FC Series

Intelligent Stepper Motor Stages





Controller GUI Manual

Version 1.0.x

Experience | Solutions

Nevvport_®

For Motion, Think Newport[™]

Preface

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FC Series Intelligent Stepper Motor Stages

1.0 Introduction

1.1 Purpose

The purpose of this document is to provide instructions on how to use the FC Series Controller GUI.

1.2 Overview

The FC Series GUI is a graphical user interface (GUI) which allows the user to interact with the controller that is integrated with intelligent stepper motor stages. The user can initiate moves, change the state of the controller, adjust configuration parameters, etc. Communication with the FC series is achieved via an RS-422 serial link and a USB to RS422 adaptor. The provided GUI requires USB communication interface, based on WindowsTM operating system. Advanced programming is simplified by an ASCII command interface and a set of two letter mnemonic commands.

1.3 Controller State Diagram



The FC series controller is defined by the following state diagram.

Actions in each state when End of Runs is encountered

NOT REFERENCED: No action.

CONFIGURATION: No action.

HOMING:	Only check at end of HOMING and then change to NOT REFERENCED state.
MOVING:	Abort motion and then change to NOT REFERENCED state.
READY:	Change to NOT REFERENCED state.
DISABLE:	Change to NOT REFERENCED state.

2.0 Getting Started

- 2.1 Overview and Setup
- 2.1.1 Components

USB-RS422-1.8 USB Adaptor



FC-PS40 Power Supply



FC Series Intelligent Stepper Motor Stages



2.1.2 Electrical Installation

- 1. Connect the USB-RS422-1.8 adaptor cable to the FC series stage.
- 2. Connect the FC-PS40 power supply to the FC series stage.



3. Connect the USB cable to an available USB port of the PC



4. Connect the power cable to an electrical outlet.

2.2 First Connection



CAUTION

BEFORE ANY INSTALLATION, CONTACT YOUR I.T. ADMINISTRATOR TO VERIFY THAT YOU HAVE THE APPROPRIATE RIGHTS.

2.2.1 FC Series USB Driver Installation on Windows 7

- 1. Connect the FC Series controller to a USB port with the provided USB cable.
- 2. Detection of this new connected device (the first time) is signaled by a message in the bottom-right of the screen.



- 3. For Windows 7 64 bit, the USB driver installation is completed when the message disappears.
- 4. For Windows 7 32 bits, right click on the new detected device and select "Update driver".

NOTE
Automatic driver installation requires internet connection.

Click "Search automatically for updated driver software".

9	<u>n</u> 1	Jpdate Driver Software - USB Serial Converter	X
1	Hov	v do you want to search for driver software?	
	•	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	
	+	Browse my computer for driver software Locate and install driver software manually.	
			Cancel

5. The following window will pop up after driver installation is completed.



2.2.2 FC Series USB Driver Installation on Window XP

- 1. Download FC_USB_RS422_driver from newport.com
- 2. Run the executable file included.



Device Driver Installation Wi	izard
	Welcome to the Device Driver Installation Wizard! This wizard helps you install the software drivers that some computers devices need in order to work.
	To continue, click Next.
	< Back Next > Cancel

3. Select "Extract" and the following window will pop up.

The following page indicates that the drivers have been successfully installed.

Device Driver Installation Wi	zard						
	Completing the Device Driver Installation Wizard						
	The drivers were successfully in	stalled on this computer.					
	You can now connect your dev came with instructions, please m	ice to this computer. If your device ead them first.					
	5 H	D					
	✓ FTDI CDM Driver Packa ✓ FTDI CDM Driver Packa ✓ FTDI CDM Driver Packa	승규가 잘 알려야 한 것을 가지 않는 것을 가지 않는 것을 수 있다. 것을 하는 것을 수 있다. 말 하는 것을 하는 것을 하는 것을 하는 것을 수 있다. 말 하는 것을 것 같이 않다. 말 하는 것을 수 있다. 말 하는 것 같이 않다. 말 하는 것 같 않았다. 말 하는 것 않다. 말 하는 것 않 않다. 않는 것 않아, 않이 않다. 않이 않다. 않아, 않이 않다. 말					
	< Back	Finish Cancel					

- 4. Once the drivers are installed connect the FC series stage to a USB port with the USB-RS422-1.8 cable.
- 5. Detection of this new connected device (the first time) is signaled by a message in the bottom -right of the screen.



Now, your FC series is installed and ready to use.



2.3 USB Driver Installation Verification

Open the "Device Manager" and select the "Device" tab to check your configuration. In the display menu, select "View devices by type".

Expand "USB Bus controllers" line and check the new line USB Serial Converter:

⊿ -₿.	Universal Serial Bus controllers
1	USB Serial Converter

Expand "Ports (COM and LPT)" line and check the new line USB Serial Port (COMx):



NOTES

Note the COM port number (x) assigned to the device. This will be required for troubleshooting.

2.4 Discover Instruments

Start the Controller GUI from Newport\MotionControl\FCStepper.

🖘 Map Applet	×
Instruments Discovered :	Discover
	Launch Applet

Next, click on "**Discover**" and the number of stages discovered will appear. This window allows the user to select a COM port where the desired stage is connected.

Map Applet	
Instruments Discovered : 2	Discover
COM1 COM2	
	Launch Applet

NOTE

When more than one FC stage is connected, multiple instances of this GUI can be open to control each individual stage. To discern a COM port for a specific instrument, note their COM number in the Device Manager when the connection is added.

Next, click "Launch Applet" button.

3.0 User Interface

3.1 Configuration

The Configuration tab allows the user to view and/or change information related to the logging configuration and the instrument settings.

In LoggingConfiguration, read only values are displayed for the log file name and the log file path. The logging level may be changed to any of the settings in the drop-down list on the right hand side.

Trace is the most detailed of the settings. When this setting is selected, the Controller GUI logs all the information.

Critical Error is the least detailed of the settings. When this setting is selected, the Controller GUI will only log errors that are defined to be critical.

Cor	nfiguration	Main	Parameters	Address	Diagnost	ics Ab	out							
•	2↓	3												
_	LoggingCo	onfigurati	on			0								,
	LogFile	Name				FCSte	per.L	og						1
	LogPat	h				\\Log								
	Level					Trace								
-	Instrument		on			0								-
	Polling					200								
	NbDigit					6								
Ξ	Diagnostic	s				0							_	-
_	Delay					1000								
_	Models					0								
	⊟ Instrum					0								
		ument Ty				FCSte	per							
		finstrum				1								
_	SelectedA		onChannel			RS232								
		aaress IerAddres				0 3								
_	Memorized		-			0								
	BufferD		5			5								
	Rolling					5								
	Rolling													-
	C family cor		36)\Newport\ 1.0	MotionC	ontrol\FC	Steppe	r\Con	tig\New;	oort.FC	Step	per.C	ave		

The polling interval defines the number of milliseconds between each time the Controller GUI polls the FC series for the latest information. The user may change the polling interval by entering a value. Diagnostics Delay defines the time delay in milliseconds between each command sent from a text file.

InstrumentType and NoOfInstruments display the name and number of connected instruments.

The **Save** button allows the user to save the current settings to the configuration file.

Configurable settings

The following table describes all the settings that can be changed by the user.

Parameter	Description	Values / Type	Default
	LoggingConfiguration	1	
Level	Logging level. Trace is the most detailed of the settings and when this setting is selected the applet logs everything. Critical Error is the least detailed of the settings and when this setting is selected the applet will only log errors that are defined to be critical.	Trace Detail Equipment Message Info Warning Error Critical Error	Trace
	InstrumentInformation	า	
PollingInterval	The polling interval defines the number of milliseconds (delay) between each time the applet polls the instrument for the latest information.	An Integer	200
NbDigits	Number of fractional digits after the decimal point.	An Integer	6
	Diagnostics		
Delay	The delay defines the number of milliseconds between each sent command from a text file.		
	Models\InstrumentInfo	D	
CommunicationChannel	The communication channel	RS232	RS232
	MemorizedPosition		
BufferDepth	BufferDepth defines the maximum number of analog I/O values displayed in the chart.	An Integer	5
RollingBuffer	The list of the memorized position in the rolling buffer for a selected controller address	A String	
	SelectedAxis		
ControllerAddress	List of the selected controller address.	A String	

3.2 Main

The *Main* tab displays the main controls in the Controller GUI like a virtual front panel. It is updated each time the polling interval timer expires.

	3: FCL100
4	Configuration Main Parameters Address Diagnostics About
	Initialization and Configuration
	Disable Save Pos.
	Current Position
	0.000000
	-50,000
	Incremental Motion / PR-Move Relative
	#1 4 #2 4
	Cyclic Motion Target Motion / PA
	Cycle Current cycle #1 #2
	Dwell 0 msec 🕐 Go to Go to
	Motion Configuration Values
	Velocity : 20.00 Minimum end of run : -50.00
	Acceleration : 160.00 Maximum end of run : 50.00
bo Box	Rename Go to
	3) FC family controller 1.1.0

"Initialization and Configuration"

In the "Initialization and Configuration" area, the first button changes the controller status to "Enabled" or "Disabled" To see the different controller states, refer to the controller state diagram in section 1.3. The second button "Save Pos." memorizes the current position in the combo box. As soon as a new position is memorized, this is displayed in the trace.

"Current Position"

In the "Current Position" area, the current position is displayed in a text box and visualized in a slider. The slider limits are defined with the ends of run. An LED icon shows the current controller state. When the mouse hovers over the icon, the controller state is displayed in an information balloon.

"Incremental Motion / PR-Move Relative"

In the "Incremental Motion / PR-Move Relative" area, two increment values can be defined. For each defined increment, a relative move is performed in either the negative or positive direction.

"Cyclic Motion" and "Target position / PA"

In the "Cyclic Motion" area, a motion cycle is configured with a number of cycles (Cycle) and a dwell time in milliseconds. The motion cycle gets the defined target positions from the "Target Motion / PA" area to perform the cycle.



In the "Target Motion / PA"" area, two target positions can be defined. The "Go to" button executes the absolute move to go to the specified target position.

"Motion Configuration Values"

In the "Motion Configuration Values", the current ends of run, velocity, and acceleration are displayed in this area: "Minimum end of run", "Maximum end of run", "Acceleration", and "Velocity" can be modified and saved with the "Set" button.

Memorized positions

The combo box memorizes the positions set by the "Save Pos." button. Each of these positions can be renamed or deleted. To execute an absolute move to one of these memorized positions, select one item of the combo box and click on the "Go to" button. When the mouse moves over to the combo box, the position is shown in an information balloon.

Rename a memorized position: Select an item from the combo box, edit the position name to change it and click on the "Rename" button to save the new position name.

Delete a memorized position: Select an item from the combo box, rightclick on the mouse and select the "Delete" menu to delete the selected memorized position.

NOTE

The FC series controller supports native units of millimeter (FCL) or degrees (FCR). All the parameters such as position, velocity and acceleration are defined on the same scale. These units are not shown in the GUI.

- Position (Units)
- Velocity (Units/s)
- Acceleration (Units/s²)

3.3 Parameters

The *Parameters* tab displays the stage parameters for the selected controller.

Note modification of parameters is disabled in the Parameters tab. User configuration parameter such as velocity, acceleration and End of Runs can be changed in the main tab. Other configuration parameters can be modified in the diganostics tab by using the commands. Refer to user's manual for details of the commands.

COM24	_ _ X
3: FCL100	•
Configuration Main Parameters Address Diagnostics About	
Acceleration (AC) 160	
Velocity (VA) 20	
Jerk time (JR) 0.04	
Software Limit - (SL) -50	
Software Limit + (SR) 50	
Backlash (BA) 0	
Hysteresis (BH) 0	
Micro step factor (FRM) 128	
Motor Peak Curr. Limit (QIL) 1.5	
Home mode (HT) 2	
Home Velocity (OH) 10	
Home Timeout (OT) 22	
Integral gain (KI) 4.9E-05	
Proportional gain (KP) 2	
3) FC family controller 1.1.0	
	CL
	EA
	R
Initialized	

3.4 Address

- The *Address* tab allows the followings:1) To scan and select connected FC series controllers.
- 2) To configure the controller address

© COM24					X
Configuration Main Par	ameters Address Diagnos	tics About			
Controller pool setting					_
Selected controllers					
3: FCL100		-	Delete		
Detected controllers					
3: FCL100		•	Add	Discover	
- Controller address setting					
Steps					
2. Select the desired add 3. Press the 'Set' button	e sure the address of your co dress for your controller from the to assign the new address to roller and power off. Now, it's	he list box below. your connected contro	oller.		
Note					
To setup a daisy cha set to #1 (Master sta	t address to another con ain, the first stage of the age). The others have to Once your controllers ar ".	chain must have it be set to a differe	ts address nt address		
	Contro	oller address	•	Set	
3) FC family controller 1.1.0					
					CLEAR
Initialized					

3.4.1 Controller pool setting

"Discover" button

The Discover button scans to detect connected FC controllers (address #1 to address #4).

ontroller pool setting Selected controllers			
3: FCL100	•	Delete	
Detected controllers			
3: FCL100	•	Add	Discover

After a *Discover* action, the list of detected controllers is filled. Stage model number is shown next to the address #1 through #4. This address helps to identify each controller connected.

SN COM24		x
Configuration Main Parameters Address Diagnostics About		
Selected controllers		
1: FCL100 Delete		
Detected controllers		
2: FCL200 Add	Discover	
1: FCL100 2: FCL200		
Controller address setting		
Steps		
 Connect only the FCStepper controller you want to initialize, to your computer via the COM port. Make sure the address of your controller is set to 1. 		
 Select the desired address for your controller from the list box below. Press the 'Set' button to assign the new address to your connected controller. 		
 Hess the Set battom to assign the new address to you connected controller. Disconnect your Controller and power off. Now, it's ready to be chained. 		
<u>Note</u> To assign a different address to another controller, follow Steps above.		
To setup a daisy chain, the first stage of the chain must have its address		
set to #1 (Master stage). The others have to be set to a different address in between 2 and 4. Once your controllers are chained as recommended.		
perform a "Discover".		
Controller address	Set	
	Jel	
1) FC family controller 1.1.0		
1) PC Tanniy Conditioner 1.1.0		с
		E
		AR
		in a
Target Move Command Send Successful.		

"Add" button

The *Add* button allows the user to add a connected FC controller to the list of selected controllers.

After adding a detected controller, the list of selected controllers is updated.

∞ COM24	
Configuration Main Parameters Address Diagnostics About	
Controller pool setting	
Selected controllers	
1: FCL100 Delete	
1: FCL100	
2: FCL200	
2: FCL200 Add	Discover
Controller address setting	
Steps	
 Connect only the FCStepper controller you want to initialize, to your computer via the COM port. Make sure the address of your controller is set to 1. Select the desired address for your controller from the list box below. Press the 'Set' button to assign the new address to your connected controller. Disconnect your Controller and power off. Now, it's ready to be chained. 	
Note To assign a different address to another controller, follow Steps above. To setup a daisy chain, the first stage of the chain must have its address set to #1 (Master stage). The others have to be set to a different address in between 2 and 4. Once your controllers are chained as recommended, perform a "Discover".	
Controller address 🗸	Set
1) FC family controller 1.1.0	с
	L
	R
Target Move Command Send Successful.	

"Delete" button

The *Delete* button removes the selected FC controller from the list of selected controllers.

3.4.2 Controller address setting

This part allows the user to configure the address of the FC controller.

"Set" button

Select a controller address from the list and press the "Set" button. A progress bar is displayed during the address configuration.

onfiguration	Main	Parameters	Address	Diagnostics	About				
Controller p	ool settin	g							
Selected	controlle	rs							
1: FCL10)					•	Delete	1	
Detected	controlle	13							
1: FCL10)					-	Add		Discover
									DISCOVEI
Controller a	ddroee er	tting							
Steps	uuress se	sung							
		EC Stanger of	antes lles ver	want to initia	line te ver		tar		
				J want to initia			ter		
					In a not to				
via the (OM port	Make sure th	e address	of your control					
via the (2. Select t	OM port. he desire	Make sure th d address for	e address your contro	of your control ller from the lis	t box belo	w.	llor		
via the 0 2. Select t 3. Press th	OM port. he desire ie 'Set' bu	Make sure the d address for atton to assign	e address your contro the new a	of your control ller from the lis ddress to your	t box belo connecte	w. d contro	ller.		
via the 0 2. Select t 3. Press th	OM port. he desire ie 'Set' bu	Make sure the d address for atton to assign	e address your contro the new a	of your control ller from the lis	t box belo connecte	w. d contro	ller.		
via the 0 2. Select t 3. Press th 4. Disconr	OM port. he desire ie 'Set' bu	Make sure the d address for atton to assign	e address your contro the new a	of your control ller from the lis ddress to your	t box belo connecte	w. d contro	ller.		
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via the 0 2. Select t 3. Press th 4. Disconr <u>Note</u> To assig	COM port. he desire le 'Set' bu hect your n a diffe	Make sure th d address for itton to assign Controller and erent addres	e address your contro the new a power off. ss to anol	of your control ller from the lis ddress to your Now, it's read	t box belo connecte ly to be ch	w. d contro ained. v Steps	above.		
via the 0 2. Select t 3. Press th 4. Disconr <u>Note</u> To assig To setup	COM port. he desire le 'Set' bu nect your n a diffe a dais	Make sure th d address for itton to assign Controller and erent address chain, the	e address (your contro the new a power off. ss to anol first stag	of your control ller from the lis ddress to your Now, it's read ther controll e of the cha	t box belo connecte ly to be ch er, follow	w. d contro ained. v Steps have it	above. s address		
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via the 0 2. Select t 3. Press th 4. Disconr Note To assig To setup set to # in betwee	COM port. he desire ie 'Set' bu hect your n a diffe a daisy I (Maste en 2 an	Make sure th d address for itton to assign Controller and erent addres (chain, the r stage). Th d 4. Once y	e address your contro the new a power off. ss to anol first stag ne others	of your control lier from the lis ddress to your Now, it's read ther controll e of the cha have to be ollers are cl	t box belo connecte ly to be ch er, follov ain must set to a hained a	w. d contro ained. v Steps have it differer	above. s address nt address		C-+
via the 0 2. Select t 3. Press th 4. Disconr Note To assig To setup set to # in betwee	COM port. he desire ie 'Set' bu hect your n a diffe a daisy I (Maste en 2 an	Make sure th d address for itton to assign Controller and erent addres (chain, the r stage). Th d 4. Once y	e address your contro the new a power off. ss to anol first stag ne others	of your controll ller from the lis ddress to your Now, it's read ther controll the of the cha have to be	t box belo connecte ly to be ch er, follov ain must set to a hained a	w. d contro ained. v Steps have it differen s recon	above. s address nt address		Set
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via the (2. Select t 3. Press tf 4. Disconr <u>Note</u> To assig To setup set to # in betwe perform	OM port he desire e "Set" bu rect your n a diffe a daisy I (Maste en 2 an a "Disce	Make sure th d address for itton to assign Controller and errent addree: r chain, the r stage). Th d 4. Once y over".	e address your contro the new a power off. ss to anol first stag ne others	of your control lier from the lis ddress to your Now, it's read ther controll e of the cha have to be ollers are cl	t box belo connecte ly to be ch er, follov ain must set to a hained a	w. d contro ained. v Steps have it differen s recon	above. s address nt address		Set
via the 0 2. Select 1 3. Press th 4. Disconr Note To assig To setup set to # in betwe perform	OM port he desire e "Set" bu rect your n a diffe a daisy I (Maste en 2 an a "Disce	Make sure th d address for itton to assign Controller and errent addree: r chain, the r stage). Th d 4. Once y over".	e address your contro the new a power off. ss to anol first stag ne others	of your control lier from the lis ddress to your Now, it's read ther controll e of the cha have to be ollers are cl	t box belo connecte ly to be ch er, follov ain must set to a hained a	w. d contro ained. v Steps have it differen s recon	above. s address nt address		Set
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Now disconnect this controller from your PC and connect the next one. Select a new, unallocated address and press the "Set" button again (proceed the same way with all other controllers).

3.4.3 Daisy-chaining

Up to **4 FC series controllers** can be networked through the internal RS232 communications link. Before daisy-chaining, the controller address of each stage must be set separately. The FC controller that will be connected to the PC must have its controller address set to 1 and all subsequent stages must have a different controller address set between 2 and 4.

Once the controller address of each stage is set, **unplug all the power cables** and **disconnect the USB cable** from all the stages except for the FC controller that has its address set to 1. Use the daisy chain cables to connect each controller. It does not matter whether you use the upper or lower RS422 connector to daisy chain the stages.

- Only the FC controller with address 1 should be connected to the PC
- All other FC controllers must be daisy-chained.

Plug in all the power supplies and open the GUI. Under the Address tab select the Discover button to scan for connected FC's. Once the scan is complete, discovered controllers will be added in "Detected controllers" list. Use the "Add" button to add controllers to the "Selected controllers" list.

3.5 Diagnostics

The Diagnostics tab allows the user to enter instrument commands and to view the history of commands that were sent and the responses that were received. This list of commands and the syntax of each command can be found in the user's manual.

A file of commands can be sent line by line to the controller with the "Send Command file" button.

COM24									X
Configuration	Main	Parameters	Address	Diagnostics	About				
Command :									
Command H	istory :	Send				Send	Command file		
Response H	liston: ·								
	iistory .							_	CL
									EAR
Note: The F	RS comm	and may affect	t vour initia	al motion settin	a				
you previou	sly applie	ed in the Main	tab.		-				
) FC family cor	ntroller 1.	1.0							
									EAR
nitialized									
64/69 ⁷ 0/6975									

3.6 About

The About tab displays the information about the GUI and the connected instrument. It displays the Controller GUI name, version, and copyright information.

It also displays the instrument model, the instrument key (serial number or COM port), the firmware version and the list of the selected axes.

3: FCL100		
Configuration Main Parameters	Address Diagnostics About	
FC Stepper application		
Property	Value	
Assembly	FC Stepper	
Assembly Version	1.0.0.0	
File version	1.0.0.0	
Copyright	Copyright © Newport Corporation 2013	
Selected controller version	FC family controller 1.1.0	
Instrument Key	COM24	
Supported Models	FCStepper	
Axis #1	FCL100	
Diagnostics.Logging.Applet	1.0.0.1	
Newport.FCStepper.Applet	1.0.0.0	
Newport.FCStepper.CommandIn		
Newport.FCStepper.CommonAp	0.0.0.1	
Newport.FCStepper.Configuratio		
VCPWrap	1.0.0.0	
VmlViewer	1 0 0 17024	
) FC family controller 1.1.0		
itialized		



Service Form

Your Local Representative

Tel.:	 	
Fax:_	 	

Name:	Return authorization #:				
Company:	(Please obtain prior to return of item) Date:				
Address:					
Country:					
P.O. Number:	Fax Number:				
Item(s) Being Returned:					
Model#:	Serial #:				
Description:					
Reasons of return of goods (please list any specific problems):					



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