Eding CNC

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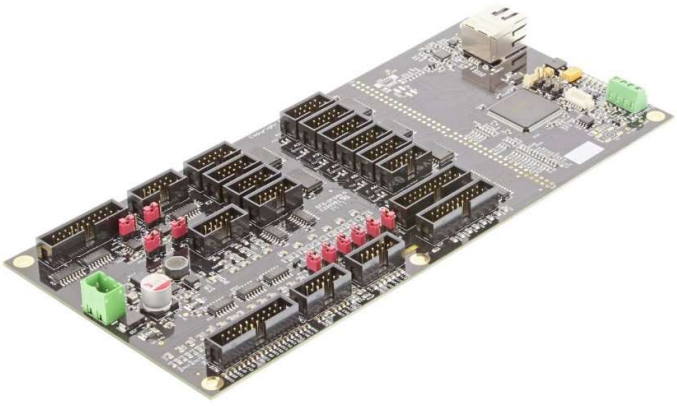
Hardware Manual

CNC760

Revision 2 23 June, 2017

Released



History:

Revision	Date	Author
1	22-5-2017	AB
2	23-6-2017	AB

Revision overview:

Revision	Remarks
1	Initial version.
2	Fixed typo’s in AUX-IN overview

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1 Introduction

1.1 Purpose

This manual desribebdes the hardware of the CNC760.

The CNC760 is a 6-asix CNC controller with addional 4 extruder controllers. The basic specification is:

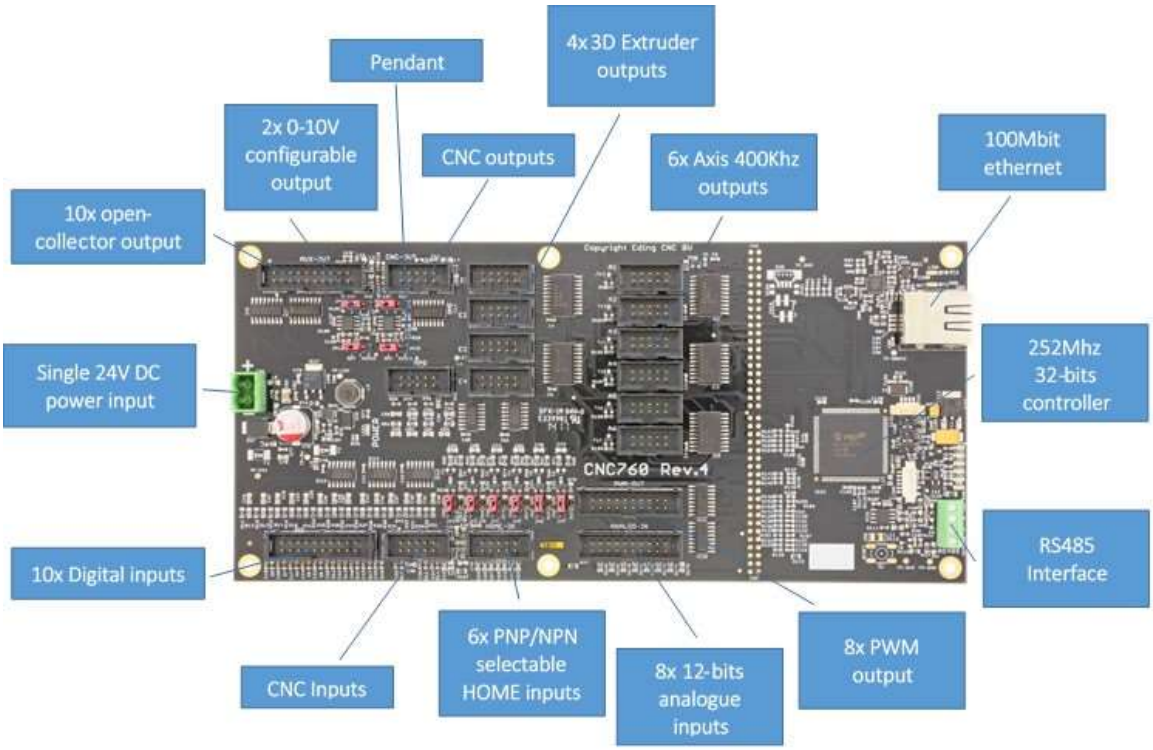
6x axis controller interface	Puls/Direction	5V (max. 400Khz)
	Enable	5V or open-collector (max. 24V)
	Alarm	
4x extruder interface	Enable/Direction/Step	5V
6x digital HOME inputs	24V	
10x digital outputs	Open collector (max. 24V)	
10x digital inputs	24V	
8x analog inputs	0-3.3v (12 bits)	
2x analog outputs	0-10V	
2x cooling outputs	Open collector (max. 24V)	
8x PWM outputs	Open collector (max. 24V)	
Safety relay I/O	Output System Ready	Output for safety relay (Watchdog) Open Collector
	Input External Error	24V
	Input E-Stop	24V
1x Length detection input (Probe)	24V	
1x Spindle encoder input	5V input	
1x RS485 interface	RS485, MODBUS compatible (for connecting extra I/O or functionality, cable length up to 20m)	
Handwheel interface (Pendant)	2x digital input	5V
	2x MPG input	5V
	2x dedicated analog input	0-3.3V
Interface	100Mbit Ethernet	
Power Supply	24VDC	
Dimension	230x107mm (suitable for DIN rail mounting)	
Others	Firmware upgradable through network connection	

1.2 Scope

This document describes the hardware of the CNC760.

2 Board overview

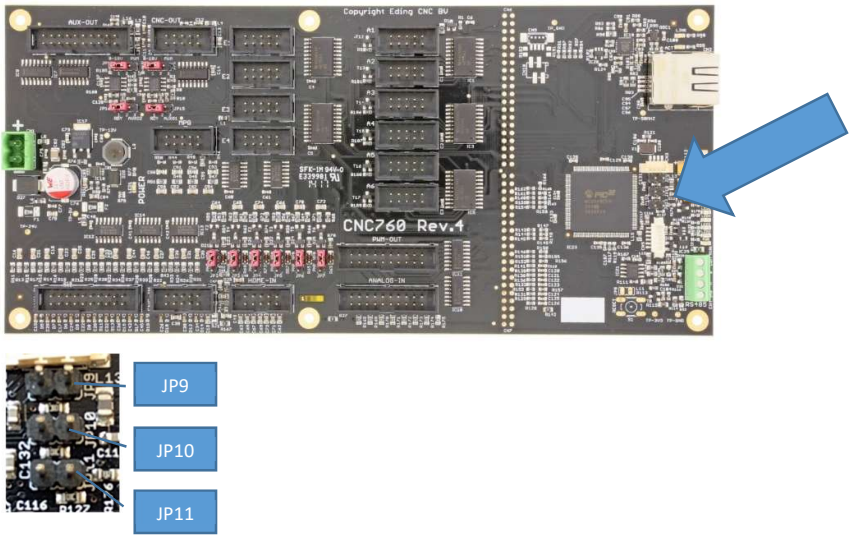
The image below shows an overview of the CNC760.



3 Board jumpers and indicators

3.1 JP9, JP10, JP11

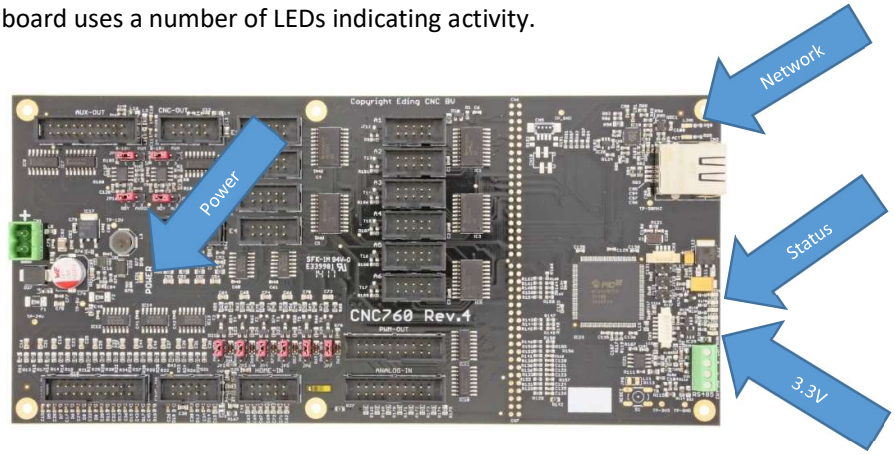
With these jumpers, several settings can be forced:



JP9	Reserved
JP10	Startup with default IP address 172.22.2.100
JP11	Skip bootloader

3.2 LED indications (LED2-LED6)

The board uses a number of LEDs indicating activity.



Power LEDs:

LED1: indicates that the external power is connected, this means that 24V and 5V are available.

PWR: this LED indicates that the power for the processor is available (3.3V).

Network LEDs:

Yellow = Network activity

Green = Network connection

Status LEDS:

LED6	RED	SYSREADY, indicates when CNC system is ready for operation. Can be used in cooperation with safety relay.
LED5	RED	WATCHDOG charge pump, indicates operation of the watchdog circuitry
LED4	GREEN	Controller 'heartbeat' indicating the board is active
LED3	GREEN	Indicates 'Machine On'
LED2	GREEN	Flashing when application is starting up. After startup, will be switch ON if E-STOP occurred.

Please note, when in bootloader mode LED2 and LED3 will toggle to indicate this.

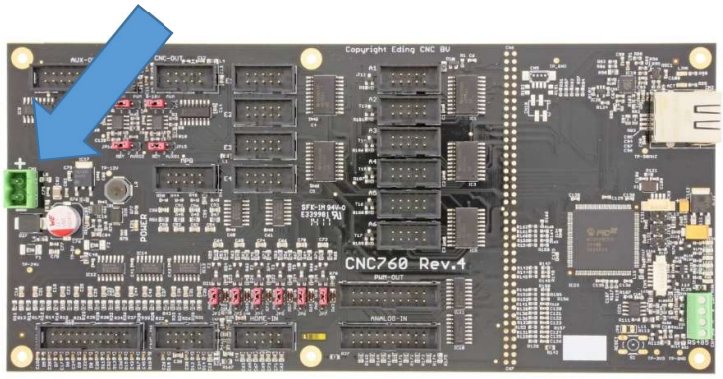
4 Connectors

4.1 Power

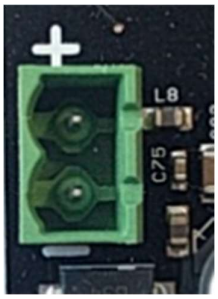
The voltage of the supplied power is 24V DC.

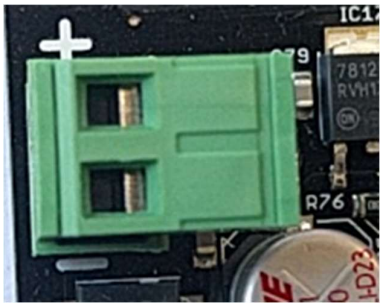
Warning: Due to a protection diode at the input the 24V that is available on a number of connectors will be a bit lower, please check when connecting 24V devices to that connector if they will operate correctly.

Warning: Although the 24V is also available on numerous connectors, it is advisable to use separate wiring for powering 24V devices if much current is needed.



The image below shows the power connector.





Warning: Check the polarity of the power, damage to the board may occur if the polarity is reversed.

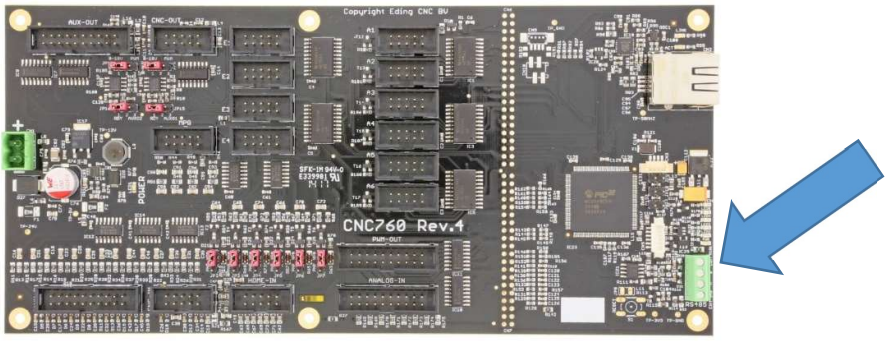
4.2 Network

The board needs to be connected via *cross* cable of type CAT5 or CAT5E. We advise to use properly shielded network cables type SF/UTP. The default IP address is 172.22.2.100.

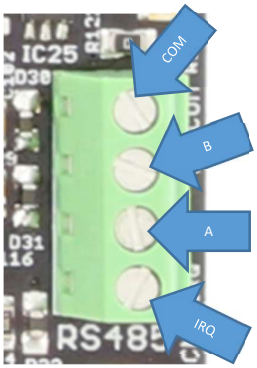
Note: Make sure that the PC that the board is connected to is correctly setup and has the correct IP address, make sure there is no IP address conflict.

4.3 RS485

Via the RS485 connector external hardware can be connected. RS485 is a balanced signal, this decreases susceptibility to interference. The protocolled that is used is MODBUS.



The image below shows a close up of the connector.

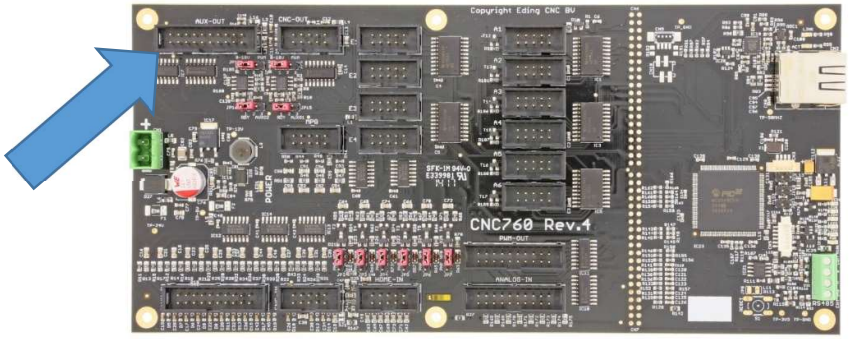


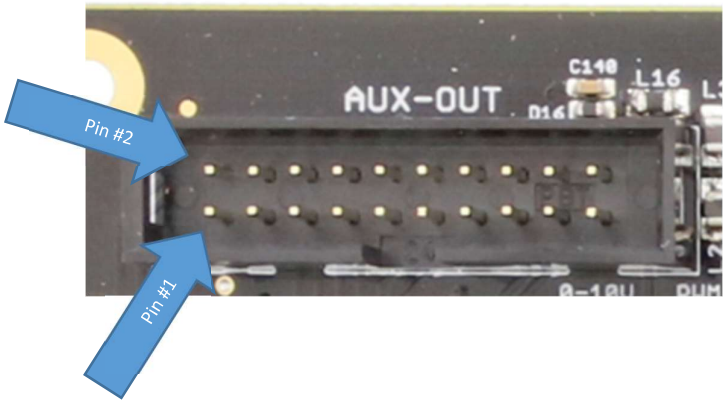
The connector consists out of 4 signals:

COM	Common	
B	Balanced signal	
A		
IRQ	IRQ	Input for external interrupt

4.4 AUX-OUT

The auxiliary outputs are *open-collector* outputs that can be used to switch external devices. An open-collector output means it switches the connected wire to GND. This enables the user to switch devices that do not need the same voltage rating as the controller has.





This output can directly be used, for example, to switch a relay. If a logic signal is needed a pull-up resistor is required.

Please note, an open-collector output *can not* be measured with eg. a multimeter, to test an output connected a 10k resistor between output and +5V or 24V, now you should be able to measure this output switching.

Warning: Connecting an open-collector output directly to a positive voltage eg. 24V will cause a short-circuit damaging the board.

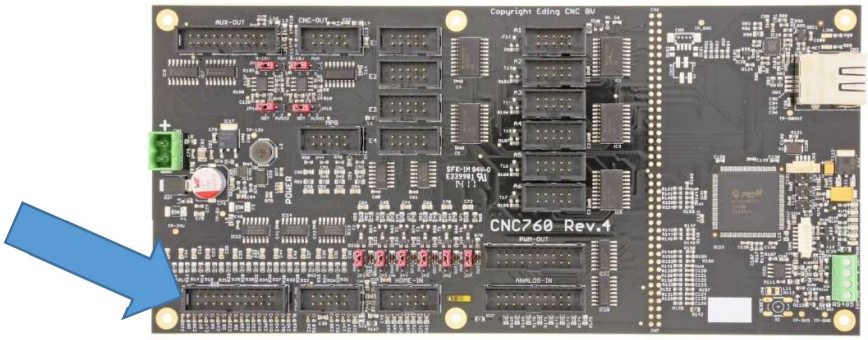
Below an overview of all connections of this connector:

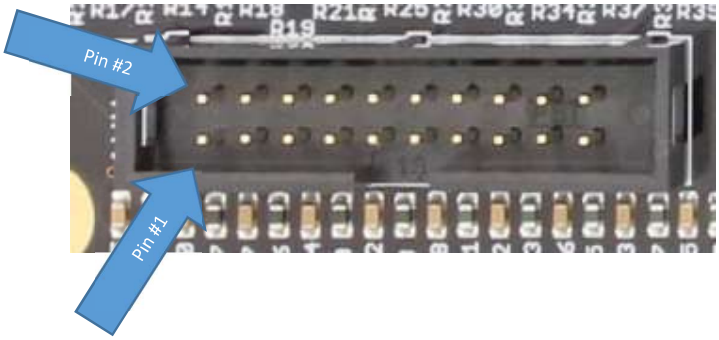
Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	GND		GROUND			
2	GND		GROUND			
3	AUX OUT1	OUTPUT	Open Collector	Aux Output 1	Max. rating 50V/500mA	Optional used for controlling 0-10V output1
4	SYSRDY	OUTPUT	Open Collector	System Ready	Max. rating 50V/500mA	System Ready, indicates that system is ready for operation.
5	AUX OUT2	OUTPUT	Open Collector	Aux Output 2	Max. rating 50V/500mA	Optional used for controlling 0-10V output2
6	AUX OUT9	OUTPUT	Open Collector	Aux Output 9	Max. rating 50V/500mA	Shared with AEE3
7	AUX OUT3	OUTPUT	Open Collector	Aux Output 3	Max. rating 50V/500mA	
8	AUX OUT10	OUTPUT	Open Collector	Aux Output 10	Max. rating 50V/500mA	Shared with AEE4
9	AUX OUT4	OUTPUT	Open Collector	Aux Output 4	Max. rating 50V/500mA	
10	GND		GROUND			
11	AUX OUT5	OUTPUT	Open Collector	Aux Output 5	Max. rating 50V/500mA	
12	GND		GROUND			
13	AUX OUT6	OUTPUT	Open Collector	Aux Output 6	Max. rating 50V/500mA	
14	GND		GROUND			
15	AUX OUT7	OUTPUT	Open Collector	Aux Output 7	Max. rating 50V/500mA	Shared with AEE1
16	PWM-VOLT2	OUTPUT	*PWM or 0-10V, see also 'Configuring the analogue outputs'*			
17	AUX OUT8	OUTPUT	Open Collector	Aux Output 8	Max. rating 50V/500mA	Shared with AEE2
18	GND		GROUND			
19	+24V		POWER		+24V/1A	
20	+24V		POWER		+24V/1A	

Warning: The total combined output current of pin #19/#20 should not exceed 1A.

4.5 AUX-IN

The auxiliary inputs are digital input used to retrieve the status of an external signal, for example a switch.





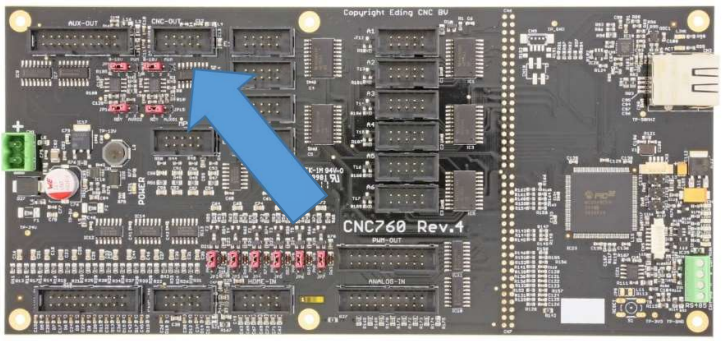
Each input has a pull-down, this means that when no signal is connector the board will see a 'low' signal. Connecting an input to 24V will cause the board to detect an 'high' signal.

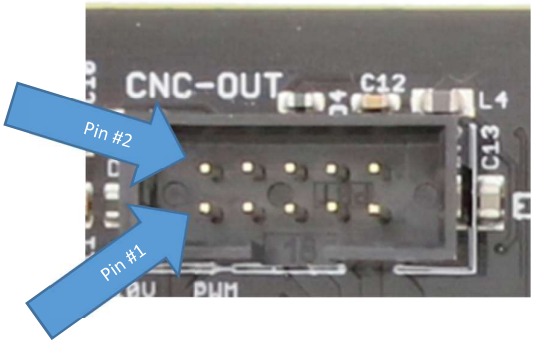
Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	GND		GROUND			
2	GND		GROUND			
3	AUX IN1	INPUT	Digital in	Aux Input 1	Input voltage 24V	
4	GND		GROUND			
5	AUX IN2	INPUT	Digital in	Aux Input 2	Input voltage 24V	
6	AUX IN9	INPUT	Digital in	Aux Input 9	Input voltage 24V	
7	AUX IN3	INPUT	Digital in	Aux Input 3	Input voltage 24V	
8	AUX IN10	INPUT	Digital in	Aux Input 10	Input voltage 24V	
9	AUX IN4	INPUT	Digital in	Aux Input 4	Input voltage 24V	
10	GND		GROUND			
11	AUX IN5	INPUT	Digital in	Aux Input 5	Input voltage 24V	
12	GND		GROUND			
13	AUX IN6	INPUT	Digital in	Aux Input 6	Input voltage 24V	
14	GND		GROUND			
15	AUX IN7	INPUT	Digital in	Aux Input 7	Input voltage 24V	
16	GND		*GROUND*			
17	AUX IN8	INPUT	Digital in	Aux Input 8	Input voltage 24V	
18	GND		GROUND			
19	+24V		POWER		+24V/1A	
20	+24V		POWER		+24V/1A	

Warning: The total combined output current of pin #19/#20 should not exceed 1A.

4.6 CNC-OUT

The CNC-OUT signals are output signals, and are typical related to controlling the CNC functionality.





Below an overview of all connections of this connector:

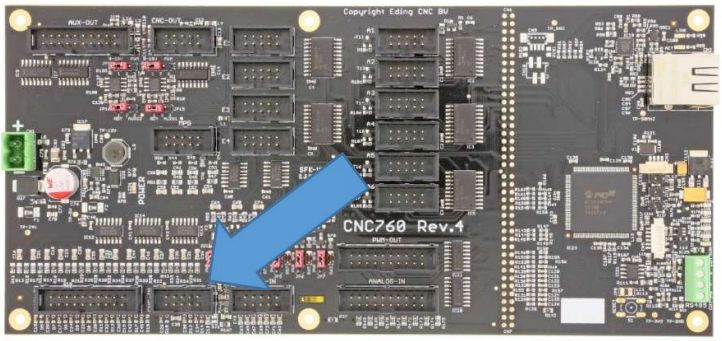
Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	PWM-VOLT1	Output	*PWM or 0-10V, see also 'Configuring the analogue outputs'*			
2	SYSRDY	Output	Open Collector	System Ready	Max. rating 50V/500mA	System Ready, indicates that system is ready for operation.
3	TOOLON	Output	Open Collector	Switch tool on (eg. Spindle)	Max. rating 50V/500mA	
4	TOOLDIR	Output	Open Collector	Set tool direction	Max. rating 50V/500mA	
5	COOL2	Output	Open Collector	Coolant2 signal	Max. rating 50V/500mA	
6	COOL1	Output	Open Collector	Coolant1 signal	Max. rating 50V/500mA	
7	+24V		POWER		+24V/1A	
8	Charge Pump	Output	Open Collector	Watchdog signal	Max. rating 50V/500mA	Pulsed signal
9	+5V	Output	Power		5VDC/500mA	
10	GND		Ground			

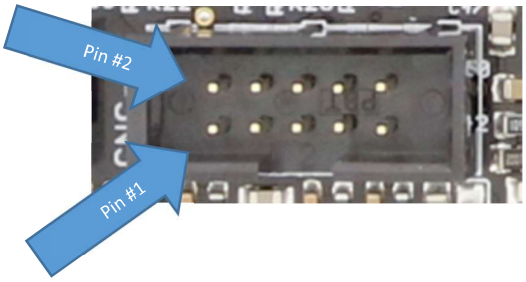
Warning: Connecting an open-collector output directly to a positive voltage eg. 24V will cause a short-circuit damaging the board.

Warning: The total combined output current of pin #7 should not exceed 1A.

4.7 CNC-IN

The CNC-IN signals are CNC related inputs.





Below an overview of all connections of this connector:

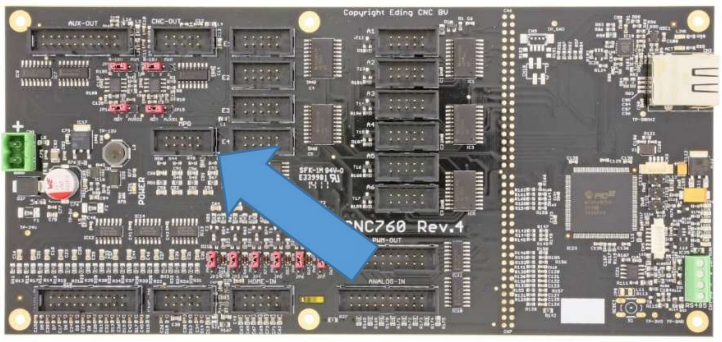
Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	PROBE	Input	Digital	Input signal for external probe signal	Input voltage 24V	
2	SPINDLEX	Input	Digital		Input voltage 5V	
3	ESTOP	Input	Digital	External EMERGENCY STOP signal	Input voltage 24V	
4	EXTERR	Input	Digital	External ERROR signal	Input voltage 24V	
5	PROBE	Input	Digital			Shared with pin #1
6	SPINDLEA	Input	Digital	Signal A input	Input voltage 5V	
7	+24V		POWER		+24V/1A	
8*	SPINDLEB/GND	Input/Ground	Digital	Signal B input	Input voltage 5V	
9	+24V		POWER		+24V/1A	
10	GND		Ground			

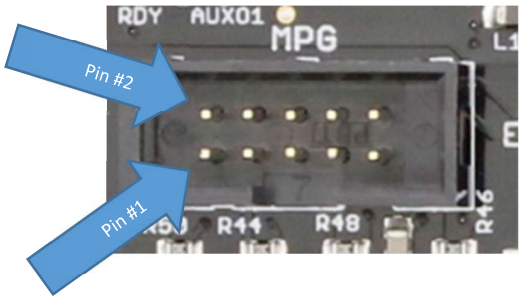
Warning: The total combined output current of pin #7 and #9 should not exceed 1A.

Note, pin #8 can be connected to Ground for backward compatibility by removing resistor R167, and closing the pads of SJ1

4.8 MPG

The MPG connectors makes it possible to connect directly a wired pendant to the controller.





Below an overview of all connections of this connector:

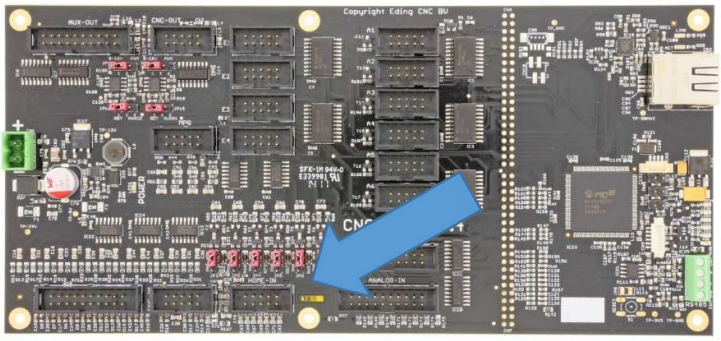
Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	AN7	Input	Analogue	Analogue input for additional selections	Input voltage 3.3V	This is actual AN7, so not an extra analog input
2	PAUSE	Input	Digital	Pause switch	Input Voltage 5V	
3	HW-A	Input	Digital	Handwheel A input	Input voltage 5V	
4	RUN	Input	Digital	Run switch	Input voltage 5V	
5	HW-B	Input	Digital	Handwheel B input	Input voltage 5V	
6	AN8	Input	Analogue	Analogue input for additional selections	Input voltage 3.3V	This is actual AN8, so not an extra analog input
7	+3.3V	Output	Power		+3.3V/100mA	
8	GND		Ground			
9	+5V	Output	Power		+5V/500mA	
10	GND		Ground			

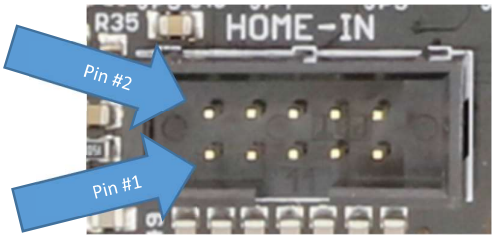
Note, 3.3V on pin #7 not present on revision 4 of hardware.

The analogue inputs AN7 & AN8 can be used to have extra selection for axis and multiplication factor. See also Appendix B for more info.

4.9 HOME-IN

The HOME inputs are required for the machine to be able to detect the 'home' position.





Below an overview of all connections of this connector:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	HOME1	Input	Digital	Home input 1	Input Voltage 24V	
2	HOME2	Input	Digital	Home input 2	Input Voltage 24V	
3	HOME3	Input	Digital	Home input 3	Input Voltage 24V	
4	HOME4	Input	Digital	Home input 4	Input Voltage 24V	
5	HOME5	Input	Digital	Home input 5	Input Voltage 24V	
6	HOME6	Input	Digital	Home input 6	input Voltage 24V	
7	+24V		POWER		+24V/1A	
8	GND		Ground			
9	Reserved					Do not connect
10	GND		Ground			

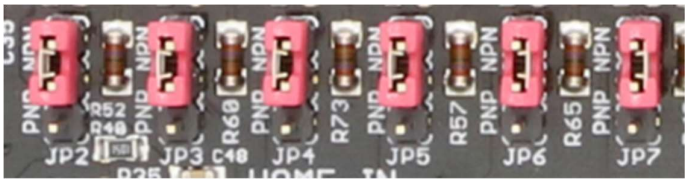
Warning: The total output current of pin #7 should not exceed 1A.

The home-input can be configured into two modes, each mode describes what type of switch or sensor is connected. If the switch or sensor is activated, it means that it will switch either to ground (0V) or to a voltage, in this case 24V. A switch or sensor that switches to 0 (negative) is called NPN, a switch or sensor that switches to 24V (positive) is called PNP.

PNP = Input should be 'HIGH' (24V) to detect the switch/sensor being activated.

NPN = Input should be 'LOW' (0V) to detect the switch/sensor being activated.

This mode selection is done via several jumpers:



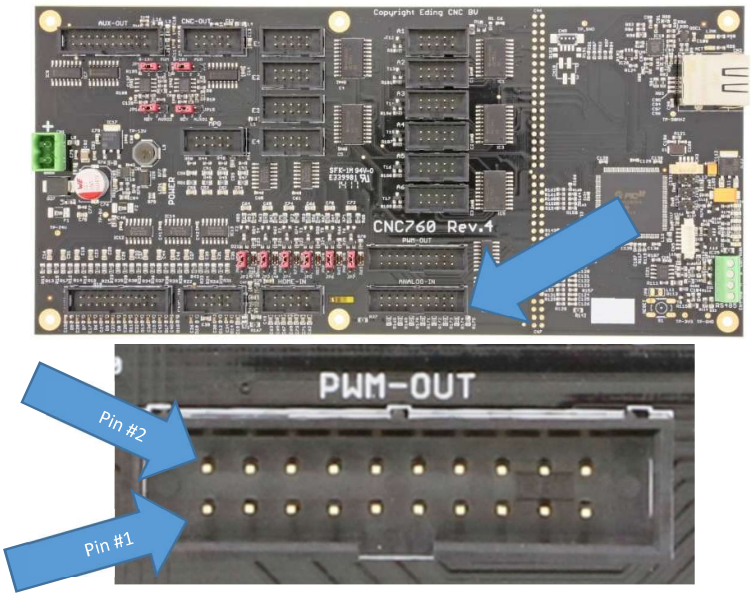
The *default* settings are NPN.

Each jumper corresponds to an input:

Jumper	Input
JP2	Home input 1
JP3	Home input 2
JP4	Home input 3
JP5	Home input 4
JP6	Home input 5
JP7	Home input 6

4.10 PWM-OUT

The PWM outputs enable the user to add extra control of devices that use PWM signals for control.



Below an overview of all connections of this connector:

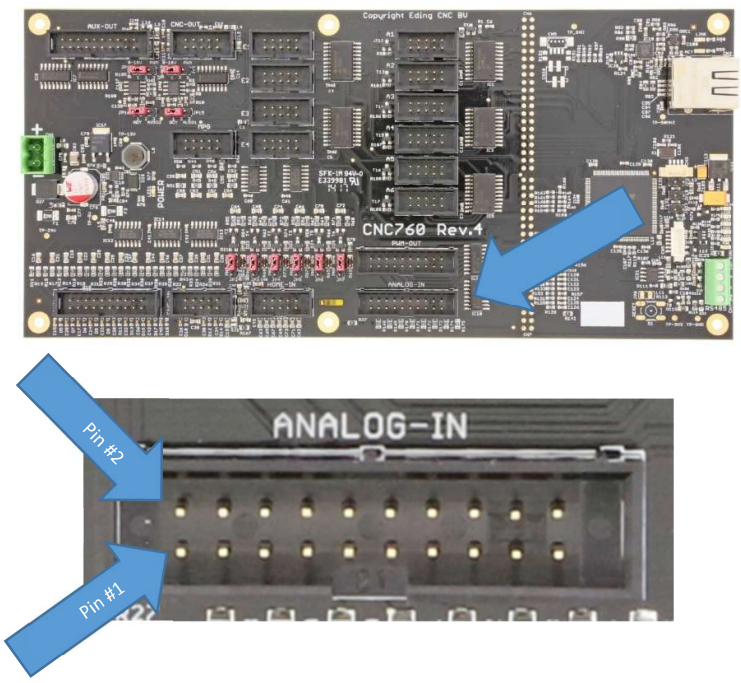
Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	GND		Ground			
2	GND		Ground			
3	PWM1	Output	Open Collector	PWM Output 1	Max. rating 50V/500mA	Also used for generating 0-10V output1
4	SYSRDY	Output	Open Collector	System Ready	Max. rating 50V/500mA	System Ready, indicates that system is ready for operation.
5	PWM2	Output	Open Collector	PWM Output 2	Max. rating 50V/500mA	Also used for generating 0-10V output2
6	GND		Ground			
7	PWM3	Output	Open Collector	PWM Output 3	Max. rating 50V/500mA	
8	GND		Ground			
9	PWM4	Output	Open Collector	PWM Output 4	Max. rating 50V/500mA	
10	GND		Ground			
11	PWM5	Output	Open Collector	PWM Output 5	Max. rating 50V/500mA	
12	GND		Ground			
13	PWM6	Output	Open Collector	PWM Output 6	Max. rating 50V/500mA	
14	GND		Ground			
15	PWM7	Output	Open Collector	PWM Output 7	Max. rating 50V/500mA	
16	GND		Ground			
17	PWM8	Output	Open Collector	PWM Output 8	Max. rating 50V/500mA	
18	GND		Ground			
19	+24V		POWER		+24V/1A	
20	+24V		POWER		+24V/1A	

Warning: Connecting an open-collector output directly to a positive voltage eg. 24V will cause a short-circuit damaging the board.

Warning: The total combined output current of pin #19/#20 should not exceed 1A.

4.11 ANALOG-IN

The analog inputs can be used to capture input voltages. The maximum voltage is 3.3V, make sure you do not exceed this limit as it will damage this input, or even the rest of the board.



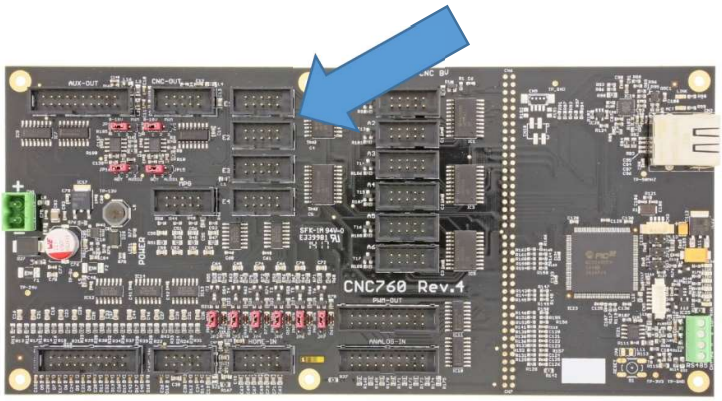
Below an overview of all connections of this connector:

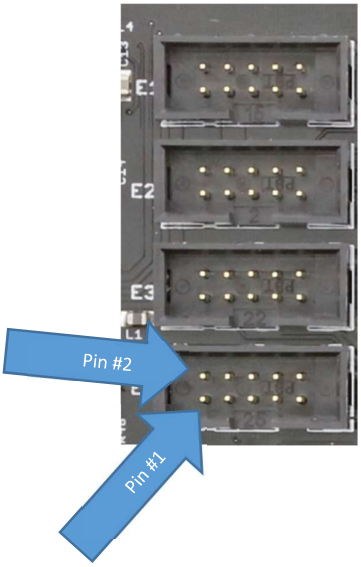
Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	GND		Ground	Ground		
2	GND		Ground	Ground		
3	AN1	Input	Analogue	Analoge input 1	Max. input voltage 3.3V	Pulled down with 100k resistor
4	Reserved					Do not connect
5	AN2	Input	Analogue	Analoge input 2	Max. input voltage 3.3V	Pulled down with 100k resistor
6	GND		Ground	Ground		
7	AN3	Input	Analogue	Analoge input 3	Max. input voltage 3.3V	Pulled down with 100k resistor
8	GND		Ground	Ground		
9	AN4	Input	Analogue	Analoge input 4	Max. input voltage 3.3V	Pulled down with 100k resistor
10	GND		Ground	Ground		
11	AN5	Input	Analogue	Analoge input 5	Max. input voltage 3.3V	Pulled down with 100k resistor
12	GND		Ground	Ground		
13	AN6	Input	Analogue	Analoge input 6	Max. input voltage 3.3V	Pulled down with 100k resistor
14	GND		Ground	Ground		
15	AN7	Input	Analogue	Analoge input 7	Max. input voltage 3.3V	Pulled down with 100k resistor
16	GND		Ground	Ground		
17	AN8	Input	Analogue	Analoge input 8	Max. input voltage 3.3V	Pulled down with 100k resistor
18	GND		Ground	Ground		
19	+24V		POWER		+24V/1A	
20	AVDD	Output	Power		+3.3V/100mA	

Warning: The total output current of pin #19 should not exceed 1A.

4.12 Extruder E1-E4

The extruder outputs can be used in 3D printer applications, controlling up to 4 extruders. The four outputs are designated E1 to E4.





On the next page all signals for the extruders are shown.

Note, the enable output for each of the 4 extruders are shared with an AUX OUT output, please check in your application that no pinning conflicts occurs!

Note, the step and direction signal for each extruder is combined with these signals for axis 6

Below an overview of the 4 extruder connectors:

Extruder 1:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	AEE1	Output	Digital	Extruder enable E1	5V/15mA	Shared with AUX OUT7
2	GND		Ground			
3	DIRE1	Output	Digital	Extruder direction signal E1	5V/15mA	Shared with DIR6
4	GND		Ground			
5	STEPE1	Output	Digital	Extruder step signal E1	5V/15mA	Shared with STEP6
6	GND		Ground			
7	GND		Ground			
8	GND		Ground			
9	+5V	Output	Power		+5V/500mA	See warning.
10	GND		Ground			

Extruder 2:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	AEE2	Output	Digital	Extruder enable E2	5V/15mA	Shared with AUX OUT8
2	GND		Ground			
3	DIRE2	Output	Digital	Extruder direction signal E2	5V/15mA	Shared with DIR6
4	GND		Ground			
5	STEPE2	Output	Digital	Extruder step signal E2	5V/15mA	Shared with STEP6
6	GND		Ground			
7	GND		Ground			
8	GND		Ground			
9	+5V	Output	Power		+5V/500mA	See warning.
10	GND		Ground			

Extruder 3:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	AEE3	Output	Digital	Extruder enable E3	5V/15mA	Shared with AUX OUT9
2	GND		Ground			
3	DIRE3	Output	Digital	Extruder direction signal E3	5V/15mA	Shared with DIR6
4	GND		Ground			
5	STEPE3	Output	Digital	Extruder step signal E3	5V/15mA	Shared with STEP6
6	GND		Ground			
7	GND		Ground			
8	GND		Ground			
9	+5V	Output	Power		+5V/500mA	See warning.
10	GND		Ground			

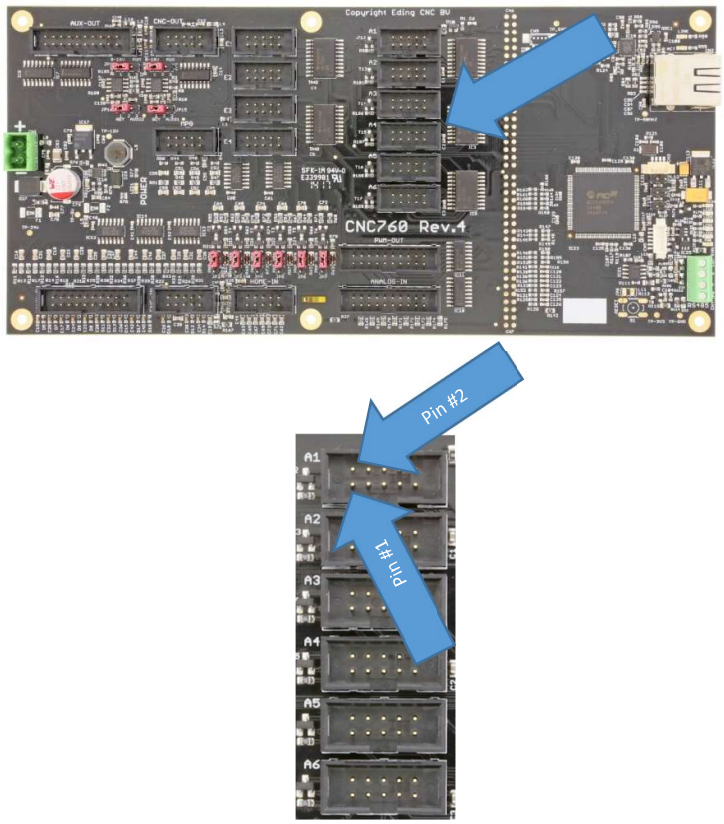
Extruder 4:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	AEE4	Output	Digital	Extruder enable E4	5V/15mA	Shared with AUX OUT10
2	GND		Ground			
3	DIRE4	Output	Digital	Extruder direction signal E4	5V/15mA	Shared with DIR6
4	GND		Ground			
5	STEPE4	Output	Digital	Extruder step signal E4	5V/15mA	Shared with STEP6
6	GND		Ground			
7	GND		Ground			
8	GND		Ground			
9	+5V	Output	Power		+5V/500mA	See warning.
10	GND		Ground			

Warning: The total combined output current of pin #9 of the extruders should not exceed 500mA.

4.13 Axis A1-A6

These outputs can control up to 6 axis simultaneously, these output are designated A1 to A6. Beside the step and direction signal each output has several extra signals.



Each axis output has a two enable outputs, these signals are used to enable to motor driver. The difference between these two signal is that one signal is a digital +5V signal, and the other is an open-collector signal. This helps in connecting the controller to different kind of drives.

Also, an alarm output is available. This input signals can be used by the motor driver to indicate problems with the drive. It is assumed that the alarm outputs of these drives can be coupled together. This would suggest that these outputs of the drivers are open-collector outputs. So each output can pull the alarm input low to generate an alarm.

Note, Please, *CHECK* what kind of output the alarm output of a drive is !!!!!

Below an overview of the 6 axis connectors:

Axis 1:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	ENABLE1	Output	Digital	Amplifier enable 1	5V/15mA	
2	ENABLE1	Output	Open-collector	Amplifier enable 1	Max. rating 40V/100mA	
3	DIR1	Output	Digital	Direction signal 1	5V/15mA	
4	GND		Ground			
5	STEP1	Output	Digital	Step signal 1	5V/15mA	
6	GND		Ground			
7	GND		Ground			
8	DRV-ALM+	Input	Digital	Alarm input		Pulled up with 4k7
9	+5V	Output	Power		+5V/500mA	See warning.
10	DRV-ALM-		Ground			

Axis 2:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	ENABLE1	Output	Digital	Amplifier enable 1	5V/15mA	
2	ENABLE1	Output	Open-collector	Amplifier enable 1	Max. rating 40V/100mA	
3	DIR1	Output	Digital	Direction signal 1	5V/15mA	
4	GND		Ground			
5	STEP1	Output	Digital	Step signal 1	5V/15mA	
6	GND		Ground			
7	GND		Ground			
8	DRV-ALM+	Input	Digital	Alarm input		Pulled up with 4k7
9	+5V	Output	Power		+5V/500mA	See warning.
10	DRV-ALM-		Ground			

Axis 3:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	ENABLE1	Output	Digital	Amplifier enable 1	5V/15mA	
2	ENABLE1	Output	Open-collector	Amplifier enable 1	Max. rating 40V/100mA	
3	DIR1	Output	Digital	Direction signal 1	5V/15mA	
4	GND		Ground			
5	STEP1	Output	Digital	Step signal 1	5V/15mA	
6	GND		Ground			
7	GND		Ground			
8	DRV-ALM+	Input	Digital	Alarm input		Pulled up with 4k7
9	+5V	Output	Power		+5V/500mA	See warning.
10	DRV-ALM-		Ground			

Axis 4:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	ENABLE1	Output	Digital	Amplifier enable 1	5V/15mA	
2	ENABLE1	Output	Open-collector	Amplifier enable 1	Max. rating 40V/100mA	
3	DIR1	Output	Digital	Direction signal 1	5V/15mA	
4	GND		Ground			
5	STEP1	Output	Digital	Step signal 1	5V/15mA	
6	GND		Ground			
7	GND		Ground			
8	DRV-ALM+	Input	Digital	Alarm input		Pulled up with 4k7
9	+5V	Output	Power		+5V/500mA	See warning.
10	DRV-ALM-		Ground			

Axis 5:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	ENABLE1	Output	Digital	Amplifier enable5	5V/15mA	
2	ENABLE1	Output	Open-collector	Amplifier enable5	Max. rating 40V/100mA	
3	DIR1	Output	Digital	Direction signal 5	5V/15mA	
4	GND		Ground			
5	STEP1	Output	Digital	Step signal 5	5V/15mA	
6	GND		Ground			
7	GND		Ground			
8	DRV-ALM+	Input	Digital	Alarm input		Pulled up with 4k7
9	+5V	Output	Power		+5V/500mA	See warning.
10	DRV-ALM-		Ground			

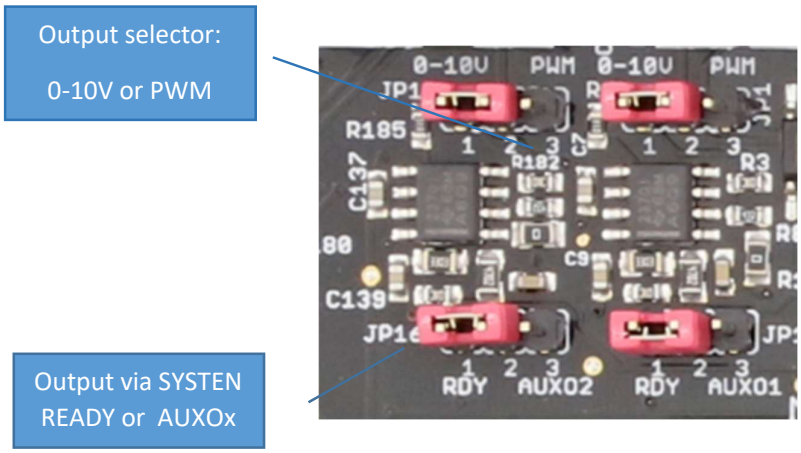
Axis 6:

Pin #	Name	Direction	Type	Function	Electrical Spec.	Remarks
1	ENABLE1	Output	Digital	Amplifier enable 6	5V/15mA	
2	ENABLE1	Output	Open-collector	Amplifier enable 6	Max. rating 40V/100mA	
3	DIR1	Output	Digital	Direction signal 6	5V/15mA	
4	GND		Ground			
5	STEP1	Output	Digital	Step signal 6	5V/15mA	
6	GND		Ground			
7	GND		Ground			
8	DRV-ALM+	Input	Digital	Alarm input		Pulled up with 4k7
9	+5V	Output	Power		+5V/500mA	See warning.
10	DRV-ALM-		Ground			

Warning: The total combined output current of pin #9 of the axis should not exceed 500mA.

5 Configuring the analogue outputs

The CNC760 board contains two identical 0-10V outputs. There are 2 jumpers for each output that can be used to configure the behaviour of these outputs.



Output signal type:

The top jumper selects what signal is present on the output. Either 0-10V, which is default, or the standard PWM signal. These outputs use the existing PWM outputs of the board.

From the picture above, the left output (PWM-VOLT2) uses PWM2 output, the right output (PWM-VOLT1) uses PWM1 output.

When the PWMx output signal is selected it's identical to the PWMx signal on the PWM output connectors, that means that this signal is an open-collector output.

Warning: Connecting an open-collector output directly to a positive voltage eg. 24V will cause a short-circuit

Output enable behaviour:

The bottom jumper selects whether the output is enabled when the 'SYSTEM READY' is available, the default behaviour, or that it is controlled via an AUXOx output.

From the pictures above, the left output (PWM-VOLT2) uses AUXO2 output to control the output, the right output (PWM-VOLT1) uses AUXO1 output to control the output.

WARNING: If the jumper is set to enable the output via one of the AUXOx outputs, the 'SYSTEM READY' signal will no longer switch off this output.

6 Getting started

Before installing the board it's a clever idea to validate that the board is operational.

Validate the board

Step 1. The first step is to validate the board is operational. Connect the network cross cable to the board and the PC. Make sure you have set the correct IP address on the PC. For a description on how to setup the PC please refer to the software manual.

Step 2. Connect the power, as a result the two blue power leds should turn on. And observe that the status LEDs indicates that the board is active, indicated by the 'heart beat'.

Step 3. Try to connect to the board.

The board is now able to communicate with the application software.

Check for motion

Now the board is operational the next step is to check whether the machine and home switches work correctly. We start with the homing switches. Make sure that the power is off.

Step 1. The first step is to determine how to configure the jumpers. For now, the most important once are the jumpers for the home inputs. Set these jumpers to the correct position based on the type of the home switches used.

Step 2. Power up the board and connect.

Step 3. By using the I/O screen of the application validate that the switches are correctly detected; if you need to invert the signal do this in the setup of the software. If this is done, power down the board.

Step 4. Connect the drivers to the board, you can choose to connect all motors at once or just one at a time. Please check the manual of the driver on how to connect it to the controllers, also check that the enable is correctly connected; directly or via the open-collector output. Some drivers will automatically be enabled when this input is not connected and they're power up.

Step 5. DOUBLE check all connections.

Step 6. Power up the board and driver(s) and connect to the board.

Step 7. Normally with the default settings of the software you should be able to get some motion. If not please check the following:

- Are all signals correctly connected?
- Do some signals need to be inverted (eg. enable) ?

TIP: By using the software I/O screen you can manually check the enabling of the drivers. When the drive is not enabled you will be able to move it by hand, if it is enabled this should not be possible.

If all want ok, your machine has now a basic setup. From here you can continue to connect more I/O to the board, please check all I/O via the software; also check whether inversion is necessary.

Please note that the system will need to be tuned to each specific machine. This means that machine parameters as speed/acceleration etc. will need to be changed to get optimum performance. Please make sure you know who to do this, and If not request support.

And finally perform each part step by step, so you know where to look in case something does not work immediately.