WCAM-BREAKOUT-PCB-R01 Documentation

1 Introduction

This document describes the use of the WCAM-BREAKOUT-PCB-R01 development board and provides advice on how to use the board.

2 Development board overview

The intended use case of the board is to provide an interface to the OMNIVISION OV02740-H34A-Z image sensor. It has the typical Raspberry Pi camera connector to which a user can connect the sensor via the 2 lane + clock CSI interface:

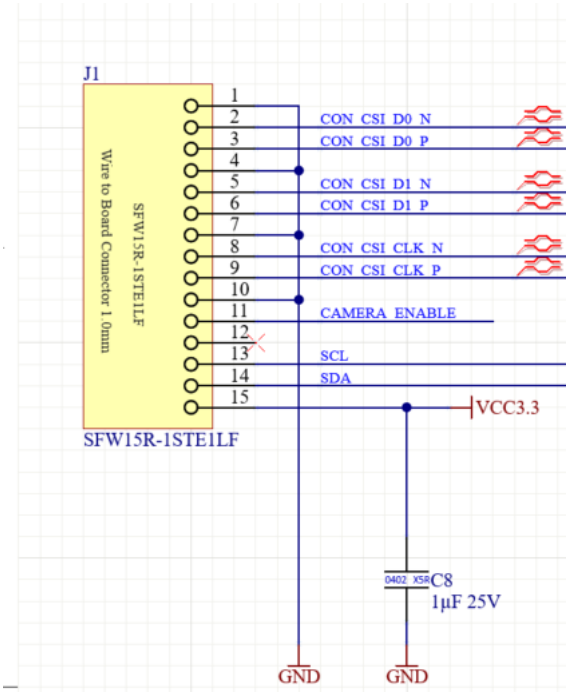

Figure 1 Main connector J1

Physical data connection:

The RASP CAM FPC 20 FFC cable corresponds to the specification of connector J1, which means that a Raspberry Pi 5, for example, can be connected to the development board via the FFC cable. There is also an enable signal for the camera on J1 pin 11 and an I2C bus connection on J1 pins 14 and 15 to send and receive commands between the master and the image sensor at address 0x20. The camera enable signal on pin 11 activates the camera, the internal power supply and the port expander IC. First apply a 3.3V signal to this pin to activate all components.

Power supply recommendations:

The digital logic of the image sensor operates with a voltage of 1.8 V, which is generated internally from the 3.3 V supplied via the J1 connection on pin 15. The user does not need to apply any voltages other than the 3.3V to connector J1. If the board is used with a Raspberry Pi, no further steps need to be taken other than connecting the two together with an ffc cable.

Digital logic communication:

The image sensor provides multiple digital signals for control and status information. These signals can be accessed in two ways.

At first, an I2C to GPIO port expander PE is connected to the I2C bus of the connector J1. It is configured to listen at the adress 0x75. If there is a need for an alternative address, the resistors R60, R61, R66 and R67 can be placed or removed. For details see the datasheet of TCAL9539. Via I2C commands, also described on the datasheet of the TCAL9539, the GPIOs can be configured as an input, output or high impedance. Furthermore outputs of the port expander can be configured as a logic high or logic low while the status of the inputs can be read from the chip.

As a second way to access the digital logic of the image sensor a direct connection can be made by connecting jumper wires to the pin header connector J4:

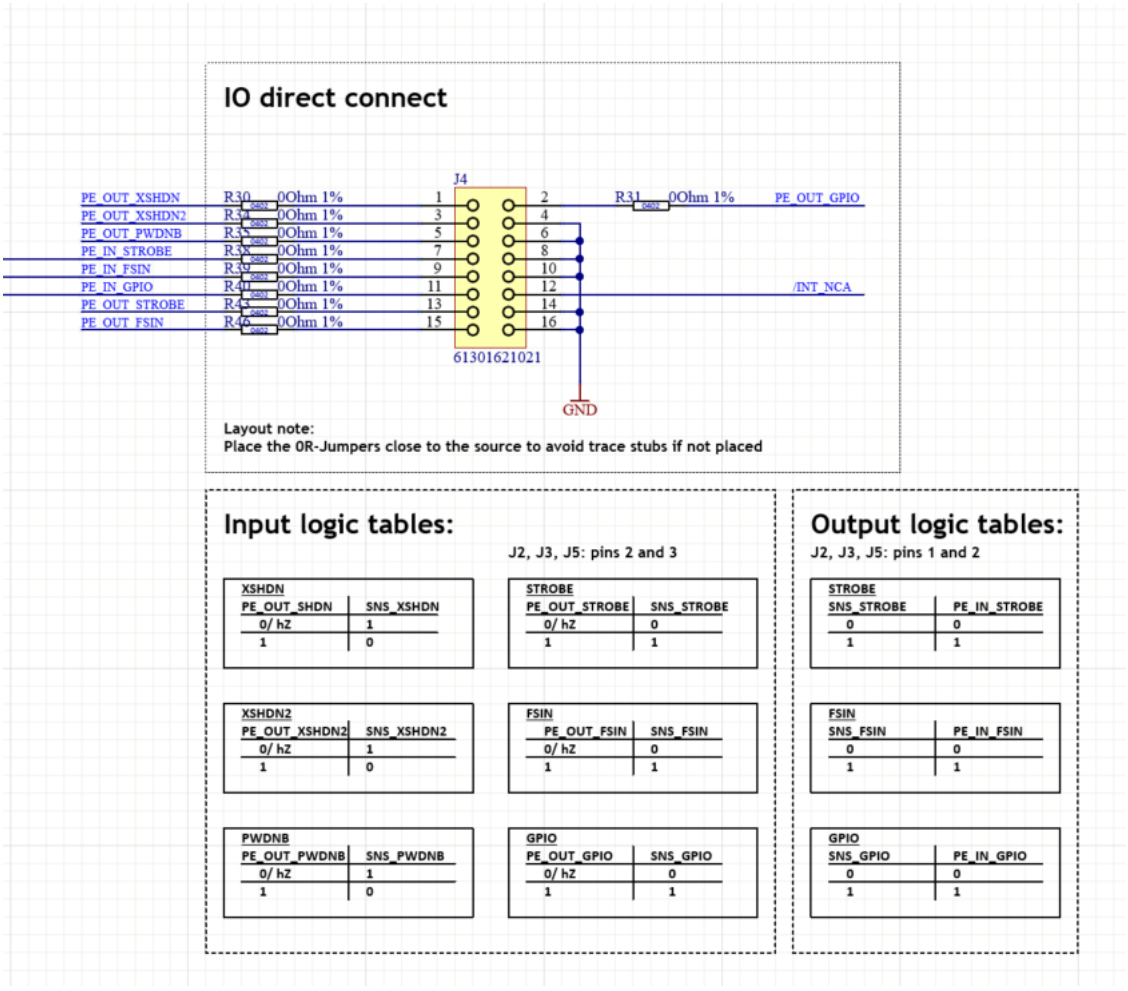

Figure 2 Direct IO connector and logic tables

For accessing the digital signals via the port expander or the connector J4 the logic inversion shown in the input logic tables in figure 2 needs to considered. For example if the input signal SNS_XHDN should be LOW, set the output of the port expander HIGH.

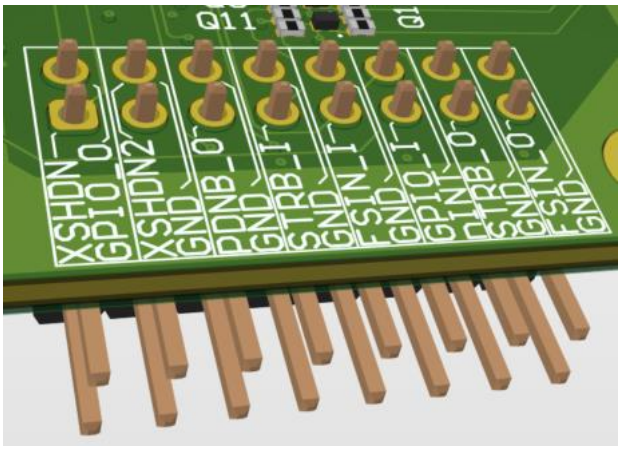

Figure 3 J4 IO connector

This way of access has been primarily designed for a connection with the standard IO-header of a raspberry pi but can be used with other hardware aswell as long the input signals supply a voltage level of 3,3V at a logic HIGH state or near ground potential at a LOW state. The outputs are also tied to 3,3V logic so do not short these to ground. There are also signals which can be configured as an output and aswell as an input.

To configure the signals a jumper needs to placed at the following pin headers:

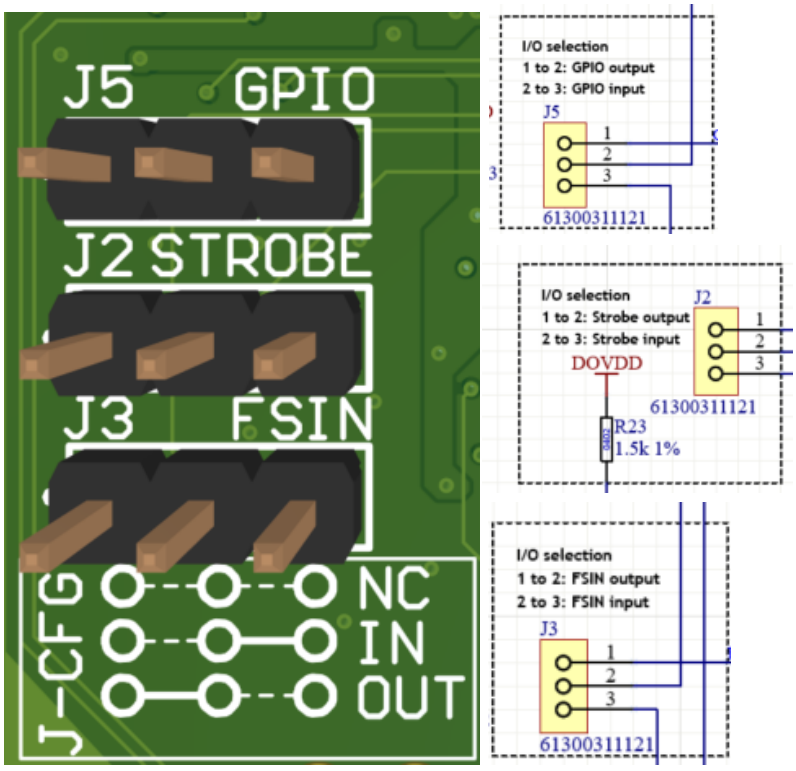

Figure 4 J2, J3, J5 jumper options

Place a jumper between pin 1 and 2 to configure the signal as an input or place the jumper between pin 2 and 3 for an output configuration.

List of digital signals (J4)

- XSHDN: Input, reset and power down, active low on image sensor. Active high on J4.
- GPIO_O: Output from master, reads as input to the image sensor, configurable over J5.
- XSHDN2: Input, reset and power down, active low on image sensor. Active high on J4.

- PDNB_O: Input, power down, active low on image sensor. Active high on J4.
- STRB_I: Input, frame exposure output indicator, configurable over J3.
- FSIN_I: Output, frame sync, configurable over J3.
- GPIO_I: Input to the master, configurable over J5.
- nInt: Interrupt, is controlled by the port expander.
- STRB_O: Input to the master, frame exposure output indicator, configurable over J2.
- FSIN_O: Output from master, reads as input to the image sensor, configurable over J3.