Camera interfacing

How to use the camera

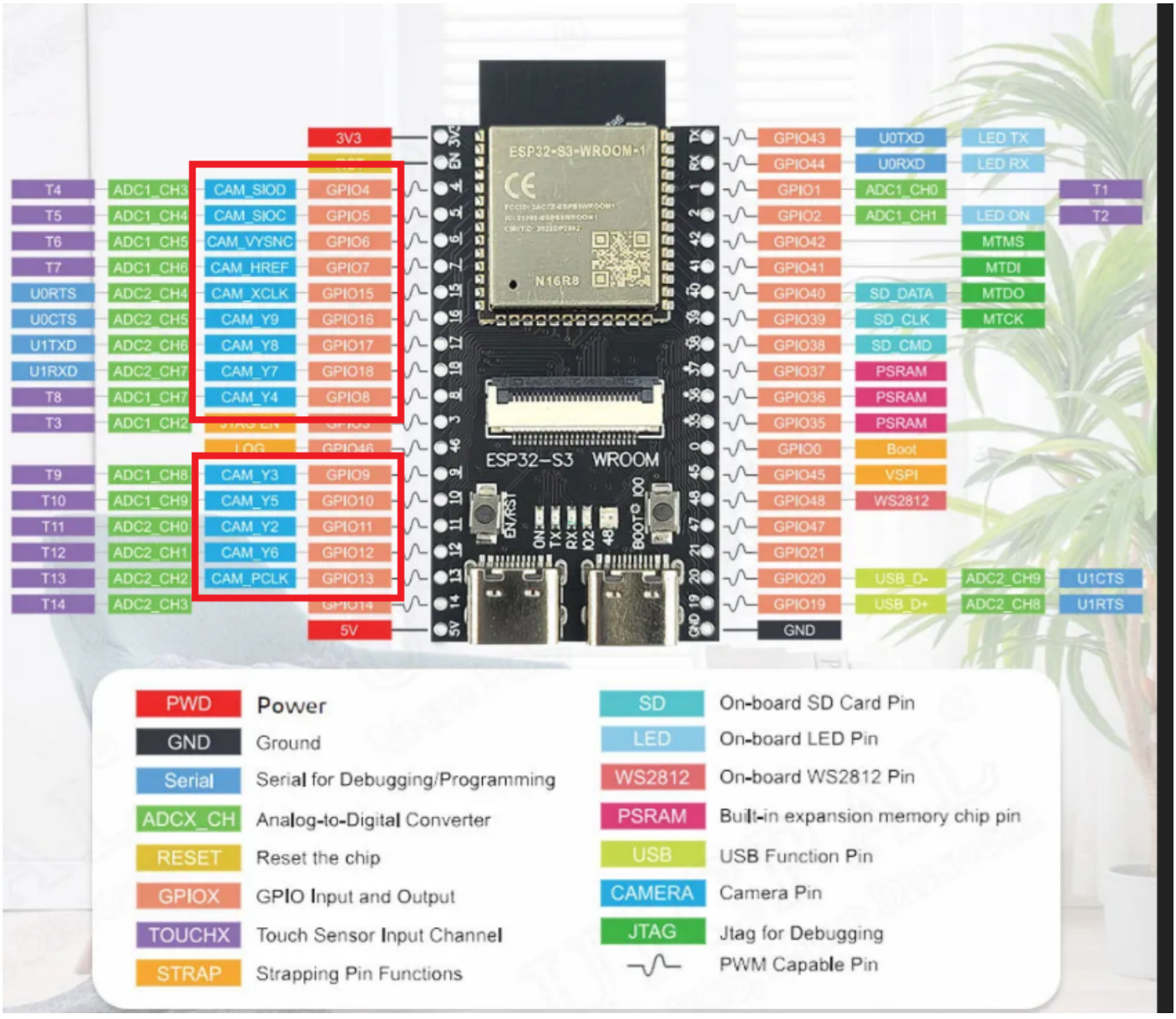
- Configuration and initialization

Configuration and initialization

There are plenty of examples how to interface with the camera, but you'll find that you'll spend time trying to figure out "why it doesn't work. Where many posts will suggest "you have a faulty model", it's very likely you didn't find the correct pin-out schematic.

Or you have selected the wrong module for example.

So we have to check the schematic back.



We then can infer thee next configuration:

```
#define PWDN_GPIO_NUM -1
#define RESET_GPIO_NUM -1

#define XCLK_GPIO_NUM 15
#define SIOD_GPIO_NUM 4
#define SIOC_GPIO_NUM 5

#define Y2_GPIO_NUM 11
#define Y3_GPIO_NUM 9
#define Y4_GPIO_NUM 8
#define Y5_GPIO_NUM 10
#define Y6_GPIO_NUM 12
#define Y7_GPIO_NUM 18
#define Y8_GPIO_NUM 17
#define Y9_GPIO_NUM 16

#define VSYNC_GPIO_NUM 6
#define HREF_GPIO_NUM 7
#define PCLK_GPIO_NUM 13
```

It's then easy to follow most examples online, after you set the camera configuration.
Be aware that the order of the parameters is fixed, else the compiler will give an error "***designator order for field XXX does not match declaration order in YYY***"

```
 camera_config_t config =  {
  .pin_pwdn = PWDN_GPIO_NUM,
  .pin_reset = RESET_GPIO_NUM,
  .pin_xclk = XCLK_GPIO_NUM,
  .pin_sscb_sda = SIOD_GPIO_NUM,
  .pin_sscb_scl = SIOC_GPIO_NUM,
  .pin_d7 = Y9_GPIO_NUM,
  .pin_d6 = Y8_GPIO_NUM,
  .pin_d5 = Y7_GPIO_NUM,
  .pin_d4 = Y6_GPIO_NUM,
  .pin_d3 = Y5_GPIO_NUM,
  .pin_d2 = Y4_GPIO_NUM,
  .pin_d1 = Y3_GPIO_NUM,
  .pin_d0 = Y2_GPIO_NUM,
  .pin_vsync = VSYNC_GPIO_NUM,
```

```
  .pin_href = HREF_GPIO_NUM,
  .pin_pclk = PCLK_GPIO_NUM,
  .xclk_freq_hz = 20000000,
  .ledc_timer = LEDC_TIMER_0,
  .ledc_channel = LEDC_CHANNEL_0,
  .pixel_format = PIXFORMAT_JPEG,//YUV422,GRAYSCALE,RGB565,JPEG
  .frame_size = FRAMESIZE_UXGA,//QQVGA-UXGA, For ESP32, do not use sizes above QVGA when not JPEG. The performance of the ESP32-S series has improved a lot, but JPEG mode always gives better frame rates.
  .jpeg_quality = 12, //0-63, for OV series camera sensors, lower number means higher quality
  .fb_count = 1, //When jpeg mode is used, if fb_count more than one, the driver will work in continuous mode.
  .grab_mode = CAMERA_GRAB_WHEN_EMPTY//CAMERA_GRAB_LATEST. Sets when buffers should be filled
  //init with high specs to pre-allocate larger buffers
  };
```

The function to initialize the camera is then simple as this:

```
void startCamera()
{

 if (psramFound()) {
   config.frame_size = FRAMESIZE_UXGA;
   config.jpeg_quality = 10;
   config.fb_count = 2;
 } else {
   config.frame_size = FRAMESIZE_SVGA;
   config.jpeg_quality = 12;
   config.fb_count = 1;
 }

 // Camera init
 esp_err_t err = esp_camera_init(&config);
 if (err != ESP_OK) {
   Serial.printf("Camera init failed with error 0x%x", err);
   ESP.restart();
 }
 else
 {
   Serial.printf("Camera init succeeded");
 }
}
```