

S200-DLS Start-Up Guide

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S200-DLS Start-Up Guide

- This Guide will show start-up of a single axis system using a stand alone DSA control with a S200-DLS drive.
- The scope of this guide will be to begin with a new drive and control, and finish by closing the servo loop and jogging the axis.

Motors

- Motors with SFD high resolution feedback must be used. (2,097,152 counts per Rev.)
- Most AKM motors are available with this feedback option.

Connections

The drive is interfaced using the following connectors.



S200-DLS Servo Drive

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Motor Connections

- Connect the motor power lead to the J2 connector on the drive.
- Connect the SFD to the J3 connector on the drive.

Power Connections

 Connect 24 VDC to the DSA control. Be sure to connect the common terminal back to the single point ground.



• Supply 120/240 VAC to the S200 J1 connector.



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Drive I/O Connections

- Drive I/O can be connected to two locations. J4 Command I/O and J7 Drive I/O.
- J4 (Command I/O) has 4 inputs. Input 1 on J4 is the drive enable and <u>must</u> be hard wired appropriately. There are 2 outputs on this connector. They can not be used through PiCPro.

This diagram shows the connections for sourcing inputs, and sourcing outputs. Sourcing inputs are usually referred to as PNP type, and sourcing outputs switch the positive side of the load.



J4 Connector Pin Numbers

This diagram shows the connections for sinking inputs, and sinking outputs. Sinking inputs are usually referred to as NPN type, and sinking outputs switch the negative side of the load.

J4 Connector Pin Numbers



Both J4-24 and J4-25 need to be wired. For single ended operation connect the unused input to the signal ground

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J7 (Drive I/O) has 4 inputs and 4 outputs.

Drive Input 5. The first input on the J7 connector can be configured to be a fast input.

Power for both connectors is 24 VDC and must be connected to J6 (I/O Power)

These I/O points are available in the DSA controls program through the use of the SD_IO function block.



DSA I/O Connections

- The DSA controls (D2 D16) have 8 DC inputs and 7 DC outputs available.
- They are declared as IGEN2.1 IGEN2.8 and OGEN2.1 – OGEN 2.7
 Table 6-22: General I/O Port Pin Descriptions

Functio	n	Notes	Pin		
DC Outputs 1-7 DC Inputs 1-8 Shield Ground		Nominal 24 Vd up to 250 ma.	1-7		
		Nominal 24 Vd	8-15		
		Provides a path chassis to an e	Shell		
Pin	Table 6-2	23: General I/	O Port Pin Assignments		
	orginal		o o nine con r niver		
1	DCOUT1	Out	_		
2	DCOUT2	Out	_		
3	DCOUT3	Out	_		
4	DCOUT4	Out			
5	DCOUT5	Out	15-pin HD female D-sut	o (face view)	
6	DCOUT6	Out			
7	DCOUT7	Out	15 25		
8	DCIN1	In	000		
9	DCIN2	In	000		
10	DCIN3	In	11 000		
11	DCIN4	in			
12	DCIN5	In			
13	DCIN6	In			
14	DCIN7	In	-		
15	DCIN8	in			
Shull	Drain	In	-		

Connecting the GEN I/O





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Digital Link Connection

- Connect a Cat 5 cable from the control Dlink connector to the S200 J10 (Dlink In)
- Connect the S200 J9 (Dlink Out) to each subsequent Drive.
- A "straight-through" shielded cable must be used when connecting the Control to the Drive. And from Drive to Drive.
- They are available up to 30M.

Address Switches

• The Drive address switches must be set.

The top switch is the most significant digit The bottom switch is the least significant.



For address 1-9 the top switch will be set to zero. Etc.

These addresses are typically set consecutively starting with 1. This is not a requirement. As long as each has a unique setting between 1-64 it will work fine.

Anytime the address is changed the Drive <u>must</u> be power cycled.

Example Ladder for the control

- For this exercise we will use the MMCD2Ex.ldo
- It is found in the following folder.
- C:\G&L Motion Control Data\Applications V17.0.1\Examples\Digital MMC Smart Drive Standard Examples\Mmc d2
- This folder must be added to the PiCPro Libraries List.



Selecting the Mmc d2 folder

PiCPro Professional Edition	A PiCPro Professional Edition
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Browse for Folder	Browse for Folder
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CNG Applications V17.0.1	C:VG BlockIO
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C:\S3L Motion Control Data\Applicat	tions V17.0.1\ASPB
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MMCD2Ex.ldo

- Open MMCD2Ex.ldo using PiCPro. Then do a Save As using a new name. Example: S200D2ex.ldo
- This will now be the working ladder for this example.



Drive Scaling

The SDF is a high resolution feedback device. It has 2,097,152 counts per rev. Although this can be used directly in the control, it may cause overflows in some calculations at high speeds. It is typically beneficial to scale this to a smaller value. For this example we will scale it to 10,000 counts or feedback units per revolution.

Online with the Drive

- To get online, the S200 with motor and feedback must be connected to the DSA control and powered up.
- Start the PiCPro software. Connect the PiCPro cable between the PS2 connector on the front of the DSA control and the serial port on your computer. Be sure communications is established. This is indicated by the green connector in the lower right corner.
- Access the drive by selecting Online
 Drive Operations -Maintenance



With a new drive the system will report back that an uninitialized drive has been found.

화 PiCPro Professional Edition - [Digital Drive List - [Untitled] ONLINE]	
File Edit Online View Window Help	- 6
d 24 xee og 29 97 =5 57: 550 migg = 910 i 0	
Address 🛦 Drive Name Device Connected? Enabled? Branch/Node Faults? Warnings?	
<end list="" of=""></end>	

n uninitialized drive bac	been connected. To in	itialize the drive and ad	ld it to the drive lict, specify a par	no and
notor model for the drive	Select 'Initialize and I	Insert' to add the drive	. Select 'Cancel' to leave the drive	e anu e
.ninitialized.				
Drive Name:				
Motor Model:			•	
Drive Model: S20	360			
Drive Address: 1				
Initialize and Insert	Cancel	Help		

The drive must be assigned a name, and the attached motor model selected.





- Expand the Feedback and Scaling Menu and Scroll down
- Turn on User Defined Position loop Scaling
- Access Position Loop FU/Load Rev and set FU/Load Rev to 10000. This will set up the feedback to give us 10000 feedback units per motor rev.



Close and save the drive window.

Servo Setup

• The servo setup function in the example program is titled MMCD2. We will open it and save it under a new name.



• Right click on the function and select View Servo function.



File Save As



Double click on Axis 1 to access Axis Properties. Then click on Axis Data.



Ladder Unit Scaling

• We now want to set up the system so that a Ladder Unit (LU) is equal to 1/1000th of a Rev. Ladder Units are what you program in. They are the smallest commandable unit. Enter 10000 for Feedback Units and 1000 for Ladder units.



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Expert View	? 01:Ax	is1 Unite
System		1
Tuning		
Advanced Tuning		
NO		
Limits and Indicators		
Feedback and Scaling		
Motor		
Brake Apply Time	0	msec
Brake Release Time	0	msec
Feedback Type	SFD	
Motor Model	AKM21E-x000tCxx	
English Metric Units	Metric	
Rated Voltage	120	V0/65
Ke	14	voRs/1000
Kt	0.113	n-m/Amp
Poles Per Rev	6	Poles
Inductance	5.20	milliHenry
Resistance	3.42	Ohms
Continuous Current	4.40	Amps
Maximum Current	17.50	Amps
Inertia	0.1070	kg-cm*2
Max Speed	0000	RPM
Lines Per Rev	2048	Lines
Thermal Resistance	1.480	deg C/Watt
Thermal Capasitanse	66	Watt sea/d
Hall Offset		
Magnetic Offset		
Index Offset		
Thermal Device	Thermistor	
Maximum Motor Temp.	140	Degrees C
Alignment Mode	Absolute Device	

Select Calc Defaults, then enter the Max motor speed as well as the scaled number of Feedback Units (FU's)



Select Apply & OK

• For this example, we are only using one axis. Select Axis 2 and press delete. It will ask you to confirm this.



Compile Servo Function

 One must now Compile the servo function with these changes. Anytime any data in the servo function is changed it must be compiled followed by a scan stopped full download of the Ladder.



Close the Servo Setup Window

Replace the MMCD2 function with the NEW one.



Use the VIEW menu to select Software Declarations. The MMCD2Ex ladder has 8 GEN outputs declared. The DSA control only has 7 GEN outputs available. The I/O point for the 8th output must be deleted. Select the I/O point and press the delete key.

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<u><u>u</u></u>	51			_				10-20
	Main Ladder - [S200D2ex.ldo]							Ŀ
	Ax11n8 ()	ln_8	Ax2in8	1	1			
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(R)		AckAlarms	BOOL	G			Ack\Alarms on\HMI\	
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1	H CLOSE	MachineStartInput	BOOL	G	IGEN2.1		Machine\Start\Momentary\Input	
7	M CLOSI	EstopInput	BOOL	G	IGEN2.2		E-Stop Input Normally Closed	
		CstopInput	BOOL	G	IGEN2.3		C-Stop\input\Normally\Closed	
ç	EN06 CLSD	HomeSw	BOOL	G	IGEN2.4		Gen I/O \Connector \Input 4\	
9	LoopClsd[1]	GENI5	BOOL	G	IGEN2.5		Gen I/O \Connector \Input 5\	
9	MSTR ATC LoopClsd[2]	GENI6	BOOL	G	IGEN2.6		Gen I/O \Connector \Input 6\	
_	- DELY A2C	GENI7	BOOL	G	IGEN2.7		Gen I/O \Connector \Input 7\	
		GENIB	BOOL	G	IGEN2.8		Gen I/O \Connector \Input 8\	Ł
	A3C -	PWRONRLY	BOOL	G	OGEN2.1		Power On/Relay/I	
	ALC -	GEN02	BOOL	G	OGEN2.2		Gen I/O \Connector \Output 2\	
	, AHC	. GENO3	BOOL	G	OGEN2.3		Gen I/O (Connector (Output 3)	
	A5C -	I GENOS	BOOL	0	OGEN2.4		Gen I/O Connector YOutput 41	
		GENOS	BOOL	6	OGEN2.5	/	Gen IIO (Connector (Output 6)	
	A6C -	GEN07	BOOL	G	OGEN2.7		Gen I/O \Connector \Output 7\	1
	A7C -	GEN08	BOOL	G	OGEN2.8		Gen I/O \Connector \Output 8\	1
		· SHORT1	BOOL	G	ISGEN2.1		Short \Circuit \Indicator \Output 1-8	
	A8C -	FirstScan	BOOL	-			First scanlone-shot\\	
		InitDrv	<fb>DSTRT</fb>					1
	· · · · ·	DrivelnitAxis	USINT	G				1
		DriveInitOk	BOOL	G			Servos linit. without lerror.	1
		DriveInitFail	BOOL	G				1
		DriveInitErr	INT	G			STRTSERV/error/number/	1
	l drops, if servo software indicates an	EStopOk	BOOL				e-stop of lall axes IOK l	1
	ressed, or if the end of travel limits are	CStopOk	BOOL				c-stop of Vall axes VOK V	1
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H Network #9 SDIO_	1_2:			GENIB	BOOL	G	IGEN2.8		Gen I/O Connector Vinput 8	
4	10			PWRONBLY	BOOL	G	OGEN2 1		Power On/Relavit	
1.	13			GEN02	BOOL	G	OGEN2.2		Gen I/O \Congector \Output 2\	
	_SD1_10-		(GEN03	BOOL	G	OGEN2.3		Gen I/D Connector 10utput 31	
	SD	10		GENO4	BOOL	G	OGEN2.4		Gen I/O \Connector \Output 4\	
DrivelnitOk	ENIOS	01/	Ax1_I0_0k	GENO5	BOOL	G	OGEN2.5		Gen I/O \Connector \Output 5\	
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AXIS1	Axis	A In	\rightarrow Ax1AnalogInput	GEN07	BOOL	G	OGEN2.7	/	Gen I/O \Connector \Output 7\	
WrtAx10ut1			RdAx10ut1	GEN08	BOOL	G			Gen I/O \Connector \Output 8\	
I I I	W_01	R_01	()	SHORT1	BOOL	G	ISGEN2.1		Short VCircuit Vindicator VOutput 1-8	
WrtAx10ut2			RdAx10ut2	FirstScan	BOOL				First scanlone-shot\\	
WitAv10ut3	02	R_02	RdAv10ut3	InitDrv	<fb>DSTRT</fb>					
	W 03	R 03		DriveInitAxis	USINT	G				
WrtAx10ut4			RdAx10ut4	DriveInitOk	BOOL	G			Servos Init. Iwithout Ierror.	
	W 04	R 04		DriveInitFail	BOOL	G				

Hardware Declaration

Use the VIEW menu to select Hardware Declarations. The Hardware declaration table must be changed to match the DSA control.



Close and Save Changes

Downloading the Ladder

Select the Compile and Download Menu. Check the Start the Scan and Enable Animation buttons.



Running the Application



The GEN I/O on the DSA Control and the S200 DLS I/O (J4 Command I/O, J6 I/O Power, J7 Drive I/O) <u>must be wired in and available</u> to run the application. The I/O from the S200 DLS is available in the Ladder through the SD_IO function block in Network 9.

Turn on IGEN2.2 (ESTOP) and IGEN2.3 (CSTOP). These are programmed as Normally Closed contacts.

Command (J4) input 1 (drive enable) must be on.

Toggle IGEN2.1 (Machine Start). This will clear any faults and close the servo loop on the axis.

I/O is used to Jog the Axis



You are now ready to jog the axis.

For more information on individual functions, point at the center of them and right click the mouse. Select help. The online documentation for that function will appear on the screen.





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