Raspberry Pi for video monitoring (Relevant information)
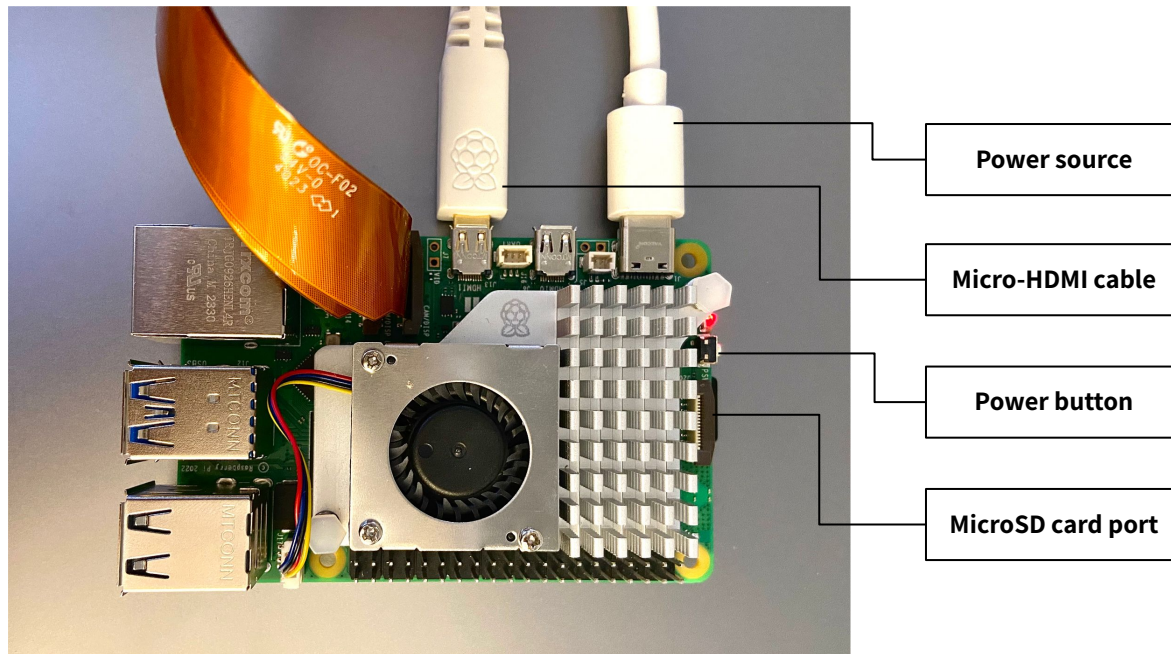
Video monitoring system

Raspberry Pi 5 computer

USB-C Power supply

Micro-HDMI ports

Camera connectors

Ethernet and USB

Raspberry Pi Camera Module 3

Camera cables

Active cooler
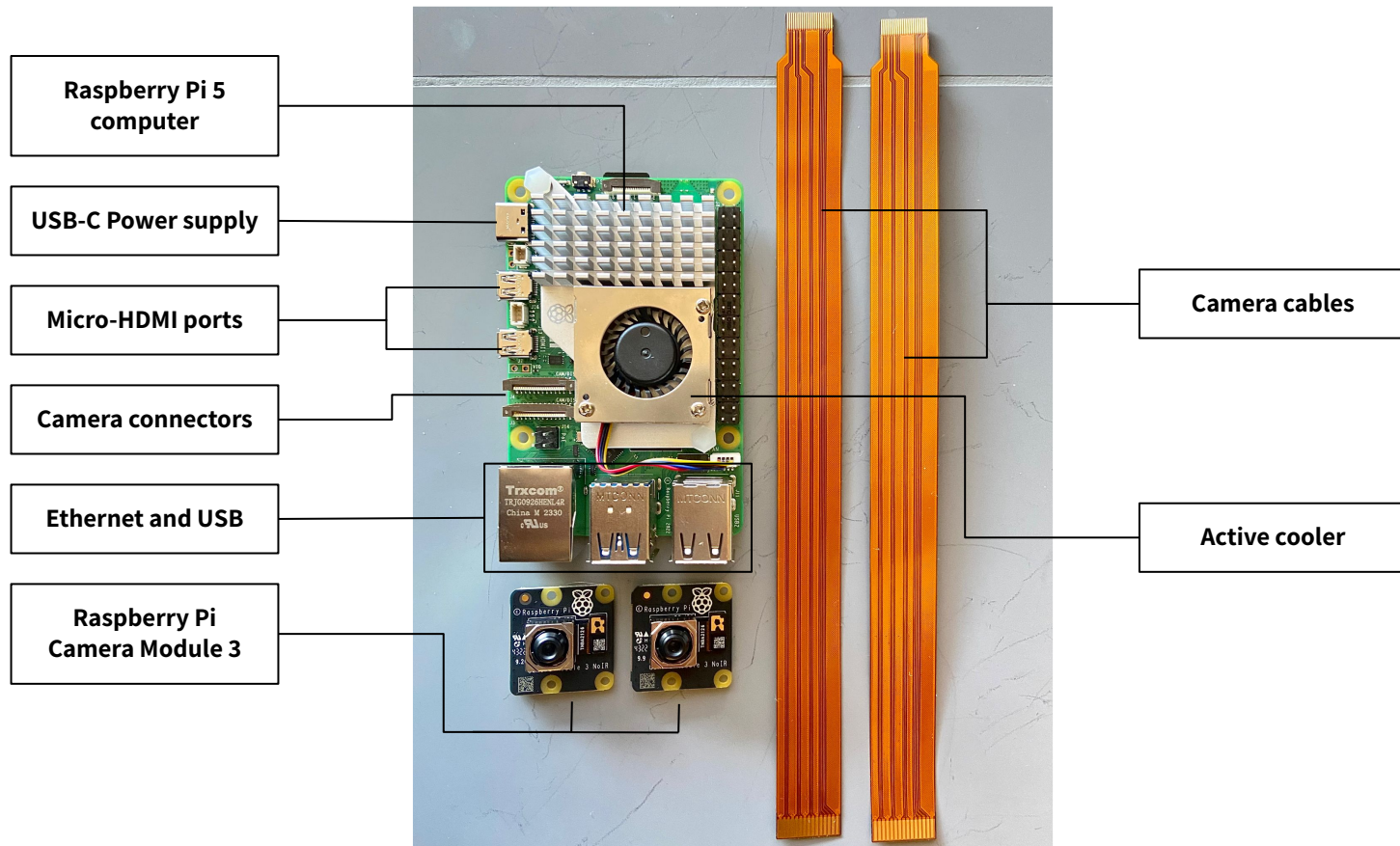
Assembled hardware
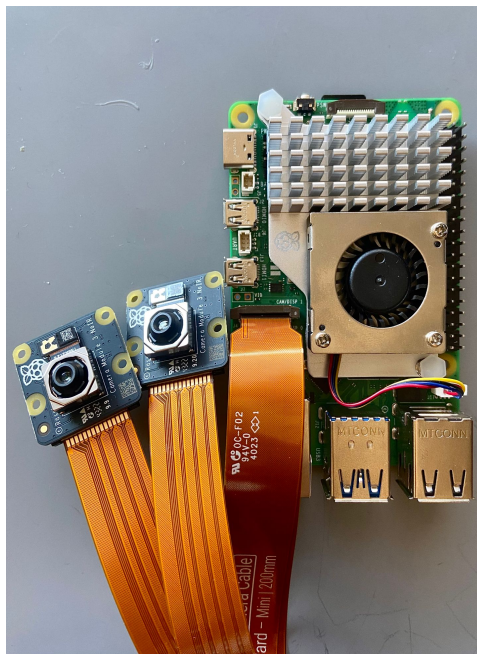
Main model assembled

Connected to monitor and power supply

Power source

Micro-HDMI cable

Power button
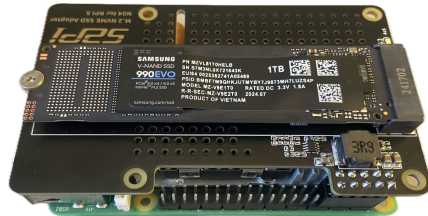
MicroSD card port

Data Management

SSD (1 TB)

SSD Adapter for Raspberry Pi5


Assembled Pi w/ SSD

- Videos recorded at 20 FPS as h.264 files on the Raspberry Pi.
- After recording, the Raspberry converts the videos to MP4 format.
- Once converted, the MP4 files are uploaded to a google drive file.
- After upload, the MP4 video is deleted from the Raspberry Pi to free up space.
- Timestamps files are saved separately on the Raspberry Pi as the recorded length may not always be accurate due to the FPS value.

Raspberry camera

➔ It records compressed video files, it does not record single frames to a video file.

◆ Some frames will be late and/or missed and it is difficult to predict which ones.

➔ The camera can be triggered using <u>two pins</u>, one for triggering start/stop of video and a second for triggering frames.

➔ <u>Trigger Camera project:</u> System designed for time stamped and triggered video acquisition using Raspberry Pi

◆ For synchronizing frame acquisition with external events

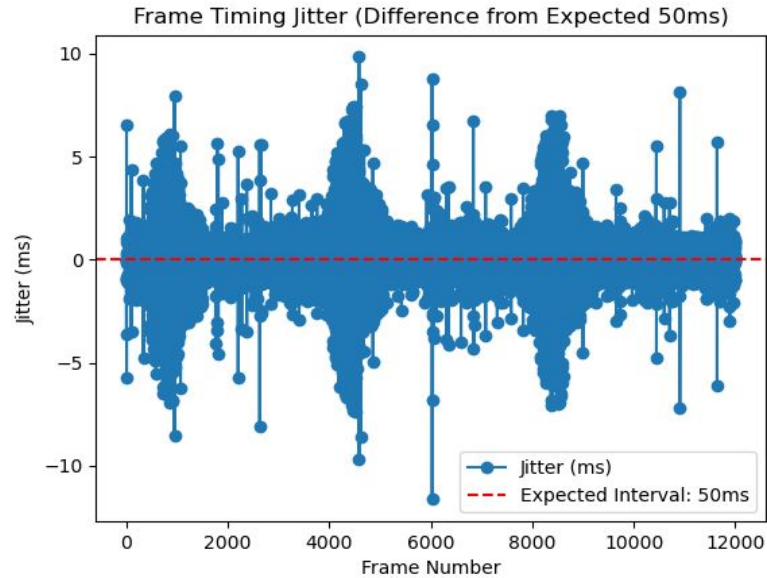# Connection between Raspberry Pi and Pico

➔ The connection can be established in three ways:
  ◆ Direct USB-to-USB serial
  ◆ Direct Tx/Rx Pins serial
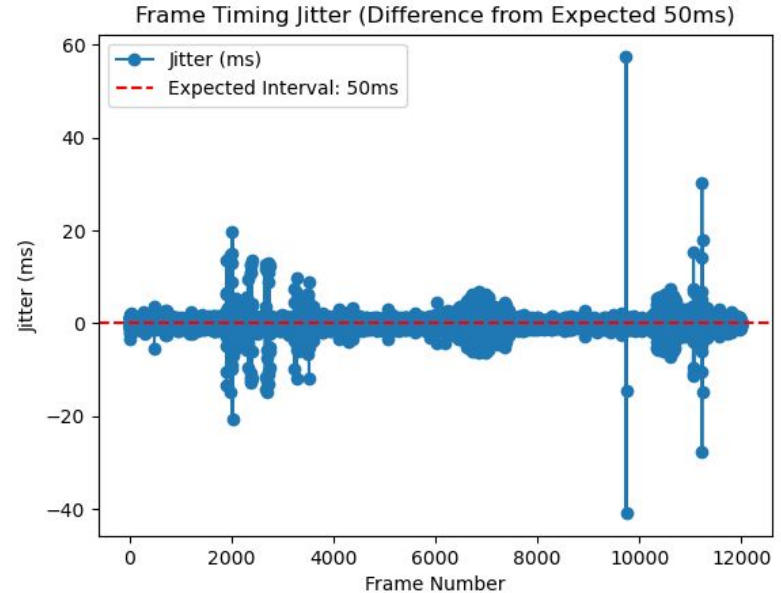   ● GPIO, UART, I2C and SPI
  ◆ USB-TTL to Rx/Rx serial
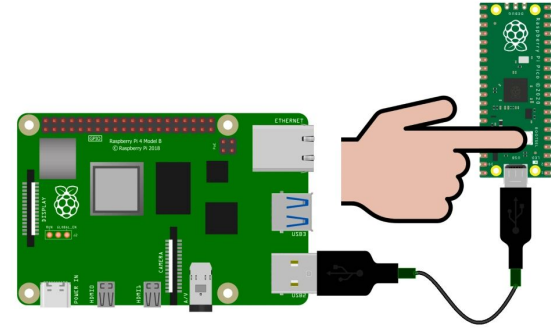
Timing of the frames

➔ At 20fps, some frames may arrive late or early, and it can be difficult to predict which ones will deviate.
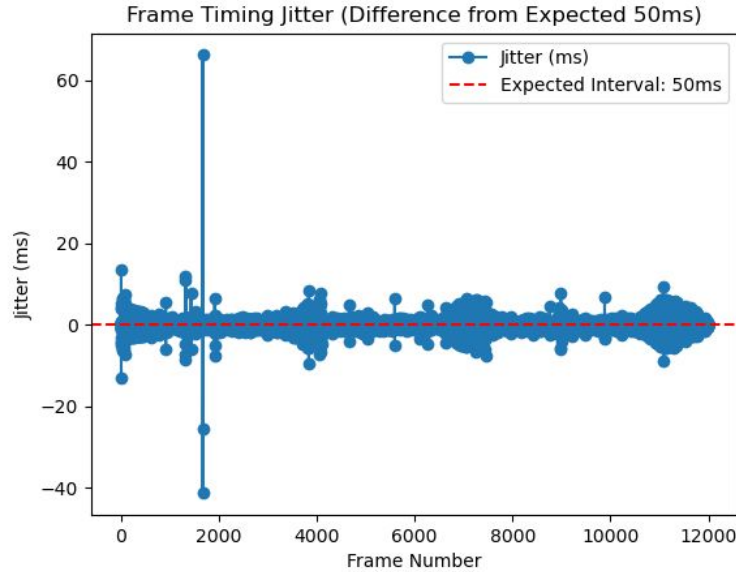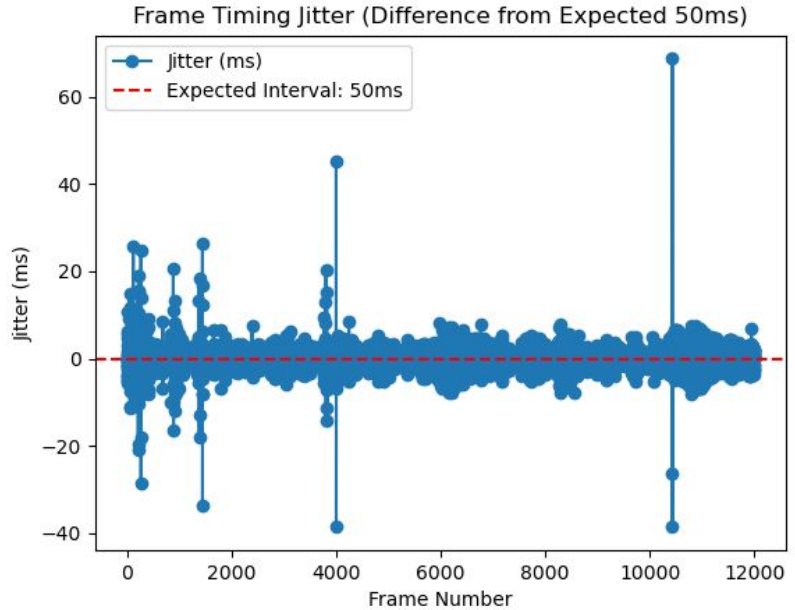

Run #1

Run #2

Dropped frames

➔ Dropped frames can occur unexpectedly

Frame Timing Jitter (Difference from Expected 50ms)

Run #3
Dropped frames = 1675

Frame Timing Jitter (Difference from Expected 50ms)

Run #4
Dropped frames = 124,1446, 4002, 10427