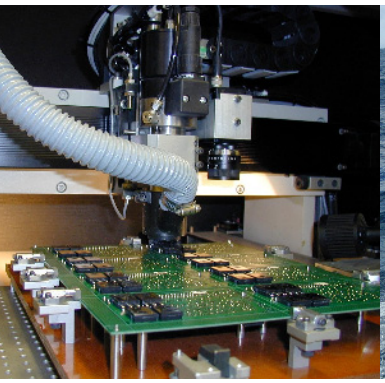
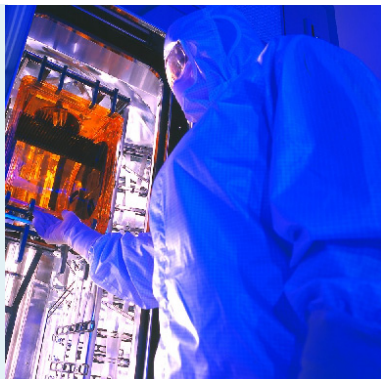
ADVANCED MOTION CONTROLS



Everything's possible.

Serial Communication

Reference Manual

DigiFlex® Performance™ Servo Drives

Preface

ADVANCED Motion Controls constantly strives to improve all of its products. We review the information in this document regularly and we welcome any suggestions for improvement. We reserve the right to modify equipment and documentation without prior notice.

For the most recent software, the latest revisions of this manual, and copies of compliance and declarations of conformity, visit the company's website at *www.a-m-c.com*. Otherwise, contact the company directly at:

ADVANCED Motion Controls • 3805 Calle Tecate Camarillo, CA • 93012-5068 USA

Agency Compliances

The company holds original documents for the following:

- UL 508c, file number E140173
- Electromagnetic Compatibility, EMC Directive - 2014/30/EU
  EN61000-6-2:2005
  EN61000-6-4:2007/A1:2011
- Electrical Safety, Low Voltage Directive - 2014/35/EU
  EN 60204-1:2006/A1:2009
- Reduction of Hazardous Substances (RoHS II), 2011/65/EU

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Related Documentation

- Product datasheet specific for your drive, available for download at www.a-m-c.com.

Attention Symbols

The following symbols are used throughout this document to draw attention to important operating information, special instructions, and cautionary warnings. The section below outlines the overall directive of each symbol and what type of information the accompanying text is relaying.

Note - Pertinent information that clarifies a process, operation, or ease-of-use preparations regarding the product.

Notice - Required instruction necessary to ensure successful completion of a task or procedure.

Caution - Instructs and directs you to avoid damaging equipment.

Warning - Instructs and directs you to avoid harming yourself.

Danger - Presents information you must heed to avoid serious injury or death.

Revision History

Document ID	Revision #	Date	Changes
MNCMSRRF-01x	0.0	7/7/2007	First Draft
MNCMSRRF-02	4.6	10/11/2007	First Release
MNCMSRRF-03	5.4.2	6/20/2008	- Updated for DriveWare 5.4.2 - Corrected entries in Control Byte Bit Definition Tables - Changed Control Loop Configuration Parameters (D0.00h-D02Eh) - Changed Serial Encoder Type Values (32.09h) - Added Encoder Emulation Divide by Enum (32.0Fh) - Added Encoder SinCos Error Window (32.10h) - Removed Motor Pole Pairs (34.0Bh) - Shifted Current Loop & Commutation Control Parameters sub indexes 34.0Ch-34.2Ah up to 34.0Bh-34.29h -Updated Position Loop Integrator Decay Active Window units to "Counts" - Changed "Inhibit Bridge" references to "Disable Bridge" - Changed "User Inhibit" references to "User Disable" - Changed "Commanded Inhibit" references to "Commanded Disable" - Changed "Dynamic Brake" references to "Auxiliary Disable" - Removed Digital Output Mask: Commanded Dynamic Brake (5A.1Bh) - Shifted Digital Output Mask sub indexes 5A.1Ch-5A.55h up to 5A.1Bh-5A.54h - Updated description for Event Response Time Parameters (64h) - Removed Event Action: Commanded Dynamic Brake (65.2Ch) - Shifted Event Action sub indexes 65.2Dh-65.30h up to 65.2Ch-65.2Fh - Updated Even Action Options Table - Removed Event Recovery Time: Log Entry Missed (66.02h) - Shifted Event Recovery Time sub indexes 66.03h-66.21h up to 66.02h-66.20h - Removed Programmable Status Parameters (5Bh) - Removed Programmable Status Mask (5B.00h-5B.54h) - Updated Control Parameters (01.00h) - Updated Drive Status bit-field definitions table - Changed "Auxiliary Input Values" to "Gearing Values" (1Ch) - Updated Auxiliary Input (1C.00h) - Added Gear Ratio Denominator (1C.02h) - Added Gear Ratio Numerator (1C.03h) - Added Auxiliary Encoder Value (1Eh) - Removed Log Counter: Commanded Dynamic Brake (28.1Bh) - Shifted Log Counter sub indexes 28.1Ch-28.35h up to 28.1Bh-28.34h - Updated DA3 acceleration scaling factor - Updated Ks constant value
MNCMSRRF-04	5.8.5	12/22/2008	- Added Event Recovery Time: Log Entry Missed (sub-index 66.02h) - Shifted 66h: Event Recovery Time Parameters sub-indices 66.02h-66.20h up to 66.03h-66.21h - Added sub-indices 32.11h, 32.12h, and 32.14h to 32h: Feedback Sensor Parameters - Added Current Limiting Algorithm (sub-index 34.2Ah) - Added 1Bh: PWM and Direction Input Values - Added Stop Deceleration Limit Velocity Mode (sub-index 62.04h) - Updated Stop Deceleration Limit Position Mode (sub-index 62.02h) - Added Digital Output Mask: Safe Torque Off Active (sub-index 5A.55h)

Document ID	Revision #	Date	Changes
MNCMSRRF-05	7.0	7/2012	- Updated 58h: Digital Input Parameters - Added sub-index 02.06h to 02h: Drive Status - Updated Start-Up Sequence Control (sub-index 08.00h) - Updated Bit-Field Definitions in Table 2.12 Drive Status Bit-field Definitions - Added sub-indices 10.15h and 10.17h to 10h: Current Values - Added sub-indices 11.0Ah and 11.0Ch to 11h: Velocity Values - Added sub-indices 12.08h, 12.0Ah, and 12.0Ch to 12h: Position Values - Added sub-index 1E.02h to 1Eh: Auxiliary Encoder Values - Added object 27h: Feedback Hardware Diagnostics - Added unit type DA4 to Table A.1 Drive Units and Scaling Factors - Added Scale Factor 1 (SF1) unit type to Table A.1 Drive Units and Scaling Factors - Added sub-index 28.35h to 28h: Fault Log Counter - Added object 29h: Motion Engine Status - Updated sub-index 32.0Ah in 32h: Feedback Sensor Parameters - Added sub-index 34.2Bh to 34h: Current Loop & Commutation Control Parameters - Added sub-indices 36.0Dh through 36.13h to 36h: Velocity Loop Control Parameters - Added sub-indices 38.0Dh through 38.15h to 38h: Position Loop Control Parameters - Updated sub-indices in 3Ch: Command Limiter Parameters - Added sub-indices 3D.05h through 3D.08h to 3Dh: Deadband Parameters - Added object 3Eh: Jog Parameters - Added sub-indices 44.0Ch through 44.16h to 44h: Analog Input Parameters - Updated object 46h: Auxiliary Input Parameters - Added sub-indices 58.15h through 58.20h to 58h: Digital Input Parameters - Shifted sub-indices 5A.2Dh through 5A.55h to 5A.2Ch through 5A.54h - Added sub-indices 5A.55h through 5A.5Fh to 5Ah: Digital Output Parameters - Added sub-index 62.06h to 62h: Braking/Stop General Properties - Added sub-index 64.22h to 64h: Event Response Time Parameters - Added sub-index 65.30h to 65h: Event Action Parameters - Added sub-index 66.22h to 66h: Event Recovery Time Parameters - Added sub-index 67.21h to 67h: Event Time-Out Window Parameters - Added sub-index 68.29h to 68h: Event Maximum Recoveries Parameters - Shifted sub-index User Bit Control to 01.02h - Added sub-index 01.01h to 01h: Control Parameters - Added object C8h: Motion Engine Configuration - Added object C9h: Motion Engine Control - Added object D1h: Mode Configuration - Added object D3h: Active Mode and Configuration
MNCMSRRF-06	7.1		- Added sub-indices 5A.60 through 5A.62 to 5Ah: Digital Output Parameters - Added object CAh: Dynamic Index Data - Added drive unit DA5 to Table A.1 on page 186 - Added conversion constant K_{DS} to Table A.2 on page 187
MNCMSRRF-07	7.2	2/2014	- Added object 18h: Programmable Limit Switch Values - Modified sub-index 32.03h of 32h: Feedback Sensor Parameters - Added sub-indices 32.15h and 32.16h to 32h: Feedback Sensor Parameters - Added object 40h: Programmable Limit Switch Parameters - Modified sub-index 5A.54h of 5Ah: Digital Output Parameters - Added sub-indices 5A.63h and 5A.64h in 5Ah: Digital Output Parameters
MNCMSRRF-08	7.3	2/2015	- Shifted sub-indices 32.15h and 32.16h to 32.16h and 32.17h, respectively - Removed sub-index 58.1Dh Motion Engine Reset from object 58h: Digital Input Parameters - Shifted sub-indices 58.1Eh-58.21h to 58.1Dh-58.20 in object 58h: Digital Input Parameters - Added sub-index 5A.65h to object 5Ah: Digital Output Parameters - Added sub-index 68.2Ah to object 68h: Event Maximum Recoveries Parameters
MNCMSRRF-09	7.4	10/2017	- Added sub-index 05.04h to object 05h: Serial Interface Configuration - Added object 22h: Analog Input ADC Raw Values

Contents

1 Serial Communication Protocol

The *ADVANCED* Motion Controls' serial protocol is a byte-based, binary, master-slave protocol to access drive 'commands'. The drive commands provide read or write access to drive parameters with each command containing one or more parameters. Each command is assigned a unique index number and parameters within a command are given offset values. As a result, parameters are referenced using a combination of the command index and parameter offset values. The serial protocol utilizes variable length commands to access one or more parameters within an index.

1.1 Physical Layer

- RS232: single node, point-to-point only.
- RS485: multi-node, four-wire or two-wire/half duplex.
- RS232/485 settings: 1 start bit, 1 stop bit, 8 data bits, no parity.
- Max Baud rate: 921600 bits/s, factory default is 115200 bits/s.
- Node address range: 1 to 63; factory default is 63.

1.1.1 Protocol Timing

ADVANCED Motion Controls' serial communication uses a command-response protocol. The drive expects to immediately have control of the communication channel upon completion of a message in RS232 or RS485 2-wire setups. *ADVANCED* Motion Controls recommends the host release the communication channel within 10µs to prevent collisions. While waiting for a drive response, the host should include a timeout in case of lost messages. *ADVANCED* Motion Controls recommends a 10ms timeout before resending or sending a new command.

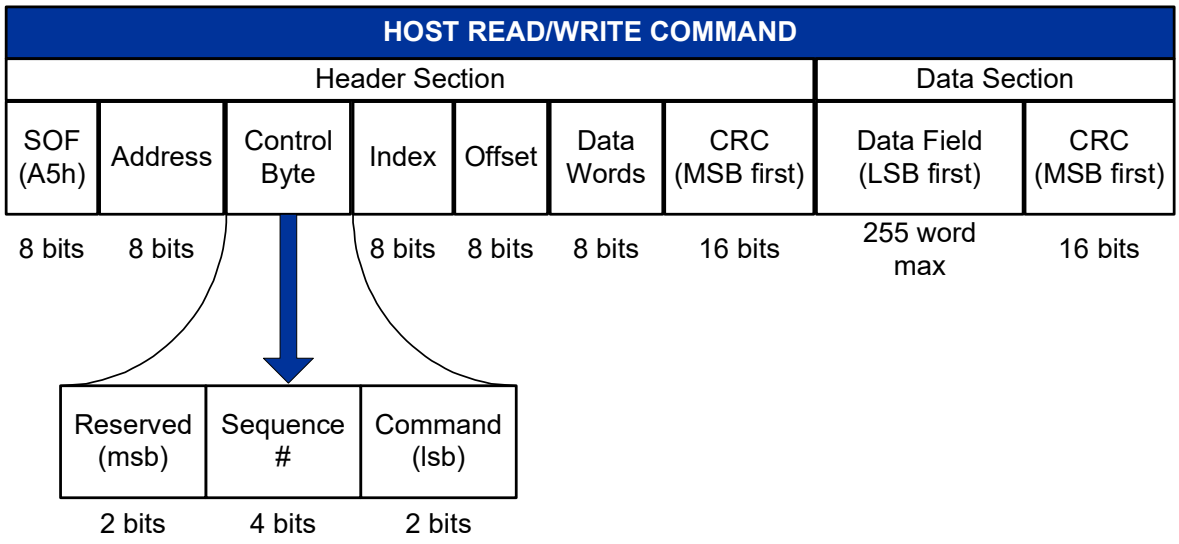
1.2 Message Structure (Command)

This section describes the structure of the command message. See "Protocol Timing" on page 1 for command/response timing.

1.2.1 Command (Master / Slave)

The master (or host) sends the following command frame:

FIGURE 1.1 Host Read/Write Command



1.2.2 S.O.F. (Start Of Frame)

Every message between a Master and Slave begins with the SOF byte. SOF is always A5h whether the message is from Master or Slave.

1.2.3 Address

Message destination address, each node must have a unique Node-ID set either via hardware addressing switches, or via setup software. Valid Node-ID ranges are shown in table below.

Factory default node address = 3Fh. See hardware and software help-file documentation for setting unique node addresses.

TABLE 1.1 Address Description

Address number	Description
00h	Heartbeat message from host broadcast to all drives.
01h – 3Fh	Valid range of node addresses. Host may only communicate with one drive at a time.
40h – FEh	Illegal addresses
FFh	Reserved for Master address. All node Replies will address FFh.

1.2.4 Control Byte

The control byte is used to specify each messages function and sequence. Table 1.2 contains bit level details for setting the control byte.

Sequence Bits Any number applied to the sequence bits, by the host, will be returned in the node reply therefore indicating which host command the response pertains to. It is suggested to implement a counter that increments the sequence number every Host Command. The number will roll over at 0Fh and start at 00h again. This method allows the Master to monitor the Node replies for correct sequencing. If a Node reply is received that does not match the last Master sequence number, a message was likely lost or ignored.

TABLE 1.2 Control Byte Bit Definition

Command Bits 0 & 1	Sequence Bits 2 - 5	Reserved Bits 6 & 7	Description
0	User specified	00	Reserved for future use.
1	User specified	00	This message does not contain data. The Node's response message will contain the number of words specified in the command's "Data Words" byte from a location specified by the command's "Offset" byte.
2	User specified	00	This message contains the number of words specified by the command's "Data Words" byte to a location specified by the command's "Offset" byte. The Node's response message will not contain data.
3	User specified	00	Reserved for future use.
	Example: Host issues a 1 Command with a sequence value of 5. Control byte = 00010101 or 15h.		

1.2.5 Index

The basic operation of AMC servo drives relies on a list of indexes that contain parameters within them (just like an array). Each index is an 8-bit number that identifies each "parameter structure." In order to change parameters in the drive, the correct parameter structure must be located and the corresponding index used in the actual message frame. Use the attached Command Dictionary to locate the appropriate index for a particular parameter.

1.2.6 Offset Byte

In order to identify a parameter within a specific index, an offset value is used. This value indicates in "words" (1 word = 2 bytes) how far into the index a parameter is. If there are 3 2-word parameters in a particular index, then the total length of the index is 6 bytes. The offset of each parameter is 0, 2, and 4.

Offset values are Zero Based therefore if it is desired to access parameter 3, and an offset of 4 is used: This indicates the entry point into the parameter structure is 8 bytes down and the next 2 words correspond to parameter 3.

All parameter offsets should be provided in the Command Dictionary. If they are not, they can usually be calculated by looking at the data type of all the parameters in an index and adding up the bytes to get to the desired parameter. Divide the number of bytes by 2, which should always be an integer.

1.2.7 Data Words

8-bit value that indicates the number of words (2 bytes) in the DATA field. The data field cannot have more than 255 words (510 bytes), therefore the valid range is from 0 – 255.

In case of a WRITE command, Data Length indicates the number of data words in the host's Command message. In case of a Read command, Data Length indicates the number of data words in the node's Response message.

1.2.8 Header CRC Value

Both the Header section and Data section of a message must have a CRC value included. If there is no data, there will be no Data Section CRC bytes. If a node does not identify with the Address byte, and the node does not agree with the Header section CRC check, the message will be ignored until another SOF occurs. If the Header section passes the two tests, but the Data CRC bytes fail, a frame error will be sent out by the drive.

The CRC used is referred to as CRC-16-CCITT (XModem) and is based on the polynomial $X^{16}+X^{12}+X^5+1$. The following CRC lookup table (Table 1.4) may be used with this sample C-code from Joe Campbell's C Programmer's Guide to Serial Communications, Second Edition:

```
void crccheck(USHORT data, USHORT  *accumulator, USHORT *crctable)
{
*accumulator = ( *accumulator  <<  8 ) ^ crctable[( *accumulator >> 8) ^ data]
}
```

Where:

TABLE 1.3 Variable Definitions

Variable	Description
crctable[ ]	256 element 1-dimensional array shown in the Table 1.4
data	The input data byte into the algorithm, pass 1 byte to this argument
accumulator	The accumulation of each data byte that is processed and factored into the previous accumulator value.

The easiest way to use this is to populate each byte of the Header section into an array and put this code inside a FOR loop where each element of the array is processed as the "data" term one at a time. The final value in the accumulator should then be placed MSB first into the CRC portion of the Header Section. The accumulator must begin at zero for each message. The same process works for the Data Section CRC bytes.

Table 1.4 shows the CRC lookup table is a 1-dimensional array with 256 elements. It is laid out as element 0, 1, 2, 3 …. until the last column, then the next row starts the next element. For

example, 70E7 is element 7, and 8108 is element 8. Thus this table may be copied and formatted into a one dimensional array and used.

Alternatively, the code in Appendix A will automatically create the crc-table, possibly eliminating typos.

TABLE 1.4 CRC Table for CRC-16-CCITT

0000	1021	2042	3063	4084	50A5	60C6	70E7
8108	9129	A14A	B16B	C18C	D1AD	E1CE	F1EF
1231	0210	3273	2252	52B5	4294	72F7	62D6
9339	8318	B37B	A35A	D3BD	C39C	F3FF	E3DE
2462	3443	0420	1401	64E6	74C7	44A4	5485
A56A	B54B	8528	9509	E5EE	F5CF	C5AC	D58D
3653	2672	1611	0630	76D7	66F6	5695	46B4
B75B	A77A	9719	8738	F7DF	E7FE	D79D	C7BC
48C4	58E5	6886	78A7	0840	1861	2802	3823
C9CC	D9ED	E98E	F9AF	8948	9969	A90A	B92B
5AF5	4AD4	7AB7	6A96	1A71	0A50	3A33	2A12
DBFD	CBDC	FBBF	EB9E	9B79	8B58	BB3B	AB1A
6CA6	7C87	4CE4	5CC5	2C22	3C03	0C60	1C41
EDAE	FD8F	CDEC	DDCD	AD2A	BD0B	8D68	9D49
7E97	6EB6	5ED5	4EF4	3E13	2E32	1E51	0E70
FF9F	EFBE	DFDD	CFFC	BF1B	AF3A	9F59	8F78
9188	81A9	B1CA	A1EB	D10C	C12D	F14E	E16F
1080	00A1	30C2	20E3	5004	4025	7046	6067
83B9	9398	A3FB	B3DA	C33D	D31C	E37F	F35E
02B1	1290	22F3	32D2	4235	5214	6277	7256
B5EA	A5CB	95A8	8589	F56E	E54F	D52C	C50D
34E2	24C3	14A0	0481	7466	6447	5424	4405
A7DB	B7FA	8799	97B8	E75F	F77E	C71D	D73C
26D3	36F2	0691	16B0	6657	7676	4615	5634
D94C	C96D	F90E	E92F	99C8	89E9	B98A	A9AB
5844	4865	7806	6827	18C0	08E1	3882	28A3
CB7D	DB5C	EB3F	FB1E	8BF9	9BD8	ABBB	BB9A
4A75	5A54	6A37	7A16	0AF1	1AD0	2AB3	3A92
FD2E	ED0F	DD6C	CD4D	BDAA	AD8B	9DE8	8DC9
7C26	6C07	5C64	4C45	3CA2	2C83	1CE0	0CC1
EF1F	FF3E	CF5D	DF7C	AF9B	BFBA	8FD9	9FF8
6E17	7E36	4E55	5E74	2E93	3EB2	0ED1	1EF0

1.2.9 Data Field

This is the variable length data field with the following format:

1. Contains an even number of data bytes in the case of a “write” command.
2. Contains nothing in the case of a “read” command.
3. Data is always in Little Endian format (LSB first).
4. Maximum Data length = 510 bytes (255 words).

1.2.10 Data CRC Value

16-bit CRC on the DATA field only. Organize CRC bytes MSB first (opposite order of Data bytes). Use the same method for calculating Data CRC as in "Header CRC Value" on page 4.

1.2.11 Host Command Notes:

All bytes are sent least significant bit (LSB) first.

The two 16-bit CRC's are sent with upper byte first, then lower byte.

For CRC calculation, use CRC-16-CCITT (XModem) based on the polynomial: $X^{16}+X^{12}+X^5+1$ with the CRC table provided in "Header CRC Value" on page 4.

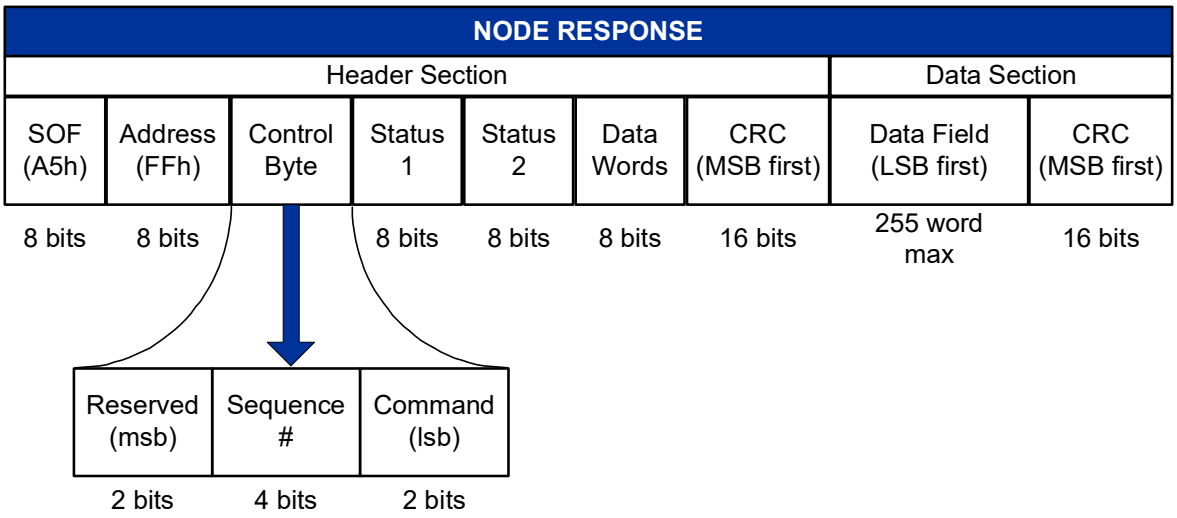
1.3 Message Structure (Reply)

This section describes the structure of the reply message. See "Protocol Timing" on page 1 for command/response timing.

1.3.1 Reply (Slave / Master)

The destination node (slave) responds with the following command frame:

FIGURE 1.2 Node Response



1.3.2 S.O.F. (Start Of Frame)

Every message between a Master and Slave begins with the SOF byte. SOF is always A5h whether message is from Master or Slave.

1.3.3 Address

Always FFh in the case of Node Response to host. All nodes will always reply with FFh.

1.3.4 Control Byte

The control byte is used to specify message function and sequencing. Table 1.5 contains bit level details for interpreting the node response.

Sequence Bits Any number applied to the sequence bits by the host will be returned by the node therefore indicating which host command this response pertains to. The suggested use is to implement a counter to increment the sequence bits, every host command, until rollover and keep incrementing. This method allows the host to monitor the node responses for missed messages.

TABLE 1.5 Control Byte Bit Definition

Command Bits 0 & 1	Sequence Bits 2 - 5	Reserved Bits 6 & 7	Description
0	User specified	X	This message contains no data.
1	User specified	X	Reserved for future use.
2	User specified	X	This message contains Data as specified by Data Words in the Header section of the Response message.
3	User specified	X	Reserved for future use.
	Example: Node responds to a Host 1 command containing a sequence value of 5. Node Response Control byte value = 00010110 or 16h; this indicates node is sending the requested data to host.		

1.3.5 Status 1

8-bit field, with following meanings:

TABLE 1.6

Value	Description
1h	Command complete
2h	Command incomplete
4h	Invalid command
6h	Do not have write access. See index “Access Control” for obtaining write access.
8h	Frame or CRC error

1.3.6 Status 2

To be defined.

1.3.7 Data Words

8-bit value that indicates the number of words (2 bytes) in the DATA field of the response message. The data field cannot have more than 255 words (510 bytes), therefore the valid range is from 0 – 255.

1.3.8 Header CRC Value

Both the Header section and Data section of a message must have a CRC value included. If there is no data, there will be no Data CRC bytes. The host should use the CRC calculation in “Header CRC Value” on page 4 (Host Command section) on each node response to check the integrity of the message.

1.3.9 Data Field

This is a variable length data field with the following format:

1. If Control Byte → Command Bits = 0 or 1, there is no Data or Data CRC bytes.

2. If Control Byte → Command Bits = 2 or 3, this message contains data of length specified in the Data Length field of the Node Response → Header section.
3. Data is always in Little Endian format (LSB first).
4. Maximum Data length = 510 bytes (255 words).

1.3.10 Data CRC Value

16-bit CRC on the DATA field only. Organize CRC bytes MSB first (opposite order of Data bytes). Use the same method for calculating CRC as in the "Header CRC Value" on page 4 (Host Command section).

1.3.11 Node Response Notes:

All bytes are sent least significant bit (LSB) first.

The two 16-bit CRC's are sent with upper byte first, then lower byte.

For CRC calculation, use the CRC X.25 (CCITT) polynomial: $X^{16}+X^{12}+X^5+1$ with the CRC table provided in "Header CRC Value" on page 4 (Host Command section).

1.4 Examples

This section contains examples of how messages are sent.

1.4.1 Example 1: Write to index 69, parameter 2

Write value 01234567h (19088743 decimal) to Commanded Input Parameters → Commanded Input Value # 2. Node address is 3Fh.

"Commanded Input Parameters" happens to be Index 69 (45h). Index 69 (45h) has eight parameters called "Commanded Input Values # 1 - 8." Each parameter is 2 words (4 bytes).

Commanded Input value # 2 starts at the 5th byte into Index 69 (45h) and takes up the next 2 words (4 bytes). Therefore the offset value needed is 02h, indicating to the node that it must start writing data just after the first 2 words of Index 69 (45h).

Because each parameter is a 32-bit value, the Data Length will be 2 to indicate to the node that it will only be writing 4 bytes. Below are the Write Command and Node Reply.

Host Writes

FIGURE 1.3 Host Write Command To index 5

Header Section								Data Section					
SOF	Adrs	Control	Index	Offset	Length	CRC MSB	CRC LSB	Data (Hex) LSB first				CRC MSB	CRC LSB
A5h	3Fh	02h	45h	02h	02h	96h	2Bh	67	45	23	01	BDh	36h

Node Replies

FIGURE 1.4 Node Response to Host Command

Header Section								Data Section		
SOF	Adrs	Control	Status 1	Status 2	Length	CRC MSB	CRC LSB	Data (Hex) LSB first	CRC MSB	CRC LSB
A5h	FFh	00h	01h	00h	00h	CFh	B6h	None	None	

1.4.2 Example 2: Read from Index 69, parameter 2

Read current value from Commanded Input Parameters → Commanded Input Value # 2. Node address is 3Fh.

As in example 1 "Commanded Input Parameters" is Index 69 (45h). Index 69 (45h) has four parameters called "Commanded Input Values # 1 - 4." Each parameter is 2 words (4 bytes).

Commanded Input value # 2 starts at the 5th byte into Index 69 (45h) and takes up the next 2 words (4 bytes). Therefore the offset value needed is 02h, indicating to the node that it must start transmitting data just after the first 2 words of Index 69 (45h).

Because each parameter is a 32-bit value, the Data Length will be 2 to indicate to the node that it will only be transmitting 4 bytes. Below is the Read Command and node Reply.

Host Writes

FIGURE 1.5 Host Write Command To index 5

Header Section								Data Section		
SOF	Adrs	Control	Index	Offset	Length	CRC MSB	CRC LSB	Data (Hex) LSB first	CRC MSB	CRC LSB
A5h	3Fh	01h	45h	02h	02h	0Dh	F7h	None	None	

Node Replies

FIGURE 1.6 Node Response to Host Command

Header Section								Data Section					
SOF	Adrs	Control	Status 1	Status 2	Length	CRC MSB	CRC LSB	Data (Hex) LSB first				CRC MSB	CRC LSB
A5h	FFh	02h	01h	00h	02h	02h	9Ch	67	45	23	01	BDh	36h

2 Command Dictionary

2.1 Dictionary Table Format

The command dictionary provides one entry for each existing command. Since commands may or may not have parameters, the following convention is used for each entry:

TABLE 2.1 Command Table Example.

02.01h	Sub Index Name			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	N/A	Read / Write*	No
Description: Detailed description of what this command does and how to use it. * This indicates a note about conditions.				

In the example of Table 2.1, the command index and parameter is referenced via the dot (.). 02h is the command index and .01h is the parameter. Commands without parameters will be referenced without the dot (.).

Furthermore, each entry has the following attributes:

- Data Type: This field specifies the data type of the command. Data types can be 8-bit, 16-bit, 32-bit, or string.
- Range: This field specifies the usable range of the values this command can contain.
- Units: This field specifies the units that apply to the value stored in this command. If the value contained in this command has no units, the field will contain "N/A." The appropriate physical unit is only supplied if there is a one-to-one relationship between the physical unit and the drive data type. For units which require scaling between a physical unit and the drive data type, an abbreviation for a drive unit is supplied. All drive units are described in "Appendix A" on page 186.
- Accessibility: This field specifies whether the command can be read or written to. If there is a * in this box, then the command may only be accessible in certain modes. See the Description box for more information about mode dependencies.
- Stored to NVM: This field specifies whether or not the command can be stored to Non Volatile Memory such that it is recalled on power up.
- Description: This field contains detailed information on the command and what it is used for.

2.2 Configuration Commands

Although the following commands are used predominately during drive setup and initialization, they are not restricted to use only during setup. Configuration commands can be divided into the following three categories.

- Administrative Commands: these commands are used for administrative operations such as loading or restoring parameters from non-volatile memory.
- Communication Commands: these commands determine the communication settings of the drive. They can only be set via the communication channel interface.
- Drive Commands: these commands define the drive configuration and are largely determined by the DriveWare setup and configuration software. Commands which contain general drive information are also available.

2.2.1 Administrative Commands

07h: Access Control

07.00h	Exclusive Access			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – Fh	N/A	Read/Write	No

Description:

This bit field must be set correctly in order to gain write access to drive parameters. If the drive has a default network interface, seizing write access with this parameter will override network write access.

Bit	Access Group	Description
0	Reserved	Read/Write as zero
1	Operational	Seize exclusive write access to drive operational group commands
2	Tuning	Seize exclusive write access to drive tuning commands
3	Comm1	Seize exclusive write access to Comm1 parameters command
4-15	Reserved	Read/Write as zero

The table below shows which parameters correspond to which access group.

Access Group	Commands Seized For Write Access
Operational	01h, 02h, 03h, 06h, 08h, 09h, 0A, 0Bh, 0Ch, 28h, 32h, 3Ah, 45h, 48h, 62h, 8Ch, D0h
Tuning	33h, 34h, 36h, 37h, 38h, 39h, 3Ch, 3Dh, 43h, 44h, 46h, 54h, 58h, 64h, 65h, 66h, 67h, 68h
Comm1	04h, 05h

09h: Restore Drive Parameters

09.00h	Restore Drive Parameters Key			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	See Table	N/A	Write Only	No

Description:

Defines which parameters will be restored from the drive's non-volatile memory to the current project file.

Key (Hex)	Description
165B	Restore CANopen communication parameters
1CAE	Restore RS232 communication parameters
7405	Restore non-axis parameters
8137	Restore axis parameters

0Ah: Store Drive Parameters

0A.00h	Store Drive Parameters Key			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	See Table	N/A	Write Only	Yes

Description:

Defines which parameters will be stored to the drive's non-volatile memory.

Key (Hex)	Description
1CAE	Store CANopen communication parameters
165B	Store RS232 communication parameters
7405	Store non-axis parameters
8137	Store axis parameters

2.2.2 Communication Commands

The following objects are used to configure the network settings.

Note

For RS485 communication, disable Modbus by setting object 05.04h to 1. This prevents the drive from inadvertently responding to erroneous commands.

05h: Serial Interface Configuration

05.00h	RS-232 Drive Address			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 63	N/A	Read/Write	Yes
Description: Specifies the RS-232 drive address.				

05.01h	RS-232 Baud Rate			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - 7	N/A	Read/Write	Yes

Description:

An integer value that corresponds to the RS-232 baud rate selection. The recommended baud rate is 115200. Use the table below to select the desired baud rate. Baud rates below 38400 are not recommended for drive commissioning.

Value	Baud Rate (bits/s)
0	9600
1	19200
2	38400
3	57600
4	115200

05.02h	RS-485 Drive Address			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 63	N/A	Read/Write	Yes
Description: Specifies the RS-485 drive address.				

05.03h	RS-485 Baud Rate			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	0 - 7	N/A	Read/Write	Yes

Description:

An integer value that corresponds to the RS-485 baud rate selection. The recommended baud rate is 115200. Use the table below to select the desired baud rate. Baud rates below 38400 are not recommended for drive commissioning.

Value	Baud Rate (bits/s)
0	9600
1	19200
2	38400
3	57600
4	115200
5	230400
6	460800
7	921600

05.04h	RS-485 Modbus Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0-1	N/A	Read/Write	Yes

Description:

Enables or disables Modbus communication. A value of 1 disabled Modbus communication, and a value of 0 enables Modbus communication.


Note

For RS485 communication, disable Modbus by setting this value to 1. This prevents the drive from inadvertently responding to erroneous commands.

06h: Network Configuration

06.00h	Network Address			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	N/A	Read/Write	Yes

Description:

Specifies the network address for drives with an additional network communication interface.

06.01h	Network Baud Rate			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	N/A	Read/Write	Yes
Description: Specifies the baud rate for drives with an additional network communication interface.				

04h: Heartbeat Parameters

04.00h	Reset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Write Only	No
Description: Writing any value to this parameter is considered a heartbeat. The period between heartbeats must be less than the value specified in the Consumer Timeout parameter (04.01h) in order to avoid a Communication Channel Error in the drive.				

04.01h	Consumer Timeout			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	ms	Read/Write	No
Description: For non-zero values, enables heartbeat feature and sets the maximum amount of time, in milliseconds, the drive will wait for a heartbeat (see parameter 04.00h) before throwing a Communication Channel Error. Setting this parameter to zero disables the heartbeat feature.				

2.2.3 Drive Configuration

2.2.3.1 Motion Control Profile

D0h: Control Loop Configuration Parameters

D0.00h-D0.1Eh	Control Loop Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	N/A	N/A	Read / Write	Yes
Description: Control loop configuration. Drive setup and configuration software will determine the values in this parameter. For systems that do not load parameter values from non-volatile memory but rather download parameters to the drive upon each system initialization, this parameter should be read from the drive upon completion of setup and configuration and saved with all other relevant drive parameters.				

32h: Feedback Sensor Parameters

32.00h	Encoder Wiring Polarity			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the encoder wiring polarity.				

32.01h	Maximum Phase Detection Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)}-1]$	DC2	Read / Write	Yes
Description: Contains a value corresponding to the maximum phase detection current that is allowed during a phase detect. See "Appendix A" on page 186 for units conversion.				

32.03h	Phase Detect Settling Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(31)} – 1]$	N/A	Read / Write	Yes

Description:
Contains the delay after a phase detect, before the commutation angle value is assigned. This delay should be set greater than the time it takes for the load to settle after phase detection. The value to be written to the drive is calculated as follows:
(desired phase detect settling time in milliseconds) x f
where f = the switching frequency of the drive in kHz.
Examples:
For a drive with a switching frequency of 20 kHz, to achieve a phase detect settling time of 500ms, the value written to the drive is:
500 x 20 = 10000
For a drive with a switching frequency of 14 kHz, to achieve a phase detect settling time of 500ms, the value written to the drive is:
500 x 14 = 7000

32.05h	Maximum Phase Detection Brake Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	0 – [$2^{(32)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: Contains a value corresponding to the maximum phase detection brake time.				

32.07h	Maximum Phase Detection Motion			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	DG1	Read / Write	Yes
Description: Contains a value corresponding to the maximum phase detection motion that is allowed during a phase detect. See "Appendix A" on page 186 for unit conversion details.				

32.08h	Resolver Resolution			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 1	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the resolver resolution.

Value	Resolver Resolution*
0	Low (12 bit = 4096 counts/resolver cycle standard)
1	High (14 bit = 16384 counts/resolver cycle standard)

*Refer to the drive datasheet for the specific resolution values supported by the drive.

32.09h	Serial Encoder Type			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$-1]	N/A	Read/Write	Yes

Description:

Contains a value corresponding to the serial encoder type.

Value	Serial Encoder Type
0	Not Assigned
1	Hiperface
2	Endat

32.0Ah	Position Interpolation / Velocity Divider			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes

Description:

For Sin/Cos encoder interpolation, contains a value corresponding to the position interpolation. The number of position counts per Sin/Cos cycle is equal to 4 multiplied by the interpolation value. This only applies to position. The measured velocity is unaffected by the interpolation. For digital encoder feedback (BiSS, EnDat 2.2) contains a value corresponding to the Velocity Divider parameter. The Velocity Divider is used to scale down the feedback going to the velocity gains when very high resolution encoders are used. This prevents saturation of the velocity loop. For incremental encoder feedback, the Interpolation Value is 1.

	Sin/Cos Encoder	Digital Encoder
Value	Interpolation	Velocity Divider
0	1x	1
1	2x	2
2	4x	4
3	8x	8
4	16x	16
5	32x	32
6	64x	64
7	128x	128
8	256x	256
9	512x	512

32.0Bh	Encoder Steps Per Encoder Sine Period			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the encoder steps per encoder sine period.

32.0Ch	Secondary Encoder Position Interpolation			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the secondary encoder position interpolation.

32.0Dh	Low Speed Smoothing Constant			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the low speed smoothing constant.				

32.0Fh	Encoder Emulation Divide by enum			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	Yes
Description: Contains a value corresponding to the emulated encoder divide by amount. The drive will output an emulated encoder frequency equal to the drive's interpreted encoder frequency divided by the divide amount. Allowable values are 1,2,4,8,16 and 32.				

32.10h	Encoder SinCos Error Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	Integer16	N/A	Read / Write	Yes
Description: Contains a value corresponding to the Sin/Cos error window for drives that support a 1V peak-to-peak encoder. The valid range in physical units is 0 to 1. The window determines whether or not a feedback sensor error should be activated according to the health of a Sin/Cos encoder (see object 27.02h). If x is the error window entered in this object, then an error is activated when the health of the encoder is not within the range 1±x. See "Appendix A" on page 186 for information on scaling.				

32.11h	Emulation Output Mode			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - 1	N/A	Read / Write	Yes
Description: This applies only to drives that support sin/cos encoder or absolute encoder feedback. Specifies whether the output encoder signal is buffered (0) or emulated (1).				

32.12h	Position of Emulated Index			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(32)}]$ – $[2^{(31)}-1]$	counts	Read / Write	Yes
Description: This applies only to drives that support sin/cos encoder or absolute encoder feedback. Specifies the position of the emulated index in drive counts.				

32.14h	Emulated Counts per Emulated Index

Data Type	Data Range	Units	Accessibility	Stored to NVM
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read / Write	Yes

Description:

This applies only to drives that support sin/cos encoder or absolute encoder feedback. Specifies the number of emulated counts per emulated index.

32.16h	Digital Absolute Only - Resolution Configuration Bitfield			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	N/A	Read / Write	Yes

Description:

Contains the absolute encoder resolution. This parameter is used with BiSS encoders. The bits are separated into resolution per turn and resolution (turns).

Bit	Description
0...7	Number of bits per turn. A value of decimal 16 represents 2^{16} counts per turn.
8...15	Number of bits whole turns. A value of decimal 16 represents 2^{16} turns.

32.17h	Digital Absolute Only - Data Format Configuration Bitfield			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	N/A	Read / Write	Yes

Description:

Contains information about the data format used. This parameter is used with BiSS encoders. The bits are separated into data width and justification for single turn data and multi turn data.

Bit	Description
0...6	Single turn data width. A value of decimal 16 represents 16 bits.
7	1 when bits/turn data is left justified, and 0 when bits/turn data is right justified.
8...14	Multi turn data width. A value of decimal 16 represents 16 bits.
15	1 when turns data is left justified, and 0 when turns data is right justified.

46h: Auxiliary Input Parameters

46.00h	Auxiliary Input - Input Counts: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$1 - [2^{(16)} – 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the number of input counts in the input/output ratio used for Encoder following and Step and Direction modes in Configuration 0.

46.01h	Auxiliary Input - Output Counts: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$-[2^{(16)}-1]$ - $[2^{(16)}-1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the output in the input/output ratio used for Encoder following and Step and Direction modes in Configuration 0. Encoder following mode can be used only when the position loop is closed. However, Step and Direction can be used to control position, velocity or current. Therefore, the scaling value used is mode dependent.				

46.02h	Auxiliary Input - Input Counts: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$1 - [2^{(16)}-1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the number of input counts in the input/output ratio used for Encoder following and Step and Direction modes in Configuration 1.				

46.03h	Auxiliary Input - Output Counts: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$-[2^{(16)}-1]$ - $[2^{(16)}-1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the output in the input/output ratio used for Encoder following and Step and Direction modes in Configuration 1. Encoder following mode can be used only when the position loop is closed. However, Step and Direction can be used to control position, velocity or current. Therefore, the scaling value used is mode dependent.				

34h: Current Loop & Commutation Control Parameters

34.00h	Torque Current Loop Proportional Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$0 - [2^{(15)}-1]$	N/A	Read / Write	Yes
Description: Contains the value of proportional gain for the current loop. This value is calculated from the gain value as follows: $Gain \times 2^{9} = Value\ to\ the\ drive$				

34.01h	Torque Current Loop Integral Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 – [$2^{(15)}$-1]	N/A	Read / Write	Yes
Description: Contains the value of integral gain for the current loop. This value is calculated from the gain value as follows: $Gain \times 2^9 = Value\ to\ the\ drive$				

34.02h	Torque Current Target Offset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	[$-2^{(15)}$] – [$2^{(15)}$-1]	DC1	Read / Write	Yes
Description: Contains a value corresponding to the torque current target offset				

34.03h	Peak Current Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 – [$2^{(15)}$-1]	DC1	Read / Write	Yes
Description: Contains a value corresponding to the peak current limit set in the drive. See "Appendix A" for unit conversion.				

34.04h	Peak Current Hold Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: Contains a value corresponding to the peak current time set in the drive.				

34.05h	Continuous Current Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 – [$2^{(15)}$-1]	DC1	Read / Write	Yes
Description: Contains a value corresponding to the continuous current limit set in the drive. See "Appendix A" for unit conversion.				

34.06h	Peak to Continuous Current Transition Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes

Description:
Contains a value corresponding to the peak to continuous current transition time set in the drive.

34.07h	Flux Current Reference Loop Proportional Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to the flex current reference loop proportional gain. The flux current loop is only used for AC induction motors. This value can be calculated from the gain value as follows: (Flux Current Reference Loop Proportional Gain) x 10000h, where ($0 \leq$ Gain ≤ 32767)				

34.09h	Flux Current Reference Loop Integral Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to the flex current reference loop integral gain. The flux current loop is only used for AC induction motors. This value can be calculated from the gain value as follows: (Flux Current Reference Loop Integral Gain) x 400000h, where ($0 \leq$ Gain ≤ 512)				

34.0Bh	Rated Peak Line Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to the rated peak line current allowed when using an AC induction motor.				

34.0Ch	No Load Peak Magnetization Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to the no-load peak magnetization current allowed when using an AC induction motor.				

34.0Dh	Rated Frequency			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to the rated frequency.				

34.0Eh	Rated Rotor No Load Base Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	RPM	Read / Write	Yes
Description: Contains a value corresponding to the rated rotor no-load base speed. This parameter is only used with an AC induction motor.				

34.0Fh	FW Threshold Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the field weakening threshold speed. This parameter is used for AC induction motors only.				

34.10h	Motor Type			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	-	N/A	Read / Write	Yes
Description: Contains a value corresponding to the type of motor connected to the drive.				

34.11h	Auxiliary Commutation Mode			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	-	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the auxiliary commutation mode. Auxiliary commutation only occurs if the drive is connected to a ***brushed*** motor. Brushed motors commutate the motor internally and therefore do not require the drive to commutate the motor. The drive supplies current over two phases. This remains fixed for a brushed drive.

34.12h	Encoder Direction			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - 3	N/A	Read/Write	Yes

Description:

Contains a value corresponding to the direction of the encoder feedback.

Data Value	Rotation Direction	Primary Feedback Polarity
0	Inverted	Inverted
1	Inverted	Standard
2	Standard	Inverted
3	Standard	Standard

34.13h	Synchronization Mode			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	-	N/A	Read / Write	Yes
Description: Contains a value corresponding to the current commutation method.				

34.14h	Encoder Counts Per Electrical Cycle			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)}-1]$	counts	Read / Write	Yes
Description: Contains the number of encoder counts per electrical cycle.				

34.16h	NTHS Angle 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} –1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the NTHS angle 1.				

34.17h	NTHS Angle 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} –1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the NTHS angle 2.				

34.18h	NTIS Angle 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} –1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the NTIS angle 1.				

34.19h	NTIS Angle 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} –1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the NTIS angle 2.				

34.1Ah	NTA-EZ Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the NTA-EZ position.				

34.1Bh	Max SPA Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the max SPA error.				

34.1Ch	Max SPA Adjustment			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the max SPA adjustment.				

34.1Dh	EC Adjust Count			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the EC adjust count.				

34.1Eh	ECC Adjust Amount			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the ECC adjust amount.				

34.1Fh	Valid HS Mask			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the valid HS mask.				

34.20h	Hall Parameter 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description				
Contains a value corresponding to Hall Parameter 1.				

34.21h	Hall Parameter 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to Hall Parameter 2.				

34.22h	Hall Parameter 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to Hall Parameter 3.				

34.23h	Hall Parameter 4			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to Hall Parameter 4.				

34.24h	Hall Parameter 5			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to Hall Parameter 5.				

34.25h	Hall Parameter 6			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to Hall Parameter 6.				

34.26h	Hall Parameter 7			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Contains a value corresponding to Hall Parameter 7.				

34.27h	Hall Parameter 8			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Contains a value corresponding to Hall Parameter 8.				

34.28h	Phase Detect Control			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:
Contains a value corresponding to the Phase Detect Control options:

Data Value	Description
0	Normal Phase Detect operation
1	Ignore User Positive Limit Event
2	Ignore User Negative Limit Event
3	Ignore both User Positive and Negative Limit Events

34.29h	Phase Offset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	[$-2^{(15)}$] – [$2^{(15)}$-1]	DG1	Read / Write	Yes
Description: Contains a value corresponding to the Phase Advance feature.				

34.2Ah	Current Limiting Algorithm			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 2	N/A	Read / Write	Yes

Description:

Selects from one of 3 current limiting algorithms. See "Current Limiting Algorithm" on page 196 for more details.

Data Value	Description
0	Time Based (Default)
1	Charge Based with RMS Scaling
2	Charge Based

34.2Bh	Torque At Command Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$1 – [2^{(31)}-1]$	DC2	Read / Write	Yes

Description:

Contains a value for an At Command window around the current error. While in current mode, when the current error is within this window, the At Command event will be active.

36h: Velocity Loop Control Parameters

36.00h	Velocity Feedback Direction			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16		N/A	Read / Write	Yes

Description:

Contains a value corresponding to the feedback polarity of an auxiliary encoder used for velocity feedback.

36.01h	Velocity Feedback Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(30)}$]	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the velocity feedback filter coefficient. To convert between the value entered into DriveWare and the value sent to the drive, use the following functions.

DriveWare to the drive:

$$2^{30}(-e^{a}+1) = P$$

where a = [value entered into DriveWare] x (-6.283185307x10^{-4}) and P = [value sent to drive]

Drive to DriveWare:

$$\frac{\ln\left(1-\frac{P}{2^{30}}\right)}{-6.283185307\times 10^{-4}} = [\text{value seen in DriveWare (Hz)}]$$

where P = [value in drive]

36.03h	Velocity Loop Proportional Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the proportional loop gain of the velocity loop for Gain Set 0. This value can be calculated from the gain value as follows:

(Velocity Loop Proportional Gain) x ((2^{16} * V_{vel} * R_{ppv}) / (2 * C_{pk})), where:

V_{vel} = (Switching Frequency / 2)

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

36.05h	Velocity Loop Integral Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the integral loop gain of the velocity loop for Gain Set 0. This value can be calculated from the gain value as follows:

(Velocity Loop Integral Gain) x $(2^{32} * R_{ppv}) / (2 * C_{pk})$, where

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

36.07h	Velocity Loop Derivative Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the derivative loop gain of the velocity loop for Gain Set 0. This value can be calculated from the gain value as follows:

(Velocity Loop Derivative Gain) x $((2^{16} * (V_{vel})^2 * R_{ppv}) / (2 * C_{pk}))$, where

V_{vel} = (Switching Frequency / 2)

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

36.09h	Velocity Loop Acceleration Feed Forward Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the velocity loop acceleration feed forward gain for Gain Set 0. This value can be calculated from the gain value as follows:

(Velocity Loop Acceleration Feed Forward Gain) x $((2^{16} * (V_{vel})^2 * R_{ppv}) / (2 * C_{pk}))$, where

V_{vel} = (Switching Frequency / 2)

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

36.0Bh	Velocity Loop Integrator Decay Rate			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to a percentage of the velocity loop integrator decay rate. The value can be calculated from the velocity loop integrator decay rate as follows:

(% of Integrator Gain) * (2^{16} / 100)

36.0Dh	Velocity Loop Proportional Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the proportional loop gain of the velocity loop for Gain Set 1. This value can be calculated from the gain value as follows:

(Velocity Loop Proportional Gain) x ((2^{16} * V_{vel} * R_{ppv}) / (2 * C_{pk})), where:

V_{vel} = (Switching Frequency / 2)

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

36.0Fh	Velocity Loop Integral Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the integral loop gain of the velocity loop for Gain Set 1. This value can be calculated from the gain value as follows:

(Velocity Loop Integral Gain) x (2^{32} * R_{ppv}) / (2 * C_{pk}), where

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

36.11h	Velocity Loop Derivative Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the derivative loop gain of the velocity loop for Gain Set 1. This value can be calculated from the gain value as follows:

(Velocity Loop Derivative Gain) x ((2^{16} * (V_{vel})^2 * R_{ppv}) / (2 * C_{pk})), where

V_{vel} = (Switching Frequency / 2)

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

36.13h	Velocity Loop Acceleration Feed Forward Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value that corresponds to the velocity loop acceleration feed forward gain for Gain Set 1. This value can be calculated from the gain value as follows:

(Velocity Loop Acceleration Feed Forward Gain) x ((2^{16} * (V_{vel})^2 * R_{ppv}) / (2 * C_{pk})), where

V_{vel} = (Switching Frequency / 2)

R_{ppv} = Interpolation Value (see object 32.0Ah for a reference table to locate the actual interpolation value using the stored enum)

C_{pk} = Peak Current

37h: Velocity Limits

37.00h	Motor Over Speed Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	DS1	Read / Write	Yes

Description:

Contains a value corresponding to the motor over speed limit set in the drive. When the velocity of the motor meets or exceeds this value, the drive will indicate a motor over speed condition is present. See "Appendix A" on page 186 for unit conversion.

37.02h	Zero Speed Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	DS1	Read / Write	Yes
Description: Contains a value corresponding to the motor zero speed limit set in the drive. When the velocity of the motor reaches this value or LOWER, the drive will indicate that it has reached a zero speed condition. See "Appendix A" on page 186 for unit conversion.				

37.04h	Velocity At Speed Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	DS1	Read / Write	Yes
Description: Contains a value corresponding to the velocity at speed limit set in the drive. When the velocity of the motor reaches this value or LOWER, the drive will indicate that it has reached its target velocity. See "Appendix A" on page 186 for unit conversion.				

37.06h	Velocity Loop Following Error Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	[$-2^{(31)}$] – [$2^{(31)}$-1]	DS1	Read / Write	Yes
Description: Contains a value corresponding to the velocity at speed limit set in the drive. If the measured velocity meets or exceeds this value, the drive will perceive this as a velocity following error. See "Appendix A" on page 186 for unit conversion.				

37.08h	Positive Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	DS1	Read / Write	Yes
Description: Contains a value corresponding to the positive velocity limit set in the drive. When the speed set by this value is met or exceeded, the drive will indicate that the positive limit was reached. See "Appendix A" on page 186 for unit conversion.				

37.0Ah	Negative Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	DS1	Read / Write	Yes
Description: Contains a value corresponding to the negative velocity limit set in the drive. When the speed set by this value is met or exceeded, the drive will indicate that the negative limit was reached. See "Appendix A" on page 186 for unit conversion.				

37.0Ch	Velocity Loop Integrator Decay Active Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes
Description: Contains a value that corresponds to the velocity loop integrator decay active window.				

38h: Position Loop Control Parameters

38.00h	Position Loop Proportional Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop proportional gain for Gain Set 0. This value can be calculated from the gain value using the following formula:

(Position Loop Proportional Gain) x 2^{32}, where

38.02h	Position Loop Integral Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop integral gain for Gain Set 0. This value can be calculated from the gain value using the following formula:

(Position Loop Integral Gain) x (2^{41} / V_{pos}), where

V_{pos} = (Switching Frequency / 2)

38.04h	Position Loop Derivative Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop derivative gain for Gain Set 0. This value can be calculated from the gain value using the following formula:

(Position Loop Derivative Gain) x (2^{28} * V_{pos}), where

V_{pos} = (Switching Frequency / 2)

38.06h	Position Loop Velocity Feed Forward Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop velocity feed forward gain for Gain Set 0. This value can be calculated from the gain value using the following formula:

(Position Loop Velocity Feed Forward Gain) x $(2^{28} * V_{pos})$, where

V_{pos} = (Switching Frequency / 2)

38.08h	Position Loop Acceleration Feed Forward Gain: Set 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop acceleration feed forward gain for Gain Set 0. This value can be calculated from the gain value using the following formula:

(Position Loop Acceleration Feed Forward Gain) x $(2^{28} * (V_{pos})^2)$, where

V_{pos} = (Switching Frequency / 2)

38.0Ah	Position Feedback Direction			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	-	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the feedback polarity of an auxiliary encoder used for position feedback.

38.0Bh	Position Loop Integrator Decay Rate			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	%	Read / Write	Yes

Description:

Contains a value that corresponds to the position loop integrator decay rate. The value is in percentage of the position loop Integrator Gain.

38.0Dh	Position Loop Proportional Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop proportional gain for Gain Set 1. This value can be calculated from the gain value using the following formula:

(Position Loop Proportional Gain) x 2^{32}, where

38.0Fh	Position Loop Integral Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop integral gain for Gain Set 1. This value can be calculated from the gain value using the following formula:

(Position Loop Integral Gain) x (2^{41} / V_{pos}), where

V_{pos} = (Switching Frequency / 2)

38.11h	Position Loop Derivative Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop derivative gain for Gain Set 1. This value can be calculated from the gain value using the following formula:

(Position Loop Derivative Gain) x (2^{28} * V_{pos}), where

V_{pos} = (Switching Frequency / 2)

38.13h	Position Loop Velocity Feed Forward Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the position loop velocity feed forward gain for Gain Set 1. This value can be calculated from the gain value using the following formula:

(Position Loop Velocity Feed Forward Gain) x (2^{28} * V_{pos}), where

V_{pos} = (Switching Frequency / 2)

38.15h	Position Loop Acceleration Feed Forward Gain: Set 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)}-1]$	N/A	Read / Write	Yes
Description:				
Contains a value corresponding to the position loop acceleration feed forward gain for Gain Set 1. This value can be calculated from the gain value using the following formula: (Position Loop Acceleration Feed Forward Gain) x $(2^{28} * (V_{pos})^2)$, where V_{pos} = (Switching Frequency / 2)				

39h: Position Limits

39.00h	Measured Position Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} –1]$	counts	Read / Write	Yes
Description:				
Replacement value for the measured position when the Set Position event is triggered. This allows you to redefine the current measured position (e.g. reset to zero).				

39.02h	Home Position Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} –1]$	counts	Read / Write	Yes
Description:				
Position value of the home position. When the measured position reaches this position, within the In-Home Position Window, the At-Home event becomes active.				

39.04h	Max Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} –1]$	counts	Read / Write	Yes
Description:				
Maximum allowed measured position. The Max Measured Position event will become active if the measured position exceeds this value.				

39.06h	Min Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} –1]$	counts	Read / Write	Yes
Description:				
Minimum allowed measured position. The Min Measured Position event will become active if the measured position exceeds this value.				

39.08h	At Home Position Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	counts	Read / Write	Yes
Description: Defines a window around the Home Position Value, such that when the measured position is within this window, the At-Home event will be active.				

39.0Ah	In Position Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 - [2^{(32)} - 1]$	counts	Read / Write	Yes
Description: Defines a window around the target position, such that when the measured position is within this window, the At Command event will be active.				

39.0Ch	Position Following Error Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 - [2^{(32)} - 1]$	counts	Read / Write	Yes
Description: The maximum allowed position error (difference between target position and measured position), prior to setting the "Position Following Error" event (active in position mode only). For CANopen drives, this parameter is equivalent to the "Position Following Error Limit" of DSP402 (command 6065h).				

39.0Eh	Max Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	counts	Read / Write	Yes
Description: Maximum allowed target position. The Max Target Position event will become active if the target position exceeds this value.				

39.10h	Min Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	counts	Read / Write	Yes
Description: Minimum allowed target position. The Min Target Position event will become active if the target position exceeds this value.				

39.12h	Position Limits Control			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	-	N/A	Read / Write	Yes
Description:				
Defines if the position limits are enabled or not. 3 = Enable Limits, 0 = Disable Limits.				

39.13h	Position Loop Integrator Decay Active Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)}-1]$	Counts	Read / Write	Yes
Description:				
Contains a value that corresponds to the position loop integrator decay active window.				

3Ah: Homing Configuration Parameters

3A.00h	Homing Speed During Search For Switch			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$0 - [2^{(32)} –1]$	DS4	Read / Write	Yes
Description:				
The magnitude of the velocity to be used during the search for the switch (before searching for the home/zero position). See "Appendix A" on page 186 for unit conversion.				

3A.02h	Homing Speed During Search For Zero			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$0 - [2^{(32)} –1]$	DS4	Read / Write	Yes
Description:				
The magnitude of the velocity to be used during the search for the home/zero position. See "Appendix A" on page 186 for unit conversion.				

3A.04h	Homing Method			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} –1]$	N/A	Read / Write	Yes
Description:				
The type of homing routine used. See "Homing" on page 188 for routine descriptions.				

3A.05h	Homing Acceleration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	0 - [$2^{(32)}$ –1]	DA1	Read / Write	Yes
Description: The acceleration and deceleration used during the search for the switch and during the search for zero. See "Appendix A" on page 186 for unit conversion details.				

48h: PVT Parameters

48.00h	Buffer Threshold Warning Level			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: A buffer threshold warning will occur when this number of PVT points is left in the buffer.				

48.01h	PVT Input Method			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:

Defines if incremental or absolute position is to be used with PVT commands. Incremental position sets the PVT target position point equal to the previous PVT position point plus the specified value. Absolute position sets the PVT target position point equal to the specified value.

Value	Input Method
0	Absolute position with sequence counter
1	Incremental position with sequence counter

3Ch: Command Limiter Parameters

The command limiter limits the slope of the target command in any mode. It is broken into four components, where each component is assigned to one parameter. To remove any effects of the command limiter, maximize all limiter parameters. Some limiter parameters have units that change with the operating mode of the drive. For these parameters, refer to Table 2.2 to make the correct unit selection.

TABLE 2.2 Command Limiter Units

Drive Operation Mode	Units
Current (Torque)	DJ1
Velocity	DA2
Position (Around Velocity Or Current)	DS2

3C.00h	Linear Ramp Positive Target Positive Change: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum positive change in positive command used with the command limiter for Configuration 0. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.03h	Linear Ramp Positive Target Negative Change: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum negative change in positive command used with the command limiter for Configuration 0. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.06h	Linear Ramp Negative Target Negative Change: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum negative change in negative command used with the command limiter for Configuration 0. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.09h	Linear Ramp Negative Target Positive Change: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum positive change in negative command used with the command limiter for Configuration 0. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.0Ch	Linear Ramp Positive Target Positive Change: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum positive change in positive command used with the command limiter for Configuration 1. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.0Fh	Linear Ramp Positive Target Negative Change: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum negative change in positive command used with the command limiter for Configuration 1. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.12h	Linear Ramp Negative Target Negative Change: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum negative change in negative command used with the command limiter for Configuration 1. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.15h	Linear Ramp Negative Target Positive Change: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	0 - [$2^{(48)}$ –1]	See Table 2.2	Read / Write	Yes
Description:				
Defines the maximum positive change in negative command used with the command limiter for Configuration 1. Units are mode dependant. See "Appendix A" on page 186 for unit conversions.				

3C.18h	Controlled Accel/Decel Maximum Speed: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer64	0 - [$2^{(64)}$ –1]	DS3	Read / Write	Yes
Description:				
Sets the maximum speed for a profile in Configuration 0. See "Appendix A" on page 186 for unit conversions.				

3C.1Ch	Controlled Accel/Decel Maximum Acceleration: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Interger32	0 - [$2^{(32)}$ –1]	DA3	Read / Write	Yes
Description:				
Defines the maximum acceleration used with the command limiter in Configuration 0. See "Appendix A" on page 186 for unit conversions.				

3C.1Eh	Controlled Accel/Decel Maximum Deceleration: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	DA3	Read / Write	Yes
Description: Defines the maximum deceleration used with the command limiter in Configuration 0. See "Appendix A" on page 186 for unit conversions.				

3C.20h	Controlled Accel/Decel Maximum Speed: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer64	0 - [$2^{(64)}$ –1]	DS3	Read / Write	Yes
Description: Sets the maximum speed for a profile in Configuration 1. See "Appendix A" on page 186 for unit conversions.				

3C.24h	Controlled Accel/Decel Maximum Acceleration: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Interger32	0 - [$2^{(32)}$ –1]	DA3	Read / Write	Yes
Description: Defines the maximum acceleration used with the command limiter in Configuration 1. See "Appendix A" on page 186 for unit conversions.				

3C.26h	Controlled Accel/Decel Maximum Deceleration: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	DA3	Read / Write	Yes
Description: Defines the maximum deceleration used with the command limiter in Configuration 1. See "Appendix A" on page 186 for unit conversions.				

2.2.3.2 Hardware Profile

0Bh: Stored User Parameters

0B.00h	User Defined Drive Name			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String256	ASCII Values	N/A	Read / Write	Yes
Description: Contains a user specified drive name for the drive. The characters in the string are stored as ASCII values. For the drive name "AMC", the digits stored are: 41h, 4Dh, 43h				

08h: Drive Initialization Parameters

08.00h	Start-Up Sequence Control			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - $[2^{(16)}-1]$	N/A	Read/Write	Yes

Description:

Defines how the drive will behave when power is first applied..

Bit	Drive Initialization Parameters
0	Disable Bridge
1	Load Config 1
2	Phase Detect
3	Set Position
4	Enable Motion Engine After Startup Sequence
5-15	Reserved

08.01h	Start-Up Phase Detect Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - $[2^{(16)}-1]$	N/A	Read/Write	Yes

Description:

Defines how the Phase Detect feature will behave when power is first applied.

Value	Description
0	Phase Detect immediately upon power-up
1	Phase Detect after the first bridge enable upon power-up

C8h: Motion Engine Configuration

C8.00h	Motion Engine Startup Motion			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - $[2^{(16)}-1]$	N/A	Read/Write	Yes

Description:

Defines the startup behavior when running a motion engine index upon power-up. The bit values are broken up as defined below.

Bits 0:2

0: Indexer Mode

1-7: Reserved

Bits 3:4

0: Motion initiated via digital inputs

1: Motion initiated via Network commands

Bits 5:8

Defines the index number to load on power-up

Bits 9:15

0: Motion will not immediately start.

1: Motion will automatically start if the Motion Engine is configured to be enabled on power-up.

2-7: Reserved

33h: User Voltage Protection Parameters

33.00h	Over-Voltage Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read/Write	Yes

Description:

Contains the over voltage limit specified for the drive. It must be set lower than the drive over-voltage hardware shutdown point and greater than the Nominal DC Bus Voltage. See "Appendix A" on page 186 for unit conversion.

33.01h	Under-Voltage Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read/Write	Yes

Description:

Contains the under voltage limit specified for the drive. It must be set above the drive under-voltage hardware shutdown point and less than the Nominal DC Bus Voltage. See "Appendix A" on page 186 for unit conversion.

33.02h	Shunt Regulator Enable Threshold			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 – [$2^{(15)}$-1]	DV1	Read/Write	Yes
Description: Contains a value corresponding to the shunt regulator enable threshold voltage. When the bus reaches this voltage, built in shut regulator will turn on allow excess energy to be dissipated across an external shunt resistor. Not all drives have built in shunt regulators. See "Appendix A" on page 186 for unit conversion.				

33.03h	Shunt Regulator Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	See table below	N/A	Read/Write	Yes

Description:

Contains a value corresponding to the current state of the shunt regulator.

Value (Hex)	Description
00	Disable Shunt Regulator
02	Enable Shunt Regulator

33.04h	External Shunt Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	ohms (Ω)	Read / Write	Yes
Description: Contains a value corresponding to the resistance of the external shunt resistor.				

33.05h	External Shunt Power			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	watts (W)	Read / Write	Yes
Description: Contains a value corresponding to the amount of power the external shunt resistor is allowed to dissipate.				

33.06h	External Shunt Inductance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	microhenrys (µH)	Read / Write	Yes
Description: Contains a value corresponding to the inductance of the external shunt resistor.				

54h: Drive Temperature Parameters

54.00h	External Analog Temperature Disable Level			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	DT1	Read / Write	Yes
Description: Contains a value corresponding to the temperature disable level for an analog over temperature event. See "Appendix A" on page 186 for unit conversion.				

54.02h	External Analog Temperature Enable Level			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	DT1	Read / Write	Yes
Description: Contains a value corresponding to the temperature re-enable level after the analog over temperature event has been activated. See "Appendix A" on page 186 for unit conversion.				

54.04h	Thermistor Disable Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	Ohms	Read / Write	Yes
Description: If supported by the hardware, this value represents the value of the thermistor resistance (ohms) in which the Motor Over Temperature Event is to trip. For a Positive Thermal Coefficient (PTC), the disable resistance will be greater than or equal to the enable value. For a Negative Thermal Coefficient (NTC), the disable resistance will be less than the enable value.				

54.05h	Thermistor Enable Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	Ohms	Read / Write	Yes
Description: If supported by the hardware, this value represents the value of the thermistor resistance (ohms) in which the Motor Over Temperature Event is to release. For a Positive Thermal Coefficient (PTC), the disable resistance will be greater than or equal to the enable value. For a Negative Thermal Coefficient (NTC), the disable resistance will be less than the enable value.				

54.06h	Thermal Monitor Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	N/A	N/A	Read / Write	Yes

Description:

If supported by the hardware, configures the operation of the thermistor/thermal cutoff switch.

Valid Values	
0	Disabled
1	Thermistor Active
2	Thermal Cutoff Switch Active Closed
3	Thermal Cutoff Switch Active High

43h: Capture Configuration Parameters The following tables are used by the parameters of this command.

TABLE 2.3 Capture Edge Configuration

Value	Description
0	None / Off
1	Rising Edge
2	Falling Edge
3	Both Rising and Falling Edges

TABLE 2.4 Capture Trigger Type

Value	Description
0	Single Trigger: Captures one value at a time. Need to reset Capture before capturing another.
1	Continuous Trigger: Captures a new value each time Capture input is triggered without having to reset.

TABLE 2.5 Capture Source High/Low Values

Signal Source	Low Value	High Value
Velocity Feedback	16	17
Velocity Measured	18	19
Velocity Target	20	21
Velocity Demand	22	23
Velocity Error	24	25
Position Measured	26	27
Position Target	28	29
Position Demand	30	31
Position Error	32	33
Auxiliary Position Input	34	35
Phase Angle	15	87
Stator Angle	86	87

43.00h	Capture 'A' Edge Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 3	N/A	Read / Write	Yes
Description: Selects the edge(s) that will trigger Capture A to capture the pre-selected signal source. See Table 2.3 for a list of allowable values.				

43.01h	Capture 'A' Trigger			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 1	N/A	Read / Write	Yes
Description: Selects whether a value should be captured only once, upon the first applicable edge that is encountered, or every time an edge is encountered. See Table 2.4 for a list of allowable values.				

43.02h	Capture 'A' Source – Low Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	See Table 2.5	N/A	Read / Write	Yes
Description: This parameter is used together with the next to select the signal source to capture. See Table 2.5 for a list of allowable values.				

43.03h	Capture 'A' Source – High Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	See Table 2.5	N/A	Read / Write	Yes
Description: This parameter is used together with the previous to select the signal source to capture. See Table 2.5 for a list of allowable values.				

43.04h	Capture 'B' Edge Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 3	N/A	Read / Write	Yes
Description: Selects the edge(s) that will trigger Capture B to capture the pre-selected signal source. See Table 2.3 for a list of allowable values.				

43.05h	Capture 'B' Trigger			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 1	N/A	Read / Write	Yes
Description: Selects whether a value should be captured only once, upon the first applicable edge that is encountered, or every time an edge is encountered. See Table 2.4 for a list of allowable values.				

43.06h	Capture 'B' Source – Low Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	See Table 2.5	N/A	Read / Write	Yes
Description: This parameter is used together with the next to select the signal source to capture. See Table 2.5 for a list of allowable values.				

43.07h	Capture 'B' Source – High Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	See Table 2.5	N/A	Read / Write	Yes
Description: This parameter is used together with the previous to select the signal source to capture. See Table 2.5 for a list of allowable values.				

43.08h	Capture 'C' Edge Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 3	N/A	Read / Write	Yes
Description: Selects the edge(s) that will trigger Capture C to capture the pre-selected signal source. See Table 2.3 for a list of allowable values.				

43.09h	Capture 'C' Trigger			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 1	N/A	Read / Write	Yes
Description: Selects whether a value should be captured only once, upon the first applicable edge that is encountered, or every time an edge is encountered. See Table 2.4 for a list of allowable values.				

43.0Ah	Capture 'C' Source – Low Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	See Table 2.5	N/A	Read / Write	Yes
Description: This parameter is used together with the next to select the signal source to capture. See Table 2.5 for a list of allowable values.				

43.0Bh	Capture 'C' Source – High Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	See Table 2.5	N/A	Read / Write	Yes
Description: This parameter is used together with the previous to select the signal source to capture. See Table 2.5 for a list of allowable values.				

58h: Digital Input Parameters

TABLE 2.6 Command 58 Mapping

Bit	Digital Input Mask
0	Digital Input 1
1	Digital Input 2
2	Digital Input 3
3	Digital Input 4
4	Digital Input 5
5	Digital Input 6
6	Digital Input 7
7	Digital Input 8
8…15	Reserved

Note: Number of actual inputs depends on drive model

58.00h	Digital Input Mask: Active Level			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Determines which digital inputs are active high and which are active low. See Table 2.6 above for mapping structure.				

58.01h	Digital Input Mask: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to User Disable. See Table 2.6 above for mapping structure.				

58.02h	Digital Input Mask: Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the positive limit. See Table 2.6 above for mapping structure.				

58.03h	Digital Input Mask: Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to negative limit. See Table 2.6 above for mapping structure.				

58.04h	Digital Input Mask: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to activate Motor Over Temperature. See Table 2.6 above for mapping structure.				

58.05h	Digital Input Mask: Phase Detection			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to activate Phase Detection. See Table 2.6 above for mapping structure.				

58.06h	Digital Input Mask: Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to activate the Auxiliary Disable. See Table 2.6 above for mapping structure.				

58.07h	Digital Input Mask: Set Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to activate the Set Position event. See Table 2.6 above for mapping structure.				

58.08h	Digital Input Mask: Start Homing			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to activate the Start Homing event. See Table 2.6 above for mapping structure.				

58.09h	Digital Input Mask: Home Switch			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Home Switch. See Table 2.6 above for mapping structure.				

58.0Ah	Digital Input Mask: User Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the User Stop event. See Table 2.6 above for mapping structure.				

58.0Bh	Digital Input Mask: Set / Reset Capture A			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Set / Reset Capture A event. See Table 2.6 above for mapping structure.				

58.0Ch	Digital Input Mask: Set / Reset Capture B			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Set / Reset Capture B event. See Table 2.6 above for mapping structure.				

58.0Dh	Digital Input Mask: Set / Reset Capture C			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Set / Reset Capture C event. See Table 2.6 above for mapping structure.				

58.0Eh	Digital Input Mask: Reset Event History			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Reset Event History event. See Table 2.6 above for mapping structure.				

58.0Fh	Digital Input Mask: Configuration Select			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Configuration Select event. See Table 2.6 above for mapping structure.				

58.10h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	Yes

58.11h	Digital Input Mask: Gain Select			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Gain Select event. See Table 2.6 above for mapping structure.				

58.12h	Digital Input Mask: Zero Position Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Zero Position Error event. See Table 2.6 above for mapping structure.				

58.13h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	Yes

58.14h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	Yes

58.15h	Digital Input Mask: Motion Engine Mode			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Defines which digital inputs, if any, are assigned to the Motion Engine Mode event. See Table 2.6 above for mapping structure.				

58.16h	Digital Input Mask: Motion Engine Enable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Defines which digital inputs, if any, are assigned to the Motion Engine Enable event. See Table 2.6 above for mapping structure.				

58.17h	Digital Input Mask: Motion Execute			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Defines which digital inputs, if any, are assigned to the Motion Execute event. See Table 2.6 above for mapping structure.				

58.18h	Digital Input Mask: Motion Select 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description:				
Defines which digital inputs, if any, are assigned to the Motion Select 0 event. See Table 2.6 above for mapping structure.				

58.19h	Digital Input Mask: Motion Select 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Motion Select 1 event. See Table 2.6 above for mapping structure.				

58.1Ah	Digital Input Mask: Motion Select 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Motion Select 2 event. See Table 2.6 above for mapping structure.				

58.1Bh	Digital Input Mask: Motion Select 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Motion Select 3 event. See Table 2.6 above for mapping structure.				

58.1Ch	Digital Input Mask: Motion Engine Abort			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Motion Engine Abort event. See Table 2.6 above for mapping structure.				

58.1Dh	Digital Input Mask: Jog Plus			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Jog Plus event. See Table 2.6 above for mapping structure.				

58.1Eh	Digital Input Mask: Jog Minus			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Jog Minus event. See Table 2.6 above for mapping structure.				

58.1Fh	Digital Input Mask: Jog 0 Select			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Jog 0 Select event. See Table 2.6 above for mapping structure.				

58.20h	Digital Input Mask: Jog 1 Select			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital inputs, if any, are assigned to the Jog 1 Select event. See Table 2.6 above for mapping structure.				

5Ah: Digital Output Parameters

TABLE 2.7 Command 5A Mapping

Bit	Digital Output Mask
0	Digital Output 1
1	Digital Output 2
2	Digital Output 3
3	Digital Output 4
4…15	Reserved

5A.00h	Digital Output Mask: Active Level			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs are active high and which are active low. See Table 2.7 above for mapping structure.				

5A.01h	Digital Output Mask: Drive Reset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Drive Reset event. See Table 2.7 above for mapping structure.				

5A.02h	Digital Output Mask: Drive Internal Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Drive Internal Error event. See Table 2.7 above for mapping structure.				

5A.03h	Digital Output Mask: Short Circuit Fault			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Short Circuit Fault event. See Table 2.7 above for mapping structure.				

5A.04h	Digital Output Mask: Over-Current Fault			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Over-Current event. See Table 2.7 above for mapping structure.				

5A.05h	Digital Output Mask: Hardware Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Hardware Under Voltage event. See Table 2.7 above for mapping structure.				

5A.06h	Digital Output Mask: Hardware Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Hardware Over Voltage event. See Table 2.7 above for mapping structure.				

5A.07h	Digital Output Mask: Drive Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Drive Over Temperature event. See Table 2.7 above for mapping structure.				

5A.08h	Digital Output Mask: Parameter Restore Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Parameter Restore Error event. See Table 2.7 above for mapping structure.				

5A.09h	Digital Output Mask: Parameter Store Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Parameter Store Error event. See Table 2.7 above for mapping structure.				

5A.0Ah	Digital Output Mask: Invalid Hall State			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Invalid Hall State event. See Table 2.7 above for mapping structure.				

5A.0Bh	Digital Output Mask: Phase Synchronization Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Phase Synchronization Error event. See Table 2.7 above for mapping structure.				

5A.0Ch	Digital Output Mask: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Motor Over Temperature event. See Table 2.7 above for mapping structure.				

5A.0Dh	Digital Output Mask: Phase Detection Fault			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Phase Detection Fault event. See Table 2.7 above for mapping structure.				

5A.0Eh	Digital Output Mask: Feedback Sensor Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Feedback Sensor Error event. See Table 2.7 above for mapping structure.				

5A.0Fh	Digital Output Mask: Log Entry Missed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Log Entry Missed event. See Table 2.7 above for mapping structure.				

5A.10h	Digital Output Mask: Software Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Software Disable event. See Table 2.7 above for mapping structure.				

5A.11h	Digital Output Mask: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the User Disable event. See Table 2.7 above for mapping structure.				

5A.12h	Digital Output Mask: User Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Positive Limit event. See Table 2.7 above for mapping structure.				

5A.13h	Digital Output Mask: User Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Negative Limit event. See Table 2.7 above for mapping structure.				

5A.14h	Digital Output Mask: Current Limiting (Foldback)			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Current Limiting event. See Table 2.7 above for mapping structure.				

5A.15h	Digital Output Mask: Continuous Current Limit Reached			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Continuous Current Limit Reached event. See Table 2.7 above for mapping structure.				

5A.16h	Digital Output Mask: Current Loop Saturated			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Current Loop Saturated event. See Table 2.7 above for mapping structure.				

5A.17h	Digital Output Mask: User Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the User Under Voltage event. See Table 2.7 above for mapping structure.				

5A.18h	Digital Output Mask: User Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the User Over Voltage event. See Table 2.7 above for mapping structure.				

5A.19h	Digital Output Mask: Non-Sinusoidal Commutation			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Non-Sinusoidal Commutation. See Table 2.7 above for mapping structure.				

5A.1Ah	Digital Output Mask: Phase Detection			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Phase Detection event. See Table 2.7 above for mapping structure.				

5A.1Bh	Digital Output Mask: User Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the User Auxiliary Disable event. See Table 2.7 above for mapping structure.				

5A.1Ch	Digital Output Mask: Shunt Regulator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Shunt Regulator event. See Table 2.7 above for mapping structure.				

5A.1Dh	Digital Output Mask: Phase Detection Complete			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Phase Detection Complete event. See Table 2.7 above for mapping structure.				

5A.1Eh	Digital Output Mask: Command Limiter Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Command Limiter Active event. See Table 2.7 above for mapping structure.				

5A.1Fh	Digital Output Mask: Motor Over Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Motor Over Speed event. See Table 2.7 above for mapping structure.				

5A.20h	Digital Output Mask: At Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the At Command event. See Table 2.7 above for mapping structure.				

5A.21h	Digital Output Mask: Zero Velocity			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Zero Velocity event. See Table 2.7 above for mapping structure.				

5A.22h	Digital Output Mask: Velocity Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Velocity Following Error event. See Table 2.7 above for mapping structure.				

5A.23h	Digital Output Mask: Positive Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Positive Velocity Limit event. See Table 2.7 above for mapping structure.				

5A.24h	Digital Output Mask: Negative Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Negative Velocity Limit event. See Table 2.7 above for mapping structure.				

5A.25h	Digital Output Mask: Max Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Max Measured Position event. See Table 2.7 above for mapping structure.				

5A.26h	Digital Output Mask: Min Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Min Measured Position event. See Table 2.7 above for mapping structure.				

5A.27h	Digital Output Mask: At Home Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the At Home Position event. See Table 2.7 above for mapping structure.				

5A.28h	Digital Output Mask: Position Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Position Following Error event. See Table 2.7 above for mapping structure.				

5A.29h	Digital Output Mask: Max Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Max Target Position Limit event. See Table 2.7 above for mapping structure.				

5A.2Ah	Digital Output Mask: Min Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Min Target Position Limit event. See Table 2.7 above for mapping structure.				

5A.2Bh	Digital Output Mask: Set Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Set Position event. See Table 2.7 above for mapping structure.				

5A.2Ch	Digital Output Mask: Homing Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Homing Active event. See Table 2.7 above for mapping structure.				

5A.2Dh	Digital Output Mask: Apply Brake			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Apply Brake event. See Table 2.7 above for mapping structure.				

5A.2Eh	Digital Output Mask: PVT Buffer Full			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Writ	Yes
Description: Defines which digital outputs, if any, are assigned to the PVT Buffer Full event. See Table 2.7 above for mapping structure.				

5A.2Fh	Digital Output Mask: PVT Buffer Empty			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the PVT Buffer Empty event. See Table 2.7 above for mapping structure.				

5A.30h	Digital Output Mask: PVT Buffer Threshold			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the PVT Buffer Threshold event. See Table 2.7 above for mapping structure.				

5A.31h	Digital Output Mask: PVT Buffer Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the PVT Buffer Failure event. See Table 2.7 above for mapping structure.				

5A.32h	Digital Output Mask: PVT Buffer Empty Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the PVT Buffer Empty Stop event. See Table 2.7 above for mapping structure.				

5A.33h	Digital Output Mask: PVT Sequence Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the PVT Sequence Number event. See Table 2.7 above for mapping structure.				

5A.34h	Digital Output Mask: Communication Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Communication Error event. See Table 2.7 above for mapping structure.				

5A.35h	Digital Output Mask: Homing Complete			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Homing Complete event. See Table 2.7 above for mapping structure.				

5A.36h	Digital Output Mask: Commanded Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Commanded Stop event. See Table 2.7 above for mapping structure.				

5A.37h	Digital Output Mask: User Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the User Stop event. See Table 2.7 above for mapping structure.				

5A.38h	Digital Output Mask: Bridge Enabled			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Bridge Enabled status. See Table 2.7 above for mapping structure.				

5A.39h	Digital Output Mask: Dynamic Brake Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Dynamic Brake Active event. See Table 2.7 above for mapping structure.				

5A.3Ah	Digital Output Mask: Stop Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Stop Active event. See Table 2.7 above for mapping structure.				

5A.3Bh	Digital Output Mask: Positive Stop Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Positive Stop Active event. See Table 2.7 above for mapping structure.				

5A.3Ch	Digital Output Mask: Negative Stop Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Negative Stop Active event. See Table 2.7 above for mapping structure.				

5A.3Dh	Digital Output Mask: Positive Inhibit Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Positive Inhibit Active event. See Table 2.7 above for mapping structure.				

5A.3Eh	Digital Output Mask: Negative Inhibit Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to the Negative Inhibit Active event. See Table 2.7 above for mapping structure.				

5A.3Fh	Digital Output Mask: User Bit 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 0. See Table 2.7 above for mapping structure.				

5A.40h	Digital Output Mask: User Bit 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 1. See Table 2.7 above for mapping structure.				

5A.41h	Digital Output Mask: User Bit 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 2. See Table 2.7 above for mapping structure.				

5A.42h	Digital Output Mask: User Bit 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 3. See Table 2.7 above for mapping structure.				

5A.43h	Digital Output Mask: User Bit 4			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 4. See Table 2.7 above for mapping structure.				

5A.44h	Digital Output Mask: User Bit 5			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 5. See Table 2.7 above for mapping structure.				

5A.45h	Digital Output Mask: User Bit 6			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 6. See Table 2.7 above for mapping structure.				

5A.46h	Digital Output Mask: User Bit 7			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 7. See Table 2.7 above for mapping structure.				

5A.47h	Digital Output Mask: User Bit 8			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 8. See Table 2.7 above for mapping structure.				

5A.48h	Digital Output Mask: User Bit 9			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 9. See Table 2.7 above for mapping structure.				

5A.49h	Digital Output Mask: User Bit 10			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 10. See Table 2.7 above for mapping structure.				

5A.4Ah	Digital Output Mask: User Bit 11			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 11. See Table 2.7 above for mapping structure.				

5A.4Bh	Digital Output Mask: User Bit 12			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 12. See Table 2.7 above for mapping structure.				

5A.4Ch	Digital Output Mask: User Bit 13			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 13. See Table 2.7 above for mapping structure.				

5A.4Dh	Digital Output Mask: User Bit 14			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 14. See Table 2.7 above for mapping structure.				

5A.4Eh	Digital Output Mask: User Bit 15			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to User Bit 15. See Table 2.7 above for mapping structure.				

5A.4Fh	Digital Output Mask: Capture A			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Capture A. See Table 2.7 above for mapping structure.				

5A.50h	Digital Output Mask: Capture B			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Capture B. See Table 2.7 above for mapping structure.				

5A.51h	Digital Output Mask: Capture C			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Capture C. See Table 2.7 above for mapping structure.				

5A.52h	Digital Output Mask: Commanded Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Commanded Positive Limit. See Table 2.7 above for mapping structure.				

5A.53h	Digital Output Mask: Commanded Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Commanded Negative Limit. See Table 2.7 above for mapping structure.				

5A.54h	Digital Output Mask: Safe Torque Off Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Safe Torque Off Active. See Table 2.7 above for mapping structure.				

5A.55h	Digital Output Mask: Zero Position Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Zero Position Error. See Table 2.7 above for mapping structure.				

5A.56h	Digital Output Mask: Motion Engine Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Engine Error. See Table 2.7 above for mapping structure.				

5A.57h	Digital Output Mask: Motion Engine Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Engine Active. See Table 2.7 above for mapping structure.				

5A.58h	Digital Output Mask: Motion Busy			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Busy. See Table 2.7 above for mapping structure.				

5A.59h	Digital Output Mask: Motion Done			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Done. See Table 2.7 above for mapping structure.				

5A.5Ah	Digital Output Mask: Motion Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Error. See Table 2.7 above for mapping structure.				

5A.5Bh	Digital Output Mask: Motion Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Active. See Table 2.7 above for mapping structure.				

5A.5Ch	Digital Output Mask: Motion Aborted			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Aborted. See Table 2.7 above for mapping structure.				

5A.5Dh	Digital Output Mask: Motion Execute			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Execute. See Table 2.7 above for mapping structure.				

5A.5Eh	Digital Output Mask: Motion MotionDone			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion MotionDone. See Table 2.7 above for mapping structure.				

5A.5Fh	Digital Output Mask: Motion SequenceDone			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion SequenceDone. See Table 2.7 above for mapping structure.				

5A.60h	Digital Output Mask: Absolute Position Valid			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Absolute Position Valid. See Table 2.7 above for mapping structure.				

5A.61h	Digital Output Mask: Jog Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Jog Active See Table 2.7 above for mapping structure.				

5A.62h	Digital Output Mask: PWM and Direction Broken Wire			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to PWM and Direction Broken Wire See Table 2.7 above for mapping structure.				

5A.63h	Digital Output Mask: PLS 1 Post Active Level			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to PLS 1 Post Active Level. See Table 2.7 above for mapping structure.				

5A.64h	Digital Output Mask: PLS 2 Post Active Level			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to PLS 2 Post Active Level. See Table 2.7 above for mapping structure.				

5A.65h	Digital Output Mask: Motion Engine Abort			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes
Description: Defines which digital outputs, if any, are assigned to Motion Engine Abort. See Table 2.7 above for mapping structure.				

44h: Analog Input Parameters

44.00h	Analog Input 1 Offset: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	[$-2^{(15)}$] - [$2^{(15)}$ –1]	DAI	Read / Write	Yes
Description: Contains a value corresponding to the Analog Input 1 Offset in Configuration 0. To convert the desired Offset Voltage to the appropriate do the following: Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.				

44.01h	Analog Input 1 Scale Factor: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 1 in Configuration 0. The values contained are mode dependent and require a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

44.03h	Analog Input 2 Offset: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	DAI	Read / Write	Yes

Description:

Contains a value corresponding to the Analog Input 2 Offset in Configuration 0.

To convert the desired Offset Voltage to the appropriate value do the following:

Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.

44.04h	Analog Input 2 Scale Factor: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 2 in Configuration 0. This value is mode dependent and requires a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

44.06h	Analog Input 3 Offset: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	DAI	Read / Write	Yes

Description:

Contains a value corresponding to the Analog Input 3 Offset in Configuration 0.

To convert the desired Offset Voltage to the appropriate value do the following:

Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.

44.07h	Analog Input 3 Scale Factor: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 3 in Configuration 0. The value is mode dependent and requires a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

44.09h	Analog Input 4 Offset: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	DAI	Read / Write	Yes

Description:

Contains a value corresponding to the Analog Input 4 Offset in Configuration 0.

To convert the desired Offset Voltage to the appropriate value do the following:

Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.

44.0Ah	Analog Input 4 Scale Factor: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 4 in Configuration 0. The value is mode dependent and requires a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

44.0Ch	Analog Input 1 Offset: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	DAI	Read / Write	Yes

Description:

Contains a value corresponding to the Analog Input 1 Offset in Configuration 1.

To convert the desired Offset Voltage to the appropriate do the following:

Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.

44.0Dh	Analog Input 1 Scale Factor: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 1 in Configuration 1. The values contained are mode dependent and require a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

44.0Fh	Analog Input 2 Offset: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	DAI	Read / Write	Yes

Description:

Contains a value corresponding to the Analog Input 2 Offset in Configuration 1.

To convert the desired Offset Voltage to the appropriate value do the following:

Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.

44.10h	Analog Input 2 Scale Factor: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 2 in Configuration 1. This value is mode dependent and requires a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

44.12h	Analog Input 3 Offset: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	DAI	Read / Write	Yes

Description:

Contains a value corresponding to the Analog Input 3 Offset in Configuration 1.

To convert the desired Offset Voltage to the appropriate value do the following:

Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.

44.13h	Analog Input 3 Scale Factor: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 3 in Configuration 1. The value is mode dependent and requires a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

44.15h	Analog Input 4 Offset: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	DAI	Read / Write	Yes

Description:

Contains a value corresponding to the Analog Input 4 Offset in Configuration 1.

To convert the desired Offset Voltage to the appropriate value do the following:

Multiply Voltage (in decimal) by 819.2 and ignore any resulting fractional part. Now convert this decimal value to hexadecimal.

44.16h	Analog Input 4 Scale Factor: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:

Contains a value corresponding to the scale factor for analog input 4 in Configuration 1. The value is mode dependent and requires a different algorithm to calculate for each mode.

Assigned to Current Loop Example: Desired scale factor = (X Amps / 1 Volt)

(X Amps * 10 * 2^18) / Drive Peak Current = Value in decimal; convert to hex.

Assigned to Velocity Loop Example: Desired Scale factor = (X cnts/sec / 1 Volt)

Convert X cnts/sec → Y cnts/100us by dividing by 10000.

Now multiply: Ycnts * 20 * 2^18 = Value in Decimal; convert to hex.

Assigned to Position Loop Example: Desired Scale Factor = (X cnts / 1 Volt)

Now Multiply: X cnts * 80 = Value in Decimal; convert to hex.

Assigned to Current Limit Example: Desired Scale Factor = (X % of drive peak / 1 Volt)

Cannot achieve a value higher than 20% / 1 Volt.

Now Multiply X * 2^18 / 5 = Value in Decimal; convert to hex.

Assigned to External Temperature: Desired Scale Factor = (X degrees C / 1 Volt)

Now multiply X *20 *2^18 = Value in Decimal; convert to hex

5Ch: Analog Output Parameters

5C.00h	Analog Output 1 Signal Select A			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:

Together with Signal Select B determines which internal drive parameter is assigned to analog output 1.

5C.01h	Analog Output 1 Signal Select B			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:

Together with Signal Select A determines which internal drive parameter is assigned to analog output 1.

5C.02h	Analog Output 1 Offset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes
Description: Analog output 1 offset.				

5C.03h	Analog Output 1 Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes
Description: Analog output 1 gain.				

5C.05h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

5C.06h	Analog Output 2 Signal Select A			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes
Description: Together with Signal Select B determines which internal drive parameter is assigned to analog output 2.				

5C.07h	Analog Output 2 Signal Select B			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes
Description: Together with Signal Select B determines which internal drive parameter is assigned to analog output 2.				

5C.08h	Analog Output 2 Offset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes
Description: Analog output 2 offset.				

5C.09h	Analog Output 2 Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes
Description: Analog output 2 gain.				

5C.0Bh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

40h: Programmable Limit Switch Parameters

40.00h	Programmable Limit Switch Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:

Defines the PLS mode and the signal that is monitored by PLS 1 and PLS 2.

Bit	Description
0...4	PLS input select bits. 0 = No Source, 1 = Measured Position, 2 = Demand Position
5...14	Reserved
15	A value of 1 enables linear mode. A value of 0 enables rotary mode.

40.01h	Programmable Limit Rollover Count			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 - [2^{(32)} - 1]$	N/A	Read / Write	Yes
Description: Contains the maximum value of the PLS position counter before rollover to zero.				

40.03h	PLS 1 Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:

Contains the limits and settings for PLS 1.

Bit	Description
0	PLS enable. 0 = disable, 1 = enable.
1	Output active level. 0 = active low, 1 = active high.
2	Repeat control. 0 = repeat count enabled, 1 = repeat count disabled (infinite repeat)
3	Pulse width control. 0 = pulse width based on position, 1 = pulse width based on time.
4-5	Pulse direction control. 0 = level sensitive / both directions, 1 = rising edge forward, 2 = falling edge reverse
6-7	Reserved. Write as 0.
8...15	Pulse repeat count. Total number of pulses in the pulse train = 1 + repeat count.

40.04h	PLS 1 Lower Position Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	counts	Read / Write	Yes

Description:

Contains the value of the lower PLS 1 pulse edge.

For rotary mode: Lower Position ≥ 0

For linear mode: Any 32 bit value

40.06h	PLS 1 Upper Position Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	counts	Read / Write	Yes

Description:

Contains the value of the upper PLS 1 pulse edge. Upper Position ≥ Lower Position.

40.08h	PLS 1 Repeat Delta Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	counts	Read / Write	Yes

Description:

Contains the number of counts between repeating pulses. Repeat Delta Value > (Upper Position - Lower Position)

40.0Ah	PLS 1 Pulse Width Time Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - [$2^{(16)}$ –1]	-	Read / Write	Yes

Description:

Used with time-based PLS. Contains the pulse width of PLS 1 in terms of time. Measured in number of position loop samples (or switching frequency/2).

40.0Bh	PLS 2 Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:

Contains the limits and settings for PLS 2.

Bit	Description
0	PLS enable. 0 = disable, 1 = enable.
1	Output active level. 0 = active low, 1 = active high.
2	Repeat control. 0 = repeat count enabled, 1 = repeat count disabled (infinite repeat)
3	Pulse width control. 0 = pulse width based on position, 1 = pulse width based on time.
4-5	Pulse direction control. 0 = level sensitive / both directions, 1 = rising edge forward, 2 = falling edge reverse
6-7	Reserved. Write as 0.
8...15	Pulse repeat count. Total number of pulses in the pulse train = 1 + repeat count.

40.0Ch	PLS 2 Lower Position Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	counts	Read / Write	Yes

Description:

Contains the value of the lower PLS 2 pulse edge.

For rotary mode: Lower Position ≥ 0

For linear mode: Any 32 bit value

40.0Eh	PLS 2 Upper Position Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	counts	Read / Write	Yes

Description:

Contains the value of the upper PLS 2 pulse edge. Upper Position ≥ Lower Position.

40.10h	PLS 2 Repeat Delta Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - [$2^{(32)}$ –1]	counts	Read / Write	Yes
Description:				
Contains the number of counts between repeating pulses. Repeat Delta Value > (Upper Position - Lower Position)				

40.12h	PLS 2 Pulse Width Time Window			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - [$2^{(16)}$ –1]	-	Read / Write	Yes
Description:				
Used with time-based PLS. Contains the pulse width of PLS 2 in terms of time. Measured in number of position loop samples (or switching frequency/2).				

3Dh: Deadband Parameters

Some deadband parameters have units that vary with the operating mode of the drive. For these parameters, refer to Table 2.8 for the correct unit selection.

TABLE 2.8 Deadband Units

Drive Operation Mode	Units
Current (Torque)	DC2
Velocity	DS1
Position (Around Velocity Or Current)	counts

3D.00h	Deadband Type: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 1	N/A	Read / Write	Yes
Description:				
Deadband Type for Configuration 0.				

Value (Hex)	Description
0	Non-linear (starts smoothly after reaching end of deadband)
1	Linear (jumps to command after reaching end of deadband)

3D.01h	Deadband Width: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	See Table 2.8	Read / Write	Yes
Description: The width from the midpoint to one end of the deadband for Configuration 0. Therefore, the total width is 2X this value.				

3D.03h	Deadband Set Point: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}]$ – $[2^{(31)}-1]$	See Table 2.8	Read / Write	Yes
Description: Midpoint of the deadband for Configuration 0.				

3D.05h	Deadband Type: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 1	N/A	Read / Write	Yes

Description:

Deadband Type for Configuration 1.

Value (Hex)	Description
0	Non-linear (starts smoothly after reaching end of deadband)
1	Linear (jumps to command after reaching end of deadband)

3D.06h	Deadband Width: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – $[2^{(31)}-1]$	See Table 2.8	Read / Write	Yes
Description: The width from the midpoint to one end of the deadband for Configuration 1. Therefore, the total width is 2X this value.				

3D.08h	Deadband Set Point: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}]$ – $[2^{(31)}-1]$	See Table 2.8	Read / Write	Yes
Description: Midpoint of the deadband for Configuration 1.				

3Eh: Jog Parameters

3E.00h	Maximum Jog Acceleration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$1 – [2^{(31)}-1]$	DA4	Read / Write	Yes
Description: Sets the maximum acceleration for the selected Jog.				

3E.02h	Maximum Jog Deceleration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$1 – [2^{(31)}-1]$	DA4	Read / Write	Yes
Description: Sets the maximum deceleration for the selected jog.				

3E.04h	Jog Speed 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$1 – [2^{(31)}-1]$	DS1	Read / Write	Yes
Description: Sets the target speed for Jog 0.				

3E.06h	Jog Speed 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$1 – [2^{(31)}-1]$	DS1	Read / Write	Yes
Description: Sets the target speed for Jog 1.				

3E.08h	Jog Speed 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$1 – [2^{(31)}-1]$	DS1	Read / Write	Yes
Description: Sets the target speed for Jog 2.				

3E.0Ah	Jog Speed 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$1 – [2^{(31)}-1]$	DS1	Read / Write	Yes
Description: Sets the target speed for Jog 3.				

62h: Braking/Stop General Properties

62.00h	Braking: Delay After Applying Brake			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: Specifies the delay, in milliseconds, after applying the external brake before disabling the power bridge or dynamic braking.				

62.01h	Braking: Delay Before Disengaging Brake			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: Specifies the delay, in milliseconds, before releasing the external brake after enabling the power bridge or discontinuing dynamic braking.				

62.02h	Stop Deceleration Limit Position Mode			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	1 - [$2^{(31)}$ –1]	DA1	Read / Write	Yes
Description: Specifies the maximum position mode deceleration during a controlled stop event (Stop). See "Appendix A" on page 186 for unit conversion details.				

62.04h	Stop Deceleration Limit Velocity Mode			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	1 - [$2^{(31)}$ –1]	DA1	Read / Write	Yes
Description: Specifies the maximum velocity mode deceleration during a controlled stop event (Stop). See "Appendix A" on page 186 for unit conversion details.				

62.06h	Stop Jerk Limit Current Mode			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	1 - [$2^{(31)}$ –1]	DJ1	Read / Write	Yes
Description: Sets the rate at which the target current ramps down during a stop event. Only valid for current mode. See "Appendix A" on page 186 for unit conversion details.				

64h: Event Response Time Parameters

64.00h	Event Response Time: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Motor Over Temperature before its Event Action (65h) is executed. The last bit (bit 15) is reserved for disabling/enabling the drive, making this an Unsigned15 in actual practice.				

64.01h	Event Response Time: Feedback Sensor Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a Feedback Sensor Error before its Event Action (65h) is executed.				

64.02h	Event Response Time: Log Entry Missed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a Log Entry Missed before its Event Action (65h) is executed.				

64.03h	Event Response Time: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a User Disable before the power bridge is disabled.				

64.04h	Event Response Time: Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a Positive Limit input before its Event Action (65h) is executed.				

64.05h	Event Response Time: Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a Negative Limit input before its Event Action (65h) is executed.				

64.06h	Event Response Time: Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	Milliseconds	Read / Write	Yes
Description: The time delay after the occurrence of Current Limiting before its Event Action (65h) is executed.				

64.07h	Event Response Time: Continuous Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of reaching the Continuous Current setting before its Event Action (65h) is executed.				

64.08h	Event Response Time: Current Loop Saturated			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Current Loop Saturated before its Event Action (65h) is executed.				

64.09h	Event Response Time: User Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of User Under Voltage before its Event Action (65h) is executed.				

64.0Ah	Event Response Time: User Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a user-specified Over Voltage level before its Event Action (65h) is executed.				

64.0Bh	Event Response Time: Motor Over Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Motor Over Speed before its Event Action (65h) is executed.				

64.0Ch	Event Response Time: User Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a User Auxiliary Disable input before the bridge is disabled.				

64.0Dh	Event Response Time: Shunt Regulator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Shunt Regulator activity before its Event Action (65h) is executed.				

64.0Eh	Event Response Time: Command Limiter Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Command Limiter Active before its Event Action (65h) is executed.				

64.0Fh	Event Response Time: At Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of At Command before its Event Action (65h) is executed.				

64.10h	Event Response Time: Zero Velocity			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Zero Velocity before its Event Action (65h) is executed.				

64.11h	Event Response Time: Velocity Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Velocity Following Error before its Event Action (65h) is executed.				

64.12h	Event Response Time: Positive Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Positive Velocity Limit before its Event Action (65h) is executed.				

64.13h	Event Response Time: Negative Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Negative Velocity Limit before its Event Action (65h) is executed.				

64.14h	Event Response Time: At Home Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of At Home Position before its Event Action (65h) is executed.				

64.15h	Event Response Time: Position Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Position Following Error before its Event Action (65h) is executed.				

64.16h	Event Response Time: Max Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(15)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Max Target Position Limit before its Event Action (65h) is executed.				

64.17h	Event Response Time: Min Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Min Target Position Limit before its Event Action (65h) is executed.				

64.18h	Event Response Time: Max Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Maximum Measured Position Limit before its Event Action (65h) is executed.				

64.19h	Event Response Time: Min Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Minimum Measured Position Limit before its Event Action (65h) is executed.				

64.1Ah	Event Response Time: PVT Buffer Full			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of PVT Buffer Full before its Event Action (65h) is executed.				

64.1Bh	Event Response Time: PVT Buffer Empty			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of PVT Buffer Empty before its Event Action (65h) is executed.				

64.1Ch	Event Response Time: PVT Buffer Threshold			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of PVT Buffer Threshold before its Event Action (65h) is executed.				

64.1Dh	Event Response Time: PVT Buffer Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of PVT Buffer Failure before its Event Action (65h) is executed.				

64.1Eh	Event Response Time: PVT Buffer Empty Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of PVT Buffer Empty Stop before its Event Action (65h) is executed.				

64.1Fh	Event Response Time: PVT Sequence Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of PVT Sequence Number before its Event Action (65h) is executed.				

64.20h	Event Response Time: Communication Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of Communication Error before its Event Action (65h) is executed.				

64.21h	Event Response Time: User Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of a User Stop command before stopping the motor.				

64.22h	Event Response Time: PWM and Direction Broken Wire			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(15)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after the occurrence of PWM and Direction Broken Wire before its Event Action (65h) is executed.				

65h: Event Action Parameters

65.00h	Event Action: Parameter Restore Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Parameter Restore Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.01h	Event Action: Parameter Store Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Parameter Store Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.02h	Event Action: Invalid Hall State			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after an Invalid Hall State. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.03h	Event Action: Phase Synch Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Phase Synch Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.04h	Event Action: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Motor Over Temperature. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.05h	Event Action: Feedback Sensor Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Feedback Sensor Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.06h	Event Action: Log Entry Missed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Log Entry Missed. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.07h	Event Action: Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Current Limiting. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.08h	Event Action: Continuous Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Continuous Current. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.09h	Event Action: Current Loop Saturated			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after Current Loop Saturated. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.0Ah	Event Action: User Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a User Under Voltage. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.0Bh	Event Action: User Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a User Over Voltage. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.0Ch	Event Action: Shunt Regulator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after Shunt Regulator active. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.0Dh	Event Action: Command Limiter Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after Command Limiter Active. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.0Eh	Event Action: Motor Over Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Motor Over Speed. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.0Fh	Event Action: At Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after an At Command state. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.10h	Event Action: Zero Velocity			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Zero Velocity state. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.11h	Event Action: Velocity Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Velocity Following Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.12h	Event Action: Positive Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Positive Velocity Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.13h	Event Action: Negative Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Negative Velocity Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.14h	Event Action: Max Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Max Measured Position Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.15h	Event Action: Min Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Min Measured Position Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.16h	Event Action: At Home Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after an At Home Position state. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.17h	Event Action: Position Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Position Following Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.18h	Event Action: Max Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Max Target Position Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.19h	Event Action: Min Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Min Target Position Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.1Ah	Event Action: PVT Buffer Full			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a PVT Buffer Full status. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.1Bh	Event Action: PVT Buffer Empty			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a PVT Buffer Empty status. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.1Ch	Event Action: PVT Buffer Threshold			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after reaching PVT Buffer Threshold. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.1Dh	Event Action: PVT Buffer Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a PVT Buffer Failure. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.1Eh	Event Action: PVT Buffer Empty Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a PVT Buffer Empty Stop. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.1Fh	Event Action: PVT Sequence Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a PVT Sequence Number. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.20h	Event Action: Comm Channel Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Comm Channel Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.21h	Event Action: User Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a User Positive Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.22h	Event Action: User Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a User Negative Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.23h	Event Action: Drive Reset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Drive Reset. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.24h	Event Action: Drive Internal Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Drive Internal Error. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.25h	Event Action: Short Circuit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Short Circuit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.26h	Event Action: Current Overshoot			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Current Overshoot. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.27h	Event Action: Hardware Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Hardware Under Voltage. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.28h	Event Action: Hardware Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Hardware Over Voltage. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.29h	Event Action: Drive Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Drive Over Temperature. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.2Ah	Event Action: Software Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Software Disable. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.2Bh	Event Action: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a User Disable. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.2Ch	Event Action: User Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a User Auxiliary Disable. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.2Dh	Event Action: Phase Detection Fault			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Phase Detection Fault. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.2Eh	Event Action: Commanded Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Commanded Positive Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.2Fh	Event Action: Commanded Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a Commanded Negative Limit. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

65.30h	Event Action: PWM and Direction Broken Wire			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read / Write	Yes
Description: The action of the drive immediately after a PWM and Direction Broken Wire. Refer to the table below (Table 2.10) for the valid event actions and their respective values.				

TABLE 2.9 Event Action Values Definition

Event Action Values	Hex Values	Event Actions
0	00h	No Action
1	01h	Disable Power Bridge
2	02h	Disable Positive Direction
3	03h	Disable Negative Direction
4	04h	Dynamic Brake
5	05h	Positive Stop
6	06h	Negative Stop
7	07h	Stop
8	08h	Apply Brake **then** Disable Bridge
9	09h	Apply Brake **then** Dynamic Brake
10	0Ah	Apply Brake **and** Disable Bridge
11	0Bh	Apply Brake **and** Dynamic Brake

TABLE 2.10 Event Action Options

Sub Index	Event	Valid Event Action Values (refer to Table 2.9 for value definitions)											
00h	Parameter Restore Error	-	1	-	-	4	-	-	-	8	9	10	11
01h	Parameter Store Error	-	1	-	-	4	-	-	-	8	9	10	11
02h	Invalid Hall State	-	1	-	-	4	-	-	-	8	9	10	11
03h	Phase Synch Error	0	1	-	-	4	-	-	-	8	9	10	11
04h	Motor Over Temperature	0	1	2	3	4	5	6	7	8	9	10	11
05h	Feedback Sensor Error	0	1	2	3	4	5	6	7	8	9	10	11
06h	Log Entry Missed	0	1	2	3	4	5	6	7	8	9	10	11
07h	Current Limiting	0	1	2	3	4	5	6	7	8	9	10	11
08h	Continuous Current	0	1	2	3	4	5	6	7	8	9	10	11
09h	Current Loop Saturated	0	1	2	3	4	5	6	7	8	9	10	11
0Ah	User Under Voltage	0	1	2	3	4	5	6	7	8	9	10	11
0Bh	User Over Voltage	0	1	2	3	4	5	6	7	8	9	10	11
0Ch	Shunt Regulator	0	1	-	-	4	-	-	-	8	9	10	11
0Dh	Command Limiter Active	0	-	-	-	-	-	-	-	-	-	-	-
0Eh	Motor Over Speed	0	1	2	3	4	5	6	7	8	9	10	11
0Fh	At Command	0	1	2	3	4	5	6	7	8	9	10	11
10h	Zero Velocity	0	-	-	-	-	-	-	-	-	-	-	-
11h	Velocity Following Error	0	1	2	3	4	5	6	7	8	9	10	11
12h	Positive Velocity Limit	0	1	2	3	4	5	6	7	8	9	10	11
13h	Negative Velocity Limit	0	1	2	3	4	5	6	7	8	9	10	11
14h	Max Measured Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
15h	Min Measured Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
16h	At Home Position	0	-	-	-	-	-	-	-	-	-	-	-
17h	Position Following Error	0	1	2	3	4	5	6	7	8	9	10	11
18h	Max Target Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
19h	Min Target Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
1Ah	PVT Buffer Full	0	1	2	3	4	5	6	7	8	9	10	11
1Bh	PVT Buffer Empty	0	1	2	3	4	5	6	7	8	9	10	11
1Ch	PVT Buffer Threshold	0	1	2	3	4	5	6	7	8	9	10	11
1Dh	PVT Buffer Failure	0	1	2	3	4	5	6	7	8	9	10	11

1Eh	PVT Buffer Empty Stop	0	1	2	3	4	5	6	7	8	9	10	11
1Fh	PVT Sequence Number	0	1	2	3	4	-	-	-	8	9	10	11
20h	Comm Channel Error	0	1	2	3	4	5	6	7	8	9	10	11
21h	User Positive Limit	-	-	2	-	-	5	-	-	-	-	-	-
22h	User Negative Limit	-	-	-	3	-	-	6	-	-	-	-	-
23h	Drive Reset	-	1	-	-	-	-	-	-	-	-	10	-
24h	Drive Internal Error	-	1	-	-	-	-	-	-	-	-	10	-
25h	Short Circuit	-	1	-	-	-	-	-	-	-	-	10	-
26h	Current Overshoot	-	1	-	-	-	-	-	-	-	-	10	-
27h	Hardware Under Voltage	-	1	-	-	-	-	-	-	-	-	10	-
28h	Hardware Over Voltage	-	1	-	-	4	-	-	-	-	-	10	-
29h	Drive Over Temperature	-	1	-	-	-	-	-	-	-	-	10	-
2Ah	Software Disable	-	1	-	-	-	-	-	-	8	-	10	-
2Bh	User Disable	-	1	-	-	-	-	-	-	8	-	10	-
2Ch	User Auxiliary Disable	-	2	-	-	4	-	-	-	8	9	10	11
2Dh	Phase Detection Fault	-	1	-	-	-	-	-	-	8	-	10	-
2Eh	Commanded Positive Limit	-	-	2	-	-	5	-	-	-	-	-	-
2Fh	Commanded Negative Limit	-	-	-	3	-	-	6	-	-	-	-	-
30h	PWM and DIR Broken Wire	0	1	2	3	4	5	6	7	-	-	-	-

66h: Event Recovery Time Parameters

66.00h	Event Recovery Time: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Motor Over Temperature is no longer true before its Event Action (65h) is removed.				

66.01h	Event Recovery Time: Feedback Sensor Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Feedback Sensor Error is no longer true before its Event Action (65h) is removed.				

66.02h	Event Recovery Time: Log Entry Missed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Log Entry Missed is no longer true before its Event Action (65h) is removed.				

66.03h	Event Recovery Time: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after User Disable is no longer true before its Event Action (65h) is removed.				

66.04h	Event Recovery Time: Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Positive Limit is no longer true before its Event Action (65h) is removed.				

66.05h	Event Recovery Time: Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Negative Limit is no longer true before its Event Action (65h) is removed.				

66.06h	Event Recovery Time: Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Current Limiting is no longer true before its Event Action (65h) is removed.				

66.07h	Event Recovery Time: Continuous Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Continuous Current Limiting is no longer true before its Event Action (65h) is removed.				

66.08h	Event Recovery Time: Current Loop Saturated			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Current Loop Saturated status is no longer true before its Event Action (65h) is removed.				

66.09h	Event Recovery Time: User Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after User Under Voltage is no longer true before its Event Action (65h) is removed.				

66.0Ah	Event Recovery Time: User Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after User Over Voltage is no longer true before its Event Action (65h) is removed.				

66.0Bh	Event Recovery Time: User Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after User Auxiliary Disable is no longer true before its Event Action (65h) is removed.				

66.0Ch	Event Recovery Time: Shunt Regulator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Shunt Regulator active is no longer true before its Event Action (65h) is removed.				

66.0Dh	Event Recovery Time: Command Limiter Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Command Limiter Active is no longer true before its Event Action (65h) is removed.				

66.0Eh	Event Recovery Time: Motor Over Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Motor Over Speed is no longer true before its Event Action (65h) is removed.				

66.0Fh	Event Recovery Time: At Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after At Command is no longer true before its Event Action (65h) is removed.				

66.10h	Event Recovery Time: Zero Velocity			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Zero Velocity is no longer true before its Event Action (65h) is removed.				

66.11h	Event Recovery Time: Velocity Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Velocity Following Error is no longer true before its Event Action (65h) is removed.				

66.12h	Event Recovery Time: Positive Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Positive Velocity Limit is no longer true before its Event Action (65h) is removed.				

66.13h	Event Recovery Time: Negative Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Negative Velocity Limit is no longer true before its Event Action (65h) is removed.				

66.14h	Event Recovery Time: Max Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Max Measured Position Limit status is no longer true before its Event Action (65h) is removed.				

66.15h	Event Recovery Time: Min Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Min Measured Position Limit status is no longer true before its Event Action (65h) is removed.				

66.16h	Event Recovery Time: At Home Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after no longer At Home Position before its Event Action (65h) is removed.				

66.17h	Event Recovery Time: Position Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Position Following Error is no longer true before its Event Action (65h) is removed.				

66.18h	Event Recovery Time: Max Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Max Target Position Limit is no longer true before its Event Action (65h) is removed.				

66.19h	Event Recovery Time: Min Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Min Target Position Limit is no longer true before its Event Action (65h) is removed.				

66.1Ah	Event Recovery Time: PVT Buffer Full			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after PVT Buffer Full is no longer true before its Event Action (65h) is removed.				

66.1Bh	Event Recovery Time: PVT Buffer Empty			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after PVT Buffer Empty is no longer true before its Event Action (65h) is removed.				

66.1Ch	Event Recovery Time: PVT Buffer Threshold			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after PVT Buffer Threshold is no longer true before its Event Action (65h) is removed.				

66.1Dh	Event Recovery Time: PVT Buffer Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after PVT Buffer Failure is no longer true before its Event Action (65h) is removed.				

66.1Eh	Event Recovery Time: PVT Buffer Empty Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after PVT Buffer Empty Stop is no longer true before its Event Action (65h) is removed.				

66.1Fh	Event Recovery Time: PVT Sequence Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after PVT Sequence Number error is no longer true before its Event Action (65h) is removed.				

66.20h	Event Recovery Time: Communication Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description: The time delay after Communication Error is no longer true before its Event Action (65h) is removed.				

66.21h	Event Recovery Time: User Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after User Stop is no longer true before it is considered no longer active.				

66.22h	Event Recovery Time: PWM and Direction Broken Wire			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time delay after PWM and Direction Broken Wire is no longer true before it is considered no longer active.				

67h: Event Time-Out Window Parameters

67.00h	Event Time-Out Window: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Motor Over Temperature as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.01h	Event Time-Out Window: Feedback Sensor Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Feedback Sensor Error as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.02h	Event Time-Out Window: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description: The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a User Disable as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.03h	Event Time-Out Window: User Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Positive Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.04h	Event Time-Out Window: User Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Negative Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.05h	Event Time-Out Window: Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of Current Limiting as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.06h	Event Time-Out Window: Continuous Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of Continuous Current as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.07h	Event Time-Out Window: Current Loop Saturated			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Current Loop Saturated as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.08h	Event Time-Out Window: User Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a User Under Voltage as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.09h	Event Time-Out Window: User Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a User Over Voltage as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.0Ah	Event Time-Out Window: User Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a User Auxiliary Disable as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.0Bh	Event Time-Out Window: Shunt Regulator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Shunt Regulator as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.0Ch	Event Time-Out Window: Command Limiter Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Command Limiter Active as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.0Dh	Event Time-Out Window: Motor Over Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Motor Over Speed as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.0Eh	Event Time-Out Window: At Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of At Command as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.0Fh	Event Time-Out Window: Zero Velocity			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of Zero Velocity as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.10h	Event Time-Out Window: Velocity Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Velocity Following Error as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.11h	Event Time-Out Window: Positive Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Positive Velocity Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.12h	Event Time-Out Window: Negative Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Negative Velocity Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.13h	Event Time-Out Window: Max Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of Max Measured Position Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.14h	Event Time-Out Window: Min Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of Min Measured Position Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.15h	Event Time-Out Window: At Home Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of At Home Position as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.16h	Event Time-Out Window: Position Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Position Following Error as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.17h	Event Time-Out Window: Max Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of Max Target Position Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.18h	Event Time-Out Window: Min Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of Min Target Position Limit as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.19h	Event Time-Out Window: PVT Buffer Full			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a PVT Buffer Full as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.1Ah	Event Time-Out Window: PVT Buffer Empty			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a PVT Buffer Empty as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.1Bh	Event Time-Out Window: PVT Buffer Threshold			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a PVT Buffer Threshold as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.1Ch	Event Time-Out Window: PVT Buffer Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a PVT Buffer Failure as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.1Dh	Event Time-Out Window: PVT Buffer Empty Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a PVT Buffer Empty Stop as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.1Eh	Event Time-Out Window: PVT Sequence Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a PVT Sequence Number as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.1Fh	Event Time-Out Window: Communication Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a Communication Error as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.20h	Event Time-Out Window: User Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of a User Stop as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

67.21h	Event Time-Out Window: PWM and Direction Broken Wire			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	milliseconds (ms)	Read / Write	Yes
Description:				
The time, after the Recovery Time (66h) and subsequent removal of the event action, during which the drive will NOT consider an occurrence of PWM & Dir Broken Wire as a new occurrence. The Event Action (65h) will still be applied in case an event does occur within this window. However, that occurrence will not be counted as a new occurrence with regard to the Maximum Recoveries (68h) attribute.				

68h: Event Maximum Recoveries Parameters

68.00h	Event Maximum Recoveries: Short Circuit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes
Description:				
Each occurrence of a Short Circuit performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Short Circuit event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.				

68.01h	Event Maximum Recoveries: Hardware Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes
Description:				
Each occurrence of a Hardware Under Voltage performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Hardware Under Voltage event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.				

68.02h	Event Maximum Recoveries: Hardware Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Hardware Over Voltage performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Hardware Over Voltage event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.03h	Event Maximum Recoveries: Drive Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Drive Over Temperature performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Drive Over Temperature event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.04h	Event Maximum Recoveries: Invalid Hall State			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of an Invalid Hall State performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Invalid Hall State event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.05h	Event Maximum Recoveries: Phase Synchronization Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Phase Synchronization Error performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Phase Synchronization Error event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.06h	Event Maximum Recoveries: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Motor Over Temperature performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Motor Over Temperature event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.07h	Event Maximum Recoveries: Phase Detection Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Phase Detection Failure performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Phase Detection Failure event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.08h	Event Maximum Recoveries: Feedback Sensor Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Feedback Sensor Error performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Feedback Sensor Error event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.09h	Event Maximum Recoveries: Log Entry Missed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Log Entry Missed performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Log Entry Missed event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.0Ah	Event Maximum Recoveries: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a User Disable performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the User Disable event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.0Bh	Event Maximum Recoveries: User Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Positive Limit performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Positive Limit event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.0Ch	Event Maximum Recoveries: User Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Negative Limit performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Negative Limit event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.0Dh	Event Maximum Recoveries: Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Current Limiting performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Current Limiting event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.0Eh	Event Maximum Recoveries: Continuous Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Continuous Current Limiting performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Continuous Current Limiting event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.0Fh	Event Maximum Recoveries: Current Loop Saturated			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Current Loop Saturated performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Current Loop Saturated event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.10h	Event Maximum Recoveries: User Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a User Under Voltage performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the User Under Voltage event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.11h	Event Maximum Recoveries: User Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a User Over Voltage performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the User Over Voltage event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.12h	Event Maximum Recoveries: User Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a User Auxiliary Disable performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the User Auxiliary Disable event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.13h	Event Maximum Recoveries: Shunt Regulator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Shunt Regulator performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Shunt Regulator event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.14h	Event Maximum Recoveries: Command Limiter Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Command Limiter Active performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Command Limiter Active event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.15h	Event Maximum Recoveries: Motor Over Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of a Motor Over Speed performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Motor Over Speed event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.16h	Event Maximum Recoveries: At Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of At Command performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the At Command event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.17h	Event Maximum Recoveries: Zero Velocity			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Zero Velocity performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Zero Velocity event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.18h	Event Maximum Recoveries: Velocity Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Velocity Following Error performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Velocity Following Error event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.19h	Event Maximum Recoveries: Positive Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Positive Velocity Limit performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Positive Velocity Limit event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.1Ah	Event Maximum Recoveries: Negative Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Negative Velocity Limit performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Negative Velocity Limit event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.1Bh	Event Maximum Recoveries: Max Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Max Measured Position performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Max Measured Position event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.1Ch	Event Maximum Recoveries: Min Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Min Measured Position performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Min Measured Position event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.1Dh	Event Maximum Recoveries: At Home Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of At Home Position performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the At Home Position event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.1Eh	Event Maximum Recoveries: Position Following Errors			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Position Following Errors performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Position Following Errors event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.1Fh	Event Maximum Recoveries: Max Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Max Target Position performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Max Target Position event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.20h	Event Maximum Recoveries: Min Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Min Target Position performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Min Target Position event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.21h	Event Maximum Recoveries: PVT Buffer Full			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of PVT Buffer Full performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the PVT Buffer Full event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.22h	Event Maximum Recoveries: PVT Buffer Empty			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of PVT Buffer Empty performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the PVT Buffer Empty event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.23h	Event Maximum Recoveries: PVT Buffer Threshold			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of PVT Buffer Threshold performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the PVT Buffer Threshold event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.24h	Event Maximum Recoveries: PVT Buffer Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of PVT Buffer Failure performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the PVT Buffer Failure event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.25h	Event Maximum Recoveries: PVT Buffer Empty Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of PVT Buffer Empty Stop performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the PVT Buffer Empty Stop event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.26h	Event Maximum Recoveries: PVT Sequence Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of PVT Buffer Sequence Number performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the PVT Buffer Sequence Number event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.27h	Event Maximum Recoveries: Communication Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Communication Error performs the action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Communication Error event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.28h	Event Maximum Recoveries: User Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of User Stop performs the event action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the User Stop event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.29h	Event Maximum Recoveries: PWM and Direction Broken Wire			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of PWM and Direction Broken Wire performs the event action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the PWM and Direction Broken Wire event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

68.2Ah	Event Maximum Recoveries: Motion Engine Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 65535	N/A	Read / Write	Yes

Description:

Each occurrence of Motion Engine Error performs the event action assigned to this event. Each time the event is removed for longer than the addition of the values in the Time-Out Window (67h) and Recovery Time (66h), a recovery counter is incremented. This command sets the maximum recovery count allowed before the Motion Engine Error event latches and must be actively reset in order to enable the bridge. Re-setting the recovery counter requires a connection to the AMC drive configuration software appropriate for this drive. For more information on event handling, see the Help file associated with the AMC drive configuration software.

8Ch: Product Information

8C.00h	Hardware Information			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(352)	ASCII	N/A	Read Only	Yes

Description:

Provides all the drive information in a single 352-byte string. The meaning of each byte in the string is divided into sections according to the following table. Bytes 2 through 33 provide the "Control Board Name" for example.

Byte Definitions	Description
0...1	Reserved
2...33	Control Board Name
34...65	Control Board Version
66...97	Control Board Serial Number
98...129	Control Board Build Date
130...161	Control Board Build Time
162...191	Reserved
192...223	Product Part Number (including revision letter)
224...255	Product Version
256...287	Product Serial Number
288...319	Product Build Date
320...351	Product Build Time

8Dh: Firmware Information

8D.00h	Firmware Version			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	ASCII	N/A	Read Only	Yes

Description:

Returns a 32-byte string containing the firmware version that is currently running on the drive.

8D.10h	Bootloader Version			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	ASCII	N/A	Read Only	Yes
Description: Returns a 32-byte string containing the bootloader version that is currently running on the drive.				

8D.20h	FPGA-Image Version			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	ASCII	N/A	Read Only	Yes
Description: Returns a 32-byte string containing the FPGA-image version that is currently running on the drive.				

D8h: Power Board Information

D8.00h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.01h	Name			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	N/A	N/A	Read Only	Yes

D8.11h	Version			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	N/A	N/A	Read Only	Yes

D8.21h	Serial Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	N/A	N/A	Read Only	Yes

D8.31h	Build Date			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	N/A	N/A	Read Only	Yes

D8.41h	Build Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
String(32)	N/A	N/A	Read Only	Yes

D8.51h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.52h	DC Bus Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	PBV	Read Only	Yes

D8.53h	DC Bus Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	PBV	Read Only	Yes

D8.54h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	N/A	N/A	Read Only	Yes

D8.56h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	N/A	N/A	Read Only	Yes

D8.58h	Maximum Peak Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	PBC	Read Only	Yes

D8.59h	Maximum Continuous Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	PBC	Read Only	Yes

D8.5Ah	Maximum Peak Current Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	PBT	Read Only	Yes

D8.5Bh	Maximum Peak To Continuous Current Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	PBT	Read Only	Yes

D8.5Ch	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.5Dh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	N/A	N/A	Read Only	Yes

D8.5Fh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	N/A	N/A	Read Only	Yes

D8.61h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	N/A	N/A	Read Only	Yes

D8.63h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.64h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.65h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.66h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.67h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.68h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.69h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.6Ah	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.6Bh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.6Ch	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.6Dh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.6Eh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.6Fh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	N/A	N/A	Read Only	Yes

D8.70h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.71h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.72h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.73h	Switching Frequency			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	N/A	PBF	Read Only	Yes

D8.75h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.76h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.77h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.78h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.79h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.7Ah	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

D8.7Bh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	Yes

2.3 Drive Operation Commands

The following commands are typically used during operation. They are either used to perform specific tasks or to obtain information from the drive. These commands have been divided into the following three categories: Control Commands, Command Commands, and Monitor Commands.

2.3.1 Control Commands

01h: Control Parameters

01.00h	Drive Control Word 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 1FFFh	N/A	Read/Write	No

Description:

This bit field enables/disables certain drive functions according to the table below.

Bit	Name	Description
0	Software Disable	Causes the bridge to be disabled.
1	Zero Position Error	Sets the target position equal to the measured position
2	Phase Detect	Activates the phase detection routine.
3	Set Position	Causes the position counter to be loaded with the preset position value.
4	Motion Engine Enable	Causes the auxiliary input command counter to be loaded with the preset command value.
5	Home Execute	Causes the homing routine to be active.
6	Commanded Stop	Causes the drive to stop.
7	Capture 1 Arm	A change from 0 to 1 arms/rearms Capture unit 1. A change from 1 to 0 Disarms it.
8	Capture 2 Arm	A change from 0 to 1 arms/rearms Capture unit 2. A change from 1 to 0 Disarms it.
9	Capture 3 Arm	A change from 0 to 1 arms/rearms Capture unit 3. A change from 1 to 0 Disarms it.
10	Commanded Positive Limit	Activates positive limiting.
11	Commanded Negative Limit	Activates negative limiting.
12	Reset Events	Resets all but the following events: Current Overshoot, Parameter Restore Error, Parameter Store Error, Phase Detection Failure, Software Disable
13-15	Reserved	Read as zero / write as zero.

01.01h	Drive Control Word 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 1FFFh	N/A	Read/Write	No

Description:

This bit field enables/disables certain drive functions according to the table below.

Bit	Name	Description
0	Gain Parameters Set	A change from 0 to 1 selects Gain Set 1. A change from 1 to 0 selects Gain Set 0.
1	Command Limiter Parameters Set	A change from 0 to 1 selects Command Limiter Set 1. A change from 1 to 0 selects Command Limiter Set 0.
2	Command Source Modifier Set	A change from 0 to 1 selects Source Modifier Set 1. A change from 1 to 0 selects Source Modifier Set 0.
3	Jog Plus	Writing a 1 asserts Jog Plus. Writing a 0 deasserts Jog Plus.
4	Jog Minus	Writing a 1 asserts Jog Minus. Writing a 0 deasserts Jog Minus.
5	Jog Select 0	Writing a 1 sets bit 0 of the Jog Speed Select. Writing a 0 clears it.
6	Jog Select 1	Writing a 1 sets bit 1 of the Jog Speed Select. Writing a 0 clears it.
7 - 15	Reserved	Read as zero / write as zero.

01.02h	User Bit Control			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – FFFFh	N/A	Read / Write	No

Description:

Toggles the User Bits on or off by assigning a 1 or 0 to the appropriate bit. See the table below for bit assignment. Note that User Bits can be mapped to digital outputs through the configuration software or by directly configuring command 24h.

Bit	Assignment (1 = asserted, 0 = not asserted)
0	User Bit 0
1	User Bit 1
2	User Bit 2
3	User Bit 3
4	User Bit 4
5	User Bit 5
6	User Bit 6
7	User Bit 7
8	User Bit 8
9	User Bit 9
10	User Bit 10
11	User Bit 11
12	User Bit 12
13	User Bit 13
14	User Bit 14
15	User Bit 15

D1h: Mode Configuration

D1.00h	Mode Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 1FFFh	N/A	Read/Write	No

Description:

Defines the active configuration. The bit values are broken up as defined below.

Bit 0

0: Configuration 0 Active, Load Gains, Profiles, Filter, and Source Modifier configurations that have been mapped to Configuration 0.

1: Configuration 1 Active, Load Gains, Profiles, Filter and Source Modifier configurations that have been mapped to Configuration 1.

Bits 1:3

0: Use the loops specified by the selected configuration.

1: Torque Only

2: Velocity around Torque

3: Position around Torque

4: Position around Velocity around Torque

Bits 4:7

0: Use the limiter specified by the selected configuration.

1: None

2: First Difference Rate Limiter

3: Linear Interpolation

4: Accel/Decel

5: Camming

Bits 8:12 - Selects the Command Source Modifier to be used.

0: Use the source modifier specified by the selected configuration.

1: None

2: Dead band Only

3: Gearing Only

4: Dead band -> Gearing

5: Summation Node Only

6: Dead band -> Summation Node

7: Gearing -> Summation Node

8: Dead band -> Gearing -> Summation Node

Bits 13:14

0: Use loop offsets specified by the selected configuration

1: All loop offsets are Not Connected

2: All offsets are supplied by the Communication Channel

3: Stand Alone configuration

Bit 15

Reserved

D3h: Active Mode and Configuration

D3.00h	Active Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 1FFFh	N/A	Read Only	No

Description:

Defines the active configuration. The bit values are broken up as defined below.

Bits 0

0: Configuration 0 Active, Load Gains, Profiles, Filter, and Source Modifier configurations that have been mapped to Configuration 0.

1: Configuration 1 Active, Load Gains, Profiles, Filter and Source Modifier configurations that have been mapped to Configuration 1.

Bits 1:3

0: Use the loops specified by the selected configuration.

1: Torque Only

2: Velocity around Torque

3: Position around Torque

4: Position around Velocity around Torque

Bits4:7

0: Use the limiter specified by the selected configuration.

1: None

2: First Difference Rate Limiter

3: Linear Interpolation

4: Accel/Decel

5: Camming

Bits 8:12 - Selects the Command Source Modifier to be used.

0: Use the source modifier specified by the selected configuration.

1: None

2: Dead band Only

3: Gearing Only

4: Dead band -> Gearing

5: Summation Node Only

6: Dead band -> Summation Node

7: Gearing -> Summation Node

8: Dead band -> Gearing -> Summation Node

Bits 13:14

0: Use loop offsets specified by the selected configuration

1: All loop offsets are Not Connected

2: All offsets are supplied by the Communication Channel

3: Stand Alone configuration

Bit 15

Reserved

D3.02h	Active Mode Enum			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 1FFFh	N/A	Read Only	No

Description:

Defines the active configuration. The bit values are broken up as defined below.

Bits 0:15

0: Standby Mode

1: Homing Mode

2: Jog Mode

3: Motion Engine Mode

45h: Interface Inputs

Interface inputs can be used in place of analog inputs for any function that can be assigned to an analog input. Examples of this include command source, feedback source, and motor temperature source. The units for interface inputs are dependent upon the function the interface input is assigned to as given in Table 2.11. For details on unit conversion see "Appendix A" on page 186.

TABLE 2.11 Interface Input Units

Interface Input Function	Units
Position Command Source	counts
Velocity Command Source	DS1
Torque/Current Command Source	DC2
Position Feedback Source	counts
Velocity Feedback Source	DS1
Motor Temperature Source	DT1

45.00h	Interface Input 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No

Description:

Defines the value used with interface input 1.

45.02h	Interface Input 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No

Description:

Defines the value used with interface input 2.

45.04h	Interface Input 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No
Description: Defines the value used with interface input 3.				

45.06h	Interface Input 4			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No
Description: Defines the value used with interface input 4.				

45.08h	Interface Input 5			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No
Description: Defines the value used with interface input 5.				

45.0Ah	Interface Input 6			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No
Description: Defines the value used with interface input 6.				

45.0Ch	Interface Input 7			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No
Description: Defines the value used with interface input 7.				

45.0Eh	Interface Input 8			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.11	Read / Write	No
Description: Defines the value used with interface input 8.				

2.3.2 Motion Engine Command Objects

C9h: Motion Engine Control

C9.00h	Motion Engine Control Enum			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	N/A	N/A	Read/Write	No

Description:

Defines the startup behavior when running a motion engine index upon power-up. The bit values are broken up as defined below.

Bits 0:15 - Enumerated values

0: Select Motion (This enum is only used when motion is initiated via a digital input.)

1: Initiate Selected Motion (Run the index or sequence specified in the Motion Engine Control Data)

2: Abort Active Motion (No fault, Motion Engine will return to ready for motion start)

3: Reserved. Write zero.

4: Initiate Dynamic Index

5: Set Motion Select Source

6: Indexer / Sequencer Select

7-15: Reserved

Bits 16:31 - This is the data that is associated with each of the action enums above. The allowable values for each enum are as follows

0: Select Index - When the communication channel is the motion select source, the valid range is [0,15], otherwise it is an error

1: Initiate Selected Motion - When the communication channel is the motion select source, this value will be the motion that is initiated. Otherwise it will be ignored.

2: Abort Active Motion - Values are ignored

3: Reserved. Write zero.

4: Initiate Dynamic Index - Values are ignored

5: Set Motion Select Source - 0:Hardware, 1:Communication Channel - all other values are invalid

6: Indexer / Sequencer Select - When the communication channel is the motion select source, this value will be the motion type that is selected. Valid values are 0: Indexer, 1: Sequencer - all other values are invalid

7-15: Reserved

CAh: Dynamic Index Data

CA.00h	Move Index			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	-	Read / Write	No

Description:

When defining a dynamic index, this value should be set to 0x0020.

CA.01h	Move Type			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	-	Read / Write	No

Description:

Defines the type of move.

Value	Move Type
0x0008	Absolute
0x0018	Relative

CA.02h	Repeat Count			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	-	Read / Write	No

Description:

Specifies the number of times to repeat the move. Only valid for relative moves.

CA.03h	Dwell Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	milliseconds (ms)	Read / Write	No

Description:

Specifies the time after the move is complete before the Index Done status becomes active.

CA.04h	Position Target - Word 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	counts	Read / Write	No

Description:

The least significant word in the 2-word (32-bit) position command. Depending on the assigned move type, will apply to an absolute or relative position target.

CA.05h	Position Target - Word 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	counts	Read / Write	No

Description:

The most significant word in the 2-word (32-bit) position command. Depending on the assigned move type, will apply to an absolute or relative position target.

CA.06h	Max Velocity - Word 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DS3	Read / Write	No
Description: The least significant word in the 4-word (64-bit) maximum velocity value. See "Appendix A" on page 186 for unit conversion.				

CA.07h	Max Velocity - Word 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DS3	Read / Write	No
Description: The second word in the 4-word (64-bit) maximum velocity value. See "Appendix A" on page 186 for unit conversion.				

CA.08h	Max Velocity - Word 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DS3	Read / Write	No
Description: The third word in the 4-word (64-bit) maximum velocity value. See "Appendix A" on page 186 for unit conversion.				

CA.09h	Max Velocity - Word 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DS3	Read / Write	No
Description: The most significant word in the 4-word (64-bit) maximum velocity value. See "Appendix A" on page 186 for unit conversion.				

CA.0Ah	Max Acceleration - Word 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DA5	Read / Write	No
Description: The least significant word in the 2-word (32-bit) maximum acceleration value. See "Appendix A" on page 186 for unit conversion.				

CA.0Bh	Max Acceleration - Word 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DA5	Read / Write	No
Description: The most significant word in the 2-word (32-bit) maximum acceleration value. See "Appendix A" on page 186 for unit conversion.				

CA.0Ch	Max Deceleration - Word 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DA5	Read / Write	No
Description: The least significant word in the 2-word (32-bit) maximum deceleration value. See "Appendix A" on page 186 for unit conversion.				

CA.0Dh	Max Deceleration - Word 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - FFFFh	DA5	Read / Write	No
Description: The most significant word in the 2-word (32-bit) maximum deceleration value. See "Appendix A" on page 186 for unit conversion.				

CA.0Eh - CA.1Bh	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	-	-	-s	No

2.3.3 Monitor Commands

02h: Drive Status

02.00h	Drive Bridge Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The function of each bit is given in Table 2.12 below.				

02.01h	Drive Protection Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The function of each bit is given in Table 2.12 below.				

02.02h	System Protection Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The function of each bit is given in Table 2.12 below.				

02.03h	Drive/System Status 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The function of each bit is given in Table 2.12 below.				

02.04h	Drive/System Status 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The function of each bit is given in Table 2.12 below.				

02.05h	Drive/System Status 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The function of each bit is given in Table 2.12 below.				

02.06h	Active Configuration Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The function of each bit is given in Table 2.12 below.				

TABLE 2.12 Drive Status Bit-field Definitions

Bit	Drive Bridge Status	Drive Protection Status	System Protection Status	Drive System Status 1	Drive System Status 2	Drive System Status 3	Active Configuration Status
0	Bridge Enabled	Drive Reset	Parameter Restore Error	Log Entry Missed	Zero Velocity	PVT Buffer Full	Absolute Position Valid
1	Dynamic Brake Enabled	Drive Internal Error	Parameter Store Error	Software Disable	At Command	PVT Buffer Empty	Positive Stop Active
2	Stop Enabled	Short Circuit	Invalid Hall State	User Disable	Velocity Following Error	PVT Buffer Threshold	Negative Stop Active
3	Positive Stop Enabled	Current Overshoot	Phase Sync. Error	User Positive Inhibit	Positive Target Velocity Limit	PVT Buffer Failure	Reserved
4	Negative Stop Enabled	Under Voltage	Motor Over Temperature	User Negative Inhibit	Negative Target Velocity Limit	PVT Buffer Empty Stop	Reserved
5	Positive Torque Inhibit Active	Over Voltage	Phase Detection Fault	Current Limiting	Command Limiter Active	PVT Buffer Sequence Error	Reserved
6	Negative Torque Inhibit Active	Drive Over Temperature	Feedback Sensor Error	Continuous Current Foldback	In Home Position	Commanded Stop	Reserved
7	External Brake Active	Reserved	Motor Over Speed	Current Loop Saturated	Position Following Error	User Stop	Reserved
8	Reserved	Reserved	Max Measured Position	User Under Voltage	Max Target Position Limit	Capture 1 Active	Reserved
9	Reserved	Reserved	Min Measured Position	User Over Voltage	Min Target Position Limit	Capture 2 Active	Reserved
10	Reserved	Reserved	Comm. Error (Node Guarding)	Non-sinusoidal Commutation	Set Position Active	Capture 3 Active	Reserved
11	Reserved	Reserved	PWM & Dir Broken Wire	Phase Detection	Reserved	Commanded Positive Limit	Reserved
12	Reserved	Reserved	Motion Engine Error	Motion Engine Active	Homing Active	Commanded Negative Limit	Reserved
13	Reserved	Reserved	Motion Engine Abort	User Auxiliary Disable	Safe Torque Off Status	Reserved	Reserved
14	Reserved	Reserved	Reserved	Shunt Regulator	Homing Complete	Reserved	Reserved
15	Reserved	Reserved	Reserved	Phase Detect Done	Zero Position Error	Reserved	Reserved

03h: Drive Status History

03.00h	Drive Bridge Status History			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only*	No

Description:

If an event becomes active and then becomes inactive, Drive Status History will mark the event with a history bit. If a bit is 1, that event has occurred sometime in the past; 0 indicates the event has never occurred since power-up. The function of each bit is given in Table 2.12 of command 02h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

03.01h	Drive Protection Status History			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only*	No

Description:

If an event becomes active and then becomes inactive, Drive Status History will mark the event with a history bit. If a bit is 1, that event has occurred sometime in the past; 0 indicates the event has never occurred since power-up. The function of each bit is given in Table 2.12 of command 02h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

03.02h	System Protection Status History			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only*	No

Description:

If an event becomes active and then becomes inactive, Drive Status History will mark the event with a history bit. If a bit is 1, that event has occurred sometime in the past; 0 indicates the event has never occurred since power-up. The function of each bit is given in Table 2.12 of command 02h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

03.03h	Drive/System Status 1 History			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only*	No

Description:

If an event becomes active and then becomes inactive, Drive Status History will mark the event with a history bit. If a bit is 1, that event has occurred sometime in the past; 0 indicates the event has never occurred since power-up. The function of each bit is given in Table 2.12 of command 02h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

03.04h	Drive/System Status 2 History			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only*	No

Description:

If an event becomes active and then becomes inactive, Drive Status History will mark the event with a history bit. If a bit is 1, that event has occurred sometime in the past; 0 indicates the event has never occurred since power-up. The function of each bit is given in Table 2.12 of command 02h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

03.05h	Drive/System Status 3 History			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only*	No

Description:

If an event becomes active and then becomes inactive, Drive Status History will mark the event with a history bit. If a bit is 1, that event has occurred sometime in the past; 0 indicates the event has never occurred since power-up. The function of each bit is given in Table 2.12 of command 02h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

29h: Motion Engine Status

29.00h	Active Sequence			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	-2 - 15	N/A	Read Only	No

Description:

Displays the active sequence number when using motion engine sequencing.

Bits 0:7

0-15 for index 0 to 15

FE: Dynamic Index

FF: No Invalid Index

Bits 8:15

Reserved

29.01h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	N/A	N/A	Read Only	No

29.03h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	N/A	N/A	Read Only	No

29.04h	Motion Engine Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	0 - 9	N/A	Read Only	No

Description:

Defines the present state of the motion engine.

Value	Motion Engine State
0	Inactive
1	Waiting for Motion Start (Motion Engine is enabled and ready for an index)
2	Executing Motion (Index is currently running)
3	Program Load in Progress (Motion Engine is not ready for commanded index)
4	Program Load Failure - CRC Error (Problem loading Index. Must reset Motion Engine to continue)
5	Halt Asserted (Motion has been interrupted)
6	Single Step Active
7	Break Point Active
8	No Errors
9	Invalid Data Parameter (Problem loading Index. Must reset Motion Engine to continue)
10	Invalid Op-Code (Problem loading Index. Must reset Motion Engine to continue)
11	Invalid Op-code for Dynamic Motion (Problem with index parameters)
12	Invalid Reference Frame (Problem with index parameters)
13	Invalid Bridge State (Bridge must be enabled to begin indexed motion)
14	User Defined Fault

0Eh: Feedback Sensor Values

0E.00h	Primary Encoder Counts			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No

Description:

Contains the current number of encoder counts from the primary encoder. It is an absolute value in that it does not depend on the current load measured position or home values.

0E.02h	Latched Encoder/Resolver Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$0 - [2^{(32)} – 1]$	counts	Read Only	No

Description:

Contains a value corresponding to the latched encoder/resolver position.

0E.04h	Commutation Synchronization Counts			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description: Contains a value corresponding to the commutation synchronization counts.				

0E.06h	Hall Sensor Values			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} –1]$	N/A	Read Only	No
Description: Contains a value corresponding to the Hall sensor values.				

27h: Feedback Hardware Diagnostics

27.00h	Sin/Cos Encoder Sine			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	Volts (SF1)	Read Only	No
Description: Represents the differential voltage of the +/- sine input of a 1V peak-to-peak encoder. Only applicable to drives that support Sin/Cos encoders. See "Appendix A" on page 186 for information on scaling.				

27.01h	Sin/Cos Encoder Cosine			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	Volts (SF1)	Read Only	No
Description: Represents the differential voltage of the +/- cosine input of a 1V peak-to-peak encoder. Only applicable to drives that support Sin/Cos encoders. See "Appendix A" on page 186 for information on scaling.				

27.02h	Sin/Cos Encoder Health			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	Volts (SF1)	Read Only	No
Description: Represents the health of the Sin/Cos encoder inputs according to the formula below, where a value closer to 1 is healthy and a value closer to 0 is unhealthy. See "Appendix A" on page 186 for information on scaling. Encoder Health = $Sin^2 + Cos^2$				

27.03h	Absolute Encoder Fault Word			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 – [$2^{(16)}$-1]	N/A	Read Only	No

Description:

Contains a value that corresponds to an absolute encoder fault code. Fault codes are listed below by encoder type. The drive checks for faults and attempts to clear them during a phase detection routine. If a fault cannot be cleared, the appropriate fault code will be given by this sub-index and the drive will activate a feedback sensor error.

Hiperface (Stegmann):

Status Value	Status Name
00h	No Error
01h	Analog signals outside of specification
02h	Internal angle offset erroneous
03h	Data field partition destroyed
04h	Analog limit is not available
05h	Internal I^2C is not serviceable
06h	Internal checksum error
07h	Encoder reset occurred
08h	Counter overflow
09h	Parity error
0Ah	Checksum of transmitted data is wrong
0Bh	Unknown command code
0Ch	Number of data transmitted is wrong
0Dh	Command argument transmitted is impermissible
0Eh	Data may not be written to the data field selected
0Fh	Wrong access code
10h	Size of specified data field cannot be changed
11h	Specified word address outside data field
12h	Access to non-existent data field
1Ch	Monitoring the magnitude of the analog signals
1Dh	Critical encoder current
1Eh	Critical encoder temperature
1Fh	Speed too high, position information not possible
20h	Position of single turn impermissible
21h	Position error, multi-turn
22h	Position error, multi-turn
23h	Position error, multi-turn
28h	Error absolute value formation linear measuring system

EnDat (Heidenhein):

Bit	Fault Name
0	Light Source
1	Signal Amplitude
2	Position Value
3	Over Voltage
4	Under Voltage
5	Over Current
6	Battery
7-15	RFU

27.04h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	N/A	N/A	Read Only	Yes

27.05h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	N/A	N/A	Read Only	Yes

1Ch: Gearing Input Values

1C.00h	Auxiliary Input 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description: Contains a value corresponding to the number of encoder counts sent to the gearing module.				

1C.02h	Gear Ratio Denominator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	counts	Read Only	No
Description: Value corresponding to the denominator of the gear ratio input counts.				

1C.03h	Gear Ratio Numerator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	counts	Read Only	No
Description: Value corresponding to the numerator of the gear ratio input counts.				

1Eh: Auxiliary Encoder Values

1E.00h	Auxiliary Encoder Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	Counts	Read / Write	No
Description: Contains the raw number of counts seen on the auxiliary encoder input. This value resets to zero when the drive is power-cycled.				

1E.02h	Auxiliary Position Index Capture Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	Counts	Read Only	No
Description: Contains the position of the last auxiliary encoder index capture by the drive. Requires auxiliary encoder with index.				

10h: Current Values

10.00h	Current Target - Torque			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DC2	Read Only	No
Description: Contains the value of the target current (torque-producing). See "Appendix A" on page 186 for unit conversion.				

10.02h	Current Demand - Torque			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains the value of the demand current (torque-producing). See "Appendix A" on page 186 for unit conversion.				

10.03h	Current Measured - Torque			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains the value of the measured current (torque-producing). See "Appendix A" on page 186 for unit conversion.				

10.04h	Current Error - Torque			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains the error between the target current and the measured current (torque-producing). This is equivalent to: demand current minus measured current. When the demand current is reached, the current error is zero. See "Appendix A" on page 186 for unit conversion.				

10.05h	Current Target - Flux			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DC2	Read Only	No
Description: Contains the value of the target current (flux-producing). See "Appendix A" on page 186 for unit conversion.				

10.07h	Current Demand - Flux			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains the value of the demand current (flux-producing). See "Appendix A" on page 186 for unit conversion.				

10.08h	Current Measured - Flux			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains the value of the measured current (flux-producing). See "Appendix A" on page 186 for unit conversion.				

10.09h	Current Error - Flux			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains the value of the Current error (flux-producing). See "Appendix A" on page 186 for unit conversion.				

10.0Ah	Current Target - Flux Reference			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DC2	Read Only	No
Description: Contains a value corresponding to the Current target flux reference. See "Appendix A" on page 186 for unit conversion.				

10.0Ch	Current Demand - Flux Reference			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	N/A	Read Only	No
Description: Contains a value corresponding to the current demand flux reference.				

10.0Dh	Current Measured - Flux Reference			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	N/A	Read Only	No
Description: Contains a value corresponding to the current measured flux reference.				

10.0Eh	Current Error - Flux Reference			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	N/A	Read Only	No
Description: Contains a value corresponding to the current error flux reference.				

10.0Fh	Current Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	N/A	Read Only	No
Description: Contains a value corresponding to the current limit.				

10.11h	Current Measured - Phase A			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains a value corresponding to the current measured in phase A. See "Appendix A" on page 186 for unit conversion.				

10.12h	Current Measured - Phase B			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DC1	Read Only	No
Description: Contains a value corresponding to the current measured in phase B. See "Appendix A" on page 186 for unit conversion.				

10.13h	Phase Angle - Rotor			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 359	DG1	Read Only	No
Description: Contains a value corresponding to the Phase Angle – Rotor. See "Appendix A" on page 186 for unit conversion.				

10.14h	Phase Angle - Stator			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 359	DG1	Read Only	No
Description: Contains a value corresponding to the Phase Angle – Stator. See "Appendix A" on page 186 for unit conversion.				

10.15h	Torque Summation Input			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DC2	Read Only	No
Description: Contains the raw current command before filtering or an offset has been applied. See "Appendix A" on page 186 for unit conversion.				

10.17h	Torque Summation Offset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DC2	Read Only	No
Description: Contains the offset of the commanded current in the current loop. See "Appendix A" on page 186 for unit conversion.				

11h: Velocity Values

11.00h	Velocity Measured Pre-Filter			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DS1	Read Only	No
Description: Contains the measured velocity before the feedback cutoff filter. See "Appendix A" on page 186 for unit conversion.				

11.02h	Velocity Measured Post-Filter			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DS1	Read Only	No
Description: Contains the measured velocity after the feedback cutoff filter. See "Appendix A" on page 186 for unit conversion.				

11.04h	Velocity Target			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DS1	Read Only	No
Description: Contains the current velocity target when the drive is in velocity mode. See "Appendix A" on page 186 for unit conversion.				

11.06h	Velocity Demand			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DS1	Read Only	No
Description: Contains the current velocity demand when the drive is in velocity mode. See "Appendix A" on page 186 for unit conversion.				

11.08h	Velocity Loop Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DS1	Read Only	No
Description: Contains the error between the target velocity and the measured velocity. This is equivalent to target velocity minus measured velocity. When the current commanded velocity is reached, the velocity loop error will be zero. See "Appendix A" on page 186 for unit conversion.				

11.0Ah	Velocity Summation Input			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DS1	Read Only	No
Description: Contains the raw velocity command before filtering or an offset has been applied. See "Appendix A" on page 186 for unit conversion.				

11.0Ch	Velocity Summation Offset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DS1	Read Only	No
Description: Contains the offset of the commanded velocity in the velocity loop. See "Appendix A" on page 186 for unit conversion.				

12h: Position Values

12.00h	Position Measured			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description: Contains the current measured position in counts.				

12.02h	Position Target			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description:				
Contains the current commanded position when the drive is used in the position mode.				

12.04h	Position Demand			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description:				
Contains the current position demand in counts.				

12.06h	Position Loop Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description:				
Contains the error between the target position (in counts) and the measured position (in counts). This is equivalent to target position (counts) minus measured position (counts). When the current commanded position is reached, the position loop error will be zero.				

12.08h	Position Summation Input			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description:				
Contains the raw position command before filtering or an offset has been applied.				

12.0Ah	Position Summation Offset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description:				
Contains the offset of the commanded position in the position loop.				

12.0Ch	Position Index Capture Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description:				
Contains the position of the last encoder index captured by the drive. Requires encoder with index.				

0Ch: PVT Quick Status

0C.00h	PVT Quick Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$ –1]	N/A	Read Only	No

Description:

Consolidates status information with regards to PVT. Bit definitions are given below.

Bit	PVT Drive Status
0-4	Number of PVT points in the drive
5-7	Reserved
8	Zero Speed
9	At Command
10	Homing Active
11	Homing Complete
12	Bridge Enabled
13	Brake Enabled
14	Stop
15	PVT Executing

1Dh: PVT Status Values

1D.00h	PVT Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	See Table	N/A	Read Only	No

Description:

A bit field corresponding to the current status of PVT. The bit field definitions are given below.

Bit	PVT Status	Description
0	Buffer Full	The PVT Buffer is Full
1	Buffer Empty	The PVT Buffer is Empty
2	Buffer Threshold	The PVT Buffer has reached its threshold
3	Buffer Failure	Problem Reading Point From PVT Buffer
4	Buffer Empty Stop	The PVT Buffer is Empty, Last PVT Point has been reached
5	PVT point wrong sequence	A PVT Point Sequence Error has occurred
6	PVT buffer executing	The PVT Buffer is presently in use
7...15	Reserved	Reserved For Future Use

1D.01h	PVT Points Remaining			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read Only	No
Description: Contains a value corresponding to the number of PVT points remaining in the PVT buffer. This value gets decremented by 1 after each PVT point is executed. When it reaches zero, the PVT buffer is empty.				

1D.02h	PVT Sequence Number			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – 15	N/A	Read Only	No
Description: Contains a value corresponding to the current PVT point in the PVT buffer that is being executed.				

14h: Command Limiter Input

14.00h	Input Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	N/A	Read Only	No
Description: Contains a value corresponding to the input of the command limiter.				

0Fh: Power Bridge Values

0F.00h	DC Bus Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$0 – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the DC Bus Voltage. See "Appendix A" on page 186 for unit conversions.				

0F.01h	Phase A Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DPV	Read Only	No
Description: Contains a value corresponding to the Phase A Output Voltage. See "Appendix A" on page 186 for unit conversion details.				

0F.02h	Phase B Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DPV	Read Only	No
Description: Contains a value corresponding to the Phase B Output Voltage. See "Appendix A" on page 186 for unit conversion details.				

0F.03h	Phase C Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DPV	Read Only	No
Description: Contains a value corresponding to the Phase C Output Voltage. See "Appendix A" on page 186 for unit conversion details.				

0F.04h	Trap Mode Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DPV	Read Only	No
Description: Contains a value corresponding to the trap mode output voltage. See "Appendix A" on page 186 for unit conversion details.				

21h: Drive Temperature Values

21.00h	External Thermal Sense Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	N/A	Read Only	No
Description: Contains a value corresponding to the external thermal sense value. This value represents the motor temperature value detected by the drive. To determine the physical temperature, use the following formula: (Thermal Sense Value) / 65536 = Temperature measured by drive (in °C) Example: The reported External Thermal Sense Value is 1234567 (decimal). The temperature measured by the drive is therefore (1234567/65536) = 18.8 °C				

21.02h	Thermistor Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	Ohms	Read Only	No
Description: If supported by the hardware, this value represents the measured thermistor resistance value in ohms.				

19h: Capture Values The capture values have units that vary with the operating mode of the drive. For these parameters, refer to Table 2.13 for the correct unit selection.

TABLE 2.13 Capture Units

Drive Operation Mode	Units
Current (Torque)	DC2
Velocity	DS1
Position (Around Velocity Or Current)	counts

19.00h	Capture 'A' Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.13	Read Only	No
Description: Capture A captured value				

19.02h	Capture 'B' Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.13	Read Only	No
Description: Capture B captured value				

19.04h	Capture 'C' Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.13	Read Only	No
Description: Capture C captured value				

23h: Digital Input Values

23.00h	Digital Inputs (Post Active Level)			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	See Table	N/A	Read Only	No

Description:

Bit field corresponding to the state of the digital inputs. Bit field definitions are given below.

Bit	Digital Inputs*
0	Digital Input 1
1	Digital Input 2
2	Digital Input 3
3	Digital Input 4
4	Digital Input 5
5	Digital Input 6
6	Digital Input 7
7	Digital Input 8
8	Digital Input 9
9	Digital Input 10
10	Digital Input 11
11	Digital Input 12
12	Digital Input 13
13	Digital Input 14
14	Digital Input 15
15	Digital Input 16

*Number of actual inputs depends on drive model

24h: Digital Output Values

24.00h	Digital Outputs (Pre Active Level)			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	See Table	N/A	Read Only	No

Description:

Bit field corresponding to the state of the digital outputs. Bit field definitions are given below.

Bit	Digital Outputs*
0	Digital Output 1
1	Digital Output 2
2	Digital Output 3
3	Digital Output 4
4	Digital Output 5
5	Digital Output 6
6	Digital Output 7
7	Digital Output 8
8	Digital Output 9
9	Digital Output 10
10	Digital Output 11
11	Digital Output 12
12	Digital Output 13
13	Digital Output 14
14	Digital Output 15
15	Digital Output 16

*Number of actual outputs depends on drive model

1Ah: Analog Input Values

1A.00h	Analog Input 1 Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DAI	Read Only	No

Description:

Contains a value corresponding to the voltage present on analog input 1. See "Appendix A" on page 186 for unit conversion details.

1A.01h	Analog Input 2 Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DAI	Read Only	No

Description:

Contains a value corresponding to the voltage present on analog input 2. See "Appendix A" on page 186 for unit conversion details.

1A.02h	Analog Input 3 Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DAI	Read Only	No
Description: Contains a value corresponding to the voltage present on analog input 3. See "Appendix A" on page 186 for unit conversion details.				

1A.03h	Analog Input 4 Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DAI	Read Only	No
Description: Contains a value corresponding to the voltage present on analog input 4. See "Appendix A" on page 186 for unit conversion details.				

22h: Analog Input ADC Raw Values

22.00h	Analog Input 1 ADC Raw Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	N/A	Read Only	No
Description: Provides the full scale raw value of the ADC used for Analog Input 1.				

22.01h	Analog Input 2 ADC Raw Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	N/A	Read Only	No
Description: Provides the full scale raw value of the ADC used for Analog Input 2.				

22.02h	Analog Input 3 ADC Raw Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	N/A	Read Only	No
Description: Provides the full scale raw value of the ADC used for Analog Input 3.				

22.03h	Analog Input 4 ADC Raw Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	N/A	Read Only	No
Description: Provides the full scale raw value of the ADC used for Analog Input 4.				

25h: Analog Output Values

25.00h	Analog Output 1 Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DAO	Read Only	No
Description: Contains a value corresponding to the value of analog output 1. The analog outputs have a range of 0 to 10 Volts. See "Appendix A" on page 186 for unit conversion details.				

25.01h	Analog Output 2 Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DAO	Read Only	No
Description: Contains a value corresponding to the value of analog output 2. The analog outputs have a range of 0 to 10 Volts. See "Appendix A" on page 186 for unit conversion details.				

18h: Programmable Limit Switch Values

18.00h	PLS Input Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	counts	Read Only	No
Description: Contains the value of the programmable limit switch position input. If a rollover value has been defined, this value will range between zero and the rollover value.				

18.02h	PLS 1 State			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Bits	0-1	-	Read Only	No
Description: Contains the current state of PLS 1. This bit is high when PLS 1 is active.				

18.03h	PLS 2 State			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Bits	0-1	-	Read Only	No
Description: Contains the current state of PLS 2. This bit is high when PLS 2 is active.				

15h: Deadband Input Value

15.00h	Deadband Input Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] – [2^{(31)}-1]$	DC2, DS1, counts	Read Only	No
Description: Value of the command input to the Deadband function. Mode dependant units.				

1Bh: PWM and Direction Input Values

1B.00h	Applied PWM Duty Cycle			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(13)}] – [2^{(13)}]$	Fractional duty cycle * $2^{(13)}$	Read Only	No
Description: Contains the value of the input duty cycle expressed as a signed fraction when the drive is configured for PWM command input. This value represents the measured duty cycle after polarity and inversions applied.				

1B.01h	Input PWM Duty Cycle			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$0 – [2^{(13)}]$	duty cycle * $2^{(13)}$	Read Only	No
Description: Contains the value of the input duty cycle expressed as an unsigned fraction when the drive is configured for PWM command input. This value represents the measured duty cycle before polarity and inversions applied.				

28h: Fault Log Counter

28.00h	Log Counter: Total Run Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	$0 – 2^{48}$	msec	Read Only	No
Description: This command holds the total run time of the drive.				

28.03h	Log Counter: Drive Reset			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0- [2^{(16)} –1]$	count	Read Only	No
Description: Number of times Drive Reset occurred in the life of the drive.				

28.04h	Log Counter: Drive Internal Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0- [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Drive Internal Error occurred in the life of the drive.				

28.05h	Log Counter: Short Circuit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Short Circuit occurred in the life of the drive.				

28.06h	Log Counter: Current Overshoot			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Current Overshoot occurred in the life of the drive.				

28.07h	Log Counter: Hardware Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Hardware Under Voltage occurred in the life of the drive.				

28.08h	Log Counter: Hardware Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Hardware Over Voltage occurred in the life of the drive.				

28.09h	Log Counter: Drive Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Drive Over Temperature occurred in the life of the drive.				

28.0Ah	Log Counter: Parameter Restore Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Parameter Restore Error occurred in the life of the drive.				

28.0Bh	Log Counter: Parameter Store Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Parameter Store Error occurred in the life of the drive.				

28.0Ch	Log Counter: Invalid Hall State			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Invalid Hall State occurred in the life of the drive.				

28.0Dh	Log Counter: Phase Synchronization Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Phase Sync. Error occurred in the life of the drive.				

28.0Eh	Log Counter: Motor Over Temperature			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Motor Over Temperature occurred in the life of the drive.				

28.0Fh	Log Counter: Phase Detection Fault			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Phase Detection Fault occurred in the life of the drive.				

28.10h	Log Counter: Feedback Sensor Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Feedback Sensor Error occurred in the life of the drive.				

28.11h	Log Counter: Log Entry Missed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Log Entry Missed occurred in the life of the drive.				

28.12h	Log Counter: Software Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Software Disable occurred in the life of the drive.				

28.13h	Log Counter: User Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times User Disable occurred in the life of the drive.				

28.14h	Log Counter: User Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times User Positive Limit occurred in the life of the drive.				

28.15h	Log Counter: User Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times User Negative Limit occurred in the life of the drive.				

28.16h	Log Counter: Current Limiting			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Current Limiting occurred in the life of the drive.				

28.17h	Log Counter: Continuous Current			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Continuous Current occurred in the life of the drive.				

28.18h	Log Counter: Current Loop Saturated			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Current Loop Saturated occurred in the life of the drive.				

28.19h	Log Counter: User Under Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times User Under Voltage occurred in the life of the drive.				

28.1Ah	Log Counter: User Over Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times User Over Voltage occurred in the life of the drive.				

28.1Bh	Log Counter: User Auxiliary Disable			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times User Auxiliary Disable occurred in the life of the drive.				

28.1Ch	Log Counter: Shunt Regulator Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Shunt Regulator Active occurred in the life of the drive.				

28.1Dh	Log Counter: Command Limiter Active			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Command Limiter Active occurred in the life of the drive.				

28.1Eh	Log Counter: Motor Overspeed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Motor Overspeed occurred in the life of the drive.				

28.1Fh	Log Counter: At Command			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times At Command occurred in the life of the drive.				

28.20h	Log Counter: Zero Speed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Zero Speed occurred in the life of the drive.				

28.21h	Log Counter: Velocity Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Velocity Following Error occurred in the life of the drive.				

28.22h	Log Counter: Positive Target Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Positive Target Velocity Limit occurred in the life of the drive.				

28.23h	Log Counter: Negative Target Velocity Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Negative Target Velocity Limit occurred in the life of the drive.				

28.24h	Log Counter: Upper Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Upper Measured Position Limit occurred in the life of the drive.				

28.25h	Log Counter: Lower Measured Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Lower Measured Position Limit occurred in the life of the drive.				

28.26h	Log Counter: At Home Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times At Home Position occurred in the life of the drive.				

28.27h	Log Counter: Position Following Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Position Following Error occurred in the life of the drive.				

28.28h	Log Counter: Upper Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Upper Target Position Limit occurred in the life of the drive.				

28.29h	Log Counter: Lower Target Position Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Lower Target Position Limit occurred in the life of the drive.				

28.2Ah	Log Counter: PVT Buffer Full			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times PVT Buffer Full occurred in the life of the drive.				

28.2Bh	Log Counter: PVT Buffer Empty			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times PVT Buffer Empty occurred in the life of the drive.				

28.2Ch	Log Counter: PVT Buffer Threshold Exceeded			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times PVT Buffer Threshold Exceeded occurred in the life of the drive.				

28.2Dh	Log Counter: PVT Buffer Failure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times PVT Buffer Failure occurred in the life of the drive.				

28.2Eh	Log Counter: PVT Buffer Empty Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times PVT Buffer Empty Stop occurred in the life of the drive.				

28.2Fh	Log Counter: PVT Sequence Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times PVT Sequence Error occurred in the life of the drive.				

28.30h	Log Counter: Communication Channel Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Communication Channel Error occurred in the life of the drive.				

28.31h	Log Counter: Commanded Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Commanded Stop occurred in the life of the drive.				

28.32h	Log Counter: User Stop			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times User Stop occurred in the life of the drive.				

28.33h	Log Counter: Commanded Positive Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Commanded Positive Limit occurred in the life of the drive.				

28.34h	Log Counter: Commanded Negative Limit			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of times Commanded Negative Limit occurred in the life of the drive.				

28.35h	Log Counter: PWM and Direction Broken Wire Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	count	Read Only	No
Description: Number of time PWM and Direction Broken Wire Error occurred in the life of the drive.				

Appendix A

A.1 Drive Units

Table A.1 below shows scaling factors and formulas for converting physical units to drive units.

TABLE A.1 Drive Units and Scaling Factors

Abbreviation	Drive Unit Type	Physical Units	Data Type	Scaling Factor
DA1	Acceleration	counts/s^2	Integer32/Unsigned32	$2^{34}/K_S^2$
DA2	Acceleration	counts/s^2	Unsigned48	$2^{34}/K_I K_S^2$
DA3	Acceleration	counts/s^2	Integer32	$2^{28}/(K_{MS}\, K_S)$
DA4	Acceleration	counts/s^2	Integer32	$2^{(18)}/(K_S^2)$
DA5	Acceleration	counts/s^2	Unsigned48	$2^{28}/K_{DS}\, K_S$
DC1	Current	A	Integer16	$2^{13}/K_P$
DC2	Current	A	Integer32	$2^{15}/K_P$
DJ1	Jerk	A/s	Unsigned48	$2^{32}/(K_P\, K_S)$
DG1	Angle	degrees	Integer16/Unsigned16	$2^{16}/360$
DS1	Speed/Velocity	counts/s	Integer32	$2^{17}/K_I K_S$
DS2	Speed/Velocity	counts/s	Unsigned48	$2^{17}/K_S$
DS3	Speed/Velocity	counts/s	Integer64	$2^{33}/K_S$
DS4	Speed/Velocity	counts/s	Unsigned32	$2^{17}/K_S$
DV1	Voltage	V	Integer16	$2^{14}/(1.05\, K_{OV})$
DPV	Phase Voltage	V	Integer16	$2^{14}/K_B$
DAI	Analog Input Voltage	V	Integer16	$2^{14}/20$
DAO	Analog Output Voltage	V	Integer16	$2^{14}/10$
DT1	Temperature	°C	Integer32	2^{16}
PBC	Power Board Current	A	Unsigned16	10
PBV	Power Board Voltage	V	Unsigned16	10
PBT	Power Board Time	s	Unsigned16	100
PBF	Power Board Frequency	Hz	Unsigned32	$2^{16}/1000$
SF1	Scale Factor 1	-	-	2^{14}

1.Multiply physical units by the scaling factor to obtain drive units. Divide drive units by the scaling factor to obtain physical units.

The drive units used for a parameter depend upon the parameter type and size. Drive units must be rounded to the nearest integer and then converted to a hexadecimal base of the appropriate data type before they are written to the drive. When converting to a signed integer data type, use two's complement for representation of negative numbers (see Conversion Example 2). Some scaling factors involve drive dependent constants. These constants are given in Table A.2, along with details on determining their values.

TABLE A.2 Drive Dependent Conversion Constants

Constant	Value
K_B	DC Bus Voltage in volts. This value can be read from 0F.00h.
K_{DS}	Maximum dynamic index speed (in counts/s). This value can be read from CA.06h, CA.07h, CA.08h, and CA.09h.
K_I	Feedback interpolation value. Only applies to drives that support 1 V_{pp} Sin/Cos feedback. For all other drives, K_I = 1. When applicable, this value can be read from 32.08h.
K_{MS}	Maximum profiler speed (in counts/s) for an Accel/Decel command profile. This value can be read from 3C.18h for Configuration 0 and 3C.20h for Configuration 1.
K_{OV}	The hardware defined, DC bus, over-voltage limit of the drive in volts. This value can be read from D8.53h.
K_P	The maximum rated peak current of the drive in amps. For example, 20 for the DPRALTE-**020**B080. This value can be read from D8.58h.
K_S	Switching frequency of the drive in Hz. This value can be found on the drive datasheet, or can be read from D8.73h and divided by 65.536.

A.1.1 Conversion Example 1

Drive: DPRALTE-020B080
Feedback: 1000 Line Incremental Encoder

To specify a Motor Over Speed Limit (37.01h) of 10,000 RPM, first convert to the appropriate physical unit as shown below, keeping in mind that counts have a quadrature resolution (4X) over lines.

$$10{,}000\frac{\text{rev}}{\text{min}}\cdot\frac{1000\,\text{lines}}{1\,\text{rev}}\cdot\frac{4\,\text{counts}}{1\,\text{line}}\cdot\frac{1\,\text{min}}{60\,\text{sec}}=666{,}666.7\frac{\text{counts}}{\text{sec}}.$$

Motor Over Speed is of data type Integer32 and uses DS1 drive units. Taking the appropriate 32-bit scaling factor from Table A.1 yields

$$666{,}666.7\cdot\frac{2^{17}}{K_I K_S}=666{,}666.7\cdot\frac{2^{17}}{1\cdot 20{,}000}=4369066.9,$$

where K_I = 1 because we are not dealing with 1 V_{PP} Sin/Cos feedback. Rounding this to the nearest integer and converting to a hexadecimal base then results in

$$4369067_{10} = 42AAAB_{16}.$$

Now, to apply the setting, a value of 42AAABh would be written to sub-index 37.01h.

A.1.2 Conversion Example 2

To set a temperature parameter to 23°F first convert to the appropriate physical unit as shown below.

$$\frac{5}{9}(23 - 32) = -5 \text{ °C.}$$

Referring to Table A.1, the appropriate scaling factor yields

$$-5 \cdot 2^{16} = -327680.$$

Because the resulting integer value is negative, two's complement notation will be used to represent its hexadecimal equivalent. To obtain the two's complement, the positive version of the desired number should be subtracted from 2^N, where N is the number of bits in the data type. Temperature parameters use the data type Integer32 so the calculation is as follows.

$$2^N - 327680 = 2^{32} - 327680 = 4294639616$$
$$4294639616_{10} = FFFB0000_{16}$$

The final step would be to write a value of FFFB0000h to the appropriate parameter.

A.2 Homing

AMC drives support a wide variety of homing routines. These routines rely on signals such as limit switch, home switch, and encoder index signals to achieve precise starting positions. Four objects define the speed, acceleration, and the particular homing method used. These objects are listed in the table below.

TABLE A.3 Homing Objects

Object Index	Description
3A.00h	Homing Speed During Search For Switch
3A.02h	Homing Speed During Search For Zero
3A.04h	Homing Method
3A.05h	Homing Acceleration

A.2.1 Homing Speeds

There are two homing speeds to take into consideration: the speed during the search for home switch, and the speed during the search for zero. Typically, the speed during the search for the home switch is set to be faster than the speed during the search for the index.

A.2.2 Homing Method

ADVANCED Motion Controls homing methods depend on the presence of up to three different system components: an index pulse, a home switch, and a limit switch. The simplest homing methods require just one or none of these components, whereas the more complex methods require two or all of these components. All homing methods have been summarized in Table A.4, along with their necessary components. There are a total of 35 possible homing methods, some of which are reserved and not currently specified.

A.2.3 Homing Acceleration

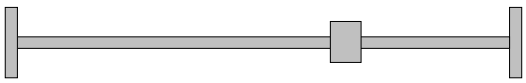
A single value is used to define the acceleration and deceleration of all moves during the homing routine.

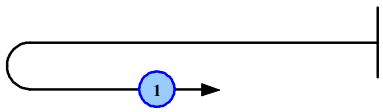
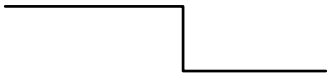
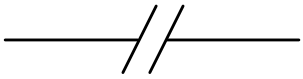
TABLE A.4 Homing Methods Summary

Homing Method	Index Pulse	Home Switch	Limit Switch
Methods 1 & 2	✓		✓
Methods 3 to 6	✓	✓	
Methods 7 to 14	✓	✓	✓
Methods 15 & 16	Reserved		
Methods 17 & 18			✓
Methods 19 to 22		✓	
Methods 23 to 30		✓	✓
Methods 31 & 32	Reserved		
Methods 33 & 34	✓		
Method 35			

Because these homing methods can become fairly complex, they are best described visually. As a result, *homing diagrams* are utilized to illustrate the behavior of each method. Homing diagrams consist of multiple components each of which is described in Figure A.1.

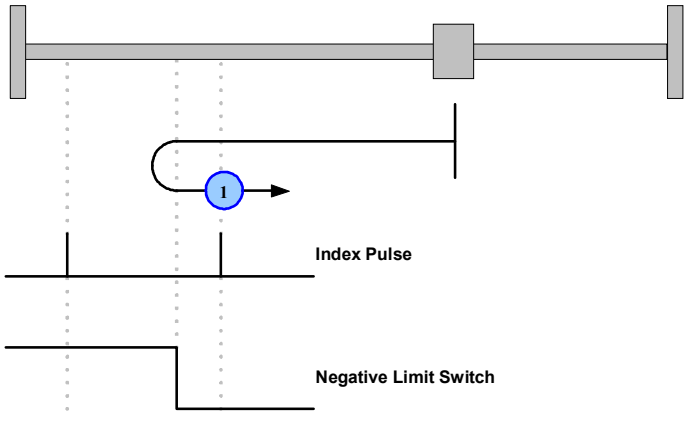
FIGURE A.1 Homing Diagrams

Load and physical limits	
The square near the middle of the illustration shows the load object that is to be moved. The endpoints represent physical limitations or barriers, which the load cannot travel past. The left side is in the negative direction while the right side is in the positive direction.	

Direction of travel	
The vertical line on the right side represents the starting position. The load travels in the direction of the arrow. In the illustration shown, the load begins traveling in the negative direction and then switches directions to move in the positive direction. The circle represents the home position at which point the (actual) measured position is reset to zero. The small section of arrow following the circle represents the distance traveled, past the home position, during deceleration of the load. Lastly, the number in the circle represents the number designated to that particular homing method.	
Index Pulse	
Each vertical line represents one index pulse.	
Limit/Home Switch	
A label in the actual homing diagram will be used to label a switch as either a limit/home switch. As shown, there are only two positions for a switch: high (active) or low (inactive).	
Break	
Represents a break in the diagram. This is used for representing a length of distance too large to properly scale on the diagram.	

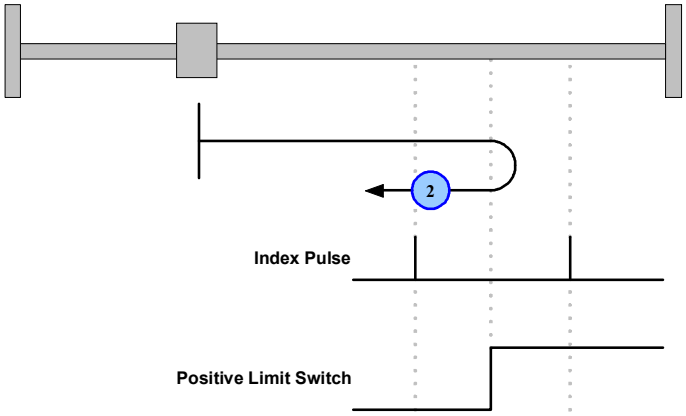
Method 1: Homing on the Negative Limit Switch This method uses the negative limit switch and index to home the load. If the negative limit switch is off, the motor moves in the negative direction. Once the limit switch toggles, the motor changes direction and moves until the next encoder index. Homing is complete at this point. Figure A.2 illustrates the homing diagram for this method.

FIGURE A.2 Homing on the Negative Limit Switch



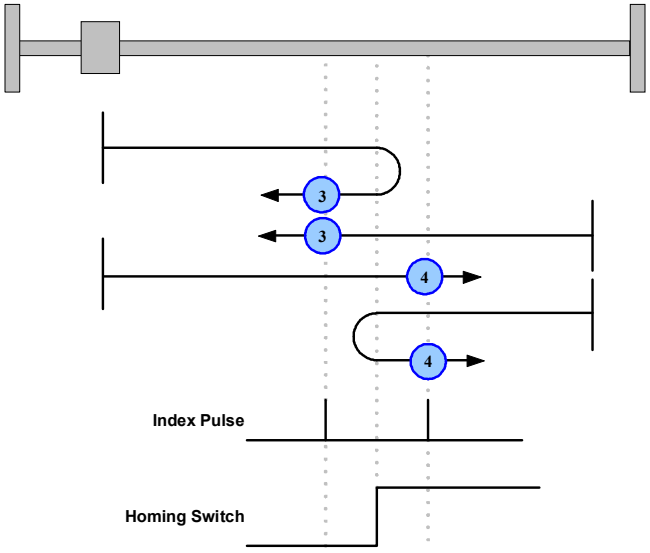
Method 2: Homing on the Positive Limit Switch This method uses the positive limit switch and index to home the load. If the positive limit switch is off, the motor moves in the positive direction. Once the limit switch toggles, the motor changes direction and moves until the next encoder index. Homing is complete at this point. Figure A.3 illustrates the homing diagram for this method.

FIGURE A.3 Homing on the Positive Limit Switch



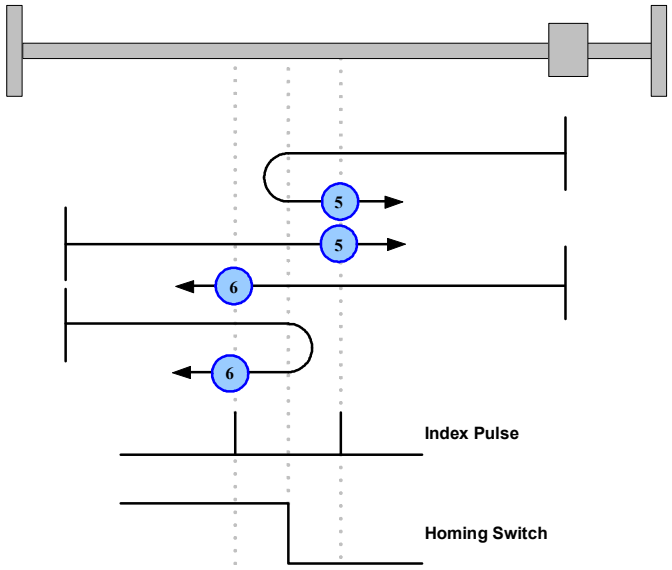
Methods 3 and 4: Homing on the Positive Home Switch These methods use the positive home switch and index to home the load. The initial direction of movement for a given routine method is dependent on the home switch position. However, the final position is always in the same direction. Homing methods 3 and four perform the same operations, but in opposite directions with opposite home switch polarity. Figure A.4 illustrates the homing diagram for these methods.

FIGURE A.4 Homing on the Positive Home Switch



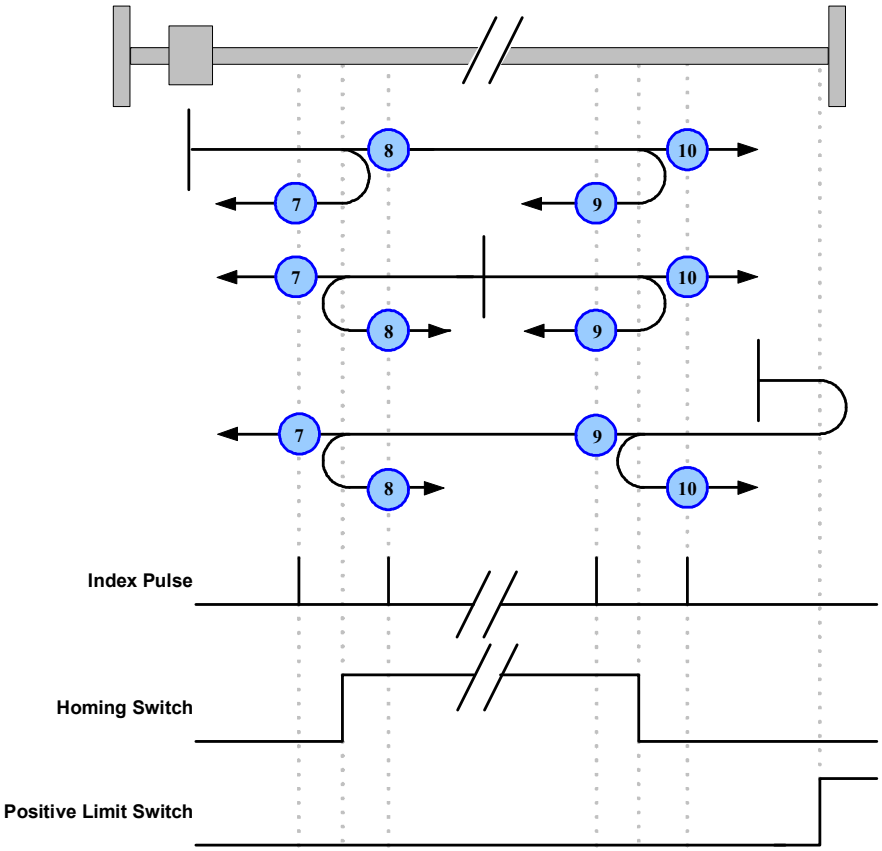
Methods 5 and 6: Homing on the Negative Home Switch This is literally a mirror image of the homing routines used by methods 3 and 4. Figure A.5 illustrates the homing diagram for these methods.

FIGURE A.5 Homing on the Negative Home Switch



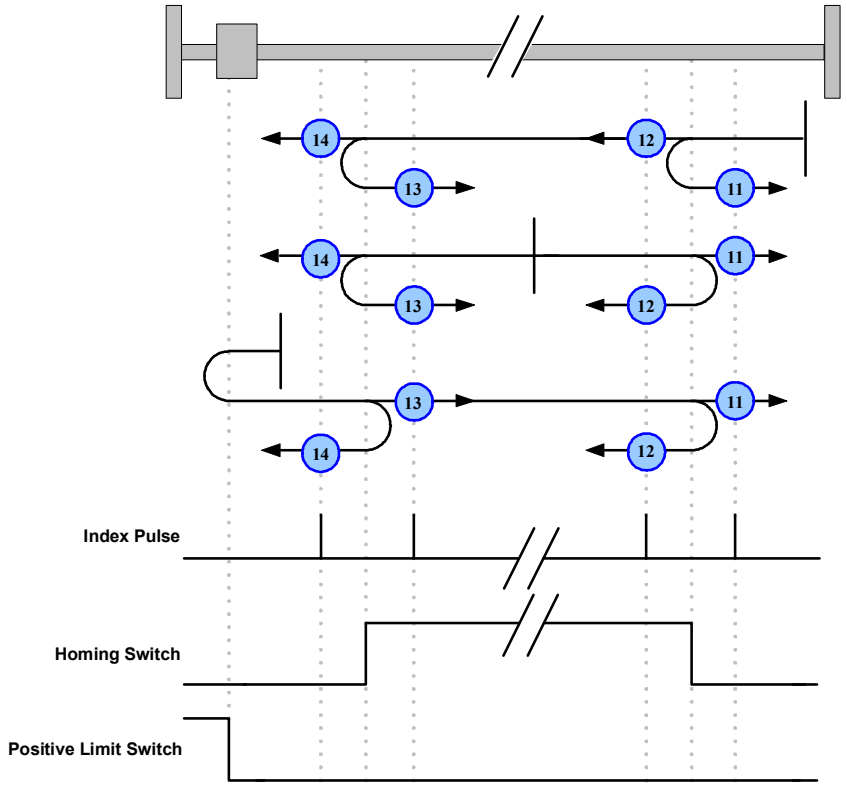
Methods 7-14: Homing on the Home Switch These methods use all three possible homing components (index pulse, home switch, and limit switch) with the index pulse to the nearest right or left of the home switch always being the sought after home position. Methods 7 to 10 use a positive limit switch and if the starting position is outside the active home switch region the initial direction of travel is always positive. For cases where the starting position is inside the active home switch region the initial direction will depend upon the index pulse being sought after: methods 7 & 8 home towards the left home switch edge so the initial direction will be left, whereas methods 9 & 10 home towards the right home switch edge so the initial direction will be right. Note that the only difference between methods 7 & 8 is that one homes to the index pulse left of the home switch edge whereas the other homes to the index pulse to the right; the same difference holds true for methods 9 & 10. Figure A.6 illustrates the homing diagram for methods 7 to 10.

FIGURE A.6



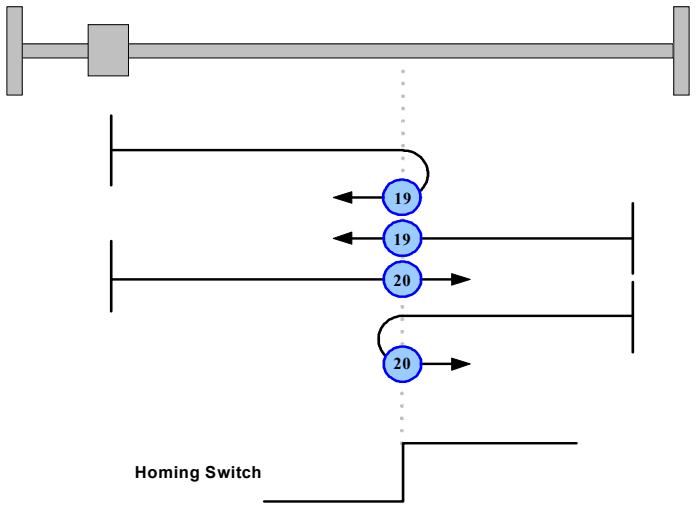
Methods 11 to 14 use a negative limit switch instead of a positive limit switch. As a result, the initial direction will be left, instead of right, whenever the starting point is outside of the active home switch region. Outside of this difference, methods 11 to 14 are identical to methods 7 to 10. Figure A.7 illustrates the homing diagram for methods 11 to 14.

FIGURE A.7



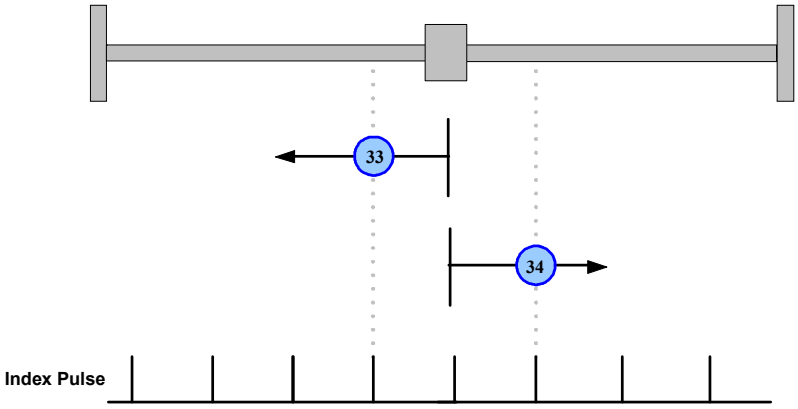
Methods 17-30: Homing without an Index Pulse: These homing routines use the same methods as 1 to 14, except the index pulse is not used. Instead, the home position is dependant on the edge of the relevant home or limit switch. To illustrate this difference, Figure A.8 shows the homing diagram for methods 19 and 20, which are equivalent to methods 3 and 4 without the index pulse.

FIGURE A.8



Methods 33 and 34: Homing on the Index Pulse These homing methods home to the nearest index pulse. Method 33 homes in the negative directions and method 34 homes in the positive direction.

FIGURE A.9

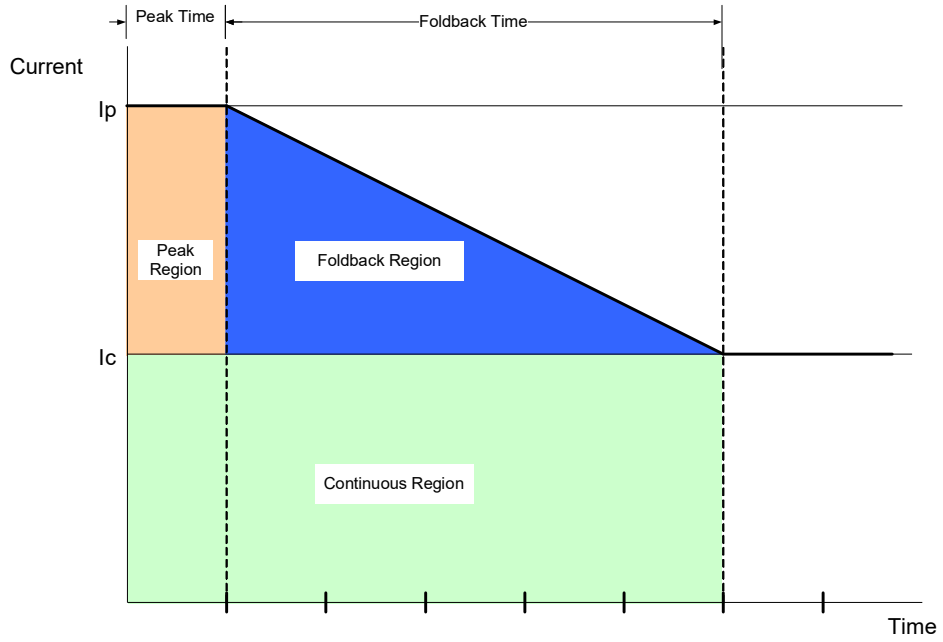


Method 35 This homing method requires no index pulse or switches and involves nothing more than setting the current measured position equal to the home position value, which can be accomplised in object 39.02h “Home Position Value” on page 40.

A.3 Current Limiting Algorithm

In order to understand the current limiting algorithm used by *ADVANCED* Motion Controls Digiflex Performance servo drives, it is necessary to first understand the different current limiting regions. The graph in Figure A.10 breaks the available current into three different regions.

FIGURE A.10 Current Limiting Regions



- **Continuous Region:** The commanded current is less than or equal to the continuous current limit. The available current is equal to the commanded current.
- **Peak Region:** The commanded current is between the continuous and peak current limits. The available current is equal to the commanded current for a limited time (Peak Time).
- **Foldback Region:** Commanded current is between the continuous and peak current limits of the drive. The available current is less than the commanded current. The available current decreases over time until it equals the continuous current limit. The rate of this decrease is equal to:

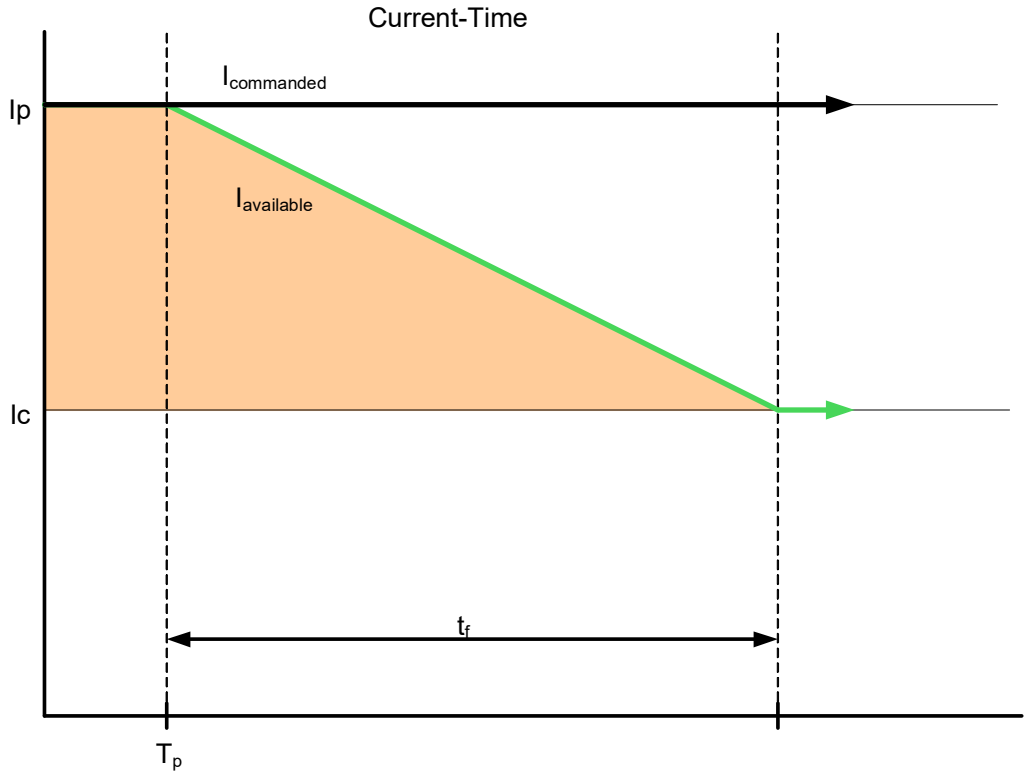
$$Slope = \frac{Ip - Ic}{tf}$$

Ip	Peak current limit
Ic	Continuous current limit
tf	Foldback time

A.3.1 Time-Based Peak Current Limiting

The full peak value of current is available to begin with. When a current command is equal to the peak current limit, the current begins to foldback to the continuous limit after T_p, following the same slope as given in "Current Limiting Algorithm" on page 196. Once the available current has reached the continuous current limit after t_f, the available current will be limited to the continuous current limit until the commanded current is dropped below the continuous level.

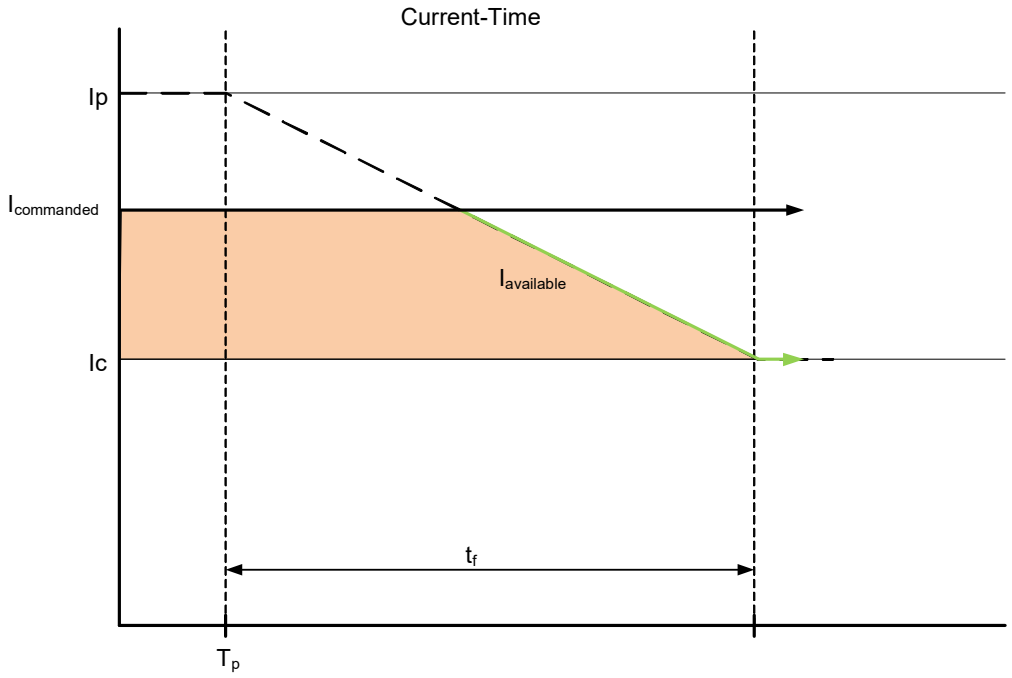
FIGURE A.11 Time-Based Peak Current Limiting



A.3.2 Time-Based Non-Peak Current Limiting

When the commanded current is between the peak and continuous current limits, the available current will begin to foldback at the intersection with the slope from "Time-Based Peak Current Limiting". The larger the commanded current, the sooner the available current will begin to foldback.

FIGURE A.12 Time-Based Non-Peak Current Limiting



A.3.3 Time-Based Current Recovery

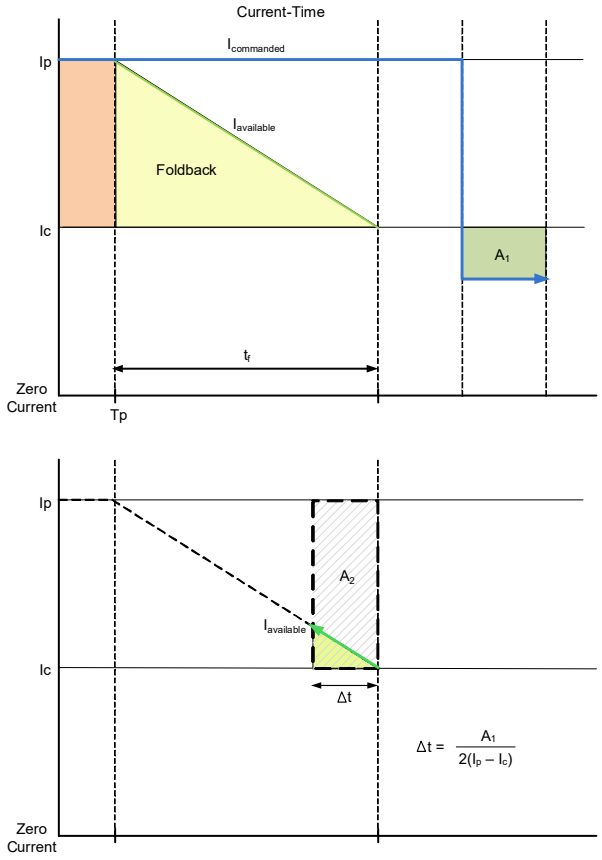
Initially, the full peak value of current is available. A commanded current above the continuous level causes the available current to foldback to the continuous level as shown in the first graph of Figure A.13. When the commanded current drops below the continuous current limit value ($\mathbf{A_1}$ in the first graph), the available current will then begin to recover along the slope of the foldback line towards the peak current level, as shown in the second graph of Figure A.13. The relationship between the commanded current and the recovered current is given as:

$$A_2 = \frac{1}{2}A_1$$

Using this relationship, you can calculate the amount of time recovered, Δt, by using the following equation:

$$\Delta t = \frac{A_1}{2(I_p - I_c)}$$

FIGURE A.13 Time-Based Current Recovery - Foldback and Commanded Current

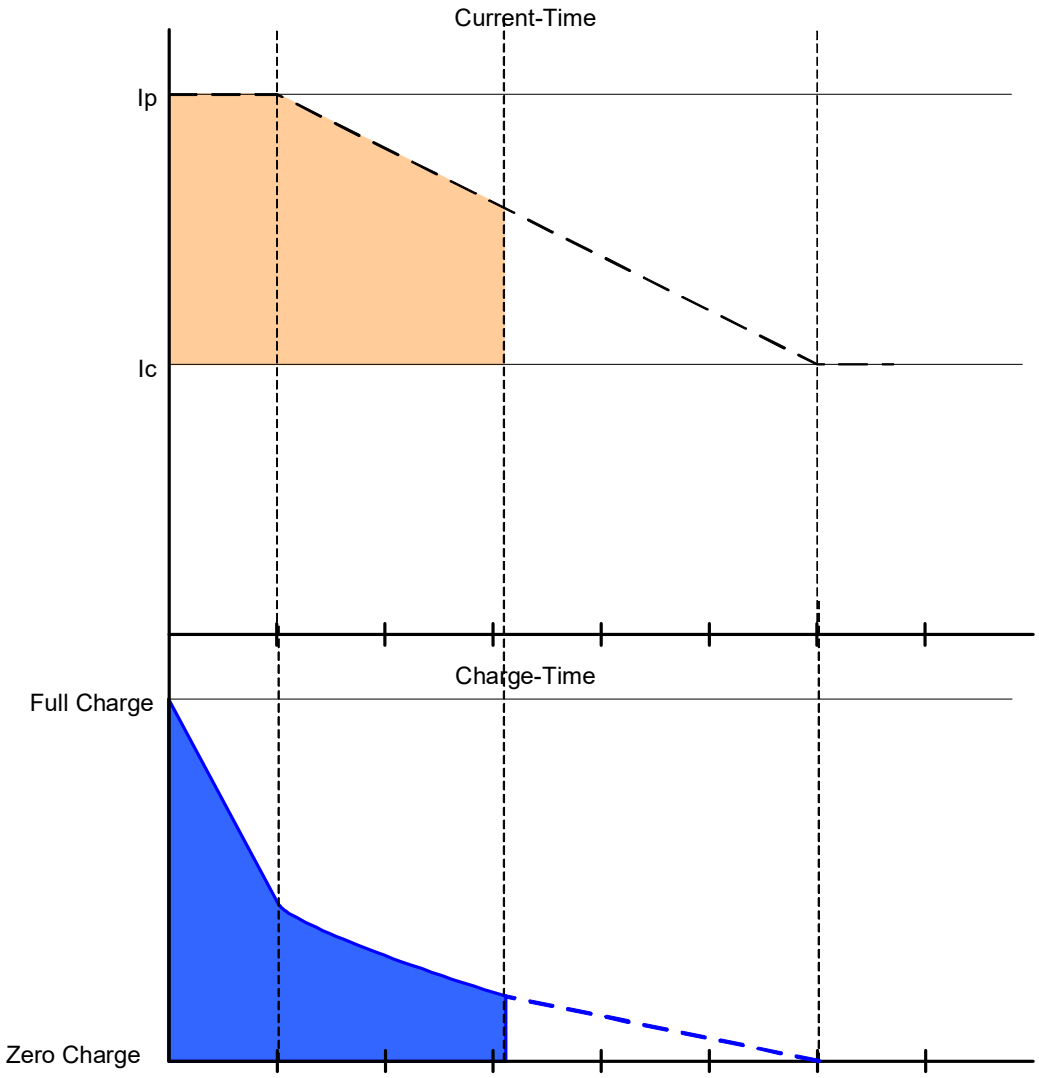


Note that it will take a command of zero current to fully recover from a full foldback condition.

A.3.4 Charge-Based Peak Current Limiting

The charge is full to begin with. When a current greater than the continuous current limit is commanded, the charge begins to decay. The loss of charge is determined by the area under the curve as shown in Figure A.14. The larger the command, the faster the charge will decay. When the charge decreases to zero, the available current will be limited to the continuous current limit until the charge is restored.

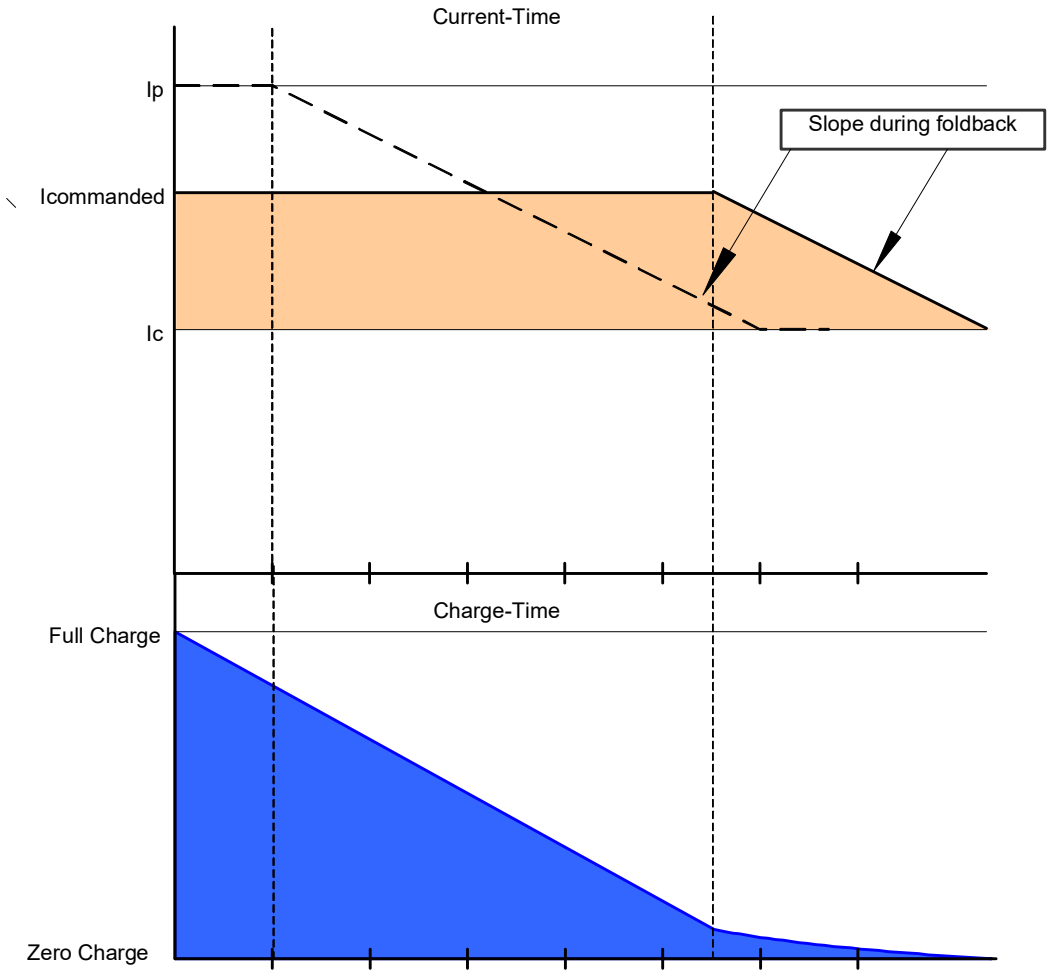
FIGURE A.14 Charge-Based Peak Current Limiting



A.3.5 Charge-Based Non-Peak Current Limiting

When the commanded current is between the peak and continuous current limits, the commanded current will be available for a longer period when compared to limiting at peak command. Note that the slope of the line during foldback is the same for both cases.

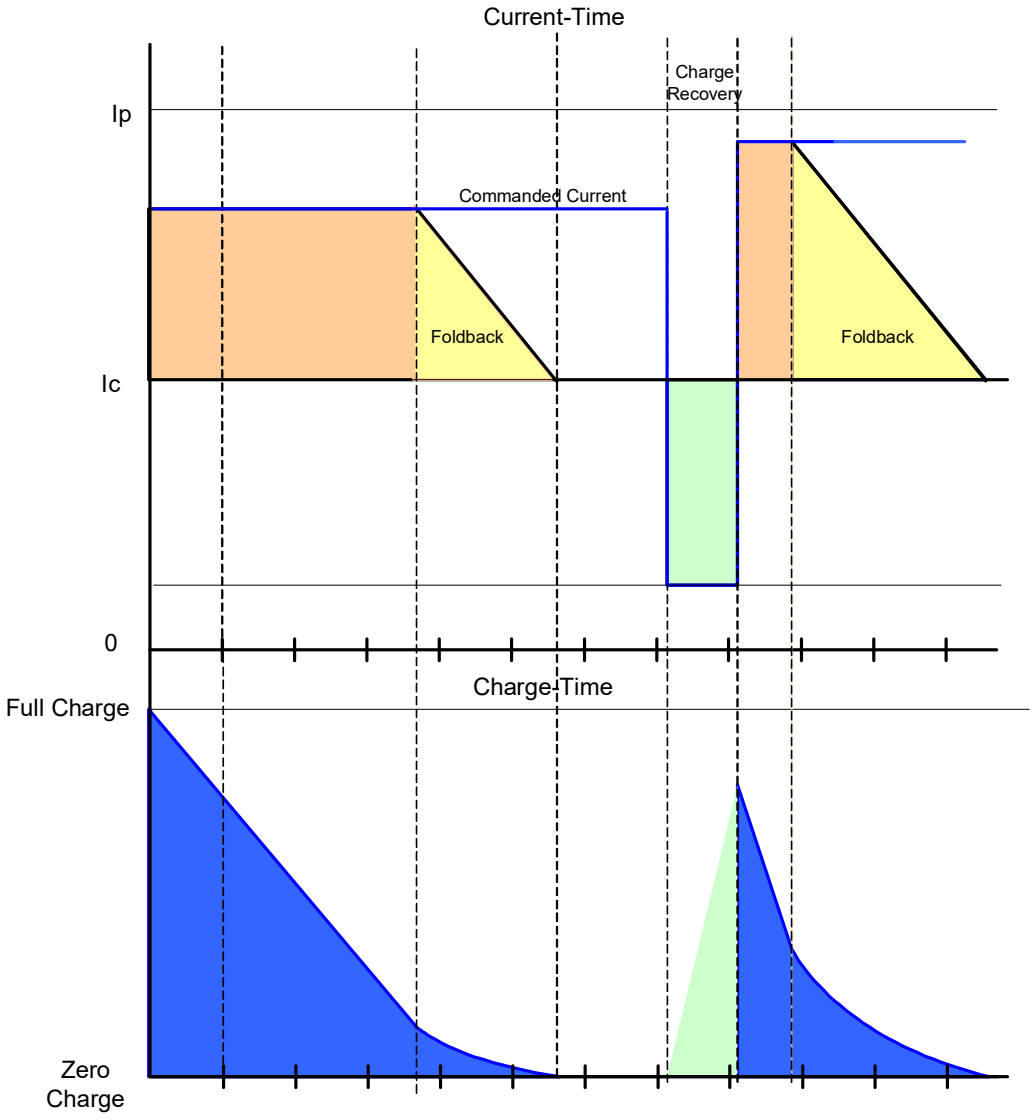
FIGURE A.15 Charge-Based Non-Peak Current Limiting



A.3.6 Charge-Based Current Recovery

After losing some value of charge, the charge may be recovered when the commanded value is dropped less than the continuous current limit. The amount of charge recovered depends on the magnitude of the commanded current and the amount of time in which it is commanded. The new amount of charge can be calculated by measuring the area within the curve as shown during the charge recovery phase in Figure A.16.

FIGURE A.16 Charge Recovery



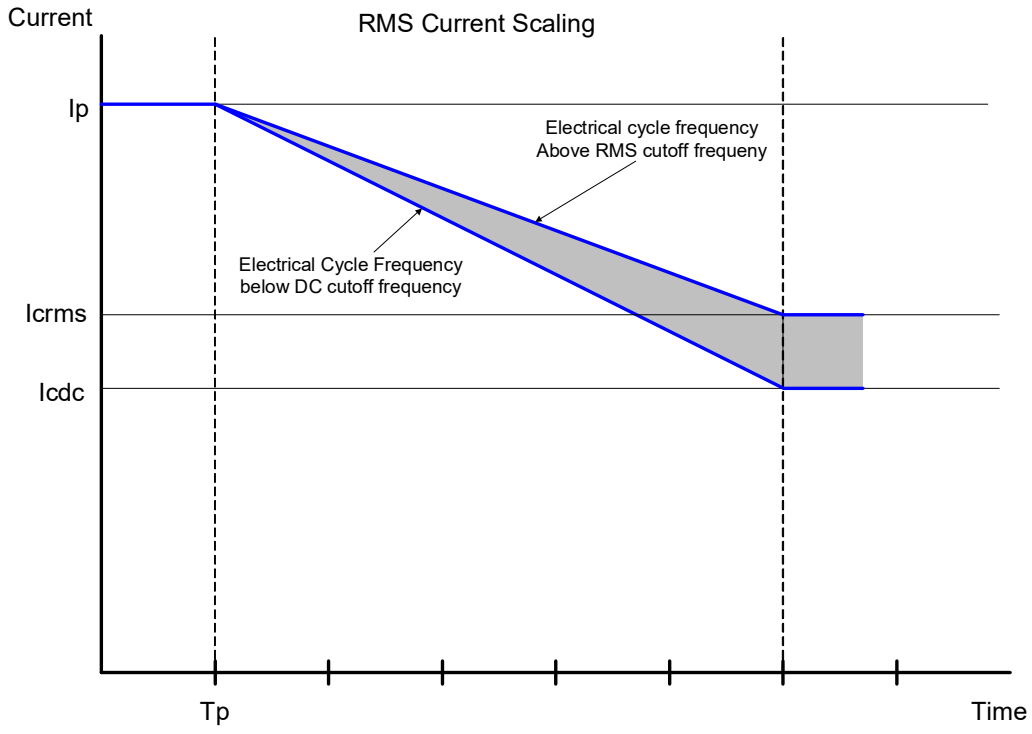
A.3.7 RMS Current Scaling

RMS Current Scaling uses the charge-based algorithm described above. The only difference is the value of the continuous current the drive is capable of outputting. The continuous RMS limit can be used when the motor is moving so that the electrical cycle frequency is greater than the upper frequency assigned to that drive. The upper frequency is typically around 5Hz or 150 RPM for a 4-pole motor. The continuous RMS value is the continuous DC value multiplied by the square root of two.

$$Icrms \equiv \sqrt{2} \cdot Icdc$$

When the electrical cycle frequency drops below the upper frequency, the continuous current drops below the RMS value. When the motor is moving at slow speeds, the continuous current is equal to the DC value of the current.

FIGURE A.17 RMS Current Limiting



Appendix B

B.1 Code Examples

The following C code is copied from Joe Campbell's C Programmer's Guide to Serial Communications, Second Edition.

This code creates the CRC lookup table used to create the 16-bit CRC value used in the Protocol described in this document. See Table 1.4 on page 5.

```
#include <stdlib.h>
#define CRC_POLY 0x1021

int main(void)
{
  unsigned short *crctable;

  if((crctable = mk_crctable((unsigned short)CRC_POLY,crchware)) == NULL)
       {
       printf("mk_crctable() memory allocation failed\n");
      exit(1);
      }

  free(crctable);
  return 0;
}


unsigned short *mk_crctable(unsigned short poly, unsigned short (*crcfn)
               (unsigned short, unsigned short, unsigned short))
{
  unsigned short *crctable;
  int i;

      if((crctable = (unsigned short *)malloc(256*sizeof(unsigned))) == NULL)
       {
       return NULL;
 }

      for(i=0; i < 256; i++)
      {
      crctable[i] = (*crcfn)(i,poly,0);
      }
  return crctable;
```

```
}

unsigned short crchware(unsigned short data, unsigned short genpoly, unsigned
short accum)
{
  static int i;
  data <<= 8;

      for(i = 8; i > 0; i--)
      {
      if((data ^ accum) & 0x8000)
      accum = (accum << 1 ) ^ genpoly;
      else
      accum <<=1;
      data <<=1;
      }
  return accum;
}
```

An alternate method of calculating the CRC is based on the Bit by Bit method and does not rely on a lookup table. This method has the advantage that it takes less memory to implement.

```
// implements CRC-CCITT using shift register // // Polynomial: x^16 + x^12 +
x^5 + x^1

#include <stdio.h>

static unsigned int accum, Gr1 = 0x0810;

void ResetCRC()
{
      // Resets the Accumulator
      // Call before each new CRC value to calculate
      accum = 0;
}

void CrunchCRC (char x)
{
      // Compute CRC using BitbyBit method
      int i, k;
            for (k=0; k<8; k++) {
            i = (x >> 7) & 1;
            if (accum & 0x8000)
            {
                  accum = ((accum ^ Gr1) << 1) + (i ^ 1);
            }
            else
            {
                  accum = (accum << 1) + i;
            }
            accum &= 0x0ffff;
            x <<= 1;
      }
```

```
}

int _tmain(int argc, _TCHAR* argv[])
{
int buf[5];
int i = 0;

ResetCRC();

buf[0]=0xa5; //SOF
buf[1]=0x3f; //address 63
buf[2]=0x01; // read
buf[3]=0x12; // position
buf[4]=0x00; // offset zero
buf[5]=0x02; // 2 words (32bit)

for (i=0; i<=5; i++)
{
      CrunchCRC(buf[i]);
}

CrunchCRC(0);
CrunchCRC(0);

// value returned should be 0xB0CB
printf("CRC is %04x\n", accum);
```

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***ADVANCED* Motion Controls® Serial Communication**
Reference Manual
MNCMSRRF-09

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