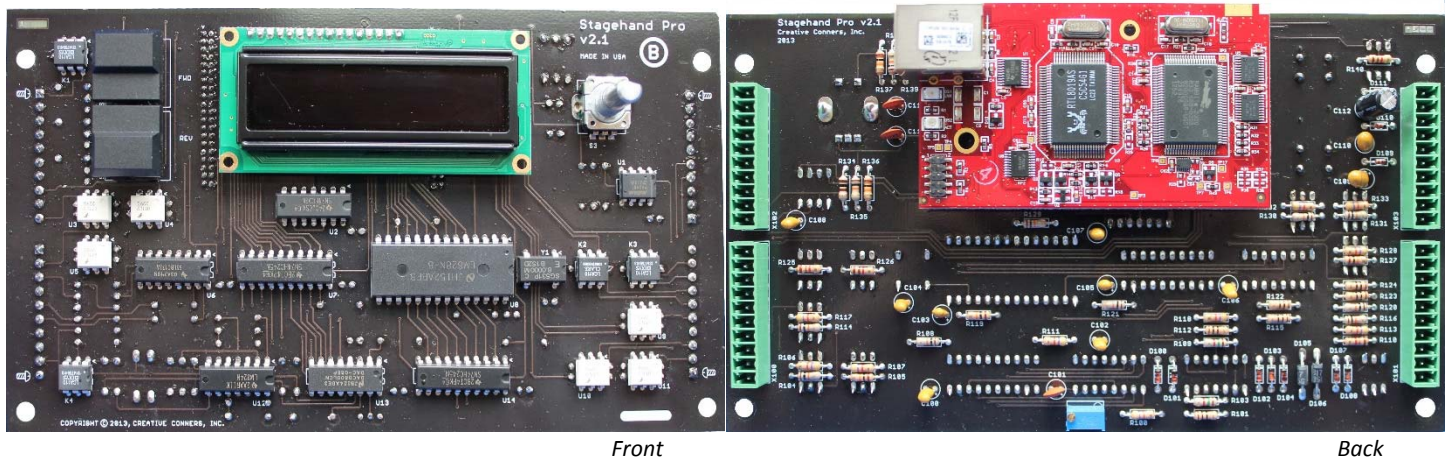


Stagehand Pro OEM

Creative Conners, Inc.



The Stagehand Pro OEM Board is a full-featured scenic motion controller from Creative Conners, Inc. The feature rich, fully redesigned circuit board is the perfect companion for our Spikemark™ software. The Pro line features allow you to build smarter custom controllers, yet keeps its trademark simplicity and flexibility. With more safety inputs and open ended ports you can satisfy all your automation needs.

Features:

- Ethernet control through Spikemark™
- Rack-mount friendly design
- On screen encoder feedback
- Stunning OLED character display
- Update firmware remotely through Spikemark™
- Forward and reverse buttons
- Manual jog speed control knob
- Simple IP Configuration
- Brake fault indication
- VFD fault indication.
- Enable output signal
- RS 485 link
- +/- 10vdc speed control signal
- Quadratic encoder input with differential line drivers
- Forward/reverse limits
- Ultimate Limits
- Emergency stop
- Auxiliary serial port

1. Change History

1.1. Datasheet Changes

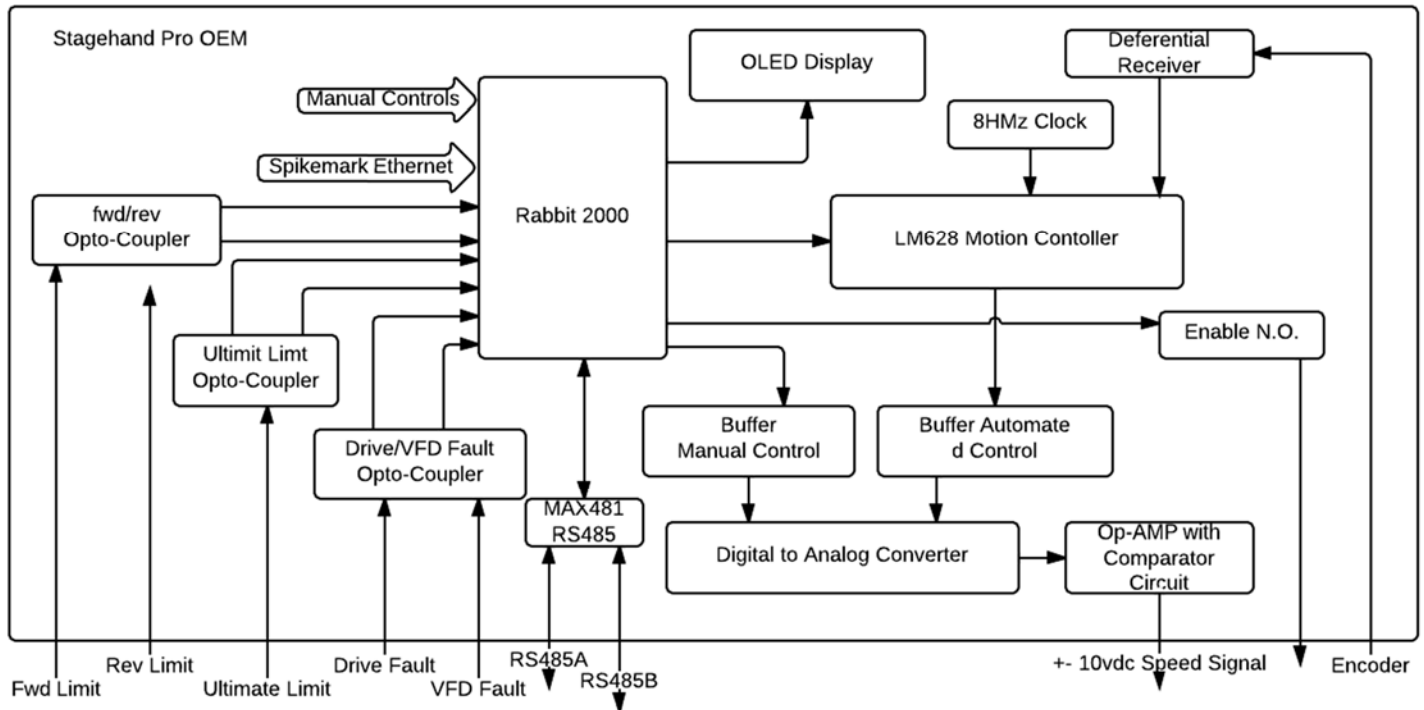
Rev	Changes	Date
1.0	Original Release for review.	9/26/2013

1.2. PBC Changes

Rev	Changes	Date
A	Prototype, released for review and testing.	7/25/2013
B	<ol style="list-style-type: none"> Minor board design changes. Silkscreen and color change. Added decoupling capacitors. 	9/1/2013

2. Block Diagram

2.1. Diagram 1

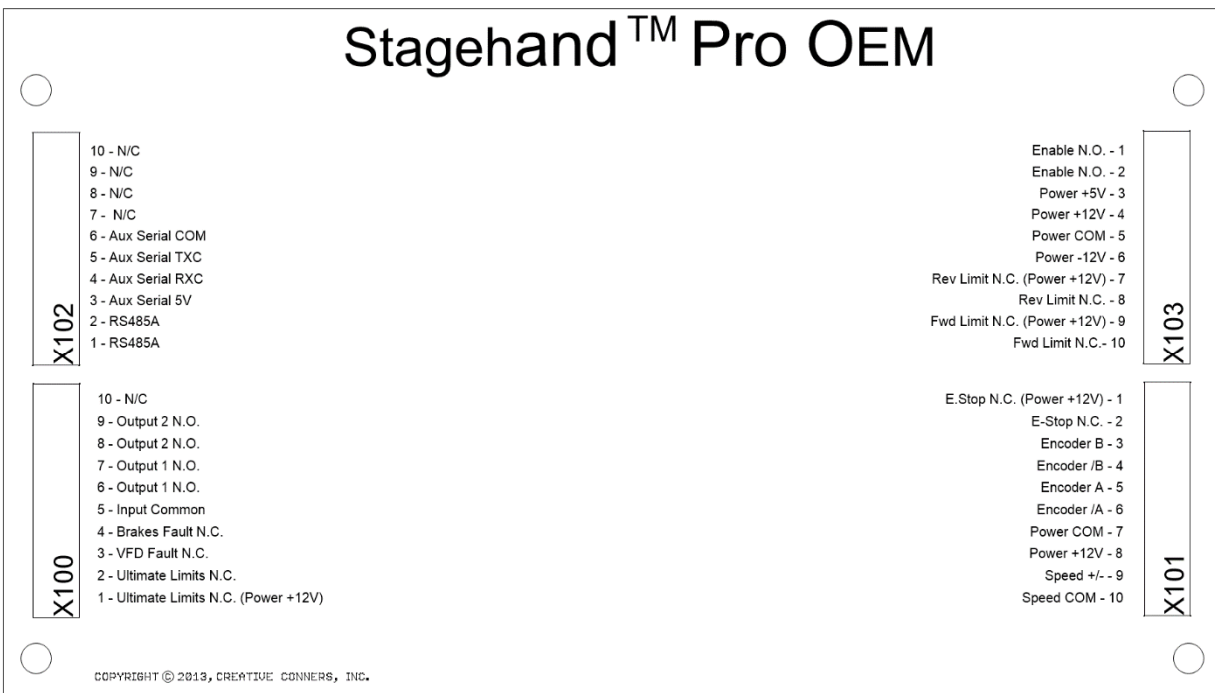


2.2. Encoder Characteristics:

Encoder Input	Min	Max
Velocity	0 counts/second	15,999,023 counts/second
Acceleration	0 counts/second/second	15,999,023 counts/second/second
Position	-1,073,741,824 counts	1,073,741,823 counts

3. Terminal Block layout.

3.1. Package



3.2. Pin out Descriptions

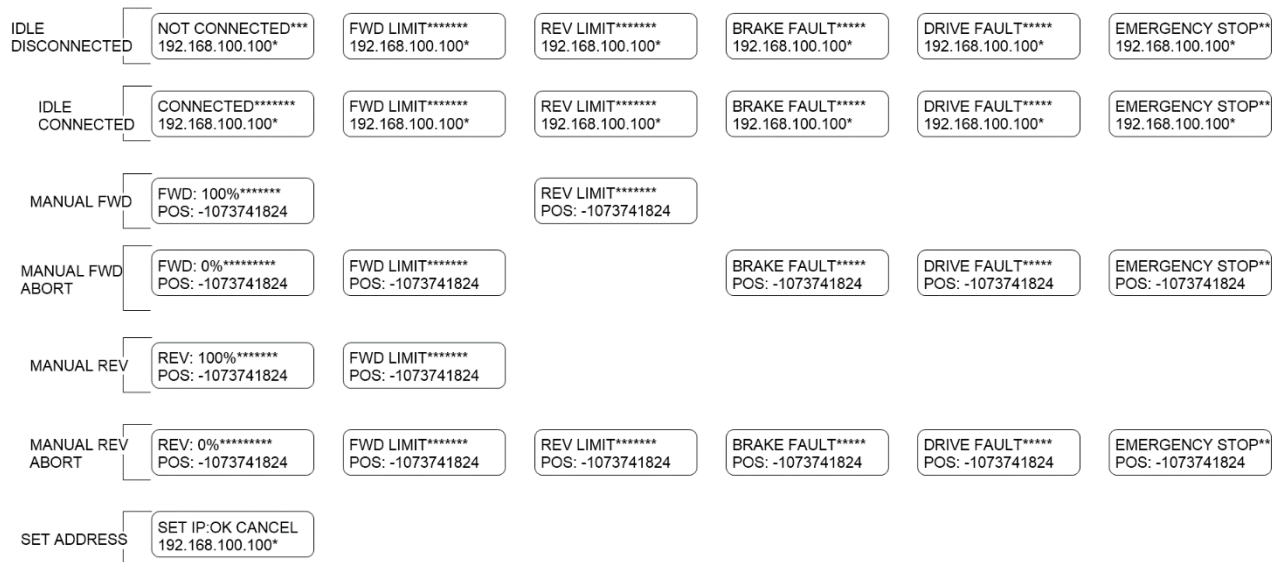
Connector Number	Label	Type	Description	Operation Statistics		
				Min	Typical	Max
X100	1	Ultimate Limits N.C.	Output		12.4v	
	2	Ultimate Limits N.C.	Input		12.4v	13v
	3	VFD Fault N.C.	Input	3v	24v	24v
	4	Brakes Fault N.C.	Input	3v	24v	24v

	5	Input Common	Common	This common is tied to cathode of both optocouplers of the VFD and Brake Fault.	Com	Com	Com
	6	Output 1 N.O.	N/A	N/A Currently not used			
	7	Output 1 N.O.	N/A	N/A Currently not used			
	8	Output 2 N.O.	N/A	N/A Currently not used			
	9	Output 2 N.O.	N/A	N/A Currently not used			
	10	N/C	N/C	N/C			
Connector Number	Label	Type	Description	Operation Statistics			
				Min	Typical	Max	
X101	1	E-Stop N.C.	Output	+12 volt output, connected to your emergency stop contactor	12v	12.4	13v
	2	E-Stop N.C.	Input	Emergency stop input requires 12 volt constant input.	12v	12.4v	13v
	3	Encoder B	Input	Input B for quadrature encoder with differential line drivers	-7v	12v	12v
	4	Encoder /B	Input	Input /B for quadrature encoder with differential line drivers	-7v	12v	12v
	5	Encoder A	Input	Input A for quadrature encoder with differential line drivers	-7v	12v	12v
	6	Encoder /A	Input	Input /A for quadrature encoder with differential line drivers	-7v	12v	12v
	7	Power COM	Common	Can be used for encoder common	Com	Com	Com
	8	Power +12V	Output	+12vdc board supply.	11.5v	12.4v	13v
	9	Speed +/-	Output	Outputs a +/- 10vdc speed control signal to a motor amplifier. +10vdc is full speed forward. -10vdc is full speed reverse.			
	10	Speed COM	Common	Common reference for the speed signal.			
Connector Number	Label	Type	Description	Operation Statistics			
				Min	Typical	Max	
X102	1	RS485A	Link	RS485 Link to VFD			
	2	RS485B	Link	RS485 Link to VFD			
	3	Aux Serial 5V	Input	Aux +5v	4.5	4.9v	5v
	4	Aux Serial RXC	Input	Serial TTL			
	5	Aux Serial TXC	Input	Serial TTL			
	6	Aux Serial COM	Input	Aux Common	Com	Com	Com
	7	N/C	N/C				
	8	N/C	N/C				
	9	N/C	N/C				
	10	N/C	N/C				
Connector Number	Label	Type	Description	Operation Statistics			
				Min	Typical	Max	
X103	1	Enable N.O.	Input	Enable Input max 40v at 120mA			
	2	Enable N.O.	Output	Enable Output mac 40v at 120mA			
	3	Power +5V	Input	5v constant power input to power the logic function of the controller	4.5v 260mA	4.9v 270mA	5v 300mA

4	Power +12V	Input	12v constant power input to power the limit sensors, estop, encoder and motor speed signal amplifier.	11.5v	12.5v	13v
				26mA	26mA	30mA
5	Power COM	Input	Power common	Com	Com	Com
6	Power -12V	Input	-12v constant power input power the limit sensors, estop sensor, encoder, and motor speed signal amplifier.	-11.5v	-12.5v	-13v
				16mA	16mA	20mA
7	Rev Limit N.C.	Output	+12 volt output to be connected to an N.C. limit switch		12.4v	
8	Rev Limit N.C.	Input	Senses +12v from a normally closed limit switch.	10v	12.4v	12v
9	Fwd Limit N.C.	Output	+12 volt output to be connected to an N.C. limit switch		12.4v	
10	Fwd Limit N.C.	Input	Senses +12v from a normally closed limit switch.	10v	12.4v	12v

4. OLED Display Scenarios

4.1. Scenarios



4.2. Descriptions

- During a fault condition, emergency stop, or limit condition the OLED screen will flash indicating which condition you have entered. In previous version only one condition was shown even if multiply condition were met. With the new flashing conditions it is easy to see all of the condition you are currently in.

NOT CONNECTED*** 192.168.100.100* CONNECTED***** 192.168.100.100*

Spikemark™ network connection status.

FWD LIMIT*****
192.168.100.100*

REV LIMIT*****
192.168.100.100*

The forward and or reverse limits have been triggered.

BRAKE FAULT*****
192.168.100.100*

DRIVE FAULT*****
192.168.100.100*

Brake and or drive fault have been triggered during idle or Spikemark™ controlled state.

FWD: 0%*****
POS: -1073741824

FWD: 100%*****
POS: -1073741824

REV: 0%*****
POS: -1073741824

REV: 100%*****
POS: -1073741824

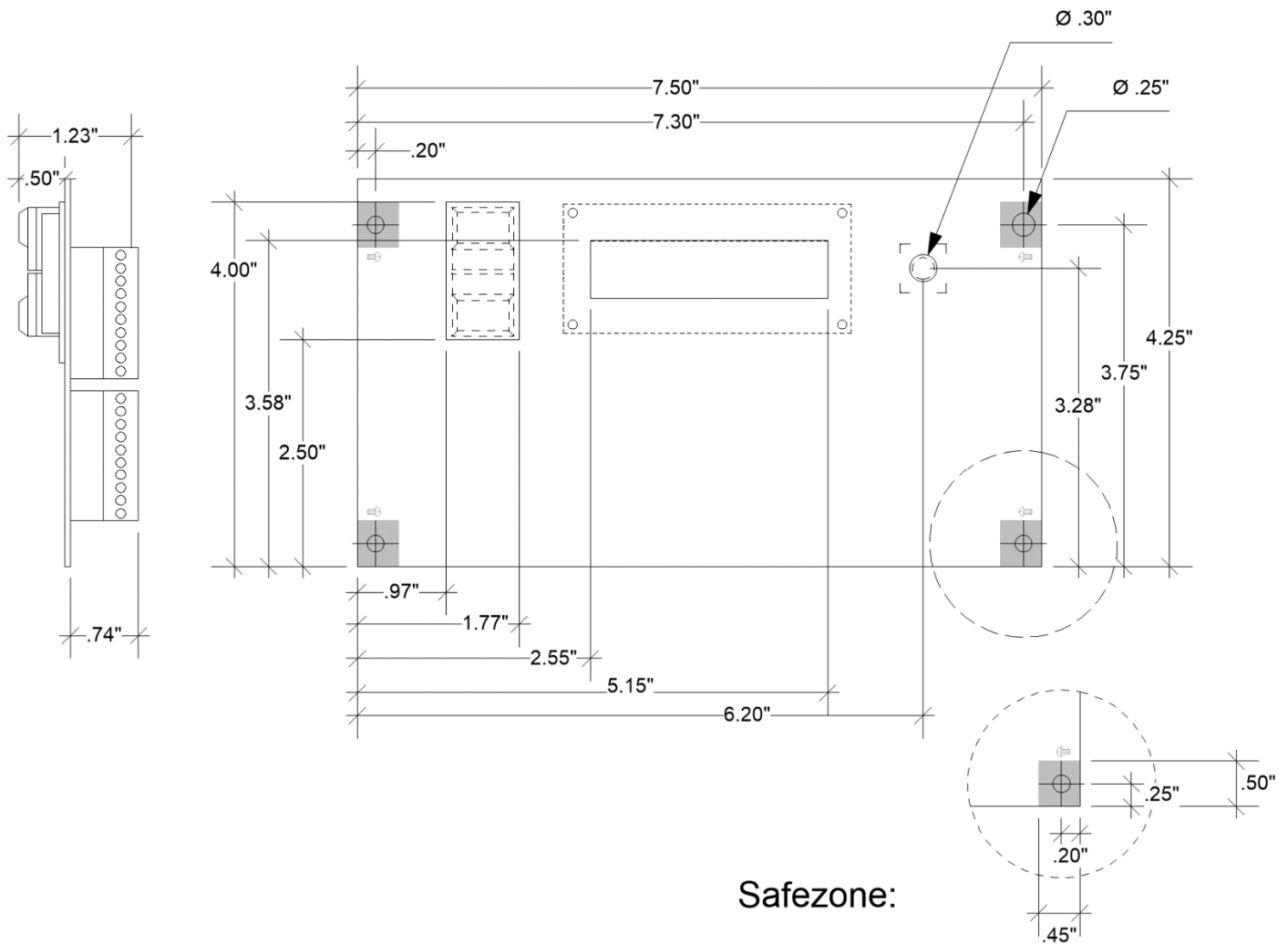
Forward and reverse during manual jog mode. During this state the “POS” shows the encoder counts. This will allow you to accurately move without being connected to Spikemark™. As you can see in the picture of scenarios when in manual jog mode you will see encoder counts even if you hit a fault, limit or e-stop.

SET IP:OK CANCEL
192.168.100.100*

By pressing the speed knob, you can adjust the IP address of the stagehand to connect with Spikemark™.

5. Mechanical Drawings

5.1. Not to scale dimensions only



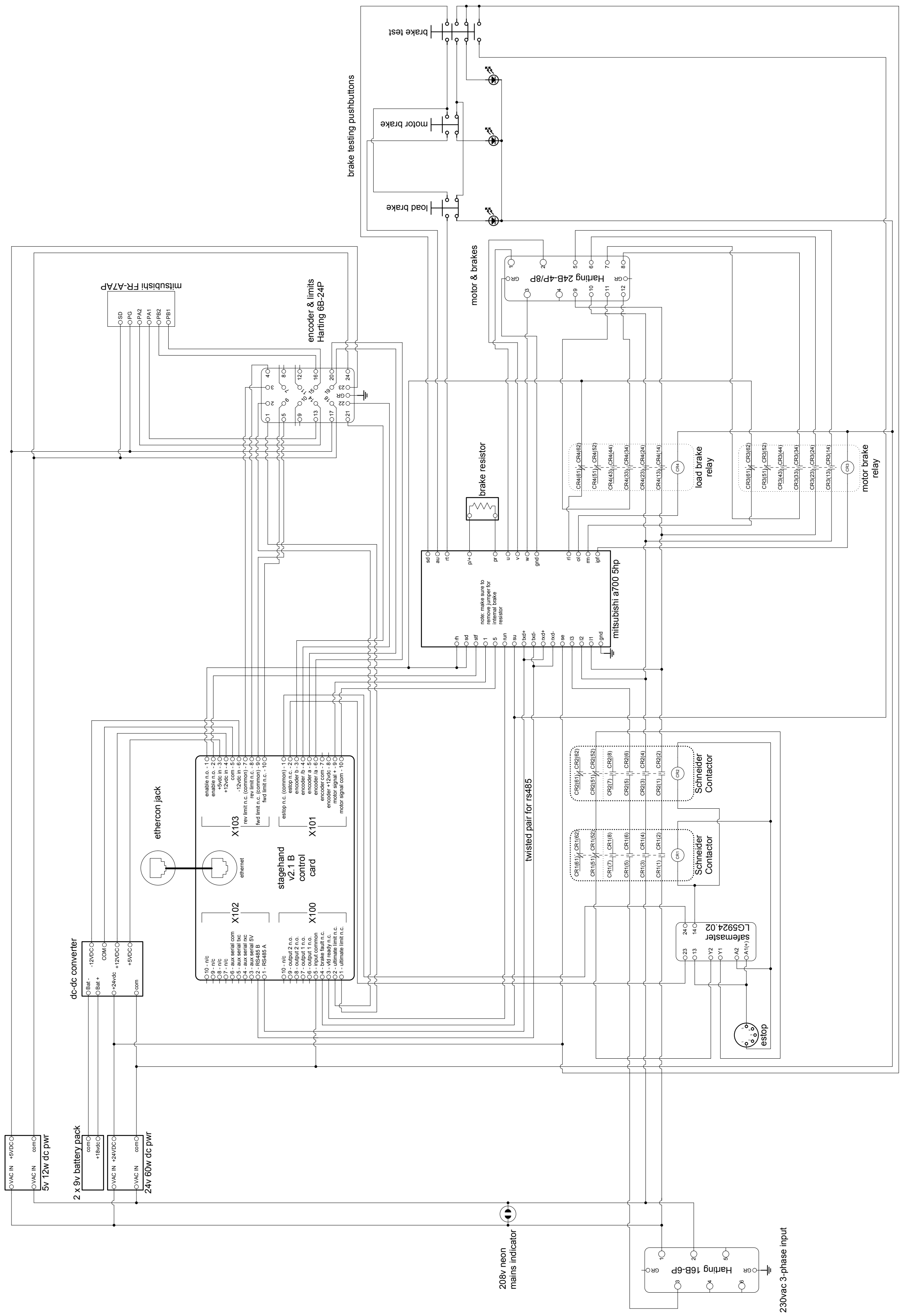
5.2. The Safe zone

- The safe zone is designed so that any object (screw) in this area will be safe from interfering with the circuit board operations.

6. Reference Implementation

6.1. Stagehand Pro AC.

- The following is a wiring diagram of Creative Conners' Stagehand Pro AC.



Revisions
8/24/13 Updated with new control board
9/28/13 Added brake fault override to brake bin