

CMUcam2 Emulation

The CMUcam2 has the following capabilities:

- Track user defined color blobs at up to 50 Frames Per Second (frame rate depends on resolution and window size settings)
- Track motion using frame differencing at 26 Frames Per Second
- Find the centroid of any tracking data
- Gather mean color and variance data
- Gather a 28 bin histogram of each color channel
- ~~Process Horizontally Edge Filtered Images~~
- Transfer a real-time binary bitmap of the tracked pixels in an image
- Arbitrary image windowing
- Image Down Sampling
- Adjust the camera's image properties
- Dump a raw image (single or multiple channels)
- Up to 176 x 255 Resolution
- Supports baudrates of: 115,200 57,600 38,400 19,200 9,600 4,800 2,400 1,200
- Control 5 servo outputs
- ~~Slave parallel image processing mode off of a single camera bus~~
- Automatically use servos to do two axis color tracking
- B/W Analog video output (PAL or NTSC, depending on camera module used)
- Flexible output packet customization
- Power Down Mode
- Multiple pass image processing on a buffered image

[Compiled Firmware Image \(115,200 8N1\)](#) (Right click and save)

[Source File](#) (Right click and save)

There are several differences between the CMUcam2 emulation and the actual CMUcam2. Below is a list of all CMUcam2 functionality with non-supported features crossed off. Many crossed off features will be supported in the near future.

BM Buffer Mode
 CR Camera Register
 CP Camera Power
 DC Difference Channel
 DS Down Sample
 FD Frame Difference
 FS Frame Stream
 GB Get Button
 GH Get Histogram
 GI Get Aux IO inputs
 GM Get Mean
 GS Get Servo Positions
 GT Get Tracking Parameters
 GV Get Version
 GW Get Window
 HC Histogram Configure
 HD High Resolution Difference
 HR Hi-Res Mode
~~HT Set Histogram Track~~
 LO Led Control
 LF Load Frame to Difference
~~LM Line Mode~~
~~MD Mask Difference~~
 NF Noise Filter
 OM Output Packet Mask
~~PD Pixel Difference~~
 PF Packet Filter
 PM Poll Mode
 RF Read Frame into Buffer

RM Raw Mode
 RS Reset
 SF Send Frame
 SM Servo Mask
 SO Servo Output
 SP Servo Parameters
 ST Set Track Command
 SV Servo Position
 TC Track Color
 TI Track Inverted
 TW Track Window
~~UD Upload Difference buffer~~
 VW Virtual Window

The following commands will not be supported in the near future:

CT Set Camera Type
 DM Delay Mode
 L1 Led Control (look at SO instead)
 PS Packet Skip
 SD Sleep Deeply
 SL Sleep Command

CMUcam2 Emulation Differences

- **Servo Input Range**
 - Servos are now 0-255 8bit values.
- **Jumpers**
 - Due to the lack of jumpers on the CMUcam3, baudrate and servo direction changes need to be done at compile time. These are controlled by #defines at the top of cmucam.c
- **Set Input (SI *pin*) Command**
 - sets the *pin* to be an input
- **Software Color Space (CS *value*) Command**
 - CS 0 sets the color space to the hardware default (RGB or YCrCb)
 - CS 1 does a software conversion to the HSV color space
 - Conversion assumes hardware is set to RGB for correct results
 - HSV space is integer where all values are scaled between 16 and 240
 - Note, this is only available in [r504](#) and higher
- **Set Output Can Control the Blue and Orange LEDs**
 - Servos 2 and 3 will stop working
 - so 2 1 -> Blue on
 - so 2 0 -> Blue off
 - so 3 1 -> Orange on
 - so 3 0 -> Orange off
- **No Slave Mode.**
 - It is possible, but we currently don't support it.
- **Output Mask (OM)**
 - only supports T and S packets (type 0 and 1)
- **Line Mode (LM)**
 - only supports track color mode (LM 0 1)
 - track color statistics added in [r523](#) (LM 0 2)
- **Send JPEG (SJ)**
 - sends a jpeg compressed frame, header and all
- **Demo Mode**
 - Since holding down the programming button puts the CMUcam3 into programming mode, you need to press the button half a second after startup to enter demo mode.
- **Hi-Res Frame Difference**
 - This now works the same as low-res frame differencing, just at a higher resolution.

Attachments

- [cmucam2_ipc2106-cmucam3.hex](#) (268.5 kB) -"CMUcam2 already compiled hex file", added by agr on 07/02/07 23:26:04.
- [cmucam2.c](#) (43.7 kB) -"CMUcam2 Emulation Source", added by agr on 07/02/07 23:26:34.