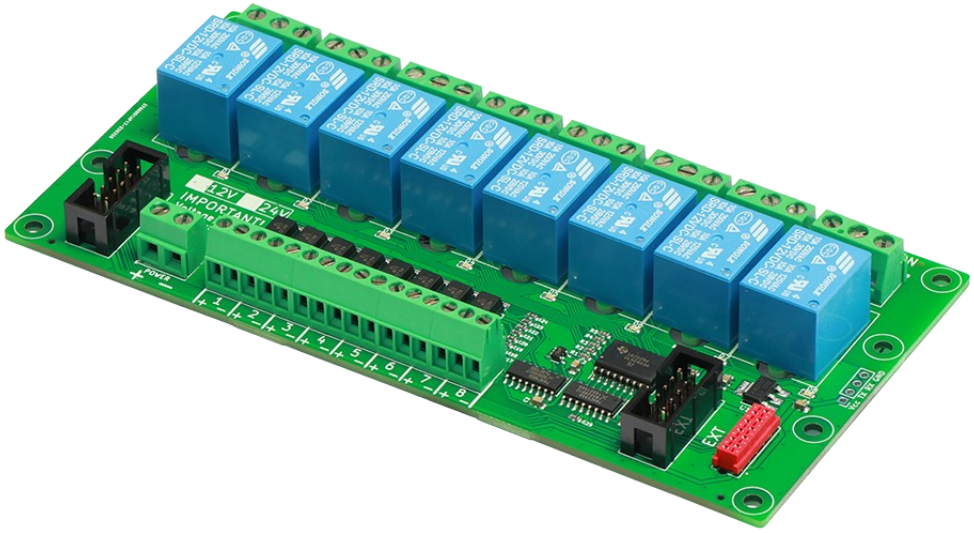
PlanetCNC

ExtInOut expansion board

2022/06/20 Rev1.1



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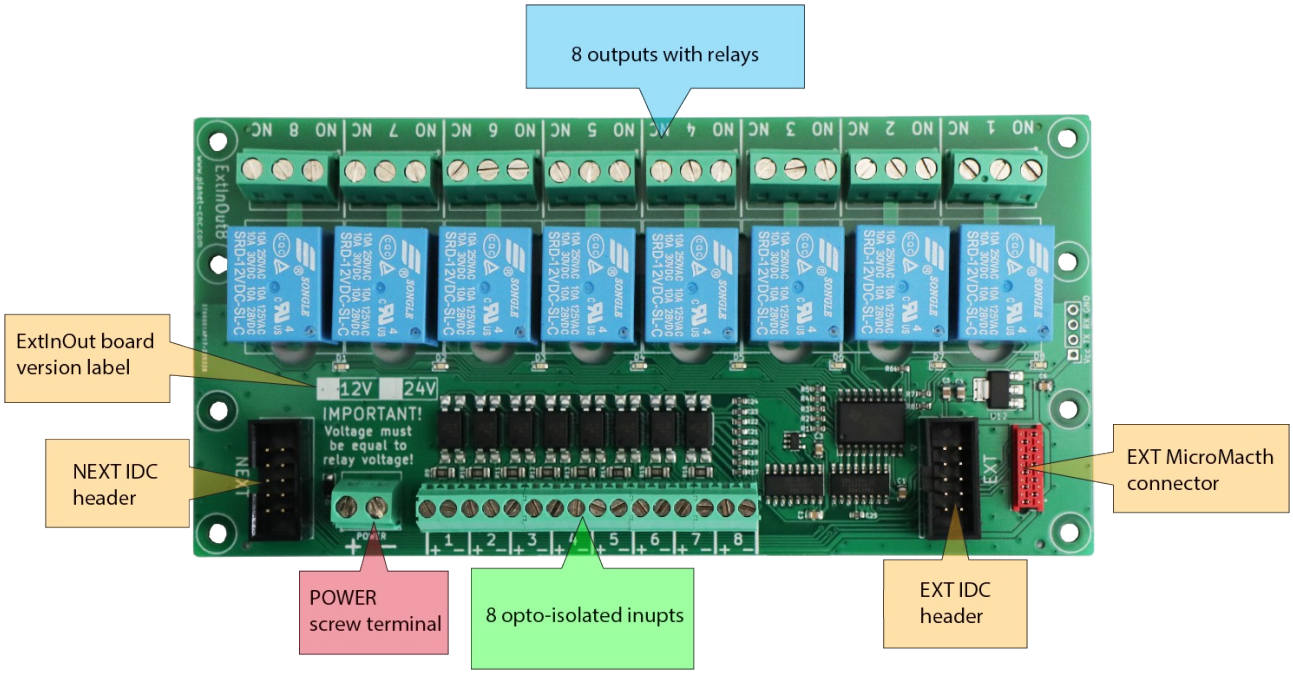
Introduction

Overview

ExtInOut expansion board is a device, that expands the number of motion controller inputs and outputs. This board can be used with Mk3, Mk3/4 and Mk3DRV controller.

Features and specifications:



ExtInOut board version label:

- ExtInOut expansion board is available in two versions: 12VDC and 24VDC. Version used, depends on the type of external power supply.
- Board will have a mark next to 12V label if version is suitable for 12V power supply
- Board will have a mark next to 24V label if version is suitable for 24V power supply

8 Outputs with relays:

- Single ExtInOut expansion board offers 8 outputs with relays
- Outputs with relays can be used to control:
  - solenoid valves
  - light indicators
  - various motors
  - switching devices such as contactors and/or motor starters

8 Opto-isolated inputs:

- Single ExtInOut expansion board offers 8 opto-isolated input channels
- Inputs can be used with:
  - buttons
  - switches
  - PNP and NPN proximity sensors
  - other switching devices

NEXT IDC header:

- You can daisy chain up to 4 ExtInOut boards, providing a total of 32 inputs and 32 outputs with relays.
- NEXT heder is used to connect a currnet ExtInOut board with the next ExtInOut board in the daisy chain connection

EXT IDC header:

- EXT IDC header is used to connect a previous ExtInOut board with the current ExtInOut board in the daisy chain connection
- This header can also be used to connect first ExtInOut board with older MK3 controllers EXT IDC header.

POWER screw terminal:

- External power supply screw terminal connector, used for powering on-board relays.
- External power supply voltage value depends on the version (12V or 24V) of ExtInOut board used

EXT MicroMatch connector:

- You can daisy chain up to 4 ExtInOut boards, providing a total of 32 inputs and 32 outputs with relays.
- NEXT heder is used to connect a currnet ExtInOut board with the next ExtInOut board in the daisy chain connection

Input specification:

Inputs use opto-coupler and a resistor.
Min voltage supplied to input : 5VDC
Max voltage supplied to input without external current limiting resistor: 12VDC*

*PLEASE NOTE:

- Input voltage source is independent from POWER terminal voltage source (relay voltage source).

- When using power supply that exceeds max voltage input ratings, please use current limiting resistor for opto-isolated inputs.

Output specification:

Relay outputs offer: Common, NC (normally closed) and NO(normally opened) terminals.

Relays* specification:

@ Voltage 250VAC, capable of switching up to 10A

@ Voltage 125VAC, capable of switching up to 10A

@ Voltage 30VDC, capable of switching up to 10A

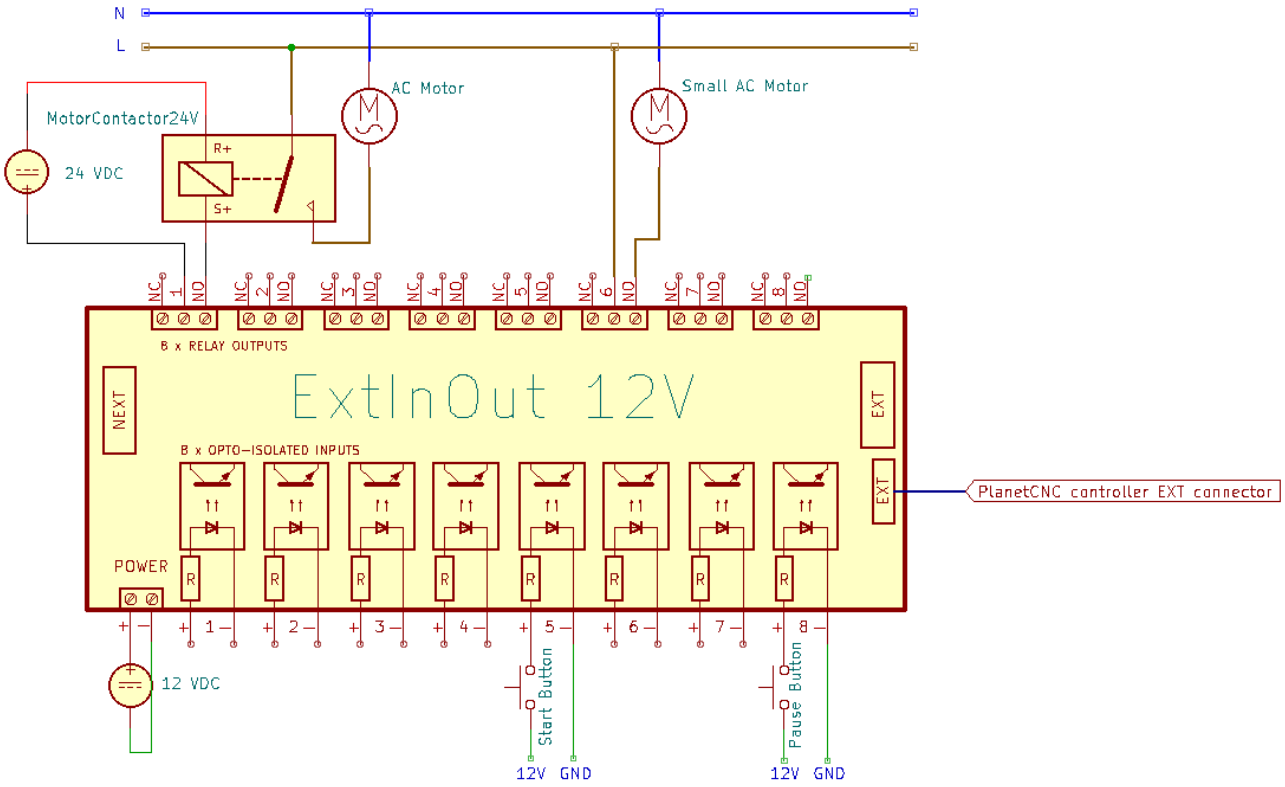
@ Voltage 28VDC, capable of switching up to 10A

*ExtInOut 12VDC → uses 12VDC relays

*ExtInOut 24VDC → uses 24VDC relays

Connection diagrams

Schematic below describes the use of ExtInOut board with motor contactor, small motor and input buttons:



Schematic below describes the use of ExtInOut board with LED's, solenoid value and PNP/NPN proximity sensors:

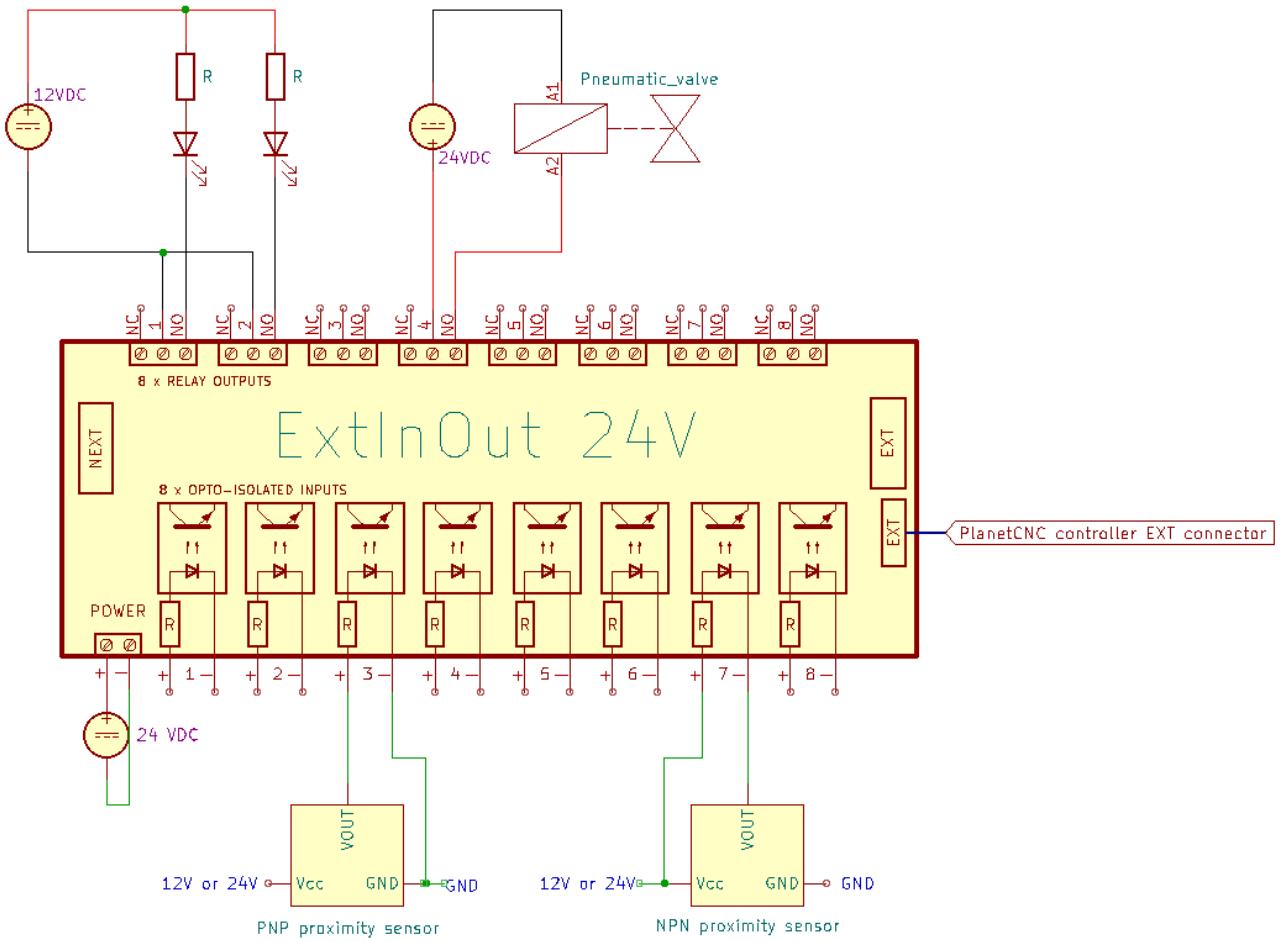


Diagram below, illustrates connection between Mk3/4 controller and ExtInOut board.

It also illustrates connection of small DC motor and PNP proximity sensor with ExtInOut board.

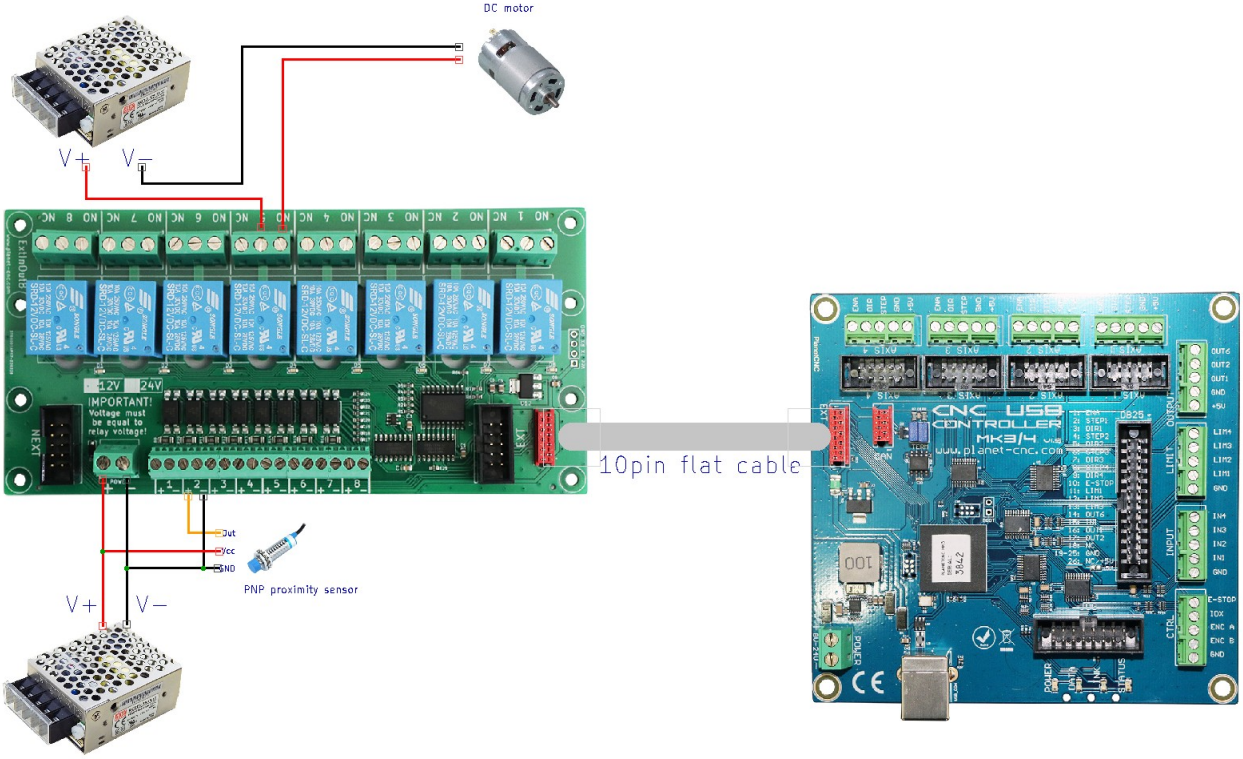


Diagram below, illustrates connection between Mk3/4 controller and ExtInOut board.

It also illustrates connection of solenoid value and input button with ExtInOut board.

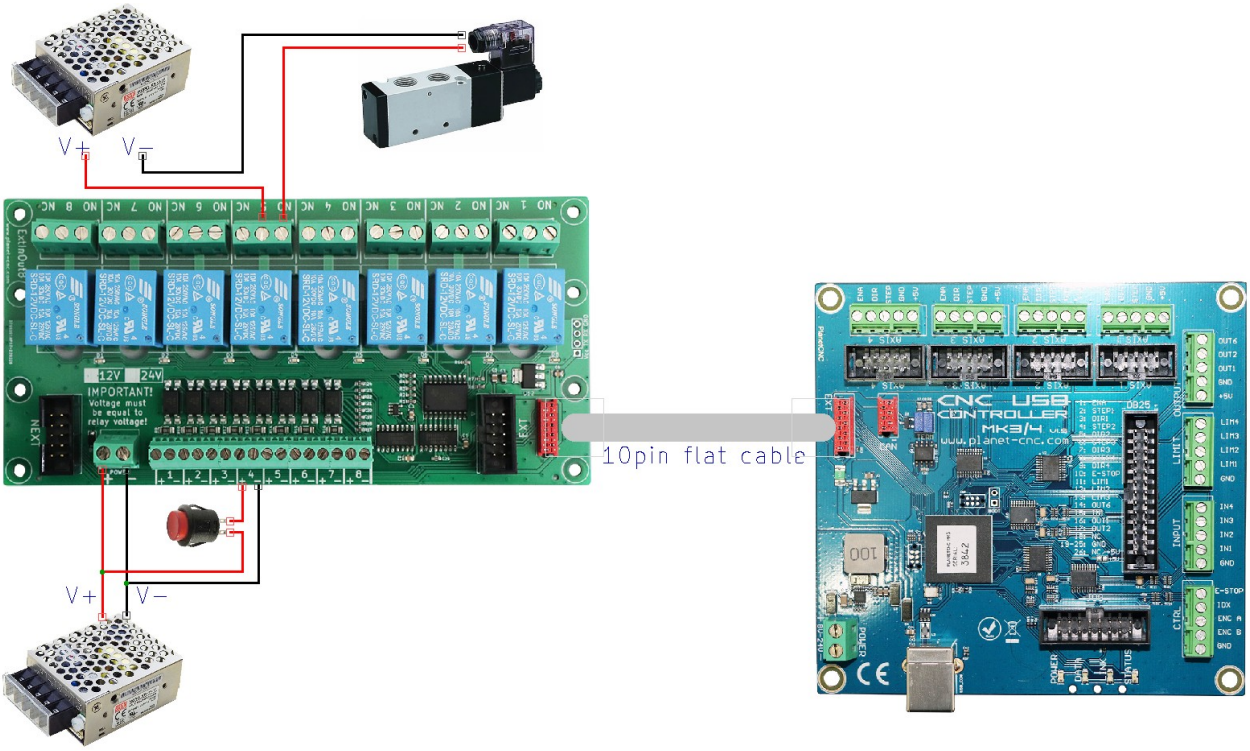


Diagram below, illustrates connection between Mk3/4 controller and ExtInOut board.

It also illustrates connection of motor starter for AC motor value and NPN proximity sensor with ExtInOut board.

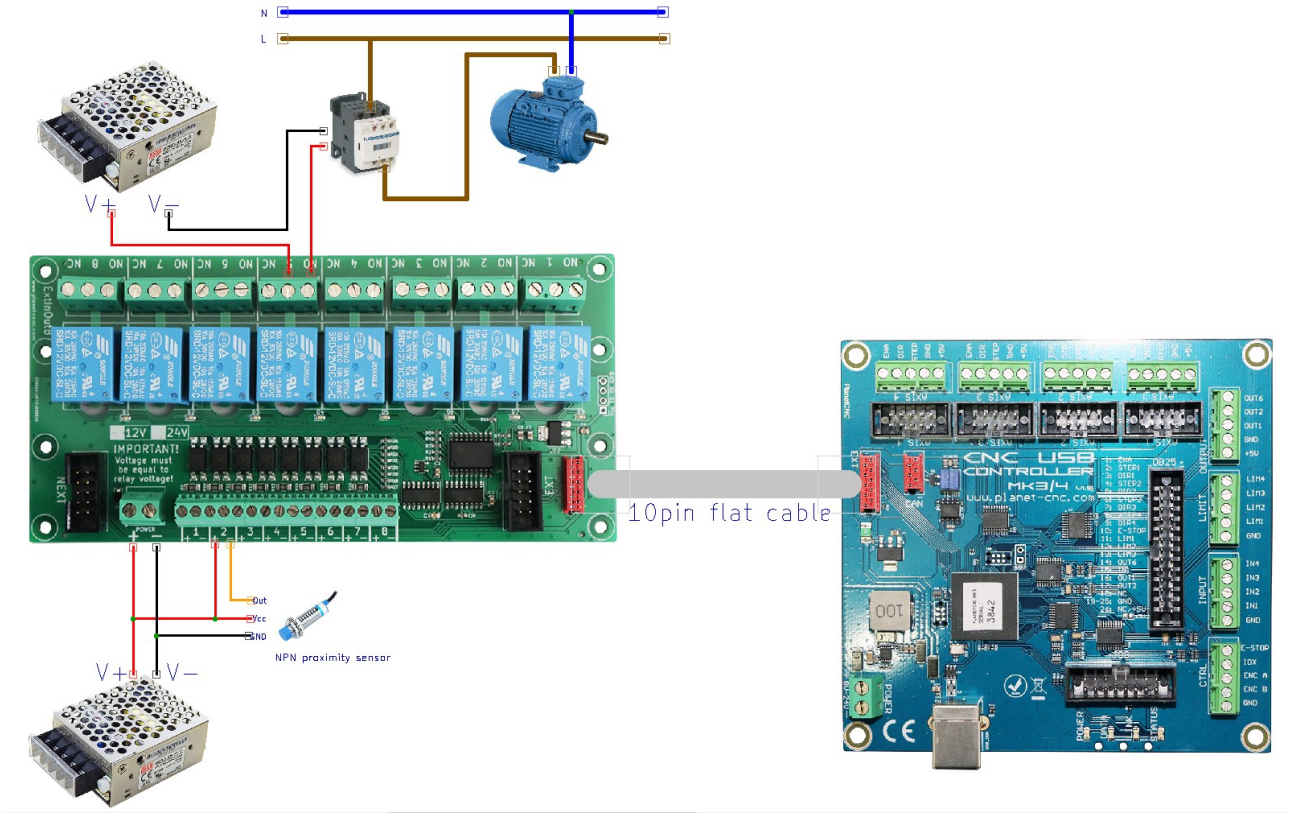
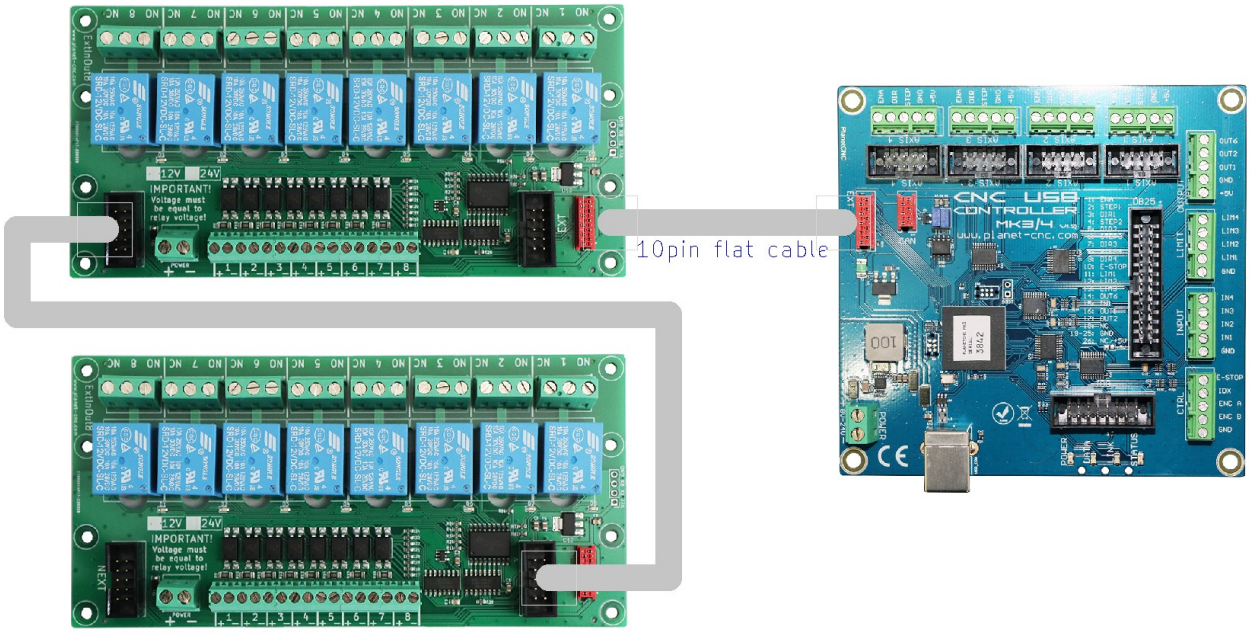


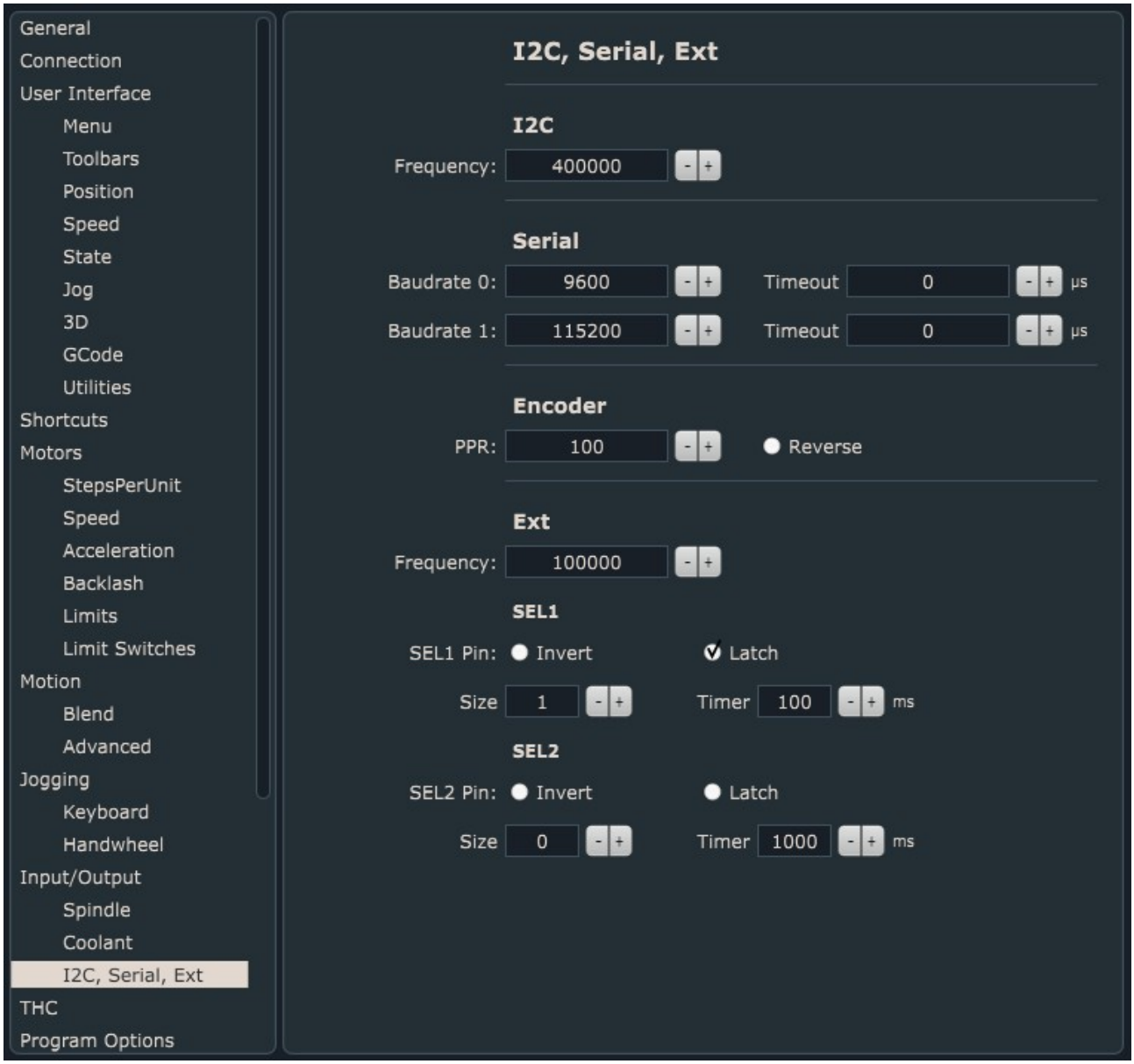
Diagram below, illustrates connection between Mk3/4 controller and two ExtInOut boards:



ExtInOut board's use with PlanetCNC TNG software

Settings related to EXT are located under File/Settings/Input/Output → I2C,Serial,Ext

Example of EXT settings configuration for one ExtInOut board connected to PlanetCNC controller:



Please note: MK3 controller uses also EXT2 connector. Settings related to EXT2, are under SEL2 chapter.

Frequency:

Value of EXT clock frequency. Default value is suitable for most cases.

SEL1 Pin:

Invert: Inverts SEL1 pin

Latch:

Size:

Inserted value should be equal to the number of ExtInOut boards used with EXT1 connector of controller.

Eg.g.: If you use only one board, value is 1. If you use 3 boards connected in daisy chain, value is 3.

Timer:

Refresh time value of ExtInOut board inputs

SEL2 Pin:

Invert: Inverts SEL2 pin

Latch:

Size:

Inserted value should be equal to the number of ExtInOut boards used with EXT2 connector of Mk3 controller.

Eg.g.: If you use only one board, value is 1. If you use 3 boards connected in daisy chain, value is 3.

Timer:

Refresh time value of ExtInOut board inputs

Gcode commands:

ExtInOut relay output control:

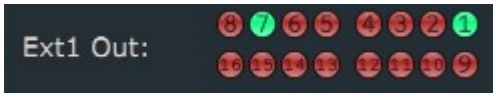
There are multiple ways on how you can control ExtInOut relay outputs:

Example: #<_extout1|num>

Activate relay outputs 1 and 7:

#<_extout1|1> = 1

#<_extout1|7> = 1



Example: #<_extout1> = n

Activate relay outputs 1 – 4 of first ExtInOut board:

#<_extout1> = 15

Activate relay outputs 1 – 4(outputs 9-12) of second ExtInOut board:

#<_extout1> = 3840

Example: #<_extout1> = BIN[ ]

Activate relay outputs 1 – 4 of first ExtInOut board:

#<_extout1> = BIN[00001111]

Activate relay outputs 1 – 4(outputs 9-12) of second ExtInOut board:

#<_extout1> = BIN[0000111100000000]

Example: #<_extout1> = HEX[ ]

Activate relay outputs 5 – 8 of first board:

#<_extout1> = HEX[F0]

Activate relay outputs 5 – 8 (outputs 13-16)of second board:

#<_EXTOUT1> = HEX[F000]

Reading ExtInOut board inputs:

ExtInOut board input status values are available through parameters **#<_extin1> and #<_extin2>.**

You can use them with your gcode, script files, expressions, toolbar buttons etc..

EXT State panel settings:

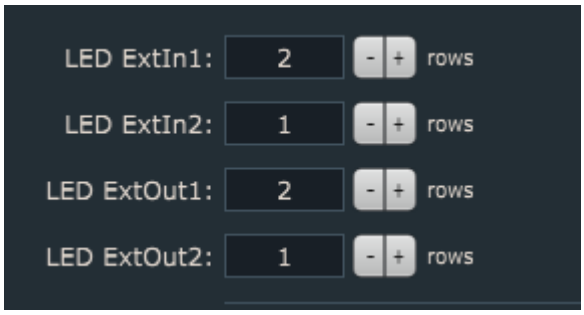
EXT input and output status lights can be displayed under IO state panel of PlanetCNC TNG sw.

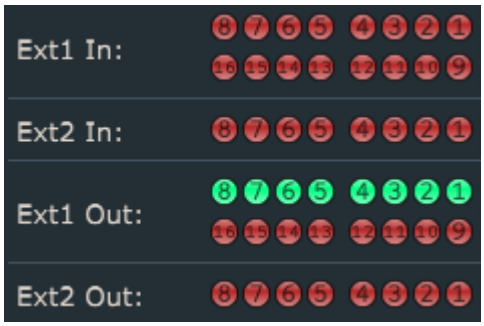
EXT IO LED settings are located under *File/Settings/User Interface/State* →

LED ExtIn1 and LED ExtIn2 → Rows

LED ExtOut1 and LED ExtOut2 → Rows

Each row displays 8 inputs and outputs of dedicated ExtInOut board. So if you use two ExtInOut boards with EXT1 of your controller, you should use insert value 2:





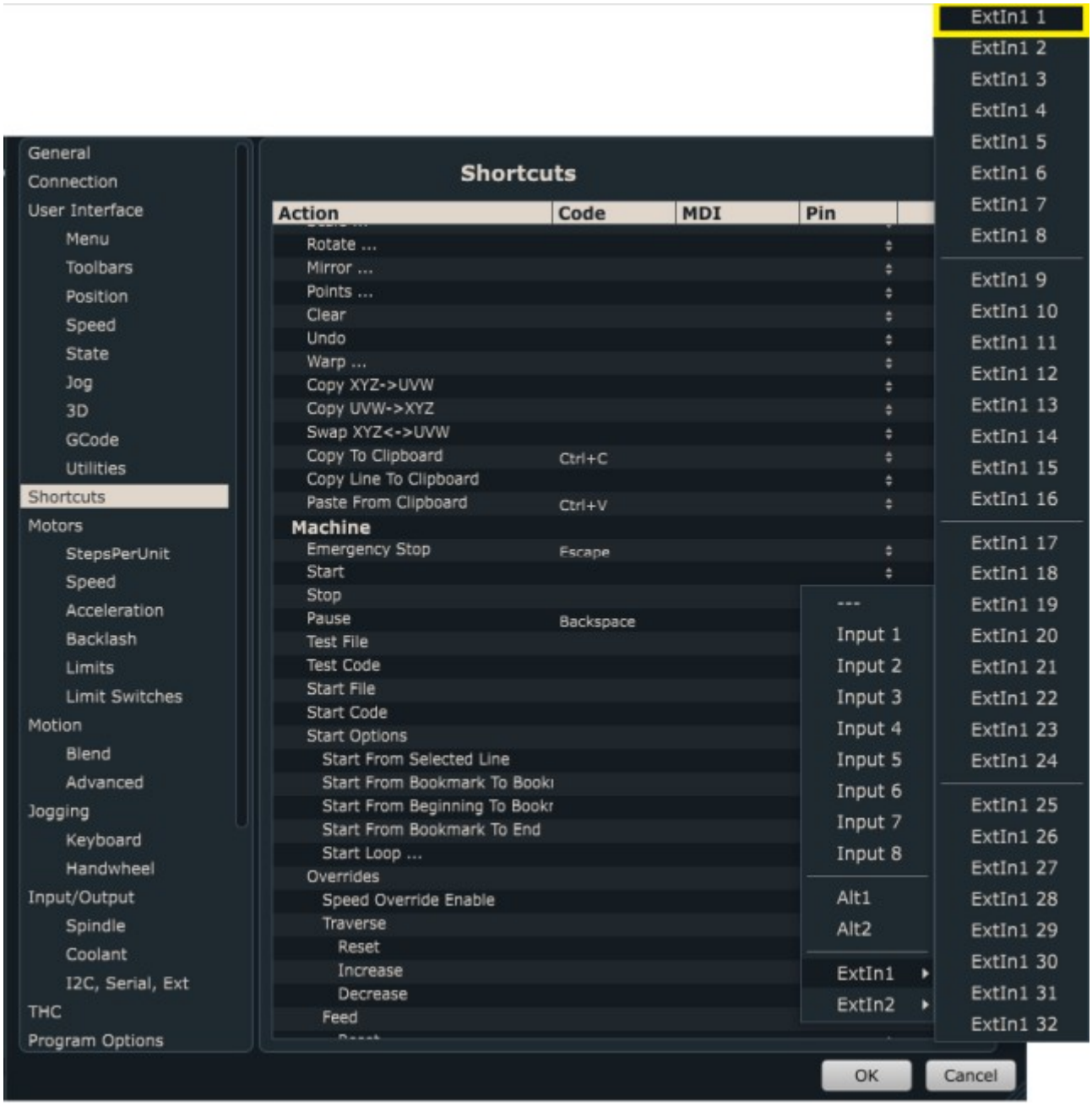
Using PlanetCNC TNG software pin shortcuts with ExtInOut board inputs:

You can map inputs of ExtInOut board as a shortcut pin in PlanetCNC TNG.

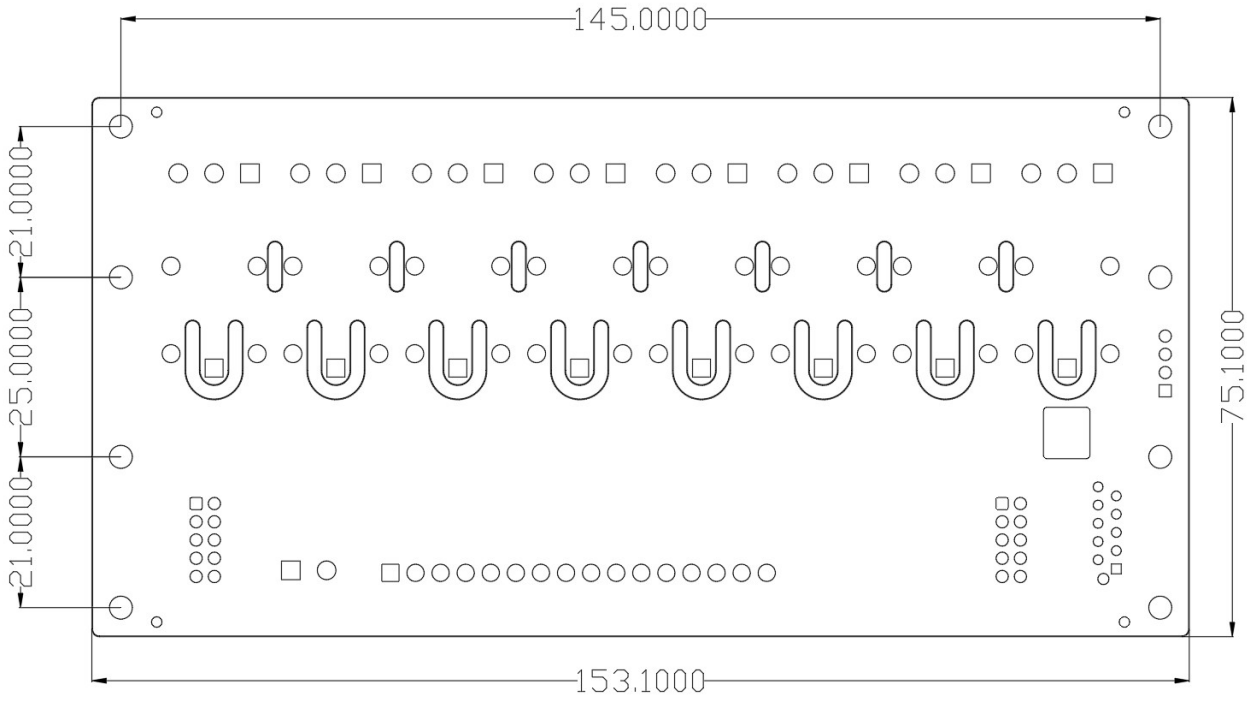
Example:

We want to use ExtInOut boards input 1 as a **program start button**.

Under File/Settings/User Interface/Shortcuts → Machine/Start → Pin → ExtIn1→ ExtIn1 1



Dimensions:



DXF file is available at link below:

ExtInOut DXF file

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