

Frequently Asked Questions about uCFG™

What is uCFG?

The microcontroller frame grabber (uCFG) is an OEM plug-in module designed to allow the digitization and acquisition of a full color, full resolution (PAL 720 x 272 or NTSC 720 x 240) single video field into a local image buffer. The buffer is accessible through a simple serial interface.

How do I communicate with the uCFG?

The uCFG communications are handled through a standard UART (serial interface). The UART nominally operates at LVTTTL (+3.3V) levels, but is also +5V tolerant. The UART's TXD/RXD signals can be connected directly to the UART pins of an external embedded MCU. The UART can also be connected to a PC's serial port but only by adding an external RS-232 level shifter IC such as Sipex SP3232. The uCFGVAL kit includes this level shifter and a DB9 female connected allowing you to connect the uCFG directly to a PC's COM port.

How many video channels are supported?

The uCFG supports 4 channels of composite video signals or 2 channels of studio quality S-Video inputs. Also, a live composite video output is provided to monitor the currently selected video channel.

How is S-Video supported?

To use S-Video mode, the uCFG is simply configured as such in its EEPROM setup. Channels 1&3 are used to input S-Video channel 1, and channels 2&4, for S-Video channel 2.

Can I mix NTSC/PAL signals?

You cannot mix NTSC/PAL signals. The uCFG board must be configured to use either all PAL or all NTSC video inputs in its EEPROM setup.

Can the uCFG autodetect the presence of video signals?

Yes, the TEST command checks for the presence of a valid video signal on each of the video inputs.

Can I trigger an image capture from an external trigger signal?

Yes, each of the 4 video channels has an associated LVTTTL (+3.3V) level external hardware trigger input with programmable polarity. ASCII commands allow you to either poll or read the status of the internal trigger latch variable.

Do I need to use hardware triggering?

Absolutely not. All triggering can be handled through ASCII serial commands as well as through external hardware signals.

What is YCbCr?

Most digital video decoder IC's on the market convert analog composite (or S-Video) signals to the industry standard ITU-BT656 digital video format. This format encodes the digital samples in the YCbCr color space. The Y stands for luma and Cb / Cr the two chroma components. The black & white (intensity) component of the image is represented by the luma, whereas the color components by the chroma. Some image processing functions are simplified by operating directly in the YCbCr color space. In the PC world, video monitors display images in the more familiar RGB color space, where three color components (Red, Green, Blue) describe the color of any given pixel. Converting between the two color spaces involves using three simple linear equations (matrix operation).

How does compression work?

First off, the raw uncompressed image samples of a digitized field are always stored in the uCFG's FIFO buffer. During download, it is possible, if desired, to request the data with a certain skip factor and/or compression ratio. Compression occurs on-the-fly as the image data samples are read out to the serial port and do not affect the original image data in the FIFO.

How long does it take to download an image?

This question depends on a number of factors. First of all, the serial baud rate will directly affect the download time. Also, changing the compression ratio reduces the amount of data to be downloaded, as does reducing the downloaded image size (i.e. download resolution settings). As well, downloading only black & white information reduces the total image data by half. Finally, uCFG processing overhead associated with the decimation/compression can also affect download times. As a rough guide, the following tables show actual download times measured with the uCFG EVAL kit connected to a PC at 115.2 kbps for a number of different settings.

- 1) Single field color image, various image sizes and compression ratios

Color	720x240	360x120	180x60
1:1	31 s	13 s	10 s
2:1	17 s	10 s	9 s
4:1	13 s	9 s	9 s
8:1	10 s	9 s	9 s

- 1) Single field, black & white image, various image sizes and compression ratios

B&W	720x240	360x120	180x60
1:1	15.5 s	6 s	4 s
2:1	8.5 s	4 s	3 s
4:1	6 s	3 s	3 s
8:1	4.5 s	3 s	3 s

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