Recommended Wiring of the SmartPrecision™ Interpolator

TN-1204 | REV 160621

PURPOSE

This document is an overview of the recommended guidelines for connecting to Mercury™ SmartPrecision™ programmable interpolators. It will allow users to design connections which will ensure the best quality and most reliable encoder performance.

BACKGROUND

The Mercury Series SmartPrecision™ interpolator design is based on a Field Programmable Gate Array or FPGA. The FPGA must be loaded with "code" each time the device is powered on. The code resides in a non-volatile memory device external to the FPGA called a Serial Flash chip. On each power up, a micro-controller on the interpolator loads the code from the Serial Flash device into the FPGA

This code is originally loaded at the factory using "Reserved" pins on the interpolator's HD15 connector. If noise is induced on one of these pins, a "false" download command may be interpreted. As a result, data in the Serial Flash chip can be corrupted. This data corruption will prevent the FPGA from being loaded properly at power up and will interfere with the interpolator's normal function. Units which have been corrupted in this fashion can be reprogrammed in the factory and returned to normal operation.

SOLUTION

To prevent any issues with data corruption, follow these recommendations for connecting to the SS200c, SS300c, and SS350c SmartPrecision™ interpolators with quadrature output or the SS300cSi and SS350cSi interpolators with SPI serial outputs.

- Consult the applicable interface drawing or datasheet available on the Celera Motion website
- Wire up the power, ground, and other signal pins as per the pin map diagrams shown below in Tables 1, 2 or 3 below depending on your applicable interpolator model.
- Pins 2 and 3 are receive and transmit lines for RS232 communication to SmartPrecision™ software. They should only be connected to for this purpose.
- Pins labeled as "Reserved" should not be connected to for any reason.

- Pin 1 is a test pin used only for factory programming. Tie this pin to ground (pin 13) in your mating HD15 connector as displayed in Figure 1 below.
- Warning: Do not apply power to your encoder until pin 1 has been grounded.

Table 1:

SS200c, SS300c, SS350c pin map

HD15 PIN	FUNCTION
1	Ground (at receiving end)
2	RS232 Transmit
3	RS232 Receive
4	A- Quadrature
5	A+ Quadrature
6	Reserved -n/c
7	Reserved -n/c
8	Reserved -n/c
9	B- Quadrature
10	B+ Quadrature
11	Alarm
12	+5V
13	Ground
14	I+ index
15	I+ index

Table 2:

SS350cSi pin map

HD15 PIN	FUNCTION
1	Ground (at receiving end)
2	RS232 Transmit
3	RS232 Receive
4	Serial Data Out- (SDO-)
5	Serial Data Out- (SDO+)
6	Reserved -n/c

7	Chip Select+ (n_CS+)
8	Chip Select+ (n_CS-)
9	Serial Clock Feedback (SCF-)
10	Serial Clock Feedback (SCF+)
11	Alarm
12	+5VDC
13	Ground
14	Serial Clock (SCK+)
15	Serial Clock (SCK-)

Table 3:

SS300cSi pin map

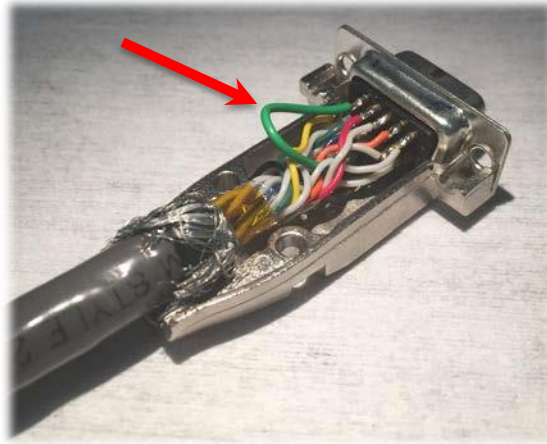| HD15 PIN	FUNCTION
1	Ground (at receiving end)
2	RS232 Transmit
3	RS232 Receive
4	Serial Data Out- (SDO-)
5	Serial Data Out- (SDO+)
6	Reserved -n/c
7	Chip Select+ (n_CS+)
8	Chip Select+ (n_CS-)
9	Trigger- (TRIG-)
10	Trigger- (TRIG+)
11	Inner Shield
12	+5VDC
13	Ground
14	Serial Clock (SCK+)
15	Serial Clock (SCK-)

Fig 1. Example customer cable with pin 1 jumped with green wire to pin 13 (ground).

Recommended Mating Connectors

- NorComp #180-015-203L001 or equivalent
- TE Connectivity #5-748481-6 or equivalent

DO'S & DON'TS:

- Do follow the pin map charts provided with all MicroE encoders
- Do not connect other signals from your system on the reserved pins
- Do ground pin 1 at the receiving end to protect the Serial Flash chip from corruption prior to applying power
- Do not hot-swap encoders by plugging them into powered extension cables

Please contact Celera Motion Applications Engineering Group with ant questions regarding these recommendations.