SMC100CC & SMC100PP

Single-Axis Motion Controller/Driver for DC or Stepper Motor



Precision Motion – Guaranteed

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SMC100 Single-Axis Motion Controller

1.0 Introduction

1.1 Purpose

The purpose of this document is to provide instructions on how to use the SMC100 Controller graphical user interface (GUI).

1.2 Overview

The SMC100 Controller GUI is a graphical user interface, that allows the user to interact with the SMC100CC or SMC100PP controller that is connected to stages. The user can initiate moves, change the state of the controller, adjust parameters, etc.



* No action, when jogging speed is different than zero, e.g. one of the keys "<", ">" or "<< >>" is pressed.

End of Runs encountered in the following state:

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.

Controller's LED display:

NOT REFERENCED:	If everything is OK then SOLID ORANGE.
NOT REFERENCED:	If hardware faults or wrong parameters then SOLID RED.
NOT REFERENCED:	If end of runs then SLOW BLINK ORANGE.
CONFIGURATION:	SLOW BLINK RED.
READY:	SOLID GREEN.
DISABLE:	SLOW BLINK GREEN.
HOMING:	FAST BLINK GREEN.
MOVING:	FAST BLINK GREEN.
JOGGING:	FAST BLINK GREEN.

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1.4 Building the System

Up to **31 controllers** can be networked through the internal RS-485 communication link. The first SMC100 is connected to the RS232 connector (address #1) which is connected to the computer and the others are linked with the RS485 connectors (address #2 to address #31).

When the addresses of all controllers are set, you can build your system.

Pull out all cables from all controllers. Set the dip switches of the controller with the address number 1 as FIRST. Set the dip switches of the other controllers, except one, as OTHERS, and set the dip switches of one controller as LAST. When you have only two controllers, one has to be set as FIRST (the one with the address number 1), and the other one as LAST. See below graphic for illustration.



Connect the SMC100CC/PP configured as FIRST to the RS-232-C port or to the USB port of your PC. Connect a RS-485 network cable to the RS-485 OUT of the FIRST controller and to the RS-485 IN of the next controller. Proceed the same with all other controllers. When done, you can check your system:

- The controller configured as FIRST should have the RS-232-C cable connected to the computer. It has the **address #1**.
- All controllers configured as OTHERS should have one RS-485 network cable connected to the RS-485 IN and another one to the RS-485 OUT.
- The controller connected as LAST should have one RS-485 network cable connected to the RS-485 IN.

Connect your stages to the SMC100CC/PP's (MOTOR connector). Connect your SMC100CC/PP's to power.

The SMC100CC/PP allows chaining power from one SMC100CC/PP to another one using the SMC-PSC0.2 cable supplied with the controller. But the total power consumption of all stages connected to the same power supply should not exceed 80 W. The maximum power consumption of each Newport stage is listed in the Newport catalog and on the Newport web site. In case of questions, contact Newport. Once controllers have been networked the GUI can be used to switch between stages using the selected stage box.



2.0 Installation

2.1 Install SMC100 Graphical User Interface

Following are steps to install SMC100 GUI:

- For 32 bit, Select and launch "SMC100 Utility Installer Win32.exe". For 64 bit, Select and launch "SMC100 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.SMC100.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\SMC100\SMC100 Utility".



3.0 Getting Started

3.1 Discover Instruments

Start the Controller GUI from Newport\MotionControl\SMC100.



Next, click on "**Discover**" button and the number of instruments discovered will appear. This window allows the user to select a com port where the desired instrument is connected.

	×
Instruments Discovered : 1 Discov	ver
COM4	
	Anglet
	Appier
SMC100	×
SMC100 Instruments Discovered : 1	ver
SMC100 Instruments Discovered : 1 Discovered : 1 COM4	ver
SMC100 Instruments Discovered : 1 Disco	ver
SMC100 Instruments Discovered : 1 Discovered : 1	ver
SMC100 Instruments Discovered : 1 Discovered : 1 COM4	ver
SMC100 Instruments Discovered : 1 Discovered : 1 COM4	ver



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 option of the settings. When this setting is selected, the Controller GUI logs all the information.

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

0000) SMC100CC, SMC100PP RS232 E
) SMC100CC, SMC100PP
SMC100CC, SMC100PP
RS232
RS232
,
5
-
ontrol\SMC100\Config\Newport.SMC1 _{'.:}

The polling interval defines the number of milliseconds between each time the Controller GUI polls the SMC100 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 type of controller and number of the connected instrument.

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

Selected stage

This box allows the user to switch between stages connected to networked S.

Parameter	Description	Values / Type	Default
	LoggingConfiguration	n	
Level	Logging level. Trace is the most detailed of the settings and when this setting is selected the Controller GUI logs everything. Critical Error is the least detailed of the settings and when this setting is selected the Controller GUI will only log errors that are defined to be critical.	Trace Detail Equipment Message Info Warning Error Critical Error	Trace
	InstrumentInformation	on	
PollingInterval	The polling interval defines the number of milliseconds (delay) between each time the Controller GUI polls the instrument for the latest information.	An Integer	200
NbDigits	Number of fractional digits after the decimal point.	An Integer	6
	Models\InstrumentIn	fo	
CommunicationChannel	The communication channel	RS232	RS232
	Diagnostics		
Delay	The delay defines the number of milliseconds between each sent command from a text file		1000
	MemorizedPosition		
BufferDepth	MaxItem defines the maximum number of memorized positions in each rolling buffer.	An Integer	5
RollingBuffer	The list of the memorized position in the rolling buffer for a selected controller address	A String	
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.

≪ COM4
1: PR50CC_PN:07/4579_UD:
Configuration Main Jog GPIO Parameters Address Diagnostics About
Initialization and Configuration
Disable Save Pos.
Current Position
-foooooo
Incremental Motion / PR-Move Relative
#1 4 b #2 4 b
Cyclic Motion Target Motion / PA-Move Absolute
Cycle Current cycle #1 #2
Dwell 0 msec O Go to Go to
Motion Configuration Values
Velocity : Minimum end of run : Maximum end of run : 20.0000 -1000000 Set
Rename Position #1
Smart stage parameters are downloaded. : Action is completed. : Configuration parameters reading please wait SMART stage parameters downloading please wait. : Action is completed. : Configuration parameters reading please wait. : Action is completed. : Configuration parameters reading please wait Initialized

"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. The second button "Save Pos." memorizes the current positions 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 LED icon, the controller state is displayed in an information balloon.

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"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 preformed in either the negative direction or positive direction.

"Cyclic Motion" and "Target position / PA-Move Absolute"

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 position / PA-Move Absolute' area to perform the cycle.



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

"Motion Configuration Values"

In the "Motion Configuration Values", the current ends of run and the velocity are displayed in a disabled text box: "Minimum end of run", "Maximum end of run" and "Velocity". These ends of run and the velocity can be modified and saved with the "Set" button.

Memorized positions

The combo box allows memorizing the positions 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 hovers over the combo box, the selected memorized position is shown in an information balloon.

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

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

4.3 Jog

Under this tab, the controller allows the jog mode with use of two arrow buttons.

Configuration	Main	Jog	GPIO	Paramete	ers Ad	dress	Diagnostic	s About	
- Initialization	and Conf Disable	iguration					Save Po	os.	
- 1000000	ition	1	Q	1 1	, 100	, pooo.	0.020070		
Jog Jog vel Curre 20.00 New	ocity nt velocity 00 velocity	, Se	st		•			Þ	
Rename	Position	#1					•	Go	to
mart stage pa Action is com Configuration MART stage	rameters pleted. paramete paramete	are dowr rs readin rs downlo	lloaded. g plea	se wait please wa	it.				C L E

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4.4 GPIO

The *GPIO* tab allows the user to modify digital outputs and to view digital and analog inputs.

Configuration	Main Jog	GPIO	Parameters Ad	dress Diagnostics About	
TTL Output	3		TTL Inputs	Analog Inputs	
Output #1	ON (OFF	Input #1	Analog input #1	
Output #2	ON	OFF	Input #2	1.3840	
Output #3	ON (OFF	Input #3	Ō	
Output #4	ON (OFF	Input #4	\circ	

<u>Digital IO</u>

TTL outputs

The four TTL outputs can be modified with a radio button (ON/OFF) and are updated each time the polling interval expires.

TTL inputs

The four TTL inputs are updated each time the polling interval expires.

Analog Inputs

Analog input #1

The analog input is updated each time the polling interval expires.

4.5 Parameters

The *Parameters* tab allows the user to view or modify stage parameters for the selected controller. A warning message is displayed as below.

Warning		X
You are entering a page wh parameters that will impact Once the values are change parameters and the current Click Yes to continue, No to	ere you can change critica performance. d, a controller reset is nec working values will be los o cancel.	al motor and stage essary to save these .t.
	Yes	s No

Parameters page for a CC stage

S COM4						x		
1: PR50CC_PN:07/4579_	UD:					•		
Configuration Main Jo	og GPIO	Parameters	Address Dia	gnostics	About			
Acceleration (AC)	80.000	н	ome Mode (HT) 2.00000		1		
Velocity (VA)	20.0000	Hom	ne Velocity (OH) 10.0000				
Jerk time (JR)	0.04000	Horr	ne Timeout (OT	3600.00				
Software Limit - (SL)	-100000	Co	ntrol Loop (SC)	Opened	Opened	-		
Software Limit + (SR)	1000000		Kp Factor (KP)	109.489				
Backlash (BA)	0.00000	_	Kd Factor (KD)	0.07299				
Hysteresis (BH)	0.00000		Ki Factor (KI)	729.926				
Encoder Increment (SU)	0.01003	Follo	wing Error (FE)	1.00000				
Check stage name (ZX3)	\checkmark	Velocity Fee	d Forward (KV)	0.72992				
Motor Driver Voltage (DV) 12.0000								
Motor Peak Current Limit (QIL) 0.30000								
Motor RMS Current Limit (QIR) 0.15000								
RMS Current Averaging Time (QIT) 3.00000								
Download parameters from SmartStage SMC100CC Set parameters								
: Action is completed. : Action is completed. : Configuration parameters reading please wait Smart stage parameters are downloaded. : Action is completed. : Configuration parameters reading please wait								
Initialized								
					_			

Parameters	page	for	a	PP	stage

		Deservator		D	
Configuration Main Jog	GPIO	Parameters	Address	Diagnostics	About
Acceleration (AC	1.60000				
Velocity (VA	0.16000	<u> </u>			
Jerk time (JR	0.04000				
Software Limit - (SL	0.00000				
Software Limit + (SR	12.0000				
Backlash (BA	0.00000				
Hysteresis (BH					
Distance per full step (FRS					
Micro step factor (FRM	10.0000				
Base velocity (VB	0.00000				
Motor Peak Curr. Limit (QIL	0.30000				
Home Mode (HT	4.00000				
Home Velocity (OH	0.16000				
Home Timeout (OT	165.000		Check stag	ge name (ZX3)	V
Download parameters fro	m SmartSta	age SMC	:100PP	Set paramet	ters
Smart stage parameters are downloaded. : Action is completed. : Configuration parameters reading please wait SMART stage parameters downloading please wait. : Action is completed. : Configuration parameters reading please wait					

"Download parameters from SmartStage" button

The "Download parameters from SmartStage" button downloads parameters from the SmartStage and saves them in its flash memory (configuration parameters). After the parameters have been downloaded the configuration parameters are read and updated.



"Set parameters" button

The "Set parameters" button modifies the configuration parameters.



4.6 Address

The Address tab allows two things:

- 1) To scan and select connected SMC100 controllers.
- 2) To configure an RS485 address

Configuration Main Jog GPIO Parameters Address Diagnostics About Controller pool setting Selected controllers					
Controller pool setting Selected controllers					
Selected controllers					
T: PR50CC_PN:0//45/9_0D:					
Detected controllers					
1: PR50CC_PN:07/4579_UD: Add Discover					
Controller address setting					
 using the COM port. Ensure DIP switches on the Controller are in 'FIRST' position. 2. Select the desired Controller address from the listbox below. 3. Press 'Set' button to assign this address to the connected Controller. 4. Download the Stage parameters if required. 5. Disconnect this Controller and power off. 6. To assign a different address to another Controller, follow the above steps. For details, see "Communication Settings" section of the Product Manual. Please refer to the SMC100 User's manual for daisy chaining or any parameter's modification. Note: After an address configuration, it's recommended to perform a "Discover". 					
Controller address					
Smart stage parameters are downloaded. C : Action is completed. L : Configuration parameters reading please wait E SMART stage parameters downloading please wait. A : Action is completed. R : Configuration parameters reading please wait R					
Initialized					

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Controller pool setting 4.6.1

<u>"Discover" button</u> The Discover button scans to find connected SMC100 controllers (address #1 to address #31).

Controller pool setting	
Selected controllers	
1: PR50CC_PN:07/4579_UD:	▼ Delete
Detected controllers	
1. PR50CC_PN-07/4579_LID:	 Add Discover

After a *Discover* action, the list of detected controllers is filled.

COM4	
Configuration Main Jog GPIO Parameters Address Controller pool setting Selected controllers 1: PB50CC_PN:07/4579_LID:	ess Diagnostics About
Detected controllers 1: PR50CC_PN:07/4579_UD: 1: PR50CC_PN:07/4579_UD: 2: Not assigned	Add Discover
3: Not assigned 4: Not assigned 5: Not assigned 6: Not assigned 7: Not assigned 8: Not assigned 9: Not assigned 10: Not assigned	ize, to your computer are in 'FIRST' position. Controller.
11: Not assigned 12: Not assigned 13: Not assigned 14: Not assigned 15: Not assigned 16: Not assigned 17: Not assigned 18: Not assigned	te above steps. luct Manual. or any parameter's form a "Discover". ▼ Set
19: Not assigned Adc 20: Not assigned : Ac 21: Not assigned : Ac 22: Not assigned : Cc 23: Not assigned Sm: 24: Not assigned : Ac 25: Not assigned : Ac 25: Not assigned	C L E A R
27: Not assigned 28: Not assigned 29: Not assigned	

"Add" button The *Add* button allows the user to add a connected SMC100 controller to the list of "Selected controllers".

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

Configuration	Main	log GPI	O Paramet	ters	Address	Diagnos	tics About
Controller po	ool setting -						
Selected of	controllers						
1: PR50CC	_PN:07/4	579_UD:			-	Delete	
1: PR50CC	_PN:07/4	579_UD:					
2: 2: Not assi 2: Not assi	ssigned aned					Add	Discover
] []
Controller -	denna actti						
3. Press 'S 4. Downlog	et' button t	o assign this	address to th			ontrollor	
5. Disconr 6. To assig For details Please refe modificatio Note: After	ad the Stag nect this Co gn a differen , see "Com er to the SM n. r an addres	je parameter ntroller and p nt address to munication S MC100 User s configurati	sources to ut rs if required. power off. another Con Settings'' sect s manual for o on, it's recom	ntroller, ion of daisy o	follow th the Produ thaining o	e above s uct Manua or any para orm a "Di	steps. al. ameter's iscover''.
5. Disconr 6. To assig For details Please ref, modificatio Note: After	ad the Stag nect this Co gn a differen , see "Com er to the SN n. r an addres	je parameter ntroller and p nt address to munication S MC100 User's s configurati	si frequired. power off. another Con Settings'' sect s manual for o con, it's recom Contro	ne con ntroller, ion of daisy c mende oller ad	follow th the Produ haining o ed to perf ldress	e above s uct Manua r any para orm a "Di	steps. al. ameter's iscover''. ✓ Set

<u>"Delete</u>" button The *Delete* button deletes an SMC100 controller from the list of selected controllers.

4.6.2 Controller address setting

This part allows the user to configure the RS485 address of the FIRST controller.

"Set" button

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

It is recommended to note the address of the controller somewhere. For example, use the stickers supplied with the SMC100CC/PP.

So COM4		_
Configuration Main Jog GPIO Parame	eters Address Diagnostics About	
Controller pool setting		
Selected controllers		
1: PR50CC_PN:07/4579_UD:	▼ Delete	
Detected controllers		
1: PR50CC_PN:07/4579_UD:	✓ Add Discover	
Controller address setting		
 Steps: 1. Connect only the SMC100 Controller that you using the COM port. Ensure DIP switches of 2. Select the desired Controller address from the 3. Press 'Set' button to assign this address to 14. Download the Stage parameters if required 5. Disconnect this Controller and power off. 6. To assign a different address to another Confordetails, see "Communication Settings" see Please refer to the SMC100 User's manual for modification. Note: After an address configuration, it's recommunication is the set of the	rou want to initialize, to your computer on the Controller are in 'FIRST' position. the listbox below. the connected Controller. d. ontroller, follow the above steps. ection of the Product Manual. r daisy chaining or any parameter's ommended to perform a "Discover".	
Cont	troller address Set	
Address discovering is completed. Smart stage parameters are downloaded. : Action is completed. : Configuration parameters reading please wait SMART stage parameters downloading please w : Action is completed. Initialized	wait. 8 9 10 12	

Now disconnect this controller from your PC and connect the next one instead. Select a new, not yet allocated address and press the "Set" button again (proceed the same with all other controllers).

4.7 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 Command Interface User Manual.

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

SO COM4	
Configuration Main Jog GPIO Parameters Address Command :	Diagnostics About Send Command file C L E A R
Note	
Address discovering is completed. Smart stage parameters are downloaded. : Action is completed. : Configuration parameters reading please wait SMART stage parameters downloading please wait. : Action is completed. Initialized	C L E A R

4.8 About

The About tab displays the information about the Controller GUI and the connected instruments. 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 for the selected axis and the list of the selected axes.

onfiguration Main Jog	GPIO	Parameters	Address	Diagnostic	cs Abou	ít 📃
Sample applet for develop	ing in	strument sp	ecific ap	plets		
Property	Val	Je				-
Assembly	SM	C100				
Assembly Version	0.0	.1.0				
File version	0.0	.1.0				
Copyright	Copyright © Newport Corporation 2012					
Selected controller version		SMC_CC - Controller-driver version 3.04				E
Instrument Key	CO	M4				
Supported Models		SMC100CC, SMC100PP				
Axis #1		PR50CC_PN:07/4579_UD				
Axis #2	2					_
Diagnostics.Logging.Applet		1.0.0.0				
Newport.SMC100.Applet	0.0	0.0.1.0				
Newport.SMC100.CommandInte	1.0	.0.0				-
Idress discovering is completed. Idress discovering is completed. Action is completed. Configuration parameters reading MART stage parameters downloa	oaded. plea ading	se wait please wait.				

Name: _____

Company:_____

Service Form

Your Local Representative

Tel.:	 	
Fax:	 	

Address:	Date:
Country:	Phone Number:
P.O. Number:	Fax Number:
Item(s) Being Returned:	
Model#:	Serial #:
Description:	
Reasons of return of goods (please list any specific problems):	

Return authorization #: ______(Please obtain prior to return of item)



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