PWM Output for Spindles and Lasers

a.) 5 volt PWM output signal is on DB25 pin# 14. (https://en.wikipedia.org/wiki/Pulse-width_modulation)

b.) DB25 pin# 14 is Output 2

c.) Output 2 is also connected to Relay 2 via the ribbon cable

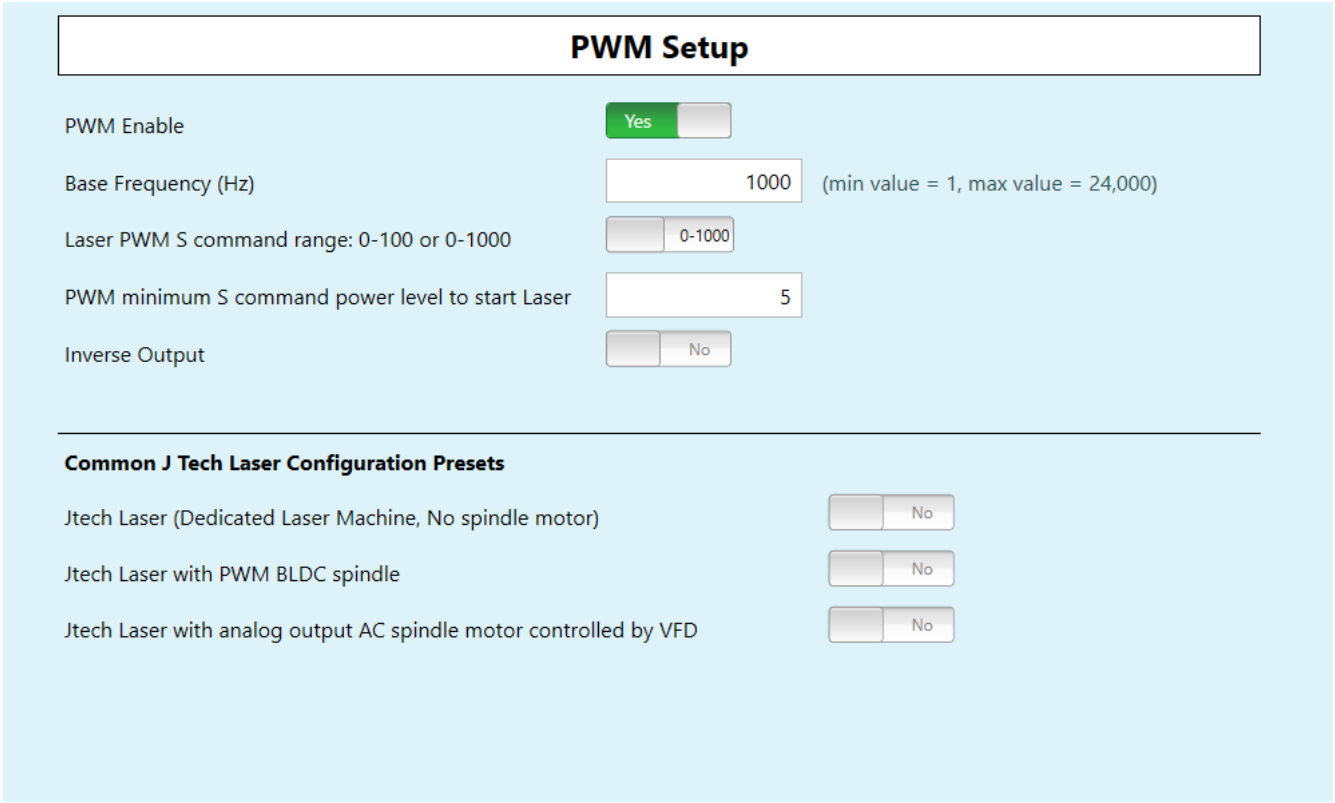
d.) If PWM output is used, Relay 2 must be disabled. See schematic to cut ribbon cable lead to Relay 2. see schematic S15049

e.) PWM is based on 0-100 OR 0-1000 S command. User selects range 0-100 or 0-1000 in Acorn Wizard.

f.) M37 turns ON Laser Output, M38 Turns Laser output OFF: M37 will activate Laser Enable, Laser Reset, and PWM Select. After .5s will turn off LaserReset. At this point the laser controller will look at the PWM signal from OUTPUT2. M38 will wait 30s to allow JTECH laser controller to cool, then performs a M95 /37 /38 to turn off both Laser Enable and PWMSelect.

g.) PWM Velocity modulation feature adjusts the PWM output based on velocity of the machine tool so over-burning is avoided in the corners or turn arounds. G37 is used to turn ON and OFF PWM Velocity Modulation. G37 ON = PWM VM ON, G37 OFF = PWM VM OFF

h.) Simple PWM controls are located in the Acorn Wizard. In addition to “manual PWM controls”, preset buttons for common Jtech configurations are present and have matching schematics. (S15049,S15056,S15057)



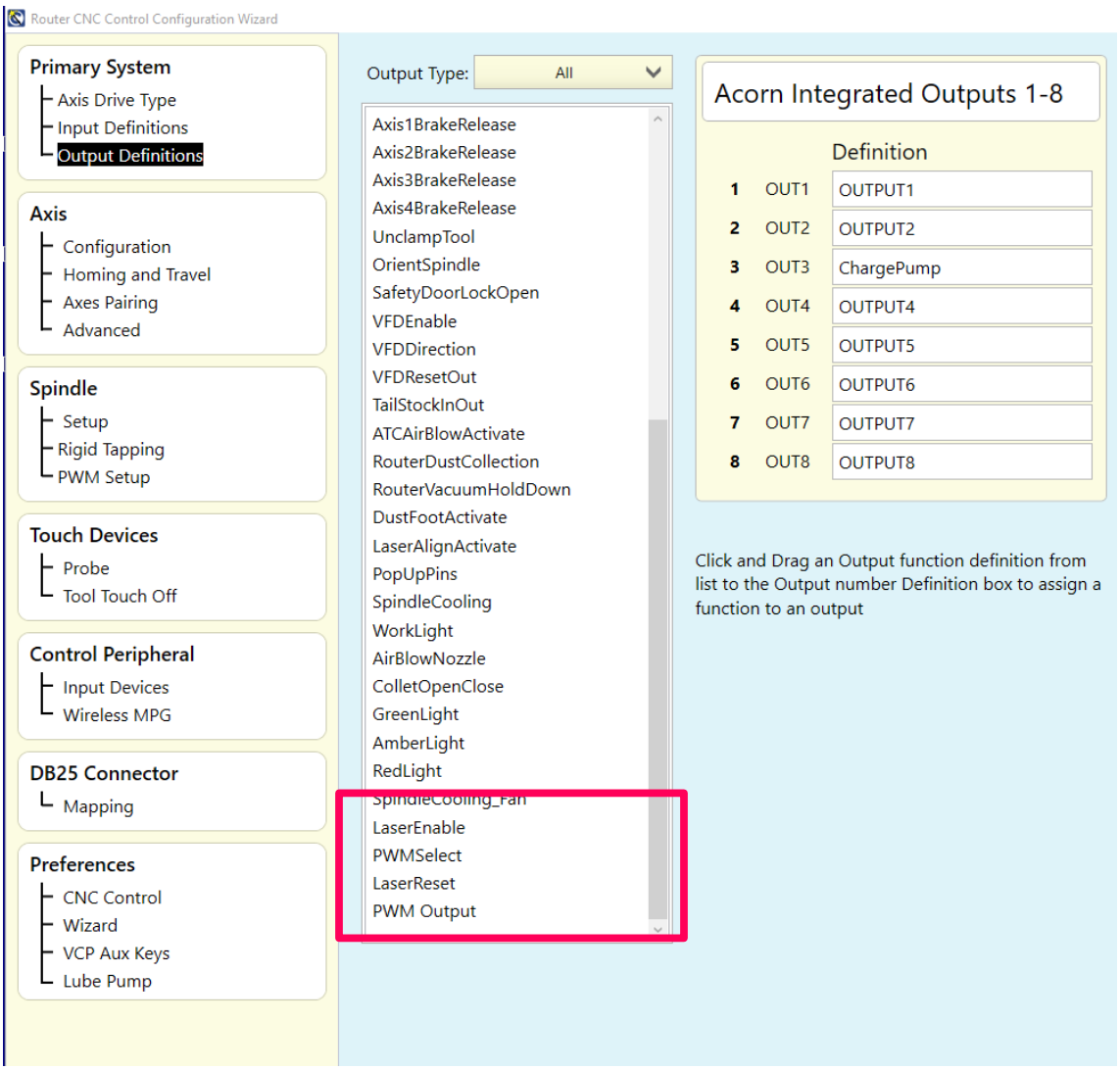
PWM related i/o added to the Wizard.

a.) PWM Output: The PWM signal itself. Can only be used on Output 2 (Output 2 of DB25 pin#14) Related cnc code is the S command.

b.) LaserEnable: Typically used in a safety interlock circuit, see Jtech schematic S15049 as an example. Related M codes. M37 - Enables Safety Interlock and Resets Laser. M38 - Disables Safety Interlock after a delay to allow component cool down.

c.) LaserReset: Momentary output to Reset Laser. Used to send a reset signal to the laser controller, see Jtech schematic S15049 as an example

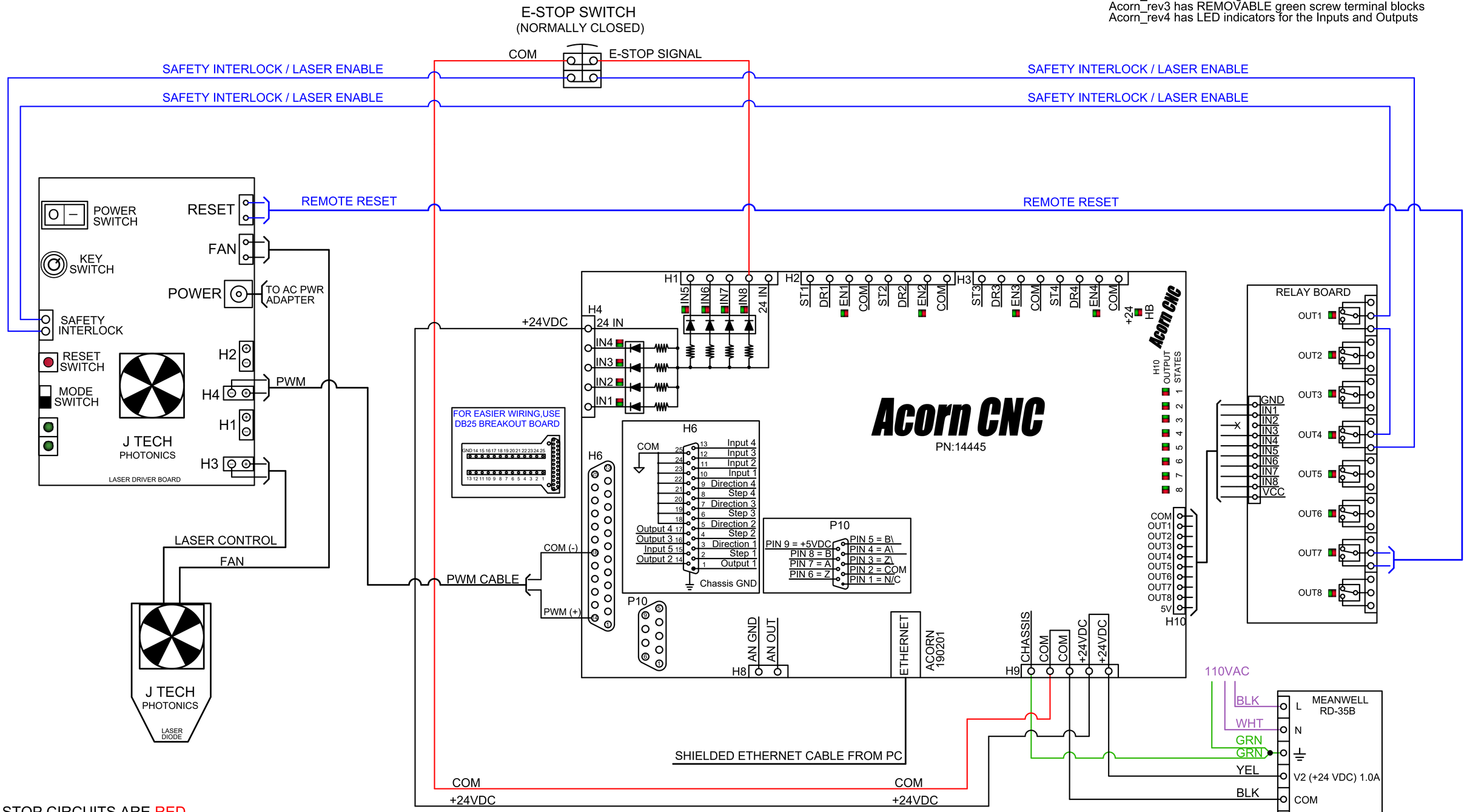
d.) PWMSelect: Output to move PWM signal from Spindle to Laser. PWMSelect is used when the PWM signal is required to be sent to different devices. For example a machine that has both a Spindle Motor and a Laser that require PWM to run. PWM from output 2 is connected to the COM of the relay PWMSelect is assigned to. To use with Standard Layout, Spindle PWM should be connected to NC side of Relay and Laser should be connected to NO side of relay. When PWMSelect is deactivated, PWM is being sent to Spindle. When PWMSelect is activated, the PWM signal is being sent to laser. Follow Schematic J-TECH Photonics Laser, BLDC Spindle Control #S15057



ACORN I/O	1	2	3	4
INPUTS				
OUTPUTS	NoFaultOut	PWMOutput		LaserEnable
ACORN I/O	5	6	7	8
INPUTS				EStopOK
OUTPUTS			LaserReset	

Title: ACORN_rev4, J-TECH PHOTONICS LASER		
Date: 201020	Ver: 2	Drawn by: CEM
Filename: S15049.DWG		Sheet 1 of 1

How to tell the difference between Acorn_rev2, Acorn_rev3 and Acorn_rev4
Acorn_rev2 has FIXED green screw terminal blocks
Acorn_rev3 has REMOVABLE green screw terminal blocks
Acorn_rev4 has LED indicators for the Inputs and Outputs



E-STOP CIRCUITS ARE RED
OPTIONAL CONNECTIONS ARE BLUE
GROUNDS ARE GREEN
110VAC IS VIOLET

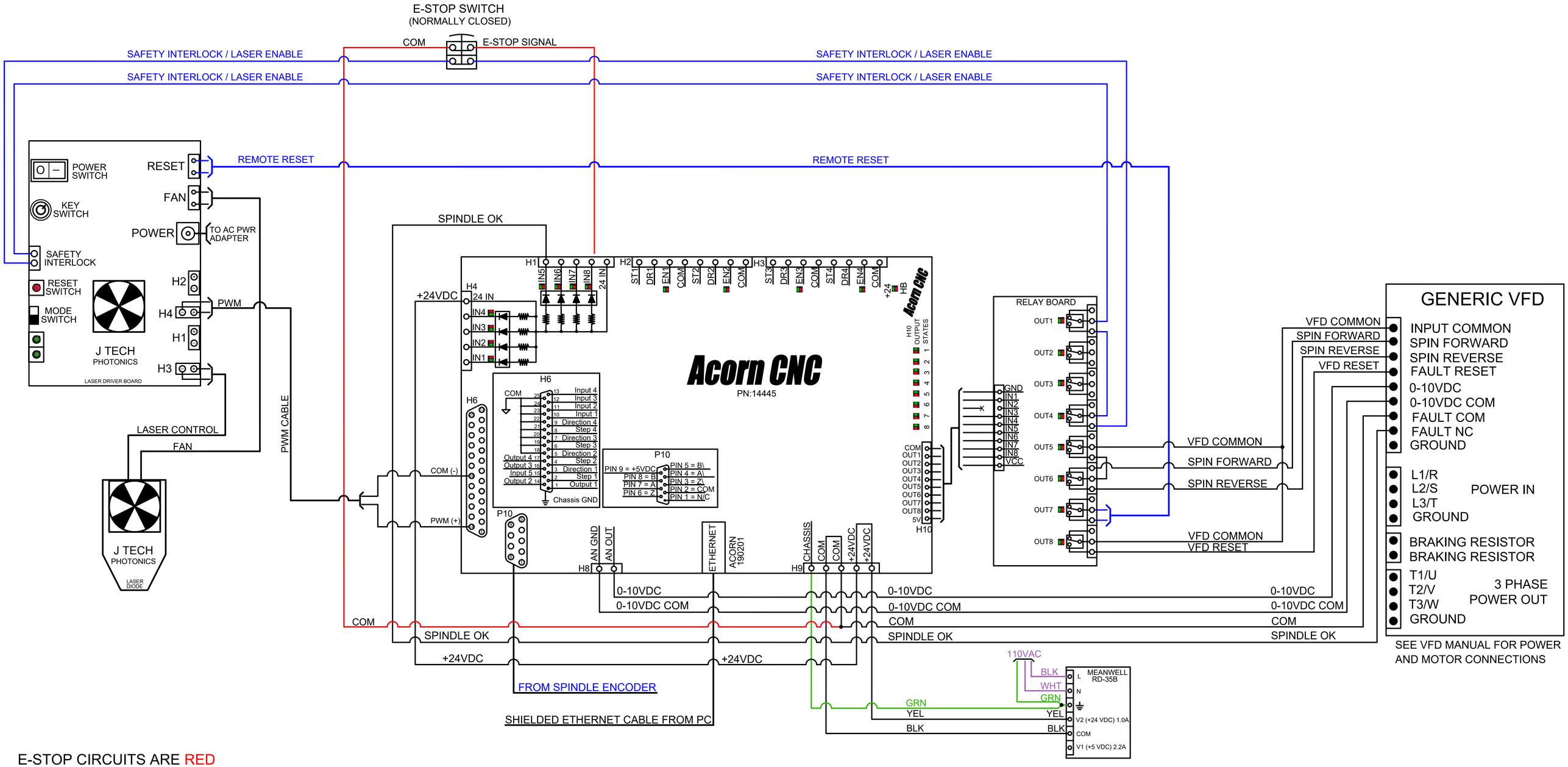
ACORN I/O	1	2	3	4
INPUTS				
OUTPUTS	NoFaultOut	PWMOutput		LaserEnable
ACORN I/O	5	6	7	8
INPUTS	SpindleOK			EStopOK
OUTPUTS	VFDEnable	VFDDirection	LaserReset	VFDResetOut

Title: ACORN_rev4, J-TECH PHOTONICS LASER, GENERIC VFD ENABLE-DIRECTION

Date: 201021 | Ver: 1 | Drawn by: CEM

Filename: S15056.DWG | Sheet 1 of 1

How to tell the difference between Acorn_rev2, Acorn_rev3 and Acorn_rev4
Acorn_rev2 has FIXED green screw terminal blocks
Acorn_rev3 has REMOVABLE green screw terminal blocks
Acorn_rev4 has LED indicators for the Inputs and Outputs

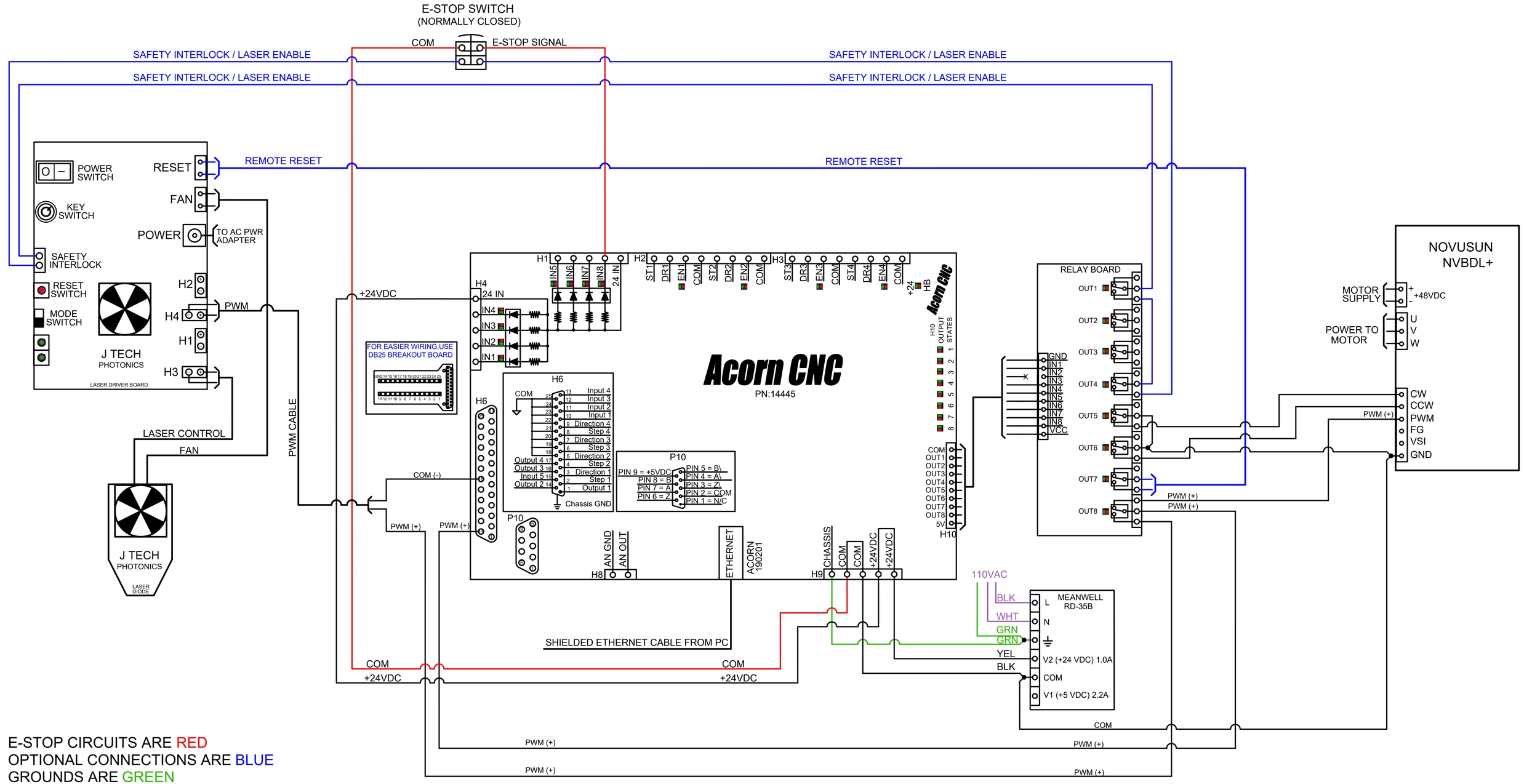


E-STOP CIRCUITS ARE RED
OPTIONAL CONNECTIONS ARE BLUE
GROUNDS ARE GREEN
110VAC IS VIOLET

ACORN I/O	1	2	3	4
INPUTS				
OUTPUTS	NoFaultOut	PWMOutput		LaserEnable
ACORN I/O	5	6	7	8
INPUTS				EStopOK
OUTPUTS	SpinFWD	SpinREV	LaserReset	PWMSelect

Title: ACORN_rev4, J-TECH PHOTONICS LASER, BLDC SPINDLE CONTROL (NOVUSUN NVBL+)		
Date: 201021	Ver: 1	Drawn by: CEM
Filename: S15057.DWG		Sheet 1 of 1

How to tell the difference between Acorn_rev2, Acorn_rev3 and Acorn_rev4
Acorn_rev2 has FIXED green screw terminal blocks
Acorn_rev3 has REMOVABLE green screw terminal blocks
Acorn_rev4 has LED indicators for the Inputs and Outputs



E-STOP CIRCUITS ARE RED
OPTIONAL CONNECTIONS ARE BLUE
GROUNDS ARE GREEN
110VAC IS VIOLET

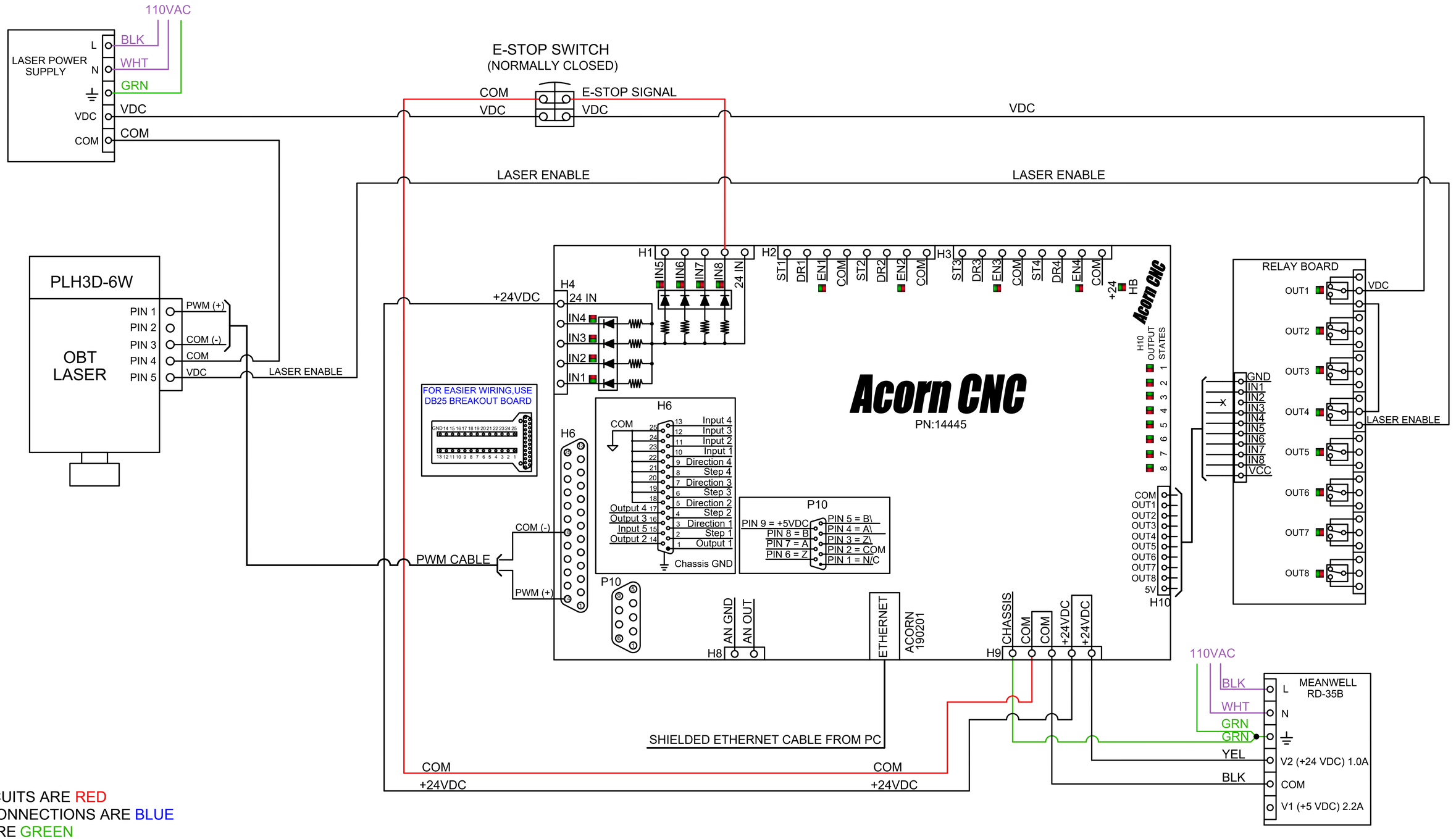
ACORN I/O	1	2	3	4
INPUTS				
OUTPUTS	NoFaultOut	PWMOutput		LaserEnable
ACORN I/O	5	6	7	8
INPUTS				EStopOK
OUTPUTS				

Title:

ACORN_rev4, OBT LASER

Date: 201214	Ver: 1	Drawn by: CEM
Filename: S15061.DWG		Sheet 1 of 1

How to tell the difference between Acorn_rev2, Acorn_rev3 and Acorn_rev4
Acorn_rev2 has FIXED green screw terminal blocks
Acorn_rev3 has REMOVABLE green screw terminal blocks
Acorn_rev4 has LED indicators for the Inputs and Outputs

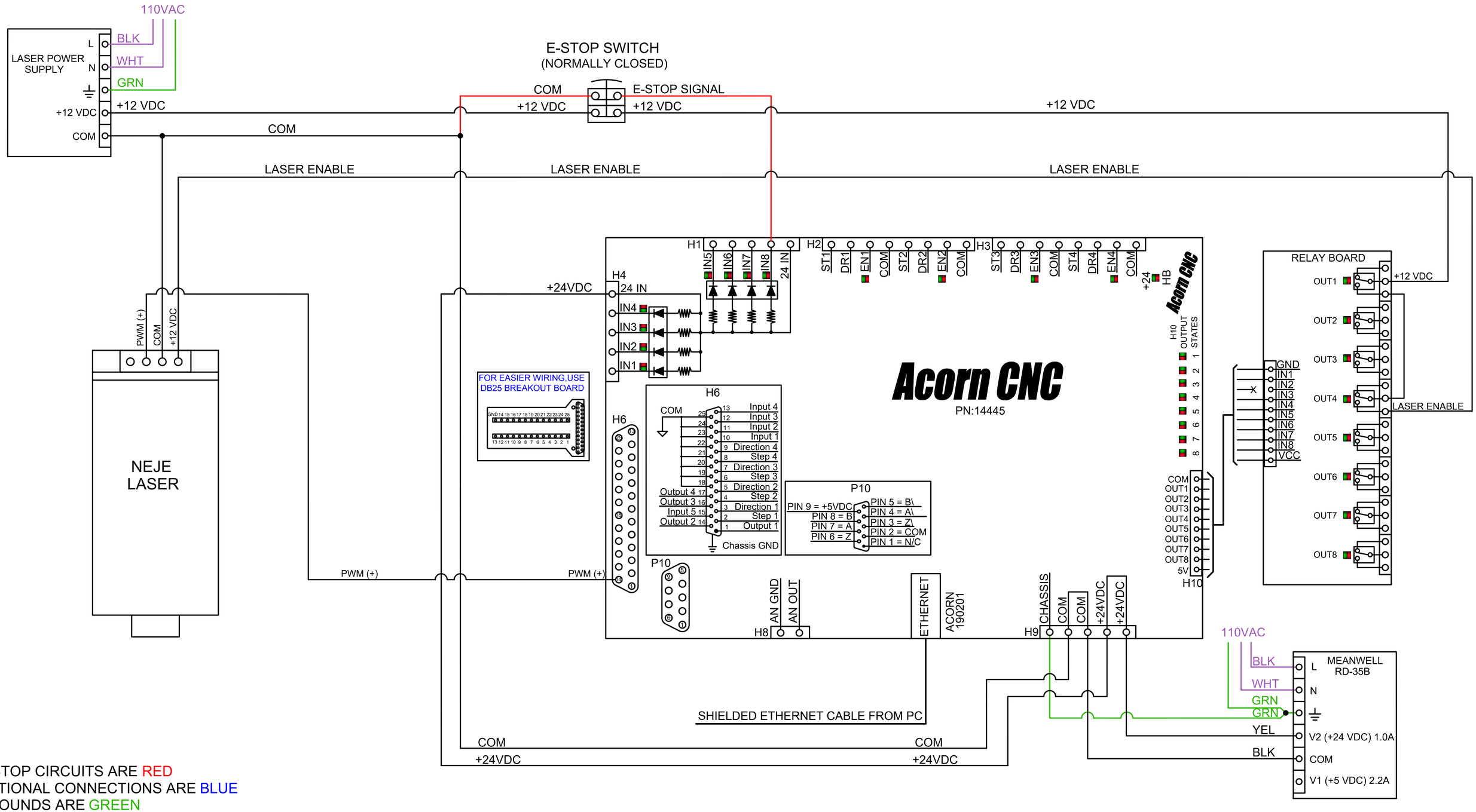


E-STOP CIRCUITS ARE RED
OPTIONAL CONNECTIONS ARE BLUE
GROUNDS ARE GREEN
110VAC IS VIOLET

ACORN I/O	1	2	3	4
INPUTS				
OUTPUTS	NoFaultOut	PWMOutput		LaserEnable
ACORN I/O	5	6	7	8
INPUTS				EStopOK
OUTPUTS				

Title: ACORN_rev4, NEJE LASER		
Date: 201214	Ver: 1	Drawn by: CEM
Filename: S15062.DWG		Sheet 1 of 1

How to tell the difference between Acorn_rev2, Acorn_rev3 and Acorn_rev4
Acorn_rev2 has FIXED green screw terminal blocks
Acorn_rev3 has REMOVABLE green screw terminal blocks
Acorn_rev4 has LED indicators for the Inputs and Outputs

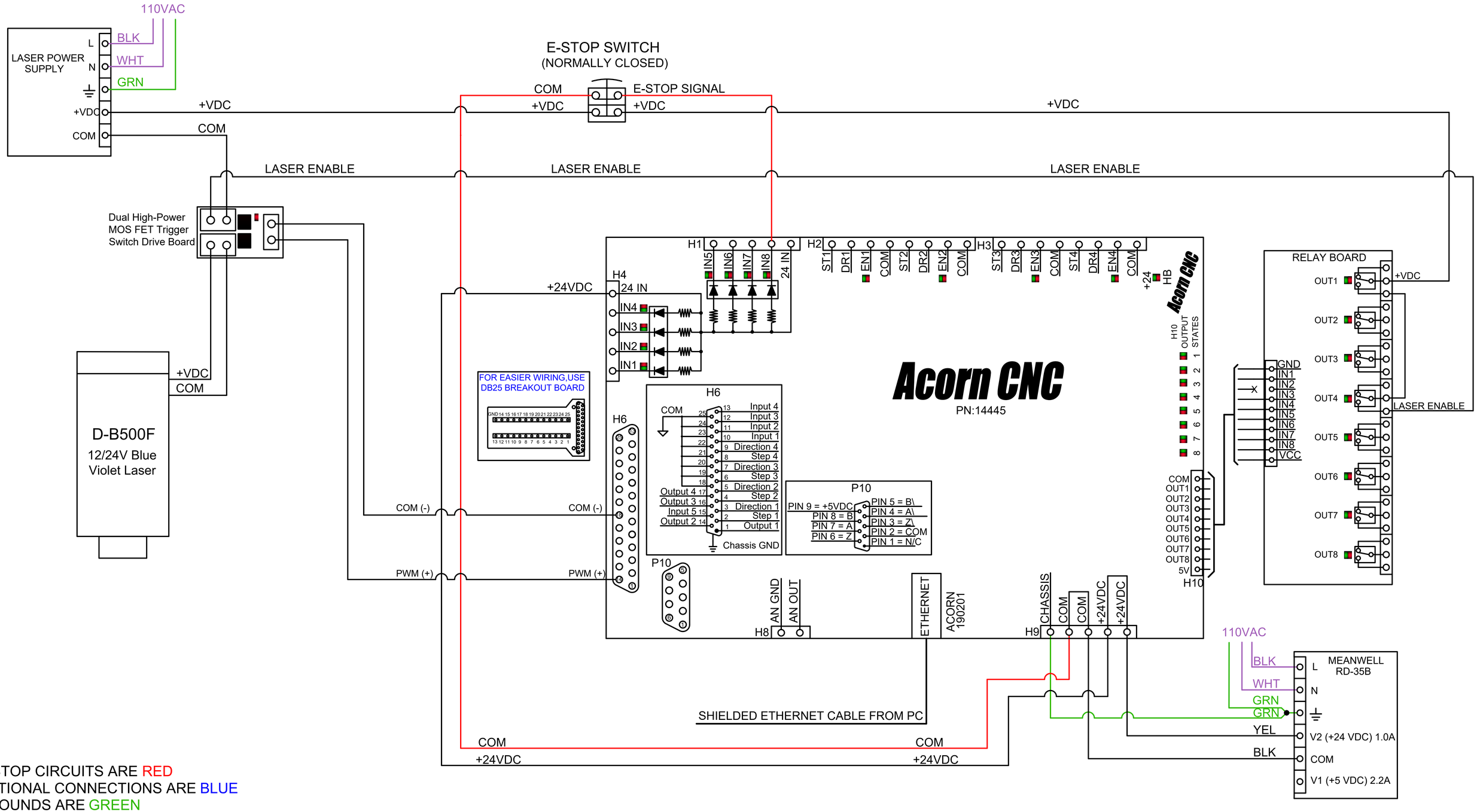


E-STOP CIRCUITS ARE RED
OPTIONAL CONNECTIONS ARE BLUE
GROUNDS ARE GREEN
110VAC IS VIOLET

ACORN I/O	1	2	3	4
INPUTS				
OUTPUTS	NoFaultOut	PWMOutput		LaserEnable
ACORN I/O	5	6	7	8
INPUTS				EStopOK
OUTPUTS				

Title: ACORN_rev4, COMCROW D-B500F LASER		
Date: 201215	Ver: 1	Drawn by: CEM
Filename: S15063.DWG		Sheet 1 of 1

How to tell the difference between Acorn_rev2, Acorn_rev3 and Acorn_rev4
Acorn_rev2 has FIXED green screw terminal blocks
Acorn_rev3 has REMOVABLE green screw terminal blocks
Acorn_rev4 has LED indicators for the Inputs and Outputs



E-STOP CIRCUITS ARE RED
OPTIONAL CONNECTIONS ARE BLUE
GROUNDS ARE GREEN
110VAC IS VIOLET

ZigZagSyncTest Instruction

1-27-21

Requirements: Acorn CNC12 v4.6+ Mill or Router

These test programs are included with the v4.6 installation.

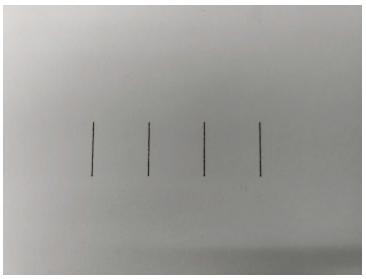
ZigZagLaserSyncTest-X_Axis.cnc

ZigZagLaserSyncTest-Y_Axis.cnc

Purpose:

These two programs were created to test for and adjust backlash in your laser table axes.

The program will create a four lines in either the X or Y direction by moving back and forth in that axis and firing the laser in short 0.006 inch pulses at specific points while moving in each direction. Below is an example of what you want to see when done.



Backlash in an axis will produce something like this when a line is examined under magnification.

As you can see the machine has backlash in this axis and is loosing motion when changing directions. Since each “dot” is 0.006 inches long we can make an educated guess at the backlash adjustment need to align the “dot”

Simply use the wizard to adjust the backlash compensation for that axis and run the program again to verify or determine if more or less compensation is needed.