

TECHNICAL NOTES: INTERFACING WITH DRIVES



Connecting Optira Series™ Encoder and AgilityRH™ motor to Elmo Gold DC Whistle Servo Drive

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1 INTRODUCTION

This document will follow the process involved in mounting a MicroE Optira™ encoder to an Applimotion AgilityRH™ rotary motor and the connecting them to an Elmo Gold DC Whistle Servo Drive.

2 REQUIRED ITEMS

2.1 Optira

The Optira Series Encoder combines MicroE's patented PurePrecision™ technology with state-of-the-art electronics and signal processing to deliver unprecedented performance in an incredibly small and lightweight package, providing resolution of up to 5nm with all AGC, interpolation, and signal processing performed in the sensor head. The latest documentation is available at <http://www.microsystems.com/resource/product-documentation>.

2.2 Optira Development Kit

The Optira Development Kit includes a flat cable, calibration board, and a DB-15 output cable. Refer to the Optira installation manual for more info.

2.3 Applimotion AgilityRH rotary motor

The Applimotion AgilityRH rotary motor is a NEMA 23 brushless motor/rotary actuator with large through hole for precision direct drive applications. The AgilityRH rotary motor has a 16 mm axial through hole with optional shaft extensions available, NEMA 23 mounting flange, high performance single ring multi-pole magnets (windings can be customized for your voltage, speed and current requirements), less than 1% higher harmonic content on sinusoidal torque curves, and standard encoder resolution 288,000 counts/rev, optional resolution up to 29,492,200 counts/rev.



Designed for direct drive rotary applications to replace geared mechanical stages with better accuracy, higher reliability, quiet operation, and longer life.

2.4 Elmo Gold DC Whistle Servo Driver

The DC Whistle is a super compact OEM panel mounted version of the Whistle. It weighs just 273 g (only 9.6 ounces) and supports up to 20 A of continuous current. Its high density enables the drive to deliver 3.3 kW of peak power and 1.6 kW of continuous power. Based on Elmo's SimplIQ Motion Control technology, the DC Whistle is capable of operating in position, velocity and current modes and it offers a wide range of feedback and I/O options. With Elmo's Composer software, users can easily perform drive setup, configuration, tuning, analysis and programming. The drive operates on DC power.

2.5 Computer with Elmo Studio software loaded

Elmo Studio software is available for download on the Elmo website. This is used to set up the drive for the first time.

2.6 Power Source

Review the documentation for the all the components to determine the correct voltage and amperage to run your equipment.

2.7 Documentation

Before you begin, have the manuals for each product available for review.



3 WIRE ENCODER-TO-DRIVE CONNECTOR (PORT B)

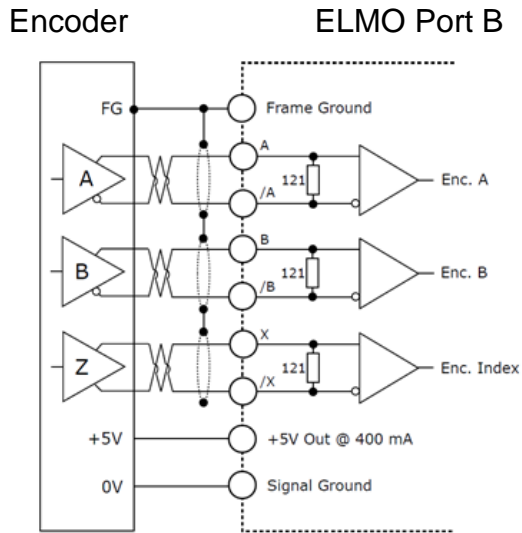


Figure 1 Digital Encoder

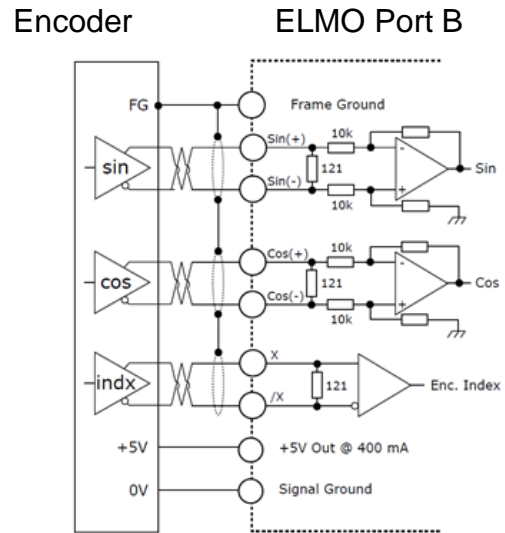


Figure 2 Analog Encoder

ELMO PORT B	ELMO Desc	MicroE Wire	MicroE DB15	ELMO PORT B	ELMO Desc	MicroE Wire	MicroE DB15
1	+5V	WHT	7	1	+5V	BLU	4
2	Sgnd	BLK	2	2	Sgnd	BRN	12
3	Enc A	ORN	14	3	Sin(+)	RED	10
4	Enc /A	GRN	6	4	Sin(-)	VIO	2
5	Enc B	BLU	13	5	Cos(+)	WHT	9
6	Enc /B	BRN	5	6	Cos(-)	BLK	1
7	Enc X	RED	12	7	X	ORN	3
8	Enc /X	VIO	4	8	/X	GRN	11



4 INSTALL OPTIRA SENSOR AND CALIBRATION BOARD

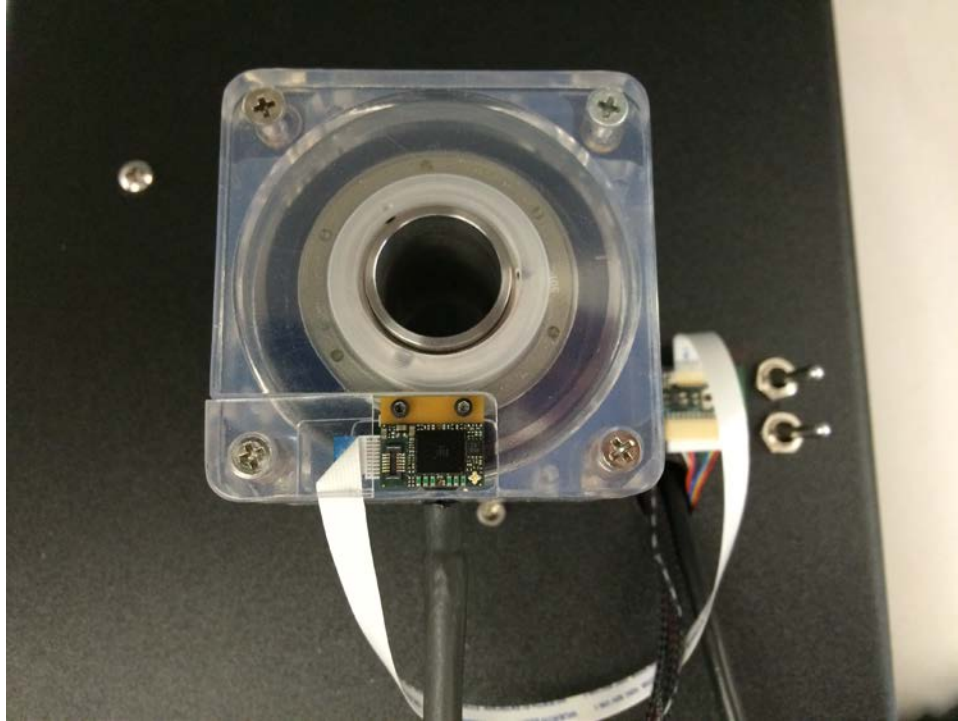


Figure 1

4.1.1 Attach the FPC (Flat Flexible) BEFORE installing the encoder.

(The flex cable exposed contacts should be on the opposite side from the brown connector lock)

4.1.2 Attach the encoder to the motor housing using two 0-80 x 1/4 button head screws (Note: The motor in this demonstration was built in a clear housing for demonstration purposes only, your motor would come in an aluminum housing).



- 4.1.3 Use the Z-height Shim Spacer (part of optional development kit) to set the proper gap between the sensor's riser and the top of the scale (0.010"). Refer to the Optira Interface Drawing for details.



Figure 2

- 4.1.4 Connect the other end of the FPC (Flat Flexible) to the calibration board.
(The flex cable exposed contacts should be on the opposite side from the brown connector lock).
- 4.1.5 Mount the calibration board to the stationary part of the stage.
(Kapton tape is recommended for electrical isolation if you choose to mount directly to the stage).
- 4.1.6 Connect the DB-15 output cable to the other side of the calibration board.



5 POWER UP AND CALIBRATE OPTIRA

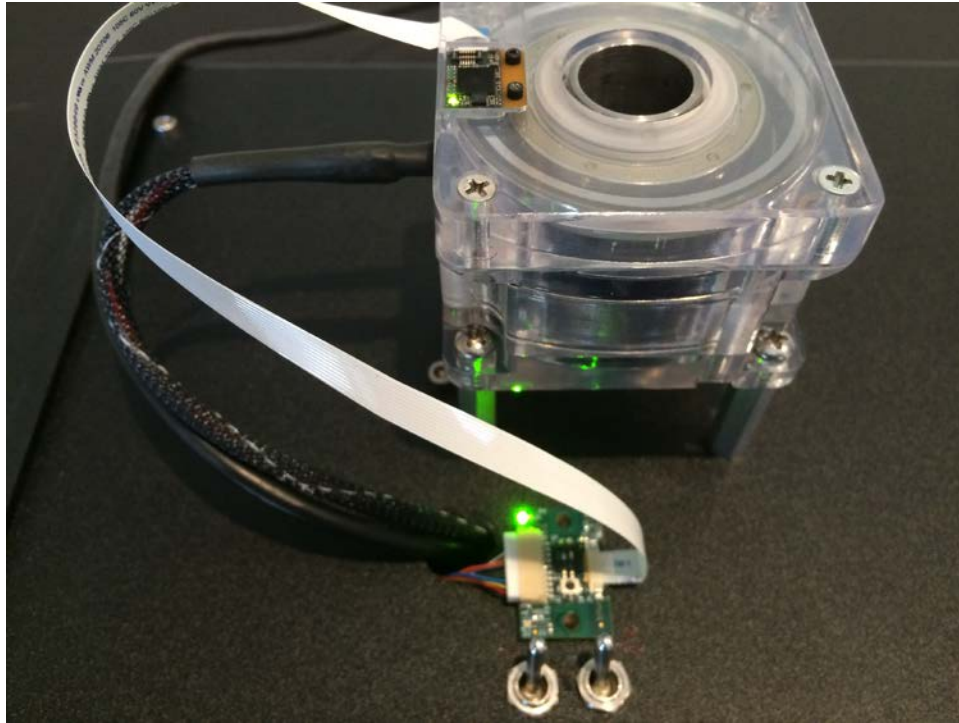


Figure 3

5.1.1 Turn on the power source to the AMC Drive (J6 should be disconnected at this point).

5.1.2 You should see a green LED on both the encoder and Calibration board.





Figure 4

5.1.3 Press the Calibration momentary switch to initiate Index Optimization.



5.1.4 The Red Fault LED will illuminate to indicate that it is in calibration mode.

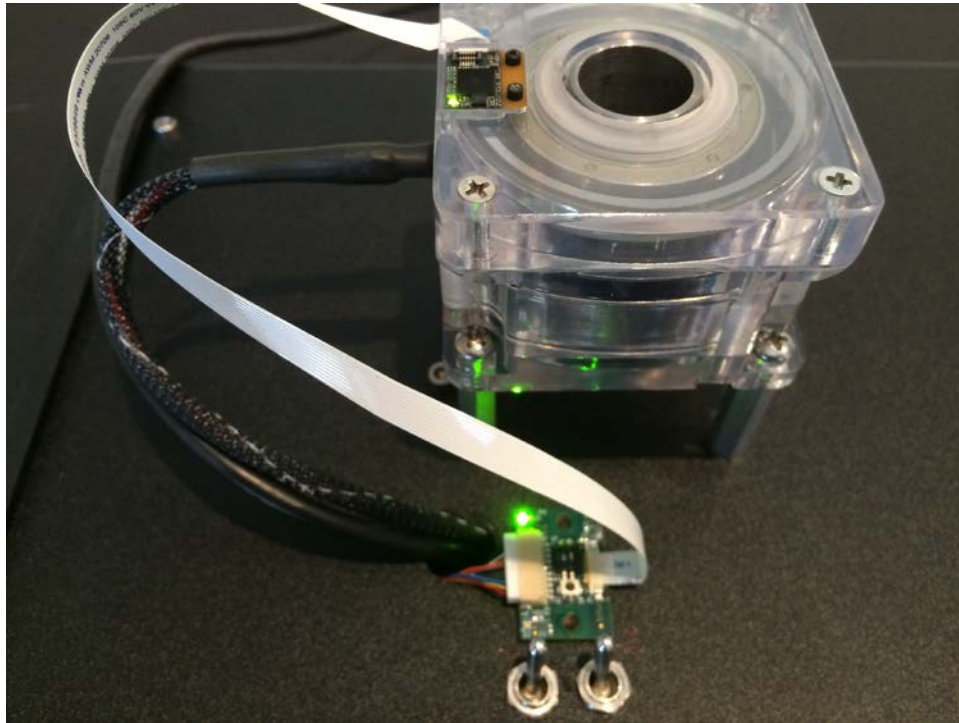


Figure 5

5.1.5 Manually move the encoder/carriage repeatedly over the index on the scale until the LED turns green.



6 ELMO DRIVE SETTINGS

6.1 Set up communications



Figure 6

6.1.1 Open ELMO Application Studio II software (Highlighted in Figure 6).

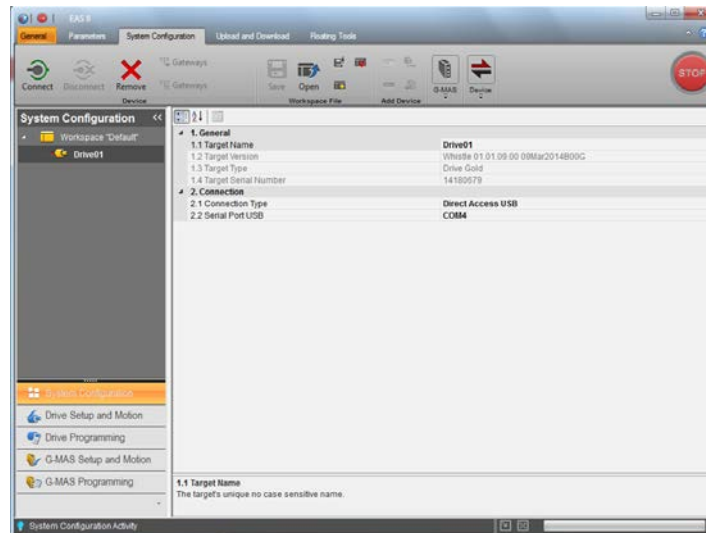


Figure 7



6.1.2 With a USB Cable connected to the drive and PC, Select System Configuration (Highlighted in yellow in figure 7).

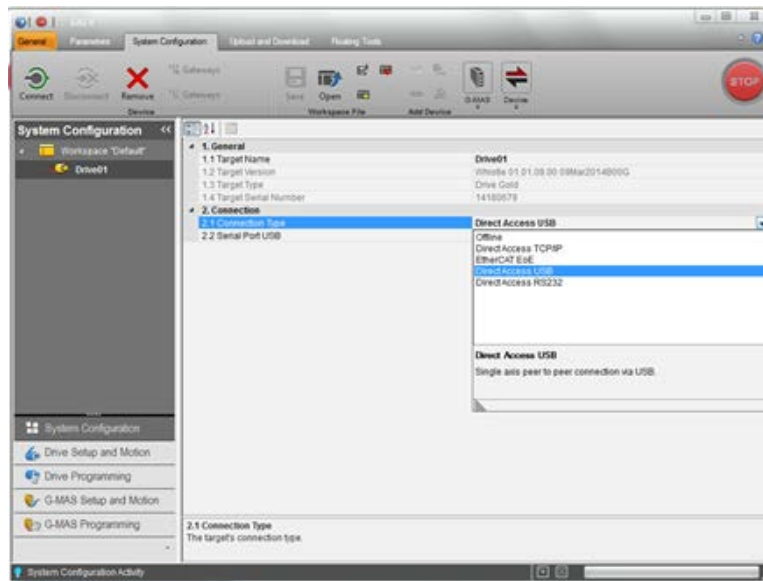


Figure 8

6.1.3 Select Direct Access USB from the pull down menu.

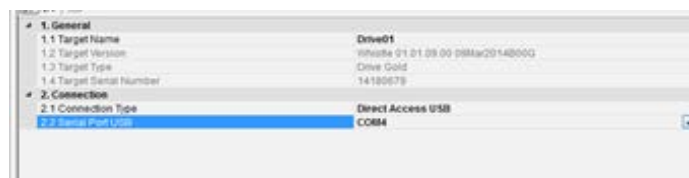


Figure 9



6.1.4 Select the correct communications port (The USB driver will report a virtual com port when it initializes).

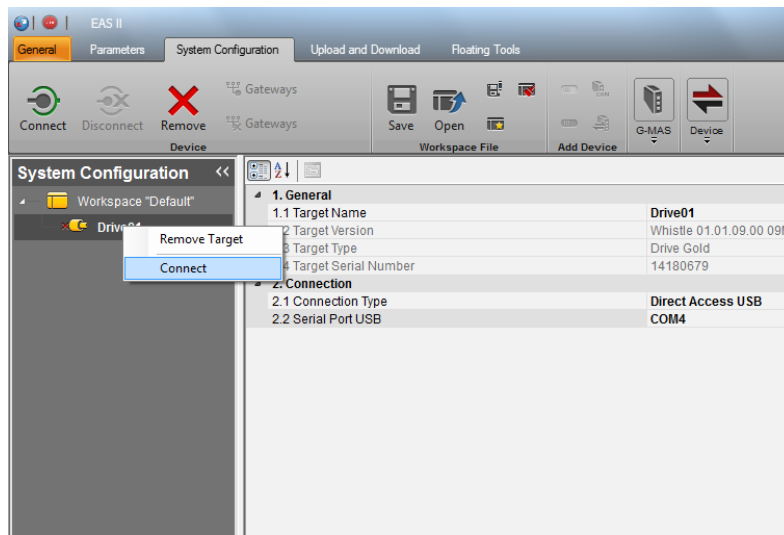


Figure 10

6.1.5 Right Mouse Click on the Drive01 and choose to Connect.

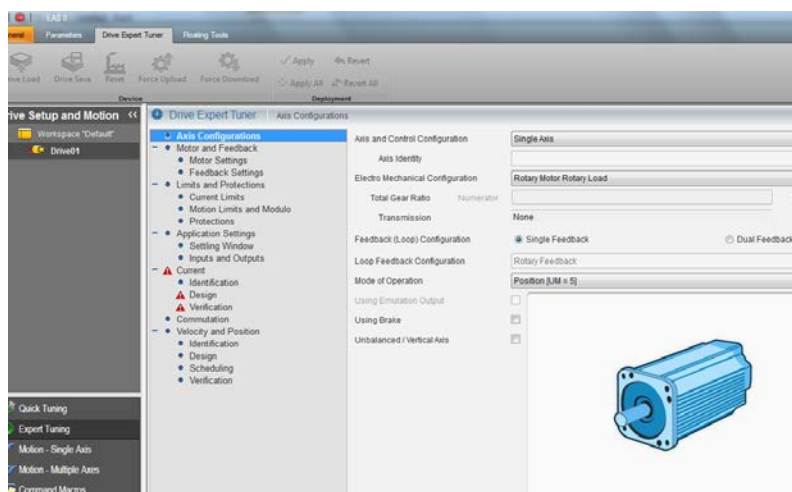


Figure 11



6.1.6 Choose Drive Setup and Motion from the left hand window and then select Expert Tuning.

Note: The list of points below the Drive Expert Tuner are designed to be set one after the other moving down the list (Figure 11).

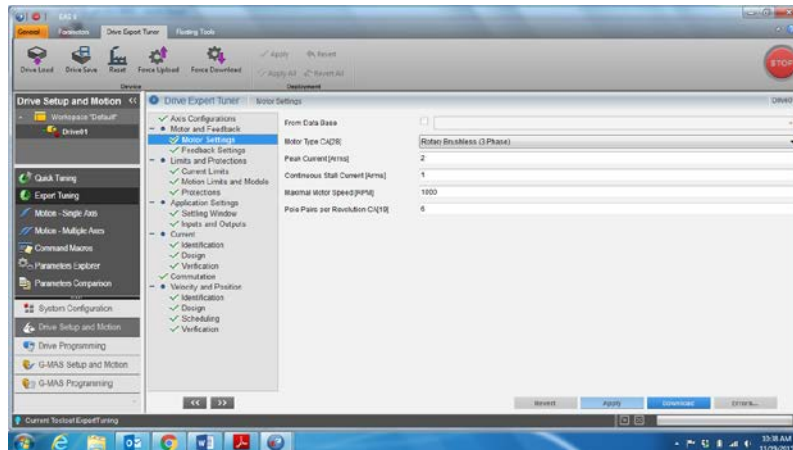


Figure 12



6.1.7 The AgilityRH has 6 poles, your motor values may be different. (Figure 12).

6.2 Set your encoder type.

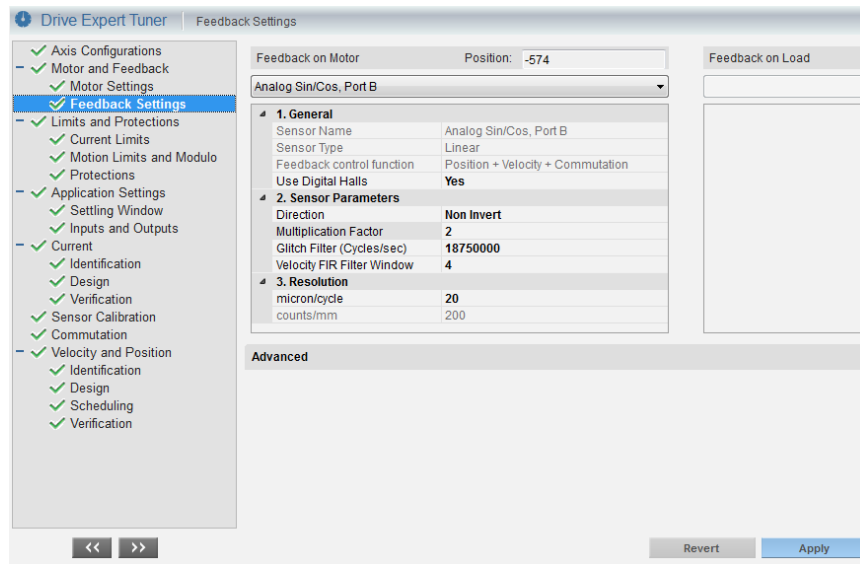


Figure 13

6.2.1 Select Feedback Settings under the Drive Setup and Motion Tab. If our Encoder has a Quadrature Output you would choose the option on top and you would be asked to enter the either the lines or counts per revolution. In this case we chose the Analog Sin/Cos, Port B option and you will enter 20 in the micron/cycle. You can also choose your Multiplication factor.



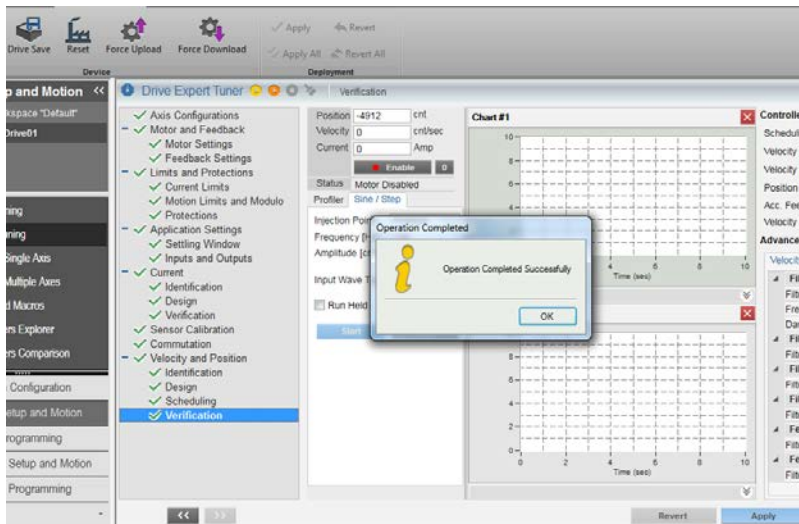


Figure 14

6.2.2 After you step through the rest of the settings and verifications you should finish by Clicking Drive Save (show in the top left of figure 14)

7 CONCLUSION

This document gives a brief description of how to set up an ELMO drive with a MicroE Veratus encoder using ELMO's APPLICATION STUDIO software. It should be used in conjunction with the most recent installation manuals for both components which will be available at www.microsystems.com and www.elmomc.com. There is also application assistance available at celera_support@gsig.com

