Host Command Reference

Q and SCL commands for servo and stepper drives

*Includes RS-232, RS-485,
Ethernet UDP, Ethernet TCP/IP, EtherNet/IP,
Modbus RTU and Modbus TCP/IP*

Applied Motion Products
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APPLIED MOTION PRODUCTS

Contents

STAC5-Q/IP, SVAC3-Q/IP

Defines usage of digital output Y2 as the Brake Output, which can be used to automatically activate and deactivate a holding brake. Output Y2 can also be configured as a Tach Output, or a General Purpose output for use with other types of output commands. There are three states that can be defined:

> BO1: Output is closed (energized) when drive is enabled, and open when the drive is disabled.
> BO2: Output is open (de-energized) when drive is enabled, and closed when the drive is disabled.
> BO3: Output is not used as a Brake Output and can be used as a general purpose output.

NOTE: Setting the BO command to 1 or 2 overrides previous assignments of this output's function. Similarly, if you use the AO or MO command to set the function of the output after setting the BO command to 1 or 2, usage of the output will be reassigned and BO will be automatically set to 3.

Command Details:

Structure	BO{Parameter #1}{Parameter #2 (Flex I/O only}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Output Usage (see above)
- units	integer code
- range	1, 2 or 3
Parameter #2 (Flex I/O only)	I/O Point (if applicable, see note below)
- units	integer code
- range	1 - 4

NOTES:
> *• For drives with Flex I/O, the SD command must be executed to set an I/O point as an output before that output can be assigned as the Brake Output.*
> *• Parameter #2 only applies to drives equipped with Flex I/O. This includes the STM24SF and STM24QF. Parameter #2 is not defined for drives equipped with standard I/O.*

Examples:

All drives with standard I/O:

Command	Drive sends	Notes
BO1	-	Brake Output will be closed when drive is enabled
BO	BO=1	

Drives with Flex I/O only:

Command	Drive sends	Notes
SD4O	-	Configures I/O 4 as output (see SD command for details)
BO14	-	Brake Output is mapped to I/O point 4 and will be Closed when drive is enabled
BO	BO=14	

BR - Baud Rate

Compatibility: All drives
Affects: Serial communications
See also: TD, PB, PM, PR commands

Sets or requests the bit rate (baud) for serial communications. At power up a drive will send its power-up packet at 9600 baud. If a response from a host system (such as a software application from Applied Motion) is not detected after 1 second and the drive is configured for SCL or Q operation (see PM command) the drive will set the baud rate according to the value stored in the Baud Rate NV parameter. A Host system can set the baud rate at anytime using this command. See Appendix B, "Host Serial Communications" for details.

NOTE 1: Setting the value takes effect immediately.

NOTE 2: Due to processor speed limitations, -Si drives can accept only parameter values 1, 2 or 3. -S and -Q drives will accept parameter values of 1-5.

Command Details:

Structure	BR{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Baud rate (see above)
- units	integer code
- range	1 = 9600 bps 2 = 19200 3 = 38400 4 = 57600 *(-S and -Q drives only)* 5 = 115200 *(-S and -Q drives only)*

Examples:

Command	Drive sends	Notes
BR2	-	Baud rate is immediately set to 19200
BR	BR=2	

BS - Buffer Status

Compatibility: All drives
See also: CT, PS commands

Requests from the drive the number of available command locations in the command buffer. This technique simplifies sending commands by eliminating the need to calculate if there is enough space in the buffer for a command. If the drive responds with at least a "1", a command can be sent.

If a drive responds to the BS command with the value "63" it means the buffer is empty. If a "0" is returned the buffer is full and no more buffered commands can be accepted (a buffer overflow will occur if another command is sent).

Command Details:

Structure	BS
Type	IMMEDIATE
Usage	READ ONLY
Non-Volatile	NO
Register Access	None
Units	Empty command spaces in buffer

Examples:

Command	Drive sends	Notes
BS	BS=20	There is room in the buffer for 20 more commands

CA - Change Acceleration Current

Compatibility:	STM Integrated Step Motors
Affects:	Motor accel/decel current and torque
See also:	PA, CC, PC commands

Sets or requests the accel/decel current setting ("peak of sine") of the stepper drive, also known as the peak current. CA will only accept parameter values equal to or larger than the current CC setting.

NOTE: CA has no effect in Command Mode 7 (CM7 - Step and Direction mode).

Command Details:

Structure	CA{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"M" (029) Note: The CA command uses different units than the "M" register; see Data Registers section for details

Parameter Details:

Parameter #1	Accel/Decel Current
- units	amps (resolution is 0.01 amps)
- range	STM23: 0 - 5.0 STM17: 0 - 2.0

Configurator software may also be used to set all current levels.

Example:

STM17, STM23

Command	Drive Sends	Notes
CA1.75	-	Set accel/decel current to 1.75 amps (peak of sine)
CA	CA=1.75	

CB - CANopen Baudrate

Compatibility: SV200 series servo drives only
Affects: CANopen drives
See also: None

Sets or requests the CANopen baudrate of CANopen type drives.
0 – 1 Mbps
1 – 800 kbps
2 – 500 kbps
3 – 250 kbps
4 – 125 kbps
5 – 50 kbps
6 – 20 kbps
7 – 12.5 kbps

Command Details:

Structure	CB{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	Yes
Register Access	None
Units	Empty command spaces in buffer

Parameter Details:

Parameter #1	CANopen baudrate of C type drive
- units	Integer
- range	0~7
Default value	0

Example:

Command	Drive Sends	Notes
CB1	%	Set the baudrate of CANopen drive to 1 Mbps
CB	CB=1	The baudrate of CANopen drive is 1 Mbps

CC - Change Current

Compatibility: All drives
Affects: Motor current and torque
See also: CA, CI, CP, PC commands

BLu, SV

Sets or requests the continuous (RMS) current setting of the servo drive.

STAC6

Sets or requests the current setting ("peak of sine") of the stepper drive, also known as the running current. The range of the CC command may be limited from the ranges shown in the Parameters table below based on the settings defined in the *STAC6 Configurator* software. Use *STAC6 Configurator* to select a motor and set the maximum current setting. Note that setting CC automatically sets CI to the same value if the new CC value is less than the starting CI value.

ST-Q/Si, ST-S, STM

Sets or requests the current setting ("peak of sine") of the stepper drive, also known as the running current. The range of the CC command may be limited from the ranges shown in the Parameters table below based on the settings defined in the *ST Configurator* software. Use *ST Configurator* to select a motor and set the maximum current setting. Note that setting CC automatically sets CI to 50% of CC. If a CI value different than 50% of CC is needed be sure to always set CI after setting CC.

Command Details:

Structure	CC{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"N" (030) Note: The CC command uses different units than the "N" register; see Data Registers section for details

Parameter Details:

BLu, SV, SVAC3

Parameter #1	Continuous current setting
- units	amps rms
- range	BLuDC4: 0 - 4.5 BLuDC9: 0 - 9.0 BLuAC5: 0 - 5.0 SV: 0 - 7.0 SVAC3 (120V): 0 - 3.5 SVAC3 (220V): 0 - 1.8 Note: For StepSERVO and SV200 series, see hardware manual for peak current range.

STAC6, ST-Q/Si, ST-S, STM, STAC5

Parameter #1	Running current
- units	amps
- range*	STAC6: 0 - 6.0 ST5 : 0 - 5.0 ST10: 0 - 10.0 STM: 0 - 5.0 STAC5 (120): 0 - 5 STAC5 (220): 0 - 2.55

*Current setting in stepper drives depends on the selected motor. Use *Configurator* software to select a motor and set the maximum current setting.

Examples:

BLu, SV, SVAC3
Command	Drive sends	Notes
CC4.50	-	Set continuous current to 4.5 amps rms
CC	CC=4.5	

STAC6
Command	Drive sends	Notes
CC4.50	-	Set running current to 4.5 amps
CI2	-	Set idle current to 2.0 amps
CC1.8	-	Set idle current to 1.8 amps
CC	CC=1.8	
CI	CI=1.8	CI automatically set to 1.8 amps along with CC1.8 command

ST-Q/Si, ST-S, STM, STAC5
Command	Drive sends	Notes
CC3	-	Set running current to 3.0 amps
CI	CI=1.5	CI automatically set to 1.5 amps along with CC3 command
CI1	-	Set idle current to 1.0 amps

CD - Idle Current Delay Time

Compatibility: Stepper drives only
Affects: Motor current at rest
See also: CC, CI commands

Sets or requests the amount of time the drive will delay before transitioning from full current (CC) to idle current (CI). This transition is made after a step motor takes the final step of a move. Operating in any form of pulse & direction mode the drive will reset the idle current delay timer each time a step pulse is received by the drive.

Command Details:

Structure	CD{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Delay time
- units	seconds
- range	0.00 to 10.00

Examples:

Command	Drive sends	Notes
CD0.4	-	Idle current delay time set to 0.4 seconds
CD	CD=0.4	

CE - Communication Error

Compatibility: All drives
See also: AL command

Requests the hexadecimal equivalent of the communication error's 8-bit binary word. The presence of a comm error will also be shown in the Alarm Code (AL command) as well as the status LEDs at the front of the drive (Appendix F). Bit assignments for the 8-bit word are shown in the Response Details table below.

Command Details:

Command Type	IMMEDIATE
Usage	READ ONLY
Non-Volatile	NO
Register Access	None

Response Details:

Response	Communication error code
- units	hexadecimal code
- range	bit 0 = parity flag error bit 1 = framing error bit 2 = noise flag error bit 3 = overrun error bit 4 = Rx buffer full bit 5 = Tx buffer full bit 6 = bad SPI op-code bit 7 = Tx time-out

Examples:

Command	Drive sends	Notes
CE	CE=0010	Rx buffer full
CE	CE=0002	Framing error

CF - Anti-resonance Filter Frequency

Compatibility: Stepper drives only
Affects: Mid-range performance of step motors
See also: CG command

Sets or requests the anti-resonance filter frequency setting. This setting is in Hz and works in conjunction with the anti-resonance filter gain setting (CG) to cancel instabilities due to mid-band resonance.

NOTE: We strongly suggest using the appropriate Configurator software application to set this value by entering as accurate a load inertia value as possible in the motor settings window.

Command Details:

Structure	CF{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Filter frequency
- units	Hz
- range	1 - 2000

Examples:

Command	Drive sends	Notes
CF1400	-	Set anti-resonance filter frequency to 1400 Hz
CF	CF=1400	

CG - Anti-resonance Filter Gain

Compatibility: Stepper drives only
Affects: Mid-range performance of step motors
See also: CF command

Sets or requests the anti-resonance filter gain setting. This setting is unit-less and works in conjunction with the anti-resonance filter frequency setting (CF) to cancel instabilities due to mid-band resonance.

NOTE: We strongly suggest using the appropriate Configurator software application to set this value by entering as accurate a load inertia value as possible in the motor settings window.

Command Structure:

CG{Parameter #1}

Command Details:

Structure	CG{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Filter gain
- units	integer number
- range	0 - 32767

Examples:

Command	Drive sends	Notes
CG800	-	Set anti-resonance filter gain to 800
CG	CG=800	

CI - Change Idle Current

Compatibility: Stepper drives only
Affects: Motor current at standstill, holding torque
See also: CC, PI, CD commands

Idle current is the level of current supplied to each motor phase when the motor is not moving. Using an idle current level lower than the running motor current level (see CC command) aids in motor cooling. A common level used for the idle current setting is 50% of the running current. After a motor move, there is a time delay after the motor takes its last step before the reduction to the idle current level takes place. This delay is set by the CD command.

STAC6

CI cannot be greater than CC. If you attempt to set CI higher than CC it will be automatically limited to the CC value. Furthermore, setting CC automatically sets CI to the same value if the new CC value is less than the starting CI value.

ST-Q/Si, ST-S, STM

CI cannot be greater than 90% of CC. If you attempt to set CI to a higher value than this CI is automatically limited to 90% of CC. Furthermore, setting CC automatically sets CI to 50% of the CC value. If a CI value different than 50% of CC is needed be sure to always set CI after setting CC.

Command Details:

Structure	CI{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	Yes
Register Access	"O" (031) Note: The CI command uses different units than the "O" register; see Data Registers section for more details

Parameter Details:

STAC6

Parameter #1	Idle current
- units	amps
- range	0 - 100% of running current

ST-Q/Si, ST-S, STM, STAC5

Parameter #1	Idle current
- units	amps
- range	0 - 90% of running current

Examples:

STAC6

Command	Drive sends	Notes
CI1.0	-	Set idle current to 1.0 amps
CI	CI=1	
CC0.5	-	Set running current to 0.5 amps
CI	CI=0.5	CI automatically set 0.5 amps along with CC0.5 command

ST-Q/Si, ST-S, STM, STAC5

Command	Drive sends	Notes
CI2	-	Set idle current to 2 amps
CC2	-	Set running current to 2 amps
CI	CI=1	CI automatically set to 1 amp to match 50% of CC2 command
CI1.8	-	Set idle current to 1.8 amps, or 90% of last CC value

CJ - Commence Jogging

Compatibility: All drives
See also: JS, JA, JL, SJ, CS and DI commands.

Starts the motor jogging. The motor accelerates up to the jog speed (JS) at a rate defined by the jog accel (JA) command, then runs continuously until stopped. To stop jogging, use the SJ (Stop Jogging) command for a controlled decel rate (decel rate set by JL command). For a faster stop, use the ST command (decel rate set by AM command), but beware that if the speed or load inertia is high, the drive may miss steps, stall, or fault. The jogging direction is set by the last DI command. Use the CS command to change jog speed and direction while already jogging. CS does not affect JS.

Use in Q Programs (Q drives only)

Within a stored Q program jog moves are most commonly initiated with the CJ command. However, because the SJ and ST commands are immediate type they cannot be used within a Q program to stop the jog move. So the procedure to stop a jog move within a Q program involves both the MT (Multi-tasking) and SM (Stop Move) commands. See Examples below for a sample command sequence.

Command Details:

Structure	CJ
Type	BUFFERED
Usage	WRITE ONLY
Non-Volatile	NO
Register Access	None

Examples:

Command	Drive sends	Notes
JA10	-	Set jog accel to 10 rps/s
JL25	-	Set jog decel to 25 rps/s
JS1	-	Set jog speed to 1 rps
CJ	-	Start jogging with speed set by last JS command
CS10	-	Change jog speed to 10 rps
SJ	-	Stop jogging using decel rate set by last JL command

The following example changes the jog speed during program execution by directly loading a value into the "J" register. This method allows for dynamically calculated jog speeds, and does not affect the original JS or DI setting. CJ always starts a jog move using JS and DI, so this is the recommended method of changing speed dynamically during program execution.

Sample Q program sequence

MT1	Turn Multi-tasking ON
FI58	Filter input X5 for 8 processor ticks (2 msec)
WIX5L	Wait for input X5 low
CJ	Commence jogging
RLJ480	Change speed to 2 rev/sec by directly loading the J register. Note, units are 0.25rpm.
WIX5H	Wait for input X5 high
SMD	Stop Move using the decel ramp set by JL

CM - Command Mode (AKA Control Mode)

Compatibility: All drives
Affects: Drive mode of operation
See also: PM command

Sets or requests the Command Mode that the drive operates in. For more automated setup of command modes use the appropriate *Configurator* or *Quick Tuner* software application. The most common command mode is Point-to-Point (21), in which all move commands can be executed. Move commands (like FL, FP, FS, and CJ) can still be executed when the command mode is set to Step & Direction (7), because the drive will temporarily switch to command mode 21 to execute the move, then revert back to command mode 7 when the move is finished. However move commands are either ignored or do not function properly when the command mode is set to any velocity mode (11-18) or the Analog Position mode (22).

WARNING: Changing the Command Mode without proper care may cause the motor to spin at a high rate of speed or give other unexpected results. For this reason it is suggested that the appropriate Configurator or Quick Tuner software application be used to test specific Command Modes first before changing them in the application using the CM command.

Command Details:

Structure	CM{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"m" (061) Note: Because a drive can change Command Mode on it's own to complete certain moves, the CM command and the "m" register may not always match.

Parameter Details:

Parameter #1	Command mode
- units	integer code
- range	1 - Commanded Torque (servo only) 2 - Analog Torque (servo only) 7 - Step & Direction 10 - Commanded Velocity (jog mode) 11 - Analog velocity 12 to 18 - (see below) 21 - Point-to-Point 22 - Analog Position

NOTE: In Command Modes 11, 12, 13 and 14, input X2 will function to reverse the direction of motion.

For StepSERVO and SV200, additional command modes have been added for variations on analog torque control as well as expanded velocity modes. See appropriate software and help files for details.

Command Modes 12 to 18 are for stepper drives and SV servo drives only:

12 - Analog velocity mode with input X1 as run/stop input
13 - Analog velocity mode with input X5 (X4 for STAC5 drives) as speed change input
14 - Analog velocity mode with input X1 as run/stop input and input X5 (X4 for STAC5 drives) as speed change input
15 - Velocity mode (JS for speed)
16 - Velocity mode (JS for speed) with input X1 as run/stop input
17 - Velocity mode (JS for speed) with input X5 (X4 for STAC5 drives) as speed change input
18 - Velocity mode (JS for speed) with input X1 as run/stop input and input X5 (X4 for STAC5 drives) as speed change input

NOTE: It is recommended to use Configurator or Quick Tuner software for setting up velocity mode operation.

Examples:

Command	Drive sends	Notes
CM2	-	Sets the servo drive to Analog Torque mode, at which time there is a linear relationship between the voltage at the drive's analog input and the motor current.
CM7	-	Sets the drive to Step & Direction input mode, which is used for all digital positioning schemes like Step (Pulse) & Direction, CW/CCW Pulse, and A/B Quadrature. Use the appropriate Configurator or Quick Tuner application to set the proper scheme within this mode.
CM10	-	Sets the drive to Command Velocity, or jog mode, which in practice is very similar to Point-to-Point mode (CM21). When in CM21 and a jog command is issued, like CJ, the drive automatically switches to CM10 during the jog move and then back to CM21 when the jog move is stopped. Conversely, when in CM10 and a feed move is commanded, like FL, the drive automatically switches to CM21 during the move and then back to CM10 when the move is finished. CM10 is most useful with servo drives, and when the JM (Jog Mode) is set to 2. This puts the drive into a jog mode in which position error is ignored. Then, when the motor is at rest the drive acts somewhat like a constant friction device in that a certain amount of torque (set by CC and CP commands) is required to move the shaft.
CM11	-	Sets the drive to Analog Velocity mode. In servo drives this will be similar to the Analog Torque mode, where voltage level at the analog input relates to motor speed. In stepper drives this puts the drive into continuous oscillator mode, with speed set by the JS command.
CM22	-	Sets the drive to Analog Positioning mode. In this mode it is also possible to control the position through the use of an external encoder.

CN - Secondary Control Mode

Compatibility: SV200 series servo drives only
Affects: All control mode
See also: CM, MS commands

Sets or requests the second command mode that the servo drive operates in. This command was first introduced on the SV200 series servo drives and is used to set a second, alternate command mode that can be triggered by changing the state of a specific digital input (X8 input for SV200 series). Primary command mode is set with CM. See SVX Servo Suite software and drive's hardware manual for details.

1 - Commanded Torque
2 - Analog Torque
3 - Analog Torque with Input X2 as direction input
4 - Analog Torque with Input X2 as direction input
5 - Analog Torque with Input X1 as start/stop input
6 - Analog Torque with Input X1&X2 as start/stop & direction input
7 - Step & Direction
8 - Analog Torque with Input X1&X2 as start/stop & direction input
10 - Commanded Velocity (jog mode)
11 - Analog velocity
12 - Analog velocity mode with input X1 as run/stop input
13 - Analog velocity mode with input X10 X11 X12 as speed change input
14 - Analog velocity mode with input X1 as run/stop input and input X10~X12 as speed change input
15 - Velocity mode (JS for speed)
16 - Velocity mode (JS for speed) with input X1 as run/stop input
17 - Velocity mode (JS for speed) with input X10~X12 as speed change input
18 - Velocity mode (JS for speed) with input X1 as run/stop input and input X10~X12 as speed change input
21 - Point-to-Point
22 - Analog Position

Command Details:

Structure	CN{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	The second control mode
- units	Integer
- range	1~22
Default value	7

Examples:

Command	Drive sends	Notes
CN7	%	Set the second control mode to Step & Direction
CN	CN=7	The second control mode is Step & Direction

CO - Node ID/ IP address

Compatibility: SV200 series servo drives only
Affects: CANopen drives & Ethernet drives

Sets or requests the CANOpen Node ID of CANOpen type drives or the Ethernet IP address of Ethernet type drives.

For the Ethernet type drives, the CO command sets the IP address which can be modified as necessary with SVX Servo Suite.
Default IP address list for Ethernet type drives:
0 – 10.10.10.10
1 – 192.168.1.10
2 – 192.168.1.20
3 – 192.168.1.30
4 – 192.168.0.40
5 – 192.168.0.50
6 – 192.168.0.60
7 – 192.168.0.70
8 – 192.168.0.80
9 – 192.168.0.90
10 –192.168.0.100
11 –192.168.0.110
12 –192.168.0.120
13 –192.168.0.130
14 –192.168.0.140
15 –0.0.0.0(DHCP)

Command Details:

Structure	CO{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Node ID of CANOpen type drives or the IP address of Ethernet type drives
- units	Integer
- range	For CANOpen type drives 1~127 For Ethernet type drives 0~15
Default value	For CANOpen type drives 1 For Ethernet type drives 0

Examples:

Command	Drive sends	Notes
CO1	%	Set the node ID to 1 of CANOpen drive or set the IP address to 192.168.1.10 (default IP Address list)
CO	CN=7	The node ID of CANOpen drive is 1 or the IP address of Ethernet drive is 192.168.1.10 (default IP Address list)

CP - Change Peak Current

Compatibility: Servo drives only
Affects: Motor current, especially during acceleration and deceleration
See also: CC, PC, PP commands

Sets or requests the peak (RMS) current setting of the servo drive. Peak current sets the maximum current that should be used with a given motor. When the motor position requires more than the continuous value, the peak current time calculation is done using I^2/T which integrates current values for more accurate modeling of drive and motor heating. The servo drive will allow peak current for nor more than one second. After one second of operation at peak current the current is reduced to the continuous current setting (see CC command).

Command Details:

Structure	CP{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"O" (031) Note: The CP command uses different units than the "O" register; see Data Registers section for more details

Parameter Details:

Parameter #1	Peak current limit
- units	amps RMS
- range	BLuDC4: 0 - 13.5 A BLuDC9: 0 - 18.0 A BLuAC5: 0 - 15.0 A SV7: 0 - 14.0 A SVAC3 (120V): 0 - 7.5 SVAC3 (220V): 0 - 3.75 Note: For StepSERVO and SV200 series, see hardware manual for peak current range.

Examples:

Command	Drive sends	Notes
CP9.0	-	Peak current is set to 9.0 amps RMS
CP	CP=9.0	

CR - Compare Registers

Compatibility: Q drives only
Affects: Contents of condition code register "h"
See also: RI, RD, RM, RL, QJ commands

Compare the contents of two data registers. The first data register (Parameter #1) is tested by comparing it against the data value in the second data register (Parameter #2). The result is a condition code that can be used for program conditional processing (see QJ command). For Example, if the first data register is greater than the second the "greater than" flag is set and the QJGx command can be used to create a conditional jump.

Command Details:

Structure	CR(Parameter #1)(Parameter #2)
Type	BUFFERED
Usage	WRITE ONLY
Non-Volatile	NO
Register Access	All data registers

Parameter Details:

Parameter #1	First data register assignment
- units	character
- range	All data register assignments
Parameter #2	Second data register assignment
- units	character
- range	All data register assignments

Examples:

Command	Drive sends	Notes
CRE1	-	Compare data register "E" to data register "1"
QJG5	-	If "E" register is greater than "1" register jump to line 5 of Q segment, otherwise proceed to next line.

CS - Change Speed

Compatibility: All drives
Affects: Jog speed while jogging
See also: CJ, JS, JA, JL commands

Sets or requests the jogging speed in rev/sec while jogging. When Jogging using the CJ command the Jog speed can be changed dynamically by using this command. The sign of CS can be positive or negative allowing the direction of jogging to be changed dynamically also. Ramping between speeds is controlled by the JA and JL commands. Setting CS does not change JS or DI.

Command Details:

Structure	CS{Parameter #1}
Type	IMMEDIATE
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"J" (026) Note: The CS command uses different units than the "J" register; see Data Registers section for more details.

Parameter Details:

Parameter #1	Jog Speed
- units	rev/sec
- range	BLu, SV, STAC6, ST-Q/Si, ST-S, STAC5, SVAC3: -133.3333 to 133.3333 (resolution is 0.0042) STM: -80.0000 to 80.0000 (resolution is 0.0042) sign determines direction: "-" for CCW, no sign for CW

Examples:

Command	Drive sends	Notes
JS1	-	Set base jog speed to 1 rev/sec
CJ	-	Commence jogging
CS2.5	-	Set jog speed to CW at 2.5 rev/sec
CS	CS=2.5	Displays current Jog speed
CS-5	-	Set jog speed to CCW at 5 rev/sec
SJ	-	Stop jogging

CT - Continue

Compatibility: All drives
See also: PS, ST, SK commands

Resume execution of buffered commands after a PS command has been sent. The PS (Pause) command allows you to pause execution of commands in the command buffer. After sending the PS command, subsequent commands are buffered in the command buffer until either a CT command is sent, at which time the buffered commands resume execution in the order they were received, or until the command buffer is full.

Command Details:

Structure	CT
Type	IMMEDIATE
Usage	WRITE ONLY
Non-Volatile	NO
Register Access	None

Examples:

Command	Drive sends	Notes
PS	-	Pause command buffer
FL2000	-	CW move, 2000 counts
WT.25	-	Wait 0.25 seconds
FL-2000	-	CCW move, 2000 counts
CT	-	Resume execution of buffered commands

DA - Define Address

Compatibility: All drives
Affects: Drive address for multi-drop communications

Sets individual drive address character for multi-drop RS-485 communications. This command is not required for single-axis (point-to-point) or RS-232 communications.

Command Details:

Structure	DA{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	RS-485 network address
- units	character
- range	Valid address characters are: ! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < > ? @

Examples:

Command	Drive sends	Notes
DA1	-	Set drive address to "1"
DA	DA=1	

DC - Change Distance

Compatibility: All drives
Affects: FC, FY, FO, FM commands.

Sets or requests the change distance. The change distance is used by various move commands to define more than one distance parameter. All move commands use the DI command at some level, and many require DC as well. Examples are FC, FM, FO, and FY. The moves executed by these commands change their behavior after the change distance (DC) has been traveled.   For example, FM is similar to FS, but in an FM move the sensor input is ignored until the motor has moved the number of steps set by DC. This is useful for masking unwanted switch or sensor triggers. Since DI sets move direction (CW or CCW), the sign of DC is ignored.

Command Details:

Structure	DC{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"C" (019)

Parameter Details:

Parameter #1	distance
- units	encoder counts
- range	0 to 2,147,483,647 (the sign of negative values is ignored)

Examples:

Command	Drive sends	Notes
DC80000	-	Set change distance to 80000 counts
DC	DC=80000	
DI-100000	-	Set overall move distance to 100000 counts in CCW direction
DC50000	-	Set change distance to 50000 counts
VE5	-	Set base move velocity to 5 rev/sec
VC2	-	Set change velocity to 2 rev/sec
FC	-	Initiate FC command

DD - Default Display Item of LEDs

Compatibility: SV200 servo drives only
Affects: LED display

Sets or requests the default monitor item for the drive's LED display after power up.
The item is defined as belows:

0	Velocity
1	Position Error
2	StepPosition
3	Encoder Position
4	Position Command
5	Temperature
6	DC_Bus_Voltage
7	Address
8	Alarm History 0
9	Alarm History 1
10	Alarm History 2
11	Alarm History 3
12	Alarm History 4
13	Alarm History 5
14	Alarm History 6
15	Alarm History 7

Command Details:

Structure	DD{Parameter #1}
Type	IMMEDIATE
Usage	READ/WRITE
Non-Volatile	Yes
Register Access	None

Parameter Details:

Parameter #1	Default display item of LEDs
- units	Integer
- range	0~15
Default value	0

Examples:

Command	Drive sends	Notes
DD0	%	Set the default display item to immediate velocity
DD	DD=0	The default display item is immediate velocity

DE - Deceleration

Compatibility: All drives
Affects: FC, FD, FE, FL, FM, FO, FS, FP, FY, SH commands
See also: AM, DE, DI, DC, VE commands

Sets or requests the deceleration rate used in point-to-point move commands in rev/sec/sec.

Command Details:

Structure	DE{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"B" (018) Note: The DE command uses different units than the "B" register; see Data Registers section for details

Parameter Details:

Parameter #1	Deceleration rate
- units	rev/sec/sec (rps/s)
- range	0.167 to 5461.167 (resolution is 0.167 rps/s)

Examples:

Command	Drive sends	Notes
DE125	-	Set deceleration rate to 125 rev/sec/sec
DE	DE=125	

DI - Distance/Position

Compatibility: All drives
Affects: All move commands
See also: AC, DC, DE and VE commands

Sets or requests the move distance in encoder counts (servo) or steps (stepper). The sign of DI indicates move direction: no sign means CW and "-" means CCW. DI sets both the distance for relative moves, like FL, and the position for absolute moves, like FP. DI also sets the direction of rotation for jogging (CJ).

Command Details:

Structure	DI{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"D" (020)

Parameter Details:

Parameter #1	distance
- units	encoder counts (servo) or steps (stepper)
- range	-2,147,483,647 to 2,147,483,647 sign determines direction: "-" for CCW, no sign for CW

Examples:

Command	Drive sends	Notes
DI20000	-	Set distance to 20000 counts in the CW direction
DI	DI=20000	
DI-8000	-	Set distance to 8000 counts in the CCW direction
FL	-	Initiate FL move

DL - Define Limits

Compatibility: All drives
Affects: All move commands
See also: AM command

CW and CCW end-of-travel limits are available on all drives and can be used to define the boundaries of acceptable motion in a motor/drive system. If one of these inputs is activated while defined as an end-of-travel limit, motor rotation will stop in that direction, and an alarm code will show at the drive's status LEDs. When used within a Q program with point-to-point position commands (FL, FP, etc.), limit switch actuation will stop the motion that is specified by the Q program and then the program will drop down to the next line. When defining these inputs as end-of-travel limits both inputs are defined together as either active low, active high, or not used, except for StepSERVO series and SV200 series servo drives. See below for details.

Note that when used in conjunction with jogging commands within a Q program, the ability to jog off a limit in the opposite direction may be limited.

BLu-S/Q, STAC6
Defines usage of inputs X6 and X7 as dedicated end-of-travel limits. X6 is the CCW limit input and X7 is the CW limit input. If not needed, X6 and X7 can be redefined as general purpose inputs.

STAC5-S, SVAC3-S
Defines usage of inputs X1 and X2 as dedicated end-of-travel limits. X1 is the CW limit input and X2 is the CCW limit input. If not needed, X1 and X2 can be redefined as general purpose inputs.

STAC5-Q/IP, SVAC3-Q/IP
Defines usage of inputs IN7 and IN8 as dedicated end-of-travel limits. IN7 is the CW limit input and IN8 is the CCW limit input. If not needed, IN7 and IN8 can be redefined as general purpose inputs.

Blu-Si
Defines usage of top-board inputs IN7 and IN8 as dedicated end-of-travel limits. IN7 is the CW limit input and IN8 is the CCW limit input.

ST-Q/Si, SV
Defines the usage of inputs X7 and X8 as dedicated end-of-travel limits. X7 is the CW limit input and X8 is the CCW limit input. If not needed, X7 and X8 can be redefined as general purpose inputs.

ST-S, STM-17/23
Defines the STEP and DIR inputs as CW end-of-travel and CCW end-of-travel limit inputs, respectively. The STEP and DIR inputs can each be assigned to only one function in an application. If you want to use the STEP and DIR inputs as end-of-travel limit inputs you can define them as such in two ways, with the *ST Configurator* software, or with the DL command. DL takes no effect if the drive is set in Command Mode (CM) 7, 11, 12, 13, 14, 15, 16, 17 or 18, because these modes predefine these inputs and take precedence over the DL command. Also, setting the JE command after setting the DL command reassigns the STEP and DIR inputs as jog inputs and turns off any limit input usage (DL3). In other words, the DL and JE commands, as well as Command Modes (CM) 7, 11, 12, 13, 14, 15, 16, 17 and 18 each assign a usage to the STEP and DIR inputs. Each of these must exclusively use the STEP and DIR inputs. Command Modes are most dominant and will continually prevent DL and JE from using the inputs. DL and JE exclude each other by overwriting the usage of the STEP and DIR inputs.

STM24-C
Defines the usage of inputs IN1 and IN2 as dedicated end-of-travel limits. IN1 is the CW limit input and IN2 is the CCW limit input. If not needed, IN1 and IN2 can be redefined as general purpose inputs.

STM24-SF/QF

Drives with Flex I/O allow a user to configure a drives I/O (I/O1 through I/O4) to be either an input or an output by using the SD command. For the DL command,
the drive uses inputs I/O3 and I/O4 as dedicated end-of-travel limits. I/O3 is the CW limit input and I/O4 is the CCW limit input. If not needed, I/O3 and I/O4 can be redefined as general purpose inputs.

There are three end-of-travel limit input states that can be defined with the DL command:

DL1: End-of-travel limit occurs when an input is closed (energized). Motion stops automatically at rate defined by AM command.

DL2: End-of-travel limit occurs when an input is open (de-energized). Motion stops automatically at rated defined by AM command.

DL3: Inputs are not used as end-of-travel limit inputs and can be used as a general purpose inputs. In the case of ST-S and STM drives, DL will be automatically set to 3 if CM is set to 7, 11, 12, 13, 14, 15, 16, 17, or 18, or if JE is executed after the DL command is set.

Command Details:

Structure	DL{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Limit input state (see above)
- units	integer number
- range	1, 2 or 3

Examples:

Command	Drive sends	Notes
DL1	-	Set limit inputs to work with normally open limit switches
DL	DL=1	
DL3	-	Set limit inputs to act as general purpose inputs

NOTE: When working with digital inputs and outputs it is important to remember the designations **low** *and* **high**. *If current is flowing into or out of an input or output, i.e. the circuit is energized, the logic state for that input/ output is defined as* **low** *or closed. If no current is flowing, i.e. the circuit is de-energized, or the input/output is not connected, the logic state is* **high** *or open. A low state is represented by the "L" character in parameters of commands that affect inputs/outputs. For example, WI3L means "wait for input 3 low", and SO1L means "set output 1 low". A high state is represented by the "H" character.*

DL - Define Limits (StepSERVO and SV200 drives)

Compatibility: SSM, TSM, TXM, SS, SSAC and SV200 drives
Affects: All move commands
See also: AM, EH, FH, SH commands

CW and CCW end-of-travel limits are available on all drives and can be used to define the boundaries of acceptable motion in a motor/drive system. If one of these inputs is activated while defined as an end-of-travel limit, motor rotation will stop in that direction, and an alarm code will show at the drive's status LEDs. When defining these inputs as end-of-travel limits, individual or both inputs can be defined as either active low, active high, or not used. See below for details.

DL1: End-of-travel limit occurs when an input is closed (energized). Motion stops automatically at rate defined by AM command.
DL2: End-of-travel limit occurs when an input is open (de-energized). Motion stops automatically at rated defined by AM command.
DL3: Inputs are not used as end-of-travel limit inputs and can be used as a general purpose inputs. In the case of ST-S and STM drives, DL will be automatically set to 3 if CM is set to 7, 11, 12, 13, 14, 15, 16, 17, or 18, or if JE is executed after the DL command is set.
DL7: individually set end-of-travel in CW direction when CW Limit inputs is closed(energized).
DL8: individually set end-of-travel in CW direction when CW Limit inputs is open (de-energized).
DL9: individually set end-of-travel in CCW direction when CCW Limit inputs is closed(energized).
DL10: individually set end-of-travel in CCW direction when CCW Limit inputs is open (de-energized).
DL11~13, DL17~20: Swap the CW input and CCW input definition as above setting.

Command Details:

Structure	DL{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Limit input state (see above)
- units	integer number
- range	1 to 20

Examples:

Command Drive sends Notes
DL1 - Set limit inputs to work with normally open limit switches
DL DL=1
DL3 - Set limit inputs to act as general purpose inputs

NOTE: When working with digital inputs and outputs it is important to remember the designations low and high. If current is flowing into or out of an input or output, i.e. the circuit is energized, the logic state for that input/ output is defined as low or closed. If no current is flowing, i.e. the circuit is de-energized, or the input/output is not connected, the logic state is high or open. A low state is represented by the "L" character in parameters of commands that affect inputs/outputs. For example, WI3L means "wait for input 3 low", and SO1L means "set output 1 low". A high state is represented by the "H" character.

DR - Data Register for Capture

Compatibility: Q servo drives only (BLu-Q and SV-Q)
Affects: Quick Tuner Data Capture

Sets or requests the data register used in the register plot data source in Quick Tuner. Any data register can be selected for viewing when capturing data using Quick Tuner.

Command Details:

Command Type	BUFFERED
Usage	WRITE ONLY
Non-Volatile	NO
Register Access	All data registers

Parameter Details:

Parameter #1	Data register assignment
- units	character
- range	All data register assignments

Examples:

Command	Drive sends	Notes
DRa	-	Set capture data register to "a" (Analog Command) register

DS - Switching Electronic Gearing

Compatibility: SV200 series servo drives only
Affects: control mode 7, electronic gearing, input #9
See also: EG, PV, EU, EN

Defines the usage of input X9 as electronic gearing selection.
DS1: EG is selected when input X9 is open, and PV is selected when input X9 is closed.
DS2: EG is selected when input X9 is closed, and PV is selected when input X9 is open.
DS3: Input X9 is used as general purpose input. And EG is selected.

Command Details:

Structure	DS{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	(see above)
- units	integer number
- range	1 ~ 3
Default value	3

Examples:

Command	Drive sends	Notes
DS1	%	set the usage of electronic gearing selecting to 1
DS	DS=1	set the usage of input X9 as electronic gearing selecting is 1

DW - Dumping Voltage Setting

Compatibility: SV2D series drive.

Sets or request dumping voltage level for SV2DC drives. When voltage is above set level, regen resistor will be triggered.

Command Details:

Structure	DS{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Voltage setting
- units	n/a
- range	300-800 (30VDC~80VDC)
Default value	600

Examples:

Command	Drive sends	Notes
DW600	-	Set dumping voltage to 60VDC
DW	DW=600	Check voltage setting
SA		Save to non-volatile memory

ED - Encoder Direction

Compatibility: BLu, STAC5, STAC6, SV7, SVAC3
Affects: Encoder count direction
See also: EF, EI commands

BLu, STAC5, STAC6, SV7, SVAC3
Sets or requests the encoder count direction.

Command Details:

Structure	ED {Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	none

Parameter Details:

Parameter #1	Encoder Count Direction
- units	Binary flag (0 or 1)
- range	0 = default behavior 1 = count in reverse

Examples:

Command	Drive sends	Notes
ED1	-	Set encoder to count in reverse
ED	ED=1	

EF - Encoder Function

Compatibility: Stepper drives with encoder feedback
Affects: Stall Detection and Stall Prevention
See also: CC, CI, ER, HD, PF commands

NOTE: The behavior of this function was updated subsequent to firmware rev 1.04L (STM17, 23). Most notably, a power-cycle was requried to initialize the drive with a new EF setting. Drives with more recent firmware perform a current probe and encoder alignment immediately following execution of the EF command, and do not require the drive to be reset. All descriptions shown here assume that the drive is running current firmware.

ST-Q/Si, STM

Sets or requests the decimal equivalent of the encoder function's 3-bit word. The encoder function can be set through Configurator or by using the EF command. Only stepper drives with encoder inputs (optional on ST-Q/Si, STAC5 and STM drives) running a step motor with a shaft-mounted encoder can utilize the Stall Detection and Stall Prevention functions. Note, this feature is NOT available on the STAC6.

AMP recommends an encoder with differential outputs and a resolution of at least 1000 lines (4000 counts/rev).

    EF0: Disable Encoder Functionality
    EF1: Turn Stall Detection ON.
    EF2: Turn Stall Prevention ON.
    EF6: Turn Stall Prevention with time-out ON.

The drive performs a full current probe for encoder alignment during power-up and after each EF command is sent. It is very important to raise the idle and continuous current settings to the maximum value and then execute the new EF setting after a 1 second delay. Once the EF command is completed, the current may be reset to its normal value.

Command Details:

Structure	EF{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Encoder function setting
- units	decimal equivalent of 3-bit binary word
- range	0 = Encoder function off 1 = Stall Detection 2 = Stall Prevention 6 = Stall Prevention with time-out

Examples:

Command	Drive sends	Notes
EF1	-	Turn ON Stall Detection function
EF	EF=1	
EF6	-	Enable Stall Prevention with time-out
EF	EF=6	

Example encoder alignment sequence (STM24):

CC6	Raise current to 6A
CI5.4	Raise idle current to 5.4A*
EF1	Enable Stall Detection feature
CC3	Lower current to normal running level (application dependent)
CI2.4	Lower idle current to normal running level (application dependent)

If this is done through a Q program, add a short delay after raising current levels:

CC6	Raise current to 6A
CI5.4	Raise idle current to 5.4A*
WT1	Short delay
EF1	Enable Stall Detection feature
CC3	Lower current to normal running level (application dependent)
CI2.4	Lower idle current to normal running level (application dependent)

* 90% of CC; see CI command for details

EG - Electronic Gearing

Compatibility: All drives
Affects: Command Mode 7, FE and HW commands
See also: CM, ER, FE and HW commands.

BLu, SV

Sets or requests the pulses per revolution for electronic gearing. For example, with an EG value of 20000 the servo drive will require 20000 pulses from the master pulse source to move the servo motor 1 revolution.

STAC6, ST-Q/Si, ST-S, STM

Sets or requests the desired step/microstep resolution of the step motor.

Command Details:

Structure	EG{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	"R" (034) Note: With servo drives the EG command is equal to the "R" register. With stepper drives the EG command is equal to twice the "R" register.
Parameter #1	Servo = electronic gearing ratio Stepper = step resolution
- units	Servo = counts/rev Stepper = steps/rev
- range	Servo = 200 - 32000 Stepper = 200 - 51200

Examples:

Command	Drive sends	Notes
EG20000	-	Set electronic gearing resolution in servo drive to 20000 pulses/rev
EG	EG=20000	
RLR	RLR=20000	"R" register matches the EG setting in a servo drive
EG36000	-	Set microstep resolution to 36000 steps/rev in a stepper drive
EG	EG=36000	
RLR	RLR=18000	"R" register contains 1/2 the EG setting in a stepper drive, or 18000 steps/rev

EH - Extended Homing

Compatibility: SSM, TSM, TXM, SS, SSAC and SV200 series servo drives only
See also: DL, HA, HL, HV, HO commands

Executes the Extended Homing process. Requires input number and condition for the home sensor. Speeds for each step are set by HV command, there are three velocity settings; one for each step (see graphic and examples below). Acceleration and deceleration are set by HA (Homing Accel) and HL (Homing Decel). The start direction comes from the sign of the HO command ("-" is CCW, no sign is CW).

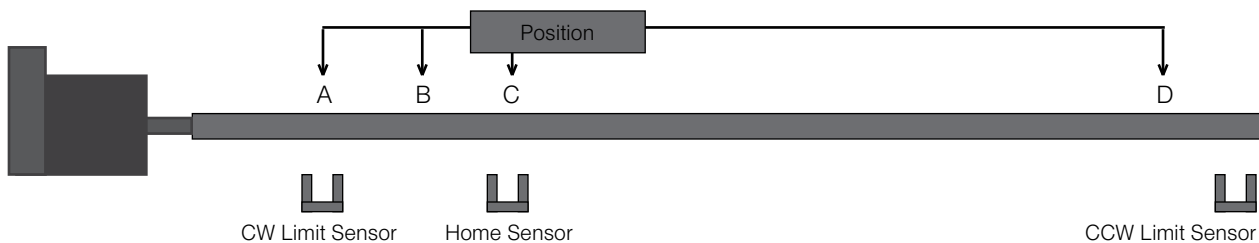HV1: Homing velocity when searching for Limit Sensor and Home sensor.
HV2: Homing velocity when moving the offset distance after home sensor has been reached.
HV3: Homing velocity when returning back to home sensor after offset move.

HO: distance to move after home sensor is initially reached.

Here are examples of the Extended Homing process for different starting positions.
Condition: HO = 20000(no sign for CW direction) , DL = 2 (end-of-travel limit triggered when input is open)

(1) When the motor is positioned at A (CW Limit Sensor triggered)
-The motor searches for the home sensor at the speed specified by HV1 value, with HA1/HL1 for acceleration/deceleration. Once home sensor is reached, it will move to the distance specified by HO value with HV2 speed and HA2/HL2 acceleration/deceleration beyond home sensor in CCW direction. Finally, the motor returns back to the home sensor position at the HV3 speed and HA3/HL3 acceleration/deceleration.

(2) When the motor is positioned at B (between CW Limit Sensor and Home Sensor)
-The motor moves in the CW direction to find CW limit sensor with HV1 speed and HA1/HL1 acceleration/deceleration.
-The CW limit sensor triggered and motion stops briefly.
-Then the motor moves the same as above (1).

(3) When the motor is positioned at C (Home Sensor triggered)
-The motor moves to the distance specified by HO value with HV2 speed and HA2/HL2 acceleration/deceleration beyond home sensor in CCW direction. Finally, the motor returns back to the home sensor position at the HV3 speed and HA3/HL3 acceleration/deceleration.

(4) When the motor is positioned at D (between Home Sensor and CCW Limit Sensor)
-The motor moves to home sensor with speed HV1 in CW direction.
-After Home Sensor triggered, The motor moves the same as above (3)

NOTE: If the HO value is negative, the motor will start in the CCW direction.

NOTE: This command is designed for use with three physical sensors or switches tied to three separate digital inputs of the drive: a home sensor, a CW end-of-travel limit, and a CCW end-of-travel limit.

Command Details:

Structure	EH{Parameter #1}
Type	BUFFERED
Usage	WRITE ONLY
Non-Volatile	No
Register Access	None

Parameter Details:

Parameter #1	Input number, Input condition
- units	Integer, letter
- range	Integer: Input number (range depends on model) letter: L = low, H = high, F = falling edge, R = rising edge

Examples:

Command	Drive sends	Notes
EH3L	%	Homing to home sensor wired to input 3, triggered by Low (closed circuit) condition

EI - Input Noise Filter

Compatibility: ST, STM, SV7, SVAC3, STAC5 and STAC6
Affects: "Input Noise Filter" parameter
See also: CM, ER, FE and HW commands.

Sets or requests the Input Noise Filter parameter. This parameter acts as a low-pass filter, rejecting noise above the specified frequency.

NOTE: On STAC5-S and SVAC3-S drives, this parameter setting affects inputs X1 - X4, and is an alternative to the FI command if input noise filtering is required.

STM17
Given a cutoff frequency, an appropriate EI value may be calculated as follows (where 'f' is the target cutoff frequency):

$$EI = 9,000,000 / f$$

ST, STM23 / 24, SV7, SVAC3, STAC5, STAC6
Given a cutoff frequency, an appropriate EI value may be calculated as follows (where 'f' is the target cutoff frequency):

$$EI = 15,000,000 / f$$

Command Details:

Structure	EI {Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	none

Parameter Details:

Parameter #1	Noise Filter Constant
- units	
- range	0 - 255

Examples:

Command	Drive sends	Notes
EI128	-	(STM17) Set noise filter to 70.3 kHz (9,000,000 / 128)
EI128	-	(STM23) Set noise filter to 117.2 kHz (15,000,000 / 128)
EI	EI=128	

EN - Numerator of Electronic Gearing Ratio

Compatibility: SV200 series servo drives only
Affects: control mode 7, electronic gearing
See also: EG, PV, EU DS commands.

Defines the numerator of electronic gearing ratio.
0 – do not use the electronic gearing ratio.

Command Details:

Structure	EN{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	numerator of electronic gearing
- units	integer number
- range	0 - 1000
Default value	1000

Examples:

Command	Drive sends	Notes
EN1000	%	Set the numerator of electronic gearing ratio to 1000
EN	EN=1000	the numerator of electronic gearing ratio is 1000

EP - Encoder Position

Compatibility: Servo drives and stepper drives with encoder feedback
Affects: Encoder position value
See also: SP, MT, WM commands.

The EP command allows the host to define the present encoder position. For example, if the encoder is at 4500 counts, and you would like to refer to this position as 0, send EP0. To ensure that the internal position counter resets properly, use SP immediately following EP. For example, to set the position to zero after a homing routine, send EP0 then SP0.

Sending EP with no position parameter requests the present encoder position from the drive.

For best results when using stepper systems, AMP recommends setting both CC and CI to the motor's maximum ratings before issuing an EP command. This will avoid any position error caused by the motor's detent torque. Once EP has been changed, reset CC and CI to their running levels.

WARNING: When in Multi-tasking mode (see MT command), the EP command should not be issued while the drive is simultaneously executing a move command (CJ, FL, FP, FS, etc.). A drive fault or other unexpected problems may result.

Command Details:

Structure	EP{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	NO
Register Access	"e" (053) read only

Parameter Details:

Parameter #1	Encoder position value
- units	Counts
- range	-2,147,483,647 to 2,147,483,647

Examples:

Command	Drive sends	Notes
EP0	-	(Step 1) reset internal position counter
SP0	-	(Step 2) reset internal position counter

ER - Encoder Resolution

Compatibility: Servo drives and stepper drives with encoder feedback
Affects: Motor Operation

Sets the encoder resolution in quadrature counts. For example, if the motor connected to the drive has an 8000 count (2000 line) per revolution encoder, set the encoder resolution to 8000.

WARNING: Changing this setting will affect motor commutation with servo drives. Use the Quick Tuner (for BLu, SV7, and SVAC3 drives) setup utility to change this setting, then run the "Timing Wizard" in Quick Tuner to properly set up the motor commutation. (for BLu, SV7, and SVAC3 drives)

Command Details:

Structure	ER{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Encoder resolution
- units	encoder counts/rev
- range	200 - 128000

Examples:

Command	Drive sends	Notes
ER8000	-	Set encoder resolution to 8000 counts/rev
ER	ER=8000	

ES - Single-Ended Encoder Usage

Compatibility: Servo and stepper drives with encoder feedback (except STM)

Allow a single-ended encoder to be used for drive feedback and commutation. This command has the same function as the box marked "Single Ended" in the Encoder setup screens of ST Configurator or QuickTuner.

While some applications require single-ended encoders to be used, differential signals are always recommended due to their superior noise immunity,

Command Details:

Structure	ES{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Single Ended Encoder Usage Flag
- units	integer
- range	0 = Differential encoder used (recommended) 1 = Single-ended encoder used

Examples:

Command	Drive sends	Notes
ES0	-	Drive will use a differential encoder
ES	ES=0	
ES1	-	Drive will use a single-ended encoder
ES	ES=1	

ES - Absolute Encoder Mode

Compatibility: TSM23X, TXM24X, TXM34X

Sets or request TruCount absolute encoder operation mode. This setting will not be saved unitl next power cycle
ES0 Use as incremental encoder
ES1 Use as incremental encoder with single turn absolute
ES2 Use as multiturn with overflow alarm
ES3 Use as multiturn with no overflow alarm

Command Details:

Structure	ES{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Encoder mode setting
- units	n/a
- range	0-3
- default	3

Examples:

Command	Drive sends	Notes
ES3	-	Set absolute encoder mode to 3
ES	ES=3	Check encoder mode
SA		Save to non-volatile memory

EU - Denominator of Electronic Gearing Ratio

Compatibility: SV200 series servo drives only
Affects: control mode 7, electronic gearing
See also: EG, PV, EN, DS commands.

Defines the denominator of electronic gearing ratio.
0 – do not use the electronic gearing ratio.

Command Details:

Structure	EU{Parameter #1}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	None

Parameter Details:

Parameter #1	Denominator of electronic gearing
- units	integer number
- range	0 - 1000
Default value	1000

Examples:

Command	Drive sends	Notes
EU1000	%	Set the denominator of electronic gearing ratio to 1000
EU	EN=1000	the denominator of electronic gearing ratio is 1000

FA - Function of the Single-ended Analog Input

Compatibility: SV200 series servo drives only
Affects: Control mode relating to analog input
See also: CM, CN commands

Defines the function of the single-ended analog input.
The command has two parameters: the first parameter selects the analog channel; the second parameter sets the function of the selected analog channel.
1 – select analog channel 1
2 – select analog channel 2
eg:
FA11 Analog input Ain1 is used as velocity or position reference input.
FA12 Not used.
FA13: Analog input Ain1 is used as general purpose analog input.
FA21 Not used.
FA22 Analog input Ain2 is used as torque reference input.
FA23: Analog input Ain2 is used as general purpose analog input.

Command Details:

Structure	FA{Parameter #1}{Parameter #2}
Type	BUFFERED
Usage	READ/WRITE
Non-Volatile	YES
Register Access	NO

Parameter Details:

Parameter #1	Single-ended analog input channel
- units	integer number
- range	1~2
Parameter #2	Function of the selected analog channel
- units	integer number
- range	1~3
Default value	3

Examples:

Command	Drive sends	Notes
FA11	%	Set the Analog input Ain1 to be used as velocity or position reference input.
FA1	FA1=1	The Analog input Ain1 is used as velocity or position reference input.

FC - Feed to Length with Speed Change
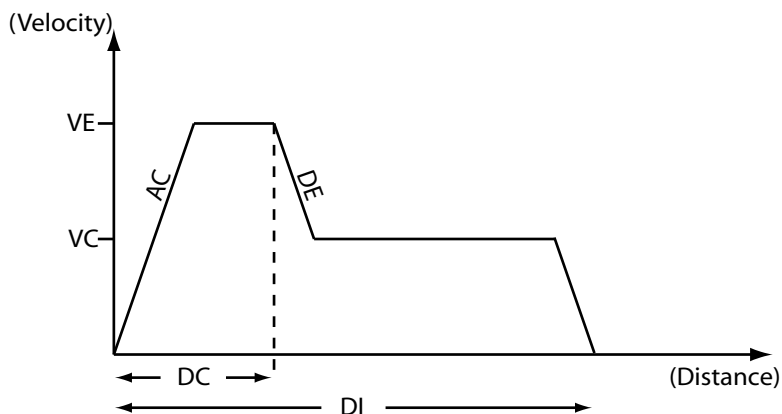
Compatibility: All drives, though Q drives have added functionality (see below)
See also: VC, VE, DC, DI, SD, WP commands

Executes a feed to length (relative move) with a speed change. Overall move distance and direction come from the last DI command. Accel and decel are from AC and DE commands, respectively. Initial speed is VE. After the motor has moved DC counts, the speed changes to VC. If DC is equal to or greater than DI, a speed change will not occur.
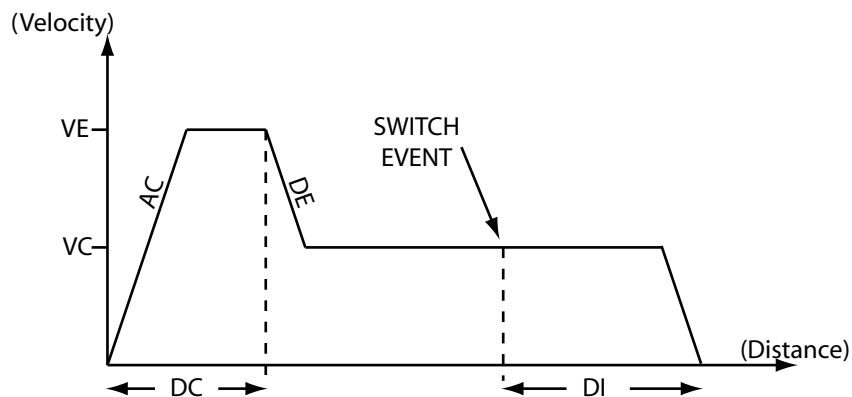
Optionally, a parameter pair may be used with the FC command to designate a switch and polarity to use as a trigger for the final move segment. If a switch parameter is used, the motor will change speed at the DC distance and will maintain that speed until the input is triggered. Once this input condition is met, the drive will travel the full DI distance and decelerate to a stop per the DE ramp. In this scenario, the overall move distance is the sum of DC, DI and the distance between the DC change point and the point where the input is triggered. The overall distance then, depends on the location of the trigger input.

Q drives only

With Q drives there may be multiple VCs and DCs per FC command, allowing for more complex, multi-velocity moves. To make multi-velocity moves with more than one speed change, the WP (Wait Position) command is also required. A sample sequence is shown in the Examples section below.

FC used without optional parameter

FC used with optional parameter

Command Details:

Structure	FC{Parameter #1}{Parameter #2}
Type	BUFFERED
Usage	WRITE ONLY
Non-Volatile	NO
Register Access	None

Parameter Details:

(See Appendix F: Working With Inputs and Outputs)

Examples:

Command	Drive sends	Notes
DI50000	-	Set distance to 50000 steps
VE5	-	Set velocity to 5 rps
DC40000	-	Set change distance to 40000 steps
VC0.5	-	Set change velocity to 0.5 rps
FC	-	Initiate move

FC with I/O trigger

DI50000	-	Set distance to 50000 steps
VE5	-	Set velocity to 5 rps
DC40000	-	Set change distance to 40000 steps
VC0.5	-	Set change velocity to 0.5 rps
FC1L	-	Initiate move, specifying that the drive will move 50000 steps beyond the point where input 1 goes LOW.

For Q drives only

MT1	-	Turn multi-tasking ON*
DI50000	-	Set overall move distance to 50000 steps
VE5	-	Set initial velocity to 5 rps
DC10000	-	Set 1st change distance to 10000 steps
VC10	-	Set 1st change velocity to 10 rps
FC	-	Initiate move
WP	-	Wait position
DC20000	-	Set 2nd change distance to 20000 steps
VC1	-	Set 2nd change velocity to 1 rps
WP	-	Wait position
DC30000	-	Set 3rd change distance to 30000 steps
VC0.5	-	Set 3rd change velocity to 0.5 rps

* Because multi-tasking is required for the WP command to be used, only Q models can perform multi-segment moves.

FD - Feed to Double Sensor

Compatibility: All drives
See also: FM, FS, FY, VC commands; see AT command for using analog input as sensor input

Accelerates the motor at rate AC to speed VE. When the first sensor is reached (first input condition is made), the motor decelerates at rate DE to speed VC. When the second sensor is reached (second input condition is made), the motor decelerates over the distance DI to a stop at rate DE. The sign of the DI register is used to determine both the direction of the move (CW or CCW), and the distance past the second sensor. If DI is long the motor may not begin decel immediately after the second sensor. If DI is short the motor may decelerate using a faster decel rate than DE. Both analog and digital inputs can be used as sensor inputs.

BLu, STAC6, STAC5-Q/IP, SVAC3-Q/IP, STM
Both sensor inputs must be from the same physical I/O connector of the drive. This means that both inputs used in this command must reside on the same I/O connector, either IN/OUT 1 or IN/OUT 2. In the case of BLuDC drives this means that both inputs must reside on the same connector, either the main driver board I/O connector (DB-25) or the top board connector (screw terminal).

Command Details:

Structure	FD(Parameter #1)(Parameter #2)
Type	BUFFERED
Usage	WRITE ONLY
Non-Volatile	NO
Register Access	None

Parameter Details:

(See Appendix F: Working With Inputs and Outputs)

Examples:

Command	Drive sends	Notes
FDX2F4H	-	Launch Feed to Double Sensor move: decel from VE to VC when input 2 changes from high to low (falling), then decel to a stop when input 4 is high
AC50	-	Set accel rate to 50 rev/sec/sec
DE50	-	Set decel rate to 50 rev/sec/sec
DI-1	-	Set move direction to CCW
VE5	-	Set initial velocity to 5 rev/sec
VC1	-	Set change velocity to 1 rev/sec
FD1F2H	-	Launch Feed to Double Sensor move: decel from VE to VC when input 1 changes from high to low (falling), then decel to a stop when input 2 is high