

MOTKA™ Motion Controller

Command Reference

Revision 1.1

MOTKA LLP

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1. Command Descriptions

This command reference is a supplementary document to the MOTKA™ Motion Controller User's Manuals. For information on proper controller operation, consult the respective User's Manual. This reference provides detail descriptions of all the commands. These commands are listed in alphabetical order.

All commands and arguments are in ASCII characters and terminated with a Carriage Return (0x0D). Using ASCII characters allows straightforward interface with MOTKA Motion Controllers with any ready-to-use text communication utilities such as Microsoft's HyperTerminal.

In general, a valid syntax of a command consists of a 2-letter opcode, one or more arguments for the specific axis, and terminated by a carriage return (0x0D) as shown below. If more than one argument is entered, each argument must be separated by a comma. The first argument after the opcode represents the first axis, whereas the second argument represents the second axis. Spaces are optional between Opcode and first argument, as well as between comma and the next argument.

<2-Letter Opcode> <argument for axis1>, <argument for axis2><CR>

Example, the command

MR 10000<CR>

MR is the two letter command for Move Relative. 10000 is the argument which represents the required position value in counts. The <CR> terminates the command.

1.1. Parameter Arguments

Some commands operate with numerical arguments. These commands have 2-letter opcode and the arguments, represented by n, are the values. These values can be specified for one axis, or combination of axes separated by commas.

Examples of valid syntax are listed below.

MR n<CR>	Move to relative position for Axis 1 only
MR n,n<CR>	Move to relative position for Axis 1 and 2 only
MR , n<CR>	Move to relative position for Axis 2 only

1.2. Boolean Arguments

Some commands require no value to operate with. However, it is a Boolean command which parameter takes the ASCII character 'T' or 'F' (represents True or False). These commands have 2-letter opcode and the arguments, represented by b, are either 'T' or 'F'. These arguments can be specified for one axis, or combination of axes separated by commas.

Examples of valid syntax for such commands are listed below.

SE T<CR>	Enable servo for Axis 1 only
SE T,T<CR>	Enable servo for Axis 1 and 2
SE ,T<CR>	Enable servo for Axis 2 only
SE F,F<CR>	Disable servo for Axis 1 and 2

1.3. Query

These commands have 2-letter opcode and the arguments accept ASCII character '?' (0x3F). These arguments can be specified for one axis, or combination of axes separated by commas.

Examples of valid syntax for such commands are listed below.

GP ? <CR>	Get the position for Axis 1 only
1000<CR>	Returned position of Axis 1 in counts
GP ?,? <CR>	Get the position for Axis 1 and 2
1000<CR>	Returned position of Axis 1 in counts
53000<CR>	Returned position of Axis 2 in counts
GP ,? <CR>	Get the position for Axis 2 only
53000<CR>	Returned position of Axis 2 in counts

Immediately after executing a query command, corresponding responses will be returned. The responses are ASCII characters, terminated with a Carriage Return (0x0D). See the example above for details.

2. Commands

All commands are listed in alphabetical order. Each command will be explained, and examples will be listed to help user to understand and use the command with ease.

For clarity, <CR> is omitted in the documentation below.

Command	Descriptions
AL	Acceleration limit
DL	Deceleration limit
GL	Get limits
GP	Get position
GV	Get version
HT	Halt
KD	Derivative gain
KI	Integral gain
KP	Proportional gain
MA	Move absolute
MC	Move continuous
MH	Move home
MR	Move relative
MT	Motor type
SE	Servo enable
SL	Speed limit

Table 1 - List of commands in alphabetical order

To facilitate referencing, the command list is organised into functional categories as well.

Category	Command	Descriptions
Initialisation	SE	Servo enable
Motion limits settings	AL	Acceleration limit
	DL	Deceleration limit
	SL	Speed limit
Information query	GL	Get limits
	GP	Get position
	GV	Get version
	MT	Motor type
PID Controller settings	KD	Derivative gain
	KI	Integral gain
	KP	Proportional gain
Motion commands	HT	Halt
	MA	Move absolute
	MC	Move continuous
	MH	Move home
	MR	Move relative

Table 2 – List of commands in categorical order

AL

Command: Acceleration Limit

Descriptions: The AL command sets the acceleration of an axis in counts per second-square. If AL is set, the acceleration of motion for that axis will be controlled at that value. This function is useful in application where acceleration of motion must be satisfied.

Arguments: AL n,n
Where n is unsigned integer ranged from 0 to 4,294,967,295 decimal. If AL is 0, no acceleration is set. The units are in counts/sec².

Default: 72000

Examples: AL 256000,15000 Set Axis 1 acceleration to 256000 counts/sec² and Axis 2 to 15000 counts/sec².
AL ?,? Get the acceleration for Axis 1 and 2.
256000
15000

Related Commands: DL Deceleration Limit
SL Speed Limit

DL

Command: Deceleration Limit

Descriptions: The DL command sets the deceleration of an axis in counts per second-square. If DL is set, the deceleration of motion for that axis will be controlled at that value. This function is useful in application where deceleration of motion must be satisfied.

Arguments: DL n,n
Where n is unsigned integer ranged from 0 to 4,294,967,295 decimal. If DL is 0, no deceleration is set. The units are in counts/sec².

Default: 72000

Examples: DL 256000,15000 Set Axis 1 deceleration to 256000 counts/sec² and Axis 2 to 15000 counts/sec².
DL ?,? Get the deceleration for Axis 1 and 2.
256000
15000

Related Commands: AL Deceleration Limit
SL Speed Limit

GL

Command: Get Limits

Descriptions: The Get Limits command returns the status of the Forward, Reverse limits and Home indicator. If Home is active, it returns ASCII character '1' followed by a CR (0x0D). If Forward limit is active, it returns ASCII character '2' followed by a CR (0x0D). If Reverse limit is active, it returns ASCII character '3' followed by a CR (0x0D). If none of the limits are active, it returns ASCII character '0' followed by a CR (0x0D).

Arguments: GL n, n
where n is '?'. The returned value status of the limits. See descriptions above for details.

Default: -

Examples:	GL ?,?	Get the status of limits.
	0	No active limits detected in Axis A.
	3	Reverse limit detected in Axis B.

Related -

Commands:

GP

Command: Get Position

Descriptions: The Get Position command returns the current position of the motor(s).

Arguments: GP n,n
where n is '?' for each axis, or any combination of axes. The units of the returned values are in encoder counts.

Default: -

Examples:	MA 1000	Move to absolute position for Axis 1 only.
	GP ? 1000	Get the current position for Axis 1 only.
	MR 1000, 1000	Move to relative position for Axis 1 and 2.
	GP ?,? 2000 5000	Get the current position for Axis 1 and 2.

Related -

Commands:

GV

Command: Get Version

Descriptions: The Get Version command returns the version number of the software.

Arguments: GV n
where n is '?'. The returned value is the software version number.

Default: -

Examples: GV ? Get the software version number.
1.0.0 Version 1.0.0 is returned.

**Related
Commands:** -

HT

Command: Halt

Descriptions: The Halt command halts the motion of selected motor(s) in its current position.

Arguments: HT b,b
where b is either 'T' or 'F' for each axis, or any combination of axes.

Default: 'F' for all axes.

Examples:	HT T,T	Halt motion for Axis 1 and 2.
	HT ,T	Halt motion for Axis 2 only.
	HT F,T	Halt motion for Axis 2 only.

Related -

Commands:

KP

Command: Proportional Gain

Descriptions: The KP command designates the proportional gain of the PID filter.

Arguments: KP n,n
where n is unsigned integer ranged from 0 to 4,294,967,295 decimal.

Default: 0

Examples: KP 500,230 Set Axis 1 with proportional gain of 500 and Axis 2 with 230.
KP ?,? Get the proportional gain for Axis 1 and 2.
500
230

Related KD Differential Gain

Commands: KI Integral Gain

MA

Command: Move Absolute

Descriptions: The MA command moves the axis to the absolute position, referenced from the absolute zero.

In the event where Forward Limit is active, MA in the positive direction will not be executed. Similarly, MA in the negative direction when Reverse Limit is active will not be executed.

Arguments: MA n,n
where n is signed integer ranged from -2,147,483,647 to 2,147,483,648 decimal. The units are in encoder counts.

Default: 0

Examples:	MA 100,-5000	Move to Axis 1 to absolute position 100 counts and Axis 2 to -5000 counts.
	GP ?,?	Get the current positions of Axis 1 and 2.
	100	
	-5000	

Related	MC	Move Continuous
Commands:	MH	Move Home
	MR	Move Relative

MC

Command: Move Continuous

Descriptions: The MC command moves the axis continuously at a specified speed and direction.

In the event where Forward Limit is active, MC in the positive direction will not be executed. Similarly, MC in the negative direction when Reverse Limit is active will not be executed.

Arguments: MC n,n
where n indicates the speed and is signed integer ranged from -2,147,483,647 to 2,147,483,648 decimal. Negative integer indicates reverse direction. The units are in encoder counts per second.

Default: 0

Examples: MC 10000,-5000 Move to Axis 1 in forward direction continuously at a speed of 10000 counts/second, and Axis 2 in reverse direction at 5000 counts/second

Related MA Move Absolute

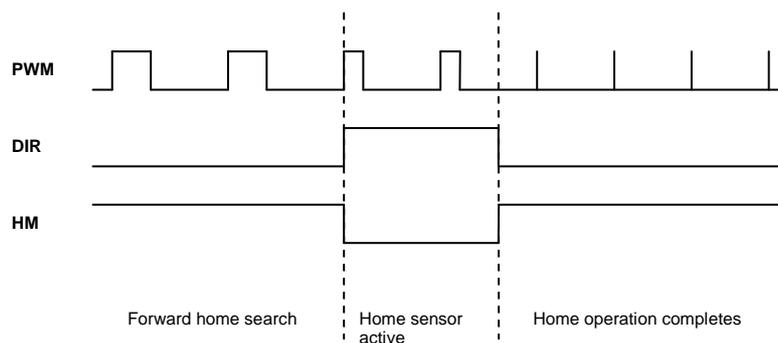
Commands: MH Move Home

MR Move Relative

MH

Command: Move Home

Descriptions: The MH command initiates the corresponding PWM pulses and Direction bit. In the figure shown below, the MH instruction searches in the forward (DIR is logic '0') direction. Once the HM input is active (logic '0'), it toggles the Direction bit and reduces the speed of search, and hence reverses the motion at a lower speed. This motion continues until the HM input is inactive and the home operation is complete.



Arguments: MH n,n

where n indicates the speed and is signed integer ranged from -2,147,483,647 to 2,147,483,648 decimal. Negative integer indicates reverse direction. The units are in encoder counts per second.

Default: 0

Examples: MH ,-5000 Find the home position of Axis 2 in the reverse direction at 5000 counts/second.

Related MA Move Absolute
Commands: MC Move Continuous
 MR Move Relative

MR

Command: Move Relative

Descriptions: The MR command moves the axis to the relative position, referenced from the current position.

In the event where Forward Limit is active, MR in the positive direction will not be executed. Similarly, MR in the negative direction when Reverse Limit is active will not be executed.

Arguments: MR n,n
where n is signed integer ranged from -2,147,483,647 to 2,147,483,648 decimal. The units are in encoder counts.

Default: 0

Examples:	GP ?,? 300 1000	Get position of Axis 1 and Axis 2.
	MR 100,-5000	Move to Axis 1 to relative position 100 counts and Axis 2 to -5000 counts.
	GP ?,? 400 -4000	Get position of Axis 1 and Axis 2.

Related MA Move Absolute

Commands: MC Move Continuous

MH Move Home

MT

Command: Motor Type

Descriptions: The Motor Type command returns the type of motor, servo or stepper, the controller is configured to work with. The controller can be configured to control either servo or stepper motors, or both. Refer to the User Manual for more detail on how to configure the motor type.

Arguments: MT n,n
where n is '?' for each axis, or any combination of axes. The returned value can be:
0 – for stepper motor, or
1 – for servomotor.

Default: -

Examples:

MT ?	Get the motor type for Axis 1 only.
1	1 indicates Axis 1 is configured for servomotor.
MT ?,?	Get the motor type for Axis 1 and 2.
1	1 indicates Axis 1 is configured for servomotor.
0	0 indicates Axis 2 is configured for stepper motor.

Related -

Commands:

SE

Command: Servo Enable

Descriptions: The Servo Enable command instructs the controller to enable servo control using the current motor position.

Arguments: SE b,b
where b is either 'T' or 'F' for each axis, or any combination of axes.

Default: 'F' for all axes.

Examples:	SE T,T	Enable servo for Axis 1 and 2.
	SE T,F	Enable servo for Axis 1 disable Axis 2.
	SE ,T	Enable servo for Axis 2 only

Related -

Commands:

SL

Command: Speed Limit

Descriptions: The SL command sets the speed of an axis in counts per second. If SL is set, the speed of motion for that axis will be controlled at that value. This function is useful in application where speed of motion must be satisfied.

Arguments: SL n,n
where n is unsigned integer ranged from 0 to 4,294,967,295 decimal. If SL is 0, no limit is set. The units are in counts/sec.

Default: 25000 counts/sec

Examples: SL 256000,15000 Set Axis 1 speed to 256000 counts/sec and Axis 2 to 15000 counts/sec.

SL ?,?
256000 Get the speed for Axis 1 and 2.
15000

Related AL Acceleration Limit

Commands: DL Deceleration Limit

3. Error Codes

Whenever there is an error occurred, an error code will be returned. These error codes are in ASCII characters and terminated with a Carriage Return (0x0D).

Error Code	Descriptions of Error
E0001	Invalid opcode.
E0002	Invalid syntax.
E0003	Forward limit active.
E0004	Reverse limit active.

4. Revision History

Date	Revision	Changes
09-April-2015	1.0	Initial release.
12-February-2015	1.1	Added DL command.

Table 3 - Document revision history