

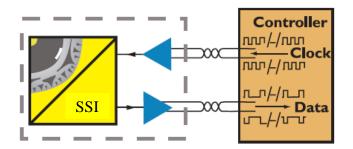
# Using an External SSI Linear Encoder for Dual Loop Mode

#### Objective

Explain how to set up a "Dual Loop" system using an external SSI linear encoder.

#### SSI (Synchronous Serial Interface) Interface Primer

SSI output provides effective synchronization in a closed-loop control system. A clock pulse train from the drive is used to shift out encoder data: one bit of position data is transmitted to the drive per clock pulse received by the sensor.



Key SSI Parameters are:

- Baud Rate
- Communication Bit Resolution Number of data bits used to represent the whole encoder position in the communication message.
- Data Format: Gray Code or Binary Format
- Power Supply Fail Bit Monitoring

Understanding the positional data of a SSI linear encoder:

- The maximum position is based on the Communication Bit Resolution (Number of data Bits) and the units of resolution for each bit.
- Example: A SSI encoder which has 24 bits of position data and resolution of 1 micron has a maximum position of 2^24 (16,777,216) microns



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## Application Tools EZAT-17, rev. 1, 11/01/2010 Applicable Products: SM EZMotion, Digitax ST-Z

Step 1 – External SSI Encoder Setup

CEMERSON Control Techniques - PowerTools		
Eile Edit Device Options Tools View W		
		Select Absolute SSI only
	- Slot Configuration	2
E Vertical	Slot Number Slot 3	
Graph	Slot3 Module Universal Encoder Plus	Select Encoder Voltage Based on
Hardware	SM-Universal Encoder Plus	Encoder Specifications
Slot 1 - Ethernet	Encoder Configuration	Encoder specifications
Slot 2 - EZMotion	Encoder Type Absolute SSI only	
Slot 3 - Universal Encoder Plus	Encoder Setup	Enter Number of Encoder Turn
Drive Menu Initialize	Encoder Supply Voltage 5 Volts	
E Setup		Bits Based on Required
i	Enable Auto Encoder Configuration	Resolution & User Units
🕀 👬 Motion	Encoder Turns 4	
ia filosofians arte intervente anti-arte intervente anti- arte intervente anti-arte intervente anti- arte intervente anti-arte intervente anti- arte intervente anti-arte interv	Encoder Comms Resolution 24	Enter Encoder Communication
	Lines Per Rev	Bit Resolution Based on Encoder
	Lines Per Rev Divider	Specifications
	Encoder Comms Band Rate 500K	-
		Select Encoder Comms Baud
Ready	Path not set Disconnected	Rate Based on Encoder
For Help, press F1	li.	Specifications
Not Applicable		
r r		

Note: Increase Encoder Turns to improved feedback resolution. Feedback resolution is displayed on User Units Setup in Step 2



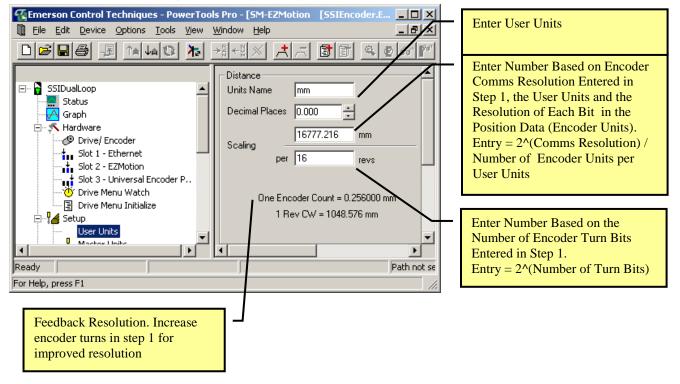
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### Step 2 – User Units Setup



### Step 3 – Dual Loop Setup

	Select the Appropriate Motor Encoder Port
Image: SSIDual.cop     Modeus Node Address	Check the Dual Loop Mode
Status  Graph  Motor Feedback Source Drive  Drive  Dual Loop Control Mode Enable  Dupdate Rate  Dupdate Rate  Dupdate Rate  Dupdate Rate  Dive  Dupdate Rate  Dive  Dive Dive	Select the Appropriate SSI Encoder Port
Image: Second P.     Switching Frequency       Image: Second P.     Second P.       <	Enter number based on the number of motor revs to move the SSI encoder to the full range entered as the numerator in step 2.
pready	Enter Number Based on the Number of Encoder Turn Bits Entered in Step 1. Entry = 2^(Number of Turn Bits)
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#### Step 4 – Master Unit Setup

🔀 Emerson Control Techniques - PowerTools Pro - [SM-EZMotion [SSIEncoder.EZM]]						
🗓 Eile Edit Device Options Tools View Window Help _ 문자						
	<u>* +1+1× + 55 • • • • • • • • • • • • • • • • •</u>					
SSIDualLoop Status Status Hardware Setup User Units User Units Master Units Master Units	Feedback Seurce None         Master Feedback Source       None         Module Variable       Unassigned         Drive Parameter       3.29         Master Polarity       Positive					
Wirtual Master       Position       Velocity       Q       Current	Master Position Setup       Define Home Position       Image: Define Home Positio					
Distance Recovery     Tuning     Errors     Setup NVM     Devices / Vars     I/O Setup     I/O Setup	Master Position Filter Enable Samples 16 Enable Feedforward					
Ready	Path not set					
For Help, press F1	1.					

For Dual Loop Mode Make Sure Master Feedback Source is Set to None.

#### Examples:

Encoder Data Gear		Gearing	PowerTools Configuration						
			PowerTools User Units			SSI Encoder Setup		Dual Loop Setup	
Comm						Encoder			Posn Fdbk
Bits	Resolution	(distance per	Units	Numerator	Denominator	Turns	Resolutio	Enc Revs	Enc Revs
		motor rev)					n		
24	1 Micron	27.5mm/rev	mm	16777.216	16	4	24	610	16
24	1 Micron	27.5mm/rev	mm	16777.216	1024	10	24	610	1024
24	1 Micron	1mm/rev	mm	16777.216	16	4	24	16777	16
25	1 Micron	1mm/rev	mm	33554.432	16	4	25	33554	16

For information on setting up a Dual Loop system with incremental feedback refer to Application Note EZAT-13.

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