Specialty Modules Specifications

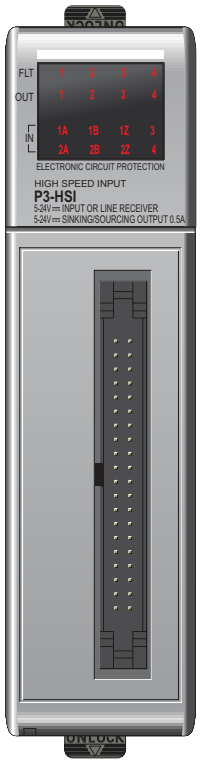
In This Chapter...

High-Speed Input (HSI) Module Overview

The P3-HSI is a high-speed (1MHz) input module. It has both differential (line receiver, 5V max) and single ended (5-24V) inputs that accept Pulse/Direction and Quadrature signals on each of the two independent input channels. Additionally, it has four general purpose high-speed inputs and four general purpose 5–24 VDC, 0.5 amp outputs. All inputs are isolated.

Use the hardware configuration tool in the Productivity Suite programming software to setup the HSI module. See the Productivity Suite help file.

HSI Specifications



General Specifications	
Module Type	Intelligent
Modules per Base	No limit
I/O Points Used	None, mapped directly to tags in CPU
Surrounding Air Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	5.76 W
Enclosure Type	Open Equipment
Emissions	EN61000-6-4 (Conducted and radiated RF emissions)
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in any local, expansion, or remote base in a Productivity3000 System.
Field Wiring	Use *ZIP*Link Wiring System, see Chapter 5. Must use copper conductors rated 75 degrees C or equivalent.
EU Directive	See the "EU Directive" topic in the Productivity3000 Help File. Information can also be obtained at: www.productivitypac.com
Weight	113.4 g (4oz)
Agency Approvals	UL508 file E157382, Canada & USA CE (EN61131-2*)

*Meets EMC and Safety requirements. See the Declaration of Conformity for details.

Connector Specifications	
Connector Type	IDC style header with latch, Omron XG4A-4034
Number of Pins	40 point
Pitch	0.1 in. (2.54 mm)

CPU	Firmware Required	Productivity Suite Required
P3-550	Version 1.1.12.x or later	Version 1.6.x.x or later

No terminal block sold for this module; *ZIP*Link required. See Chapter 5 for part numbers of *ZIP*Link cables and connection modules required with this module.

Power Specifications

External Power	24VDC +10% / -15%, Class 2
Maximum Voltage	26.4 VDC
Minimum Voltage	20.4 VDC
Current Consumption Excluding Outputs	47mA
Maximum Current Consumption Total of the 4 Status Outputs	2A

Differential (5V) Input Specifications

Pulse Inputs	Differential inputs (6 pts: 1A, 1B, 1Z, 2A, 2B, 2Z)
Isolation	Each input is isolated from other circuits
Input Signal Type, per Channel Select	Differential
Input Volts	5VDC
Input Volts Maximum	±5.6 VDC, limited by protection
Input Impedance	200Ω min., 500Ω max.
Inputs Rated Current	5VDC, 15mA 8mA typ., 15mA max.
Input Minimum ON Voltage	3.0 VDC
Input Maximum OFF Voltage	1.0 VDC
Input Minimum ON Current	5.0 mA
Input Maximum OFF Current	2.0 mA
OFF to ON Response Time	1A, 1B, 2A, 2B: 0.48 µs 1Z, 2Z, 3IN, 4IN: 6µs
ON to OFF Response Time	1A, 1B, 2A, 2B: 0.48 µs 1Z, 2Z, 3IN, 4IN: 6µs
Max. Input Frequency	1A, 1B, 2A, 2B: 1MHz 1Z, 2Z, 3IN, 4IN: 300kHz*

Note: The voltage difference between the input pairs must be between 3-5.6 volts.

* The Z pulse input (1Z & 2Z) is capable of capturing a 1 MHz wide pulse for the purpose of resetting an encoder count but a 3 microsecond pause (300 kHz) is required between pulses.

Single Ended (5-24V) Input Specifications

Status Input	Single ended inputs (8 pts: 1A, 1B, 1Z, 2A, 2B, 2Z, 3IN, 4IN)
Isolation	Each input is isolated from other circuits
Input Volts Range	5–24 VDC
Input Volts Maximum	±34 VDC, limited by protection
Input Impedance	1kΩ min., 5kΩ max.
Inputs Rated Current	5–24 VDC, 16mA 5.2 mA typ. @ 5VDC 22mA max. @ 34VDC
Input Minimum ON Voltage	4.5 VDC
Input Maximum OFF Voltage	2.0 VDC
Input Minimum ON Current	5.0 mA
Input Maximum OFF Current	1.4 mA
OFF to ON Response Time	1A, 1B, 2A, 2B: 0.48 µs 1Z, 2Z, 3IN, 4IN: 6µs
ON to OFF Response Time	1A, 1B, 2A, 2B: 0.48 µs 1Z, 2Z, 3IN, 4IN: 6µs
Max. Input Frequency	1A, 1B, 2A, 2B: 200kHz* 1Z, 2Z, 3IN, 4IN: 200kHz*

* Inputs are not limited to this speed but single ended signals are not usually reliable above 200 kHz due to cabling capacitance.

Status Output Specifications		
Status Outputs	4 Outputs	
Output Signal Type, per Output	Current Sinking	Current Sourcing
Operating Voltage[1]	5–24 VDC	5–24 VDC[1]
Output Volts Maximum	36VDC	26.4 VDC[1]
Output Current Maximum	500mA	500mA
Overcurrent Protection	Short circuit detect and current limit with automatic retry for each output	
Output Self Limiting Current	1.2 to 2.4 amps	
Max Inrush Current	Self limited	
Output Voltage Drop	0.7 VDC @ 0.5 A	0.7 VDC @ 0.5 A
Thermal Protection	Independent overtemperature protection each output	
Output Voltage Clamp During Inductive Switching	+45VDC	-20VDC
Maximum OFF to ON Response	25µs[2]	
Maximum ON to OFF Response	25µs[2]	

Notes:
1. Operating voltage of current sourcing outputs must be no greater than external power.
2. Measured at 5VDC operating voltage, 0.5 A load curent.

Resolution of Frequency Measurements for "Fast Mode"		
Input Frequency	**Sampling Period**	**Resolution**
1Hz to 1MHz	1000ms	±1Hz
10Hz to 1MHz	100ms	±10Hz
100Hz to 1MHz	10ms	±100Hz
1MHz	1ms	±1000Hz

Inaccuracy of Frequency Measurements Due to Time Base Errors	
25MHz Crystal for Time Base	
Inaccuracy at 25°C, Maximum	±30 PPM
Inaccuracy 0-60°C, Referenced to 25°C	±30 PPM
Inaccuracy Due to Aging, Maximum	±5 PPM/Year
Max Time Base Inaccuracy 0-60°C and 10 Years Operation	0.01%

Inaccuracy of Frequency Measurements[1,2] for "Slow Mode"			
Input Frequency	Step/Dir	Quadrature 1X	Quadrature 4X
1Hz	±0.002 Hz	±0.002 Hz	±0.002 Hz
10Hz	±0.009 Hz	±0.009 Hz	±0.009 Hz
100Hz	±0.015 Hz	±0.015 Hz	±0.015 Hz
1kHz	±1Hz	±1Hz	±1Hz
10kHz	±100Hz	±100Hz	±100Hz
100kHz	±1000Hz	±1000Hz	±1000Hz
1MHz	±40000Hz	±40000Hz	±40000Hz

Inaccuracy of Frequency Measurements[1,2] for "Fast Mode"				
Input Frequency	Sampling Period	Step/Dir	Quadrature 1X	Quadrature 4X
1Hz	±1 Second	±1Hz	±1Hz	±1Hz
10Hz				
100Hz				
1kHz				
10kHz				
100kHz				
1MHz				

Inaccuracy of Frequency Measurements[1,2,3,4] for "Auto Mode"			
Input Frequency	Step/Dir	Quadrature 1X	Quadrature 4X
1Hz	±1Hz	±1Hz	±1Hz
10Hz			
100Hz			
1kHz			
10kHz	±100Hz	±100Hz	±100Hz
100kHz	±1000Hz	±1000Hz	±1000Hz
1MHz	±10000Hz	±10000Hz	±10000Hz

1. For stable input signal at given input frequency.
2. For total measurement error add the time base error to the tabulated error.
3. Maximum sample period: 1 second.
4. Minimum sample period: 0.001.

Module Range:	Target position range ±2.147 billion (32-bit signed integer)

NOTE: *Refer to the I/O Module Configuration Help File Topic (P212) in the Productivity Suite Software for more information on Mode selections.*

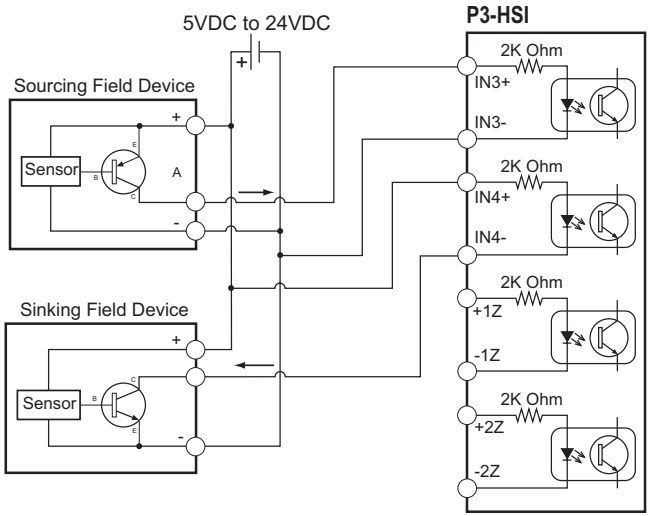
HSI LED Indicators

Status LEDs	
4 Fault Status LEDs	One per status output(FLT1, 2, 3,& 4)
8 Input LEDs	One per status input (1A, 1B, 1Z, 2A, 2B, 2Z, IN3 & IN4)
4 Output Status LEDs	(OUT1, OUT 2, OUT3, & OUT4)

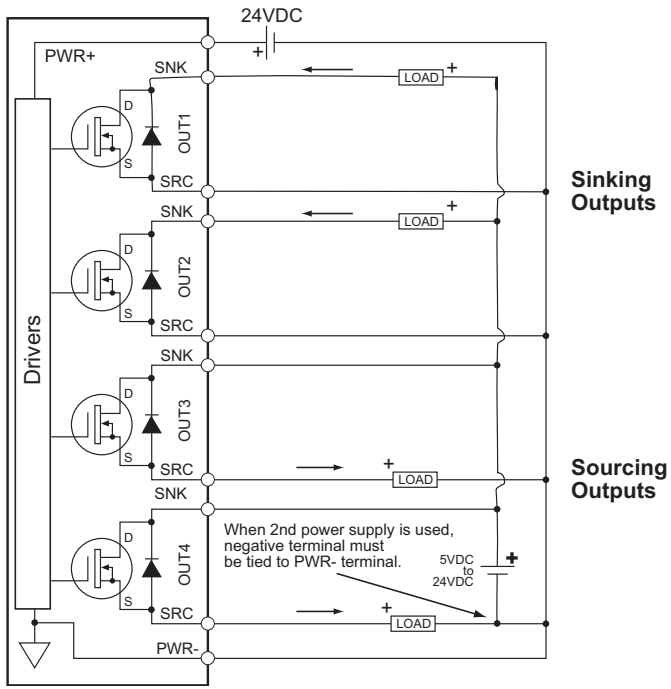
Note: All front panel fault LED's blinking indicates loss of external power.

HSI Wiring Examples

Status Inputs Wiring Diagram

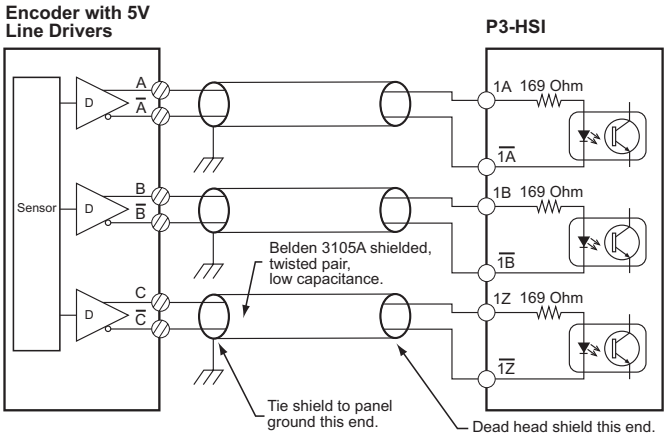


Status Outputs Wiring Diagram

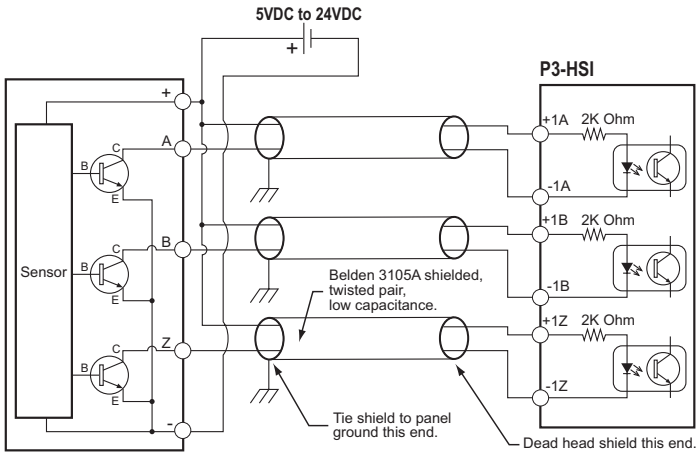


5V Encoder Inputs Wiring Diagram

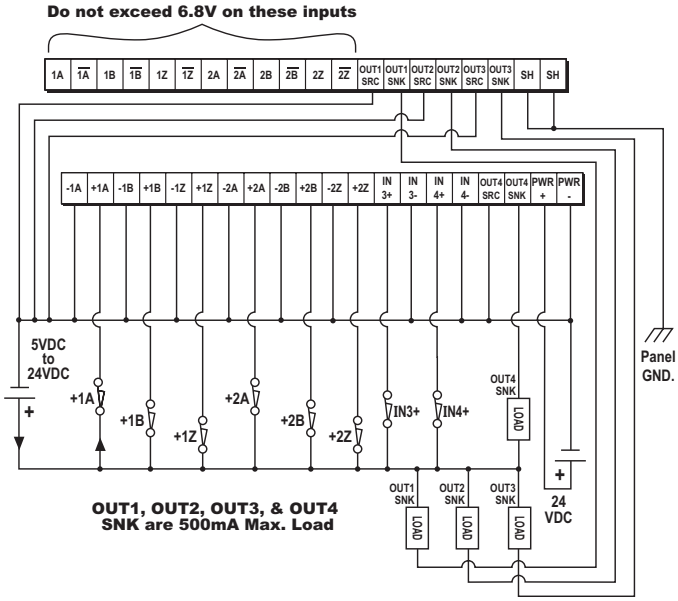
To prevent damage to P3-HSI 5V inputs,
do not exceed 6.8V or 30 mA on inputs
1A, $\overline{1A}$, 1B, $\overline{1B}$, 1Z, $\overline{1Z}$, 2A, $\overline{2A}$, 2B, $\overline{2B}$, 2Z, & $\overline{2Z}$.



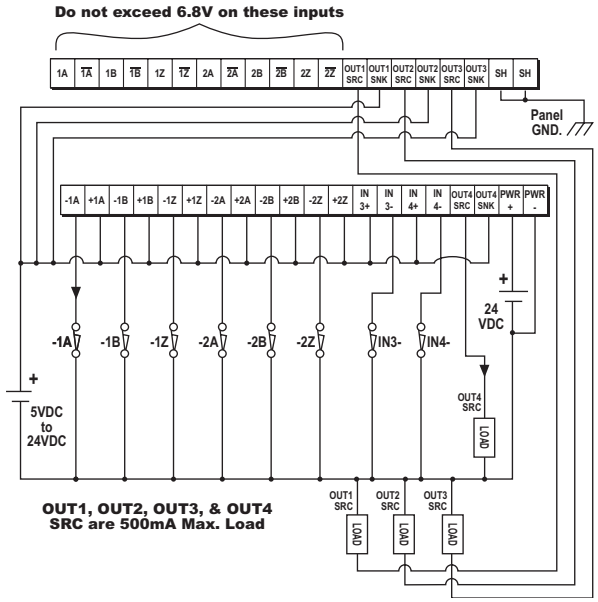
24V Encoder Inputs Wiring Diagram



Sinking I/O Wiring Diagram



Sourcing I/O Wiring Diagram



High-Speed Output (HSO) Module Overview

The P3-HSO is a high-speed (1MHz) output module that supports Pulse/Direction, Up/Down and Quadrature pulse output on each of the two independent output channels. It has both line driver and open drain outputs. Additionally, it has six general purpose high-speed inputs and four general purpose outputs. Simple move, velocity move, and additional high level instructions make it easy to implement the application's motion profile.

Use the hardware configuration tool in the Productivity Suite programming software to setup the HSO module. See the Productivity Suite help file.

HSO Specifications

General Specifications	
Module Type	Intelligent
Modules per Base	No limit
I/O Points Used	None, mapped directly to tags in CPU
Surrounding Air Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-20° to 70°C (-4° to 158°F)
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	1800VAC applied for 1 second
Insulation Resistance	>10MΩ @ 500VDC
Heat Dissipation	6.26 W
Enclosure Type	Open Equipment
Emissions	EN61000-6-4 (Conducted and radiated RF emissions)
Agency Approvals	UL508 file E157382, Canada & USA CE (EN61131-2*)
Module Keying to Backplane	Electronic
Module Location	Any I/O slot in any local, expansion, or remote base in a Productivity3000 System.
Field Wiring	Use ZIPLink Wiring System, see Chapter 5. Must use copper conductors rated 75 degrees C or equivalent.
EU Directive	See the "EU Directive" topic in the Productivity3000 Help File. Information can also be obtained at: www.productivitypac.com
Weight	114g (4oz)

*Meets EMC and Safety requirements. See the Declaration of Conformity for details.

Connector Specifications	
Connector Type	IDC style header with latch, Omron XG4A-4034
Number of Pins	40 point
Pitch	0.1 in. (2.54 mm)

CPU	Firmware Required	Productivity Suite Required
P3-550	Version 1.1.12.x or later	Version 1.6.x.x or later

No terminal block sold for this module; *ZIP*Link required. See Chapter 5 for part numbers of *ZIP*Link cables and connection modules required with this module.

Power Specifications

External Power	24VDC +10%/-15%, Class 2
Maximum Voltage	26.4 VDC
Minimum Voltage	20.4 VDC
Current Consumption Excluding Outputs	130mA
Maximum Current Consumption Total of the 4 Status Outputs	2A

Pulse Outputs Specifications

Pulse Outputs	2 Channels	
Output Pulse Type, per Channel Select	Selectable for pulse & direction, up/down or quadrature	
Output Signal Type, per Channel Select	**RS-422 Line Driver** Current Sinking and Sourcing	**Open Drain FET Outputs** Current Sinking
Output Volts	RS-422 levels	24VDC
Output Volts Maximum	5VDC	36VDC
Protection for Overcurrent and Short Circuit to Power	Current limit and Thermal shutdown[2]	Current limit and Thermal shutdown[1]
Protection Short to Ground	Yes	Yes
Overcurrent Trip Level	Output current limit ±200mA max.[2]	100mA minimum
Maximum Continuous Output Current	±60mA	40mA
Max Switching Frequency, 1m Cable	1MHz	500kHz*
Max Switching Frequency, 10m Cable	1MHz	200kHz*

Notes:
1. Any fault shuts off the output. Fault is indicated and output is kept off until a new move start is received.
2. RS-422 thermal faults auto reset after device cool down.

* Outputs are not limited to these speeds but single ended signals produced by the FETs are not usually reliable above these speeds due to cabling capacitance.

Status Input Specifications

Status Input	6 inputs
Isolation	Each status input is individually isolated from all other circuits
Input Volts Range	5–24 VDC
Input Volts Maximum	±34VDC, limited by protection
Input Impedance	1kΩ min., 5kΩ max.
Inputs Rated Current	5–24 VDC, 16mA 5.2 mA typ. @ 5VDC 22mA max. @ 34VDC
Input Minimum ON Voltage	4.5 VDC
Input Maximum OFF Voltage	2.0 VDC
Input Minimum ON Current	5.0 mA
Input Maximum OFF Current	1.4 mA
OFF to ON Response Time	4µs
ON to OFF Response Time	4µs

Status Output Specifications		
Status Outputs	4 Outputs	
Output Signal Type, per Output	Current Sinking	Current Sourcing
Operating Voltage[1]	5–24VDC	5–24VDC[1]
Output Volts Maximum	36VDC	26.4 VDC[1]
Output Current Maximum	500mA	500mA
Overcurrent Protection	Short circuit detect, overcurrent shutdown[1]	
Output Self Limiting Current	1.2 to 2.4 amps	
Max. Inrush Current	Self limited	
Output Voltage Drop	0.7 VDC @ 0.5 A	0.7 VDC @ 0.5 A
Thermal Protection	Independent overtemperature protection each output	
Output Voltage Clamp During Inductive Switching	+45VDC	-20VDC
Maximum OFF to ON Response	25µs[2]	
Maximum ON to OFF Response	25µs[2]	

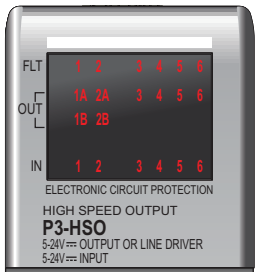
Notes:
1. Any fault shuts off the output. Fault is indicated and output is kept off until a new move start is received.
2. Operating voltage for current sourcing outputs must be less or equal to the External power.
3. Measured at 5V operating voltage, 0.5 A load.

Resolution of Frequency Output Measurements	
Output Frequency	**Resolution**
1kHz	0.01 Hz
10kHz	0.67 Hz
100kHz	67Hz
1MHz	6622Hz

Inaccuracy of Output Frequency Due to Time Base Errors	
25 MHz Crystal for Time Base	
Inaccuracy at 25°C, Maximum	±30 PPM
Inaccuracy 0-60°C, Referenced to 25°C	±30 PPM
Inaccuracy Due to Aging, Maximum	±5 PPM/Year
Max Time Base Inaccuracy 0-60°C and 10 Years Operation	0.01%

Module Range:	Target position range ±2.147 billion (32-bit signed integer)

HSO LED Indicators



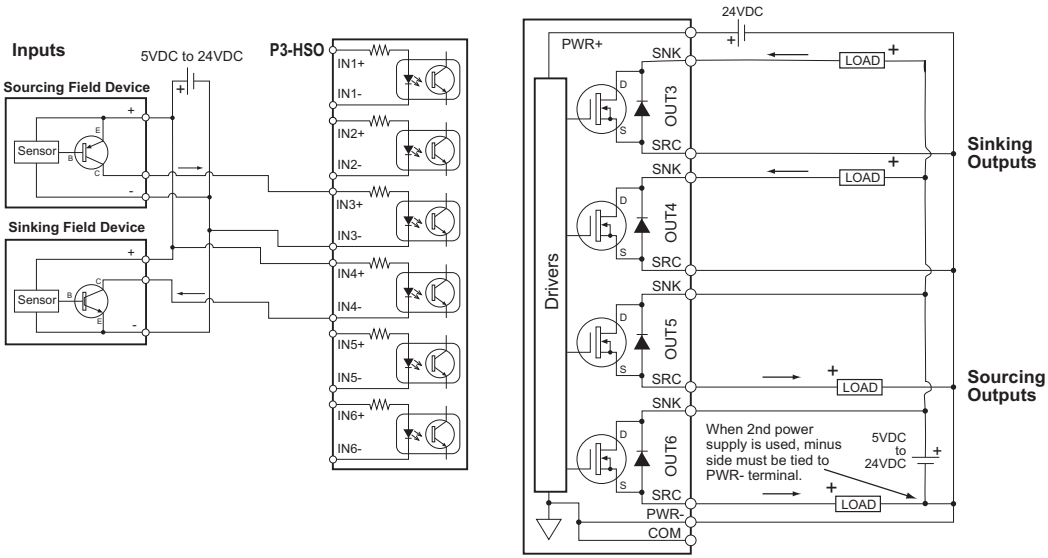
Status LEDs	
6 Fault Status LEDs	One per pulse output and one per status output (FLT1, 2, 3, 4, 5 & 6)
6 Input LEDs	One per status input (IN1, 2, 3, 4, 5 & 6)
8 Output Status LEDs	(OUT1A &1B, OUT 2A & 2B, OUT3, 4, 5 & 6)

Note: All front panel fault LED's blinking indicates loss of external power.

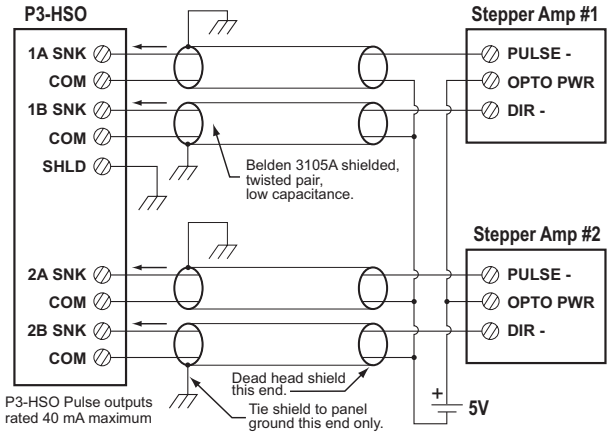
4

HSO Wiring Examples

Status Inputs and Outputs



Sinking Pulse Output Wiring Diagram



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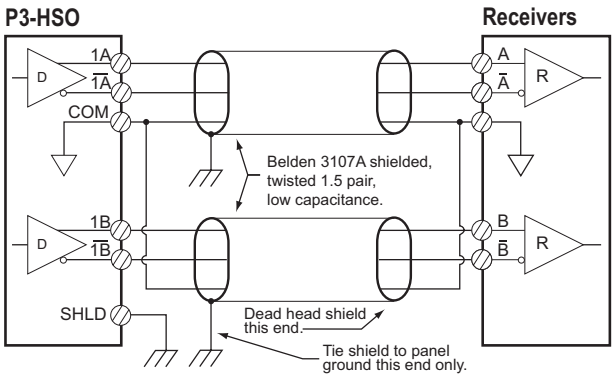
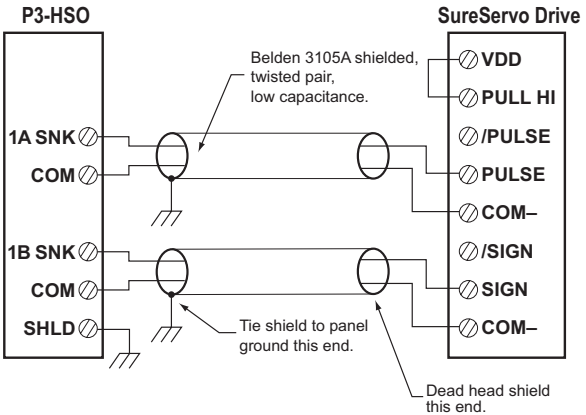
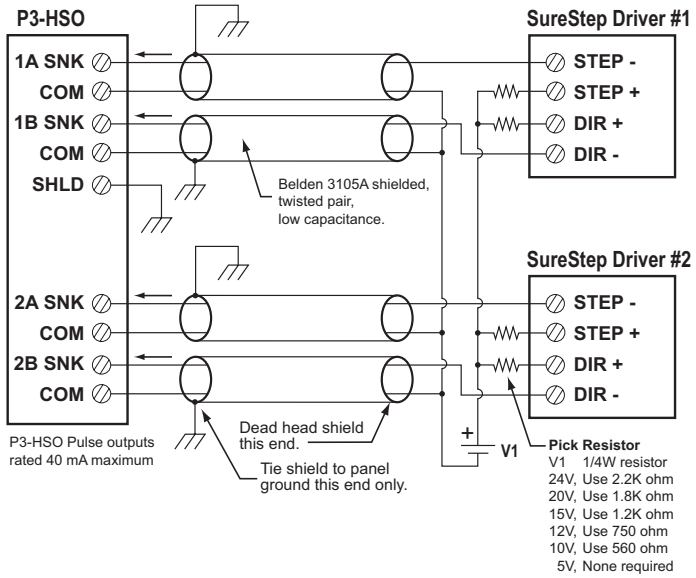
Line Driver Pulse Output Wiring Diagram



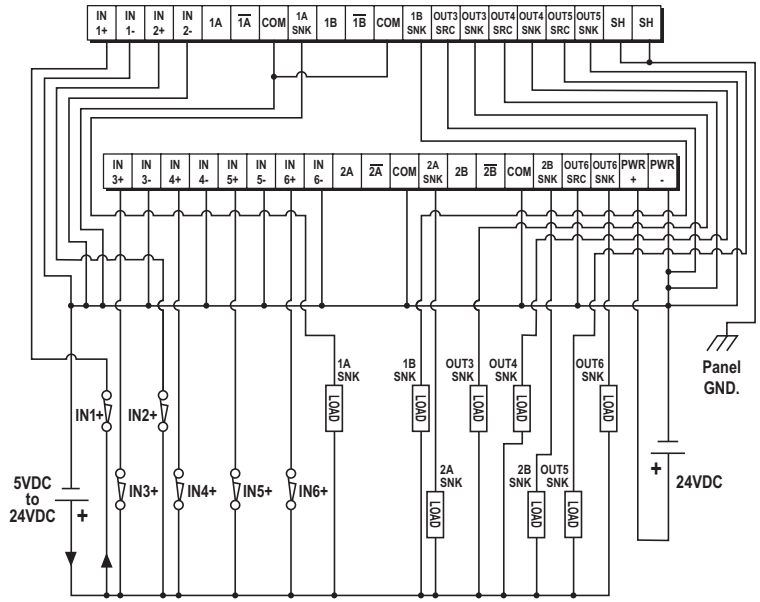
SureServo Wiring Diagram



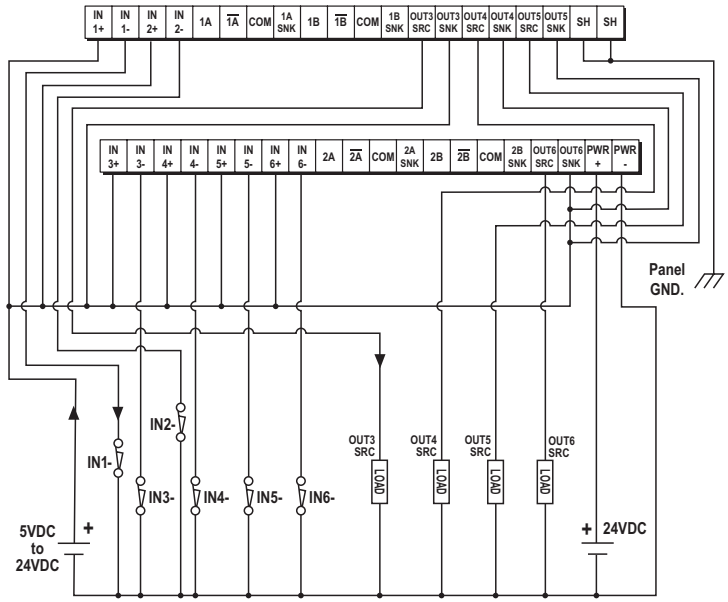
SureStep Wiring Diagram



Sinking I/O Wiring Diagram

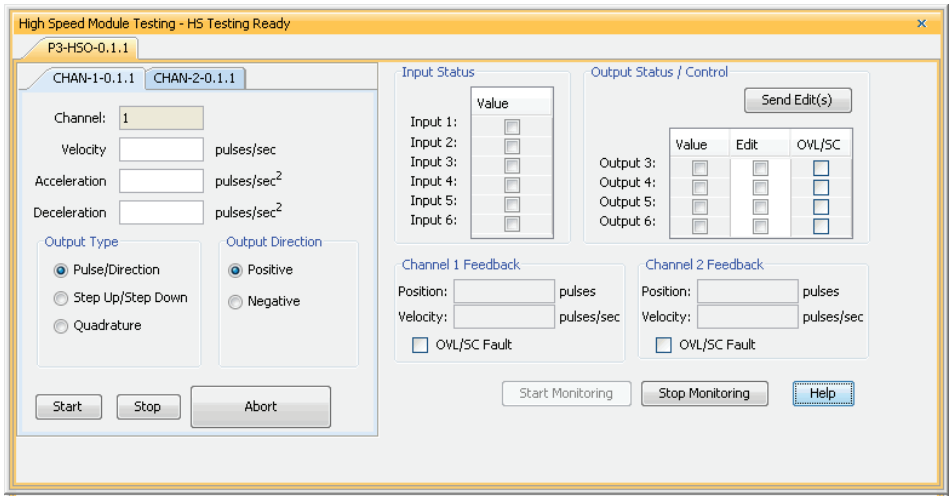


Sourcing I/O Wiring Diagram



High-Speed Module Tester Utility

The High-Speed Module Tester is a software utility that allows a user to test the P3-HSO module's inputs and outputs. It is highly recommended that you simulate your P3-HSO functions before attempting to control the module from your CPU program. This software utility, seen below, can be useful with debugging, confirming field wiring and verifying external device operation.



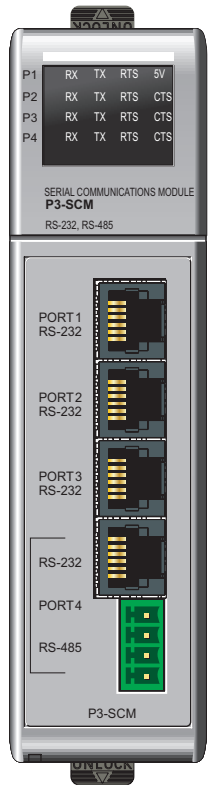
Refer to the Productivity Suite help file for more information on the High-Speed Module Tester Utility.

P3-SCM Serial Communications Module

The P3-SCM is a 4-port serial communications module capable of Modbus, ASCII and Custom Communications Protocols. The P3-SCM is also able to power the C-more Micro through RS-232 (Port 1 only) for use with the Productivity3000.

This module contains (4) RS-232 (RJ12) ports half or full duplex, (1) RS-485 port (4-wire terminal block) half duplex, all supporting Modbus RTU Master/Slave, ASCII In/Out and Custom Protocol up to 38.4K baud rate.

P3-SCM Specifications



Removable RS-485 Terminal Connector included. Spare connectors available (part no. P3-RS485CON-1).

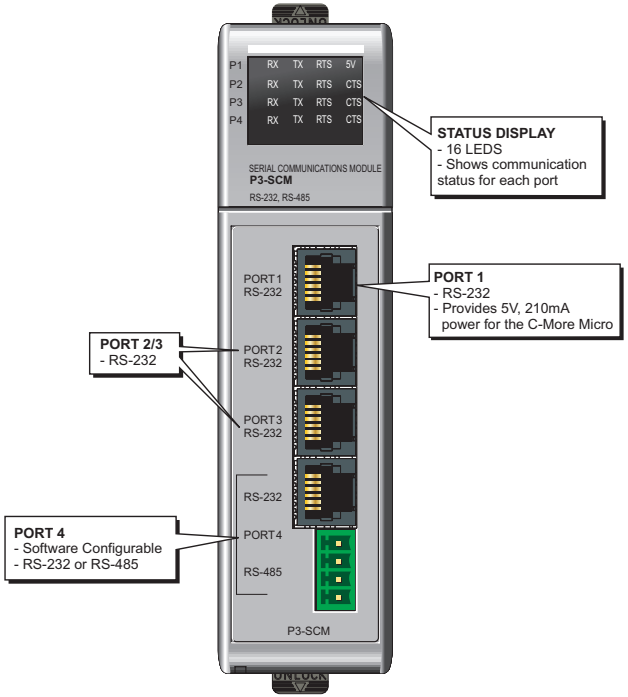
General Specifications	
Module Type	Intelligent
Modules per Base	Base size limited, 11 Max
Modules per Group	11 Max
I/O Points Used	None, mapped directly to tags in CPU
Field Wiring Connector	4 - RJ12, 1 - 4 Position Terminal Block
Operating Temperature	0° to 60°C (32° to 140°F) IEC 60068-2-14 (Test Nb, Thermal Shock)
Storage Temperature	-20° to 70°C (-4° to 158°F) IEC 60068-2-1 (Test Ab, Cold) IEC 60068-2-2 (Test Bb, Dry Heat) IEC 60068-2-14 (Test Na, Thermal Shock)
Humidity	5 to 95% (non-condensing) IEC 60068-2-30 (Test Db, Damp Heat)
Environmental Air	No corrosive gases permitted (EN61131-2 pollution degree 1)
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Field to Logic Side Isolation	None
Insulation Resistance	No Isolation
Noise Immunity	NEMA ICS3-304 IEC 61000-4-2 (ESD) Impulse 1000V @ 1µS pulse IEC 61000-4-4 (FTB) RFI, (145MHz, 440MHz 5W @ 15cm) IEC 61000-4-3 (RFI)
Emissions	EN61000-6-4 (Conducted and radiated RF emissions)
Module Location	Any I/O slot in any local, expansion, or remote base in a Productivity3000 System.
Weight	260g (9oz)
Agency Approvals[1]	UL508 file E157382, Canada & USA CE (EN61131-2007)

1. To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page

Removable Terminal Block Specifications	
Number of Positions	4 Screw Terminals, 3.5MM Pitch
Wire Range	16–28 AWG, Solid/Stranded Conductor "Use Copper Conductors, 75°C or Equivalent".
Screwdriver Size	TW-SD-VSL-1 (recommended)
Screw Torque	0.4 N·m

RS-485 Cable Options	
Recommended	Recommend L19827-100, L19827-500, L19827-1000 or Belden #9841

CPU	Firmware Required	Productivity Suite Required
P3-530	Version 1.1.15.x or later	Version 1.6.x.x or later
P3-550	Version 1.1.12.x or later	



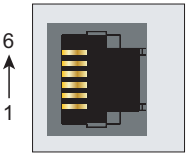
P3-SCM Configuration Options

Configuration Item	Port 1 (RS-232)	Ports 2, 3 & 4 (RS-232)	Port 4 (when RS-485)
Protocol Selections	Disabled, Modbus RTU, ASCII/Custom		
Data Rate	1200,2400,4800,9600,19200, 33600, & 38400		
Parity	None, Odd or Even		
Data Bits[4]	7 or 8 Bit		
RTS Off Delay Time[1]	None, or 0–5,000 msec		N/A
RTS On Delay Time[1]	None, or 0–5,000 msec		N/A
Modbus Character Timeout[2]	None, or 0–10,000 msec		
Communication Timeout (Timeout between query and response)	100–30,000 msec		
Response/Request Delay Time	N/A		None, or 1–5,000 msec
Comm Heartbeat Value[2]	2–1,000 sec		
Node Address (Station)	1 to 247		
CTS	N/A	Ignore, Wait, System Input[3]	N/A
Enable/Disable CTS Wait Timeout	N/A	Enable Timeout, Disable Timeout (Never Timeout)	N/A
CTS Wait Timeout	N/A	100–999,900 msec	N/A
RTS	On, Off, Assert During Transmit, System Output		N/A
Port 4 RS-485 2-Wire Mode	N/A		Disable, Enable
MODBUS Port Security	Read/Write, Read Only		

1. For “None” selection with Modbus RTU protocol, Modbus.org minimums are used. This minimum is 3.5 character times up to 19, 200 baud rate and 1.75 ms over 19,200 baud rate.
2. Only applies to MODBUS messages
3. CTS signal is only provided on Ports 2, 3 & 4
4. 7-bit data is only supported with Odd or Even parity

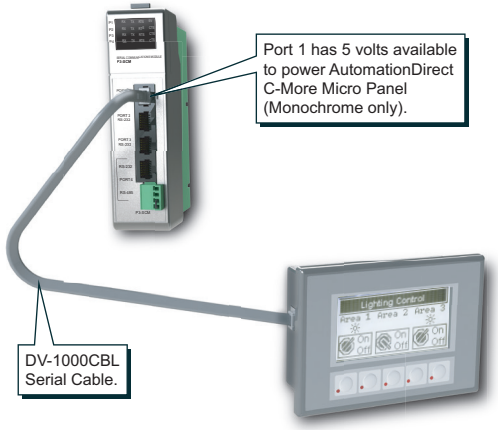
Port 1 RS-232 Specifications

Port Name	RS-232
Description	Non-isolated RS-232 DTE port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection.
Data Rates	Selectable, 1200, 2400, 4800, 9600, 19200, 33600 and 38400.
+5V Cable Power Source	210mA maximum at 5V, ± 5%. Reverse polarity and overload protected.
TXD	RS-232 Transmit output
RXD	RS-232 Receive input
RTS	Handshaking output for modem control.
GND	Logic ground
Maximum Output Load (TXD/RTS)	3kΩ, 1,000pf
Minimum Output Voltage Swing	±5V
Output Short Circuit Protection	±15mA
Port Status LED	Red LED is illuminated when active for TXD, RXD, RTS



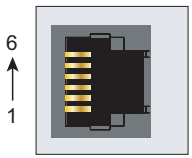
6-pin RJ12 Female Modular Connector

Pin #	Signal	
1	GND	Logic Ground
2	+5V	210mA Maximum
3	RXD	RS-232 Input
4	TXD	RS-232 Output
5	RTS	RS-232 Output
6	GND	Logic Ground



Ports 2, 3 and 4 RS-232 Specifications

Port Name	RS-232
Description	Non-isolated RS-232 DTE port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection.
Data Rates	Selectable, 1200, 2400, 4800, 9600, 19200, 33600 and 38400.
TXD	RS-232 Transmit output
RXD	RS-232 Receive input
RTS	Handshaking output for flow control.
CTS	Handshaking input for flow control.
GND	Logic ground
Maximum Output Load (TXD/RTS)	3kΩ, 1,000pf
Minimum Output Voltage Swing	±5V
Output Short Circuit Protection	±15mA
Port Status LED	Red LED is illuminated when active for TXD, RXD, RTS



6-pin RJ12 Female Modular Connector

Pin #	Signal	
1	GND	Logic Ground
2	CTS	RS-232 Input
3	RXD	RS-232 Input
4	TXD	RS-232 Output
5	RTS	RS-232 Output
6	GND	Logic Ground

RS-232 Ports 1, 2, 3 and 4

Electrical Specifications	Min	Typ	Max	Units
Output ON (3kΩ, 1000pF Load)	5.0	5.2		Volts
Output OFF (3kΩ, 1000pF Load)		-5.2	-5.0	Volts
Output Short-Circuit Current		15		mA
Short-Circuit Duration			No Limit	Seconds
Output Resistance	300			Ohm
Input ON Threshold		1.6	2.4	Volts
Input OFF Threshold	0.6	1.2		Volts
Input Resistance	3k	5k	7k	Ohm

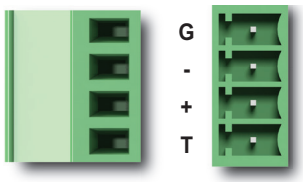
Line Specifications for RS-232 Ports

RS-232 Line Specifications	Options	Units
Data Rate Setting	1200,2400,4800,9600,19200, 33600, & 38400	Baud
Data Rate Error	±2	%
Data Bits Setting[1]	7 or 8	Bits
Stop Bits Setting	1	Bits
Parity Setting	None[1], Odd or Even	Parity
Data Transmission	Half duplex or Full duplex[2]	N/A
Network	Point-to-Point	N/A

1. 7-bit data are only supported with odd or even parity
2. Full duplex is only supported for ASCII/Custom Protocol

Port 4 (RS-485 Configuration)

Port Name	RS-485
Description	Non-isolated RS-485 port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD/EFT protection and automatic echo cancellation when transmitter is active.
Data Rates	Selectable, 1200, 2400, 4800, 9600, 19200, 33600 and 38400.
TXD+/RXD+	RS-485 transceiver high
TXD-/RXD-	RS-485 transceiver low
GND	Logic ground
Input Impedance	19KΩ
Maximum load	50 transceivers, 19kΩ each, 60Ω termination (two 120Ω resistors at each end)
Output Short-Circuit Protection	±250mA, thermal shut-down protection
Electrostatic Discharge Protection	±8KV per IEC1000-4-2
Electrical Fast Transient Protection	±2KV per IEC1000-4-4.
Minimum Differential Output Voltage	1.5V with 60Ω load
Fail safe inputs	Logic high input state if inputs are unconnected
Maximum Common Mode Voltage	-7.5V to 12.5V.
Port Status LED	Red LED illuminated when active for TXD and RXD
Cable Options	Recommend L19827-100, L19827-500, L19827-1000 or Belden #984



Pin #	Signal
G	GND
–	TXD-/RXD-
+	TXD+/RXD+
T	TERMINATION

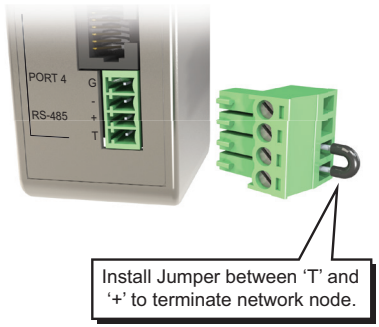
RS-485 Port 4

Electrical Specifications	Min	Type	Max	Units
Driver Differential Output (60Ω load)	1.5			Volts
Driver Common-Mode Output			3	Volts
Driver Short-Circuit Output Current			250	mA
Short-Circuit Duration (Thermal Shutdown)			No Limit	Seconds
Receiver Differential Input Threshold	200			mV
Receiver Common-Mode Input	-7		12	Volts
Input Resistance	12k			Ohm
Termination Resistance (TB jumper wire 'T' to '+')		120		Ohm
Cable Length (38400 BAUD max.)			1200	Meters

Line Specifications for RS-485 Port

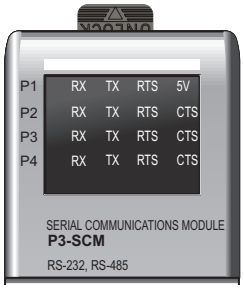
RS-485 Line Specifications	Options	Units
Data Rate Setting	1200,2400,4800,9600,19200, 33600, & 38400	Baud
Data Rate Error	±2	%
Data Bits Setting[1]	7 or 8	Bits
Stop Bits Setting	1	Bits
Parity Setting	None[1], Odd or Even	Parity
Data Transmission	Half duplex	N/A

1. 7-bit data are only supported with odd or even parity



* Jumper not included

P3-SCM LED Indicators



Diagnostic LEDs

LED	Port 1	Port 2	Port 3	Port 4
RXD	X	X	X	X
TXD	X	X	X	X
RTS	X	X	X	X
CTS		X	X	X
5V	X			

1. All RS232 & RS485 LED's reflect the actual electrical level of the signal, there is no direct firmware control of LED's
2. RS232 LED's RXD, TXD, RTS & CTS are turned ON when their voltage on the RS232 wire is postive
   a - This occurs when the UART I/O signal is low (GND)
   b - They are turned OFF when the voltage on the RS232 wire is negative
3. RS485 LED's RXD, TXD, RTS & CTS are turned ON when the UART I/O signal is low (GND)
4. 5V LED is ON when 5V power is good, 5V LED is OFF when 5V is shorted to ground

Port 4 LED Behavior

Port 4	RX	TX	RTS	CTS
RS232	Flickers on RXD activity, OFF when idle	Flickers on TXD activity, OFF when idle	ON when asserted, OFF otherwise	ON when asserted, OFF otherwise
RS485				Always OFF

Notes