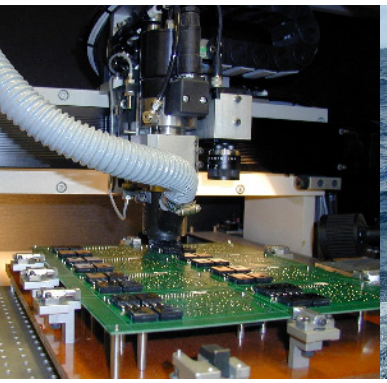
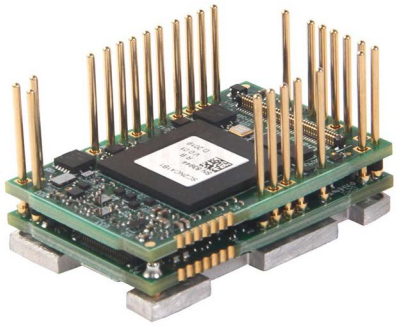
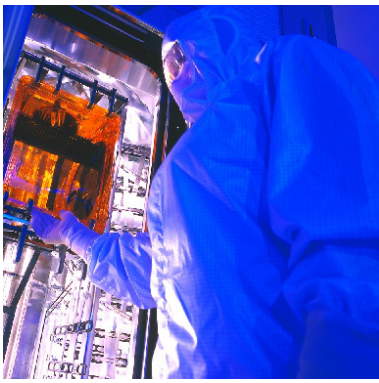
ADVANCED MOTION CONTROLS



Everything's possible.

Serial Communication

Reference Manual

FlexPro® 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:

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Agency Compliances

The company holds original documents for the following:

- UL/IEC 61800 5-1, 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 60204-1:2019
- Reduction of Hazardous Substances (RoHS III), 2015/863/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

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


Notice

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


Caution

Caution - Instructs and directs you to avoid damaging equipment.


Warning

Warning - Instructs and directs you to avoid harming yourself.


DANGER

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

Revision History

Document ID	Revision #	Date	Changes
MNCMSRFP-01	1.0	9/2021	First Release
MNCMSRFP-02	2.0	9/2022	Removed the following sub-indexes from 2034h Current Loop & Commutation Control Parameters: 2034.08h, 2034.09h, 2034.0Ah, 2034.0Bh, 2034.0Ch Removed the following sub-indexes from 2037h Velocity Limits: 2037.06h, 2037.07h Removed the following sub-indexes from 2039h Position Limits: 2039.09h, 2039.0Ah, 2039.0Bh Removed the following sub-indexes from 2043h Capture Configuration Parameters: 2043.01h - 2043.09, 2043.0Ah, 2043Bh, 2043Ch Removed 205Ch: Analog Output Parameters Removed 208Dh: Firmware Information Added 2049h: PVT Buffer Control Added 2049.02h Trajectory Point Edited 2048.02h PVT Input Method

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:

TABLE 1.1 Host Read/Write Command

Header Section							Data Section	
SOF (A5h)	Address	Control Bytes (LSB first)	Index (LSB first)	Sub-Index	Sequence	CRC (MSB first)	Data Field (LSB first)	CRC (MSB first)
8 bits	8 bits	16 bits	16 bits	8 bits	8 bits	16 bits	8192 word max	16 bits

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 1.2 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 Bytes

The control bytes are used to specify each message's function and size. Table 1.3 contains bit level details for setting the control byte.

Data Word Count Bits Value that indicates the number of words (2 bytes) in the DATA field. The data field cannot have more than 8192 words (16384 bytes), therefore the valid range is

from 0 – 8192. In case of a READ command, Data Length indicates the number of data words in the node's Response message.

TABLE 1.3 Control Bytes Bit Definition

Command Bit 0	Reserved Bit 1	Data Word Count Bits 2-15	Description
0	0	Index dependent	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 "Sub-Index" byte.
1	0	Index dependent	This message contains the number of words specified by the command's "Data Words" byte to a location specified by the command's "Sub-Index" byte. The Node's response message will not contain data.

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 16-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 Sub-Index

The sub-index identifies the parameter of interest within a specific index.

1.2.7 Sequence

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..

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 1.5) 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 1.4 Variable Definitions

Variable	Description
crctable[ ]	256 element 1-dimensional array shown in the Table 1.5
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 1.5 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 1.5 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 = 16384 bytes (8192 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 3.

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 3.

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:

TABLE 1.6 Node Response

Header Section							Data Section	
SOF (A5h)	Address	Control Bytes (LSB first)	Command Status	Application Status	System Status (LSB first)	CRC (MSB first)	Data Field (LSB first)	CRC (MSB first)
8 bits	8 bits	16 bits	8 bits	8 bits	16 bits	16 bits	8192 word max	16 bits

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 Bytes

The control bytes are used to specify message sequencing. Table 1.7 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 1.7 Control Bytes Bit Definition

Sequence Bits 0-3	Reserved Bit 4-15
User Specified	0
User Specified	0

1.3.5 Command Status

The command status byte describes the status of the message delivery (Data Link/Physical Layer/Transport Layer) and the drive processor. Table 1.6 and Table 1.7 contain bit level details for interrupting the command status byte.

TABLE 1.8 Message Delivery Status Bit Definition

Message Delivery Status Bits 0-3	Description
0	No error
1	Data was received but header format did not match
2	Message frame error
3	Invalid start of frame error
4	Header CRC error
5	Data CRC error
6	Invalid access error
7	Insufficient memory to store accompanying data
8	Host sent more data than expected
9	Host sent unexpected data. Drive is busy executing another command
10	Drive timed out while expecting additional data
11-15	Reserved

TABLE 1.9 Drive Processor Status Bit Definition

Drive Processor Status Bits 4-7	Description
0	No error
1	Command fail
2	Command index not supported
3	Sub-index not supported
4	Processor busy
5	Sub-index data size incorrect
6	Invalid write
7	Axis not supported
8	Command buffer not available
9	Invalid data size
10	Processor busy
11	Invalid offset length
12	Command failed to complete
13-15	Reserved

1.3.6 Application Status

The application status byte describes the processing status for the parameter being written/read. Table 1.8 contains bit level details for interpreting the application status byte.

TABLE 1.10 Application Status Byte Bit Definition

Application Status Bits 0-7	Description
0	No error
1	Verification failure: Generic
2	Verification failure: Non-negative
3	Verification failure: Positive
4	Invalid parameter
5	Verification failure: Parameter out of range
6	Verification failure: Parameter out of order
7	Write access error
8	Read access error
9	Parameter not supported
10	Invalid element
11	Data Wrong size
12	Buffer too small
13	Invalid mapping
14	Transaction incomplete
15	Internal process busy
16	Invalid type
17	Invalid command
18	Not ready
19	Write failure
20	Read failure
21	File Not found
22	Invalid Configuration
23	Invalid Drive State
24	Parameter must not be zero
25	NVM access failure
26	CRC error
27-31	Reserved

1.3.7 System Status

Reserved. These bytes should always read 0.

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 3 (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 Bit = 1, there is no Data or Data CRC bytes.
2. If Control Byte → Command Bits = 0, 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 = 16384 bytes (8192 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 3 (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 3 (Host Command section).

1.4 Examples

This section contains examples of how messages are sent.

1.4.1 Example 1: Write to Interface Input 2

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

"Commanded Input Parameters" is Index 2045h. Interface input 2 has a listed sub-index of 02h.

Because Interface Input 2 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 1.1 Host Write Command To Input 2

Header Section										Data Section					
SOF	Address	Control Bytes		Index		Sub-Index	Sequence	CRC		Data Field				CRC	
A5h	3Fh	09h	00h	45h	20h	02h	01h	77h	8Dh	67h	45h	23h	01h	BDh	36h

Node Replies

FIGURE 1.2 Node Response to Host Command

Header Section										Data Section	
SOF	Address	Control Bytes		Command Status	Application Status	System Status		CRC		Data Field	CRC
A5h	FFh	01h	00h	00h	00h	00h	00h	2Eh	86h	None	None

1.4.2 Example 2: Read from Interface Input 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 2045h with a listed sub-index of 02h for Interface Input 2.

The Data Length will still 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 1.3 Host Read Command To Interface Input 2

Header Section										Data Section	
SOF	Address	Control Bytes		Index		Sub-Index	Sequence	CRC		Data Field	CRC
A5h	FFh	08h	00h	45h	20h	02h	01h	32h	2Dh	None	None

Node Replies

FIGURE 1.4 Node Response to Host Command

Header Section										Data Section					
SOF	Address	Control Bytes		Command Status	Application Status	System Status		CRC		Data Field				CRC	
A5h	FFh	01h	00h	00h	00h	00h	00h	2Eh	86h	67h	45h	23h	01h	BDh	36h

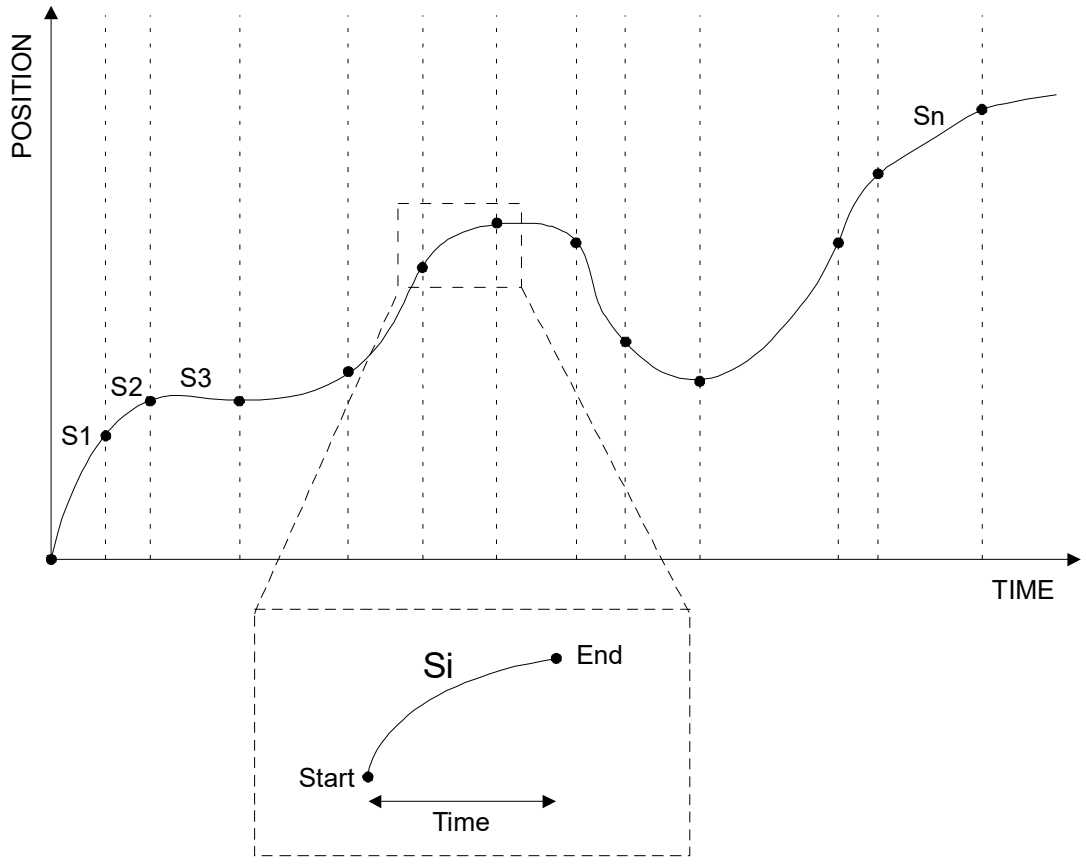
1.5 PVT Mode

1.5.1 PVT Overview

PVT mode is a position data-streaming mode that allows coordinated motion between multiple axes. Arbitrary position and velocity profiles can be executed on each axis. This is achieved via a so-called PVT command. A PVT command contains the position, velocity, and time information of profile segment end points. The servo drive performs a third order interpolation between segment end points. This results in a kind of partial trajectory generation where both host controller and servo drive generate a specific portion of the overall move profile trajectory. The host controller calculates position and velocity of intermittent points on the overall trajectory, while the servo drive interpolates between these intermittent points to ensure smooth motion. The actual position loop is closed within the drive. This reduces the number of commands that need to be sent from host controller to drive, which is critical in distributed control systems. The number of segments and the time duration of each segment need to be selected based upon required accuracy and network bandwidth.

An arbitrary position profile can be split in multiple consecutive segments as follows:

FIGURE 1.5



Each segment has a start point and an end point. The end point of one segment is the start point of the next segment. Each segment end point (start or end) has a position and velocity value. The segment time can be variable depending on curvature (smaller time for rapidly changing positions).

PVT mode operates through PVT commands. A PVT command is an unconfirmed message. The PVT command contains segment end point position and velocity information, and segment time. A 15 level FIFO buffer alleviates host controller timing requirements. The buffer can be cleared and the buffer pointer can be re-positioned. The drive will also send the following PVT related error messages: buffer empty, buffer full, counter error, or message length error. The Time Stamp message can be used to maintain time synchronization of nodes involved in PVT motion.

1.5.2 PVT Messages

Enable PVT & Mode Selection For PVT, the mode of operation must be set to Position around Velocity with the command source set to PVT via ACE.

Configuration The following objects are useful for configuring the drive's behaviors in PVT mode. Set digital outputs to indicate PVT status or specify warning messages for minimum number of buffer points. When errors occur in PVT mode, select from multiple event actions to configure the drive to react appropriately.

TABLE 1.11

Object index	Sub-index range	Name	Description
2048h	01h – 2h	PVT Parameters	Specifies the minimum number of buffered PVT end points before a warning message is sent and the PVT Input Method. Configures whether position values are absolute or relative.
205Ah	31h – 35H	Digital Output Parameters	Assign digital outputs to indicate specific PVT status
2064h	1Ch – 20H	Fault Response Time Parameters	Sets the wait time before reacting to an occurrence of a PVT event
2065h	1Bh – 1FH	Fault Event Action Parameters	Selects the event action when a PVT event occurs. Possible event actions include Disable Power Bridge, Dynamic Brake, and many others.
2066h	22h – 26h	Fault Recovery Time Parameters	Sets the amount of time after the cause of the PVT fault no longer exists before drive fault condition is cleared
2067h	1Fh – 23FH	Fault Time-Out Window Parameters	Time after drive fault condition is cleared before a new occurrence is considered a new fault
2068h	27Fh – 2Bh	Fault Maximum Recoveries Parameters	Max number of faults before a permanent action is taken

PVT Message Protool Once the drive is configured, it is ready to receive PVT segment and points into its 15 level FIFO buffer. The PVT Control Action object (2049.01h) is used to clear points from the buffer, reset its status, and to start motion. The PVT Trajectory Point object

(2049.02h) is used to add points to the buffer. The construction of the PVT message is made up to the Target Position, Velocity at Target, Time, and the Sequence Number.

TABLE 1.12 PVT Message Examples

Object index	Sub-index range	Name	Description
2048h	01h – 2h	PVT Parameters	Specifies the minimum number of buffered PVT end points before a warning message is sent and the PVT Input Method. Configures whether position values are absolute or relative.

Add a PVT Point To add a PVT segment to the buffer, the user can write to the PVT Trajectory Point object, 2049.02h. Make sure to increment the sequence number for subsequent points if the PVT Input Method (Object 2048.02h) is configured to check the sequence number. The PVT Input Method also determines if the position value is interpreted as an absolute or relative position.

TABLE 1.13

Data Field			
Word [1:0}	**Word [3:2]**	**Word 4, Bits [7:0]**	**Word 4, Bits [15:8]**
P	V	T	S

Empty Buffer If for any reason the PVT buffer should be cleared, writing the value 01h to the PVT Action Control object (2049.01h) will remove all the points previously loaded in the buffer.

End of Motion To end a PVT sequence, first insert a PVT point with a specified position, zero velocity, a specified time duration, and sequence number incremented from the previous point. The next PVT point should have the same specified position, but with zero specified for both velocity and time. The sequence number, however, continues to increment.

TABLE 1.14

Data Field			
Word [1:0}	**Word [3:2]**	**Word 4, Bits [7:0]**	**Word 4, Bits [15:8]**
P	0	T	S

TABLE 1.15

Data Field			
Word [1:0}	**Word [3:2]**	**Word 4, Bits [7:0]**	**Word 4, Bits [15:8]**
P	0	0	S+1

Start Motion Once there are enough PVT end points in the PVT buffer, motion may begin. With the drive in Operation Enabled state, sending a value of 0h to PVT Control Action (object 2049.01h) will start motion. Note that this command can be sent as soon as the drive has at least one PVT command. To ensure smooth motion, new PVT commands must be sent in a timely fashion.


Note

The Zero Velocity event must be active prior to sending the PVT start command or motion will occur.

See Application Note FlexPro RS485 PVT for a detailed example.

1.5.3 PVT Status

The following objects display the PVT status of the drive.

TABLE 1.16

Object index	Sub-index range	Name	Description
2022h	06h	Drive Status	The bits is in the sub-index provide status on the PVT buffer
201Dh	01h	PVT Status	Same as bits 0 – 5 of object 2002.06h
201Dh	02h	PVT Points Remaining	Remaining number of points in the buffer to be executed
201Dh	03h	PVT Sequence Number	The current PVT point in the buffer

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 198.
- 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 ACE setup and configuration software. Commands which contain general drive information are also available.

2.2.1 Administrative Commands

2007h: Access Control

2007.01h	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	2001h, 2002h, 2003h, 2006h, 2008h, 2009h, 200A, 200Bh, 200Ch,2028h, 2032h, 203Ah, 2045h, 2048h, 2062h, 208Ch, 20D0h
Tuning	2033h, 2034h, 2036h, 2037h, 2038h, 2039h, 203Ch, 203Dh, 2043h, 2044h, 2046h, 2054h, 2058h, 2064h, 2065h, 2066h, 2067h, 2068h
Comm1	2004h, 2005h

2009h: Restore Drive Parameters

2009.01h	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

200A.01h	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.

2005h: Serial Interface Configuration

2005.01h	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.

2005.02h	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

2005.03h	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.

2005.04h	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

2005.05h	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.

2006h: Network Configuration

2006.01h	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.

2006.02h	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.

2004h: Heartbeat Parameters

2004.01h	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 (2004.02h) in order to avoid a Communication Channel Error in the drive.

2004.02h	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 2004.01h) before throwing a Communication Channel Error. Setting this parameter to zero disables the heartbeat feature.				

2100h: Data Acquisition Module Command Overview

2100.01h	Module Status			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read Only	No

Description:
16-bit Data Acquisition Status Register.

Bits	Name	Description
[7:0]	Runtime Mode	This value indicates what the Module is doing: 0: Not Running 1: Idle Mode 2: Armed for Trigger Mode 3: Waiting for Trigger Mode 4: Capturing Data Mode 5: Post Capture Mode
[11:8]	Buffer 1 Status	This value indicates what each of the two Data Acquisition Buffers are doing: 0: Free/Unused 1: Presently Being filled with data 2: Buffer is full of data and ready to be read out 3: Buffer is busy transferring data out
[15:12]	Buffer 2 Status	

2100.02h	Acquisition Mode Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	No

Description:

Configures the operation mode of the module.

Bits	Name	Description
[7:0]	Operational Mode	This value specifies the operational mode of the module. Valid values are: O: Off 1: Auto Capture Mode: The specified data channels are constantly capturing data at the specified rate 2: Immediate Capture Mode: Regardless of the trigger configuration, the buffers will begin filling up with captured data 3: Normal Triggered Mode: Data capture will begin every time a valid trigger event occurs 4: Single Trigger Mode: Data will be captured starting from a valid trigger event and will continue until the final buffer is full
[15:8]	Data Decimation Rate	This parameter specifies how much the sample data will be decimated. The valid values are as follows: A sample will be taken: 0: Every servo interrupt, (approx. 50usec) 1: Every 2 Servo interrupt, (approx. 100usec) 2: Every 4 Servo interrupt, (approx. 200usec) 3: Every 10 Servo interrupts, (approx. 500usec) 4: Every 20 Servo interrupts, (approx. 1msec) 5: Every 40 Servo interrupts, (approx. 2msec) 6: Every 100 Servo interrupts, (approx. 5msec) 7: Every 200 Servo interrupts, (approx. 10msec) 8: Every 400 Servo interrupts, (approx. 20msec) 9: Every 1000 Servo interrupts, (approx. 50msec) 10: Every 2000 Servo interrupts, (approx. .1sec) 11: Every 4000 Servo interrupts, (approx. .2sec) 12: Every 10000 Servo interrupts, (approx. .5sec) 13: Every 20000 Servo interrupts, (approx. 1sec) 14: Every 40000 Servo interrupts, (approx. .sec)

2100.03h	Event Trigger Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	No

Description:

Configures what will cause the data capture to begin.

Bits	Name	Description
[0]	Trigger 1 Polarity	This configures the logical polarity of the two trigger sources. Valid values are: 0: Standard polarity 1: Inverted Polarity
[1]	Trigger 2 Polarity	
[6:2]	Combination	This parameter Specifies the source of the Trigger event. Valid values are: 0: No Trigger Specified 1: Trigger 1 only 2: Trigger 2 only 3: Trigger1 OR Trigger 2 4: Trigger1 AND Trigger 2 5: Trigger 1 XOR Trigger 2
[15:7]	Trigger Position	This 9bitU8 number specifies the percentage of the captured data that occurs BEFORE the trigger event. Valid range: 0<= value < 0x100

2100.04h	Trigger 1 Config			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	No

Description:

Specifies what will cause Trigger #1 to go active.

Word	Bits	Name	Description
0	[7-0]	Trigger Type	This value specifies the type of trigger. Valid values are: 0: No Trigger 1: Signal value rising through trigger level: Pre: sig < level => Post: sig > level 2: Signal value rising to/through trigger value: Pre: sig < level => Post: sig >= level 3: Signal Value falling through trigger level: Pre: sig > level => Post: sig < level 4: Signal Value falling to/through trigger level: Pre: sig > level => Post: sig <= level 5: Signal value Greater than the trigger level: sig > level 6: Signal value Greater than or equal to the trigger level: sig >= level 7: Signal value Less than the trigger value: sig < level 8: Signal value Less than or equal to the trigger value: sig <= level
0	[15-8]	Trigger Signal Source Select	This parameter selects the source of the trigger signal. Valid values are contained in the list of signal enums described above.
1	[7-0]	Trigger Delay Count	This 8bit parameter selects the number of triggers that will occur BEFORE the trigger event is generated and the data may be captured.
1	[15-8]	Debounce Count	This 8bit parameter specifies the number of data samples that the trigger condition must be valid before a trigger is signaled.
2	[15-0]	Minimum Active Time	Specifies the minimum number off data samples that the condition must be true (not implemented yet)
3	[15-0]	Maximum Active Time	Specifies the maximum number for data samples that the condition must be true (not implemented yet)
7-4	-	Trigger Threshold Information	The value of this parameter is dependent of the trigger type as described below.

2100.05h	Trigger 2 Config			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	No

Description:

Specifies what will cause Trigger #2 to go active.

Word	Bits	Name	Description
0	[7-0]	Trigger Type	This value specifies the type of trigger. Valid values are: 0: No Trigger 1: Signal value rising through trigger level: Pre: sig < level => Post: sig > level 2: Signal value rising to/through trigger value: Pre: sig < level => Post: sig >= level 3: Signal Value falling through trigger level: Pre: sig > level => Post: sig < level 4: Signal Value falling to/through trigger level: Pre: sig > level => Post: sig <= level 5: Signal value Greater than the trigger level: sig > level 6: Signal value Greater than or equal to the trigger level: sig >= level 7: Signal value Less than the trigger value: sig < level 8: Signal value Less than or equal to the trigger value: sig <= level
0	[15-8]	Trigger Signal Source Select	This parameter selects the source of the trigger signal. Valid values are contained in the list of signal enums described above.
1	[7-0]	Trigger Delay Count	This 8bit parameter selects the number of trigger events that will occur BEFORE the data is captured.
1	[15-8]	Debounce Count	This 8bit parameter specifies the number of data samples that the trigger condition must be valid before a trigger event is signaled.
2	[15-0]	Minimum Active Time	Specifies the minimum number off data samples that the condition must be true (not implemented yet)
3	[15-0]	Maximum Active Time	Specifies the maximum number for data samples that the condition must be true (not implemented yet)
7-4	-	Trigger Threshold Information	The value of this parameter is dependent of the trigger type as described below.

2100.06h	Trace Table			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)} – 1]$	N/A	Read / Write	No

Description:

A list of enum values that specifies which drive signals to capture.

Word	Bits	Name	Description
0	[7-0]	Capture Signal Source Select 1	This parameter selects the source of the captured signal. Valid values are contained in the list of signal enums as described above. The size of the selected signals, in words, must not exceed 16. Signals with 16-bits of data consume 1 channel, Signals with 32-bits of data consume 2 channels, etc. A signal is selected from the master list of signals listed above. Any combination of signals may be captured, as long as the total number of channels consumed is less than or equal to 16.
0	[15-8]	Capture Signal Source Select 2	
1	[7-0]	Capture Signal Source Select 3	
1	[15-8]	Capture Signal Source Select 4	
2	[7-0]	Capture Signal Source Select 5	
2	[15-8]	Capture Signal Source Select 6	
3	[7-0]	Capture Signal Source Select 7	
3	[15-8]	Capture Signal Source Select 8	
4	[7-0]	Capture Signal Source Select 9	
4	[15-8]	Capture Signal Source Select 10	
5	[7-0]	Capture Signal Source Select 11	
5	[15-8]	Capture Signal Source Select 12	
6	[7-0]	Capture Signal Source Select 13	
6	[15-8]	Capture Signal Source Select 14	
7	[7-0]	Capture Signal Source Select 15	
7	[15-8]	Capture Signal Source Select 16	

2.2.3 Drive Configuration

2.2.3.1 Motion Control Profile

20D0h: Control Loop Configuration Parameters

20D0.01h	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. Object data length is 33 words.				

2076h: Analog Motor Feedback Parameters

2076.01h	Commutation Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
-	-	-	-	-

2076.02h	Commutation Counts			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 - 2^{30}$	N/A	Read / Write	No
Description: The number of commutation counts per unit length.				

2076.03h	Pole Pairs per Unit Length			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	1 - 64	Pole Pairs	Read / Write	No
Description: The high byte specifies the integral number of pole pairs and the low byte specifies the fractional pole pair count.				

2076.04h	Phase Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - 2^{15}$	Ohms	Read / Write	No
Description: 16bitS12 value used to specify the resistance of each phase of the motor.				

2076.05h	Phase Inductance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	0 - 2^{15}	Henrys	Read / Write	No
Description: 16bitS14 value used to specify the inductance of each phase of the motor.				

2076.06h	Null Torque Angle at Lower Bound			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - 360	DG1	Read / Write	No
Description: Represents the Null torque angle when the value of the analog input is at the lower bound of the voltage range.				

2076.07h	Counts per Full Scale			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	Counts	Read / Write	No
Description: The amount of counts per full scale of the voltage range.				

2076.08h	Analog Input Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ -1]	N/A	Read / Write	No

Description:
Allows the user to configure the operational behavior of the analog input. The bits of the structure are defined as follows:

Bits	Name	Description
[0]	Invert Input	Setting this bit effectively causes the normalized input voltage value to be multiplied by -1
[1]	Rotary Input	Setting this bit causes the analog input to "wrap around" one boundary to the other, used for rotary pots
[15:2]	Reserved	This value MUST be zero

2076.09h	Input Voltage Bounds			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	N/A	N/A	Read / Write	No

Description:

Contains the Upper and Lower bounds of the voltage range, whose structure is defined below:

Word #	Name	Description
0	Upper Voltage Boundary	The percentage of the full-scale input voltage that represents the most valid input voltage.
1	Lower Voltage Boundary	The percentage of the full-scale input voltage that represents the most valid input voltage.

2076.0Ah	Reference Frame Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ -1]	N/A	Read / Write	No

Description:

Specifies how to use the selected number of position bits and whether to reflect the axis. The bits of the structure are defined as follows:

Bits	Name	Description
[0]	Enable Reflection over Encoder Axis	Allows the user to reflect the encoder axis about 0 0: Do NOT reflect axis: encoder position = (ref = 1) 1: Reflect the encoder axis: encoder position = ref (- 1) encoder position = (ref) * raw encoder position + user offset
[1]	Enable Absolute Encoder Modulo	Allows the user to keep the monitored absolute position within the range of the analog input 0: Disable Modulo: The monitored Encoder position can go out of the range of the encoder 1: Enable Modulo: No matter how far the encoder moves in one direction, the value reported by the Absolute encoder position will always lie within the range: encoder position = ((ref) * raw encoder position) % Range + Range Offset, where Range and Range Offset are specified by their respective sub-indexes. It should be noted that the range value should be such that the maximum distance the encoder is expected to move should be less than half of the range.
[4:2]	Position Feedback Configuration	Allows the user to specify how the drive's position frame of reference will be initialized when the feedback object is used for position feedback: 0: Pos = raw encoder position 1: Pos = raw encoder position + offset 2: Pos = -raw encoder position 3: Pos = -raw encoder position + offset 4: Pos = encoder position
{15:5]	Reserved	Value MUST be 0.

2076.0Bh	Monitored Encoder Offset and Range			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer64	-2^{31} - 2^{31}	N/A	Read / Write	No
Description: This is the range and offset values that are applied to the position that is read from the analog input. It allows the user to specify the absolute reference frame.				

2076.0Ch	Voltage Sense LFP Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 - 1	N/A	Read / Write	No
Description: Specifies the cutoff frequency characteristics of the single pole lowpass filter that is dedicated to the analog input based motor feedback. It is applied prior to the conversion to position and velocity.				

2077h: Analog Motor Feedback Values

2077.01h	Raw Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	N/A	N/A	Read Only	No
Description: The raw value of the analog input from the ADC.				

2077.02h	Bounded Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	N/A	N/A	Read Only	No
Description: The raw value but bounded by a set boundary.				

2077.03h	Analog Input Value Range			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The value of the analog input converted to a range value.				

2077.04h	Analog Input Value Absolute Range			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	N/A	N/A	Read Only	No
Description: The absolute value of the analog input converted to a range value.				

2077.05h	Analog Position Counts Unsigned			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read Only	No
Description: The number of position counts from the analog input.				

2077.06h	Analog Position Counts Signed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	N/A	N/A	Read Only	No
Description: The number of turns of the rotor, either forwards or backwards.				

2077.07h	Monitored Encoder Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	N/A	Counts	Read Only	No
Description: The monitored encoder raw position value.				

2077.08h	Captured Encoder Position			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	N/A	Counts	Read Only	No
Description: The captured encoder position.				

202Fh: AC Induction Motor Parameters

202F.01h	Currents			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$[-2^{(32)}] – [2^{(31)}-1]$	N/A	Read / Write	No

Description:
This object is a 2-word structure containing the values for rated peak motor line current and no-load peak magnetization current.

	Description
Word 0	The rated line current used to compute the AC induction slip coefficients.
Word 1	The no-load magnetization current used to compute the internal AC induction parameters.

202F.02h	Speeds			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned48	$[-2^{(32)}] – [2^{(31)}-1]$	N/A	Read / Write	No

Description:
This object is a 3-word structure containing the values for the rated frequency, rotor no-load base speed, and field weakening threshold speed.

	Description
Word 0	The specified line frequency in Hz of the AC induction motor.
Word 1	The rotor base speed (electrical cycles per minute).
Word 2	The field weakening threshold speed (electrical cycles per minute).

2070h: Incremental Encoder #1 Motor Feedback

2070.01h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
-	-	-	-	-

2070.02h	Incremental Encoder #1 - Commutation Counts per Unit Length			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$0 – [2^{(30)}-1]$	counts	Read / Write	Yes

Description:
Contains a value corresponding to the number of quadrature counts per unit length.

2070.03h	Incremental Encoder #1 - Pole Pairs per Unit Length			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	1-64	counts	Read / Write	Yes
Description: Contains a value corresponding to the number of pole pairs per unit length.				

2070.04h	Incremental Encoder #1 - Motor Phase Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	ohms	Read / Write	Yes
Description: Contains a value corresponding to the resistance of each phase of the motor.				

2070.05h	Incremental Encoder #1 - Motor Phase Inductance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	Henrys	Read / Write	Yes
Description: Contains a value corresponding to the inductance of each phase of the motor.				

2070.06h	Incremental Encoder #1 - Null Torque Sync 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 Null Torque Angle of the first of the two synchronization edges.				

2070.07h	Incremental Encoder #1 - Null Torque Sync 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 Null Torque Angle of the second of the two synchronization edges.				

2070.08h	Incremental Encoder #1 - Commutation Angle Error Limit			
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 error angle that will be tolerated before a commutation sync error is reported.				

2070.09h	Incremental Encoder #1 - Maximum Commutation Angle Error 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 maximum amount of phase angle correction that may be applied per each synchronization event.				

2070.0Ah	Incremental Encoder #1 - Hall State Table			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	$0 – [2^{(16)}-1]$	N/A	Read / Write	Yes

Description:
Contains an array listing the optimum torque angle for each valid Hall state.

	Torque Angle Default Values	
Hall State Value	Hex	Degrees
0	0x0000	0
1	0x4000	90
2	0XEAAB	330
3	0x1555	30
4	0x9555	210
5	0x6AAB	150
6	0xC000	290
7	0x000	0

2070.0Bh	Incremental Encoder #1 - Low Speed Estimator Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$0 – [2^{(32)}-1]$	N/A	Read / Write	Yes
Description: Contains a value corresponding to the K_t/J value used by the Low Speed Estimator when the encoder is used as a velocity feedback source.				

2070.0Ch	Incremental Encoder #1 - NTAD Selection Enum			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	0-2	N/A	Read / Write	Yes

Description:
Selects from one of the three Null Torque Angle Determination methods.

Null Torque Angle Determination Method	
Description	Value
Wake and Shake	0
Slam and Go	1
Sweep the Leg	2

2070.0Dh	Incremental Encoder #1 - Maximum Amount of NTAD Movement Allowed			
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 amount of movement allowed (per unit length) during the execution of certain Null Torque Angle Determination methods.

2070.0Eh	Incremental Encoder #1 - Maximum Torque Current Allowed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	DC1	Read / Write	Yes

Description:
Contains a value corresponding to the maximum amount of torque producing current to be used during any of the Null Torque Angle Determination methods. See "Appendix A" on page 198 for unit conversion.

2070.0Fh	Incremental Encoder #1 - Lock Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	ms	Read / Write	Yes

Description:
Contains a value corresponding to the number of milliseconds to lock the rotor in a null torque position at the end of a successful Null Torque Angle Determination.

2070.10h	Incremental Encoder #1 - Internal Retry Brake Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$-1]	ms	Read / Write	Yes
Description: Contains a value corresponding to the number of milliseconds to apply the dynamic brake to stop any motion between consecutive Null Torque Angle Determinaton retry attempts.				

2072h: Incremental Encoder #2 Motor Feedback

2072.01h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
-	-	-	-	-

2072.02h	Incremental Encoder #2 - Commutation Counts per Unit Length			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	0 – [$2^{(32)}$-1]	counts	Read / Write	Yes
Description: Contains a value corresponding to the number of quadrature counts per unit length.				

2072.03h	Incremental Encoder #2 - Pole Pairs per Unit Length			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	1-64	counts	Read / Write	Yes
Description: Contains a value corresponding to the number of pole pairs per unit length.				

2072.04h	Incremental Encoder #2 - Motor Phase Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$-1]	ohms	Read / Write	Yes
Description: Contains a value corresponding to the resistance of each phase of the motor.				

2072.05h	Incremental Encoder #2 - Motor Phase Inductance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 – [$2^{(16)}$-1]	Henrys	Read / Write	Yes
Description: Contains a value corresponding to the inductance of each phase of the motor.				

2072.06h	Incremental Encoder #2 - Null Torque Sync 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 Null Torque Angle of the first of the two synchronization edges.				

2072.07h	Incremental Encoder #2 - Null Torque Sync 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 Null Torque Angle of the second of the two synchronization edges.				

2072.08h	Incremental Encoder #2 - Commutation Angle Error Limit			
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 error angle that will be tolerated before a commutation sync error is reported.				

2072.09h	Incremental Encoder #2 - Maximum Commutation Angle Error 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 maximum amount of phase angle correction that may be applied per each synchronization event.				

2072.0Ah	Incremental Encoder #2 - Hall State Table			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	$0 – [2^{(16)}-1]$	N/A	Read / Write	Yes

Description:
Contains an array listing the optimum torque angle for each valid Hall state.

	Torque Angle Default Values	
Hall State Value	Hex	Degrees
0	0x0000	0
1	0x4000	90
2	0XEAAB	330
3	0x1555	30
4	0x9555	210
5	0x6AAB	150
6	0xC000	290
7	0x000	0

2072.0Bh	Incremental Encoder #2 - Low Speed Estimator Gain			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$0 – [2^{(32)}-1]$	N/A	Read / Write	Yes

Description:
Contains a value corresponding to the K_t/J value used by the Low Speed Estimator when the encoder is used as a velocity feedback source.

2072.0Ch	Incremental Encoder #2 - NTAD Selection Enum			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	0-2	N/A	Read / Write	Yes

Description:
Selects from one of the three Null Torque Angle Determination methods.

Null Torque Angle Determination Method	
Description	Value
Wake and Shake	0
Slam and Go	1
Sweep the Leg	2

2072.0Dh	Incremental Encoder #2 - Maximum Amount of NTAD Movement Allowed			
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 amount of movement allowed (per unit length) during the execution of certain Null Torque Angle Determination methods.				

2072.0Eh	Incremental Encoder #2 - Maximum Torque Current Allowed			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	DC1	Read / Write	Yes
Description: Contains a value corresponding to the maximum amount of torque producing current to be used during any of the Null Torque Angle Determination methods. See "Appendix A" on page 198 for unit conversion.				

2072.0Fh	Incremental Encoder #2 - Lock Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	ms	Read / Write	Yes
Description: Contains a value corresponding to the number of milliseconds to lock the rotor in a null torque position at the end of a successful Null Torque Angle Determination.				

2072.10h	Incremental Encoder #2 - Internal Retry Brake Time			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 – [2^{(16)}-1]$	ms	Read / Write	Yes
Description: Contains a value corresponding to the number of milliseconds to apply the dynamic brake to stop any motion between consecutive Null Torque Angle Determinaton retry attempts.				

2074h: BiSS-C Encoder Motor Feedback

2074.01h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
-	-	-	-	-

2074.02h	BiSS-C Encoder - Commutation Counts per Unit Length			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	$0 – [2^{(32)}-1]$	counts	Read / Write	Yes
Description: Contains a value corresponding to the number of quadrature counts per unit length.				

2074.03h	BiSS-C Encoder - Pole Pairs per Unit Length			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	1-64	counts	Read / Write	Yes
Description: Contains a value corresponding to the number of pole pairs per unit length.				

2074.04h	BiSS-C Encoder - Motor Phase Resistance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$0 – [2^{(16)}-1]$	ohms	Read / Write	Yes
Description: Contains a value corresponding to the resistance of each phase of the motor.				

2074.05h	BiSS-C Encoder - Motor Phase Inductance			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$0 – [2^{(16)}-1]$	Henrys	Read / Write	Yes
Description: Contains a value corresponding to the inductance of each phase of the motor.				

2074.06h	BiSS-C Encoder - Null Torque Angle at Encoder Zero 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 null torque angle of the motor when the position of the absolute encoder is 0 counts.				

2074.07h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
-	-	-	-	-

2074.08h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
-	-	-	-	-

2074.09h	BiSS-C Encoder - Monitored Encoder Parameters			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer64	$0 – [2^{(32)}-1]$	N/A	Read / Write	Yes
Description: This is a structure containing both the offset and range of the monitored encoder. The offset is added to the absolute position value that is read from the encoder. The range restricts the values the encoder may take. Together it allows the user to specify the absolute reference frame.				

2046h: Auxiliary Input Parameters

2046.01h	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.				

2046.02h	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.				

2046.03h	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.				

2046.04h	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.

2034h: Current Loop & Commutation Control Parameters

2034.01h	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:

$$Gain \times 2^9 = Value\ to\ the\ drive$$

2034.02h	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:

$$Gain \times 2^9 = Value\ to\ the\ drive$$

2034.03h	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

2034.04h	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.

2034.05h	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.

2034.06h	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.				

2034.07h	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.				

2036h: Velocity Loop Control Parameters

2036.01h	Loop Configuration Control			
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 the velocity/position feedback source...

Bit	Name	Description
0	Feedback Direction Configuration 0	1: Standard Feedback Direction, 0: Inverted Feedback Direction
1	Feedback Direction Configuration 1	1: Standard Feedback Direction, 0: Inverted Feedback Direction

2036.02h	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 ACE and the value sent to the drive, use the following functions:

ACE to drive:

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

where a = [value entered into ACE] x ($-6.283185307 \times 10^{-4}$) and P = [value sent to drive]

Drive to ACE:

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

where P = [value in drive]

2036.03h	Velocity Loop Proportional Gain: 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
C_{pk} = Peak Current

2036.04h	Velocity Loop Integral Gain: 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
C_{pk} = Peak Current

2036.05h	Velocity Loop Derivative Gain: 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
C_{pk} = Peak Current

2036.06h	Velocity Loop Acceleration Feed Forward Gain: 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
C_{pk} = Peak Current

2036.07h	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) * $(2^{16} / 100)$

2036.08h	Velocity Loop Proportional Gain: 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
C_{pk} = Peak Current

2036.09h	Velocity Loop Integral Gain: 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
C_{pk} = Peak Current

2036.0Ah	Velocity Loop Derivative Gain: 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
C_{pk} = Peak Current

2036.0Bh	Velocity Loop Acceleration Feed Forward Gain: 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

C_{pk} = Peak Current

2037h: Velocity Limits

2037.01h	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 198 for unit conversion.

2037.02h	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 198 for unit conversion.

2037.03h	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 198 for unit conversion.

2037.04h	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 198 for unit conversion.

2037.05h	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 198 for unit conversion.				

2037.06h	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 198 for unit conversion.				

2037.07h	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.				

2038h: Position Loop Control Parameters

2038.01h	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				

2038.02h	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)

2038.03h	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)

2038.04h	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)

2038.05h	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)

2038.06h	Configuration Control			
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 the velocity/position feedback source..

Bit	Name	Description
0	Feedback Direction Configuration 0	1: Standard Feedback Direction, 0: Inverted Feedback Direction
1	Feedback Direction Configuration 1	1: Standard Feedback Direction, 0: Inverted Feedback Direction

2038.07h	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.

2038.08h	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

2038.09h	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)

2038.0Ah	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)

2038.0Bh	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)

2038.0Ch	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)				

2039h: Position Limits

2039.01h	Preset Position			
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).				

2039.02h	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.				

2039.03h	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.				

2039.04h	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.				

2039.05h	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.				

2039.06h	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.				

2039.07h	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).				

2039.08h	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.				

203Ah: Homing Configuration Parameters

203A.01h	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 198 for unit conversion.				

203A.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 198 for unit conversion.				

203A.03h	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 200 for routine descriptions.				

203A.04h	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 198 for unit conversion details.				

2048h: PVT Parameters

2048.01h	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.

2048.02h	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. If the positioning is incremental, the position value will be added to the previous target position. This object is also used to define whether the buffer checks the sequence number.

Value	Input Method
0	Absolute position with sequence counter
1	Incremental position with sequence counter
2	Reserved
3	Reserved
4	Absolute Input Mode, No Sequence Number
5	Incremental Input Mode, No Sequence Number

2049h: PVT Buffer Control

2049.01h	PVT Control Action			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:

This object instructs the PVT Generation to take the specified action.

Value	Action
0	Start Motion
1	Empty Buffer
2	Reserved
3	Clear PVT Generator Status

2049.02h	Trajectory Point			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:

This object is used to add a PVT point to the buffer. Data length is 5 words.

Word Offset	Bits	Name	Description	Units
0	[31:0]	Waypoint Target Position	Position when the waypoint is reached. Position can be absolute or relative, depending on the PVT Input Mode (Object 2048.2h). Valid range: [-2^31:2^31]	counts
2	[31:0]	Velocity at Waypoint Position	Velocity at the end of the trajectory segment when the waypoint is reached.	counts/second
4	[7:0]	Time of Travel	The time of the trajectory segment. Valid range: [2,255], (0 is allowed only for a stop point.	milliseconds
4	[15:8]	Sequence Number	Sequence number of this waypoint. If the generation is configured to verify the sequence number, it must match the expected sequence number, (object 201D.3h). It is a circular counter. Valid range: [0,255]	N/A

203Ch: 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

203C.01h	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 198 for unit conversions.

203C.02h	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 198 for unit conversions.				

203C.03h	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 198 for unit conversions.				

203C.04h	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 198 for unit conversions.				

203C.05h	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 198 for unit conversions.				

203C.06h	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 198 for unit conversions.				

203C.07h	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 198 for unit conversions.				

203C.08h	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 198 for unit conversions.				

203C.09h	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 198 for unit conversions.				

203C.0Ah	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 198 for unit conversions.				

203C.0Bh	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 198 for unit conversions.				

203C.0Ch	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 198 for unit conversions.				

203C.0Dh	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 198 for unit conversions.				

203C.0Eh	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 198 for unit conversions.				

2.2.3.2 Hardware Profile

2008h: Drive Initialization Parameters

2008.01h	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

2008.02h	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

20C8h: Motion Engine Configuration

20C8.00h	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

2033h: User Voltage Protection Parameters

2033.01h	Voltage Limits			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read / Write	Yes

Description:

Contains the over voltage and under voltage limit specified for the drive. The over voltage limit must be set lower than the drive over-voltage hardware shutdown point and greater than the Nominal DC Bus Voltage. The under voltage limit must be set above the drive under-voltage hardware shutdown point and less than the Nominal DC Bus Voltage. See "Appendix A" on page 198 for unit conversion.

2033.02h	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

2033.03h	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 198 for unit conversion.

2033.04h	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.

2033.05h	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.

2033.06h	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.

2054h: Drive Temperature Parameters

2054.01h	External Temperature Control			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	DT1	Read / Write	Yes
Description: Controls when the drive is enabled/disabled using the external temperature. See "Appendix A" on page 198 for unit conversion.				

2054.02h	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.				

2054.03h	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.				

2054.04h	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

2043h: 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

2058h: 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

2058.01h	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.				

2058.02h	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.				

2058.03h	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.				

2058.04h	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.				

2058.05h	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.				

2058.06h	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.				

2058.07h	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.				

2058.08h	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.				

2058.09h	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.				

2058.0Ah	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.				

2058.0Bh	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.				

2058.0Ch	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.				

2058.0Dh	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.				

2058.0Eh	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.				

2058.0Fh	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.				

2058.10h	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.				

2058.11h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	Yes

2058.12h	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.				

2058.13h	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.				

2058.14h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	Yes

2058.15h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	Yes

2058.16h	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.				

2058.17h	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.				

2058.18h	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.				

2058.19h	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.				

2058.1Ah	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.				

2058.1Bh	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.				

2058.1Ch	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.				

2058.1Dh	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.				

2058.1Eh	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.				

2058.1Fh	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.				

2058.20h	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.				

2058.21h	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.				

205Ah: 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

205A.01h	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.				

205A.02h	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.				

205A.03h	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.				

205A.04h	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.				

205A.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.				

205A.06h	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.				

205A.07h	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.				

205A.08h	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.				

205A.09h	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.				

205A.0Ah	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.				

205A.0Bh	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.				

205A.0Ch	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.				

205A.0Dh	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.				

205A.0Eh	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.				

205A.0Fh	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.				

205A.10h	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.				

205A.11h	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.				

205A.12h	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.				

205A.13h	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.				

205A.14h	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.				

205A.15h	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.				

205A.16h	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.				

205A.17h	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.				

205A.18h	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.				

205A.19h	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.				

205A.1Ah	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.				

205A.1Bh	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.				

205A.1Ch	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.				

205A.1Dh	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.				

205A.1Eh	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.				

205A.1Fh	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.				

205A.20h	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.				

205A.21h	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.				

205A.22h	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.				

205A.23h	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.				

205A.24h	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.				

205A.25h	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.				

205A.26h	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.				

205A.27h	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.				

205A.28h	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.				

205A.29h	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.				

205A.2Ah	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.				

205A.2Bh	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.				

205A.2Ch	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.				

205A.2Dh	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.				

205A.2Eh	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.				

205A.2Fh	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.				

205A.30h	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.				

205A.31h	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.				

205A.32h	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.				

205A.33h	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.				

205A.34h	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.				

205A.35h	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.				

205A.36h	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.				

205A.37h	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.				

205A.38h	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.				

205A.39h	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.				

205A.3Ah	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.				

205A.3Bh	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.				

205A.3Ch	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.				

205A.3Dh	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.				

205A.3Eh	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.				

205A.3Fh	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.				

205A.40h	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.				

205A.41h	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.				

205A.42h	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.				

205A.43h	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.				

205A.44h	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.				

205A.45h	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.				

205A.46h	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.				

205A.47h	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.				

205A.48h	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.				

205A.49h	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.				

205A.4Ah	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.				

205A.4Bh	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.				

205A.4Ch	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.				

205A.4Dh	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.				

205A.4Eh	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.				

205A.4Fh	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.				

205A.50h	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.				

205A.51h	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.				

205A.52h	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.				

205A.53h	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.				

205A.54h	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.				

205A.55h	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.				

205A.56h	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.				

205A.57h	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.				

205A.58h	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.				

205A.59h	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.				

205A.5Ah	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.				

205A.5Bh	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.				

205A.5Ch	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.				

205A.5Dh	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.				

205A.5Eh	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.				

205A.5Fh	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.				

205A.60h	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.				

205A.61h	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.				

205A.62h	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.				

205A.63h	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.				

205A.64h	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.				

205A.65h	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.				

205A.66h	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.				

2044h: Analog Input Configuration

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

2044.01h	Analog Input 1 Config 0: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 1 Configuration 0.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.02h	Analog Input 1 Config 0: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 1 Configuration 0 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.03h	Analog Input 1 Config 0: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 1 Configuration 0 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.04h	Analog Input 1 Config 0: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 1 Configuration 0 in int32S30 notation.

2044.05h	Analog Input 1 Config 0: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 1 Configuration 0 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.06h	Analog Input 1 Config 0: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes
Description: Contains the Deadband Width of Analog Input 1 Configuration 0 in int16S14 notation.				

2044.07h	Analog Input 1 Config 0: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes
Description: Contains the Deadband Setpoint of Analog Input 1 Configuration 0 in int16S14 notation.				

2044.08h	Analog Input 1 Config 1: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 1 Configuration 1.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.09h	Analog Input 1 Config 1: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 1 Configuration 1 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.0Ah	Analog Input 1 Config 1: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 1 Configuration 1 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.0Bh	Analog Input 1 Config 1: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 1 Configuration 1 in int32S30 notation.

2044.0Ch	Analog Input 1 Config 1: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 1 Configuration 1 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.0Dh	Analog Input 1 Config 1: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Width of Analog Input 1 Configuration 1 in int16S14 notation.

2044.0Eh	Analog Input 1 Config 1: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Setpoint of Analog Input 1 Configuration 1 in int16S14 notation.

2044.0Fh	Analog Input 2 Config 0: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 2 Configuration 0.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.10h	Analog Input 2 Config 0: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	[$-2^{(15)}$] - [$2^{(15)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 2 Configuration 0 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.11h	Analog Input 2 Config 0: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	[$-2^{(31)}$] - [$2^{(31)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 2 Configuration 0 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.12h	Analog Input 2 Config 0: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	[$-2^{(31)}$] - [$2^{(31)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 2 Configuration 0 in int32S30 notation.

2044.13h	Analog Input 2 Config 0: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 2 Configuration 0 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.14h	Analog Input 2 Config 0: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Width of Analog Input 2 Configuration 0 in int16S14 notation.

2044.15h	Analog Input 2 Config 0: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Setpoint of Analog Input 2 Configuration 0 in int16S14 notation.

2044.16h	Analog Input 2 Config 1: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 2 Configuration 1.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.17h	Analog Input 2 Config 1: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 2 Configuration 1 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.18h	Analog Input 2 Config 1: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 2 Configuration 1 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.19h	Analog Input 2 Config 1: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 2 Configuration 1 in int32S30 notation.

2044.1Ah	Analog Input 2 Config 1: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 2 Configuration 1 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.1Bh	Analog Input 2 Config 1: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes
Description: Contains the Deadband Width of Analog Input 2 Configuration 1 in int16S14 notation.				

2044.1Ch	Analog Input 2 Config 1: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes
Description: Contains the Deadband Setpoint of Analog Input 2 Configuration 1 in int16S14 notation.				

2044.1Dh	Analog Input 3 Config 0: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 3 Configuration 0.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.1Eh	Analog Input 3 Config 0: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 3 Configuration 0 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.1Fh	Analog Input 3 Config 0: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 3 Configuration 0 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.20h	Analog Input 3 Config 0: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 3 Configuration 0 in int32S30 notation.

2044.21h	Analog Input 3 Config 0: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 3 Configuration 0 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.22h	Analog Input 3 Config 0: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Width of Analog Input 3 Configuration 0 in int16S14 notation.

2044.23h	Analog Input 3 Config 0: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Setpoint of Analog Input 3 Configuration 0 in int16S14 notation.

2044.24h	Analog Input 3 Config 1: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 3 Configuration 1.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.25h	Analog Input 3 Config 1: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	[$-2^{(15)}$] - [$2^{(15)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 3 Configuration 1 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.26h	Analog Input 3 Config 1: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	[$-2^{(31)}$] - [$2^{(31)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 3 Configuration 1 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.27h	Analog Input 3 Config 1: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	[$-2^{(31)}$] - [$2^{(31)}$ –1]	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 3 Configuration 1 in int32S30 notation.

2044.28h	Analog Input 3 Config 1: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 3 Configuration 1 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.29h	Analog Input 3 Config 1: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Width of Analog Input 3 Configuration 1 in int16S14 notation.

2044.2Ah	Analog Input 3 Config 1: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Setpoint of Analog Input 3 Configuration 1 in int16S14 notation.

2044.2Bh	Analog Input 4 Config 0: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 4 Configuration 0.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.2Ch	Analog Input 4 Config 0: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 4 Configuration 0 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.2Dh	Analog Input 4 Config 0: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 4 Configuration 0 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.2Eh	Analog Input 4 Config 0: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 4 Configuration 0 in int32S30 notation.

2044.2Fh	Analog Input 4 Config 0: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 4 Configuration 0 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.30h	Analog Input 4 Config 0: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes
Description: Contains the Deadband Width of Analog Input 4 Configuration 0 in int16S14 notation.				

2044.31h	Analog Input 4 Config 0: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes
Description: Contains the Deadband Setpoint of Analog Input 4 Configuration 0 in int16S14 notation.				

2044.32h	Analog Input 4 Config 1: Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	$0 - [2^{(16)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 4 Configuration 1.

Bit(s)	Description
0	Invert Input; 0=Non-inverted; 1=Inverted
1	Enable Input Warnings; 0=Disabled; 1=Enabled
2	Enable Deadband; 0=Disabled; 1=Enabled
3-6	Output Left Shift: 0-15
7-15	Reserved (must be 0)

2044.33h	Analog Input 4 Config 1: Input Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the four Input Limits and Warning Boundaries of Analog Input 4 Configuration 1 in int16S14 notation.

Offset	Description
0	Upper Input Limit
1	Upper Input Warning
2	Lower Input Warning
3	Lower Input Limit

2044.34h	Analog Input 4 Config 1: Output Boundaries			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the two Output Boundaries of Analog Input 4 Configuration 1 in int32S20 notation.

Element	Description
0	Upper Output Limit
1	Lower Output Limit

2044.35h	Analog Input 4 Config 1: Low Pass Filter Coefficient			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	N/A	Read / Write	Yes

Description:
Contains the Low Pass Filter Coefficient of Analog Input 4 Configuration 1 in int32S30 notation.

2044.36h	Analog Input 4 Config 1: Deadband Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the configuration parameters of Analog Input 4 Configuration 1 Deadband.

Element	Description
0	Non-Linear
1	Linear

2044.37h	Analog Input 4 Config 1: Deadband Width			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Width of Analog Input 4 Configuration 1 in int16S14 notation.

2044.38h	Analog Input 4 Config 1: Deadband Setpoint			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] - [2^{(15)} - 1]$	See Table 2.8	Read / Write	Yes

Description:
Contains the Deadband Setpoint of Analog Input 4 Configuration 1 in int16S14 notation.

2040h: Programmable Limit Switch Parameters

The Programmable Limit Switch Parameters contains tables for the Configuration Control in Table 2.9 and the Pulse Generator Configurations (#1 and #2) in Table 2.10.

2040.01h	Programmable Limit Switch Structure			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	N/A	Read / Write	No

Description:

Configures all the parameters for the PLS module.

Word #	Data Type	Name	Description
0	Structure	Configuration Control	Configures the behavior of the PLS module. Allows host to select the input source signal and to select linear or rotary mode. See Table 2.9.
1 2	Integer	Roll-over count	The rotary roll-over value used. Default is 20,000
3	Structure	Pulse Generator #1 Configuration	Configuration for pulse generator #1. See Table 2.10.
4 5	Integer	Pulse Gen. #1 Lower Position	Lower position count for Pulse Gen. Default is 1,000.
6 7	Integer	Pulse Gen. #1 Upper Position	Upper position count for Pulse Gen. Default is 1750. Upper Position ≥ Lower Position
8 9	Integer	Pulse Gen. #1 Repeat Size	Specifies the number of counts between repeating pulses. Default: 2,000
10	Unsigned int	Pulse Gen. #1 Pulse Width (time)	Only used in Time Base mode: This specifies the width of the triggered pulse in terms of the number of position loop samples (2Ts). Must be greater than 0. Default: 16. See Table 2.9.
11	Structure	Pulse Generator #2 Configuration	Configuration for pulse generator #2. See Table 2.10.
12 13	Integer	Pulse Gen. #2 Lower Position	Lower position count for Pulse Gen. Default is 2,000.
14 15	Integer	Pulse Gen. #2 Upper Position	Upper position count for Pulse Gen. Default is 2,500. Upper Position ≥ Lower Position
16 17	Integer	Pulse Gen. #2 Repeat distance	Specifies the number of counts between repeating pulses. Default: 2,000
18	Unsigned int	Pulse Gen. #2 Pulse Width (time)	Only used in Time Base mode: This specifies the width of the triggered pulse in terms of the number of position loop samples (2Ts). Must be greater than 0. Default: 16

TABLE 2.9 Configuration Control

Bits	Name	Description
[3:0]	PLS Source Enum	Valid Values: 0: No source, (Master Disable) (default)
[14:4]	Reserved	Valid Values: 0
[15]	Linear/Rotary Mode Select	0: Rotary Mode (default) 1: Linear Mode

TABLE 2.10 Pulse Generator Configurations (#1 and #2)

Bits	Name	Description
[0]	Pulse #1 Generator Enable	0: Pulse Generator is disabled, (default) 1: Pulse Generator is enabled
[1]	Pulse #1 Output Active Level	0: Active Hi (default) 1: Active Lo
[2]	Pulse #1 Repeat Control	0: Pulse repeat count enabled (the value of the repeat counter will be used) (default) 1: Pulse repeat count disabled (infinite repeat count)
[3]	Pulse #1 Pulse Width Control	0: Pulse width is based on position counts (default) 1: Pulse width is based on time
[4:5]	Pulse #1 Direction Control	Valied Values: 0: Level sensitive/Both directions (default) 1: Rising Edge-Forward 2: Rising Edge-Reverse
[6:7]	Reserved	Valid Values: 0
[8:15]	Pulse #1 Repeat Count	Valid Values: $0 \leq RepeatCount < 256$ Total number of pulses in the pulse train = 1+Repeat Count (default = 0)

203Dh: Deadband Parameters Some deadband parameters have units that vary with the operating mode of the drive. For these parameters, refer to Table 2.11 for the correct unit selection.

TABLE 2.11 Deadband Units

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

203D.01h	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)

203D.02h	Deadband Width: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	See Table 2.11	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.				

203D.03h	Deadband Set Point: Config 0			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	[$-2^{(31)}$] – [$2^{(31)}$-1]	See Table 2.11	Read / Write	Yes
Description: Midpoint of the deadband for Configuration 0.				

203D.04h	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)

203D.05h	Deadband Width: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	0 – [$2^{(31)}$-1]	See Table 2.11	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.				

203D.06h	Deadband Set Point: Config 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	[$-2^{(31)}$] – [$2^{(31)}$-1]	See Table 2.11	Read / Write	Yes
Description: Midpoint of the deadband for Configuration 1.				

203Eh: Jog Parameters

203E.01h	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.				

203E.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.				

203E.03h	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.				

203E.04h	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.				

203E.05h	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.				

203E.06h	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.				

2062h: Braking/Stop General Properties

2062.01h	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.				

2062.02h	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.				

2062.03h	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 198 for unit conversion details.				

2062.04h	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 198 for unit conversion details.				

2062.05h	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 198 for unit conversion details.				

2064h: Event Response Time Parameters

2064.01h	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 (2065h) is executed. The last bit (bit 15) is reserved for disabling/enabling the drive, making this an Unsigned15 in actual practice.				

2064.02h	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 (2065h) is executed.				

2064.03h	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 (2065h) is executed.				

2064.04h	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.				

2064.05h	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 (2065h) is executed.				

2064.06h	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 (2065h) is executed.				

2064.07h	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 (2065h) is executed.				

2064.08h	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 (2065h) is executed.				

2064.09h	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 (2065h) is executed.				

2064.0Ah	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 (2065h) is executed.				

2064.0Bh	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 (2065h) is executed.				

2064.0Ch	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 (2065h) is executed.				

2064.0Dh	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.				

2064.0Eh	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 (2065h) is executed.				

2064.0Fh	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 (2065h) is executed.				

2064.10h	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 (2065h) is executed.				

2064.11h	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 (2065h) is executed.				

2064.12h	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 (2065h) is executed.				

2064.13h	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 (2065h) is executed.				

2064.14h	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 (2065h) is executed.				

2064.15h	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 (2065h) is executed.				

2064.16h	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 (2065h) is executed.				

2064.17h	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 (2065h) is executed.				

2064.18h	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 (2065h) is executed.				

2064.19h	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 (2065h) is executed.				

2064.1Ah	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 (2065h) is executed.				

2064.1Bh	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 (2065h) is executed.				

2064.1Ch	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 (2065h) is executed.				

2064.1Dh	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 (2065h) is executed.				

2064.1Eh	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 (2065h) is executed.				

2064.1Fh	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 (2065h) is executed.				

2064.20h	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 (2065h) is executed.				

2064.21h	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 (2065h) is executed.				

2064.22h	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.				

2064.23h	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 (2065h) is executed.				

2065h: Event Action Parameters

2065.01h	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 2.13) for the valid event actions and their respective values.				

2065.02h	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 2.13) for the valid event actions and their respective values.				

2065.03h	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 2.13) for the valid event actions and their respective values.				

2065.04h	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 2.13) for the valid event actions and their respective values.				

2065.05h	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 2.13) for the valid event actions and their respective values.				

2065.06h	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 2.13) for the valid event actions and their respective values.				

2065.07h	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 2.13) for the valid event actions and their respective values.				

2065.08h	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 2.13) for the valid event actions and their respective values.				

2065.09h	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 2.13) for the valid event actions and their respective values.				

2065.0Ah	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 2.13) for the valid event actions and their respective values.				

2065.0Bh	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 2.13) for the valid event actions and their respective values.				

2065.0Ch	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 2.13) for the valid event actions and their respective values.				

2065.0Dh	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 2.13) for the valid event actions and their respective values.				

2065.0Eh	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 2.13) for the valid event actions and their respective values.				

2065.0Fh	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 2.13) for the valid event actions and their respective values.				

2065.10h	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 2.13) for the valid event actions and their respective values.				

2065.11h	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 2.13) for the valid event actions and their respective values.				

2065.12h	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 2.13) for the valid event actions and their respective values.				

2065.13h	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 2.13) for the valid event actions and their respective values.				

2065.14h	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 2.13) for the valid event actions and their respective values.				

2065.15h	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 2.13) for the valid event actions and their respective values.				

2065.16h	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 2.13) for the valid event actions and their respective values.				

2065.17h	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 2.13) for the valid event actions and their respective values.				

2065.18h	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 2.13) for the valid event actions and their respective values.				

2065.19h	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 2.13) for the valid event actions and their respective values.				

2065.1Ah	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 2.13) for the valid event actions and their respective values.				

2065.1Bh	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 2.13) for the valid event actions and their respective values.				

2065.1Ch	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 2.13) for the valid event actions and their respective values.				

2065.1Dh	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 2.13) for the valid event actions and their respective values.				

2065.1Eh	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 2.13) for the valid event actions and their respective values.				

2065.1Fh	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 2.13) for the valid event actions and their respective values.				

2065.20h	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 2.13) for the valid event actions and their respective values.				

2065.21h	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 2.13) for the valid event actions and their respective values.				

2065.22h	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 2.13) for the valid event actions and their respective values.				

2065.23h	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 2.13) for the valid event actions and their respective values.				

2065.24h	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 2.13) for the valid event actions and their respective values.				

2065.25h	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 2.13) for the valid event actions and their respective values.				

2065.26h	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 2.13) for the valid event actions and their respective values.				

2065.27h	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 2.13) for the valid event actions and their respective values.				

2065.28h	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 2.13) for the valid event actions and their respective values.				

2065.29h	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 2.13) for the valid event actions and their respective values.				

2065.2Ah	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 2.13) for the valid event actions and their respective values.				

2065.2Bh	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 2.13) for the valid event actions and their respective values.				

2065.2Ch	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 2.13) for the valid event actions and their respective values.				

2065.2Dh	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 2.13) for the valid event actions and their respective values.				

2065.2Eh	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 2.13) for the valid event actions and their respective values.				

2065.2Fh	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 2.13) for the valid event actions and their respective values.				

2065.30h	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 2.13) for the valid event actions and their respective values.				

2065.31h	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 2.13) for the valid event actions and their respective values.				

TABLE 2.12 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 2.13 Event Action Options

Sub Index	Event	Valid Event Action Values (refer to Table 2.12 for value definitions)											
01h	Parameter Restore Error	-	1	-	-	4	-	-	-	8	9	10	11
02h	Parameter Store Error	-	1	-	-	4	-	-	-	8	9	10	11
03h	Invalid Hall State	-	1	-	-	4	-	-	-	8	9	10	11
04h	Phase Synch Error	0	1	-	-	4	-	-	-	8	9	10	11
05h	Motor Over Temperature	0	1	2	3	4	5	6	7	8	9	10	11
06h	Feedback Sensor Error	0	1	2	3	4	5	6	7	8	9	10	11
07h	Log Entry Missed	0	1	2	3	4	5	6	7	8	9	10	11
08h	Current Limiting	0	1	2	3	4	5	6	7	8	9	10	11
09h	Continuous Current	0	1	2	3	4	5	6	7	8	9	10	11
0Ah	Current Loop Saturated	0	1	2	3	4	5	6	7	8	9	10	11
0Bh	User Under Voltage	0	1	2	3	4	5	6	7	8	9	10	11
0Ch	User Over Voltage	0	1	2	3	4	5	6	7	8	9	10	11
0Dh	Shunt Regulator	0	1	-	-	4	-	-	-	8	9	10	11
0Eh	Command Limiter Active	0	-	-	-	-	-	-	-	-	-	-	-
0Fh	Motor Over Speed	0	1	2	3	4	5	6	7	8	9	10	11
10h	At Command	0	1	2	3	4	5	6	7	8	9	10	11
11h	Zero Velocity	0	-	-	-	-	-	-	-	-	-	-	-
12h	Velocity Following Error	0	1	2	3	4	5	6	7	8	9	10	11
13h	Positive Velocity Limit	0	1	2	3	4	5	6	7	8	9	10	11
14h	Negative Velocity Limit	0	1	2	3	4	5	6	7	8	9	10	11
15h	Max Measured Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
16h	Min Measured Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
17h	At Home Position	0	-	-	-	-	-	-	-	-	-	-	-
18h	Position Following Error	0	1	2	3	4	5	6	7	8	9	10	11
19h	Max Target Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
1Ah	Min Target Position Limit	0	1	2	3	4	5	6	7	8	9	10	11
1Bh	PVT Buffer Full	0	1	2	3	4	5	6	7	8	9	10	11
1Ch	PVT Buffer Empty	0	1	2	3	4	5	6	7	8	9	10	11
1Dh	PVT Buffer Threshold	0	1	2	3	4	5	6	7	8	9	10	11
1Eh	PVT Buffer Failure	0	1	2	3	4	5	6	7	8	9	10	11

1Fh	PVT Buffer Empty Stop	0	1	2	3	4	5	6	7	8	9	10	11
20h	PVT Sequence Number	0	1	2	3	4	-	-	-	8	9	10	11
21h	Comm Channel Error	0	1	2	3	4	5	6	7	8	9	10	11
22h	User Positive Limit	-	-	2	-	-	5	-	-	-	-	-	-
23h	User Negative Limit	-	-	-	3	-	-	6	-	-	-	-	-
24h	Drive Reset	-	1	-	-	-	-	-	-	-	-	10	-
25h	Drive Internal Error	-	1	-	-	-	-	-	-	-	-	10	-
26h	Short Circuit	-	1	-	-	-	-	-	-	-	-	10	-
27h	Current Overshoot	-	1	-	-	-	-	-	-	-	-	10	-
28h	Hardware Under Voltage	-	1	-	-	-	-	-	-	-	-	10	-
29h	Hardware Over Voltage	-	1	-	-	4	-	-	-	-	-	10	-
2Ah	Drive Over Temperature	-	1	-	-	-	-	-	-	-	-	10	-
2Bh	Software Disable	-	1	-	-	-	-	-	-	8	-	10	-
2Ch	User Disable	-	1	-	-	-	-	-	-	8	-	10	-
2Dh	User Auxiliary Disable	-	2	-	-	4	-	-	-	8	9	10	11
2Eh	Phase Detection Fault	-	1	-	-	-	-	-	-	8	-	10	-
2Fh	Commanded Positive Limit	-	-	2	-	-	5	-	-	-	-	-	-
30h	Commanded Negative Limit	-	-	-	3	-	-	6	-	-	-	-	-
31h	PWM and DIR Broken Wire	0	1	2	3	4	5	6	7	-	-	-	-

2066h: Event Recovery Time Parameters

2066.01h	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 (2065h) is removed.				

2066.02h	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 (2065h) is removed.				

2066.03h	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 (2065h) is removed.				

2066.04h	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 (2065h) is removed.				

2066.05h	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 (2065h) is removed.				

2066.06h	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 (2065h) is removed.				

2066.07h	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 (2065h) is removed.				

2066.08h	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 (2065h) is removed.				

2066.09h	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 (2065h) is removed.				

2066.0Ah	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 (2065h) is removed.				

2066.0Bh	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 (2065h) is removed.				

2066.0Ch	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 (2065h) is removed.				

2066.0Dh	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 (2065h) is removed.				

2066.0Eh	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 (2065h) is removed.				

2066.0Fh	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 (2065h) is removed.				

2066.10h	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 (2065h) is removed.				

2066.11h	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 (2065h) is removed.				

2066.12h	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 (2065h) is removed.				

2066.13h	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 (2065h) is removed.				

2066.14h	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 (2065h) is removed.				

2066.15h	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 (2065h) is removed.				

2066.16h	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 (2065h) is removed.				

2066.17h	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 (2065h) is removed.				

2066.18h	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 (2065h) is removed.				

2066.19h	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 (2065h) is removed.				

2066.1Ah	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 (2065h) is removed.				

2066.1Bh	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 (2065h) is removed.				

2066.1Ch	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 (2065h) is removed.				

2066.1Dh	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 (2065h) is removed.				

2066.1Eh	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 (2065h) is removed.				

2066.1Fh	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 (2065h) is removed.				

2066.20h	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 (2065h) is removed.				

2066.21h	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 (2065h) is removed.				

2066.22h	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.				

2066.23h	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.				

2067h: Event Time-Out Window Parameters

2067.01h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.02h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.03h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.04h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.05h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.06h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.07h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.08h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.09h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.0Ah	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.0Bh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.0Ch	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.0Dh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.0Eh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.0Fh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.10h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.11h	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 (2066h) 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 (2065h) 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 (2068h) attribute.

2067.12h	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 (2066h) 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 (2065h) 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 (2068h) attribute.

2067.13h	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 (2066h) 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 (2065h) 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 (2068h) attribute.

2067.14h	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 (2066h) 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 (2065h) 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 (2068h) attribute.

2067.15h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.16h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.17h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.18h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.19h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.1Ah	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.1Bh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.1Ch	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.1Dh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.1Eh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.1Fh	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.20h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.21h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2067.22h	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 (2066h) 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 (2065h) 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 (2068h) attribute.				

2068h: Event Maximum Recoveries Parameters

2068.01h	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 (2067h) and Recovery Time (2066h), 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.				

2068.02h	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 (2067h) and Recovery Time (2066h), 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.				

2068.03h	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 (2067h) and Recovery Time (2066h), 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.

2068.04h	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 (2067h) and Recovery Time (2066h), 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.

2068.05h	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 (2067h) and Recovery Time (2066h), 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.

2068.06h	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 (2067h) and Recovery Time (2066h), 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.

2068.07h	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 (2067h) and Recovery Time (2066h), 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.

2068.08h	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 (2067h) and Recovery Time (2066h), 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.

2068.09h	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 (2067h) and Recovery Time (2066h), 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.

2068.0Ah	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 (2067h) and Recovery Time (2066h), 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.

2068.0Bh	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 (2067h) and Recovery Time (2066h), 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.

2068.0Ch	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 (2067h) and Recovery Time (2066h), 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.

2068.0Dh	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 (2067h) and Recovery Time (2066h), 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.

2068.0Eh	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 (2067h) and Recovery Time (2066h), 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.

2068.0Fh	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 (2067h) and Recovery Time (2066h), 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.

2068.10h	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 (2067h) and Recovery Time (2066h), 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.

2068.11h	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 (2067h) and Recovery Time (2066h), 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.

2068.12h	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 (2067h) and Recovery Time (2066h), 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.

2068.13h	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 (2067h) and Recovery Time (2066h), 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.

2068.14h	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 (2067h) and Recovery Time (2066h), 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.

2068.15h	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 (2067h) and Recovery Time (2066h), 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.

2068.16h	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 (2067h) and Recovery Time (2066h), 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.

2068.17h	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 (2067h) and Recovery Time (2066h), 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.

2068.18h	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 (2067h) and Recovery Time (2066h), 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.

2068.19h	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 (2067h) and Recovery Time (2066h), 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.

2068.1Ah	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 (2067h) and Recovery Time (2066h), 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.

2068.1Bh	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 (2067h) and Recovery Time (2066h), 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.

2068.1Ch	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 (2067h) and Recovery Time (2066h), 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.

2068.1Dh	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 (2067h) and Recovery Time (2066h), 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.

2068.1Eh	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 (2067h) and Recovery Time (2066h), 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.

2068.1Fh	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 (2067h) and Recovery Time (2066h), 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.

2068.20h	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 (2067h) and Recovery Time (2066h), 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.

2068.21h	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 (2067h) and Recovery Time (2066h), 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.

2068.22h	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 (2067h) and Recovery Time (2066h), 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.

2068.23h	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 (2067h) and Recovery Time (2066h), 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.

2068.24h	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 (2067h) and Recovery Time (2066h), 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.

2068.25h	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 (2067h) and Recovery Time (2066h), 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.

2068.26h	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 (2067h) and Recovery Time (2066h), 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.

2068.27h	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 (2067h) and Recovery Time (2066h), 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.

2068.28h	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 (2067h) and Recovery Time (2066h), 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.

2068.29h	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 (2067h) and Recovery Time (2066h), 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.

2068.2Ah	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 (2067h) and Recovery Time (2066h), 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.

2068.2Bh	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 (2067h) and Recovery Time (2066h), 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.

208Ch: Product Information

208C.01h	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

20D8h: Power Board Information

20D8.01h	Power Board Map ID			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - [$2^{(16)}$ –1]	N/A	Read / Write	No

Description:
Contains the bitfield for the Power Board Map ID.

Bits	Name	Description
Low Byte High Byte	Power Board Map ID Minor Bit #0-7	Part of an 8-bit field used to store the Power Board Map ID's Minor Revision Number
8 - 15	Power Board Map ID Major Bit #0-7	Part of an 8-bit field used to store the Power Board Map ID's Major Revision Number

20D8.02h	Power Board Build Data			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	See Table	Read / Write	No

Description:
Contains the Power Board Build Data Structure.

Member Name	Member Offset	Member Data Type	Member Unit
Power Board Name	0	String(50)	Text - 50 bytes
Power Board Version	1	String(8)	Text - 8 bytes
Power Board Serial Number	2	String(16)	Text - 16 bytes
Power Board Build Date	3	String(8)	Text - 8 bytes
Power Board Build Time	4	String(8)	Text - 8 bytes

20D8.03h	Bus Voltage Data			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	See Table	Read / Write	No

Description:
Contains the Bus Voltage Data Structure.

Member Name	Member Offset	Member Data Type	Member Unit
Rated Bus Voltage	0	Unsigned16	.1 Volt
Hardware Under Voltage	1	Unsigned16	.1 Volt
Hardware Over Voltage	2	Unsigned16	.1 Volt
Per Unit Voltage	3	Unsigned16	.1 Volt

20D8.04h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	N/A	N/A	Read / Write	No

20D8.05h	Phase Current Data			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	See Table	Read / Write	No

Description:

Contains the Phase Current Data Structure.

Member Name	Member Offset	Member Data Type	Member Unit
Rated Peak Current	0	Unsigned16	.1 Amps
Rated Continuous Current	1	Unsigned16	.1 Amps
Over Current	2	Unsigned16	.1 Amps
Maximum Measurable Current	3	Unsigned16	.1 Amps
Rated Peak Current Hold Time	4	Unsigned16	msec
Rated Peak to Rated Continuous Foldback Time	5	Unsigned16	msec

20D8.06h	Commutation Frequency Data			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	See Table	Read / Write	No

Description:

Contains the Commutation Frequency Data Structure.

Member Name	Member Offset	Member Data Type	Member Unit
DC Cutoff Frequency	0	Unsigned16	100 uHz
Rms Cutoff Frequency	1	Unsigned16	100 uHz

20D8.07h	PWM Period Data			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	See Table	Read / Write	No

Description:

Contains the PWM Period Data Structure.

Member Name	Member Offset	Member Data Type	Member Unit
Max PWM Period	0	Unsigned16	100nsec
Min PWM Period	1	Unsigned16	100nsec
Nom PWM Period	2	Unsigned16	100nsec
Default PWM Period	3	Unsigned16	100nsec

20D8.08h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	N/A	N/A	Read / Write	No

20D8.09h	Shunt Regulator Data			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	See Table	Read / Write	No

Description:
Contains the Shunt Regulator Data Structure.

Member Name	Member Offset	Member Data Type	Member Unit
Max Shunt PWM Period	0	Unsigned16	100nsec
Internal Rate Shunt Power	1	Unsigned16	Watts
Internal Shunt Resistance	2	Unsigned16	10 milliohms
Continuous Shunt Current	3	Unsigned16	10 milliamps

20D8.0Ah	Thermal Limit Data			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
See Table	N/A	See Table	Read / Write	No

Description:
Contains the Thermal Limit Data Structure.

Member Name	Member Offset	Member Data Type	Member Unit
Drive Disable Temperature	0	Unsigned16	10 millidegrees C
Drive Enable Temperature	1	Unsigned16	10 millidegrees C
Rate Temperature	2	Unsigned16	10 millidegrees C

20D8.0Bh	Load Filter Efficiency			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	0 - 10000	% Efficiency * 0.01	Read / Write	No

Description:
External motor filter efficiency (* .01 = % efficient).

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

2001h: Control Parameters

2001.01h	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.

2001.02h	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.

2001.03h	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 2024h.

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

20D1h: Mode Configuration

20D1.01h	Mode Configuration			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned32	N/A	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 15:31

Reserved. Write zero.

20D3h: Active Mode and Configuration

20D3.01h	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

20D3.03h	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				

2045h: 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 2.14. For details on unit conversion see "Appendix A" on page 198.

TABLE 2.14 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

2045.01h	Interface Input 1			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.14	Read / Write	No
Description: Defines the value used with interface input 1.				

2045.02h	Interface Input 2			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.14	Read / Write	No
Description: Defines the value used with interface input 2.				

2045.03h	Interface Input 3			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.14	Read / Write	No
Description: Defines the value used with interface input 3.				

2045.04h	Interface Input 4			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.14	Read / Write	No
Description: Defines the value used with interface input 4.				

2.3.2 Motion Engine Command Objects

20C9h: Motion Engine Control

20C9.01h	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

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

Bits	Value	Motion Engine State
0-15	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
16-31	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 is 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

20CAh: Dynamic Index Data

20CA.01h	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.

20CA.02h	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

20CA.03h	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.

20CA.04h	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.

20CA.05h	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.

20CA.06h	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.

20CA.07h	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 198 for unit conversion.				

20CA.08h	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 198 for unit conversion.				

20CA.09h	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 198 for unit conversion.				

20CA.0Ah	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 198 for unit conversion.				

20CA.0Bh	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 198 for unit conversion.				

20CA.0Ch	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 198 for unit conversion.				

20CA.0Dh	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 198 for unit conversion.				

20CA.0Eh	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 198 for unit conversion.				

20CA.0FEh - 20CA.1Ch	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Unsigned16	-	-	-s	No

2.3.3 Monitor Commands

2002h: Drive Status

2002.01h	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 2.15 below.				

2002.02h	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 2.15 below.				

2002.03h	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 2.15 below.				

2002.04h	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 2.15 below.				

2002.05h	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 2.15 below.				

2002.06h	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 2.15 below.				

2002.07h	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 2.15 below.				

TABLE 2.15 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

2003h: Drive Status History

2003.01h	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 2.15 of command 2002h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

2003.02h	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 2.15 of command 2002h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

2003.03h	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 2.15 of command 2002h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

2003.04h	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 2.15 of command 2002h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

2003.05h	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 2.15 of command 2002h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

2003.06h	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 2.15 of command 2002h.

*Features a Read / Write function, in that any history bit can be cleared by writing a 1 to that bit.

2029h: Motion Engine Status

2029.01h	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

2029.02h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	N/A	N/A	Read Only	No

2029.03h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
N/A	N/A	N/A	Read Only	No

2029.04h	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.

Bits	Value	Motion Engine State
0-7	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
8-15	0	No Errors
	1	Invalid Data Parameter (Problem loading Index. Must reset Motion Engine to continue)
	2	Invalid Op-Code (Problem loading Index. Must reset Motion Engine to continue)
	3	Invalid Op-code for Dynamic Motion (Problem with index parameters)
	4	Invalid Reference Frame (Problem with index parameters)
	5	Invalid Bridge State (Bridge must be enabled to begin indexed motion)
	6	User Defined Fault

200Eh: Feedback Sensor Values

200E.01h	Electrical Cycle Position			
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 electrical cycle position.

200E.02h	Latched Encoder Position			
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 encoder position read when a capture edge occurs during phase detect.

200E.03h	Phase Sync Error			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	counts	Read Only	
Description: Contains a value corresponding to the phase sync error.				

200E.04h	Present Hall State			
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 present Hall state.				

200E.05h	Stator Angle			
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 stator angle.				

200E.06h	Rotor Angle			
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 rotor angle.				

200E.07h	Stator Frequency			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$0 - [2^{(15)} - 1]$	e.c./min	Read Only	No
Description: Contains a value corresponding to the stator frequency of the motor.				

200E.08h	Rotor Frequency			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$0 - [2^{(15)} - 1]$	e.c./min	Read Only	No
Description: Contains a value corresponding to the rotor frequency of the motor.				

200E.09h	Cumulative Commutation Counts			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$0 – [2^{(31)} – 1]$	counts	Read Only	No
Description: Contains a value corresponding to the cumulative commutation counts.				

200E.0Ah	Captured Electrical Cycle Position			
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 captured electrical cycle position.				

200E.0Bh	Phase Sync Adjustment			
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 phase sync adjustment.				

200E.0Ch	Step Cycle Position			
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 step cycle position.				

200E.0Dh	Estimated Drive Current in Phase 1			
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 estimated drive current in phase 1. See "Appendix A" on page 198 for unit conversion details.				

200E.0Eh	Estimated Generated Current in Phase 1			
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 estimated generated current in phase 1. See "Appendix A" on page 198 for unit conversion details.				

200E.0Fh	Estimated Drive Current in Phase 2			
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 estimated drive current in phase 2. See "Appendix A" on page 198 for unit conversion details.				

200E.10h	Estimated Generated Current in Phase 2			
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 estimated generated current in phase 2. See "Appendix A" on page 198 for unit conversion details.				

200E.11h	Local Error Raw			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(31)}] - [2^{(31)} - 1]$	counts	Read Only	No
Description: Contains a value corresponding to the position error before active damping is applied for stepper motors.				

200E.12h	Local Error Filtered			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(31)}] - [2^{(31)} - 1]$	counts	Read Only	No
Description: Contains a value corresponding to the position error after active damping is applied for stepper motors.				

2027h: Feedback Hardware Diagnostics

2027.01h	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 198 for information on scaling.				

2027.02h	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 198 for information on scaling.				

2027.03h	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 198 for information on scaling. Encoder Health = $Sin^2 + Cos^2$				

2027.04h	Absolute Encoder Fault Word 1			
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

2027.05h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	N/A	N/A	Read Only	Yes

2027.06h	Reserved			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	N/A	N/A	Read Only	Yes

201Ch: Gearing Input Values

201C.01h	Gearing Input			
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.				

201C.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.				

201C.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.				

201Eh: Auxiliary Encoder Values

201E.01h	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.				

201E.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.				

2011h: Velocity Values

2011.01h	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 198 for unit conversion.				

2011.02h	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 198 for unit conversion.				

2011.03h	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 198 for unit conversion.				

2011.04h	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 198 for unit conversion.				

2011.05h	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 198 for unit conversion.				

2011.06h	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 198 for unit conversion.				

2011.07h	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 198 for unit conversion.				

2012h: Position Values

2012.01h	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.				

2012.02h	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.				

2012.03h	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.				

2012.04h	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.				

2012.05h	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.				

2012.06h	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.				

2012.07h	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.				

200Ch: PVT Quick Status

200C.01h	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

201Dh: PVT Status Values

201D.01h	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

201D.02h	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.				

201D.03h	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.				

2014h: Command Limiter Input

2014.01h	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.				

200Fh: Power Bridge Values

200F.01h	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 198 for unit conversions.				

200F.02h	Control Loop 1 Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Control Loop 1 Output Voltage. See "Appendix A" on page 198 for unit conversions.				

200F.03h	Control Loop 2 Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Control Loop 2 Output Voltage. See "Appendix A" on page 198 for unit conversions.				

200F.04h	Ualpha Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Ualpha Output Voltage. See "Appendix A" on page 198 for unit conversions.				

200F.05h	Ubeta Output Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Ubeta Output Voltage. See "Appendix A" on page 198 for unit conversions.				

200F.06h	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 198 for unit conversion details.				

200F.07h	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 198 for unit conversion details.				

200F.08h	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 198 for unit conversion details.				

200F.09h	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 198 for unit conversion details.				

200F.0Ah	Phase D 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 D Output Voltage. See "Appendix A" on page 198 for unit conversion details.				

200F.0Bh	Va Measured Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Va Measured Voltage. See "Appendix A" on page 198 for unit conversion details.				

200F.0Ch	Vb Measured Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Vb Measured Voltage. See "Appendix A" on page 198 for unit conversion details.				

200F.0Dh	Vc Measured Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Vc Measured Voltage. See "Appendix A" on page 198 for unit conversion details.				

200F.0Eh	Vd Measured Voltage			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer16	$[-2^{(15)}] – [2^{(15)}-1]$	DV1	Read Only	No
Description: Contains a value corresponding to the Vd Measured Voltage. See "Appendix A" on page 198 for unit conversion details.				

2021h: Drive Temperature Values

2021.01h	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				

2021.02h	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.				

2019h: Capture Values

The capture values have units that vary with the operating mode of the drive. For these parameters, refer to Table 2.16 for the correct unit selection.

TABLE 2.16 Capture Units

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

2019.01h	Capture 'A' Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} –1]$	See Table 2.16	Read Only	No
Description: Capture A captured value				

2019.02h	Capture 'B' Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} –1]$	See Table 2.16	Read Only	No
Description: Capture B captured value				

2019.03h	Capture 'C' Value			
Data Type	**Data Range**	**Units**	**Accessibility**	**Stored to NVM**
Integer32	$[-2^{(31)}] - [2^{(31)} - 1]$	See Table 2.16	Read Only	No
Description: Capture C captured value				

2023h: Digital Input Values

2023.01h	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

2024h: Digital Output Values

2024.01h	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

201Ah: Analog Input Values

201A.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 198 for unit conversion details.

201A.02h	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 198 for unit conversion details.				

201A.03h	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 198 for unit conversion details.				

201A.04h	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 198 for unit conversion details.				

2025h: Analog Output Values

2025.01h	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 198 for unit conversion details.				

2025.02h	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 198 for unit conversion details.				

2018h: Programmable Limit Switch Values

2018.01h	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.				

2018.02h	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.				

2018.03h	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.				

2015h: Deadband Input Value

2015.01h	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.				

201Bh: PWM and Direction Input Values

201B.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.				

201B.02h	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.				

2028h: Fault Log Counter

2028.01h	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.				

2028.02h	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.				

2028.03h	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.				

2028.04h	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.				

2028.05h	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.				

2028.06h	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.				

2028.07h	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.				

2028.08h	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.				

2028.09h	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.				

2028.0Ah	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.				

2028.0Bh	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.				

2028.0Ch	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.				

2028.0Dh	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.				

2028.0Eh	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.				

2028.0Fh	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.				

2028.10h	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.				

2028.11h	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.				

2028.12h	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.				

2028.13h	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.				

2028.14h	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.				

2028.15h	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.				

2028.16h	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.				

2028.17h	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.				

2028.18h	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.				

2028.19h	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.				

2028.1Ah	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.				

2028.1Bh	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.				

2028.1Ch	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.				

2028.1Dh	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.				

2028.1Eh	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.				

2028.1Fh	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.				

2028.20h	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.				

2028.21h	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.				

2028.22h	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.				

2028.23h	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.				

2028.24h	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.				

2028.25h	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.				

2028.26h	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.				

2028.27h	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.				

2028.28h	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.				

2028.29h	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.				

2028.2Ah	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.				

2028.2Bh	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.				

2028.2Ch	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.				

2028.2Dh	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.				

2028.2Eh	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.				

2028.2Fh	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.				

2028.30h	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.				

2028.31h	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.				

2028.32h	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.				

2028.33h	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.				

2028.34h	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	$2^{34}/K_S^2$
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	$2^{14}/K_P$
DC2	Current	A	Integer32	$1000/K_P$
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	$2^{17}/K_S$
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 200F.01h.
K_{DS}	Maximum dynamic index speed (in counts/s). This value can be read from 20CA.07h, 20CA.08h, 20CA.09h, and 20CA.0Ah.
K_{MS}	Maximum profiler speed (in counts/s) for an Accel/Decel command profile. This value can be read from 203C.09h for Configuration 0 and 203C.0Ch for Configuration 1.
K_{OV}	The hardware defined, DC bus, over-voltage limit of the drive in volts. This value can be read from 20D8.03h.
K_P	The maximum rated peak current of the drive in amps. For example, 10 for the FE060-**5**-RM. This value can be read from 20D8.05h.
K_S	Switching frequency of the drive in Hz. This value can be found on the drive datasheet, or can be read from 20D8.07h and divided by 65.536.

A.1.1 Conversion Example 1

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.

$$10{,}000\frac{\text{rev}}{\text{min}}\times\frac{1000\,\text{lines}}{1\,\text{rev}}\times\frac{4\,\text{counts}}{1\,\text{line}}\times\frac{1\,\text{min}}{60\,\text{sec}}=666{,}666.7\frac{\text{counts}}{\text{sec}}.$$

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

$$666{,}666.7\times\frac{2^{17}}{K_I K_S}=666{,}666.7\times\frac{2^{17}}{1\times 20{,}000}=4369066.9,$$

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

$$4369067_{10}=42\text{AAAB}_{16}.$$

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

$$-5 \times 2^{16} = -327680.$$

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.

$$2^N - 327680 = 2^{32} - 327680 = 4294639616$$

$$4294639616_{10} = \text{FFFB0000}_{16}$$

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

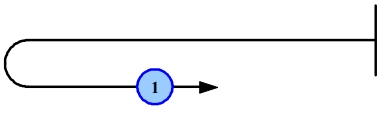
A single value is used to define the acceleration and deceleration of all moves during the homing routine.

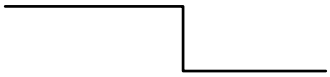
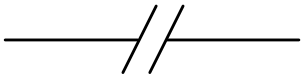
TABLE A.4 Homing Methods Summary

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.

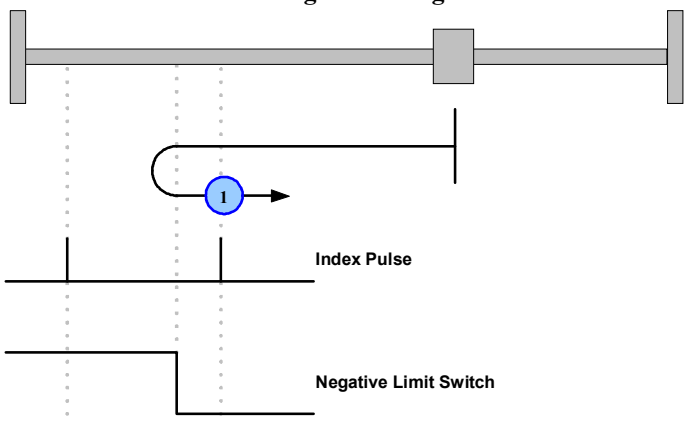
FIGURE A.1 Homing Diagrams

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.	

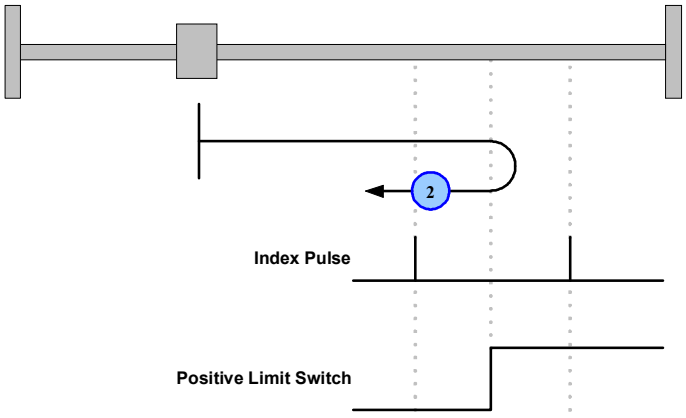
Method 1: Homing on the Negative Limit Switch This method uses the negative limit switch and index to home the load. If the negative limit switch is off, the motor moves in the negative direction. Once the limit switch toggles, the motor changes direction and moves until the next encoder index. Homing is complete at this point. Figure A.2 illustrates the homing diagram for this method.

FIGURE A.2 Homing on the Negative Limit Switch



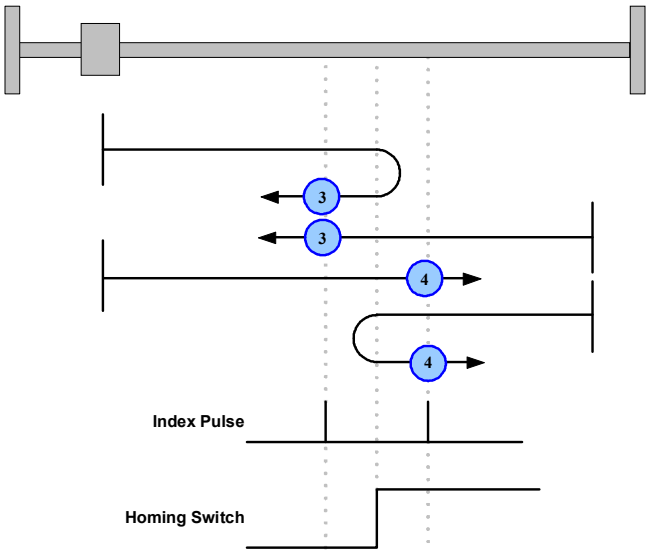
Method 2: Homing on the Positive Limit Switch This method uses the positive limit switch and index to home the load. If the positive limit switch is off, the motor moves in the positive direction. Once the limit switch toggles, the motor changes direction and moves until the next encoder index. Homing is complete at this point. Figure A.3 illustrates the homing diagram for this method.

FIGURE A.3 Homing on the Positive Limit Switch



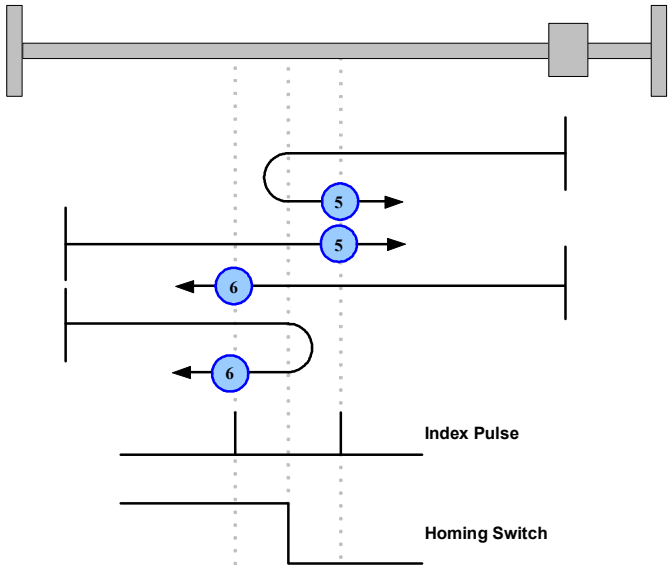
Methods 3 and 4: Homing on the Positive Home Switch These methods use the positive home switch and index to home the load. The initial direction of movement for a given routine method is dependent on the home switch position. However, the final position is always in the same direction. Homing methods 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



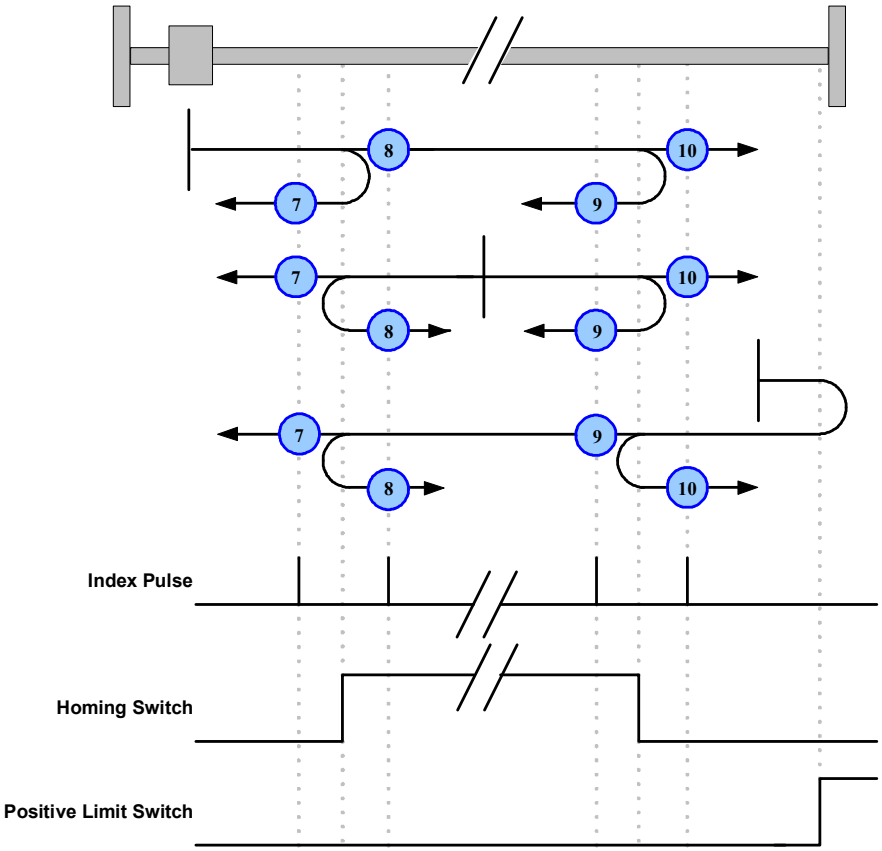
Methods 5 and 6: Homing on the Negative Home Switch This is literally a mirror image of the homing routines used by methods 3 and 4. Figure A.5 illustrates the homing diagram for these methods.

FIGURE A.5 Homing on the Negative Home Switch



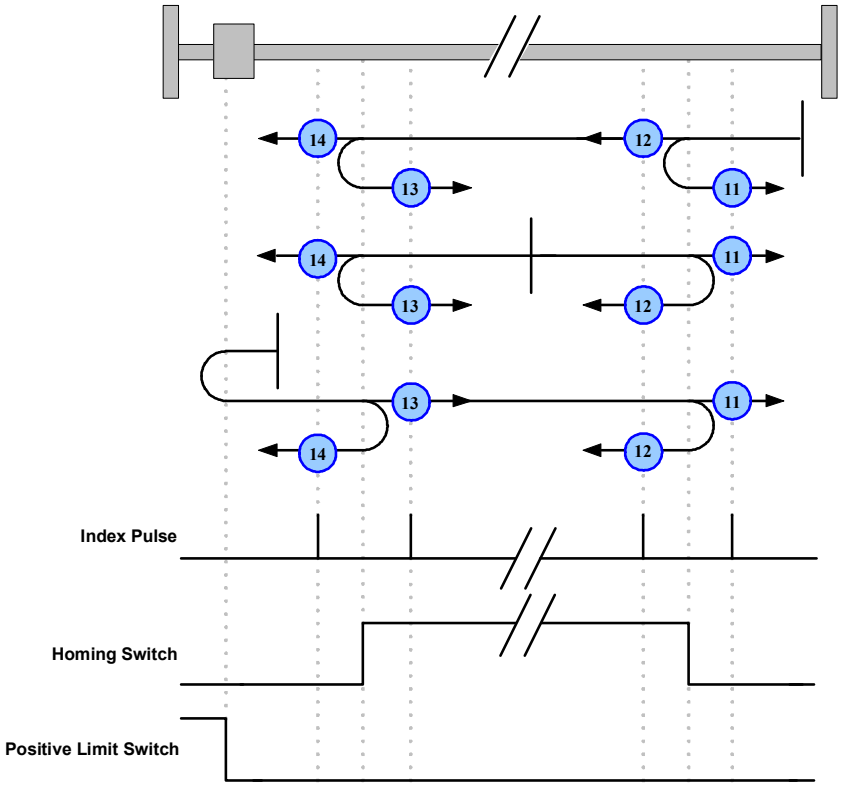
Methods 7-14: Homing on the Home Switch These methods use all three possible homing components (index pulse, home switch, and limit switch) with the index pulse to the nearest right or left of the home switch always being the sought after home position. Methods 7 to 10 use a positive limit switch and 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



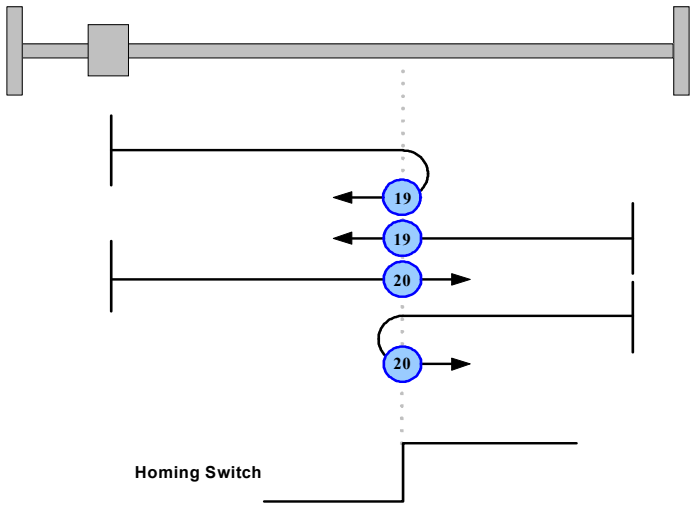
Methods 11 to 14 use a negative limit switch instead of a positive limit switch. As a result, the initial direction will be left, instead of right, whenever the starting point is outside of the active home switch region. Outside of this difference, methods 11 to 14 are identical to methods 7 to 10. Figure A.7 illustrates the homing diagram for methods 11 to 14.

FIGURE A.7



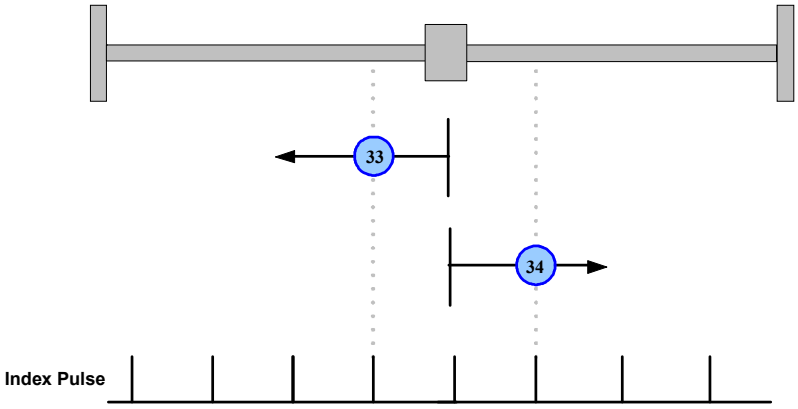
Methods 17-30: Homing without an Index Pulse: These homing routines use the same methods as 1 to 14, except the index pulse is not used. Instead, the home position is dependant on the edge of the relevant home or limit switch. To illustrate this difference, Figure A.8 shows the homing diagram for methods 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

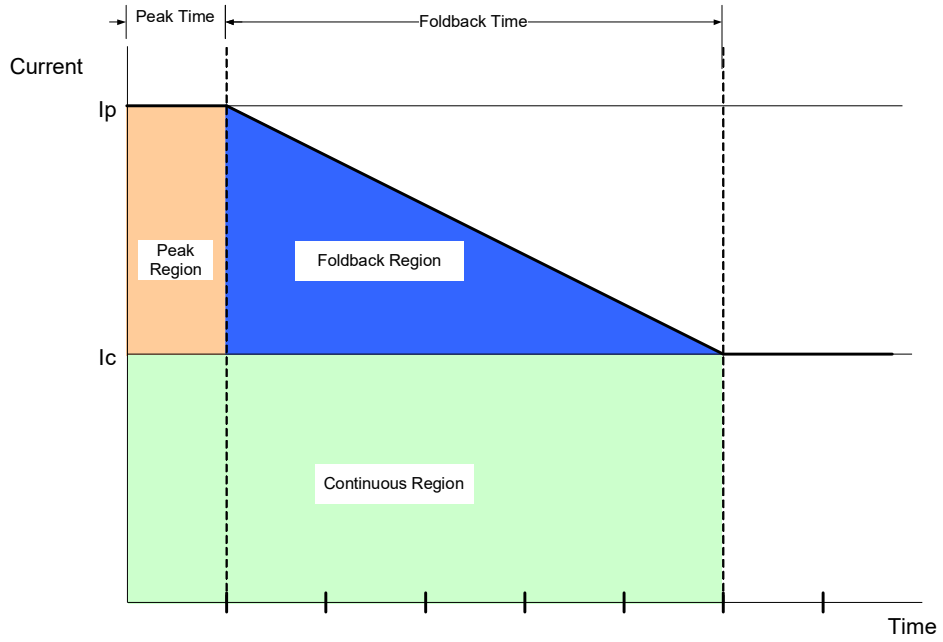


Method 35 This homing method requires no index pulse or switches and involves nothing more than setting the current measured position equal to the home position value, which can be accomplised in object 2039.02h “Home Position Value” on page 53.

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:

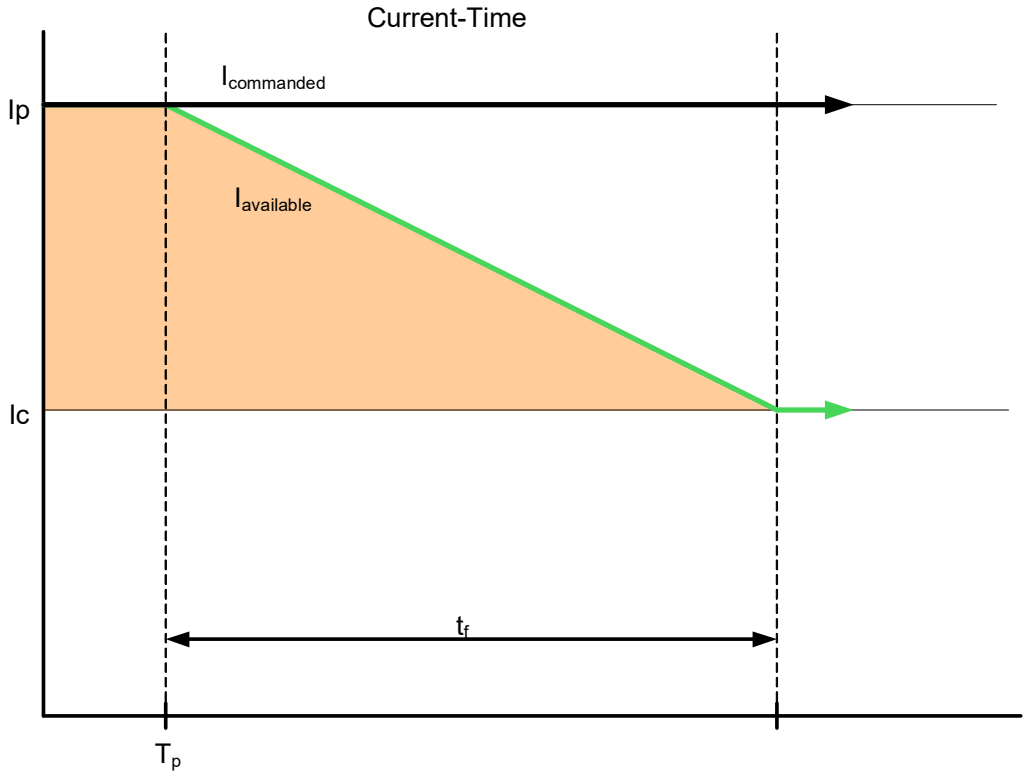
$$Slope = \frac{Ip - Ic}{tf}$$

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 208. 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.

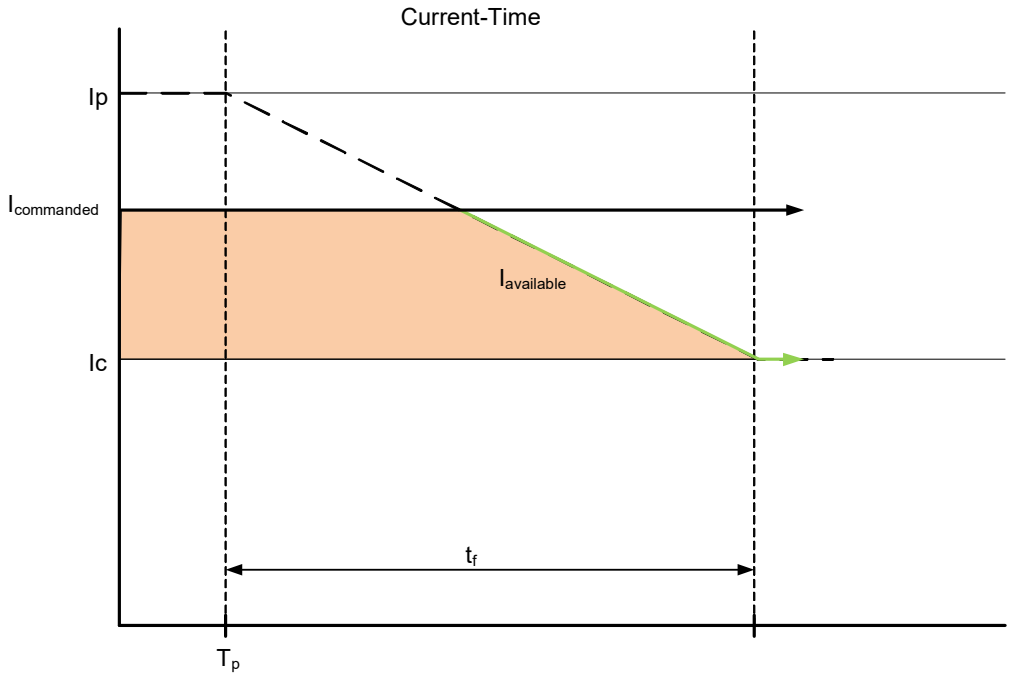
FIGURE A.11 Time-Based Peak Current Limiting



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

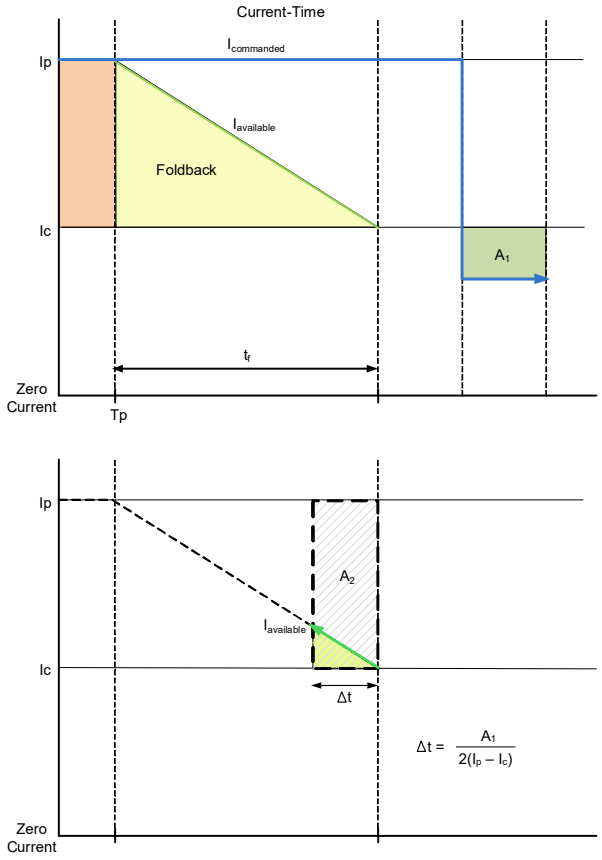
Initially, the full peak value of current is available. A commanded current above the continuous level causes the available current to foldback to the continuous level as shown in the first graph of Figure A.13. When the commanded current drops below the continuous current limit value ($\mathbf{A_1}$ 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

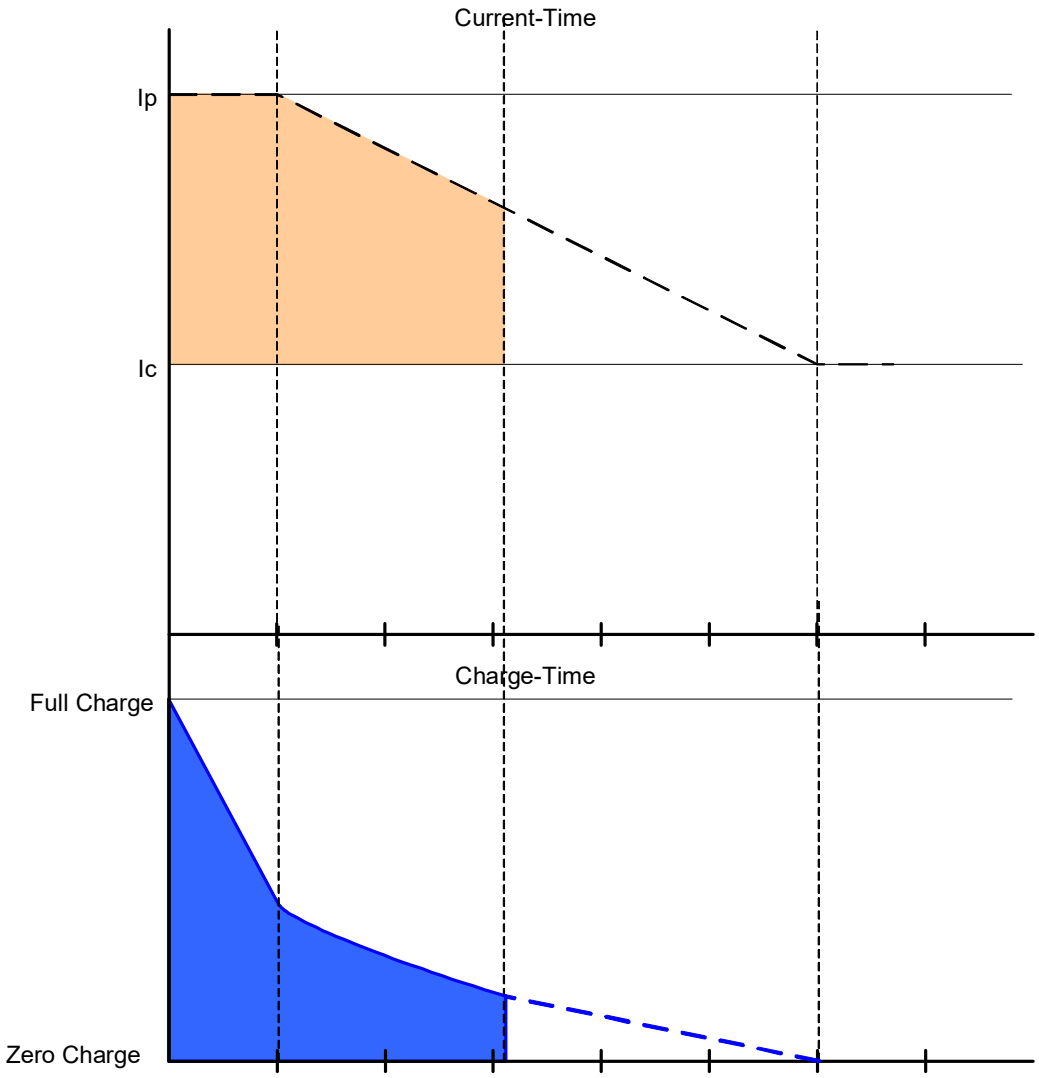


Note that it will take a command of zero current to fully recover from a full foldback condition.

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.

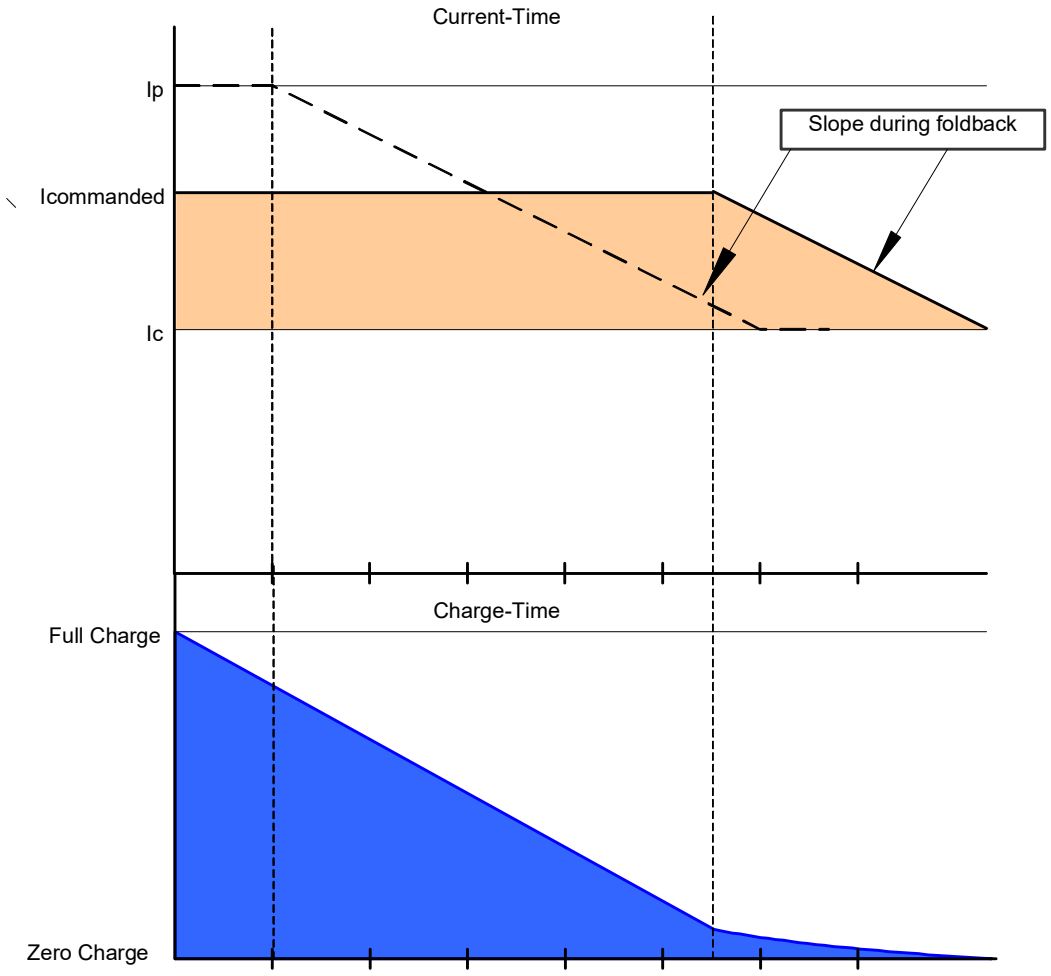
FIGURE A.14 Charge-Based Peak Current Limiting



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.

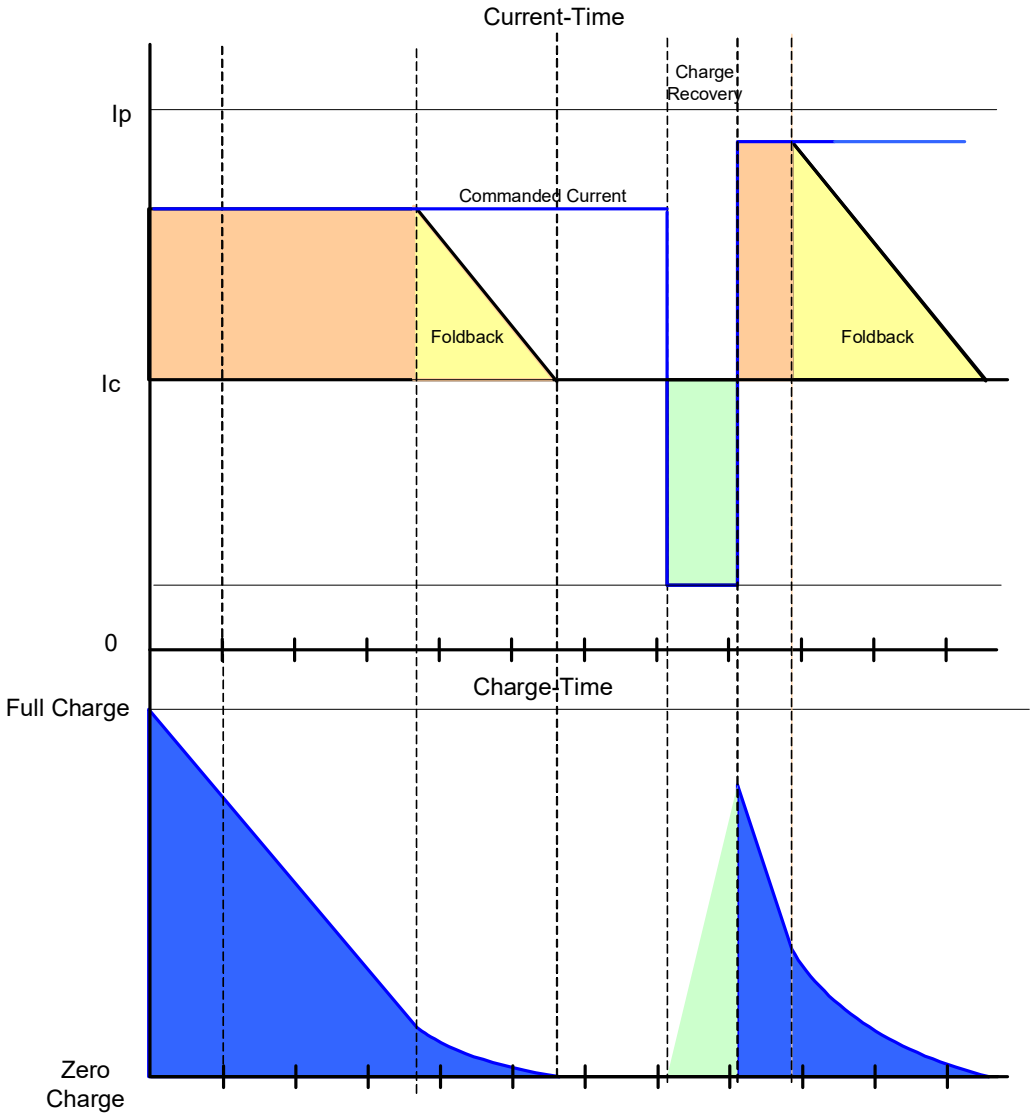
FIGURE A.15 Charge-Based Non-Peak Current Limiting



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



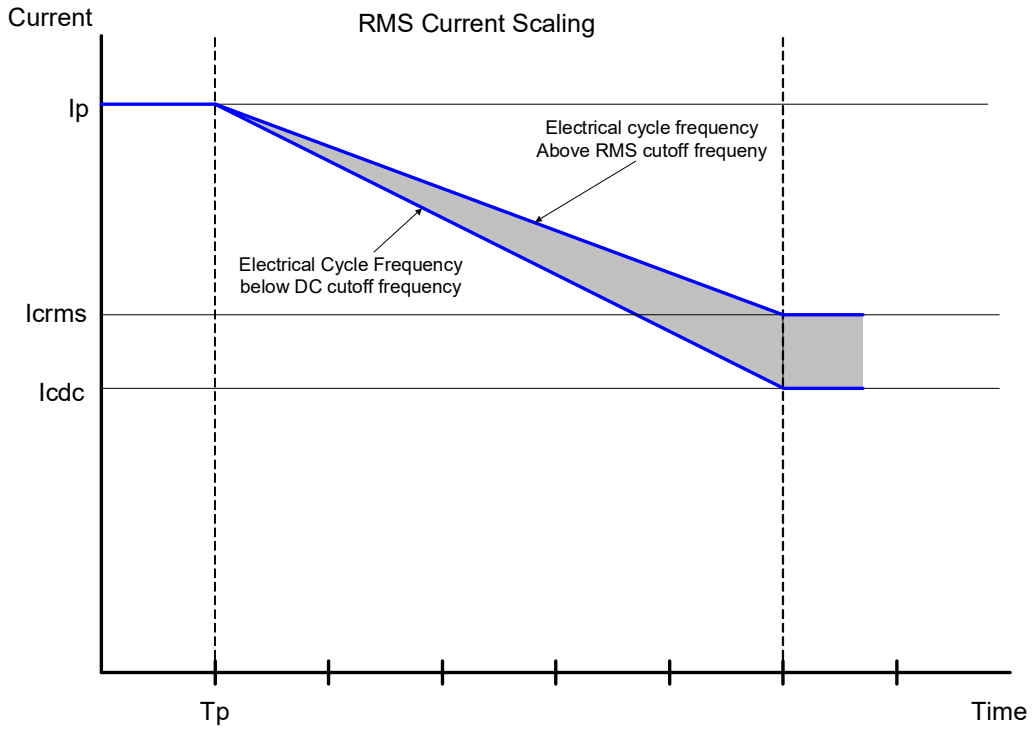
A.3.7 RMS Current Scaling

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
MNCMSRFP-02

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