

FC Series

Intelligent Stepper Motor Stages





Controller GUI Manual

V2.0.x

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Original instructions.

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Intelligent Stepper Motor Stages FC Series

1.0 Introduction

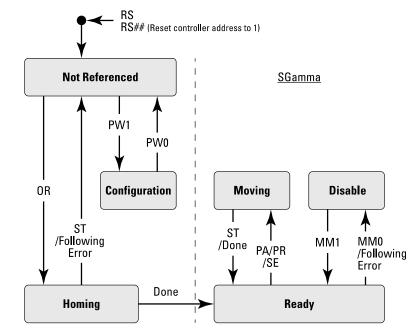
1.1 Purpose

The purpose of this document is to provide instructions on how to use the FC Series Controller graphical user interface (GUI).

1.2 Overview

The FC Series GUI is a graphical user interface, that 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 Installation

2.1 Install FC Stepper Graphical User Interface

Following are steps to install FC Stepper GUI:

- For 32 bit, Select and launch "FCStepper Utility Installer Win32.exe". For 64 bit, Select and launch "FCStepper Utility Installer Win64.exe".
- A window opens up showing Install welcome page.
- Click on "Next".
- A window opens up allowing destination folder selection. By default it is showing C:\.
- Click on "Next".
- Ready to install window opens up. Click "Install".
- Then installation starts, wait for completion. Click on "Finish" to finalize the installation.

32 bit installer will be installed "Newport. FCStepper.CommandInterface.dll" in GAC_32 folder and 64 bit installer will be installed the dll in GAC_64 folder.

NOTE

LabVIEW user can add reference of command interface dll from GAC during VI creation.

2.2 Launch GUI

From Windows "START" menu, select "All Programs\Newport\Motion Control\FCStepper\FCStepper Utility".

3.0 Getting Started

- 3.1 Overview and Setup
- 3.1.1 Components

USB-RS422-1.8 USB Adaptor



FC-PS40 Power Supply

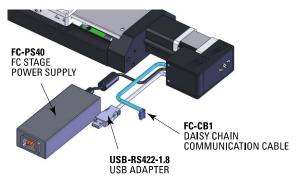


FC Series Intelligent Stepper Motor Stages



3.1.2 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.

3.2 First Connection



CAUTION

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

3.2.1 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.



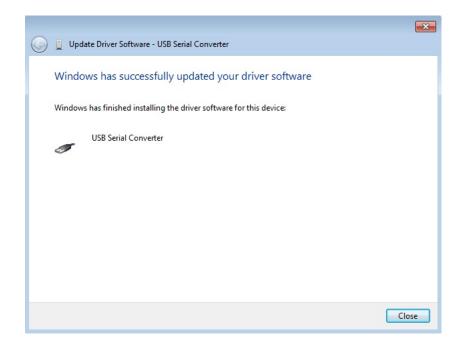
- 3. For Windows 7 64 bit, the USB driver installation is completed when the message disappears.
- 4. For Windows 7 32 bits, right click on the new detected device and select "Update driver".

NOTE Automatic driver installation requires internet connection.

Click "Search automatically for updated driver software".

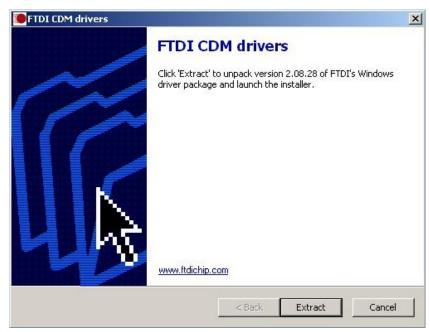
<u> </u>	Jpdate Driver Software - USB Serial Converter	×
Hov	v do you want to search for driver software?	
•	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your 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.



3.2.2 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 W	izard	
	Completing the De Installation Wizard	
	The drivers were successfully in	nstalled on this computer.
	You can now connect your dev came with instructions, please r	rice to this computer. If your device ead them first.
	Di Nor	0.1
-	 ✓ FTDI CDM Driver Packa ✓ FTDI CDM Driver Packa ✓ FTDI CDM Driver Packa 	18 : 20 · 20 · 20 · 20 · 20 · 20 · 20 · 20
	< 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.

3.3 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.

3.4 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.

4.0 User Interface

4.1 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	Diagnosti	cs About		
	2↓	3						
_			on)		
_	LogFile					CSteppe	er.Log	
	LogPat					Log		
	Level					Ггасе		
Ξ	Instrument	Informati	on			D		E
	Polling	nterval			1	200		
	NbDigit	s			1	5		
Ξ	Diagnostic	s				D		
	Delay					1000		
_	Models					D		
	⊟ Instrum					0		
		Instrument Type				CSteppe	ar an	
		fInstrum				1		
			onChannel			RS232		
Ξ	SelectedA					0		
_		erAddres				3		
	Memorized		S			D		
	BufferD					5		
	Rolling							
				MotionC	ontrol\FC	Stepper\C	Config\Newport.FCStepper.Configura	tion _:
) F(C family cor	troller 1.	1.0					C L E J

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 GUI logs everything. Critical Error is the least detailed of the settings and when this setting is selected the GUI will only log errors that are defined to be critical.	Trace Detail Equipment Message Info Warning Error Critical Error	Trace
	InstrumentInformation	ı	
PollingInterval	The polling interval defines the number of milliseconds (delay) between each time the GUI 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	

4.2 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"

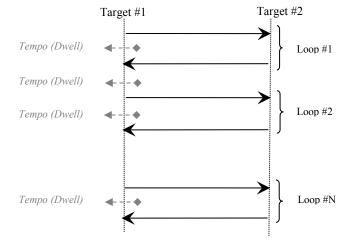
In the "Current Position" area, the current position is displayed in a text box and visualized in a slider. The slider limits are defined with the ends of run. An LED icon shows the current controller state. When the mouse hovers over the icon, the controller state is displayed in an information balloon.

"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)

4.3 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.

ST COM24	_ D 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)	
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	

4.4 Address

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

Configuration Main Parameters Address Diagnostics About Controller pool setting Selected controllers 3: FCL100 Delete Detected controllers 3: FCL100 Add Discover Controller address setting Steps 1. 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. 2. Select the desired address for your controller from the list box below. 3. Press the "Set' buttor to assign the new address to your controller. 4. 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 assign a different address to another controller, follow Steps above. To assign a different address to another controller, follow Steps above. To assign a different address to another controller, follow Steps above. To assign a different address to another controller and ress in between 2 and 4. Once your controllers are chained as recommended. perform a "Discover". Controller address Set 3) FC family controller 1.1.0 C	N COM24									x
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3) FC family controller 1.1.0	To setup a set to #1 in betwee	a daisy (Master n 2 and	chain, the stage). The 4. Once y	first stag	have to be	ain must h set to a d	iffere	ts address nt address		
C L E A R					Controller	address		•	Set	
L E A R	3) FC family cont	roller 1.1	.0							
										L E A
Initialized										
	Initialized									

4.4.1 Controller pool setting

"Discover" button

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

Selected controllers		
3: FCL100	▼ Delete	
Detected controllers		
		cover

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.

Store COM24	
Configuration Main Parameters Address Diagnostics About	
Selected controllers	
1: FCL100	te
Detected controllers	
2: FCL200 Add	d Discover
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. 	
 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 addr set to #1 (Master stage). The others have to be set to a different addr	ess
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	
	CL
	Ē
	R
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	x
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. 	
<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	
1) FC family controller 1.1.0	
	C L E A R
Target Move Command Send Successful.	

"Delete" button

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

4.4.2 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 A	bout				
Controller p	ool settin	g							
Selected	controlle	rs							
1: FCL10)					▼ De	lete		
Detected	controlle	ers							
1: FCL10)					- A	dd	Discov	er
Controller a	ddress se	ettina							
Steps	1001033 30	Jung							
via the (2. Select t	OM port. he desire	d address for	e address o your contro	of your controller ller from the list b	is set to 1. ox below.				
via the 0 2. Select t 3. Press th 4. Disconr Note To assig To setup set to #	COM port. he desire he 'Set' bu hect your n a diffe a daisy 1 (Maste en 2 an	Make sure th d address for itton to assign Controller and erent addres y chain, the er stage). Th d 4. Once y	e address of your contro the new a power off. ss to anot first stag ne others	of your controller	is set to 1. ox below. onnected co o be chain , follow S must ha t to a dif	ontroller. ed. Steps abov ve its add ferent add	ress		
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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).

4.4.3 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.

4.5 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 :	
Send Send Command file Command History :	
Response History :	
	C L E A
	R
Note: The RS command may affect your initial motion setting	
you previously applied in the Main tab.	
3) FC family controller 1.1.0	CL
	E A R
Initialized	

4.6 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.

: FCL100		
Configuration Main Parameters	Address Diagnostics About	
C 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	1
Axis #1	FCL100	
Diagnostics.Logging.Applet	1.0.0.1	
Newport.FCStepper.Applet	1.0.0.0	
Newport.FCStepper.CommandIn	0.0.0.2	
Newport.FCStepper.CommonAp	0.0.0.1	
Newport.FCStepper.Configuratio	0.0.0.1	
VCPWrap	1.0.0.0	
Velliouer	1 0 0 1703/	
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)
Address:	- _ Date:
Country:	
P.O. Number:	
Item(s) Being Returned:	
Model#:	
Description:	
Reasons of return of goods (please list any specific problems):	

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North America & Asia

Newport Corporation 1791 Deere Ave. Irvine, CA 92606, USA

Sales Tel.: (800) 222-6440 e-mail: sales@newport.com

Technical Support Tel.: (800) 222-6440 e-mail: tech@newport.com

Service, RMAs & Returns Tel.: (800) 222-6440 e-mail: service@newport.com

Europe

MICRO-CONTROLE Spectra-Physics S.A.S 9, rue du Bois Sauvage 91055 Évry CEDEX France

Sales

Tel.: +33 (0)1.60.91.68.68 e-mail: france@newport.com

Technical Support e-mail: tech_europe@newport.com

Service & Returns Tel.: +33 (0)2.38.40.51.55

