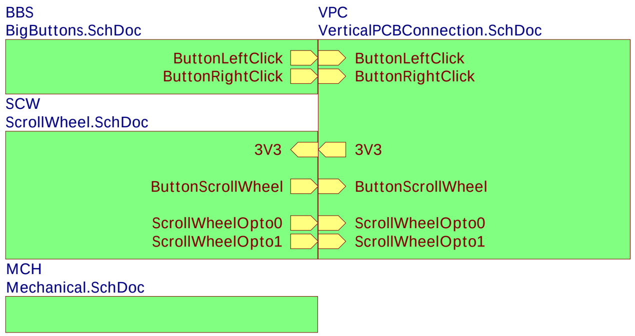

Title: Vertical.SchDoc

PCB: Vertical.PrjPCB

Version: R1.003

Date: 2019-09-18 Time: 2:24:15 PM

Sheet 1 of 5

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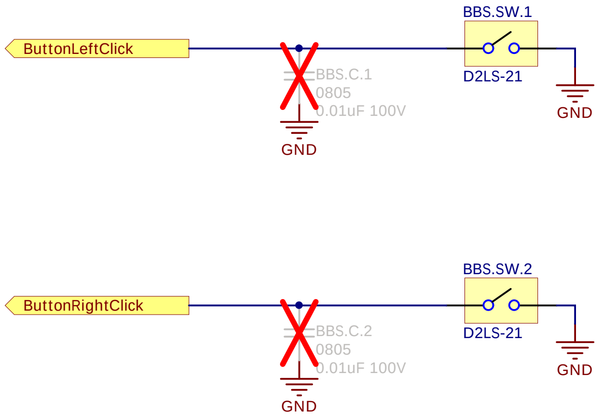
1 2 3 4



These two switches actuate the left and right click buttons.

Activate the pull-up resistors on the GPIO pins attached to these switches to make them work.

Title: BigButtons.SchDoc		
PCB: Vertical.PrjPCB	Version: R1.003	
Date: 2019-09-18 Time: 2:24:15 PM	Sheet 2 of 5	

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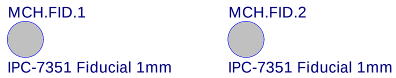
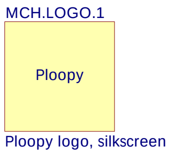
Pick and Place Fiducials

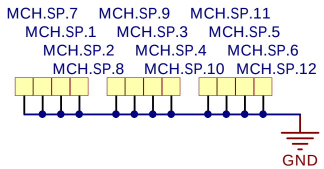




Spark Gaps -- Case

These spark gaps are placed here so we can protect board inputs from ESD above 1500V or so. These act as a first line of defense, bringing down the maximum voltages seen by other protection components (caps, TVS diodes, etc.)

These spark gaps are meant to go on the edge of the board, so they can protect against ESD that attacks the system through the case or heatsink.



Title: Mechanical.SchDoc

PCB: Vertical.PrjPCB

Version: R1.003

Date: 2019-09-18 Time: 2:24:15 PM

Sheet 3 of 5

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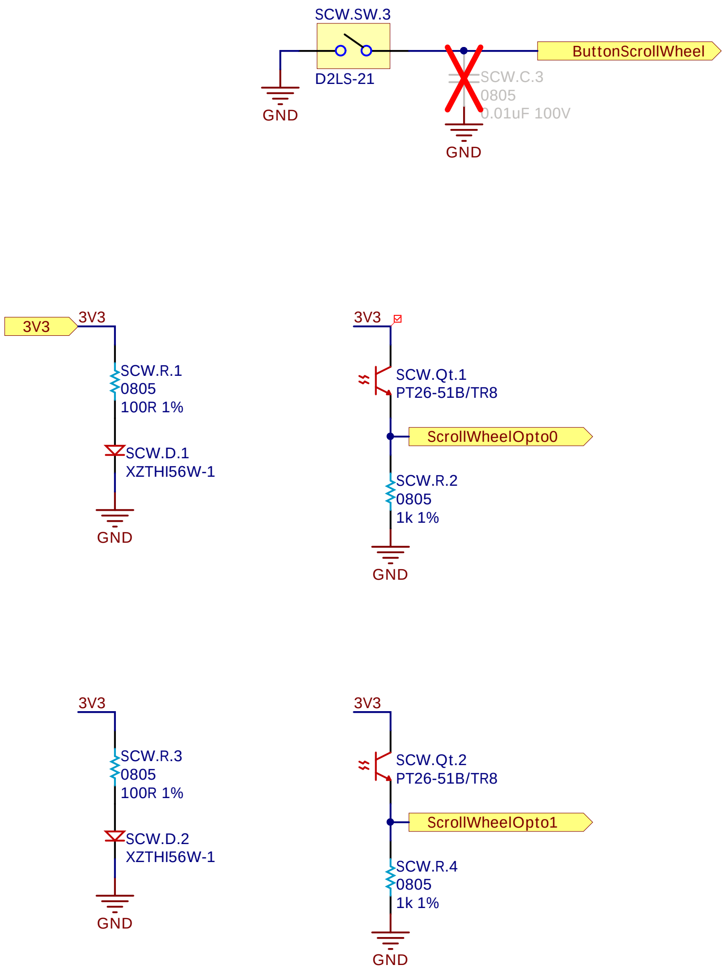

The button is pretty straightforward: when the scroll wheel gets pressed, the button is pressed.

To make this work, the pull-up resistor on the GPIO pin it's attached to needs to be activated.

The scroll wheel mechanism is a 2-bit optical encoder. The light paths are spaced 1.5 periods over the encoder wheel holes, which should allow for the detection of the rotation direction as well as the rotation itself.

Two IR LEDs are used as light sources; the ligh from these is obstructed by the encoder wheel built into the scroll wheel mechanism. Two phototransistors are used to detect when the light is blocked/not blocked by the wheel.

Typical LED forward voltage is 1.3V @20mA. To achieve this current level with a 3.3V supply, we'll use a 100R resistor, which is very convenient.

At this power level, the output should be approx 2.3mW/sr.

Since the light path distance is about 12mm, that works out to about 2mW/cm^2, though the actual delivered power will be lower due to the vagaries of the obstructions in the mechanism.

With this amount of light (and accounting for the fact that we'll probably lose a lot of it along the way), we are expecting 1-3mA out of the phototransistor (see figure 6 of the datasheet), so we size the biasing resistor accordingly to produce a useful signal.

Title: ScrollWheel.SchDoc
PCB: Vertical.PrjPCB
Version: R1.003
Date: 2019-09-18 Time: 2:24:16 PM
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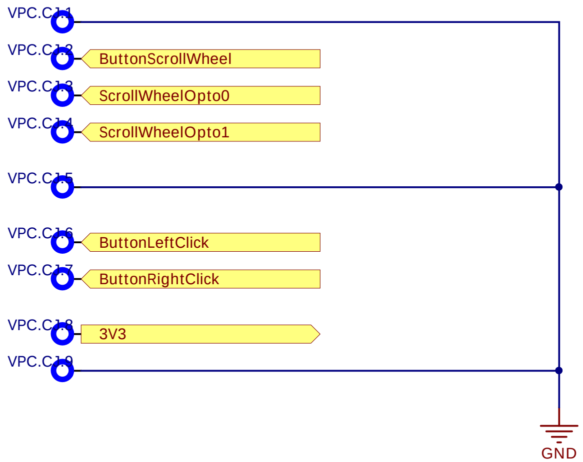
The two PCBs have castellated connections, which are represented here. These carry a shared ground and all the signals from the various UI bits and pieces that are hosted on the vertical board.



Title: VerticalPCBConnection.SchDoc	
PCB: Vertical.PrjPCB	Version: R1.003
Date: 2019-09-18 Time: 2:24:16 PM	Sheet 5 of 5

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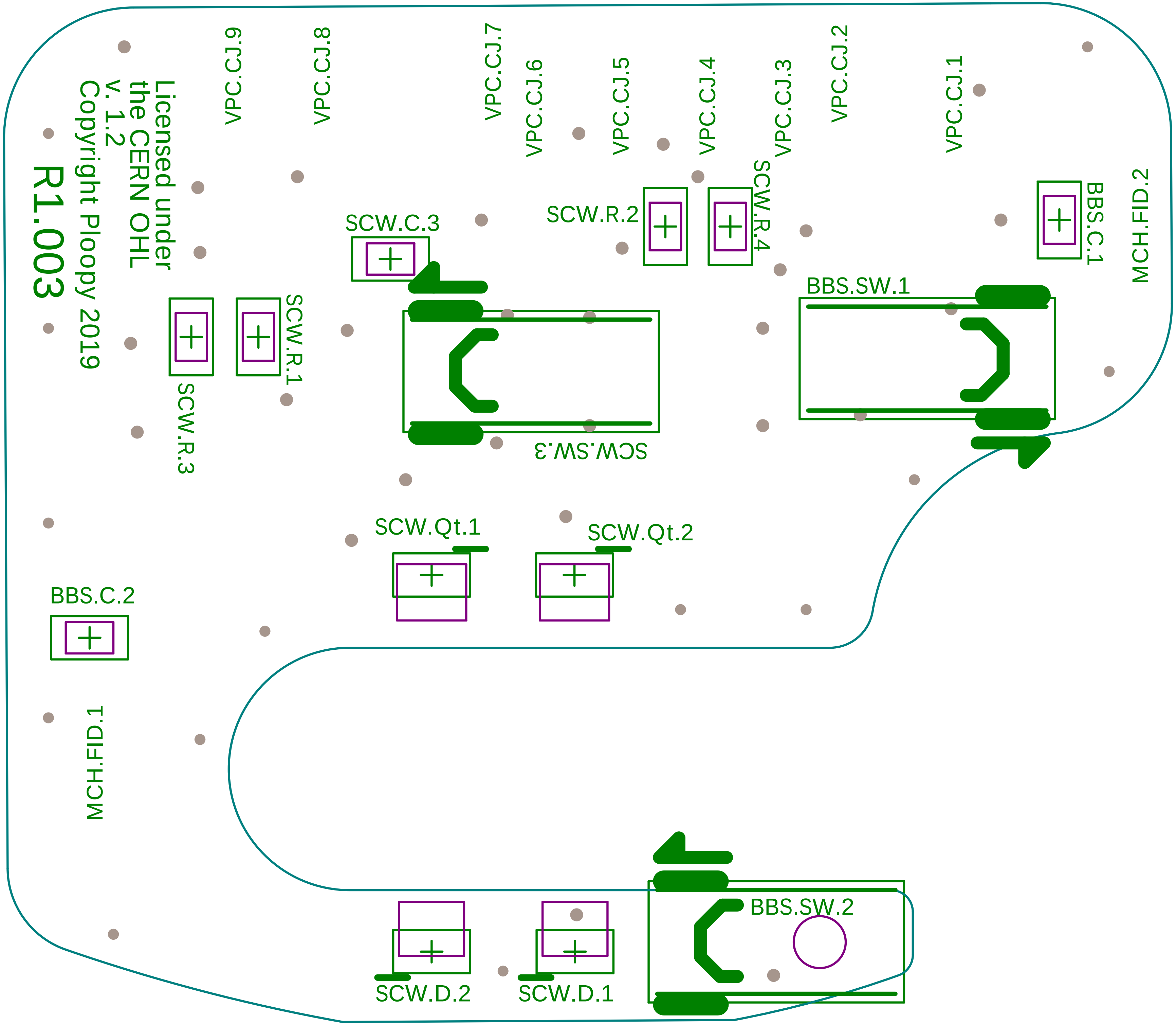
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VPC.CJ.5
VPC.CJ.4
VPC.CJ.3
VPC.CJ.2
VPC.CJ.1
SCW.C.3
SCW.R.2
SCW.R.4
BBS.C.1
MCH.FID.2
BBS.SW.1
SCW.R.1
SCW.R.3
SCW.SW.3
SCW.Qt.1
SCW.Qt.2
BBS.C.2
MCH.FID.1
BBS.SW.2
SCW.D.2
SCW.D.1