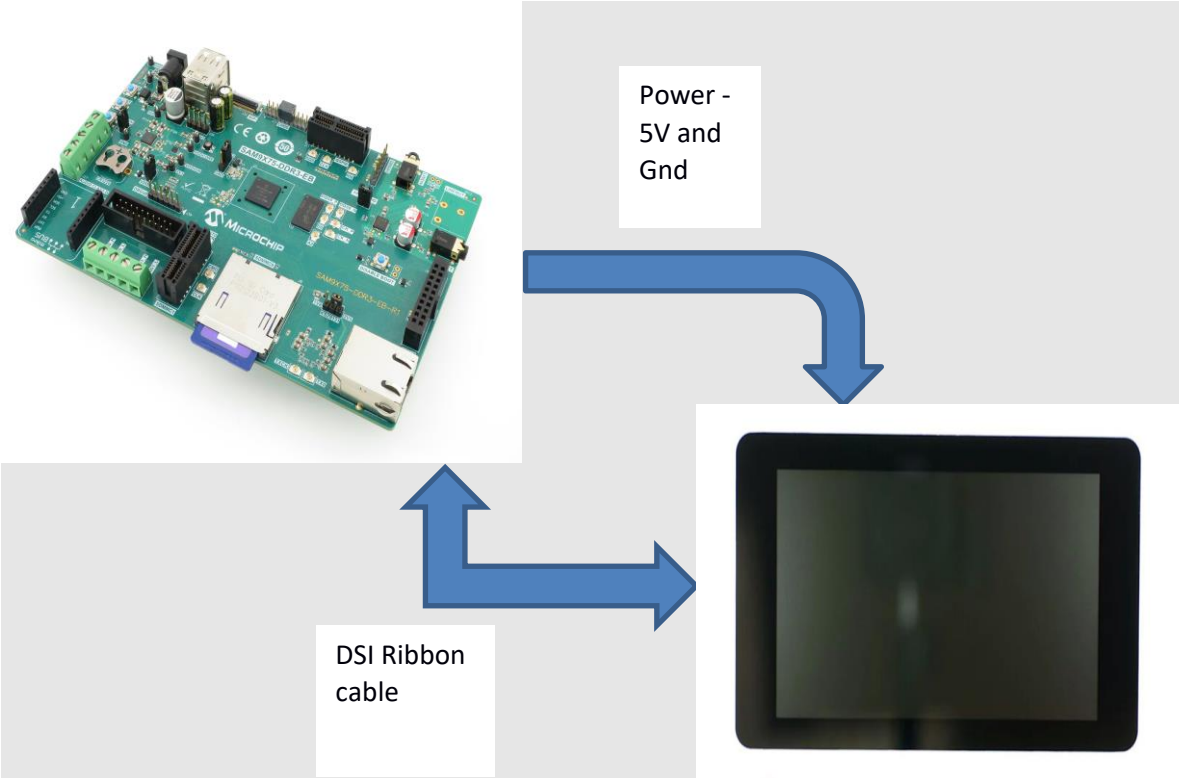
SAM9X75-EB – Hardware – Interfacing Guide

MIPI DSI Display 2
Hardware Connection 2
Raspberry Pi Display 3
DSI Ribbon cable 4
Connection procedure 4
I2S – Audio 7
Hardware Rework 7
MIPI CSI Camera 10
Hardware Connection 10
Raspberry Pi Camera Module 10
CSI Connector Cable 11
Connection Procedure 12
Testing Procedure 13

MIPI DSI Display

Hardware Connection



Raspberry Pi Display

Raspberry Pi 7-inch Display is connected to SAM9X75EB board through a DSI ribbon cable. To know more about the Raspberry Pi Display and different connectors on the display board, check the below link: https://thepihut.com/blogs/raspberry-pi-tutorials/raspberry-pi-7-touch-screen-assembly-guide

DSI Ribbon cable

The sam9x75eb board and the raspberry pi display board are connected using ribbon cable:

Further details of the ribbon cable can be found in this link: https://www.waveshare.com/dsi-cable-15cm.htm

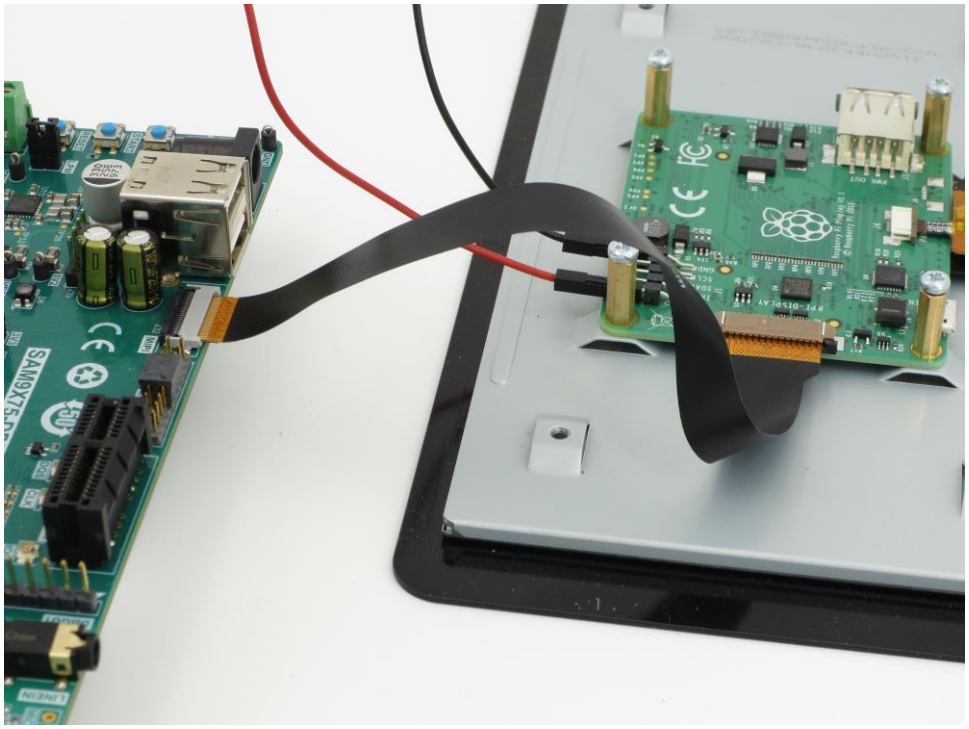
The DSI ribbon cables looks as shown below:

Connection procedure

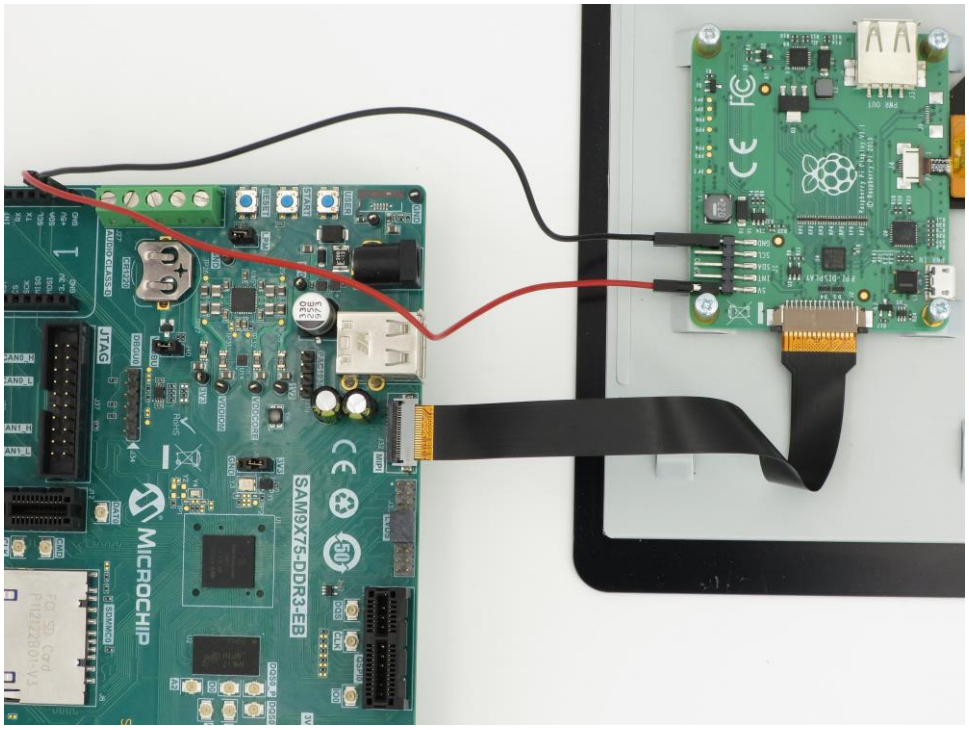
The connection details are given below:

- One end is connected to the R-Pi display. It has a 15pin end on the display side
- The other end is connected to the SAM9X75EB board. It has a 22pin end.
- The R-Pi display has 5V power input header J1 which can be connected to an available 5V source on the SAM9X75EB, like the mikroBUS slot.

- The connections of the ribbon cables and power lines are shown below:
  - DSI ribbon cable connection between SAM9X75EB board and Raspberry Pi display board

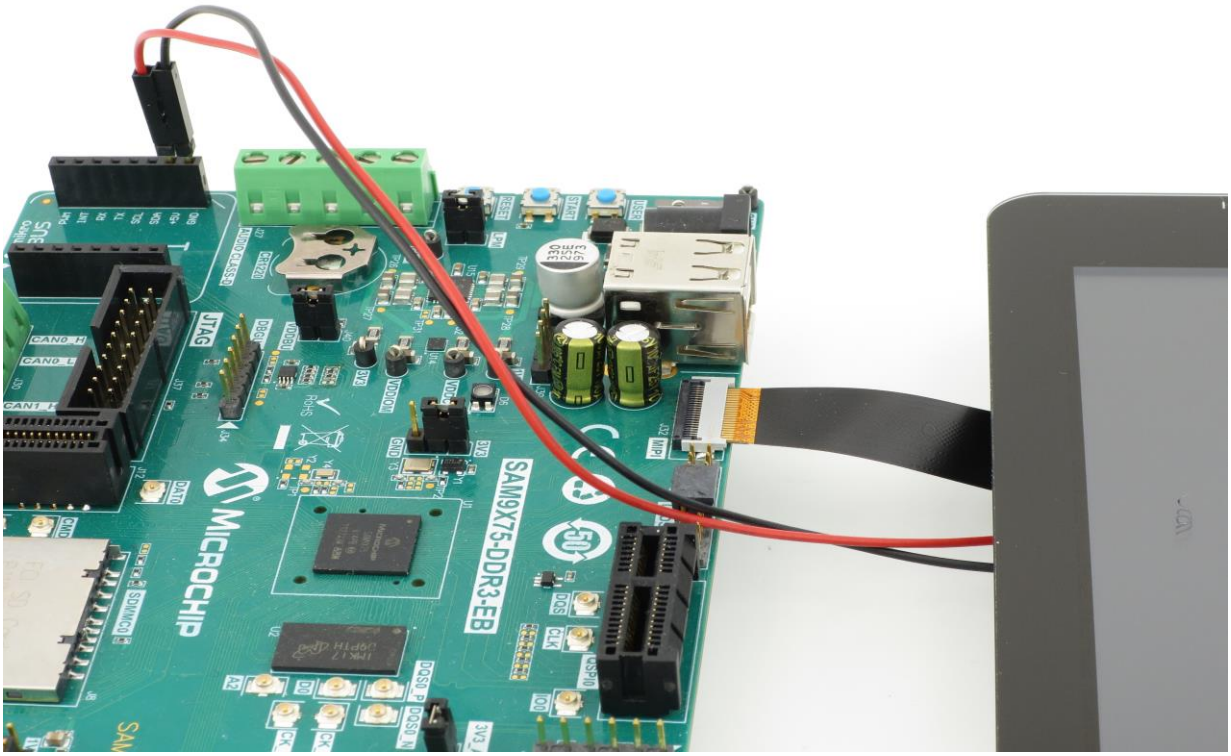


  - 5v and GND connection between SAM9X75EB and Raspberry Pi Display



- Overall connections of SAM9X75EB with Raspberry Pi Display setup is shown below

- A closer look is shown below

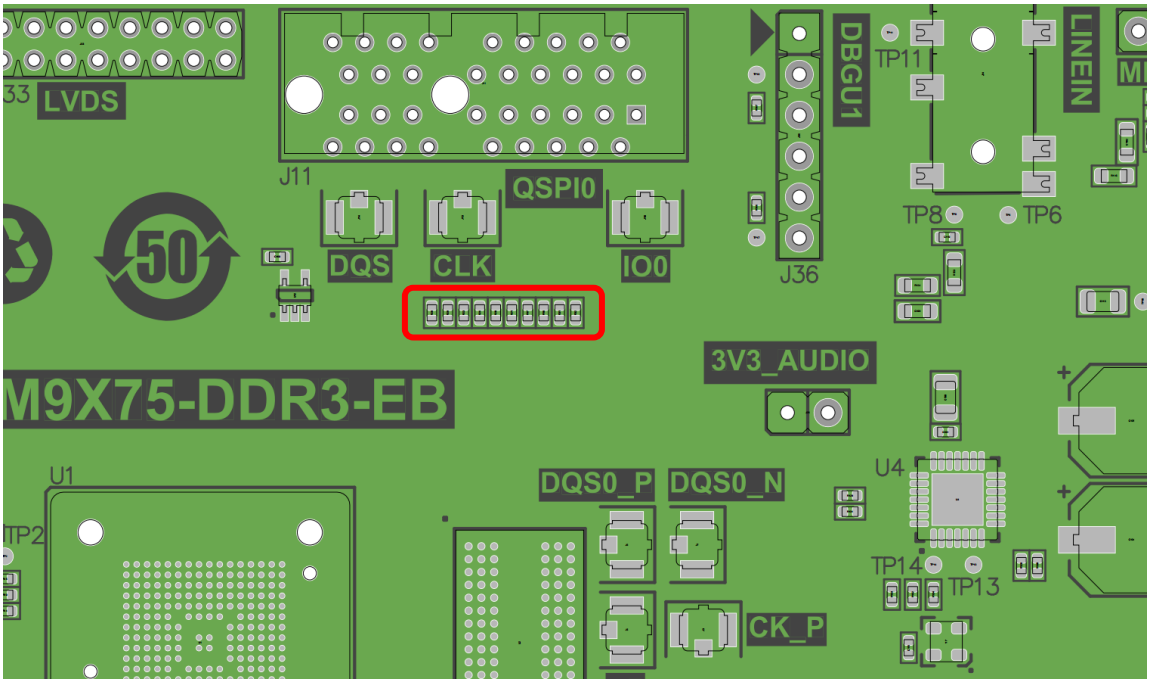


I2S – Audio

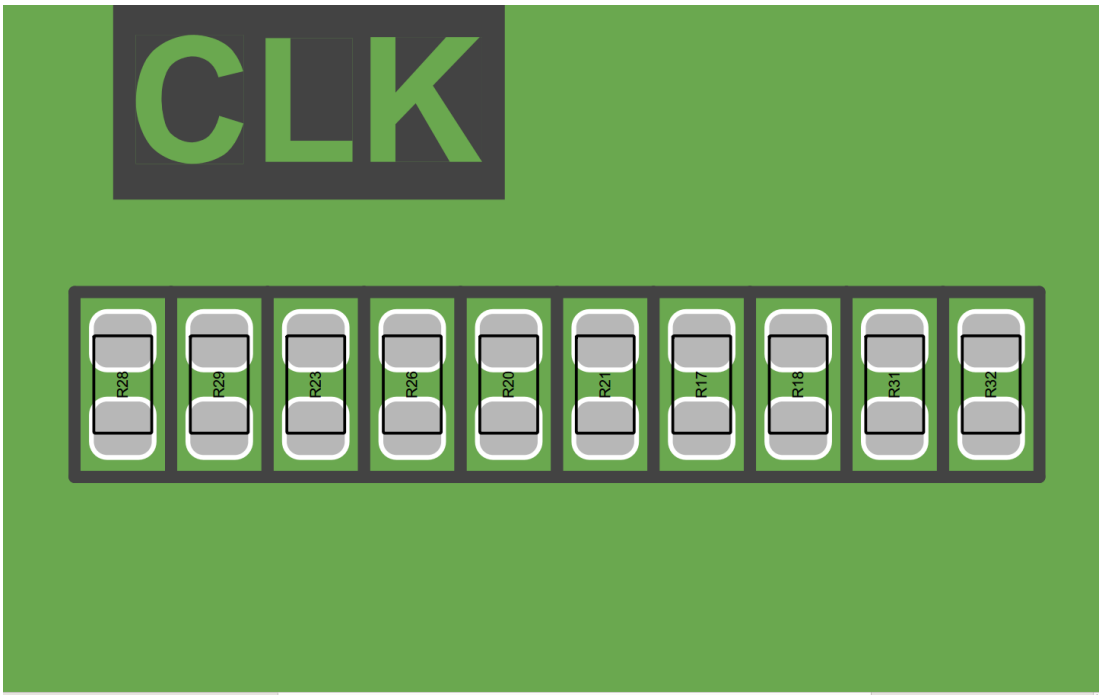
Hardware Rework

I2S Audio Path in sam9x75eb is multiplexed with QSPI interface. For I2S to work, the board Hardware must be reworked. The rework steps are given below.

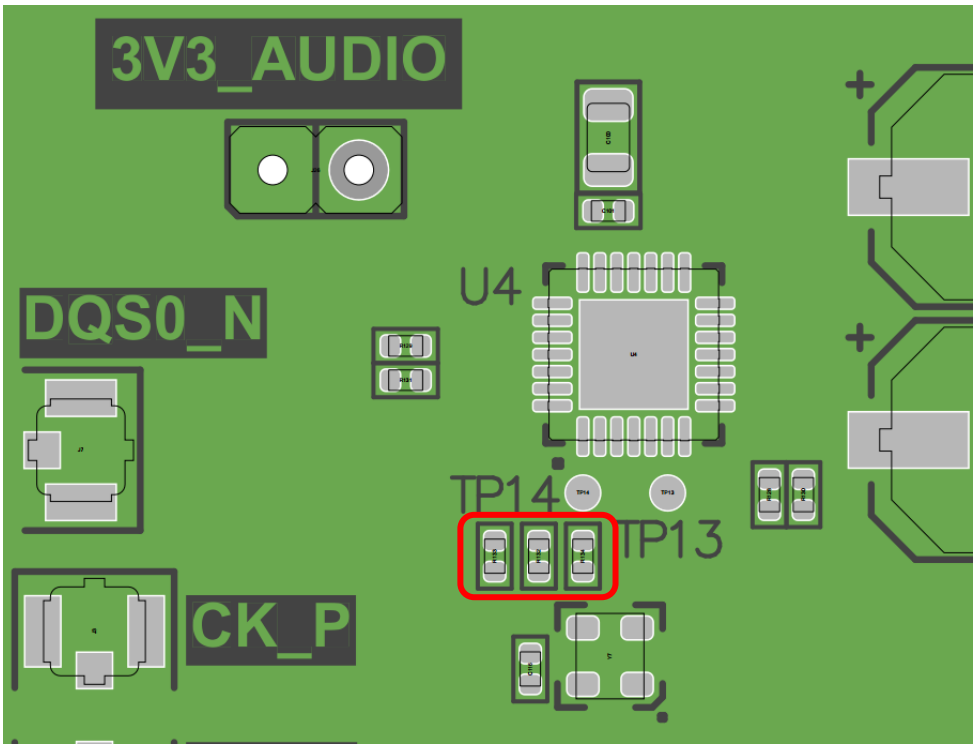
- The resistors **R28, R23, R20, R17, R31** should be unmounted, moved to **R29, R26, R21, R18, R32** pads and mounted
- The resistors are shown below



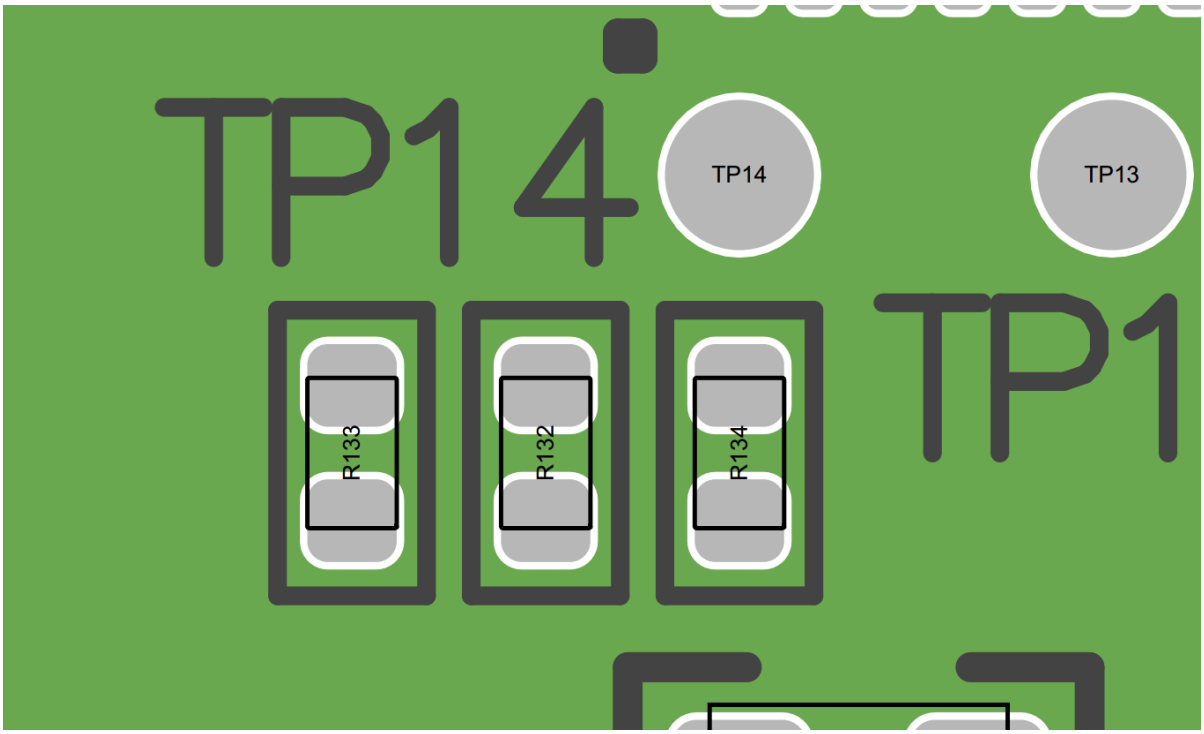
- A closer look of the resistors showing the resistor numbers is shown below



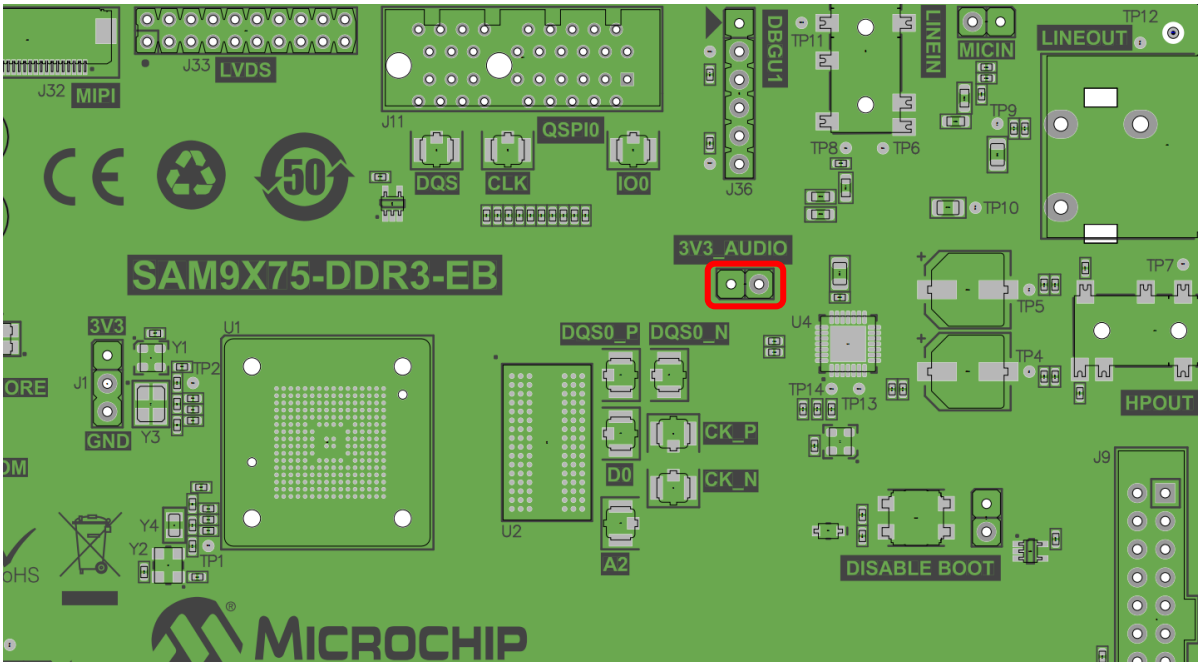
- The resistor R133 should be unmounted, moved to the R134 pad and mounted
- The resistor placement is shown below



- A closer look of the resistor pads is shown below

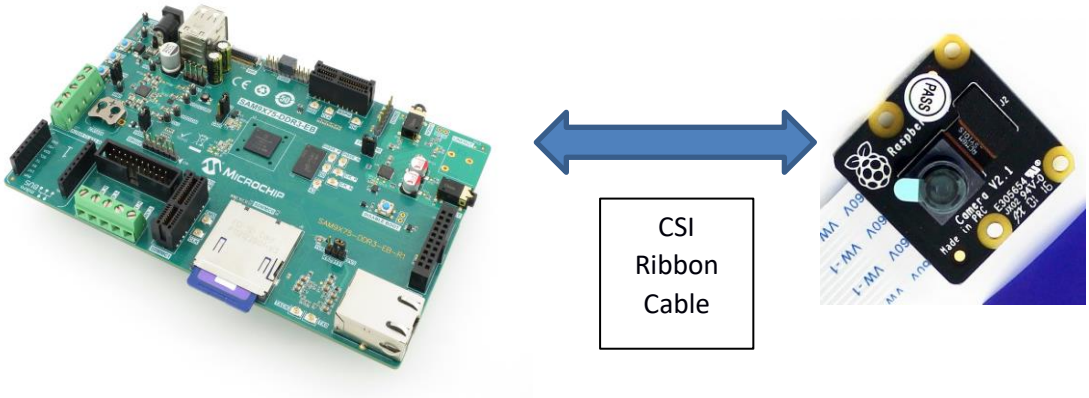


- Note that the Jumper J26 3V3_AUDIO should be kept closed



MIPI CSI Camera

Hardware Connection



Raspberry Pi Camera Module

Raspberry Pi Camera Module 2 NoIR is connected to SAM9X75EB board through a CSI ribbon cable. To know more about the Raspberry Pi Camera and connectors on the module check the below official Raspberry Pi page link: https://www.raspberrypi.com/products/pi-noir-camera-v2/

CSI Connector Cable

The sam9x75eb board and the raspberry pi camera module are connected using ribbon cable:

Further details of the ribbon cable can be found in the links given below.

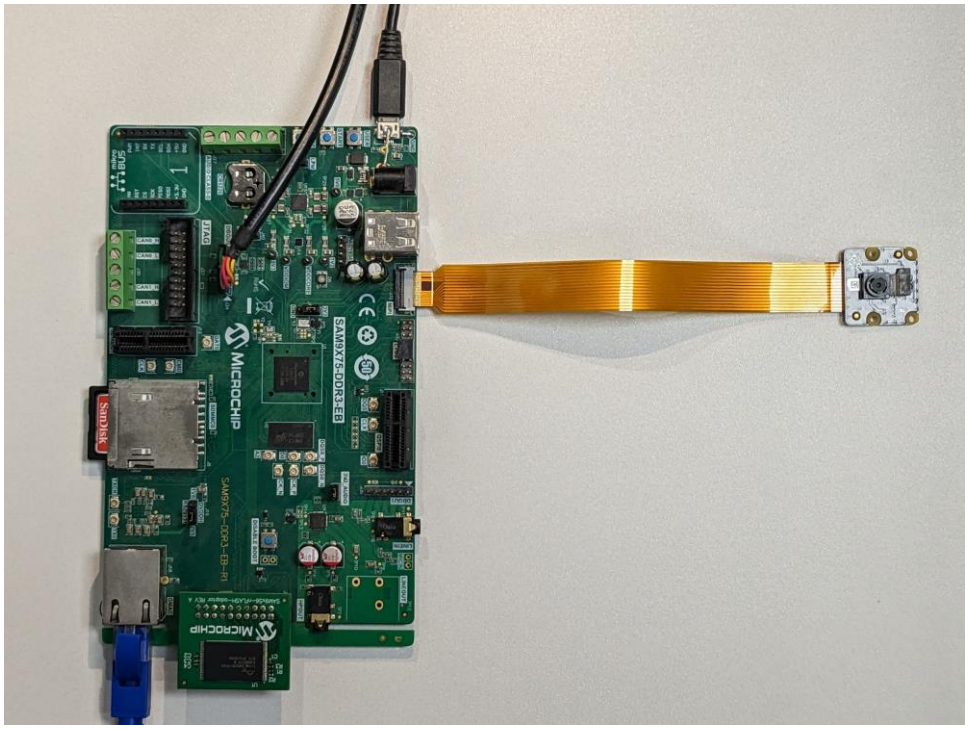
- Mouser:
  - https://eu.mouser.com/ProductDetail/SparkFun/PRT-14272?qs=YCa%2FAAYMW03CVrQccQmXsw%3D%3D
  - https://eu.mouser.com/ProductDetail/Seeed-Studio/114992065?qs=B6kkDfuK7%2FD81XpUK9rVrQ%3D%3D
- Digi-Key:
  - https://www.digikey.ro/en/products/detail/adafruit-industries-llc/5211/15650057
  - https://www.digikey.ro/en/products/detail/raspberry-pi/SC0004/12339168

The DSI ribbon cables looks as shown below:

Connection Procedure

The connection details of the ribbon cable are given below:

- One end is connected to the R-Pi Camera module 2. It has a 15pin end on the camera side
- The other end is connected to the SAM9X75EB board. It has a 22pin end.
- The connection of the ribbon cable is shown below



Testing Procedure

- Load overlay imx219 by setting the bootargs as below

```
# bootcmd=fatload mmc 0:1 ${loadaddr} ${board_name}.itb; bootm
${loadaddr}#kernel_dtb#imx219
```

- The scripts for capturing and storing still images are placed in the following path:

  ~/video-capture-at91/sam9x75/imx219

- Execute the following scripts in order to capture images

```
# cd ~/video-capture-at91/sam9x75/imx219

# ./1640x1232.sh
# ./fswebcam_1640x1232.sh
# ./1920x1080.sh
# ./fswebcam_1920x1080.sh
# ./3264x2464.sh
# ./fswebcam_3264x2464.sh
# ./640x480.sh
# ./fswebcam_640x480.sh
```

- Execute the following command to capture video

```
# gst-launch-1.0 v4l2src device="/dev/video0" num-buffers=10 ! video/x-raw,width
=3264,height=2464 ! videoconvert ! avimux  ! filesink
location=capture_imx219.avi
```