SMC100CC & SMC100PP

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





Nevvport®

Controller GUI Manual

Version 1.0.x

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Preface

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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 GUI.

1.2 Overview

The SMC100 Controller GUI is a graphical user interface (GUI) which 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.





1.3 **Controller State Diagram**

* 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.

EDH0310En1022-11/13

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 Getting Started

2.1 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.

SMC100	×
Instruments Discovered : 1	Discover
COM4	
	Launch Applet
	×
SMC100	X
SMC100	Discover
SMC100 Instruments Discovered : 1 COM4	Discover
SMC100 Instruments Discovered : 1 COM4	Discover
SMC100 Instruments Discovered : 1 COM4	Discover
SMC100 Instruments Discovered : 1 COM4	Discover
SMC100 Instruments Discovered : 1 COM4	Discover

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 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.

Diagnostics	0 4
Delay	1000
Models	0
InstrumentType	SMC100CC, SMC100PP
NoOfInstruments	1
CommunicationChannel	RS232
SelectedAddress	0
ControllerAddress	1
MemorizedPositions	0
BufferDepth	5
RollingBuffer1	
RollingBuffer2	
RollingBuffer3	
RollingBuffer4	
RollingBuffer5	
Pollipa Puffor¢	
C:\Program Files (x86)\Newpor	t\MotionControl\SMC100\Config\Newport.SMC1() Save

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	0 n	
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	

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.

COM4			1.1			X
1: PR50CC_PN:07/4579	UD:					-
Configuration Main J	log GPIO	Parameters	Address	Diagnostics	About	
Initialization and Config	uration					
Disable				Save Pos		
Current Position	_					
-1000000		I I	1000000.	0.000000		
Incremental Motion / P	R-Move Relative	e				
#1 🖪			#2 ◀			
Cyclic Motion		-	Tarnet Moti	on / PA-Move	Absolute	
Cycle C	urrent cycle		#1	#2		
Dwell 0 msec	c 🗌	U	Go	to	Go to	
Motion Configuration V	alues					
Velocity :	Minimum en	nd of run :	Maximum	end of run :	Cat	
20.0000	-1000000		100000		Set	
Rename Position #	<i>‡</i> 1			•	Go to	o
Smart stage parameters ar : Action is completed. : Configuration parameters SMART stage parameters : Action is completed. : Configuration parameters	e downloaded. reading plea: downloading reading plea:	se wait please wait. se wait				C L E A R
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.

"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.

3.3 Jog

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

Configuration	Main	Jog	GPIO	Parameter	Address	Diagnostics	About
Initialization	and Conf Disable	iguration				Save Po	s.
- Current Posi	tion	1	0	1 1	1000000.	0.020070	
Jog Jog vek 20.00 New v	ocity nt velocity 00 velocity	S	et		4		Þ
Rename	Position	#1				•	Go to
mart stage pa Action is comp Configuration MART stage	rameters bleted. paramete paramete	are down rs readin rs downl	nloaded. 1g plea oading	se wait . please wait			

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3.4 GPIO

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

COM4 1: PR50CC_PI	N:07/45	79_UC):			-		X
Configuration	Main	Jog	G	PIO	Parameters	Address	Diagnostics	About
TTL Output Output #1 Output #2 Output #3 Output #4	ts © ©	ON ON ON	 0 0 0 0 0 0 	FF FF FF	TTL Input # Input # Input #		Analog In Analog ii 1.3840	nput #1
Smart stage pai : Action is comp : Configuration SMART stage p : Action is comp : Configuration Initialized	ameters oleted. paramete oleted. paramete	are do ers rea ers dov ers rea	ownloa ding vnload ding	ded. . pleas ing j	e wait please wait. e wait			C L E A R

Digital IO

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.

3.5 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 where you parameters that will impact perfor Once the values are changed, a co parameters and the current workin Click Yes to continue, No to cance	u can change critical motor and stage mance. ntroller reset is necessary to save these ng values will be lost. el.
	Yes No

Parameters page for a CC stage

∞ COM4										x
1: PR50CC_PI	N:07/4579	_UD:				_				•
Configuration	Main J	log	GPIO	Par	ameters	Address	Diag	nostics	About	
Acceler	ration (AC)	80.000	0		н	lome Mode	(HT)	2.00000		۱ ۱
Ve	locity (VA)	20.000	0		Hor	ne Velocity	(OH)	10.0000	1	1
Jerl	k time (JR)	0.0400	0		Hor	ne Timeout	(OT)	3600.00		
Software	Limit - (SL)	-10000	0		Co	ontrol Loop	(SC)	Opened	Opened	-
Software L	imit + (SR)	100000	х			Ko Factor	(KP)	109.489		1
Bac	klash (BA)	0.0000	0			Kd Factor	(KD)	0.07299		1
Hyste	eresis (BH)	0.0000	0	_		Ki Facto	r (KI)	729.926		1
Encoder Incre	ment (SU)	0.0100	3		Foll	owing Error	(FE)	1.00000		1
Check stage r	name (ZX3)	1		Ve	locity Fee	ed Forward	(KV)	0.72992		1
				Ν	Aotor Driv	ver Voltage	(DV)	12.0000		1
				Motor	Peak Cu	urrent Limit	(QIL)	0.30000		i I
			N	Notor	RMS Cu	rrent Limit (QIR)	0.15000		i I
			RMS	Curre	ent Avera	ging Time	QIT)	3.00000		1 I
Download p	arameters	from Sm	artStage	e	SMC1	IDCC	Se	t paramet	ers	-
: Action is comp : Action is comp : Configuration Smart stage pal : Action is comp : Configuration	oleted. oleted. parameters rameters ar oleted. parameters	reading e downlo reading	plea: baded. plea:	se wa	ait ait				* III *	C L E A R
Initialized										
	_	-	_						_	_

Parameters page for a PP stage

: TRAT2PPD_PN:B1022314	/55450_L	JD:102/09			•
Configuration Main Jog	GPIO	Parameters	Address	Diagnostics About	
Acceleration (AC)	1 60000				
Velocity (VA)	0.16000				
lede time (IP)	0.10000				
Software Limit (SL)	0.04000				
Software Limit - (SL)	12,0000				
Software Limit + (SR)	0.00000				
backiash (BA)	0.00000				
Hysteresis (BH)					
Distance per full step (FRS)	10.0000				
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) 🔽	
Download parameters from	n SmartSta	age SM	C100PP	Set parameters	
nart stage parameters are do	wnloaded.				
ction is completed.					L
Jorniguration parameters read MART stage parameters dow	nloading .	ase wait please wait.			E
ction is completed.					R
onfiguration parameters read	ling plea	ase 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.



3.6 Address

The Address tab allows two things:

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

COM4						
Configuration Main Jog GPIO Parameters Address Diagno	ostics About					
Controller pool setting						
Selected controllers						
1: PR50CC_PN:07/4579_UD:	e					
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 PINS I position. Select the desired Controller address from the listbox below. Press 'Set' button to assign this address to the connected Controller. Download the Stage parameters if required. Disconnect this Controller and power off. 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	▼ Set					
Smart stage parameters are downloaded. C : Action is completed. C : Configuration parameters reading please wait E SMART stage parameters downloading please wait. A : Action is completed. C : Configuration parameters reading please wait. A R Itiniziand						

3.6.1 Controller pool setting

"Discover" button

The Discover button scans to find connected SMC100 controllers (address #1 to address #31).

Selected controllers 1: PR50CC_PN:07/4579_UD:	
1: PR50CC_PN:07/4579_UD:	▼ Delete
	Delete
Detected controllers	
1: PR50CC_PN:07/4579_UD:	 Add Discover

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

S COM4	
Configuration Main Jog GPIO Parameters Addr	ress Diagnostics About
Selected controllers	
1: PR50CC_PN:07/4579_UD:	▼ Delete
1: PR50CC_PN:07/4579_UD:	Add Discover
1: PR50CC PN:07/4579 UD:	
2: Not assigned 3: Not assigned 5: Not assigned 6: Not assigned 7: Not assigned 9: Not assigned 10: Not assigned 11: Not assigned 12: Not assigned 13: Not assigned 14: Not assigned 15: Not assigned 16: Not assigned 17: Not assigned 18: Not assigned 19: Not assigned 19: Not assigned 19: Not assigned 19: Not assigned 19: Not assigned 2: Not as	ize, to your computer are in 'FIRST' position. Controller. he above steps. luct Manual. or any parameter's form a "Discover". Set C L E A R

"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.

↔ COM4						
Configuration Main Jog GPIO Parameters Address Diagnostics About						
Controller pool setting						
Selected controllers						
1: PR50CC_PN:07/4579_UD:						
1: PR50CC_PN:07/4579_UD:						
2: 2: Not assigned 2: Not assigned Add Discover						
Controller address setting						
 Using the COM port. Ensure DIP switches on the Controller are in 'FIRST' position. Select the desired Controller address from the listbox below. Press 'Set' button to assign this address to the connected Controller. Download the Stage parameters if required. Disconnect this Controller and power off. 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". 						
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						

"Delete" button

The Delete button deletes an SMC100 controller from the list of selected controllers.

3.6.2 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.

SP COM4		All			_		x
C	Main	CDIO D		Address	Diamati		
Configuration	Main Jog	GPIO Pa	rameters	Address	Diagnostic	cs Adout	
Controller po	ol setting						
Selected c	ontrollers						
1: PR50CC_PN:07/4579_UD: Delete							
Detected c	ontrollers						
1: PR50CC	_PN:07/4579_UD):		•	Add	Discover	
Controller ad	dress setting						
2. Select th 3. Press 'Se 4. Downloa 5. Disconne 6. To assig For details, Please refe modification Note: After	COM port. Ensure e desired Controll et' button to assign d the Stage parar ect this Controller n a different addres see "Communical r to the SMC100 n. an address config	e DIP switch re DIP switch n this address fr n this address meters if requ and power o ess to anothe tion Settings User's manua guration, it's r	nes on the om the list s to the co uired. ff. er Controlle " section o al for daisy recomment	rr, follow th chaining of the Prodiction of chaining of ded to perf	icontroller.	computer T position. eps. neter's cover".	
		(Controller a	address 2	2	Set	
Address discove Smart stage par : Action is comp : Configuration p SMART stage p : Action is comp Initialized	ering is completed ameters are down leted. parameters reading arameters downlo leted.	Iloaded. g please w ading plea	vait ase wait.	3 4 5 6 7 8 9 9	0		C L E A R

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).

3.7 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.

© COM4	
Configuration Main Jog GPIO Parameters Address Command :	Diagnostics About Send Command file
Response History : >>1VE <<1VE SMC_CC - Controller-driver version 3.04	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

3.8 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	Diagnostics	s Abou	ıt	
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					
Instrument Key		COM4					
Supported Models		SMC100CC, SMC100PP					
Axis #1		PR50CC_PN:07/4579_UD					
Axis #2	2						
Diagnostics.Logging.Applet	1.0	.0.0					
Newport.SMC100.Applet		0.0.1.0					
Newport.SMC100.CommandInte	1.0	.0.0					Ŧ
ddress discovering is completed. mart stage parameters are downloaded. Action is completed. Configuration parameters reading please wait MART stage parameters downloading please wait. Action is completed				CLEAF			

Name: _____

Company:_____

Service Form

Your Local Representative

Tel.:	 	
Fax:_	 	

Address:	Date:					
Country:	Phone Number: Fax Number:					
P.O. 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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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