



SPI Camera On Raspberry Pi Pico



(Arducam Mini 2MP)

QUICK START GUIDE

INTRODUCTION

As an alternative to Arduino, Raspberry Pi Pico lacks processing power, memory, and a CSI interface, which makes it impossible for Pico to work with the official or any MIPI CSI-2 camera modules. Thankfully, Pico has a wide range of flexible I/O options includes SPI, which enables the Arducam SPI camera to work with Pico.

Now, the Arducam team has solved the compatibility of our SPI camera with Raspberry Pi Pico. Get the camera working for the Person Detection demo!

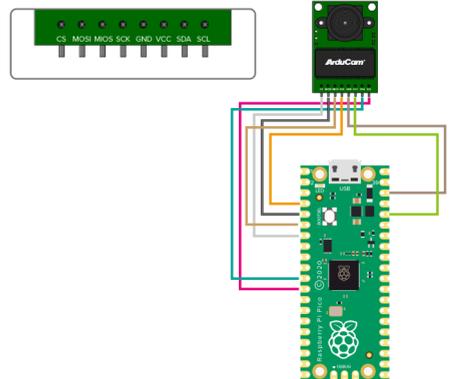
KEY SPECS

Image sensor	OV2640
Active array size	1600x 1200
Resolution support	UXGA, SVGA,VGA,QVGA,CIF,QCIF
Format support	RAW, YUV, RGB, JPEG
Lens	1/4 inch
SPI speed	8MHz
Frame buffer Size	8MByte
Working temp.	-10°C+55°C
Power Consumption	Normal: 5V/70mA, Low power Mode: 5V/20mA

FEATURES

- M12 mount or CS mount lens holder with changeable lens options
- I2C interface for the sensor configuration
- SPI interface for camera commands and data stream
- All IO ports are 5V/3.3V tolerant
- Support JPEG compression mode, single and multiple shoot mode, one time capture multiple read operation, burst read operation, low power mode and etc.

TYPICAL WIRING



PINOUT

Pin No.	Pin Name	Description
1	CS	SPI slave chip select input
2	MOSI	SPI master output slave input
3	MISO	SPI master input slave output
4	SCLK	SPI serial clock input
5	GND	Power ground
6	VCC	3.3V ~ 5V Power supply
7	SDA	Two-Wire Serial Interface Data I/O
8	SCL	Two-Wire Serial Interface Clock

NOTE: Arducam Mini 2MP camera module is a general-purpose solution compatible with multiple platforms, include Arduino, ESP32, Micro:bit and the Raspberry Pi Pico we're using. For the wiring and software on other platforms, please refer to the product page: <https://www.arducam.com/product/arducam-2mp-spi-camera-b0067-arduino/>

If you need our help or want to customize other models of Pico cameras, feel free to contact us at support@arducam.com

SOFTWARE SETUP

To facilitate copying, please refer to doc page: <https://www.arducam.com/docs/pico/arducam-camera-module-for-raspberry-pi-pico/spi-camera-for-raspberry-pi-pico/>
We will keep online up-to-date continuously.

1. Get the driver

```
git clone https://github.com/ArduCAM/PICO_SPI_CAM.git
```

2. How to access SPI Camera using C

2.1 Cameras supported by the driver

- OV2640 2MP_Plus JPEG format
- OV5642 5MP_Plus JPEG format

2.2 Demos provided

- ▶ ArduCAM_Mini_2MP_Plus_4CAM_VideoStreaming
- ▶ ArduCAM_MINI_2MP_Plus_Videostreaming
- ▶ ArduCAM_Mini_5MP_Plus_4CAM_VideoStreaming
- ▶ ArduCAM_MINI_5MP_Plus_Videostreaming

2.3 Compile the driver library

Note: Refer to the official manual for the development environment: <https://www.raspberrypi.org/documentation/rp2040/getting-started/#getting-started-with-c>

Choose the demo and input the following code to compile it. (default is ArduCAM_MINI_2MP_Plus_Videostreaming)

3. How to access Camera using Python (on Windows)

3.1 Download and install developing software Thonny

Refer to the official manual: <https://thonny.org/>

3.2 Configure the IDE

Refer to the official manual: <https://circuitpython.org/>

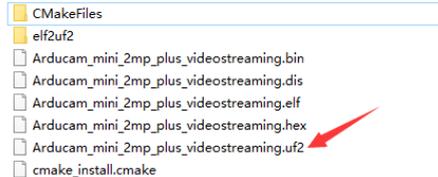
3.3 Run Thonny

- Copy all the files except `boot.py` under `PICO_SPI_CAM/Python/` file path to Pico.
- Open Thonny software->Select `Interpreter`->Select `CircuitPython(generic)`-> Press `OK`
- Open Device Manager to check the `Ports(COM & LPT)` of Pico and then configure port number of CircuitPython(generic)
- Copy all the `boot.py` file under `PICO_SPI_CAM/Python/` file path to Pico.
- Reboot Pico and then check the new port number under `Ports(COM & LPT)`, it's used to USB communication.
- Open the camera drive program `CircuitPython device` via opening file on Thonny
- Click `Run`, and it appears `[48], CameraType is OV2640, SPI Interface OK` means that the initialization of the camera is completed. Note `[48]` refers to the I2C device address of OV2640 camera.

```
cd PICO_SPI_CAM
mkdir build
cd build
cmake..
make
```

2.4 Run the .uf2 file

- Copy the `PICO_SPI_CAM/C/build/Examples/ArduCAM_MINI_2MP_Plus_Videostreaming/ArduCAM_mini_2mp_plus_videostreaming.uf2` file to Pico to run the test.



```
CMakeFiles
elf2uf2
ArduCAM_mini_2mp_plus_videostreaming.bin
ArduCAM_mini_2mp_plus_videostreaming.dis
ArduCAM_mini_2mp_plus_videostreaming.elf
ArduCAM_mini_2mp_plus_videostreaming.hex
ArduCAM_mini_2mp_plus_videostreaming.uf2
cmake_install.cmake
```

- Open `HostApp.exe` under `PICO_SPI_CAM/HostApp` file path, configure the port number, and click `Image` to view the image.

- Open `HostApp.exe` under `PICO_SPI_CAM/HostApp` file path, select the port number used for USB communication, and click `Image` to view the image.

If you need our help or the API detailed information, feel free to contact us.

Email: support@arducam.com

Web: www.arducam.com

Doc Page: <https://www.arducam.com/docs/pico/arducam-camera-module-for-raspberry-pi-pico/spi-camera-for-raspberry-pi-pico/>