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User Guide - Revision 2.01 01/23/04

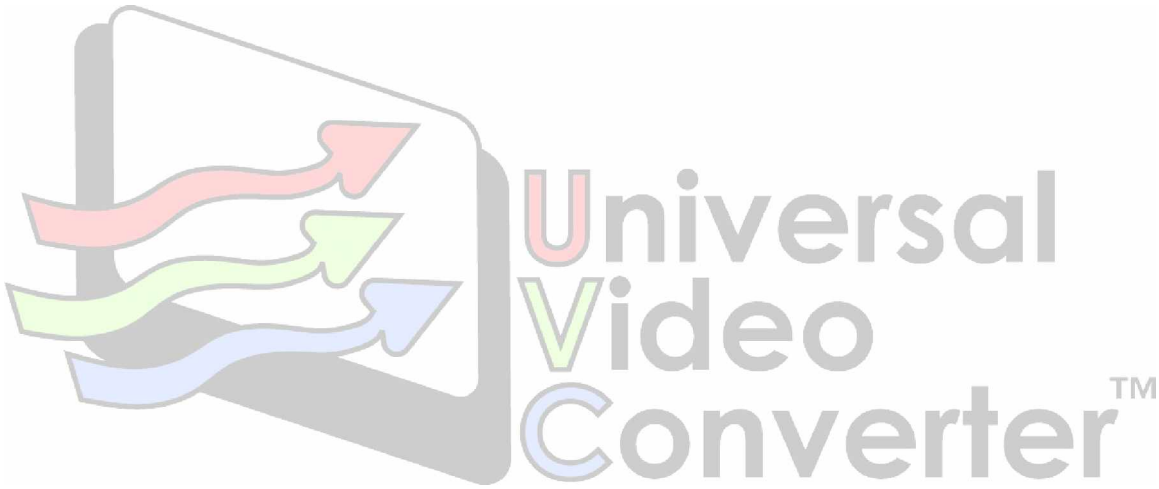


Table of Contents

!!! IMPORTANT NOTE !!!

This documentation applies to the 2.0 release of the uVC and the 02 revision of the PCB. The pinouts for the video output have changed with the H Sync and Video Ground being swapped to match pinouts on most monitors. Note, if you have 1.x release of the board with the 00 revision of the PCB, please note that you must swap the H Sync and Video Ground Pins on your monitor cable.

Overview

This is a very simple board that has only one function, to allow the display of PC based games on older arcade style monitors. The board needs to be an external device that requires no modification to the software running on the PC. It will handle one of three input resolutions (1024x768, 800x600 or 640x480) with a vertical refresh rate of 60Hz and output to one of two user selectable output modes (640x240@15.72KHz) or (640x384@24.9KHz) The coin-op monitors are RGB non-interlaced and run at 60Hz. The Input of the board will be a DBH-15 VGA analog VGA connector and the output is a 0.156" molex connector with pins for R, G, B, Ground and Syncs.

Legal Statements

Trouble Shooting

The uVC should almost always work right out of the box. If you are having trouble getting an image to appear follow these steps:

- Verify that you have the proper output mode (try switching switch #3)
- Verify that you have the proper video cable attached to the monitor (note, if you have a 1.x board, make sure that they H and GND pins are correct, as they changed on 2.x boards)
- Try changing your sync from positive to negative, some monitors can't support positive sync.
- Try changing from composite to separate sync, some monitors can not support composite sync.

Input Resolutions

The uVC board supports multiple input resolutions

- Multiple PC VGA Input Formats
  - Input Resolutions
    - 640x480
    - 800x600
    - 1024x768
  - Input Frequency
    - Vertical 60Hz

Output Resolutions

The uVC board supports multiple output resolutions

- **Mode 1 - Low Resolution - CGA - (std resolution)**
  - Horizontal Pixel Clock — 73.626 ns
  - Horizontal Active Pixels — 640 pixels — 47.121 µs
  - Horizontal Total Pixels — 864 pixels — 63.613 µs
  - Horizontal Front Porch — 64 pixels — 4.712 µs
  - Horizontal Sync Width — 60 pixels — 4.418 µs
  - Horizontal Back Porch — 100 pixels — 7.363 µs
  - Horizontal Scan Rate — 15.72 KHz — 63.613 µs
  - Vertical Line Clock — 63.613 µs
  - Vertical Active Lines — 240 lines — 15.267 ms
  - Vertical Total Lines — 262 lines — 16.667 ms
  - Vertical Front Porch* — 3 lines — 0.318 ms
  - Vertical Sync Width — 3 lines — 0.191 ms
  - Vertical Back Porch — 14 lines — 0.891 ms
  - Vertical Refresh Rate — 60 Hz — 16.667 ms
- **Mode 2 - Med Resolution - EGA**
  - Horizontal Pixel Clock — 50.080 ns
  - Horizontal Active Pixels — 640 pixels — 32.051 µs
  - Horizontal Total Pixels — 800 pixels — 40.064 µs
  - Horizontal Front Porch — 16 pixels — 0.801µs
  - Horizontal Sync Width — 80 pixels — 4.006 µs
  - Horizontal Back Porch — 64 pixels — 3.205 µs
  - Horizontal Scan Rate — 24.96 KHz — 40.064 µs
  - Vertical Line Clock — 40.064 µs
  - Vertical Active Lines — 384 lines — 15.385 ms
  - Vertical Total Lines — 416 lines — 16.667 ms
  - Vertical Front Porch* — 5 lines — 0.200 ms
  - Vertical Sync Width — 5 lines — 0.200 ms
  - Vertical Back Porch — 22 lines — 0.881 ms
  - Vertical Refresh Rate — 60 Hz — 16.667 ms

*Vertical Front Porch Timing is variable based on input frequency

Cooling

The board and chips use passive cooling. No heat sinks or fans are required. The board can perform in an environment up to 60 degrees Celsius.

Power

The board has a standard PC Hard Drive power connector, which brings in +12vdc, +5vdc, and Ground. The board contains and onboard power supply which will take the +12vdc and convert it to 3.3v and 1.8v needed in the logic. The +5vdc is passed onto the onboard 5v components.

DIP Switch Settings

8 – Sync Output Signal On=Composite *Off=HV Sync Separate

7 – Vertical Sync Polarity

Separate Sync -- *On=Positive Off=Negative

Composite Sync -- *On=Always Low Off=Always Hi

6 – Horizontal/Composite Sync Polarity *On=Positive Off=Negative

5:4 – Input Resolution

- *On/On = Auto Detect
- On/Off=VGA (640x480)
- Off/On=SVGA (800x600)
- Off/Off=XGA (1024x768)

3 – Output Display *On = Low Res (CGA) 15.75KHz Off = Med Res (EGA) 24.5KHz

2 – Output Delay Scan Lines

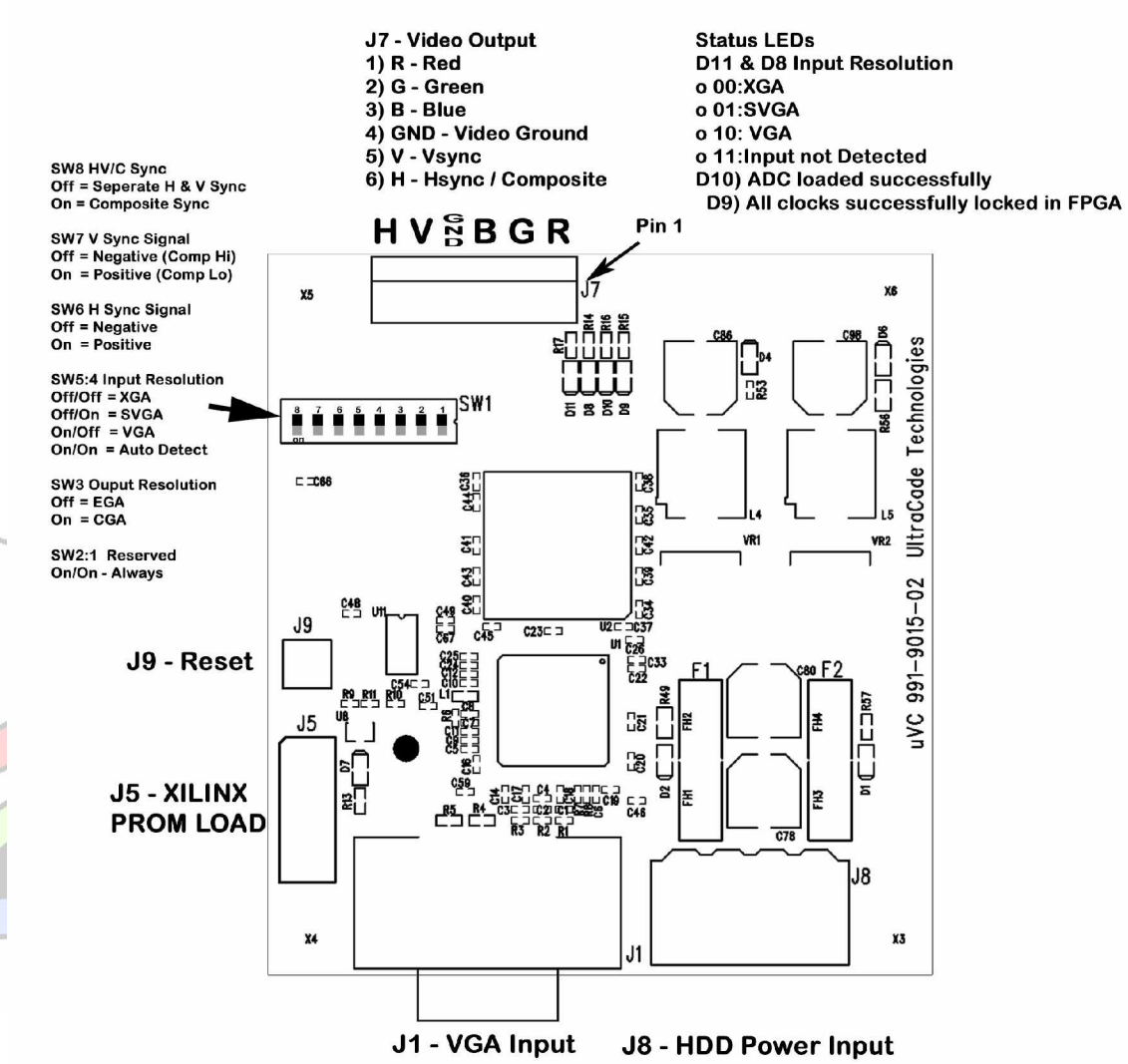
- *On = 8
- Off = 16

This should be set to as low as possible. If tearing appears on the bottom of the screen, increase the delay lines. If the top of the screen is wrapped around to the bottom, decrease the delay lines.

1 – Reserved

*denotes default settings

Configuration

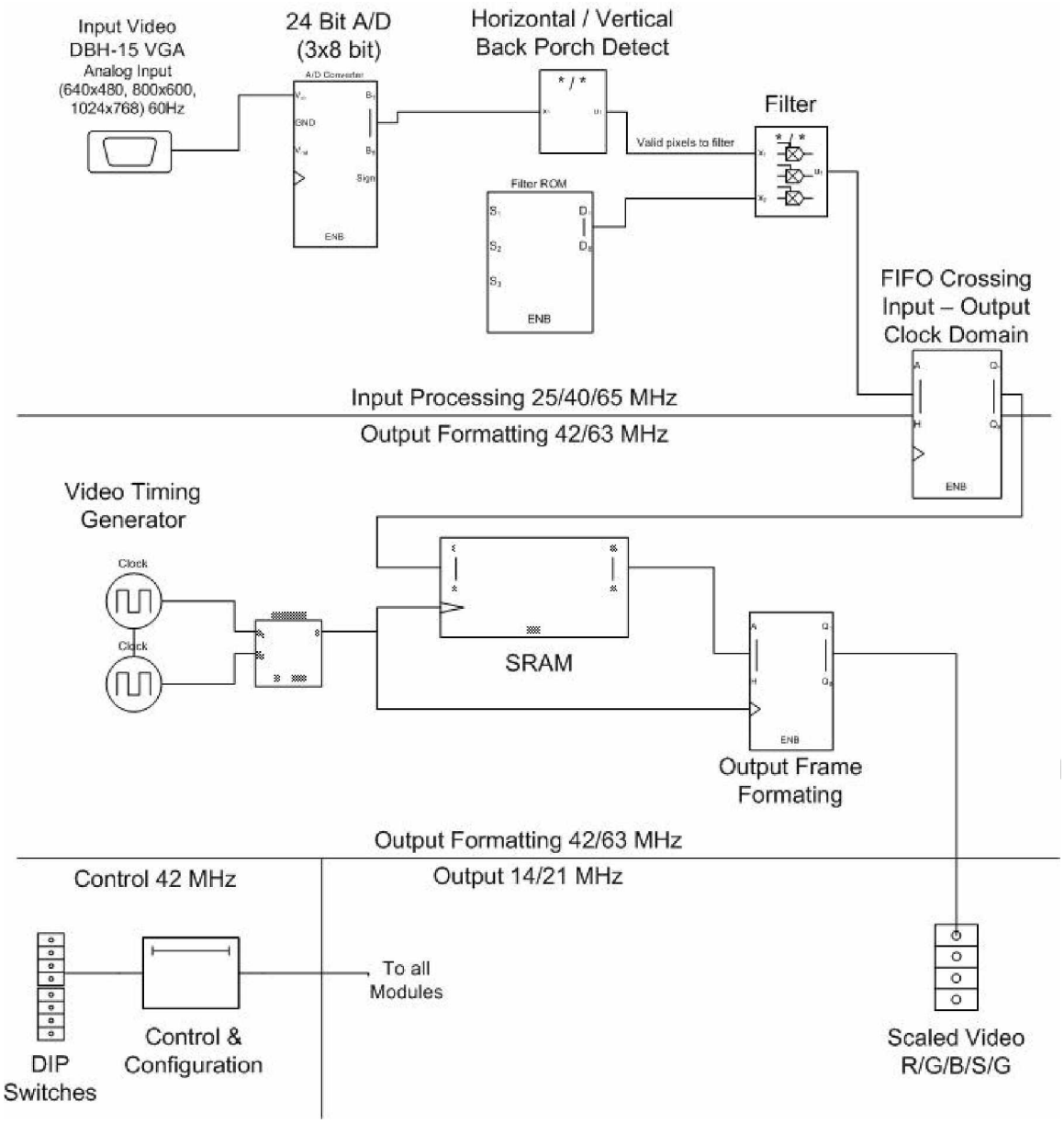


LED Outputs

There are four (4) LED's used for status display on board:

- D11 / D8
    - Input resolution (closest to dip switch)
        - 00:XGA
        - 01:SVGA
        - 10: VGA
        - 11:Input not Detected
- D10
    - Analog to Digital Converter loaded successfully
- D9
    - All clocks successfully locked in FPGA

Logic Diagram



Revision History

- January 23, 2004, DRF, Fixed J7 in wiring diagram
- December 14, 2003, DRF, Added Troubleshooting Section
- November 26, 2003, DRF, Update to version 2.00
    - PCB Revision 02
        - Removal of unused LEDs
        - Removal of unused pads for non-populated components
        - Reset changed to external header instead of a push button
    - Output Pins reversed to match monitor input pinouts
    - BIOS screen now shows input and output resolution while syncing
- November 6, 2003, DRF, Update to version 1.81 ROM
    - Updated logic diagram
    - Updated switch settings
    - Added logo screen when switching modes or no input detected
- October 16, 2003, DRF, Updates to version 1.3 ROM
    - Automatic input resolution detection
    - Fix tear on SVGA -> CGA
- October 14, 2003, DRF, Updates to version 1.1 ROM
    - Update to remove use of jumpers
    - All settings via DIP switch
    - Additional of Polarity for H & V Syncs

- October 13, 2003, DRF, Updates to version 0.20 ROM
    - Input Horizontal Timing
    - Addition of new switch functions on chart
    - Correction to input resolution Switch notes
    - Output Timing update
    - Power Update
- October 10, 2003, DRF, Initial Revision to version 0.18 ROM