Microcontroller Frame Grabber™ Evaluation Kit (uCFGEVAL™) User's Guide

Features

- Kit includes a standard uCFG OEM frame grabber daughtercard
- Includes a motherboard (uCFGMB) accepting the uCFG daughtercard
- 4 video inputs/1 video output BNC connectors, DB9 female RS-232 serial port connector, level shifter circuitry, and DC power jack
- Windows-based command and viewing software
- Includes full circuit schematics and user manuals for both uCFG as well as motherboard
- Includes 5 ft DB9 male to female RS-232 communications cable (DB9-MF-5F)
- Includes a regulated +5V DC adapter (DC-ADAPT-5V)
- LVTTL UART, I^2C, and trigger signals of uCFG board brought out to motherboard 0.1" headers for easy hookup

Table of Contents

Overview

The microcontroller frame grabber™ evaluation kit (uCFGEVAL™) allows the quick evaluation of the uCFG 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.

Getting Started

The following steps will guide you through the board setup and testing process.

Kit Contents

The uCFGEVAL kit comes complete with the following items:

- uCFG OEM daughterboard
- uCFGMB motherboard
- +5V DC adapter (DC-ADAPT-5V)
- 5 ft male-to-female DB9 RS-232 cable (DB9-MF-5F)
- Circuit schematics for uCFG and uCFGEVAL
- PC viewer software CD
- User's manual

Unpacking the Board

First, unpack the kit and inspect the different parts listed in the "kit contents" section. If there is any physical damage to any of the parts, please contact the shipping company to make a claim. Lay out all the parts and make sure the uCFG daughtercard is properly inserted into the motherboard **(WARNING: it is possible to plug the uCFG board backwards inadvertently. DOING SO WILL DAMAGE THE BOARDS AND VOID THE WARRANTY)**. Make sure whenever plugging in the daughtercard that the "video inputs" silkscreen on the daughtercard is lined up with the same label on the motherboard.

Hooking up the Signals

Figures 1 and 2 illustrate the location and hookup of the various signals on the uCFGMB. First, connect one end of the serial communications cable to the DB9 connector of the uCFGMB and the other end to the RS-232 port of your PC. Connect all the available video signals to the video input BNC connectors (you don't have to use all the video signals). Video input 1 is the left most BNC connector. If your video cables have RCA connectors instead of BNC connectors, then you can use a simple RCA to BNC adapter as shown in Figure 2 on the live video output channel (we offer a separate 5-pack adapter set part number BNC-RCA-5PK).

Connect the video output (right most connector) to the video input of a video monitor (optional). Connect the regulated +5V DC adapter into the DC power jack of the uCFGEVAL. Finally, if using the RS-232 port to connect to a PC, make sure there is a jumper installed in positions 1&2 of header J2 (also, be aware that if the J3 jumper is loaded on the *uCFG daughtercard*, then the board will assume default settings).

Plug the adapter into a wall outlet. The green LED should now be lit. You are now ready to connect to the uCFGEVAL.

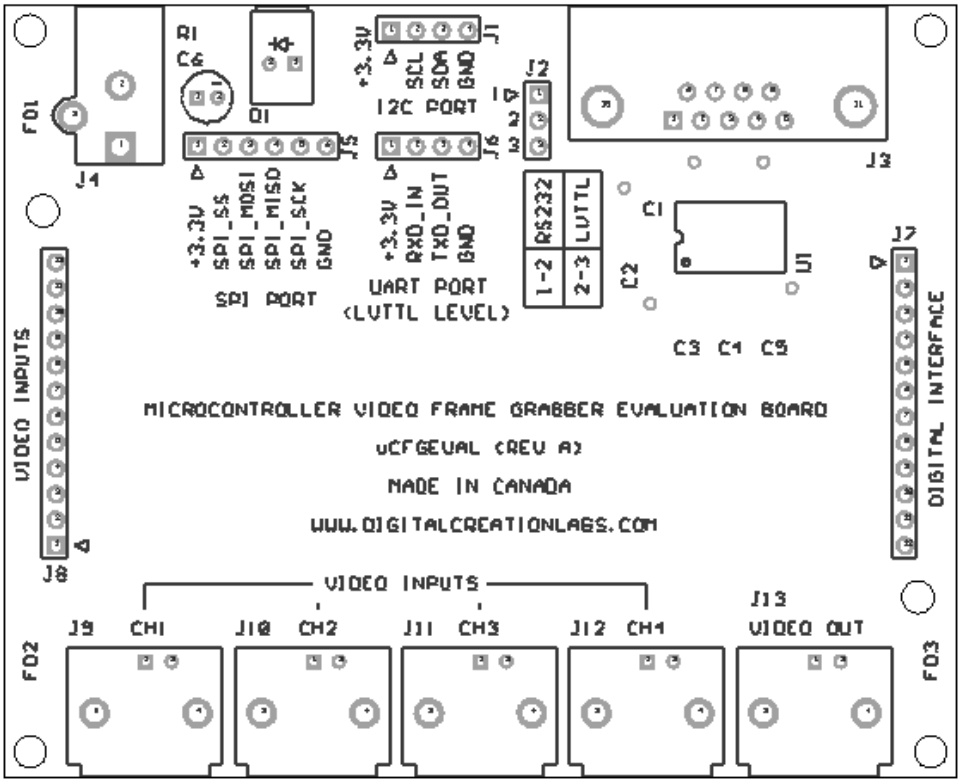

Figure 1: Top view of the uCFGMB motherboard (uCFG daughtercard not shown). Notice the video input/output connector positions. Also, be careful to match “video inputs” silk screen labels when inserting uCFG card.

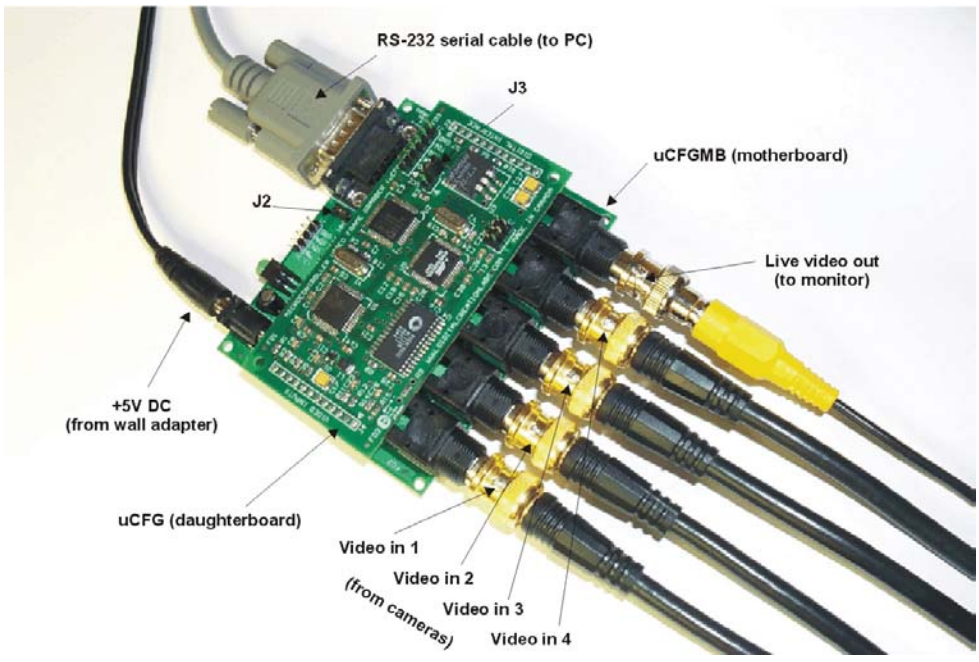

Figure 2: Hooking up all the different signals to the uCFGMB

Viewer Software

The accompanying CD includes the PC viewer software as well as datasheets, app notes and sample test images. The top level directory on the CD is called uCFGEVAL. You may simply copy this folder onto your hard drive. The viewer software is an executable file which doesn't need to be installed. Please note that since copying the files from a CD, their attributes will be set to read-only. If using Windows 2000 or XP, you can simply right click on the uCFGEVAL top directory copied to your hard drive and select properties, then uncheck read-only. This should apply the changes to all the files in the subdirectory. If there are any problems accessing the CD, you can always download all its contents including the latest version of the viewer software from our web site at http://www.digitalcreationlabs.com/support.htm

Under the uCFGEVAL/Software directory, click on the uCFGViewer.exe application. The viewer application should start.

Connecting to the Board

Figure 3 shows the PC viewer software's main dialog screen. All operations of the uCFG can be performed from this menu. The first step is to establish contact with the uCFG. After starting the software, select the serial port on which the uCFG is connected (i.e. COM1) from the drop list. Then, select the baud rate (115.2 kbps by default), and press "Connect". If everything is ok, you should see "COM1: 115200 baud" in the status window. Of course, this string may differ based on you selected options. If there is an error, then another software (such as another instance of the viewer software) may already be using the selected COM port. If the error persists, try selecting a different COM port.

Once successfully connected, press the "Ping" button. You should see a *OK reply in the command log window. If you get a timeout error, then the board was not responding. This could be because the serial cable was not connected, the board was not powered, the wrong COM port was used, the viewer software was not connected to the COM port or simply that the uCFG board's baud rate settings are different then the viewer settings.

If a uCFG board has previously been setup with an unknown baud rate setting, then you can always load jumper J3 on the uCFG board and then cycle the power. This will force the board to its default settings, including a baud rate of 115.2 kbps. Please note that the EEPROM contents are NOT changed by this action, but the board simply ignores the EEPROM on power-up and assumes hardwired default settings. This will allow you to make changes to the board configuration. When finished, don't forget to remove the J3 jumper and cycle the power so that the new EEPROM settings can take effect.

A Tour of the Menu

Figure 3 shows the PC viewer software's main dialog screen. All operations of the uCFG can be performed from this menu.

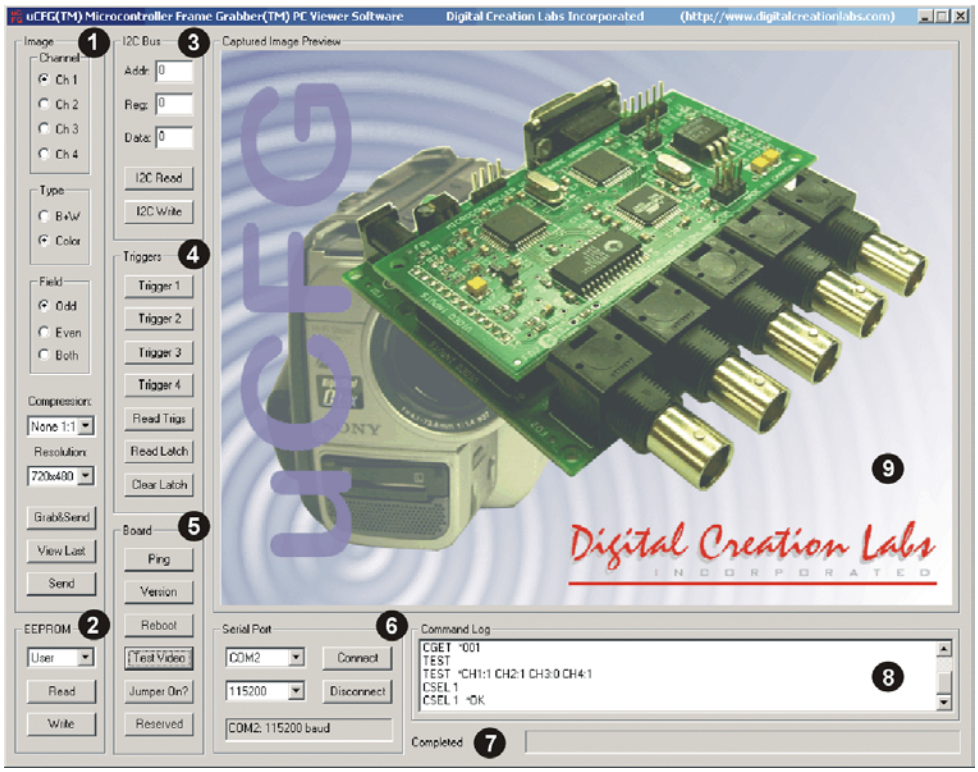

Figure 3: PC viewer software main dialog screen

The different GUI control groups and elements are described below:

(1) Image download settings group

Channel: By clicking on Ch 1 to 4, the analog multiplexer instantaneously switches between the video inputs. The live video output displays the currently selected input channel.

Image type: Selects whether to download the complete color image data, or only the b&w portion when either the Grab&Send or the Send buttons are pressed.

Field Type: Chooses between grabbing the "Odd" or "Even" field when the Grab&Send button is pressed. When "Both" is selected, the viewer will first command an Odd field grab and download, followed by an Even field grab and download. This should only be performed on a static scene, otherwise image motion artifacts will be observed.

Compression: Selects the image download compression settings for the next download operation.

Resolution: Selects the image download resolution settings. Please note that when a single field download is selected (i.e. Odd or Even), the viewer software will download the requested field from the uCFG, and then interpolate locally every missing 2nd line (i.e. the missing field) in order to display the downloaded image in the correct aspect ratio on the screen.

Grab&Send: Triggers a field grab of the specified field type/source channel and downloads the data using the specified color/compression/resolution settings.

View Last: Every downloaded image is saved to a filed called *image.bmp* in the local directory. The View Last button simply reads in the last downloaded *image.bmp* file in the local directory and displays it in the viewer. This is convenient when the program is closed then re-opened at a

later time to review the last image. As well, to display any archived image, just copy it to the local directory and rename it to *image.bmp* and press View Last.

Send: This button will download any image data currently sitting in the uCFG's FIFO using the currently specified download settings. It is a convenient way to play with the download and compression parameters. Each time a setting is changed, the Send button will simply re-download the image data using the new settings (remember, the uCFG's FIFO always contains the full resolution, full color raw image data regardless of the image download settings).

(2) EEPROM configuration group

User/Config: This drop list selects whether to read/write the 256 bytes of general purpose user space in the uCFG's internal EEPROM or the 256 bytes of configuration space.

Read: The action of reading either the user or configuration EEPROM space will download the entire contents of the corresponding non-volatile memory space and create an Intel hex file called *eepruser.hex* or *eeprconf.hex* in the local directory. This file can be used to clone the settings of one board to the next or to simply archive the board settings. For archival purposes, remember to move the file away from the local directory to prevent overwriting by future reads. When reading the **configuration space**, a configuration menu will appear and show the current board settings in a user-friendly GUI format. This essentially deciphers the configuration hex file contents and presents the data in a more intuitive fashion (as opposed to cryptic hex data). At that point, you have the opportunity to make changes to the board setup. When you press OK, the changes are saved to the updated *eeprconf.hex* file. AN IMPORTANT NOTE: IF ANY CHANGES WERE MADE, THEY WILL NOT BE RE-WRITTEN AUTOMATICALLY TO THE UCFG, but only to the *eeprconf.hex* file. To update the uCFG settings, you must manually press the Write button.

Write: This button simply reads the local copy of the *eeprconf.hex* or *eepruser.hex* file depending on the selected option, and writes its contents to the uCFG's configuration or user space. In the case of the configuration space, this will effectively update the board power-up defaults according to the file contents. To change these settings, use the Read button and edit them first, then press Write.

(3) I^2C bus control group

This group allows interfacing directly to the I^2C bus (bridge function). Please note that the uCFG's internal video decoder IC is located at decimal address 74. If you connect an I^2C peripheral to the I^2C header, you should be able to talk to it using this control group.

Address: Specify the decimal (0-255) address of the I^2C peripheral to address.

Register: Specify the decimal register address (0-255) within the I^2C peripheral to read/write.

Data: Specify the decimal data value to write (0-255) to the specified I^2C peripheral address and register.

I2C Read: This button reads a byte from the specified I^2C peripheral at the specified address. The decimal result is shown in the "Data" value box and also in the command log window.

I2C Write: This button writes a byte to the specified I^2C peripheral at the specified address.

(4) Trigger control group

Trigger1-4: Pressing any of these buttons will simulate the activation of a hardware trigger (regardless of its configured polarity).

Read Trigs: Pressing this button, will return (in the command log) the decimal instantaneous value of the trigger inputs. The lower 4 bits correspond to the active (1) or inactive (0) state of each of the 4 trigger inputs regardless of the configured polarity. Any or all bits can be active simultaneously. This is useful to debug trigger inputs. As an example, if triggers 1 and 3 were active, then the value returned would be decimal 5 (bit positions 0 and 2 high).

Read Latch: Pressing this button, will return the value of the last latched trigger as a decimal value. The lower 4 bits correspond to the active (1) or inactive (0) state of each of the 4 trigger inputs regardless of the configured polarity. Only one bit in the trigger latch value can be high at any time (because of the trigger arbitration scheme). For example, if trigger 3 was last activated, bit position 2 would be high, which would read as decimal 4.

Clear Latch: Pressing this button clear the trigger latch to zero.

(5) Miscellaneous uCFG commands

Ping: This button simply checks if a uCFG board is present. The command log returns *OK if a board was detected. If there is a timeout error, then the board did not respond. This could be because the serial cable was not connected, the board was not powered, the wrong COM port was used, the viewer software was not connected to the COM port or simply that the uCFG board's baud rate settings are different then the viewer settings.
Reboot: This button forces the uCFG to reboot through a watchdog timeout-induced hardware reset. The command may take a second or so to execute.
Test Video: This button will get the uCFG to test for the presence of a valid video signal on each of its 4 inputs in composite mode, or 2 inputs in S-Video mode. The results are returned in the command log window.
Jumper On?: This returns *YES in the command log window if the board default settings jumper J3 is installed on the uCFG or *NO if not. This can be useful to detect if defaults are forced.
Reserved: Reserved for future use, has no effect.

(6) Serial port control group

COM port select: Select the PC's COM port to which the uCFGEVAL is connected.
Baud rate select: Select the PC's baud rate for communicating with the uCFGEVAL.
Connect: Tries to establish connection with the selected COM port at the selected baud rate. The status text box displays the result. On error, the COM port may not exist, or may already be in use by another program or by another instance of the PC viewer running in the background.
Disconnect: This disconnects from the currently selected COM port and releases it to be used by other programs. You can simply press Connect again to re-connect.

(7) Progress bar

Shows the progress of various operations. The text label to the left shows the nature of the operation in progress.

(8) Command log

This text log is the main means to observe all the physical ASCII messages sent to and received from the uCFG board. Most of the buttons generate a command string sent out the serial port and simultaneously logged into the command log window. The second line following each command is simply the echo received from the uCFG as well as a * character followed by the reply. The only exception to the rule are the Grab & Send button and the Send button which do not display most of the command traffic simply because the volume of data would overflow the log.

(9) Image display window

The downloaded image is displayed in this window (and also saved to the file *image.bmp* in the local directory). The View Last button also causes the image file *image.bmp* to be displayed in this window.

Setting up the uCFG Configuration Defaults (EEPROM)

The uCFG has 512 bytes of non-volatile EEPROM memory on-board. A portion of this memory (256 bytes) is reserved for board configuration. To setup a uCFG board, simply select the "config" option in the list box of the EEPROM GUI control group. Press the Read button. The board setting will be downloaded and displayed in the menu shown in Figure 4. If the board has never been initialized, a message will appear indicating that the defaults will be used instead. At this point, it is possible to customize the board setting. Here is a description of the various menu items:

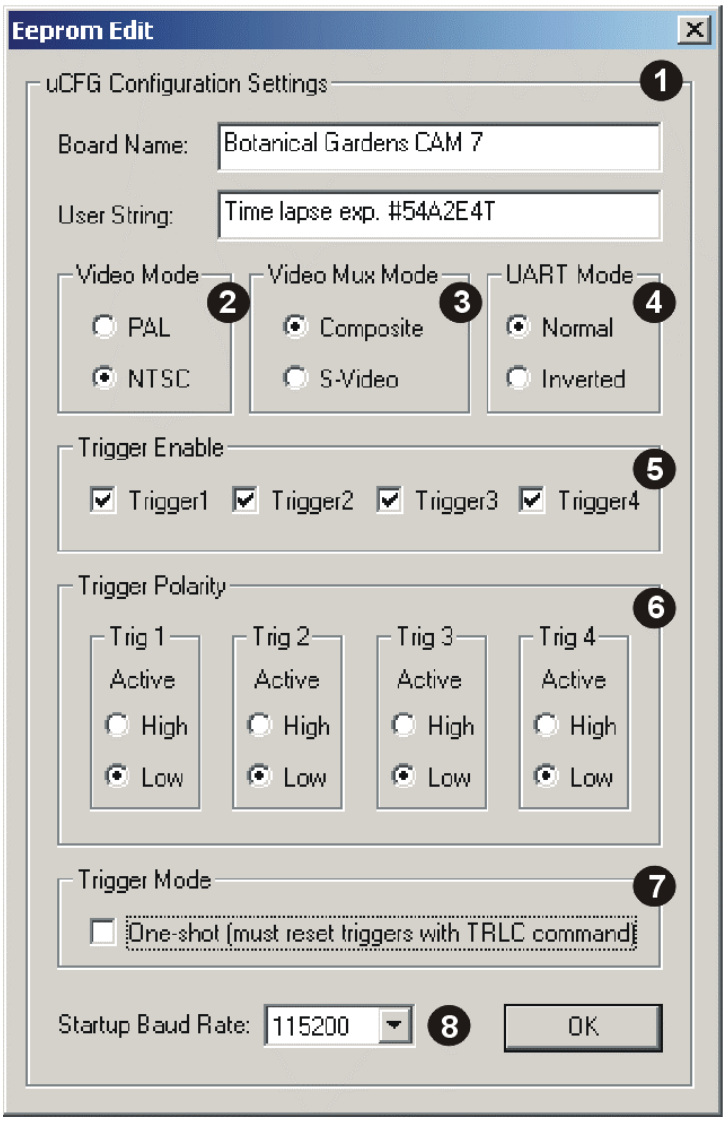

Figure 4: uCFG board setup configuration menu

(1) Textual board description group

Board name: You can give the uCFG board a unique arbitrary textual name description (25 chars max)

User string: General purpose user string (25 chars max)

(2) Video mode options

Setup according to your cameras.

PAL: Places the uCFG board in PAL mode on all inputs.

NTSC: Places the uCFG board in NTSC mode on all inputs.

(3) Video multiplexer mode options

Setup according to your video source type.

Composite: Provides 4 channels of composite video inputs.

S-Video: Provides 2 channels of S-Video inputs. Channels 1&3 are the Y and C components of S-Video input 1 and 2&4, that of input 2.

(4) UART mode options

This option allows inverting the polarity on the UART signals of the uCFG if necessary. This is usually left in normal mode for most applications.

Normal: Normal polarity on TXD and RXD uCFG UART lines.

Inverted: Inverted polarity on TXD and RXD uCFG UART lines.

(5) Trigger enable group

This group allows the selective enabling of the 4 input triggers. When disabled, a trigger cannot trigger a frame grab. Please note that the TRRD command (only) will still return the trigger status of all triggers regardless of their enabled or disabled state.

(6) Trigger polarity group

This group allows the configuration of the trigger polarity.

Active High: The input trigger signal will be considered active when high. The image grab will be triggered by the leading edge (low to high transition).

Active Low: The input trigger signal will be considered active when low. The image grab will be triggered by the falling edge (high to low transition).

(7) Trigger mode setting

One-shot: When checked, the trigger behavior will be as follows: a field will be grabbed following a trigger, but any further grabs will be inhibited until the latch is cleared. This ensures that a trigger event cannot be missed in cases where trigger polling is infrequent. The last detected trigger can then be read with the Read Latch button. When the latch is cleared (with the Clear Latch button), the frame grabber can be triggered again. If unchecked, then the uCFG will be set to retriggerable mode, where any trigger always causes an immediate field grab and overwrite of the previous image data. The system then has to poll and determine when a trigger was pressed.

(8) Startup baud rate setting

Select the default startup baud rate of the uCFG from the drop list. Please be aware that when the board restarts or is rebooted, the new baud rate will take effect immediately. The viewer software will then have to be reconfigured to match the new baud rate setting in order to communicate with the uCFG.

After setting up the board, press OK on the EEPROM edit menu. This will save the new settings in the *eeprconf.hex* file. At this point, if there were any changes, **they were only performed to the hex file, and not to the uCFG board**. It is therefore necessary to press the Write button. The *eeprconf.hex* file is then uploaded to the uCFG board's EEPROM configuration memory. **Once the update is completed, the changes will not take effect until the board power is cycled, or the Reboot button is pressed.**

PLEASE NOTE: If a shunt is loaded on J3, then the next time the uCFG powers up, it will assume the default configuration regardless of the EEPROM user settings. These defaults include:

Video mode: NTSC
Video mux mode: Regular composite inputs (4 inputs)
UART mode: Normal
Trigger enable: all enabled
Trigger polarity : all active high
Trigger mode: retriggerable
Startup baud rate: 115.2 kbps

This is convenient when setting up a uCFG unit with unknown prior settings. If J3 is not shunted, then the power up settings will be read from EEPROM.

Grabbing your First Image

Now that the board is setup correctly (and has been rebooted or power-cycled) we can acquire our first image. To do so, follow these instructions:

1) Make sure the viewer software is connected to the COM port by selecting the appropriate port, baud rate, and by pressing the Connect button. The Serial Port status box should indicate a valid connection. If an error occurred, try a different setting.
2) Press the Ping button. It should return *OK.
3) Now, select the video channel from which the video field will be grabbed. Press on Ch1 (assuming there is a video signal on channel 1). The video output should display a live image from channel 1 at this point.
4) In the image type, select Color.
5) In the field type, select Odd.
6) In the compression type, select 1:1.
7) In the resolution selection list, select 720x480 (assuming NTSC).
8) Now, press Grab & Send. Sit back and wait for the image to download.
9) You should now see your first color field grab from uCFG…Congratulations!
10) Now that the image is frozen in the uCFG's buffer, it is possible to experiment with different compression settings. Select 4:1 in the compression, and press Send. The same image is downloaded with a higher compression setting (and faster download).
11) You can also alter the size of the image (decimation). Select 360x240, then Send. A smaller decimated version of the original image is downloaded.
12) As well, you can select B+W, then press Send. The b&w component of the image is downloaded (twice as fast).
13) Go ahead and play with the various settings.
14) As a test of one of the highest quality settings, aim the camera at a static object. Select Color, 1:1 compression, 720x480, "Both" fields, and then press Grab&Send. The system will first acquire an Odd field and download it then an Even field, and download it as well. The final result is a full 720x480 color image.

Controlling the I^2C Bus

Let's try out a few of the I^2C commands:

1) In the I^2C bus group, enter 74 in the I^2C device address field. This is the address of the uCFG's video decoder IC.
2) In the Register field, enter 2. Now, press the I2C Read button.
3) If the board is setup for composite video inputs, the data field should read 192 if Ch 1 was selected, 193 if Ch 2 was selected, 194 if Ch 3 was selected, and 195 if Ch 4 was selected. In S-Video mode, you will read 200 or 201 depending on whether Ch 1 or Ch 2 were selected.
4) Go ahead and change the data value as follows: if was set to 192, then type in 193. If was set to 193, enter 192. If was set to 194, then enter 195, and if was set to 195, enter 194. Press Write. The selected video channel should instantly switch over. Entering arbitrary values or values other then the ones described will not work or may result in erroneous operations of the video decoder. These settings are specific to the video decoder IC. More generally, you can just hookup a 3.3V based I^2C peripheral to the I^2C header of the uCFGMB and control if from this menu.

Experimenting with Triggers

If you have hardware triggers installed (see the Electrical section for information on how to perform the hookup), then you can try them out in this section. Otherwise, you can simply simulate hardware triggers with the Trigger buttons.

1) Assuming all the trigger buttons have been enabled in the board's EEPROM configuration, then you can press trigger 1. This should cause the video 1 input to instantly switch (if it wasn't already) and be displayed on the video output. A field is immediately acquired and stored in the FIFO.
2) Press the Send command to download the image just acquired (of course, setup all the download menu options before pressing Send).
3) Press the Read Latch button. A decimal value is returned in the command log. This should be 1 if Trig 1 was last activated, 2 for Trig 2, 4 for Trig 3, and 8 for Trig 4 (remember, lower 4 binary bits represent the triggers).
4) Press the Clear Latch button, then Read Latch again. It should return 0.

5) Go ahead and play with the triggers and the trigger latch.
6) If the board was setup in one-shot triggering mode, only the trigger pressed following a Clear Latch (i.e. when the latch is zero) would cause a frame grab. Any subsequent triggers would have no effect (until the latch was cleared again).
7) The Read Trigs button simply returns the binary-encoded lower 4 bit state (1=active, 0=inactive) of the various trigger inputs.

Miscellaneous Operations

Try out a few of the miscellaneous commands.

5) Press Version. The board name and firmware version number should appear in the command log.
6) Press Test Video. After a small delay, the status of the 4 video inputs will be shown in the command log.
7) Press JumperOn?. Will return *NO if the J3 jumper on the uCFG is not loaded, or *YES if it is.

Communicating with a Serial Terminal

All the operations performed by the PC viewer software ultimately translate into simple ASCII commands as seen in the command log. It is possible to control the uCFG from a simple serial terminal program (such as HyperTerm). Simply configure the baud rate correctly, and type PING. You should receive an *OK reply. Go ahead and experiment with all the various commands. See the uCFG datasheet for the command list and syntax.

Electrical

The uCFGMB board shown in Figure 1 has a number of headers available for interfacing to the various uCFG signals. The following will indicate the purpose of the various headers and signals, as well as showing hookup diagrams. **NOTE the triangle next to each header points to PIN #1.**

Motherboard Connector Pinouts

J1 Header

The J1 header is the I^2C expansion port. The pinout is as follows:

J1 Pin #	Signal Name	Signal Description
1	**+3.3V**	+3.3V output (10 mA max)
2	**SCL**	I^2C SCL signal (internally pulled up to +3.3V with 2.2K resistor). This is NOT 5V tolerant so only use 3.3V I^2C peripherals (or en external 3.3V to 5V I^2C level shifter)
3	**SDA**	I^2C SDA signal (internally pulled up to +3.3V with 2.2K resistor). This is NOT 5V tolerant so only use 3.3V I^2C peripherals (or en external 3.3V to 5V I^2C level shifter)
4	**GND**	Ground

J2 Header

The J2 header allows the uCFG UART to be driven by the RS-232 level shifter (jumper on pins 1&2) or by the direct LVTTL lines on J6 (jumper on pins 2&3).

J3 Header

J3 is a standard DB9 female DCE pinout RS-232 connector.

J4 Header

J4 is the external DC power connector (5 to 9VDC). Center positive. **DO NOT APPLY REVERSE POLARITY, AS DAMAGE WILL OCCUR AND WARRANTY WILL BE VOID.**

J5 Header

J5 is labeled as SPI port, but also doubles as the trigger input pins. The pinout is as follows:

J5 Pin #	Signal Name	Alternate Signal Name	Signal Description
1	**+3.3V**		+3.3V output (10 mA max)
2	**SPI_SS**	**TRIGGER 1**	External trigger 1 input (+3.3V LVTTL). **NOT +5V tolerant.**
3	**SPI_MOSI**	**TRIGGER 2**	External trigger 2 input (+3.3V LVTTL). **NOT +5V tolerant.**
4	**SPI_MISO**	**TRIGGER 3**	External trigger 3 input (+3.3V LVTTL). **NOT +5V tolerant.**
5	**SPI_SCK**	**TRIGGER 4**	External trigger 4 input (+3.3V LVTTL). **NOT +5V tolerant.**
6	**GND**		Ground

J6 Header

The J6 header is the LVTTL interface signals for those wishing to interface directly to the uCFG UART with an external MCU (without level shifter). In order for this header to work, J2 must have a jumper installed in positions 2&3. The pinout is as follows:

J6 Pin #	Signal Name	Signal Description
1	**+3.3V**	+3.3V output (10 mA max)
2	**RXD_IN**	Input signal to the uCFG UART. LVTTL (+3.3V level). Unlike all the other inputs, this input is +5V tolerant.
3	**TXD_OUT**	Output signal from the uCFG UART. LVTTL (+3.3V level).
4	**GND**	Ground

Triggers

The 4 external trigger inputs to the uCFG support any +3.3V LVTTL inputs. In fact, the 4 inputs have weak pull-ups to 3.3V. For simple experimentation, it is therefore easy to wire a set of 4 pushbuttons (not provided) as shown in Figure 5.

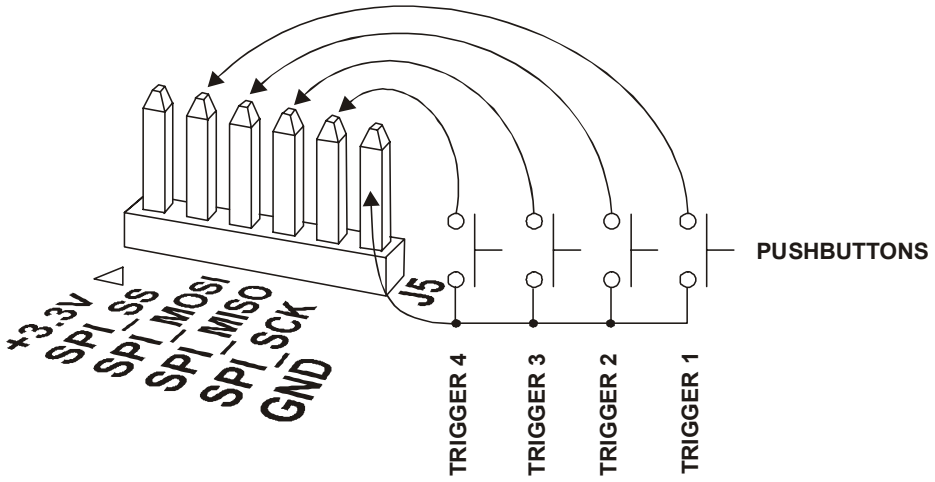

Figure 5: Hardware trigger pushbutton hookup

The pushbuttons are wired directly to the J5 header. If you have alternate trigger signal sources, you may also connect them instead of pushbuttons. As long as they are within the +3.3V range and do not stay active when the power to the main uCFG board is removed (otherwise this could create latch-up problems and electrical damage). In this example, the uCFG board's 4 triggers must be setup as active LOW in the EEPROM settings using the PC viewer software.

Support

If you are experiencing problems controlling or configuring the uCFG or if the documentation is unclear, you may contact us via e-mail at support@digitalcreationlabs.com We are continuously trying to improve our products and associated documentation. We always welcome user feedback and suggestions.

Schematics

(Full up-to-date circuit schematics are available with the uCFGEVAL kit.)

Liability Disclaimer

Digital Creation Labs Incorporated gives no warranty either expressed or implied and specifically disclaims all other warranties, including warranties for merchantability and fitness. In no event shall the liability of Digital Creation Labs Incorporated exceed the buyer's purchase price nor shall Digital Creation Labs Incorporated be liable for any indirect or consequential damages.

Life Support Policy

Digital Creation Labs Incorporated's products are not intended or authorized for use in any critical medical, life support, or life-saving devices or applications or any other system whose failure to perform correctly could result in life support failure.

FCC, CE, IC Certification

Digital Creation Labs Incorporated's products are provided as OEM unfinished products to be integrated into a customer's end product design. The customer is therefore responsible to test for, and obtain all the required EMI/EMC certifications of their final product wherever applicable.

Trademarks

Microcontroller Frame Grabber, uCFG and uCFGEVAL are all Trademarks of Digital Creation Labs Incorporated.