KOLLMORGEN

SqDC SynqNet
DC Drive

Operating Instructions

Version 1 - 03/07

Valid for HW/SW Version 1.0

Keep all product manuals as a product component during the life span of the product.

Pass all product manuals to future users/owners of the product

DANAHER MOTION

Revision History

Rev	Date	Valid For	Description
1.0	OCT 2006	HW/SW Versions 1.0	New Quick start Guide
1.1	FEB 2007	same	Quick Start Guide rewritten

Important Notice

Print Version 004

March 2007

How to Contact Us

Danaher Motion is committed to quality customer service. Our goal is to provide the customer with information and resources as soon as they are needed. In order to serve in the most effective way, contact your local sales representative for order status and delivery information, product information and literature, and application and field technical assistance. If you are unaware of who your local sales representative is, please contact us at:
Email: sep@danahermotion.com and specify **SynqNet Support** in the subject line.

Important Safety Information

The information found in this section is designed for your safety and the prevention of needless repairs to the machine.

Operational Warnings and Cautions

DANGER

Danger means that the situation described will cause death or injury to you or someone else if the safety information is not obeyed.

NOTE

Please take note of the fact that……

CAUTION

Caution means that the situation described could cause damage to the equipment or the program.

WARNING

Warning means that the situation described can cause damage to either the equipment or the program and we recommend that only an experienced operator should perform these adjustments.

Contents

Chapter 1

INTRODUCTION

1.1 About this Guide

This guide is written for integration engineers that want to create a working environment on the test bench. Installation and step by step setup instructions are included.

A more detailed description of the system is provided in the SqDC Technical Manual which is included together with our applications notes, in Acrobat-Reader format on the accompanying CD-ROM in multiple languages. You can print out this documentation on any standard commercial printer. You can also purchase a printed copy of the documentation from us at the following E-mail address sep@danahermotion.com and specify **SynqNet Support** in the subject line.

It is strongly recommended that only suitable personnel install and setup the system.

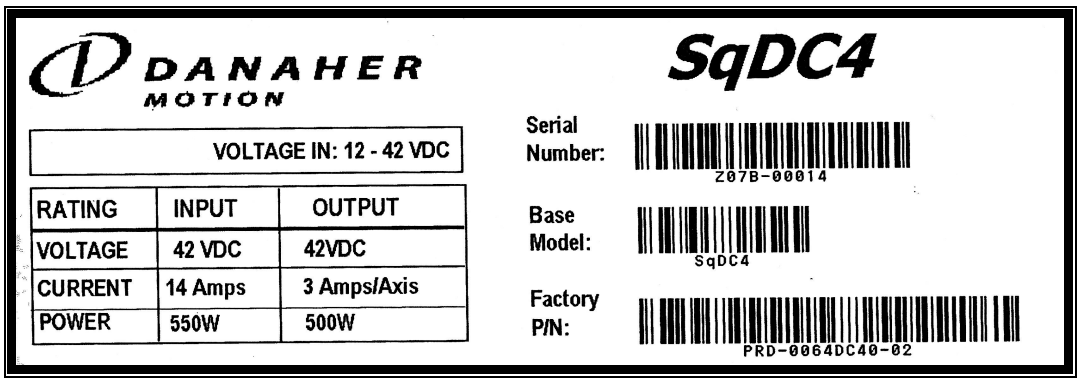
1. The guide is divided into the following sections
2. Unpacking the Drive
3. Drive Hardware Setup
4. SynqNet Installation
5. Configuring the SynqNet Motion Console
6. Configuring the Drive Parameters
7. Operating the Drive

1.1.1 Downloading Manuals from our Website

You can use the link www.DanaherMotion.com to download our product manuals from the **DanaherMotion** website.

1.1.2 Product Identification

Check the product labeling on the packaging and the product and confirm that you have received the correct product, SqDC4. This can be confirmed from the product label which should conform to that illustrated below



Chapter 2

PRE-INSTALLATION REQUIREMENTS

This section describes all the equipment required to test drive the stepper drive.

2.1 Lab Electrical Requirements

The following equipment must be readily available in order to install and setup the **SqDC SynqNet DC Drive** and the **SynqNet** PC controller.

Table 1: Electrical Requirements

Requirement	Description
Bus Power Supply	
Power Supply Type	Unregulated or Regulated
Output Voltage	12 to 42 Volts
Output Current	1.5 to 10 Amps The output current depends on motor selection, load and power supply voltage.
Current Limit	Adjustable
Logic Power Supply	
Power Supply Type	Regulated
Output Voltage	24V +-10%
Output Current	1A
DC Motors???	
DC Motor Type	Permanent Magnet Brushed DC (PMDC)
Voltage	0 - 42 Vdc
Current	3A rms (MAX), 4.5A peak (MAX)

2.2 Required Cables

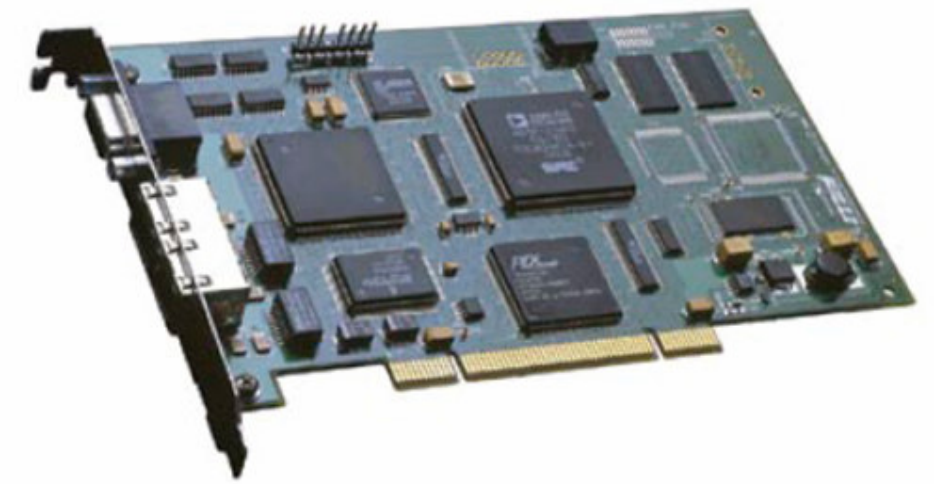
See *Appendix D Connector Pin-Outs* on page 35 for the information required to build the cables

2.3 Motion Control Card

You need to acquire a SynqNet PC controller card from Danaher Motion Performance Controls (DMPC) as the motion control of the motor is performed by this card.

2.3.1 What is SynqNet

SynqNet is a high-performance; synchronous network technology specifically designed for multi-axis motion control applications. It is the only system that dramatically reduces system wiring while simultaneously provides higher performance than conventional analog control systems.



2.3.2 Acquiring the Latest SynqNet Software Version

You must download the latest version of the SynqNet MPI software for your card from the DMPC support site. Use the **Download** tab on the website.

When downloading the software you are prompted to get a password to unzip the downloaded file.

NOTE

The MPI-setup version must be 03.04.00 or later.

For further details please visit to the Danaher Motion Performance Controls Website: http://www.motioneng.com/

2.3.3 PC Requirements

Any PC running:

- ❑ Microsoft Windows 2000 or better
- ❑ Acrobat reader version 5 or better
- ❑ Internet browser (IE recommended)

Chapter 3

INSTALLING THE HARDWARE

This section includes the:

- ❑ Unpacking the hardware
- ❑ General information on installing the SynqNet system
- ❑ IMPORTANT safety information
- ❑ Grounding information
- ❑ Connecting the drive cables

3.1 Unpacking Instructions

Upon receipt of the equipment, inspect the components to ensure that no damage has occurred during shipment. If damage has occurred, notify the carrier immediately. Check all shipping material for connector kits, documentation, diskettes, CD-ROM, or other small pieces of equipment before disposing of the packing material.

IMPORTANT INFORMATION

Do not dispose of shipping materials until the packing list has been thoroughly checked and all items accounted for.

When removing all packing material and equipment from the shipping container be aware that some of the shipped items may be small enough to be accidentally discarded.

ESD WARNING

Electronic components in this equipment are design-hardened to reduce sensitivity to ESD (Electro Static Discharge) however, proper procedures should be taken when handling the equipment to avoid any damage.

3.2 General

These installation steps are designed to lead you through the proper installation and setup of the SynqNet system. They were developed with the assumption that you have a fundamental understanding of basic electronics, computers, mechanics, and proper safety practices. However, you do not have to be an expert in motion control to install and operate the drive system. It is recommended that you read the entire manual completely before attempting installation or operating the equipment.

3.2.1 Safety

DANGER

High voltages could be present as well as dangerous and hazardous conditions.

Be certain to follow all national and local codes during installation.

3.2.2 Grounding

System grounding is essential for proper performance of the drive system. A ground bus bar may be used as a single point ground for the system. Safety grounding should be provided to all pieces of the system from a star point. In addition to the safety grounding, a high frequency ground must be provided that connects the back panel to the enclosure and, ultimately, to earth ground. The objective is to provide an extremely low impedance path between the filters, drives, power supplies, and earth ground.

This high frequency ground is accomplished with the use of a flat braid or copper bus bar. It is important not to rely on a standard wire for the high frequency ground. In general, a wire has an inductance of 8nH-per-inch, regardless of diameter. At higher frequencies because the voltage runs on the surface of the conductor, this unwanted inductance between grounds equates to limited filter performance.

NOTE

When connecting high frequency grounds, use the shortest braided ribbon or braided cable as possible.

3.3 Connecting the Drive Cables

1. Before connecting the cables ensure that the power source is powered **OFF**.
2. Use Figure 1 and the two tables below to connect the cables.
3. When all the power cables are connected, turn on the power source.
4. Connect the communications cable.

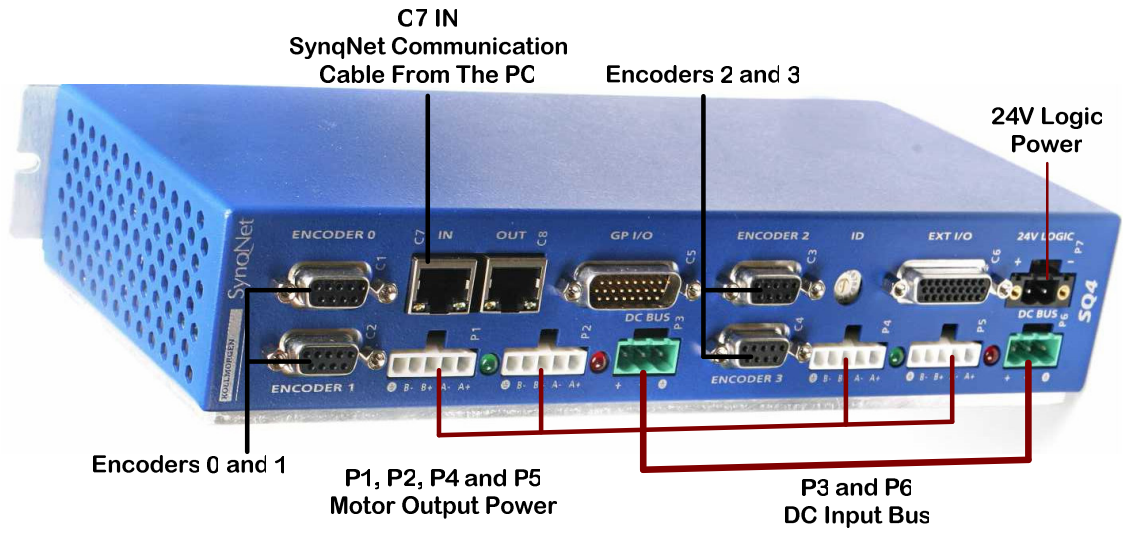


Figure 1: Front Cable Connection Panel

Table 2: Cable Connection Chart

STEP	Connect Cable	To	Description
1	**24V Logic Power**	**P7**	12 to 42 Volts at 12 Amps.
2	**Encoder**	**C1 to C4**	Motor encoders 0 to 3.
3	**DC Bus (Input)**	**P3 and P6**	DC power for driving the motors (12 to 42 Volts and 12 Amps).
4	**Motor Power** **Pin 2 Phase A +** **Pin 3 Phase A-**	**P1, P2, P4 and P5**	Maximum Output Rating is 50V at 5 Amps.
5	**Communication IN**	**C7**	Connect one end of the SynqNet communications cable to the **IN** connector. The other end connects to the Motion Control card when it is installed to the PC.

Table 3: Connector Grouped by Axis

Plug Group	Axis 0	Axis 1	Axis 2	Axis 3
Encoder	Encoder 0 (C1)	Encoder 1 (C2)	Encoder 2 (C3)	Encoder 3 (C3)
Output Power	M0 (P1)	M1 (P2)	M2 (P4)	M3 (P5)
Input Bus	B0 (P3)		B1 (P6)	

Chapter 4

INSTALLING THE DMPC CONTROLLER CARD

This section installs the:

- DMPC Controller card
- The DMPC Drivers
- SynqNet communication cable that is connected to the drive

4.1 Installing the DMPC Controller Card

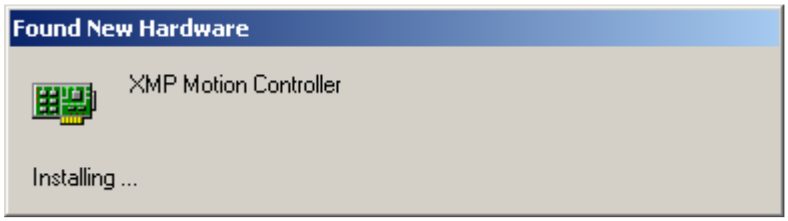
1. Install the **SynqNet** motion controller card using the instructions you received from the manufacturer.
2. Connect the communication cable that has one side connected to the motor drive to the **OUT** connector on the newly installed SynqNet card.

4.2 Installing the DMPC Drivers

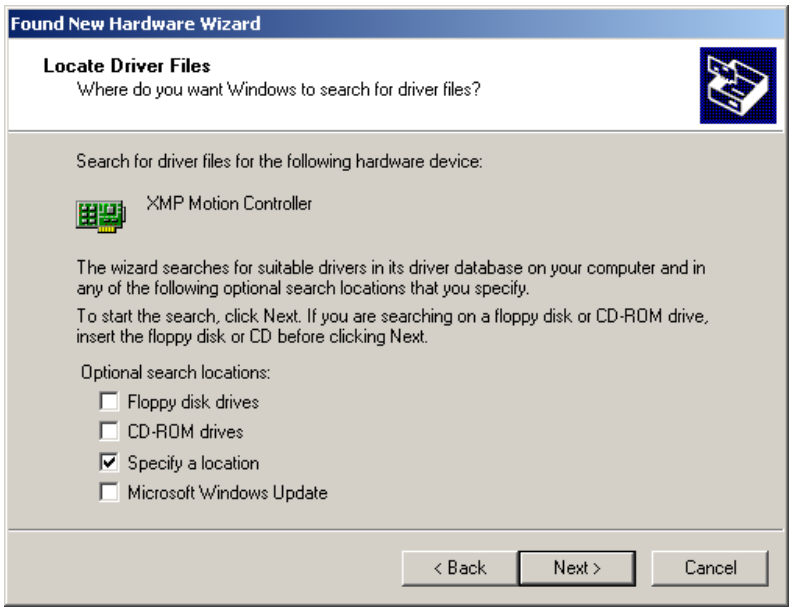
1. Power **ON** the PC.

The system has found the newly installed motion controller card.

2. Click the Next > button to continue.

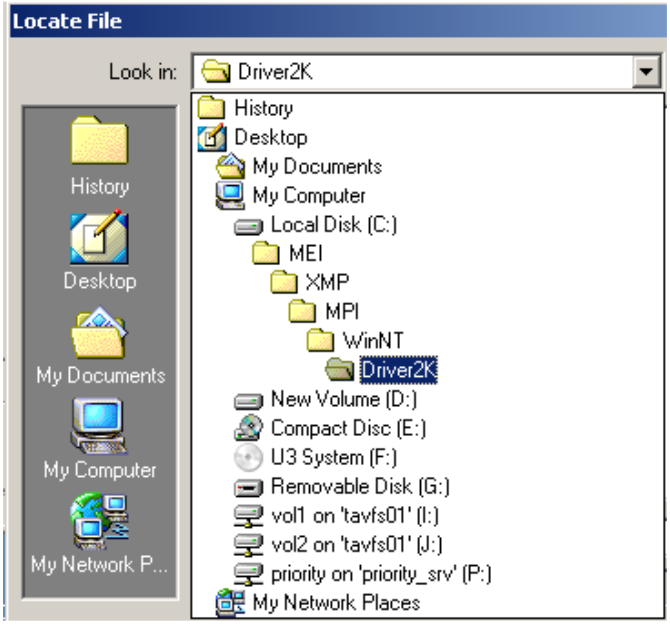


3. Click the Next > button.

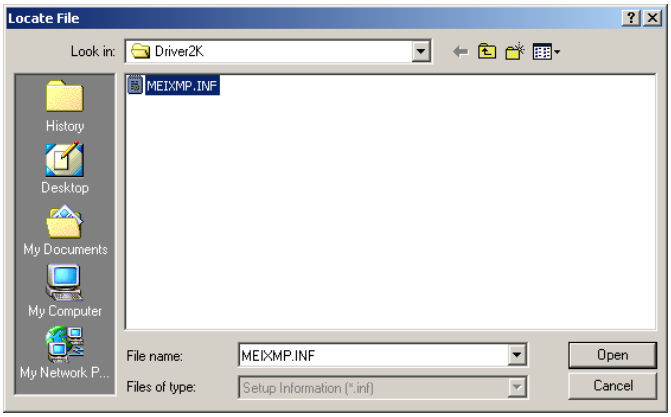


4. Select the **Specify a location** checkbox.

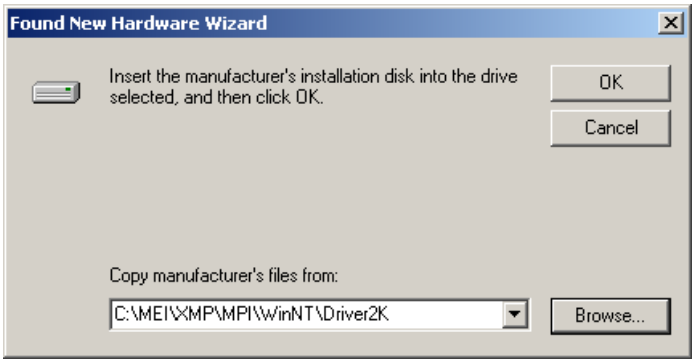
5. Click the Next > button.



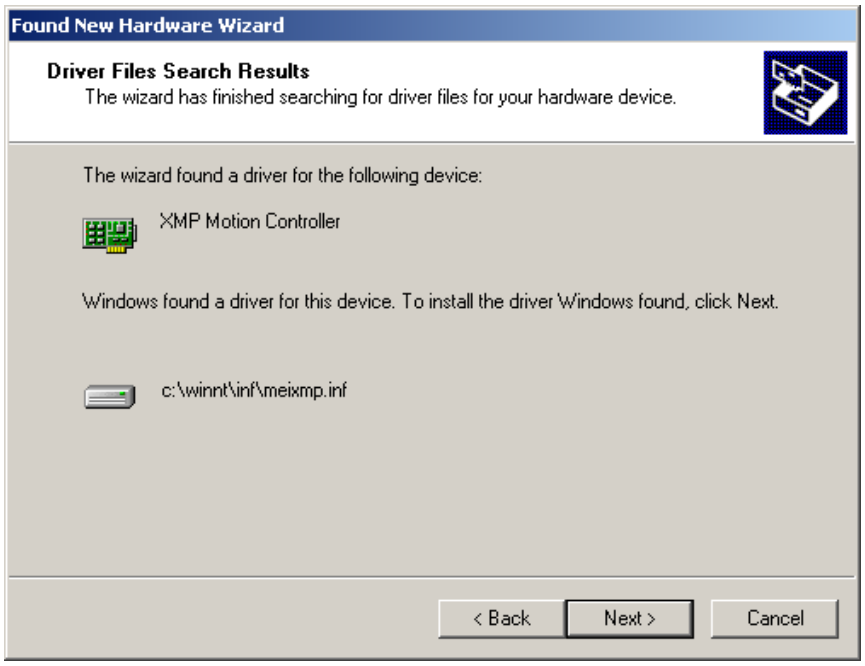
If you are running Windows NT open the folder as shown above.



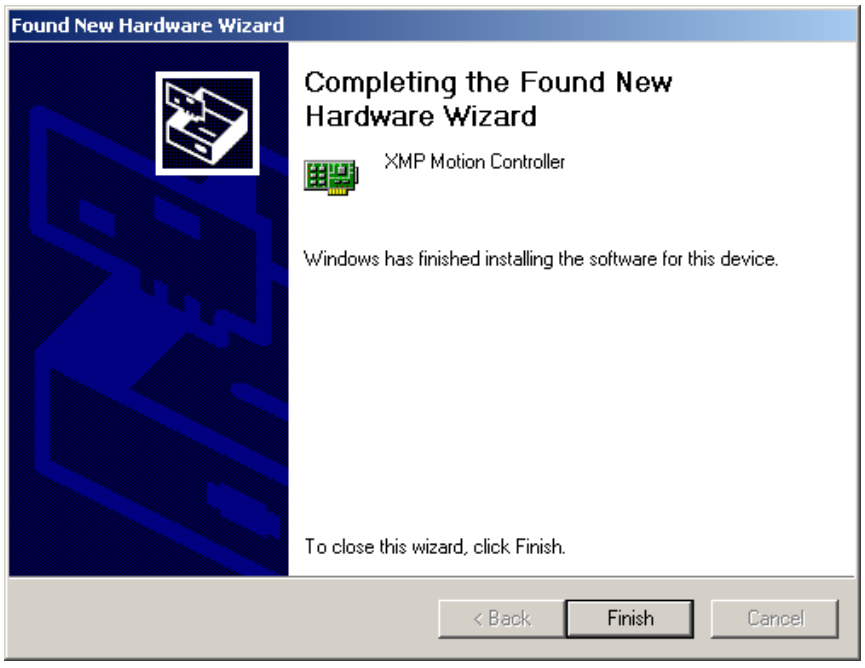
6. Either double-click the **MEIXMP.INF** file, or select it and click the Open button.



7. Click the OK button.



8. Click the Next > button.



9. Click the Finish button.

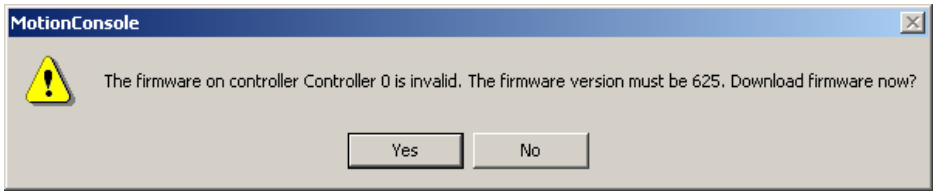
4.3 Installing the Motion Console Program

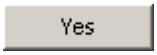
1. Install the file **03.04.XX_WinNTSetup.exe** (or later version) on your PC.

   If you did not receive this file either download it from our website http://support.motioneng.com/.
   To open the program you are required to get a **password** from support@motioneng.com. Installing this file places the **Motion Console** icon on the desktop.

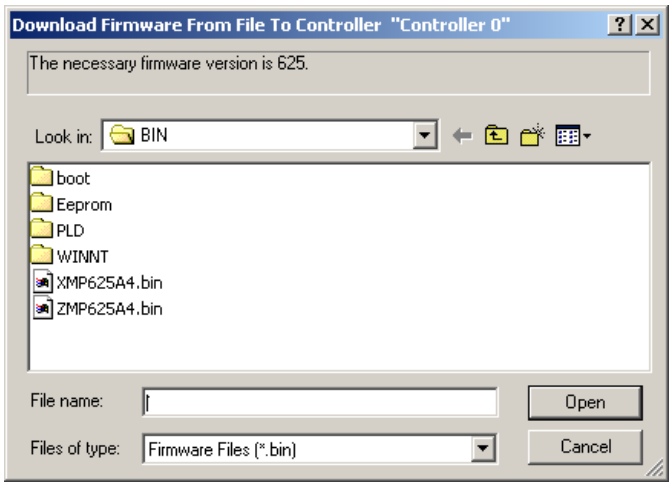
2. From the desktop, click the 

icon.



3. Click the 

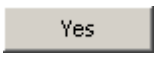
button.



   The necessary firmware version is displayed on the top of the window (625).

4. Select the **XMPxxx.bin** file.

   Downloads the binary image to the SqNode.

5. Click the 

button.

Chapter 5

USING THE MOTION CONSOLE

This section describes in a step-by-step format how to:

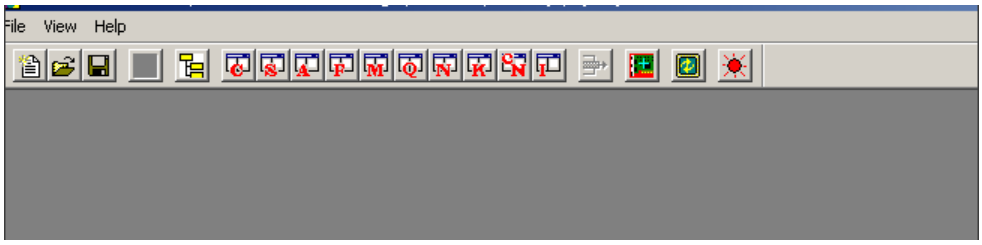
- Use the Motion Console to synchronize the SynqNet to the drive
- Configuring the motor parameters using a text editor
- Configuring the motion control console

5.1 Loading the Motion Console

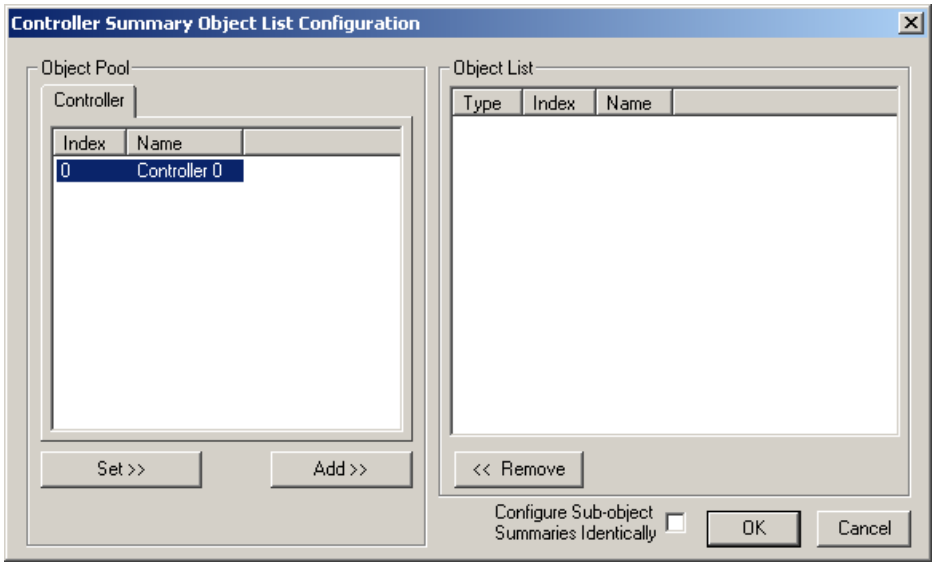
To load the motion console application:

1. If the **Motion Console** is not open, then from the desktop, click the 

icon.

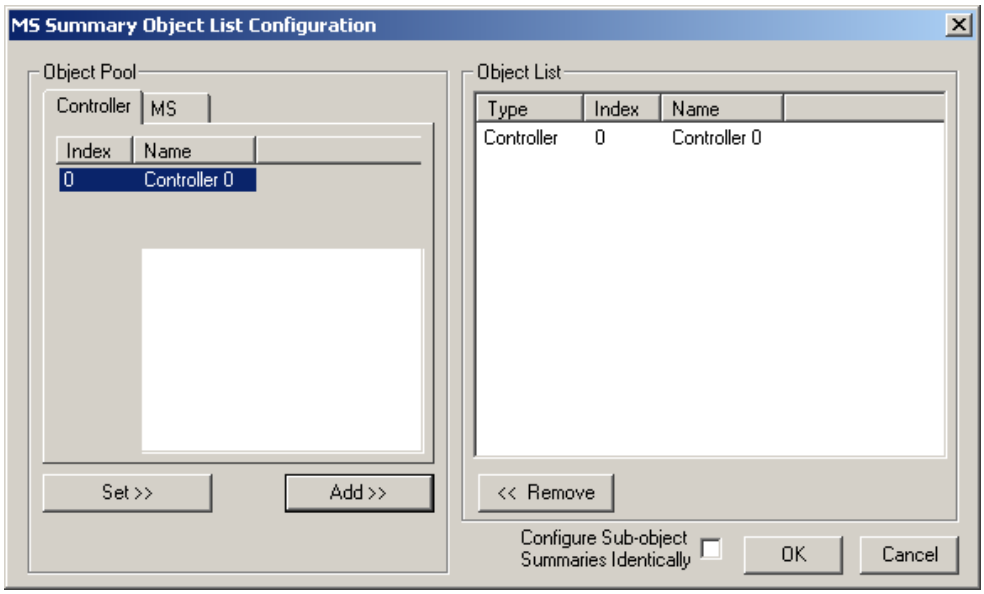


2. Click the  toolbar button.

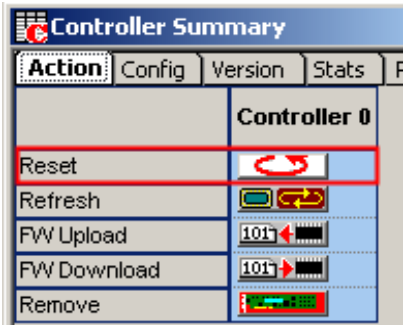


3. From the **Object Pool** pane, select the controller to add to the **Object List**.

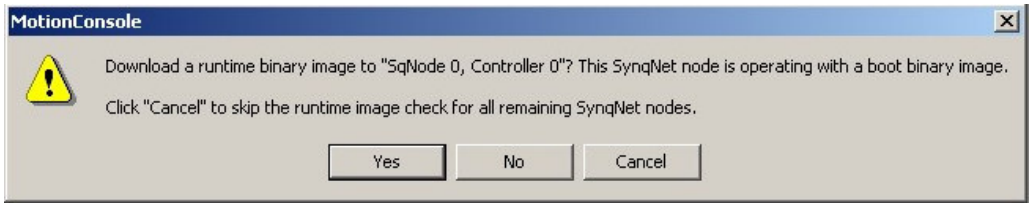
4. Click the Add >> button.



5. Click the OK button.

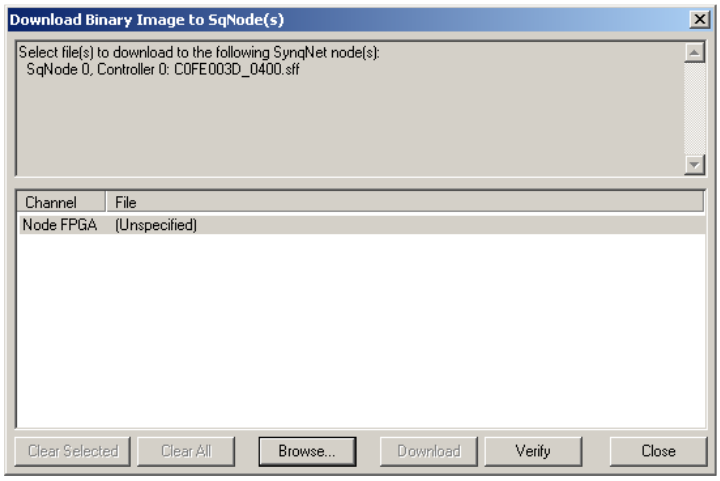


6. Click the button to synchronize the controller and drive.



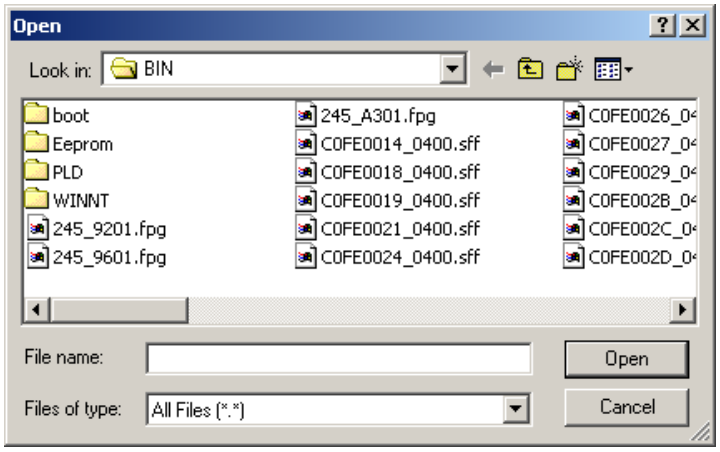
If the FPGA Runtime has not been previously installed the following message is displayed.

7. Click the Yes button.

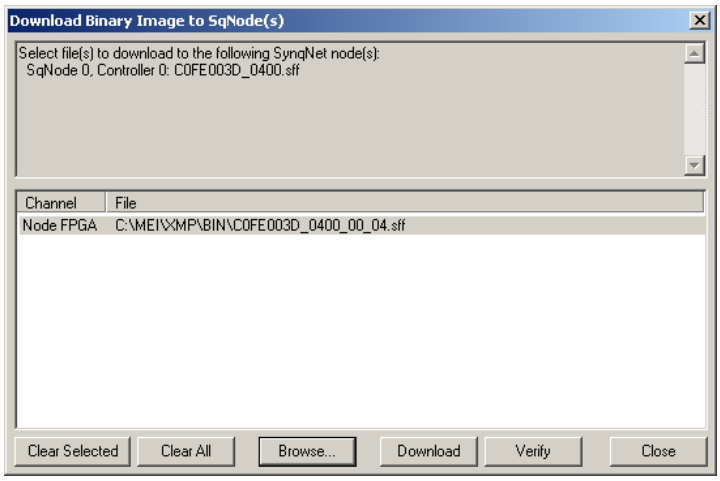


You are asked to select the **COFE003D_0400.sff** file.

8. Click the Browse... button to select the file.

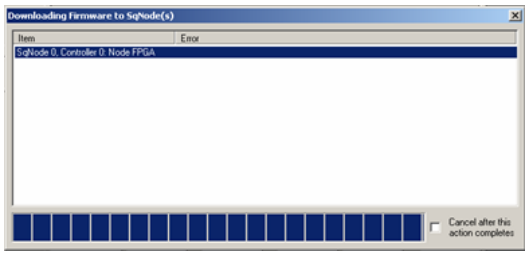


9. Select the **COFE003D_0400.sff** file.



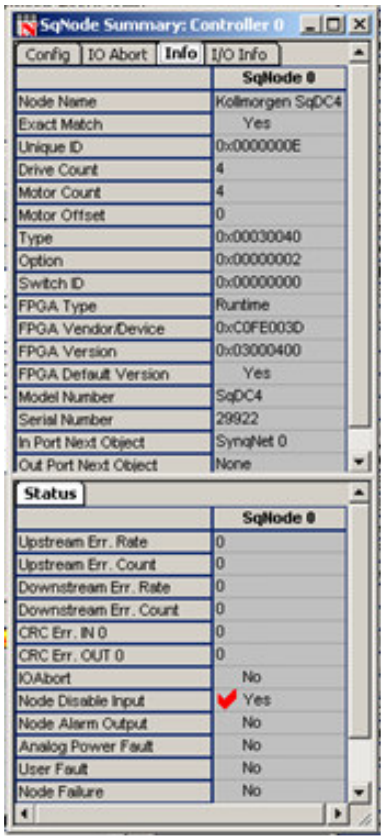
The **COFE003D_0400.sff** file is now ready to be downloaded.

10. Click the Download button

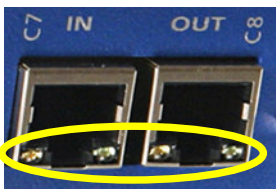


The download progress is shown above.

11. Click the Close button and click the **Info** tab.



The **Motion Console** opens after synchronizing the controller and drive.



Communication LED Indicators

Communication is established between the controller and the drive. The **SynqNet** controller is synchronized with the drive and the Yellow LEDs change from blinking to solid **ON**.

5.2 Configuring the Motor Parameters

NOTE

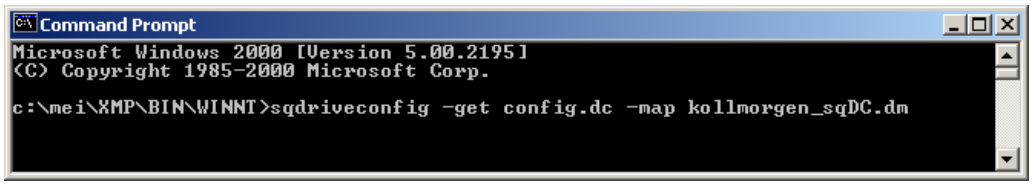
The motor parameters can only be uploaded once the SynqNet controller is synchronized with the drive. See previous section.

This section explains how to upload the motor configuration parameters from the motor drive controller using a Dos **–get** command to the PC and saved in the **Config.dc** file. Once on the PC we can configure the parameters to suit the specific motors you want to connect to the drive controller. When the file is configured it is downloaded back onto the drive controller using a **–set** command.

5.2.1 Uploading the Motor Parameters (get command)

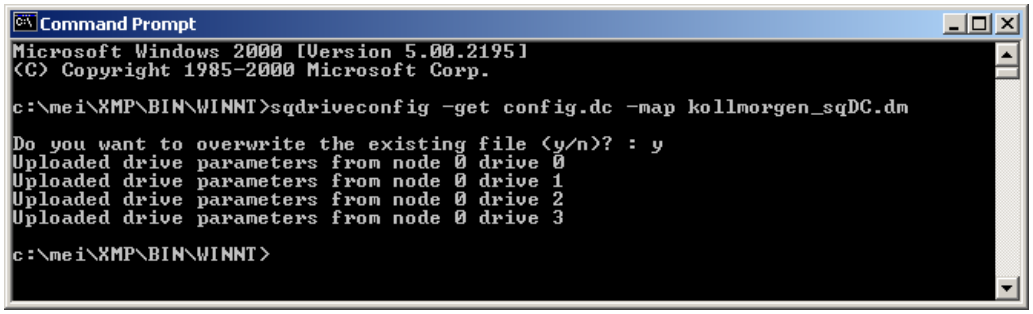
◆ **To upload the motor parameters from the drive unit:**

1. At the command prompt, enter the following command:
   sqDriveconfig –get config.dc –map kollmorgen sqDC.dm



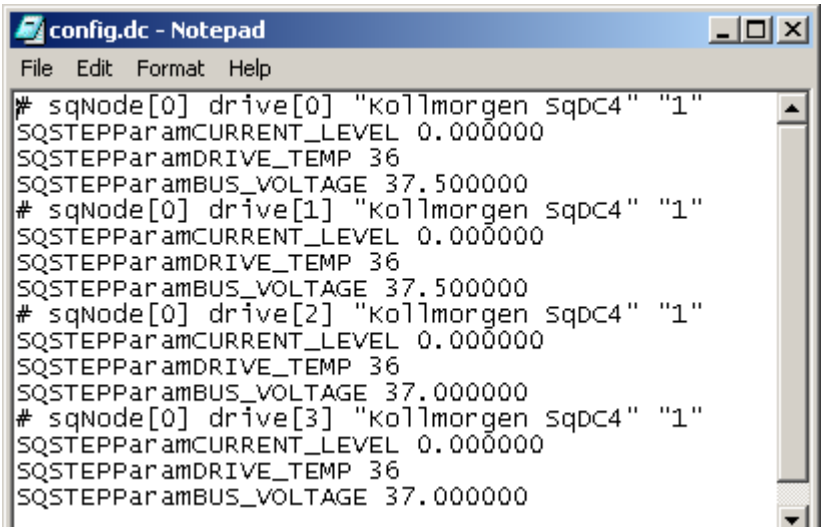
   This command fetches the parameters from the motor drive.
2. Press the **ENTER** key.
3. Enter **Y** and press the **ENTER** key, to the message,

   Do you want to overwrite the existing file (y/n)?



   The motor parameters for the four axes (0, 1, 2 and 3) are uploaded to the PC.

4. Open the **Config.ds** file in any text editor.
   Located at: C:\MEI\XMP\BIN\WINNT.



The motor parameters are shown in the example above.

5.2.2 Editing the Motor Configuration File

The motor parameters must now be changed to suit the specific motors that are to be connected to the drive controller. The parameters are:

- ❑ Peak Current Limit Fault Level
- ❑ Drive Temperature not implemented in this version (Read Only)
- ❑ Drive Bus Voltage displayed in Volts (Read Only)

5.2.2.1 Setting the Peak Current Level

◆ **To set the peak current level:**

Change the parameter **SQSTEPParamCURRENT_LEVEL** to 50 Amps.

```
# sqNode[0] drive[0] "Kollmorgen SqDC4" "1"
SQSTEPParamCURRENT_LEVEL 50.000000
SQSTEPParamDRIVE_TEMP 35
SQSTEPParamBUS_VOLTAGE 36.000000
```

- ❑ Use the formula below to change the peak current level on all 4 axes.

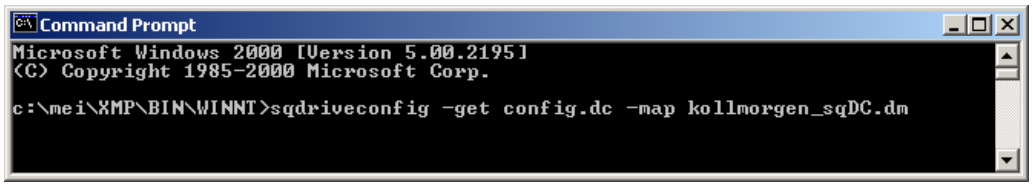
$$\text{PeakSine} = \text{DIpeak} * \frac{X}{100}$$

Where X: is a value between 0 and 100 and DIpeak=4.5

5.2.3 Downloading the Motor Parameters (Set command)

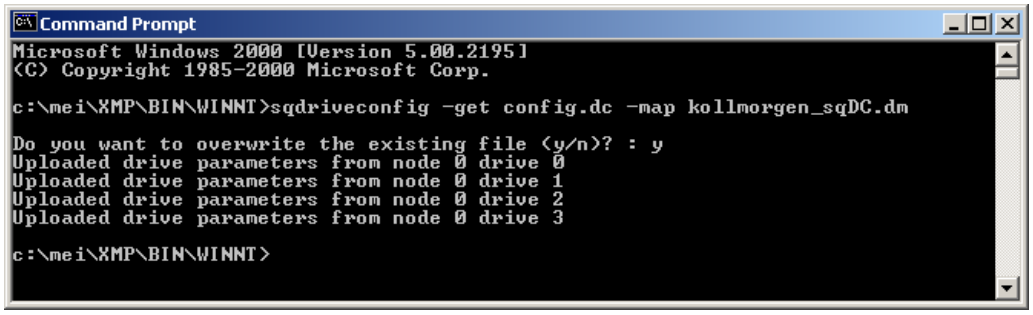
◆ **To download the motor parameters to the drive unit:**

1. At the command prompt, enter the following command:
   sqDriveconfig –set config.dc –map kollmorgen sqDC.dm



   This command downloads the parameters to the motor drive.
2. Press the **ENTER** key.
3. Enter **Y** and press the **ENTER** key, to the message,

   Do you want to overwrite the existing file (y/n)?



   The motor parameters for the four axes (0, 1, 2 and 3) are downloaded to the motor drive.

5.3 Configuring the Motion Control Console

This section describes how to:

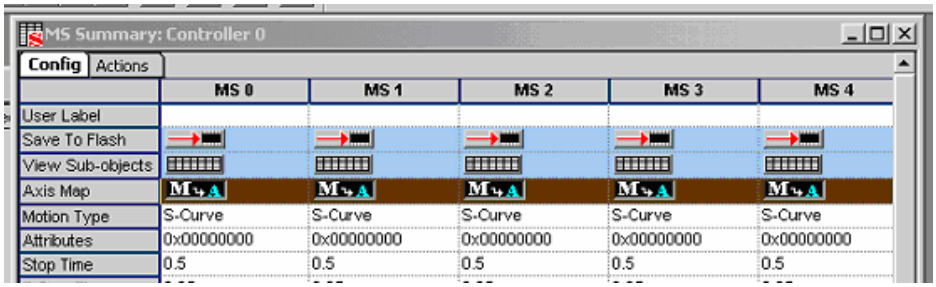
- ❑ Map the axes
- ❑ Setting the motor configuration parameters
- ❑ Clearing the errors
- ❑ Setting the axes motion parameters

You must perform the configuration in the sequence listed below.

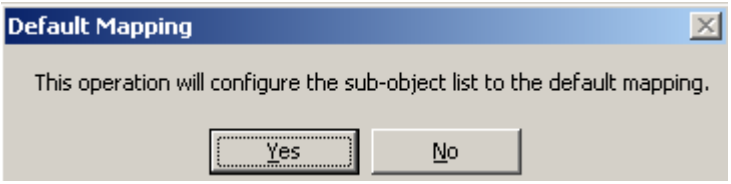
If the **Motion Console** is not installed go first to sections 4.3 *Installing the Motion Console Program* on page 12 and if it is installed and not loaded, go to section 5.1 *Loading the Motion Console* on page 13.

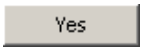
5.3.1 Mapping the Axes

1. From the toolbar, click the  button.
2. Add the selected controller to the **Object List**.
3. Click the  button.
4. Click the **Config** tab if it is not selected.



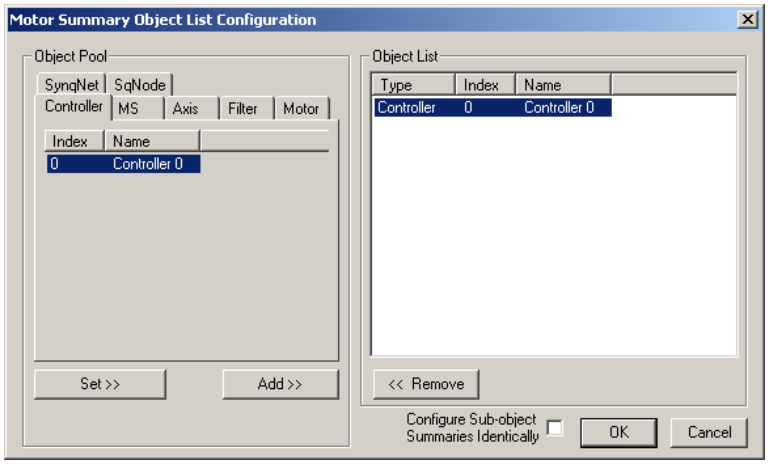
5. Click **Axis Map** to select the complete row.
   This selects the complete row.
6. Hold down the **Shift** key and click the left-hand  button.



7. Click  to configure the **sub-object** list to default mapping.

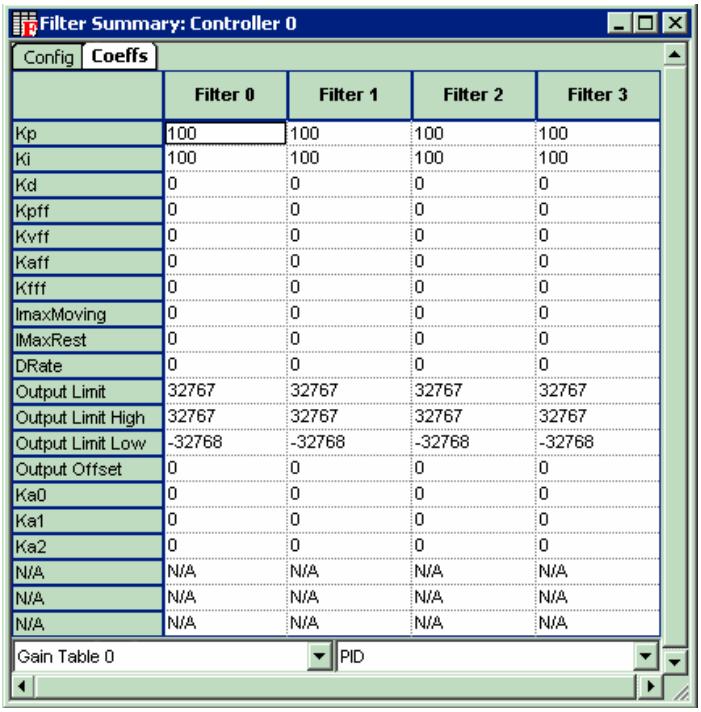
5.3.2 Setting the Filter Parameters (PID Coefficients)

1. From the toolbar, click the  button.



In this example the controller is already added.

2. From the **Object Pool** select the controller to add to the **Object List**.
3. Click the Add >> button.
4. Click the OK button and click the **Coeffs** tab.

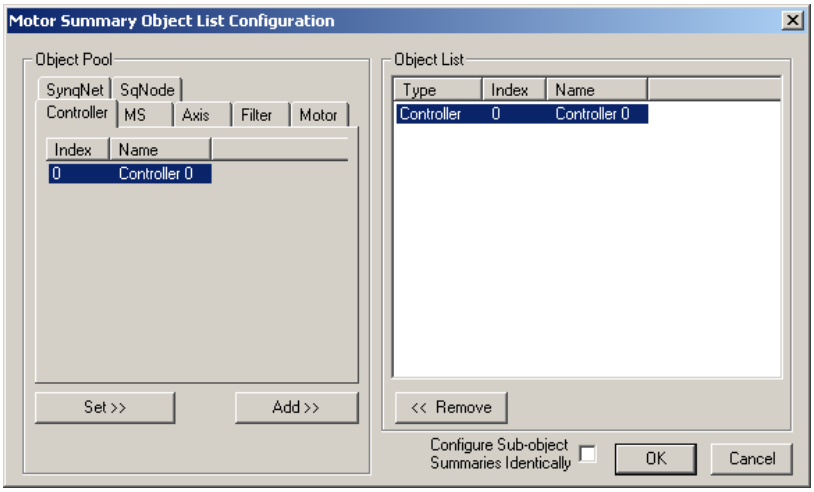


5. For all four axes, enter the value of 100 for the **Kp** and **Ki** filters.

5.3.3 Setting the Motor Configuration Parameters

This section is used to set the motor parameters.

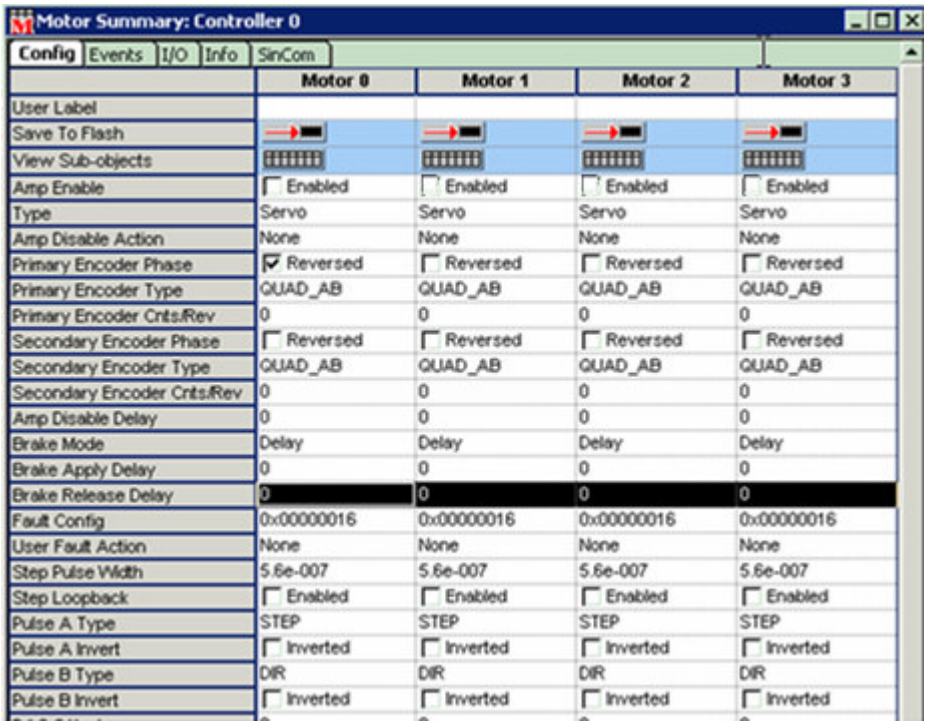
1. From the toolbar, click the  button.



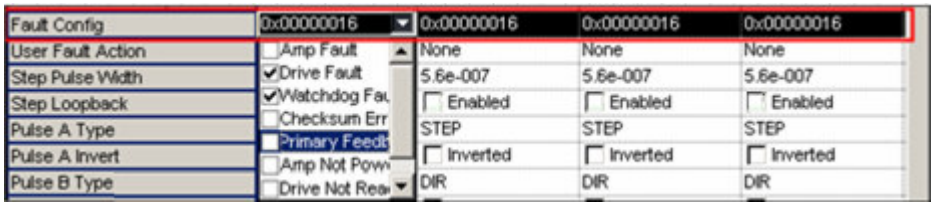
In this example the controller is already added.

2. From the **Object Pool** select the controller to add to the **Object List**.

3. Click the Add >> button.
4. Click the OK button.



5. Set the **Type** to **Servo** for all four axes.
6. If you are using single ended encoders disable **Primary Feedback Fault**. **If not skip this step**.

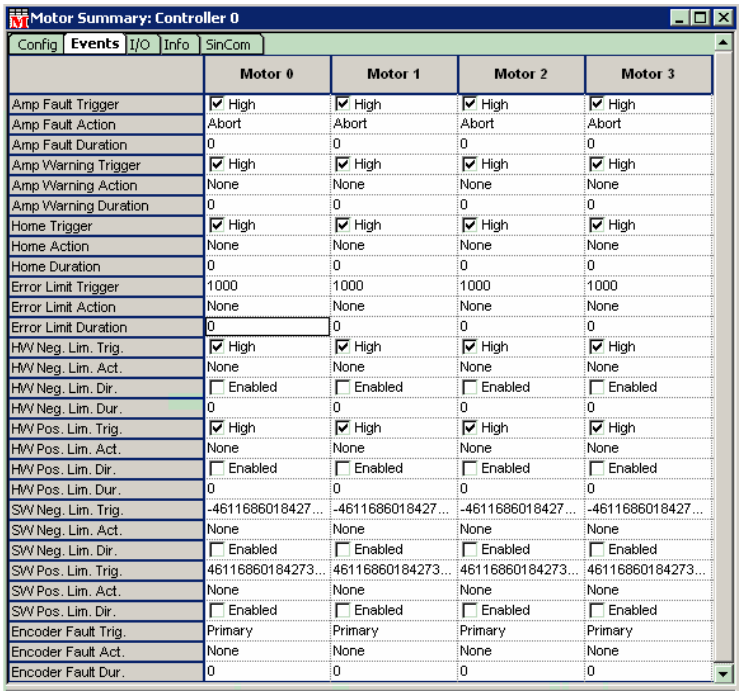


   a. Clear the **Primary Feedback Fault** checkbox under **Fault Config**.
   b. Ensure that the **Fault Config** value is now **0X00000006**.

      If not change it manually.

7. If you are using differential encoders ensure that the **Fault Config** value is **0X00000016**.

8. Click the **Events** tab.



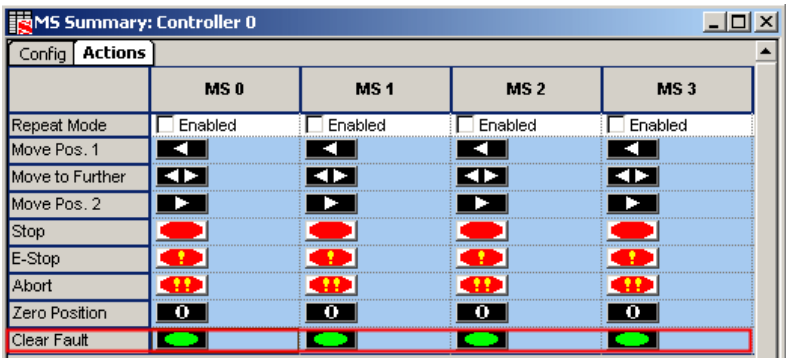
	Motor 0	Motor 1	Motor 2	Motor 3
Amp Fault Trigger	☑ High	☑ High	☑ High	☑ High
Amp Fault Action	Abort	Abort	Abort	Abort
Amp Fault Duration	0	0	0	0
Amp Warning Trigger	☑ High	☑ High	☑ High	☑ High
Amp Warning Action	None	None	None	None
Amp Warning Duration	0	0	0	0
Home Trigger	☑ High	☑ High	☑ High	☑ High
Home Action	None	None	None	None
Home Duration	0	0	0	0
Error Limit Trigger	1000	1000	1000	1000
Error Limit Action	None	None	None	None
Error Limit Duration	0	0	0	0
HW Neg. Lim. Trig.	☑ High	☑ High	☑ High	☑ High
HW Neg. Lim. Act.	None	None	None	None
HW Neg. Lim. Dir.	☐ Enabled	☐ Enabled	☐ Enabled	☐ Enabled
HW Neg. Lim. Dur.	0	0	0	0
HW Pos. Lim. Trig.	☑ High	☑ High	☑ High	☑ High
HW Pos. Lim. Act.	None	None	None	None
HW Pos. Lim. Dir.	☐ Enabled	☐ Enabled	☐ Enabled	☐ Enabled
HW Pos. Lim. Dur.	0	0	0	0
SW Neg. Lim. Trig.	-46116860184273...	-46116860184273...	-46116860184273...	-46116860184273...
SW Neg. Lim. Act.	None	None	None	None
SW Neg. Lim. Dir.	☐ Enabled	☐ Enabled	☐ Enabled	☐ Enabled
SW Pos. Lim. Trig.	46116860184273...	46116860184273...	46116860184273...	46116860184273...
SW Pos. Lim. Act.	None	None	None	None
SW Pos. Lim. Dir.	☐ Enabled	☐ Enabled	☐ Enabled	☐ Enabled
Encoder Fault Trig.	Primary	Primary	Primary	Primary
Encoder Fault Act.	None	None	None	None
Encoder Fault Dur.	0	0	0	0

9. Except for **Amp Fault Action** set the other fault actions to **None**.
10. Set the **Encoder Fault** action to:

For Encoder Type	Enter the Value
Single Ended	None
Differential	E-Stop/Abort

5.3.4 Clearing the Errors

1. From the toolbar, click the  button.
2. Click the **Action** tab.



	MS 0	MS 1	MS 2	MS 3
Repeat Mode	☐ Enabled	☐ Enabled	☐ Enabled	☐ Enabled
Move Pos. 1	◀	◀	◀	◀
Move to Further	◀▶	◀▶	◀▶	◀▶
Move Pos. 2	▶	▶	▶	▶
Stop	●	●	●	●
E-Stop	●	●	●	●
Abort	●	●	●	●
Zero Position	0	0	0	0
Clear Fault	●	●	●	●

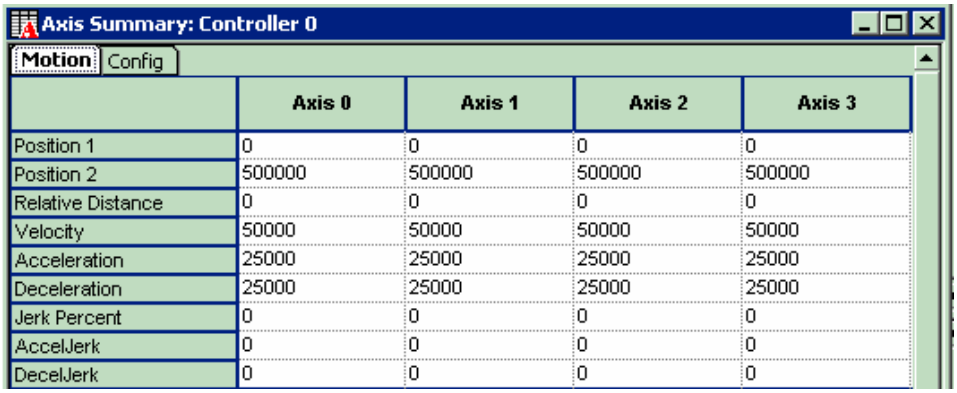
3. Click the green **Clear Fault**  button for each of the motors.

   The red LEDs on the drive turn **OFF**.

5.3.5 Setting the Axes Motion Parameters

This section controls the motion of the motor.

1. From the toolbar, click the  button.
2. Add the selected controller to the **Object List**.
3. Click the  button.



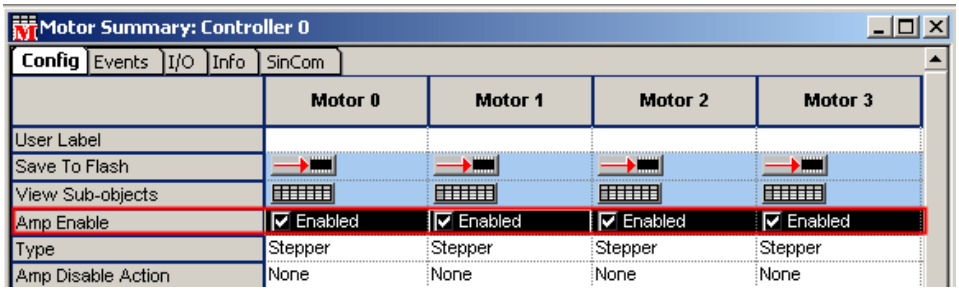
4. Set the motion following parameters on each axis:
   a. Position 1 and Position 2
   b. Velocity
   c. Acceleration
   d. Deceleration

NOTE

All the other values are optional and can be set as required.

5.3.6 Set Amp Enable

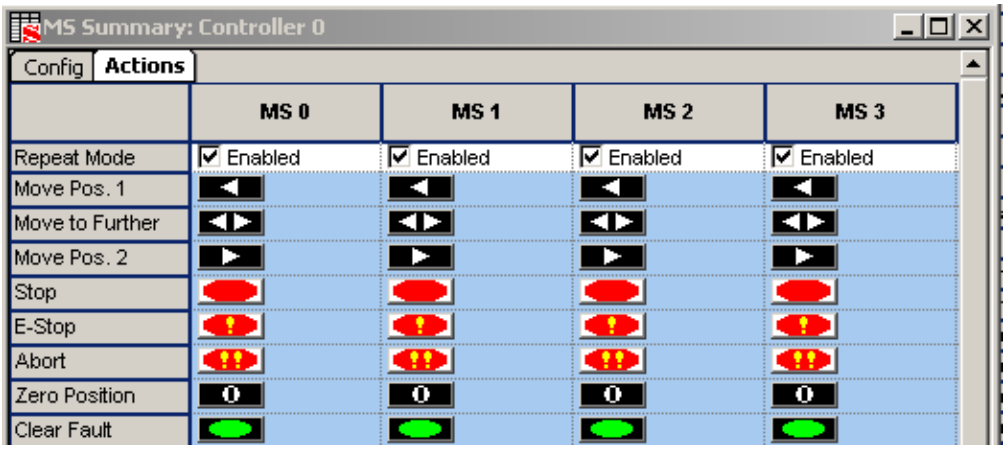
1. From the toolbar, click the  button.



2. Select the **Amp Enabled** checkbox **(Enabled)** for each motor.

5.3.7 Start and Stop the Motors

1. From the toolbar, click the  button.
2. Click the **Actions** tab.



3. Click **Zero Position** for all axes.
4. Click **Clear Fault** for all axes.
5. Select the **Repeat Mode** checkboxes **(Enabled)** for each motor.
6. Click  to move the motor to position 1.
7. Click  to move the motor to the furthest position.
8. Click  to move the motor to position 2.

NOTE

Click the Abort  button to force an error and then clear it by clicking the Clear Fault  button.

Chapter 6

ERROR MESSAGES

The **sqDriveMsg Utility** displays all the faults and warnings present on the specified drive.

6.1 Using the sqDriveMsg Utility

- Use Table 4 below as a guide to find the required faults and warnings.

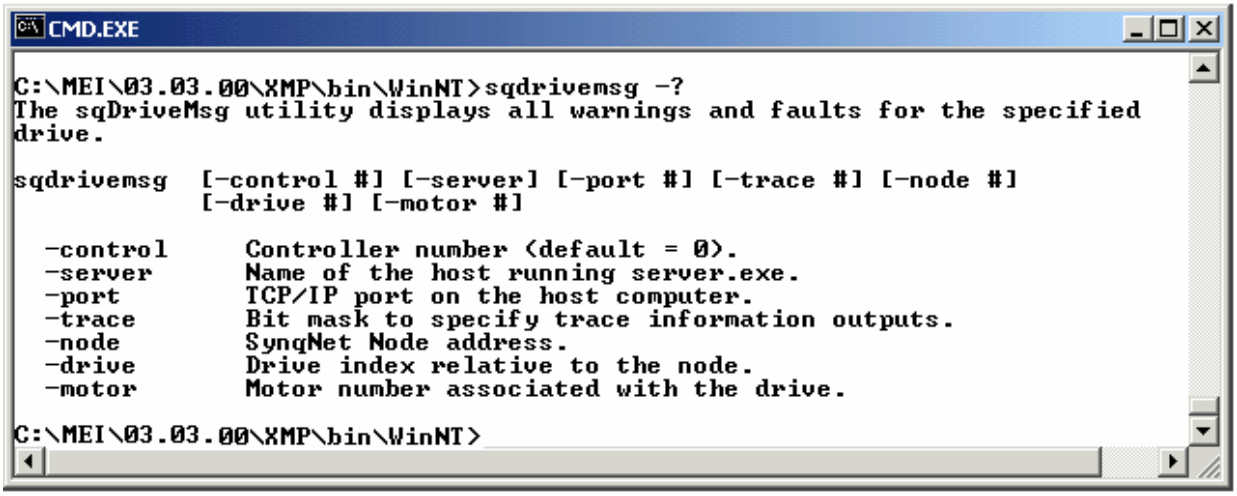


Table 4 sqDriveMsg Utility Arguments

Argument	Description
-?	Help
-control #	Controller number (default=0).
-server #	Name or IP address of the host running server.exe.
-port #	TCP/IP port on the host computer (default=3300).
-trace #	Bit mask to specify trace information outputs.
-node #	Node address of the SynqNet network (default=0).
-drive #	Index of the drive relative to the node (default=0).
-motor #	The MPI motor object mapped to the drive (default=0).

NOTE

You can use either –node and –drive, or just –motor to specify the desired drive interface.

6.1.1 Example

To see the faults and warnings for drive 0 on node 1.

```
C:Mei\03.03.00\Xmp\Bin\WinNT>sqdrivemsg -node 1
Fault Count = 1
Fault Read: 0x20: Invalid hall state
Warning Count = 2
Warning Read: 0x1: Bus Under-Voltage
Warning Read: 0x4: Phase-Finding is required
```

6.1.2 Error Messages

Table 5 sqDriveMsg Utility Drive Faults for DC Motors

Drive Fault	Description	sqDC Bits
Over Current	Global drive fault will effect both axes.	0
Bus Over Voltage	Global drive fault will effect both axes.	1
Over Temparature	Global drive fault will effect both axes.	2
Bus Under Voltage	Global drive fault will effect both axes.	3

Table 6 sqDriveMsg Utility Axes Faults for DC Motors

Axes Fault	Description	sqDC Bits
Axis_0_Current Limit	Axis 0 Current Limit Fault	5
Axis_1_Current Limit	Axis 1 Current Limit Fault	7

Appendix A HARDWARE SPECIFICATIONS

A.1 Mechanical

The SqDC SynqNet DC Drive provides a 4 axis small motor servo drive with a compact footprint. The figure below illustrates the system dimensions and the connector interfaces, which are all situated on the front of the unit. The unit can be positioned vertically or horizontally with mounting holes provided on the L-bracket for installing on any surface.

A.1.1 Physical Characteristics

Figure 2: Physical Dimensions

A.1.2 Front Panel

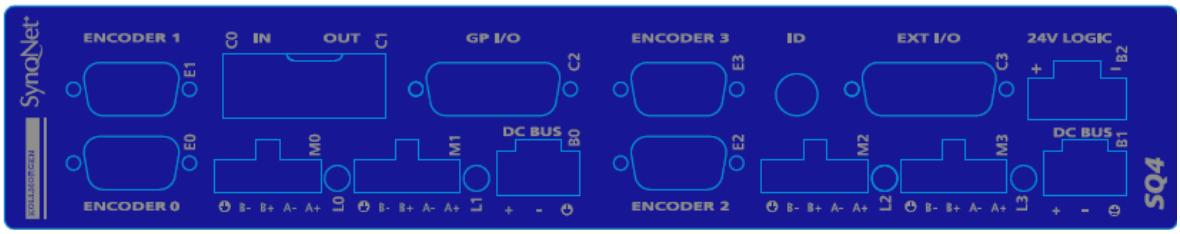


Figure 3: SqDC4 Front Panel Silk

A.1.3 Weight

Total weight without cables is **1.1** Kilograms.

A.2 Electrical Specifications

Table 7: Electrical Specifications

Specifications	Test Condition	MIN	TYP	MAX	Unit
Bus voltage		12	-	42	V
Logic Voltage		18	24	28	V
Phase output Current	RMS	0.4		3	Arms
Phase Output Current	Peak	0.57		4.5	Apeak
Logic Quiescent Current	I/O Floating		250		mA
Active Power Dissipation	I_{out}(per axis)=3Arms		12		W
Encoder Voltage Supply		4.5	5	5.5	V
Encoder Current Supply			100	250	mA
GPIO Input Voltage		2		30	V
GPIO Output Current		0	15	60	mA
GPIO Output Vce				40	V
High Speed I/O	RS-422/485 Standard		1MB/s	10MB/s	

A.3 Environmental Specifications

Table 8: Environmental Specifications

Specifications	Description
Ambient Temperature	0 to +50 Degrees C
Storage Temperature	-20 to 70 Degrees C
Maximum L-Bracket Temperature	70 Degree C
Current per axis without additional heat-sinking	~1.5 Arms
Ambient Humidity	10% to 90%, non condensing
Atmosphere	Without corrosive gasses or dust
Altitude	De-rated 5% per 1000ft (300m) above 3300ft (1000m)
Vibration	0.5 G

DANGER

Additional cooling may be required to limit the plate temperature to 70°C when operating the unit at higher currents across multiple axes.

IMPORTANT NOTE

This does not limit the peak transient current limit of 5A per axis only the continuous rated value.

Chapter 7

Appendix B CONFIGURATION FILE PARAMETERS

The motor parameters must now be changed to suit the specific motors that are to be connected to the drive controller. The parameters are:

- Peak Current Level
- Drive Temperature (Read Only)
- Drive Bus Voltage displayed in Volts (Read Only)

```
# sqNode[0] drive[0] "Kollmorgen SqDC4" "1"
SQSTEPParamCURRENT_LEVEL 0.000000
SQSTEPParamDRIVE_TEMP 36
SQSTEPParamBUS_VOLTAGE 37.500000
# sqNode[0] drive[1] "Kollmorgen SqDC4" "1"
SQSTEPParamCURRENT_LEVEL 0.000000
SQSTEPParamDRIVE_TEMP 36
SQSTEPParamBUS_VOLTAGE 37.500000
# sqNode[0] drive[2] "Kollmorgen SqDC4" "1"
SQSTEPParamCURRENT_LEVEL 0.000000
SQSTEPParamDRIVE_TEMP 36
SQSTEPParamBUS_VOLTAGE 37.000000
# sqNode[0] drive[3] "Kollmorgen SqDC4" "1"
SQSTEPParamCURRENT_LEVEL 0.000000
SQSTEPParamDRIVE_TEMP 36
SQSTEPParamBUS_VOLTAGE 37.000000
```

B.1 Peak Current Level

Amplitude of the sine wave produced as a percentage of the drive peak rated current which is **4.5** Amps.

$$PeakSine = DIpeak * \frac{X}{100}$$

Where X: is a value between 0 and 100 and DIpeak=4.5

B.2 Heat-sink Temperature

This parameter is READ-ONLY and provides the temperature of the heatsink in degrees Celsius.

- ❑ Valid operating range from 10-80°C (50-176°F)
- ❑ Accuracy of reading ±3%

NOTE

The over-temperature fault is set at 70°C (158°F).

B.3 Bus Voltage

This parameter is READ-ONLY and provides the voltage of the DC bus in volts.

- ❑ Valid measuring range from 0-96 Volts
- ❑ Accuracy of reading ±1%

NOTE

The over-voltage fault is set at 48 Volts (DC).

Appendix C ENCODERS

Two encoder options are available for use with the SqDC:

- ❑ Incremental (ABI) Encoder
- ❑ Absolute SSI based Encoder

C.1 Incremental Encoders

The SynqNet system can accommodate incremental encoders with and without the the Index pulse use for absolute position definition. They can be supplied in either single ended or differential wiring configuration. Single ended wiring is generally cheaper than the differential output types but is more susceptible to electrical noise and provides no wire break indication.

C.1.1 Single Ended ABI Encoders

Single ended encoders have only one wire per output. They could have four or five wires. Two supply power and then there is A, B and I (index).

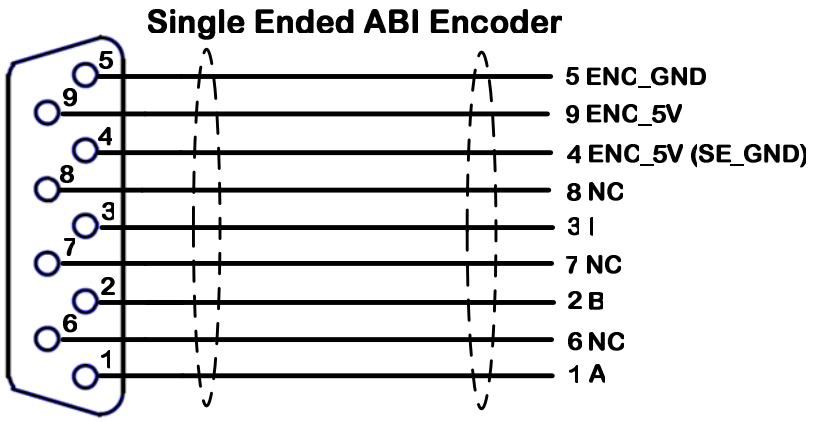
Advantages

- ❑ Simple to build and inexpensive

Disadvantages

- ❑ No line break fault detection
- ❑ Susceptible to noise
- ❑ Does not keep position information after power off

DB-9 Wiring Diagram



C.1.2 Differential ABI Encoders

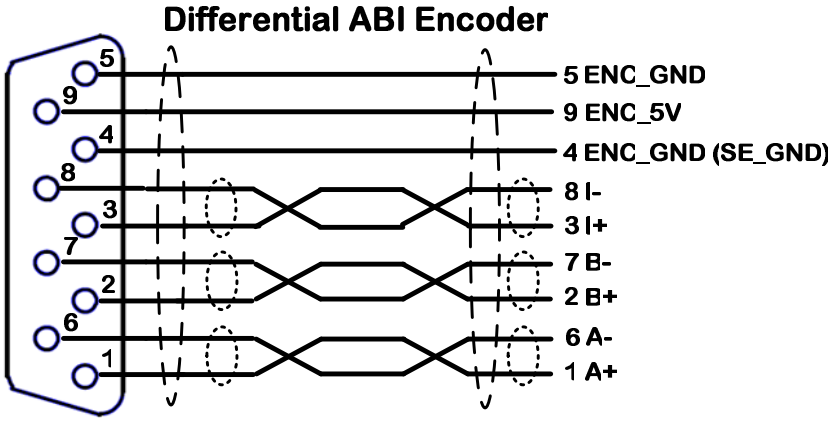
Advantages

- More noise immunity
- Provides wire break indication

Disadvantages

- Does not keep position after loss of power

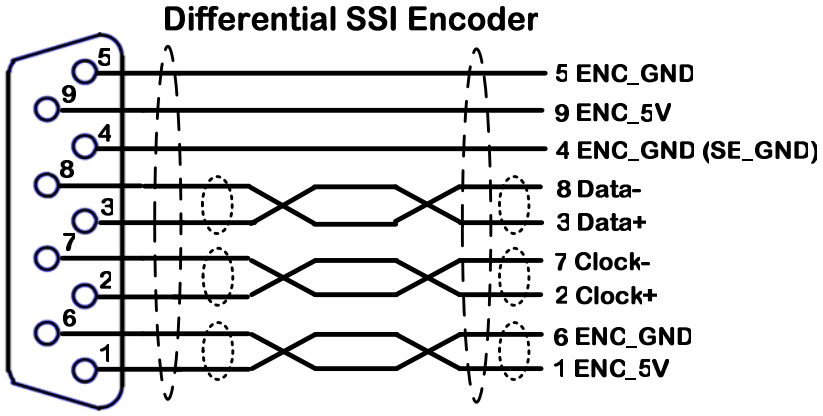
DB-9 Wiring Diagram



C.2 Absolute Encoders

An absolute encoder provides a unique value at each position and retains actual shaft position even if power fails. The electronic interface SSI or Synchronous Serial Interface was designed for use with absolute encoders and is a digital communication protocol.

DB-9 Wiring Diagram



Appendix D CONNECTOR PIN-OUTS

This section describes the connector pin-outs. These include logic power, bus power, motor connectors and more. This section includes the following:

- ❑ Logic Power
- ❑ Bus Power
- ❑ Motor Connector

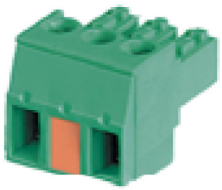
D.1 Logic Power

Connector Definition		
Manufacturer		Phoenix Contact
Part Number		MSTB 2,5/2-GF-5,08-BK
Mating Connector Part Number		MSTBT 2,5/ 2-STF-5,08
Pin Out		
Pin #	Description	Comments
1	Logic +	+24VDC
2	Logic -	Refer to Grounding Tree - TBD

The illustration shows a 15-position version

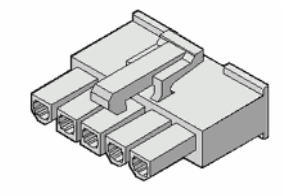
D.2 Bus Power

Connector Definition		
Manufacturer		Sauro
Part Number		3-pin, 5.08 pitch header with tab – CIM039M5
Mating Connector Part Number		CTF030M5
Pin Out		
Pin #	**Description**	**Comments**
1	Bus +	48VDC; regulated or unregulated
2	Bus -	Refer to Grounding Tree TBD
3	PE	Power Earth



D.3 Motor Connector

Connector Definition		
Manufacturer	Molex	
Part Number	39-30-3056; 4.20mm (.165") Pitch Mini-Fit Jr.™ Header	
Mating Connector Part Number	39-01-4051 (Housing) 44476-3112 (Pins)	
Pin Out		
Pin #	**Description**	**Comments**
1	Phase A-	
2	Phase A+	
3	Phase B+	
4	Phase B-	
5	PE	Power Earth



D.4 Encoder Connector

Connector Definition			
Manufacturer	Stewart		
Part Number	D-Type 9 pins Female		
Mating Connector Part Number			
Pin Out			
Pin #	**Differential ABI**	**Single Ended ABI**	**Differential SSI**
1	A+	A	ENC_5V
2	B+	B	CLK+
3	I+	I	DATA+
4	ENC_GND (SE_CON)	ENC_5V (SE_CON)	ENC_GND (SE_CON)
5	ENC_GND	ENC_GND	ENC_GND
6	A-	NC	ENC_GND
7	B-	NC	CLK-
8	I-	NC	DATA-
9	ENC_5V	ENC_5V	ENC_5V

Appendix E SALES AND SERVICES

We are committed to quality customer service. In order to serve in the most effective way, please contact your local sales representative for assistance.

If you are unaware of your local sales representative, please contact us.

Europe

Danaher Motion Customer Support Europe

E-mail: sep@danahermotion.net

Phone: +972-3-927-3800

Fax: +972-3-922-8075

www.danahermotion.net

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www.danahermotion.com