

Motion Creator Pro 2

User's Manual

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Preface

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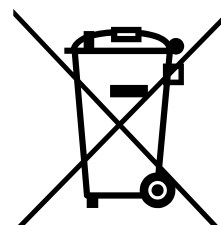
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Revision History

Revision	Release Date	Description of Change(s)
0.1	2022-12-30	Preliminary release

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1 Overview

Motion Creator Pro 2 (MCP2) software is a user interface specifically developed for ADLINK motion control products. In a standard Windows environment, MCP2 provides simple configuration, testing, and verification functions without end users' writing code, reducing testing time and accelerating device development.

MCP2 software supports all ADLINK motion control products, including pulse control cards and EtherCAT control card, and provides basic motion control functions such as single-axis motion, tween motion, and homing. Functions such as axis status and IO status on the user interface can also be monitored in real time.

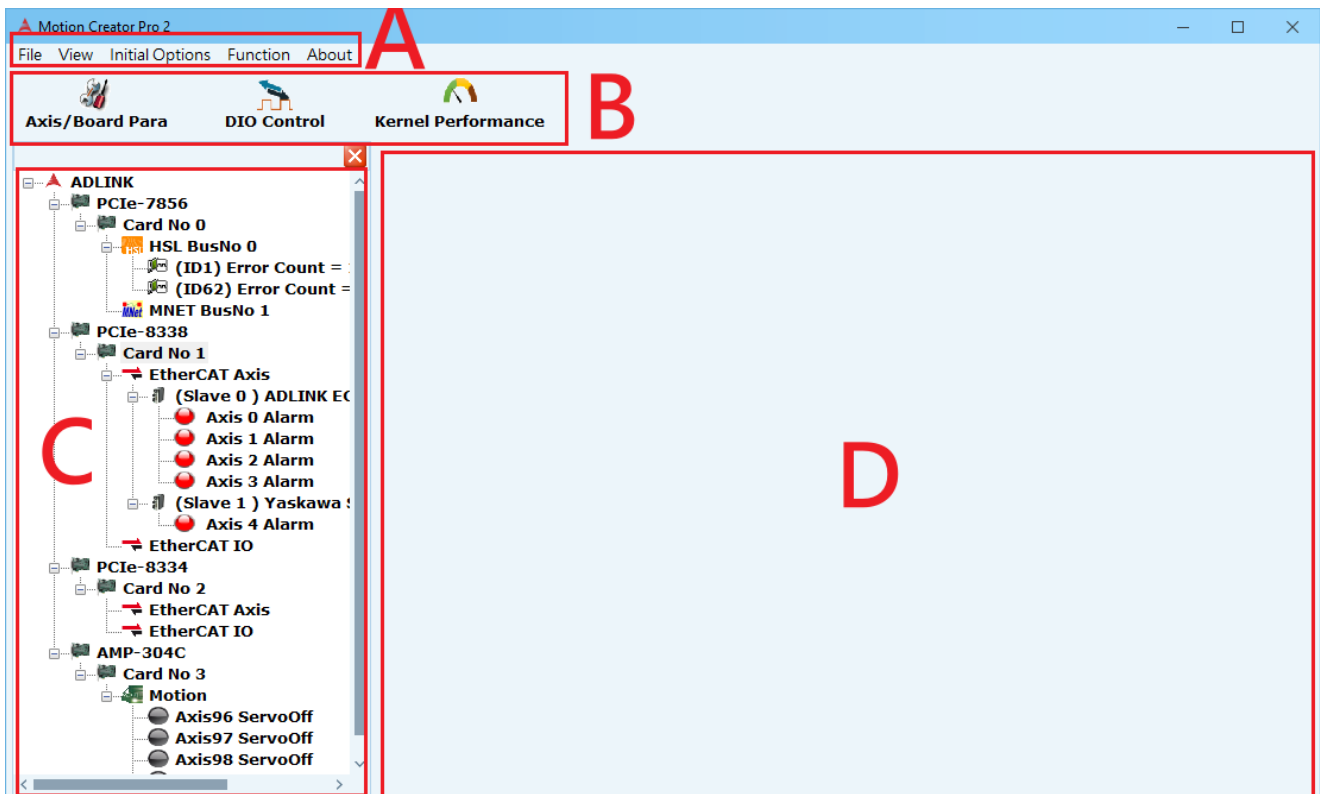
Notes:

- The MCP2 software execution path is: **Start>Assembly>ADLINK>PCIe-8338>Motion Creator Pro 2.**
- MCP2 software is best viewed with a minimum screen resolution of 1920X1080.

1.1 User Interface

This section describes the elements of the MCP2 user interface. There are four main elements to the MCP2 user interface.

- A: Menus
- B: icon bar
- C: Device tree
- D: Function pages



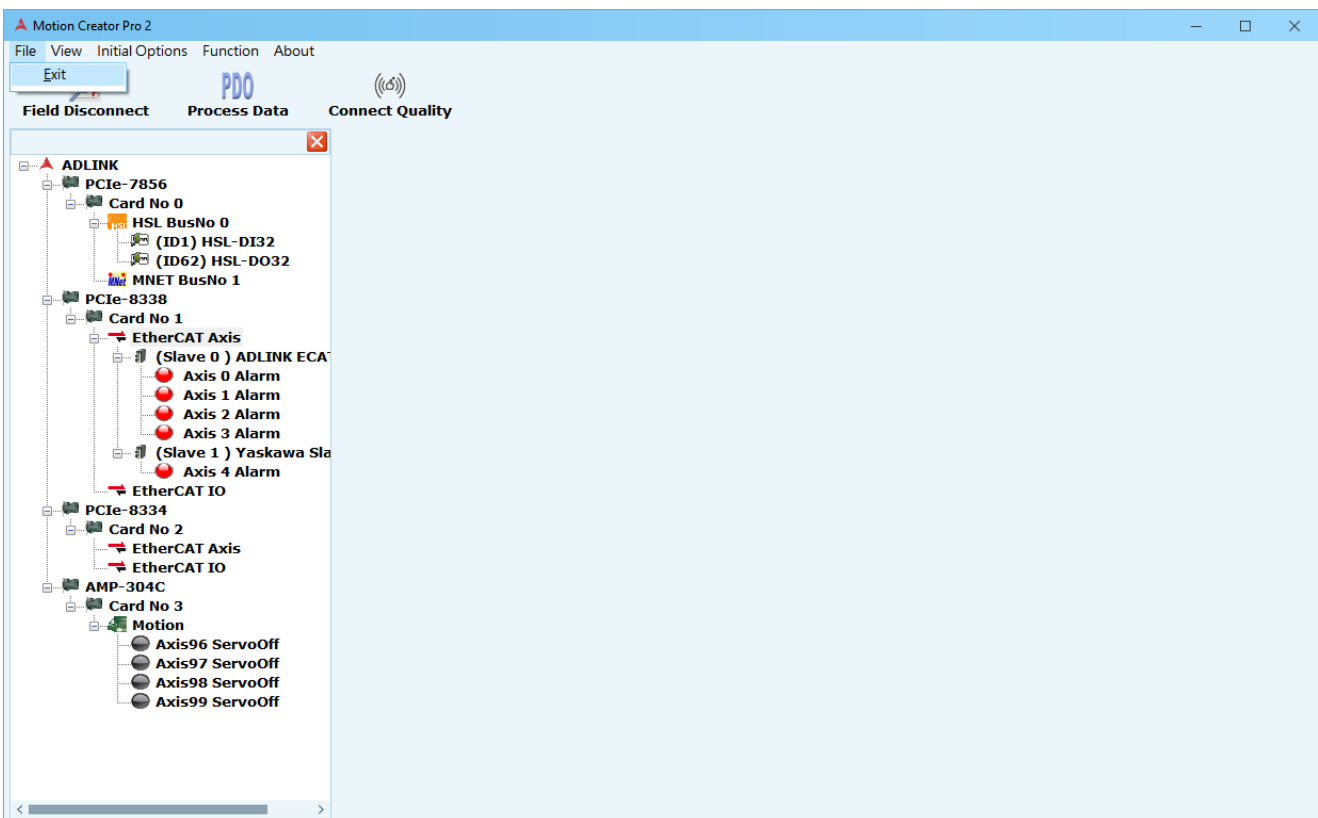
1.2 Menus

This area includes the following menus: **File**, **View**, **Initial Options**, **Function**, and **About**.

Note: The **Function** menu can be displayed only after clicking a Card No. on the device tree view.

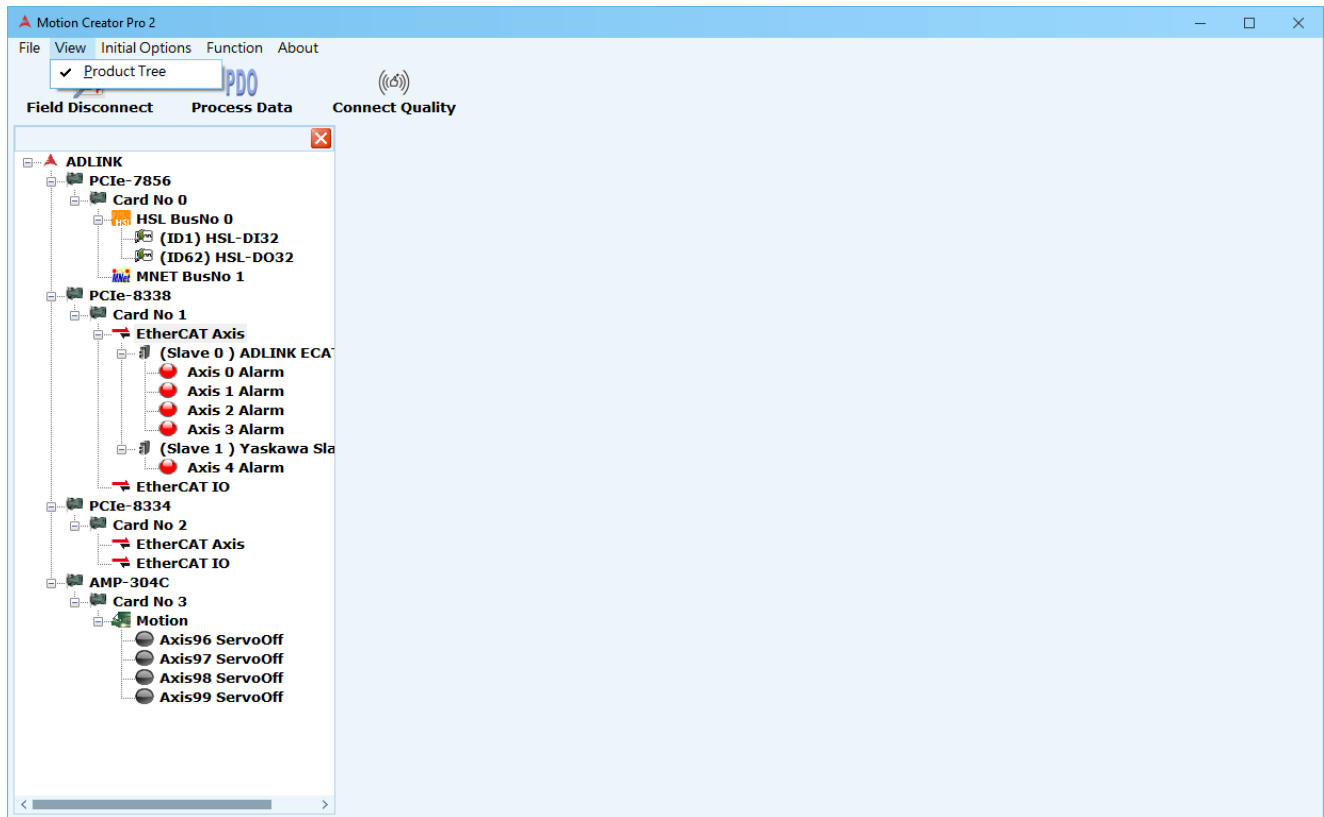
1.2.1 File->Exit

Click to exit MCP2.



1.2.2 View->Project Tree

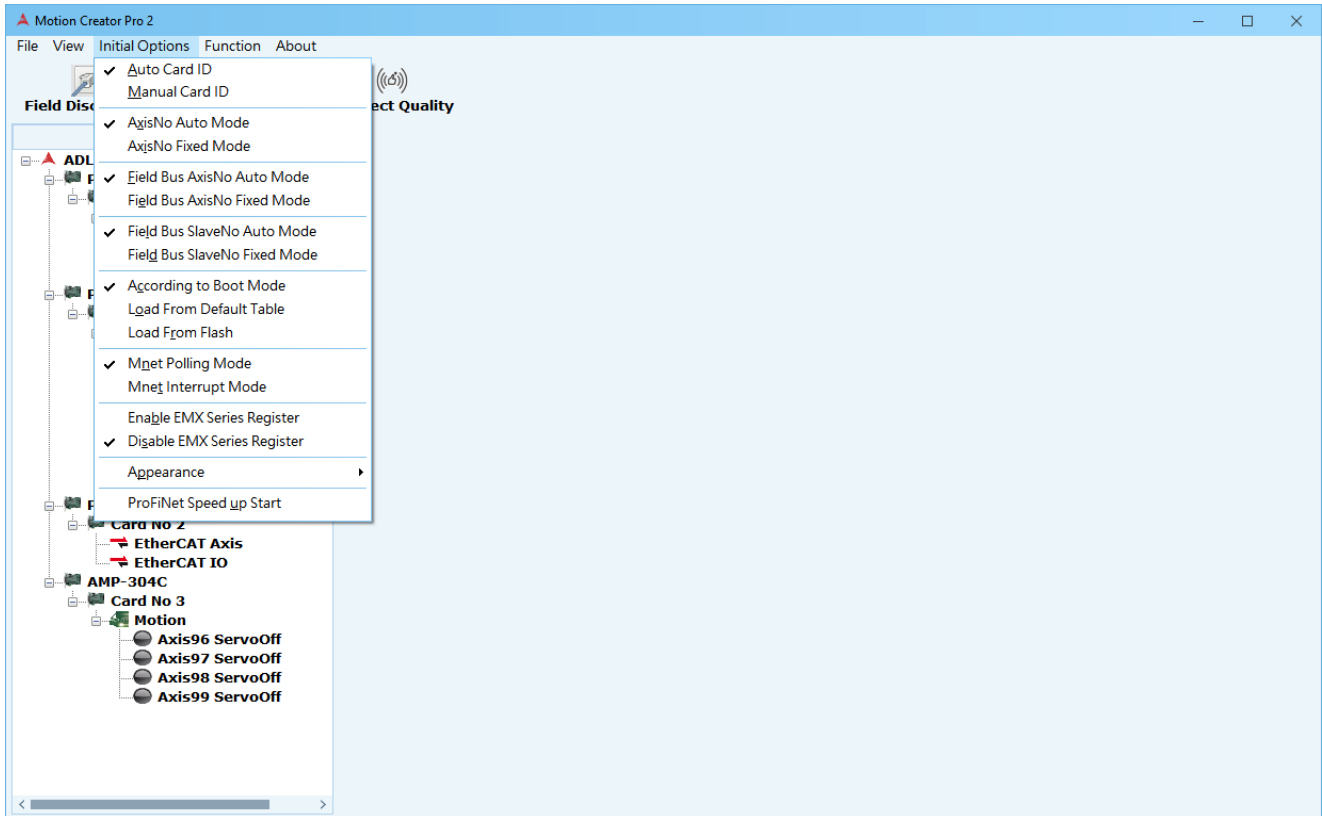
Used to open/close the device tree panel.



1.2.3 Initial Options->xxx Mode

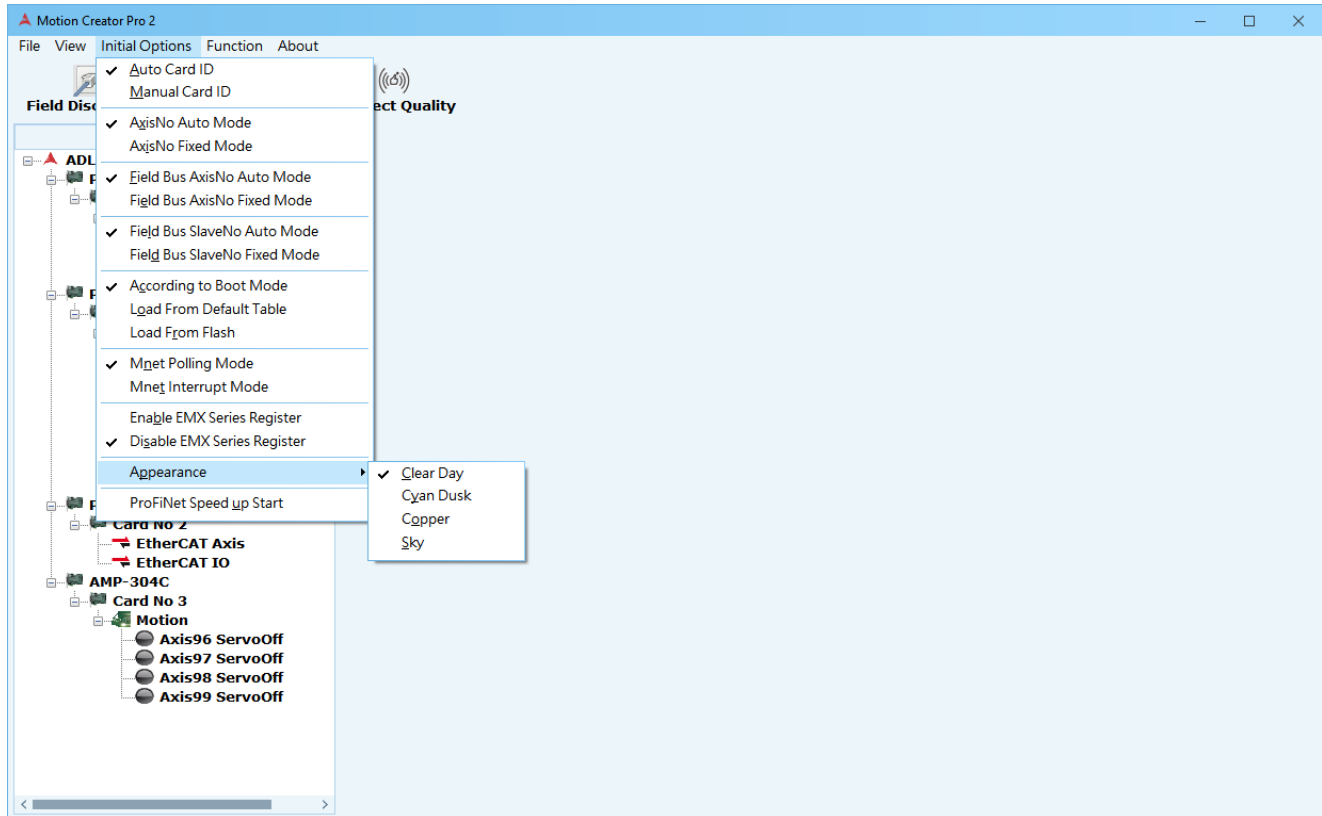
This menu lists the control card initialization options. Once the settings in this menu are changed, restart MCP2 to complete the changes.

Some parameters correspond to APS_initial(I32 *BoardID_InBits, I32 Mode). For details, see the APS function library.



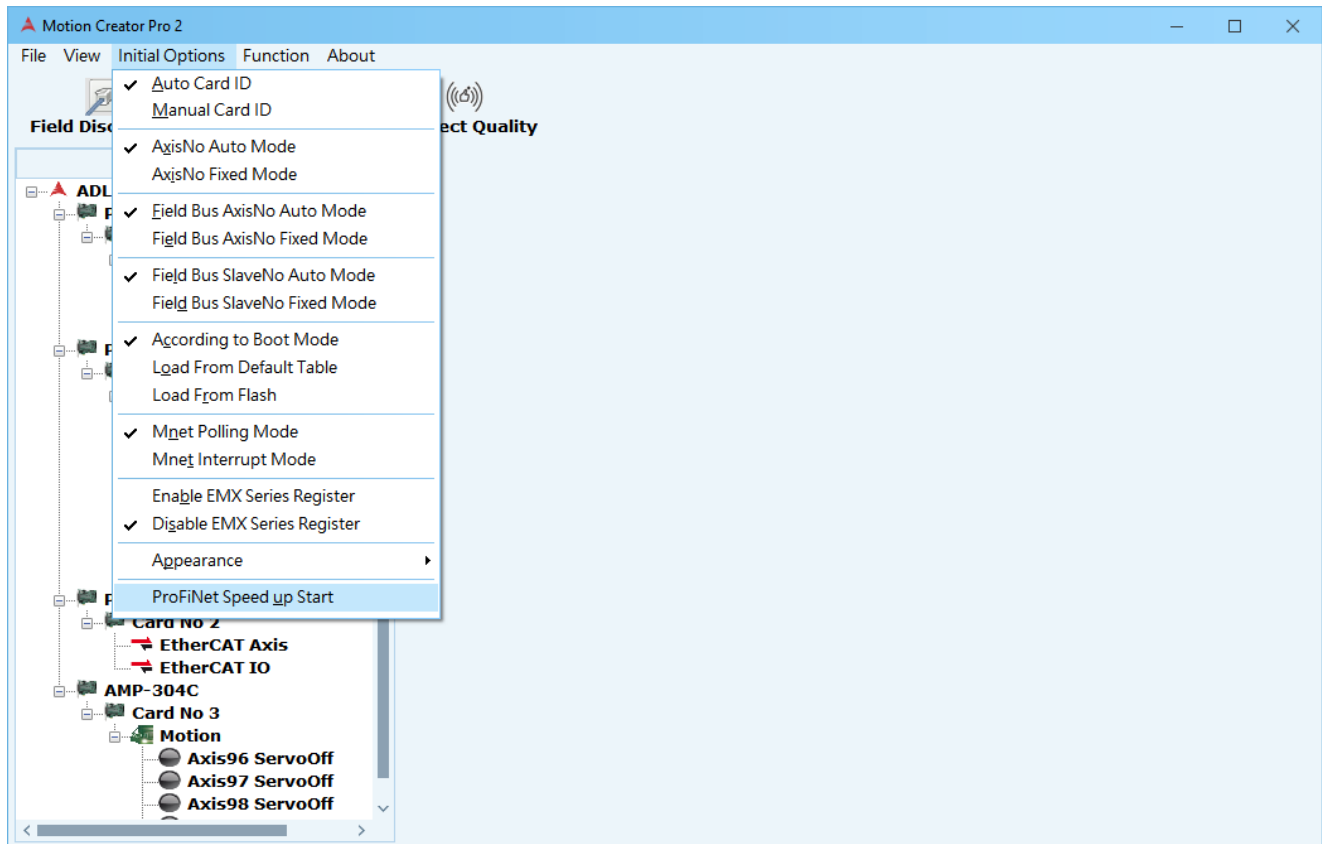
1.2.4 Initial Options->Appearance

Use these options to change the appearance of MCP2. Once the settings in this menu are changed, restart MCP2 to complete the changes.



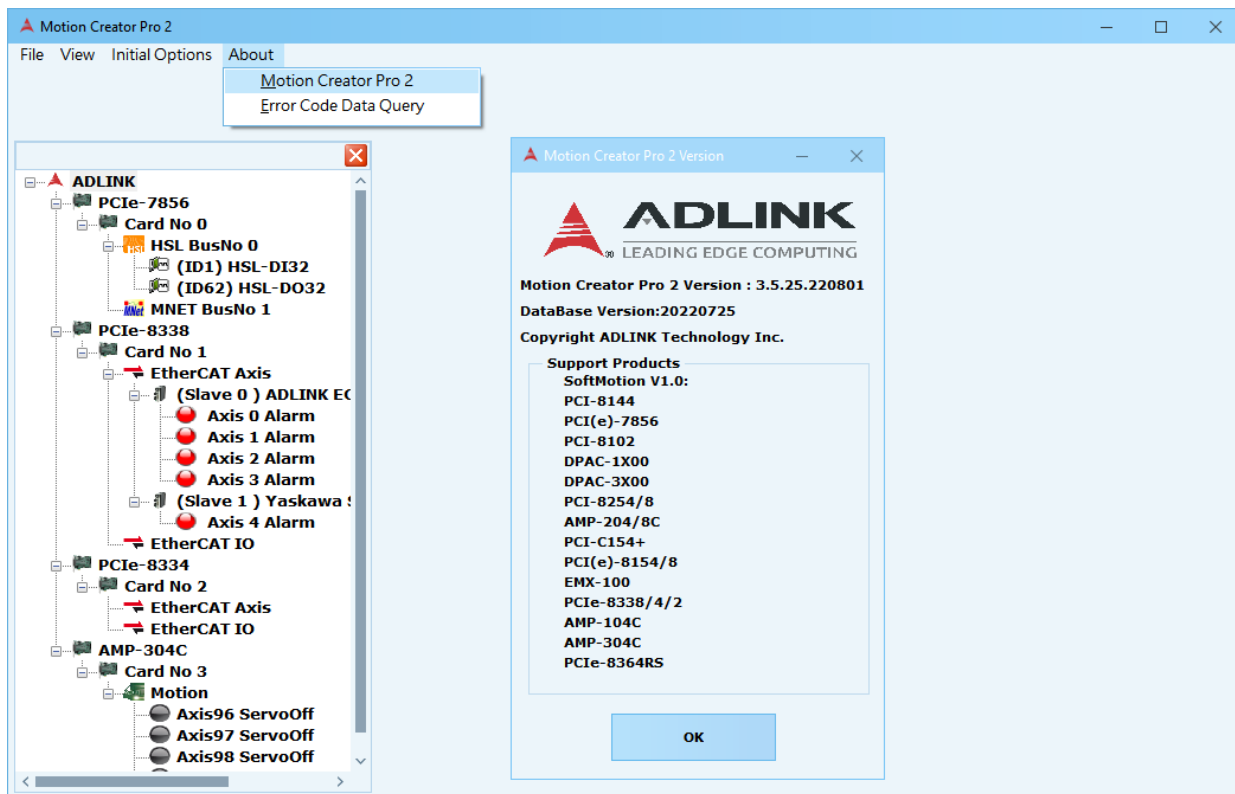
1.2.5 Initial Options->ProFiNetSpeed up Start

Slave connection for fast startup of card after initial connection.



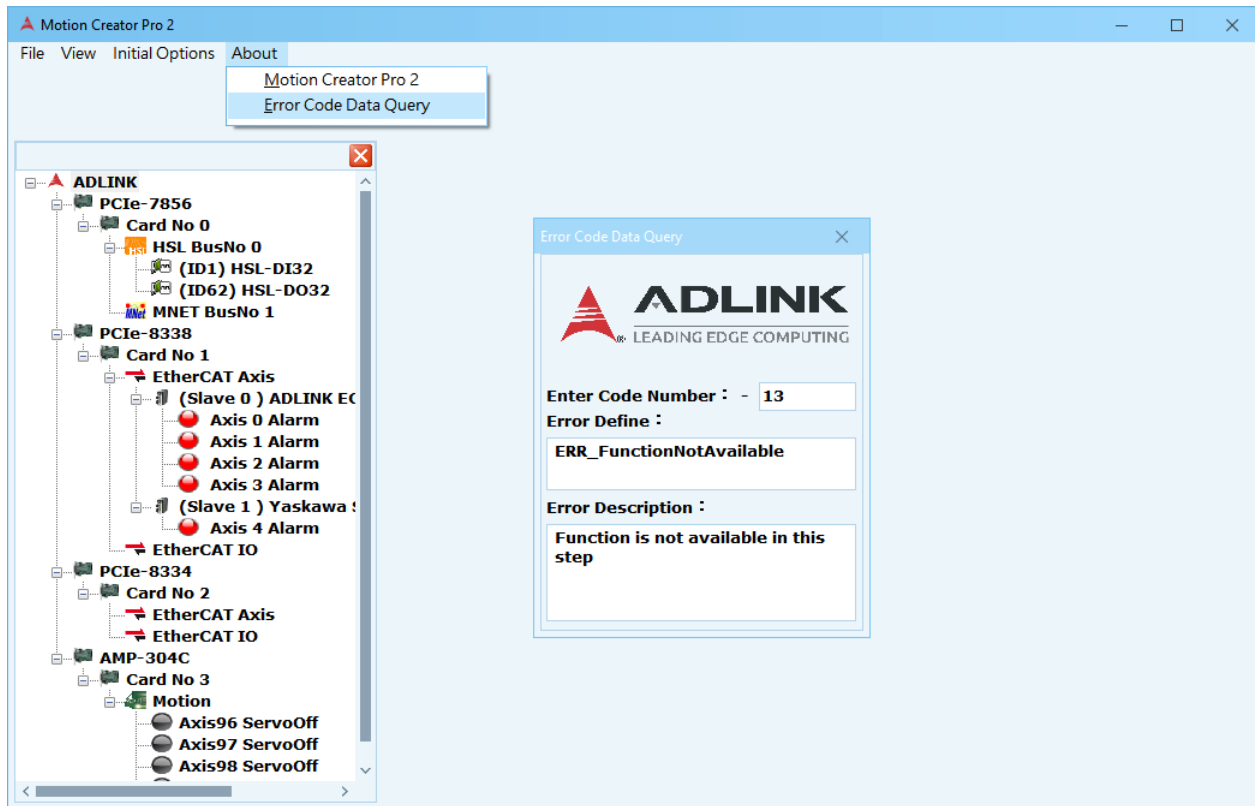
1.2.6 About->Motion Creator Pro 2

This menu item lists the MCP2 version information and supported hardware.



1.2.7 About->Error Code Data Query

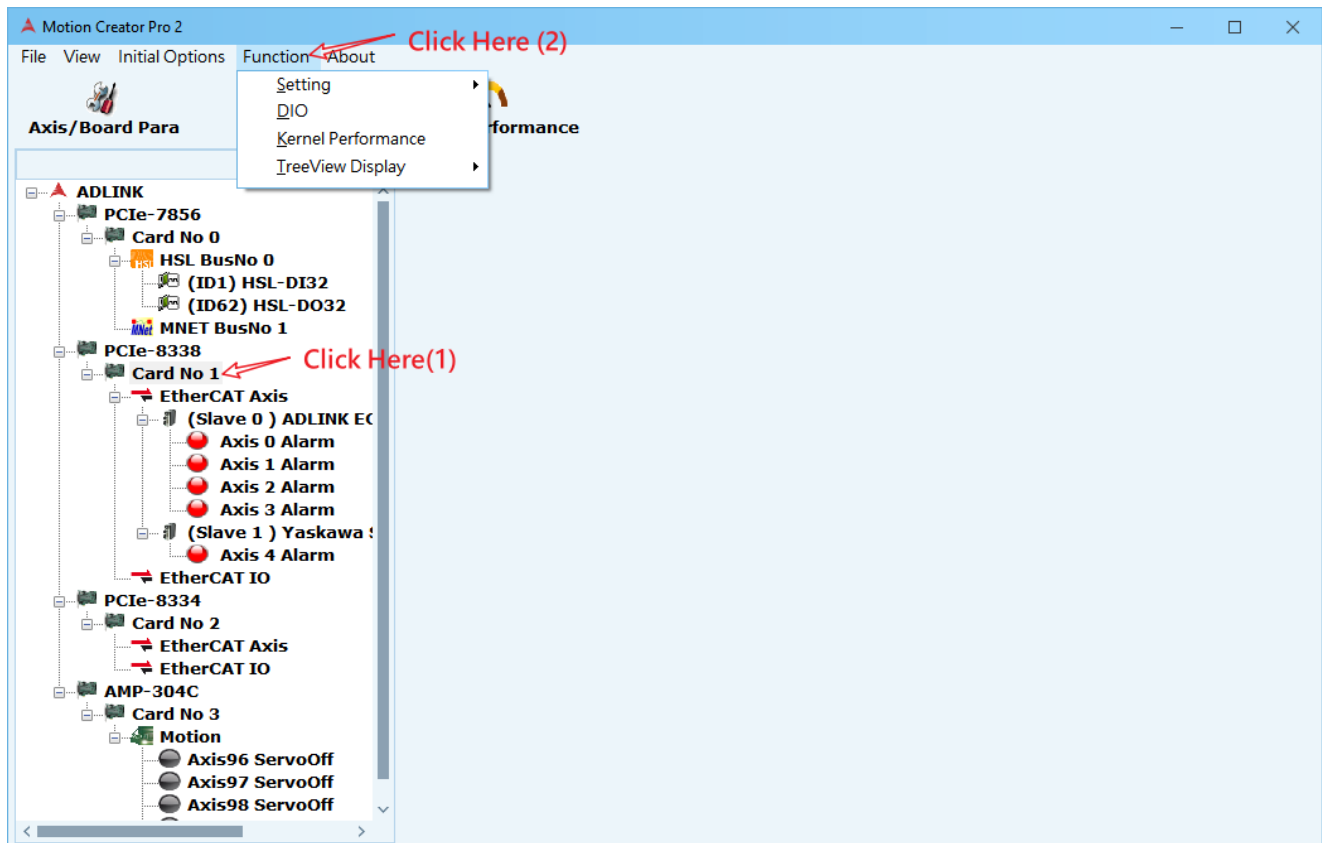
Enter an error code to show its definition and description.



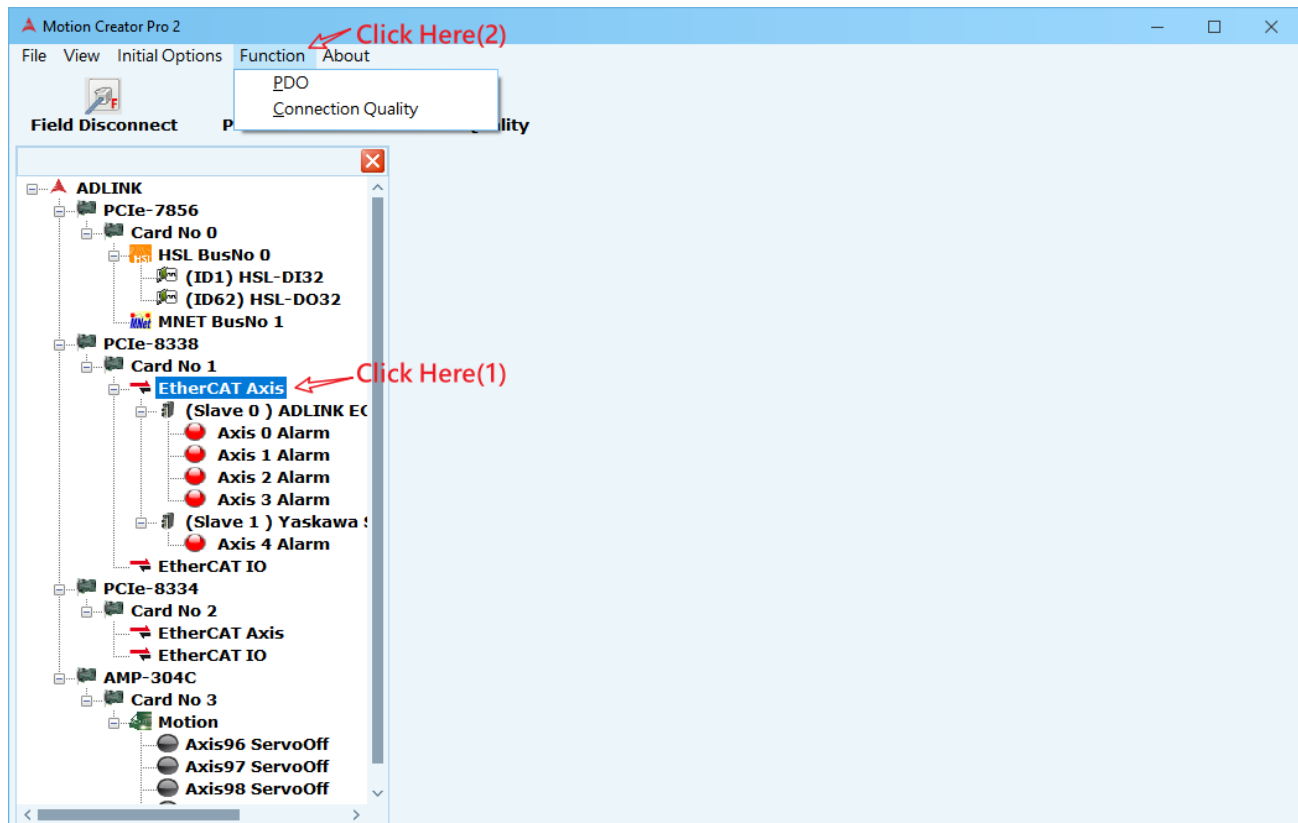
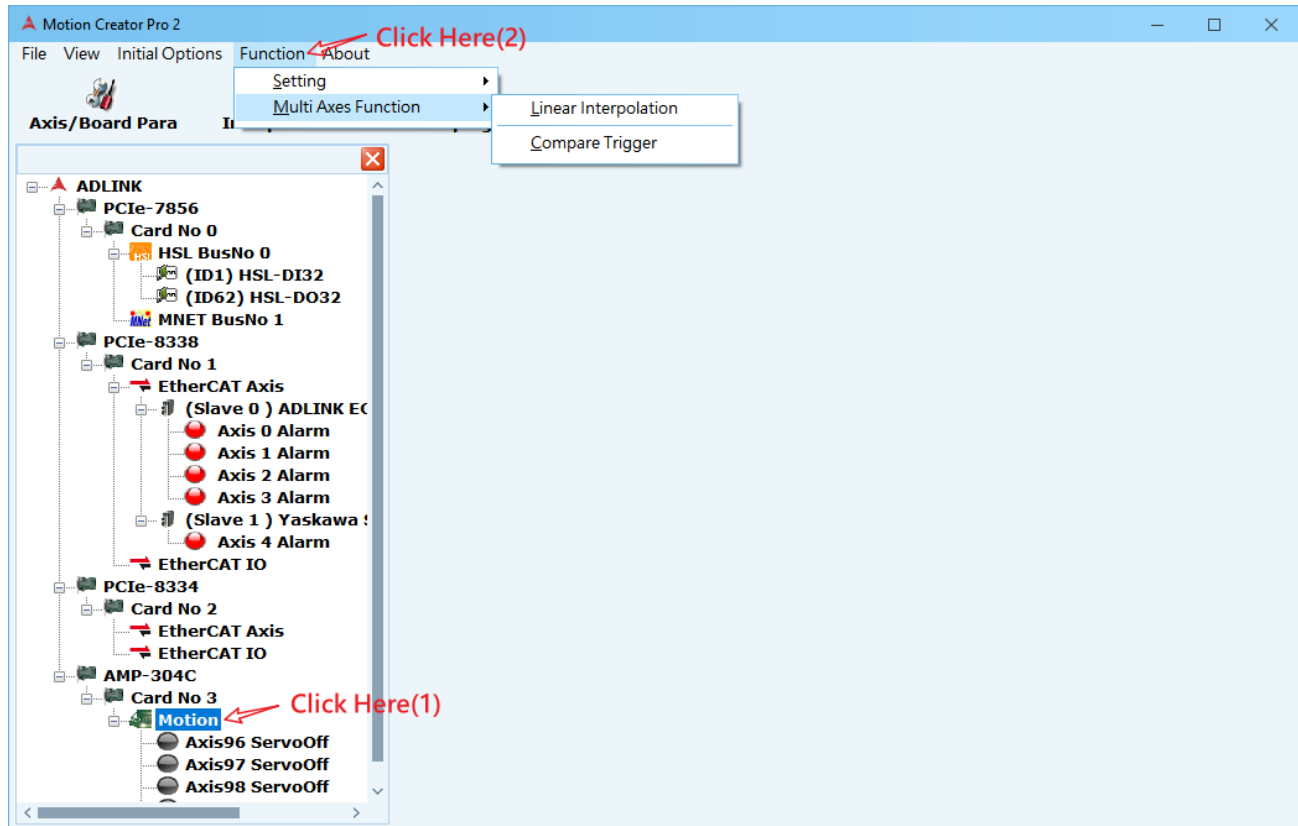
1.3 Function

This menu corresponds to the feature category selected in the device tree view. The relevant features are listed below. The following figures illustrate the respective available options in the Function menu when Card_No, Slave, and Axis are selected in the device tree.

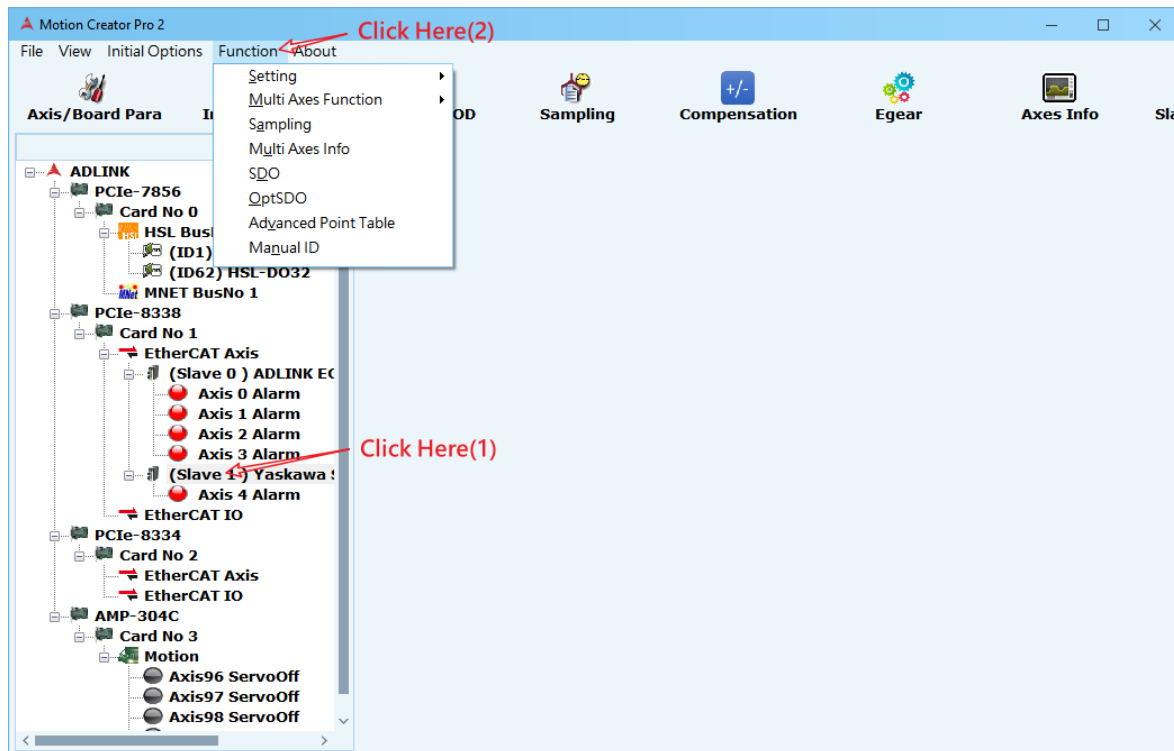
1. Click **Card No->Function**
2. The following figure shows the various hardware or system related functions.



1. Click **Motion\EtherCAT\ProfiNet\HSL\MNET->Function**
2. The menu displays as shown below, including functions such as multi-axis motion control, sampling and parameter setting.



1. Click **Slave No. ->Function**
2. The menu displays as shown below, including functions for single-axis motion control, point-to-point movement and return to origin.



1.4 Icon Bar

The icon bar is where frequently used functions can be put for quick selection. For example, the Function Menu will display different function icons according to whether the user selects Card No, Motion, Axis and Slave in the device tree view.

The following three diagrams illustrate the diagrams that appear when different items are clicked. Click Card No 0 in the following device tree view to display DIO, DSP Performance and other icons.

STEIN - ADD MISSING PICTURES

2 Installation

STEIN - ADD MISSING INFORMATION

3 MCP2 Function list

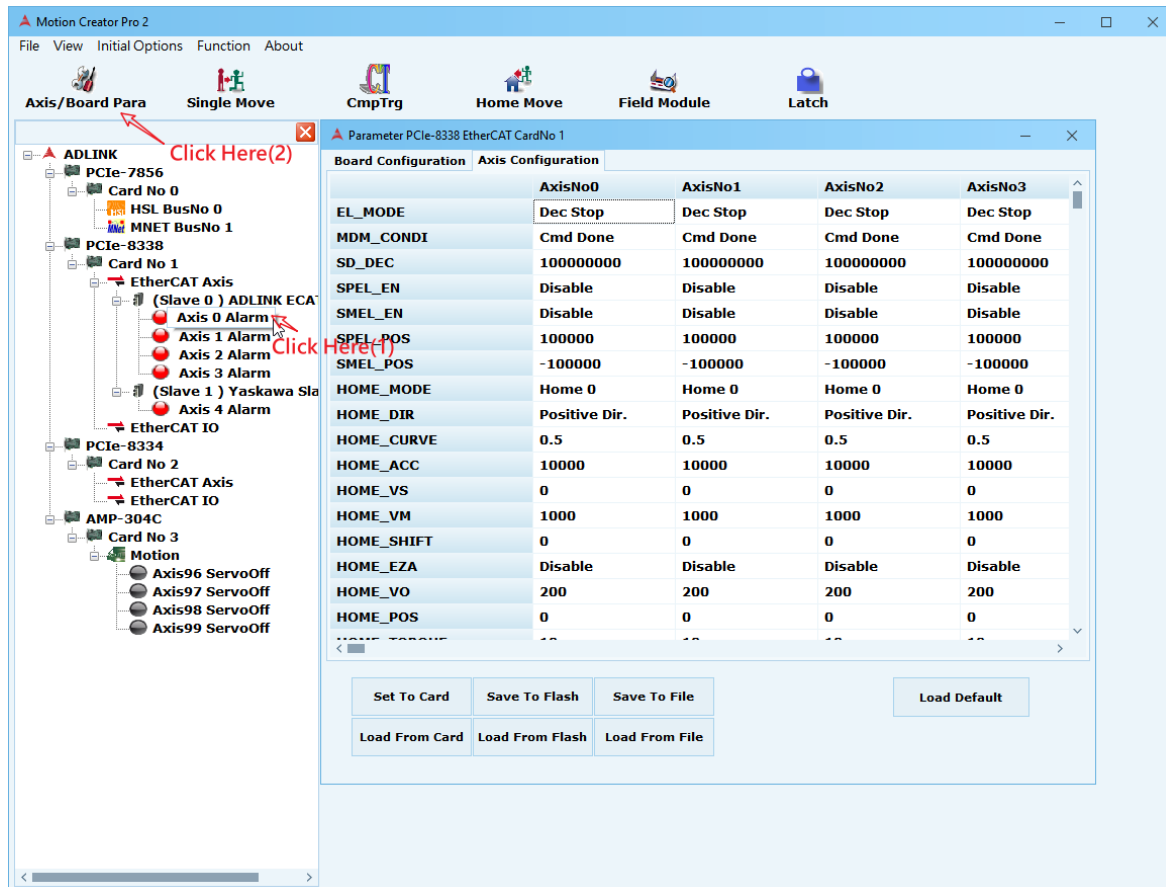
3.1 Parameter Manager

The control card axis parameters and system parameters can be unified by the parameter management, including operation mode, acceleration rate, deceleration rate, acceleration, motion I/O logic, etc. See the APS Function Library parameter table for definitions and detailed descriptions.

To open the parameter manager page, follow these steps:

Step 1. Click “Card” or “Slave” or “Axis” in the device tree.

Step 2. Click **Axis/Board Para** on the icon bar.



Parameter PCIe-8338 EtherCAT CardNo 1

	AxisNo0	AxisNo1	AxisNo2	AxisNo3
EL_MODE	Dec Stop	Dec Stop	Dec Stop	Dec Stop
MDM_CONDI	Cmd Done	Cmd Done	Cmd Done	Cmd Done
SD_DEC	100000000	100000000	100000000	100000000
SPEL_EN	Disable	Disable	Disable	Disable
SMEL_EN	Disable	Disable	Disable	Disable
SPEL_POS	100000	100000	100000	100000
SMEL_POS	-100000	-100000	-100000	-100000
HOME_MODE	Home 0	Home 0	Home 0	Home 0
HOME_DIR	Positive Dir.	Positive Dir.	Positive Dir.	Positive Dir.
HOME_CURVE	0.5	0.5	0.5	0.5
HOME_ACC	10000	10000	10000	10000
HOME_VS	0	0	0	0
HOME_VM	1000	1000	1000	1000
HOME_SHIFT	0	0	0	0
HOME_EZA	Disable	Disable	Disable	Disable
HOME_VO	200	200	200	200
HOME_POS	0	0	0	0

Buttons: Set To Card, Save To Flash, Save To File, Load Default, Load From Card, Load From Flash, Load From File

3.1.1 Parameter Configuration

For board configuration, refer to the APS Function Library manual **Table definition-> Board Parameter table**. The following example shows a PCI-8338 board.

Parameter PCIe-8338 EtherCAT CardNo 2	
Board Configuration	
Board Parameter	Board Parameter Value
EMG_LOGIC	Normal Open
DO_LOGIC	No Invert
DI_LOGIC	No Invert
IO_ACCESS_SEL	Mode 0
ECAT_SYNC_MODE	DC Mode
OP_RETRY_COUNT	0
SERVO_ON_MODE	Standard mode
SERVO_ON_NO_RESET_ALARM	Reset Alarm With Servo On Process
ECAT_SYNC_OFFSET	66
MAN_SLAVE_ID_SRC_1ST_GR	0
MAN_SLAVE_ID_SRC_2ND_GR	0
ECAT_CONTI_FRAME_LOSS_CNT	0
SAMPLING_SRC_AXIS_TYPE	Axis Number
EMG_MODE	Servo off directly
ECAT_RESTORE_OUTPUT	Restore
DI_EMG_FILTER_ENABLE	Enable
DI_EMG_FILTER_RANGE	5 us
PULSER_FILTER_RANGE	5 us

The board configuration page is available under **Table definition->A. Board Parameter table->PCIe-833x board parameter table** as shown below.

3_20250509_001_v0_1

PCIe-833x board parameter table

PCIe-833x Board parameter table				
NO.	Define	Description	Parameter data meaning	Default
00h	PRB_EMG_LOGIC	EMG Logic	0 : Not inverse 1 : Inverse	0
14h	PRB_DO_LOGIC	DO logic	0 : no invert; 1 : invert	0
15h	PRB_DI_LOGIC	DI logic	0 : no invert; 1 : invert	0
16h	PRB_IO_ACCESS_SEL	IO access selection	0 : Mode 0 1 : Reserved 2 : Mode 2 3 : Mode 3 (*Note 1)	0
17h	PRB_ECAC_SYNC_MODE	EtherCAT synchronization mode selection	0 : DC mode (Default) 1 : Free run	0
18h	PRB_OP_RETRY_COUNT	EtherCAT retry OP state count.		0
19h	PRB_ECAC_SERVO_ON_MODE	EtherCAT servo on mode selection	0 : Standard mode(Default) 1 : Fast mode, no check status word	0
1Ah	PRB_ECAC_SERVO_ON_NO_RESET_ALARM	EtherCAT servo on bypass reset alarm	0 : No bypass reset alarm while servo on (Default) 1 : Bypass reset	0

Axis Configuration is described in the APS Function Library manual under **Table definition-> Axis Parameter table**. The following figure shows the PCI-8338 board information.

Parameter PCIe-8338 EtherCAT CardNo 2

Board Configuration	Axis Configuration	AxisNo12	AxisNo13	AxisNo14	AxisNo15
EL_MODE	Dec Stop	Dec Stop	Dec Stop	Dec Stop	Dec Stop
MDM_CONDI	Cmd Done	Cmd Done	Cmd Done	Cmd Done	Cmd Done
SD_DEC	100000000	100000000	100000000	100000000	100000000
SPEL_EN	Disable	Disable	Disable	Disable	Disable
SMEL_EN	Disable	Disable	Disable	Disable	Disable
SPEL_POS	100000	100000	100000	100000	100000
SMEL_POS	-100000	-100000	-100000	-100000	-100000
HOME_MODE	Home 0	Home 0	Home 0	Home 0	Home 0
HOME_DIR	Positive Dir.	Positive Dir.	Positive Dir.	Positive Dir.	Positive Dir.
HOME_CURVE	0.5	0.5	0.5	0.5	0.5
HOME_ACC	10000	10000	10000	10000	10000
HOME_VS	0	0	0	0	0
HOME_VM	1000	1000	1000	1000	1000
HOME_SHIFT	0	0	0	0	0
HOME_EZA	Disable	Disable	Disable	Disable	Disable
HOME_VO	200	200	200	200	200
HOME_POS	0	0	0	0	0

Axis configuration is available under **Table definition->A. Board Parameter table->PCIe-833x Axis parameter table**, as shown below.

APS_FunctionLibrary_V0.1

PCIe-833x Axis parameter table

NO.	Define	Description	Value	Default	Type
02h (2)	PRA_EL_MODE	Stop mode when EL turns on. Note : Deceleration profile is given according to PRA_SD_DEC.	0 : Deceleration stop 1 : Stop immediately	0	I32
03h (3)	PRA_MDM_CONDI	Motion done condition (Affective with motion status NSTP bit)	0 : Command done; 1 : Command done with INP	0	I32
07h (7)	PRA_SD_DEC	Stop deceleration including EL stop, stop function and multi-stop.	Unit : pulse/sec2	10000000 0.0	F64
08h (8)	PRA_SPEL_EN	Soft PEL enable	0 : Disable 1 : Reserved 2 : Soft-limit (SPEL)	0	I32
09h (9)	PRA_SMEL_EN	Soft MEL enable	0 : Disable 1 : Reserved 2 : Soft-limit (SMEL)	0	I32
0Ah (10)	PRA_SPEL_POS	Soft-end-limit for positive end [F64]	Unit : pulse	100000.0	F64
0Bh (11)	PRA_SMEL_POS	Soft-end-limit for negative end [F64]	Unit : pulse	-100000.0	F64
		Home mode setting *If user uses EtherCAT home	0 : home mode 0 (ORG) 1 : home mode 1 (EL)	0	I32

3.1.2 Save Axis Parameter

There are several buttons for parameter operations at the bottom of the page. After setting parameters according to system settings, you can select the following storage/loading methods:

Set To Card	Save To Flash	Save To File	Load Default
Load From Card	Load From Flash	Load From File	

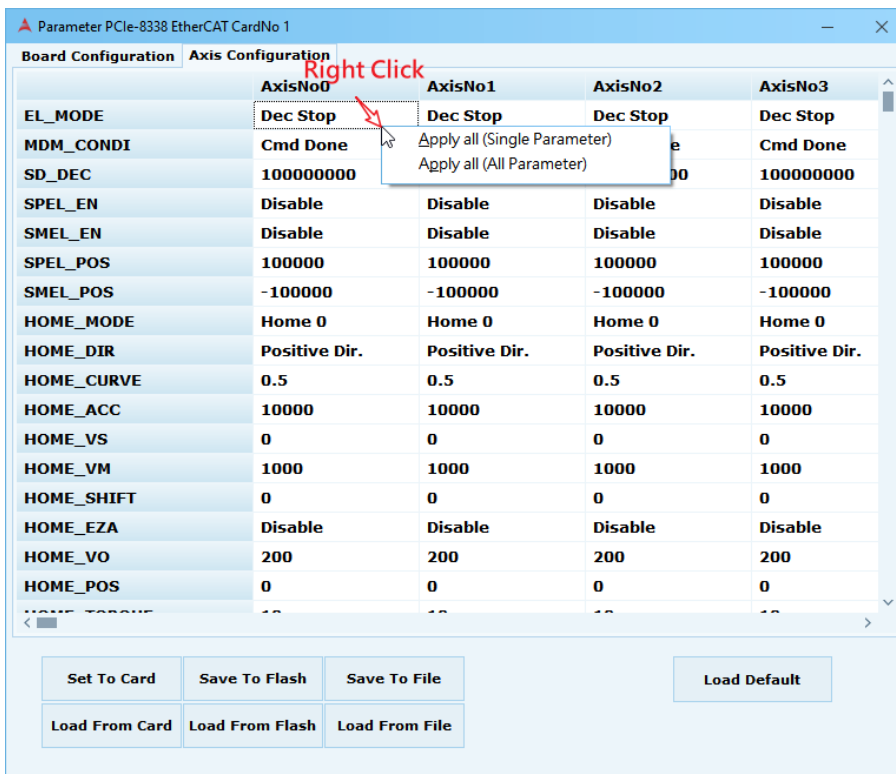
- **Set To Card:** The parameter set value is directly written to the control card for use.
- **Load From Card:** Read parameters from the control card to the page display.
- **Save To Flash:** Writes parameters to non-volatile memory in the control card.
- **Load From Flash:** Read parameters from non-volatile memory of control card to page display.
- **Save To File:** Writes the parameter to the specified file (xml).
- **Load From File:** Read parameters from the specified file to the page display (xml).
- **Load Default:** Load the factory default value to the page display.

3.1.3 Apply All

In a motion control system, there may be multiple axis parameters that are similar or exactly the same. MCP2 provides a copy of the parameter set value to the multi-axis function, saving the need to enter each axis parameter setting each time.

Click the right mouse button on the setting axis parameter setting page to select one of the following options:

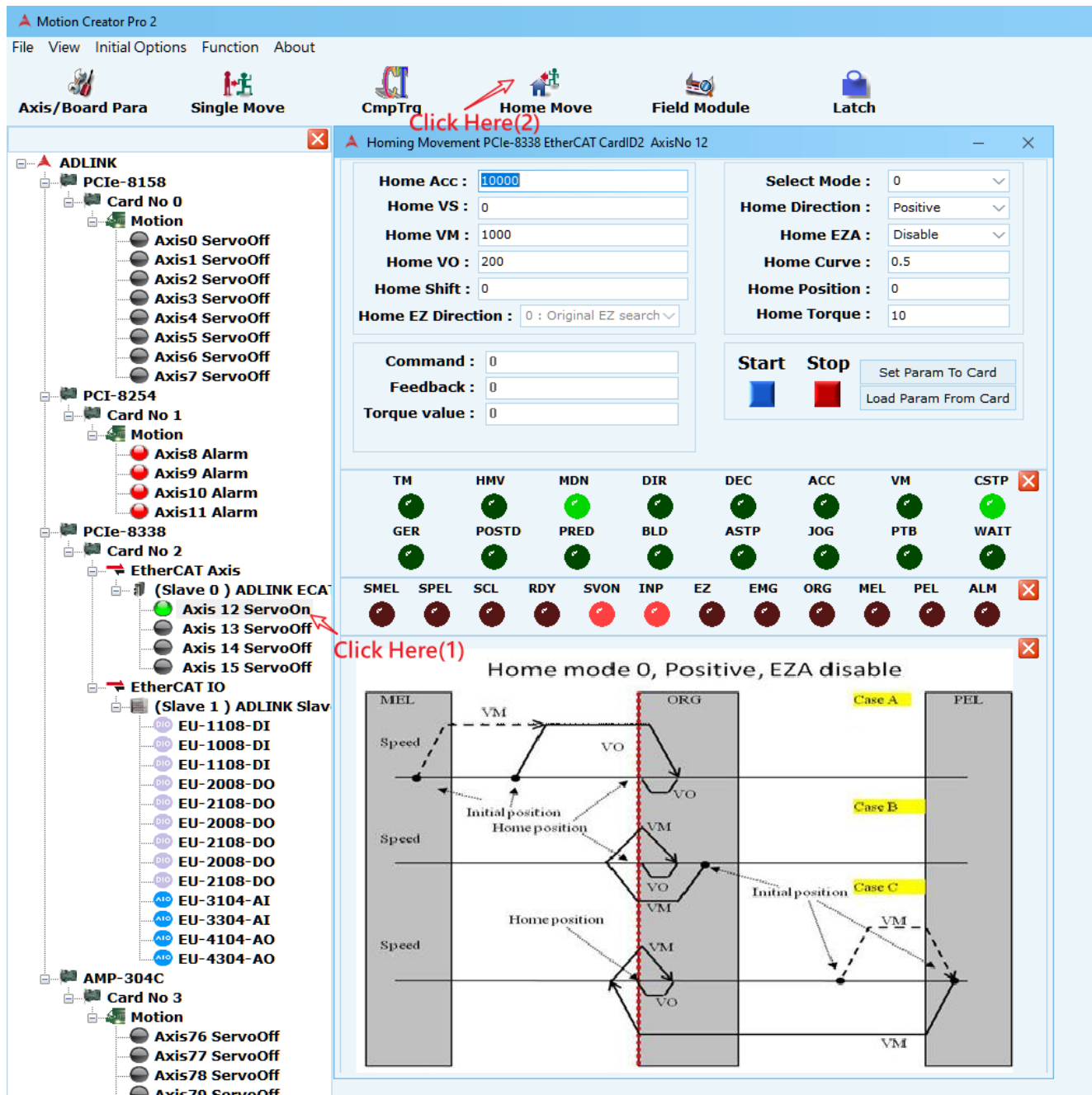
- **Apply all (Single Parameter):** Copy only the set values of this column to other axes.
- **Apply all (All Parameter):** Copies all parameter values for this axis to other axes.



3.2 Homing

The Homing page is used for the origin of the startup axis (ORG or DOG, etc.) position. Through the axis parameter settings, you can select n modes, and real-time monitoring of command, displacement, and various motion status information.

The steps to open the return to origin page are shown below. First, click **Axis0** in the device tree, then click the **Home Move** icon.



The screenshot displays the Motion Creator Pro 2 interface. On the left, the device tree shows the hierarchy: ADLINK > PCIe-8158 > Card No 0 > Motion > Axis0 ServoOff. A red arrow points to the 'Home Move' icon in the top toolbar, labeled 'Click Here(2)'. Another red arrow points to 'Axis 12 ServoOn' in the device tree, labeled 'Click Here(1)'. The main window, titled 'Homing Movement PCIe-8338 EtherCAT CardID2 AxisNo 12', contains the following settings:

- Home Acc:** 10000
- Home VS:** 0
- Home VM:** 1000
- Home VO:** 200
- Home Shift:** 0
- Home EZ Direction:** 0 : Original EZ search
- Select Mode:** 0
- Home Direction:** Positive
- Home EZA:** Disable
- Home Curve:** 0.5
- Home Position:** 0
- Home Torque:** 10
- Command:** 0
- Feedback:** 0
- Torque value:** 0
- Start/Stop buttons:** Set Param To Card, Load Param From Card

Below the settings are two rows of status indicators:

TM	HMV	MDN	DIR	DEC	ACC	VM	CSTP
GER	POSTD	PRED	BLD	ASTP	JOG	PTB	WAIT

Below these are two rows of indicator lights:

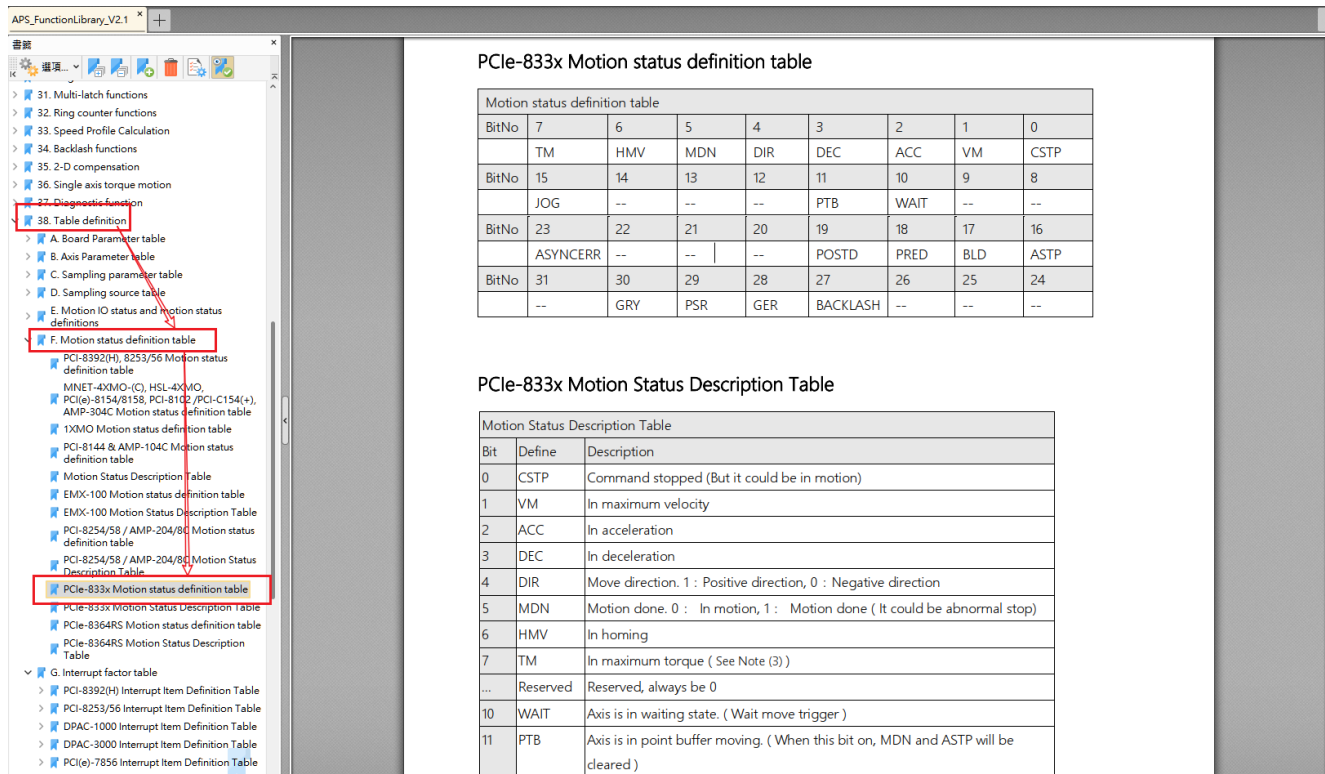
SMEL	SPEL	SCL	RDY	SVON	INP	EZ	EMG	ORG	MEL	PEL	ALM

At the bottom, a graph titled 'Home mode 0, Positive, EZA disable' shows three cases (A, B, C) of speed vs. position. Case A shows a linear ramp to the home position (ORG). Case B shows a linear ramp to the home position (ORG) with a dwell. Case C shows a linear ramp to the home position (ORG) with a dwell and a subsequent ramp. The graph includes labels for 'Initial position', 'Home position', 'VM', and 'VO'.

- (1) Various return to origin parameter settings
- (2) Start/stop button and set/load parameters
- (3) Status display area
- (4) Display of the current way back to the origin

25

For motion status, refer to **Table definition-> Motion status definition tables** in the APS Function Library. For example, the following figure shows PCI-8338 Motion Status 38. Table definition-> F. Motion status definition table -> PCIe-833x Motion status definition table, as shown below.



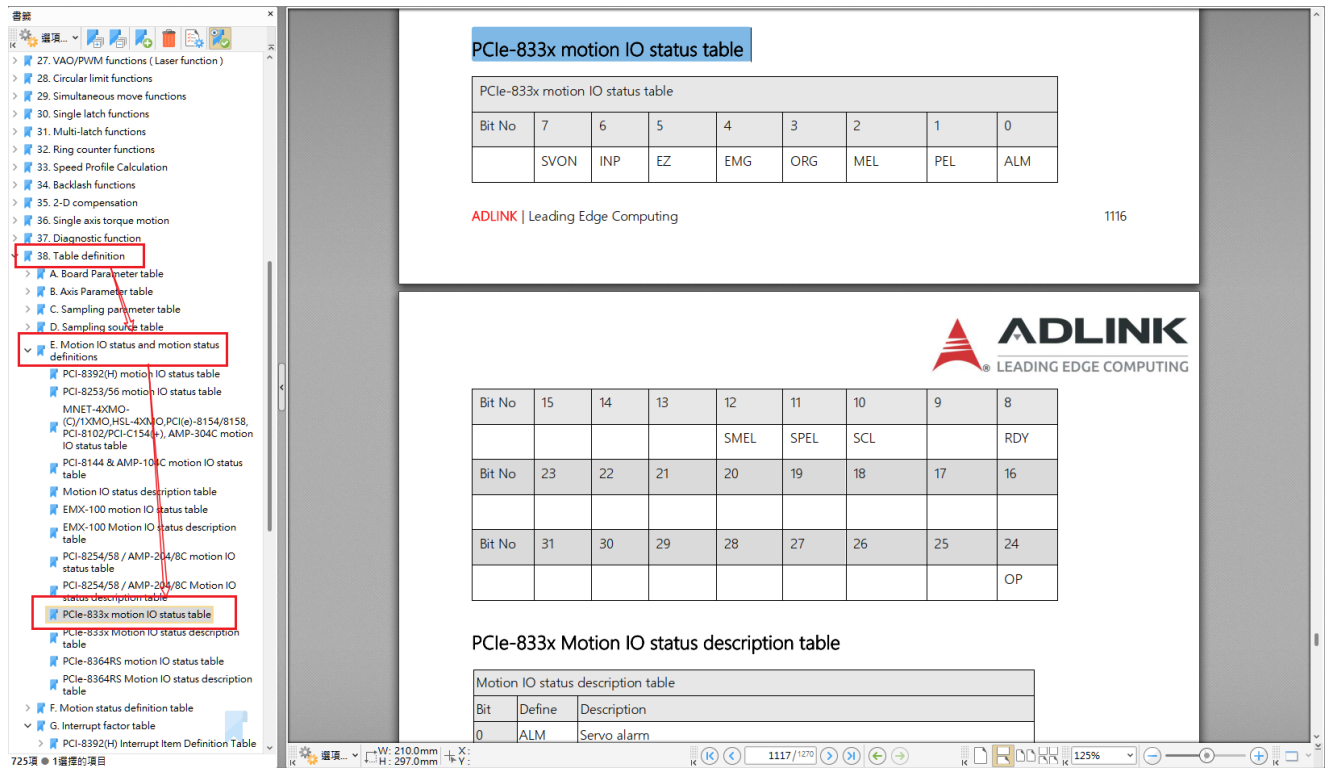
PCIe-833x Motion status definition table

Motion status definition table								
BitNo	7	6	5	4	3	2	1	0
	TM	HMV	MDN	DIR	DEC	ACC	VM	CSTP
BitNo	15	14	13	12	11	10	9	8
	JOG	--	--	--	PTB	WAIT	--	--
BitNo	23	22	21	20	19	18	17	16
	ASYNCERR	--	--	--	POSTD	PRED	BLD	ASTP
BitNo	31	30	29	28	27	26	25	24
	--	GRY	PSR	GER	BACKLASH	--	--	--

PCIe-833x Motion Status Description Table

Motion Status Description Table		
Bit	Define	Description
0	CSTP	Command stopped (But it could be in motion)
1	VM	In maximum velocity
2	ACC	In acceleration
3	DEC	In deceleration
4	DIR	Move direction. 1 : Positive direction, 0 : Negative direction
5	MDN	Motion done; 0 : In motion, 1 : Motion done (It could be abnormal stop)
6	HMV	In homing
7	TM	In maximum torque (See Note (3))
...	Reserved	Reserved, always be 0
10	WAIT	Axis is in waiting state. (Wait move trigger)
11	PTB	Axis is in point buffer moving. (When this bit on, MDN and ASTP will be cleared)

For Motion IO Status definitions, see **Table definition->Motion IO status and motion status definitions** in the APS Function Library. For the example above, the PCIe - 8338 Motion path for IO Status reference content is shown as 38. Table definition-> E. Motion IO status and motion status definitions -> PCIe-833x motion IO status table, as below.



The screenshot displays the Motion Creator Pro 2 software interface. On the left, a tree view under 'Table definition' shows the navigation path: 'E. Motion IO status and motion status definitions' > 'PCIe-833x motion IO status table'. The main area on the right shows the 'PCIe-833x motion IO status table' and the 'PCIe-833x Motion IO status description table'.

PCIe-833x motion IO status table

Bit No	7	6	5	4	3	2	1	0
	SVON	INP	EZ	EMG	ORG	MEL	PEL	ALM

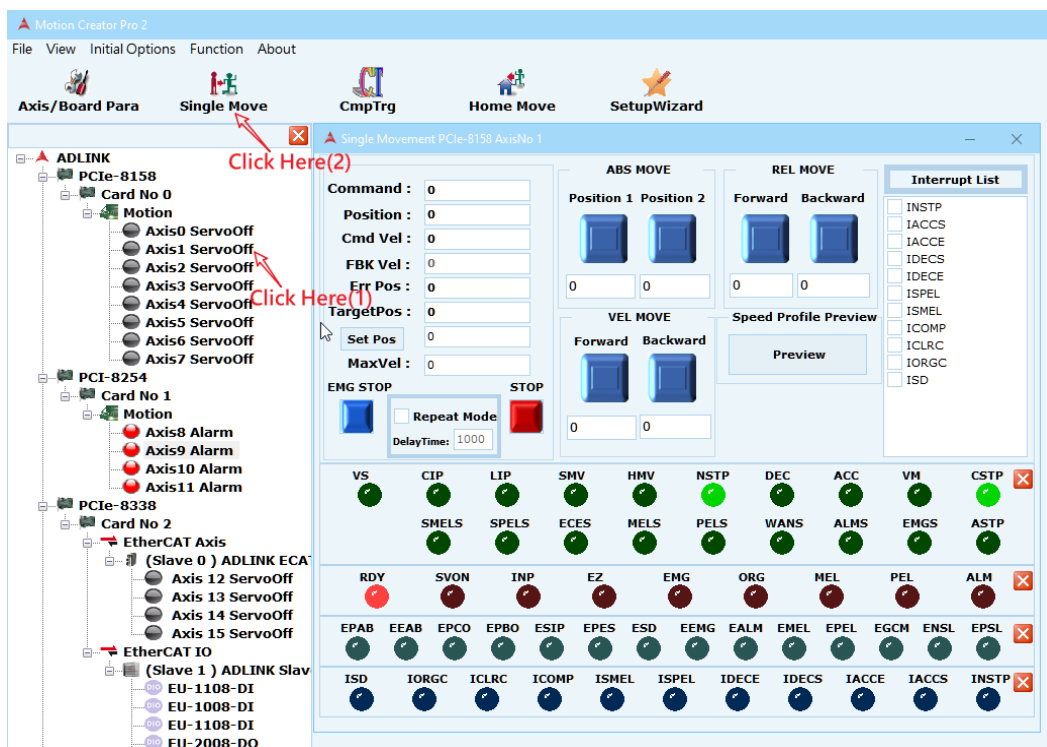
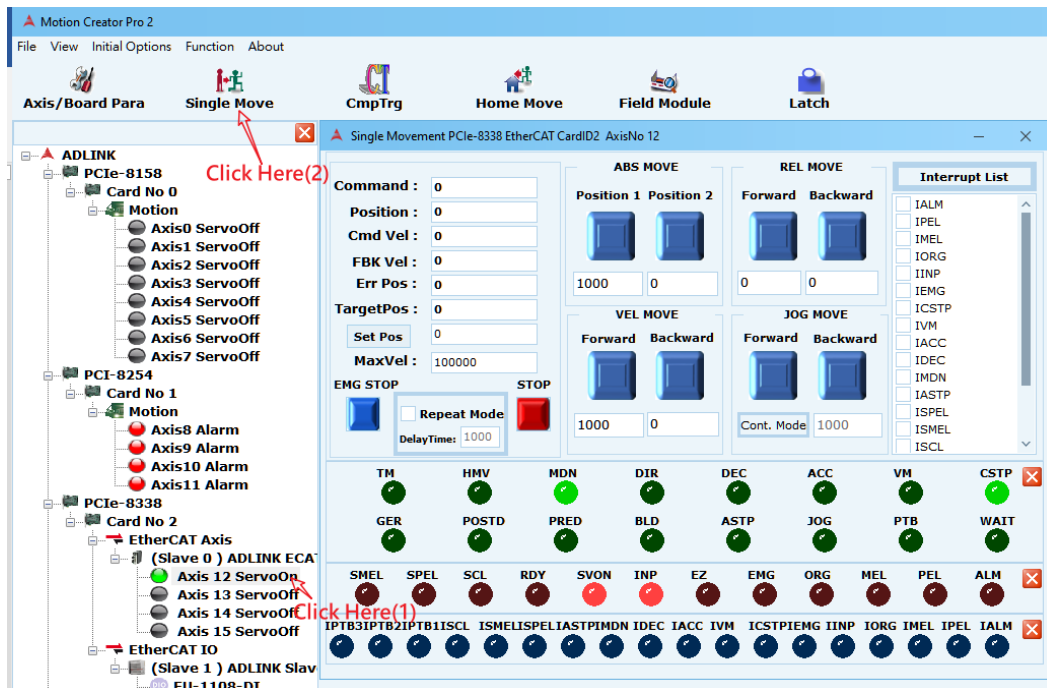
PCIe-833x Motion IO status description table

Bit	Define	Description
0	ALM	Servo alarm

3.3 Single Move

The single-axis operation function can control a single axis to do absolute motion, relative motion, speed motion and inch motion and other functions, and can monitor the command, displacement, speed and various motion state information in real time.

The steps of opening the single-axis operation page are as shown below. First, click **Axis x** on the device tree, and then click the **Single Move** icon.



3.3.1 Position/Command Status

This area displays the following information:

- **Command:** Current command location
- **Position:** Current feedback location
- **Cmd Vel:** Current command speed
- **FBK Vel:** Current feedback speed
- **Err Pos:** Displacement error value
- **TargetPos:** Target position
- **Set Pos:** Set the command position and the feedback position at the same time
- **MaxVel:** Set point to point maximum velocity

Command :	0
Position :	0
Cmd Vel :	0
FBK Vel :	0
Err Pos :	0
TargetPos :	0
Set Pos	0
MaxVel :	100000

3.3.2 Move Operation

Motion operation can be divided into four operation modes, the input displacement is in Pulse units.

- (1) ABS MOVE: Absolute position movement, you can enter the absolute position
- (2) REL MOVE: Relative position movement, you can enter the relative position
- (3) VEL MOVE: Speed movement, speed can be entered
- (4) JOG MOVE: Move in inches, click Free or Step mode. (Step mode must set displacement)

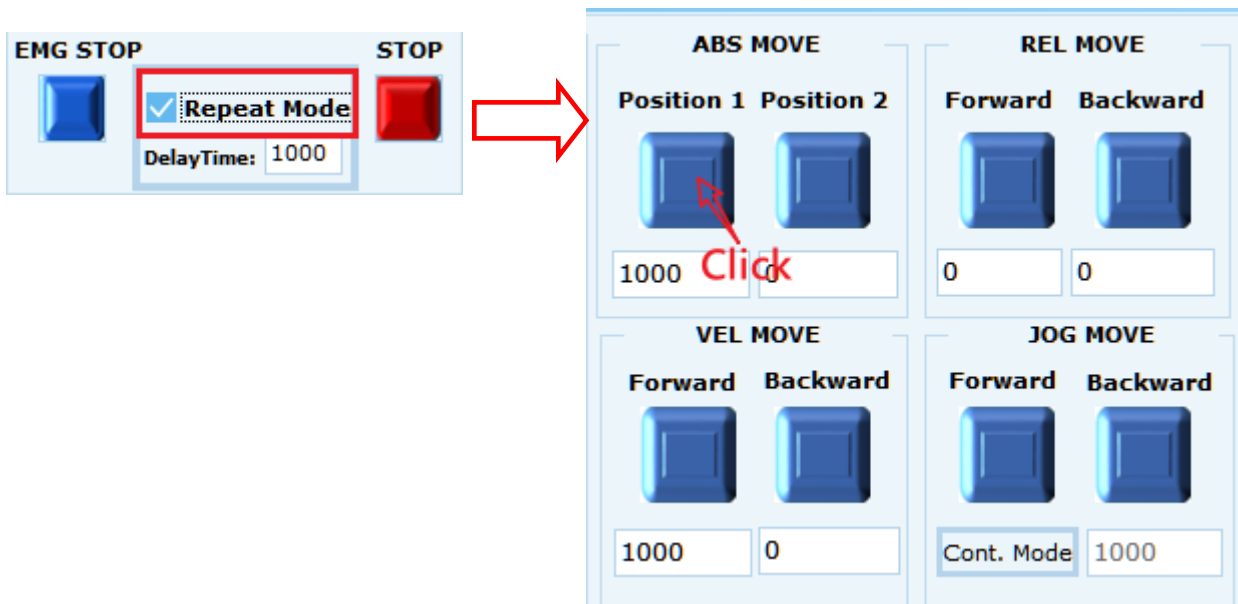


The image displays four panels for different move operations, each with a red border and a red number in the top left corner:

- (1) ABS MOVE:** Features two buttons labeled "Position 1" and "Position 2". Below "Position 1" is a numeric input field containing "1000". Below "Position 2" is a numeric input field containing "0".
- (2) REL MOVE:** Features two buttons labeled "Forward" and "Backward". Below "Forward" is a numeric input field containing "0". Below "Backward" is a numeric input field containing "0".
- (3) VEL MOVE:** Features two buttons labeled "Forward" and "Backward". Below "Forward" is a numeric input field containing "1000". Below "Backward" is a numeric input field containing "0".
- (4) JOG MOVE:** Features two buttons labeled "Forward" and "Backward". Below "Forward" is a label "Cont. Mode" and a numeric input field containing "1000". Below "Backward" is a numeric input field containing "1000".

Note: The increase or decrease rate can be set in [3.1 Parameter Management](#).

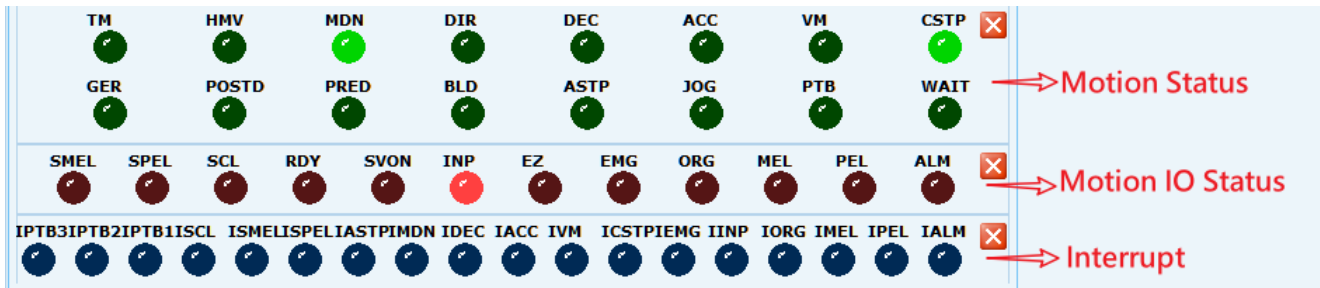
If it is necessary to perform reciprocating movement between two displacements, check **Repeat Move** and set the **Delay Time** interval before the movement operation is performed.



The image shows a control panel on the left with a red box highlighting the "Repeat Mode" checkbox, which is checked. Below it is a "DelayTime:" label followed by a numeric input field containing "1000". To the right of this panel is a large red arrow pointing towards the right. On the right side, there are four panels for move operations, identical to the ones in the previous image. A red arrow points from the "Repeat Mode" checkbox to the "Position 1" button in the "ABS MOVE" panel, with the word "Click" written in red next to it.

3.3.3 Status View

The Status display area provides real-time feedback to the controller, including Motion Status, Motion IO, Interrupt, and Interrupt Error blocks.



• Motion Status

Refer to the APS Function Library manual **Table definition-> Motion status definition tables**. For PCIe-8338 Motion Status, refer to 38. Table definition-> F. Motion status definition table -> PCIe-833x Motion status definition table, as shown below.

PCIe-833x Motion status definition table

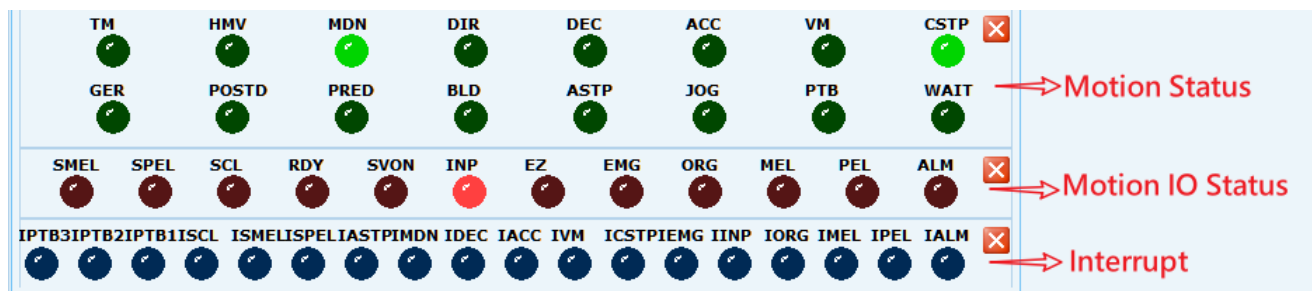
BitNo	7	6	5	4	3	2	1	0
	TM	HMV	MDN	DIR	DEC	ACC	VM	CSTP
BitNo	15	14	13	12	11	10	9	8
	JOG	--	--	--	PTB	WAIT	--	--
BitNo	23	22	21	20	19	18	17	16
	ASYNCERR	--	--	--	POSTD	PRED	BLD	ASTP
BitNo	31	30	29	28	27	26	25	24
	--	GRY	PSR	GER	BACKLASH	--	--	--

PCIe-833x Motion Status Description Table

Bit	Define	Description
0	CSTP	Command stopped (But it could be in motion)
1	VM	In maximum velocity
2	ACC	In acceleration
3	DEC	In deceleration
4	DIR	Move direction. 1 : Positive direction, 0 : Negative direction
5	MDN	Motion done. 0 : In motion, 1 : Motion done (It could be abnormal stop)
6	HMV	In homing
7	TM	In maximum torque (See Note (3))
...	Reserved	Reserved, always be 0
10	WAIT	Axis is in waiting state. (Wait move trigger)
11	PTB	Axis is in point buffer moving. (When this bit on, MDN and ASTP will be cleared)

如有伺服異常停止的情況，Soft motion 系列軸卡可點選“ASTP”查得停止的原因。





Refer to APS Function Library manual **Table definition->Motion IO status and motion status definitions**. For PCIe-8338 Motion path IO Status, refer to 38. Table definition-> E. Motion IO status and motion status definitions -> PCIe-833x motion IO status table, as shown below.

目錄

- > 27. VAO/PWM functions (Laser function)
- > 28. Circular limit functions
- > 29. Simultaneous move functions
- > 30. Single latch functions
- > 31. Multi-latch functions
- > 32. Ring counter functions
- > 33. Speed Profile Calculation
- > 34. Backlash functions
- > 35. 2-D compensation
- > 36. Single axis torque motion
- > 37. Diagnostic function
- > 38. Table definition
 - > A. Board Parameter table
 - > B. Axis Parameter table
 - > C. Sampling parameter table
 - > D. Sampling source table
 - > E. Motion IO status and motion status definitions
 - PCI-8392(H) motion IO status table
 - PCI-8253/56 motion IO status table
 - MNET-4XMO-
(C)/1XMO, HSL-4XMO, PCI(e)-8154/8158,
PCI-8102/PCI-8154(-), AMP-304C motion
IO status table
 - PCI-8144 & AMP-100C motion IO status
table
 - Motion IO status description table
 - EMX-100 motion IO status table
 - EMX-100 Motion IO status description
table
 - PCI-8254/58 / AMP-204/8C motion IO
status table
 - PCI-8254/58 / AMP-204/8C Motion IO
status description table
 - PCIe-833x motion IO status table
 - PCIe-833x Motion IO status description
table
 - PCIe-8364RS motion IO status table
 - PCIe-8364RS Motion IO status description
table
 - > F. Motion status definition table
 - > G. Interrupt factor table
 - > PCI-8392(H) Interrupt Item Definition Table

PCIe-833x motion IO status table

Bit No	7	6	5	4	3	2	1	0
	SVON	INP	EZ	EMG	ORG	MEL	PEL	ALM

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ADLINK

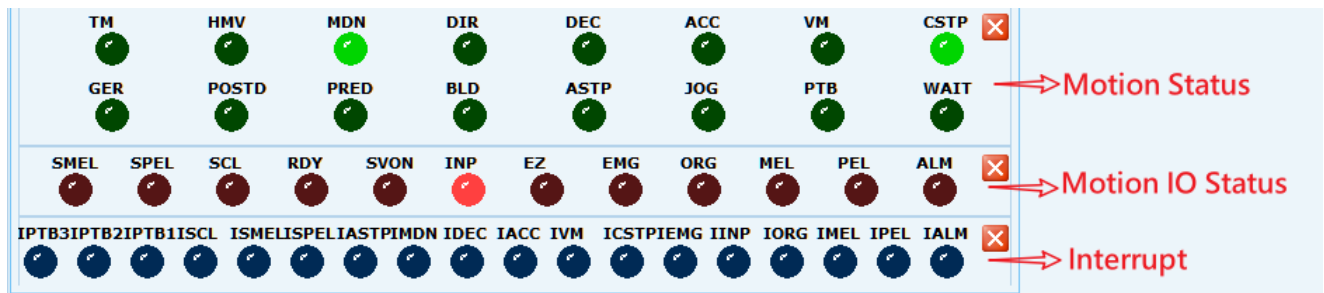
LEADING EDGE COMPUTING

Bit No	15	14	13	12	11	10	9	8
				SMEL	SPEL	SCL		RDY
Bit No	23	22	21	20	19	18	17	16
Bit No	31	30	29	28	27	26	25	24
								OP

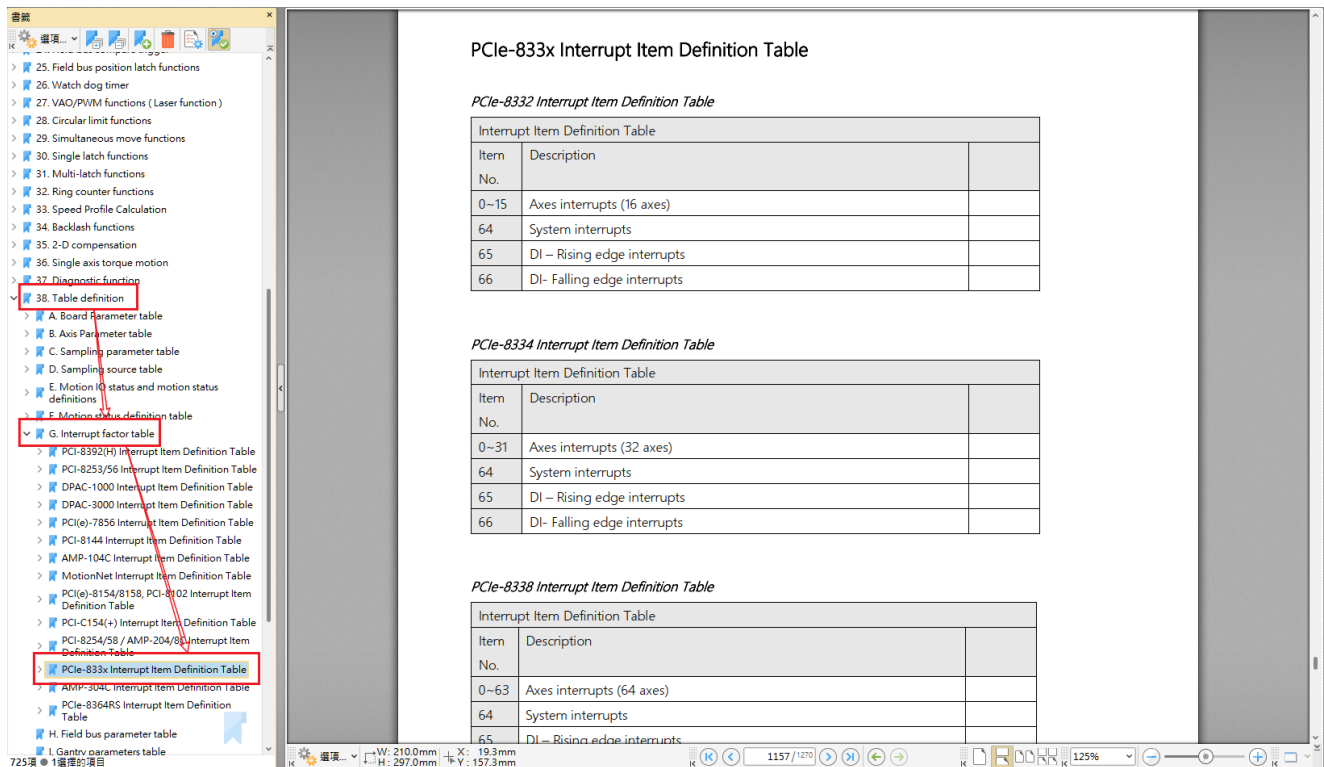
PCIe-833x Motion IO status description table

Bit	Define	Description
0	ALM	Servo alarm

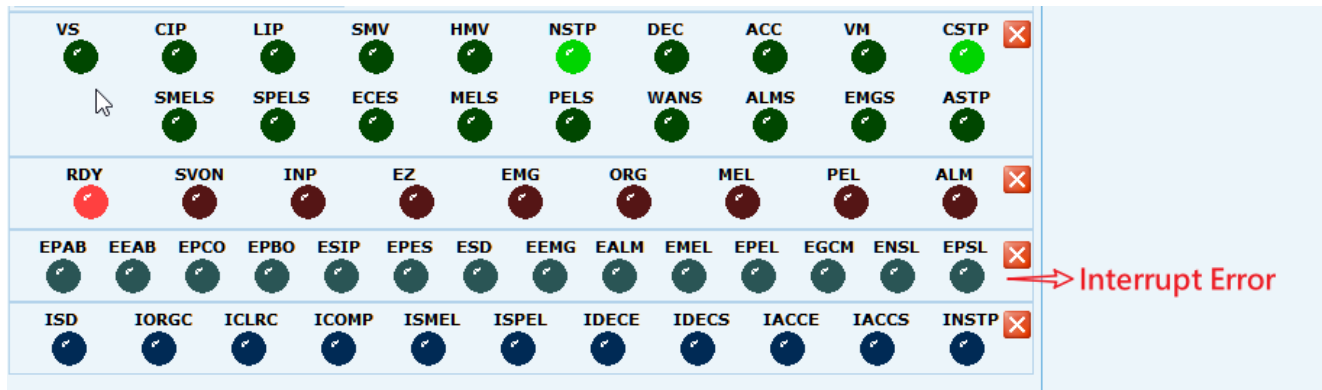
- Interrupt



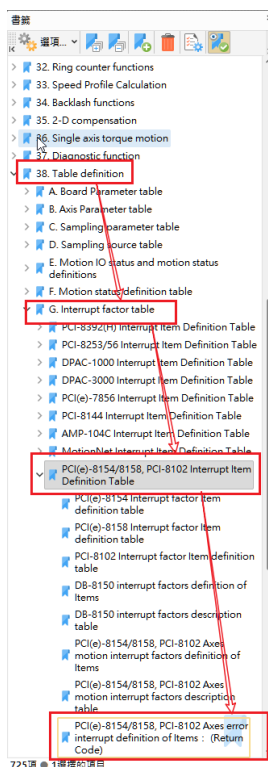
Refer to the APS Function Library manual **Table definition-> Interrupt factor table**. For the Interrupt reference content path for the PCIe-8338, refer to 38. Table definition-> G. Interrupt factor table -> PCIe-833x Interrupt Item Definition Table, as shown below.



- Interrupt Error (Pulse type Axis card only)



Refer to the APS Function Library manual **Table definition-> Interrupt factor table-> Interrupt Item Definition Table-> Axes error** for the corresponding interrupt definitions. For the PCIe-8158 error interrupt reference path, refer to 38. Table definition-> G. Interrupt factor table -> PCI(e)-8154/8158, PCI-8102 Axes error interrupt definition of Items, as shown below.



11	ICOMP4	General comparator is ON
12	ICOMP5	Trigger comparator or comparator 5 is ON
13	ICLRC	Counter is reset by CLR input
14	Reserved	Reserved
15	IORG	Counter is latched by ORG input
16	ISD	SD input turns on
17	Reserved	Reserved
18	Reserved	Reserved
19	ICSTA	CSTA input or APS_start_simultaneous_move turn on
20~	Reserved	Reserved(Always set to 0)

PCI(e)-8154/8158, PCI-8102 Axes error interrupt definition of Items : (Return Code)

The error interrupt sources are non-maskable but the error number of situation could be get from APS_wait_error_int()'s return code if it is not timeout.

Return Code	Interrupt condition description	Note
0	+Soft Limit is on and axis is stopped	
1	-Soft Limit is on and axis is stopped	
2	Error Comparator or comparator 3 is ON and axis is stopped	
3	General Comparator is on and axis is stopped	
4	Trigger Comparator or comparator 5 is ON and axis is stopped	
5	+End Limit is on and axis is stopped	
6	-End Limit is on and axis is stopped	

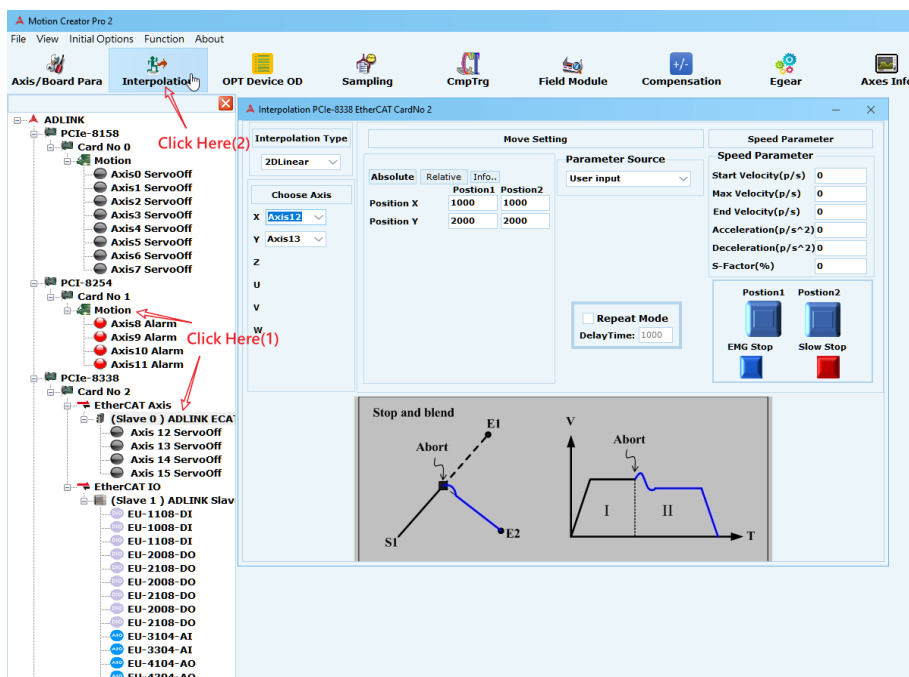
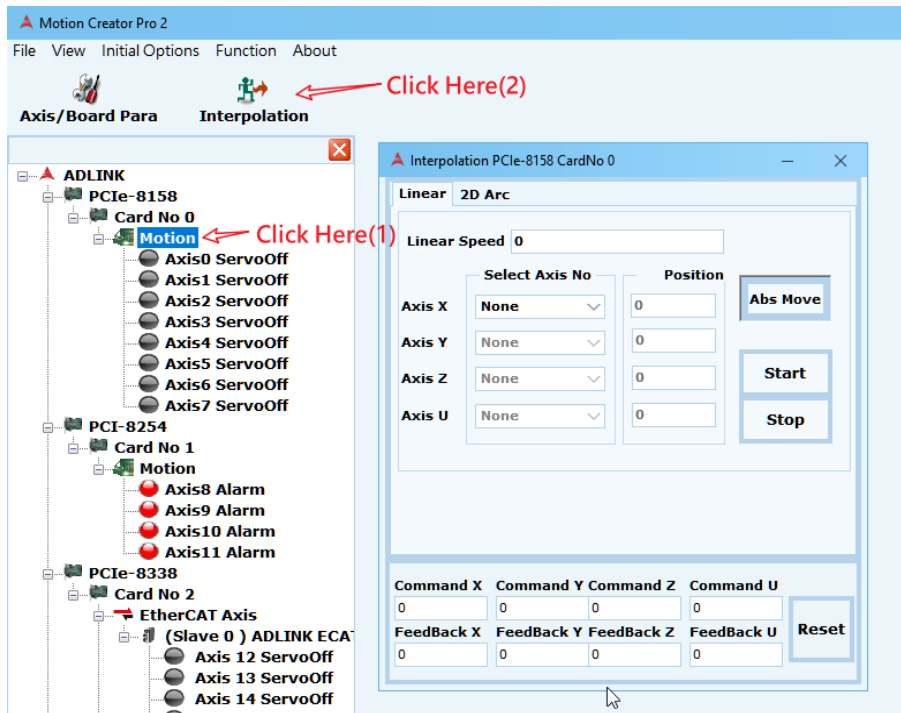
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3.4 Interpolation

Interpolation is suitable for use in motion control systems where there is an interaction between the displacement of more than one axis, for example, 2 axis, 2 axis arc, 3 axis, etc. The tween function is divided into two settings for pulse type axis cards and soft motion axis cards, and their corresponding setting parameters are also slightly different.

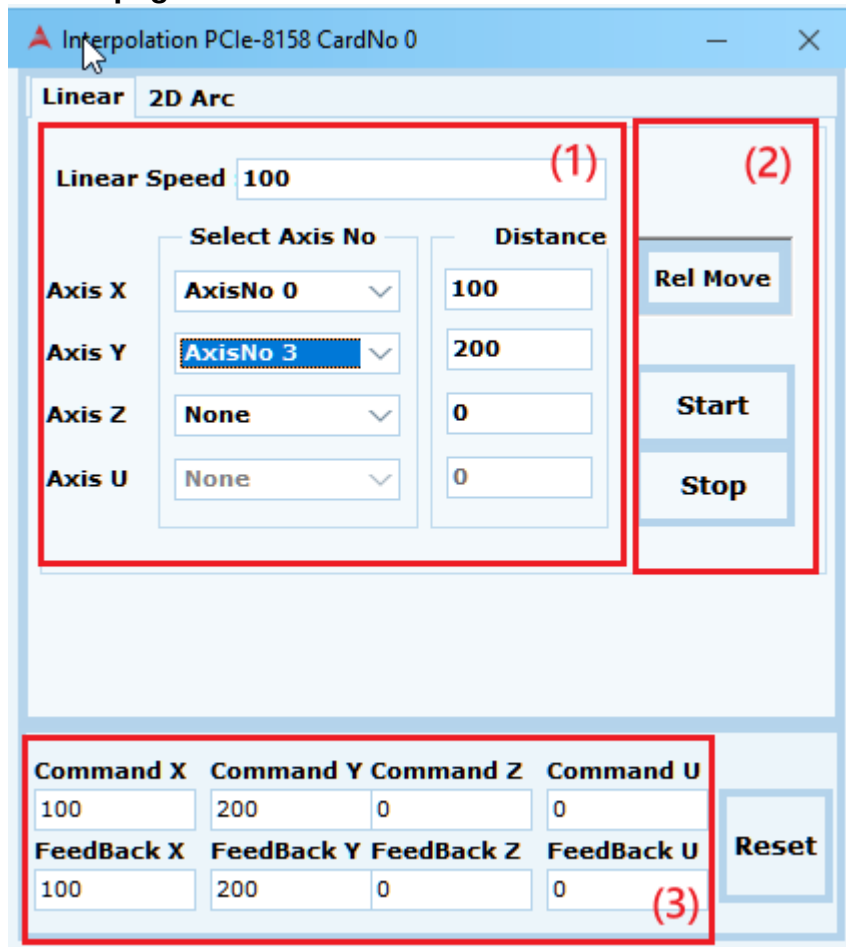
Click **Slave** or **Motion** in the device tree according to the card type, and then click the **Interpolation** icon, as shown below.



- **Pulse type Axis card page**

The setting functions are divided into two pages.

Linear page



Interpolation PCIe-8158 CardNo 0

Linear 2D Arc

Linear Speed 100 (1)

Select Axis No

Axis X AxisNo 0

Axis Y AxisNo 3

Axis Z None

Axis U None

Distance

100

200

0

0

Rel Move

Start

Stop

Command X Command Y Command Z Command U

100 200 0 0

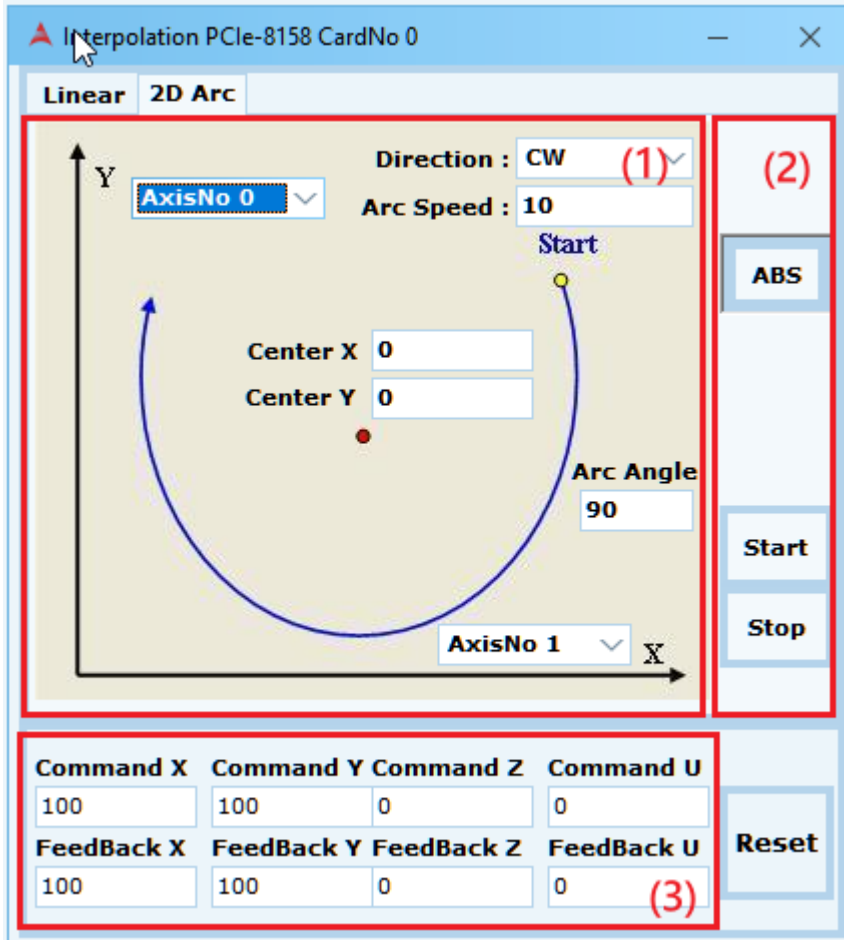
FeedBack X FeedBack Y FeedBack Z FeedBack U

100 200 0 0 (3)

Reset

- (1) Select the axis number and displacement quantity to perform the tween movement.
- (2) **Abs Mode/Rel Mode:** Set absolute or relative motion and the amount of displacement.
Start/Stop: Start command and stop command
- (3) Monitor the command and reply of each axis.

2D Arc page



Interpolation PCIe-8158 CardNo 0

Linear 2D Arc

Direction : CW (1)

Arc Speed : 10

Start

Center X 0

Center Y 0

Arc Angle 90

AxisNo 1 X

Y

AxisNo 0

ABS

Start

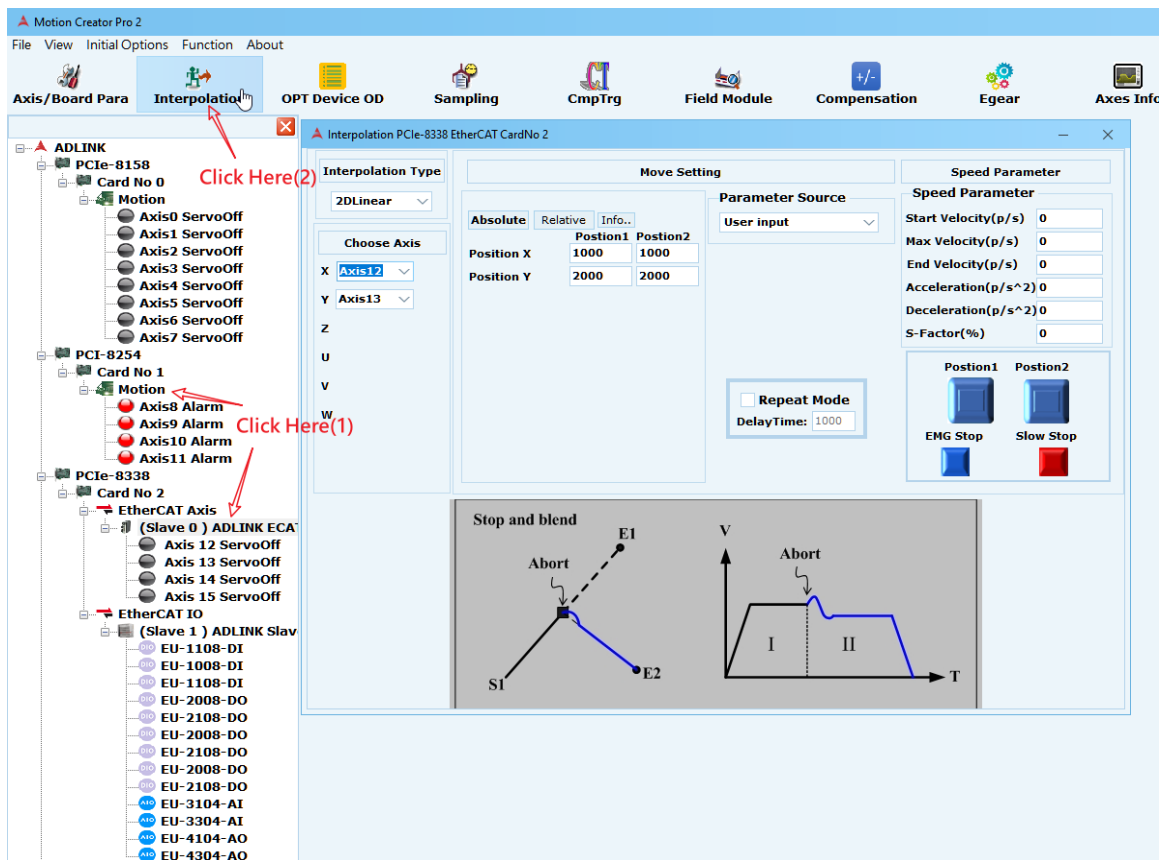
Stop

Command X	Command Y	Command Z	Command U
100	100	0	0
FeedBack X	FeedBack Y	FeedBack Z	FeedBack U
100	100	0	0 (3)

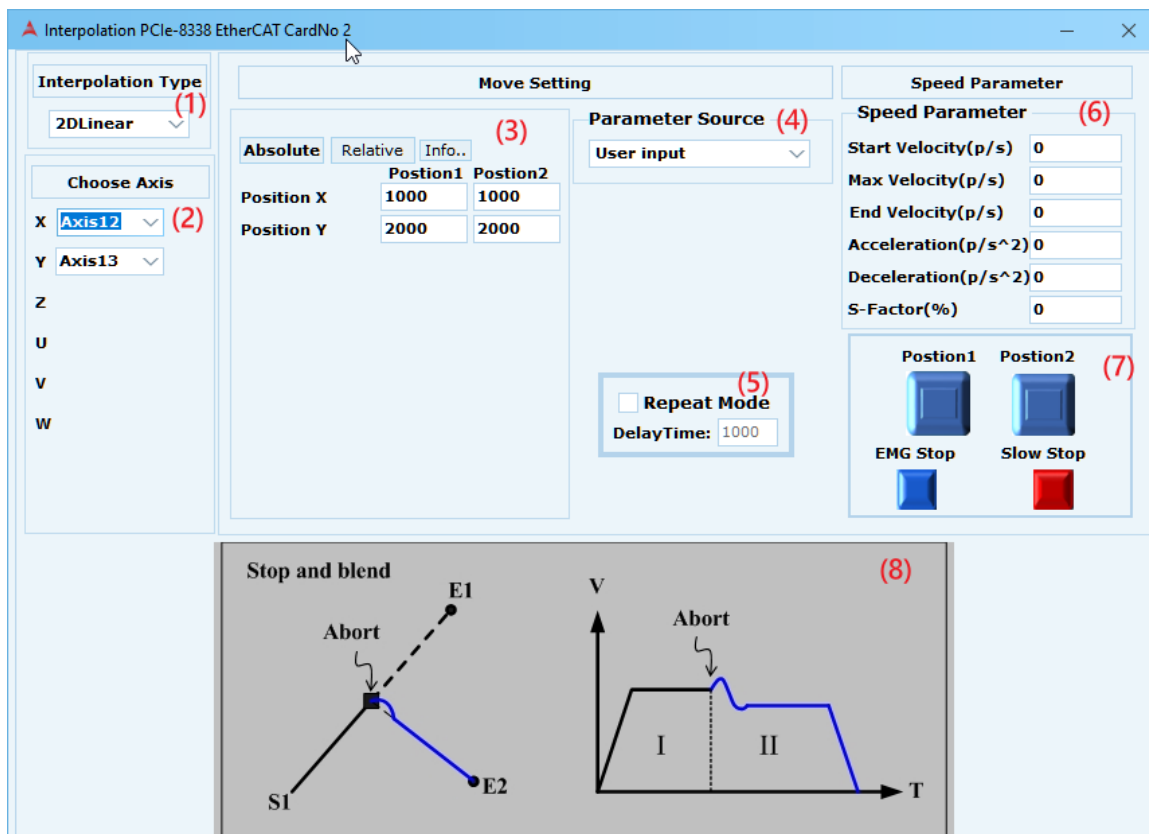
Reset

- (1) Select the axis number, rotation amount, center point, speed and steering for 2D Arc movement.
- (2) **Abs /Rel**: Set absolute or relative motion.
Start/Stop: Start command and stop command.
- (3) Monitor the commands and feedback of each axis.

- Soft motion axis card page



The tween function of a soft motion axis card can be roughly divided into eight areas.



- (1) **Interpolation Type:** The API for selecting the exercise type among the eleven tween types is as follows.

Interpolation Type	
2DLinear	APS_line_all
3DLinear	APS_line_all
4DLinear	APS_line_all
5DLinear	APS_line_all
6DLinear	APS_line_all
2DARC_A	APS_arc2_ca_all
2DARC_E	APS_arc2_ce_all
3DARC_A	APS_arc3_ca_all
3DARC_E	APS_arc3_ce_all
3DSPH_A	APS_spiral_ca_all
3DSPH_E	APS_spiral_ce_all

- (2) **Choose Axis:** Select the axis number for the tween motion.
- (3) **Absolute/Relative:** Set absolute or relative motion and the amount of displacement.
- (4) **Parameter Source:** Select the source of the speed parameter.

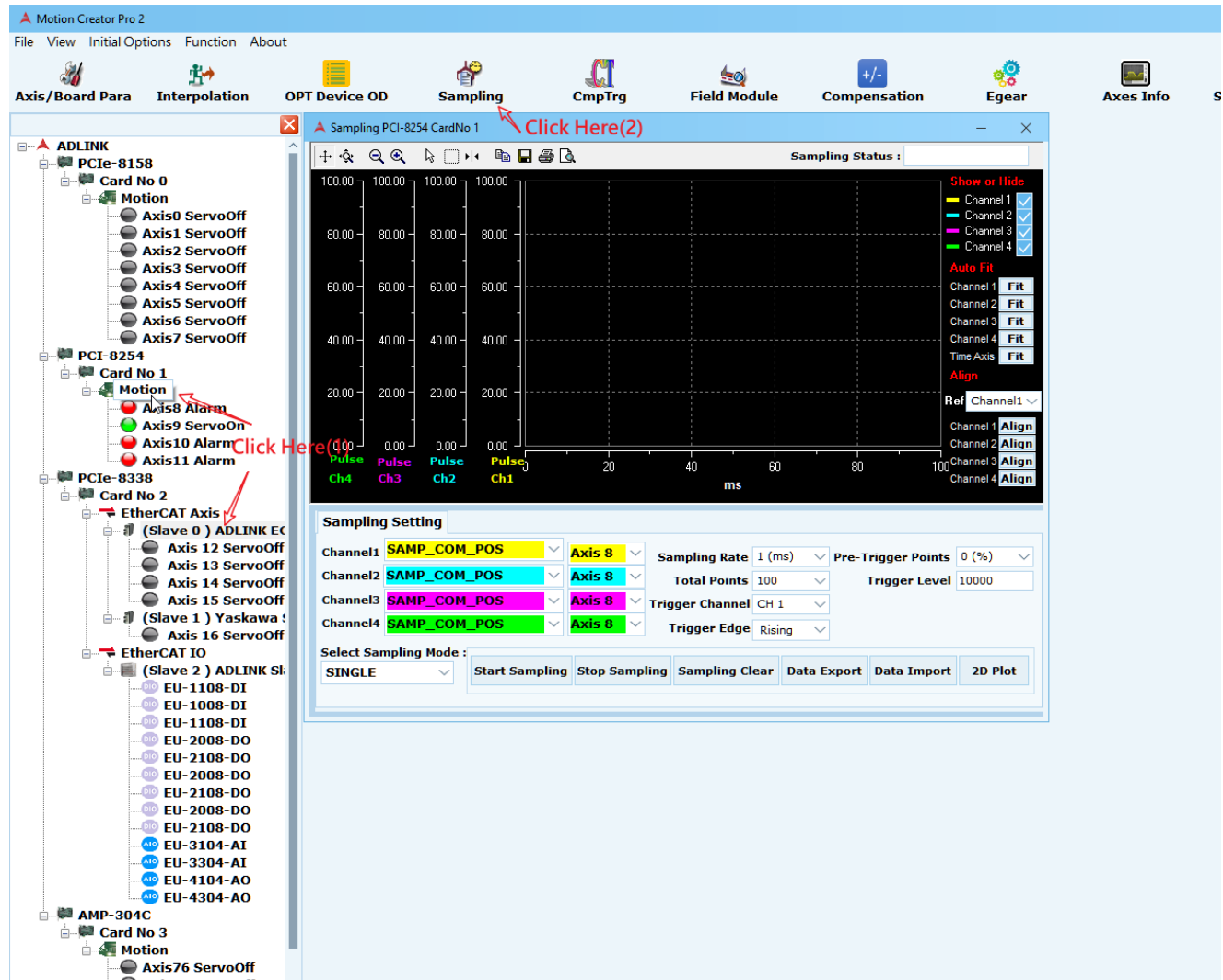
Parameter Source	Description
User input	Use the velocity parameter in block (6)
Axis parameter	Use current axis parameter Settings (for axis parameter pages, please refer to 3.1 and APS manual Settings)
Only Vmax	Use the speed parameters in Block (6), but the maximum speed should be set according to 3.1 and APS manual

- (5) If it is necessary to perform reciprocating and back movement between two displacements, you can select **Repeat Move** and set the **Delay Time** before performing the movement operation.
- (6) **Speed Parameter:** Enter each speed set. If the parameter selected in block (4) is from user input, the operation in block (7) will use the setting here.
- (7) Start and stop movement operation control.
- (8) Schematic diagram of the selected mode.

3.5 Sampling

The sampling page function can collect command, position, speed and other data and display them on the motion control process chart, help with machine adjustment or analysis.

Follow the steps in the image below. Click **Slave** or **Motion** in the device tree, and then click the **Sampling** icon.



The screenshot shows the Motion Creator Pro 2 interface with the Sampling window open. The left sidebar displays the device tree, including ADLINK, PCI-8158, PCI-8254, and PCI-8338. The main window shows the Sampling Status graph and the Sampling Setting panel.

Sampling Status: The graph displays four channels (Ch1, Ch2, Ch3, Ch4) over a 100 ms time axis. The y-axis ranges from 0.00 to 100.00. The graph shows a pulse for Ch1 and Ch2, and a steady state for Ch3 and Ch4.

Sampling Setting:

Channel	Sampling Mode	Axis	Sampling Rate	Pre-Trigger Points	Trigger Level
Channel1	SAMP_COM_POS	Axis 8	1 (ms)	0 (%)	10000
Channel2	SAMP_COM_POS	Axis 8			
Channel3	SAMP_COM_POS	Axis 8			
Channel4	SAMP_COM_POS	Axis 8			

Sampling Mode: SINGLE

Buttons: Start Sampling, Stop Sampling, Sampling Clear, Data Export, Data Import, 2D Plot

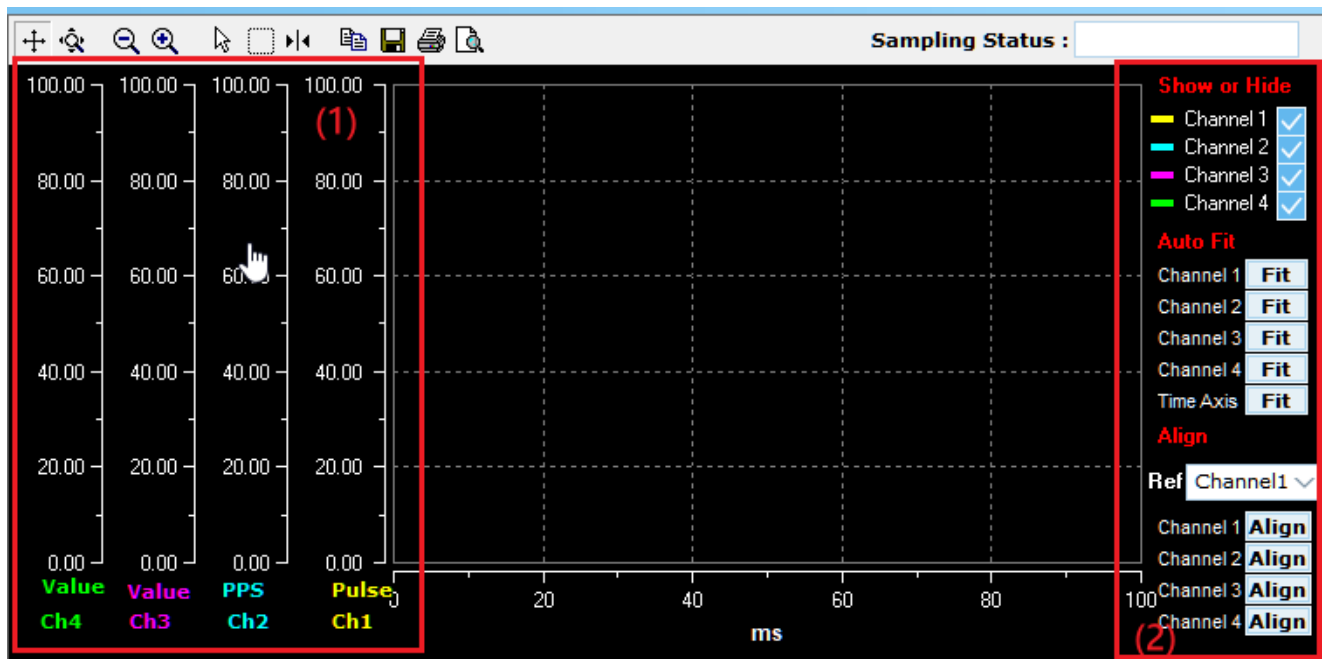
Annotations: Red arrows point to the 'Sampling' icon in the top toolbar and the 'Axis 8' dropdown in the Sampling Setting panel.

3.5.1 Drawing Area

The sampling function collects multiple varying data points. For example, the channel values in the left part of the drawing area (1) are scaled independently while the time in the graph section displays as milliseconds.

Items highlighted in (2) control the data display mode settings as follows.

- **Show or Hide:** Select whether to display the channel
- **Auto Fit:** Automatically adjust the data to fill the drawing area
- **Align:** Align the Y-coordinate axis of the data of each channel to a specified channel for display.



3.5.2 Sampling Settings

Sampling settings can be organized into three sections:

- (1) Decide which axis of motion to sample and the type of data to sample, such as position and velocity, etc.
- (2) Set the sampling speed, points and options to trigger the sampling channel.
- (3) **Single** or **Repeat** trigger modes can be displayed after setting.

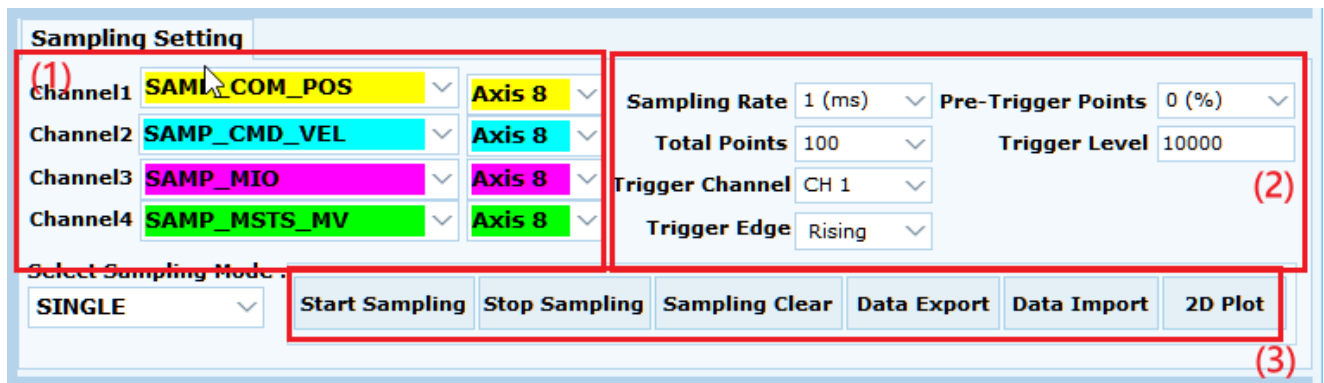
Start Sampling: Start taking samples

Stop Sampling: Click to stop sampling

Sampling Clear: Clear drawing area data

Data Export: Output sampling data to file (*.csv format)

Data Import: Input sample data file (*.csv format)



The screenshot shows the 'Sampling Setting' dialog box. It is divided into three main sections highlighted by red boxes and numbered:

- (1) Channel Selection:** This section contains four channels, each with a data type and an axis selection.

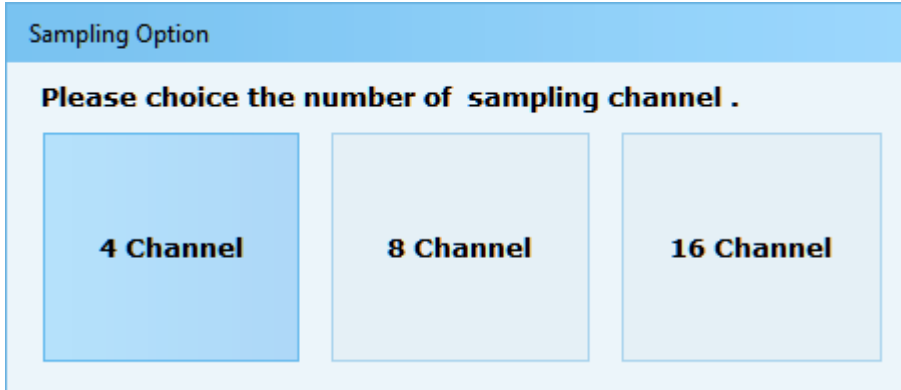
Channel	Data Type	Axis
Channel1	SAMP_COM_POS	Axis 8
Channel2	SAMP_CMD_VEL	Axis 8
Channel3	SAMP_MIO	Axis 8
Channel4	SAMP_MSTS_MV	Axis 8
- (2) Sampling Parameters:** This section contains settings for the sampling process.

Parameter	Value
Sampling Rate	1 (ms)
Pre-Trigger Points	0 (%)
Total Points	100
Trigger Channel	CH 1
Trigger Edge	Rising
Trigger Level	10000
- (3) Sampling Mode and Actions:** This section contains the sampling mode and a row of action buttons.

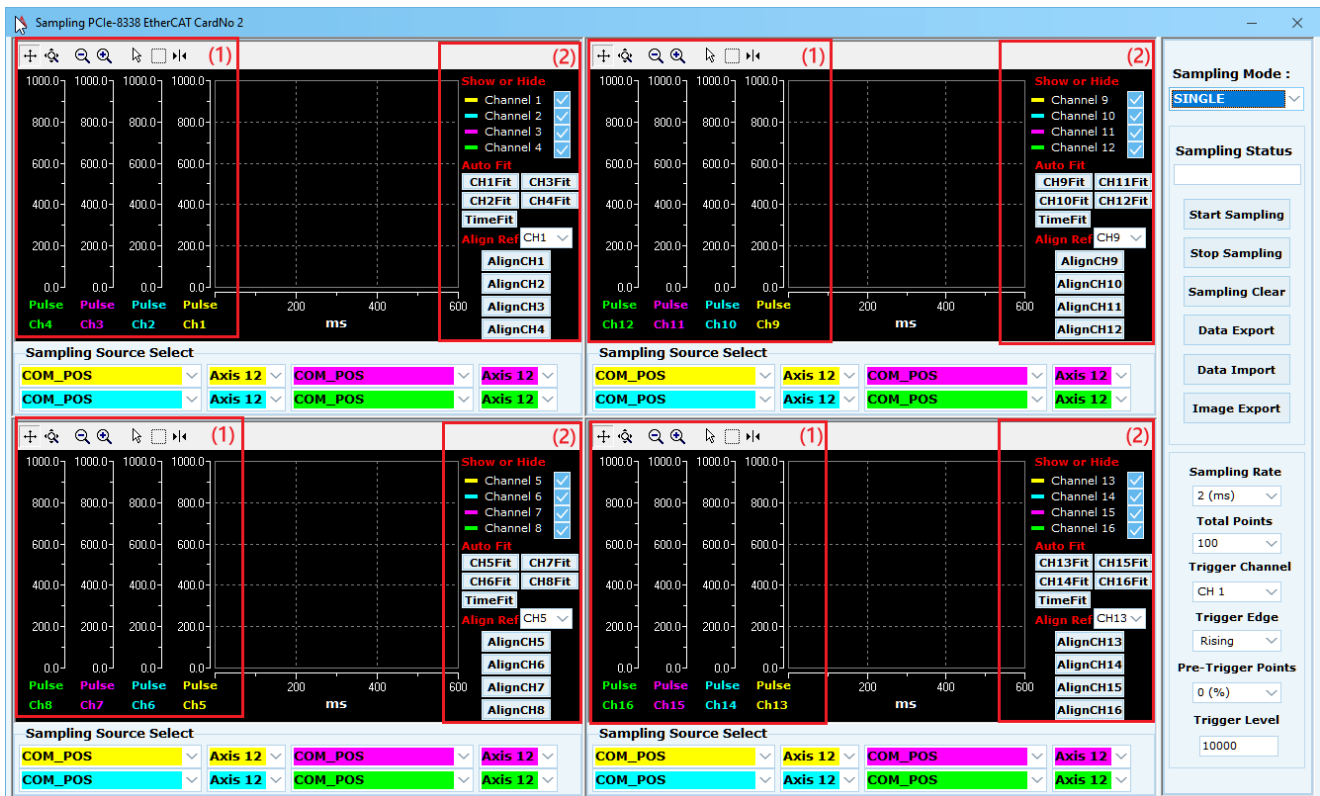
Sampling Mode	Start Sampling	Stop Sampling	Sampling Clear	Data Export	Data Import	2D Plot
SINGLE	[Button]	[Button]	[Button]	[Button]	[Button]	[Button]

3.5.3 16CH Sampling

The 16CH sampling function can simultaneously collect 4, 8, or 16 different kinds of data as shown in the figure below. The unit and numerical scale may be different for different data types. Currently, only the Ether Cat series is supported.



In the following figure, the Y-axis in the left part of the drawing areas are scaled independently, while the transverse X-axis is fixed as the time axis, with a minimum unit of millisecond.



Sampling setting can be divided into three steps:

- (1) Decide which axis of motion to sample and the type of data to sample, such as position and velocity, etc.
- (2) Set the sampling speed, points and options to trigger the sampling channel.
- (3) **Single** or **Repeat** trigger mode can be displayed after setting.

Start Sampling: Start taking samples

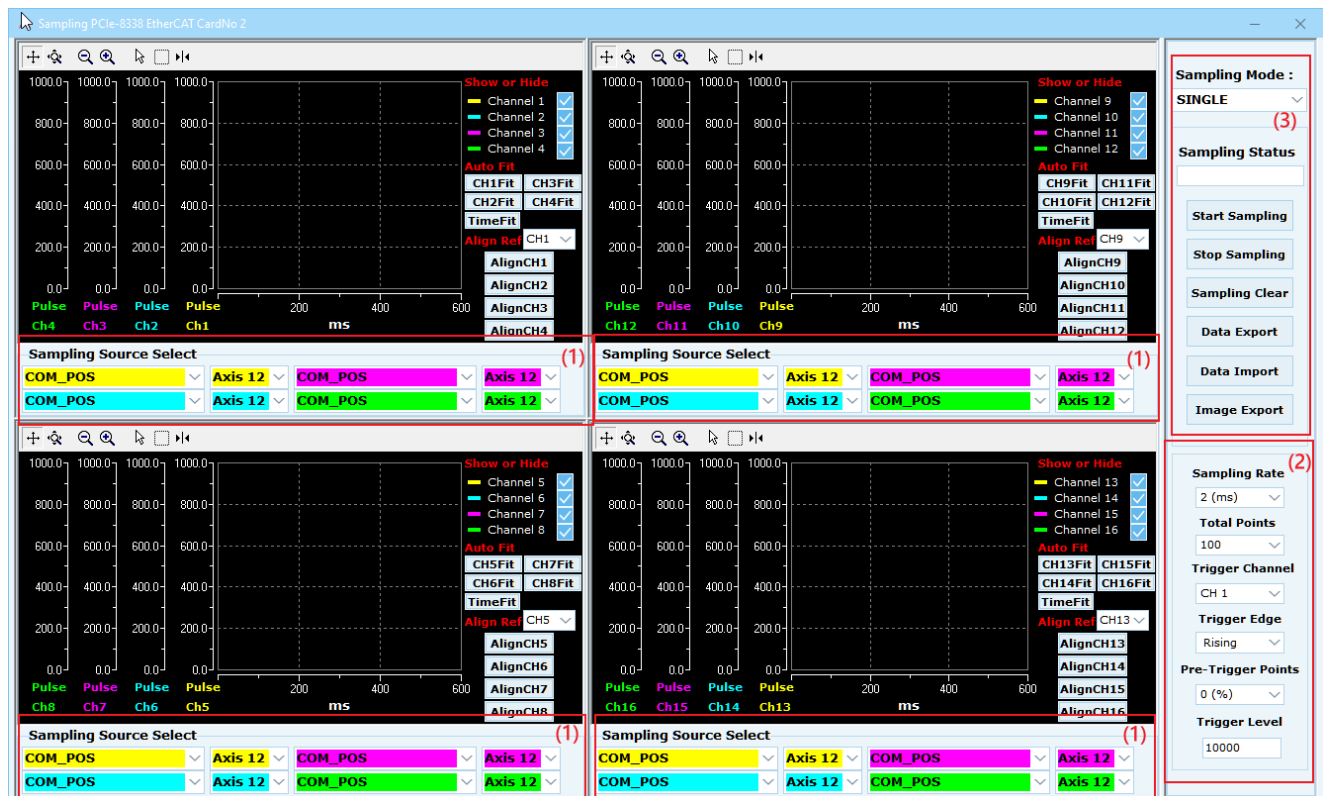
Stop Sampling: Click to stop sampling

Sampling Clear: Clear drawing area data

Data Export: Output sampling data to file (*.csv format)

Data Import: Input the sample data file (*.csv format)

Image Export: Capture images



3.6 Setup Wizard

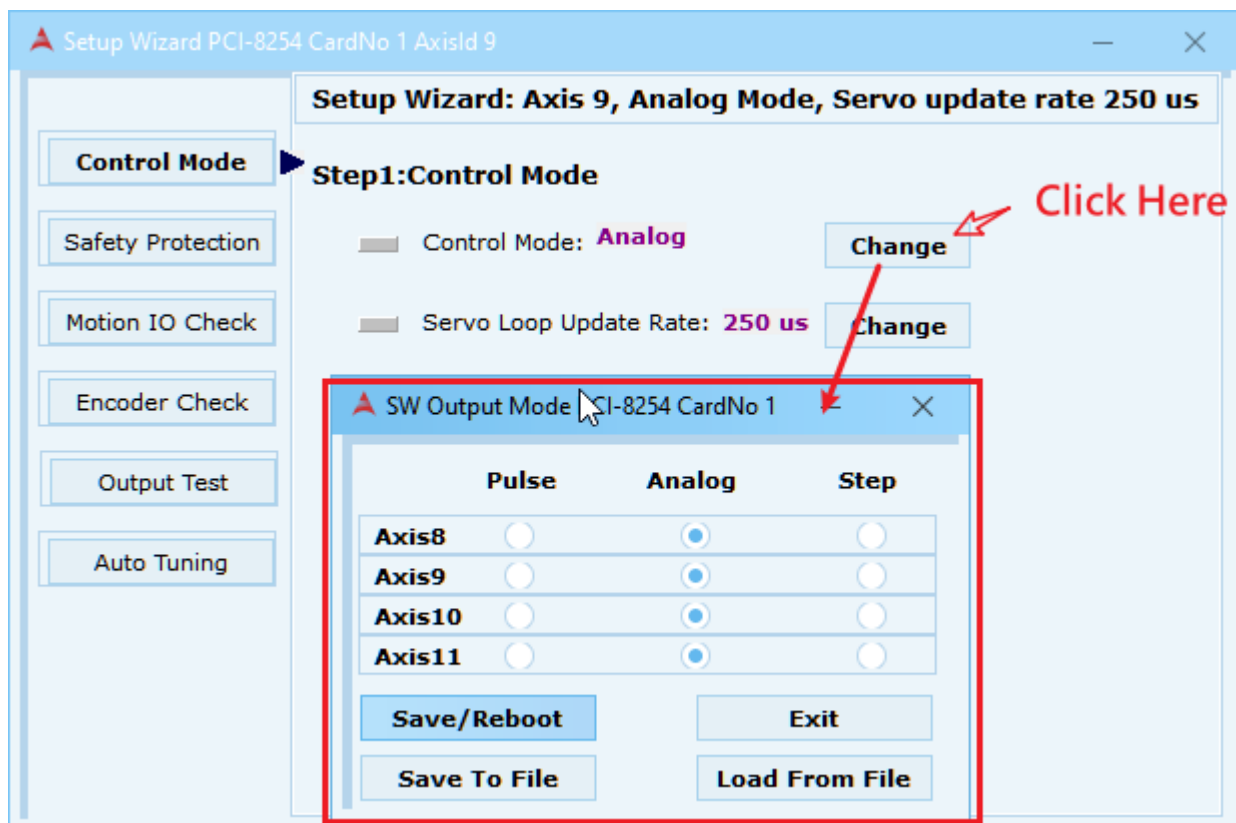
Setup Wizard is a tool that lets you quickly set parameters for an axis, helping you to easily and efficiently complete system setup by walking through the page step by step. We recommend that you perform this function as a first step before performing any motion control operations (at the beginning of using this control card). Setup Wizard can achieve the following:

- Control card basic parameter setting including control mode, servo cycle, safety setting, etc.
- Wiring check for I/O, Encoder, etc.
- Servo tuning machine (analogical, closed-loop control mode) provides Auto tuning function to help users find out a set of stable servo parameters with certain performance.

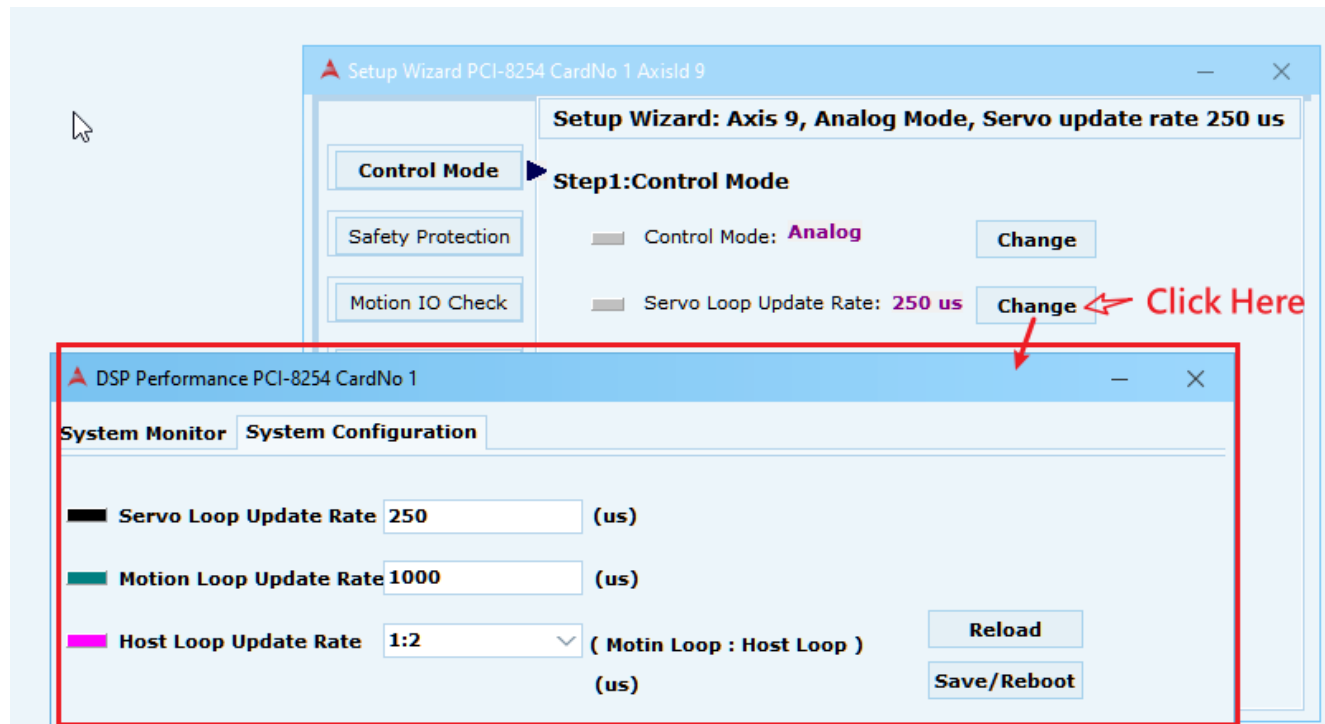
To open the **Setup Wizard** page, click **Axis x** in the setup tree, and then click the **Setup Wizard** icon.

3.6.1 Control Mode

Set the control mode of each axis to **Analog Type** or **Pulse Type**, and then click **Change**. A new page will appear for you to set the output signal type of each axis. After changing the settings, click **Save/Reboot**. It might take some time to save and reset the control card. When the action is complete, click **Exit**.

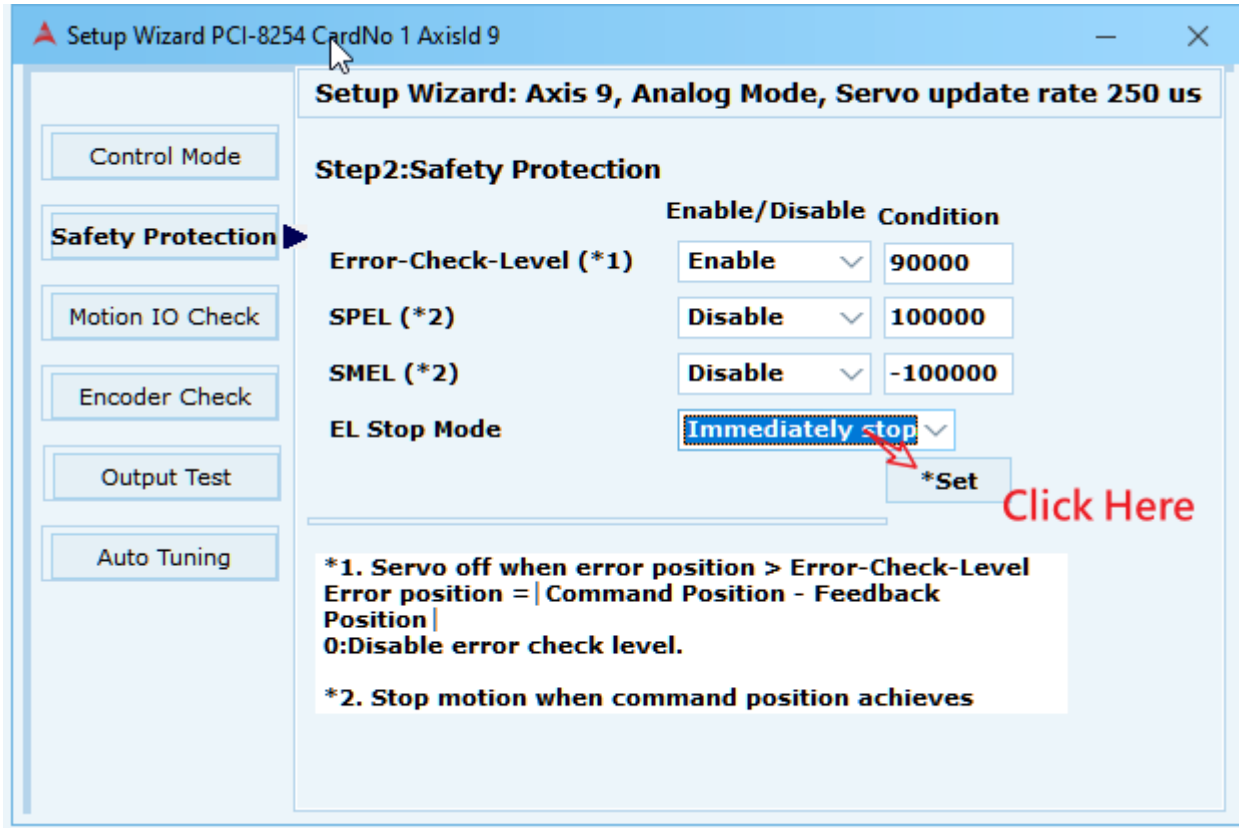


Open the Servo settings window to control the update rate speed as shown in the figure below. Fill in the appropriate **Servo Loop Update Rate** setting, click **Save/Reboot**, and then wait for the control card to reset.



3.6.2 Safety Protection

Safety Protection includes protection settings for Error-Check-Level and soft-limits. Set whether to enable the function and parameters. The **Set** button is marked with an asterisk (*) to remind you that you need to click it in order to write the set parameters to the hardware.



Setup Wizard: Axis 9, Analog Mode, Servo update rate 250 us

Step2:Safety Protection

	Enable/Disable	Condition
Error-Check-Level (*1)	Enable	90000
SPEL (*2)	Disable	100000
SMEL (*2)	Disable	-100000
EL Stop Mode	Immediately stop	

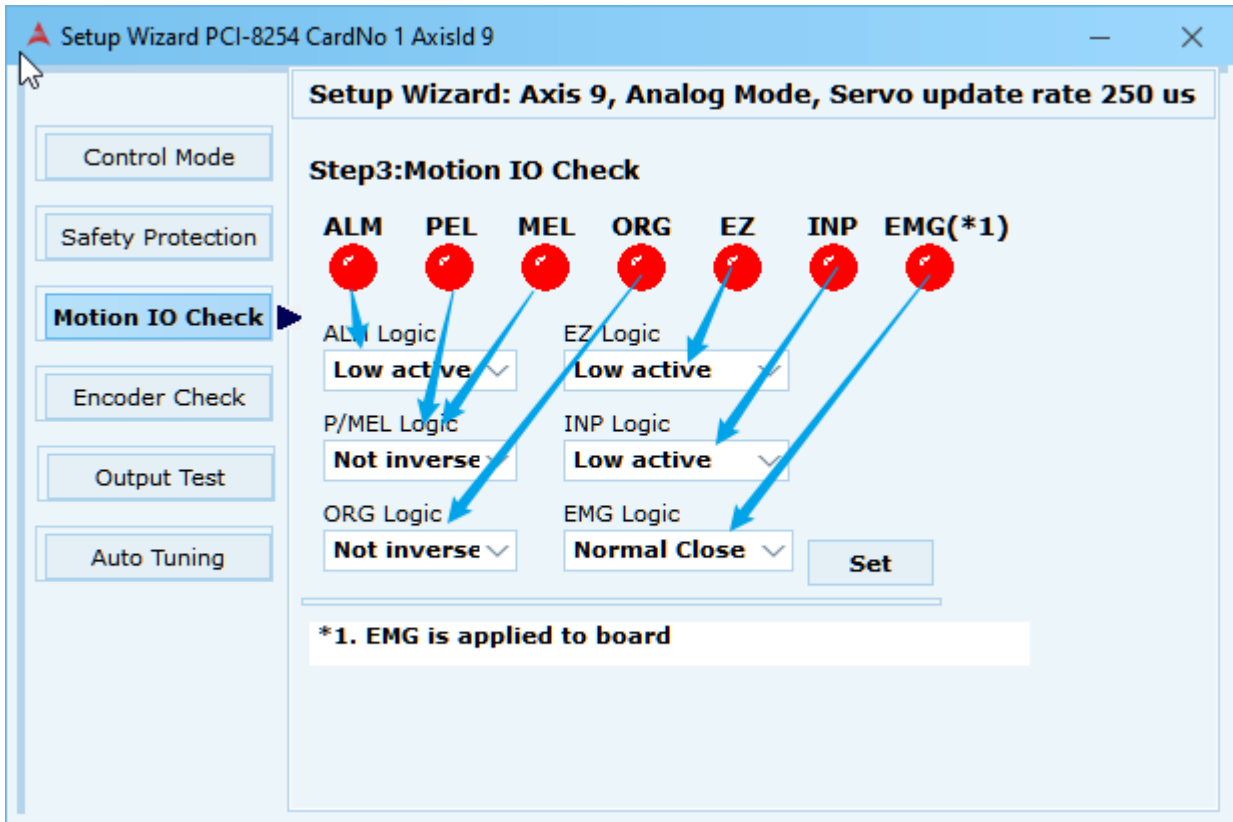
***Set** Click Here

***1. Servo off when error position > Error-Check-Level**
Error position = | Command Position - Feedback Position |
0:Disable error check level.

***2. Stop motion when command position achieves**

3.6.3 Motion IO Check

These settings configure the Motion IO forward and reverse signals. The real-time status of each IO is shown by the LED light and the logic is set by the corresponding fields.



Setup Wizard PCI-8254 CardNo 1 AxisId 9

Setup Wizard: Axis 9, Analog Mode, Servo update rate 250 us

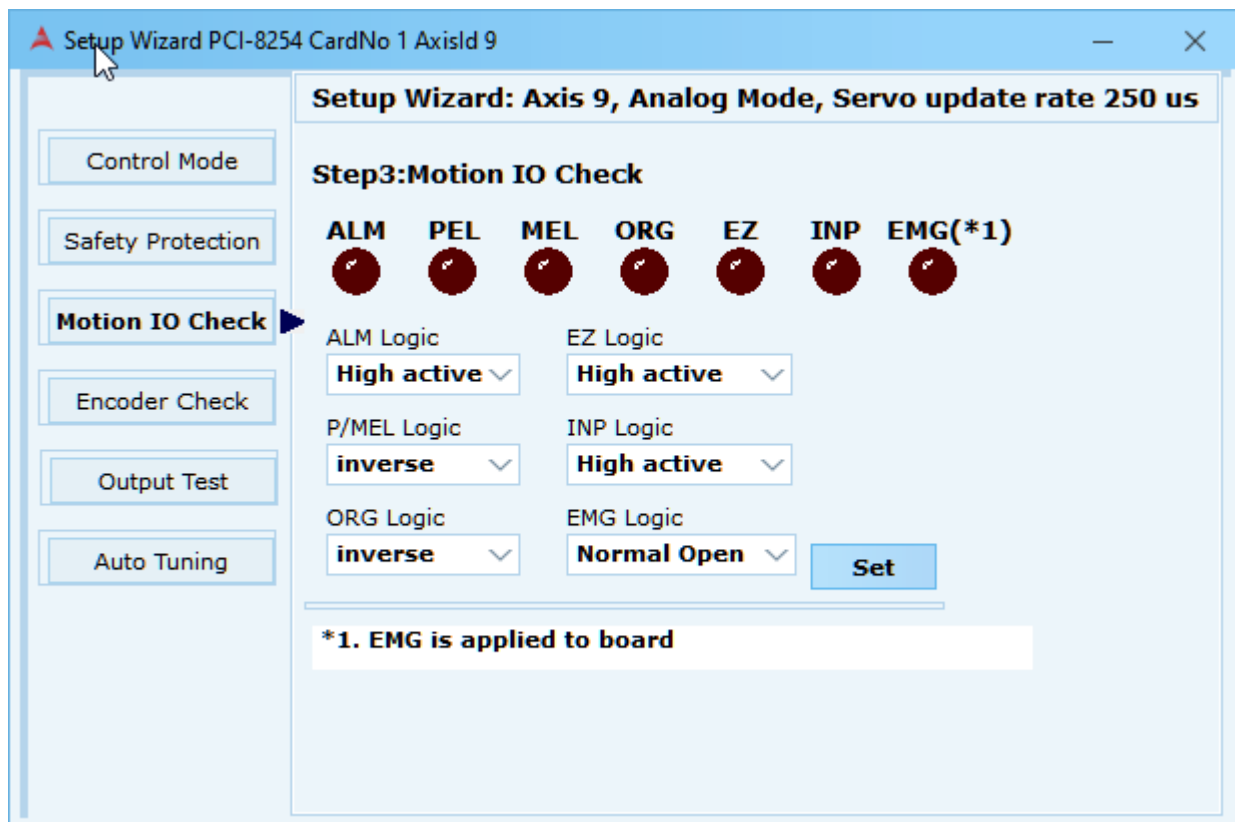
Step3: Motion IO Check

Signal	LED Status	Logic Setting
ALM	On	Low active
PEL	On	Low active
MEL	On	Not inverse
ORG	On	Not inverse
EZ	On	Low active
INP	On	Low active
EMG(*1)	On	Normal Close

Set

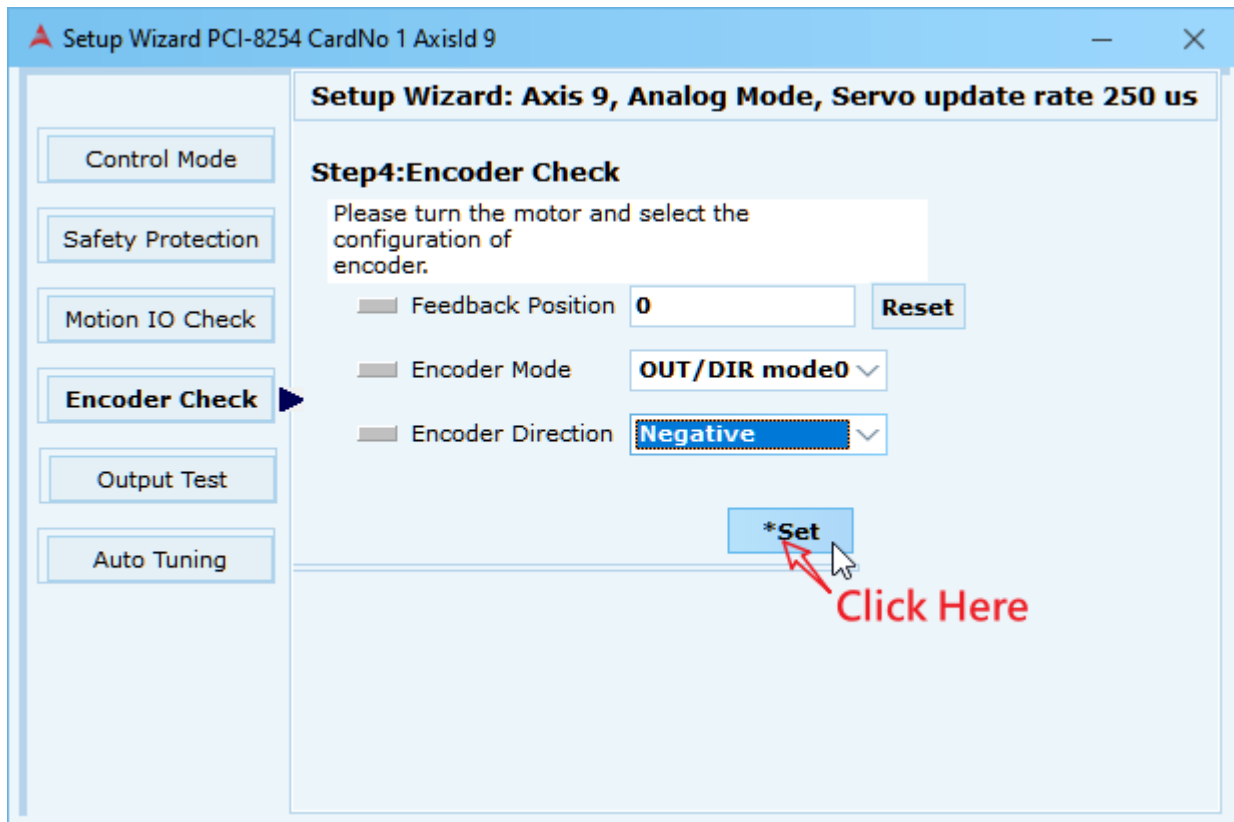
*1. EMG is applied to board

Set the relevant logic signals until all IO LED lights turn off, as shown below.



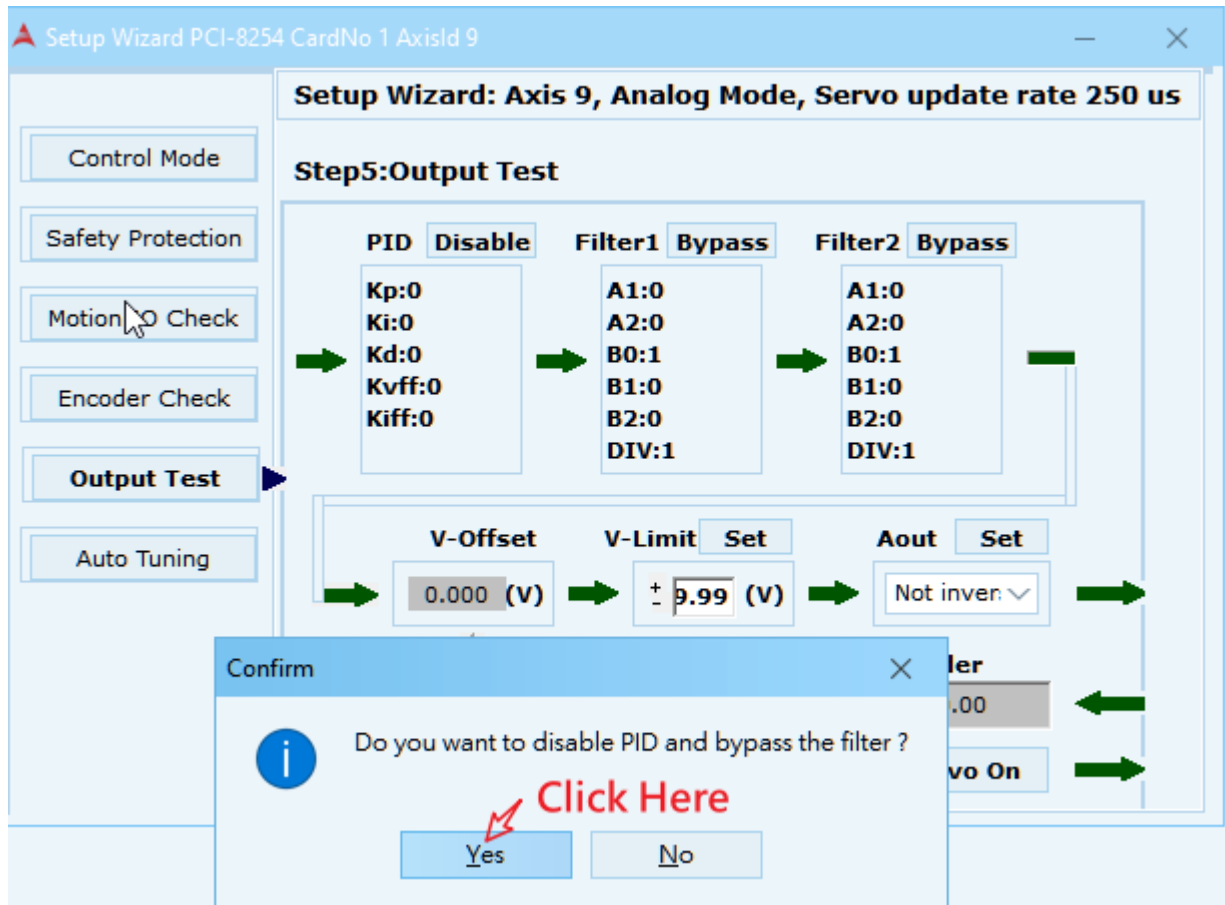
3.6.4 Encoder Check

After setting **Encoder Mode** and **Encoder Direction**, click **Set** to write the set values to the hardware.

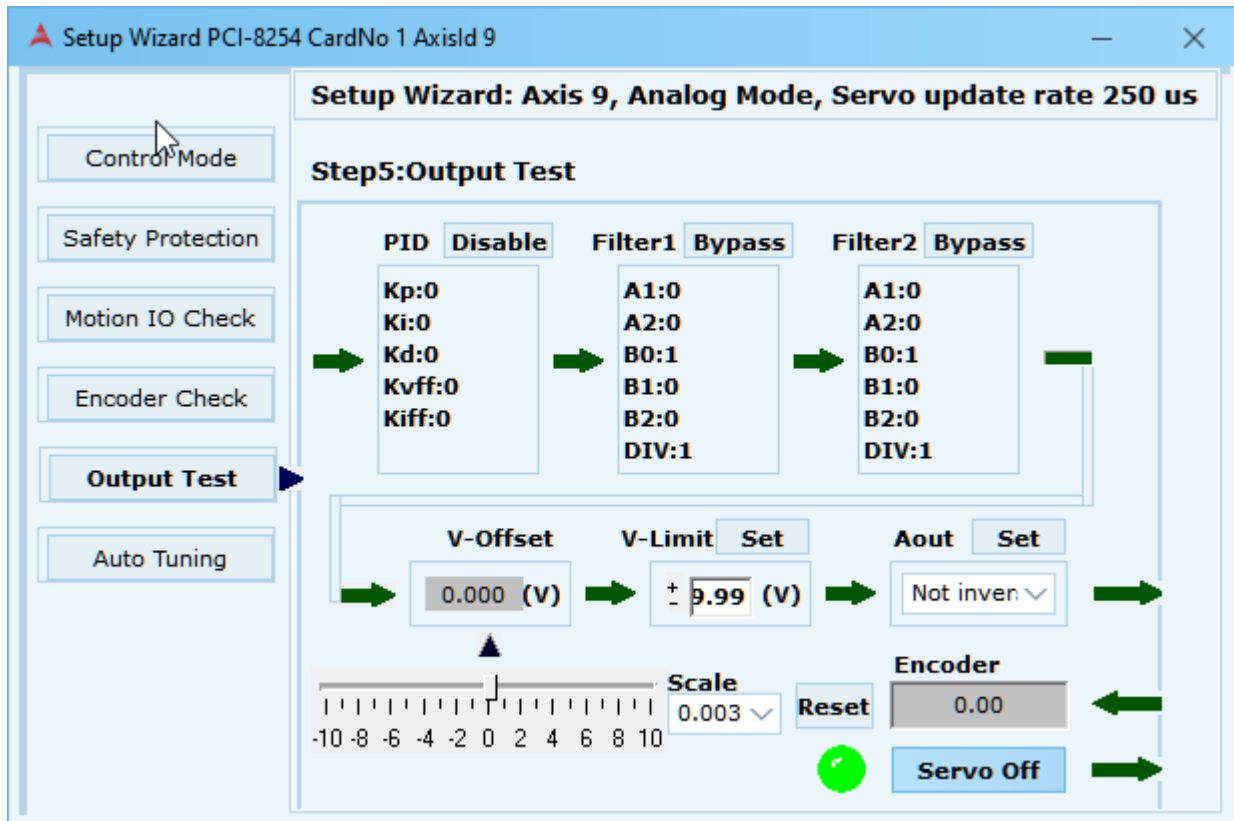


3.6.5 Output Test

When switching to the output test page, you will be automatically asked whether to clear parameters such as PID and Filter. Click **Yes** to clear all the settings. The PID parameter of the axis is set to 0 (Disable), and the filter parameter is set to no function (bypass). If you select "No", no configuration is performed.



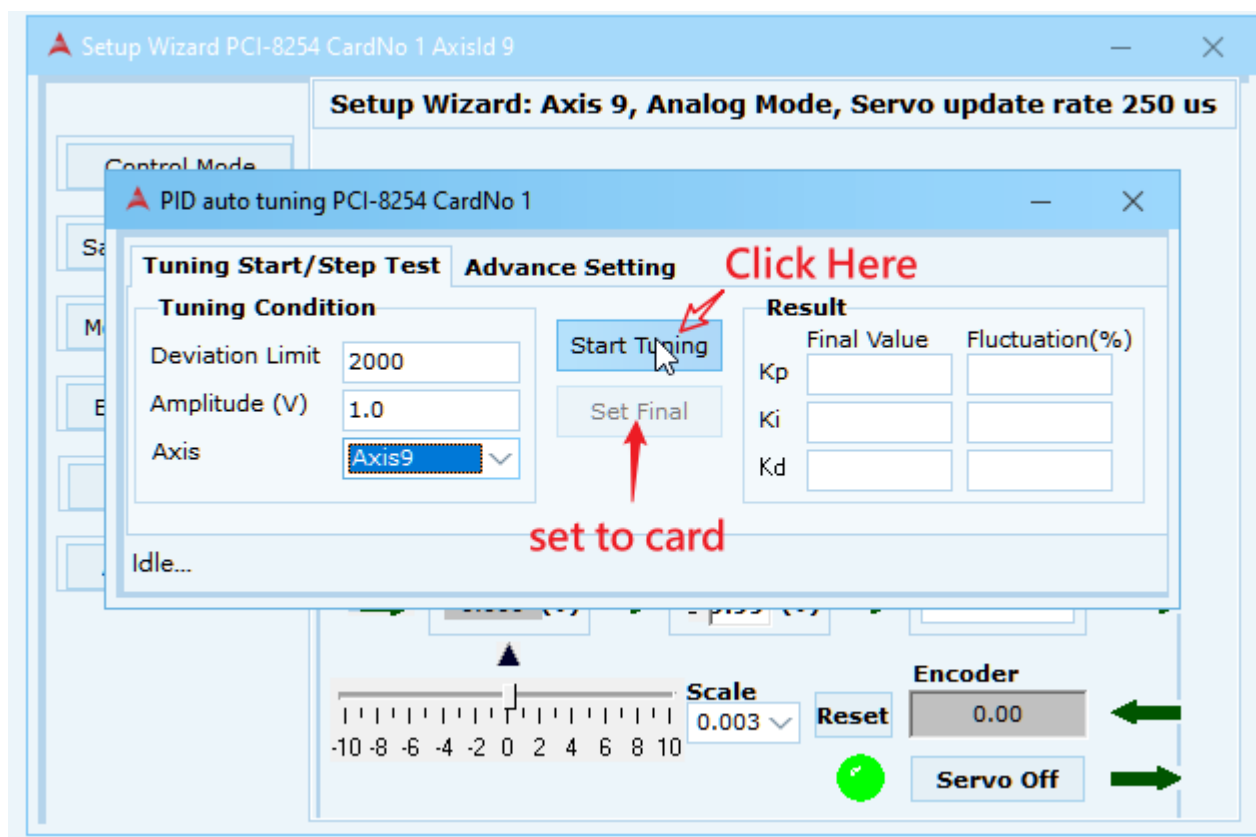
After Servo On is selected, the part selected by the dashed red box [please add red box] in the following figure is used to set the V-Offset value. First, select the scale size of a single shift from scale as 1V, 0.1V or 0.003V, and then use the mouse wheel or the left and right keyboard keys to adjust the V-Offset to an appropriate value.



3.6.6 Auto Tuning

After the settings in sections **2.1 to 2.5 [put in correct section numbers]** are complete, you will enter the auto-tuning function, which will automatically calculate a set of appropriate PID values according to your motion control system.

- (1) Confirm whether the shaft number is correct.
- (2) Select the Start Tuning button to start the tuning action (it might take some time).
- (3) Adjust the vibration of the axis (Amplitude of vibration). If the vibration amplitude is too small, the Auto-tuning program cannot calculate the PID value.
- (4) Repeat steps 2 and 3 to find a set of PID values. Results are displayed in the Result fields. Fluctuation indicates the calculation convergence (smaller is better).
- (5) When the program is complete, you must click **Set Final** to write the PID value into the control card and complete auto-tuning.

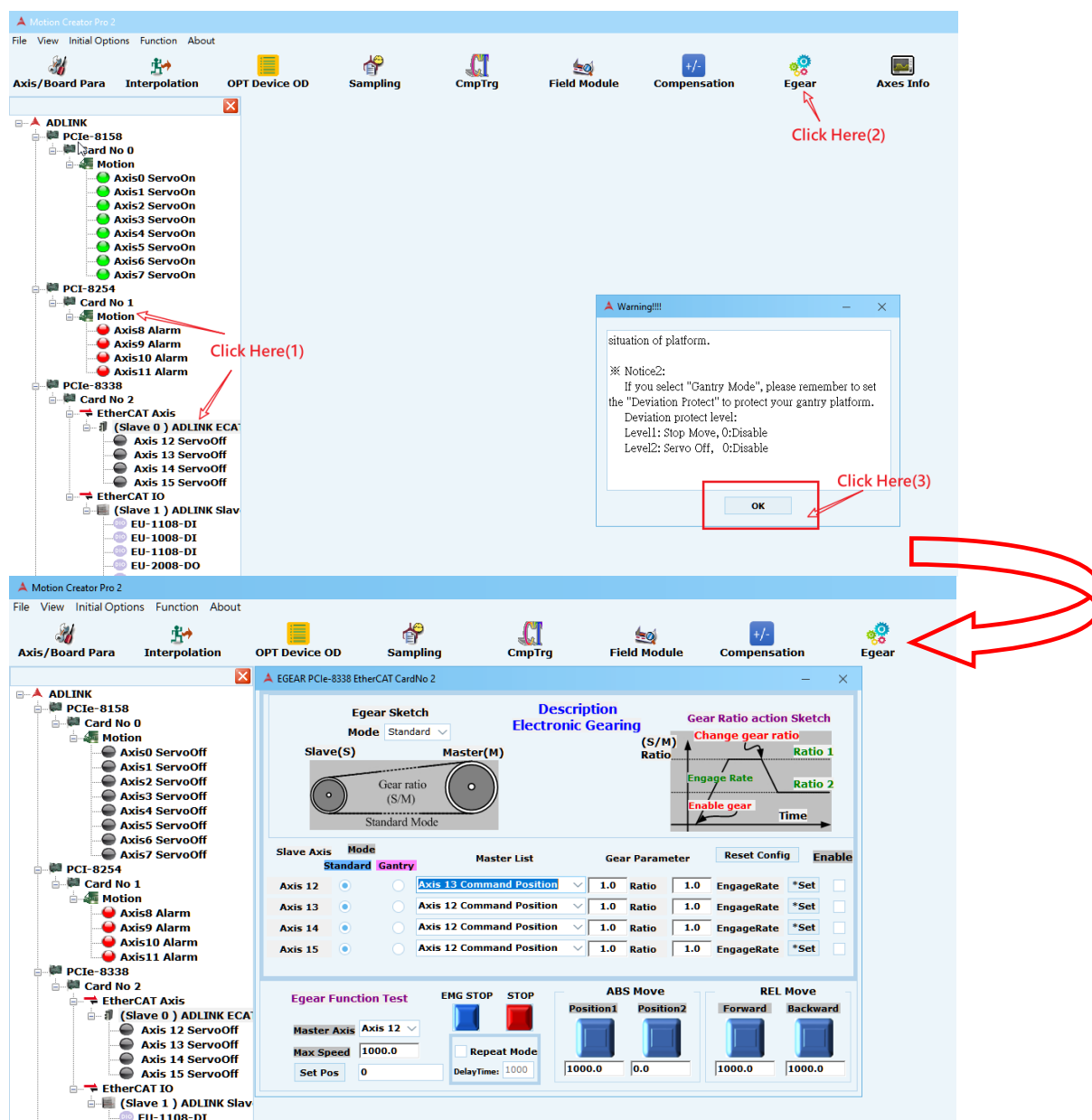


After completing the Setup Wizard, you can carry out a single-axis movement operation or positioning movement operation (homing). You can also go to 3.1.1 Parameter Configuration to view the axis parameter settings or save the parameters.

3.7 E-GEAR

Electronic gear functions are divided into two modes: Standard and Gantry. In Standard mode, gear ratios can be set in the master/driven shaft. The controller will output different displacements in the master/driven shaft according to the gear ratio set. The gear ratio of the master/driven shaft in Gantry mode is fixed at 1:1, which is suitable for situations where the master/driven shaft needs to move at the same time and the displacement is the same, like a gantry control system.

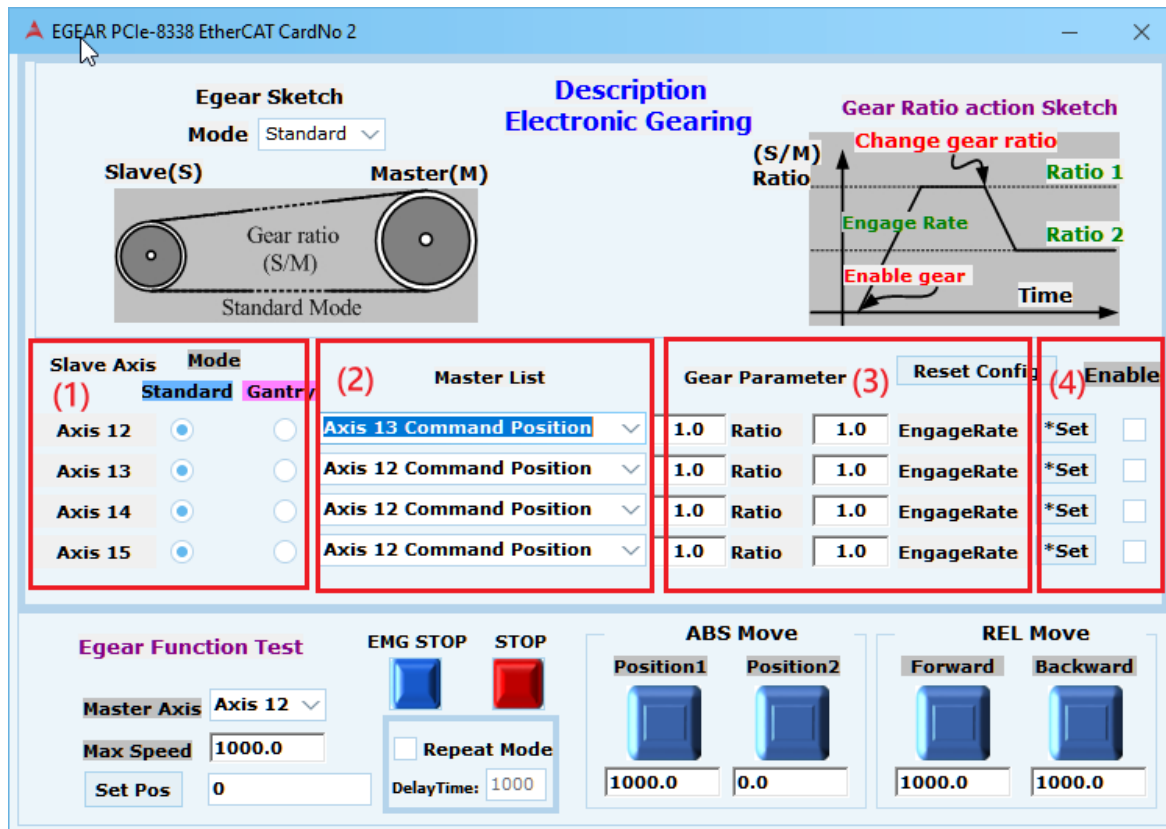
Click **Slave** or **Motion** in the device tree according to the coaxial card used, and then click the **Egear** icon. A warning message will pop up to remind you of the things you should pay attention to before using the electronic gear.



The screenshot illustrates the steps to configure E-GEAR in Motion Creator Pro 2. The top window shows the device tree on the left, with 'Motion' selected under 'Card No 1'. The 'Egear' icon is highlighted in the top menu bar. A warning dialog box is shown, reminding the user to set 'Deviation Protect' level if 'Gantry Mode' is selected. The bottom window shows the 'EGEAR' configuration interface for 'Card No 2'. The 'Mode' is set to 'Standard'. The 'Gear Ratio action Sketch' shows a graph of (S/M) Ratio vs Time, with 'Engage Rate' and 'Ratio 1' and 'Ratio 2' indicated. The 'Gear Parameter' table lists the configuration for Slave Axis 12, 13, 14, and 15, all with a Ratio of 1.0 and EngageRate of 1.0. The 'Egear Function Test' section includes buttons for 'EMG STOP', 'STOP', 'Repeat Mode', and 'Set Pos'. The 'ABS Move' and 'REL Move' sections provide position and speed settings for Forward and Backward movements.

Slave Axis	Mode	Master List	Gear Parameter	Reset Config	Enable
Axis 12	Standard	Axis 13 Command Position	1.0 Ratio	1.0 EngageRate	*Set
Axis 13	Standard	Axis 12 Command Position	1.0 Ratio	1.0 EngageRate	*Set
Axis 14	Standard	Axis 12 Command Position	1.0 Ratio	1.0 EngageRate	*Set
Axis 15	Standard	Axis 12 Command Position	1.0 Ratio	1.0 EngageRate	*Set

Set the electronic gear.



- (1) Set the axis to Standard or Gantry mode
- (2) Select the spindle number and signal source
- (3) Set gear ratio parameters:
In Standard mode, set Ratio and Engage Rate

1.0 Ratio 1.0 EngageRate

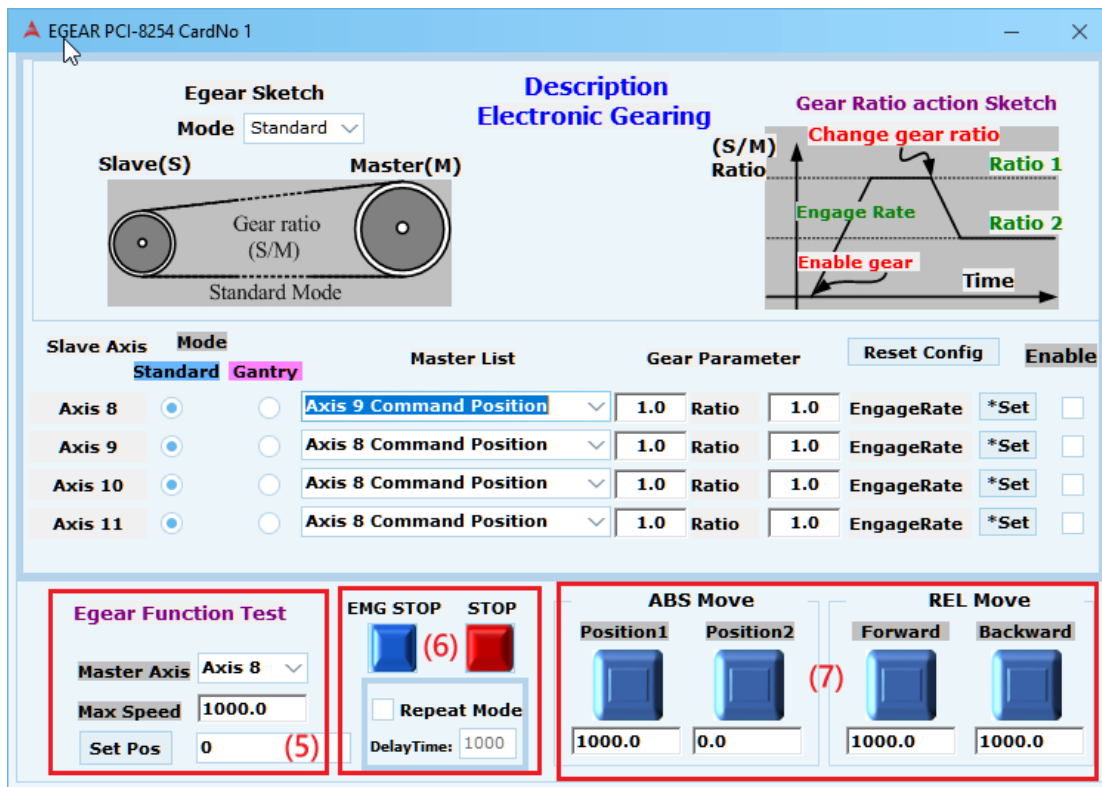
Set the protection amount of Deviation in Gantry mode

Level1: Stop Move

Level2: Servo Off

0 Level1 0 Level2

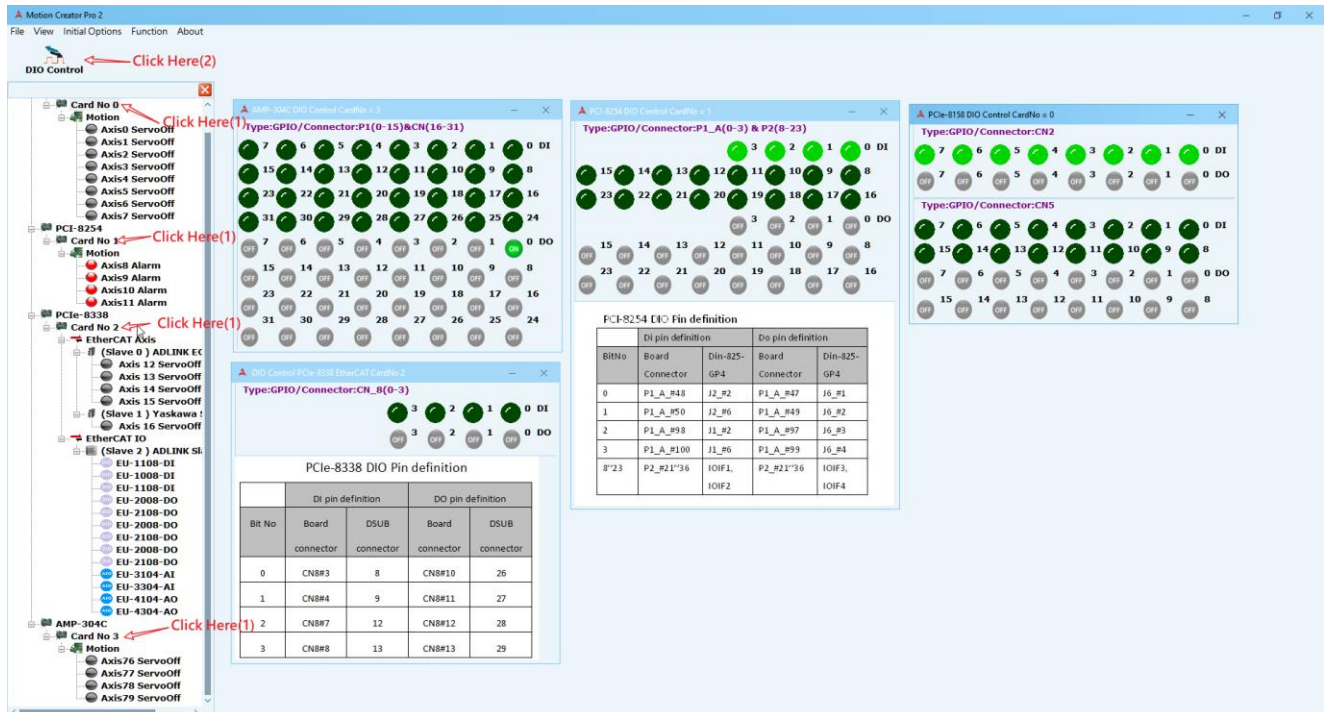
- (4) Write parameter values into the controller and set whether to start



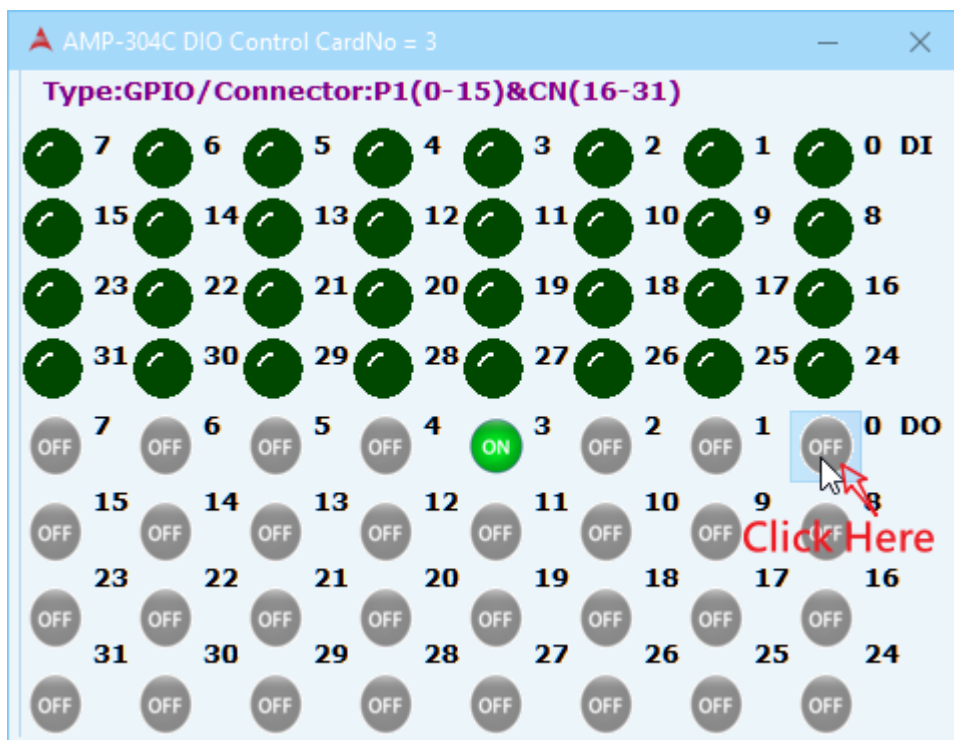
- (5) Set the maximum speed and position of the spindle
- (6) If it is necessary to perform reciprocating movement between two displacements, you can select Repeat Move and set the interval Delay Time before performing the movement operation
- (7) ABS MOVE: Enter absolute position movement values
REL MOVE: Enter relative position movement values

3.8 DIO

The number of DIO groups supported varies depending on the axis card used. Click **Card No x** in the device tree, and then click the **DIO Control** icon to view DIO information.



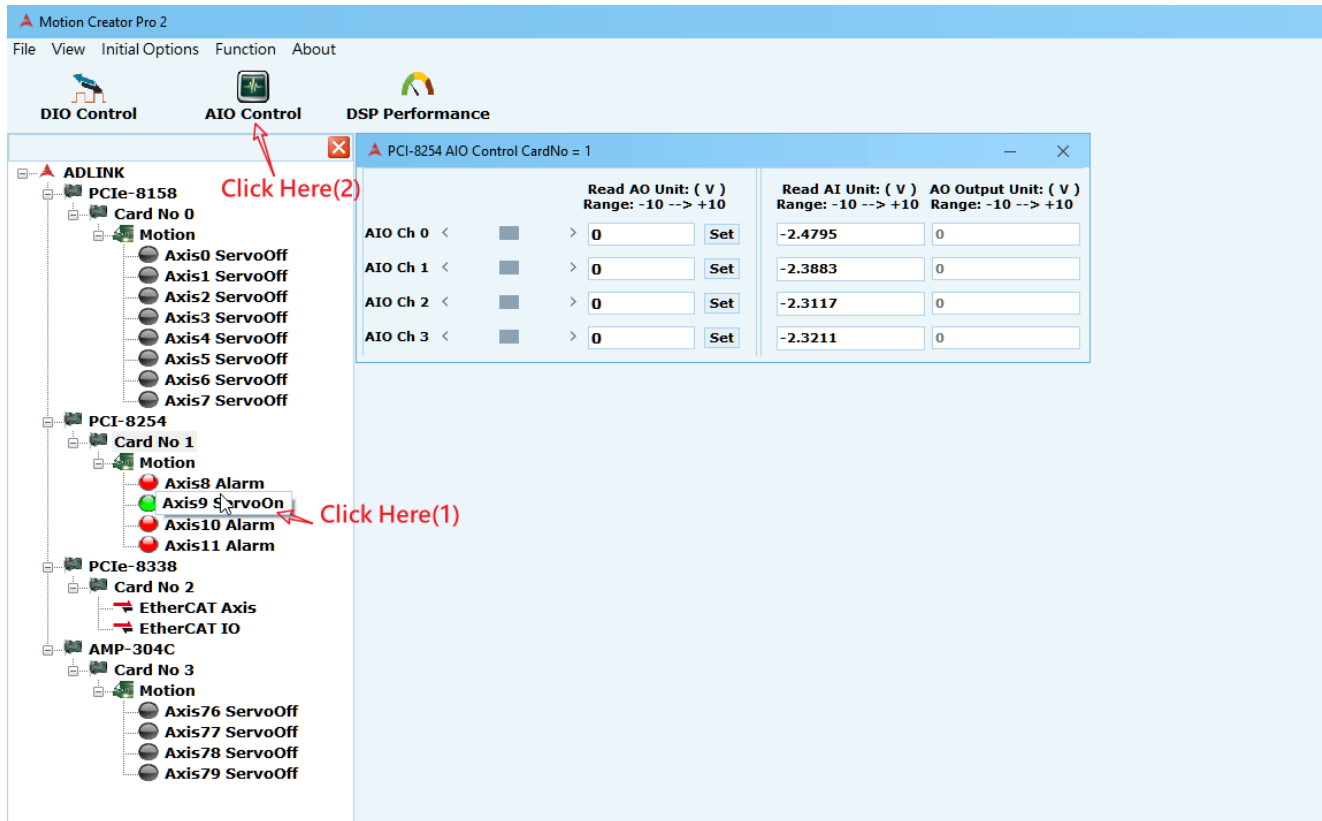
To set the digital output value, click the corresponding switch.



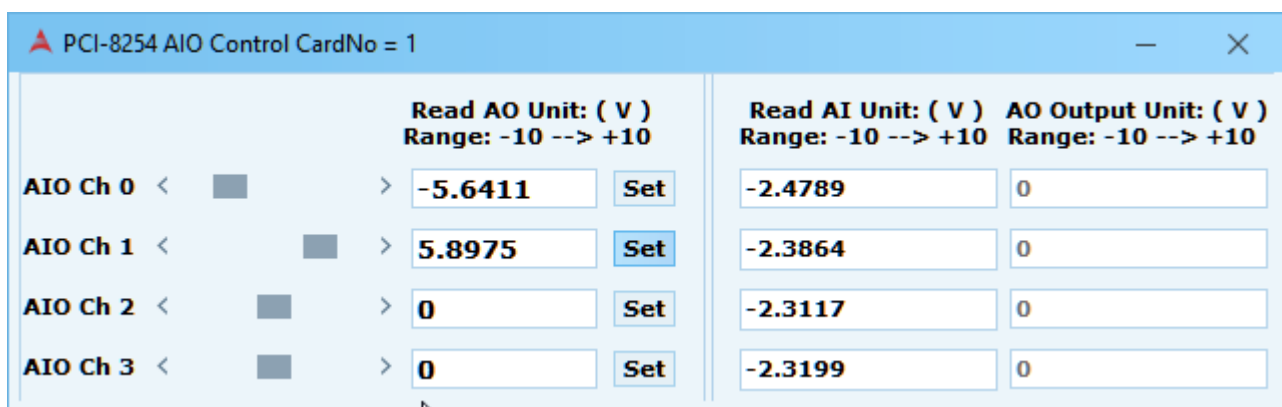
3.9 AIO

Different cards support different numbers of AIO groups. The analog output can be set using reel pull or direct input voltage value.

Click **Card No x** in the device tree, and then click the **AIO Control** icon to view AIO information.



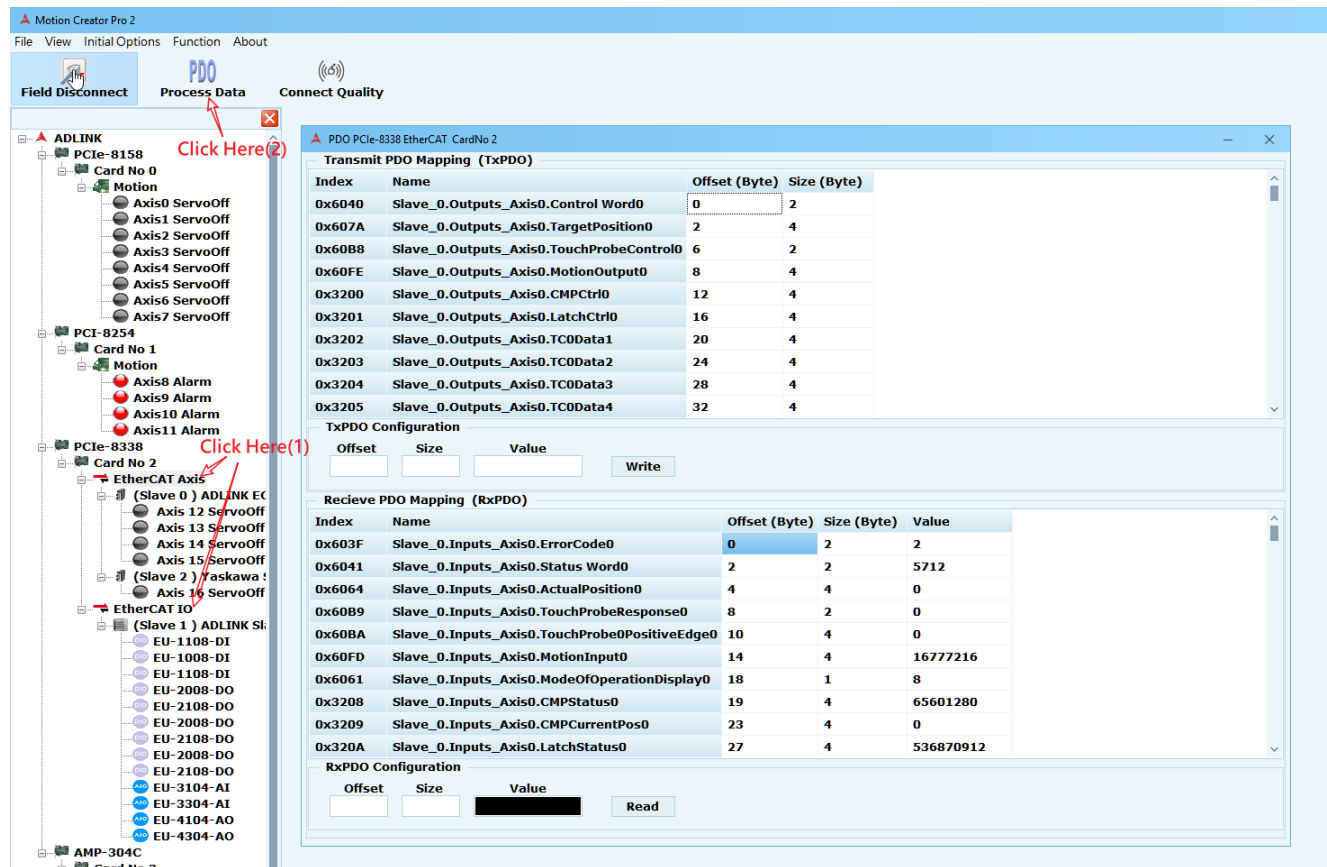
Setting analog output values by scrolling in the field with a mouse, or by direct entering a value, and then clicking **Set**.



3.10 PDO

The Process Data (PDO) page can display the read and write exchange of a process data object (PDO).

Click **Ether Cat Axis** or **Ether Cat Axis IO** in the device tree, and then click the **PDO** icon to view process data information.



Transmit PDO Mapping (TxPDO)

Index	Name	Offset (Byte)	Size (Byte)
0x6040	Slave_0.Outputs_Axis0.Control Word0	0	2
0x607A	Slave_0.Outputs_Axis0.TargetPosition0	2	4
0x60B8	Slave_0.Outputs_Axis0.TouchProbeControl0	6	2
0x60FE	Slave_0.Outputs_Axis0.MotionOutput0	8	4
0x3200	Slave_0.Outputs_Axis0.CMPCtrl0	12	4
0x3201	Slave_0.Outputs_Axis0.LatchCtrl0	16	4
0x3202	Slave_0.Outputs_Axis0.TC0Data1	20	4
0x3203	Slave_0.Outputs_Axis0.TC0Data2	24	4
0x3204	Slave_0.Outputs_Axis0.TC0Data3	28	4
0x3205	Slave_0.Outputs_Axis0.TC0Data4	32	4

TxPDO Configuration

Offset	Size	Value

Receive PDO Mapping (RxPDO)

Index	Name	Offset (Byte)	Size (Byte)	Value
0x603F	Slave_0.Inputs_Axis0.ErrorCode0	0	2	2
0x6041	Slave_0.Inputs_Axis0.Status Word0	2	2	5712
0x6064	Slave_0.Inputs_Axis0.ActualPosition0	4	4	0
0x60B9	Slave_0.Inputs_Axis0.TouchProbeResponse0	8	2	0
0x60BA	Slave_0.Inputs_Axis0.TouchProbe0PositiveEdge0	10	4	0
0x60FD	Slave_0.Inputs_Axis0.MotionInput0	14	4	16777216
0x6061	Slave_0.Inputs_Axis0.ModeOfOperationDisplay0	18	1	8
0x3208	Slave_0.Inputs_Axis0.CMPStatus0	19	4	65601280
0x3209	Slave_0.Inputs_Axis0.CMPCurrentPos0	23	4	0
0x320A	Slave_0.Inputs_Axis0.LatchStatus0	27	4	536870912

RxPDO Configuration

Offset	Size	Value

Users can enter requirements for what the PDO needs.

- **TxPDO:** Slave A program data object (PDO) sent from the station. The user can fill the offset, Value (Size is the size of the byte of Value, which will be automatically entered into the system after filling in the offset) into the edit field and press the Write button to write. You can also enter the offset Value for the desired value and press the Read button to read it.
- **RxPDO:** Slave A program data object (PDO) received from the slave. Press the Read button to read the offset Value of the input value to obtain the value and the corresponding Size.

PDO PCIe-8338 EtherCAT CardNo 1

Transmit PDO Mapping (TxPDO)

Index	Name	Offset (Byte)	Size (Byte)
0x6040	Slave_0.Outputs_Axis0.Control Word0	0	2
0x607A	Slave_0.Outputs_Axis0.TargetPosition0	2	4
0x60B8	Slave_0.Outputs_Axis0.TouchProbeControl0	6	2
0x60FE	Slave_0.Outputs_Axis0.MotionOutput0	8	4
0x3200	Slave_0.Outputs_Axis0.CMPCtrl0	12	4
0x3201	Slave_0.Outputs_Axis0.LatchCtrl0	16	4
0x3202	Slave_0.Outputs_Axis0.TC0Data1	20	4
0x3203	Slave_0.Outputs_Axis0.TC0Data2	24	4
0x3204	Slave_0.Outputs_Axis0.TC0Data3	28	4
0x3205	Slave_0.Outputs_Axis0.TC0Data4	32	4

TxPDO Configuration

Offset

Size

Value

Write

Recieve PDO Mapping (RxPDO)

Index	Name	Offset (Byte)	Size (Byte)	Value
0x603F	Slave_0.Inputs_Axis0.ErrorCode0	0	2	2
0x6041	Slave_0.Inputs_Axis0.Status Word0	2	2	5640
0x6064	Slave_0.Inputs_Axis0.ActualPosition0	4	4	0
0x60B9	Slave_0.Inputs_Axis0.TouchProbeResponse0	8	2	0
0x60BA	Slave_0.Inputs_Axis0.TouchProbe0PositiveEdge0	10	4	0
0x60FD	Slave_0.Inputs_Axis0.MotionInput0	14	4	150994952
0x6061	Slave_0.Inputs_Axis0.ModeOfOperationDisplay0	18	1	8
0x3208	Slave_0.Inputs_Axis0.CMPStatus0	19	4	65601280
0x3209	Slave_0.Inputs_Axis0.CMPCurrentPos0	23	4	0
0x320A	Slave_0.Inputs_Axis0.LatchStatus0	27	4	536870912

RxPDO Configuration

Offset

Size

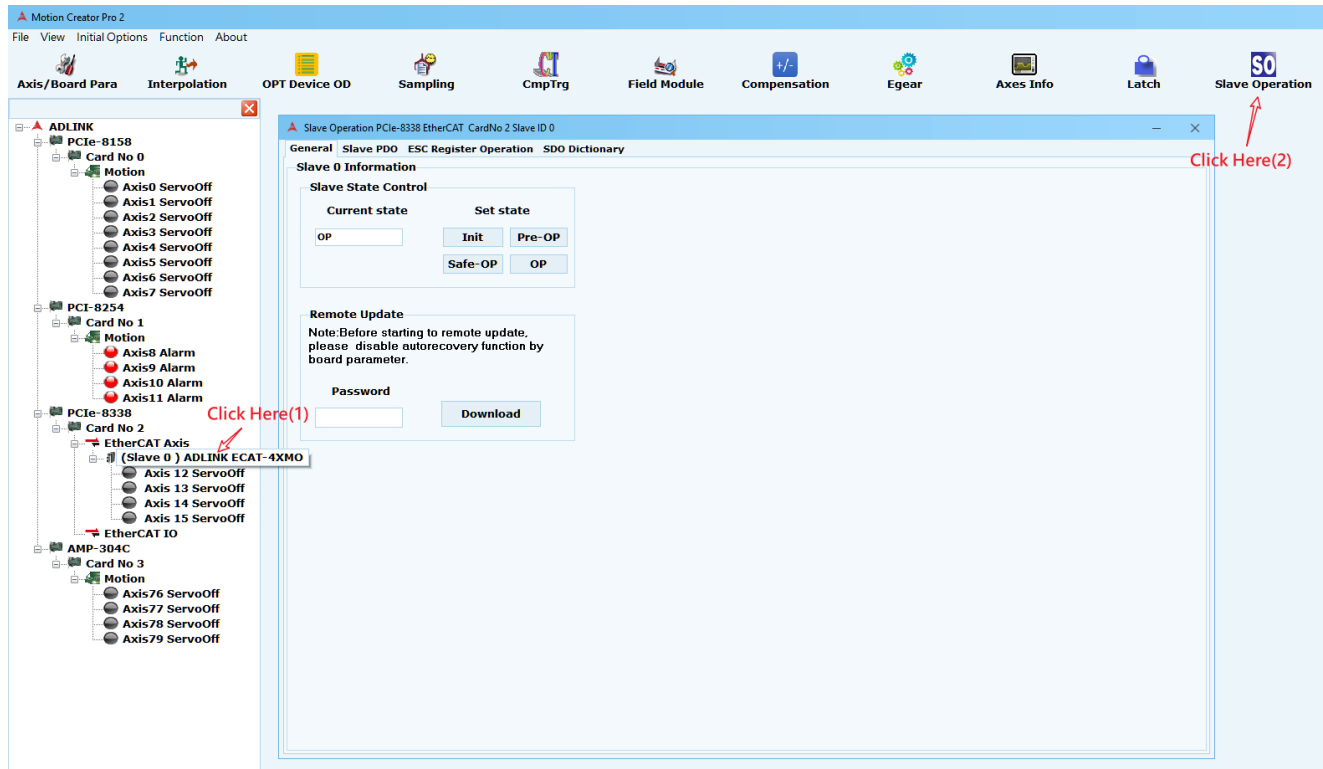
Value

Read

3.11 SDO

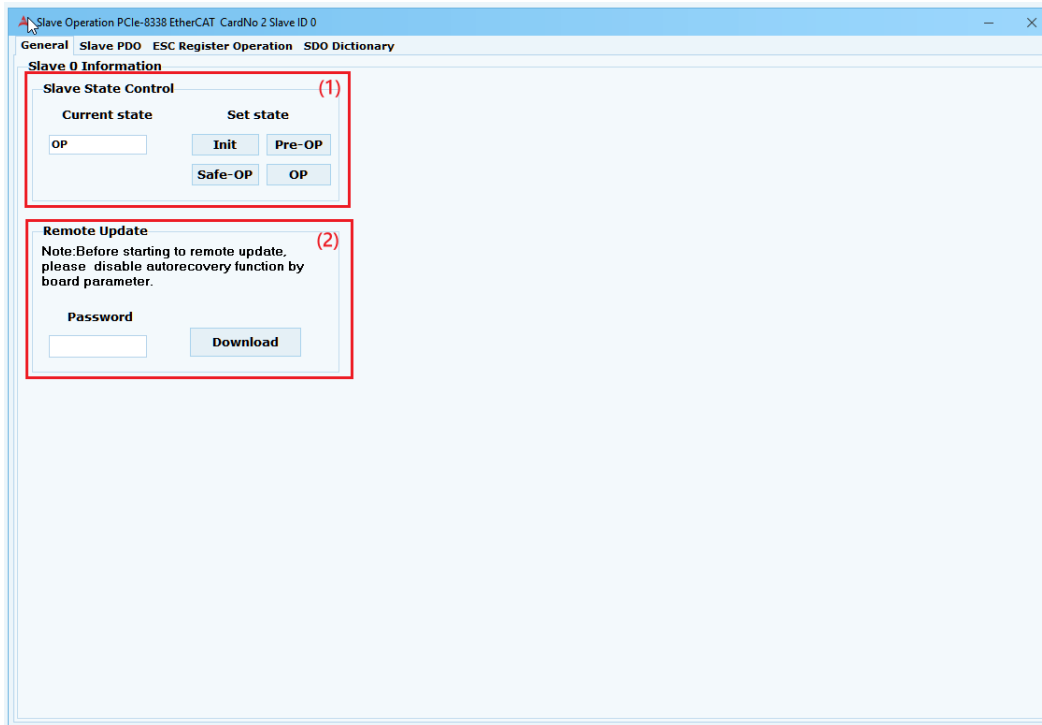
The SDO (Process Data) page can read and write OD (Object Dictionary) data through SDO communication to obtain the slave-specific data. SDO additionally supports parameter configuration and status monitoring.

Click **(Slave x) xxxxx xxxx** in the device tree and then click the **SO** icon.



The SDO Mapping Editor page has four sub-pages.

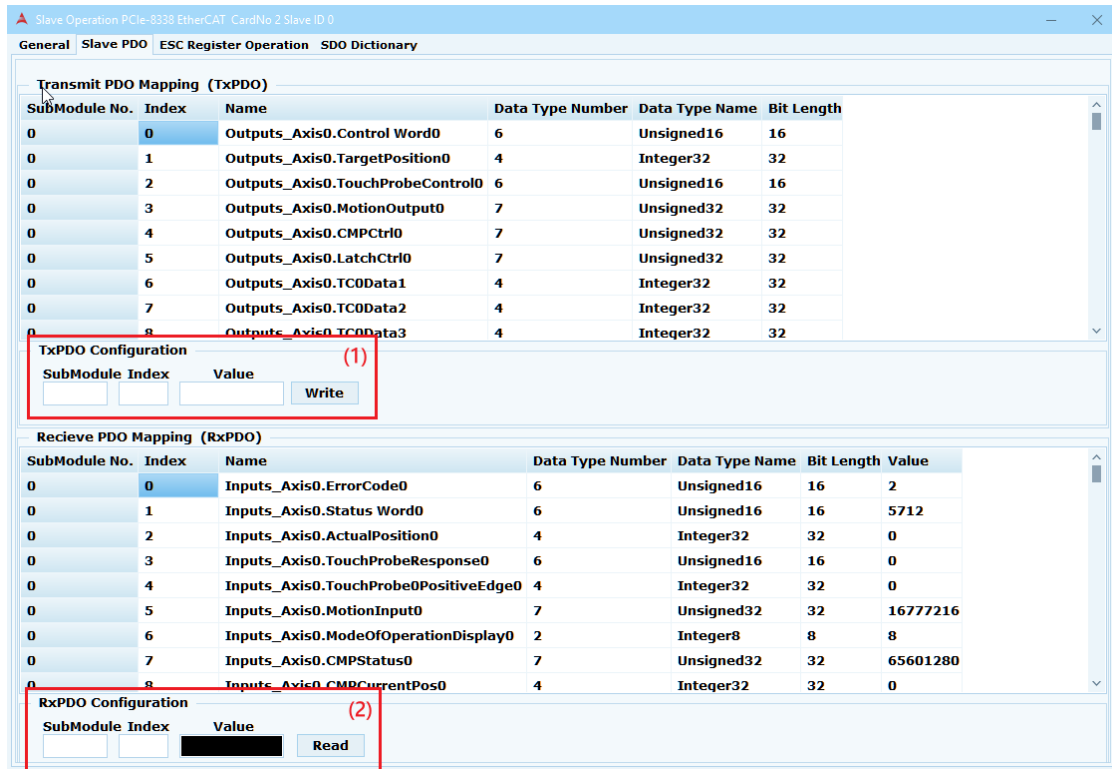
General



- (1) **Slave State Control:** Set EtherCAT slave state.
- (2) **Remote Update:** Update file over EtherCAT. (Contact ADLINK for details.)

Slave PDO

Slave PDO lists the object dictionaries that the slave can operate through the PDO, using the Read and Write buttons.



Transmit PDO Mapping (TxPDO)

SubModule No.	Index	Name	Data Type Number	Data Type Name	Bit Length
0	0	Outputs_Axis0.Control Word0	6	Unsigned16	16
0	1	Outputs_Axis0.TargetPosition0	4	Integer32	32
0	2	Outputs_Axis0.TouchProbeControl0	6	Unsigned16	16
0	3	Outputs_Axis0.MotionOutput0	7	Unsigned32	32
0	4	Outputs_Axis0.CMPCtrl0	7	Unsigned32	32
0	5	Outputs_Axis0.LatchCtrl0	7	Unsigned32	32
0	6	Outputs_Axis0.TC0Data1	4	Integer32	32
0	7	Outputs_Axis0.TC0Data2	4	Integer32	32
0	8	Outputs_Axis0.TC0Data3	4	Integer32	32

TxPDO Configuration (1)

SubModule Index Value Write

Receive PDO Mapping (RxPDO)

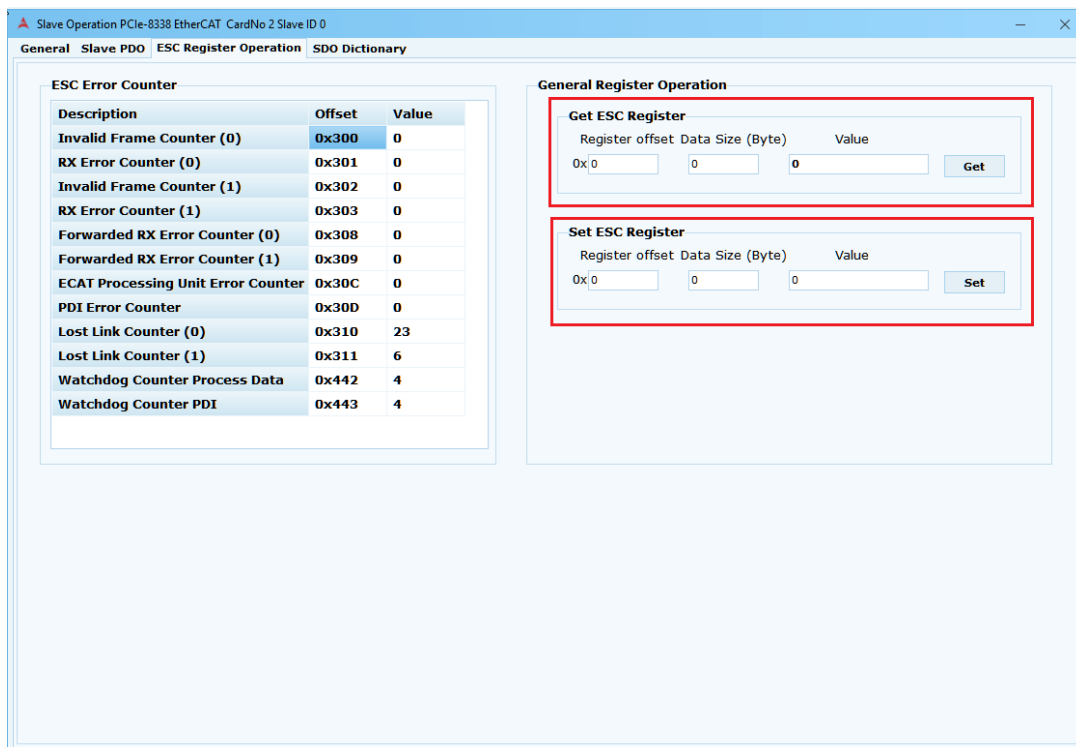
SubModule No.	Index	Name	Data Type Number	Data Type Name	Bit Length	Value
0	0	Inputs_Axis0.ErrorCode0	6	Unsigned16	16	2
0	1	Inputs_Axis0.Status Word0	6	Unsigned16	16	5712
0	2	Inputs_Axis0.ActualPosition0	4	Integer32	32	0
0	3	Inputs_Axis0.TouchProbeResponse0	6	Unsigned16	16	0
0	4	Inputs_Axis0.TouchProbe0PositiveEdge0	4	Integer32	32	0
0	5	Inputs_Axis0.MotionInput0	7	Unsigned32	32	16777216
0	6	Inputs_Axis0.ModeOfOperationDisplay0	2	Integer8	8	8
0	7	Inputs_Axis0.CMPStatus0	7	Unsigned32	32	65601280
0	8	Inputs_Axis0.CMPCurrentPos0	4	Integer32	32	0

RxPDO Configuration (2)

SubModule Index Value Read

- (1) **Write:** Input the SubModule and Index of the operation Name OD in TxPDO table, and enter the corresponding Value by referring to Data Type Name and Bit Length, and then click **Write**.
- (2) **Read:** Input the SubModule of the operation name OD in the RxPDO table, Index and then click **Read** to get its value.

ESC Register Operation



Slave Operation PCIe-8338 EtherCAT CardNo 2 Slave ID 0

General Slave PDO ESC Register Operation SDO Dictionary

ESC Error Counter

Description	Offset	Value
Invalid Frame Counter (0)	0x300	0
RX Error Counter (0)	0x301	0
Invalid Frame Counter (1)	0x302	0
RX Error Counter (1)	0x303	0
Forwarded RX Error Counter (0)	0x308	0
Forwarded RX Error Counter (1)	0x309	0
ECAT Processing Unit Error Counter	0x30C	0
PDI Error Counter	0x30D	0
Lost Link Counter (0)	0x310	23
Lost Link Counter (1)	0x311	6
Watchdog Counter Process Data	0x442	4
Watchdog Counter PDI	0x443	4

General Register Operation

Get ESC Register

Register offset Data Size (Byte) Value

0x 0 0 0

Set ESC Register

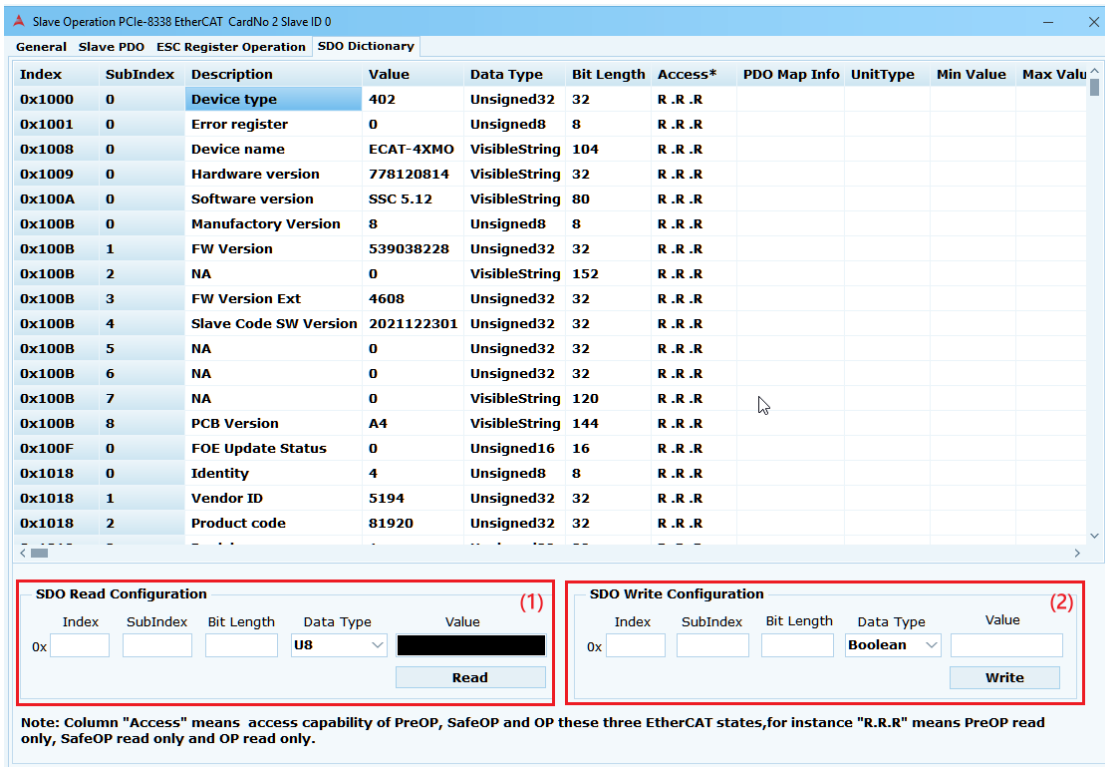
Register offset Data Size (Byte) Value

0x 0 0 0

Read and write information pages for EtherCAT Slave Controller.

SDO Dictionary

The SDO Dictionary page lists all the service data objects the user can manipulate.



Index	SubIndex	Description	Value	Data Type	Bit Length	Access*	PDO Map Info	UnitType	Min Value	Max Value
0x1000	0	Device type	402	Unsigned32	32	R .R .R				
0x1001	0	Error register	0	Unsigned8	8	R .R .R				
0x1008	0	Device name	ECAT-4XMO	VisibleString	104	R .R .R				
0x1009	0	Hardware version	778120814	VisibleString	32	R .R .R				
0x100A	0	Software version	SSC 5.12	VisibleString	80	R .R .R				
0x100B	0	Manufactory Version	8	Unsigned8	8	R .R .R				
0x100B	1	FW Version	539038228	Unsigned32	32	R .R .R				
0x100B	2	NA	0	VisibleString	152	R .R .R				
0x100B	3	FW Version Ext	4608	Unsigned32	32	R .R .R				
0x100B	4	Slave Code SW Version	2021122301	Unsigned32	32	R .R .R				
0x100B	5	NA	0	Unsigned32	32	R .R .R				
0x100B	6	NA	0	Unsigned32	32	R .R .R				
0x100B	7	NA	0	VisibleString	120	R .R .R				
0x100B	8	PCB Version	A4	VisibleString	144	R .R .R				
0x100F	0	FOE Update Status	0	Unsigned16	16	R .R .R				
0x1018	0	Identity	4	Unsigned8	8	R .R .R				
0x1018	1	Vendor ID	5194	Unsigned32	32	R .R .R				
0x1018	2	Product code	81920	Unsigned32	32	R .R .R				

SDO Read Configuration (1)

Index: SubIndex: Bit Length: Data Type: Value:

Read

SDO Write Configuration (2)

Index: SubIndex: Bit Length: Data Type: Value:

Write

Note: Column "Access" means access capability of PreOP, SafeOP and OP these three EtherCAT states, for instance "R.R.R" means PreOP read only, SafeOP read only and OP read only.

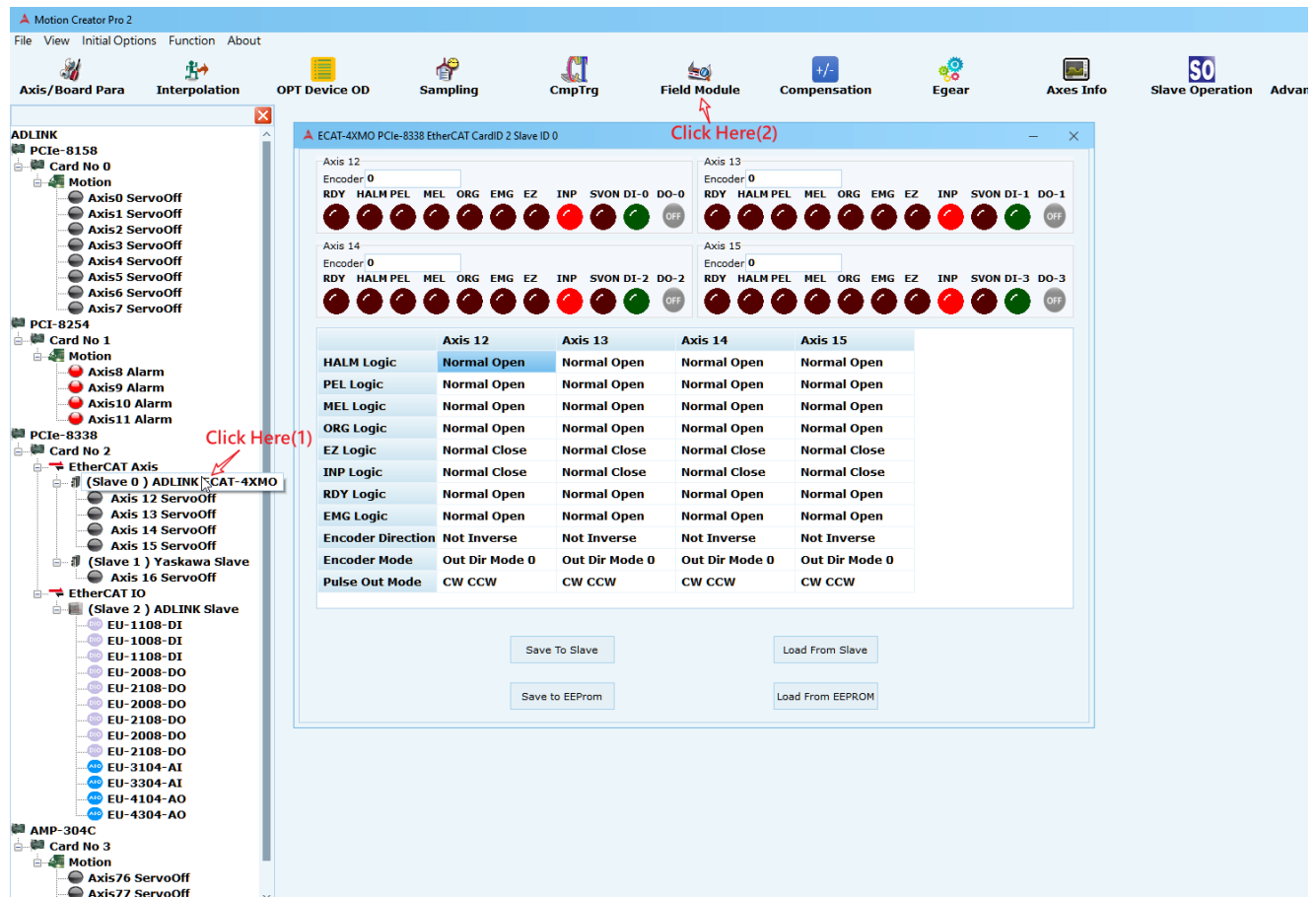
- (1) **Read:** Enter Index and SubIndex, and click **Read** to display the desired Value in the value field.
- (2) **Write:** Enter Index, SubIndex, Value and click **Write** to set the desired values.

3.12 Field module

ADLINK Slave-specific pages, depending on Slave Axis or Slave IO, have different rendering functions.

3.12.1 ADLINK Slave Axis

To open the Field module page, click **Slave x** on the device tree, and then click the **Field module** icon.



The screenshot displays the Motion Creator Pro 2 software interface. The left sidebar shows the device tree with the following structure:

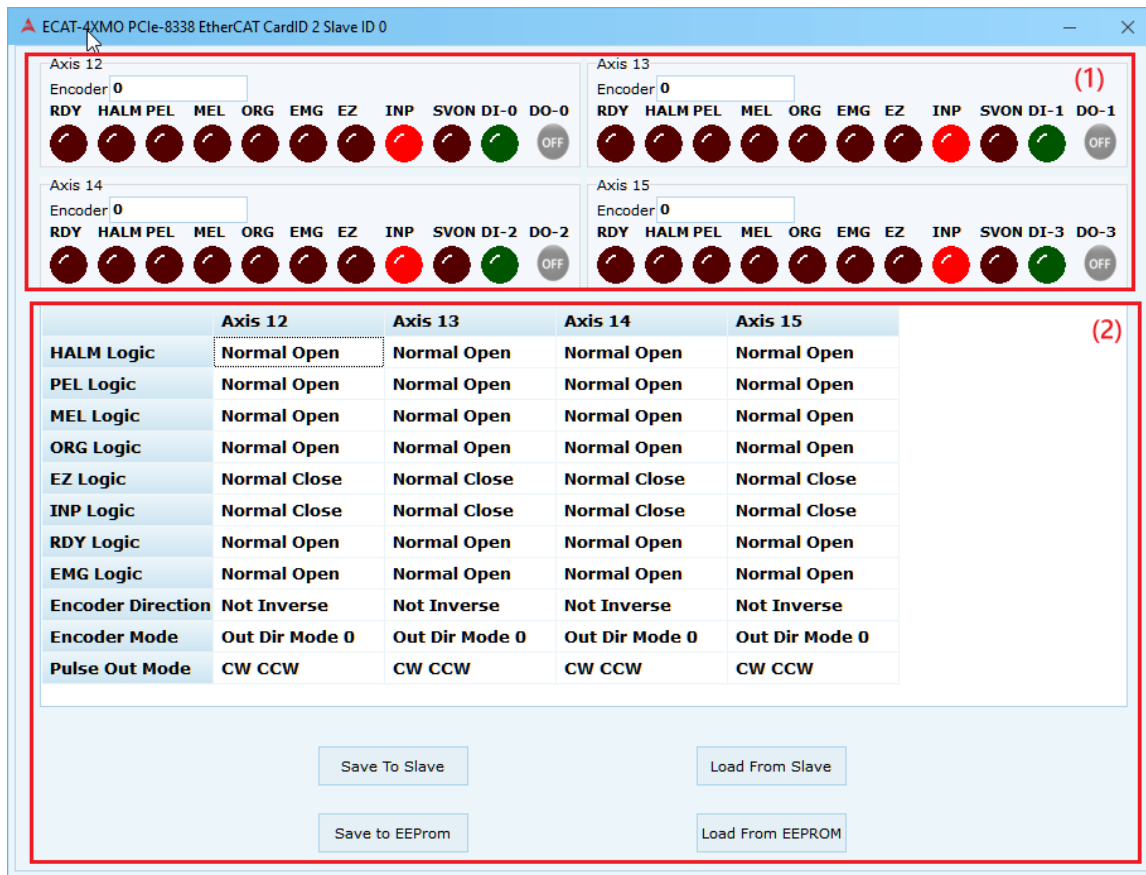
- ADLINK
 - PCIe-8158
 - Card No 0
 - Motion
 - Axis0 ServoOff
 - Axis1 ServoOff
 - Axis2 ServoOff
 - Axis3 ServoOff
 - Axis4 ServoOff
 - Axis5 ServoOff
 - Axis6 ServoOff
 - Axis7 ServoOff
 - PCI-8254
 - Card No 1
 - Motion
 - Axis8 Alarm
 - Axis9 Alarm
 - Axis10 Alarm
 - Axis11 Alarm
 - PCIe-8338
 - Card No 2
 - EtherCAT Axis
 - (Slave 0) ADLINK CAT-4XMO
 - Axis 12 ServoOff
 - Axis 13 ServoOff
 - Axis 14 ServoOff
 - Axis 15 ServoOff
 - (Slave 1) Yaskawa Slave
 - Axis 16 ServoOff
 - EtherCAT IO
 - (Slave 2) ADLINK Slave
 - EU-1108-DI
 - EU-1008-DI
 - EU-1108-DI
 - EU-2008-DO
 - EU-2108-DO
 - EU-2008-DO
 - EU-2108-DO
 - EU-2008-DO
 - EU-2108-DO
 - EU-3104-AI
 - EU-3304-AI
 - EU-4104-AO
 - EU-4304-AO
 - AMP-304C
 - Card No 3
 - Motion
 - Axis76 ServoOff
 - Axis77 ServoOff

The main window displays the Field module configuration for the selected slave axis (Axis 12). The configuration is as follows:

	Axis 12	Axis 13	Axis 14	Axis 15
HALM Logic	Normal Open	Normal Open	Normal Open	Normal Open
PEL Logic	Normal Open	Normal Open	Normal Open	Normal Open
MEL Logic	Normal Open	Normal Open	Normal Open	Normal Open
ORG Logic	Normal Open	Normal Open	Normal Open	Normal Open
EZ Logic	Normal Close	Normal Close	Normal Close	Normal Close
INP Logic	Normal Close	Normal Close	Normal Close	Normal Close
RDY Logic	Normal Open	Normal Open	Normal Open	Normal Open
EMG Logic	Normal Open	Normal Open	Normal Open	Normal Open
Encoder Direction	Not Inverse	Not Inverse	Not Inverse	Not Inverse
Encoder Mode	Out Dir Mode 0	Out Dir Mode 0	Out Dir Mode 0	Out Dir Mode 0
Pulse Out Mode	CW CCW	CW CCW	CW CCW	CW CCW

Buttons at the bottom of the Field module window include: Save To Slave, Load From Slave, Save to EEPROM, and Load From EEPROM.

Using an ECAT-4XMO, for example, the information is divided into two areas.



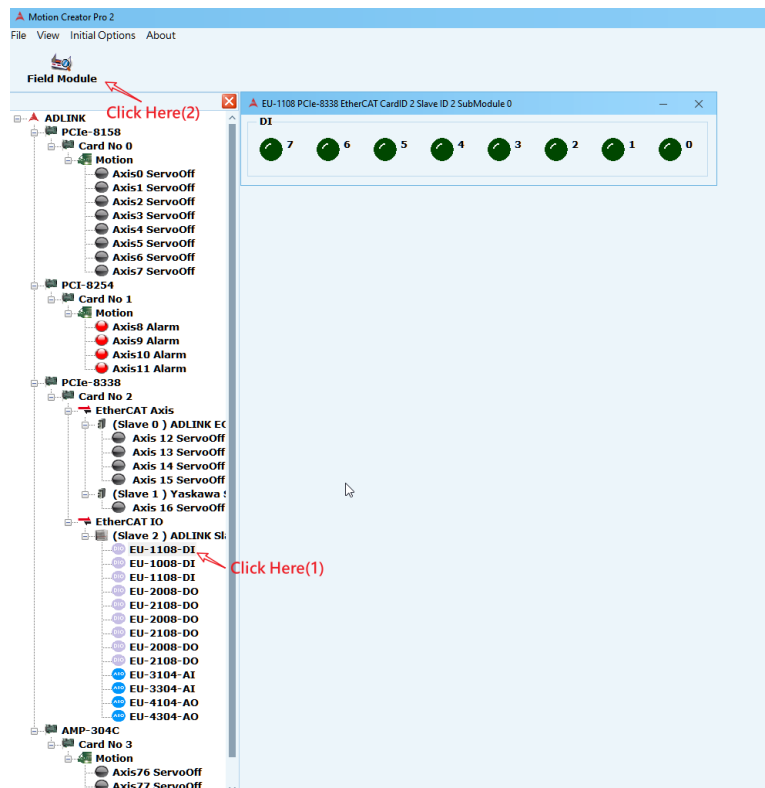
The screenshot displays the ECAT-4XMO software interface, which is divided into two main sections. The top section, labeled (1), shows the status of four axes (Axis 12, Axis 13, Axis 14, and Axis 15). Each axis has a set of status indicators (RDY, HALM, PEL, MEL, ORG, EMG, EZ, INP, SVON, DI, DO) and a corresponding encoder value. The bottom section, labeled (2), shows a table of common SDO configuration support settings for the same four axes. The table includes settings for HALM Logic, PEL Logic, MEL Logic, ORG Logic, EZ Logic, INP Logic, RDY Logic, EMG Logic, Encoder Direction, Encoder Mode, and Pulse Out Mode. Below the table are four buttons: Save To Slave, Load From Slave, Save to EEPROM, and Load From EEPROM.

	Axis 12	Axis 13	Axis 14	Axis 15
HALM Logic	Normal Open	Normal Open	Normal Open	Normal Open
PEL Logic	Normal Open	Normal Open	Normal Open	Normal Open
MEL Logic	Normal Open	Normal Open	Normal Open	Normal Open
ORG Logic	Normal Open	Normal Open	Normal Open	Normal Open
EZ Logic	Normal Close	Normal Close	Normal Close	Normal Close
INP Logic	Normal Close	Normal Close	Normal Close	Normal Close
RDY Logic	Normal Open	Normal Open	Normal Open	Normal Open
EMG Logic	Normal Open	Normal Open	Normal Open	Normal Open
Encoder Direction	Not Inverse	Not Inverse	Not Inverse	Not Inverse
Encoder Mode	Out Dir Mode 0	Out Dir Mode 0	Out Dir Mode 0	Out Dir Mode 0
Pulse Out Mode	CW CCW	CW CCW	CW CCW	CW CCW

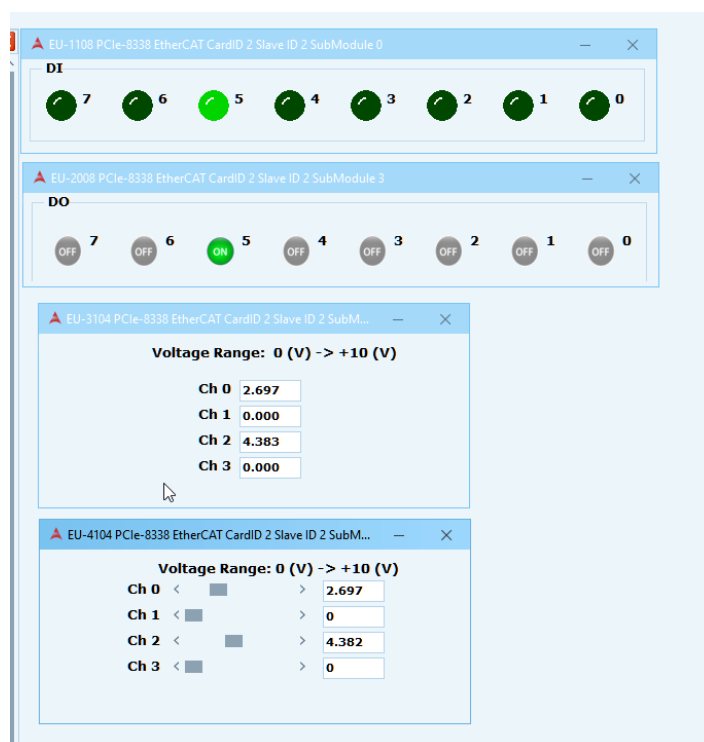
- (1) Displays the status of each axis.
- (2) Common SDO configuration support settings for an ADLINK slave.

3.12.2 ADLINK Slave IO

Click **DIO** or **AIO** in the device tree, and then click the **Field Module** icon.



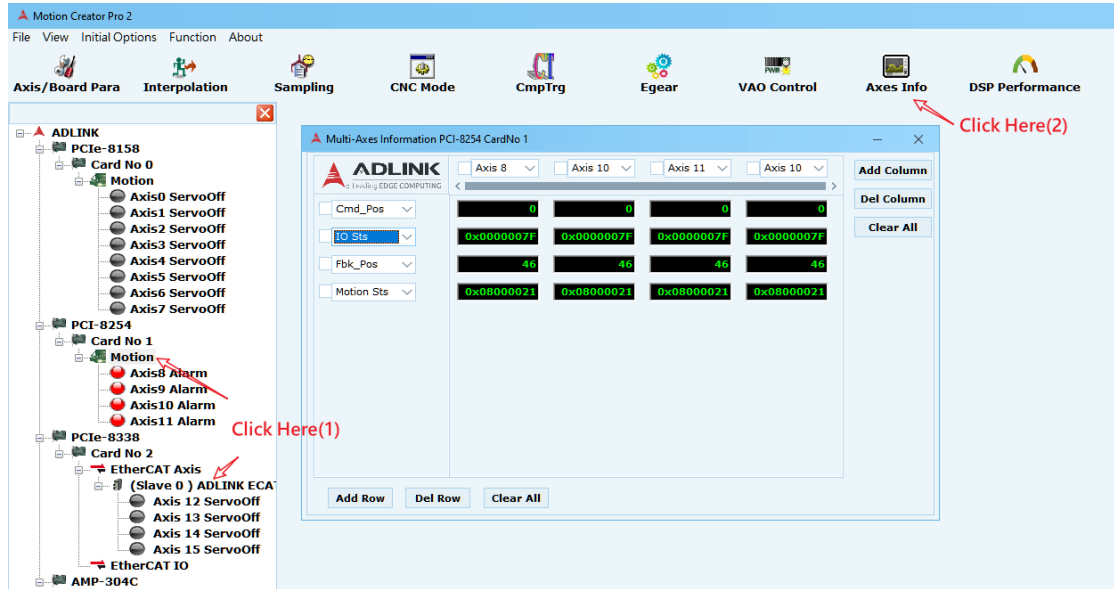
Using an EU-6000, for example, the information is divided into four different DIO and AIO settings.



3.13 Axis Info

The Axis info page monitors new or removed custom multi-axis motion states, commands, feedback, speed, acceleration, etc. for data monitoring.

To open the multi-axis information page, click **Slave x** or **Motion** on the device tree, and then click the **Axes Info** icon.



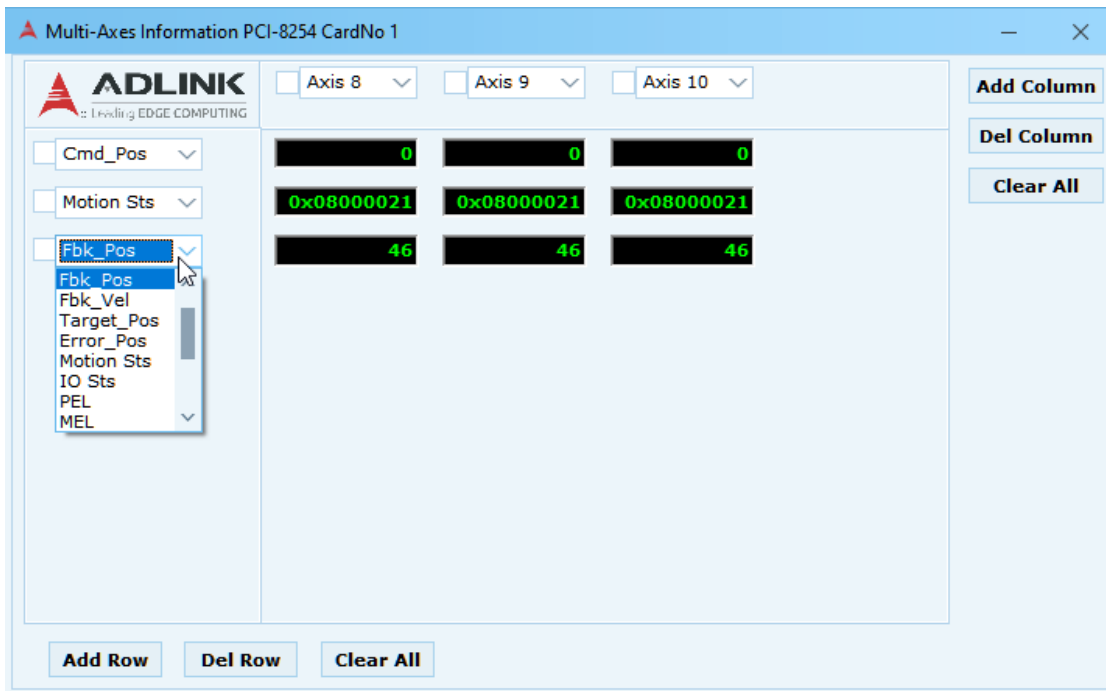
The screenshot shows the Motion Creator Pro 2 software interface. On the left is a device tree with the following structure:

- ADLINK
 - PCIe-8158
 - Card No 0
 - Motion
 - Axis0 ServoOff
 - Axis1 ServoOff
 - Axis2 ServoOff
 - Axis3 ServoOff
 - Axis4 ServoOff
 - Axis5 ServoOff
 - Axis6 ServoOff
 - Axis7 ServoOff
 - PCI-8254
 - Card No 1
 - Motion
 - Axis8 Alarm
 - Axis9 Alarm
 - Axis10 Alarm
 - Axis11 Alarm
 - PCIe-8338
 - Card No 2
 - EtherCAT Axis (Slave 0) ADLINK ECA
 - Axis 12 ServoOff
 - Axis 13 ServoOff
 - Axis 14 ServoOff
 - Axis 15 ServoOff
 - EtherCAT IO
 - AMP-304C

On the right, the 'Multi-Axes Information PCI-8254 CardNo 1' window is open. It features a table with columns for different axes (Axis 8, Axis 10, Axis 11, Axis 10) and rows for different data types (Cmd_Pos, Fbk_Pos, Motion Sts). The table contains hexadecimal values. Red arrows point to the 'Motion' node in the device tree (labeled 'Click Here(1)') and the 'Axes Info' icon in the top toolbar (labeled 'Click Here(2)').

	Axis 8	Axis 10	Axis 11	Axis 10
Cmd_Pos	0	0	0	0
Fbk_Pos	0x0000007F	0x0000007F	0x0000007F	0x0000007F
Motion Sts	46	46	46	46
	0x08000021	0x08000021	0x08000021	0x08000021

The multi-axis information page content is as follows.



Multi-Axes Information PCI-8254 CardNo 1

ADLINK :: Leading EDGE COMPUTING

Axis 8 Axis 9 Axis 10

Cmd_Pos Motion Sts Fbk_Pos

Fbk_Pos Fbk_Vel Target_Pos Error_Pos Motion Sts IO Sts PEL MEL

0 0 0

0x08000021 0x08000021 0x08000021

46 46 46

Add Column Del Column Clear All

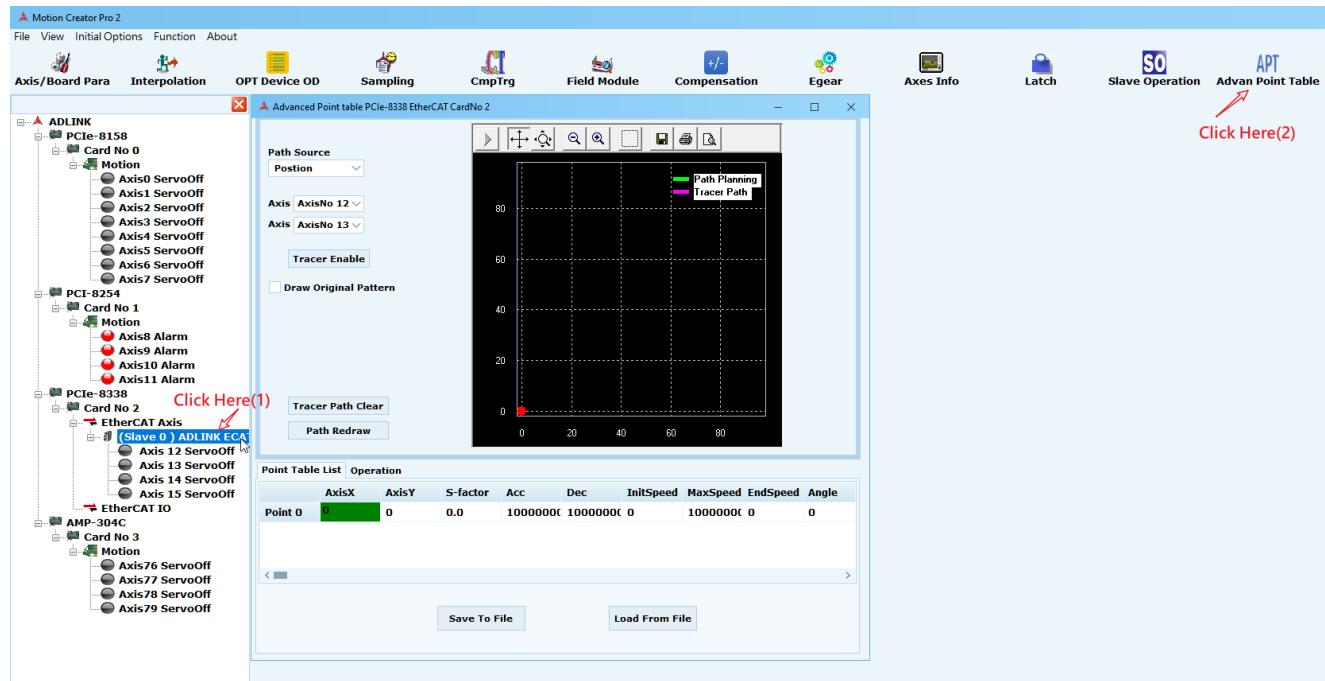
Add Row Del Row Clear All

- **Add Row:** Add columns from multiple monitoring sources, such as Cmd_Pos, Cmd_Vel, Fbk_Pos, Fbk_Vel and other monitoring sources.
- **Del Row:** Deletes the selected monitoring source column.
- **Clear All:** Deletes all monitoring source columns.
- **Add Column:** Adds a row with multiple monitoring axes. You can select the axis number to be monitored from the drop-down list.
- **Del Column:** Deletes the selected monitoring axis.
- **Clear All:** Deletes all monitoring axes.

3.14 Advanced Point Table

The advanced point table provides the function of two-dimensional multi-point continuous motion planned by the user and displays the motion trajectory on the chart. The motion content includes absolute linear motion, circular motion or relative linear motion, and circular motion. Users can set the basic parameters of each point motion and save the file for later use.

To open APT page, click **Slave x** on the device tree, and then click the **APT** icon.



The screenshot shows the Motion Creator Pro 2 software interface. The main window is titled "Advanced Point table PCIe-8338 EtherCAT CardNo 2". The interface includes a menu bar (File, View, Initial Options, Function, About) and a toolbar with various icons. The left sidebar displays a device tree with the following structure:

- ADLINK
 - PCIe-8158
 - Card No 0
 - Motion
 - Axis0 ServoOff
 - Axis1 ServoOff
 - Axis2 ServoOff
 - Axis3 ServoOff
 - Axis4 ServoOff
 - Axis5 ServoOff
 - Axis6 ServoOff
 - Axis7 ServoOff
 - PCI-8254
 - Card No 1
 - Motion
 - Axis8 Alarm
 - Axis9 Alarm
 - Axis10 Alarm
 - Axis11 Alarm
 - PCIe-8338
 - Card No 2
 - EtherCAT Axis
 - (Slave 0) ADLINK ECA (highlighted with a red arrow and "Click Here(1)")
 - Axis 12 ServoOff
 - Axis 13 ServoOff
 - Axis 14 ServoOff
 - Axis 15 ServoOff
 - EtherCAT IO
 - AMP-304C
 - Card No 3
 - Motion
 - Axis76 ServoOff
 - Axis77 ServoOff
 - Axis78 ServoOff
 - Axis79 ServoOff

The main window contains a "Path Source" dropdown set to "Position", "Axis" dropdowns for "AxisNo 12" and "AxisNo 13", a "Tracer Enable" checkbox, and a "Draw Original Pattern" checkbox. A graph displays the motion trajectory with a green "Path Planning" line and a red "Tracer Path" line. Below the graph is a "Point Table List" table:

Point	AxisX	AxisY	S-factor	Acc	Dec	InitSpeed	MaxSpeed	EndSpeed	Angle
Point 0	0	0	0.0	10000000	10000000	0	10000000	0	0

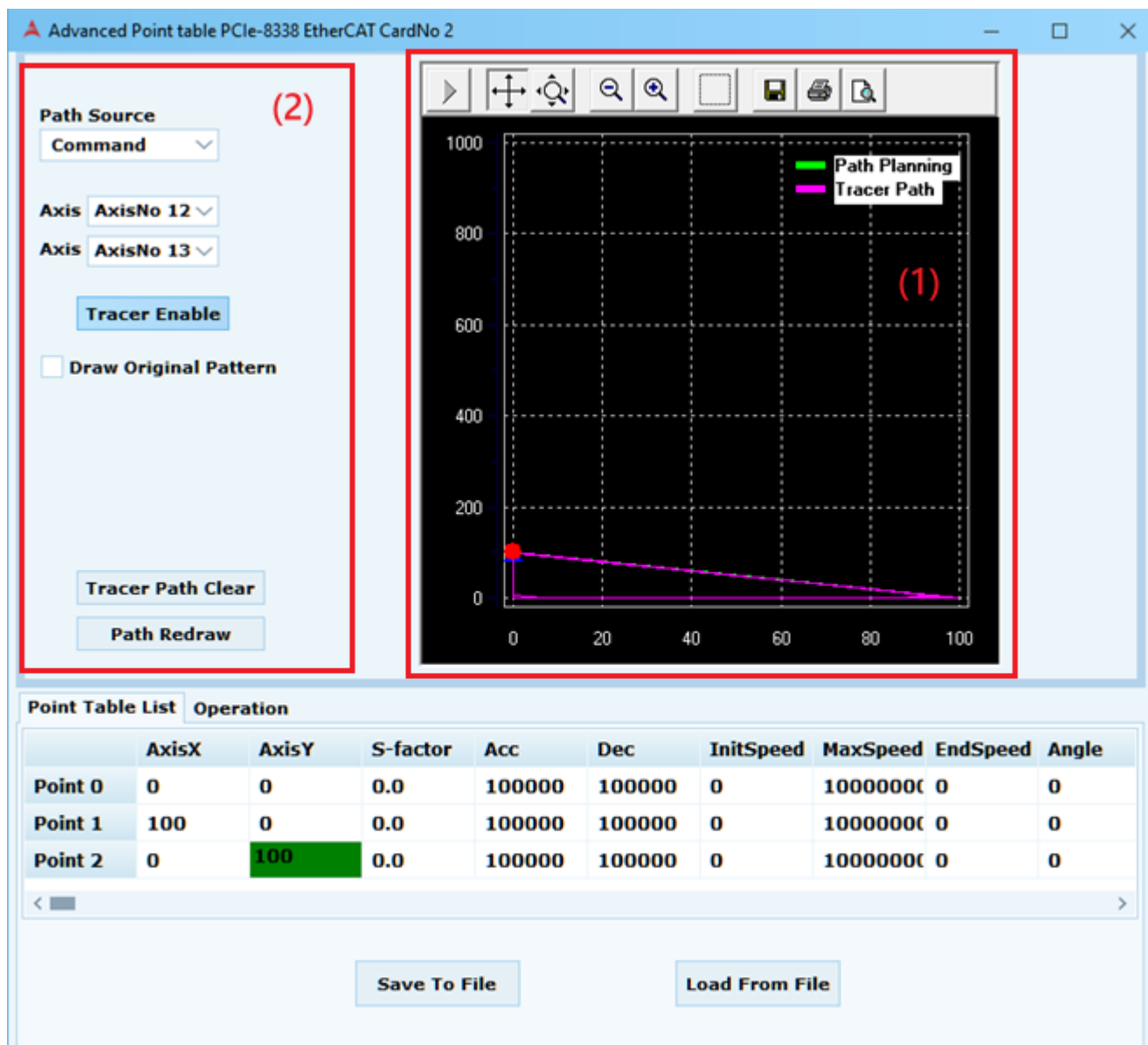
Buttons for "Tracer Path Clear", "Path Redraw", "Save To File", and "Load From File" are also present. A red arrow labeled "Click Here(2)" points to the "APT" icon in the top toolbar.

3.14.1 Drawing Area

The two-dimensional point movement track set by the user can be displayed in area (1). The green line (Path Planning) is the trajectory of the control command, and the pink line (Tracer Path) is the trajectory of the actual movement.

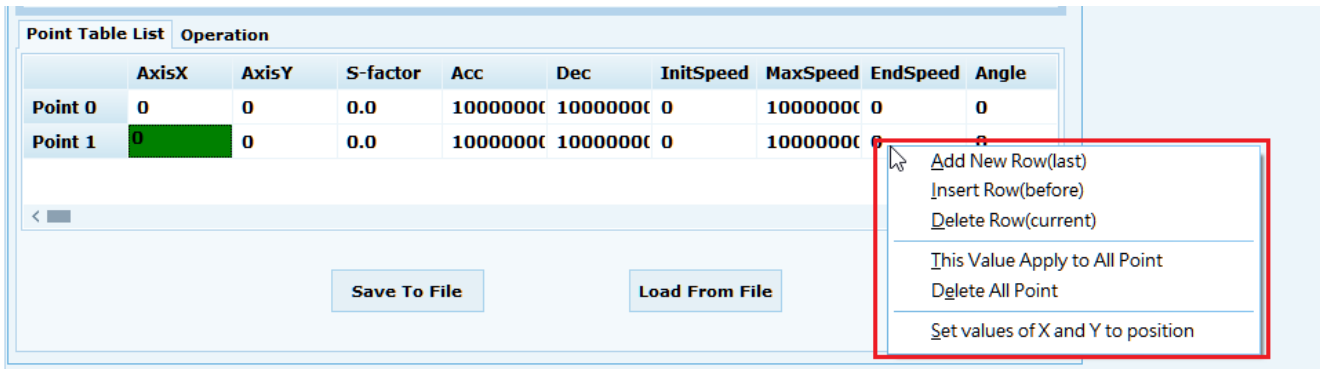
The drawing function (2) is set as follows:

- **Path Source:** Actual motion position or command position
- **Axis X,Y:** Selects the axis ID of the 2D motion
- **Tracer Path Clear:** Clears the actual path from the drawing area
- **Path Redraw:** Redraws the control command trajectory



3.14.2 Configuration Area

Right-click on the Point Table List to add or delete point movements.



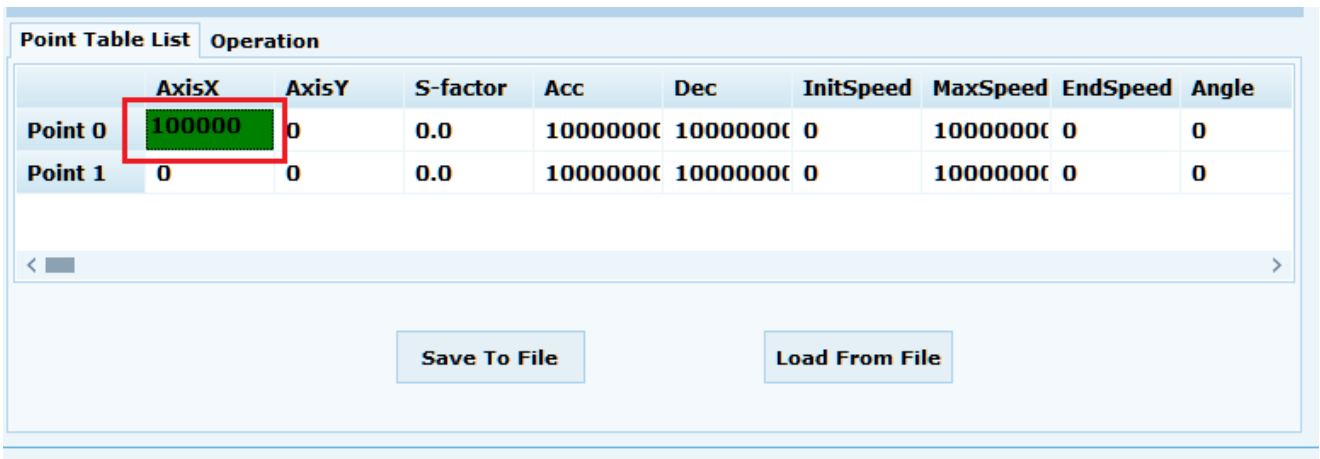
The screenshot shows the 'Point Table List' window with a table containing two points. A right-click context menu is open over the 'Point 1' row, showing options to add, insert, or delete rows, and buttons to apply values to all points or set X and Y positions.

	AxisX	AxisY	S-factor	Acc	Dec	InitSpeed	MaxSpeed	EndSpeed	Angle
Point 0	0	0	0.0	1000000	1000000	0	1000000	0	0
Point 1	0	0	0.0	1000000	1000000	0	1000000	0	0

Context Menu Options:

- Add New Row(last)
- Insert Row(before)
- Delete Row(current)
- This Value Apply to All Point
- Delete All Point
- Set values of X and Y to position

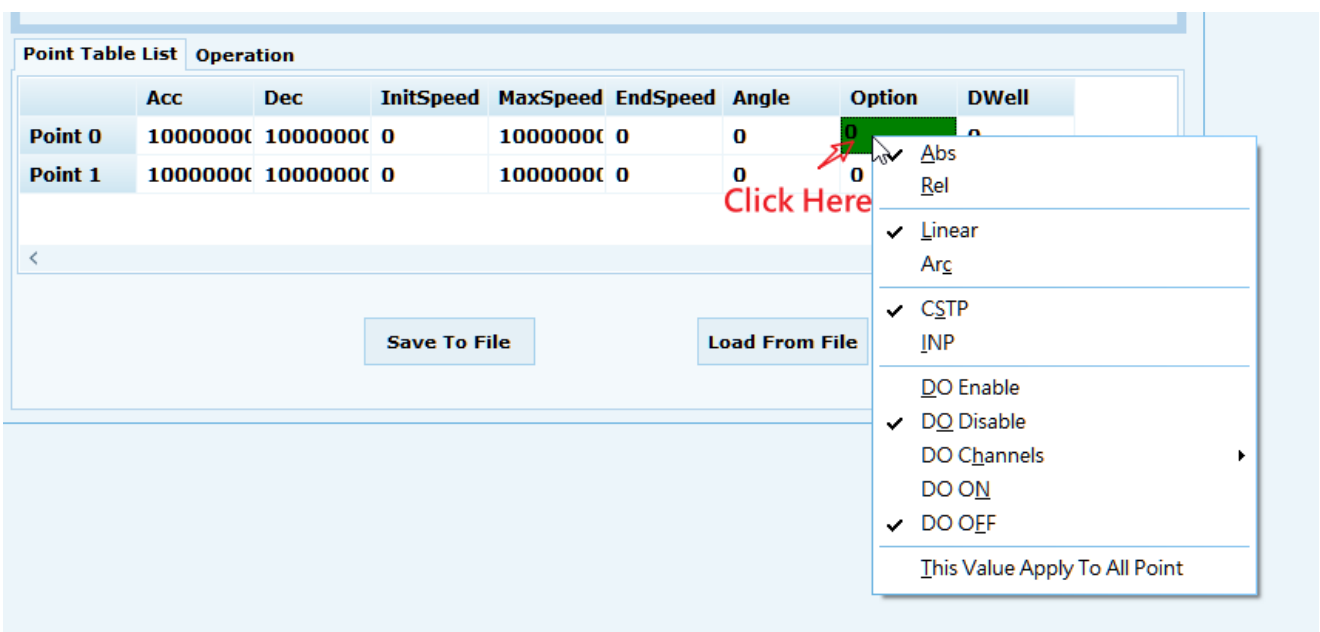
Click in the grid to edit the information of the motion command. For example, the position of Point 0, Axis X, is 100000.



The screenshot shows the 'Point Table List' window with the 'AxisX' value for 'Point 0' edited to 100000. The value is highlighted in a green box.

	AxisX	AxisY	S-factor	Acc	Dec	InitSpeed	MaxSpeed	EndSpeed	Angle
Point 0	100000	0	0.0	1000000	1000000	0	1000000	0	0
Point 1	0	0	0.0	1000000	1000000	0	1000000	0	0

Right-click in an Option cell to access advanced configuration options, such as Abs (absolute motion), Rel (relative motion), Linear (linear), Arc (Arc), etc.



The screenshot shows the 'Point Table List' window with a right-click context menu open over the 'Option' cell for 'Point 0'. The menu includes options for motion type (Abs, Rel), path type (Linear, Arc), and other settings like C&TP, INP, and DO Enable/Disable.

	Acc	Dec	InitSpeed	MaxSpeed	EndSpeed	Angle	Option	DWell
Point 0	1000000	1000000	0	1000000	0	0	0	0
Point 1	1000000	1000000	0	1000000	0	0	0	0

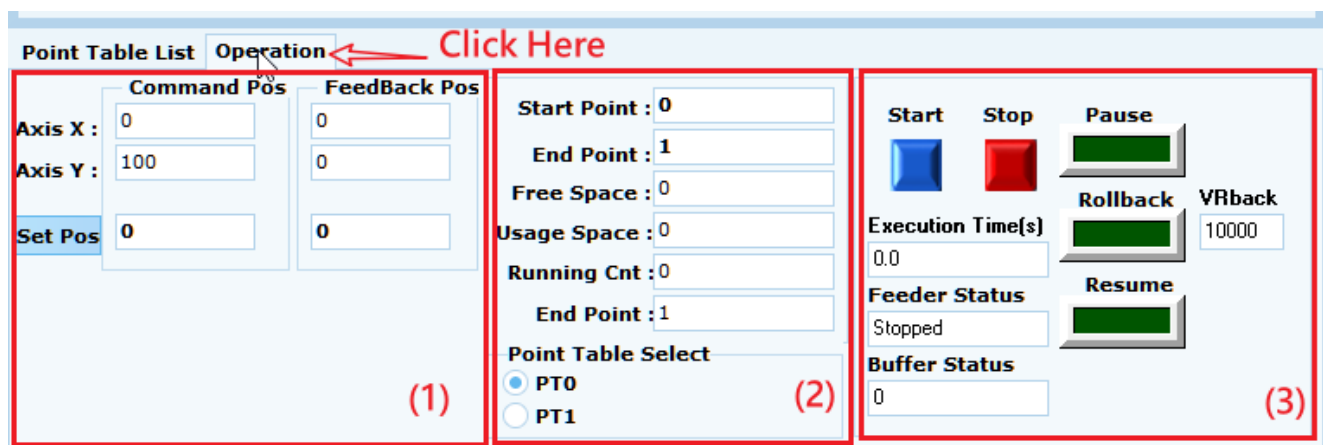
Context Menu Options:

- Abs
- Rel
- Linear
- Arc
- C&TP
- INP
- DO Enable
- DO Disable
- DO Channels
- DO ON
- DO OFF
- This Value Apply To All Point

3.14.3 Operation Area

Click the Operation tab to see the following options.

- (1) Use these values to monitor the command and feedback position of the two axes.
- (2) Use these values to monitor the current point to which the command has been executed, the buffer status of the point table, and which point table to select.
- (3) Use these values to monitor the execution time, feeder status and buffer status of the dot filler. Additional functions include:
 - **Start**: Start point table motion.
 - **Stop**: Stop point table motion.
 - **Pause**: Pause point table motion.
 - **Rollback**: In Pause state, use the speed set by VRback to return to the previous motion position.
 - **Resume**: Resume from pause.



Point Table List **Operation** ← Click Here

	Command Pos	FeedBack Pos
Axis X :	0	0
Axis Y :	100	0
Set Pos	0	0

(1)

Start Point :	0
End Point :	1
Free Space :	0
Usage Space :	0
Running Cnt :	0
End Point :	1
Point Table Select	☒ PT0 ☐ PT1

(2)

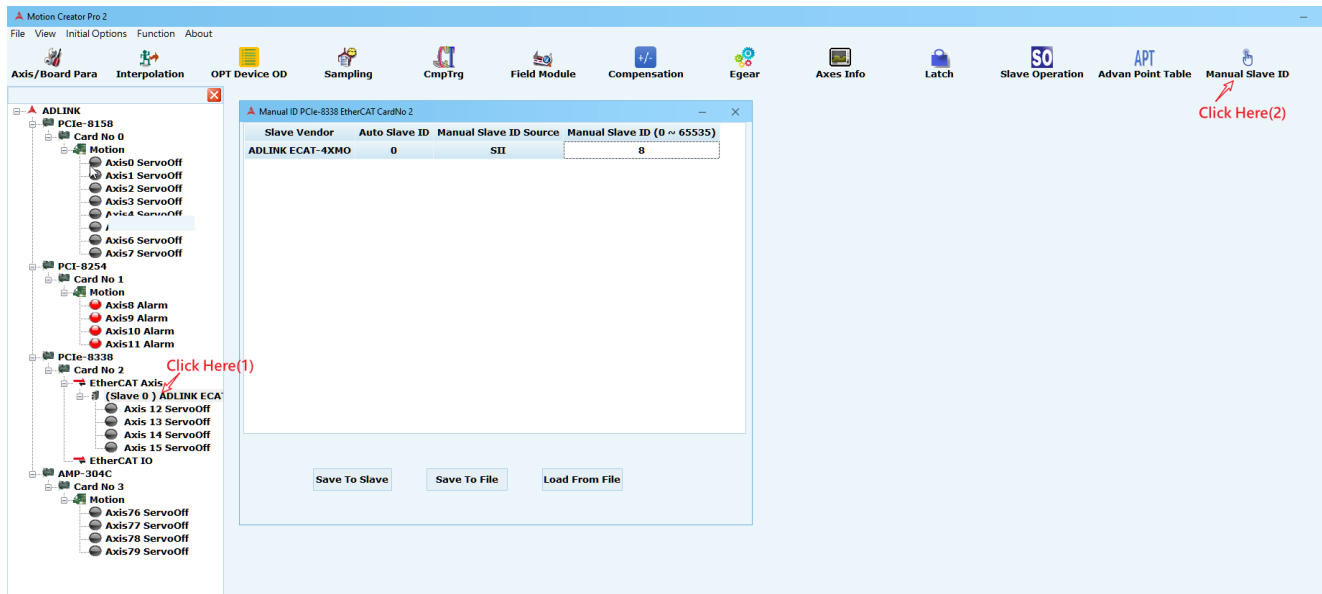
Start	Stop	Pause
Execution Time(s)		VRback
0.0		10000
Feeder Status		Rollback
Stopped		
Buffer Status		Resume
0		

(3)

3.15 Manual Settings Slave ID (Manual ID)

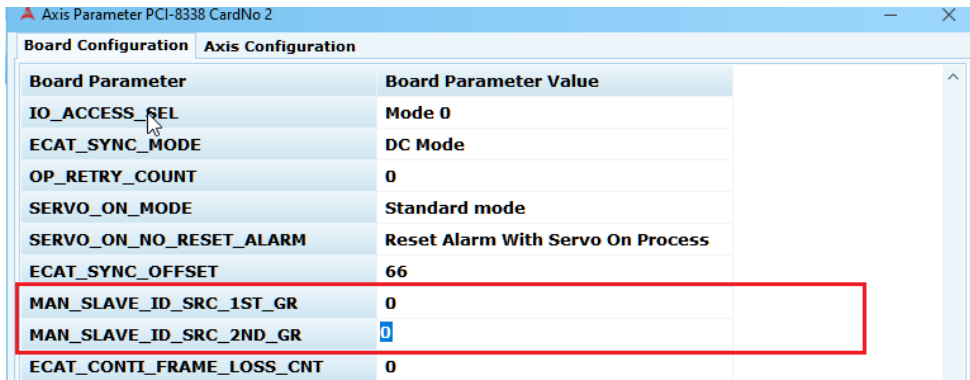
Manual ID allows the user to set the ID of each Slave.

To open the Manual ID page, click **Slave x** in the device tree, and then click the **Manual ID** icon.



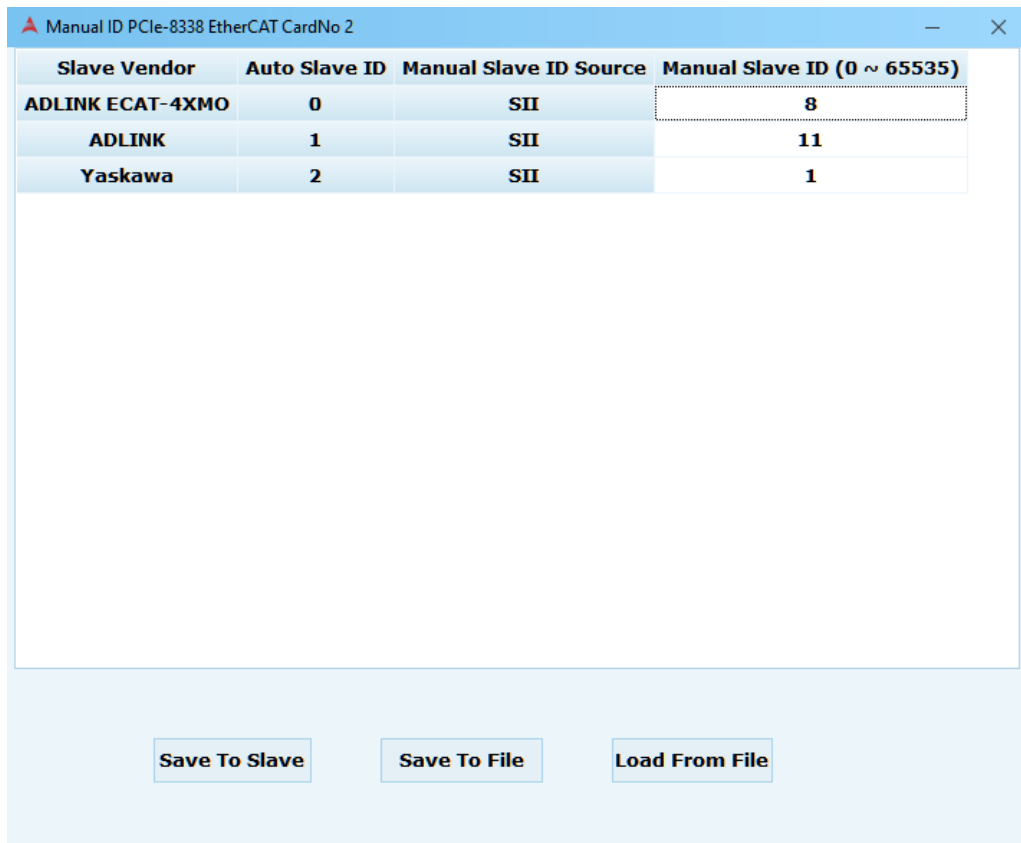
Information about the Manual ID includes:

- **Auto Slave ID:** Slave IDs that are automatically sorted from 0 to 63335 are listed in this table.
- **Manual Slave ID Source:** Currently, PCI-833X is configured to read from the ESC Configured Station Alias Register and is defined as SII. The other mode gets the information for the ID-Selector by reading the AL Status Code defined as AL Control. This information needs to be combined with board parameter to select different reading modes to read ID information. For these settings, refer to the APS Function Library manual.



Board Parameter	Board Parameter Value
IO_ACCESS_SEL	Mode 0
ECAT_SYNC_MODE	DC Mode
OP_RETRY_COUNT	0
SERVO_ON_MODE	Standard mode
SERVO_ON_NO_RESET_ALARM	Reset Alarm With Servo On Process
ECAT_SYNC_OFFSET	66
MAN_SLAVE_ID_SRC_1ST_GR	0
MAN_SLAVE_ID_SRC_2ND_GR	0
ECAT_CONTI_FRAME_LOSS_CNT	0

- **Manual Slave ID:** Editable Slave ID.
- **Save to Slave:** Writes the configured Slave ID to the EEPROM of the Slave.
- **Save to File:** Saves configuration as an xml file.
- **Load From File:** Loads an xml file and displays it in the table.



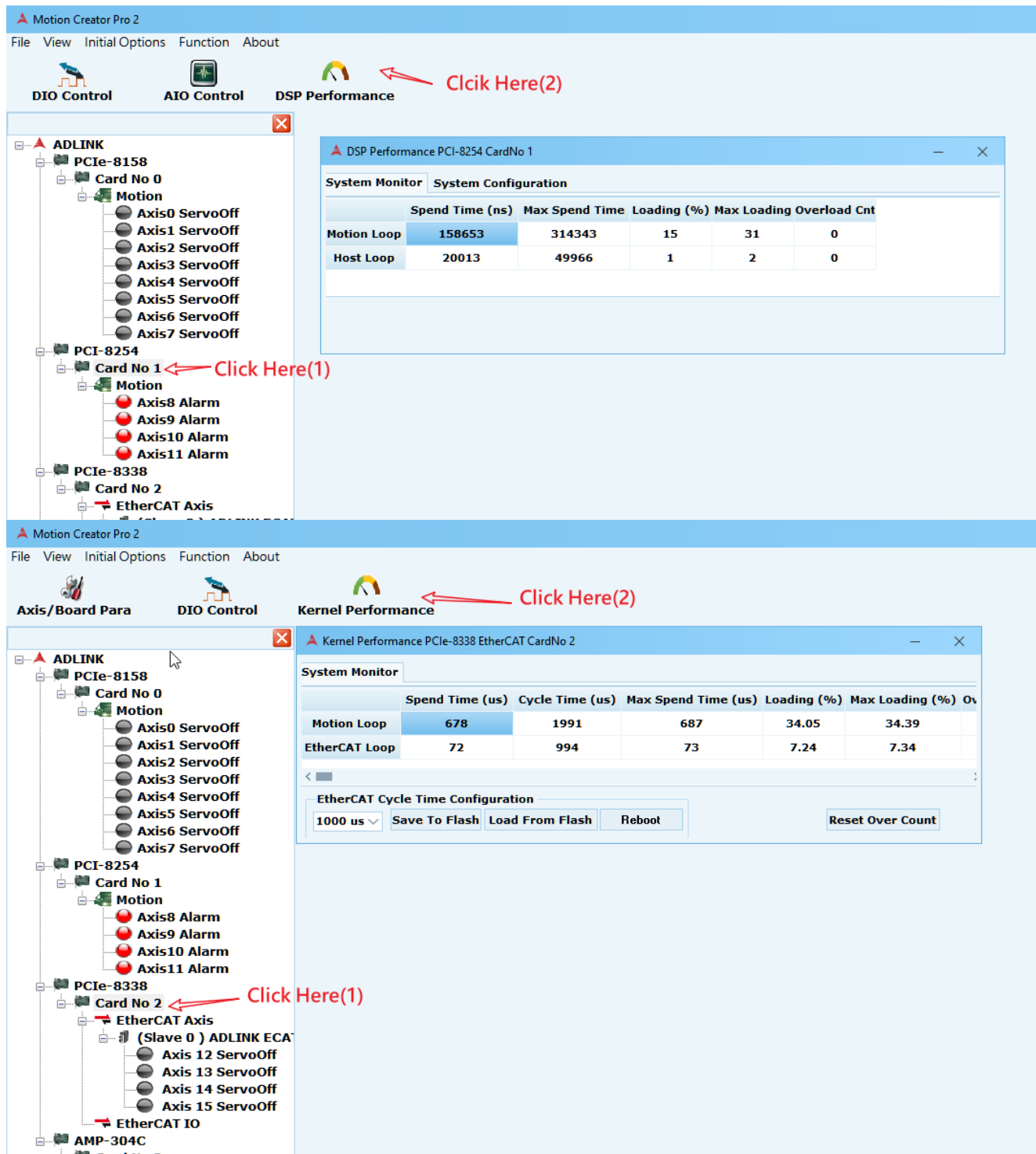
Slave Vendor	Auto Slave ID	Manual Slave ID Source	Manual Slave ID (0 ~ 65535)
ADLINK ECAT-4XMO	0	SII	8
ADLINK	1	SII	11
Yaskawa	2	SII	1

Save To Slave
Save To File
Load From File

3.16 DSP/Kernel Performance

DSP/Kernel Performance provides the user's current EtherCAT cycle time and motion cycle time, consumption time, and load, as well as the user's settings for changing the current cycle time.

To open the DSP/Kernel Performance, click **Card No x** on the device tree, and then click the **DSP Performance** or **Kernel Performance** icon as necessary.



The first screenshot shows the **DSP Performance** window for **PCI-8254 Card No 1**. The **System Monitor** tab displays the following data:

	Spend Time (ns)	Max Spend Time	Loading (%)	Max Loading	Overload Cnt
Motion Loop	158653	314343	15	31	0
Host Loop	20013	49966	1	2	0

The second screenshot shows the **Kernel Performance** window for **PCI-8338 EtherCAT Card No 2**. The **System Monitor** tab displays the following data:

	Spend Time (us)	Cycle Time (us)	Max Spend Time (us)	Loading (%)	Max Loading (%)	Overload Cnt
Motion Loop	678	1991	687	34.05	34.39	0
EtherCAT Loop	72	994	73	7.24	7.34	0

The **EtherCAT Cycle Time Configuration** section shows a value of **1000 us** with buttons for **Save To Flash**, **Load From Flash**, **Reboot**, and **Reset Over Count**.

3.16.1 DSP Performance

DSP Performance PCI-8254 CardNo 1					
System Monitor System Configuration					
	Spend Time (us)	Max Spend Time	Loading (%)	Max Loading	Overload Cnt
Motion Loop	158940	305896	15	30	0
Host Loop	20040	561386	1	28	0

- **Spend Time:** Time consumed per cycle of the current operation in nanoseconds
- **Max Spend Time:** Maximum time taken so far in nanoseconds
- **Loading:** Proportion in current cycle (work proportion) (100%)
- **Max Loading:** Recorded maximum DSP workload (100%)
- **Overload Cnt:** Cumulative number of overloading

3.16.2 Kernel Performance

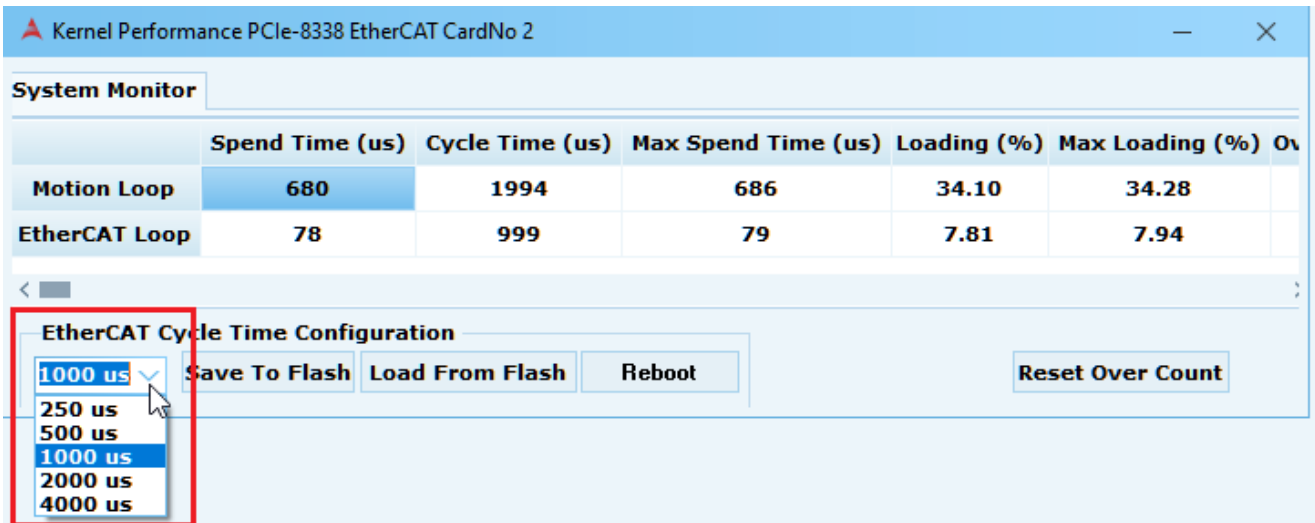
Kernel Performance PCIe-8338 EtherCAT CardNo 2						
System Monitor						
	Spend Time (us)	Cycle Time (us)	Max Spend Time (us)	Loading (%)	Max Loading (%)	Overload Cnt
Motion Loop	679	1992	689	34.09	34.50	0
EtherCAT Loop	73	995	75	7.34	7.54	0

EtherCAT Cycle Time Configuration
1000 us

- **Spend Time:** Actual system consume time in microseconds
- **Cycle Time:** Actual system cycle time in microseconds
- **Max Spend Time:** MCP2 estimates the system's biggest consumption time in microseconds
- **Loading:** MCP2 estimates the percentage of the system's current computational load (%).
- **Max Loading:** MCP2 estimated system current maximum load percentage (%)
- **Overload Cnt:** Cumulative number of overloading

3.16.3 How to set EtherCAT Cycle time

1. Select cycle time from the drop-down list.



	Spend Time (us)	Cycle Time (us)	Max Spend Time (us)	Loading (%)	Max Loading (%)	Over
Motion Loop	680	1994	686	34.10	34.28	
EtherCAT Loop	78	999	79	7.81	7.94	

EtherCAT Cycle Time Configuration

1000 us ▼ Save To Flash Load From Flash Reboot Reset Over Count

250 us

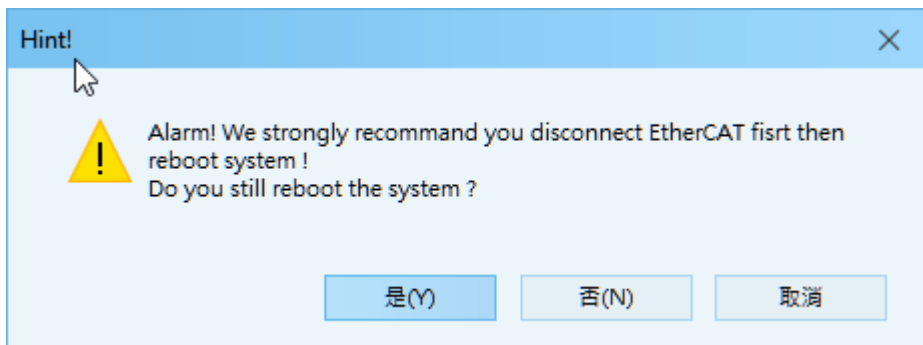
500 us

1000 us

2000 us

4000 us

2. Click **Save To Flash**.
3. Click **Reboot**. A pop-up window will appear.
Note: Ensure that Field Bus is disconnected before performing this operation.

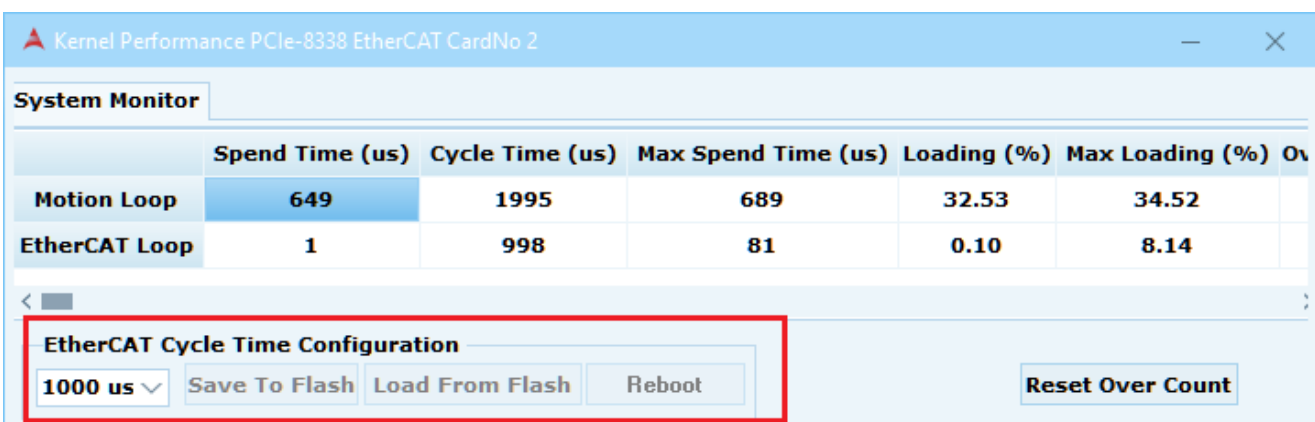


Hint!

Alarm! We strongly recommend you disconnect EtherCAT first then reboot system !
Do you still reboot the system ?

是(Y) 否(N) 取消

4. While waiting, the function button will turn white until the system is reset.



	Spend Time (us)	Cycle Time (us)	Max Spend Time (us)	Loading (%)	Max Loading (%)	Over
Motion Loop	649	1995	689	32.53	34.52	
EtherCAT Loop	1	998	81	0.10	8.14	

EtherCAT Cycle Time Configuration

1000 us ▼ Save To Flash Load From Flash Reboot Reset Over Count

- Click **Card No x**, and then click **Axis/Board Para fast** to open the page. Click **Save to Flash**.

Parameter PCIe-8338 EtherCAT CardNo 2

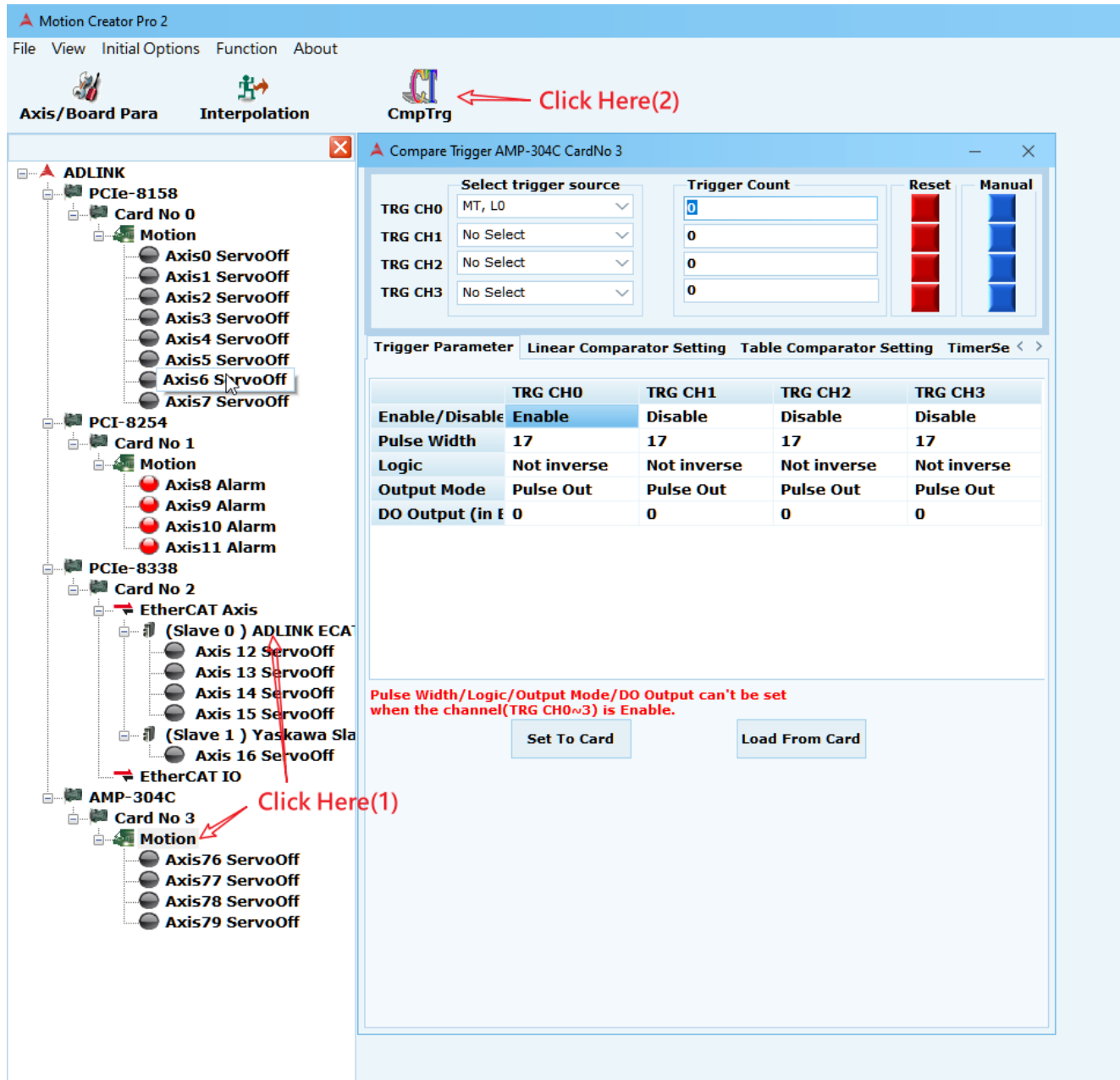
Board Configuration

Board Parameter	Board Parameter Value
EMG_LOGIC	Normal Open
DO_LOGIC	No Invert
DI_LOGIC	No Invert
IO_ACCESS_SEL	Mode 0
ECAT_SYNC_MODE	DC Mode
OP_RETRY_COUNT	0
SERVO_ON_MODE	Standard mode
SERVO_ON_NO_RESET_ALARM	Reset Alarm With Servo On Process
ECAT_SYNC_OFFSET	66
MAN_SLAVE_ID_SRC_1ST_GR	0
MAN_SLAVE_ID_SRC_2ND_GR	0
ECAT_CONTI_FRAME_LOSS_CNT	0
SAMPLING_SRC_AXIS_TYPE	Axis Number
EMG_MODE	Servo off directly
ECAT_RESTORE_OUTPUT	Restore
DI_EMG_FILTER_ENABLE	Enable
DI_EMG_FILTER_RANGE	5 us
PULSER_FILTER_RANGE	5 us

3.17 Compare Trigger

The comparison trigger functions are divided into Linear Compare and Table Compare, which take corresponding actions when the conditions set by the user are compared.

To open the compare trigger function page, click **Slave x** or **Motion** on different axis cards in the device tree, and then click the **CmpTrg** icon.



Click Here(2)

Click Here(1)

Compare Trigger AMP-304C CardNo 3

Select trigger source

TRG CH	Source	Trigger Count	Reset	Manual
TRG CH0	MT, L0	0	☐	☐
TRG CH1	No Select	0	☐	☐
TRG CH2	No Select	0	☐	☐
TRG CH3	No Select	0	☐	☐

Trigger Parameter | **Linear Comparator Setting** | Table Comparator Setting | TimerSe >

	TRG CH0	TRG CH1	TRG CH2	TRG CH3
Enable/Disable	Enable	Disable	Disable	Disable
Pulse Width	17	17	17	17
Logic	Not inverse	Not inverse	Not inverse	Not inverse
Output Mode	Pulse Out	Pulse Out	Pulse Out	Pulse Out
DO Output (in E 0	0	0	0	0

Pulse Width/Logic/Output Mode/DO Output can't be set when the channel(TRG CH0~3) is Enable.

Set To Card | Load From Card

Compare Trigger AMP-304C CardNo 3

(1) Select trigger source

TRG CH0	MT, L0
TRG CH1	No Select
TRG CH2	No Select
TRG CH3	No Select

(2) Trigger Count

0
0
0
0

(3)

Reset

Manual

Trigger Parameter

Linear Comparator Setting

Table Comparator Setting

TimerSe <

>

	TRG CH0	TRG CH1	TRG CH2	TRG CH3
Enable/Disable	Enable	Disable	Disable	Disable
Pulse Width	17	17	17	17
Logic	Not inverse	Not inverse	Not inverse	Not inverse
Output Mode	Pulse Out	Pulse Out	Pulse Out	Pulse Out
DO Output (in E	0	0	0	0

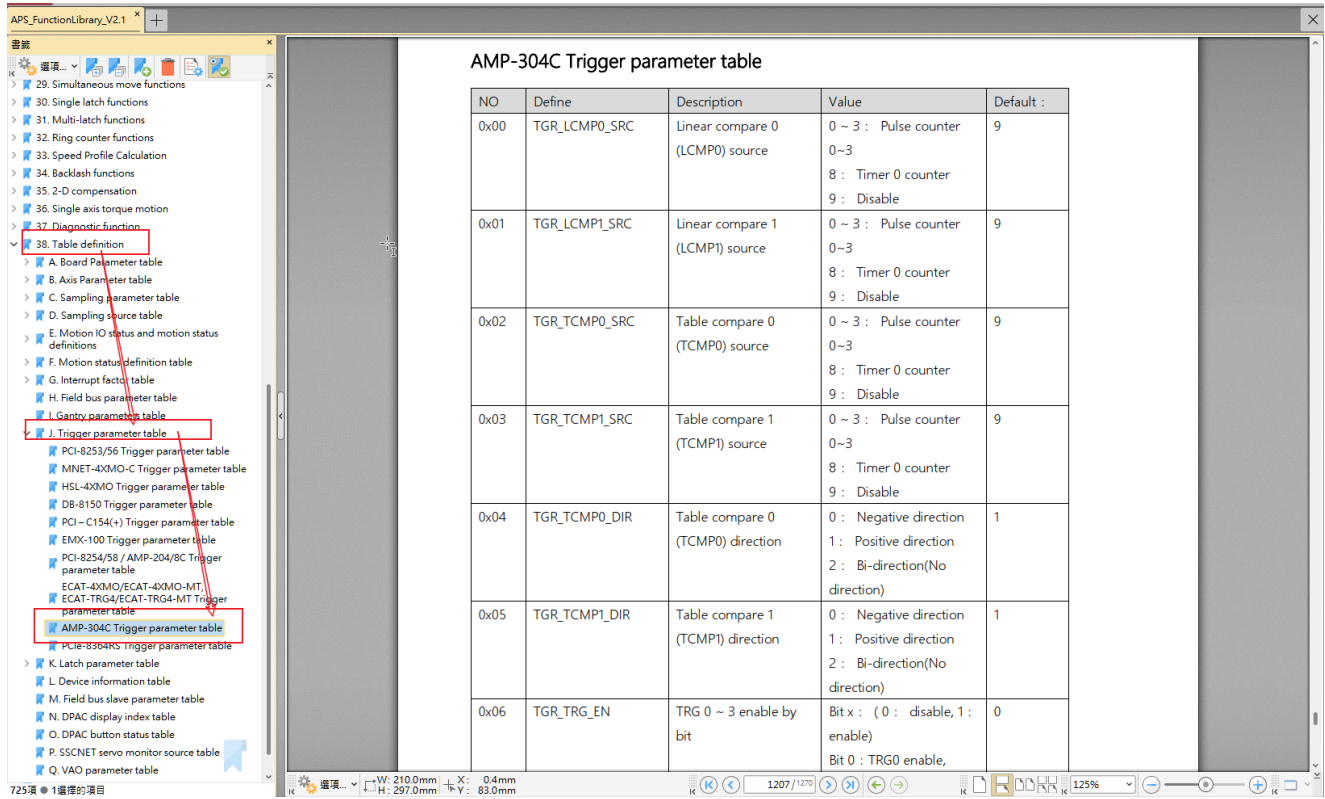
Pulse Width/Logic/Output Mode/DO Output can't be set when the channel(TRG CH0~3) is Enable.

Set To Card

Load From Card

- 82

- (4) **Trigger Parameter:** Compares the trigger setting parameters. Different axis cards have different settings. Refer to the APS Function Library manual Table definition-> Trigger parameter table for more information. This example is for ADLINK's AMP-304C, so the corresponding manual content is shown below.



The screenshot displays the APS Function Library V2.1 software interface. On the left, a tree view shows the navigation structure, with 'J. Trigger parameter table' selected. The main area displays the 'AMP-304C Trigger parameter table'.

NO	Define	Description	Value	Default :
0x00	TGR_LCMP0_SRC	Linear compare 0 (LCMP0) source	0 ~ 3 : Pulse counter 0~3 8 : Timer 0 counter 9 : Disable	9
0x01	TGR_LCMP1_SRC	Linear compare 1 (LCMP1) source	0 ~ 3 : Pulse counter 0~3 8 : Timer 0 counter 9 : Disable	9
0x02	TGR_TCMP0_SRC	Table compare 0 (TCMP0) source	0 ~ 3 : Pulse counter 0~3 8 : Timer 0 counter 9 : Disable	9
0x03	TGR_TCMP1_SRC	Table compare 1 (TCMP1) source	0 ~ 3 : Pulse counter 0~3 8 : Timer 0 counter 9 : Disable	9
0x04	TGR_TCMP0_DIR	Table compare 0 (TCMP0) direction	0 : Negative direction 1 : Positive direction 2 : Bi-direction(No direction)	1
0x05	TGR_TCMP1_DIR	Table compare 1 (TCMP1) direction	0 : Negative direction 1 : Positive direction 2 : Bi-direction(No direction)	1
0x06	TGR_TRG_EN	TRG 0 ~ 3 enable by bit	Bit x : (0 : disable, 1 : enable) Bit 0 : TRG0 enable,	0

(5) Linear Comparator Setting: [ADD CONTENT]

Trigger Parameter
Linear Comparator Setting
Table Comparator Setting
TimerSe < >

Linear Compare 0 (LCMP0)

StartPoint
0
RepeatTimes
0
Interval
0

CurrCmpValue
100
Select Input Source
Encoder 0

*SET

Linear Compare 1 (LCMP1)

StartPoint
0
RepeatTimes
0
Interval
0

CurrCmpValue
0
Select Input Source
Disable

*SET

Linear Compare 2 (LCMP2)

StartPoint
0
RepeatTimes
0
Interval
0

CurrCmpValue
0
Select Input Source
Disable

*SET

Linear Compare 3 (LCMP3)

StartPoint
0
RepeatTimes
0
Interval
0

CurrCmpValue
0
Select Input Source
Disable

*SET

(6) **Table Comparator Setting:** Sets the table comparator values.

Trigger Parameter
Linear Comparator Setting
Table Comparator Setting
TimerSe < >

TCMP0 Input Table Points

1000	1500	2000	2500	3000
3500	4000	4500	5000	5500

☒ Global
☐ Point

*SET

CmpValue : 0
Neg
Select Source
Disable
Don't Rei

TCMP1 Input Table Points

1000	2000	3000	4000	5000
6000	7000	8000	9000	10000

☒ Global
☐ Point

*SET

CmpValue : 0
Neg
Select Source
Disable
Don't Rei

TCMP2 Input Table Points

1000	2500	4000	5500	7000
8500	10000	11500	13000	14500

☒ Global
☐ Point

*SET

CmpValue : 0
Neg
Select Source
Disable
Don't Rei

TCMP3 Input Table Points

1000	3000	5000	7000	9000
11000	13000	15000	17000	19000

☒ Global
☐ Point

*SET

CmpValue : 0
Neg
Select Source
Disable
Don't Rei

(7) Timer Setting: 計時器設定

Linear Comparator Setting
Table Comparator Setting
TimerSetting

Compare Value

0

Second

Timer

Timer Counter

-20224

1

Set

Comparator

TRG_CHx

SET

Start

N: 1

Counter Driection: Positive Count

Timer Interval = (N+2) * 8ns

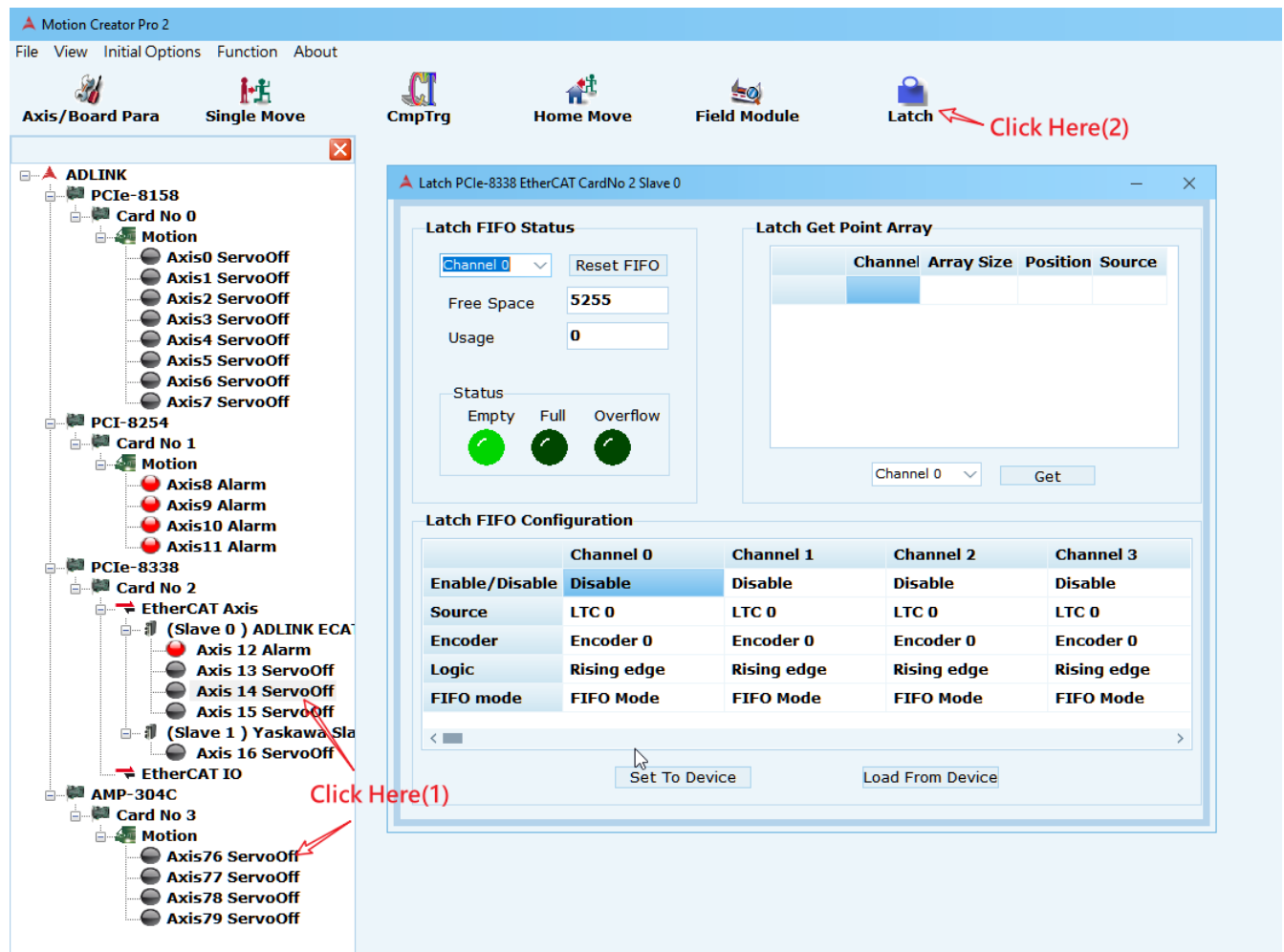
N:Range 0 ~ 268435455(0xffffffff)

☐ Enable Ring Counter

3.18 Latch

The position latch function allows the user to latch an instant position and then make a corresponding signal output or motion response to the position.

To open the Latch page, click **Axis x** on the device tree column, then click the **Latch** icon.



The screenshot shows the Motion Creator Pro 2 software interface. On the left is the device tree, and on the right is the Latch configuration window.

Device Tree (Left):

- ADLINK
 - PCIe-8158
 - Card No 0
 - Motion
 - Axis0 ServoOff
 - Axis1 ServoOff
 - Axis2 ServoOff
 - Axis3 ServoOff
 - Axis4 ServoOff
 - Axis5 ServoOff
 - Axis6 ServoOff
 - Axis7 ServoOff
 - PCI-8254
 - Card No 1
 - Motion
 - Axis8 Alarm
 - Axis9 Alarm
 - Axis10 Alarm
 - Axis11 Alarm
 - PCIe-8338
 - Card No 2
 - EtherCAT Axis
 - (Slave 0) ADLINK ECA
 - Axis 12 Alarm
 - Axis 13 ServoOff
 - Axis 14 ServoOff
 - Axis 15 ServoOff
 - (Slave 1) Yaskawa Sla
 - Axis 16 ServoOff
 - EtherCAT IO
 - AMP-304C
 - Card No 3
 - Motion
 - Axis76 ServoOff
 - Axis77 ServoOff
 - Axis78 ServoOff
 - Axis79 ServoOff

Latch Configuration Window (Right):

Latch FIFO Status

Channel 0 (selected) | Reset FIFO

Free Space: 5255

Usage: 0

Status: Empty (green), Full (green), Overflow (green)

Latch Get Point Array

Channel	Array Size	Position	Source
Channel 0			

Channel 0 (selected) | Get

Latch FIFO Configuration

	Channel 0	Channel 1	Channel 2	Channel 3
Enable/Disable	Disable	Disable	Disable	Disable
Source	LTC 0	LTC 0	LTC 0	LTC 0
Encoder	Encoder 0	Encoder 0	Encoder 0	Encoder 0
Logic	Rising edge	Rising edge	Rising edge	Rising edge
FIFO mode	FIFO Mode	FIFO Mode	FIFO Mode	FIFO Mode

Set To Device | Load From Device

Annotations:

 - Click Here(1):** Points to the "Axis 16 ServoOff" item in the device tree.
 - Click Here(2):** Points to the "Latch" icon in the top toolbar.

Latch configuration options are shown below.

Channel 0

Reset FIFO

Free Space

5201

Usage

54

Status

Empty

Full

Overflow

(1)

Channel 0

Get

	Channel	Array Size	Position	Source
Point 1	0	1	0	PWM 0 (T
Point 2	0	1	0	PWM 0 (T
Point 3	0	1	0	PWM 0 (T
Point 4	0	1		
Point 5	0	1		

Delete Current Point

Delete All Point

(2)

	Channel 0	Channel 1	Channel 2	Channel 3
Enable/Disable	Enable	Disable	Disable	Disable
Source	PWM 0 (TRG CH0)	LTC 0	LTC 0	LTC 0
Encoder	Encoder 0	Encoder 0	Encoder 0	Encoder 0
Logic	Rising edge	Rising edge	Rising edge	Rising edge
FIFO mode	FIFO Mode	FIFO Mode	FIFO Mode	FIFO Mode

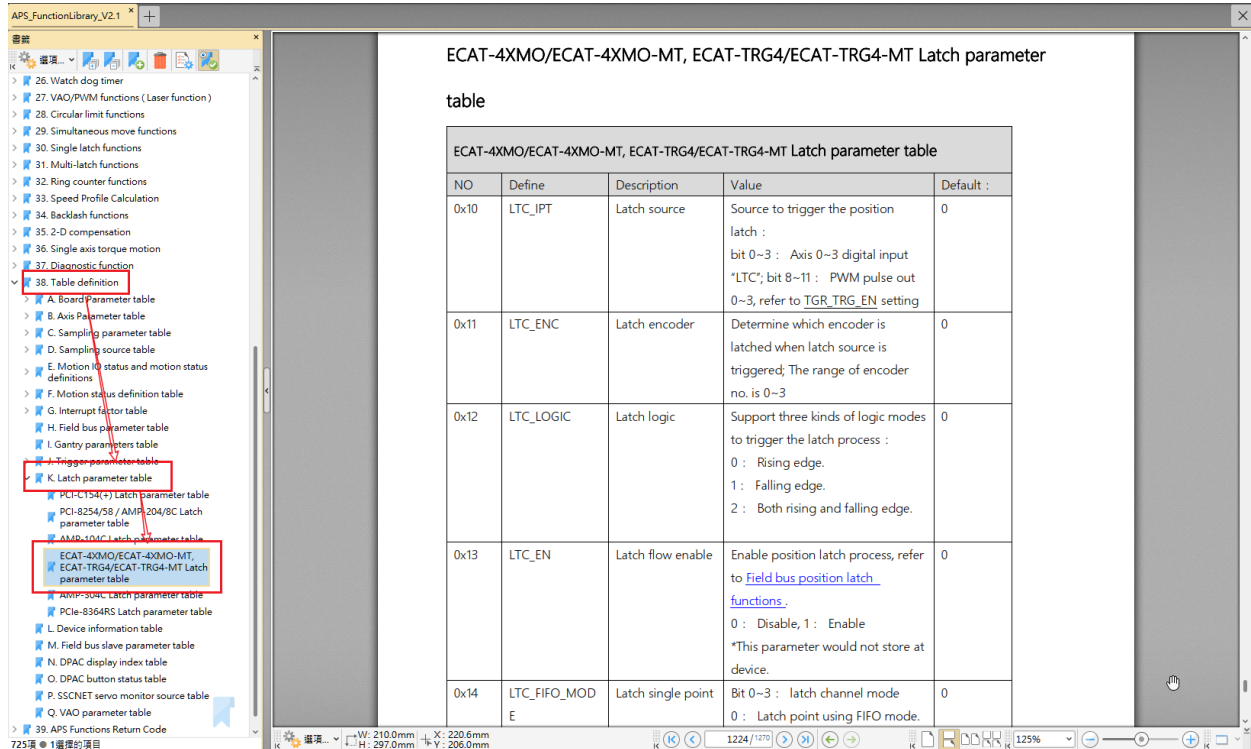
Set To Device

Load From Device

(3)

- (1) **Latch FIFO status:** Regularly updates the FIFO status of channels selected by users, and resets and usage the status.
- (2) **Latch Get Point Array:** Obtains the FIFO point information of the channel selected by the user, including the location and source of the latch. When not in use, right-click to select a single point or delete all the information.

- (3) **Latch FIFO Configuration:** Sets parameters related to Latch, such as latch channel number, source, latch encoder number and latch logical conditions, etc., and can be enabled after configuration is complete. For setting parameters, refer to the APS Function Library manual Table definition-> Latch parameter table. This example is for ADLINK's 4XMO, so the corresponding manual content is shown below.



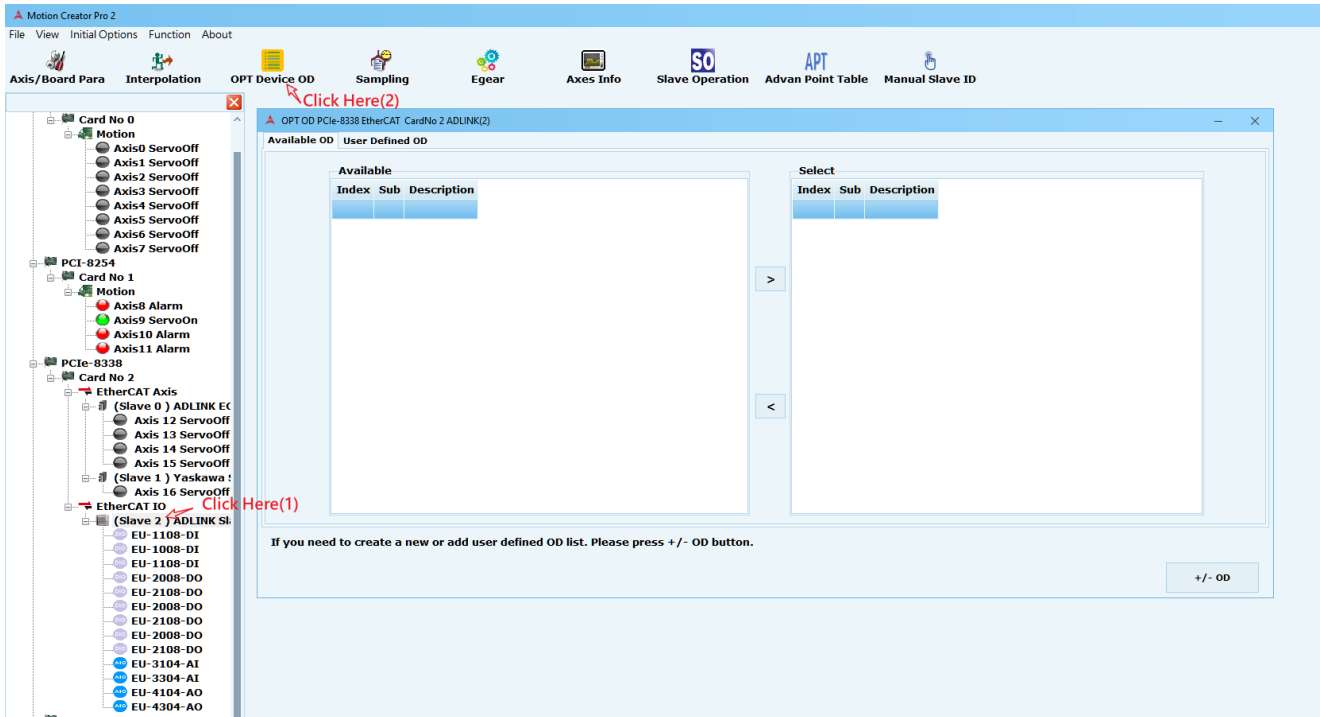
ECAT-4XMO/ECAT-4XMO-MT, ECAT-TRG4/ECAT-TRG4-MT Latch parameter table

NO	Define	Description	Value	Default :
0x10	LTC_IPT	Latch source	Source to trigger the position latch : bit 0~3 : Axis 0~3 digital input "LTC"; bit 8~11 : PWM pulse out 0~3, refer to TGR_TRG_EN setting	0
0x11	LTC_ENC	Latch encoder	Determine which encoder is latched when latch source is triggered; The range of encoder no. is 0~3	0
0x12	LTC_LOGIC	Latch logic	Support three kinds of logic modes to trigger the latch process : 0 : Rising edge. 1 : Falling edge. 2 : Both rising and falling edge.	0
0x13	LTC_EN	Latch flow enable	Enable position latch process, refer to Field bus position latch functions . 0 : Disable, 1 : Enable *This parameter would not store at device.	0
0x14	LTC_FIFO_MOD E	Latch single point	Bit 0~3 : latch channel mode 0 : Latch point using FIFO mode.	0

3.19 OPT Device OD

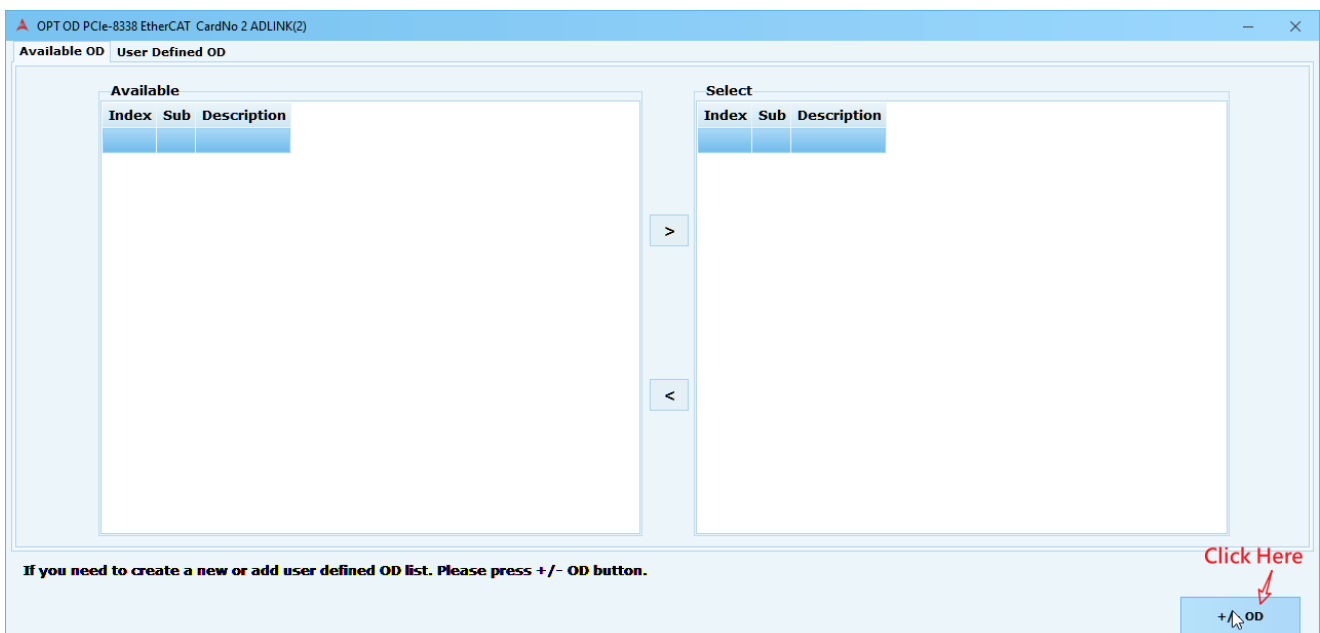
The OPT Device OD page is an extension of the SDO page. Users can choose to read and write the Object Dictionary (OD) data of the SDO to obtain the specific data of the Slave and monitor it.

To open the OPT Device OD, click **Slave x** in the device tree column, and then click the **OPT Device OD** icon.

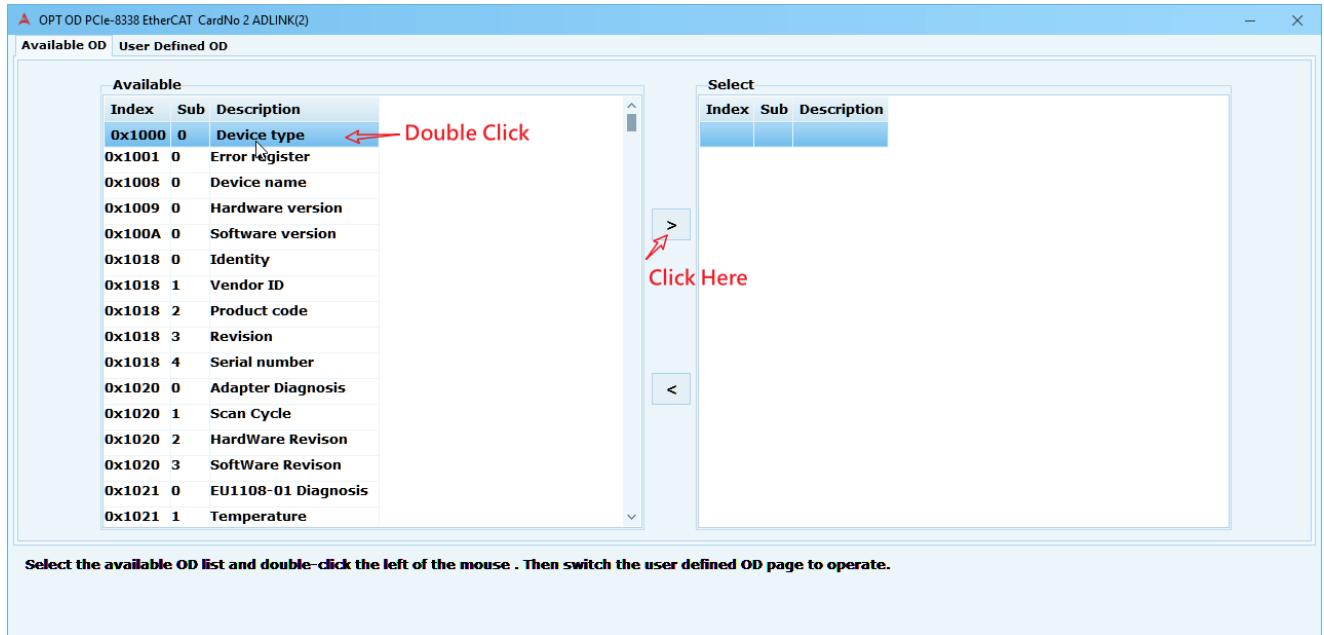


OPT Device OD function settings are shown below.

(1) +/- OD is the SLAVE SDO that generates the selection.



- (2) The generated OD Data will be displayed under Available. Double-click a project or use the right arrow button in the middle of the window to select the desired OD Data.



Available OD User Defined OD

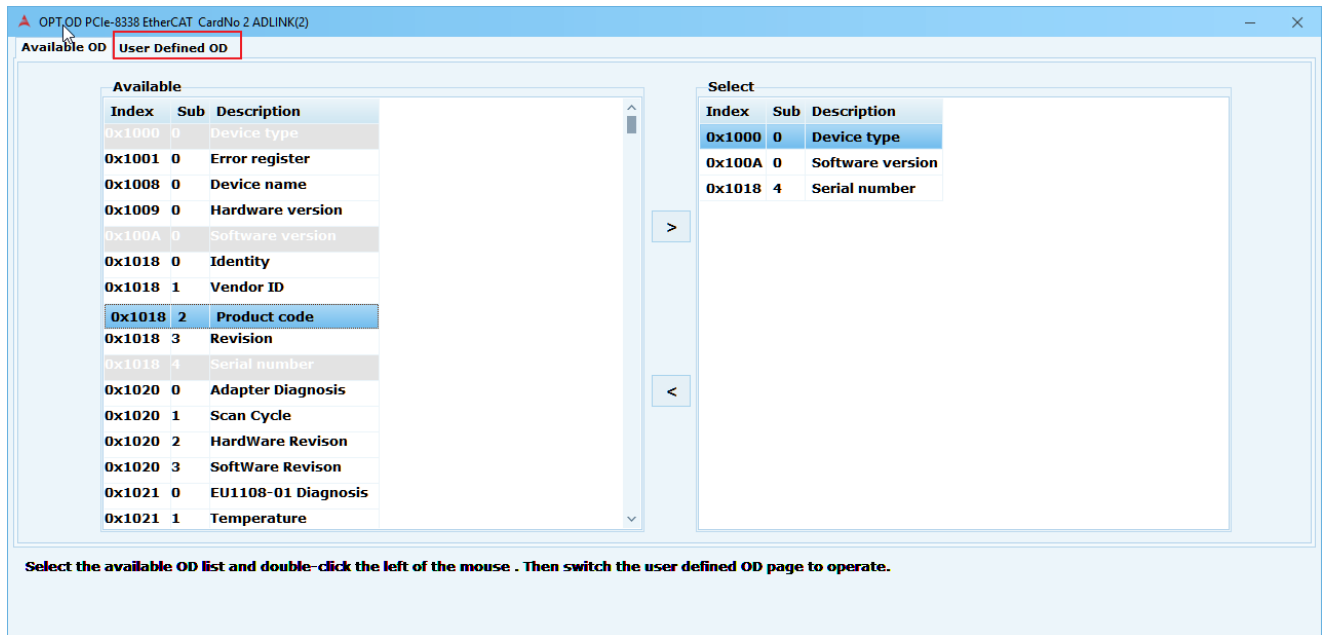
Index	Sub	Description
0x1000	0	Device type
0x1001	0	Error register
0x1008	0	Device name
0x1009	0	Hardware version
0x100A	0	Software version
0x1018	0	Identity
0x1018	1	Vendor ID
0x1018	2	Product code
0x1018	3	Revision
0x1018	4	Serial number
0x1020	0	Adapter Diagnosis
0x1020	1	Scan Cycle
0x1020	2	HardWare Revision
0x1020	3	SoftWare Revision
0x1021	0	EU1108-01 Diagnosis
0x1021	1	Temperature

Select

Index	Sub	Description
-------	-----	-------------

Select the available OD list and double-click the left of the mouse . Then switch the user defined OD page to operate.

- (3) The selection results display in the User Defined OD tab.



Available OD **User Defined OD**

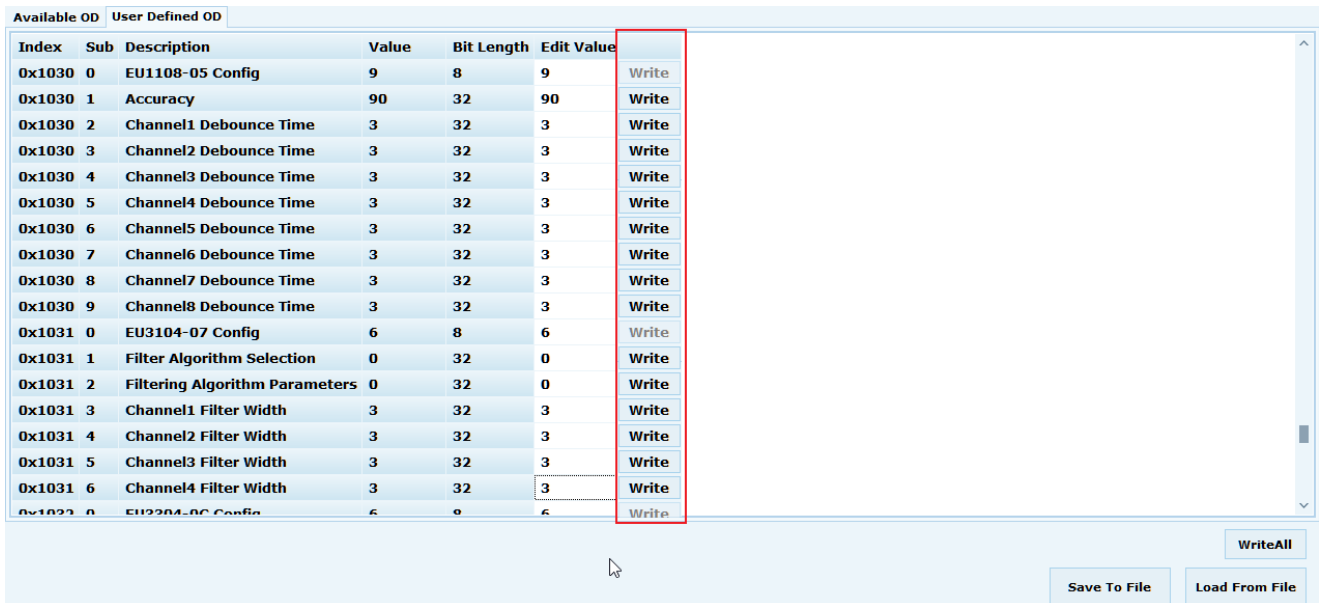
Index	Sub	Description
0x1000	0	Device type
0x1001	0	Error register
0x1008	0	Device name
0x1009	0	Hardware version
0x100A	0	Software version
0x1018	0	Identity
0x1018	1	Vendor ID
0x1018	2	Product code
0x1018	3	Revision
0x1018	4	Serial number
0x1020	0	Adapter Diagnosis
0x1020	1	Scan Cycle
0x1020	2	HardWare Revision
0x1020	3	SoftWare Revision
0x1021	0	EU1108-01 Diagnosis
0x1021	1	Temperature

Select

Index	Sub	Description
0x1000	0	Device type
0x100A	0	Software version
0x1018	4	Serial number

Select the available OD list and double-click the left of the mouse . Then switch the user defined OD page to operate.

- (4) The page displays the OD information. If there is no information in the right panel, click **Write** to write the OD Data.

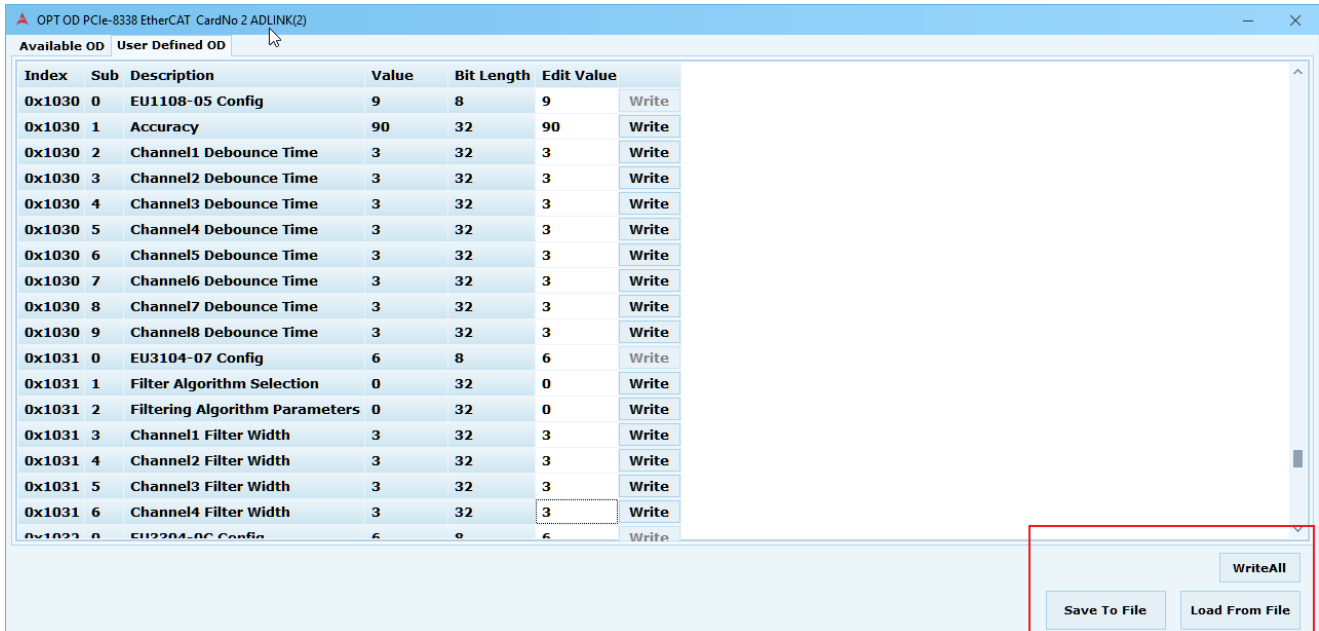


Index	Sub	Description	Value	Bit Length	Edit Value	
0x1030	0	EU1108-05 Config	9	8	9	Write
0x1030	1	Accuracy	90	32	90	Write
0x1030	2	Channel1 Debounce Time	3	32	3	Write
0x1030	3	Channel2 Debounce Time	3	32	3	Write
0x1030	4	Channel3 Debounce Time	3	32	3	Write
0x1030	5	Channel4 Debounce Time	3	32	3	Write
0x1030	6	Channel5 Debounce Time	3	32	3	Write
0x1030	7	Channel6 Debounce Time	3	32	3	Write
0x1030	8	Channel7 Debounce Time	3	32	3	Write
0x1030	9	Channel8 Debounce Time	3	32	3	Write
0x1031	0	EU3104-07 Config	6	8	6	Write
0x1031	1	Filter Algorithm Selection	0	32	0	Write
0x1031	2	Filtering Algorithm Parameters	0	32	0	Write
0x1031	3	Channel1 Filter Width	3	32	3	Write
0x1031	4	Channel2 Filter Width	3	32	3	Write
0x1031	5	Channel3 Filter Width	3	32	3	Write
0x1031	6	Channel4 Filter Width	3	32	3	Write
0x1031	7	Channel5 Filter Width	3	32	3	Write
0x1031	8	Channel6 Filter Width	3	32	3	Write
0x1031	9	Channel7 Filter Width	3	32	3	Write
0x1031	10	Channel8 Filter Width	3	32	3	Write

Buttons: WriteAll, Save To File, Load From File

- (5) Additional functions include:

- **WriteAll**: Writes all OD Data at once
- **Save To File**: Saves user defined OD Data (*.csv format)
- **Load From File**: Imports custom OD Data (*.csv format)



Index	Sub	Description	Value	Bit Length	Edit Value	
0x1030	0	EU1108-05 Config	9	8	9	Write
0x1030	1	Accuracy	90	32	90	Write
0x1030	2	Channel1 Debounce Time	3	32	3	Write
0x1030	3	Channel2 Debounce Time	3	32	3	Write
0x1030	4	Channel3 Debounce Time	3	32	3	Write
0x1030	5	Channel4 Debounce Time	3	32	3	Write
0x1030	6	Channel5 Debounce Time	3	32	3	Write
0x1030	7	Channel6 Debounce Time	3	32	3	Write
0x1030	8	Channel7 Debounce Time	3	32	3	Write
0x1030	9	Channel8 Debounce Time	3	32	3	Write
0x1031	0	EU3104-07 Config	6	8	6	Write
0x1031	1	Filter Algorithm Selection	0	32	0	Write
0x1031	2	Filtering Algorithm Parameters	0	32	0	Write
0x1031	3	Channel1 Filter Width	3	32	3	Write
0x1031	4	Channel2 Filter Width	3	32	3	Write
0x1031	5	Channel3 Filter Width	3	32	3	Write
0x1031	6	Channel4 Filter Width	3	32	3	Write
0x1031	7	Channel5 Filter Width	3	32	3	Write
0x1031	8	Channel6 Filter Width	3	32	3	Write
0x1031	9	Channel7 Filter Width	3	32	3	Write
0x1031	10	Channel8 Filter Width	3	32	3	Write

Buttons: WriteAll, Save To File, Load From File

3.20 IO Mapping

3.20.1 Ether CAT

Use the MCP2 IO-mapping form to perform mapping and checking operations. The maximum number of software port in slave is 32 for each IO type.

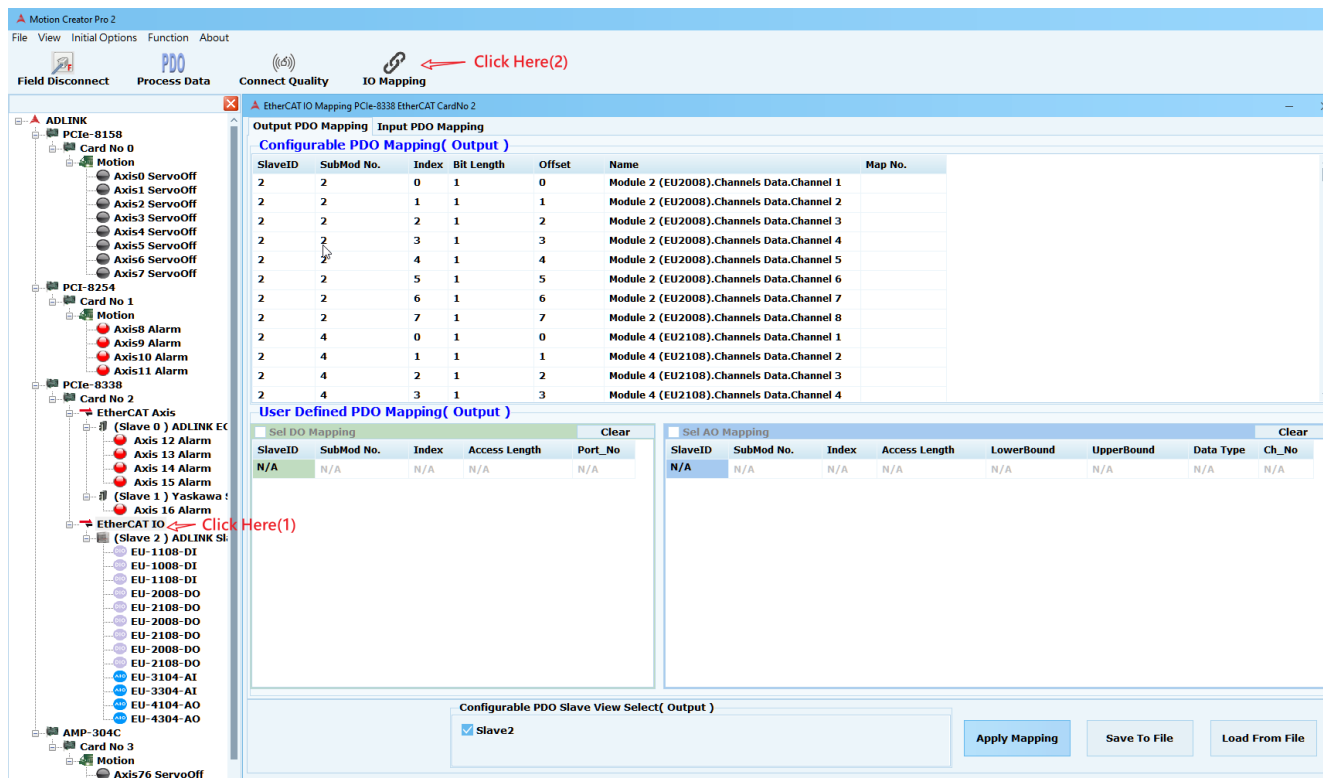
Notes:

1. Manually changing the contents of the IO mapping configuration file is not recommended.
2. The IO mapping GUI is only available via MCP2. Users should download the configuration file API from ADLINK. **[PROVIDE DOWNLOAD LINK]**
3. Configuration file can be save to "CSV" file by MCP2 IO-mapping form.
4. No need to map module that ADLINK had integrated.

Step-by-step instructions to set up IO mapping using MCP2.

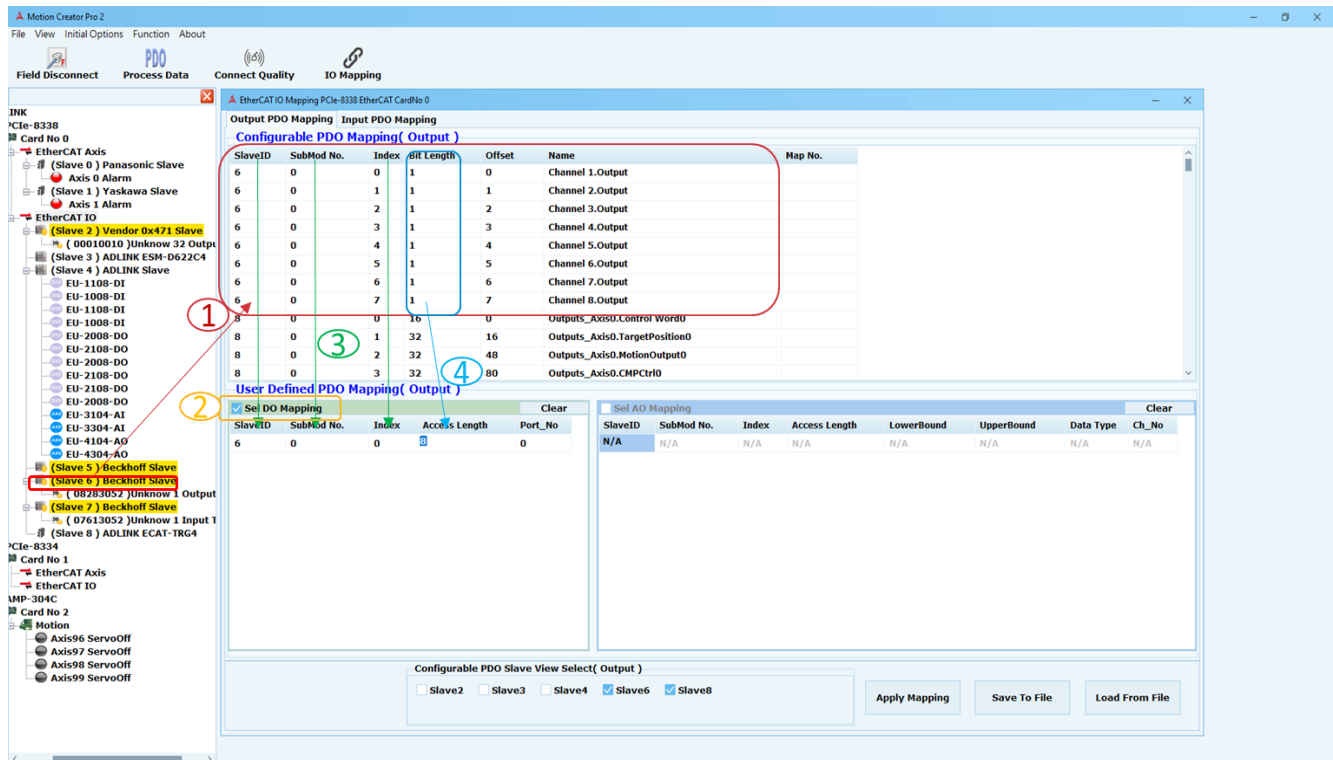
Step 1: Update kernel version in C: \Program Files (x86)\ADLINK\PCIe-833x\Kernel Update. The kernel version must be 2022050503_833x_kernel or later.

Step 2: After connecting the field bus and selecting EtherCAT IO in the tree view (1), click the **IO Mapping** icon (2) to start setting up IO mapping.



The screenshot displays the Motion Creator Pro 2 software interface. On the left, a tree view shows the system configuration, including ADLINK, PCIe-8158, Card No 0, Motion, Axis0 ServoOff, Axis1 ServoOff, Axis2 ServoOff, Axis3 ServoOff, Axis4 ServoOff, Axis5 ServoOff, Axis6 ServoOff, Axis7 ServoOff, PCI-8254, Card No 1, Motion, Axis8 Alarm, Axis9 Alarm, Axis10 Alarm, Axis11 Alarm, PCI-8338, Card No 2, EtherCAT Axis, (Slave 0) ADLINK EC, Axis 12 Alarm, Axis 13 Alarm, Axis 14 Alarm, Axis 15 Alarm, (Slave 1) Yaskawa, Axis 16 Alarm, EtherCAT IO, (Slave 2) ADLINK SL, EU-1108-DI, EU-1008-DI, EU-1108-DI, EU-2008-DO, EU-2108-DO, EU-2008-DO, EU-2108-DO, EU-2008-DO, EU-2108-DO, EU-3104-AI, EU-3304-AI, EU-4104-AO, EU-4304-AO, AMP-304C, Card No 3, Motion, and Axis76 ServoOff. The main window is titled "EtherCAT IO Mapping PCIe-8338 EtherCAT CardNo 2". It contains two tabs: "Output PDO Mapping" and "Input PDO Mapping". The "Output PDO Mapping" tab is active, showing a table with columns: SlaveID, SubMod No., Index, Bit Length, Offset, Name, and Map No. The table lists 16 channels of data for Module 2 (EU2008) and Module 4 (EU2108). Below the table, there are sections for "User Defined PDO Mapping (Output)" and "Sel AO Mapping". The "User Defined PDO Mapping (Output)" section has a table with columns: SlaveID, SubMod No., Index, Access Length, and Port_No. The "Sel AO Mapping" section has a table with columns: SlaveID, SubMod No., Index, Access Length, LowerBound, UpperBound, Data Type, and Ch_No. At the bottom, there is a "Configurable PDO Slave View Select (Output)" section with a checkbox for "Slave2" and buttons for "Apply Mapping", "Save To File", and "Load From File".

Step 2-1 (Select DIO mapping): Select the slave IO for mapping. Refer to Configurable PDO view and input the corresponding parameters.



① Select the slave IO for mapping and refer Configurable PDO view.

② Select the IO type that needs to be set.

③ Enter SlaveID data for mapping slave IO. Fill in the corresponding SubMod No.

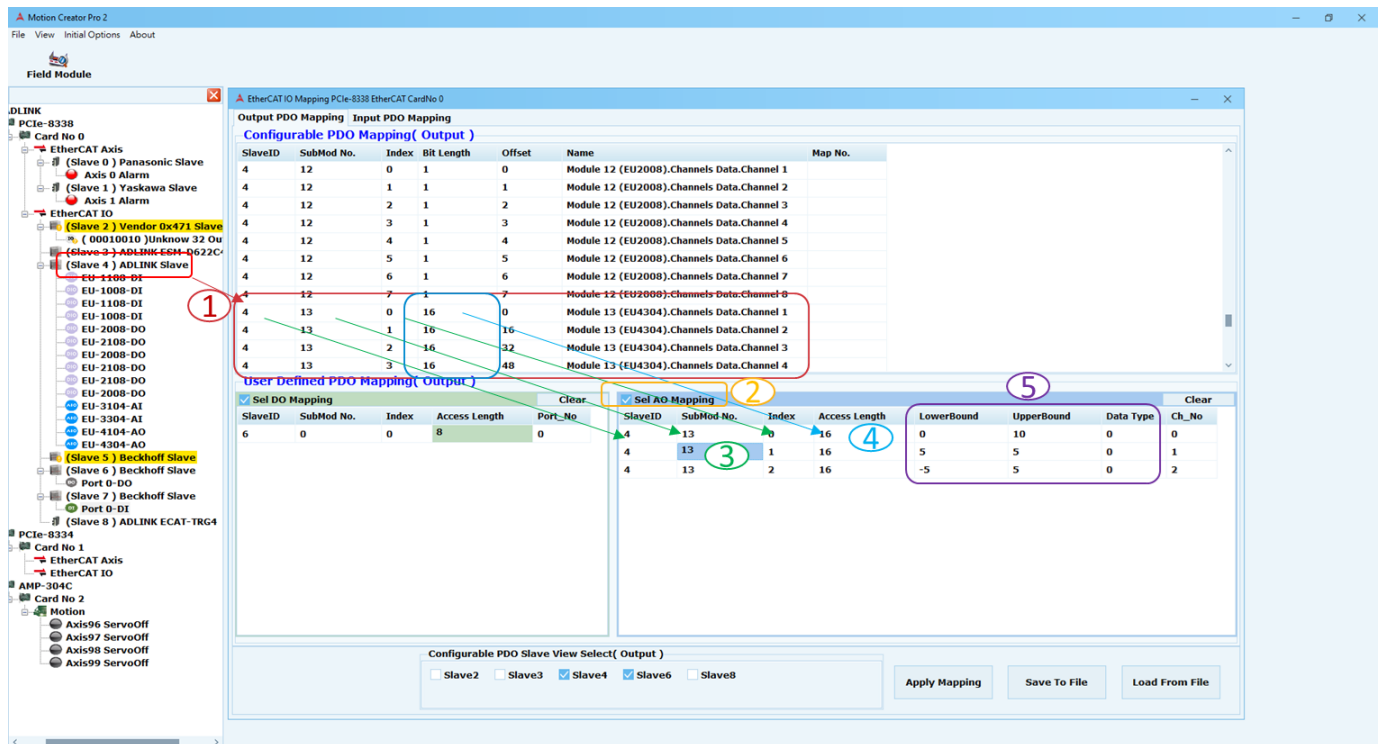
Refer to SubMod No. in Configurable PDO View. Fill in the starting index. Refer to Index in Configurable PDO View.

④ Fill in the Access Length to define the IO-bit required by the port.

DIO mapping parameters:

- **SlaveID:** Mapping of slave IO.
- **SubMod No.:** Configurable PDO view
- **Index:** Access start index according to index in Configurable PDO view.
- **Access Length:** Access port length according to Bit Length in configurable PDO view content.
 - Maximum: 32 bits
 - Minimum: 1 bit
- **Port_No:** Automatically generated.

Step 2-2 (Select AIO mapping): Select the slave IO for mapping. Refer to Configurable PDO view and input corresponding parameters.



- ① Select slave IO for mapping. Refer to Configurable PDO view.
- ② Select the IO type that needs to be set.
- ③ Fill in SlaveID fill for mapping slave IO. Fill in the corresponding SubMod No. Refer to SubMod No in Configurable PDO View. Index fills in the starting index. Refer to Index in Configurable PDO View.
- ④ Fill in Access Length to define the IO-bit required by the port.
- ⑤ Fill in LowerBound physical lower limit. Fill in UpperBound physical upper limit. Fill in

Data type Representation type:

- 0: Unsigned integer
- 1: Signed integer
- 2: Absolute value with MSB as sign
- 3: Raw data)

AIO mapping parameters:

- **SlaveID:** Mapping of slave IO.
- **SubMod No.:** Configurable PDO view
- **Index:** Access start index according to index in configurable PDO view content.
- **Access Length:** Access channel length according to Bit Length in configurable PDO view. **Note:** need correct length.
- **LowerBound:** Physical lower limit.
- **UpperBound:** Physical upper limit.

- **Data type:** Representation type
 - Type 0 (Unsigned integer)
 - E.g., for 16 bits = 0 to +65535
 - Type 1 (Signed integer)
 - E.g., for 16 bits = -32768 to +32767
 - Type 2 (Absolute value with MSB as sign)
 - E.g., for 16 bits = -32767 to +32767
 - Type 3 (Raw data)
- **Ch_No:** Automatically generated.

Step 2-3 (User Defined PDO Mapping): Adding and deleting rows can be done with two methods:

1. Right-click on the table.

SlaveID	SubMod No.	Index	Access Length	Port_No
6	0	0	8	0

Add New Row(last)
 Delete Row(current)

2. Use the keyboard to Add (Ctrl+Enter), or Delete (Ctrl+Delete).

SlaveID	SubMod No.	Index	Access Length	Port_No
6	0	0	8	0
6	0	0	8	1
6	0	0	8	2

Hint: Move the mouse over the table and a hint will appear.

☒ **Sel DO Mapping** Clear

SlaveID	SubMod No.	Index	Access Length	Port_No
N/A	N/A	N/A	N/A	N/A

Please refer to the SubMod No. column in the PDO view table.

☒ **Sel DI Mapping** Clear

SlaveID	SubMod No.	Index	Access Length	Port_No
N/A	N/A	N/A	N/A	N/A

Please refer to the SubMod No. column in the PDO view table.

☒ **Sel AO Mapping** Clear

SlaveID	SubMod No.	Index	Access Length	LowerBound	UpperBound	Data Type	Ch_No
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Please set a physical lower limit.

User Defiend DIO mapping hint

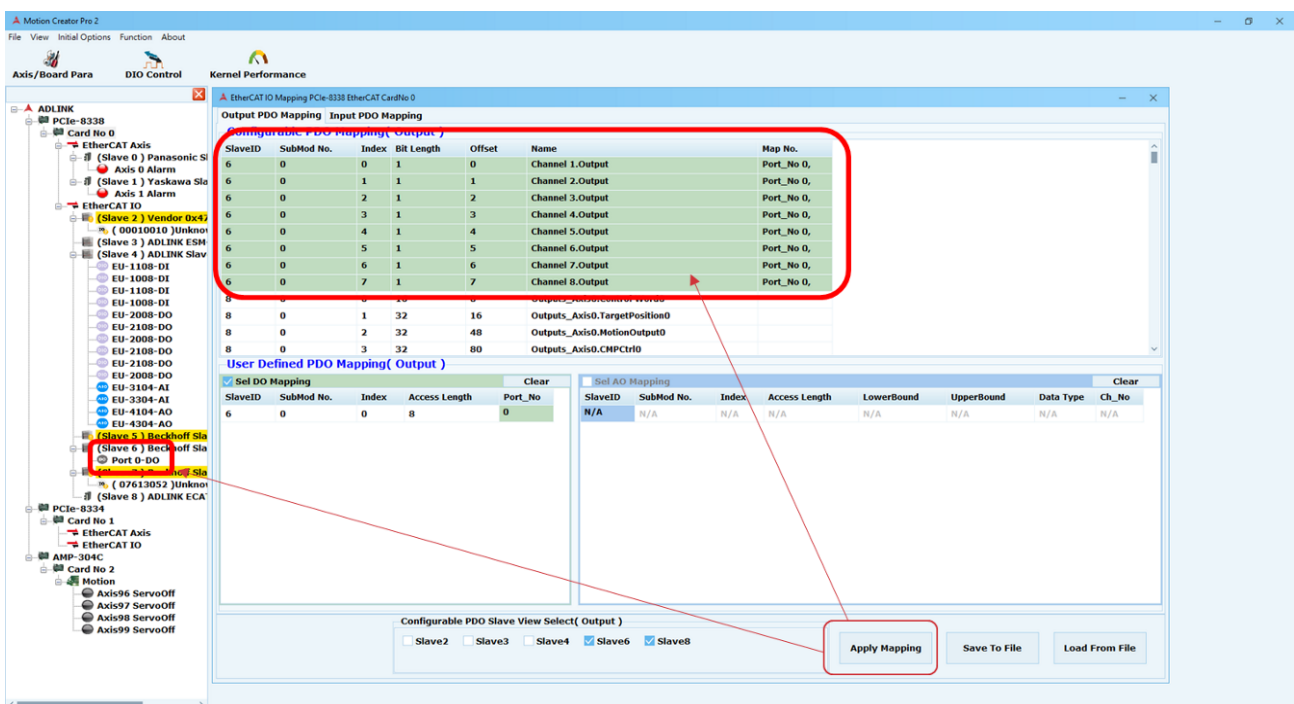
☒ Sel AI Mapping

SlaveID	SubMod No.	Index	Access Length	LowerBound	UpperBound	Data Type	Ch_No
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

0: Unsigned integer with N-bit resolution without sign, therefore polarity detection is no longer possible.
 Example : Range for 16 bits = 0 to +65535
 1: Signed integer(2's complement(negated + 1)).
 Example :Range for 16 bits = -32768 to +32767 dec.
 2: Absolute value with MSB=1 (highest bit) as sign of negative values.
 Example : Range for 16 bits = -32767 to +32767 dec.
 3: Raw data has no transformation between physical value and raw data.

User Defiend AIO mapping hint

Step 3: Click **Apply Mapping**. The Configurable PDO view will show the mapping results. The tree view will show the software defined Port No. or Channel No.



SlaveID	SubMod No.	Index	Bit Length	Offset	Name	Map No.
6	0	0	1	0	Channel 1.Output	Port_No 0,
6	0	1	1	1	Channel 2.Output	Port_No 0,
6	0	2	1	2	Channel 3.Output	Port_No 0,
6	0	3	1	3	Channel 4.Output	Port_No 0,
6	0	4	1	4	Channel 5.Output	Port_No 0,
6	0	5	1	5	Channel 6.Output	Port_No 0,
6	0	6	1	6	Channel 7.Output	Port_No 0,
6	0	7	1	7	Channel 8.Output	Port_No 0,

SlaveID	SubMod No.	Index	Access Length	Port_No
6	0	0	8	0

☒ Sel DO Mapping

SlaveID	SubMod No.	Index	Access Length	LowerBound	UpperBound	Data Type	Ch_No
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

☐ Slave2
 ☐ Slave3
 ☐ Slave4
 ☒ Slave6
 ☒ Slave8

DIO mapping showing software defined Port No.



The screenshot displays the Motion Creator Pro 2 software interface. On the left, a tree view shows the hardware configuration, including a Beckhoff slave (Slave 5) connected to Port 0-DO. The main window is titled "PCIe-8334 EtherCAT CardID 0 Slave ID 0 DO Port 0". It contains a "DO" mapping table with 32 channels, each with a status indicator (ON/OFF) and a label. Below this, there are sections for "User Defined PDO Mapping (Output)" and "Sel AO Mapping". The "Sel DO Mapping" section is active, showing a table with columns for SlaveID, SubMod No., Index, Access Length, and Port_No. The "Configurable PDO Slave View Select (Output)" section at the bottom allows selecting slaves for mapping, with "Slave6" and "Slave8" currently selected. The "Apply Mapping", "Save To File", and "Load From File" buttons are visible at the bottom right.

SlaveID	SubMod No.	Index	Access Length	Port_No
6	0	0	8	0

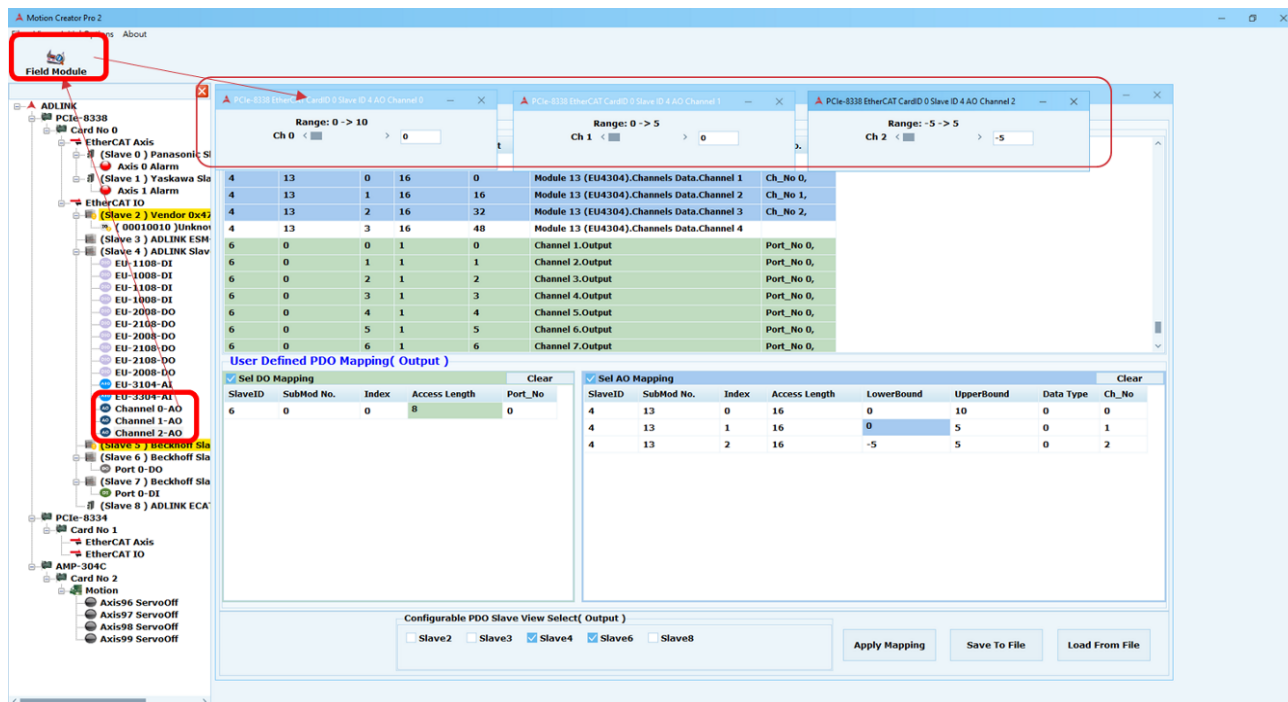
SlaveID	SubMod No.	Index	Access Length	LowerBound	UpperBound	Data Type	Ch_No
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Configurable PDO Slave View Select (Output)

☐ Slave2 ☐ Slave3 ☐ Slave4 ☒ Slave6 ☒ Slave8

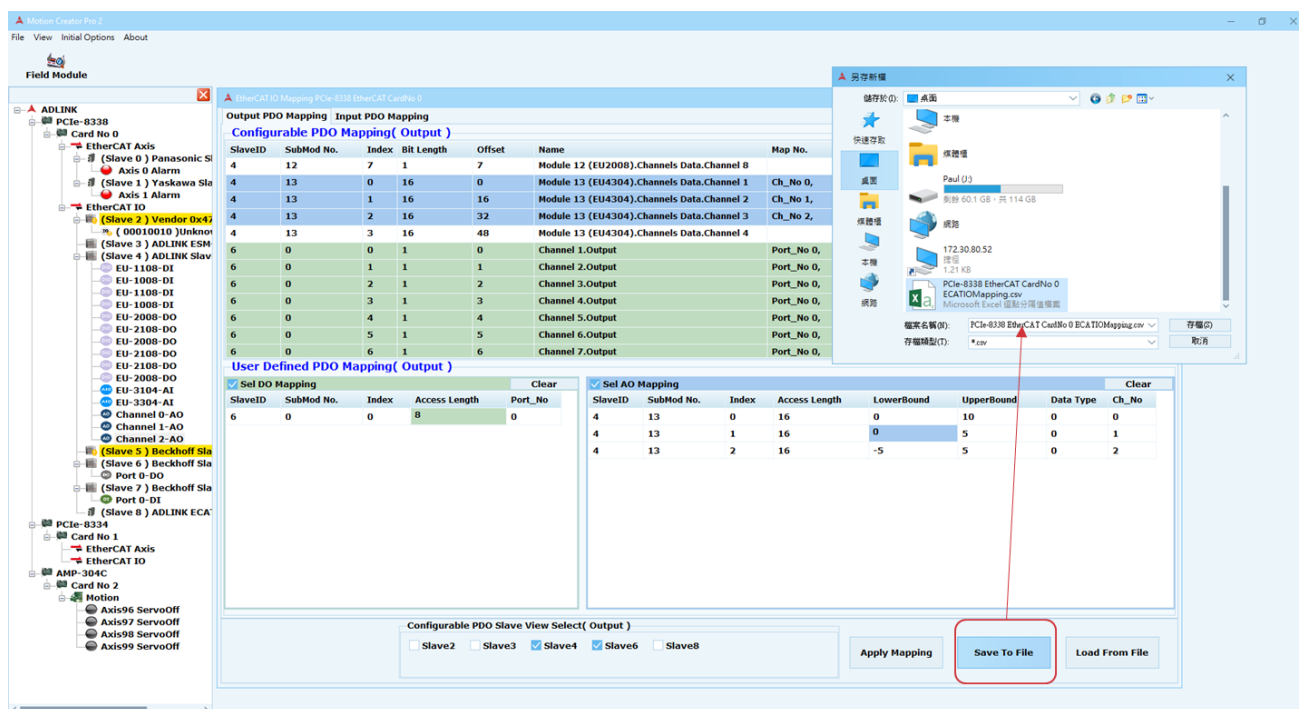
Apply Mapping Save To File Load From File

Selecting a software defined Channel No. in tree view will enable the Field Module icon. Click **Field Module** to start AO/AI channel control (default 1 channel).

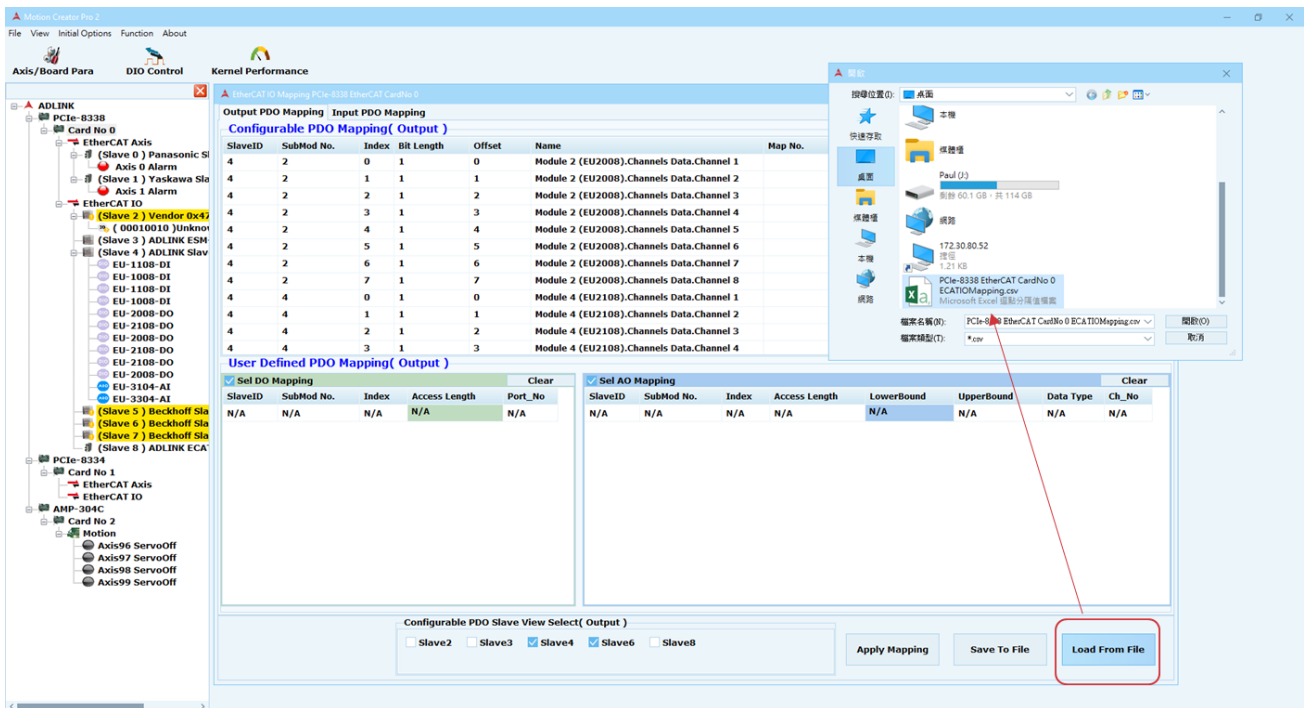


Save/Load file and apply mapping instructions

Step 1: Click **Save to File** to export the IO map data to a file.



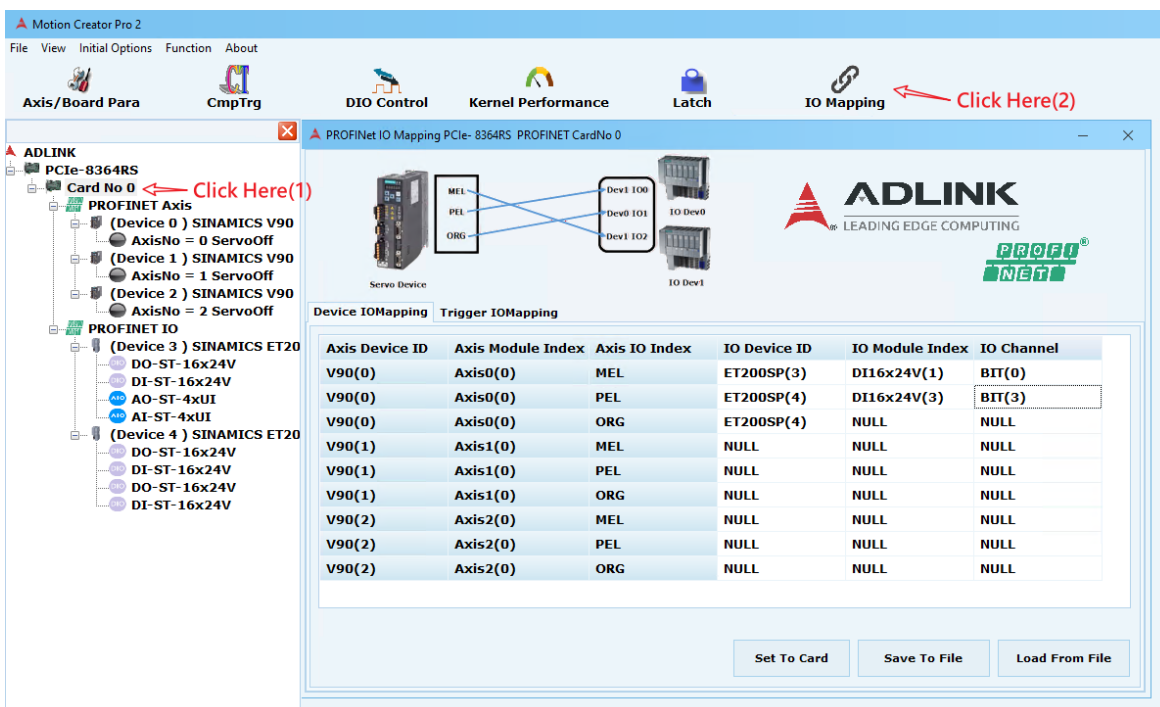
Step 2: Click **Load from file** to import and check the file contents.



3.20.2 ProFiNet

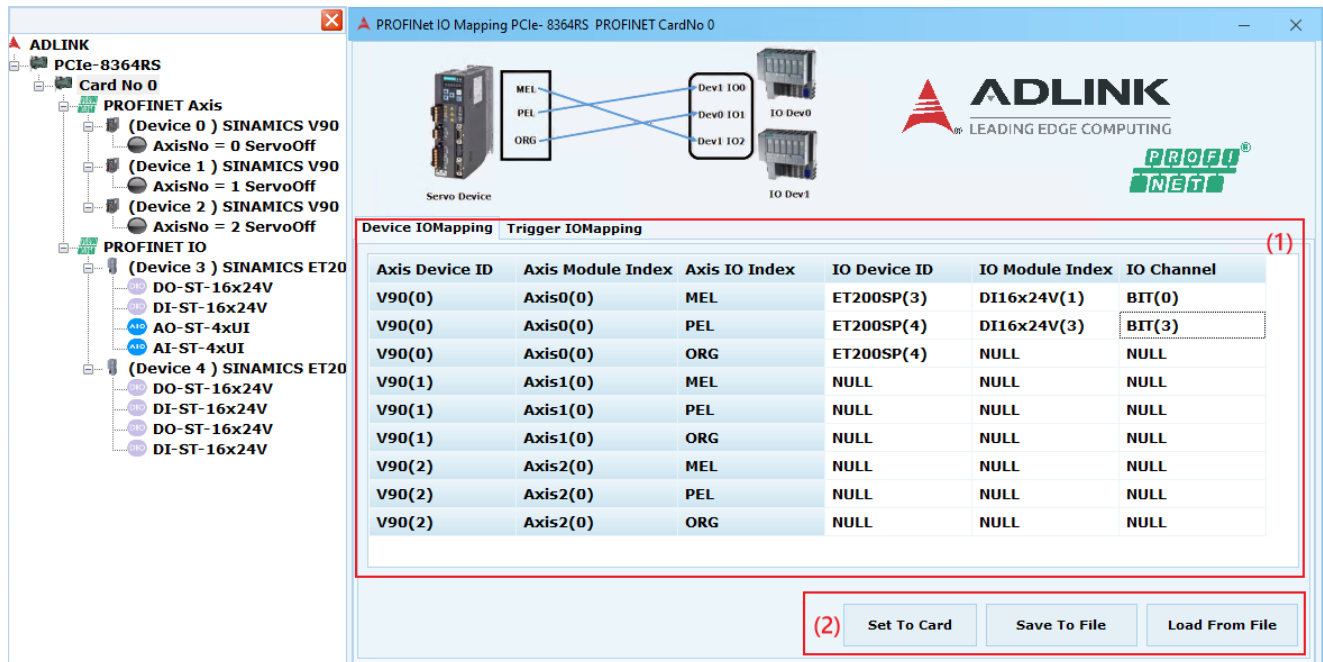
The Motion IO of the ProFiNet Slave Device uses the Slave IO as the Mapping. Therefore, I/O mapping is required for its corresponding Motion IO.

To open the IO Mapping page, click "**Card No x**" in the device tree column, and then click the **IO Mapping** icon.



ProFiNet IO Mapping is divided into two tabs.

- **Device IOMapping:** maps the desired Axis Motion IO to the Device DI and sets it to the ProFiNet card.



ADLINK PROFiNet IO Mapping PCIe- 8364RS PROFiNet CardNo 0

Device IOMapping Trigger IOMapping

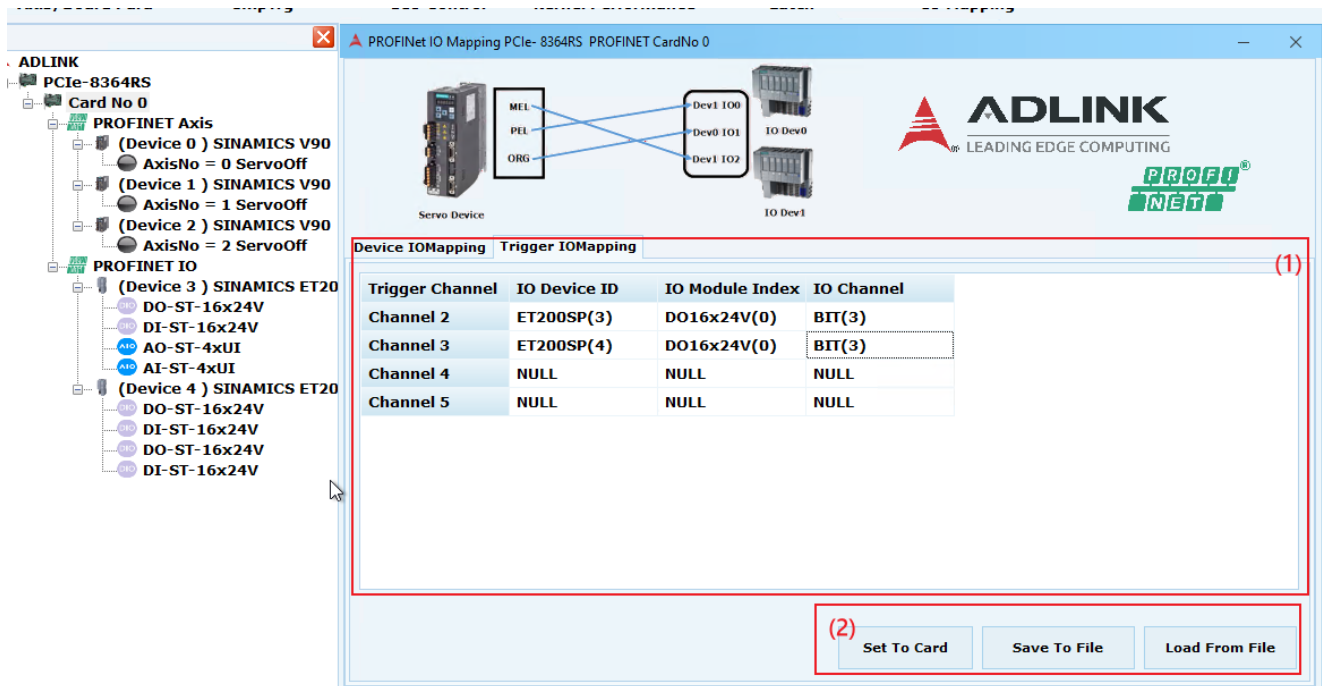
Axis Device ID	Axis Module Index	Axis IO Index	IO Device ID	IO Module Index	IO Channel
V90(0)	Axis0(0)	MEL	ET200SP(3)	DI16x24V(1)	BIT(0)
V90(0)	Axis0(0)	PEL	ET200SP(4)	DI16x24V(3)	BIT(3)
V90(0)	Axis0(0)	ORG	ET200SP(4)	NULL	NULL
V90(1)	Axis1(0)	MEL	NULL	NULL	NULL
V90(1)	Axis1(0)	PEL	NULL	NULL	NULL
V90(1)	Axis1(0)	ORG	NULL	NULL	NULL
V90(2)	Axis2(0)	MEL	NULL	NULL	NULL
V90(2)	Axis2(0)	PEL	NULL	NULL	NULL
V90(2)	Axis2(0)	ORG	NULL	NULL	NULL

(1)

(2) Set To Card Save To File Load From File

- (1) Set the Device DI mapping to Axis Motion IO table.
- (2) **Set to Card:** Set values to the ProFiNet card.
Save To File: Writes parameters to a specified file (*.csv).
Load From File: Reads parameters from the specified file to the page display (*.csv).

- **Trigger Mapping:** maps the required Trigger Output to the Device DO and sets it to the ProFiNet card.

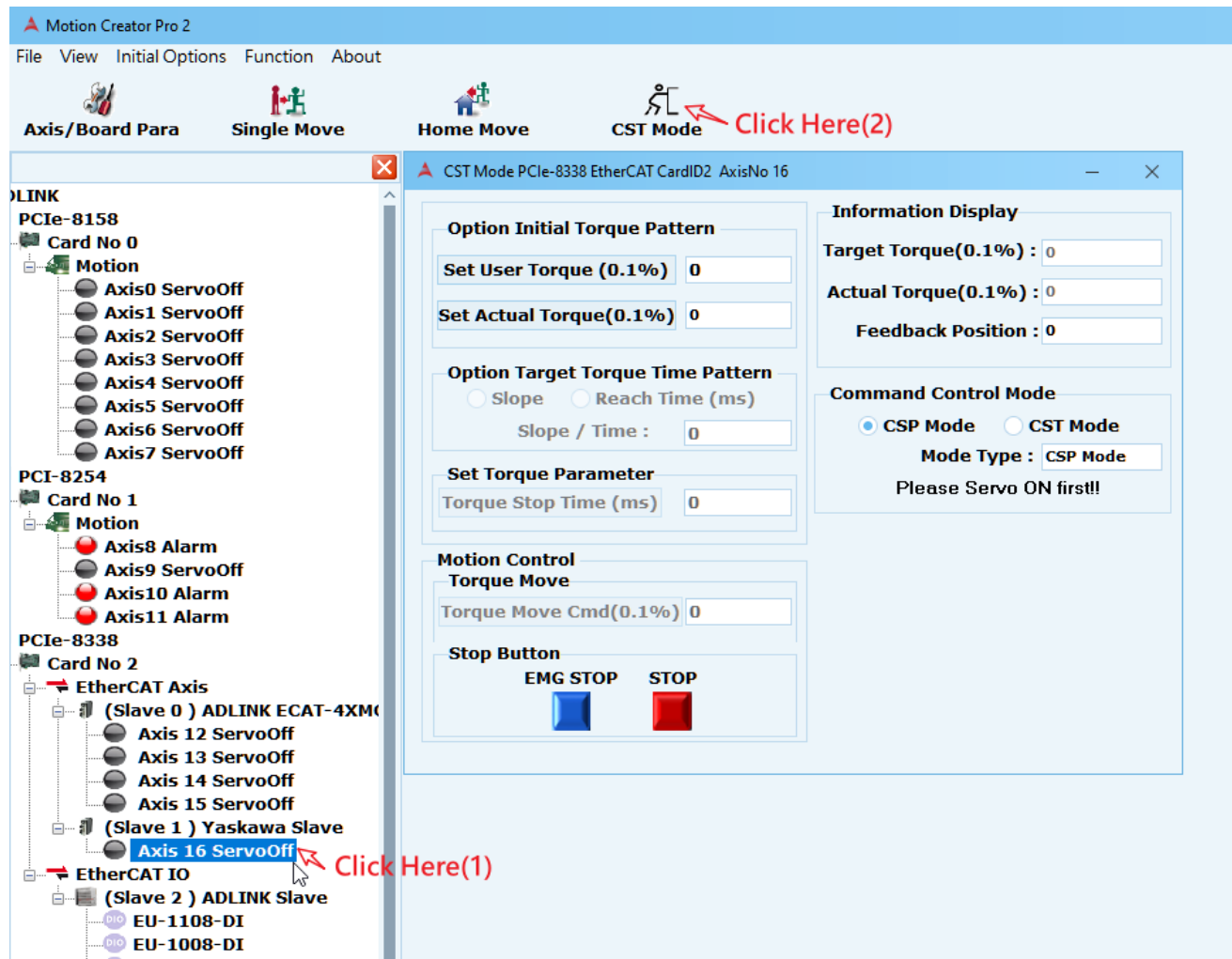


- (1) Set the Device DO mapping to the Trigger Output table.
- (2) **Set to Card:** Sets values to the ProFiNet card.
Save To File: Writes parameters to a specified file (*.csv).
Load From File: Reads parameters from the specified file to the page display (*.csv).

3.21 CST Mode

In Cyclic Synchronous Torque (CST) mode, the trace generator is located in the control unit instead of the servo drive. It provides the target torque to the drive device in a cyclic and synchronous manner, and the drive device performs torque control.

To open the CST Mode page, click **Axis x** on the device tree column, and then click the **CST Mode** icon.



The screenshot displays the Motion Creator Pro 2 software interface. The top menu bar includes File, View, Initial Options, Function, and About. The main toolbar has icons for Axis/Board Para, Single Move, Home Move, and CST Mode. A red arrow labeled "Click Here(2)" points to the CST Mode icon.

The left sidebar shows the device tree structure:

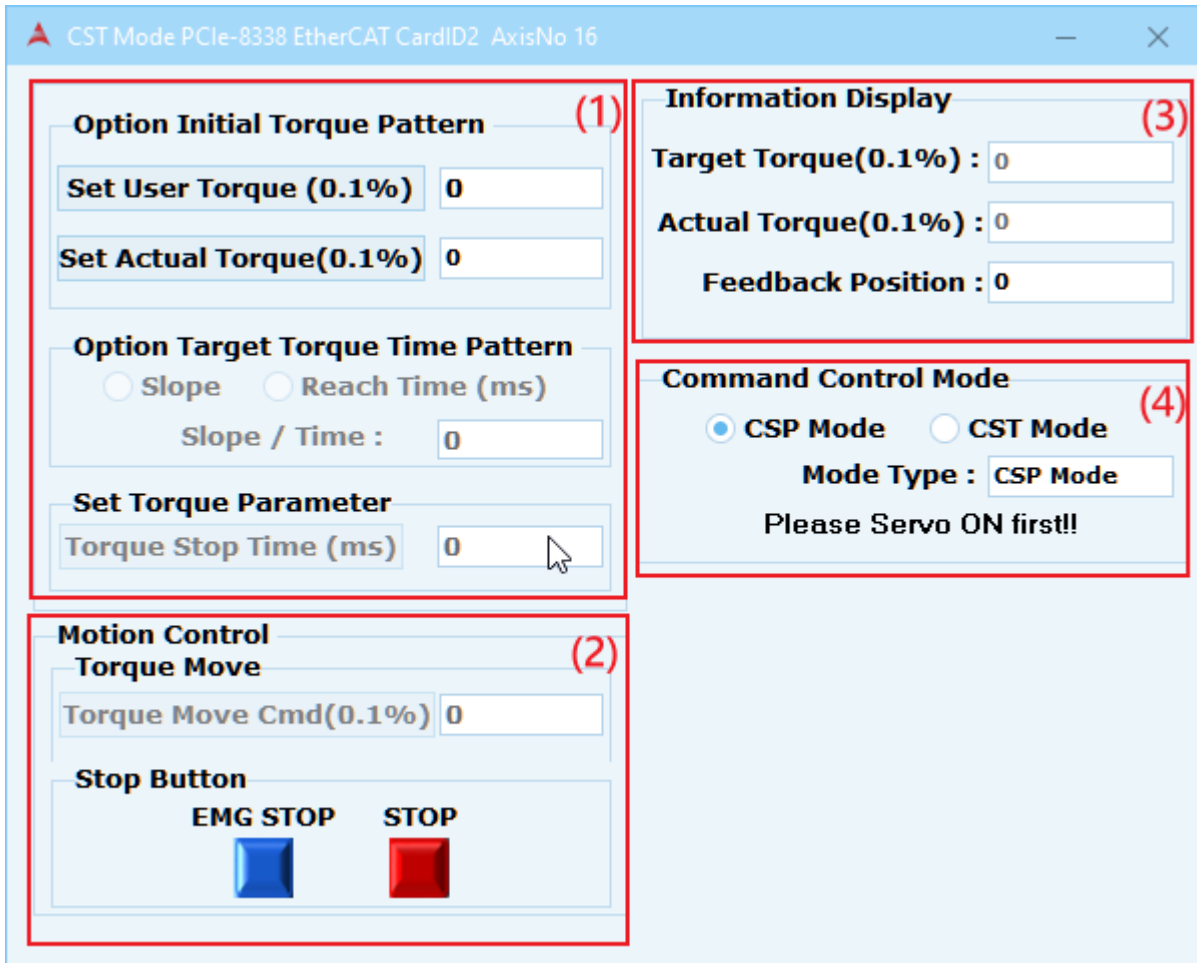
- ADLINK
 - PCIe-8158
 - Card No 0
 - Motion
 - Axis0 ServoOff
 - Axis1 ServoOff
 - Axis2 ServoOff
 - Axis3 ServoOff
 - Axis4 ServoOff
 - Axis5 ServoOff
 - Axis6 ServoOff
 - Axis7 ServoOff
 - PCI-8254
 - Card No 1
 - Motion
 - Axis8 Alarm
 - Axis9 ServoOff
 - Axis10 Alarm
 - Axis11 Alarm
 - PCIe-8338
 - Card No 2
 - EtherCAT Axis
 - (Slave 0) ADLINK ECAT-4XM
 - Axis 12 ServoOff
 - Axis 13 ServoOff
 - Axis 14 ServoOff
 - Axis 15 ServoOff
 - (Slave 1) Yaskawa Slave
 - Axis 16 ServoOff
 - EtherCAT IO
 - (Slave 2) ADLINK Slave
 - EU-1108-DI
 - EU-1008-DI

A red arrow labeled "Click Here(1)" points to the "Axis 16 ServoOff" item in the device tree.

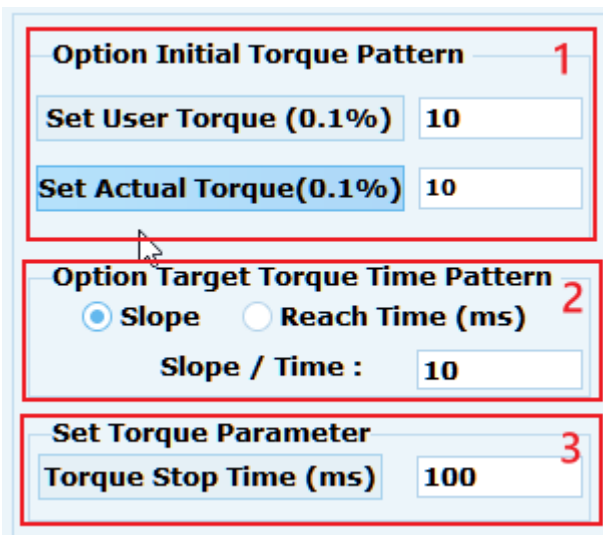
The main window displays the CST Mode configuration for "CST Mode PCIe-8338 EtherCAT CardID2 AxisNo 16". The configuration includes:

 - Option Initial Torque Pattern**
 - Set User Torque (0.1%) : 0
 - Set Actual Torque(0.1%) : 0
 - Option Target Torque Time Pattern**
 - ☐ Slope ☐ Reach Time (ms)
 - Slope / Time : 0
 - Set Torque Parameter**
 - Torque Stop Time (ms) : 0
 - Motion Control**
 - Torque Move
 - Torque Move Cmd(0.1%) : 0
 - Stop Button**
 - EMG STOP (Blue button)
 - STOP (Red button)
 - Information Display**
 - Target Torque(0.1%) : 0
 - Actual Torque(0.1%) : 0
 - Feedback Position : 0
 - Command Control Mode**
 - ☒ CSP Mode ☐ CST Mode
 - Mode Type : CSP Mode
 - Please Servo ON first!!

CST Mode options are shown below.



(1) CST Mode parameter setting and selection.



1. **Option Initial Torque Pattern:** Select (user \ actual Torque) to set the initial torque value when switching to CST mode.
2. **Option Target Torque Time Pattern:** Select Slope\reach time mode and parameters to achieve the target torque.
3. **Set Torque Parameter:** Torque Stop time value in milliseconds.

(2) Motion control



1. **Torque Move:** Torque command parameter setting.
2. **Stop Button:** **STOP** decreases the torque to 0 according to the set value of torque Stop time. The relevant settings are located in the axis parameters. **EMG STOP** indicates the immediate stop mode.

Parameter PCIe-8338 EtherCAT CardNo 2

Board Configuration	AxisNo12	AxisNo13	AxisNo14	AxisNo15
EGEAR_SOURCE	Cmd position devi	Cmd position devi	Cmd position devi	Cmd position
POS_UNIT_FACTOR	1	1	1	1
MOVE_RATIO	1	1	1	1
ABSENC_FIXOFFSET	0	0	0	0
ERR_C_LEVEL	0	0	0	0
BKL_DIST	0	0	0	0
BKL_CNTP	0	0	0	0
CMD_PSF	0	0	0	0
PSR_IPT_MODE	1x AB	1x AB	1x AB	1x AB
PSR_IPT_LOGIC	EAINV = 0 , EBinV =	EAINV = 0 , EBinV =	EAINV = 0 , EBinV =	EAINV = 0 ,
PSR_IPT_DIR	No Inverse	No Inverse	No Inverse	No Inverse
PSR_RATIO_VALUE	1	1	1	1
PSR_ACC	1000000	1000000	1000000	1000000
PSR_JERK	1000000000	1000000000	1000000000	1000000000
INIT_TRQ	0	0	0	0
TRQ_STP_TIME	0	0	0	0
MODE_CHANGE_STABLE_CN	100	100	100	100

- (3) **Status display area:** Displays target torque value, actual torque value and feedback position.

Information Display

Target Torque(0.1%) : 10

Actual Torque(0.1%) : 10

Feedback Position : 188679983

- (4) **CSP/CST Mode selection and setting:** Switches mode setting.

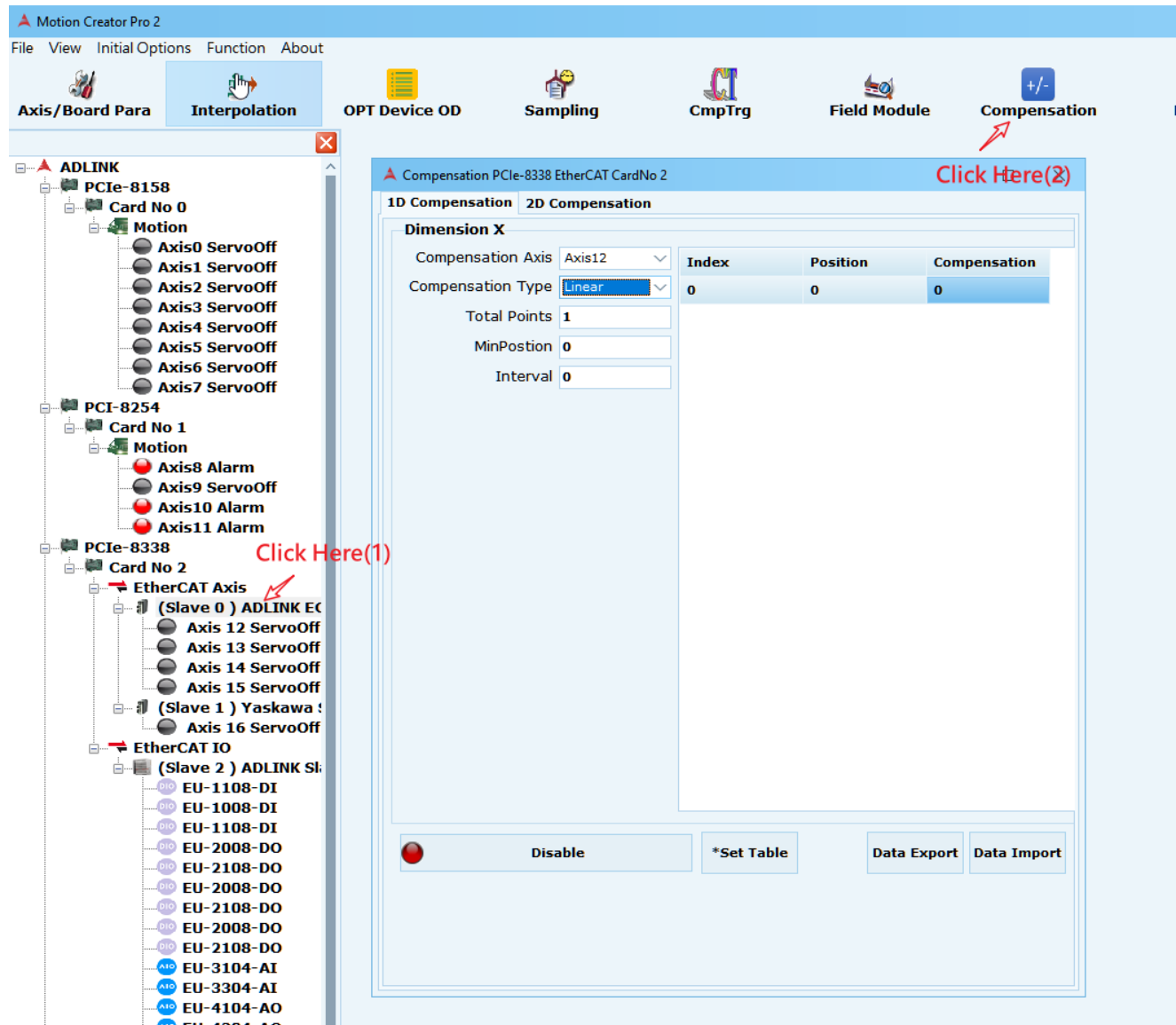
Command Control Mode

☐ CSP Mode ☒ CST Mode

Mode Type : CST Mode

3.22 Compensation

Compensation provides 1D and 2D motion compensation table settings and can export files. To open the Compensation page, click **Slave x** on the device tree column, and then click the **Compensation** icon.



ADLINK

- PCIe-8158
 - Card No 0
 - Motion
 - Axis0 ServoOff
 - Axis1 ServoOff
 - Axis2 ServoOff
 - Axis3 ServoOff
 - Axis4 ServoOff
 - Axis5 ServoOff
 - Axis6 ServoOff
 - Axis7 ServoOff
 - PCI-8254
 - Card No 1
 - Motion
 - Axis8 Alarm
 - Axis9 ServoOff
 - Axis10 Alarm
 - Axis11 Alarm
 - PCIe-8338
 - Card No 2
 - EtherCAT Axis
 - (Slave 0) ADLINK EC
 - Axis 12 ServoOff
 - Axis 13 ServoOff
 - Axis 14 ServoOff
 - Axis 15 ServoOff
 - (Slave 1) Yaskawa !
 - Axis 16 ServoOff
 - EtherCAT IO
 - (Slave 2) ADLINK SL
 - EU-1108-DI
 - EU-1008-DI
 - EU-1108-DI
 - EU-2008-DO
 - EU-2108-DO
 - EU-2008-DO
 - EU-2108-DO
 - EU-2008-DO
 - EU-2108-DO
 - EU-3104-AI
 - EU-3304-AI
 - EU-4104-AO
 - EU-4304-AO

Compensation PCIe-8338 EtherCAT CardNo 2

1D Compensation **2D Compensation**

Dimension X

Compensation Axis	Index	Position	Compensation
Axis12	0	0	0

Total Points: 1
MinPosition: 0
Interval: 0

Disable *Set Table Data Export Data Import

1D Compensation

1D Compensation
2D Compensation

Dimension X

Compensation Axis
Axis12

Compensation Type
Linear

Total Points
10

StartPosition
10

Interval
10

Index	Position	Compensation
0	10	0
1	20	0
2	30	0
3	40	0
4	50	0
5	60	0
6	70	0
7	80	0
8	90	0
9	100	0

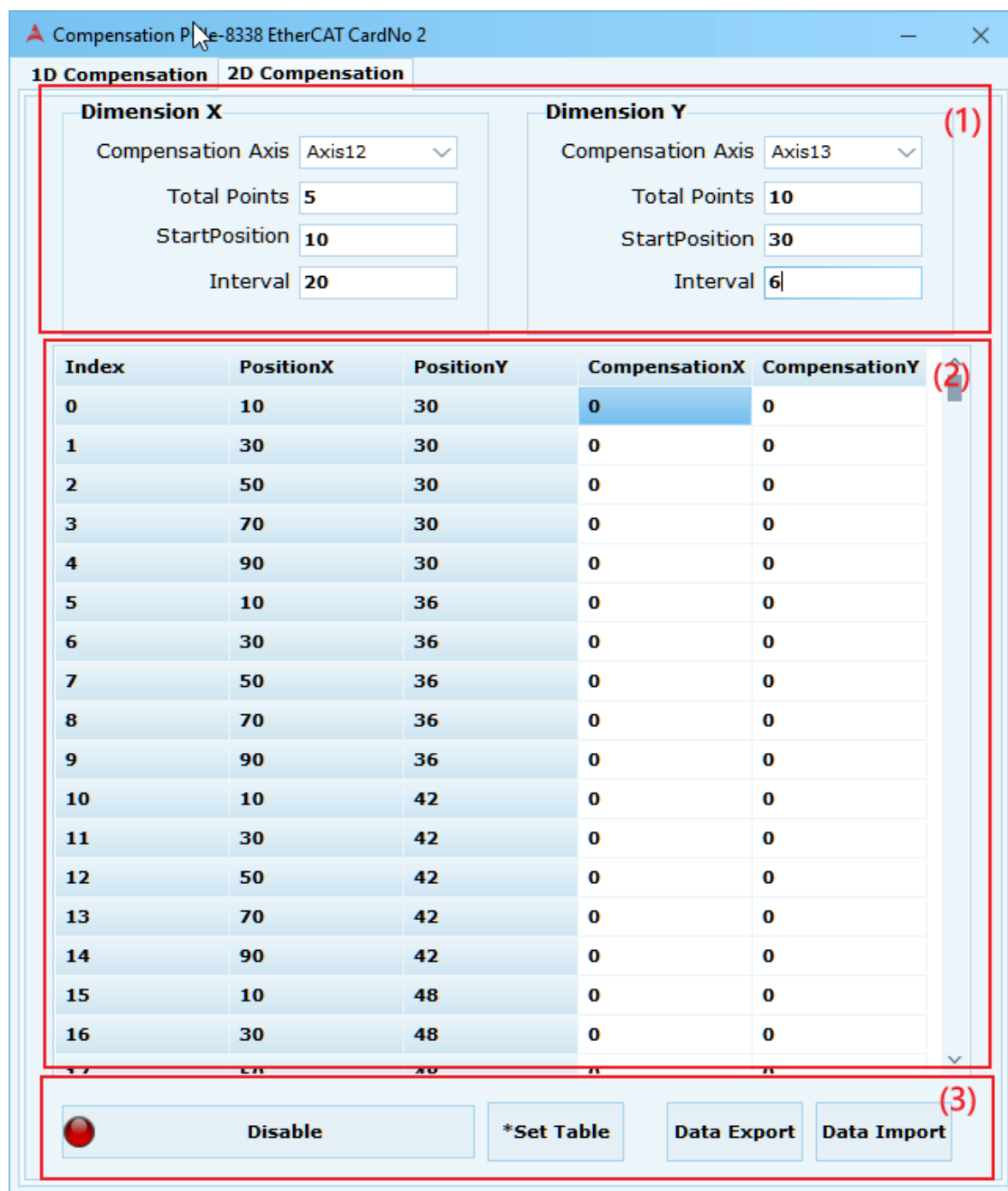

(3)
Disable

*Set Table

Data Export

Data Import

- (1) Setting parameters
 - **Compensation Axis:** The axis that sets compensation
 - **Compensation Type:** Linear or Constant
 - **Total Points:** How many points are compensated
 - **Start Position:** Compensation starting point
 - **Interval:** Compensation for point spacing
- (2) Input compensation amount
- (3) Other functions
 - **Set Table:** Sets table after compensation parameters are configured
 - **Disable/Enable:** Enables compensation
 - **Data Export:** Stores compensated data (*.csv)
 - **Data Import:** Compensation data import (*.csv)

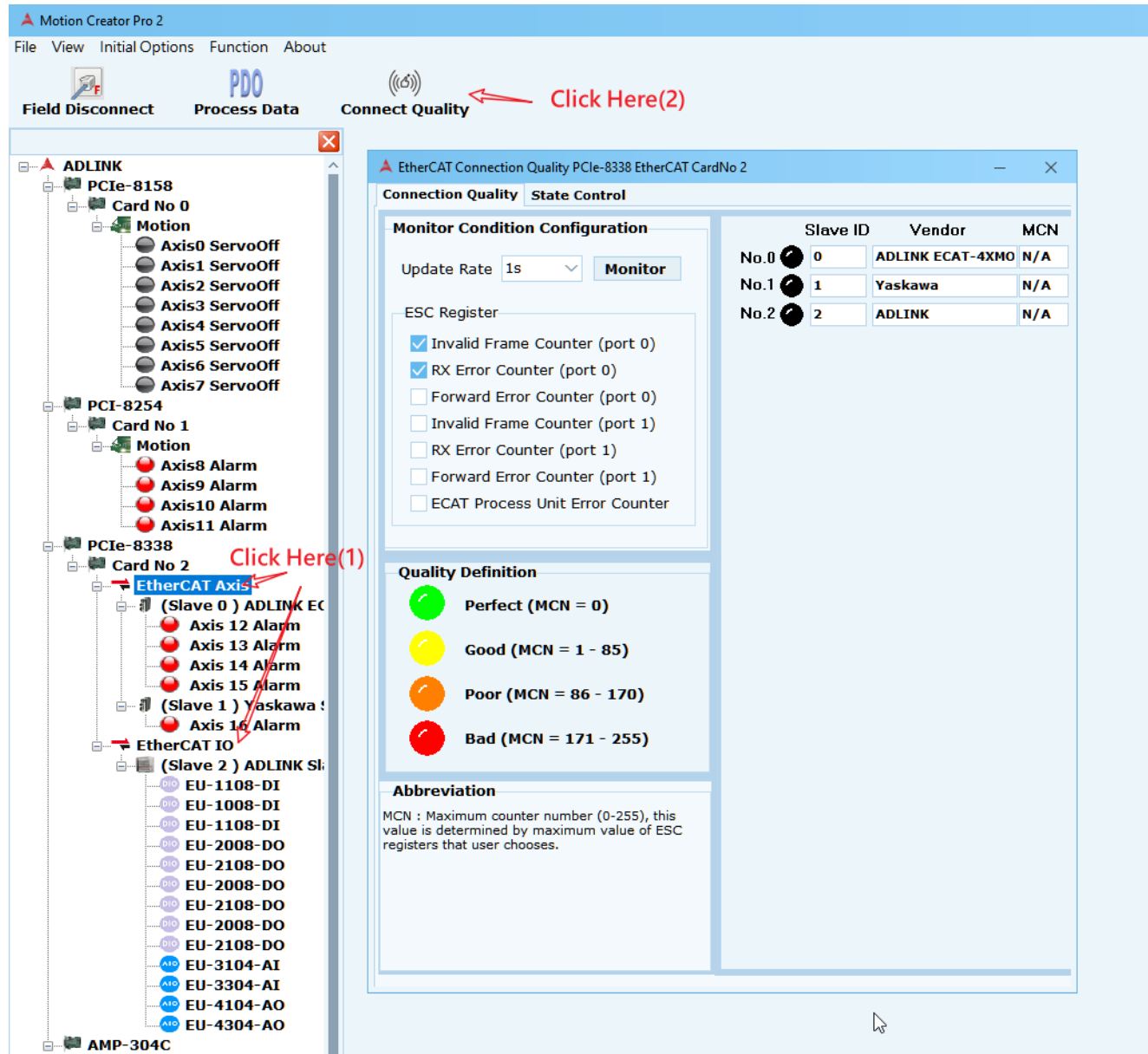


- (1) Setting parameters
 - **Compensation Axis:** An axis that sets 2D compensation
 - **Total Points:** How many points are compensated in 2D
 - **Start Position:** 2D compensation starting point
 - **Interval:** Compensating for point spacing
- (2) Input 2D compensation
- (3) Other functions
 - **Set Table:** Sets table after compensation parameters are configured
 - **Disable/Enable:** Enables compensation
 - **Data Export:** Stores 2D compensation data (*.csv)
 - **Data Import:** 2D compensation data import (*.csv)

3.23 Connect Quality

The Connect Quality page is used to monitor the connection quality and confirm the Slave connection quality.

To open the Connect Quality page, click **EtherCAT Axis** or **EtherCAT IO** on the device tree, then click the **Connect Quality** icon.



Click Here(1)

Click Here(2)

EtherCAT Connection Quality PCIe-8338 EtherCAT CardNo 2

Connection Quality **State Control**

Monitor Condition Configuration

Update Rate: 1s **Monitor**

ESC Register

- ☒ Invalid Frame Counter (port 0)
- ☒ RX Error Counter (port 0)
- ☐ Forward Error Counter (port 0)
- ☐ Invalid Frame Counter (port 1)
- ☐ RX Error Counter (port 1)
- ☐ Forward Error Counter (port 1)
- ☐ ECAT Process Unit Error Counter

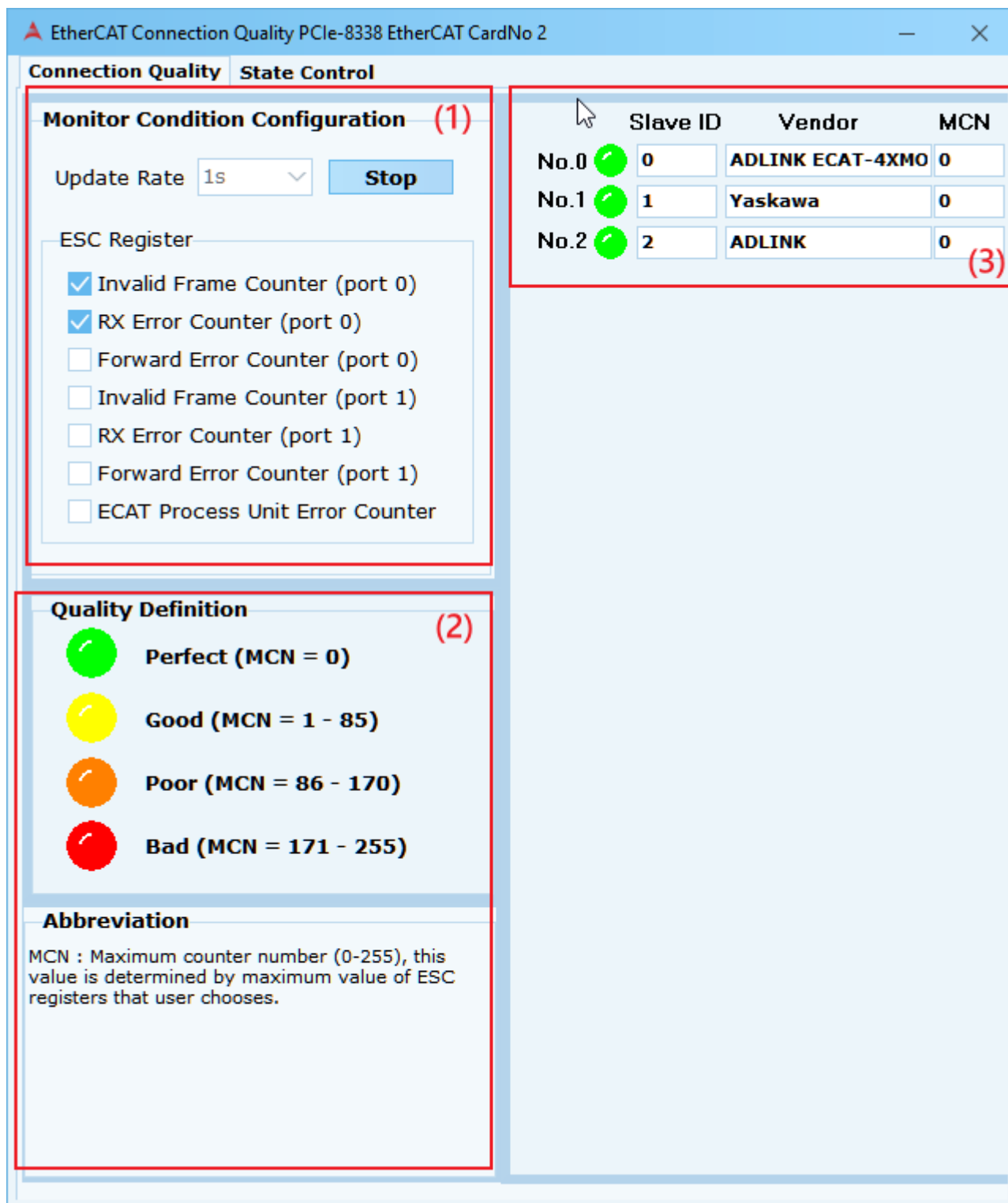
Quality Definition

- Perfect (MCN = 0)
- Good (MCN = 1 - 85)
- Poor (MCN = 86 - 170)
- Bad (MCN = 171 - 255)

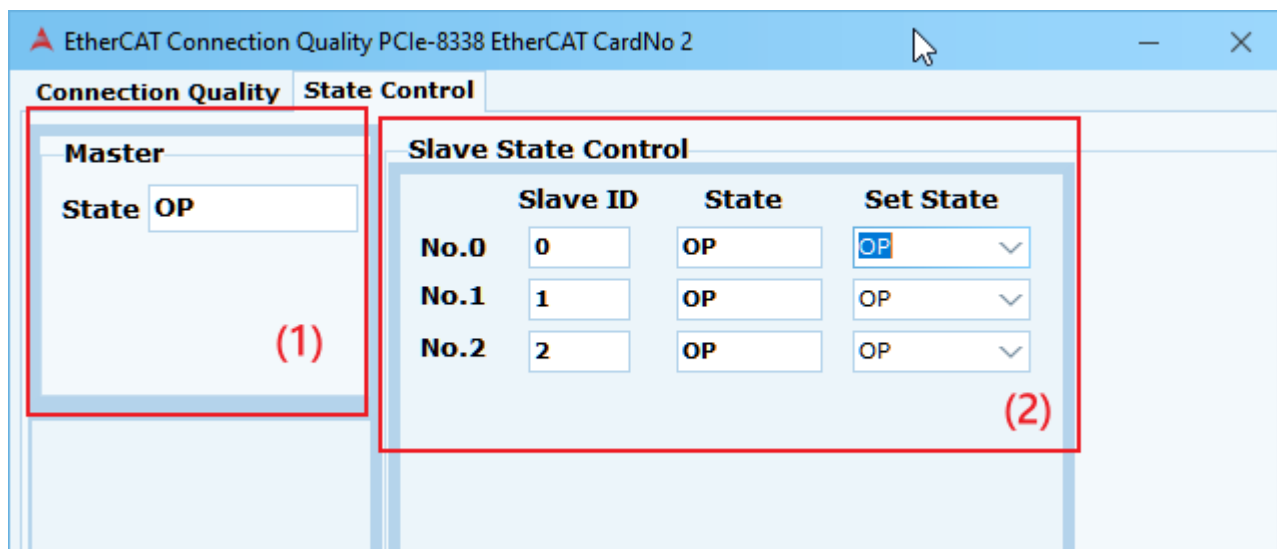
Abbreviation

MCN : Maximum counter number (0-255), this value is determined by maximum value of ESC registers that user chooses.

Slave ID	Vendor	MCN
No.0	ADLINK ECAT-4XMO	N/A
No.1	Yaskawa	N/A
No.2	ADLINK	N/A



3.22.2 State Control



- (1) EtherCAT Master current status.
- (2) **Slave State Control**: EtherCAT Slave current status and switching setting options.