

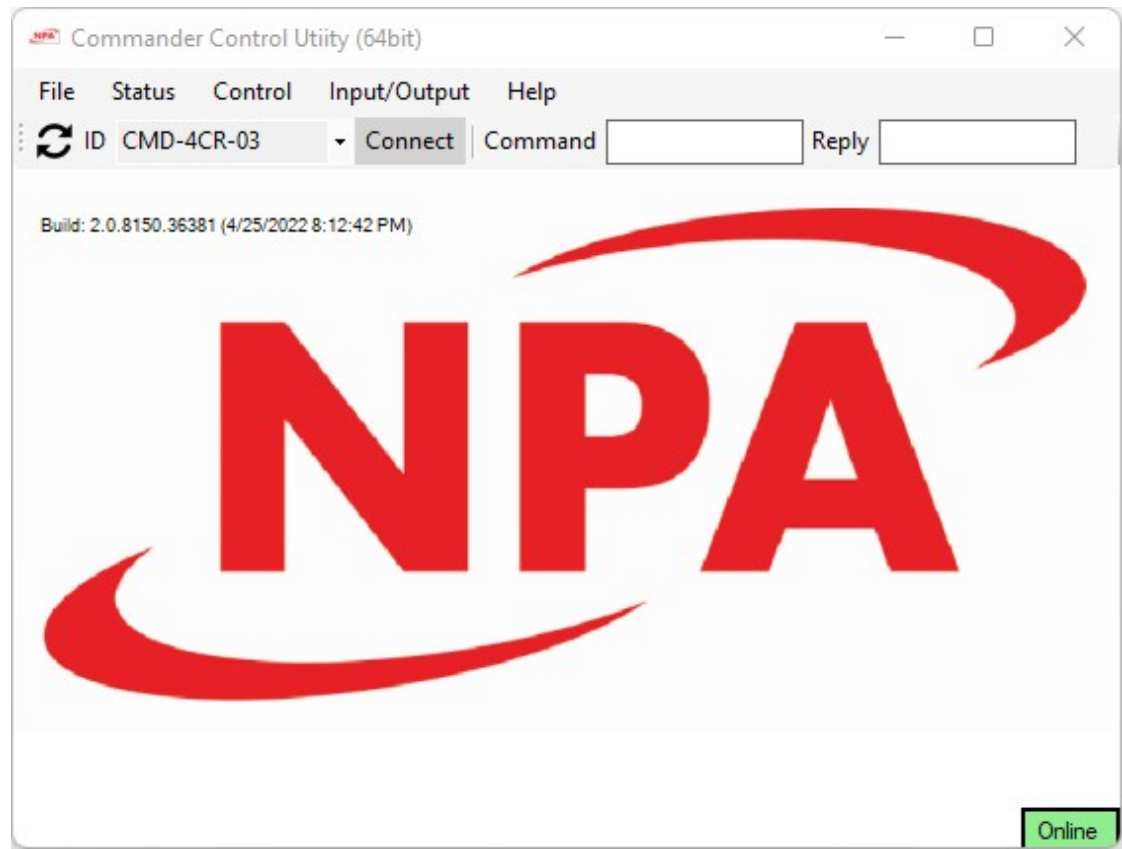
Software Utility - Commander Control Software Manual

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Software Utility - Commander Control Software Manual

Software Utility - Commander Control Software Manual



Version 2.0

Copyright

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First edition, October 2019
Current edition, August 2026

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Revision History

Date	Revision	Firmware	Changes Made
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		Compatibility	
Nov 2019	Version 1.0	CMD V127BL Software 113	New Document
Dec 2019	Version 1.1	CMD V127BL Software 113	Update screenshots to include SSPDM setting information
April 2022	Version 2.0	CMD V201BL Software 201	- Reformatted and moved to an online version of this manual - Software V201 changes - Added support of firmware Version 201 for CMD-4CR and CMD-4EX-SA * Software version numbers and firmware version numbers match - Added support for the following features: * AutoRenumbering of ID, When multiple Commanders have the same ID (Fully Supports V201+, Limited support for other firmware) * ECHO Command Viewer (Supports all firmware) * Profile Builder (Supports all firmware) * Jerk Control (Supports V201+ firmware) * Soft Limits (Supports V201+ firmware) * Helix Arc, Circle Moves (Supports V126+ firmware) * New CMD-4EX-SA controller series (Supports V201+ firmware) * MicroStepping control for the CMD-4EX-SA-TBD (Supports V201+ firmware) - Added additional features when connected to the internet. * Online Users Manuals * Online and auto-update support. - Will only show commands supported by the current Firmware Version. - About window updated to show: * Device ID * Firmware Version * SN of HardWare SN of Commander if FW version > 200 * DLL version number * Software version and build number - Update of file Storage in the Public Documents folder - Fixed bug in standalone code editor that caused GUI to crash
July 2022	Version 2.1	CMD V201BL Software 202	-Fixed the following bugs in the GUI * Online updater is now working correctly updating 32bit and 64bit * Repaired bug that prevented Motor Status screen from working with some older firmware versions. * Repaired bug which crashed GUI when setting soft limits with RS485 * Repaired bug which prevented RS485 commutation from getting status * Repaired bug which kept JOG buttons active after reaching hard end
March 2025	Version 3.0	CMD V301BL Software 300	- Refreshed Main Form with Status Strip reviewing - Combined Command Echo Viewer and Terminal Screen. The new screen is called Terminal/Echo Command Viewer - Motor Status now supports External Stop.

NOTE: CMD V201BL is compatible with Utility Software version 201 and higher. For previous versions please contact sales for correct version of the GUI software.

Last Build: 8/21/2026 11:25 AM

Cautions

Copying all or any part of this manual without written approval is prohibited.

The software specifications may change to improve performance or quality without prior notice.

Although we strive to produce this manual to be easy to understand, if you find any points that are unclear,

wrong, or have inadequate descriptions, please let us know.

We are not responsible for any results from using this controller, regardless of the item (3) above.

The Commander series of controllers and its supporting software are engineered for use in commercial apparatus. They are not intended for use in any device that may require high quality and reliability or where faults or malfunctions may directly affect human survival or injure humans. Customers must provide their own safety measures to ensure appropriate performance in all circumstances. We will not be liable for any problem, even if it was directly caused by the Commander series of controllers and its supporting software.

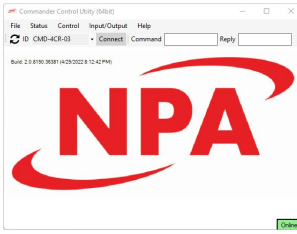
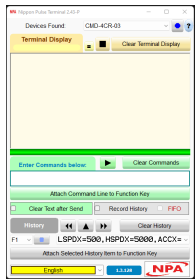
This guide is delivered subject to the following conditions and restrictions:

- This guide contains proprietary information belonging to Nippon Pulse America and Arcus Technology.
- Such information is supplied solely to assist users of A-Script enables products. These include:
 - CMD Series Motion Controllers
- The text and graphics included in this manual are for illustration and reference only. The specifications on which they are based are subject to change without notice.

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1.0 Software Utility Program Overview

The Commander core series from Nippon Pulse has two Windows GUI programs that can be obtained by downloading from their website.

	The Commander Control Utility, a Windows Graphical User Interface application, carries out two crucial functions: ○ Aids in examining and debugging the Commander core and your own interface code by giving a way to access each ASCII command quickly. ○ The controller can be tested, programmed, compiled, downloaded and debugged through the use of a standalone language. This manual provides information about the Commander Control Utility. Download the most recent version (V202a): 
	The Nippon Pulse Terminal Utility is tailored to advanced users. It is compatible with all Nippon Pulse controllers and has three main functions: ○ Use terminal mode to rapidly test each ASCII command. Additionally, the total cycle timing of each ASCII command is displayed. ○ Test proposed code using ASCII Programs, which enable the production of ASCII programs. ○ Auto Control Programs offer the capacity to compose computer programs that can completely manage a terminal utility, such as running ASCII programs and logging the results.

See [Nippon Pulse Terminal Program Software Manual](#) for more information about and downloads for the Nippon Pulse Terminal Utility

The Commander Control Utility helps the user configure, monitor, and develop programming for the Commander series of products.

- o Use various status and configuration screens to configure the inputs, outputs, and limits.
- o Trigger or clear the status of alarms and other signals for each axis.
- o Enable and control each axis using a jog or other move commands.
- o Access and run all homing routines from the utility software.
- o The Standalone Control window supports standalone program code generation, compiling, downloading, and storing.
- o Use the echo monitor to see the exact format and timing of commands sent and received from the Commander.

Both ASCII and standalone commands are accessible in the Commander Control Utility software environment.

A copy of the Commander Control Software is not shipped with the Commander products but

can be downloaded [here](#).

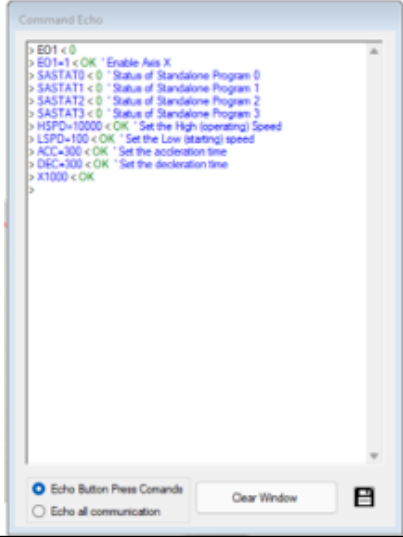
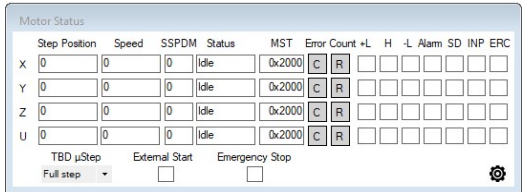
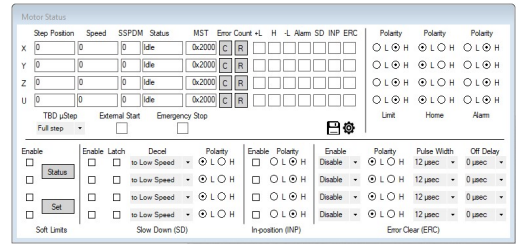
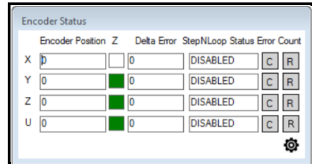
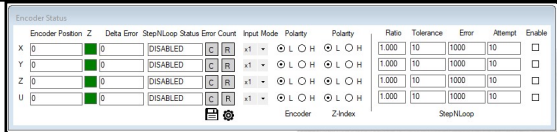
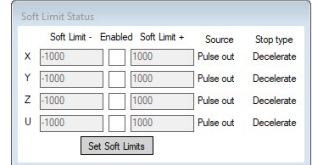


1.1 Screen Display Overview

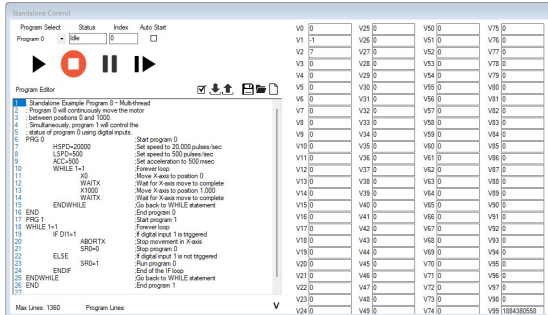
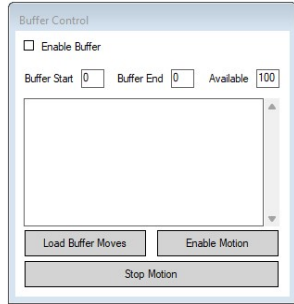
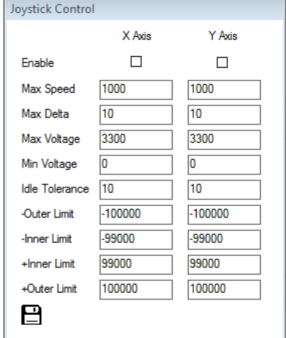
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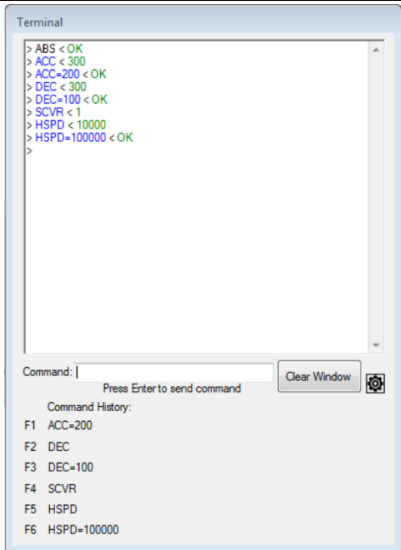
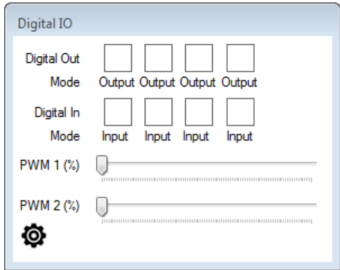
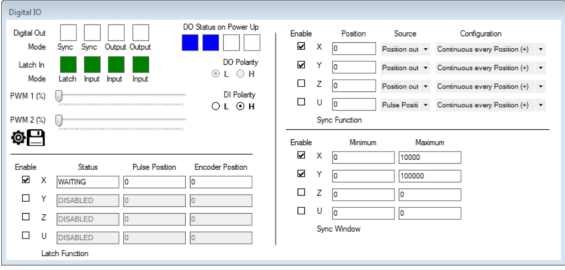
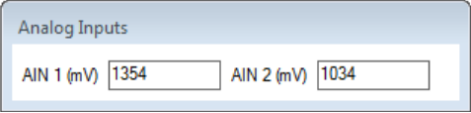
- [Screen display overview](#)
- [Screen transition diagram](#)

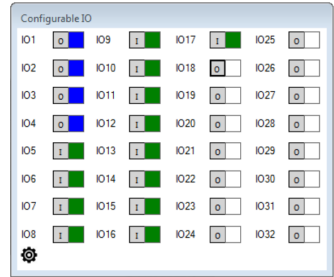
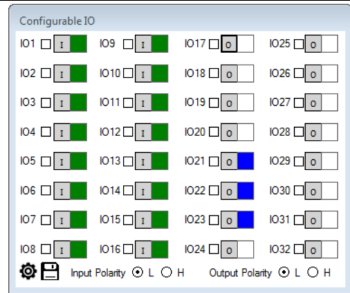
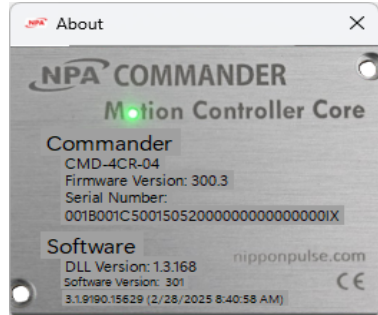
Screen Name	Functions	Screen View
Main Control Screen	• Provides access to utility software configuration, communications, and functional screens • ASCII command entry • Search for connected Commanders • Autonumbering of conflicting Commanders • Connect/disconnect from controller • Notices of software updates	

Screen Name	Functions	Screen View
Command Echo Viewer	Displays command sent to and reply from the connected Commander	
Motor Status Screen (Basic)	- Check the motor status of each axis, including position, speed, SSPDM setting, operation status, limits, home, alarms, and error flags - clear errors, reset counters for each axis	
Motor Status Screen (Advanced)	Adds additional configuration options, including polarity settings, soft limit configuration, slowdown configuration, In-position functionality, and ERC behavior	
Encoder Status Screen (Basic)	- Check encoder status, including position, Z index pulse, delta error, and StepNLoop enable for each axis - clear errors, reset counters for each axis	
Encoder Status Screen (Advanced)	- Adds additional configuration settings, including input mode, encoder and Z-index polarity settings for each axis - StepNLoop configuration settings	
Soft Limit Status	Check the status of the soft limits	
Set Soft Limits	Sets and test the soft limit settings	

Screen Name	Functions	Screen View
Axis Control Screen (Basic)	- Configure simple motion. Inputs available for high speed, low speed, accel/decel time, target position - Profile Builder - Absolute and incremental mode settings - S-curve, and soft limit activation and axis enable - Momentary jog, continuous jog, target moves, and stop functions. - Calculates acc/dec rates - Setting of soft limits - Status of SSPDM setting	
Axis Control Screen (Advanced)	- Adds Homing, interpolated moves, on-the-fly changes - Output modes, boot modes, and polarity configuration for each axis	
Profile Builder	Graphical planning of profile high speed, low speed, accel/decel time, Jerk control, s-curve, and target position	
Standalone Control (Basic)	- Develop standalone programs using A-Script for up to 4 separate programs - Compile, download, save, and access program files - Control program operation, start, stop, pause - Expand screen to view standalone variables	

Screen Name	Functions	Screen View
Standalone Control (Advanced)	Adds viewing of variables	
Buffer Control Screen	- Create buffered moves using ASCII commands - Enable and initiate buffered moves	
Manual Pulse Generator Screen	- Configure pulse generator settings for each axis - set multiplier, divider, and direction - enable and reset counters	
Joystick Control Screen	Configure all settings for joystick control for both X and Y axes	

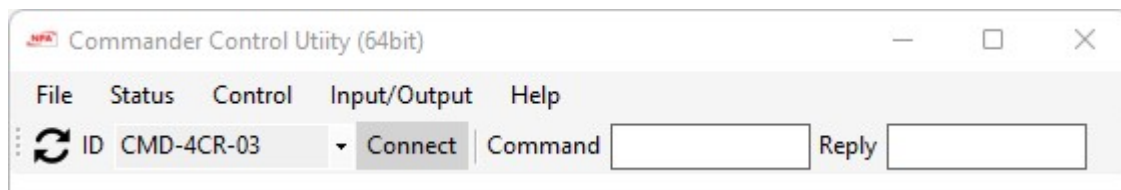
Screen Name	Functions	Screen View
Terminal Screen	Terminal mode for entering ASCII commands directly to controller. Includes last 6 commands for quick data entry.	
Digital I/O Screen (Basic)	- status of digital inputs and outputs - Settings for PWM outputs 1 and 2	
Digital I/O Screen (Advanced)		
Analog Input Screen	view current values for analog inputs 1 and 2	

Screen Name	Functions	Screen View
Configurable I/O Screen (Basic)	configure settings for all configurable I/O, adjusting input and output polarity along with boot-up output status	
Configurable IO Screen (Advanced)	- adds ability to configure output and configuration status on boot-up - setting for input and output polarity	
About Screen	- Indicates CMD-4CR ID, firmware version, and Serial Number - indicates Utility Software version and DLL version	

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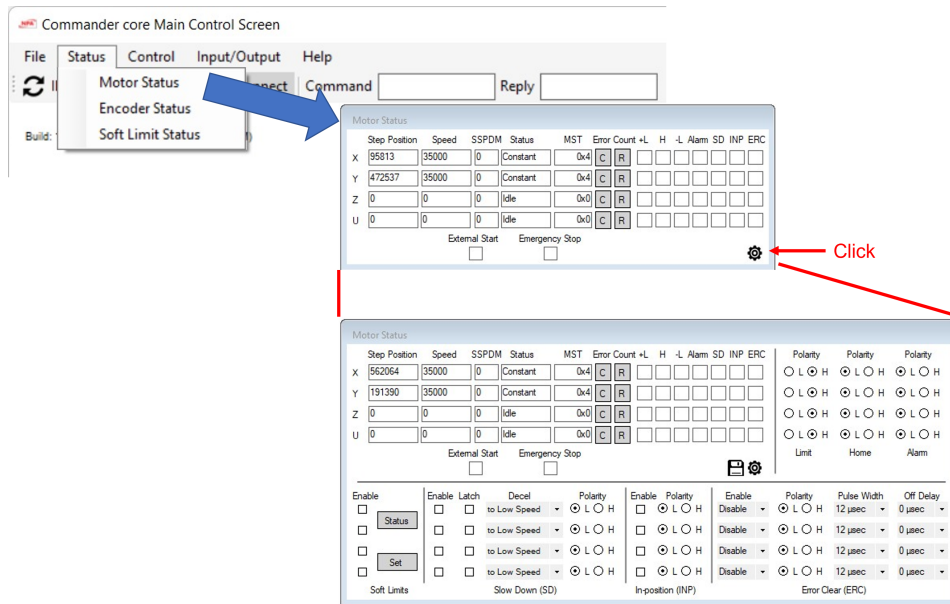
Screen transition diagram

Main screen menu:



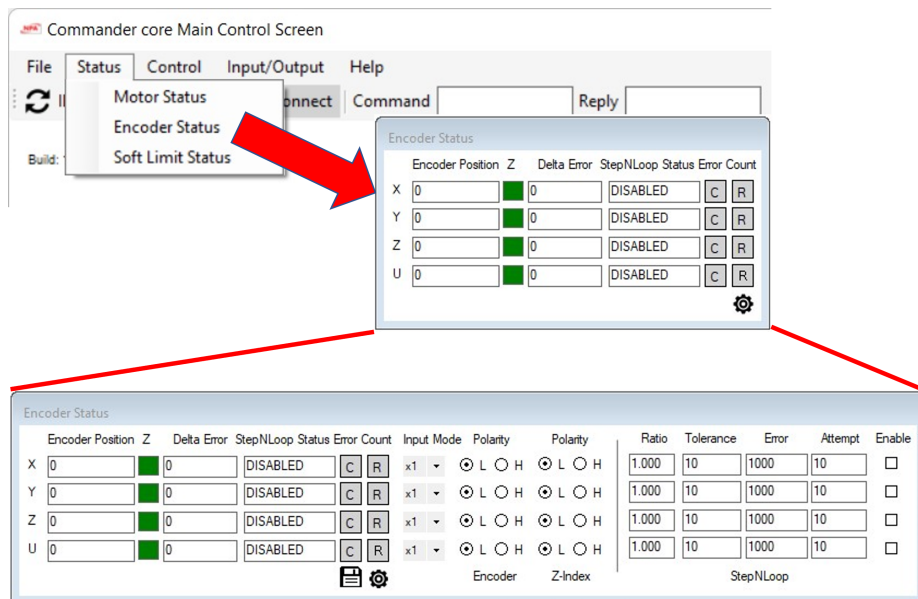
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Motor Status Screen



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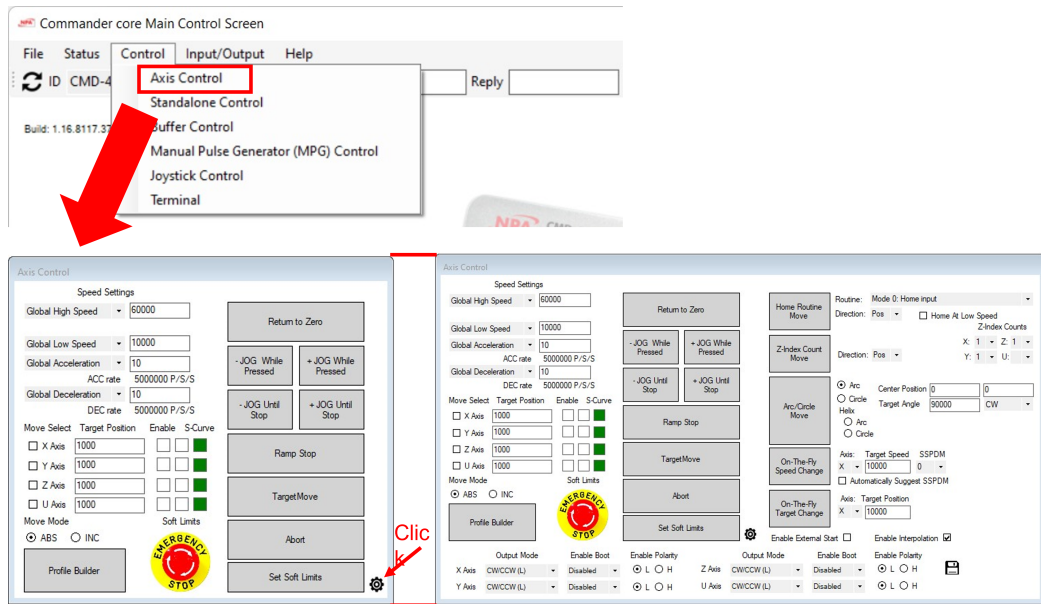
Encoder Status Screen



Soft-Limit Status Screen

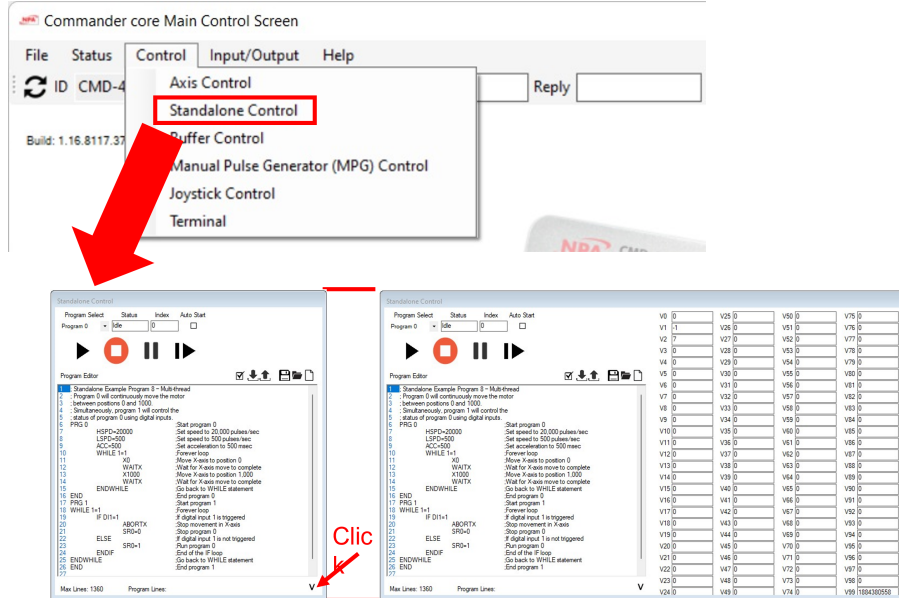
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Axis Control Screen



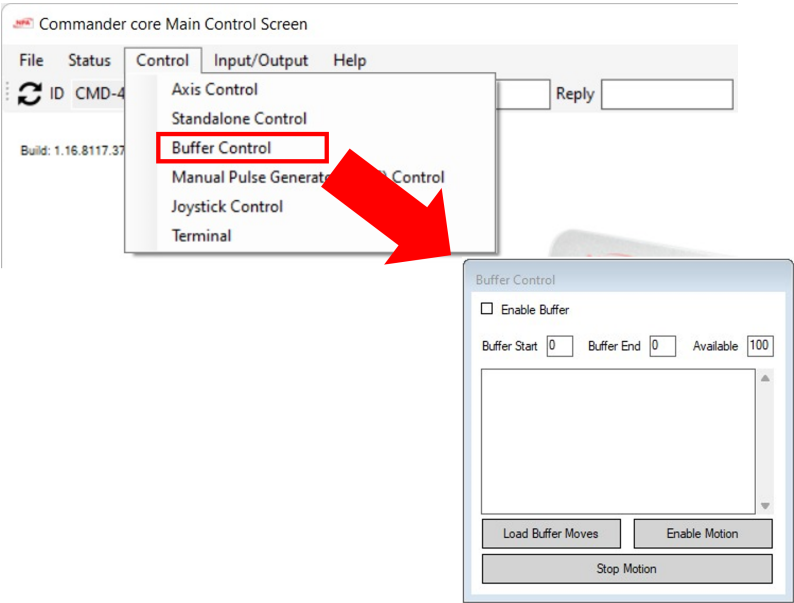
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Standalone Control Screen



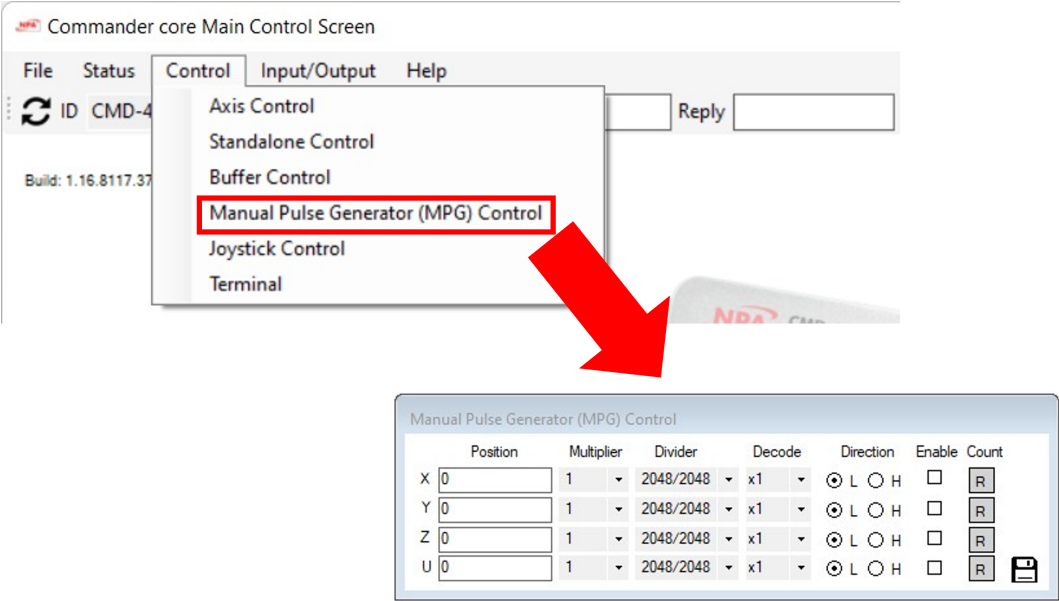
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Buffer Control Screen



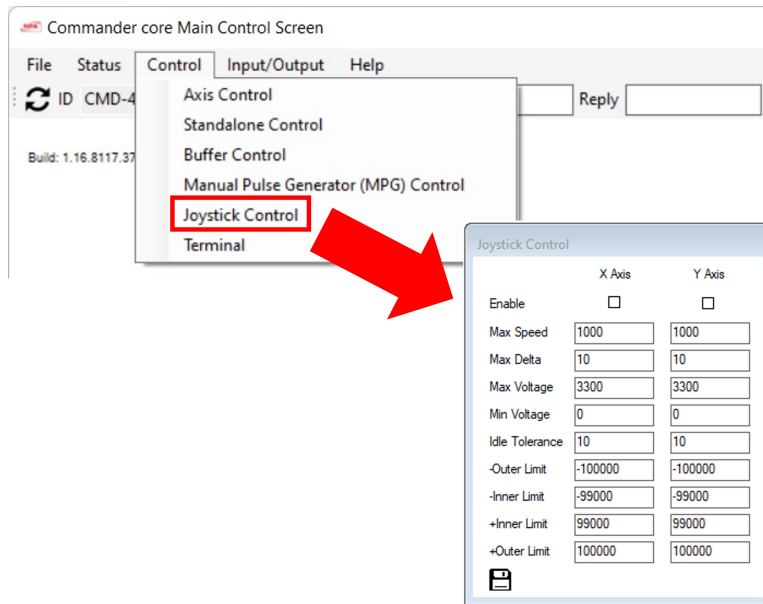
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Manual Pulse Generator (MPG) Control Screen



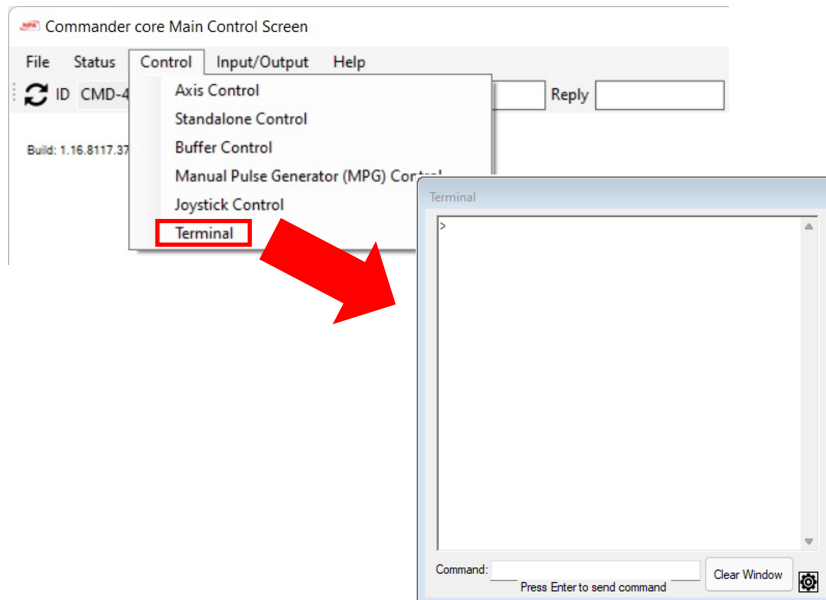
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Joystick Control Screen



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Terminal Screen

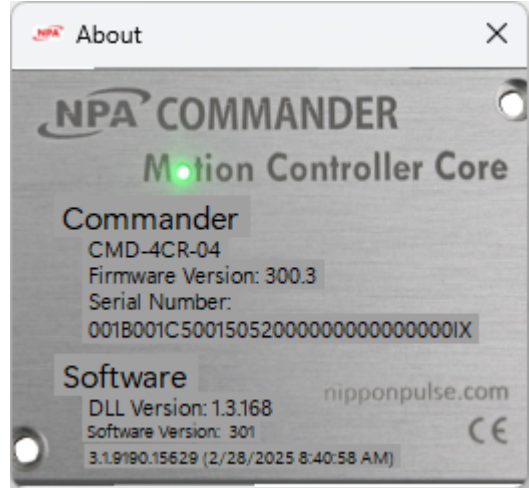
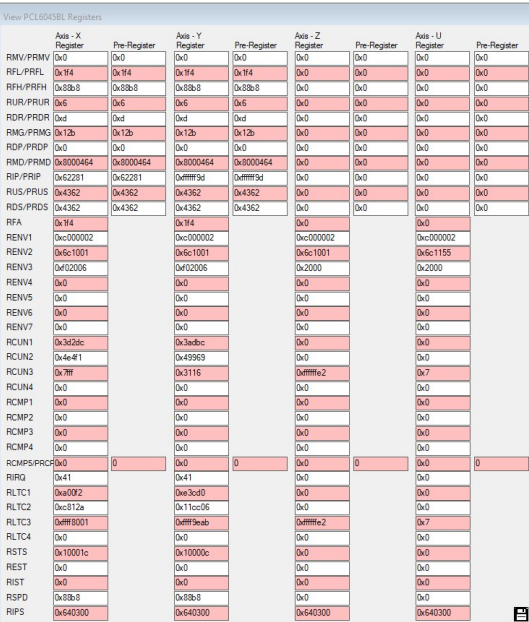


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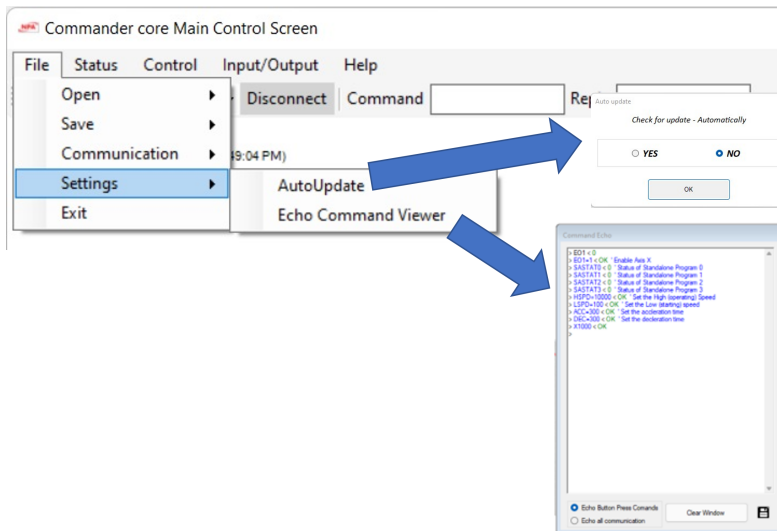
1.2 Service Screen Display Overview

On this page

- [Service Screen display overview](#)
- [Service Screen transition diagram](#)

Screen Name	Functions	Screen View
About Screen	Open the About form and click the NPA logo to enter service mode. A form will pop up asking for a password. Enter the password below for the mode you need to enable.	
Service Mode	PCL Registers Screen enabled Service Menu shown Service Manual shown	Password : CMDservice
PCL Registers Screen	Status of all registers	

Service Screen transition diagram



2.0 Navigation

Commander Control Software Navigation

This section covers the navigation for the Commander Control Software; exceptions are noted in specific topics.

On this page:

- [Commander Control Software](#)
- [Screen Access](#)
- [Expand Screen](#)
- [Save Configurations](#)

Commander Control Software opens as a blank work area with a menu bar:



Once communication is established successfully, all screen options are available through the top

menu bar. Each category contains the associated screens for that portion of the software. Any number of screens can be opened and displayed in the main work area.

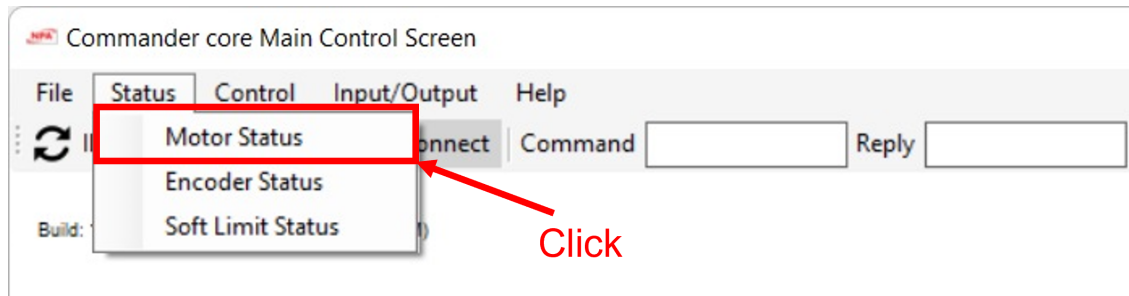
All screens appear in the work area. When multiple screens overlap select an overlapped screen to move it to the top.

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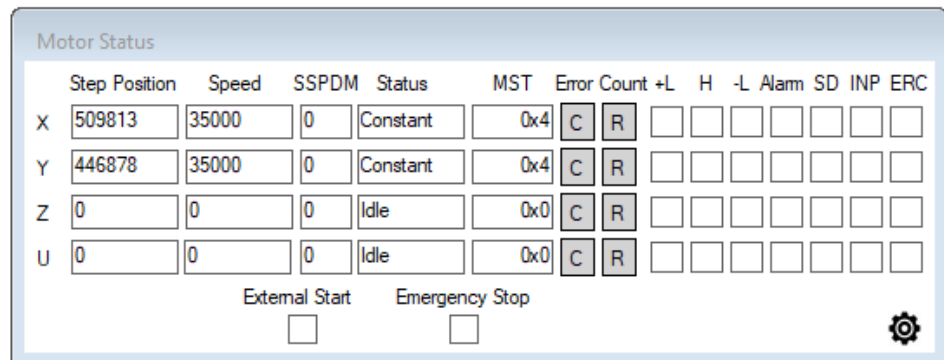
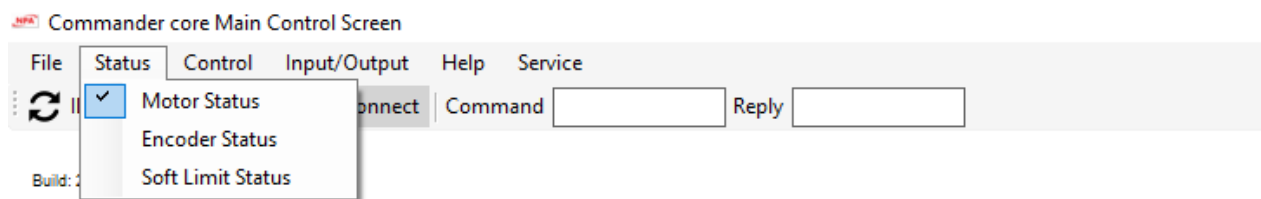
Screen Access

To open a work window, click the menu tab, then select a screen.

The work window opens in the work area.



A check mark highlighted in blue indicates an open screen is open. Click the screen name on the menu bar to close the screen.



Note: Some work windows have an  in the top right corner. You must click the  to close the window.

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Expand Screen

Many screens open in basic mode with basic information for that function.

Click Settings () to expand the work window to display advanced settings.

Click the settings icon again to close the advanced view and revert to the basic view.

Motor Status

	Step Position	Speed	SSPDM	Status	MST	Error Count	+L	H	-L	Alarm	SD	INP	ERC
X	95813	35000	0	Constant	0x4	C R							
Y	472537	35000	0	Constant	0x4	C R							
Z	0	0	0	Idle	0x0	C R							
U	0	0	0	Idle	0x0	C R							

External Start ☐ Emergency Stop ☐

Click

Motor Status

	Step Position	Speed	SSPDM	Status	MST	Error Count	+L	H	-L	Alarm	SD	INP	ERC
X	562064	35000	0	Constant	0x4	C R							
Y	191390	35000	0	Constant	0x4	C R							
Z	0	0	0	Idle	0x0	C R							
U	0	0	0	Idle	0x0	C R							

External Start ☐ Emergency Stop ☐

Limit Home Alarm

Enable Latch Decel Polarity

☐	☐	☐	to Low Speed	☒ L ☐ H
☐	☐	☐	to Low Speed	☒ L ☐ H
☐	☐	☐	to Low Speed	☒ L ☐ H
☐	☐	☐	to Low Speed	☒ L ☐ H

Soft Limits Slow Down (SD) In-position (INP)

Enable Polarity

☐	☒ L ☐ H
☐	☒ L ☐ H
☐	☒ L ☐ H
☐	☒ L ☐ H

Enable Polarity Pulse Width Off Delay

☐	☒ L ☐ H	12 μ sec	0 μ sec
☐	☒ L ☐ H	12 μ sec	0 μ sec
☐	☒ L ☐ H	12 μ sec	0 μ sec
☐	☒ L ☐ H	12 μ sec	0 μ sec

Error Clear (ERC)

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Save Configuration

The Save icon (💾) is displayed when screen configuration settings can be saved.

Click Save to store settings to the Commander as default (See [Flash Memory](#)). Some commands (e.g. ID, DB) require a Commander power cycle before they take effect.

Motor Status

Step	Position	Speed	SSPDM	Status	MST	Error Count	+L	H	-L	Alarm	SD	INP	ERC	Polarity	Polarity	Polarity
X	562064	35000	0	Constant	0x4	C R								☐ L ☒ H	☐ L ☒ H	☐ L ☒ H
Y	191390	35000	0	Constant	0x4	C R								☐ L ☒ H	☐ L ☒ H	☐ L ☒ H
Z	0	0	0	Idle	0x0	C R								☐ L ☒ H	☐ L ☒ H	☐ L ☒ H
U	0	0	0	Idle	0x0	C R								☐ L ☒ H	☐ L ☒ H	☐ L ☒ H

External Start ☐ Emergency Stop ☐ **Click**

Enable	Enable	Latch	Decel	Polarity	Enable	Polarity	Enable	Polarity	Pulse Width	Off Delay
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☒ L ☐ H	☐	☒ L ☐ H	12 μ sec	0 μ sec
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☒ L ☐ H	☐	☒ L ☐ H	12 μ sec	0 μ sec
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☒ L ☐ H	☐	☒ L ☐ H	12 μ sec	0 μ sec
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☒ L ☐ H	☐	☒ L ☐ H	12 μ sec	0 μ sec

Soft Limits Slow Down (SD) In-position (INP) Error Clear (ERC)

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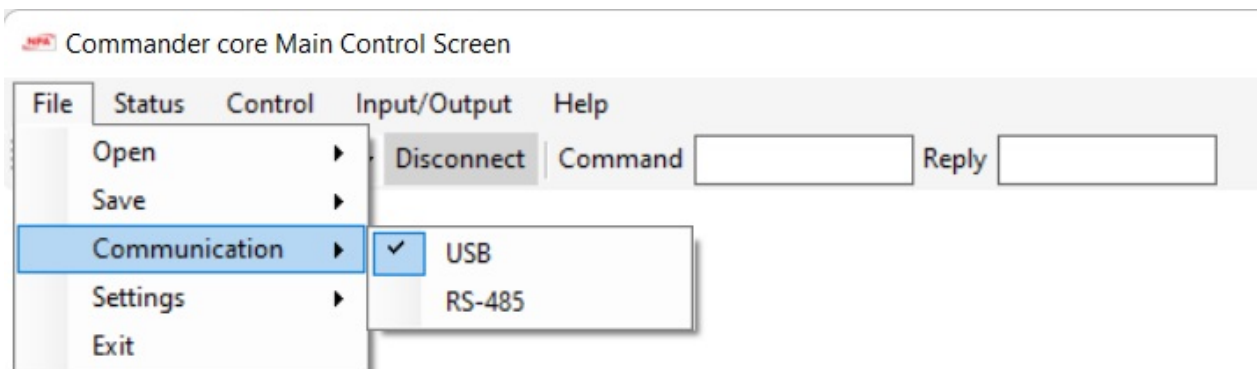
3.0 Establishing communication

The Commander core has several communication methods available. When the Commander Control Software first opens, it uses USB communication. The software also supports RS485 communication.

When the Commander Control Software opens, it runs automated processes.

1. Test for internet access. If present, then it checks for software updates.
2. All available controllers connected to the PC are found and added to the Drop-down box.
3. Test for unique IDs on all Commanders connected to the USB port. If duplicates are found, the [autoID process](#) is run.

The communication method can be changed by selecting the correct method at File > Communication.



Once the correct communication method is selected, the top bar will change showing the correct settings for your selected communication method.

Test Links

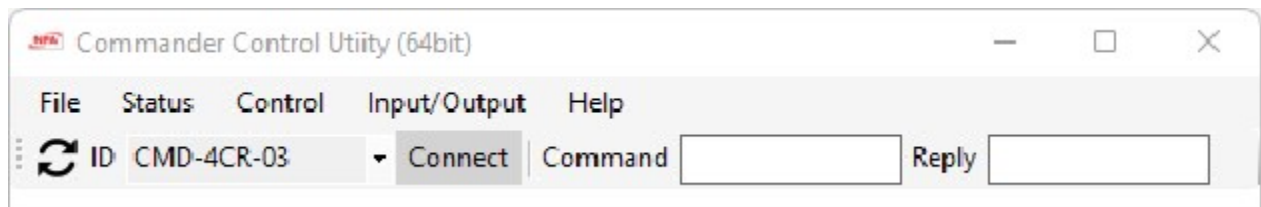
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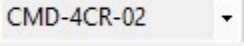
3.1 USB communication

On this page:

[USB Communication](#)[AutoID Process](#)

USB Communication



Button	Display	Description
	Controller refresh	The utility software will scan the connected hub to determine what controllers are powered and connected. If multiple controllers are connected, the drop-down box will allow selection of the controller to display.
	ID drop-down box	All available controllers connected to the PC are found and added to this drop-down box.
	Connect/Disconnect	When the controller is identified on the hub, the utility software is connected to the controller using the  button. After successful connection, the button text changes to disconnect. Simply press  to disengage the utility software from the controller.

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AutoID

When the Commander Control Software first starts, it tests for unique IDs on all Commanders connected to the USB ports. When duplicates exist, the autoID process executes automatically. The autoID process can work with up to 10 Commanders at a time. While this process works on all firmware versions, it works best when running firmware V2xx on the commanders.

AutoID process follows the following steps:

Multiple Commanders detected with the same ID.

This form assists you in setting each to a unique identification number.

Step one – detect all

Step 1 – Detect all the commanders connected, and confirm that number of commanders detected is correct.

If not, confirm the following:

- All Commanders are connected via USB to the PC running the Commander Control Software.
- All Commanders have power.

If the number of detected Commanders is different, the autoID function may run a second time to find all the commanders and IDs.

Multiple Commanders detected with the same ID.

This form assists you in setting each to a unique identification number.

Step one – detect all Commanders. Commanders Detected: 2

Step two – sets each commander to a random unique

Step 2 – A random unique ID is assigned to each Commander. If any connected Commanders are running V1xx firmware, a message is displayed asking for the Commanders' power to be cycled. This message may appear more than once.

Once all the connected commanders have a unique ID, it proceeds to the next step.

Multiple Commanders detected with the same ID.

This form assists you in setting each to a unique identification number.

Step one – detect all Commanders. Commanders Detected: 2

Step two – sets each commander to a random unique identification number.

Step three – select the new ID(s).

For each Commander listed below:

1. Use the LED checkbox to flash the LED of the selected Commander.
2. Use the drop-down box to select the new ID.
3. Press "Finished with old Commanders" to Continue

CurrentID	Serial Number	LED	NewID	Set
CMD-4EX-95	FE2FFC265761	☐	00	S
CMD-4EX-94	12BD30585761	☐	00	S

Step 3 – All the connected Commanders and their IDs are listed. A check box to flash the LED is displayed next to Commanders with V2xx firmware. Select a new ID for the Commander from the NewID dropdown box. Then press the button. When the New ID is accepted, the Current ID box will turn green and display the new ID.

Multiple Commanders detected with the same ID.

This form assists you in setting each to a unique identification number.

Step one - detect all Commanders. Commanders Detected: 2

Step two - sets each commander to a random unique identification number.

Step three - select the new ID(s).

For each Commander listed below:

1. Use the LED checkbox to flash the LED of the selected Commander.
2. Use the drop-down box to select the new ID.
3. Press "Finished with old Commanders" to Continue

CurrentID	Serial Number	LED	NewID	Set
CMD-4EX-02	FE2FFC26576	☐	02	S
CMD-4EX-94	12BD3058576	☒	00	S

Repeat this for every Commander listed; once all the IDs are set (CurrentID boxes green), you can press the "Finished – Return to app" button. If you have any Commanders with V1xx firmware, you will be requested to power cycle the Commanders before proceeding.

At times the autoID process may run more than once. This is more common when one or more Commanders with V1xx firmware or when many Commanders all have identical IDs.

All the Commanders now have unique IDs and can be accessed in the Commander Control Software.

[Return to Top](#)

3.2 RS485 communication

Commander core Main Control Screen

File Status Control Input/Output Help

Ports COM4 Baud 9600 ID 01 Connect Command Reply

Build: 1.16.8117.37472 (3/23/2022 8:49:04 PM)

Button	Display	Description
	Controller refresh	The utility software will scan the PC for available Ports, which are then added to the port drop-down box.
Ports COM4	COM Ports	All available COM ports on the PC are found and added to this drop-down box. Select the COM port the Commander Controller is connected to.
Baud 9600	Baud Rate	Select the Baud Rate that matches the Baud Rate setting (DB) in the Commander Controller.
ID 01	Identification Number	Select the identification number that matches the ID setting in the Commander Controller.
Connect / Disconnect	Connect/Disconnect	When the RS485 setting are correct, the utility software

		can be connected to the controller using the  button. After successful connection, the button text changes to disconnect. Simply press  to disengage the utility software from the controller.
--	--	---

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3.3 Ethernet

The Commander series uses 10/100 Mbps Ethernet ASCII communication over TCP/IP. Communication between the PC/PLC and The Commander series is done using standard socket programming. Every Commander comes with a unique MAC address.

Socket Settings

Port: 5001

ASCII Protocol

Sending Command

ASCII command string in the format of

[ASCII Command][NUL]

[NUL] character has ASCII code 0.

Receiving Reply

The response will be in the format of

[Response][NUL]

[NUL] character has ASCII code 0.

Examples:

For querying the X axis polarity

Send: POLX[NUL]

Reply: 7[NUL]

For jogging the X axis motor in positive direction

Send: JX+[NUL]

Reply: OK[NUL]

For aborting any motion in progress

Send: ABORT[NUL]

Reply: OK[NUL]

IP Address

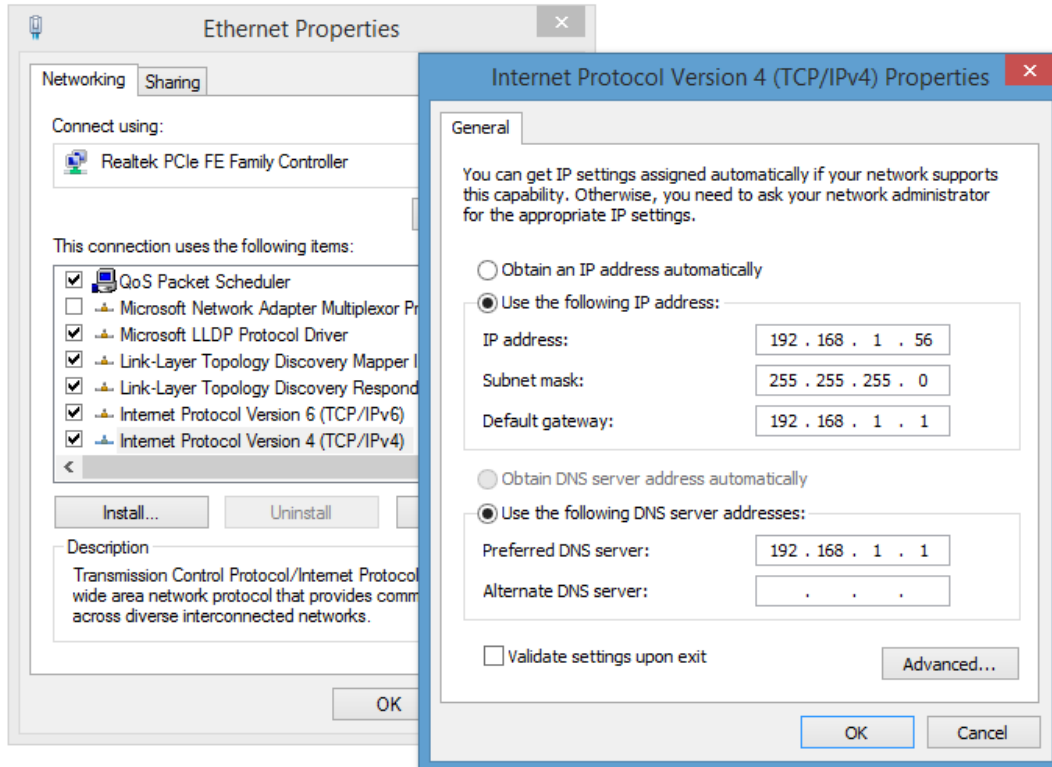
Set the IP address of the Commander module using the **IP** command. See the default IP/socket settings below.

IP: 192.168.1.2
Port: 5001

To begin communication with a factory default device, configure the PC control panel with the following settings.

IP = 192.168.1.xxx
 Subnet Mask = 255.255.255.0

A sample configuration of a Windows PC can be found below.



Changing the IP Address

The Commander provides the user with the ability to set the device IP of the module using the **IP=XXX.XXX.XXX.XXX** command.

To write the values to the device's flash memory, use the **STORE** command. After a complete power cycle, the new IP will be written to memory. Note that before a power cycle is completed, the settings will not take effect.

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4.0 Screen Details

4.1 Main Screen

The primary interface is the initial screen of the Commander Core Utility software. It serves as the hub for establishing communication and scanning for available controllers to connect or disconnect. Once a connection is established with a controller, access to the Status, Control, and Input/Output screens is facilitated through the menu tabs. Notably, the Standalone and About screens can be viewed independently without requiring a connection to a controller.

For direct communication with the controller using ASCII commands, the Command and Reply boxes are available at your disposal.



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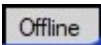
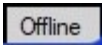
[Previous topic Sibling](#)

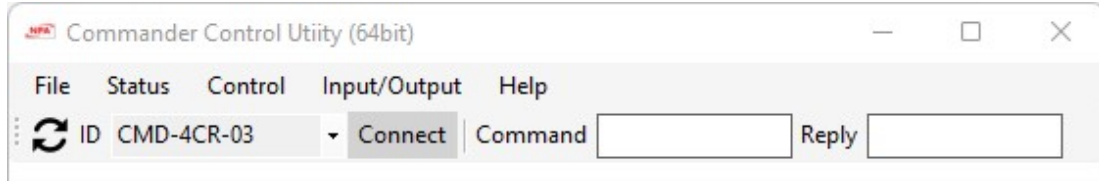
[Next topic](#)

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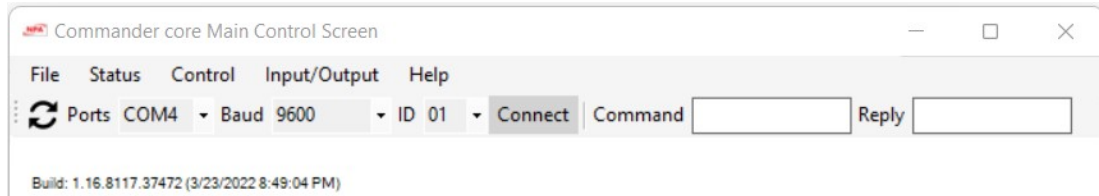
Main Screen Segments



Button	Display	Description
	Menu bar	The Menu bar houses all functions related to screen display, communication settings, configuration, and setup commands. Each drop-down menu is elaborated upon in this section , providing detailed information for clarity and ease of navigation. .
--	Work area	All screen views are presented within the work area. When multiple screens overlap, selecting the title bar of the overlapped screen brings it to the forefront. The background of the work area dynamically changes to reflect your connection status and, if connected, identifies the associated product group.
 / 	Online Indicator	Indicates the connectivity status of the Commander Control Utility to the internet. The online status is determined by the computer's ability to access the Commander support site at https://support.nipponpulse.com/ . When the connection is successful, the online indicator is shown as  enabling updates checks and the display of online help files. Conversely, when  is displayed, local help files are accessed. The online status is checked when the program first opens, and when the online indicator is clicked by the mouse.
USB Communications options		

See [USB communication](#)

RS485 Communications options

See [RS485 communication](#)

Common options

Command	Command Entry	Direct communication with the controller is facilitated by sending ASCII commands through the Command entry box. Simply press Enter to dispatch the command, and the corresponding reply will be displayed in the Reply Box.
Reply	Reply Box	Shows the Commander's response to the most recent ASCII command sent from the Command entry box.

Test Links

[Default topic](#)[First topic](#)[Last topic](#)[Parent Topic](#)[Previous topic](#)[Previous topic Sibling](#)[Next topic](#)[Next topic Sibling](#)**Menu Bar**

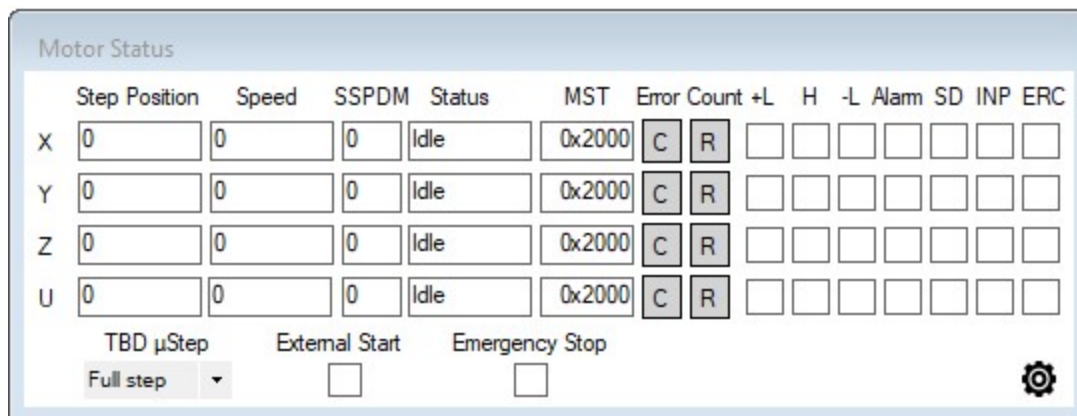
Menu Bar and functions:

Menu Group	Options	Functions
File	Open	Open saved settings or layouts (*.set)
	Save	Saves current layout or settings (*.set)
	Communication	Toggles between USB or RS-485 The RS-485 setting introduces a com port and baud rate selection input on the command line row
	Settings	Change settings for Auto Update or Open the Echo Command Viewer

	Exit	Closes the utility software program
Status	Motor Status	Activates the motor status screen in the workspace area
	Encoder Status	Activates the encoder status screen in the workspace area
	Soft Limit Status	Activates the soft limit status screen in the workspace area
Control	Axis Control	Activates the axis control screen in the workspace area
	Standalone Control	Activates the standalone control screen in the workspace area
	Buffer Control	Activates the buffer control screen in the workspace area
	Manul Pulse Generator (MPG) Control	Activates the MPG control screen in the workspace area
	Joystick Control	Activates the joystick control screen in the workspace area
	Terminal	Activates the Terminal input screen in the workspace area
Input/Output	Digital IO	Activates the digital IO status screen in the workspace area
	Analog Inputs	Activates the analog input status screen in the workspace area
	Configurable IO	Activates the configurable IO status screen in the workspace area
Service	PCL Registers	Activates the PCL register status screen in the workspace area
Help	Documentation	Provides access to the Commander core manuals
	About	Activates the utility software information screen

4.2 Motor Status Screen

The Motor Status screen furnishes a range of information concerning the motion status on each axis. It presents details such as position, speed, motion status, and specific limits and alarms. For additional settings, click  to expand the [Advanced Motor Status Screen](#)



	Step Position	Speed	SSPDM	Status	MST	Error Count	+L	H	-L	Alarm	SD	INP	ERC
X	0	0	0	Idle	0x2000	C R							
Y	0	0	0	Idle	0x2000	C R							
Z	0	0	0	Idle	0x2000	C R							
U	0	0	0	Idle	0x2000	C R							

TBD μStep: Full step
 External Start: ☐
 Emergency Stop: ☐



[Motor Status Screen Access](#)

Status

Display Name	Description	Related commands
Step Position	The value of the feedback pulse counter	P , PP
Speed	Current operating speed	PS
SSPDM	Current setting of speed range	SSPDM
Status	Status of an axis	MST
MST	Displays the status of an axis in hexadecimal	MST
	Clear error button	CLR
	Set value of the command pulse counter to 0	
+L	Positive end of travel limit switch status:  physical limit is triggered  soft-limit triggered  soft-limit active but not triggered ☐ limit not triggered	MST[axis] , Bit 4 SFL[axis] SFLSO[axis] SFLP[axis]
H	Home switch status:  input is triggered ☐ input is not triggered	MST[axis] , Bit 6
-L	Negative end of travel limit switch status:  physical limit is triggered  soft-limit triggered  soft-limit active but not triggered ☐ limit not triggered	MST[axis] , Bit 5 SFL[axis] SFLSO[axis] SFLN[axis]
Alarm	Current alarm status:  input is triggered ☐ input is not triggered	MST[axis] , Bit 3
SD	Slow down limit status, when enabled:  input is triggered ☐ input is not triggered	MST[axis] , Bit 7
INP	In-position enable status:  In-position signal is active ☐ In-position signal is waiting for activation	MST[axis] , Bit 11
ERC	Error clear pulse status:  input is triggered ☐ input is not triggered	MST[axis] , Bit 12
TBD μ Step	(CMD-4EX-SA-TBD only) Sets the μ Step rate for the stepper motor drivers.	MSR
External Start	External start switch status:  input is triggered ☐ input is not triggered	MST[axis] , Bit 14
Emergency Stop	Emergency stop switch status:  input is triggered ☐ input is not triggered	MST[axis] , Bit 15
X	X-axis row display	
Y	Y-axis row display	
Z	Z-axis row display	
U	U-axis row display	

	Show/hide Advanced Motor Status Screen	
---	--	--

Notes:

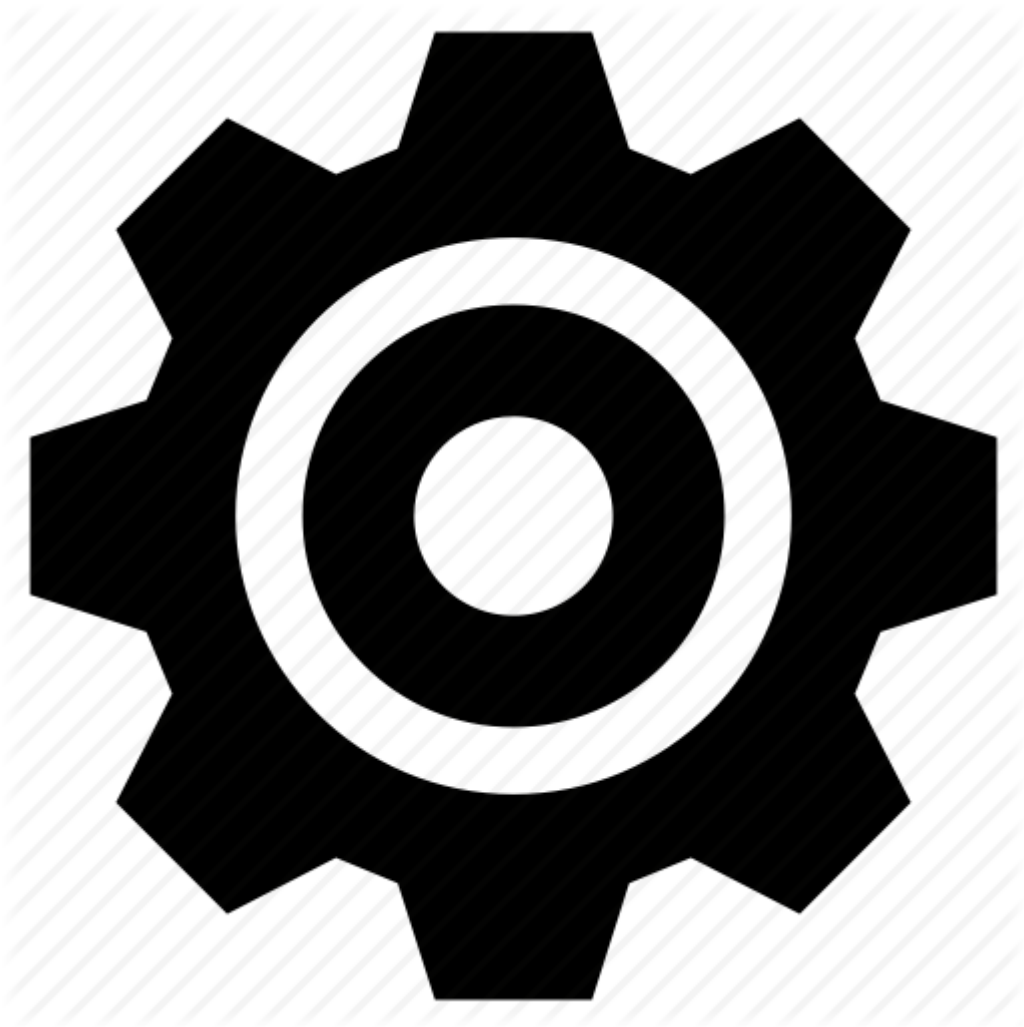
- Clear pulse counter values – Click the  button to set value of the command pulse counter 0 for that axis. There is no other condition.
- Clear error status – Click the  button to clear the error status of the axis. There is no other condition.
- The Status window displays text related to the value returned from the [MST\[axis\]](#) command, as shown in the chart below

Bit active	Description	Status display
None	Motor not in motion	Idle
0	Motor accelerating	Accelerating
1	Motor decelerating	Decelerating
2	Motor running at speed	Constant
8	Positive end of travel limit activated	+LIM ERR
9	Negative end of travel limit activated	-LIM ERR
10	Alarm input activated	ALARM ERR
16	Emergency stop initiated	EMG ERR
17	Indication the axis stopped via a slow down switch trigger	SD STOP
18	Waiting for In-position signal to finish move	Wait INP
19	Waiting for External Start signal to start move	Wait Ext Start

Advanced Motor Status Screen

The Advanced Motor Status screen offers supplementary functionality pertaining to motor status. It grants access to additional configuration options, such as polarity settings, Soft-Limit functionality, SD configuration, In-position functionality, latching, and ERC behavior. Clicking

returns the



screen to the [Motor Status Screen](#).

Motor Status

	Step Position	Speed	SSPDM	Status	MST	Error Count	+L	H	-L	Alarm	SD	INP	ERC		Polarity	Polarity	Polarity
X	0	0	0	Idle	0x2000	C	R	☐	☐	☐	☐	☐	☐	☐	☐ L ☒ H	☒ L ☐ H	☐ L ☒ H
Y	0	0	0	Idle	0x2000	C	R	☐	☐	☐	☐	☐	☐	☐	☐ L ☒ H	☒ L ☐ H	☐ L ☒ H
Z	0	0	0	Idle	0x2000	C	R	☐	☐	☐	☐	☐	☐	☐	☐ L ☒ H	☒ L ☐ H	☐ L ☒ H
U	0	0	0	Idle	0x2000	C	R	☐	☐	☐	☐	☐	☐	☐	☐ L ☒ H	☒ L ☐ H	☐ L ☒ H

TBD μ Step

External Start

Emergency Stop

Full step

☐

☐

Limit

Home

Alarm

Enable	Enable	Latch	Decel	Polarity	Enable	Polarity	Enable	Polarity	Pulse Width	Off Delay
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☐ L ☒ H	☐	☐ L ☒ H	12 μ sec	0 μ sec
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☐ L ☒ H	☐	☐ L ☒ H	12 μ sec	0 μ sec
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☐ L ☒ H	☐	☐ L ☒ H	12 μ sec	0 μ sec
☐	☐	☐	to Low Speed	☒ L ☐ H	☐	☐ L ☒ H	☐	☐ L ☒ H	12 μ sec	0 μ sec

Soft Limits

Slow Down (SD)

In-position (INP)

Error Clear (ERC)

[How to access](#)

Enviromental settings

Display	Description	Related commands
	Button to save data in the memory	STORE
	Show/hide the Advanced Motor Status	

	Screen	
Input Settings		
Limit Polarity	Set the input mode of the feedback pulse signal	POL[axis] (Bit-3)
Home Polarity	Set the direction the feedback pulse count up	POL[axis] (Bit-4)
Alarm Polarity	Set the logic of the Z-Index pulse signal	POL[axis] (Bit-5)
Soft-Limit		
Enable	Enable/disable Soft-limit function	SLF
Status	Opens the SoftLimit Status screen	
Set	Opens the Set SoftLimit Screen	
Slow Down (SD)		
Enable	Enable/disable Slow Down (SD) function	SDE (Bit-0)
Latch	Enable/disable Slow Down (SD) latching function. This command will latch SD as activated until the next command	SDE (Bit-1)
Decel	Sets how the motor reacts to the SD input being triggered	SDC
Polarity	Set the logic of the SD signal	POL[axis] (Bit-6)
In-position (INP)		
Enable	Enable/disable In-position (INP) function	INP
Polarity	Set the logic of the INP signal	POL[axis] (Bit-7)
Error Clear (ERC)		
Enable	Enable/disable Error Clear (ERC) function, and when the Error Clear signal is triggered	ERC
Polarity	Set the logic of the deviation counter clear signal	POL[axis] (Bit-8)
Pulse Width	Set the output pulse time (width) of the deviation counter clear signal	ERCP
Off Delay	Sets the OFF delay time of the deviation counter clear signal	ERCD

Notes:

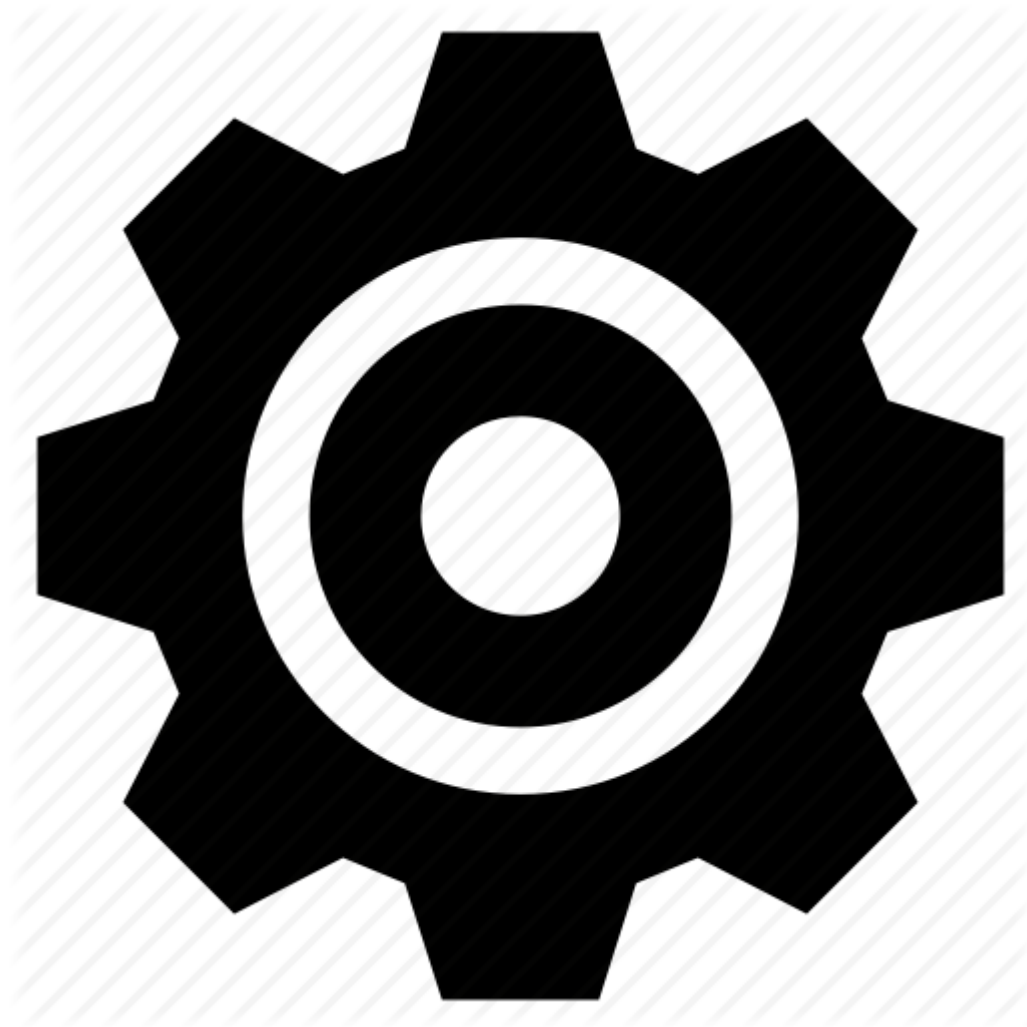
- When changing the setting, save the setting in memory by clicking the



button, or sending the STORE.

4.3 Encoder Status Screen

The encoder status screen provides information regarding the encoder position, delta error and the current StepNLoop status. Additional settings are available by clicking



to expand the

[Advanced Encoder Status Screen.](#)

	Encoder Position	Z	Delta Error	StepNLoop Status	Error Count
X	0	☐	0	DISABLED	C R
Y	0	☒	0	DISABLED	C R
Z	0	☒	0	DISABLED	C R
U	0	☒	0	DISABLED	C R

[How to access](#)

Status

Display	Description	Related commands
Encoder Position	Indicates current encoder pulse counts	E[axis], EP
Z	Z-index Status (on ☒ off ☐)	MST[axis], Bit 13
Delta Error	Deviation from expected encoder counter value during StepNLoop operation	D[axis]
StepNLoop Status	Current StepNLoop operation status	SLS[axis]
Error ☐	Clears errors related to the specific axis	CLR[axis]
Count ☐	Resets the current feedback count for the specific axis	E[axis]=0
X	The display of this row is related to the X-axis	
Y	The display of this row is related to the Y-axis	

Z	The display of this row is related to the Z-axis	
U	The display of this row is related to the U-axis	
	Show/hide the Advanced Encoder Status Screen	

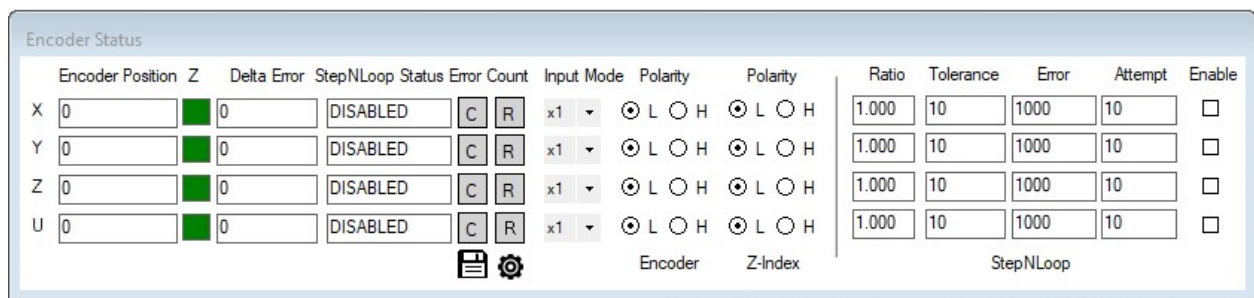
Notes:

- Clear encoder pulse counter values– Click the  button makes a value of the command pulse counter "0" for that axis. There is no other condition.
- Clear error status – Click the  button clears the error status of the axis. There is no other condition.
- StepNLoop Status window displays text related to the value returned from the [SLS\[axis\]](#) command, as shown in the chart below

Number	Description	StepNLoop Status display
0	Idle	IDLE
1	Moving	MOVING
2	Correcting	CORRECTING
3	Stopping	STOPPING
4	Aborting	ABORTING
5	Jogging	JOGGING
6	Homing	HOMING
7	Z-Homing	Z-HOMING
8	Correction range error*	RANGE ERR
9	Correction attempt error*	ATTEMPT ERR
10	Stall error – Deviation counter value has exceeded correction range value*	STALL ERR
11	Limit error	LIMIT ERR
12	N/A	DISABLED

Advanced Encoder Status Screen

The advanced encoder status screen provides configuration for the StepNLoop function along with polarity options for the encoder and Z-index pulse. By clicking  the screen returns to [Encoder Status Screen](#).



How to access

Environmental settings

Display	Description	Related commands
---------	-------------	------------------

Encoder Settings		
Input Mode	Set the input mode of the feedback pulse signal	POL[axis] (Bit-11, 12)
Encoder Direction	Set the direction the feedback pulse count up	POL[axis] (Bit-10)
Z-Index Polarity	Set the logic of the Z-Index pulse signal	POL[axis] (Bit-13)
StepNLoop Settings		
Ratio	Set the ratio of pulse per revolution (ppr) to counts per revolution (cpr)	SLR[axis]
Tolerance	Set the maximum value of position error that is acceptable to consider the axis in position	SLT[axis]
Error	Set the position value considered "out of bounds" and returns a ?stall error	SLE[axis]
Attempt	Set the number of times to retry the StepNLoop Closed Loop Control operation	SLA[axis]
Enable	Enable/disable StepNLoop function (☒ is enabled, ☐ is disabled)	SL[axis]
	Button to save data in the memory	STORE
	Show/hide the Advanced Encoder Status Screen	

Notes:

- Enable/disable StepNLoop Closed Loop Control operation
 1. Tick ☒ the check box (Enabled) to activate the StepNLoop Closed Loop Control operation.
 2. Untick ☐ to stop operation.
- When changing the setting, save the setting in memory by clicking the [STORE](#) button, or sending the STORE.



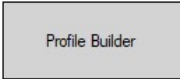
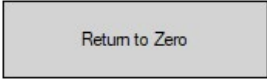
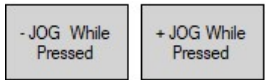
4.4 Axis Control Screen

The basic axis control screen, along with the motor status screen are a great combination to review the system set up to determine the axes are moving into the appropriate directions and performing as expected. The Axis Control screen allows configuration of the global high speed (HSPD), low speed (LSPD), acceleration (ACC), and deceleration (DEC), as well as setting individual axis settings using the drop-down box. Target positions for each axis can be set along with configuring s-curve acceleration (SCV) and positioning coordinate mode (ABS, INC).

[How to access](#)

Axis Control

Display	Description	Related commands
Profile settings		
Global High Speed or [axis] High Speed	Setting for global or axis high speed (HSPD, HSPD[axis])	HSPD
SSPDM[axis] Setting	(V127 only) The speed range mode must be set in the proper range in order to achieve the desired high-speed value. Checking the box will automatically set SSPDM, according to the desired speed range.	SSPDM
Global Low Speed or [axis] Low Speed	Setting for global or axis low speed (LSPD, LSPD[axis])	LSPD
Global Acceleration or [axis] Acceleration	Setting for global or axis acceleration (ACC, ACC[axis]) When an acceleration time is entered, the calculated deceleration rate (p/s/s) will be displayed upon moving cursor focus to another entry block.	ACC
Global Deceleration	Setting for global or axis deceleration (DEC,	DEC

or [axis] Deceleration	DEC[axis]) When an acceleration time is entered, the calculated deceleration rate (p/s/s) will be displayed upon moving cursor focus to another entry block.	
Move Select	Selects which axes will be used for motion operations	
X	The display of this row is related to the X-axis	
Y	The display of this row is related to the Y-axis	
Z	The display of this row is related to the Z-axis	
U	The display of this row is related to the U-axis	
Target Position	Establishes the target position for the associated axis	
Enable	Enable/disable the motor driver (EO, EO[1-4]) for each axis (☒ axis is enabled, ☐ axis is disabled)	EO
Soft Limit	Enable/disable Soft-limit function (☒ Soft Limit is enabled, ☐ Soft Limit is disabled)	SLF
S-curve	Enable/disable setting for each axis (☒ S-curve profile is enabled for the axis, ☐ Linear profile is enabled for the axis)	SCV
Move Mode	Select Absolute, ABS or Incremental, INC modes	ABS , INC
	Opens the Profile Builder Screen	
Displayed Buttons for Initiating or stopping motion:		
	E-STOP, Stops all axis in motion immediately	ESTOP
	(ABS mode only) Returns the axis to the set 0 position, for all selected axes in motion	(XYZU)=0
	Initiates a jog move in the (-) negative or (+) positive direction while the button is depressed for all selected axes. The axis stop when the button is no longer pressed	J
	Initiates a jog move in the (-) negative or (+) positive direction until button is clicked again, or a stop (Ramp Stop, Abort, ESTOP) is pressed for all selected axes	J
	Decelerates and stops axis motion for all selected axes in motion	STOP
	(ABS mode) Initiates a move to the target position (absolute) for all selected axes.	X , Y , Z , U
	(INC mode) The button splits into two buttons for incremental motion, which Initiates an incremental move to the target position in the (-) negative or (+) positive direction for all selected axes.	X , Y , Z , U
	Stops all motion, no error indicated	ABORT

Show/hide the [Advanced Axis Control Screen](#)

Advanced Axis Control Screen

The advanced axis control screen open access to all homing modes, on-the-fly speed and position changes, Z-index count configuration, and interpolation options. External start and Interpolation function can be enabled as well as establishing the command pulse output logic, polarity, and boot up enable status for each axis.

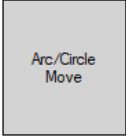
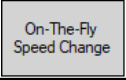
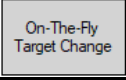
The screenshot shows the 'Axis Control' window with the following sections:

- Speed Settings:** Global High Speed (60000), Global Low Speed (10000), Global Acceleration (10), Global Deceleration (10), ACC rate (5000000 P/S/S), DEC rate (5000000 P/S/S).
- Move Select:** X Axis (1000), Y Axis (1000), Z Axis (1000), U Axis (1000). Enable checkboxes are present for each.
- Move Mode:** ABS (selected), INC.
- Profile Builder:** A button to access the profile builder.
- Emergency Stop:** A large red circular button with 'EMERGENCY STOP' text.
- Buttons:** Return to Zero, -JOG While Pressed, +JOG While Pressed, -JOG Until Stop, +JOG Until Stop, Ramp Stop, Target Move, Abort, Set Soft Limits.
- Home Routine Move:** A button to start a homing operation.
- Z-Index Count Move:** A button to start a Z-index count operation.
- Z-Index Counts:** X: 1, Z: 1, Y: 1, U: 1.
- Arc/Circle Move:** A button to start an arc or circle interpolation.
- On-The-Fly Speed Change:** Axis: X, Target Speed: 10000, SSPDM: 0.
- On-The-Fly Target Change:** Axis: X, Target Position: 10000.
- Enable External Start:** A checkbox.
- Enable Interpolation:** A checked checkbox.
- Output Mode:** X Axis: CW/CCW (L), Y Axis: CW/CCW (L), Z Axis: CW/CCW (L), U Axis: CW/CCW (L).
- Enable Boot:** Disabled for all axes.
- Enable Polarity:** L (selected), H for all axes.

How to access

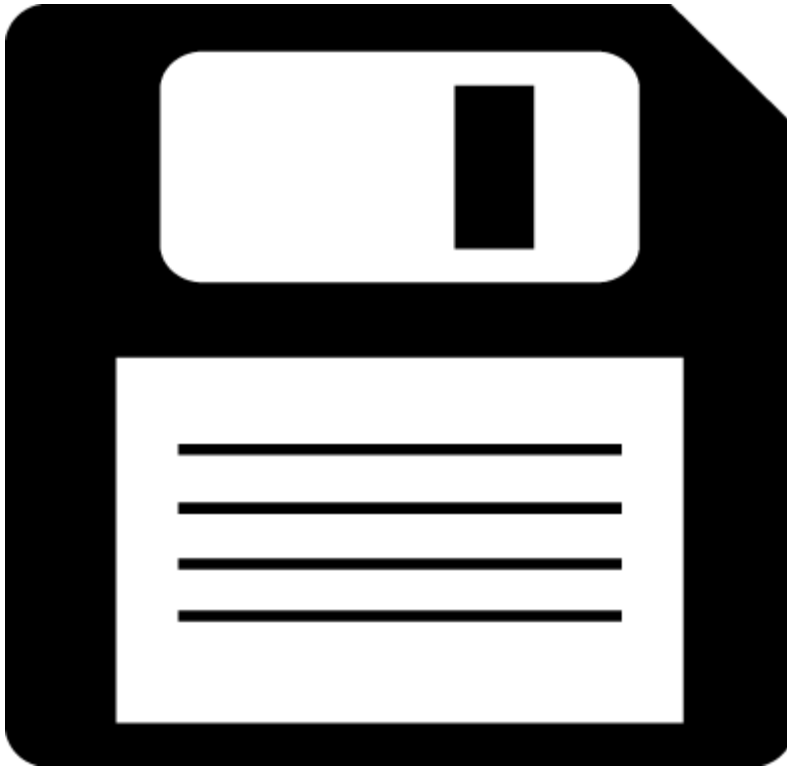
Advanced Axis Control

Display	Description
Homing	
Routine: Mode 0: Home input	Select the Homing mode
Direction: Pos	Set the movement direction of a Homing operation and Z-index count operation.
☐ Home At Low Speed	Select to home at high speed or low speed. (☒ Home at low speed, ☐ Home at high speed)
Home Routine Move	Button to start a Homing operation
Z-Index Count Move	Button to start a Z-index counter operation
Z-Index Counts X: 1 Z: 1 Y: 1 U: 1	Set the Z-index count
Linear Interpolation	
Enable Interpolation ☒	Set "Enable/Disable" of the interpolation operation mode
Circular Interpolation	
Arc	Select the Arc interpolation operation
Circle	Select the Circular interpolation operation

Helix Arc	Select the Helix Arc interpolation operation
Helix Circle	Select the Helix Circular interpolation operation
Center position	Set the center coordinates of the Arc/Circular interpolation move
Target Angle	Set the end point position of the Arc interpolation at an angle with respect to the center position (the setting unit is 0.001 degrees)
CW/CCW	Select the rotation direction of the Arc/Circular interpolation motion
	Button to start an Arc/Circular interpolation operation
On-The-Fly speed and position changes	
	Button to change the speed during operation
Target Speed 10000	Set the new target speed for the current movement
SSPDM 0 ▾	Select the speed magnification for On-The-Fly speed change operation
☐ Automatically Suggest SSPDM	Select manual or automatic setting of the speed magnification range (☒ Software suggest SSPDM based on new target speed, ☐ User must select SSPDM before requesting new target speed)
Axis: X ▾	Select the axis to change the speed/position during operation
	Button to change the amount of movement during operation
Target Position 10000	Set the new amount of movement (incremental move) or the new target point (absolute move)
Movement Start	
Enable External Start ☐	Set "use/not use" of the external start signal (☒ Movements wait for /CSTA to begin, ☐ Movement starts immediately)
Enable Polarity ☒ L ☐ H	Set the excitation ON/OFF signal logic
Enable Boot Disabled ▾	Set the excitation ON/OFF signal at the power-on
Output Mode Pulse(L)/Dir(H) ▾	Set the output mode of the command pulse signal
	Show/hide the Advanced Axis Control Screen

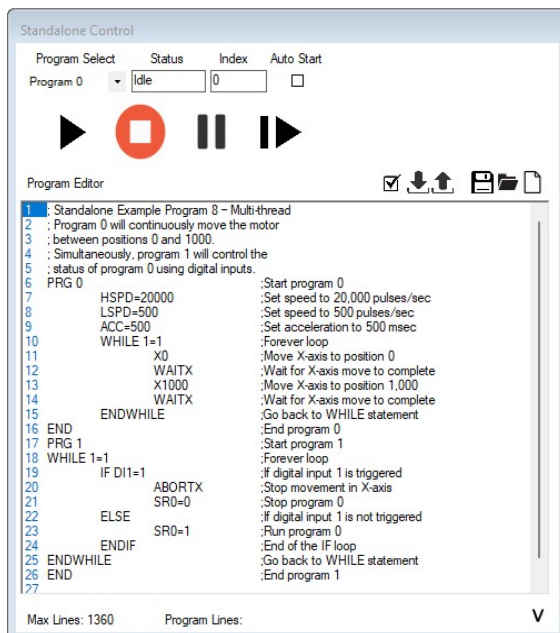
Notes:

- When changing the setting, save the setting in memory by clicking the  button, or sending the STORE.



4.5 Standalone Control Screen

All of the standalone programming functions are available in the standalone control screen. A program editing workspace allows for program development and debugging, code compiling, and program control. Programs can be saved to the PC or opened from local or networked folders.



Displayed items for Standalone Control screen:

Program Select – selection for program control, program 0 through program 3.

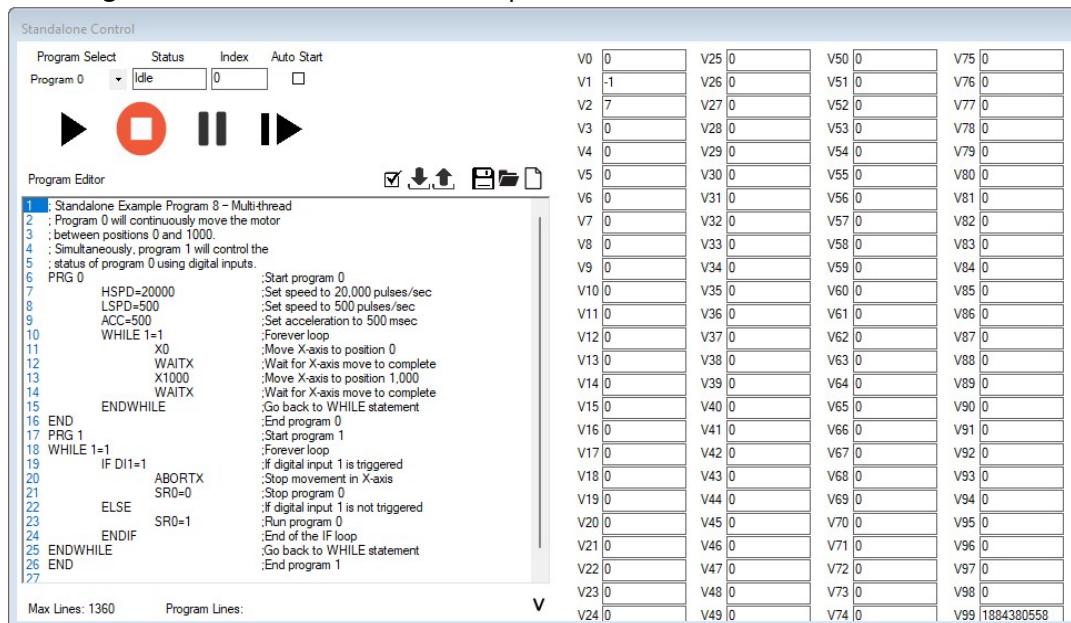
Status – indication of program status (SATAT), Idle, Running, Paused, or ERROR
 Index – indication of current line of compiled code executed by the program (SPC)
 Auto Start – selection to configure the program to run at power on(SLOAD)
 Program Editor – workspace to develop program code
 Max Lines – available number of program lines based on current configuration.
 Program Lines – number of compiled lines of code
V – expands screen to include all variables and their current values

Displayed Buttons for program control:

- ▶ Run selected program (SACTRL=1)
-  Stop current running program (SACTRL=0)
-  Pause the current running program (SACTRL=2)
-  Resume current program (SACTRL=3)
-  Compile selected program
-  Download to flash memory the current program
-  Upload from flash memory the currently stored program
-  Save the current program to PC
-  Open a program from PC
-  Clear the Program Editor workspace

Variables

The current values of all the 100 variables can be viewed at once by Selecting the V icon at the bottom right corner of the screen. This opens the Variable View.



The screenshot displays the 'Standalone Control' software interface. On the left, the 'Program Editor' shows a multi-threaded program with comments and code lines. The 'Program Select' dropdown is set to 'Program 0', and the 'Status' is 'Idle'. The 'Index' is 0, and 'Auto Start' is unchecked. The 'Program Editor' contains the following code:

```

1 Standalone Example Program 8 - Multi-thread
2 : Program 0 will continuously move the motor
3 : between positions 0 and 1000.
4 : Simultaneously, program 1 will control the
5 : status of program 0 using digital inputs.
6 PRG 0
7   HSPD=20000      :Start program 0
8   LSPD=500        :Set speed to 20,000 pulses/sec
9   ACC=500         :Set speed to 500 pulses/sec
10  WHILE 1=1       :Forever loop
11    X0             :Move X-axis to position 0
12    WAITX         :Wait for X-axis move to complete
13    X1000         :Move X-axis to position 1,000
14    WAITX         :Wait for X-axis move to complete
15  ENDWHILE        :Go back to WHILE statement
16 END              :End program 0
17 PRG 1            :Start program 1
18 WHILE 1=1       :Forever loop
19   IF DI1=1       :If digital input 1 is triggered
20     ABORTX        :Stop movement in X-axis
21     SR0=0         :Stop program 0
22   ELSE           :If digital input 1 is not triggered
23     SR0=1         :Run program 0
24   ENDIF          :End of the IF loop
25 ENDWHILE        :Go back to WHILE statement
26 END              :End program 1
27

```

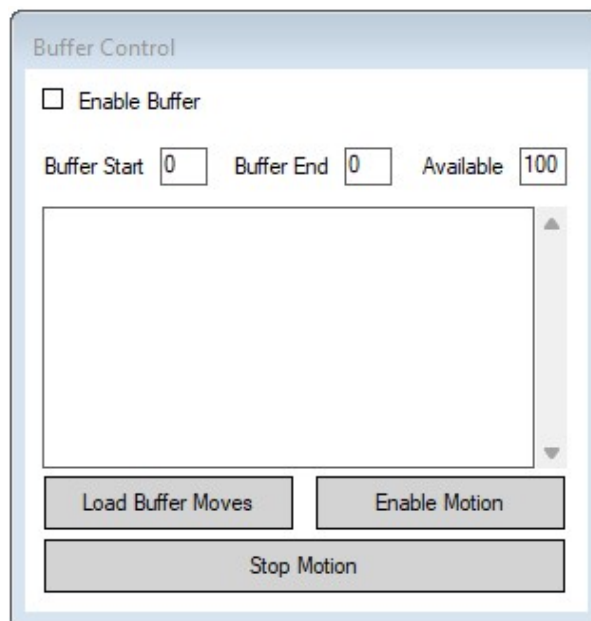
At the bottom left, it shows 'Max Lines: 1360' and 'Program Lines:'. On the right, the 'Variable View' displays a table of 100 variables (V0 to V99) with their current values. The 'V' icon at the bottom right of the Program Editor was used to open this view.

V0	0	V25	0	V50	0	V75	0
V1	-1	V26	0	V51	0	V76	0
V2	7	V27	0	V52	0	V77	0
V3	0	V28	0	V53	0	V78	0
V4	0	V29	0	V54	0	V79	0
V5	0	V30	0	V55	0	V80	0
V6	0	V31	0	V56	0	V81	0
V7	0	V32	0	V57	0	V82	0
V8	0	V33	0	V58	0	V83	0
V9	0	V34	0	V59	0	V84	0
V10	0	V35	0	V60	0	V85	0
V11	0	V36	0	V61	0	V86	0
V12	0	V37	0	V62	0	V87	0
V13	0	V38	0	V63	0	V88	0
V14	0	V39	0	V64	0	V89	0
V15	0	V40	0	V65	0	V90	0
V16	0	V41	0	V66	0	V91	0
V17	0	V42	0	V67	0	V92	0
V18	0	V43	0	V68	0	V93	0
V19	0	V44	0	V69	0	V94	0
V20	0	V45	0	V70	0	V95	0
V21	0	V46	0	V71	0	V96	0
V22	0	V47	0	V72	0	V97	0
V23	0	V48	0	V73	0	V98	0
V24	0	V49	0	V74	0	V99	1884380558

Multiple programs can be written in the program workspace (PRG 0 thru PRG 3) as one file and downloaded to flash memory. Once compiled and loaded, the Program select drop down will allow you to select the individual programs to run using the program control buttons. The Auto Start button only applies to the specific programs selected when saved to the drive. In order for the auto start or other changes to take effect in the controller, the program editor contents must be downloaded to the controller to take effect. The save button only saves the file to a PC or other network location. Similarly, when retrieving a program from the PC or other network folder, that program must be downloaded to the controller before it can be run.

4.6 Buffer Control Screen

The buffer control screen provides a workspace to write specific ASCII commands into the Interpolated Motion Buffer. You can edit the commands, load the commands to the buffer, start and stop buffer operations from this screen. The current status of the Interpolated Motion Buffer is also displayed.



Displayed information in the Buffer Command screen:

☐ Enable Buffer

– Check box display the current enabled status of the motion buffer. (Checked enabled, unchecked disabled) By clicking an unchecked box will enable ([BO](#)) the motion buffer and clicking a checked box will disable ([BE](#)) buffer control.

Buffer Start

– Identifies the starting buffer register based on the currently loaded buffer moves([BSTAT](#)), This is the location of the buffered move to be executed next.

Buffer End

- Identifies the last buffer register based on the currently loaded buffer commands([BSTAT](#))

Available

- Indicates the number of available buffer registers to load additional commands([BSTAT](#))



- entry location to input desired buffer commands

Load Buffer Moves

- Uploads the buffer commands listed in the workspace to the buffer registers([I](#))([ARC](#))([ARCT](#))([CIR](#))([CIRT](#))

Enable Motion

- Initiates the loaded buffer commands ([BSTART](#))

Stop Motion

- Turns off the buffer operation([BF](#))

Before **Enable Motion** (BSTART) is initiated, you can load up to 100 buffer registers with interpolation commands. Once **Enable Motion** is pressed, you can load new commands to the buffer, and they will run after the last loaded buffer register has been executed. To load additional commands without them executing, first, turn off buffer operation (BF), re-enable (BO), and then commence to load. Press **Enable Motion** again to initiate buffer operation.

Below are links to other documentation containing further details.

Commander Motion Controller Core Manual

[2.3.4 Buffered interpolation operation](#)

CMD Command Reference

[Interpolated motion buffer](#)

4.7 Manual Pulse Generator (MPG) Control Screen

The MPG Control screen provides the necessary configuration settings to quickly establish the MPG criteria, including the multiplier and divider parameters, and signal logic settings.

Manual Pulse Generator (MPG) Control

	Position	Multiplier	Divider	Decode	Direction	Enable	Count
X	0	1	2048/2048	x1	☒ L ☐ H	☐	R
Y	0	1	2048/2048	x1	☒ L ☐ H	☐	R
Z	0	1	2048/2048	x1	☒ L ☐ H	☐	R
U	0	1	2048/2048	x1	☒ L ☐ H	☐	R 

Displayed information on the MPG screen (applies to each axis):

Position – indicates current position of the MPG pulse counter(MP)

Multiplier – Sets the multiplication factor of the MPG pulse input(MPM)

Divider – Divides the MPG pulse counter(MPD)

Decode – Sets the logic for the pulse input (POL, Bit 15, 16)

Direction – indicates direction polarity setting for the pulse input(POL, Bit 14)

Enable – Enables/disables the pulse generator input(MPE)

– Resets the MPG pulse counter

The multiplier, divider and decoder all factor into the amount of pulse counts per revolution of the MPG.

Number of output pulses per revolution of the MPG = MPG Res x Multiplier x Divider x Decoder

Example:

MPG resolution is 100 pulses per rev, Multiplier is set to 2, Divider set to 1024/2048, and Decode set to 4x

Number of pulses per revolution of the MPG = $100 \times 2 \times (1024/2048) \times 4 = 400$

With a 100 pulse per revolution manual pulse generator, the settings can range from 0.048828125 pulses per revolution up to 12,800 pulses per revolution.

4.8 Joystick Control Screen

Joystick control utilizes the analog inputs for the X and Y axis, and when connected allows control of each axis via a joystick. The Joystick control screen allows configuration of the joystick set up for both X and Y axes.

	X Axis	Y Axis
Enable	☐	☐
Max Speed	1000	1000
Max Delta	10	10
Max Voltage	3300	3300
Min Voltage	0	0
Idle Tolerance	10	10
-Outer Limit	-100000	-100000
-Inner Limit	-99000	-99000
+Inner Limit	99000	99000
+Outer Limit	100000	100000

Save icon

Displayed information and Settings for Joystick operation:

Enable – enable/disable for each axis (J ENA)

Max Speed – setting for maximum speed allowable under joystick control(J SPD)

Max Delta – setting for the differential speed changes using the joystick (J DEL)

Max Voltage – setting for maximum analog voltage used by the joystick(J MAX)

Min Voltage – setting for minimum analog voltage used by the joystick(J MIN)

Idle Tolerance – dead band control – sets the mid voltage point and a +/- tolerance resulting in no response (JTOL)

-Side Outer Limit – Sets the negative side maximum limit value to stop immediately(J LIM 1, 5)

-Side Inner Limit – Sets the negative side limit value to decelerate and stop (J LIM 2, 6)

+Side Outer Limit – Sets the positive side maximum limit value to stop immediately(J LIM 4, 8)

+Side Inner Limit – Sets the positive side m limit value to decelerate and stop(J LIM 3, 7)

NOTE:

If the smallest input voltage value of the analog input terminal is set as the Max Voltage(J MAX), and the largest input voltage value is set as the Min Voltage(J MIN), the movement direction is reversed.

Setting the voltage for the Idle Tolerance (JTOL) too small may result in axis movement as soon as the joystick function is enabled. Consider the tolerance value to be large enough to avoid unexpected movement on enabling the joystick.

4.9 Analog Input Screen

The value of the two analog inputs are displayed (in mV)

Analog Inputs	
AIN 1 (mV)	1354
AIN 2 (mV)	1034

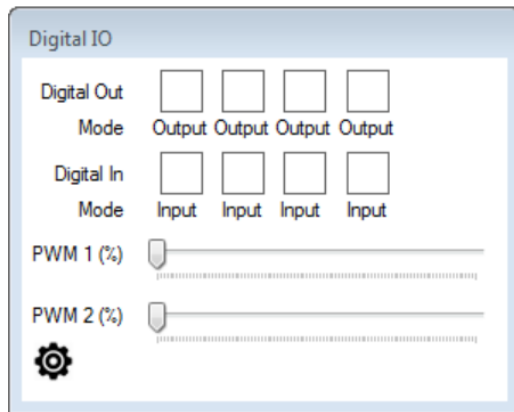
Displayed information for Analog Input screen:

AIN1 – Analog input 1 value (mV) for X axis (AI1)

AIN2 – Analog input 2 value (MV) for Y axis (AI2)

4.10 Digital IO Screen

The Digital IO screen provides information and configuration setting for digital inputs, digital outputs and PWM duty cycle settings.



Displayed information and settings for the Digital IO screen:

Digital Out – Status of digital output signal



Digital output is triggered



Digital output is not triggered

The polarity of the outputs can be changed by clicking in the white or blue box to update.

Mode – Configuration for digital output (as an output or synced)

Digital In – Status of digital input signal



Digital input is triggered



Digital input is not triggered

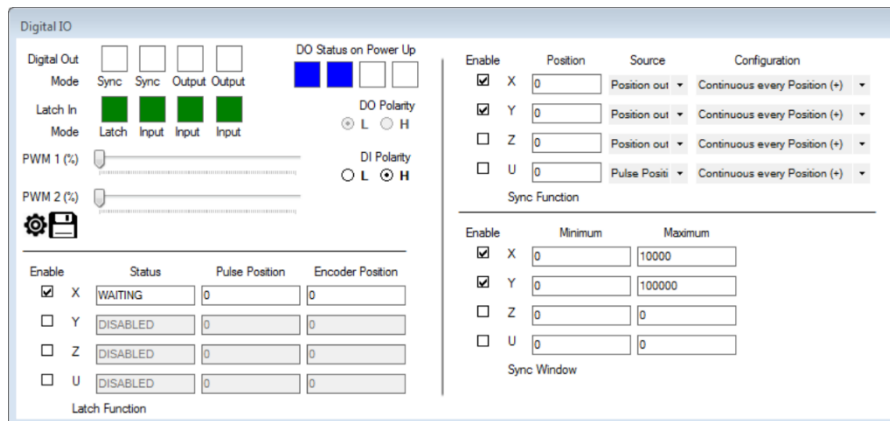
Mode – Configuration for digital input (as an input or latched)

PWM 1 (%) – Setting for PWM1 output duty cycle, percent on

PWM 2 (%) – Setting for PWM2 output duty cycle, percent on

3.10.1 Advanced Digital IO Screen

The advance Digital IO screen brings in additional configurable settings for Latch and Sync functions. Settings for digital input and output polarity and digital output status on power up are also available.



Digital output polarity (DOP) can be set to active low or high, and the status on power up (DOBOOT) can be set by clicking the desired status in the boxes. The digital input polarity(DIP) can also be set to active high or low. The status of the digital outputs (DO) can be changed by clicking the desired boxes.

Latch function can be set for each axis. Once the axis is enabled (LT), the Status will indicate the axis is WAITING. Once a digital input is triggered, the status(LTS) will indicated it has LATCHED, the Pulse (LTP) and Encoder (LTE) Position will be captured and displayed.

The Synchronization functions can be configured on the right-hand side of the screen for each

axis. The top portion sets the synchronization configuration, while the lower portion enables and sets the range for the synchronization window. For each axis, the synchronization operation can be enabled (SYNO) or disabled (SYNF), the synchronization position point (SYNP), the source position counter (pulse position out or encoder in) and logic of the synchronization pulse of when it should trigger (SYNC). The source and configuration is set using the decimal equivalent of a 4 bit value.

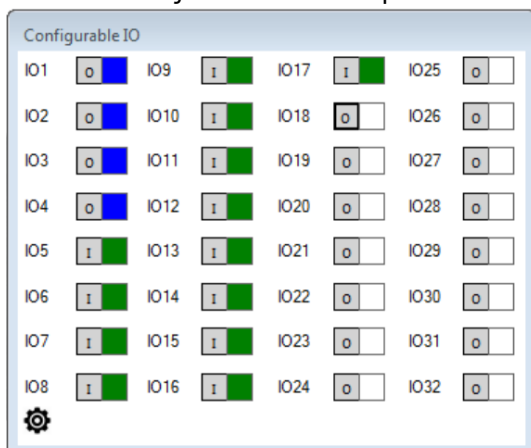
SYNC[axis]=[value], with [value] equal to:

- 1 – Pulse position, trigger when sync position = actual position from any direction
- 2 – Pulse position, trigger when sync position = actual position from positive direction
- 3 – Pulse position, trigger when sync position = actual position from negative direction
- 4 – Pulse position, trigger when sync position > actual position
- 5 – Pulse position, trigger when sync position < actual position
- 8 – Pulse position, trigger continuous, any direction
- 9 – Pulse position, trigger continuous in positive direction
- 10 – Pulse position, trigger continuous in negative direction
- 17 – Encoder position, trigger when sync position = actual position from any direction
- 18 – Encoder position, trigger when sync position = actual position from positive direction
- 19 – Encoder position, trigger when sync position = actual position from negative direction
- 20 – Encoder position, trigger when sync position > actual position
- 21 – Encoder position, trigger when sync position < actual position
- 24 – Encoder position, trigger continuous, any direction
- 25 – Encoder position, trigger continuous in positive direction
- 26 – Encoder position, trigger continuous in negative direction

For configurations that trigger continuously (8, 9, 10, 24, 25, 16), the Synchronization window can be active over a range of positions. The Synchronization window can be enabled (SYNWO), or disabled (SYNWF) for each axis, and minimum and maximum position values set (SYNMIN, SYNMAX), for each axis.

4.11 Configurable IO Screen

All configurable inputs and outputs are available to adjust based on application requirements. Use the IOCFG and IO commands to quickly identify how the current system is configured, and then make adjustments as required based on your application.



Displayed information for the configurable IO screen:

IO1  IO1 – Input/Output port number 1, each port is listed in the screen(IO[port]).

IO1  IO1 is an input and is triggered

IO21  IO1 is an input and is not triggered

IO24  IO21 is an output and is triggered

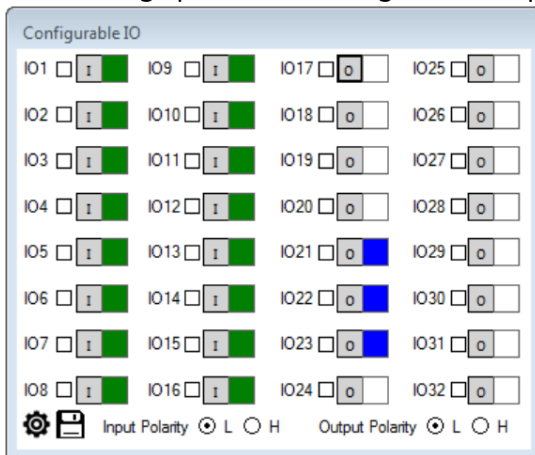
IO24 is an output and is not triggered



Each port can be changed from an Input or Output by clicking on the  or  boxes. For Outputs, the polarity of the output can be changed by clicking in the white or blue box associated with the port to update. Input polarity can not be changed in this screen.

3.11.1 Advanced Configurable IO Screen

The advanced screens adds the ability to change the polarity settings for Inputs or Outputs, along with selecting specific IO settings for each port for boot up.

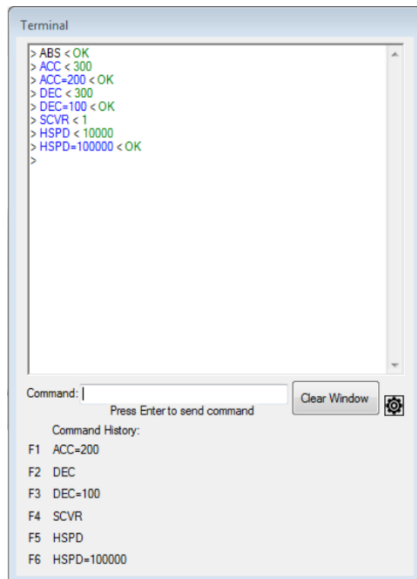


 The input polarity and output polarity for all ports can be adjusted by selecting the L or H radio buttons. For configuration on boot up, select the specific ports to be included in the boot up operation by checking the boxes next to the port. Use the  icon to store the desired boot up values in flash memory.

4.12 Terminal Screen

3.12 Terminal Screen

 A terminal screen is available to allow quick entry of ASCII commands to control all aspects of the controller. Enter command lines one at a time in the command box. The command will be executed and appear in the window. The last 5 commands are saved for convenience and can be accessed by selecting the  icon. The workspace can be cleared by selecting the **Clear Window** button.



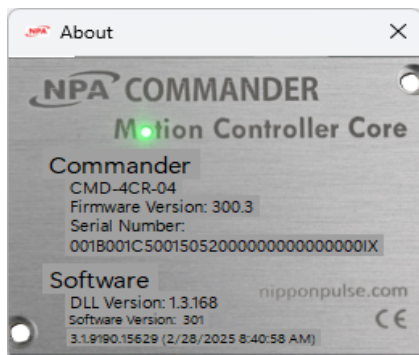
4.13 PCL Registers Screen

All register values for each axis can be viewed using the PCL Registers screen. Use the  to save the PCL registers current values show on the screen to a *.txt file. This screen can only be accessed by selecting **ctrl-alt-p** upon opening the program to expose this advanced feature.

View PCL6045BL Registers

	Axis - X Register	Pre-Register	Axis - Y Register	Pre-Register	Axis - Z Register	Pre-Register	Axis - U Register	Pre-Register
RMV/PRMV	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0
RFL/PRFL	0x1f4	0x1f4	0x1f4	0x1f4	0x0	0x0	0x0	0x0
RFH/PRFH	0x88b8	0x88b8	0x88b8	0x88b8	0x0	0x0	0x0	0x0
RUR/PRUR	0x6	0x6	0x6	0x6	0x0	0x0	0x0	0x0
RDR/PRDR	0xd	0xd	0xd	0xd	0x0	0x0	0x0	0x0
RMG/PRMG	0x12b	0x12b	0x12b	0x12b	0x0	0x0	0x0	0x0
RDP/PRDP	0x0	0x0	0x0	0x0	0x0	0x0	0x0	0x0
RMD/PRMD	0x8000464	0x8000464	0x8000464	0x8000464	0x0	0x0	0x0	0x0
RIP/PRIP	0x62281	0x62281	0xffff9d	0xffff9d	0x0	0x0	0x0	0x0
RUS/PRUS	0x4362	0x4362	0x4362	0x4362	0x0	0x0	0x0	0x0
RDS/PRDS	0x4362	0x4362	0x4362	0x4362	0x0	0x0	0x0	0x0
RFA	0x1f4		0x1f4		0x0		0x0	
RENV1	0xc000002		0xc000002		0xc000002		0xc000002	
RENV2	0x6c1001		0x6c1001		0x6c1001		0x6c1155	
RENV3	0xf02006		0xf02006		0x2000		0x2000	
RENV4	0x0		0x0		0x0		0x0	
RENV5	0x0		0x0		0x0		0x0	
RENV6	0x0		0x0		0x0		0x0	
RENV7	0x0		0x0		0x0		0x0	
RCUN1	0x3d2dc		0x3adbcb		0x0		0x0	
RCUN2	0x4e4f1		0x49969		0x0		0x0	
RCUN3	0x7ff		0x3116		0xffffe2		0x7	
RCUN4	0x0		0x0		0x0		0x0	
RCMP1	0x0		0x0		0x0		0x0	
RCMP2	0x0		0x0		0x0		0x0	
RCMP3	0x0		0x0		0x0		0x0	
RCMP4	0x0		0x0		0x0		0x0	
RCMP5/PRCF	0x0	0	0x0	0	0x0	0	0x0	0
RIRQ	0x41		0x41		0x0		0x0	
RLTC1	0xa00f2		0xe3cd0		0x0		0x0	
RLTC2	0xc812a		0x11cc06		0x0		0x0	
RLTC3	0xffff8001		0xffff9eab		0xfffffe2		0x7	
RLTC4	0x0		0x0		0x0		0x0	
RSTS	0x10001c		0x10000c		0x0		0x0	
REST	0x0		0x0		0x0		0x0	
RIST	0x0		0x0		0x0		0x0	
RSPD	0x88b8		0x88b8		0x0		0x0	
RIPS	0x640300		0x640300		0x640300		0x640300	

4.14 About Screen



The About screen shows the version level for the key parts of your system.

Commander:

The following information is displayed.

- The ID of the commander currently connected
- The firmware version (VER)
- The serial number for the Commander(SN)

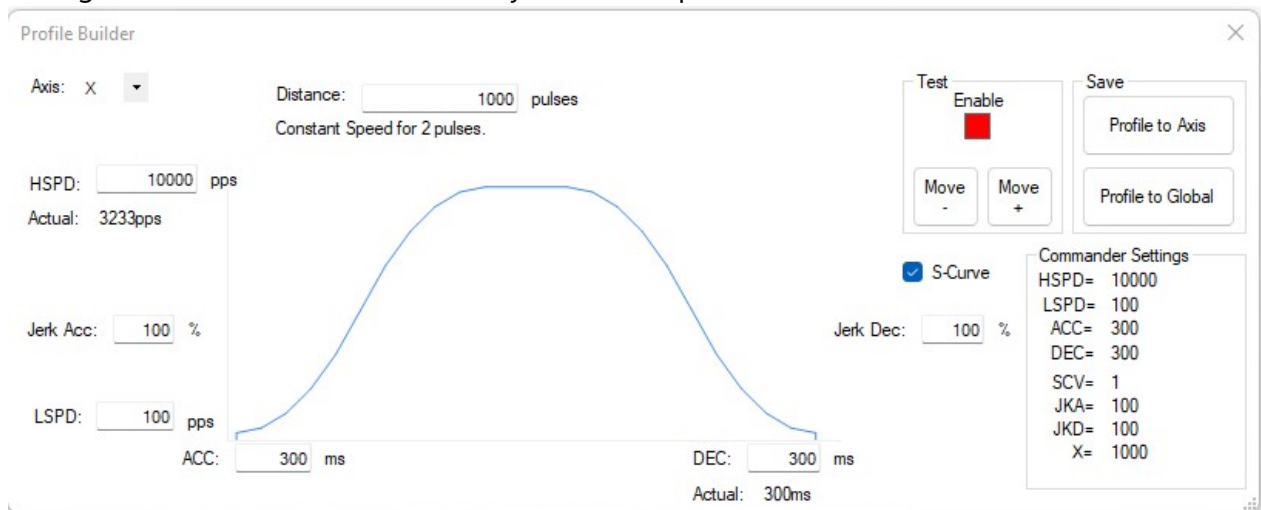
Software:

The following information is displayed.

- The version level of the DLL.
- The version level of the GUI software.
- The Software build information.

4.15 Profile Builder

The Profile Builder in the Commander Control Software can assist you in determining the correct settings for the commander to achieve your desired profile.



Service Passwords

CMDservice

Enables service mode
PCL Regisuers
Service Menu shown
Service manual shown

CMDupdate

Enables Update Developer mode to allow changing of links in the app.

CMDtest

Enables Commander test mode

SoftLimit Status

The SoftLimit Status screen in the Commander Control Software displays the current settings for the Softlimits.

Soft Limit Status

	Soft Limit -	Enabled	Soft Limit +	Source	Stop type
X	-1000	☐	1000	Pulse out	Decelerate
Y	-1000	☐	1000	Pulse out	Decelerate
Z	-1000	☐	1000	Pulse out	Decelerate
U	-1000	☐	1000	Pulse out	Decelerate

How to access

Enviromental settings

Display	Description	Related commands
	Button to save data in the memory	STORE
	Show/hide the Advanced Encoder Status Screen	
Input Settings		
Limit Polarity	Set the input mode of the feedback pulse signal	POL[axis] (Bit-3)
Home Polarity	Set the direction the feedback pulse count up	POL[axis] (Bit-4)
Alarm Polarity	Set the logic of the Z-Index pulse signal	POL[axis] (Bit-5)
Soft-Limit		
Enable	Enable/disable Soft-limit function	
Status	Opens the	
Set		
Slow Down (SD)		
Enable	Enable/disable Slow Down (SD) function	
Latch		
Decel		
Polarity		POL[axis] (Bit-5)
In-position (INP)		
Enable	Enable/disable In-position (INP) function	
Polarity		POL[axis] (Bit-5)
Error Clear (ERC)		
Enable	Enable/disable Error Clear (ERC) function	
Polarity		POL[axis] (Bit-5)
Pulse Width		
Off Delay		

Notes:

- Clear encoder pulse counter values– Click

Set SoftLimit

The Set SoftLimit screen in the Commander Control Software is used to set up the SoftLimits.

How to access

Enviromental settings

Display	Description	Related commands
	Button to save data in the memory	STORE
	Show/hide the Advanced Encoder Status Screen	
Input Settings		
Limit Polarity	Set the input mode of the feedback pulse signal	POL[axis] (Bit-3)
Home Polarity	Set the direction the feedback pulse count up	POL[axis] (Bit-4)
Alarm Polarity	Set the logic of the Z-Index pulse signal	POL[axis] (Bit-5)
Soft-Limit		
Enable	Enable/disable Soft-limit function	
Status	Opens the	
Set		
Slow Down (SD)		
Enable	Enable/disable Slow Down (SD) function	
Latch		
Decel		
Polarity		POL[axis] (Bit-5)
In-position (INP)		
Enable	Enable/disable In-position (INP) function	
Polarity		POL[axis] (Bit-5)
Error Clear (ERC)		
Enable	Enable/disable Error Clear (ERC) function	
Polarity		POL[axis] (Bit-5)
Pulse Width		
Off Delay		

Notes:

- Clear encoder pulse counter values– Click

Command Echo Viewer

End

The information in this document is believed to be accurate at the time of publication but is subject to change without notice.

	
4 Corporate Drive Street, Radford, VA 24141 USA	
Phone: 1-540-633-1677	
E-mail: info@nipponpulse.com	
Web: http://www. nipponpulse.com	

Commander Software Utility Manual Version_