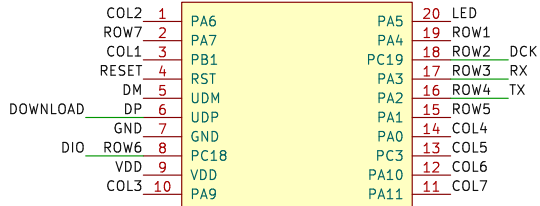


Per the CH32X035 datasheet, PA7 can not be output.

U1
CH32X033F8P6



The keyboard has 48 keys laid out in a 4-row-12-column grid.
It uses fewer GPIO pins to have a 7x7 matrix (14 pins) than to use a 4x12 (16 pins) matrix.

The mapping is top-to-bottom, left-to-right. This retains "column X <= Y".

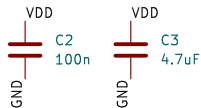
To find the key number:

switch number = keyboard column * number of rows + keyboard row.

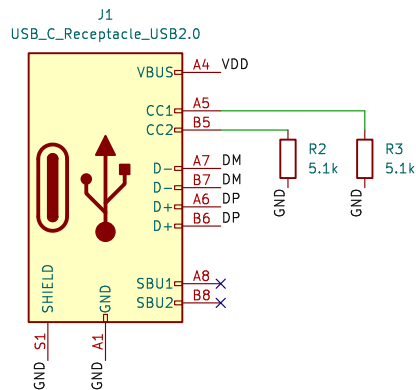
To find the logical column, 'row':

(switch number / 7, switch number % 7)

Decoupling capacitors



USB Connector



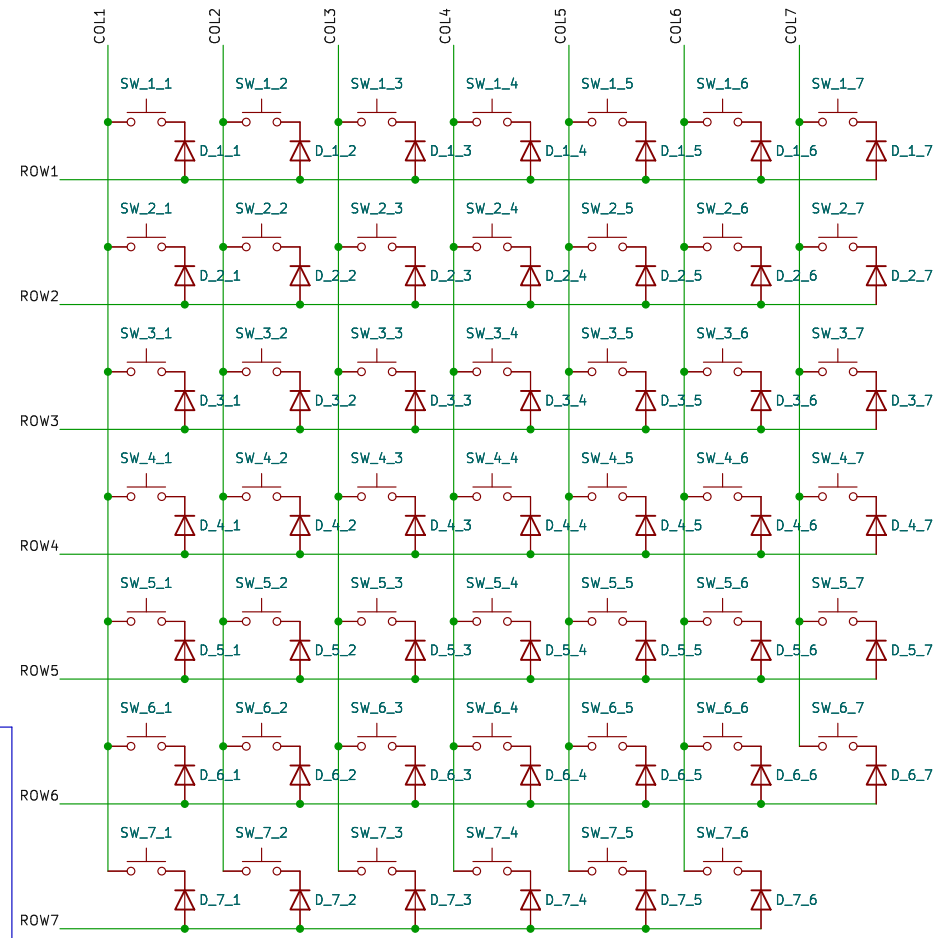
**IMPORTANT:
Take care with diode direction!**

For CH32X035:
- Only PA0-PA15 and PC16-PC17 support pull down input.
(ref. CH32X035 datasheet, section 1.4.19).
- PA7 cannot be used as an output.
(ref. notes to Table 2-1).

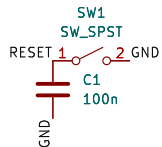
For "cathode(-) faces row", current flows from column to row, matrix scanning is done by either:
- write col high (+), and read from pull-down rows (-).
- write row low (-), and read from pull-up cols (+).

For "cathode(-) faces col", current flows from row to column, matrix scanning is done by either:
- write row high (+), and read from pull-down cols (-).
- write col low (-), and read from pull-up cols (+).

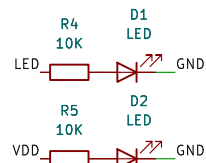
Take care the diode direction agrees with matrix scanning requirements for writing to the pin / pulling down.



Reset Switch
ref. Figure 3-3 Typical circuit of CH32X datasheet.



Download switch.
Short while plugging in USB to enter ISP flashing mode. e.g. with wchisp.



UART
For simple printf debugging with UART2. ("ROW4"/SW_4_x switches can't be used while using UART2).



WCH Link interface
(CH32X033 only compatible with WCH-LinkE or WCH-LinkW) Using DIO/DCK prevents use of ROW2/ROW6.



Hardware, Mounting Holes
For M2 screws.
Same mounting holes as JJ40.

- H1 MountingHole
- H2 MountingHole
- H3 MountingHole
- H4 MountingHole
- H5 MountingHole

Project: <https://github.com/rgoulter/keyboard-labs>
Simple 4x12 ortholinear keyboard using CH32X MCU.
48-key on 7x7 digital matrix.

Richard Goulter (rgoulter)

Sheet: /
File: keyboard-ch32x-48.kicad_sch

Title: CH32X-48

Size: A4 Date: 2025-01-10
KiCad E.D.A. 8.0.2

Rev: rev2025.2
Id: 1/1