

Group	Index	Type	Description
0x1D	0x03	LONG	FSTAT0-FSTAT7 CODE
0x1D	0x04	LONG	FSTAT0-FSTAT7 INDEX
0x1D	0x05	LONG	FSTAT0-FSTAT7 TYPE
0x1D	0x83	LONG	FSTAT8-FSTAT9 CODE
0x1D	0x84	LONG	FSTAT8-FSTAT9 INDEX
0x1D	0x85	LONG	FSTAT8-FSTAT9 TYPE

Master Parameters 0-7 Axes

Group	Index	Type	Description
0x20	0x00	FP32	Distance Into Move
0x20	0x01	FP32	Vector Velocity
:	:	:	:
0x20	0x0D	FP32	Velocity Squared
0x20	0x0E	FP32	Fraction Into Move
0x20	0x0F	FP32	Reserved
0x20	0x10	LONG	Move Counter

Master Parameters 8-15 Axes

Group	Index	Type	Description
0x28	0x00	FP32	Distance Into Move
0x28	0x01	FP32	Vector Velocity
:	:	:	:
0x28	0x0D	FP32	Velocity Squared
0x28	0x0E	FP32	Fraction Into Move
0x28	0x0F	FP32	Reserved
0x28	0x10	LONG	Move Counter

Axis Parameters 0-7 Axes

Group	Index	Type	Description
0x30	0x00	LONG	Current Position
0x30	0x01	LONG	Target Position
:	:	:	:
0x30	0x3D	FP32	Jog Acceleration
0x30	0x3E	FP32	Jog Deceleration
0x30	0x3F	FP32	Reserved

Axis Parameters 8-15 Axes

Group	Index	Type	Description
0x38	0x00	LONG	Current Position
0x38	0x01	LONG	Target Position
:	:	:	:
0x38	0x3D	FP32	Jog Acceleration
0x38	0x3E	FP32	Jog Deceleration
0x38	0x3F	FP32	Reserved

Binary Data Packets

(continued)

CMT Parameters

Group	Index	Type	Description
0x40	0x00	LONG	Feedback Encoder
0x40	0x01	LONG	Angle Between Phases
:	:	:	:
0x40	0x21	FP32	Average Velocity
0x40	0x22	FP32	Command Current

Logging Parameters

Group	Index	Type	Description
0x50	0x00	LONG	MAX Servo Period

Binary Data Packets

(continued)

Packet Retrieval:

Packet Header:

After a packet request is received, the ACR2000/ACR8000/ACR8010 responds by sending back a four byte packet header. This header is a direct echo of the request record. The echoing allows host software to do asynchronous sampling. A request can be sent by one part of the program and packet retrieval can be done by a centralized receiver. This routine would recognize the 0x00 in the header as an incoming packet and act accordingly.

In a synchronous retrieval mode, it is possible for there to be extra data in front of an incoming packet header. This would occur if there is any ASCII data pending at the time of the request, such as during a LIST. In order to retrieve a packet correctly, the host software must be able to process this data while waiting for the packet header to arrive. This should not be a problem, however, if all system echoing is turned off and no ASCII data retrieval is being done.

Packet Data:

After the packet header is received, the data arrives as a set of four byte fields. The bits in the isolation mask determine the number of fields and what they apply to. If the mask is 0xFF, a total of eight fields (32 bytes) would follow. The first field to be returned corresponds to the bit position of the lowest bit in the mask that is set.

Long integers (LONG) are returned as a four byte field. Floating point numbers (FP32) are returned in 32-bit IEEE floating point format. Both types of field are returned with the low order byte first.

Usage Example:

This example requests actual positions from axis 2, 3 and 5:

Output: `00 30 02 2C`

Input: `00 30 02 2C 20 21 22 23 30 31 32 33 50 51 52 53`
Fields: `| HEADER | AXIS2 | AXIS3 | AXIS5 |`

Actual Positions:

AXIS2: 0x23222120
AXIS3: 0x33323130
AXIS5: 0x53525150

Binary Parameter Access

Description:

Binary parameter access provides a method of reading from and writing to single system parameters on the card. Unlike binary data packets, binary parameter access uses the index of the parameter directly from Appendix A. There are no groups or masks.

A parameter access header consists of a Header ID (0x00) followed by a Packet ID code and a 2-byte parameter index. The Packet ID codes for the different types of packets are shown below. The following pages define each of the packets in detail.

Packet ID Codes:

Code	Packet Type	Description
0x88	Binary Get Long	Receive long integer from card.
0x89	Binary Set Long	Send long integer to card.
0x8A	Binary Get IEEE	Receive IEEE value from card.
0x8B	Binary Set IEEE	Send IEEE value to card

Usage Example:

This example requests current position from axis 0 parameter P12288:

Output: `00 88 00 30`

Input: `00 88 00 30 10 11 12 00`

Fields:

```
|  HEADER  | PARAMETER |
|          |   VALUE   |
```

Current Position Parameter Value:

AXIS0: 0x00121110

Binary Parameter Access

(continued)

Binary Get Long:

This packet gets a single parameter from the card. The parameter index is a 2-byte value sent low-order byte first. The parameter value in the receive packet is a 4-byte long integer received low-order byte first.

Transmit Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x88)
Byte 2-3	WORD	Parameter Index

Receive Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x88)
Byte 2-3	WORD	Parameter Index
Byte 4-7	LONG	Parameter Value

Binary Set Long:

This packet sets a single parameter on the card. The parameter index is a 2-byte value sent low-order byte first. The parameter value is a 4-byte long integer and is also sent low order byte first.

Transmit Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x89)
Byte 2-3	WORD	Parameter Index
Byte 4-7	LONG	Parameter Value

Receive Packet:

None.

Binary Parameter Access

(continued)

Binary Get IEEE:

This packet gets a single parameter from the card. The parameter index is a 2-byte value sent low-order byte first. The parameter value in the receive packet is a 4-byte image of an IEEE floating point number received low-order byte first.

Transmit Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x8A)
Byte 2-3	WORD	Parameter Index

Receive Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x8A)
Byte 2-3	WORD	Parameter Index
Byte 4-7	IEEE32	Parameter Value

Binary Set IEEE:

This packet sets a single parameter on the card. The parameter index is a 2-byte value sent low-order byte first. The parameter value is a 4-byte image of an IEEE floating point number and is also sent low-order byte first.

Transmit Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x8B)
Byte 2-3	WORD	Parameter Index
Byte 4-7	IEEE32	Parameter Value

Receive Packet:

None.

Binary Peek Command

Description:

A binary peek command consists of a four byte header followed by an address and the data to be fetched from that address. The header contains a data conversion code that controls pointer incrementing and the FP32 -> IEEE floating point conversion.

NOTE: Refer to Binary Global Parameter Access Application Note at end of Binary Host Interface section for details.

The command returns the header and peek address followed by the requested data.

Binary Peek Packet:

Transmit Packet:

Byte 0	Header ID (0x00)
Byte 1	Packet ID (0x90)
Byte 2	Conversion Code
Byte 3	Peek Word Count
Long 0	Peek Address

Receive Packet:

Byte 0	Header ID (0x00)
Byte 1	Packet ID (0x90)
Byte 2	Conversion Code
Byte 3	Peek Word Count
Long 0	Peek Address
Long 1	Peek Data 0
Long 2	Peek Data 1
:	
Long N	Peek Data (Count - 1)

Conversion Codes:

Code	Source	Destination
0x00	LONG	LONG
0x01	FP64	IEEE32
0x02	FP32	IEEE32

Binary Peek Command, continued

Usage Example:

NOTE: Addresses shown are for example only. Addresses will vary from card to card, depending on system memory allocation.

This example peeks at three words, starting at peek address 0x404500:

Output:
```
00 90 00 03 00 50 40 00
```

Input:
```
00 90 00 03 00 50 40 00 10 11 12 13 20 21 22 23 30 31 32 33
```
Fields:
```
|  HEADER  |  ADDRESS  |   DATA0   |   DATA1   |   DATA2  |
```

Requested data at address:

0x405000:	0x13121110
0x405001:	0x23222120
0x405002:	0x33323130

Binary Poke Command

Description:

A binary poke command consists of a four byte header followed by an address and the data to be stored at that address. There is no information returned from this command. The header contains a data conversion code that controls pointer incrementing and the IEEE -> FP32 floating point conversion.

NOTE: Refer to Binary Global Parameter Access Application Note at end of Binary Host Interface section for details.

Binary Poke Packet:

Transmit Packet:

Byte 0	Header ID (0x00)
Byte 1	Packet ID (0x91)
Byte 2	Conversion Code
Byte 3	Poke Word Count
Long 0	Poke Address
Long 1	Poke Data 0
Long 2	Poke Data 1
:	
Long N	Poke Data (Count - 1)

Receive Packet:

None.

Conversion Codes:

Code	Source	Destination
0x00	LONG	LONG
0x01	IEEE32	FP64
0x02	IEEE32	FP32

Binary Poke Command, continued

Usage Example:

NOTE: Addresses shown are for example only. Addresses will vary from card to card, depending on system memory allocation.

This example pokes data into three words, starting at poke address 0x405000:

```
Output:     00 91 00 03 00 50 40 00 10 11 12 13 20 21 22 23 30 31 32 33
Fields:     |  HEADER  |  ADDRESS  |   DATA0   |   DATA1   |   DATA2  |
```

Data poked into addresses:

0x405000:	0x13121110
0x405001:	0x23222120
0x405002:	0x33323130

Binary Address Command

Description:

A binary address command consists of a four byte header containing a program number and a parameter code. The command returns the header followed by the base address of the parameter type in question. If the returned address is zero, no parameters of that type have been allocated in the given program.

Peeking at the returned address will return the number of variables dimensioned for the requested type. In the case of numeric variables (DV,SV,LV) the count will be followed by the actual numeric data. For arrays (DA, SA, LA) the count will be followed by the addresses of the individual arrays. These addresses point to storage areas as if they were normal numeric variables of the same type (count followed by data.)

Binary Address Packet:

Transmit Packet:

Byte 0	Header ID (0x00)
Byte 1	Packet ID (0x92)
Byte 2	Program Number
Byte 3	Parameter Code

Receive Packet:

Byte 0	Header ID (0x00)
Byte 1	Packet ID (0x92)
Byte 2	Program Number
Byte 3	Parameter Code
Long 0	Parameter Address

Parameter Codes:

0x00	DV	Double Variables
0x01	DA	Double Arrays
0x02	SV	Single Variables
0x03	SA	Single Arrays
0x04	LV	Long Variables
0x05	LA	Long Arrays
0x06	$V	String Variables
0x07	$A	String Arrays

Binary Address Command, continued

Usage Example:

NOTE: Addresses shown are for example only. Addresses will vary from card to card, depending on system memory allocation.

This example requests the starting address of the Single Variable information for Program 5:

Output: `00 92 05 02`

Input: `00 92 05 02 00 80 40 00`
Fields:
```
|  HEADER  | PARAMETER |
|          |  ADDRESS  |
```

Starting address of the Single Variable information for Program 5:

Address: 0x408000

Binary Parameter Address Command

Description:

A binary parameter address command consists of a four byte header containing a parameter index. The command returns the header followed by the address of the parameter. If the returned address is zero, the parameter index was invalid.

Binary Address Packet:

Transmit Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x93)
Byte 2-3	WORD	Parameter Index

Receive Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x93)
Byte 2-3	WORD	Parameter Index
Long 0	LONG	Parameter Address

Usage Example:

NOTE: Addresses shown are for example only. Addresses will vary from card to card, depending on system memory allocation.

This example requests the address of the axis 0 current position parameter:

Output: `00 93 00 30`

Input: `00 93 00 30 31 50 40 00`

Fields:
```
|  HEADER  | PARAMETER |
|          |  ADDRESS  |
```

Current Position Parameter Address:

AXIS0: 0x405031

Binary Mask Command

Description:

A binary mask command consists of a four byte header followed by an address and two bit masks to be combined with the data at that address. There is no information returned from this command. The address must point to a long integer storage area. The nandmask is used to clear bits and the ormask is used to set bits. The data is modified as follows:

data = (data AND NOT nandmask) OR ormask

Binary Mask Packet:

Transmit Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x94)
Byte 2	BYTE	Reserved (0x00)
Byte 3	BYTE	Reserved (0x00)
Long 0	BYTE	Data Address
Long 1	BYTE	NAND Mask
Long 2	BYTE	OR Mask

Receive Packet:

None.

Usage Example:

NOTE: Addresses shown are for example only. Addresses will vary from card to card, depending on system memory allocation.

This example uses the Binary Mask Command to clear all of the Optoisolated Outputs and then set Output 32. The data address for Optoisolated Outputs Parameter P4097 is assumed to have been previously returned using the Binary Parameter Address Command on the previous page.

```
Output:     00 94 00 00 43 60 40 00 FF FF FF FF 01 00 00 00
Fields:     |  HEADER  | PARAMETER | NAND MASK |  OR MASK  |
            |          |  ADDRESS  |
```

Optoisolated Output Parameter P4097 Modified Data at address:

0x406043: 0x00000001

Binary Parameter Mask Command

Description:

A binary parameter mask command consists of a four byte header followed by two bit masks to be combined with a system parameter. There is no information returned from this command. The parameter index in the header must be a long integer. The nandmask is used to clear bits and the ormask is used to set bits. The data is modified as follows:

data = (data AND NOT nandmask) OR ormask

Binary Mask Packet:

Transmit Packet:

Byte 0	BYTE	Header ID (0x00)
Byte 1	BYTE	Packet ID (0x95)
Byte 2-3	WORD	Parameter Index
Long 0	LONG	NAND Mask
Long 1	LONG	OR Mask

Receive Packet:

None.

Usage Example:

This example uses the Binary Parameter Mask Command to clear all of the Optoisolated Outputs and then set Output 32.

```
Output:     00 94 01 10 FF FF FF FF 01 00 00 00
Fields:     |  HEADER  | NAND MASK |  OR MASK  |
```

Optoisolated Output Parameter P4097 Modified Data:

P4097: 0x00000001

Binary Move Command

Description:

A binary move consists of a variable length header followed by a number of four-byte data fields. The bit mapped information in the header determines the number of data fields and their content. All data fields are sent low order byte first.

Binary Move Packet:

Head 00	BYTE	Header ID (0x04)
Head 01	BYTE	Header Code 0
Head 02	BYTE	Header Code 1
Head 03	BYTE	Header Code 2
Head 04	BYTE	Header Code 3
Head 05	BYTE	Header Code 4
Head 06	BYTE	Header Code 5
Head 07	BYTE	Header Code 6
Head 08	BYTE	Header Code 7
Data 00	IEEE32	Master VEL
Data 01	IEEE32	Master FVEL
Data 02	IEEE32	Master ACC/DEC
Data 03	LONG*	Slave 0 Target or NURB/Spline control point
Data 04	LONG*	Slave 1 Target or NURB/Spline control point
Data 05	LONG*	Slave 2 Target or NURB/Spline control point
Data 06	LONG*	Slave 3 Target or NURB/Spline control point
Data 07	LONG*	Slave 4 Target or NURB/Spline control point
Data 08	LONG*	Slave 5 Target or NURB/Spline control point
Data 09	LONG*	Slave 6 Target or NURB/Spline control point
Data 10	LONG*	Slave 7 Target or NURB/Spline control point
Data 11	LONG*	Slave 8 Target or NURB/Spline control point
Data 12	LONG*	Slave 9 Target or NURB/Spline control point
Data 13	LONG*	Slave 10 Target or NURB/Spline control point
Data 14	LONG*	Slave 11 Target or NURB/Spline control point
Data 15	LONG*	Slave 12 Target or NURB/Spline control point
Data 16	LONG*	Slave 13 Target or NURB/Spline control point
Data 17	LONG*	Slave 14 Target or NURB/Spline control point
Data 18	LONG*	Slave 15 Target or NURB/Spline control point
Data 19	LONG*	Primary Center
Data 20	LONG*	Secondary Center
Data 21	IEEE32	Primary Scaling or NURB/Spline Knot
Data 22	IEEE32	Secondary Scaling or NURB Weight

* These fields are in IEEE32 format if bit 2 of header code 3 is set

Binary Move Command

(continued)

There are two versions defined for Header Code 0 based on Secondary Master Flag Bit Index 5, Enable Rapid Move Modes.

The default disabled mode for this flag (Secondary Master Flag Bit Index 5 cleared) uses the following Header Code 0 definition. This Header Code 0 definition is compatible with ACR2000/ACR8000 Firmware Versions 1.17.04 and below, and is compatible with all AcroCut/AcroMill software versions.

Header Code 0 (Enable Rapid Move Modes flag disabled – default cleared value):

Bit 0	FVEL Lockout	Forces FVEL to zero for this move
Bit 1	FOV Lockout	Forces FOV to 1.0 for this move
Bit 2	STP Ramp Activate	Sets STP equal to DEC, else STP 0
Bit 3	Code 3 Present	Header contains "Header Code 3"
Bit 4	Veloc Data Present	Packet contains master VEL
Bit 5	Accel Data Present	Packet contains master ACC/DEC
Bit 6	Counter Dir	Count down if set, else up
Bit 7	Counter Mode	Master move counter enable

The enabled mode for this flag (Secondary Master Flag Bit Index 5 Set) uses the following Header Code 0 definition. This Header Code 0 definition is compatible with ACR2000/ACR8000/ACR8010 Firmware Versions 1.17.05 and above, and is not compatible with AcroCut/AcroMill Software Versions 1.15.00 and below. The Move Modes for this header code are defined following the header code definitions.

Header Code 0 (Enable Rapid Move Modes flag enabled – set value):

Bit 0	Move Mode Bit 1	Selects the move mode for this move along with Header Code 0 Bit 2.
Bit 1	FOV/ROV Lockout	Forces FOV or ROV to 1.0 for this move
Bit 2	Move Mode Bit 0	Selects the move mode for this move along with Header Code Bit 0.
Bit 3	Code 3 Present	Header contains "Header Code 3"
Bit 4	Veloc Data Present	Packet contains master VEL
Bit 5	Accel Data Present	Packet contains master ACC/DEC
Bit 6	Counter Dir	Count down if set, else up
Bit 7	Counter Mode	Master move counter enable

Binary Move Command

(continued)

Header Code 1:

Bit 0	Master Bit 0	\
Bit 1	Master Bit 1	Master for this move packet
Bit 2	Master Bit 2	/
Bit 3	Interrupt Select	Interrupt host when move starts
Bit 4	Arc Direction	CCW if set, else CW
Bit 5	Arc Mode	Packet contains center points or Spline Knot present
Bit 6	Arc Plane Bit 0	Primary and secondary axis or NURB Mode
Bit 7	Arc Plane Bit 1	for binary arc move commands or Spline Mode

Header Code 2:

Bit 0	Slave 0 Present	
Bit 1	Slave 1 Present	
Bit 2	Slave 2 Present	\
Bit 3	Slave 3 Present	Slave target positions to be
Bit 4	Slave 4 Present	contained in this move packet
Bit 5	Slave 5 Present	/
Bit 6	Slave 6 Present	
Bit 7	Slave 7 Present	

Header Code 3:

Bit 0	Incremental Target	Target positions are incremental
Bit 1	Incremental Center	Center points are incremental
Bit 2	Floating Point Data	Targets and centers are IEEE32
Bit 3	Arc Radius Scaling	Packet contains radius scaling / NURB/Spline
Bit 4	FVEL Data Present	Packet contains master FVEL
Bit 5	Block Skip Check	Sets the master Block Skip Check
Bit 6	NURB or Spline	Move data packet for NURB or Spline Interpolation
Bit 7	Extended Codes	Extended codes 4,5,6 and 7 are present. This bit should be set if DBCB is used

Header Code 4:

Bit 0	Reserved	
Bit 1	Reserved	
Bit 2	Reserved	
Bit 3	Master Bit 3	Master for this move packet
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	

Binary Move Command

(continued)

Header Code 5:

Bit 0	Reserved
Bit 1	Reserved
Bit 2	Reserved
Bit 3	Reserved
Bit 4	Reserved
Bit 5	Reserved
Bit 6	Reserved
Bit 7	Reserved

Header Code 6:

Bit 0	Slave 8 Present	
Bit 1	Slave 9 Present	\
Bit 2	Slave 10 Present	\
Bit 3	Slave 11 Present	Slave target positions to be
Bit 4	Slave 12 Present	contained in this move packet
Bit 5	Slave 13 Present	/
Bit 6	Slave 14 Present	/
Bit 7	Slave 15 Present	

Header Code 7:

Bit 0	Reserved
Bit 1	Reserved
Bit 2	Reserved
Bit 3	Reserved
Bit 4	Reserved
Bit 5	Reserved
Bit 6	Reserved
Bit 7	Reserved

Binary Move Command

(continued)

The following Move Modes definition applies to Header Code 0 used with the Master Enable Rapid Move Modes flag set.

Move modes:

Bits 0 and 2 in Header Code 0 indicate which type of move mode is contained in the binary move packet as follows:

Move Mode Bit 1 (Header Code 0 Bit 0)	Move Mode Bit 0 (Header Code 0 Bit 2)	Move Mode
0	0	Move Mode 0 - Feed Continuous
0	1	Move Mode 1 - Feed Cornering
1	0	Move Mode 2 - Feed Stopping
1	1	Move Mode 3 – Rapid

Where: 0: Bit Cleared
1: Bit Set

Move Mode Examples:

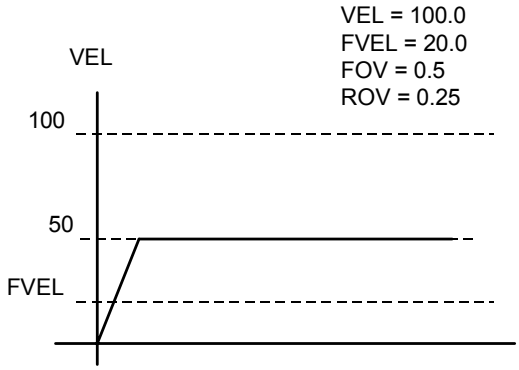

Figure 6.1 Move Mode 0 Example - Feed Continuous

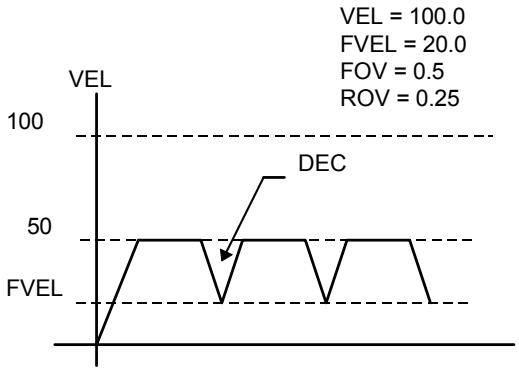

Figure 6.2 Move Mode 1 Example - Feed Cornering

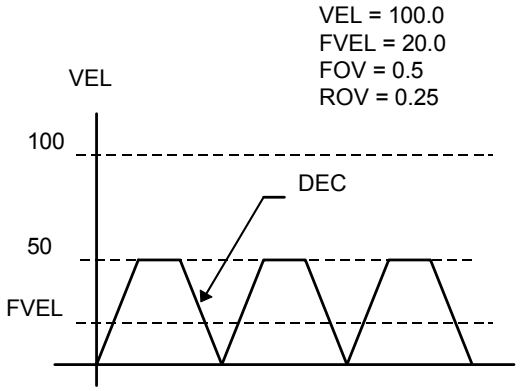

Figure 6.3 Move Mode 2 Example - Feed Stopping

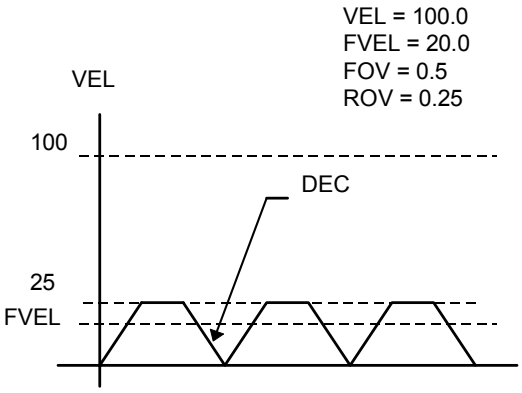

Figure 6.4 Move Mode 3 Example - Rapid

Binary Move Command

(continued)

Linear moves:

The bits in header code 2 indicate which target positions are contained in the binary move packet. If the "incremental target" bit in header code 3 is set, the targets are relative to the current target positions of the slaves, otherwise the targets are absolute. The "floating point data" bit in header code 3 indicates that the target data is in IEEE floating point format, otherwise they are long integers.

Arc moves:

When the "arc mode" bit in header code 1 is set, a circular arc is generated using two of the first three slaves attached to a master. Any slaves that are given a target position, but are not part of the circular interpolation, are executed as normal linear moves. This allows for helical interpolation.

The "arc plane" bits in header code 1 are combined to generate a number from 0 to 3 which defines the primary and secondary axes for the arc as follows:

Arc Plane	Primary Axis	Secondary Axis
0	Slave 0	Slave 1
1	Slave 1	Slave 2
2	Slave 2	Slave 0
3	Reserved	Reserved

The "arc direction" bit in header code 1 indicates the direction of the arc relative to the primary and secondary axes. A counter-clockwise arc is defined as an arc from the positive primary axis toward the positive secondary axis.

The radius of the arc will be equal to the distance between the arc target position and the given center point. If the arc target position is equal to the target position of the previous move, a 360 degree path will be generated. The target position of the previous move must lie on the defined arc or the axes will jump to that location before the arc begins.

If the "incremental center" bit in header code 3 is set, the center points are relative to the current target positions of the slaves, otherwise the center points are absolute. The "floating point data" bit in header code 3 indicates that the given center points are in IEEE floating point format, otherwise they are long integers.

NURB or Spline moves:

When the "NURB or Spline" bit in header code 3 (Bit 6) is set, the move data packet includes NURB or Spline curve data. In addition, bit 5 and 6 in header code 1 will differentiate if the data is NURB or Spline. Bit 5 of header code 1 is set when Spline data includes Knots.

The control points for NURB and Spline are sent as DATA3 thru DATA10, similar to the way the normal slave targets are sent. Load the Knot in DATA13 and Weight in DATA14 and set the Bit 3 of code 3.

Binary SET and CLR

Description:

The immediate setting and clearing of bits can be accomplished with a 3 byte binary command sequence. This sequence is a 1 byte command header followed by a two byte index value. The index value is sent low order byte first. The command is not queued and the set or clear occurs when the command is first seen by the board.

Binary SET:

Byte 0	Header ID (0x1C)
Byte 1	Index Byte 0
Byte 2	Index Byte 1
Byte 3	0x00, this byte is for ACR8020 DPCB only.

Binary CLR:

Byte 0	Header ID (0x1D)
Byte 1	Index Byte 0
Byte 2	Index Byte 1
Byte 3	0x00, this byte is for ACR8020 DPCB only.

Usage Example:

Binary Output	Description
`1C 08 02`	Set bit 520 (0x0208)
`1D 10 00`	Clear bit 32 (0x0010)

Binary FOV Command

Description:

The immediate setting of feedrate override for any or all axes can be accomplished with a 6 byte binary command sequence. This sequence is a 2 byte command header followed by a 4 byte FOV value. The command is not queued and the FOV occurs when the command is first seen by the board.

The second byte in the header is a bit mask that determines which masters are affected by the FOV value that follows. The FOV value is an image of an IEEE 32-bit floating point value, sent low order byte first.

For more than 8 masters the header bit mask Byte 1 should be set zero and then the two optional 16 master header bit mask Byte 2 and Byte3 should be filled accordingly.

Binary Format:

Byte 0	Header ID (0x07)
Byte 1	Header Bit Mask
Byte 2	Optional 16 Master Header Bit Mask
Byte 3	Optional 16 Master Header Bit Mask
Byte 4	FOV Byte 0
Byte 5	FOV Byte 1
Byte 6	FOV Byte 2
Byte 7	FOV Byte 3

Header Bit Mask:

Bit 0	Master 0 Affected	
Bit 1	Master 1 Affected	
Bit 2	Master 2 Affected	\
Bit 3	Master 3 Affected	Masters affected by the FOV
Bit 4	Master 4 Affected	contained in this command
Bit 5	Master 5 Affected	/
Bit 6	Master 6 Affected	
Bit 7	Master 7 Affected	

Binary FOV Command

(continued)

16 Master Header Bit Mask:

Bit 0	Master 0 Affected	
Bit 1	Master 1 Affected	
Bit 2	Master 2 Affected	\
Bit 3	Master 3 Affected	Masters affected by the FOV
Bit 4	Master 4 Affected	contained in this command
Bit 5	Master 5 Affected	/
Bit 6	Master 6 Affected	
Bit 7	Master 7 Affected	

16 Master Header Bit Mask:

Bit 8	Master 8 Affected	
Bit 9	Master 9 Affected	
Bit 10	Master 10 Affected	\
Bit 11	Master 11 Affected	Masters affected by the FOV
Bit 12	Master 12 Affected	contained in this command
Bit 13	Master 13 Affected	/
Bit 14	Master 14 Affected	
Bit 15	Master 15 Affected	

Usage Example:

This example uses the following IEEE conversions:

```
0.500 = 3F000000
0.123 = 3DFBE76D
```

Binary Output	Description
`07 08 00 00 00 3F`	Set Master 3 FOV to 0.5
`07 05 6D E7 FB 3D`	Set Master 0 and Master 2 FOV to 0.123

Binary ROV Command (Version 1.17.05 & Up)

Description:

The immediate setting of rapid feedrate override for any or all axes can be accomplished with a 6 byte binary command sequence. This sequence is a 2 byte command header followed by a 4 byte ROV value. The command is not queued and the ROV occurs when the command is first seen by the board.

The second byte in the header is a bit mask that determines which masters are affected by the ROV value that follows. The ROV value is an image of an IEEE 32-bit floating point value, sent low order byte first.

For more than 8 masters the header bit mask Byte 1 should be set zero and then the two optional 16 master header bit mask Byte 2 and Byte3 should be filled accordingly.

Binary Format:

Byte 0	Header ID (0x1F)
Byte 1	Header Bit Mask
Byte 2	ROV Byte 0
Byte 3	ROV Byte 1
Byte 4	ROV Byte 2
Byte 5	ROV Byte 3

Header Bit Mask:

Bit 0	Master 0 Affected	
Bit 1	Master 1 Affected	
Bit 2	Master 2 Affected	\
Bit 3	Master 3 Affected	Masters affected by the ROV
Bit 4	Master 4 Affected	contained in this command
Bit 5	Master 5 Affected	/
Bit 6	Master 6 Affected	
Bit 7	Master 7 Affected	

Binary ROV Command

(continued)

16 Master Header Bit Mask:

Bit 0	Master 0 Affected	
Bit 1	Master 1 Affected	
Bit 2	Master 2 Affected	\
Bit 3	Master 3 Affected	Masters affected by the ROV
Bit 4	Master 4 Affected	contained in this command
Bit 5	Master 5 Affected	/
Bit 6	Master 6 Affected	
Bit 7	Master 7 Affected	

16 Master Header Bit Mask:

Bit 8	Master 8 Affected	
Bit 9	Master 9 Affected	
Bit 10	Master 10 Affected	\
Bit 11	Master 11 Affected	Masters affected by the ROV
Bit 12	Master 12 Affected	contained in this command
Bit 13	Master 13 Affected	/
Bit 14	Master 14 Affected	
Bit 15	Master 15 Affected	

Usage Example:

This example uses the following IEEE conversions:

```
0.500 = 3F000000
0.123 = 3DFBE76D
```

Binary Output	Description
07 08 00 00 00 3F	Set Master 3 ROV to 0.5
07 05 6D E7 FB 3D	Set Master 0 and Master 2 ROV to 0.123

Application: Binary Global Parameter Access

See also: Binary Peek Command, Binary Poke Command

Description:

Global user variables (see Variable Memory Allocation) can be read and set using the Binary Peek and Poke Command interface.

NOTE: A maximum word count of 255 can be used when using the Binary Peek and Poke Command interface.

System Pointer Address (hardware dependent):

ACR1200: 0x400008
ACR1500: 0xC08008
ACR2000: 0x400008
ACR8000: 0x403E08
ACR8010: 0x403E08
ACR8020: 0x400009

Reading Global Variables:

Peek at the System Pointer Address (see above information) to receive the Global_Variable_Address.

If the returned address is zero, there are no dimensioned global variables (see the DIM command).

If the returned address is other than zero, peek at this address to receive the number of dimensioned global variables.

Read a global variable P(index) using the following addressing scheme for Peek:

Peek address = Global_Variable_Address + 1 + (index * 2)

Where index = 0 to (number of dimensioned global variables – 1)

Even though global variables are stored on-board as floating point 64 (FP64) numbers, they are returned as IEEE32 numbers (Conversion Code 0x01).

Application: Binary Global Parameter Access (Cont'd)

Setting Global Variables:

Peek at the System Pointer Address (see System Pointer Address on previous page) to receive the Global_Variable_Address.

If the returned address is zero, there are no dimensioned global variables (see the DIM command).

If the returned address is other than zero, peek at this address to receive the number of dimensioned global variables.

To prevent corruption of user memory, always verify P(index) is within the dimensioned global variable range before performing a POKE command.

Set a global variable P(index) using the following addressing scheme for Poke:

Poke address = Global Variable Address + 1 + (index * 2)

Where index = 0 to (number of dimensioned global variables – 1)

Even though global variables are sent as IEEE32 numbers, they are stored on-board as floating point 64 (FP64) numbers (Conversion Code 0x01).

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APENDIX A

Parameter Reference

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Parameter Overview

Description:

This appendix provides a list of all system parameters. The following is an outline of the parameters contained in this appendix:

P4096-P4359	Flag Parameters
P6144-P6655	Object Parameters 0-15
P6656-P6775	PLC Parameters
P6912-P7119	Misc Parameters
P7168-P7408	Program Parameters
P7424-P7575	FSTST Setup Parameters
P8192-P8255	Master 0 Parameters
P8448-P8511	Master 1 Parameters
P8704-P8767	Master 2 Parameters
P8960-P9023	Master 3 Parameters
P9216-P9279	Master 4 Parameters
P9472-P9535	Master 5 Parameters
P9728-P9791	Master 6 Parameters
P9984-P10047	Master 7 Parameters
P10240-P10303	Master 8 Parameters
P10496-P10559	Master 9 Parameters
P10752-P10815	Master 10 Parameters
P11008-P11071	Master 11 Parameters
P11264-P11327	Master 12 Parameters
P11520-P11583	Master 13 Parameters
P11776-P11839	Master 14 Parameters
P12032-P12095	Master 15 Parameters
P12288-P12407	Axis 0 Parameters
P12544-P12663	Axis 1 Parameters
P12800-P12919	Axis 2 Parameters
P13056-P13175	Axis 3 Parameters
P13312-P13431	Axis 4 Parameters
P13568-P13687	Axis 5 Parameters
P13824-P13943	Axis 6 Parameters
P14080-P14199	Axis 7 Parameters
P14336-P14455	Axis 8 Parameters
P14592-P14711	Axis 9 Parameters
P14848-P14967	Axis 10 Parameters
P15104-P15223	Axis 11 Parameters
P15360-P15479	Axis 12 Parameters
P15616-P15735	Axis 13 Parameters
P15872-P15991	Axis 14 Parameters
P16128-P16247	Axis 15 Parameters

Parameter Overview

P16384-P16423	CMT 0	Parameters
P16640-P16679	CMT 1	Parameters
P16896-P16935	CMT 2	Parameters
P17152-P17191	CMT 3	Parameters
P17408-P17447	CMT 4	Parameters
P17664-P17703	CMT 5	Parameters
P17920-P17959	CMT 6	Parameters
P18176-P18215	CMT 7	Parameters
P20480-P20487		Logging Parameters
P24576-P24831		ObjectParameters 16-31

P4096-P4279

Flag Parameters

General Flag Parameters Code=0x10; Index=0x00; Mask=0xFF*		P
Optoisolated Inputs	LONG	4096
Optoisolated Outputs	LONG	4097
Miscellaneous Inputs	LONG	4098
Miscellaneous Outputs	LONG	4099
User Group 0	LONG	4100
User Group 1	LONG	4101
User Group 2	LONG	4102
User Group 3	LONG	4103

Expansion I/O Flag Parameters Code=0x10; Index=0x01; Mask=0xFF*		P
XIO Board 0 Inputs	LONG	4104
XIO Board 0 Outputs	LONG	4105
XIO Board 1 Inputs	LONG	4106
XIO Board 1 Outputs	LONG	4107
XIO Board 2 Inputs	LONG	4108
XIO Board 2 Outputs	LONG	4109
XIO Board 3 Inputs	LONG	4110
XIO Board 3 Outputs	LONG	4111

Master Flag Parameters Code=0x10; Index=0x02; Mask=0xFF*		P
Master 0 Flags	LONG	4112
Master 1 Flags	LONG	4113
Master 2 Flags	LONG	4114
Master 3 Flags	LONG	4115
Master 4 Flags	LONG	4116
Master 5 Flags	LONG	4117
Master 6 Flags	LONG	4118
Master 7 Flags	LONG	4119

Axis Flag Parameters Code=0x10; Index=0x03; Mask=0xFF*		P
Axis 0 Flags	LONG	4120
Axis 1 Flags	LONG	4121
Axis 2 Flags	LONG	4122
Axis 3 Flags	LONG	4123
Axis 4 Flags	LONG	4124
Axis 5 Flags	LONG	4125
Axis 6 Flags	LONG	4126
Axis 7 Flags	LONG	4127

Program Flag Parameters Code=0x10; Index=0x04; Mask=0xFF*		P
Program 0 Flags	LONG	4128
Program 1 Flags	LONG	4129
Program 2 Flags	LONG	4130
Program 3 Flags	LONG	4131
Program 4 Flags	LONG	4132
Program 5 Flags	LONG	4133
Program 6 Flags	LONG	4134
Program 7 Flags	LONG	4135

* Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Flag Parameters (continued)

Program Flag Parameters Code=0x10; Index=0x05; Mask=0xFF		P
Program 8 Flags	LONG	4136
Program 9 Flags	LONG	4137
Program 10 Flags	LONG	4138
Program 11 Flags	LONG	4139
Program 12 Flags	LONG	4140
Program 13 Flags	LONG	4141
Program 14 Flags	LONG	4142
Program 15 Flags	LONG	4143

PLC Flag Parameters Code=0x10; Index=0x06; Mask=0xFF*		P
PLC 0 Flags	LONG	4144
PLC 1 Flags	LONG	4145
PLC 2 Flags	LONG	4146
PLC 3 Flags	LONG	4147
PLC 4 Flags	LONG	4148
PLC 5 Flags	LONG	4149
PLC 6 Flags	LONG	4150
PLC 7 Flags	LONG	4151

Other Flag Parameters Code=0x10; Index=0x07; Mask=0xFF*		P
FIFO Flags	LONG	4152
LPT1 Flags	LONG	4153
COM1 Flags	LONG	4154
COM2 Flags	LONG	4155
User Group 4	LONG	4156
User Group 5	LONG	4157
User Group 6	LONG	4158
User Group 7	LONG	4159

Secondary Master Flag Parameters Code=0x10; Index=0x08; Mask=0xFF*		P
Secondary Master 0 Flags	LONG	4160
Secondary Master 1 Flags	LONG	4161
Secondary Master 2 Flags	LONG	4162
Secondary Master 3 Flags	LONG	4163
Secondary Master 4 Flags	LONG	4164
Secondary Master 5 Flags	LONG	4165
Secondary Master 6 Flags	LONG	4166
Secondary Master 7 Flags	LONG	4167

Secondary Axis Flag Parameters Code=0x10; Index=0x09; Mask=0xFF*		P
Secondary Axis 0 Flags	LONG	4168
Secondary Axis 1 Flags	LONG	4169
Secondary Axis 2 Flags	LONG	4170
Secondary Axis 3 Flags	LONG	4171
Secondary Axis 4 Flags	LONG	4172
Secondary Axis 5 Flags	LONG	4173
Secondary Axis 6 Flags	LONG	4174
Secondary Axis 7 Flags	LONG	4175

* Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Flag Parameters (continued)

Encoder Flag Parameters Code=0x10; Index=0x0A; Mask=0xFF*		P
Encoder 0 Flags	LONG	4176
Encoder 1 Flags	LONG	4177
Encoder 2 Flags	LONG	4178
Encoder 3 Flags	LONG	4179
Encoder 4 Flags	LONG	4180
Encoder 5 Flags	LONG	4181
Encoder 6 Flags	LONG	4182
Encoder 7 Flags	LONG	4183

Encoder Flag Parameters Code=0x10; Index=0x0B; Mask=0xFF*		P
Encoder 8 Flags	LONG	4184
Encoder 9 Flags	LONG	4185
Encoder 10 Flags	LONG	4186
Encoder 11 Flags	LONG	4187
Encoder 12 Flags	LONG	4188
Encoder 13 Flags	LONG	4189
Encoder 14 Flags	LONG	4190
Encoder 15 Flags	LONG	4191

Encoder Flag Parameters Code=0x10; Index=0x0C; Mask=0xFF*		P
Encoder 16 Flags	LONG	4192
Encoder 17 Flags	LONG	4193
Encoder 18 Flags	LONG	4194
Encoder 19 Flags	LONG	4195
Encoder 20 Flags	LONG	4196
Encoder 21 Flags	LONG	4197
Encoder 22 Flags	LONG	4198
Encoder 23 Flags	LONG	4199

Encoder Flag Parameters Code=0x10; Index=0x0D; Mask=0xFF*		P
Reserved	LONG	4200
Reserved	LONG	4201
Reserved	LONG	4202
Reserved	LONG	4203
Reserved	LONG	4204
Reserved	LONG	4205
Reserved	LONG	4206
Reserved	LONG	4207

* Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Flag Parameters (continued)

CMT Flag Parameters Code=0x10; Index=0x0E; Mask=0xFF*		P
CMT 0 Flags	LONG	4208
CMT 1 Flags	LONG	4209
CMT 2 Flags	LONG	4210
CMT 3 Flags	LONG	4211
CMT 4 Flags	LONG	4212
CMT 5 Flags	LONG	4213
CMT 6 Flags	LONG	4214
CMT 7 Flags	LONG	4215

CMT Flag Parameters Code=0x10; Index=0x0F; Mask=0xFF*		P
Reserved	LONG	4216
Reserved	LONG	4217
Reserved	LONG	4218
Reserved	LONG	4219
Reserved	LONG	4220
Reserved	LONG	4221
Reserved	LONG	4222
Reserved	LONG	4223

DAC Flag Parameters Code=0x10; Index=0x10; Mask=0xFF*		P
Reserved	LONG	4224
Reserved	LONG	4225
Reserved	LONG	4226
Reserved	LONG	4222
Reserved	LONG	4228
Reserved	LONG	4229
Reserved	LONG	4230
Reserved	LONG	4231

DAC Flag Parameters Code=0x10; Index=0x11; Mask=0xFF*		P
Reserved	LONG	4232
Reserved	LONG	4233
Reserved	LONG	4234
Reserved	LONG	4235
Reserved	LONG	4236
Reserved	LONG	4237
Reserved	LONG	4238
Reserved	LONG	4239

* Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Flag Parameters (continued)

ADC Flag Parameters Code=0x10; Index=0x12; Mask=0xFF*		P
Reserved	LONG	4240
Reserved	LONG	4241
Reserved	LONG	4242
Reserved	LONG	4243
Reserved	LONG	4244
Reserved	LONG	4245
Reserved	LONG	4246
Reserved	LONG	4247

ADC Flag Parameters Code=0x10; Index=0x13; Mask=0xFF*		P
Reserved	LONG	4248
Reserved	LONG	4249
Reserved	LONG	4250
Reserved	LONG	4251
Reserved	LONG	4252
Reserved	LONG	4253
Reserved	LONG	4254
Reserved	LONG	4255

Tertiary Master Flag Parameters Code=0x10; Index=0x14; Mask=0xFF*		P
Tertiary Master 0 Flags	LONG	4256
Tertiary Master 1 Flags	LONG	4257
Tertiary Master 2 Flags	LONG	4258
Tertiary Master 3 Flags	LONG	4259
Tertiary Master 4 Flags	LONG	4260
Tertiary Master 5 Flags	LONG	4261
Tertiary Master 6 Flags	LONG	4262
Tertiary Master 7 Flags	LONG	4263

Tertiary Master Flag Parameters Code=0x10; Index=0x15; Mask=0xFF*		P
Tertiary Master 8 Flags	LONG	4264
Tertiary Master 9 Flags	LONG	4265
Tertiary Master 10 Flags	LONG	4266
Tertiary Master 11 Flags	LONG	4267
Tertiary Master 12 Flags	LONG	4268
Tertiary Master 13 Flags	LONG	4269
Tertiary Master 14 Flags	LONG	4270
Tertiary Master 15 Flags	LONG	4271

* Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Flag Parameters (continued)

Misc Control Flag Parameters Code=0x10; Index=0x16; Mask=0xFF*		P
Misc Control Group 1	LONG	4272
Reserved	LONG	4273
Reserved	LONG	4274
Reserved	LONG	4275
Reserved	LONG	4276
DPCB	LONG	4277
FSTAT	LONG	4278
Reserved	LONG	4279

Quaternary Master Flag Parameters Code=0x10; Index=0x17; Mask=0xFF*		P
Tertiary Master 0 Flags	LONG	4280
Tertiary Master 1 Flags	LONG	4281
Tertiary Master 2 Flags	LONG	4282
Tertiary Master 3 Flags	LONG	4283
Tertiary Master 4 Flags	LONG	4284
Tertiary Master 5 Flags	LONG	4285
Tertiary Master 6 Flags	LONG	4286
Tertiary Master 7 Flags	LONG	4287

Quaternary Master Flag Parameters Code=0x10; Index=0x18; Mask=0xFF*		P
Tertiary Master 8 Flags	LONG	4288
Tertiary Master 9 Flags	LONG	4289
Tertiary Master 10 Flags	LONG	4290
Tertiary Master 11 Flags	LONG	4291
Tertiary Master 12 Flags	LONG	4292
Tertiary Master 13 Flags	LONG	4293
Tertiary Master 14 Flags	LONG	4294
Tertiary Master 15 Flags	LONG	4295

TertiarySlave Flag Parameters Code=0x10; Index=0x19; Mask=0xFF*		P
Tertiary Slave 0 Flags	LONG	4296
Tertiary Slave 1 Flags	LONG	4297
Tertiary Slave 2 Flags	LONG	4298
Tertiary Slave 3 Flags	LONG	4299
Tertiary Slave 4 Flags	LONG	4300
Tertiary Slave 5 Flags	LONG	4301
Tertiary Slave 6 Flags	LONG	4302
Tertiary Slave 7 Flags	LONG	4303

Tertiary Slave Flag Parameters Code=0x10; Index=0x1A; Mask=0xFF*		P
Tertiary Slave 8 Flags	LONG	4304
Tertiary Slave 9 Flags	LONG	4305
Tertiary Slave 10 Flags	LONG	4306
Tertiary Slave 11 Flags	LONG	4307
Tertiary Slave 12 Flags	LONG	4308
Tertiary Slave 13 Flags	LONG	4309
Tertiary Slave 14 Flags	LONG	4310
Tertiary Slave 15 Flags	LONG	4311

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Flag Parameters (continued)

Quaternary Slave Flag Parameters Code=0x10; Index=0x1B; Mask=0xFF*		P
Tertiary Slave 0 Flags	LONG	4312
Tertiary Slave 1 Flags	LONG	4313
Tertiary Slave 2 Flags	LONG	4314
Tertiary Slave 3 Flags	LONG	4315
Tertiary Slave 4 Flags	LONG	4316
Tertiary Slave 5 Flags	LONG	4317
Tertiary Slave 6 Flags	LONG	4318
Tertiary Slave 7 Flags	LONG	4319

Quaternary Slave Flag Parameters Code=0x10; Index=0x1C; Mask=0xFF*		P
Tertiary Slave 8 Flags	LONG	4320
Tertiary Slave 9 Flags	LONG	4321
Tertiary Slave 10 Flags	LONG	4322
Tertiary Slave 11 Flags	LONG	4323
Tertiary Slave 12 Flags	LONG	4324
Tertiary Slave 13 Flags	LONG	4325
Tertiary Slave 14 Flags	LONG	4326
Tertiary Slave 15 Flags	LONG	4327

Master Flag Parameters Code=0x10; Index=0x1D; Mask=0xFF*		P
Master 8 Flags	LONG	4328
Master 9 Flags	LONG	4329
Master 10 Flags	LONG	4330
Master 11 Flags	LONG	4331
Master 12 Flags	LONG	4332
Master 13 Flags	LONG	4333
Master 14 Flags	LONG	4334
Master 15 Flags	LONG	4335

Axis Flag Parameters Code=0x10; Index=0x1E; Mask=0xFF*		P
Axis 8 Flags	LONG	4336
Axis 9 Flags	LONG	4337
Axis 10 Flags	LONG	4338
Axis 11 Flags	LONG	4339
Axis 12 Flags	LONG	4340
Axis 13 Flags	LONG	4341
Axis 14 Flags	LONG	4342
Axis 15 Flags	LONG	4343

Secondary Master Flag Parameters Code=0x10; Index=0x1F; Mask=0xFF*		P
Secondary Master 8 Flags	LONG	4344
Secondary Master 9 Flags	LONG	4345
Secondary Master 10 Flags	LONG	4346
Secondary Master 11 Flags	LONG	4347
Secondary Master 12 Flags	LONG	4348
Secondary Master 13 Flags	LONG	4349
Secondary Master 14 Flags	LONG	4350
Secondary Master 15 Flags	LONG	4351

* Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Flag Parameters (continued)

Secondary Axis Flag Parameters Code=0x10; Index=0x20; Mask=0xFF*		P
Secondary Axis 8 Flags	LONG	4352
Secondary Axis 9 Flags	LONG	4353
Secondary Axis 10 Flags	LONG	4354
Secondary Axis 11 Flags	LONG	4355
Secondary Axis 12 Flags	LONG	4356
Secondary Axis 13 Flags	LONG	4357
Secondary Axis 14 Flags	LONG	4358
Secondary Axis 15 Flags	LONG	4359

- Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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P6144-P6655

Object Parameters

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	ENC Parameters		ENC Number							
Index	Code=0x18		0	1	2	3	4	5	6	7
0x00	Encoder Position	LONG	6144	6160	6176	6192	6208	6224	6240	6256
0x01	Encoder Velocity	LONG	6145	6161	6177	6193	6209	6225	6241	6257
0x02	Reserved	LONG	6146	6162	6178	6194	6210	6226	6242	6258
0x03	Reserved	LONG	6147	6163	6179	6195	6211	6227	6243	6259
0x04	ABS Revolution	LONG	6148	6164	6180	6196	6212	6228	6244	6260
0x05	Reserved	LONG	6149	6165	6181	6197	6213	6229	6245	6261
0x06	Reserved	LONG	6150	6166	6182	6198	6214	6230	6246	6262
0x07	Reserved	LONG	6151	6167	6183	6199	6215	6231	6247	6263

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	STEPPER Parameters		STEPPER Number							
Index	Code=0x18		0	1	2	3	4	5	6	7
0x08	Stepper Signal	FP32	6152	6168	6184	6200	6216	6232	6248	6264
0x09	Reserved	FP32	6153	6169	6185	6201	6217	6233	6249	6265
0x0A	Reserved	FP32	6154	6170	6186	6202	6218	6234	6250	6266
0x0B	Reserved	FP32	6155	6171	6187	6203	6219	6235	6251	6267
0x0C	Stepper Count	LONG	6156	6172	6188	6204	6220	6236	6252	6268
0x0D	Reserved	LONG	6157	6173	6189	6205	6221	6237	6253	6269
0x0E	Reserved	LONG	6158	6174	6190	6206	6222	6238	6254	6270
0x0F	Reserved	LONG	6159	6175	6191	6207	6223	6239	6255	6271

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	DAC Parameters		DAC Number							
Index	Code=0x19		0	1	2	3	4	5	6	7
0x00	DAC Output	FP32	6400	6416	6432	6448	6464	6480	6496	6512
0x01	Reserved	FP32	6401	6417	6433	6449	6465	6481	6497	6513
0x02	DAC Gain	FP32	6402	6418	6434	6450	6466	6482	6498	6514
0x03	DAC Offset	FP32	6403	6419	6435	6451	6467	6483	6499	6515
0x04	Reserved	FP32	6404	6420	6436	6452	6468	6484	6500	6516
0x05	Reserved	FP32	6405	6421	6437	6453	6469	6485	6501	6517
0x06	Reserved	FP32	6406	6422	6438	6454	6470	6486	6502	6518
0x07	Reserved	FP32	6407	6423	6439	6455	6471	6487	6503	6519

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	ADC Parameters		ADC Number							
Index	Code=0x19		0	1	2	3	4	5	6	7
0x08	ADC Input	FP32	6408	6424	6440	6456	6472	6488	6504	6520
0x09	Reserved	FP32	6409	6425	6441	6457	6473	6489	6505	6521
0x0A	ADC Gain	FP32	6410	6426	6442	6458	6474	6490	6506	6522
0x0B	ADC Offset	FP32	6411	6427	6443	6459	6475	6491	6507	6523
0x0C	Reserved	FP32	6412	6428	6444	6460	6476	6492	6508	6524
0x0D	Reserved	FP32	6413	6429	6445	6461	6477	6493	6509	6525
0x0E	Reserved	FP32	6414	6430	6446	6462	6478	6494	6510	6526
0X0F	Reserved	FP32	6415	6431	6447	6463	6479	6495	6511	6527

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Object Parameters (continued)

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	ENC Parameters		ENC Number							
Index	Code=0x18		8	9	10	11	12	13	14	15
0x80	Encoder Position	LONG	6272	6288	6304	6320	6336	6352	6368	6384
0x81	Encoder Velocity	LONG	6273	6289	6305	6321	6337	6353	6369	6385
0x82	Reserved	LONG	6274	6290	6306	6322	6338	6354	6370	6386
0x83	Reserved	LONG	6275	6291	6307	6323	6339	6355	6371	6387
0x84	ABS Revolution	LONG	6276	6292	6308	6324	6340	6356	6372	6388
0x85	Reserved	LONG	6277	6293	6309	6325	6341	6357	6373	6389
0x86	Reserved	LONG	6278	6294	6310	6326	6342	6358	6374	6390
0X87	Reserved	LONG	6279	6295	6311	6327	6343	6359	6375	6391

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	STEPPER Parameters		STEPPER Number							
Index	Code=0x18		8	9	10	11	12	13	14	15
0x88	Stepper Signal	FP32	6280	6296	6312	6328	6344	6360	6376	6392
0x89	Reserved	FP32	6281	6297	6313	6329	6345	6361	6377	6393
0X8A	Reserved	FP32	6282	6298	6314	6330	6346	6362	6378	6394
0x8B	Reserved	FP32	6283	6299	6315	6331	6347	6363	6379	6395
0x8C	Stepper Count	LONG	6284	6300	6316	6332	6348	6364	6380	6396
0x8D	Reserved	LONG	6285	6301	6317	6333	6349	6365	6381	6397
0x8E	Reserved	LONG	6286	6302	6318	6334	6350	6366	6382	6398
0x8F	Reserved	LONG	6287	6303	6319	6335	6351	6367	6383	6399

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	DAC Parameters		DAC Number							
Index	Code=0x19		8	9	10	11	12	13	14	15
0x80	DAC Output	FP32	6528	6544	6560	6576	6592	6608	6624	6640
0x81	Reserved	FP32	6529	6545	6561	6577	6593	6609	6625	6641
0x82	DAC Gain	FP32	6530	6546	6562	6578	6594	6610	6626	6642
0x83	DAC Offset	FP32	6531	6547	6563	6579	6595	6611	6627	6643
0x84	Reserved	FP32	6532	6548	6564	6580	6596	6612	6628	6644
0x85	Reserved	FP32	6533	6549	6565	6581	6597	6613	6629	6645
0x86	Reserved	FP32	6534	6550	6566	6582	6598	6614	6630	6646
0x87	Reserved	FP32	6535	6551	6567	6583	6599	6615	6631	6647

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	ADC Parameters		ADC Number							
Index	Code=0x19		8	9	10	11	12	13	14	15
0x88	ADC Input	FP32	6536	6552	6568	6584	6600	6616	6632	6648
0x89	Reserved	FP32	6537	6553	6569	6585	6601	6617	6633	6649
0x8A	ADC Gain	FP32	6538	6554	6570	6586	6602	6618	6634	6650
0x8B	ADC Offset	FP32	6539	6555	6571	6587	6603	6619	6635	6651
0x8C	Reserved	FP32	6540	6556	6572	6588	6604	6620	6636	6652
0x8D	Reserved	FP32	6541	6557	6573	6589	6605	6621	6637	6653
0x8E	Reserved	FP32	6542	6558	6574	6590	6606	6622	6638	6654
0X8F	Reserved	FP32	6543	6559	6575	6591	6607	6623	6639	6655

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Object Parameters (continued)

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	ENC Parameters			ENC Number							
Index	Code=0x60			16	17	18	19	20	21	22	23
0x80	Encoder Position	LONG		24576	24592	24608	24624	Res	Res	Res	Res
0x81	Encoder Velocity	LONG		24577	24593	24609	24625	Res	Res	Res	Res
0x82	Reserved	LONG		24578	24594	24610	24626	Res	Res	Res	Res
0x83	Reserved	LONG		24579	24595	24611	24627	Res	Res	Res	Res
0x84	ABS Revolution	LONG		24580	24596	24612	24628	Res	Res	Res	Res
0x85	Reserved	LONG		24581	24597	24613	24629	Res	Res	Res	Res
0x86	Reserved	LONG		24582	24598	24614	24630	Res	Res	Res	Res
0X87	Reserved	LONG		24583	24599	24615	24631	Res	Res	Res	Res

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

P6656-P6775

PLC Parameters

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	PLC Parameters		PLC Number							
Index	Code=0x1A		0	1	2	3	4	5	6	7
0x00	Tick Preload	LONG	6656	6672	6688	6704	6720	6736	6752	6768
0x01	Tick Count	LONG	6657	6673	6689	6705	6721	6737	6753	6769
0x02	Reserved	LONG	6658	6674	6690	6706	6722	6738	6754	6770
0x03	Reserved	LONG	6659	6675	6691	6707	6723	6739	6755	6771

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	TIM Parameters		TIM Number							
Index	Code=0x1A		0	1	2	3	4	5	6	7
0x04	Timer Preload	LONG	6660	6676	6692	6708	6724	6740	6756	6772
0x05	Timer Count	LONG	6661	6677	6693	6709	6725	6741	6757	6773

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	CNT Parameters		CNT Number							
Index	Code=0x1A		0	1	2	3	4	5	6	7
0x06	Counter Preload	LONG	6662	6678	6694	6710	6726	6742	6758	6774
0x07	Counter Count	LONG	6663	6679	6695	6711	6727	6743	6759	6775

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

P6912-P7119

Miscellaneous Parameters

Mask	Position Parameters Code=0x1B, Index=0x00		P
0x01	Sample Array Index	LONG	6912
0x02	Sample Trigger Index	LONG	6913
0x04	Sample Timer Clock	LONG	6914
0x08	Sample Timer Period	LONG	6915
0x10	Global System Clock	LONG	6916
0x20	ADC State Control	LONG	6917
0x40	ADC Positive Channels	LONG	6918
0x80	ADC Negative Channels	LONG	6919

Mask	FIFO Stream Parameters Code=0x1B, Index=0x08		P
0x01	FIFO Character Buffer Count	LONG	6976
0x02	FIFO Line Buffer Count	LONG	6977
0x04	FIFO Free Character Space	LONG	6978
0x08	FIFO Command Counter	LONG	6979
0x10	FIFO Communication Timeout	LONG	6980

Mask	COM1 Stream Parameters Code=0x1B, Index=0x0C		P
0x01	COM1 Character Buffer Count	LONG	7008
0x02	COM1 Line Buffer Count	LONG	7009
0x04	COM1 Free Character Space	LONG	7010
0x08	COM1 Command Counter	LONG	7011
0x10	COM1 Communication Timeout	LONG	7012
0x20	COM1 Startup Mode	LONG	7013

Mask	COM2 Stream Parameters Code=0x1B; Index=0x0E		P
0x01	COM2 Character Buffer Count	LONG	7024
0x02	COM2 Line Buffer Count	LONG	7025
0x04	COM2 Free Character Space	LONG	7026
0x08	COM2 Command Counter	LONG	7027
0x10	COM2 Communication Timeout	LONG	7028
0x20	COM2 Startup Mode	LONG	7029

Mask	Board Information (Version 1.18 & Up) Code=0x1B; Index=0x10		P
0x01	Card / Serial Number	LONG	7040
0x02	Card Number	LONG	7041
0x04	Firmware Version	LONG	7042
0x08	Update Number	LONG	7043
0x10	Diagnostics	LONG	7044
0x20	FPGA ID	LONG	7045
0x40	IO Configuration	LONG	7046

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Miscellaneous Parameters

Mask	FSTAT Information Code=0x1B, Index=0x12		P
0x01	FSTAT Period	LONG	7056
0x02	FSTAT Count	LONG	7057

Mask	DPCB Stream Parameters Code=0x1B, Index=0x16		P
0x01	DPCB Character Buffer Count	LONG	7088
0x02	DPCB Line Buffer Count	LONG	7089
0x04	DPCB Free Character Space	LONG	7090
0x08	DPCB Command Counter	LONG	7091
0x10	DPCB Communication Timeout	LONG	7092

Mask	Firmware Information Code=0x1B, Index=0x18		P
0x01	Bootflash Version	LONG	7104
0x02	Bootflash Checksum	LONG	7105
0x04	Reserved	LONG	7106
0x08	Reserved	LONG	7107
0x10	Sysflash1 Version	LONG	7108
0x20	Sysflash1 Checksum	LONG	7109
0x40	Reserved	LONG	7110
0x80	Reserved	LONG	7111

Mask	Firmware Information Code=0x1B, Index=0x19		P
0x01	Sysflash2 Version	LONG	7112
0x02	Sysflash2 Checksum	LONG	7113
0x04	Reserved	LONG	7114
0x08	Reserved	LONG	7115
0x10	Reserved	LONG	7116
0x20	Userflash Checksum	LONG	7117
0x40	Reserved	LONG	7118
0x80	Reserved	LONG	7119

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

P6912-P7119

Miscellaneous Parameters (continued)

COM1 Startup Mode (P7013): Code=0x1B; Index=0x0C; Mask=0x20
COM2 Startup Mode (P7029): Code=0x1B; Index=0x0E; Mask=0x20

COM1/COM2Startup Mode (P7013 / P7029)	
Baudrate Field Selection Bit Description	Bit Index
Baudrate Bit 0	0
Buadrate Bit 1	1
Buadrate Bit 2	2
Buadrate Bit 3	3
Buadrate Bit 4	4
Buadrate Bit 5	5
Buadrate Bit 6	6
Buadrate Bit 7	7
Databits Control Fields Bit Description	Bit Index
Databits Bit 0	8
Databits Bit 1	9
Stopbits Control Fields Bit Description	Bit Index
Stopbits	10
Parity Bits Control Fields Bit Description	Bit Index
Parity Bit 0	11
Parity Bit 1	12
Reserved	13
Reserved	14
Startup Enable Control Fields Bit Description	Bit Index
Startup Enable	15
Reserved Bits	Bit Index
Reserved	16
Reserved	17
Reserved	18
Reserved	19
Reserved	20
Reserved	21
Reserved	22
Reserved	23
Reserved	24
Reserved	25
Reserved	26
Reserved	27
Reserved	28
Reserved	29
Reserved	30
Reserved	31

NOTE 1. ESAVE and ELOAD commands will store and load the COM1/COM2 startup mode settings in EEPROM/FLASH. ERASE will not modify the COM1/COM2 startup mode settings in EEPROM/FLASH.

NOTE 2. Default echo modes are not affected by COM1/COM2 startup mode settings. Cards numbered as Card Number 0 will default to ECHO 1; all other card numbers will default to ECHO 6 (no echo).

Miscellaneous Parameters (continued)

COM1/COM2 Startup Mode Bit Field Descriptions (P7013 and P7029):
Version 1.17 & Up (ACR8000)
Version 1.18.02 & Up (ACR1200/ACR1500/ACR2000/ACR8010)

Baudrate Field Description r/w

Selects the baudrate when the Autobaud Detect function is disabled via the Startup Enable field.

The baudrate field is set as follows:
Baudrate Bit 7 thru Bit 0 = Baudrate / 300

Example, to select a baudrate of 9600:
9600 / 300 = 32d = 20h

Databits Control Field Description r/w

Selects the number of data bits transmitted as follows:
0 = 5 Data Bits
1 = 6 Data Bits
2 = 7 Data Bits
3 = 8 Data Bits

Stopbits Control Field Description r/w

Selects the number of stop bits as follows:
0 = 1 Stop Bit
1 = 2 Stop Bits

Parity Control Field Description r/w

Selects the parity as follows:
0 = No Parity
1 = Odd Parity
2 = No Parity
3 = Even Parity

Startup Enable Field Description r/w

Enables / disables the Autobaud Detect feature of the motion controller board, in conjunction with the Autobaud Detect Disable jumper (or switch for the ACR8000) as follows:

0 = Always autobaud detect (NOTE: The Autobaud Detect Disable jumper (or switch) will be ignored)
1 = If the Autobaud Detect Disable jumper (or switch) is enabled, use the manual port communication settings above; otherwise, autobaud detect.

Refer to the appropriate Hardware Manual for Autobaud Detect Disable jumper (or switch) details.

r = read, w = write

Miscellaneous Parameters (continued)

Board Information (Version 1.18 & Up):

Card/Serial Number	r	Returns the card type in the upper four digits returned. The Serial Number is returned in the lower four digits returned. Currently, all board serial numbers default to "0000". For example: ACR8010 board returns "80100000"
Card Number	r	Returns the Card Number selected by the Card Address Dip Switch (SW1). Refer to the appropriate hardware manual for details.
Firmware Version	r	Returns the firmware version of the installed Eprom(s). For example: ACR8010 board with firmware verion 1.18.01 eproms returns "11801"
Update Number	r	Returns the firmware version update number, if any, of the installed Eprom(s). Fimware versions with no update number will return a "0". For example: ACR8010 board with firmware version 1.18.01 Update 3 eproms returns "3"
Diagnostics	r	Returns the card diagnostic information. This is a 32-bit number representation of the information that is returned from the DIAG command. See parameter detailed description following these descriptions.
FPGA ID	r	Returns the ID number of the Encoder FPGA's installed.
IO Configuration	r	ACR1500 Only. Returns the IO Configuration of the ACR1500 board. Returns a "0" for all other boards.

r = read, w = write

Miscellaneous Parameters (continued)

ACR1200 Diagnostic Parameter Details(P7044): Code=0x1B; Index=0x80; Mask=0x10

ACR1200 Diagnostic Parameter P7044	
ACR1200 Motherboard Bit Description	Bit Index
ISO	31
EXT	30
STP	29
ENC	28
Reserved	27
Reserved	26
Reserved	25
Reserved	24
BCF	23
BCL	22
VEE	21
VDD	20
Reserved	19
Reserved	18
Reserved	17
Reserved	16
I/O Expansion Board 0 Bit Description	Bit Index
Board Present**	15
ISO	14
EXT	13
Reserved	12
I/O Expansion Board 1 Bit Description	Bit Index
Board Present**	11
ISO	10
EXT	9
Reserved	8
I/O Expansion Board 2 Bit Description	Bit Index
Board Present**	7
ISO	6
EXT	5
Reserved	4
I/O Expansion Board 3 Bit Description	Bit Index
Board Present**	3
ISO	2
EXT	1
Reserved	0

Where:

0: Pass
1: Fail

**Board Present:

0: Expansion Board is detected (Present)
1: Expansion Board is not detected (Not Present)

See DIAG Command for explanations of bit designations.

Miscellaneous Parameters (continued)

ACR1500 Diagnostic Parameter Details(P7044): Code=0x1B; Index=0x80; Mask=0x10

ACR1500 Diagnostic Parameter P7044	
ACR1500 Board Bit Description	Bit Index
Reserved	31
Reserved	30
Reserved	29
ENC	28
Reserved	27
Reserved	26
Reserved	25
Reserved	24
Reserved	23
Reserved	22
Reserved	21
Reserved	20
Reserved	19
Reserved	18
Reserved	17
Reserved	16
Reserved	15
Reserved	14
Reserved	13
Reserved	12
Reserved	11
Reserved	10
Reserved	9
Reserved	8
Reserved	7
Reserved	6
Reserved	5
Reserved	4
Reserved	3
Reserved	2
Reserved	1
Reserved	0

Where:

0: Pass
1: Fail

See DIAG Command for explanations of bit designations.

Miscellaneous Parameters (continued)

ACR2000 Diagnostic Parameter Details(P7044): Code=0x1B; Index=0x80; Mask=0x10

ACR2000 Diagnostic Parameter P7044	
ACR2000 Motherboard Bit Description	Bit Index
ISO	31
EXT	30
Reserved	29
Reserved	28
Reserved	27
Reserved	26
Reserved	25
Reserved	24
ACRCOMM Module Bit Description	Bit Index
BCF	23
BCL	22
VEE	21
VDD	20
Reserved	19
Reserved	18
Reserved	17
Reserved	16
I/O Expansion Board 0 Bit Description	Bit Index
Board Present**	15
ISO	14
EXT	13
Reserved	12
I/O Expansion Board 1 Bit Description	Bit Index
Board Present**	11
ISO	10
EXT	9
Reserved	8
I/O Expansion Board 2 Bit Description	Bit Index
Board Present**	7
ISO	6
EXT	5
Reserved	4
I/O Expansion Board 3 Bit Description	Bit Index
Board Present**	3
ISO	2
EXT	1
Reserved	0

Where:

0: Pass
1: Fail

**Board Present:

0: Expansion Board is detected (Present)
1: Expansion Board is not detected (Not Present)

See DIAG Command for explanations of bit designations.

ACR8000 Diagnostic Parameter Details(P7044): Code=0x1B; Index=0x80; Mask=0x10

ACR8000 Diagnostic Parameter P7044	
ACR8000 Motherboard Bit Description	Bit Index
+5V	31
+24V	30
Reserved	29
Reserved	28
Reserved	27
Reserved	26
Reserved	25
Reserved	24
Reserved	23
Reserved	22
-12V	21
+12V	20
Reserved	19
Reserved	18
Reserved	17
Reserved	16
I/O Expansion Board 0 Bit Description	Bit Index
Reserved	15
Reserved	14
Reserved	13
Reserved	12
I/O Expansion Board 1 Bit Description	Bit Index
Reserved	11
Reserved	10
Reserved	9
Reserved	8
I/O Expansion Board 2 Bit Description	Bit Index
Reserved	7
Reserved	6
Reserved	5
Reserved	4
I/O Expansion Board 3 Bit Description	Bit Index
Reserved	3
Reserved	2
Reserved	1
Reserved	0

Where:

0: Pass
1: Fail

See DIAG Command for explanations of bit designations.

Miscellaneous Parameters (continued)

ACR8010 Diagnostic Parameter Details(P7044): Code=0x1B; Index=0x80; Mask=0x10

ACR8010 Diagnostic Parameter P7044	
ACR8010 Motherboard Bit Description	Bit Index
ISO	31
EXT	30
Reserved	29
Reserved	28
Reserved	27
Reserved	26
Reserved	25
Reserved	24
BCF	23
BCL	22
VEE	21
VDD	20
Reserved	19
Reserved	18
Reserved	17
Reserved	16
I/O Expansion Board 3 Bit Description	Bit Index
Board Present**	15
ISO	14
EXT	13
Reserved	12
I/O Expansion Board 2 Bit Description	Bit Index
Board Present**	11
ISO	10
EXT	9
Reserved	8
I/O Expansion Board 1 Bit Description	Bit Index
Board Present**	7
ISO	6
EXT	5
Reserved	4
I/O Expansion Board 0 Bit Description	Bit Index
Board Present**	3
ISO	2
EXT	1
Reserved	0

Where:

0: Pass
1: Fail

**Board Present:

0: Expansion Board is detected (Present)
1: Expansion Board is not detected (Not Present)

See DIAG Command for explanations of bit designations.

P7168-P7408

Program Parameters

PROG0 - PROG7

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Program Parameters		Program Number							
Index	Code=0x1C		0	1	2	3	4	5	6	7
0x00	Line Number	LONG	7168	7184	7200	7216	7232	7248	7264	7280

PROG8 - PROG15

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Program Parameters		Program Number							
Index	Code=0x1C		8	9	10	11	12	13	14	15
0x80	Line Number	LONG	7296	7312	7328	7344	7360	7376	7392	7408

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

FSTAT Setup Parameters (ACR8020 only)

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	FSTAT Setup Parameters			FSTAT Number							
Index	Code=0x1D			0	1	2	3	4	5	6	7
0x00	Reserved	LONG		7424	7440	7456	7472	7488	7504	7520	7536
0x01	Reserved	LONG		7425	7441	7457	7473	7489	7505	7521	7537
0x02	Reserved	LONG		7426	7442	7458	7474	7490	7506	7522	7538
0x03	Code	LONG		7427	7443	7459	7475	7491	7507	7523	7539
0x04	Index	LONG		7428	7444	7460	7476	7492	7508	7524	7540
0x05	Type	LONG		7429	7445	7461	7477	7493	7509	7525	7541
0x06	Spare	LONG		7430	7446	7462	7478	7494	7510	7526	7542
0x07	Spare	LONG		7431	7447	7463	7479	7495	7511	7527	7543

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	FSTAT Setup Parameters			FSTAT Number							
Index	Code=0x1D			8	9	10	11	12	13	14	15
0x80	Reserved	LONG		7552	7568						
0x81	Reserved	LONG		7553	7569						
0x82	Reserved	LONG		7554	7570						
0x83	Code	LONG		7555	7571						
0x84	Index	LONG		7556	7572						
0x85	Type	LONG		7557	7573						
0x86	Spare	LONG		7558	7574						
0x87	Spare	LONG		7559	7575						

Table1. FSTAT parameters

Code Field Description r/w The group code and group index work as a pair to select the data to be copied to dual port memory. The group code selects a general data grouping and the group index selects a set of eight fields within that group. The group code and group index parameters can be changed while the FSTAT is on and it won't affect the current FSTAT setup. The new FSTAT setup will not be effective until the FSTAT ON REQUEST is acknowledged.

Index Field Description r/w The group code and group index work as a pair to select the data to be copied to dual port memory. The group code selects a general data grouping and the group index selects a set of eight fields within that group. The group code and group index parameters can be changed while the FSTAT is on and it won't affect the current FSTAT setup. The new FSTAT setup will not be effective until the FSTAT ON REQUEST is acknowledged.

Type Field Description r Data Type:
1 = FP32
2 = LONG

P8192-P10047

Master Parameters

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Position Parameters			Master Number							
Index	Code=0x20			0	1	2	3	4	5	6	7
0x00	Distance Into Move	FP32		8192	8448	8704	8960	9216	9472	9728	9984
0x01	Vector Velocity	FP32		8193	8449	8705	8961	9217	9473	9729	9985
0x02	Vector Acceleration	FP32		8194	8450	8706	8962	9218	9474	9730	9986
0x03	Vector Jerk	FP32		8195	8451	8707	8963	9219	9475	9731	9987
0x04	Vector Length	FP32		8196	8452	8708	8964	9220	9476	9732	9988
0x05	Target Velocity	FP32		8197	8453	8709	8965	9221	9477	9733	9989
0x06	Target Acceleration	FP32		8198	8454	8710	8966	9222	9478	9734	9990
0x07	Reserved	FP32		8199	8455	8711	8967	9223	9479	9735	9991
0x08	Distance To Go	FP32		8200	8456	8712	8968	9224	9480	9736	9992
0x09	Feedrate Override	FP32		8201	8457	8713	8969	9225	9481	9737	9993
0x0A	Manual Vector	FP32		8202	8458	8714	8970	9226	9482	9738	9994
0x0B	Total Distance	FP32		8203	8459	8715	8971	9227	9483	9739	9995
0x0C	Distance Squared	FP32		8204	8460	8716	8972	9228	9484	9740	9996
0x0D	Velocity Squared	FP32		8205	8461	8717	8973	9229	9485	9741	9997
0x0E	Fraction Into Move	FP32		8206	8462	8718	8974	9230	9486	9742	9998
0x0F	Distance Into Path	FP32		8207	8463	8719	8975	9231	9487	9743	9999

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Sequence Parameters			Master Number							
Index	Code=0x20			0	1	2	3	4	5	6	7
0x10	Move Counter	LONG		8208	8464	8720	8976	9232	9488	9744	10000
0x11	Reserved	LONG		8209	8465	8721	8977	9233	9489	9745	10001
0x12	Reserved	LONG		8210	8466	8722	8978	9234	9490	9746	10002
0x13	INT Response Period	LONG		8211	8467	8723	8979	9235	9491	9747	10003
0x14	MBUF Filled	LONG		8212	8468	8724	8980	9236	9492	9748	10004
0x15	Reserved	LONG		8213	8469	8725	8981	9237	9493	9749	10005
0x16	Reserved	LONG		8214	8470	8726	8982	9238	9494	9750	10006
0x17	Reserved	LONG		8215	8471	8727	8983	9239	9495	9751	10007

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Speed Parameters			Master Number							
Index	Code=0x20			0	1	2	3	4	5	6	7
0x18	Rapid Feedrate Override	FP32		8216	8472	8728	8984	9240	9496	9752	10008
0x19	Move Time	FP32		8217	8473	8729	8985	9241	9497	9753	10009
0x1A	Delta TMOV Time	FP32		8218	8474	8730	8986	9242	9498	9754	10010
0x1B	TMOV Velocity	FP32		8219	8475	8731	8987	9243	9499	9755	10011
0x1C	Time Over Velocity	FP32		8220	8476	8732	8988	9245	9500	9756	10012
0x1D	TOV Internal	FP32		8221	8477	8733	8989	9245	9501	9757	10013
0x1E	TOV Rate	FP32		8222	8478	8734	8990	9246	9502	9758	10014
0x1F	User Velocity	FP32		8223	8479	8735	8991	9247	9503	9759	10015
			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	NURB Spline Parameters			Master Number							
Index	Code=0x20			0	1	2	3	4	5	6	7
0x20	NURB Time Factor	FP32		8224	8480	8736	8992	9248	9504	9760	10016
0x21	NURB Start Time	FP32		8225	8481	8737	8993	9249	9505	9761	10017
0x22	Reserved	FP32		8226	8482	8738	8994	9250	9506	9762	10018
0x23	Reserved	FP32		8227	8483	8739	8995	9251	9507	9763	10019
0x24	Spline Time Factor	FP32		8228	8484	8740	8996	9252	9508	9764	10020
0x25	Spline Buffer Length	FP32		8229	8485	8741	8997	9253	9509	9765	10021
0x26	Reserved	FP32		8230	8486	8742	8998	9254	9510	9766	10022
0x27	Reserved	FP32		8231	8487	8743	8999	9255	9511	9767	10023

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

P10240-P12095

Master Parameters, continued

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Position Parameters		Master Number							
Index	Code=0x28		8	9	10	11	12	13	14	15
0x00	Distance Into Move	FP32	10240	10496	10752	11008	11264	11520	11776	12032
0x01	Vector Velocity	FP32	10241	10497	10753	11009	11265	11521	11777	12033
0x02	Vector Acceleration	FP32	10242	10498	10754	11010	11266	11522	11778	12034
0x03	Vector Jerk	FP32	10243	10499	10755	11011	11267	11523	11779	12035
0x04	Vector Length	FP32	10244	10500	10756	11012	11268	11524	11780	12036
0x05	Target Velocity	FP32	10245	10501	10757	11013	11269	11525	11781	12037
0x06	Target Acceleration	FP32	10246	10502	10758	11014	11270	11526	11782	12038
0x07	Reserved	FP32	10247	10503	10759	11015	11271	11527	11783	12039
0x08	Distance To Go	FP32	10248	10504	10760	11016	11272	11528	11784	12040
0x09	Feedrate Override	FP32	10249	10505	10761	11017	11273	11529	11785	12041
0x0A	Manual Vector	FP32	10250	10506	10762	11018	11274	11530	11786	12042
0x0B	Total Distance	FP32	10251	10507	10763	11019	11275	11531	11787	12043
0x0C	Distance Squared	FP32	10252	10508	10764	11020	11276	11532	11788	12044
0x0D	Velocity Squared	FP32	10253	10509	10765	11021	11277	11533	11789	12045
0x0E	Fraction Into Move	FP32	10254	10510	10766	11022	11278	11534	11790	12046
0x0F	Distance Into Path	FP32	10255	10511	10767	11023	11279	11535	11791	12047

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Sequence Parameters		Master Number							
Index	Code=0x28		8	9	10	11	12	13	14	15
0x10	Move Counter	LONG	10256	10512	10768	11024	11280	11536	11792	12048
0x11	Reserved	LONG	10257	10513	10769	11025	11281	11537	11793	12049
0x12	Reserved	LONG	10258	10514	10770	11026	11282	11538	11794	12050
0x13	INT Response Period	LONG	10259	10515	10771	11027	11283	11539	11795	12051
0x14	MBUF Filled	LONG	10260	10516	10772	11028	11284	11540	11796	12052
0x15	Reserved	LONG	10261	10517	10773	11029	11285	11541	11797	12053
0x16	Reserved	LONG	10262	10518	10774	11030	11286	11542	11798	12054
0x17	Reserved	LONG	10263	10519	10775	11031	11287	11543	11799	12055

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Speed Parameters		Master Number							
Index	Code=0x28		8	9	10	11	12	13	14	15
0x18	Rapid Feedrate Override	FP32	10264	10520	10776	11032	11288	11544	11800	12056
0x19	Move Time	FP32	10265	10521	10777	11033	11289	11545	11801	12057
0x1A	Delta TMOV Time	FP32	10266	10522	10778	11034	11290	11546	11802	12058
0x1B	TMOV Velocity	FP32	10267	10523	10779	11035	11291	11547	11803	12059
0x1C	Time Over Velocity	FP32	10268	10524	10780	11036	11292	11548	11804	12060
0x1D	TOV Internal	FP32	10269	10525	10781	11037	11293	11549	11805	12061
0x1E	TOV Rate	FP32	10270	10526	10782	11038	11294	11550	11806	12062
0x1F	User Velocity	FP32	10271	10527	10783	11039	11295	11551	11807	12063
		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	NURB Spline Parameters		Master Number							
Index	Code=0x28		8	9	10	11	12	13	14	15
0x20	NURB Time Factor	FP32	10272	10528	10784	11040	11296	11552	11808	12064
0x21	NURB Start Time	FP32	10273	10529	10785	11041	11297	11553	11809	12065
0x22	Reserved	FP32	10274	10530	10786	11042	11298	11554	11810	12066
0x23	Reserved	FP32	10275	10531	10787	11043	11299	11555	11811	12067
0x24	Spline Time Factor	FP32	10276	10532	10788	11044	11300	11556	11812	12068
0x25	Spline Buffer Length	FP32	10277	10533	10789	11045	11301	11557	11813	12069
0x26	Reserved	FP32	10278	10534	10790	11046	11302	11558	11814	12070
0x27	Reserved	FP32	10279	10535	10791	11047	11303	11559	11815	12071

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Master Parameters, continued

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	LookAhead Parameters			Master Number							
Index	Code=0x20			0	1	2	3	4	5	6	7
0x28	VEL Limit	FP32		8232	8488	8744	9000	9256	9512	9768	10024
0x29	Look Ahead Min Vel	FP32		8233	8489	8745	9001	9257	9513	9769	10025
0x2A	Look Ahead Vector Angle	FP32		8234	8490	8746	9002	9258	9514	9770	10026
0x2B	Reserved	FP32		8235	8491	8747	9003	9259	9515	9771	10027
0x2C	TANG Turn Limit	FP32		8236	8492	8748	9004	9260	9516	9772	10028
0x2D	Reserved	FP32		8237	8493	8749	9005	9261	9517	9773	10029
0x2E	Reserved	FP32		8238	8494	8750	9006	9262	9518	9774	10030
0x2F	Reserved	FP32		8239	8495	8751	9007	9263	9519	9775	10031
			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Reserved Parameters			Master Number							
Index	Code=0x20			0	1	2	3	4	5	6	7
0x30	Reserved	FP32		8240	8496	8752	9008	9264	9520	9776	10032
0x31	Reserved	FP32		8241	8497	8753	9009	9265	9521	9777	10033
0x32	Reserved	FP32		8242	8498	8754	9010	9266	9522	9778	10034
0x33	Reserved	FP32		8243	8499	8755	9011	9267	9523	9779	10035
0x34	Reserved	FP32		8244	8500	8756	9012	9268	9524	9780	10036
0x35	Reserved	FP32		8245	8501	8757	9013	9269	9525	9781	10037
0x36	Reserved	FP32		8246	8502	8758	9014	9270	9526	9782	10038
0x37	Reserved	FP32		8247	8503	8759	9015	9271	9527	9783	10039

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Reserved Parameters			Master Number							
Index	Code=0x20			0	1	2	3	4	5	6	7
0x38	Reserved	LONG		8248	8504	8760	9016	9272	9528	9784	10040
0x39	Reserved	LONG		8249	8505	8761	9017	9273	9529	9785	10041
0x3A	Reserved	LONG		8250	8506	8762	9018	9274	9530	9786	10042
0x3B	Reserved	LONG		8251	8507	8763	9019	9275	9531	9787	10043
0x3C	Reserved	LONG		8252	8508	8764	9020	9276	9532	9788	10044
0x3D	Reserved	LONG		8253	8509	8765	9021	9277	9533	9789	10045
0x3E	Reserved	LONG		8254	8510	8766	9022	9278	9534	9790	10046
0x3F	Reserved	LONG		8255	8511	8767	9023	9279	9535	9791	10047

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Master Parameters, continued

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	LookAhead Parameters		Master Number							
Index	Code=0x28		8	9	10	11	12	13	14	15
0x28	VEL Limit	FP32	10280	10536	10792	11048	11304	11560	11816	12072
0x29	Look Ahead Min Vel	FP32	10281	10537	10793	11049	11305	11561	11817	12073
0x2A	Look Ahead Vector Angle	FP32	10282	10538	10794	11050	11306	11562	11818	12074
0x2B	Reserved	FP32	10283	10539	10795	11051	11307	11563	11819	12075
0x2C	TANG Turn Limit	FP32	10284	10540	10796	11052	11308	11564	11820	12076
0x2D	Reserved	FP32	10285	10541	10797	11053	11309	11565	11821	12077
0x2E	Reserved	FP32	10286	10542	10798	11054	11310	11566	11822	12078
0x2F	Reserved	FP32	10287	10543	10799	11055	11311	11567	11823	12079
		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Reserved Parameters		Master Number							
Index	Code=0x28		8	9	10	11	12	13	14	15
0x30	Reserved	FP32	10288	10544	10800	11056	11312	11568	11824	12080
0x31	Reserved	FP32	10289	10545	10801	11057	11313	11569	11825	12081
0x32	Reserved	FP32	10290	10546	10802	11058	11314	11570	11826	12082
0x33	Reserved	FP32	10291	10547	10803	11059	11315	11571	11827	12083
0x34	Reserved	FP32	10292	10548	10804	11060	11316	11572	11828	12084
0x35	Reserved	FP32	10293	10549	10805	11061	11317	11573	11829	12085
0x36	Reserved	FP32	10294	10550	10806	11062	11318	11574	11830	12086
0x37	Reserved	FP32	10295	10551	10807	11063	11319	11575	11831	12087

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Reserved Parameters		Master Number							
Index	Code=0x28		8	9	10	11	12	13	14	15
0x38	Reserved	LONG	10296	10552	10808	11064	11320	11576	11832	12088
0x39	Reserved	LONG	10297	10553	10809	11065	11321	11577	11833	12089
0x3A	Reserved	LONG	10298	10554	10810	11066	11322	11578	11834	12090
0x3B	Reserved	LONG	10299	10555	10811	11067	11323	11579	11835	12091
0x3C	Reserved	LONG	10300	10556	10812	11068	11324	11580	11836	12092
0x3D	Reserved	LONG	10301	10557	10813	11069	11325	11581	11837	12093
0x3E	Reserved	LONG	10302	10558	10814	11070	11326	11582	11838	12094
0x3F	Reserved	LONG	10303	10559	10815	11071	11327	11583	11839	12095

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

P8192-P12095

Master Parameters, continued

Distance Into Move	r	The distance traveled into the current move.
Vector Velocity	r	This is the current total vector velocity of all the axes attached to the master. It is always positive and varies between zero and user set velocity (VEL).
Vector Acceleration	r	Current vector acceleration, could be plus or minus number.
Vector Jerk	r	Current vector jerk value.
Vector Length	r	User entered Target position.
Target Velocity	r	User entered velocity for the current move block in motion.
Target Acceleration	r	User entered acceleration for the current move block in motion.
Reserved	r	
Distance To Go	r	This is the distance left for the current move in process.
Feedrate Override	r	See FOV command.
Manual Vector	r	See VECTOR command.
Total Distance	r	User programmed total distance of the master uptill current move.
Distance Squared	r	This is the square of the vector distance of all the axes attached to the master for the buffered move.
Velocity Squared	r	Square of the current vector velocity.
Fraction Into Move	r	It goes from zero to one as the move goes from start to end.
Distance Into Path	r	Current total distance traveled by the master.
Move Counter	r	If the master flags to count up or down is set then this will count the number of moves
Reserve		
Reserve		

INT Response Period	r/w	This is used by HSINT and INT commands. The default value for the INT Response period is 5 (the units are in servo period). It should be set –1 to trun this feature off.
MBUF Filled	r	It shows the number of moves buffered when using the multi-buffer mode.
Rapid Feedrate Override	r/w	See ROV command
Move Time	r	It is the time set in seconds for each move to complete. See TMOV command for details.
Delta TMOV time	r	When masters are in sync, this is the minimum move time needed by each master to complete its move.
TMOV Velocity	r	
Time over Velocity	r	See TOV command.
TOV internal	r	Current TOV value.
TOV Rate	r/w	User sets this value to change the rate of change of TOV from one value to another.
User Velocity		
NURB Time Factor	r/w	This parameter may be changed before starting the NURB move to change the speed of NURB Time Mode interpolator. Reducing this parameter by half will double the speed.
NURB Start Time	r/w	Contains the values in which the NURB will go from zero velocity to full velocity. Setting it zero nullifies it, and the profiler go to full velocity immediately.
Spline Time Factor	r/w	This parameter may be changed before starting the Spline move to change the speed of the Spline Time Mode interpolator. Reducing this parameter by half will double the speed.
Spline Buffer Length	r/w	The default value is 5. The user can change this value from 2 to 5. Making the spline buffer length smaller will result in reduced smoothness of the position curve.
VEL Limit	r	The master current vector velocity will not go above this limit.
LookAhead Min Velocity	r/w	Minimum velocity to which the LookAhead will slow down. User can change this value.
LookAhead Vector Angle	r	3-D vector turn angle at the end of current move

TANG Turn Limit	r/w	User sets this angles in degrees. If the angle beween two moves is less then this angle then no extra move is inserted for the tangential axis. The default value is zero, which means that a move will always be inserted unless the the moves make a straight line.

r = read, w = write

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P12288-P14199

Axis Parameters

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Position Parameters			Axis Number							
Index	Code=0x30			0	1	2	3	4	5	6	7
0x00	Current Position	LONG		12288	12544	12800	13056	13312	13568	13824	14080
0x01	Target Position	LONG		12289	12545	12801	13057	13313	13569	13825	14081
0x02	Actual Position	LONG		12290	12546	12802	13058	13314	13570	13826	14082
0x03	Following Error	LONG		12291	12547	12803	13059	13315	13571	13827	14083
0x04	Hardware Capture	LONG		12292	12548	12804	13060	13316	13572	13828	14084
0x05	Software Capture	LONG		12293	12549	12805	13061	13317	13573	13829	14085
0x06	Primary Setpoint	LONG		12294	12550	12806	13062	13318	13574	13830	14086
0x07	Secondary Setpoint	LONG		12295	12551	12807	13063	13319	13575	13831	14087

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Offset Parameters			Axis Number							
Index	Code=0x30			0	1	2	3	4	5	6	7
0x08	Gear Offset	LONG		12296	12552	12808	13064	13320	13576	13832	14088
0x09	Jog Offset	LONG		12297	12553	12809	13065	13321	13577	13833	14089
0x0A	Cam Offset	LONG		12298	12554	12810	13066	13322	13578	13834	14090
0x0B	Ballscrew Offset	LONG		12299	12555	12811	13067	13323	13579	13835	14091
0x0C	Backlash Offset	LONG		12300	12556	12812	13068	13324	13580	13836	14092
0x0D	Reserved	LONG		12301	12557	12813	13069	13325	13581	13837	14093
0x0E	Reserved	LONG		12302	12558	12814	13070	13326	13582	13838	14094
0x0F	Reserved	LONG		12303	12559	12815	13071	13327	13583	13839	14095

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Servo Parameters			Axis Number							
Index	Code=0x30			0	1	2	3	4	5	6	7
0x10	Proportional Gain	FP32		12304	12560	12816	13072	13328	13584	13840	14096
0x11	Integral Gain	FP32		12305	12561	12817	13073	13329	13585	13841	14097
0x12	Integral Limit	FP32		12306	12562	12818	13074	13330	13586	13842	14098
0x13	Integral Delay	FP32		12307	12563	12819	13075	13331	13587	13843	14099
0x14	Derivative Gain	FP32		12308	12564	12820	13076	13332	13588	13844	14100
0x15	Derivative Width	FP32		12309	12565	12821	13077	13333	13589	13845	14101
0x16	Feedforward Velocity	FP32		12310	12566	12822	13078	13334	13590	13846	14102
0x17	Feedforward Accel	FP32		12311	12567	12823	13079	13335	13591	13847	14103

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Monitor Parameters			Axis Number							
Index	Code=0x30			0	1	2	3	4	5	6	7
0x18	Proportional Term	FP32		12312	12568	12824	13080	13336	13592	13848	14104
0x19	Integral Term	FP32		12313	12569	12825	13081	13337	13593	13849	14105
0x1A	Derivative Term	FP32		12314	12570	12826	13082	13338	13594	13850	14106
0x1B	Velocity	FP32		12315	12571	12827	13083	13339	13595	13851	14107
0x1C	Acceleration	FP32		12316	12572	12828	13084	13340	13596	13852	14108
0x1D	Summation Point	FP32		12317	12573	12829	13085	13341	13597	13853	14109
0x1E	Filter Output Signal	FP32		12318	12574	12830	13086	13342	13598	13854	14110
0x1F	Output Signal	FP32		12319	12575	12831	13087	13343	13599	13855	14111

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

P14336-P16247

Axis Parameters (continued)

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Position Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x00	Current Position	LONG	14336	14592	14848	15104	15360	15616	15872	16128
0x01	Target Position	LONG	14337	14593	14849	15105	15361	15617	15873	16129
0x02	Actual Position	LONG	14338	14594	14850	15106	15362	15618	15874	16130
0x03	Following Error	LONG	14339	14595	14851	15107	15363	15619	15875	16131
0x04	Hardware Capture	LONG	14340	14596	14852	15108	15364	15620	15876	16132
0x05	Software Capture	LONG	14341	14597	14853	15109	15365	15621	15877	16133
0x06	Primary Setpoint	LONG	14342	14598	14854	15110	15366	15622	15878	16134
0x07	Secondary Setpoint	LONG	14343	14599	14855	15111	15367	15623	15879	16135

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Offset Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x08	Gear Offset	LONG	14344	14600	14856	15112	15368	15624	15880	16136
0x09	Jog Offset	LONG	14345	14601	14857	15113	15369	15625	15881	16137
0x0A	Cam Offset	LONG	14346	14602	14858	15114	15370	15626	15882	16138
0x0B	Ballscrew Offset	LONG	14347	14603	14859	15115	15371	15627	15883	16139
0x0C	Backlash Offset	LONG	14348	14604	14860	15116	15372	15628	15884	16140
0x0D	Reserved	LONG	14349	14605	14861	15117	15373	15629	15885	16141
0x0E	Reserved	LONG	14350	14606	14862	15118	15374	15630	15886	16142
0x0F	Reserved	LONG	14351	14607	14863	15119	15375	15631	15887	16143

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Servo Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x10	Proportional Gain	FP32	14352	14608	14864	15120	15376	15632	15888	16144
0x11	Integral Gain	FP32	14353	14609	14865	15121	15377	15633	15889	16145
0x12	Integral Limit	FP32	14354	14610	14866	15122	15378	15634	15890	16146
0x13	Integral Delay	FP32	14355	14611	14867	15123	15379	15635	15891	16147
0x14	Derivative Gain	FP32	14356	14612	14868	15124	15380	15636	15892	16148
0x15	Derivative Width	FP32	14357	14613	14869	15125	15381	15637	15893	16149
0x16	Feedforward Velocity	FP32	14358	14614	14870	15126	15382	15638	15894	16150
0x17	Feedforward Accel	FP32	14359	14615	14871	15127	15383	15639	15895	16151

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Monitor Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x18	Proportional Term	FP32	14360	14616	14872	15128	15384	15640	15896	16152
0x19	Integral Term	FP32	14361	14617	14873	15129	15385	15641	15897	16153
0x1A	Derivative Term	FP32	14362	14618	14874	15130	15386	15642	15898	16154
0x1B	Velocity	FP32	14363	14619	14875	15131	15387	15643	15899	16155
0x1C	Acceleration	FP32	14364	14620	14876	15132	15388	15644	15900	16156
0x1D	Summation Point	FP32	14365	14621	14877	15133	15389	15645	15901	16157
0x1E	Filter Output Signal	FP32	14366	14622	14878	15134	15390	15646	15902	16158
0x1F	Output Signal	FP32	14367	14623	14879	15135	15391	15647	15903	16159

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Axis Parameters (continued)

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Limit Parameters		Axis Number							
Index	Code=0x30		0	1	2	3	4	5	6	7
0x20	Plus Excess Error	FP32	12320	12576	12832	13088	13344	13600	13856	14112
0x21	Minus Excess Error	FP32	12321	12577	12833	13089	13345	13601	13857	14113
0x22	Plus In Position	FP32	12322	12578	12834	13090	13346	13602	13858	14114
0x23	Minus In Position	FP32	12323	12579	12835	13091	13347	13603	13859	14115
0x24	Plus A Limit	FP32	12324	12580	12836	13092	13348	13604	13860	14116
0x25	Minus A Limit	FP32	12325	12581	12837	13093	13349	13605	13861	14117
0x26	Plus B Limit	FP32	12326	12582	12838	13094	13350	13606	13862	14118
0x27	Minus B Limit	FP32	12327	12583	12839	13095	13351	13607	13863	14119
0x28	Plus Torque Limit	FP32	12328	12584	12840	13096	13352	13608	13864	14120
0x29	Minus Torque Limit	FP32	12329	12585	12841	13097	13353	13609	13865	14121
0x2A	Plus Torque Band	FP32	12330	12586	12842	13098	13354	13610	13866	14122
0x2B	Minus Torque Band	FP32	12331	12587	12843	13099	13355	13611	13867	14123
0x2C	Backlash Setting	FP32	12332	12588	12844	13100	13356	13612	13868	14124
0x2D	Reserved	FP32	12333	12589	12845	13101	13357	13613	13869	14125
0x2E	Plus Jog Limit	FP32	12334	12590	12846	13102	13358	13614	13870	14126
0x2F	Minus Jog Limit	FP32	12335	12591	12847	13103	13359	13615	13871	14127

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Filter 0 Parameters		Axis Number							
Index	Code=0x30		0	1	2	3	4	5	6	7
0x30	b2 Coefficient	FP32	12336	12592	12848	13104	13360	13616	13872	14128
0x31	a2 Coefficient	FP32	12337	12593	12849	13105	13361	13617	13873	14129
0x32	b1 Coefficient	FP32	12338	12594	12850	13106	13362	13618	13874	14130
0x33	a1 Coefficient	FP32	12339	12595	12851	13107	13363	13619	13875	14131
0x34	a0 Coefficient	FP32	12340	12596	12852	13108	13364	13620	13876	14132

	Filter 1 Parameters		Axis Number							
Index	Code=0x30		0	1	2	3	4	5	6	7
0x35	b2 Coefficient	FP32	12341	12597	12853	13109	13365	13621	13877	14133
0x36	a2 Coefficient	FP32	12342	12598	12854	13110	13366	13622	13878	14134
0x37	b1 Coefficient	FP32	12343	12599	12855	13111	13367	13623	13879	14135
0x38	a1 Coefficient	FP32	12344	12600	12856	13112	13368	13624	13880	14136
0x39	a0 Coefficient	FP32	12345	12601	12857	13113	13369	13625	13881	14137

	Jog Parameters		Axis Number							
Index	Code=0x30		0	1	2	3	4	5	6	7
0x3A	Current Jog Veloc	FP32	12346	12602	12858	13114	13370	13626	13882	14138
0x3B	Current Jog Accel	FP32	12347	12603	12859	13115	13371	13627	13883	14139
0x3C	Jog Veloc Setting	FP32	12348	12604	12860	13116	13372	13628	13884	14140
0x3D	Jog Accel Setting	FP32	12349	12605	12861	13117	13373	13629	13885	14141
0x3E	Jog Decel Setting	FP32	12350	12606	12862	13118	13374	13630	13886	14142
0x3F	Jog Jerk Setting	FP32	12351	12607	12863	13119	13375	13631	13887	14143

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Servo Parameters		Axis Number							
Index	Code=0x30		0	1	2	3	4	5	6	7
0x40	FBVEL Gain Setting	FP32	12352	12608	12864	13120	13376	13632	13888	14144
0x41	FBVEL Term	FP32	12353	12609	12865	13121	13377	13633	13889	14145
0x42	FFVEL Term	FP32	12354	12610	12866	13122	13378	13634	13890	14146
0x43	FFACC Term	FP32	12355	12611	12867	13123	13379	13635	13891	14147
0x44	Reserved	FP32	12356	12612	12868	13124	13380	13636	13892	14148
0x45	Reserved	FP32	12357	12613	12869	13125	13381	13637	13893	14149
0x46	Reserved	FP32	12358	12614	12870	13126	13382	13638	13894	14150
0x47	Reserved	FP32	12359	12615	12871	13127	13383	13639	13895	14151

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Axis Parameters (continued)

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Limit Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x20	Plus Excess Error	FP32	14368	14624	14880	15136	15392	15648	15904	16160
0x21	Minus Excess Error	FP32	14369	14625	14881	15137	15393	15649	15905	16161
0x22	Plus In Position	FP32	14370	14626	14882	15138	15394	15650	15906	16162
0x23	Minus In Position	FP32	14371	14627	14883	15139	15395	15651	15907	16163
0x24	Plus A Limit	FP32	14372	14628	14884	15140	15396	15652	15908	16164
0x25	Minus A Limit	FP32	14373	14629	14885	15141	15397	15653	15909	16165
0x26	Plus B Limit	FP32	14374	14630	14886	15142	15398	15654	15910	16166
0x27	Minus B Limit	FP32	14375	14631	14887	15143	15399	15655	15911	16167
0x28	Plus Torque Limit	FP32	14376	14632	14888	15144	15400	15656	15912	16168
0x29	Minus Torque Limit	FP32	14377	14633	14889	15145	15401	15657	15913	16169
0x2A	Plus Torque Band	FP32	14378	14634	14890	15146	15402	15658	15914	16170
0x2B	Minus Torque Band	FP32	14379	14635	14891	15147	15403	15659	15915	16171
0x2C	Backlash Setting	FP32	14380	14636	14892	15148	15404	15660	15916	16172
0x2D	Reserved	FP32	14381	14637	14893	15149	15405	15661	15917	16173
0x2E	Plus Jog Limit	FP32	14382	14638	14894	15150	15406	15662	15918	16174
0x2F	Minus Jog Limit	FP32	14383	14639	14895	15151	15407	15663	15919	16175

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Filter 0 Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x30	b2 Coefficient	FP32	14384	14640	14896	15152	15408	15664	15920	16176
0x31	a2 Coefficient	FP32	14385	14641	14897	15153	15409	15665	15921	16177
0x32	b1 Coefficient	FP32	14386	14642	14898	15154	15410	15666	15922	16178
0x33	a1 Coefficient	FP32	14387	14643	14899	15155	15411	15667	15923	16179
0x34	a0 Coefficient	FP32	14388	14644	14900	15156	15412	15668	15924	16180

	Filter 1 Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x35	b2 Coefficient	FP32	14389	14645	14901	15157	15413	15669	15925	16181
0x36	a2 Coefficient	FP32	14390	14646	14902	15158	15414	15670	15926	16182
0x37	b1 Coefficient	FP32	14391	14647	14903	15159	15415	15671	15927	16183
0x38	a1 Coefficient	FP32	14392	14648	14904	15160	15416	15672	15928	16184
0x39	a0 Coefficient	FP32	14393	14649	14905	15161	15417	15673	15929	16185

	Jog Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x3A	Current Jog Veloc	FP32	14394	14650	14906	15162	15418	15674	15930	16186
0x3B	Current Jog Accel	FP32	14395	14651	14907	15163	15419	15675	15931	16187
0x3C	Jog Veloc Setting	FP32	14396	14652	14908	15164	15420	15676	15932	16188
0x3D	Jog Accel Setting	FP32	14397	14653	14909	15165	15421	15677	15933	16189
0x3E	Jog Decel Setting	FP32	14398	14654	14910	15166	15422	15678	15934	16190
0x3F	Jog Jerk Setting	FP32	14399	14655	14911	15167	15423	15679	15935	16191

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Servo Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x40	FBVEL Gain Setting	FP32	14400	14656	14912	15168	15424	15680	15936	16192
0x41	FBVEL Term	FP32	14401	14657	14913	15169	15425	15681	15937	16193
0x42	FFVEL Term	FP32	14402	14658	14914	15170	15426	15682	15938	16194
0x43	FFACC Term	FP32	14403	14659	14915	15171	15427	15683	15939	16195
0x44	Reserved	FP32	14404	14660	14916	15172	15428	15684	15940	16196
0x45	Reserved	FP32	14405	14661	14917	15173	15429	15685	15941	16197
0x46	Reserved	FP32	14406	14662	14918	15174	15430	15686	15942	16198
0x47	Reserved	FP32	14407	14663	14919	15175	15431	15687	15943	16199

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Axis Parameters (continued)

			Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Reserved Parameters			Axis Number							
Index	Code=0x30			0	1	2	3	4	5	6	7
0x48	INVK Input	FP32		12360	12616	12872	13128	13384	13640	13896	14152
0x49	INVK Output	FP32		12361	12617	12873	13129	13385	13641	13897	14153
0x4A	INVK Input Previous	FP32		12362	12618	12874	13130	13386	13642	13898	14154
0x4B	Reserved	FP32		12363	12619	12875	13131	13387	13643	13899	14155
0x4C	Reserved	FP32		12364	12620	12876	13132	13388	13644	13900	14156
0x4D	Reserved	FP32		12365	12621	12877	13133	13389	13645	13901	14157
0x4E	Reserved	FP32		12366	12622	12878	13134	13390	13646	13902	14158
0x4F	Reserved	FP32		12367	12623	12879	13135	13391	13647	13903	14159
0x50	Max Velocity Limit	FP32		12368	12624	12880	13136	13392	13648	13904	14160
0x51	Gear Slip	FP32		12369	12625	12881	13137	13393	13649	13905	14161
0x52	RPM Factor	FP32		12370	12626	12882	13138	13394	13650	13906	14162
0x53	RPM	FP32		12371	12627	12883	13139	13395	13651	13907	14163
0x54	Smooth Encoder Velocity	FP32		12372	12628	12884	13140	13396	13652	13908	14164
0x55	Start Radius	FP32		12373	12629	12885	13141	13397	13653	13909	14165
0x56	End Radius	FP32		12374	12630	12886	13142	13398	13654	13910	14166
0x57	PPU	FP32		12375	12631	12887	13143	13399	13655	13911	14167
0x58	Lock Feedback Gain	FP32		12376	12632	12888	13144	13400	13656	13912	14168
0x59	DIP	FP32		12377	12633	12889	13145	13401	13657	13913	14169
0x5A	DIN	FP32		12378	12634	12890	13146	13402	13658	13914	14170
0x5B	KVF	FP32		12379	12635	12891	13147	13403	13659	13915	14171
0x5C	KVI	FP32		12380	12636	12892	13148	13404	13660	13916	14172
0x5D	KVP	FP32		12381	12637	12893	13149	13405	13661	13917	14173
0x5E	Reserved	FP32		12382	12638	12894	13150	13406	13662	13918	14174
0x5F	Reserved	FP32		12383	12639	12895	13151	13407	13663	13919	14175
0x60	Reserved	FP32		12384	12640	12896	13152	13408	13664	13920	14176
0x61	Reserved	FP32		12385	12641	12897	13153	13409	13665	13921	14177
0x62	Reserved	FP32		12386	12642	12898	13154	13410	13666	13922	14178
0x63	Reserved	FP32		12387	12643	12899	13155	13411	13667	13923	14179
0x64	Reserved	FP32		12388	12644	12900	13156	13412	13668	13924	14180
0x65	Reserved	FP32		12389	12645	12901	13157	13413	13669	13925	14181
0x66	Reserved	FP32		12390	12646	12902	13158	13414	13670	13926	14182
0x67	Reserved	FP32		12391	12647	12903	13159	13415	13671	13927	14183
0x68	Reserved	LONG		12392	12648	12904	13160	13416	13672	13928	14184
0x69	Reserved	LONG		12393	12649	12905	13161	13417	13673	13929	14185
0x6A	Reserved	LONG		12394	12650	12906	13162	13418	13674	13930	14186
0x6B	Reserved	LONG		12395	12651	12907	13163	13419	13675	13931	14187
0x6C	Gear Trigger On Offset	LONG		12396	12652	12908	13164	13420	13676	13932	14188
0x6D	Gear Trigger Off Offset	LONG		12397	12653	12909	13165	13421	13677	13933	14189
0x6E	Reserved	LONG		12398	12654	12910	13166	13422	13678	13934	14190
0x6F	Reserved	LONG		12399	12655	12911	13167	13423	13679	13935	14191
0x70	CAM Cycles	LONG		12400	12656	12912	13168	13424	13680	13936	14192
0x71	CAM Velocity Smooth	LONG		12401	12657	12913	13169	13425	13681	13937	14193
0x72	Dgain Smooth	LONG		12402	12658	12914	13170	13426	13682	13938	14194
0x73	DZU	LONG		12403	12659	12915	13171	13427	13683	13939	14195
0x74	DZL	LONG		12404	12660	12916	13172	13428	13684	13940	14196
0x75	FFVC	LONG		12405	12661	12917	13173	13429	13685	13941	14197
0x76	Reserved	LONG		12406	12662	12918	13174	13430	13686	13942	14198
0x77	Reserved	LONG		12407	12663	12919	13175	13431	13687	13943	14199

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Axis Parameters (continued)

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	Reserved Parameters		Axis Number							
Index	Code=0x38		8	9	10	11	12	13	14	15
0x48	INVK Input	FP32	14408	14664	14920	15176	15432	15688	15944	16200
0x49	INVK Output	FP32	14409	14665	14921	15177	15433	15689	15945	16201
0x4A	INVK Input Previous	FP32	14410	14666	14922	15178	15434	15690	15946	16202
0x4B	Reserved	FP32	14411	14667	14923	15179	15435	15691	15947	16203
0x4C	Reserved	FP32	14412	14668	14924	15180	15436	15692	15948	16204
0x4D	Reserved	FP32	14413	14669	14925	15181	15437	15693	15949	16205
0x4E	Reserved	FP32	14414	14670	14926	15182	15438	15694	15950	16206
0x4F	Reserved	FP32	14415	14671	14927	15183	15439	15695	15951	16207
0x50	MaxVel	FP32	14416	14672	14928	15184	15440	15696	15952	16208
0x51	Gear Slip	FP32	14417	14673	14929	15185	15441	15697	15953	16209
0x52	RPM Factor	FP32	14418	14674	14930	15186	15442	15698	15954	16210
0x53	RPM	FP32	14419	14675	14931	15187	15443	15699	15955	16211
0x54	Smooth Encoder Velocity	FP32	14420	14676	14932	15188	15444	15700	15956	16212
0x55	Start Radius	FP32	14421	14677	14933	15189	15445	15701	15957	16213
0x56	End Radius	FP32	14422	14678	14934	15190	15446	15702	15958	16214
0x57	Reserved	FP32	14423	14679	14935	15191	15447	15703	15959	16215
0x58	Lock Feedback Gain	FP32	14424	14680	14936	15192	15448	15704	15960	16216
0x59	DIP	FP32	14425	14681	14937	15193	15449	15705	15961	16217
0x5A	DIN	FP32	14426	14682	14938	15194	15450	15706	15962	16218
0x5B	KVF	FP32	14427	14683	14939	15195	15451	15707	15963	16219
0x5C	KVI	FP32	14428	14684	14940	15196	15452	15708	15964	16220
0x5D	KVP	FP32	14429	14685	14941	15197	15453	15709	15965	16221
0x5E	Reserved	FP32	14430	14686	14942	15198	15454	15710	15966	16222
0x5F	Reserved	FP32	14431	14687	14943	15199	15455	15711	15967	16223
0x60	Reserved	FP32	14432	14688	14944	15200	15456	15712	15968	16224
0x61	Reserved	FP32	14433	14689	14945	15201	15457	15713	15969	16225
0x62	Reserved	FP32	14434	14690	14946	15202	15458	15714	15970	16226
0x63	Reserved	FP32	14435	14691	14947	15203	15459	15715	15971	16227
0x64	Reserved	FP32	14436	14692	14948	15204	15460	15716	15972	16228
0x65	Reserved	FP32	14437	14693	14949	15205	15461	15717	15973	16229
0x66	Reserved	FP32	14438	14694	14950	15206	15462	15718	15974	16230
0x67	Reserved	FP32	14439	14695	14951	15207	15463	15719	15975	16231
0x68	Reserved	LONG	14440	14696	14952	15208	15464	15720	15976	16232
0x69	Reserved	LONG	14441	14697	14953	15209	15465	15721	15977	16233
0x6A	Reserved	LONG	14442	14698	14954	15210	15466	15722	15978	16234
0x6B	Reserved	LONG	14443	14699	14955	15211	15467	15723	15979	16235
0x6C	Gear Trigger On Offset	LONG	14444	14700	14956	15212	15468	15724	15980	16236
0x6D	Gear Trigger Off Offset	LONG	14445	14701	14957	15213	15469	15725	15981	16237
0x6E	Reserved	LONG	14446	14702	14958	15214	15470	15726	15982	16238
0x6F	Reserved	LONG	14447	14703	14959	15215	15471	15727	15983	16239
0x70	CAM Cycles	LONG	14448	14704	14960	15216	15472	15728	15984	16240
0x71	CAM Velocity Smooth	LONG	14449	14705	14961	15217	15473	15729	15985	16241
0x72	Dgain Smooth	LONG	14450	14706	14962	15218	15474	15730	15986	16242
0x73	DZU	LONG	14451	14707	14963	15219	15475	15731	15987	16243
0x74	DZL	LONG	14452	14708	14964	15220	15476	15732	15988	16244
0x75	FFVC	LONG	14453	14709	14965	15221	15477	15733	15989	16245
0x76	Reserved	LONG	14454	14710	14966	15222	15478	15734	15990	16246
0x77	Reserved	LONG	14455	14711	14967	15223	15479	15735	15991	16247

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Axis Parameters (continued)

Current Position	This is the current commanded position of the axis.
Target Position	User programed target postion of the buffered move.
Actual Position	Current actual postion read through feedback.
Following Error	Curent following error in servo control loop.
Hardware Capture	Latest hardware capture register value.
Software Capture	Latest software capture register value
Primary Setpoint	See Servo loop block diagram.
Secondary Setpoint	See servo loop block diagram.
Gear Offset	Curent geared position.
Jog Offset	Current Jog position.
Cam Offset	Current Cam postion.
Ballscrew Offset	Current ballscrew position.
Backlash Offset	Current backlash position.
Reserved *Reserved* *Reserved*	
Proportional Gain	See servo loop block diagram.
Integral Gain	“
Integral Limit	“
Integral Delay	“
Derivative Gain	“
Derivative Width	“
Feedforward Velocity	“
Feedforward Accel	“
Proportional Term	Value after the P Gain block.

Integral Term		Value after the Intergal block.
Derivative Term		Value after the D-gain block.
Velocity		Current totoal velocity of an axes, including any cam and gear velcoity etc.
Acceleration		Current totoal acceleration of an axes, including any cam and gear acceleration etc.
Summation Point		
Filter Output Signal		FItered servoloop siganl
Output Signal		Servo loop output signal to be fed into the DACs or Stepper
Plus Excess Error		Excess error positive band value. See EXC command.
Minus Excess Error		Excess error negative band value. See EXC command.
Plus In Position		IPB (in-position-band) positive value.
Minus In Position		IPB (in-position-band) negative value.
Plus A Limit		
Minus A Limit		
Plus B Limit		
Minus B Limit		
Plus Torque Limit		
Minus Torque Limit		
Plus Torque Band		
Minus Torque Band		
Backlash Setting		
Reserved		
Plus Jog Limit		
Minus Jog Limit		
Max Velocity Limit	r/w	Refer to the MAXVEL command.

Gear Slip	r/w	If the GEAR ACC value is other than zero, then the gear ratio will will smoothly ramp up to target Gear Ratio. This will cause the gear to slip during th acceleration ramp. The number of pulses slipped are recorded in this parameter. The user can superimpose a normal move of this gear slip value.
RPM Factor	w	If RPM factor > 0, then the algorithm turns on to calculate the RPM User enter its value according to following formula RPM Factor = 60/(Encoder Pulses per Revolution *ServoPeriod).
RPM	r	Once the user enters the RPM factor> 0, the revolution per minutes are calculated and stored in this parameter. The axis must be attached to update this paratmer.
Gear Trigger On Offset	r/w	Refer to the GEAR ON TRG command.
Gear Trigger Off Offset	r/w	Refer to the GEAR OFF TRG command.
CAM Cycles	r/w	The default value is zero, which means that if the CAM is turned on, then it will stay on. However, if this value is set to a positive number, then the CAM will stay on for that number of CAM CYCLES, and then automatically turn itself OFF. This parameter is valid for CAM Trigger mode as well.
CAM Velocity Smooth	r/w	Used to smooth out the CAM velocity that used for the feed forward control. The default value is “10”, which means that the velocity is averaged across 10 samples, to reduce the jitter in the velocity term. The user can change this value as required by the application, however, this value should be changed before turning the CAM on.
DGain Smooth	r/w	Used to subdue the humming noise in a torque motor as a result DGain. The default value is “0”, which means that no smoothing is applied. The user may change this value from “0” to “5”. The DGAIN command must be used after changing this parameter, for the change to become effective.

r = read, w = write

P16384-P18215

CMT Parameters
ACR1200/ACR1500/ACR2000/ACR8010/ACR8020

		Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
	CMT Parameters		CMT Number							
Index	Code=0x40		0	1	2	3	4	5	6	7
0x00	FeedBackEncoder	LONG	16384	16640	16896	17152	17408	17664	17920	18176
0x01	AngleBetweenPhases	LONG	16385	16641	16897	17153	17409	17665	17921	18177
0x02	EncoderShaftPosition	LONG	16386	16642	16898	17154	17410	17666	17922	18178
0x03	PhaseADacChannel	LONG	16387	16643	16899	17155	17411	17667	17923	18179
0x04	PhaseBDacChannel	LONG	16388	16644	16900	17156	17412	17668	17924	18180
0x05	PulsePerRevolution	LONG	16389	16645	16901	17157	17413	17669	17925	18181
0x06	PhaseAADCChannel	LONG	16390	16646	16902	17158	17414	17670	17926	18182
0x07	PhaseBADCChannel	LONG	16391	16647	16903	17159	17415	17671	17927	18183
0x08	PhaseMarkerOffset	LONG	16392	16648	16904	17160	17416	17672	17928	18184
0x09	ElecRevPerMechRev	LONG	16393	16649	16905	17161	17417	17673	17929	18185
0x0A	HallEffectChannel	LONG	16394	16650	16906	17162	17418	17674	17930	18186
0x0B	Reserved	LONG	16395	16651	16907	17163	17419	17675	17931	18187
0x0C	Reserved	LONG	16396	16652	16908	17164	17420	17676	17932	18188
0x0D	Reserved	LONG	16397	16653	16909	17165	17421	17677	17933	18189
0x0E	MaxFollowingErr	LONG	16398	16654	16910	17166	17422	17678	17934	18190
0x0F	CommutationRegion	LONG	16399	16655	16911	17167	17423	17679	17935	18191
0x10	CommandSignal	FP32	16400	16656	16912	17168	17424	17680	17936	18192
0x11	CommandField	FP32	16401	16657	16913	17169	17425	17681	17937	18193
0x12	SineIndexPerEncCount	FP32	16402	16658	16914	17170	17426	17682	17938	18194
0x13	PhaseAdvance	FP32	16403	16659	16915	17171	17427	17683	17939	18195
0x14	LookedUpPhaseASine	FP32	16404	16660	16916	17172	17428	17684	17940	18196
0x15	LookedUpPhaseBSine	FP32	16405	16661	16917	17173	17429	17685	17941	18197
0x16	CommandCurrentScale	FP32	16406	16662	16918	17174	17430	17686	17942	18198
0x17	FeedbackCurrentScale	FP32	16407	16663	16919	17175	17431	17687	17943	18199
0x18	PhaseASignal	FP32	16408	16664	16920	17176	17432	17688	17944	18200
0x19	PhaseBSignal	FP32	16409	16665	16921	17177	17433	17689	17945	18201
0x1A	PhaseAOffset	FP32	16410	16666	16922	17178	17434	17690	17946	18202
0x1B	PhaseBOffset	FP32	16411	16667	16923	17179	17435	17691	17947	18203
0x1C	PhaseAGain	FP32	16412	16668	16924	17180	17436	17692	17948	18204
0x1D	PhaseBGain	FP32	16413	16669	16925	17181	17437	17693	17949	18205
0x1E	MaxMotorRPM	FP32	16414	16670	16926	17182	17438	17694	17950	18206
0x1F	MaxMotorCurrent	FP32	16415	16671	16927	17183	17439	17695	17951	18207
0x20	MaxMotorCurrentNeg	FP32	16416	16672	16928	17184	17440	17696	17952	18208
0x21	AverageVelocity	FP32	16417	16673	16929	17185	17441	17697	17953	18209
0x22	CommandCurrent	FP32	16418	16674	16930	17186	17442	17698	17954	18210
0x23	Reserved	FP32	16419	16675	16931	17187	17443	17699	17955	18211
0x24	Reserved	FP32	16420	16676	16932	17188	17444	17700	17956	18212
0x25	Reserved	FP32	16421	16677	16933	17189	17445	17701	17957	18213
0x26	Reserved	FP32	16422	16678	16934	17190	17446	17702	17958	18214
0x27	Reserved	FP32	16423	16679	16935	17191	17447	17703	17959	18215

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

P16384-P18215

CMT Parameters(continued)
ACR1200/ACR1500/ACR2000/ACR8010/ACR8020

FeedBackEncoder	r/w	The feedback encoder channel.
AngleBetweenPhases	r/w	The phase difference between phase B and Phase A
EncoderShaftPosition	r	Feedback encoder position. This parameter will be reset by the marker pulse of the encoder.
PhaseADacChannel	r/w	Phase A DAC channel.
PhaseBDacChannel	r/w	Phase B DAC channel.
PulsePerRevolution	r/w	Raw encoder counts (without multiplier) per revolution.
PhaseAADCChannel	r/w	Phase A ADC channel.
PhaseBADCChannel	r/w	Phase B ADC channel.
PhaseMarkerOffset	r/w	This parameter applies to sinusoidal mode only. The commutator uses the sum of the current feedback encoder counts and this parameter to calculate the index of the sinusoidal look up table.
ElecRevPerMechRev	r/w	Electrical cycles per mechanical revolution
HallEffectChannel	r/w	Hall effect signals channel. This parameter should equal to FeedBackEncoder if hall-less commutation mode is used.
PhaseLockCount	r/w	This parameter applies to hall-less commutation only. The commutation axis is consider to be locked if the difference of two consecutive reading of the feedback encoder is less than MaxEncDelta for PhaseLockCount of consecutive servo periods.
MaxEncDelta	r/w	This parameter applies to hall-less commutation only. The commutation axis is consider to be locked if the difference of two consecutive reading of the feedback encoder is less than MaxEncDelta for PhaseLockCount of consecutive servo periods.
MaxFollowingErr	r/w	Maximium following error. If the following error is greater than this parameter the commutator will be turned off.
CommutationRegion	r/w	Hall effect signal reading.

P16384-P18215

CMT Parameters(continued)
ACR1200/ACR1500/ACR2000/ACR8010/ACR8020

CommandSignal	r	Output of servo loop.
SineIndexPerEncCount	r	Feedback encoder position. This parameter will be reset by the marker pulse of the encoder.
LookedUpPhaseASine	r	Phase A SINE value.
LookedUpPhaseBSine	r	Phase B SINE value.
CommandCurrentScale	r/w	Equivalent current amplitude per volt.
PhaseASignal	r	Phase A signal.
PhaseBSignal	r	Phase B signal.
PhaseAOffset	r/w	Phase A offset.
PhaseBOffset	r/w	Phase B offset.
PhaseAGain	r/w	Phase A signal gain.
PhaseBGain	r/w	Phase B signal gain.
MaxMotorRPM	r/w	Maximium motor speed.
MaxMotorCurrent	r/w	Maximium current.
AverageVelocity	r	Average velocity.
LockCurrent	r/w	This parameter applies to hall-less commutation mode only. This parameter specifies current amplitude during start up period.

P20480-P20487

Logging Parameters
ACR1200/ACR1500/ACR2000/ACR8010

Mask	Logging Parameters Code=0x50, Index=0x00		P
0x01	MAX Servo Period	LONG	20480
0x02	Reserved	LONG	20481
0x04	Reserved	LONG	20482
0x08	Reserved	LONG	20483
0x10	Reserved	LONG	20484
0x20	Reserved	LONG	20485
0x40	Reserved	LONG	20486
0x80	Reserved	LONG	20487

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

APPENDIX B
Flag Reference

Flag Overview

Description:

This appendix provides a list of all system flags. The following is an outline of the flags detailed in this appendix:

Description	*First Flag*	*Last Flag*	*Index*
Optoisolated Inputs	BIT0	BIT31	0x00
Optoisolated Outputs	BIT32	BIT63	0x00
Miscellaneous Inputs	BIT64	BIT95	0x00
Miscellaneous Outputs	BIT96	BIT127	0x00
User Flags Group 1-4	BIT128	BIT255	0x00
Expansion I/O Flags	BIT256	BIT511	0x01
Master Flags (0-7)	BIT512	BIT767	0x02
Axis Flags (0-7)	BIT768	BIT1023	0x03
Program Flags	BIT1024	BIT1535	0x04
PLC Flags	BIT1536	BIT1791	0x06
FIFO Stream Flags	BIT1792	BIT1823	0x07
LPT1 Stream Flags	BIT1824	BIT1855	0x07
COM1 Stream Flags	BIT1856	BIT1887	0x07
COM2 Stream Flags	BIT1888	BIT1919	0x07
User Flags Group 5-8	BIT1920	BIT2047	0x07
Secondary Master Flags (0-7)	BIT2048	BIT2303	0x08
Secondary Slave Flags (0-7)	BIT2304	BIT2559	0x09
Encoder 0-15 Flags	BIT2560	BIT3071	0x0A
Encoder 16-31 Flags	BIT3072	BIT3583	0x0C
Commutator (CMT) Flags	BIT3584	BIT4095	0x0E
DAC Flags	BIT4096	BIT4607	0x10
ADC Flags	BIT4608	BIT5119	0x12
Tertiary Master Flags	BIT5120	BIT5631	0x14
Misc Control Flags Groups 1-4	BIT5632	BIT5759	0x16
Firewire Flags	BIT5760	BIT5791	0x16
DPCB Flags	BIT5792	BIT5823	0x16
FSTAT Flags	BIT5824	BIT5855	0x16
Quaternary Master Flag	BIT5888	BIT6399	0x17
Tertiary Slave Flag	BIT6400	BIT6911	0x19
Quaternay Slave Flag	BIT6912	BIT7423	0x1B
Master Flag (8-15 Axes)	BIT7424	BIT7679	0x1D
Slave Flag (8-15 Axes)	BIT7680	BIT7935	0x1E
Secondary Master Flag (8-15)	BIT7936	BIT8191	0x1F
Secondary Slave Flag (8-15)	BIT8192	BIT8447	0x20
Reserved Flags	BIT8448	BIT8703	0x21
PLC Stepper 8-15 Flags	BIT8704	BIT8959	0x22

BIT0-BIT31

Optoisolated Inputs

	Mask=0x01
Flag Parameter Code=0x10; Index=0x00	4096

Flag Description	Physical Pinout	Bit Index	Flag Number
INP 00	P4-1	0	0
INP 01	P4-2	1	1
INP 02	P4-3	2	2
INP 03	P4-4	3	3
INP 04	P4-5	4	4
INP 05	P4-6	5	5
INP 06	P4-7	6	6
INP 07	P4-8	7	7
INP 08	P4-9	8	8
INP 09	P4-10	9	9
INP 10	P4-11	10	10
INP 11	P4-12	11	11
INP 12	P4-13	12	12
INP 13	P4-14	13	13
INP 14	P4-15	14	14
INP 15	P4-16	15	15
INP 16	P4-17	16	16
INP 17	P4-18	17	17
INP 18	P4-19	18	18
INP 19	P4-20	19	19
INP 20	P4-21	20	20
INP 21	P4-22	21	21
INP 22	P4-23	22	22
INP 23	P4-24	23	23
INP 24	P4-25	24	24
INP 25	P4-26	25	25
INP 26	P4-27	26	26
INP 27	P4-28	27	27
INP 28	P4-29	28	28
INP 29	P4-20	29	29
INP 30	P4-31	30	30
INP 31	P4-32	31	31

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT32-BIT63

Optoisolated Outputs

	Mask=0x02
Flag Parameter Code=0x10; Index=0x00	4097

Flag Description	Physical Pinout	Bit Index	Flag Number
OUT 32	P3-1	0	32
OUT 33	P3-2	1	33
OUT 34	P3-3	2	34
OUT 35	P3-4	3	35
OUT 36	P3-5	4	36
OUT 37	P3-6	5	37
OUT 38	P3-7	6	38
OUT 39	P3-8	7	39
OUT 40	P3-9	8	40
OUT 41	P3-10	9	41
OUT 42	P3-11	10	42
OUT 43	P3-12	11	43
OUT 44	P3-13	12	44
OUT 45	P3-14	13	45
OUT 46	P3-15	14	46
OUT 47	P3-16	15	47
OUT 48	P3-17	16	48
OUT 49	P3-18	17	49
OUT 50	P3-19	18	50
OUT 51	P3-20	19	51
OUT 52	P3-21	20	52
OUT 53	P3-22	21	53
OUT 54	P3-23	22	54
OUT 55	P3-24	23	55
OUT 56	P3-25	24	56
OUT 57	P3-26	25	57
OUT 58	P3-27	26	58
OUT 59	P3-28	27	59
OUT 60	P3-29	28	60
OUT 61	P3-20	29	61
OUT 62	P3-31	30	62
OUT 63	P3-32	31	63

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT64-BIT95

Miscellaneous Inputs

	Mask=0x04
Flag Parameter Code=0x10; Index=0x00	4098

Flag Description	Bit Index	Flag Number
DIP Switch Input 0 (SW1-8)	0	64
DIP Switch Input 1 (SW1-7)	1	65
DIP Switch Input 2 (SW1-6)	2	66
DIP Switch Input 3 (SW1-5)	3	67
DIP Switch Input 4 (SW1-4)	4	68
DIP Switch Input 5 (SW1-3)	5	69
DIP Switch Input 6 (SW1-2)	6	70
DIP Switch Input 7 (SW1-1)	7	71
Reserved	8	72
Reserved	9	73
Reserved	10	74
Reserved	11	75
Reserved	12	76
Reserved	13	77
Reserved	14	78
Reserved	15	79
20 ms Clock Pulse	16	80
100 ms Clock Pulse	17	81
1 Sec Clock Pulse	18	82
1 Minute Clock Pulse	19	83
Reserved	20	84
Reserved	21	85
Reserved	22	86
Reserved	23	87
Reserved	24	88
Reserved	25	89
Reserved	26	90
Reserved	27	91
Reserved	28	92
Reserved	29	93
Reserved	30	94
Reserved	31	95

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT96-BIT127

Miscellaneous Outputs

	Mask=0x08
Flag Parameter Code=0x10; Index=0x00	4099

Flag Description	Bit Index	Flag Number
LED Bank Output 0 (D34)	0	96
LED Bank Output 1 (D35)	1	97
LED Bank Output 2 (D36)	2	98
LED Bank Output 3 (D37)	3	99
LED Bank Output 4 (D38)	4	100
LED Bank Output 5 (D39)	5	101
LED Bank Output 6 (D40)	6	102
LED Bank Output 7 (D41)	7	103
Sample Trigger Armed	8	104
Sample In Progress	9	105
Sample Mode Select	10	106
Sample Trigger Latched	11	107
Reserved	12	108
Reserved	13	109
Reserved	14	110
Reserved	15	111
Trigger AT Bus Interrupt	16	112
Trigger Software Capture	17	113
Reserved	18	114
Reserved	19	115
Expansion I/O Enable 0	20	116
Expansion I/O Enable 1	21	117
Expansion I/O Enable 2	22	118
Expansion I/O Enable 3	23	119
PLS0 On	24	120
PLS1 On	25	121
PLS2 On	26	122
PLS3 On	27	123
PLS4 On	28	124
PLS5 On	29	125
PLS6 On	30	126
PLS7 On	31	127

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT128-BIT255

User Flags Group 1-4

Mask	0x10	0x20	0x40	=0x80
Flag Parameters Code=0x10; Index=0x00	4100	4101	4102	4103

Flag Description	Bit Index	User Group			
		0	1	2	3
User defined	0	128	160	192	224
User defined	1	129	161	193	225
User defined	2	130	162	194	226
User defined	3	131	163	195	227
User defined	4	132	164	196	228
User defined	5	133	165	197	229
User defined	6	134	166	198	230
User defined	7	135	167	199	231
User defined	8	136	168	200	232
User defined	9	137	169	201	233
User defined	10	138	170	202	234
User defined	11	139	171	203	235
User defined	12	140	172	204	236
User defined	13	141	173	205	237
User defined	14	142	174	206	238
User defined	15	143	175	207	239
User defined	16	144	176	208	240
User defined	17	145	177	209	241
User defined	18	146	178	210	242
User defined	19	147	179	211	243
User defined	20	148	180	212	244
User defined	21	149	181	213	245
User defined	22	150	182	214	246
User defined	23	151	183	215	247
User defined	24	152	184	216	248
User defined	25	153	185	217	249
User defined	26	154	186	218	250
User defined	27	155	187	219	251
User defined	28	156	188	220	252
User defined	29	157	189	221	253
User defined	30	158	190	222	254
User defined	31	159	191	223	255

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT256-BIT511

Expansion I/O Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x01	4104	4105	4106	4107	4108	4109	4110	4111

			Expansion I/O Board Number							
I/O Number		Bit	0		1		2		3	
INP	OUT	Index	INP	OUT	INP	OUT	INP	OUT	INP	OUT
00	32	0	256	288	320	352	384	416	448	480
01	33	1	257	289	321	353	385	417	449	481
02	34	2	258	290	322	354	386	418	450	482
03	35	3	259	291	323	355	387	419	451	483
04	36	4	260	292	324	356	388	420	452	484
05	37	5	261	293	325	357	389	421	453	485
06	38	6	262	294	326	358	390	422	454	486
07	39	7	263	295	327	359	391	423	455	487
08	40	8	264	296	328	360	392	424	456	488
09	41	9	265	297	329	361	393	425	457	489
10	42	10	266	298	330	362	394	426	458	490
11	43	11	267	299	331	363	395	427	459	491
12	44	12	268	300	332	364	396	428	460	492
13	45	13	269	301	333	365	397	429	461	493
14	46	14	270	302	334	366	398	430	462	494
15	47	15	271	303	335	367	399	431	463	495
16	48	16	272	304	336	368	400	432	464	496
17	49	17	273	305	337	369	401	433	465	497
18	50	18	274	306	338	370	402	434	466	498
19	51	19	275	307	339	371	403	435	467	499
20	52	20	276	308	340	372	404	436	468	500
21	53	21	277	309	341	373	405	437	469	501
22	54	22	278	310	342	374	406	438	470	502
23	55	23	279	311	343	375	407	439	471	503
24	56	24	280	312	344	376	408	440	472	504
25	57	25	281	313	345	377	409	441	473	505
26	58	26	282	314	346	378	410	442	474	506
27	59	27	283	315	347	379	411	443	475	507
28	60	28	284	316	348	380	412	444	476	508
29	61	29	285	317	349	381	413	445	477	509
30	62	30	286	318	350	382	414	446	478	510
31	63	31	287	319	351	383	415	447	479	511

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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BIT512-BIT767

Master Flags

See also: Secondary Master Flags, Tertiary Master Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x02	4112	4113	4114	4115	4116	4117	4118	4119

Status Flags	Bit Index	MASTER Number 0	1	2	3	4	5	6	7
Accelerating	0	512	544	576	608	640	672	704	736
Decelerating	1	513	545	577	609	641	673	705	737
Stopping	2	514	546	578	610	642	674	706	738
Jerking	3	515	547	579	611	643	675	707	739
In Motion	4	516	548	580	612	644	676	708	740
Move Buffered	5	517	549	581	613	645	677	709	741
Feedholding	6	518	550	582	614	646	678	710	742
In Feedhold	7	519	551	583	615	647	679	711	743
Control Flags	**Bit Index**	**MASTER Number 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Feedhold Request	8	520	552	584	616	648	680	712	744
Cycle Start Request	9	521	553	585	617	649	681	713	745
Kill All Moves Request ☠	10	522	554	586	618	650	682	714	746
Stop All Moves Request ☠	11	523	555	587	619	651	683	715	747
FVEL Zero Pending	12	524	556	588	620	652	684	716	748
FVEL Zero Active	13	525	557	589	621	653	685	717	749
FOV/ROV Lock Pending	14	526	558	590	622	654	686	718	750
FOV/ROV Lock Active	15	527	559	591	623	655	687	719	751
Limit Flags	**Bit Index**	**MASTER Number 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Not In Position	16	528	560	592	624	656	688	720	752
Not Excess Error	17	529	561	593	625	657	689	721	753
Within A Limit	18	530	562	594	626	658	690	722	754
Not Within B Limit	19	531	563	595	627	669	691	723	755
Not Torque Limit	20	532	564	596	628	660	692	724	756
Not In Torque Band	21	533	565	597	629	661	693	725	757
Reserved	22	534	566	598	630	662	694	726	758
Reserved	23	535	567	599	631	663	695	727	759
Sequence Flags	**Bit Index**	**MASTER Number 0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Decrement Count	24	536	568	600	632	664	696	728	760
Increment Count	25	537	569	601	633	665	697	729	761
Interrupt On Move	26	538	570	602	634	666	698	730	762
TRG Pending	27	539	571	603	635	667	699	731	763
Start Move Inhibit	28	540	572	604	636	668	700	732	764
REN Request Flag	29	541	573	605	637	669	701	733	765
Cycle Start Lockout	30	542	574	606	638	670	702	734	766
Reserved	31	543	575	607	639	671	703	735	767

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Warning:
The function of these flags has changed in Firmware Versions 1.17.05 and above.
BIT512-BIT767

BIT7424-BIT7679

Master Flags (continued)

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x1D	4328	4329	4330	4331	4332	4333	4334	4335

Status Flags	Bit Index	MASTER Number 8	9	10	11	12	13	14	15
Accelerating	0	7424	7456	7488	7520	7552	7584	7616	7648
Decelerating	1	7425	7457	7489	7521	7553	7585	7617	7649
Stopping	2	7426	7458	7490	7522	7554	7586	7618	7650
Jerking	3	7427	7459	7491	7523	7555	7587	7619	7651
In Motion	4	7428	7460	7492	7524	7556	7588	7620	7652
Move Buffered	5	7429	7461	7493	7525	7557	7589	7621	7653
Feedholding	6	7430	7462	7494	7526	7558	7590	7622	7654
In Feedhold	7	7431	7463	7495	7527	7559	7591	7623	7655
Control Flags	**Bit Index**	**MASTER Number 8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Feedhold Request	8	7432	7464	7496	7528	7560	7592	7624	7656
Cycle Start Request	9	7433	7465	7497	7529	7561	7593	7625	7657
Kill All Moves Request ☠	10	7434	7466	7498	7530	7562	7594	7626	7658
Stop All Moves Request ☠	11	7435	7467	7499	7531	7563	7595	7627	7659
FVEL Zero Pending	12	7436	7468	7500	7532	7564	7596	7628	7660
FVEL Zero Active	13	7437	7469	7501	7533	7565	7597	7629	7661
FOV/ROV Lock Pending	14	7438	7470	7502	7534	7566	7598	7630	7662
FOV/ROV Lock Active	15	7439	7471	7503	7535	7567	7599	7631	7663
Limit Flags	**Bit Index**	**MASTER Number 8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Not In Position	16	7440	7472	7504	7536	7568	7600	7632	7664
Not Excess Error	17	7441	7473	7505	7537	7569	7601	7633	7665
Within A Limit	18	7442	7474	7506	7538	7570	7602	7634	7666
Not Within B Limit	19	7443	7475	7507	7539	7571	7603	7635	7667
Not Torque Limit	20	7444	7476	7508	7540	7572	7604	7636	7668
Not In Torque Band	21	7445	7477	7509	7541	7573	7605	7637	7669
Reserved	22	7446	7478	7510	7542	7574	7606	7638	7670
Reserved	23	7447	7479	7511	7543	7575	7607	7639	7671
Sequence Flags	**Bit Index**	**MASTER Number 8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Decrement Count	24	7448	7480	7512	7544	7576	7608	7640	7672
Increment Count	25	7449	7481	7513	7545	7577	7609	7641	7673
Interrupt On Move	26	7450	7482	7514	7546	7578	7610	7642	7674
TRG Pending	27	7451	7483	7515	7547	7579	7611	7643	7675
Start Move Inhibit	28	7452	7484	7516	7548	7580	7612	7644	7676
REN Request Flag	29	7453	7485	7517	7549	7581	7613	7645	7677
Cycle Start Lockout	30	7454	7486	7518	7550	7582	7614	7646	7678
Reserved	31	7455	7487	7519	7551	7583	7615	7647	7679

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Warning:
The function of these flags has changed in Firmware Versions 1.17.05 and above.

BIT512-BIT767

Master Flags (continued)

Status Flags:

Accelerating	r, f	Flag will be set if the master is currently accelerating using the ACC ramp.
Decelerating	r, f	Flag will be set if the master is currently decelerating using the DEC ramp.
Stopping	r, f	Flag will be set if the master is currently decelerating to a complete stop using STP ramp.
Jerking	r, f	Flag will be set if the master acceleration is changing using the JRK ramp.
In Motion	r, f	Flag set if the master is currently in a move, this Flag will also stay activated when the master is in feedhold.
Move Buffered	r, f	Flag set if the master currently has a move pending (buffered) while a previous move is in progress. This Flag will clear when there are no moves pending.
Feedholding	r, f	Flag set if the master has received a feedhold request. The attached axes are decelerating or stopped. This Flag will clear when a Cycle Start request is received.
In Feedhold	r, f	Flag set if the master has received a feedhold request and the attached axes have stopped. This Flag will clear when a Cycle Start request is received.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

BIT512-BIT767

Master Flags (continued)

Control Flags:

Feedhold Request	r/w, s	This Flag will cause the current move to decelerate to zero and set the Feedholding status flag. Processor acknowledgment clears the Flag.
Cycle Start Request	r/w, s	This Flag will cause the move in progress when a Feedhold Request was processed to accelerate and continue the moves. Processor acknowledgment clears the Flag.
Kill All Moves Request 	r/w, s	See Flag description on following page.
Stop All Moves Request 	r/w, s	See Flag description on following page.
FVEL Zero Pending	r/w, s	State of "FVEL zero" flag at start of next move.
FVEL Zero Active	r/w, s	When this flag is set, use 0 for FVEL instead of FVEL setting.
FOV/ROV Lock Pending	r/w, s	State of "FOV/ROV lock" flag at start of next move.
FOV/ROV Lock Active	r/w, s	When this flag is set, use 1.0 for FOV instead of FOV setting, during feed moves. When this flag is set, use 1.0 for ROV instead of ROV setting during rapid moves.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

Warning:
The function of these flags has changed in Firmware Versions 1.17.05 and above.

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Master Flags (continued)

The Kill All Moves Request and Stop All Moves Request flag functions are user selectable via the Secondary Master Flags Bit Index 4 control flag, Enable Clear Request, as follows:

Secondary Master Flag Enable Clear Request – Cleared
(DEFAULT – Compatible with Firmware Version 1.17.05 and above)

Kill All Moves Request r/w, s

Setting this Flag will stop all moves without using any acceleration or deceleration ramps. This flag does not halt any programs or PLC's. **The user is responsible for clearing this Flag**.

Stop All Moves Request r/w, s

Setting this Flag will cause the master to respond the same as receiving a Feedhold Request, wait for "In Feedhold" flag, then follow with a Kill All Moves Request. **Processor acknowledgment clears the Stop All Moves Request Flag. The user is responsible for clearing the Kill All Moves Request Flag**.

Secondary Master Flag Enable Clear Request – Set
(Compatible with Firmware Version 1.17.04 and below)

Kill All Moves Request r/w, s

Setting this Flag will stop all moves without using any acceleration or deceleration ramps. This flag does not halt any programs or PLC's. **Processor acknowledgment clears the Kill All Moves Request Flag**.

Stop All Moves Request r/w, s

Setting this Flag will cause the master to respond the same as receiving a Feedhold Request, wait for "In Feedhold" flag, then follow with a Kill All Moves Request. **Processor acknowledgment clears the Stop All Moves Request Flag.**

Warning:
The function of these flags has changed in Firmware Versions 1.17.05 and above.

BIT512-BIT767

Master Flags (continued)

Limit Flags:

Not In Position	r, s	Flag will be set whenever any attached axes has a following error that is outside of its In-Position Band (IPB)
Not Excess Error	r, s	Flag will be set if all of the attached axes has a following error that is within their Excess Error bands (EXC)
Within A Limit	r, s	Flag will be set if all attached axes have a command position that is within the values set by Stroke Limit `A` (ALM)
Not Within B Limit	r, s	Flag will be set if any attached axes has a command position that is outside of values set by Stroke Limit `B` (BLM)
Not Torque Limit	r, s	Flag will be set if none of the attached DAC outputs is being torque limited. This is set by the value of Torque Limit. (TLM)
Not in Torque Band	r, s	Flag will be set if any attached DAC output is outside of the torque band. This is set by the value of In-Torque Band. (ITB)

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

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Master Flags (continued)

Sequence Flags:

Decrement Count	r/w, f	When this flag is set, the move counter decrements when a move starts.
Increment Count	r/w, f	When this flag is set, the move counter increments when a move starts.
Interrupt On Move	r/w, f	When this flag is set, an interrupt is sent to the AT Bus when a move is fetched from FIFO and buffered.
TRG Pending	r/w, f	This flag is set when the master is waiting for TRG condition to become true.
Start Move Inhibit	r/w, f	When this flag is set, buffered moves are prevented from starting. This flag is used internally by the BLK/STEP sequence.
REN Request Flag	r/w, s	When This flag is set, the attached axes will perform a REN command. Flag is cleared on operation.
Cycle Start Lockout	r/w, f	When this flag is set, the master will ignore cycle start requests.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

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BIT768-BIT1023

Axis Flags

See also: Secondary Axis Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=-0x03	4120	4121	4122	4123	4124	4125	4126	4127

Limit Flags	Bit Index	AXIS Number							
		0	1	2	3	4	5	6	7
Not In Position	0	768	800	832	864	896	928	960	992
Not Excess Error	1	769	801	833	865	897	929	961	993
Within A Limit	2	770	802	834	866	898	930	962	994
Not Within B Limit	3	771	803	835	867	899	931	963	995
Not Torque Limit	4	772	804	836	868	900	932	964	996
Not In Torque Band	5	773	805	837	869	901	933	965	997
Reserved	6	774	806	838	870	902	934	966	998
Reserved	7	775	807	839	871	903	935	967	999

Status Flags	Bit Index	AXIS Number							
		0	1	2	3	4	5	6	7
Not Marker	8	776	808	840	872	904	936	968	1000
Capture Complete	9	777	809	841	873	905	937	969	1001
HSINT Registered	10	778	810	842	874	906	938	970	1002
HSINT Aborted	11	779	811	843	875	907	939	971	1003
Sinusoidal Mode	12	780	812	844	876	908	940	972	1004
Gear Lock	13	781	813	845	877	909	941	973	1005
Gear At Speed	14	782	814	846	878	910	942	974	1006
Gear Stopping	15	783	815	847	879	911	943	975	1007

Control Flags	Bit Index	AXIS Number							
		0	1	2	3	4	5	6	7
Clamp Output Signal	16	784	816	848	880	912	944	976	1008
Open Servo Loop	17	785	817	849	881	913	945	977	1009
Biquad Filter Activate	18	786	818	850	882	914	946	978	1010
REN Request Flag	19	787	819	851	883	915	947	979	1011
Gear Activate	20	788	820	852	884	916	948	980	1012
Gear Active	21	789	821	853	885	917	949	981	1013
Cam Activate	22	790	822	854	886	918	950	982	1014
Ballscrew Activate	23	791	823	855	887	919	951	983	1015

Jog Flags	Bit Index	AXIS Number							
		0	1	2	3	4	5	6	7
Jog Active	24	792	824	856	888	920	952	984	1016
Jog Direction	25	793	825	857	889	921	953	985	1017
Jog At Speed	26	794	826	858	890	922	954	986	1018
Jog Stopping	27	795	827	859	891	923	955	987	1019
Jog Forward	28	796	828	860	892	924	956	988	1020
Jog Reverse	29	797	829	861	893	925	957	989	1021
Jog Limit Check	30	798	830	862	894	926	958	990	1022
Jog Lockout	31	799	831	863	895	927	959	991	1023

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Axis Flags (continued)

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=-0x1E	4336	4337	4338	4339	4340	4341	4342	4343

Limit Flags	Bit Index	AXIS Number							
		8	9	10	11	12	13	14	15
Not In Position	0	7680	7712	7744	7776	7808	7840	7872	7904
Not Excess Error	1	7681	7713	7745	7777	7809	7841	7873	7905
Within A Limit	2	7682	7714	7746	7778	7810	7842	7874	7906
Not Within B Limit	3	7683	7715	7747	7779	7811	7843	7875	7907
Not Torque Limit	4	7684	7716	7748	7780	7812	7844	7876	7908
Not In Torque Band	5	7685	7717	7749	7781	7813	7845	7877	7909
Reserved	6	7686	7718	7750	7782	7814	7846	7878	7910
Reserved	7	7687	7719	7751	7783	7815	7847	7879	7911

Status Flags	Bit Index	AXIS Number							
		8	9	10	11	12	13	14	15
Not Marker	8	7688	7720	7752	7784	7816	7848	7880	7912
Capture Complete	9	7689	7721	7753	7785	7817	7849	7881	7913
HSINT Registered	10	7690	7722	7754	7786	7818	7850	7882	7914
HSINT Aborted	11	7691	7723	7755	7787	7819	7851	7883	7915
Sinusoidal Mode	12	7692	7724	7756	7788	7820	7852	7884	7916
Gear Lock	13	7693	7725	7757	7789	7821	7853	7885	7917
Gear At Speed	14	7694	7726	7758	7790	7822	7854	7886	7918
Gear Stopping	15	7695	7727	7759	7791	7823	7855	7887	7919

Control Flags	Bit Index	AXIS Number							
		8	9	10	11	12	13	14	15
Clamp Output Signal	16	7696	7728	7760	7792	7824	7856	7888	7920
Open Servo Loop	17	7697	7729	7761	7793	7825	7857	7889	7921
Biquad Filter Activate	18	7698	7730	7762	7794	7826	7858	7890	7922
REN Request Flag	19	7699	7731	7763	7795	7827	7859	7891	7923
Gear Activate	20	7700	7732	7764	7796	7828	7860	7892	7924
Gear Active	21	7701	7733	7765	7797	7829	7861	7893	7925
Cam Activate	22	7702	7734	7766	7798	7830	7862	7894	7926
Ballscrew Activate	23	7703	7735	7767	7799	7831	7863	7895	7927

Jog Flags	Bit Index	AXIS Number							
		8	9	10	11	12	13	14	15
Jog Active	24	7704	7736	7768	7800	7832	7864	7896	7928
Jog Direction	25	7705	7737	7769	7801	7833	7865	7897	7929
Jog At Speed	26	7706	7738	7770	7802	7834	7866	7898	7930
Jog Stopping	27	7707	7739	7771	7803	7835	7867	7899	7931
Jog Forward	28	7708	7740	7772	7804	7836	7868	7900	7932
Jog Reverse	29	7709	7741	7773	7805	7837	7869	7901	7933
Jog Limit Check	30	7710	7742	7774	7806	7838	7870	7902	7934
Jog Lockout	31	7711	7743	7775	7807	7839	7871	7903	7935

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT768-BIT1023

Axis Flags (continued)

Limit Flags:

Not in Position	r, s	Flag will be set when following error is outside of In-Position Band (IPB)
Not Excess Error	r, s	Flag will be set when following error is within Excess Error band (EXC)
Within A Limit	r, s	Flag will be set if command position is within the values set by Stroke Limit `A` (ALM)
Not Within B Limit	r, s	Flag will be set if command position is outside of values set by Stroke Limit `B` (BLM)
Not Torque Limit	r, s	Flag will be set if attached DAC output is being torque limited. This is set by the value of Torque Limit. (TLM)
Not in Torque Band	r, s	Flag will be set if attached DAC output is outside of the torque band. This is set by the value of In-torque Band. (ITB)

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

Axis Flags (continued)

Status Flags:

Not Marker	r, s	Flag will be set when encoder marker of attached encoder is not present
Capture Complete	r, f	Flag will be set on completion of a encoder capture using the INTCAP command. Flag will clear when the next INTCAP is issued.
HSINT Registered	r	Cleared by the start of the HSINT command. Set when a hardware capture is detected within the HSINT capture window and the “incmov” starts.
HSINT Aborted	r	Cleared by the start of the HSINT command. Set when the optional HSINT “abortbit” is detected and the sequence is aborted.
Sinusoidal Mode	r/w, f	When this bit is set, linear moves will be converted into SINE commands. (see the SINE command for details)
Gear Lock	r/w	Set this bit to disable GEAR ACC and GEAR DEC and force gear ratio to the programmed setting.
Gear At Speed	r	This bit is set when the internal gear ratio is equal to the programmed gear ratio. This bit is cleared during GEAR ACC and GEAR DEC ramps.
Gear Stopping	r	This bit is set during the final GEAR DEC ramp after a GEAR OFF command is issued.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

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Axis Flags (continued)

Control Flags:

Clamp Output Signal	r/w, f	When this flag is set, the axis “Output Signal” parameter is forced to zero.
Open Servo Loop	r/w, f	When this flag is set, the axis does not execute servo loop.
Biquad Filter Activate	r/w, f	When this flag is set, the axis executes digital filters.
REN Request Flag	r/w, s	When this flag is set, the axis executes a REN command. Flag is cleared on operation
Gearing Activate	r/w, f	Flag is set by GEAR ON and cleared by GEAR OFF. Can be used to manually control gearing.
Gearing Active	r	Flag is set when gearing is active. If GEAR DEC is enabled, this bit will remain set after a GEAR OFF until the gear ratio ramps down to zero.
Cam Activate	r/w, f	Flag is set by CAM ON and cleared by CAM OFF. Can be used to manually control camming.
Ballscrew Activate	r/w, f	Flag is set by BSC ON and cleared by BSC OFF. Can be used to manually control ballscrew.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

BIT768-BIT1023

Axis Flags (continued)

Jog Flags:

Jog Active	r, f	Flag is set when the axis is in any jog mode.
Jog Direction	r, f	Flag is set when the axis is jogging negative and off when jogging positive or not jogging.
Jog at Speed	r, f	Flag is set when the axis speed is at the velocity set by JOG VEL command.
Jog Stopping	r, f	Flag is set when axis is ramping to zero.
Jog Forward	r/w, f	Flag is set when axis is jogging forward. Can be used to start jog forward by setting the flag or stopping jog forward by clearing the flag.
Jog Reverse	r/w, f	Flag is set when axis is jogging in reverse. Can be used to start jog reverse by setting the flag or stopping jog reverse by clearing the flag.
Jog Limit Check	r/w, f	When this flag is set the jog limits are checked when the JOG FWD and JOG REV commands are used. The value of jog limits is set using the JLM command.
Jog Lockout	r/w, f	When this flag is set a JOG FWD or JOG REV command will set the appropriate flag but not produce motion. If this flag is cleared and the Jog Forward or Jog Reverse flag is set the Jog will start. If this flag is set while in a jog mode it will not take effect until the present jog is stopped.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

BIT1024-BIT1535

Program Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x04	4128	4129	4130	4131	4132	4133	4134	4135

Status Flags	Bit Index	PROG Number							
		0	1	2	3	4	5	6	7
Program Running	0	1024	1056	1088	1120	1152	1184	1216	1248
Program Dwelling	1	1025	1057	1089	1121	1153	1185	1217	1249
Program Inhibited	2	1026	1058	1090	1122	1154	1186	1218	1250
Move Pending	3	1027	1059	1091	1123	1155	1187	1219	1251
Program Timeout	4	1028	1060	1092	1124	1156	1188	1220	1252
Program Modified	5	1029	1061	1093	1125	1157	1189	1221	1253
Reserved	6	1030	1062	1094	1126	1158	1190	1222	1254
Reserved	7	1031	1063	1095	1127	1159	1191	1223	1255

Control Flags	Bit Index	PROG Number							
		0	1	2	3	4	5	6	7
Run Request Flag	8	1032	1064	1096	1128	1160	1192	1224	1256
Halt Request Flag	9	1033	1065	1097	1129	1161	1193	1225	1257
Reserved	10	1034	1066	1098	1130	1162	1194	1226	1258
Reserved	11	1035	1067	1099	1131	1163	1195	1227	1259
Trace Mode Enable	12	1036	1068	1100	1132	1164	1196	1228	1260
Reserved	13	1037	1069	1101	1133	1165	1197	1229	1261
Reserved	14	1038	1070	1102	1134	1166	1198	1230	1262
Reserved	15	1039	1071	1103	1135	1167	1199	1231	1263

Block Flags	Bit Index	PROG Number							
		0	1	2	3	4	5	6	7
Block Control	16	1040	1072	1104	1136	1168	1200	1232	1264
Block Edge Detect	17	1041	1073	1105	1137	1169	1201	1233	1265
Block Mode	18	1042	1074	1106	1138	1170	1202	1234	1266
Block Mode Waiting	19	1043	1075	1107	1139	1171	1203	1235	1267
Step First Block	20	1044	1076	1108	1140	1172	1204	1236	1268
Step Request Flag	21	1045	1077	1109	1141	1173	1205	1237	1269
Step Control	22	1046	1078	1110	1142	1174	1206	1238	1270
Step Edge Detect	23	1047	1079	1111	1143	1175	1207	1239	1271

Pause Flags	Bit Index	PROG Number							
		0	1	2	3	4	5	6	7
Pause Control	24	1048	1080	1112	1144	1176	1208	1240	1272
Pause Edge Detect	25	1049	1081	1113	1145	1177	1209	1241	1273
Pause Mode	26	1050	1082	1114	1146	1178	1210	1242	1274
Pause Mode Waiting	27	1051	1083	1115	1147	1179	1211	1243	1275
Reserved	28	1052	1084	1116	1148	1180	1212	1244	1276
Reserved	29	1053	1085	1117	1149	1181	1213	1245	1277
Reserved	30	1054	1086	1118	1150	1182	1214	1246	1278
Reserved	31	1055	1087	1119	1151	1183	1215	1247	1279

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT1024-BIT1535

Program Flags (continued)

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x05	4136	4137	4138	4139	4140	4141	4142	4143

Status Flags	Bit Index	PROG Number 8	9	10	11	12	13	14	15
Program Running	0	1280	1312	1344	1376	1408	1440	1472	1504
Program Dwelling	1	1281	1313	1345	1377	1409	1441	1473	1505
Program Inhibited	2	1282	1314	1346	1378	1410	1442	1474	1506
Move Pending	3	1283	1315	1347	1379	1411	1443	1475	1507
Program Timeout	4	1284	1316	1348	1380	1412	1444	1476	1508
Program Modified	5	1285	1317	1349	1381	1413	1445	1477	1509
Reserved	6	1286	1318	1350	1382	1414	1446	1478	1510
Reserved	7	1287	1319	1351	1383	1415	1447	1479	1511

Control Flags	Bit Index	PROG Number 8	9	10	11	12	13	14	15
Run Request Flag	8	1288	1320	1352	1384	1416	1448	1480	1512
Halt Request Flag	9	1289	1321	1353	1385	1417	1449	1481	1513
Reserved	10	1290	1322	1354	1386	1418	1450	1482	1514
Reserved	11	1291	1323	1355	1387	1419	1451	1483	1515
Trace Mode Enable	12	1292	1324	1356	1388	1420	1452	1484	1516
Reserved	13	1293	1325	1357	1389	1421	1453	1485	1517
Reserved	14	1294	1326	1358	1390	1422	1454	1486	1518
Reserved	15	1295	1327	1359	1391	1423	1455	1487	1519

Block Flags	Bit Index	PROG Number 8	9	10	11	12	13	14	15
Block Control	16	1296	1328	1360	1392	1424	1456	1488	1520
Block Edge Detect	17	1297	1329	1361	1393	1425	1457	1489	1521
Block Mode	18	1298	1330	1362	1394	1426	1458	1490	1522
Block Mode Waiting	19	1299	1331	1363	1395	1427	1459	1491	1523
Step First Block	20	1300	1332	1364	1396	1428	1460	1492	1524
Step Request Flag	21	1301	1333	1365	1397	1429	1461	1493	1525
Step Control	22	1302	1334	1366	1398	1430	1462	1494	1526
Step Edge Detect	23	1303	1335	1367	1399	1431	1463	1495	1527

Pause Flags	Bit Index	PROG Number 8	9	10	11	12	13	14	15
Pause Control	24	1304	1336	1368	1400	1432	1464	1496	1528
Pause Edge Detect	25	1305	1337	1369	1401	1433	1465	1497	1529
Pause Mode	26	1306	1338	1370	1402	1434	1466	1498	1530
Pause Mode Waiting	27	1307	1339	1371	1403	1435	1467	1499	1531
Reserved	28	1308	1340	1372	1404	1436	1468	1500	1532
Reserved	29	1309	1341	1373	1405	1437	1469	1501	1533
Reserved	30	1310	1342	1374	1406	1438	1470	1502	1534
Reserved	31	1311	1343	1375	1407	1439	1471	1503	1535

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT1024-BIT1535

Program Flags (continued)

Status Flags:

Program Running	r, f	Flag is set when the program is running.
Program Dwelling	r, f	Flag is set when a program operation is executing a DWL command.
Program Inhibited	r, f	Flag is set when the program operation is suspended during an INH or IHPOS command.
Move Pending	r	This flag is used internally to indicate that the current block being processed contains a move that will begin when the block ends.
Program Time-out	r, f	Flag is set if IHPOS command times out Cleared by IHPOS command.
Program Modified	r, f	This flag is set when program is modified (add, delete, or edit program lines) Flag is cleared when program is run.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

Control Flags:

Run Request Flag	r/w, s	If this flag is set, program is RUN when detected. Flag is cleared automatically
Halt Request Flag	r/w, s	If this flag is set, program is Halted when detected. Flag is cleared automatically
Trace Mode Enable	r/w, f	Flag is set by TRON command, cleared with TROFF command. Can be used to enable or disable trace mode.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

BIT1024-BIT1535

Program Flags (continued)

Block Flags:

Block Control	r/w, s	Flag is set when a block command is issued for this program. Flag is cleared by AUT command. Can be used to initiate or cancel block mode by setting or clearing the flag.
Block Edge Detect	r, s	This flag reflects previous state of “Block Control” flag. It is used for detecting edges.
Block Mode	r, f	Flag is set as soon as block control is detected if no master is attached. If attached to a master the program will feedhold and flag will be set when the master “In Feedhold” flag is detected.
Block Mode Waiting	r, f	Flag is set when program is waiting for a STEP command.
Step First Block	r, f	Flag is set by entering block mode operation. Flag is cleared after first step.
Step Request Flag	r/w, s	This flag is set when a STEP command is issued, this executes the next line of a program is block mode.
Step Control	r/w, s	Rising edge of this flag causes the “Step Request” flag to be set.
Step Edge Detect	r, s	This flag reflects previous state of “Step Control” flag. It is used for detecting edges.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

BIT1024-BIT1535

Program Flags (continued)

Pause Flags:

Pause Control	r/w, s	Flag is set when a pause command is issued for this program. Flag is cleared by RESUME command. Can be used to initiate or cancel pause mode by setting or clearing the flag.
Pause Edge Detect	r, s	This flag reflects previous state of “Pause Control” flag. It is used for detecting edges.
Pause Mode	r, f	Flag is set as soon as pause control is detected if no master is attached. If attached to a master the program will feedhold and flag will be set when the master “In Feedhold” flag is detected.
Pause Mode Waiting	r, f	This flag is set when the program is waiting for RESUME command.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

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BIT1536-BIT1791

PLC Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x06	4144	4145	4146	4147	4148	4149	4150	4151

PLC Flags	Bit Index	PLC Number							
		0	1	2	3	4	5	6	7
PLC Running	0	1536	1568	1600	1632	1664	1696	1728	1760
First Scan	1	1537	1569	1601	1633	1665	1697	1729	1761
Run Request	2	1538	1570	1602	1634	1666	1698	1730	1762
Halt Request	3	1539	1571	1603	1635	1667	1699	1731	1763
Reserved	4	1540	1572	1604	1636	1668	1700	1732	1764
Reserved	5	1541	1573	1605	1637	1669	1701	1733	1765
Reserved	6	1542	1574	1606	1638	1670	1702	1734	1766
Reserved	7	1543	1575	1607	1639	1671	1703	1735	1767

Stepper Flags	Bit Index	STEPPER Number							
		0	1	2	3	4	5	6	7
Stepper Direction	8	1544	1576	1608	1640	1672	1704	1736	1768
Stepper Low Power	9	1545	1577	1609	1641	1673	1705	1737	1769
Reserved	10	1546	1578	1610	1642	1674	1706	1738	1770
Reserved	11	1547	1579	1611	1643	1675	1707	1739	1771
Reserved	12	1548	1580	1612	1644	1676	1708	1740	1772
Reserved	13	1549	1581	1613	1645	1677	1709	1741	1773
Reserved	14	1550	1582	1614	1646	1678	1710	1742	1774
Reserved	15	1551	1583	1615	1647	1679	1711	1743	1775

TIM / CNT Flags	Bit Index	TIM / CNT Number							
		0	1	2	3	4	5	6	7
Timer Output	16	1552	1584	1616	1648	1680	1712	1744	1776
Timer Input	17	1553	1585	1617	1649	1681	1713	1745	1777
Reserved	18	1554	1586	1618	1650	1682	1714	1746	1778
Reserved	19	1555	1587	1619	1651	1683	1715	1747	1779
Counter Output	20	1556	1588	1620	1652	1684	1716	1748	1780
Counter Clock	21	1557	1589	1621	1653	1685	1717	1749	1781
Counter Reset	22	1558	1590	1622	1654	1686	1718	1750	1782
Reserved	23	1559	1591	1623	1655	1687	1719	1751	1783

KR Flags	Bit Index	KR Number							
		0	1	2	3	4	5	6	7
Reserved	24	1560	1592	1624	1656	1688	1720	1752	1784
Reserved	25	1561	1593	1625	1657	1689	1721	1753	1785
Reserved	26	1562	1594	1626	1658	1690	1722	1754	1786
Reserved	27	1563	1595	1627	1659	1691	1723	1755	1787
Latch Output	28	1564	1596	1628	1660	1692	1724	1756	1788
Latch Set	29	1565	1597	1629	1661	1693	1725	1757	1789
Latch Reset	30	1566	1598	1630	1662	1694	1726	1758	1790
Reserved	31	1567	1599	1631	1663	1695	1727	1759	1791

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT8704-BIT8959

PLC Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x06	4368	4369	4370	4371	4372	4373	43740	4375

PLC Flags	Bit Index	PLC Number 8	9	10	11	12	13	14	15
Reserved	0	7168	7200	7232	7264	7296	7328	7360	7392
Reserved	1	7169	7201	7233	7265	7297	7329	7361	7393
Reserved	2	7170	7202	7234	7266	7298	7330	7362	7394
Reserved	3	7171	7203	7235	7267	7299	7331	7363	7395
Reserved	4	7172	7204	7236	7268	7300	7332	7364	7396
Reserved	5	7173	7205	7237	7269	7301	7333	7365	7397
Reserved	6	7174	7206	7238	7270	7302	7334	7366	7398
Reserved	7	7175	7207	7239	7271	7303	7335	7367	7399

Stepper Flags	Bit Index	STEPPER Number 8	9	10	11	12	13	14	15
Stepper Direction	8	7176	7208	7240	7272	7304	7336	7368	7400
Stepper Low Power	9	7177	7209	7241	7273	7305	7337	7369	7401
Reserved	10	7178	7210	7242	7274	7306	7338	7370	7402
Reserved	11	7179	7211	7243	7275	7307	7339	7371	7403
Reserved	12	7180	7212	7244	7276	7308	7340	7372	7404
Reserved	13	7181	7213	7245	7277	7309	7341	7373	7405
Reserved	14	7182	7214	7246	7278	7310	7342	7374	7406
Reserved	15	7183	7215	7247	7279	7311	7343	7375	7407

TIM / CNT Flags	Bit Index	TIM / CNT Number 8	9	10	11	12	13	14	15
Reserved	16	7184	7216	7248	7280	7312	7344	7376	7408
Reserved	17	7185	7217	7249	7281	7313	7345	7377	7409
Reserved	18	7186	7218	7250	7282	7314	7346	7378	7410
Reserved	19	7187	7219	7251	7283	7315	7347	7379	7411
Reserved	20	7188	7220	7252	7284	7316	7348	7380	7412
Reserved	21	7189	7221	7253	7285	7317	7349	7381	7413
Reserved	22	7190	7222	7254	7286	7318	7350	7382	7414
Reserved	23	7191	7223	7255	7287	7319	7351	7383	7415

KR Flags	Bit Index	KR Number 8	9	10	11	12	13	14	15
Reserved	24	7192	7224	7256	7288	7320	7352	7384	7416
Reserved	25	7193	7225	7257	7289	7321	7353	7385	7417
Reserved	26	7194	7226	7258	7290	7322	7354	7386	7418
Reserved	27	7195	7227	7259	7291	7323	7355	7387	7419
Reserved	28	7196	7228	7260	7292	7324	7356	7388	7420
Reserved	29	7197	7229	7261	7293	7325	7357	7389	7421
Reserved	30	7198	7230	7262	7294	7326	7358	7390	7422
Reserved	31	7199	7231	7263	7295	7327	7359	7391	7423

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT1536-BIT1791

PLC Flags (continued)

PLC Flags:

PLC Running	r, f	Flag is set when the PLC is running a program.
First Scan	r, f	Flag is set when the PLC program is run, clears after first scan.
Run Request	r/w, s	If this flag is set, plc is RUN when detected. Flag is cleared automatically
Halt Request	r/w, s	If this flag is set, plc is Halted when detected. Flag is cleared automatically

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

Stepper Flags:

Stepper Direction	r/w, f	Set this flag to invert the polarity of the stepper direction output on the optional stepper module.
Stepper Low Power	r/w, f	Set this flag to activate the low power output signal on the optional stepper module.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

BIT1536-BIT1791

PLC Flags (continued)

TIM Flags:

Timer Output	r, f	Flag is set when the timer count is zero. The flag will remain set until the Timer input is cleared.
Timer Input	r/w, f	Setting the flag will cause the timer count to decrement. When the flag is cleared the timer is reset to it's preset value and the timer output flag is cleared.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

CNT Flags:

Counter Output	r, f	Flag is set when the count is zero. The flag will remain set until the counter reset flag is set
Counter Clock	r/w, f	Counter will decrement once on each rising edge of this flag.
Counter Reset	r/w, f	When flag is set the counter output is cleared and counter clock inputs are ignored.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

KR Flags:

Latch Output	r, f	Flag will be set when the latch set flag is set. Flag will remain set after latch set is removed. Flag will clear when latch reset flag is set.
Latch Set	r/w, f	Setting this flag will set latch output flag.
Latch Reset	r/w, f	Setting this flag will clear latch output flag, latch set will not function as long as this flag is set.

r = read
w = write
f = fast flag, sampled once each servo interrupt
s = slow flag, sample rate of approximately 50msec (independent of servo interrupt rate)

BIT1792-BIT1823

FIFO Stream Flags

	Mask=0x01
Flag Parameter Code=0x10; Index=0x07	4152

Flag Description	Bit Index	Flag Number
Enable Character Echo	0	1792
Disable Error Reporting	1	1793
Disable Command Prompt	2	1794
Reserved	3	1795
Reserved	4	1796
Reserved	5	1797
Reserved	6	1798
Reserved	7	1799
FIFO Stream Active	8	1800
FIFO Stream Waiting	9	1801
FIFO Stream Opened	10	1802
FIFO Stream Disabled	11	1803
FIFO Stream Echoing	12	1804
FIFO Redimensioned	13	1805
Reserved	14	1806
Reserved	15	1807
FIFO Open Request	16	1808
FIFO Escape Request	17	1809
Reserved	18	1810
Reserved	19	1811
FIFO Control Prefixing	20	1812
FIFO High Bit Stripping	21	1813
Reserved	22	1814
Reserved	23	1815
Reserved	24	1816
Reserved	25	1817
Reserved	26	1818
Reserved	27	1819
Reserved	28	1820
Reserved	29	1821
Reserved	30	1822
Reserved	31	1823

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT1824-BIT1855

LPT1 Stream Flags

	Mask=0x02
Flag Parameter Code=0x10; Index=0x07	4153

Flag Description	Physical Pinout	Bit Index	Flag Number
PD0	P5-23	0	1824
PD1	P5-24	1	1825
PD2	P5-25	2	1826
PD3	P5-26	3	1827
PD4	P5-27	4	1828
PD5	P5-28	5	1829
PD6	P5-29	6	1830
PD7	P5-30	7	1831
Reserved	-----	8	1832
Reserved	-----	9	1833
PRINT	-----	10	1834
ERR	P5-19	11	1835
SLCT	P5-34	12	1836
PE	P5-33	13	1837
ACK	P5-31	14	1838
BUSY	P5-32	15	1839
STB	P5-17	16	1840
AFD	P5-18	17	1841
INIT	P5-20	18	1842
SLIN	P5-21	19	1843
INT2 EN	-----	20	1844
DIR	-----	21	1845
Reserved	-----	22	1846
Reserved	-----	23	1847
Reserved	-----	24	1848
Reserved	-----	25	1849
Reserved	-----	26	1850
Reserved	-----	27	1851
Reserved	-----	28	1852
Reserved	-----	29	1853
Reserved	-----	30	1854
Reserved	-----	31	1855

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT1856-BIT1887

COM1 Stream Flags

	Mask=0x04
Flag Parameter Code=0x10; Index=0x7	4154

COM1 Stream Flags	Bit Index	Flag Number
Enable Character Echo	0	1856
Disable Error Reporting	1	1857
Disable Command Prompt	2	1858
Reserved	3	1859
Reserved	4	1860
Reserved	5	1861
Reserved	6	1862
Reserved	7	1863
COM1 Stream Active	8	1864
COM1 Stream Waiting	9	1865
COM1 Stream Opened	10	1866
COM1 Stream Disabled	11	1867
COM1 Stream Echoing	12	1868
COM1 Redimensioned	13	1869
Reserved	14	1870
Reserved	15	1871
COM1 Open Request	16	1872
COM1 Escape Request	17	1873
Reserved	18	1874
Reserved	19	1875
COM1 Control Prefixing	20	1876
COM1 High Bit Stripping	21	1877
Reserved	22	1878
Reserved	23	1879

COM1 Configuration Flags	Bit Index	Flag Number
* Serial Input MUX0	24	1880
* Serial input MUX1	25	1881
* Receive Flag	26	1882
* Transmit Flag	27	1883
Reserved	28	1884
Reserved	29	1885
Reserved	30	1886
Reserved	31	1887

* ACR1200/ACR2000/ACR8010 serial communications control bits

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT1856-BIT1887

COM1 Stream Flags (continued)

COM1 Configuration Flags:

Serial Input MUX0	r/w	Flag is used in conjunction with the Serial Input MUX1 flag to set the COM1 serial communication protocol for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.
Serial Input MUX1	r/w	Flag is used in conjunction with the Serial Input MUX0 flag to set the COM1 serial communication protocol for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.
Receive Flag	r/w	Flag is used in conjunction with the Transmit Flag to set the COM1 RS-422/RS485 hardware interface for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.
Transmit Flag	r/w	Flag is used in conjunction with the Receive Flag to set the COM1 RS-422/RS485 hardware interface for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.

r = read, w = write

BIT1888-BIT1919

COM2 Stream Flags

	Mask=0x08
Flag Parameter Code=0x10; Index=0x07	4155

COM2 Stream Flags	Bit Index	Flag Number
Enable Character Echo	0	1888
Disable Error Reporting	1	1889
Disable Command Prompt	2	1890
Reserved	3	1891
Reserved	4	1892
Reserved	5	1893
Reserved	6	1894
Reserved	7	1895
COM2 Stream Active	8	1896
COM2 Stream Waiting	9	1897
COM2 Stream Opened	10	1898
COM2 Stream Disabled	11	1899
COM2 Stream Echoing	12	1900
COM2 Redimensioned	13	1901
Reserved	14	1902
Reserved	15	1903
COM2 Open Request	16	1904
COM2 Escape Request	17	1905
Reserved	18	1906
Reserved	19	1907
COM2 Control Prefixing	20	1908
COM2 High Bit Stripping	21	1909
Reserved	22	1910
Reserved	23	1911

COM2 Configuration Flags	Bit Index	Flag Number
* Serial Input MUX0	24	1912
* Serial input MUX1	25	1913
* Receive Flag	26	1914
* Transmit Flag	27	1915
Reserved	28	1916
Reserved	29	1917
Reserved	30	1918
Reserved	31	1919

* ACR1200/ACR2000/ACR8010 serial communications control bits

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT1888-BIT1919

COM2 Stream Flags (continued)

COM2 Configuration Flags:

Serial Input MUX0	r/w	Flag is used in conjunction with the Serial Input MUX1 flag to set the COM2 serial communication protocol for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.
Serial Input MUX1	r/w	Flag is used in conjunction with the Serial Input MUX0 flag to set the COM2 serial communication protocol for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.
Receive Flag	r/w	Flag is used in conjunction with the Transmit Flag to set the COM2 RS-422/RS485 hardware interface for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.
Transmit Flag	r/w	Flag is used in conjunction with the Receive Flag to set the COM2 RS-422/RS485 hardware interface for the ACR1200/ACR2000/ACR8010 boards. Refer to appropriate hardware manual for set-up details.

r = read, w = write

BIT1920-BIT2047

User Flags Group 4-7

Mask	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x07	4156	4157	4158	4159

Flag Description	Bit Index	User Group			
		4	5	6	7
User defined	0	1920	1952	1984	2016
User defined	1	1921	1953	1985	2017
User defined	2	1922	1954	1986	2018
User defined	3	1923	1955	1987	2019
User defined	4	1924	1956	1988	2020
User defined	5	1925	1957	1989	2021
User defined	6	1926	1958	1990	2022
User defined	7	1927	1959	1991	2023
User defined	8	1928	1960	1992	2024
User defined	9	1929	1961	1993	2025
User defined	10	1930	1962	1994	2026
User defined	11	1931	1963	1995	2027
User defined	12	1932	1964	1996	2028
User defined	13	1933	1965	1997	2029
User defined	14	1934	1966	1998	2030
User defined	15	1935	1967	1999	2031
User defined	16	1936	1968	2000	2032
User defined	17	1937	1969	2001	2033
User defined	18	1938	1970	2002	2034
User defined	19	1939	1971	2003	2035
User defined	20	1940	1972	2004	2036
User defined	21	1941	1973	2005	2037
User defined	22	1942	1974	2006	2038
User defined	23	1943	1975	2007	2039
User defined	24	1944	1976	2008	2040
User defined	25	1945	1977	2009	2041
User defined	26	1946	1978	2010	2042
User defined	27	1947	1979	2011	2043
User defined	28	1948	1980	2012	2044
User defined	29	1949	1981	2013	2045
User defined	30	1950	1982	2014	2046
User defined	31	1951	1983	2015	2047

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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BIT2048-BIT2303

Secondary Master Flags

See also: Master Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x08	4160	4161	4162	4163	4164	4165	4166	4167

Control Flags	Bit Index	MASTER Number							
		0	1	2	3	4	5	6	7
Block Skip Check	0	2048	2080	2112	2144	2176	2208	2240	2272
Block Skip Input	1	2049	2081	2113	2145	2177	2209	2241	2273
Rapid Pending	2	2050	2082	2114	2146	2178	2210	2242	2274
Rapid Active	3	2051	2083	2115	2147	2179	2211	2243	2275
Enable Clear Request	4	2052	2084	2116	2148	2180	2212	2244	2276
Enable Rapid Move Modes	5	2053	2085	2117	2149	2181	2213	2245	2277
Master Short Time	6	2054	2086	2118	2150	2182	2214	2246	2278
Master in TMOV	7	2055	2087	2119	2151	2183	2215	2247	2279
Reserved	8	2056	2088	2120	2152	2184	2216	2248	2280
Master TOV	9	2057	2089	2121	2153	2185	2217	2249	2281
Reserved	10	2058	2090	2122	2154	2188	2218	2250	2282
Reserved	11	2059	2091	2123	2155	2187	2219	2251	2283
Reserved	12	2060	2092	2124	2156	2188	2220	2252	2284
Reserved	13	2061	2093	2125	2157	2189	2221	2253	2285
Reserved	14	2062	2094	2126	2158	2190	2222	2254	2286
Reserved	15	2063	2095	2127	2159	2191	2223	2255	2287
Sync Mode	16	2064	2096	2128	2160	2192	2224	2256	2288
Sync Manual	17	2065	2097	2129	2161	2193	2225	2257	2289
Reserved	18	2066	2098	2130	2162	2194	2226	2258	2290
Sync Manual Loaded	19	2067	2099	2131	2163	2195	2227	2259	2291
Reserved	20	2068	2100	2132	2164	2196	2228	2260	2292
Reserved	21	2069	2101	2133	2165	2197	2229	2261	2293
Reserved	22	2070	2102	2134	2166	2198	2230	2262	2294
Reserved	23	2071	2103	2135	2167	2199	2231	2263	2295
Spiral mode	24	2072	2104	2136	2168	2200	2232	2264	2296
Reserved	25	2073	2105	2137	2169	2201	2233	2265	2297
TANG mode	26	2074	2106	2138	2170	2202	2234	2266	2298
Reserved	27	2075	2107	2139	2171	2203	2235	2267	2299
SlaveMaxVel	28	2076	2108	2140	2172	2204	2236	2268	2300
TARC Mode	29	2077	2109	2141	2173	2205	2237	2269	2301
Reserved	30	2078	2110	2142	2174	2206	2238	2270	2302
Reserved	31	2079	2111	2143	2175	2207	2239	2271	2303

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT7939-BIT8191

Secondary Master Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x1F	4344	4345	4346	4347	4348	4349	4350	4351

Control Flags	Bit Index	MASTER Number							
		8	9	10	11	12	13	14	15
Block Skip Check	0	7936	7968	8000	8032	8064	8096	8128	8160
Block Skip Input	1	7937	7969	8001	8033	8065	8097	8129	8161
Rapid Pending	2	7938	7970	8002	8034	8066	8098	8130	8162
Rapid Active	3	7939	7971	8003	8035	8067	8099	8131	8163
Enable Clear Request	4	7940	7972	8004	8036	8068	8100	8132	8164
Enable Rapid Move Modes	5	7941	7973	8005	8037	8069	8101	8133	8165
Master Short Time	6	7942	7974	8006	8038	8070	8102	8134	8166
Master in TMOV	7	7943	7975	8007	8039	8071	8103	8135	8167
Reserved	8	7944	7976	8008	8040	8072	8104	8136	8168
Master TOV	9	7945	7977	8009	8041	8073	8105	8137	8169
Reserved	10	7946	7978	8010	8042	8074	8106	8138	8170
Reserved	11	7947	7979	8011	8043	8075	8107	8139	8171
Reserved	12	7948	7980	8012	8044	8076	8108	8140	8172
Reserved	13	7949	7981	8013	8045	8077	8109	8141	8173
Reserved	14	7950	7982	8014	8046	8078	8110	8142	8174
Reserved	15	7951	7983	8015	8047	8079	8111	8143	8175
Sync Mode	16	7952	7984	8016	8048	8080	8112	8144	8176
Sync Manual	17	7953	7985	8017	8049	8081	8113	8145	8177
Reserved	18	7954	7986	8018	8050	8082	8114	8146	8178
Sync Manual Loaded	19	7955	7987	8019	8051	8083	8115	8147	8179
Reserved	20	7956	7988	8020	8052	8084	8116	8148	8180
Reserved	21	7957	7989	8021	8053	8085	8117	8149	8181
Reserved	22	7958	7990	8022	8054	8086	8118	8150	8182
Reserved	23	7959	7991	8023	8055	8087	8119	8151	8183
Spiral mode	24	7960	7992	8024	8056	8088	8120	8152	8184
Reserved	25	7961	7993	8025	8057	8089	8121	8153	8185
TANG mode	26	7962	7994	8026	8058	8090	8122	8154	8186
Reserved	27	7963	7995	8027	8059	8091	8123	8155	8187
SlaveMaxVel	28	7964	7996	8028	8060	8092	8124	8156	8188
TARC Mode	29	7965	7997	8029	8061	8093	8125	8157	8189
Reserved	30	7966	7998	8030	8062	8094	8126	8158	8190
Reserved	31	7967	7999	8031	8063	8095	8127	8159	8191

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT2048-BIT2303

Secondary Master Flags

Control Flags:

Block Skip Check	r/w	If this flag and the “Block Skip Input” flag are set, the next move command will be ignored. Otherwise moves are processed normally. This flag is cleared after the move is either started or ignored.
Block Skip Input	r/w	This flag must be set for the “Block Skip Check” flag to cause a move to be ignored.
Rapid Pending	r/w	State of “Rapid Active” flag at start of next move.
Rapid Active	r/w	When this flag is set, use ROV instead of FOV setting.
Enable Clear Request	r/w	When this flag is set, use Master Kill All Moves and Master Stop All Moves definition compatible with Firmware Version 1.17.04 and below. When this flag is cleared (default), use Master Kill All Moves and Master Stop All Moves definition compatible with Firmware Version 1.17.05 and above. Refer to Master Flags.
Enable Rapid Move Modes	r/w	When this flag is set, use Binary Header Code 0 definition compatible with Firmware Version 1.17.05 and above. When this flag is clear (default), use Binary Header Code 0 definition compatible with Firmware Version 1.17.04 and below. Refer to Binary Move Command.
Master Short Time	r/w	When the TMOV is ON, this flag will be set, if the move is too big to be completed in the time specified by the TMOV command. This flag will be cleared by a move, which can be done with in the time set by TMOV command.

r = read, w = write

BIT2048-BIT2303

Secondary Master Flags (continued)

Master in TMOV	r/w	This flag must be set for the time base moves. The TMOV ON command sets it and the TMOV OFF command clears it.
Sync Mode	r	This flag is set to indicate that the master is in the sync mode. It is set by the SYNC ON command and cleared by SYNC OFF command.
Sync Manual	r/w	When set, means that the moves should be loaded and started manually for the synchronized masters. The SYNC MDI command sets this flag and SYNC PROG command clears this flag.
Sync Manual Loaded	r	This flag is set when the move has been issued to the synchronized master. When the masters in sync start the move, this flag is self-cleared.
Spiral mode	r/w	
TANG mode	r	TANG ON and OFF will set and clear this flag respectively
SlaveMaxVel	r	When this flag is set, axis velocity limit mode is enabled. See “MAXVEL” command.
TARC mode	r	TARC ON and OFF will set and clear this flag respectively

r = read, w = write

BIT2304-BIT2559

Secondary Axis Flags

See also: Axis Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x09	4168	4169	4170	4171	4172	4173	4174	4175

Control Flags	Bit Index	AXIS Number							
		0	1	2	3	4	5	6	7
Positive Dir Limit	0	2304	2336	2368	2400	2432	2464	2496	2528
Negative Dir Limit	1	2305	2337	2369	2401	2433	2465	2497	2529
Dir Limit Activate	2	2306	2338	2370	2402	2434	2466	2498	2530
Dir Limit Tripped	3	2307	2339	2371	2403	2435	2467	2499	2531
CAM Trigger Mode	4	2308	2340	2372	2404	2436	2468	2500	2532
CAM Trigger Started	5	2309	2341	2373	2405	2437	2469	2501	2533
Reserved	6	2310	2342	2374	2406	2438	2470	2502	2534
Reserved	7	2311	2343	2375	2407	2439	2471	2503	2535
Gear On Trig Armed	8	2312	2344	2376	2408	2440	2472	2504	2536
Gear On Position	9	2313	2345	2377	2409	2441	2473	2505	2537
Gear Trigger Started	10	2314	2346	2378	2410	2442	2474	2506	2538
Dir Limit Tripped	11	2315	2347	2379	2411	2443	2475	2507	2539
Gear Off Armed	12	2316	2348	2380	2412	2444	2476	2508	2540
Gear Off Position	13	2317	2349	2381	2413	2445	2477	2509	2541
Gear Max	14	2318	2350	2382	2414	2446	2478	2510	2542
Gear Min	15	2319	2351	2383	2415	2447	2479	2511	2543
Reserved	16	2320	2352	2384	2416	2448	2480	2512	2544
3D ARC	17	2321	2353	2385	2417	2449	2481	2513	2545
Reserved	18	2322	2354	2386	2418	2450	2482	2514	2546
Reserved	19	2323	2355	2387	2419	2451	2483	2515	2547
Reserved	20	2324	2356	2388	2420	2452	2484	2516	2548
Reserved	21	2325	2357	2389	2421	2453	2485	2517	2549
Don't use capture Register	22	2326	2358	2390	2422	2454	2486	2518	2550
Stepper FeedBack	23	2327	2359	2391	2423	2455	2487	2519	2551

Fast Axis Limit Flags	Bit Index	AXIS Number							
		0	1	2	3	4	5	6	7
Fast EXC Flags	24	2328	2360	2392	2424	2456	2488	2520	2552
Fast IPB Flags	25	2329	2361	2393	2425	2457	2489	2521	2553
Fast ALM Flags	26	2330	2362	2394	2426	2458	2490	2522	2554
Fast BLM Flags	27	2331	2363	2395	2427	2459	2491	2523	2555
Fast TLM Flags	28	2332	2364	2396	2428	2460	2492	2524	2556
Fast TIB Flags	29	2333	2365	2397	2429	2461	2493	2525	2557
Reserved	30	2334	2366	2398	2430	2462	2494	2526	2558

Fast Master Limit Flags	Bit Index	AXIS Number							
		0	1	2	3	4	5	6	7
Fast Master Flags	31	2335	2367	2399	2431	2463	2495	2527	2559

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT8192-BIT8447

Secondary Axis Flags, continued

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x20	4352	4353	4354	4355	4356	4357	4358	4359

Control Flags	Bit Index	AXIS Number							
		8	9	10	11	12	13	14	15
Positive Dir Limit	0	8192	8224	8256	8288	8320	8352	8384	8416
Negative Dir Limit	1	8193	8225	8257	8289	8321	8353	8385	8417
Dir Limit Activate	2	8194	8226	8258	8290	8322	8354	8386	8418
Dir Limit Tripped	3	8195	8227	8259	8291	8323	8355	8387	8419
CAM Trigger Mode	4	8196	8228	8260	8292	8324	8356	8388	8420
CAM Trigger Started	5	8197	8229	8261	8293	8325	8357	8389	8421
Reserved	6	8198	8230	8262	8294	8326	8358	8390	8422
Reserved	7	8199	8231	8263	8295	8327	8359	8391	8423
Gear On Trig Armed	8	8200	8232	8264	8296	8328	8360	8392	8424
Gear On Position	9	8201	8233	8265	8297	8329	8361	8393	8425
Gear Trigger Started	10	8202	8234	8266	8298	8330	8362	8394	8426
Dir Limit Tripped	11	8203	8235	8267	8299	8331	8363	8395	8427
Gear Off Armed	12	8204	8236	8268	8300	8332	8364	8396	8428
Gear Off Position	13	8205	8237	8269	8301	8333	8365	8397	8429
Gear Max	14	8206	8238	8270	8302	8334	8366	8398	8430
Gear Min	15	8207	8239	8271	8303	8335	8367	8399	8431
Reserved	16	8208	8240	8272	8304	8336	8368	8400	8432
3D ARC	17	8209	8241	8273	8305	8337	8369	8401	8433
Reserved	18	8210	8242	8274	8306	8338	8370	8402	8434
Reserved	19	8211	8243	8275	8307	8339	8371	8403	8435
Reserved	20	8212	8244	8276	8308	8340	8372	8404	8436
Reserved	21	8213	8245	8277	8309	8341	8373	8405	8437
Don't use capture Register	22	8214	8246	8278	8310	8342	8374	8406	8438
Stepper FeedBack	23	8215	8247	8279	8311	8343	8375	8407	8439

Fast Axis Limit Flags	Bit Index	AXIS Number							
		8	9	10	11	12	13	14	15
Fast EXC Flags	24	8216	8248	8280	8312	8344	8376	8408	8440
Fast IPB Flags	25	8217	8249	8281	8313	8345	8377	8409	8441
Fast ALM Flags	26	8218	8250	8282	8314	8346	8378	8410	8442
Fast BLM Flags	27	8219	8251	8283	8315	8347	8379	8411	8443
Fast TLM Flags	28	8220	8252	8284	8316	8348	8380	8412	8444
Fast TIB Flags	29	8221	8253	8285	8317	8349	8381	8413	8445
Reserved	30	8222	8254	8286	8318	8350	8382	8414	8446

Fast Master Limit Flags	Bit Index	AXIS Number							
		8	9	10	11	12	13	14	15
Fast Master Flags	31	8223	8255	8287	8319	8351	8383	8415	8447

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

BIT2304-BIT2559

Secondary Axis Flags, continued

Control Flags:

Positive Dir Limit	r/w	If this flag and the "Dir Limit Active" flag are set, the "Dir Limit Tripped" flag will be set and a feedhold will be issued if the axis moves in the positive direction.
Negative Dir Limit	r/w	Same as "Positive Dir Limit" except in the negative direction.
Dir Limit Active	r/w	Set this flag to activate directional limit checking.
Dir Limit Tripped	r/w	Set if a directional limit condition caused a master feedhold to be issued.
CAM Trigger Mode	r	CAM Trigger mode will set this bit and will clear itself when CAM turns OFF.
CAM Trigger Started	r	Set when the CAM is in trigger mode and the external input has enabled the CAM. CAM OFF will clear this flag.
Gear ON Trig Armed	r	Set when the GEAR Trigger Mode is set by the user. The processor will clear this flag when the gear has started.
Gear Trigger Started	r	Set when the GEAR is in trigger mode and the external input has enabled the GEAR. GEAR OFF will clear this flag.
Gear Off Trigger Armed	r	Set when the GEAR OFF Trigger Mode is set by the user. The processor will clear this flag.
Gear Of Positionf		
Gear Max		When the gear max limit is hit this flag is automatically set. It self clears when gear comes back within the max limit
Gear Min		When the gear min limit is hit this flag is automatically set. It self clears when gear goes out of the min limit
Don't' use capture register		This flag is set by the user to tell that there is no feedback encoder attached to the stepper motor. In this case the when the interrupt comes the capture resigter value is not used rather current commanded positon value is used.
Stepper FeedBack for HSINT		This flag will ensure open loop stepper and still feedback the encoder counts for HSINT, INTCAP and MSEEK commands

BIT2304-BIT2559

Secondary Axis Flags, continued

Fast Axis Limit Flags:

The default update rate for the following Axis Flags (BIT768-BIT1023) is 50 milliseconds:

AXIS LIMIT FLAGS

Not In Position (IPB)
Not Excess Error (EXC)
Within A Limit (ALM)
Not Within B Limit (BLM)
Not Torque Limit (TLM)
Not In Torque Band (ITB)

The user can select these flag groups to be updated at a higher rate using the Fast Axis Limit Flags and the corresponding 'Enable Fast Flags Update Mode' flag, BIT5632 of the Misc. Control Group 1 flags.

When this mode is enabled (BIT5632), up to eight (8) axis in one group of Axis Limit flags are updated each servo period, depending on the individual axes that are selected. When more than one group of Fast Axis Limit Flags are selected, only one group of Axis Limit Flags will be updated every servo period. All axes for the selected group will be updated in the same servo period.

For example, if both Fast EXC Flags Axis 0-3 and Fast ALM Flags Axis 2-3 are selected, and Enable Fast Flags Update Mode is set, Not Excess Error flags for axes 0-3 will be updated in one servo period. The next servo period, Within A Limit flags for axes 2 and 3 will be updated. It takes two (2) servo periods to update both sets of flags. If all six groups of flags are selected, it will take six (6) servo periods to update all flags.

Only the axes required for fast flag update should be enabled, to prevent unnecessary burden on the CPU load during the servo period.

Fast Master Limit Flags:

The default update rate for the Master Limit Flags (BIT512-BIT767) is 50 milliseconds. When this mode is selected, all master limit flags for the selected axes will be updated in the servo period.

This mode works in conjunction with the Fast Axis Limit Flags. When Fast Axis Limit Flags and Fast Master Limit Flags are both enabled, only one group of limit flags will be updated in a single servo period. However, unlike the Axis Limit Flags, which update only group of limit flags in a single servo period, all of the Master Limit Flags are updated in a single servo period.

BIT2560-BIT3175

Encoder Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code-0x10; Index=0x0A	4176	4177	4178	4179	4180	4181	4182	4183

Encoder Flags	Bit Index	Encoder Number							
		0	1	2	3	4	5	6	7
Encoder Signal Fault	0	2560	2592	2624	2656	2688	2720	2752	2784
Encoder Signal Lost	1	2561	2593	2625	2657	2689	2721	2753	2785
Reserved	2	2562	2594	2626	2658	2690	2722	2754	2786
Reserved	3	2563	2595	2627	2659	2691	2723	2755	2787
ABS DATA Fault	4	2564	2596	2628	2660	2692	2724	2756	2788
ABS DATA Ready	5	2565	2597	2629	2661	2693	2725	2757	2789
Reserved	6	2566	2598	2630	2662	2694	2726	2758	2790
Reserved	7	2567	2599	2631	2663	2695	2727	2759	2791

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x0B	4184	4185	4186	4187	4188	4189	4190	4191

Encoder Flags	Bit Index	Encoder Number							
		8	9	10	11	12	13	14	15
Encoder Signal Fault	0	2816	2848	2880	2912	2944	2976	3008	3040
Encoder Signal Lost	1	2817	2849	2881	2913	2945	2977	3009	3041
Reserved	2	2818	2850	2882	2914	2946	2978	3010	3042
Reserved	3	2819	2851	2883	2915	2947	2979	3011	3043
ABS DATA Fault	4	2820	2852	2884	2916	2948	2980	3012	3044
ABS DATA Ready	5	2821	2853	2885	2917	2949	2981	3013	3045
Reserved	6	2822	2854	2886	2918	2950	2982	3014	3046
Reserved	7	2823	2855	2887	2919	2951	2983	3015	3047

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x0B	4192	4193	4194	4195	4196	4197	4198	4199

Encoder Flags	Bit Index	Encoder Number							
		16	17	18	19	20	21	22	23
Encoder Signal Fault	0	3072	3104	3136	3168	Res	Res	Res	Res
Encoder Signal Lost	1	3073	3105	3137	3169	Res	Res	Res	Res
Reserved	2	3074	3106	3138	3170	Res	Res	Res	Res
Reserved	3	3075	3107	3139	3171	Res	Res	Res	Res
ABS DATA Fault	4	3076	3108	3140	3172	Res	Res	Res	Res
ABS DATA Ready	5	3077	3109	3141	3173	Res	Res	Res	Res
Reserved	6	3078	3110	3142	3174	Res	Res	Res	Res
Reserved	7	3079	3111	3143	3175	Res	Res	Res	Res

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Encoder Flags:

Encoder Signal Fault	r	This flag is set if an encoder fault is detected by the state machine in the FPGA. This flag is cleared by the command “ENCx RES”. This flag is available on the ACR1200 and ACR8010 boards only.
Encoder Signal Lost	r	This flag is set if an encoder fault is detected by the encoder check circuit. This flag is cleared by the command “ENCx RES”. This flag is available on the ACR1200 and ACR8010 boards only.

r = read, w = write

BIT3584-BIT4095

CMT Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter Code=0x10; Index=0x0E	4208	4209	4210	4211	4212	4213	4214	4215

CMT Flags	Bit Index	CMT Number							
		0	1	2	3	4	5	6	7
CMT Commutator ON	0	3584	3616	3648	3680	3712	3744	3776	3808
CMT Sinusoidal ON	1	3585	3617	3649	3681	3713	3745	3777	3809
CMT Motor Overspeed	2	3586	3618	3650	3682	3714	3746	3778	3810
CMT Encoder Fault	3	3587	3619	3651	3683	3715	3747	3779	3811
CMT EncCheck Disable	4	3588	3620	3652	3684	3716	3748	3780	3812
CMT Following Error	5	3589	3621	3653	3685	3717	3749	3781	3813
Reserved	6	3590	3622	3654	3686	3718	3750	3782	3814
Reserved	7	3591	3623	3655	3687	3719	3751	3783	3815

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

CMT Flags:

These flags are not available on the ACR8000 board.

CMT Commutator ON	r	This flag is set when the commutator is ON.
CMT Sinusoidal ON	r	This flag is set when the commutator is in sinusoidal mode.
CMT Motor Overspeed	r	This flag is set if overspeed is detected. The commutator will be turned off if this bit is set.
CMT Encoder Fault	r	This flag is set if an encoder fault is detected . The commutator will be turned off if this bit is set and the *CMT EncCheck Disable Flag* is reset.
CMT EncCheck Disable	r/w	When this flag is cleared (default), the commutator will be turned off if an encoder fault is detected. When this flag is set, the commutator won't be turned off, even though an encoder fault is detected
CMT Following Error	r	This flag is set if the following error exceeds CMT Parameters MaxFollowingERR. The commutator will be turned off if this flag is set.

r = read, w = write

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BIT5120-BIT5631 (Version 1.18.04 & Up)

Tertiary Master Flags

See also: Master Flags, Secondary Master Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter code=0x10; index=0x14	4256	4257	4258	4259	4260	4261	4262	4263

Control Flags	Bit Index	MASTER Number							
		0	1	2	3	4	5	6	7
Spline Pending	0	5120	5152	5184	5216	5248	5280	5312	5344
Spline Buffered	1	5121	5153	5185	5217	5249	5281	5313	5345
Spline Interpolation	2	5122	5154	5186	5218	5250	5282	5314	5346
Spline Last	3	5123	5155	5187	5219	5251	5283	5315	5347
Spline Velocity Mode	4	5124	5156	5188	5220	5252	5284	5316	5348
Spline Time Mode	5	5125	5157	5189	5221	5253	5285	5317	5349
Spline End	6	5126	5158	5190	5222	5254	5286	5318	5350
Spline Knot Present	7	5127	5159	5191	5223	5255	5287	5319	5351
Spline Acc Ramp	8	5128	5160	5192	5224	5256	5288	5320	5352
Spline Started	9	5129	5161	5193	5225	5257	5289	5321	5353
Spline Neg. Knot	10	5130	5162	5194	5226	5258	5290	5322	5354
Spline Moved	11	5131	5163	5195	5227	5259	5291	5323	5355
Spline Loaded	12	5132	5164	5196	5228	5260	5292	5324	5356
Spline Data Avail	13	5133	5165	5197	5229	5261	5293	5325	5357
Spline Profiler On	14	5134	5166	5198	5230	5262	5294	5326	5358
Reserved	15	5135	5167	5199	5231	5263	5295	5327	5359
NURB Loaded	16	5136	5168	5200	5232	5264	5296	5328	5360
NURB New Segment	17	5137	5169	5201	5233	5265	5297	5329	5361
NURB Delta Done	18	5138	5170	5202	5234	5266	5298	5330	5362
NURB Stop Active	19	5139	5171	5203	5235	5267	5299	5331	5363
NURB Moved	20	5140	5172	5204	5236	5268	5300	5332	5364
NURB Interpolation	21	5141	5173	5205	5237	5269	5301	5333	5365
NURB Buffered	22	5142	5174	5206	5238	5270	5302	5334	5366
NURB Profiler On	23	5143	5175	5207	5239	5271	5303	5335	5367
NURB Pending	24	5144	5176	5208	5240	5272	5304	5336	5368
NURB Acc Ramp	25	5145	5177	5209	5241	5273	5405	5337	5369
NURB Last	26	5146	5178	5210	5242	5274	5306	5338	5370
NURB Started	27	5147	5179	5211	5243	5275	5307	5339	5371
NURB Time	28	5148	5180	5212	5244	5276	5308	5340	5372
NURB Smooth	29	5149	5181	5213	5245	5277	5309	5341	5373
NURB Dynamic	30	5150	5182	5214	5246	5278	5310	5342	5374
NURB Neg Knot	31	5151	5183	5215	5247	5279	5311	5343	5375

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Tertiary Master Flags, continued

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter code=0x10; index=0x15	4264	4265	4266	4267	4268	4269	4270	4271

Control Flags	Bit Index	MASTER Number							
		8	9	10	11	12	13	14	15
Spline Pending	0	5376	5408	5440	5472	5504	5536	5568	5600
Spline Buffered	1	5377	5409	5441	5473	5505	5537	5569	5601
Spline Interpolation	2	5378	5410	5442	5474	5506	5538	5570	5602
Spline Last	3	5379	5411	5443	5475	5507	5539	5571	5603
Spline Velocity Mode	4	5380	5412	5444	5476	5508	5540	5572	5604
Spline Time Mode	5	5381	5413	5445	5477	5509	5541	5573	5605
Spline End	6	5382	5414	5446	5478	5510	5542	5574	5606
Spline Knot Present	7	5383	5415	5447	5479	5511	5543	5575	5607
Spline Acc Ramp	8	5384	5416	5448	5480	5512	5544	5576	5608
Spline Started	9	5385	5417	5449	5481	5513	5545	5577	5609
Spline Neg. Knot	10	5386	5418	5450	5482	5514	5546	5578	5610
Spline Moved	11	5387	5419	5451	5483	5515	5547	5579	5611
Spline Loaded	12	5388	5420	5452	5484	5516	5548	5580	5612
Spline Data Avail	13	5389	5421	5453	5485	5517	5549	5581	5613
Spline Profiler On	14	5390	5422	5454	5486	5518	5550	5582	5614
Reserved	15	5391	5423	5455	5487	5519	5551	5583	5615
NURB Loaded	16	5392	5424	5456	5488	5520	5552	5584	5616
NURB New Segment	17	5393	5425	5457	5489	5521	5553	5585	5617
NURB Delta Done	18	5394	5426	5458	5490	5522	5554	5586	5618
NURB Stop Active	19	5395	5427	5459	5491	5523	5555	5587	5619
NURB Moved	20	5396	5428	5460	5492	5524	5556	5588	5620
NURB Interpolation	21	5397	5429	5461	5493	5525	5557	5589	5621
NURB Buffered	22	5398	5430	5462	5494	5526	5558	5590	5622
NURB Profiler On	23	5399	5431	5463	5495	5527	5559	5591	5623
NURB Pending	24	5400	5432	5464	5496	5528	5560	5592	5624
NURB Acc Ramp	25	5401	5433	5465	5497	5529	5561	5593	5625
NURB Last	26	5402	5434	5466	5498	5530	5562	5594	5626
NURB Started	27	5403	5435	5467	5499	5531	5563	5595	5627
NURB Time	28	5404	5436	5468	5500	5532	5564	5596	5628
NURB Smooth	29	5405	5437	5469	5501	5533	5565	5597	5629
NURB Dynamic	30	5406	5438	5470	5502	5534	5566	5598	5630
NURB Neg Knot	31	5407	5439	5471	5503	5535	5567	5599	5631

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Tertiary Master Flags, continued

Spline Interpolation	r/w	This flag is set by the Spline mode command and remains set till the interpolation mode comes to an end.
Spline Velocity Mode	r/w	Indicates that Spline Mode 1 is on.
Spline Time Mode	r/w	Indicates that Spline Mode 0 is on.
Spline Knot Present	r/w	This flag will be set if optional knot data is included in the Spline data.
Spline Started	r/w	If set, means that the Spline move has started. Self clears at the end of the move
Spline Neg. Knot	r/w	This flag is set when the user issues a negative knot and self clears when the Spline ends.
Spline Profiler On	r/w	This flag indicates that the Spline profiler is calculating the curve points.
NURB Interpolation	r/w	This flag is set by the NURB mode command and remains set till the interpolation mode comes to an end.
NURB Profiler On	r/w	This flag indicates that the NURB profiler is calculating the curve points.
NURB Started	r/w	If set means that the NURB move has started. Self clears at the end of the move
NURB Time	r/w	Indicates NURB Mode 0
NURB Smooth	r/w	Indicates NURB Mode 4
NURB Dynamic	r/w	Indicates NURB Mode 1
NURB Neg. Knot	r/w	This flag is set when the user issues a negative knot and self clears when the NURB ends.

r = read, w = write

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BIT5888-BIT6399 (Version 1.18.06 & Up)

Quaternary Master Flags

See also: Master Flags, Secondary Master Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter code=0x10; index=0x17	4280	4281	4282	4283	4284	4285	4286	4287

Flag Description	Bit Index	MASTER Number							
		0	1	2	3	4	5	6	7
VEL LIMIT	0	5888	5920	5952	5984	6016	6048	6080	6112
Look Ahead SlowDown	1	5889	5921	5953	5985	6017	6049	6081	6113
Reserved	2	5890	5922	5954	5986	6018	6050	6082	6114
Reserved	3	5891	5923	5955	5987	6019	6051	6083	6115
MBUF mode	4	5892	5924	5956	5988	6020	6052	6084	6116
Look Ahead mode	5	5893	5925	5957	5989	6021	6053	6085	6117
Reserved	6	5894	5926	5958	5990	6022	6054	6086	6118
Reserved	7	5895	5927	5959	5991	6023	6055	6087	6119
Reserved	8	5896	5928	5960	5992	6024	6056	6088	6120
Reserved	9	5897	5929	5961	5993	6025	6057	6089	6121
MBUF user RAM	10	5898	5930	5962	5994	6026	6058	6090	6122
Look Ahead Neglect	11	5899	5931	5963	5995	6027	6059	6091	6123
Reserved	12	5900	5932	5964	5996	6028	6060	6092	6124
Reserved	13	5901	5933	5965	5997	6029	6061	6093	6125
Reserved	14	5902	5934	5966	5998	6030	6062	6094	6126
Reserved	15	5903	5935	5967	5999	6031	6063	6095	6127
Perform Kinematics	16	5904	5936	5968	6000	6032	6064	6096	6128
Reserved	17	5905	5937	5969	6001	6033	6065	6097	6129
Reserved	18	5906	5938	5970	6002	6034	6066	6098	6130
Reserved	19	5907	5939	5971	6003	6035	6067	6099	6131
Reserved	20	5908	5940	5972	6004	6036	6068	6100	6132
Reserved	21	5909	5941	5973	6005	6037	6069	6101	6133
Reserved	22	5910	5942	5974	6006	6038	6070	6102	6134
Reserved	23	5911	5943	5975	6007	6039	6071	6103	6135
Reserved	24	5912	5944	5976	6008	6040	6072	6104	6136
Reserved	25	5913	5945	5977	6009	6041	6073	6105	6137
Reserved	26	5914	5946	5978	6010	6042	6074	6106	6138
Reserved	27	5915	5947	5979	6011	6043	6075	6107	6139
Reserved	28	5916	5948	5980	6012	6044	6076	6108	6140
Reserved	29	5917	5949	5981	6013	6045	6077	6109	6141
Reserved	30	5918	5950	5982	6014	6046	6078	6110	6142
Reserved	31	5919	5951	5983	6015	6047	6079	6111	6143

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Quaternary Master Flags, continued

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter code=0x10; index=0x18	4288	4289	4290	4291	4292	4293	4294	4295

Flag Description	Bit Index	MASTER Number							
		8	9	10	11	12	13	14	15
VEL LIMIT	0	6144	6176	6208	6240	6272	6304	6336	6368
Look Ahead SlowDown	1	6145	6177	6209	6241	6273	6305	6337	6369
Reserved	2	6146	6178	6210	6242	6274	6306	6338	6370
Reserved	3	6147	6179	6211	6243	6275	6307	6339	6371
MBUF mode	4	6148	6180	6212	6244	6276	6308	6340	6372
Look Ahead mode	5	6149	6181	6213	6245	6277	6309	6341	6373
Reserved	6	6150	6182	6214	6246	6278	6310	6342	6374
Reserved	7	6151	6183	6215	6247	6279	6311	6343	6375
Reserved	8	6152	6184	6216	6248	6280	6312	6344	6376
Reserved	9	6153	6185	6217	6249	6281	6313	6345	6377
MBUF user RAM	10	6154	6186	6218	6250	6282	6314	6346	6378
Look Ahead Neglect	11	6155	6187	6219	6251	6283	6315	6347	6379
Reserved	12	6156	6188	6220	6252	6284	6316	6348	6380
Reserved	13	6157	6189	6221	6253	6285	6317	6349	6381
Reserved	14	6158	6190	6222	6254	6286	6318	6350	6382
Reserved	15	6159	6191	6223	6255	6287	6319	6351	6383
Perform Kinematics	16	6160	6192	6224	6256	6288	6320	6352	6384
Reserved	17	6161	6193	6225	6257	6289	6321	6353	6385
Reserved	18	6162	6194	6226	6258	6290	6322	6354	6386
Reserved	19	6163	6195	6227	6259	6291	6323	6355	6387
Reserved	20	6164	6196	6228	6260	6292	6324	6356	6388
Reserved	21	6165	6197	6229	6261	6293	6325	6357	6389
Reserved	22	6166	6198	6230	6262	6294	6326	6358	6390
Reserved	23	6167	6199	6231	6263	6295	6327	6359	6391
Reserved	24	6168	6200	6232	6264	6296	6328	6360	6392
Reserved	25	6169	6201	6233	6265	6297	6329	6361	6393
Reserved	26	6170	6202	6234	6266	6298	6330	6362	6394
Reserved	27	6171	6203	6235	6267	6299	6331	6363	6395
Reserved	28	6172	6204	6236	6268	6300	6332	6364	6396
Reserved	29	6173	6205	6237	6269	6301	6333	6365	6397
Reserved	30	6174	6206	6238	6270	6302	6334	6366	6398
Reserved	31	6175	6207	6239	6271	6303	6335	6367	6399

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Quaternary Master Flags, continued

VEL LIMIT	r	This flag is set when the master current vector velocity hits the VEL LIMIT set by the user. It self clears
LookAhead Slow Down	r	This flag is set by the look ahead algorithm to indicate that it is forcing to slow down
MBUF Mode	r	MBUF ON and OFF command will set and clear this flag respectively
LookAhead Mode	r	LOOK ON and OFF command will set and clear this flag respectively
MBUF user RAM	r	DIM MBUF and MBUF OFF command will set and clear this flag respectively
LookAhead Neglect	r/w	User can set this flag to turn off the look ahead on the fly and vice versa

r = read, w = write

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BIT6400-BIT6911 (Version 1.18.06 & Up)

Tertiary Axis Flags

See also: Slave Flags, Secondary Slave Flags

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter code=0x10; index=0x14	4296	4297	4298	4299	4300	4301	4302	4303

Control Flags	Bit Index	MASTER Number							
		0	1	2	3	4	5	6	7
Reserved	0	6400	6432	6464	6496	6528	6560	6592	6624
Reserved	1	6401	6433	6465	6497	6529	6561	6593	6625
Reserved	2	6402	6434	6466	6498	6530	6562	6594	6626
Reserved	3	6403	6435	6467	6499	6531	6563	6595	6627
Filter Moved	4	6404	6436	6468	6500	6532	6564	6596	6628
In Dead Band	5	6405	6437	6469	6501	6533	6565	6597	6629
Reserved	6	6406	6438	6470	6502	6534	6566	6598	6630
Reserved	7	6407	6439	6471	6503	6535	6567	6599	6631
Reserved	8	6408	6440	6472	6504	6536	6568	6600	6632
Reserved	9	6409	6441	6473	6505	6537	6569	6601	6633
Reserved	10	6410	6442	6474	6506	6538	6570	6602	6634
Reserved	11	6411	6443	6475	6507	6539	6571	6603	6635
Reserved	12	6412	6444	6476	6508	6540	6572	6604	6636
Reserved	13	6413	6445	6477	6509	6541	6573	6605	6637
Reserved	14	6414	6446	6478	6510	6542	6574	6606	6638
Reserved	15	6415	6447	6479	6511	6543	6575	6607	6639
Tangential	16	6416	6448	6480	6512	6544	6576	6608	6640
Reserved	17	6417	6449	6481	6513	6545	6577	6609	6641
Reserved	18	6418	6450	6482	6514	6546	6578	6610	6642
Reserved	19	6419	6451	6483	6515	6547	6579	6611	6643
Reserved	20	6420	6452	6484	6516	6548	6580	6612	6644
Reserved	21	6421	6453	6485	6517	6549	6581	6613	6645
Reserved	22	6422	6454	6486	6518	6550	6582	6614	6646
Reserved	23	6423	6455	6487	6519	6551	6583	6615	6647
Reserved	24	6424	6456	6488	6520	6552	6584	6616	6648
Reserved	25	6425	6457	6489	6521	6553	6585	6617	6649
Reserved	26	6426	6458	6490	6522	6554	6586	6618	6650
Reserved	27	6427	6459	6491	6523	6555	6587	6619	6651
Reserved	28	6428	6460	6492	6524	6556	6588	6620	6652
Reserved	29	6429	6461	6493	6525	6557	6589	6621	6653
Reserved	30	6430	6462	6494	6526	6558	6590	6622	6654
Reserved	31	6431	6463	6495	6527	6559	6591	6623	6655

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Tertiary Axis Flags, continued

Mask	0x01	0x02	0x04	0x08	0x10	0x20	0x40	0x80
Flag Parameter code=0x10; index=0x19	4304	4305	4306	4307	4308	4309	4310	4311

Control Flags	Bit Index	MASTER Number							
		8	9	10	11	12	13	14	15
Reserved	0	6656	6688	6720	6752	6784	6816	6848	6880
Reserved	1	6657	6689	6721	6753	6785	6817	6849	6881
Reserved	2	6658	6690	6722	6754	6786	6818	6850	6882
Reserved	3	6659	6691	6723	6755	6787	6819	6851	6883
Filter Moved	4	6660	6692	6724	6756	6788	6820	6852	6884
In Dead Band	5	6661	6693	6725	6757	6789	6821	6853	6885
Reserved	6	6662	6694	6726	6758	6790	6822	6854	6886
Reserved	7	6663	6695	6727	6759	6791	6823	6855	6887
Reserved	8	6664	6696	6728	6760	6792	6824	6856	6888
Reserved	9	6665	6697	6729	6761	6793	6825	6857	6889
Reserved	10	6666	6698	6730	6762	6794	6826	6858	6890
Reserved	11	6667	6699	6731	6763	6795	6827	6859	6891
Reserved	12	6668	6700	6732	6764	6796	6828	6860	6892
Reserved	13	6669	6701	6733	6765	6797	6829	6861	6893
Reserved	14	6670	6702	6734	6766	6798	6830	6862	6894
Reserved	15	6671	6703	6735	6767	6799	6831	6863	6895
Tangential	16	6672	6704	6736	6768	6800	6832	6864	6896
Reserved	17	6673	6705	6737	6769	6801	6833	6865	6897
Reserved	18	6674	6706	6738	6770	6802	6834	6866	6898
Reserved	19	6675	6707	6739	6771	6803	6835	6867	6899
Reserved	20	6676	6708	6740	6772	6804	6836	6868	6900
Reserved	21	6677	6709	6741	6773	6805	6837	6869	6901
Reserved	22	6678	6710	6742	6774	6806	6838	6870	6902
Reserved	23	6679	6711	6743	6775	6807	6839	6871	6903
Reserved	24	6680	6712	6744	6776	6808	6840	6872	6904
Reserved	25	6681	6713	6745	6777	6809	6841	6873	6905
Reserved	26	6682	6714	6746	6778	6810	6842	6874	6906
Reserved	27	6683	6715	6747	6779	6811	6843	6875	6907
Reserved	28	6684	6716	6748	6780	6812	6844	6876	6908
Reserved	29	6685	6717	6749	6781	6813	6845	6877	6909
Reserved	30	6686	6718	6750	6782	6814	6846	6878	6910
Reserved	31	6687	6719	6751	6783	6815	6847	6879	6911

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

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Tertiary Axis Flags, continued

Filter Moved	r	FLT ON and OFF will set and clear this flag respectively
In Dead Band	r	This flag is set when the following errro in less the DZL and the and master is not in motion. It will clear when the error is bigger than DZU.

r = read, w = write

Misc Control Group 1 Flags

	Mask=0x01
Flag Parameter Code=0x10; Index=0x16	4272

Control Flag	Bit Index	Flag Number
Enable Fast Flags Update Mode	0	5632
STD Baud Rate	1	5633
FBT	2	5634
Reserved	3	5635
Reserved	4	5636
Reserved	5	5637
Reserved	6	5638
Reserved	7	5639
Reserved	8	5640
Reserved	9	5641
Reserved	10	5642
Reserved	11	5643
Reserved	12	5644
Reserved	13	5645
Reserved	14	5646
Reserved	15	5647
Reserved	16	5648
Reserved	17	5649
Reserved	18	5650
Reserved	19	5651
Reserved	20	5652
Reserved	21	5653
Reserved	22	5654
Reserved	23	5655
Bootflash Invalid/empty	24	5656
Sysflash1 Invalid/empty	25	5657
Sysflash2 Invalid/empty	26	5658
Userflash Invalid/empty	27	5659
Firmware Backed Up	28	5660
Reserved	29	5661
Reserved	30	5662
Reserved	31	5663

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

Misc Control Group 1 Flags

Control Flags:

Enable Fast Flags Update Mode	r/w	Setting this flag will enable the update of Fast Limit Flags (See Secondary Axis Flags).
Bootflash Invalid/empty	r	This flag is not valid until the FIRMWARE CHECKSUM command is issued and completed. This flag is cleared if Bootflash code is valid. This flag is set if Bootflash is invalid or empty.
Sysflash1 Invalid/empty	r	This flag is not valid until the FIRMWARE CHECKSUM command is issued and completed. This flag is cleared if Sysflash1 code is valid. This flag is set if Sysflash1 is invalid or empty.
Sysflash2 Invalid/empty	r	This flag is not valid until the FIRMWARE CHECKSUM command is issued and completed. This flag is cleared if Sysflash2 code is valid. This flag is set if Sysflash2 is invalid or empty.
Userflash Invalid/empty	r	This flag is not valid until the FIRMWARE CHECKSUM command is issued and completed. This flag is cleared if Userflash code is valid. This flag is set if Userflash is invalid or empty.
Firmware Backed Up	r	This flag is not valid until the FIRMWARE CHECKSUM command is issued and completed. This flag is cleared if Sysflash1 code and Sysflash2 code is not identical. This flag is set if Sysflash1 code and Sysflash2 code are identical.

r = read, w = write

DPCB Stream Flags (ACR8020 only)

	Mask=0x06
Flag Parameter Code=0x10; Index=0x16	4277

Flag Description	Bit Index	Flag Number
Enable Character Echo	0	5792
Disable Error Reporting	1	5793
Disable Command Prompt	2	5794
Reserved	3	5795
Reserved	4	5796
Reserved	5	5797
Reserved	6	5798
Reserved	7	5799
DPCB Stream Active	8	5800
DPCB Stream Waiting	9	5801
DPCB Stream Opened	10	5802
DPCB Stream Disabled	11	5803
DPCB Stream Echoing	12	5804
DPCB Redimensioned	13	5805
Reserved	14	5806
Reserved	15	5807
DPCB Open Request	16	5808
DPCB Escape Request	17	5809
Reserved	18	5810
Reserved	19	5811
DPCB Control Prefixing	20	5812
DPCB High Bit Stripping	21	5813
Reserved	22	5814
Reserved	23	5815
Reserved	24	5816
Reserved	25	5817
Reserved	26	5818
Reserved	27	5819
Reserved	28	5820
Reserved	29	5821
Reserved	30	5822
Reserved	31	5823

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

FSTAT Flags (ACR8020 only)

	Mask=0x40
Flag Parameter Code=0x10; Index=0x16	4278

Flag Description	Bit Index	Flag Number
FSTAT ON	0	5824
FSTAT ON REQUEST	1	5825
Spare	2	5826
Spare	3	5827
Spare	4	5828
Spare	5	5829
Spare	6	5830
Spare	7	5831
Spare	8	5832
Spare	9	5833
Spare	10	5834
Spare	11	5835
Spare	12	5836
Spare	13	5837
Spare	14	5838
Spare	15	5839
Spare	16	5840
Spare	17	5841
Spare	18	5842
Spare	19	5843
Spare	20	5844
Spare	21	5845
Spare	22	5846
Spare	23	5847
Spare	24	5848
Spare	25	5849
Spare	26	5850
Spare	27	5851
Spare	28	5852
Spare	29	5853
Spare	30	5854
Spare	31	5855

Note: Code, Index, and Mask apply to Binary Communications. Refer to Chapter 6 of this manual.

fstat flags:

FSTAT ON r/w Flag will be set if the FSTAT is on. Clear this flag will turn off FSTAT. This flag should **NOT** be set directly.

FSTAT ON Request r/w Setting this Flag will update internal FSTAT parameters and turn on FSTAT if FSTAT parameters are set up properly. **Processor acknowledgment clears the FSTAT ON Request Flag.**

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APPENDIX C

Output Module Software Configuration Examples

Output Module Software Configuration Examples

Description:

The following commands are used to configure the ACR1200 / ACR1500 / ACR2000 / ACR8000 /ACR8010 output modules for operation:

CONFIG	Tells the control what type of output module is installed.
ATTACH AXIS	Attach axis to signal and feedback.
ESAVE	Saves the axis attachments.

The following example configures an 8 axis ACR8000/ACR8010 board for eight axis of open-loop steppers (two stepper output modules); also included on the board is an analog input module (ADC input module):

```
CONFIG NONE STEPPER4 STEPPER4 NONE
ATTACH AXIS0 STEPPER0 STEPPER0
ATTACH AXIS1 STEPPER1 STEPPER1
ATTACH AXIS2 STEPPER2 STEPPER2
ATTACH AXIS3 STEPPER3 STEPPER3
ATTACH AXIS4 STEPPER4 STEPPER4
ATTACH AXIS5 STEPPER5 STEPPER5
ATTACH AXIS6 STEPPER6 STEPPER6
ATTACH AXIS7 STEPPER7 STEPPER7
ESAVE
```

The following example configures an 8 axis ACR8000/ACR8010 board for four closed-loop servos and four open-loop steppers (one DAC output module and one stepper output module):

```
CONFIG ENC4 DAC4 STEPPER4 NONE
ATTACH AXIS0 ENC0 DAC0
ATTACH AXIS1 ENC1 DAC1
ATTACH AXIS2 ENC2 DAC2
ATTACH AXIS3 ENC3 DAC3
ATTACH AXIS4 STEPPER4 STEPPER4
ATTACH AXIS5 STEPPER5 STEPPER5
ATTACH AXIS6 STEPPER6 STEPPER6
ATTACH AXIS7 STEPPER7 STEPPER7
```

Output Module Software Configuration Examples

Description (continued):

The following example configures an 8 axis ACR8010 board for two closed-loop servos with two commutator and two open-loop steppers (one DAC output module and one stepper output module):

```
CONFIG ENC4 DAC4 STEPPER4 NONE
ATTACH AXIS0 ENC0 CMT0 ENC0
ATTACH AXIS1 ENC2 CMT1 ENC2
ATTACH AXIS4 STEPPER4 STEPPER4
ATTACH AXIS5 STEPPER5 STEPPER5
ATTACH AXIS6 STEPPER6 STEPPER6
ATTACH AXIS7 STEPPER7 STEPPER7
AXIS2 OFF
AXIS3 OFF
CMT0 ENC0 ENC1
CMT0 DAC0 DAC1
CMT1 ENC2 ENC3
CMT1 DAC2 DAC3
```

The following example configures a 4 axis ACR1500 with four (4) on-board stepper outputs or a 4 axis ACR2000 with one stepper output module for four open-loop steppers. Also included on the board is an analog input module (ADC input module).

NOTE: On the ACR1500 and ACR2000 card, the attach axis statements for AXIS4 through AXIS7 must be left in the default configuration to ensure proper operation.

```
CONFIG NONE STEPPER4 NONE ADC8
ATTACH AXIS0 STEPPER0 STEPPER0
ATTACH AXIS1 STEPPER1 STEPPER1
ATTACH AXIS2 STEPPER2 STEPPER2
ATTACH AXIS3 STEPPER3 STEPPER3
ESAVE
```

The following example configures a 2 axis ACR1200 with two (4) on-board stepper outputs or a 4 axis ACR2000 with one stepper output module for four open-loop steppers. Also included on the board is an analog input module (ADC input module).

NOTE: On the ACR1500 and ACR2000 card, the attach axis statements for AXIS4 through AXIS7 must be left in the default configuration to ensure proper operation.

```
CONFIG NONE STEPPER4 NONE ADC8
ATTACH AXIS0 STEPPER0 STEPPER0
ATTACH AXIS1 STEPPER1 STEPPER1
ATTACH AXIS2 STEPPER2 STEPPER2
ATTACH AXIS3 STEPPER3 STEPPER3
ESAVE
```

Output Module Software Configuration Examples

Description (continued):

The following example configures a 4 axis ACR1500 with two (2) on-board dac outputs for two closed loop servos. Also included on the board is an analog input module (ADC input module).

NOTE: On the ACR1200 card, the attach axis statements for AXIS3 through AXIS7 must be left in the default configuration to ensure proper operation.

```
CONFIG ENC3 DAC2 NONE ADC8
ATTACH AXIS0 ENC0 DAC0
ATTACH AXIS1 ENC1 DAC1
ESAVE
```

The following example configures a 2 axis ACR1200 with one (1) on-board dac output and one (1) on-board stepper output for one closed loop servo and one open-loop stepper. Also included on the board is an analog input module (ADC input module).

NOTE: On the ACR1200 card, the attach axis statements for AXIS2 through AXIS7 must be left in the default configuration to ensure proper operation.

```
CONFIG ENC3 DACSTEP2 NONE ADC8
ATTACH AXIS0 ENC0 DAC0
ATTACH AXIS1 STEPPER0 STEPPER0
ESAVE
```