

ACE-SDX

Advanced Microstep Driver



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Revision History:

- 2.0 – First Revision
- 2.2 – Updated pin information.
- 2.3 – Start at pg 1, updated max pulse support, add pin numbering, added DMX-CFG-USB configuration, updated office address, added cable part number
- 2.4 – Updated connectors and configuration section

Firmware Compatibility:

V101

Software Compatibility:

NA

Table of Contents

1. Introduction.....	4
2. Dimensions	5
3. Connectors	6
8 pin Connector Information.....	6
4 pin Connector Information.....	7
2 pin Connector Information.....	7
4. General Specifications	8
Power Requirement.....	8
Operating Temperature	8
Controller and Motor Connection.....	8
ACE-SDX Interface Circuit.....	9
Pulse/Dir (CW/CCW) Inputs	10
Microstep	12
Current Control	12
Enable Input:.....	12
Over Temperature Alarm.....	13
5. Configuration	14
Method #1 - Using Arcus Controller and Windows PC	16
USB Device Driver Installation	17
Method #2 - Using Arcus Controller Configuration Button Only	21

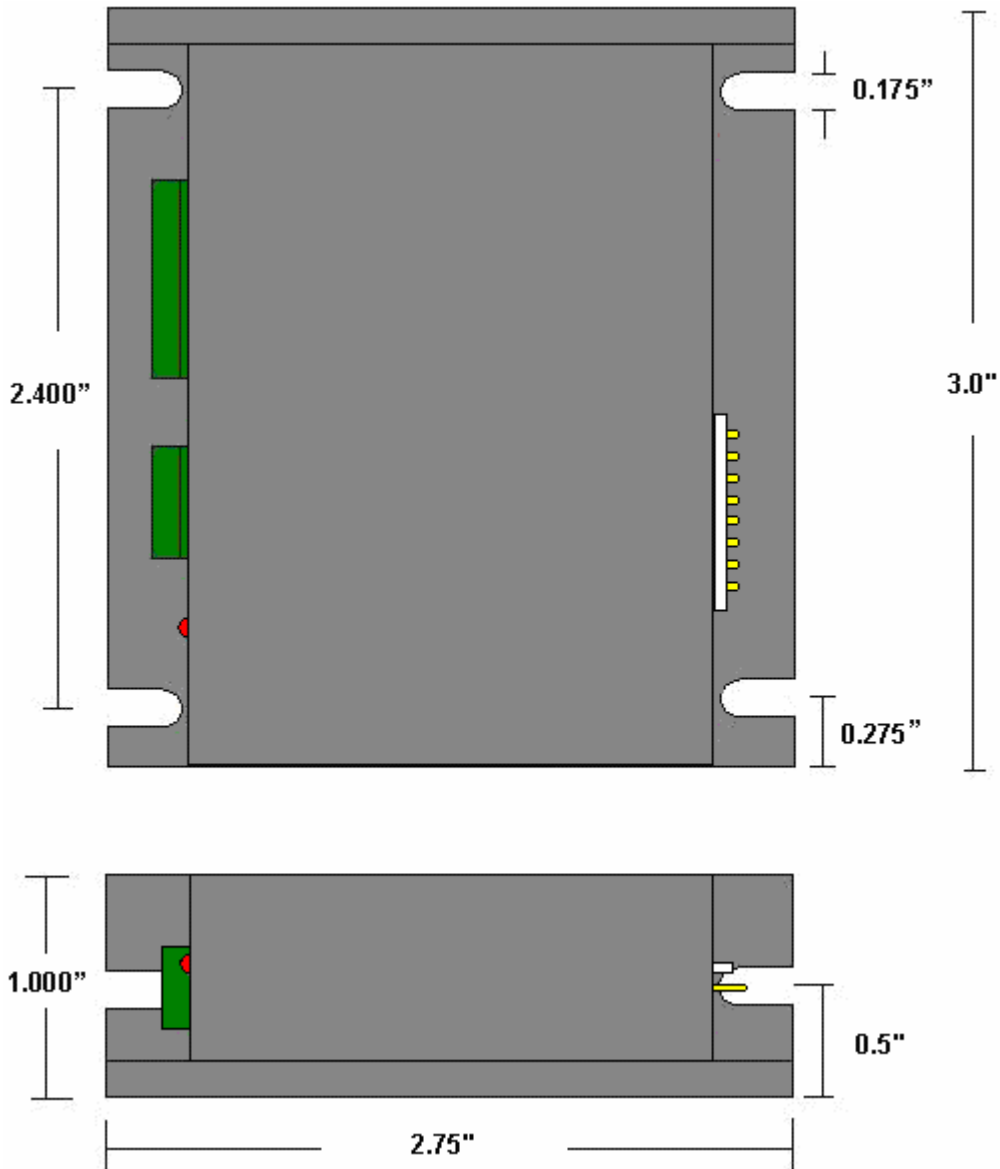
1. Introduction

ACE-SDX is an advanced microstep driver that utilizes Arcus Technology's patent pending Dynamic Microstep Technology.

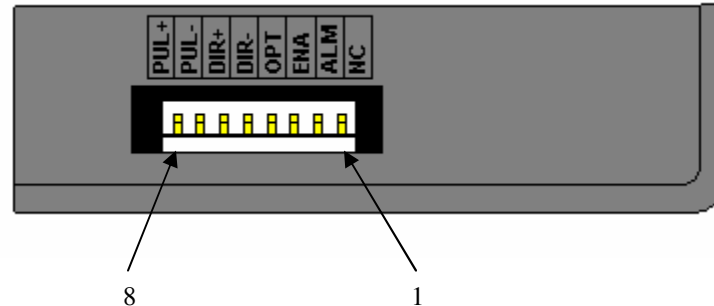
Features highlights:

- Microstep driver for bi-polar stepper motor
- Configurable microstep setting of any value from 2 to 500
- 12 to 48VDC voltage input
- Configurable current from 100mA to 3.0A (Peak current)
- Configurable as one-clock (Pulse/Dir) or two-clock (CW/CCW) operation
- Opto-isolated differential support for Pulse/Dir or CW/CCW
- Opto-isolated Enable input
- Opto-isolated Alarm output for over-temperature
- Maximum pulse rate support of 1M pulses/second
- Driver configuration using patent-pending Dynamic Configuration.

2. Dimensions



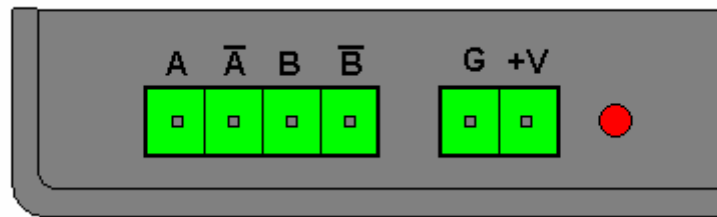
3. Connectors



8 pin Connector Information

Pin #	Name	Description
1	NC	No Connection
2	ALM	Alarm Opto-isolated Output
3	ENA	Enable Opt-isolated Input
4	OPT	Opto-Supply Input (+5V)
5	DIR-	Dir- (CCW-) Opto-isolated Input
6	DIR+	Dir+ (CCW+) Opto-isolated Input
7	PUL-	Pulse- (CW-) Opto-isolated Input
8	PUL+	Pulse+ (CW+) Opto-isolated Input

Mating Connector Description: 8 pin 0.1" (2.54mm) connector
Mating Connector Manufacturer: AMP
Mating Connector Housing Part Number: 770602-8
Mating Connector Pin Part Number: 770666-1



4 pin Connector Information

Pin #	Name	Description
1	A	Phase A of Bi-polar Step Motor
2	/A	Phase /A of Bi-polar Step Motor
3	B	Phase B of Bi-polar Step Motor
4	/B	Phase /B of Bi-polar Step Motor

Mating Connector Description: 4 pin 0.2" (5.08mm) connector

Mating Connector Manufacturer: On-Shore
Mating Connector Manufacturer Part: EDZ950/4

2 pin Connector Information

Pin #	Name	Description
1	G	Ground
2	V+	Power Input +12 to +48VDC

Mating Connector Description: 2 pin 0.2" (5.08mm) connector

Mating Connector Manufacturer: On-Shore
Mating Connector Manufacturer Part: EDZ950/2

Note: Other 5.08mm compatible connector can be used.

4. General Specifications

Power Requirement

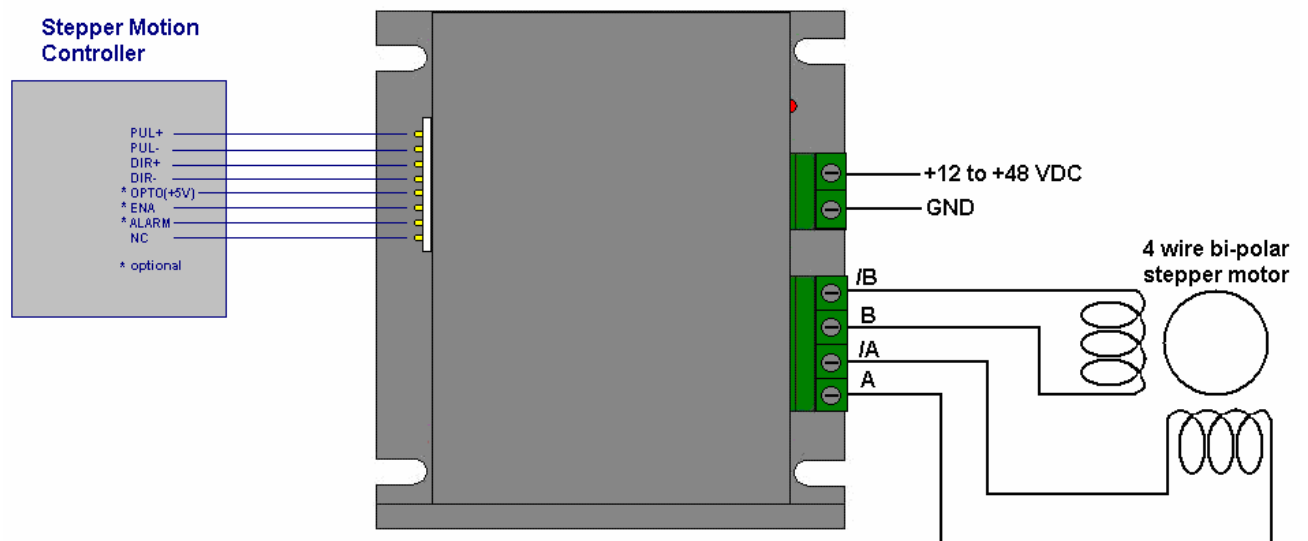
Regulated Voltage: **+12 to +48 VDC**
 Maximum Current for power supply: **3 A**

Operating Temperature

Electronic components used in ACE-SDX have maximum ambient operating temperature rating of **85 degree Celsius**. ACE-SDX has temperature sensor which is used to disable the driver power when the temperature reaches above **75 degrees Celsius**.

Controller and Motor Connection

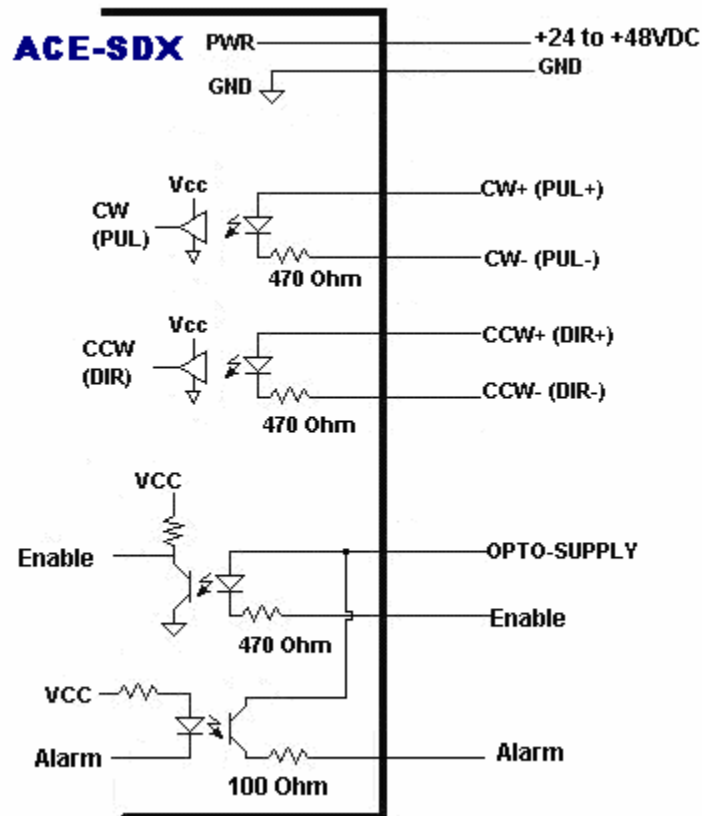
ACE-SDX supports 4 wire bi-polar stepper motors as shown below. Connect the driver to the controller which has either Pulse/Dir or CW/CCW outputs. If Enable input or Alarm output is to be used, make sure to supply Opto with 5VDC. If Opto is to be greater than 5V, add current limiting resistor.



Important Note:

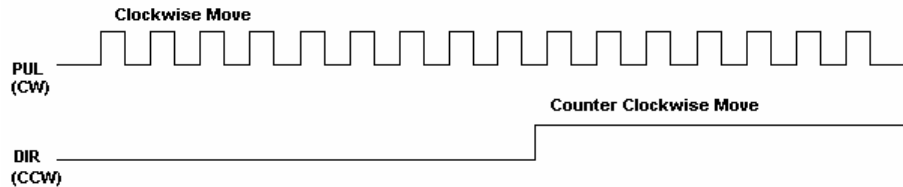
Do not disconnect the motor wires or motor connector while the power is on. Make sure to turn off the power when disconnecting the motor from the driver. If the motor is plugged in or unplugged while the power is on, driver may become damaged.

ACE-SDX Interface Circuit

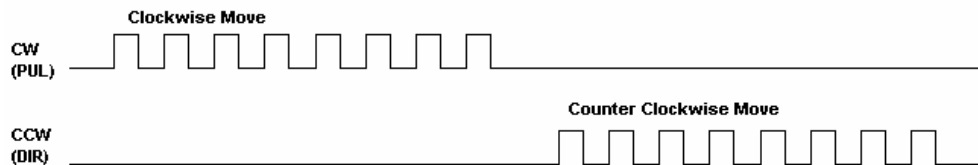


Pulse/Dir (CW/CCW) Inputs

ACE-SDX supports both one-clock (Pulse/Dir) or two-clock (CW/CCW) inputs. One-clock uses Pulse signal as the amount of movement and Dir signal as the direction of the movement.



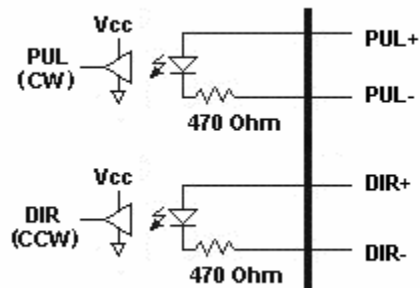
Two-clock uses CW as clockwise movement and CCW as counter clockwise movement.



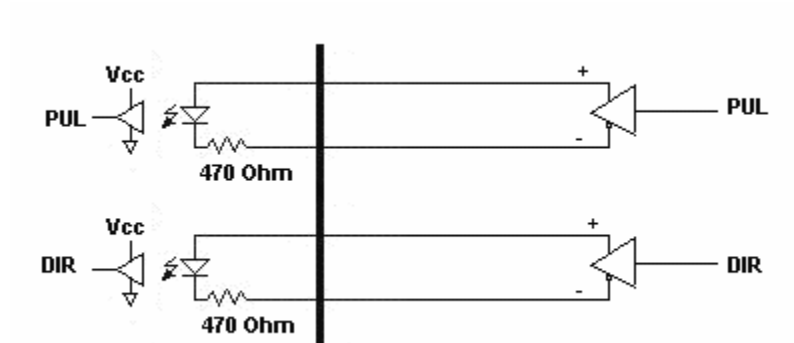
Depending on the direction polarity setting, actual direction of the stepper motor rotation can be configured for the application.

Maximum pulse rate support is 1M pulses/second.

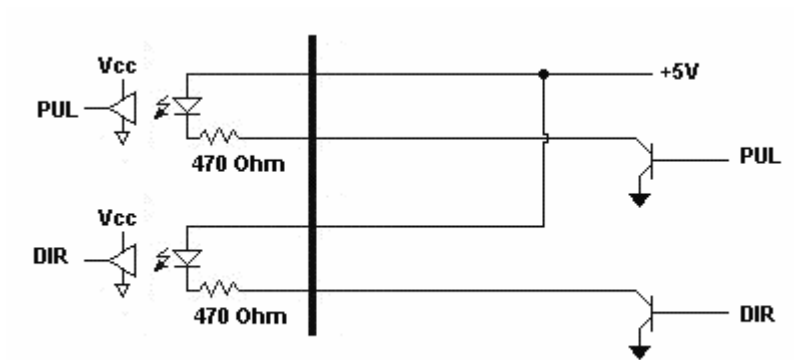
Pulse/Dir (CW/CCW) inputs are opto-isolated differential inputs with 470 Ohm resistor as shown below. Maximum source current for the diode is 50mA. If voltage across is greater than 5V, make sure to add current limiting resistor to limit the current to 50mA across the diode.



Example of Wiring using Differential Output



Example of Wiring using Open Collector Output



Microstep

ACE-SDX has configurable microstep setting range from 2 to 500 microstep. Any microstep value between 2 and 500 can be used.

Current Control

ACE-SDX has configurable current setting from 100mA to 3.0A (peak current). Current is configurable in the amount of 100mA.

Driver current is set to Run Current when the pulse input is detected and remains in run current while the pulse input is detected.

Idle Current is used when the pulse input is idle for the duration set by the Idle Time.

Run Current and the Idle Current should not exceed the maximum rated current for the stepper motor. Refer to the stepper motor specifications for the maximum rated current.

Important Note:

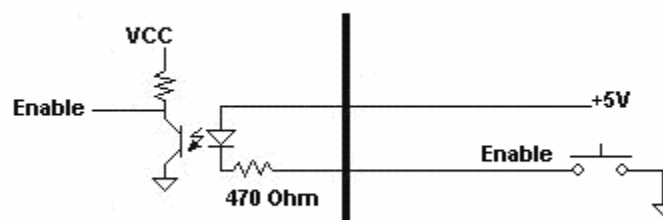
If the current is set above the rated motor current, overheating of the motor and driver will occur. Make sure to set the current below the maximum rated current of the driver.

It is recommended to use the run current at 60-70% of the maximum rated current of the motor.

Enable Input:

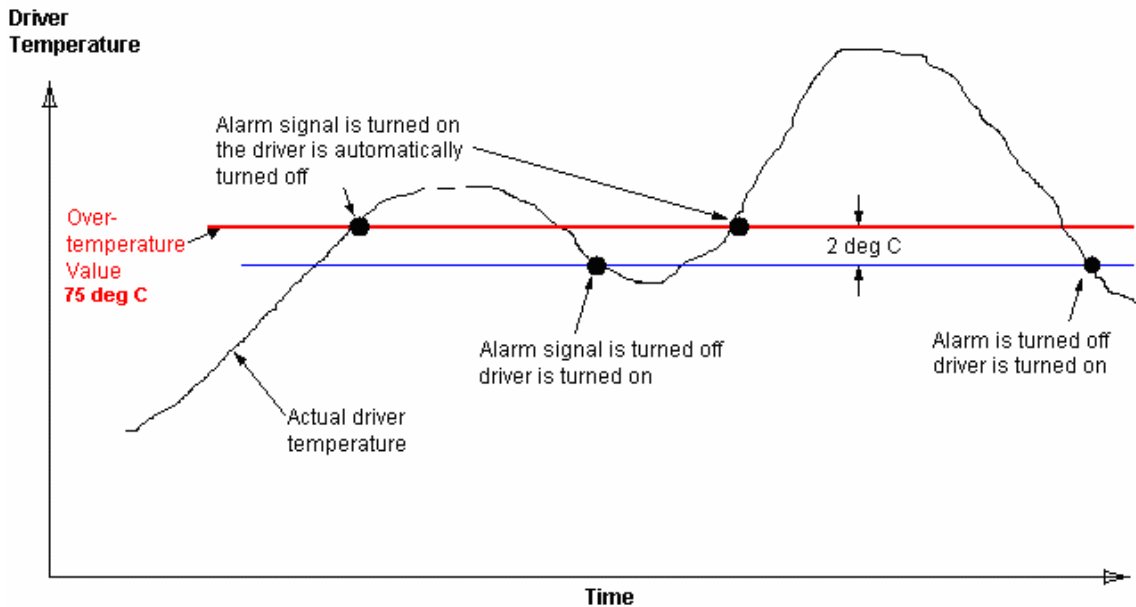
Enable signal is an opto-isolated input. If there is no connection to enable signal, the driver is enabled by default. Only when the enable signal is connected to the ground of the opto-supply input, the driver is disabled and motor is free to rotate manually. Maximum source current for the diode is 50mA. If voltage other than 5V is used for the opto-supply, make sure to add current limiting resistor to limit the current to 50mA.

Example Wiring of Enable Input using +5V Opto-supply



Over Temperature Alarm

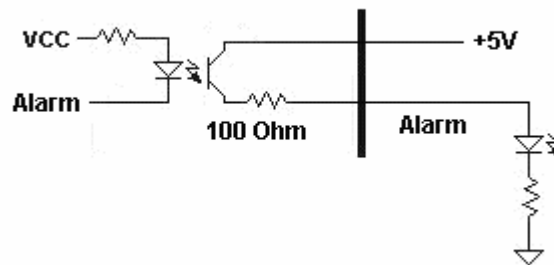
ACE-SDX has a built-in temperature sensor to detect over heating of the driver. Temperature sensing is done only when the driver is enabled. When the temperature goes over the over-temperature alarm value 75 degrees Celsius, the Alarm Output is turned on and the driver is turned off until and remained off until the temperature goes below the 73 degrees Celsius.



Alarm output is an opto-isolated output with 100 Ohm resistor. Maximum sink current is 50mA.

Current driver temperature can be read by uploading the parameters from the driver.

Example Wiring of Alarm Output using +5V Opto-supply



5. Configuration

Following are ACE-SDX parameters that can be configured:

- 1) Microstep Setting: 2 to 500
- 2) Run Current: 100mA to 3.0A (peak current)
- 3) Idle Current: 100mA to 3.0A (peak current)
- 4) Idle Time: 100 msec to 10 sec
- 5) Direction Polarity
- 6) One-clock or Two-clock mode

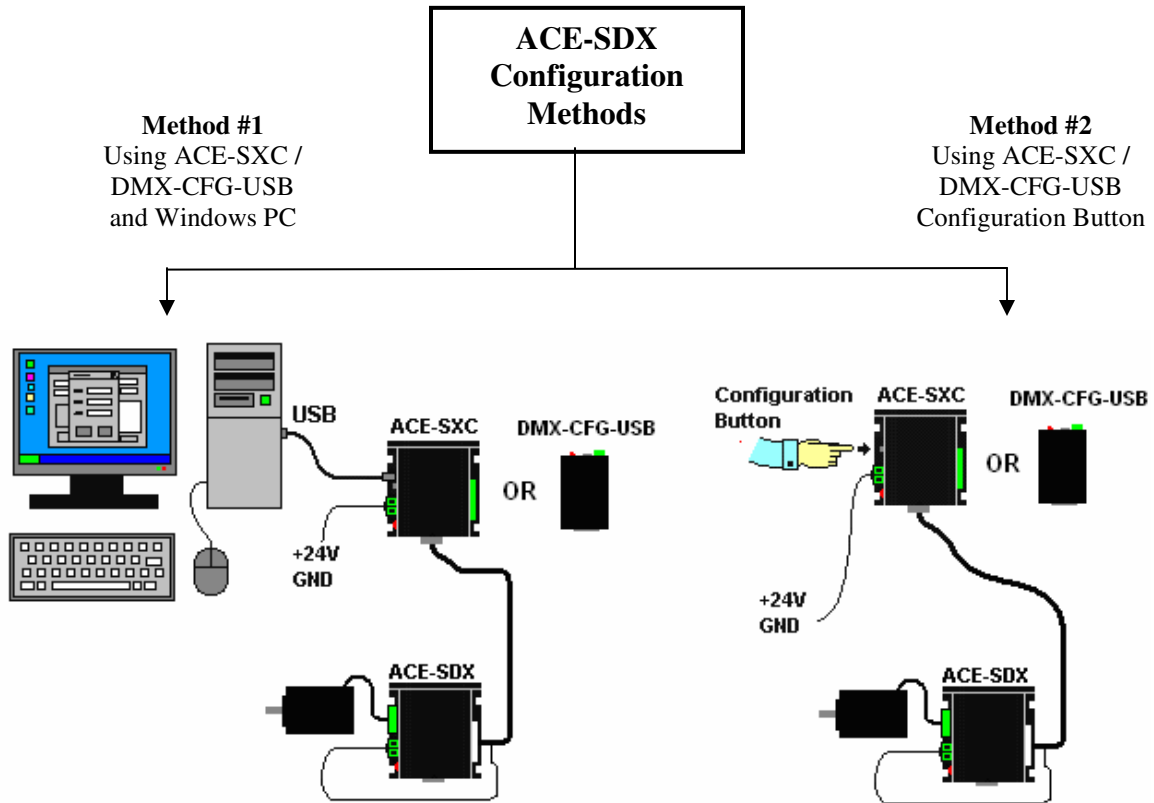
ACE-SDX uses patent-pending Dynamic Configuration Method to read and write the driver parameters using the control signals (Pulse, Dir, Enable, and Alarm) of the driver. Dynamic Configuration eliminates the need for jumpers, switches, resistors, potentiometers or communication port for reading and setting the driver parameters which results in simple and cost-effective device.

ACE-SDX product comes with following default factory settings.

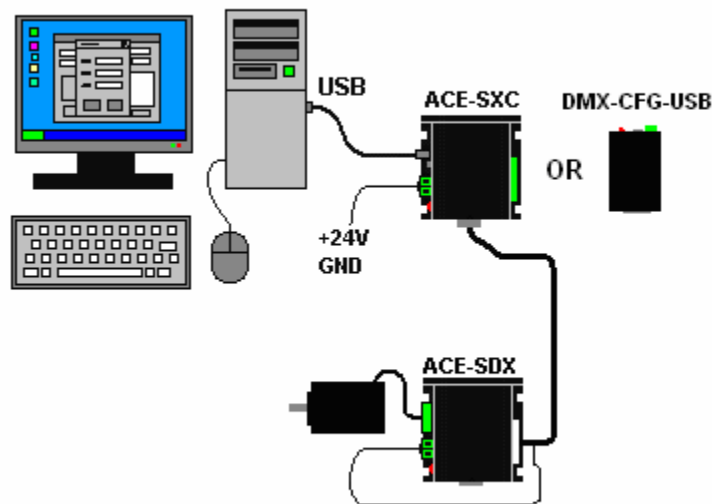
Product	Micro-Step	Run Current (Amp)	Idle Current (Amp)	Idle Time (msec)	Direction Polarity	Clock Mode
ACE-SDX	50	1.0	0.5	500	CW	One

Important Note: When setting the run and idle current, make sure to keep the current value below the maximum rated current of the stepper motor. In general it is recommended to use 60-70% of the rated current of the step motor.

ACE-SDX driver parameters can be easily configured using the ACE-SXC or DMX-CFG-USB controllers.



Method #1 - Using Arcus Controller and Windows PC



ACE-SDX can be configured using an ACE-SXC single axis controller or DMX-CFG-USB and Windows PC. ACE-SXC / DMX-CFG-USB requires a USB port to communicate and proper USB device driver must be installed before using the controller. For detailed information on ACE-SXC/DMX-CFG-USB controller usage, refer to the product manual.

Before using the ACE-SXC / DMX-CFG-USB controller, proper USB driver must be installed first on the Windows PC. If this is first time using the ACE-SXC / DMX-CFG-USB controller, install the USB device driver first. Do not connect the ACE-SXC / DMX-CFG-USB controller until the proper driver is installed first. Follow the steps to install the USB driver:

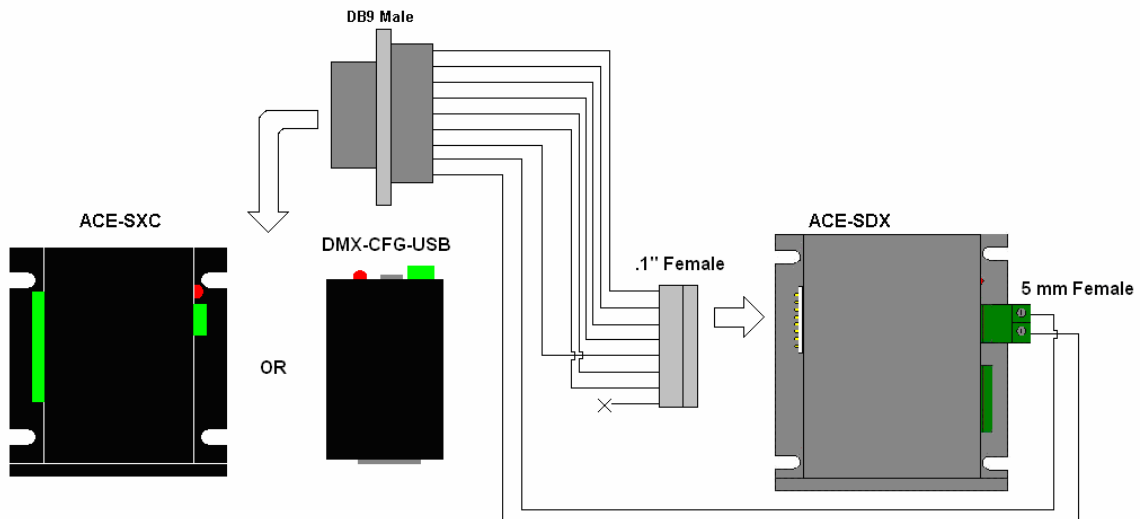
USB Device Driver Installation

- 1) From the Arcus Technology website support section (www.arcus-technology.com/download.php), download the Performax USB driver installation program. Run this USB driver installation program first before connecting the controller to the Windows PC.
- 2) Power the controller. Using a USB cable (mini-B USB cable), connect the controller to the Windows PC. Go through typical USB device installation steps.
- 3) After successful installation, the device should be recognized by the Windows PC and ready for use.

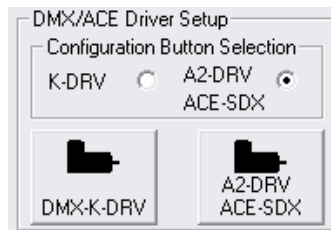
After successful USB device installation of ACE-SXC / DMX-CFG-USB, download and the corresponding Windows program from the Arcus Technology website.

- 1) Connect the ACE-SXC or DMX-CFG-USB device to the ACE-SDX with the proper cable accessory.

Cable Accessory: CBL-DB_9M-I_8F-L1-G24-V1



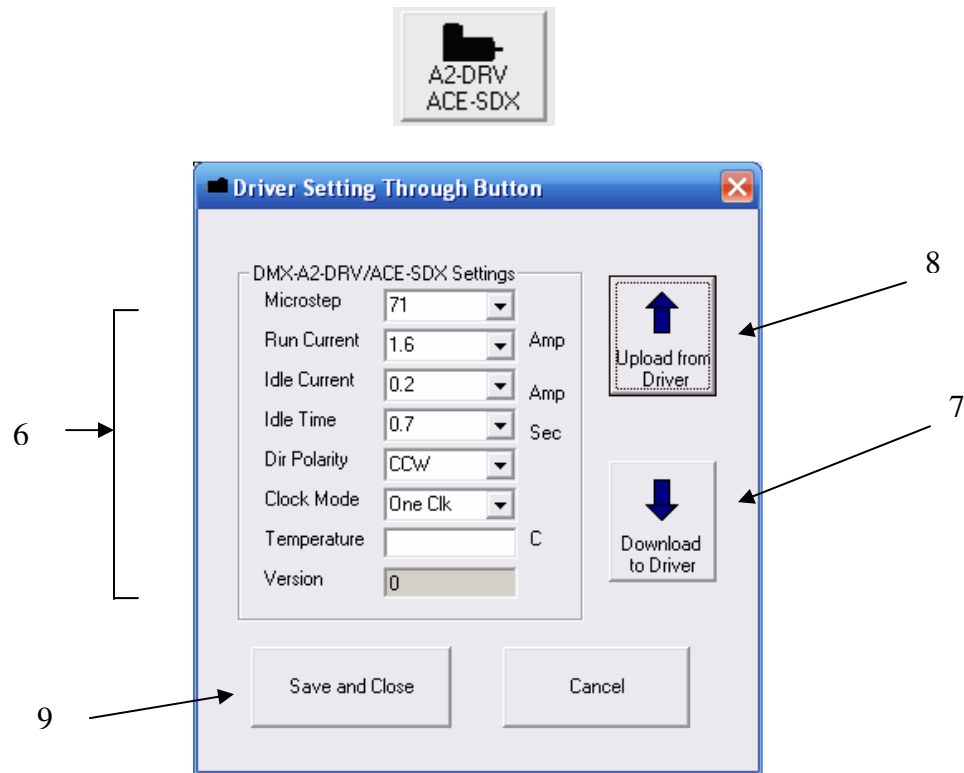
- 2) With ACE-SXC controller powered, connected, properly installed and recognized by Windows PC, the ACE-SXC Windows program will automatically find the controller. If the program is not able to find the controller, it will give an error messages. If there is any error message indicating that the program cannot find the controller, redo the USB device driver installation steps. When program is started, navigate to the following area of the GUI.



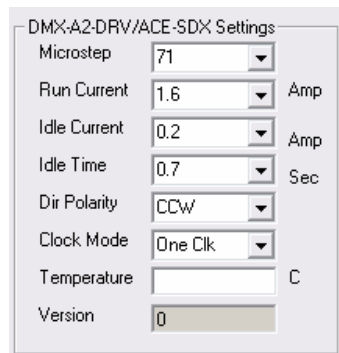
- 3) Select A2-DRV, ACE-SDX option.



- 4) Open A-Driver configuration dialog box by clicking on the A2-DRV, ACE-SDX button.
- 5) When A2-DRV, ACE-SDX configuration button is pressed, the dialog box opens as shown above. When the parameters are uploaded, the Temperature value displayed is the current temperature.



- 6) Set the driver settings.



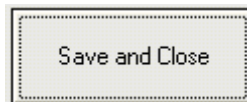
- 7) Click the **Download to Driver** button to download the parameters to the driver.



- 8) Click the **Upload from Driver** button to upload the parameters from the driver.



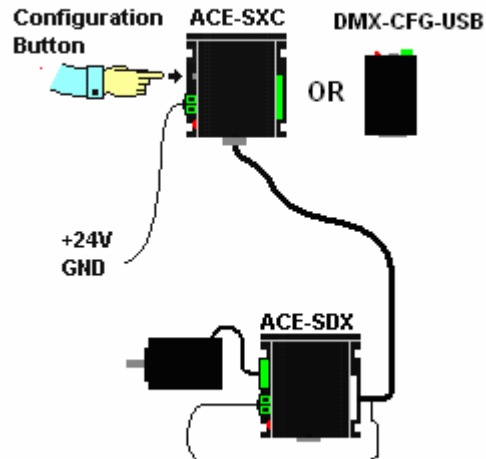
- 9) **Save and Close** button saves the selected driver settings by storing the values to the ACE-SXC / DMX-CFG-USB controller.



- 10) Once **Save and Close** button is pressed, the parameter values are stored in the RAM (temporary memory) of ACE-SXC / DMX-CFG-USB controller. The parameter values can be used in the future to download to another ACE-SDX driver. To permanently store the parameter values to ACE-SXC / DMX-CFG-USB controller, select “Store to Flash” button as shown below.



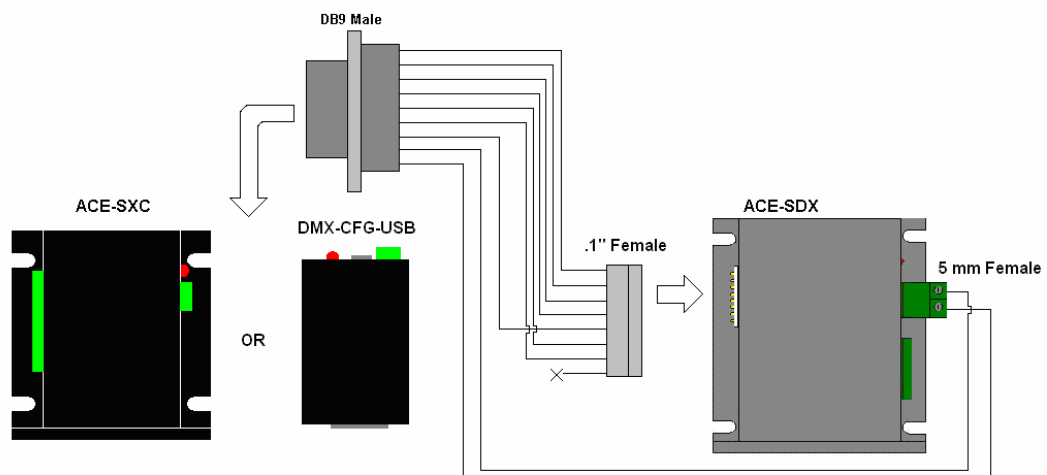
Method #2 - Using Arcus Controller Configuration Button Only



Once the driver parameter values are permanently stored on the flash memory of ACE-SXC / DMX-CFG-USB controller, driver parameters can be downloaded from controller to ACE-SDX without the use of Windows PC. For detailed information refer to the product manual

- 1) Power the ACE-SXC / DMX-CFG-USB controller.
- 2) Connect the control cable between ACE-SXC / DMX-CFG-USB and ACE-SDX. All the control signals must be connected to work properly.

Cable Accessory: **CBL-DB_9M-I_8F-L1-G24-V1**



- 3) Press and hold down the configuration button for 3 seconds. LED on ACE-SXC / DMX-CFG-USB controller will start blinking quickly.
- 4) While the LED is blinking quickly, release the button and press the button again to start the configuration of the connected driver. While the configuration is done, LED is turned off. Configuration takes about 3 seconds.
- 5) If the configuration is done properly, the LED will blink quickly for 3 seconds. If the configuration is not done properly, LED will blink slowly for 3 seconds.

Contact Information

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