VGA output

kadli edited this page on 28 Dec 2013 · 5 revisions

It's possible to let cubieboard output VGA signal.

Circuit

If you bought some daughter board with VGA connector, you can go to the next step. If not, you can build your own circuit.

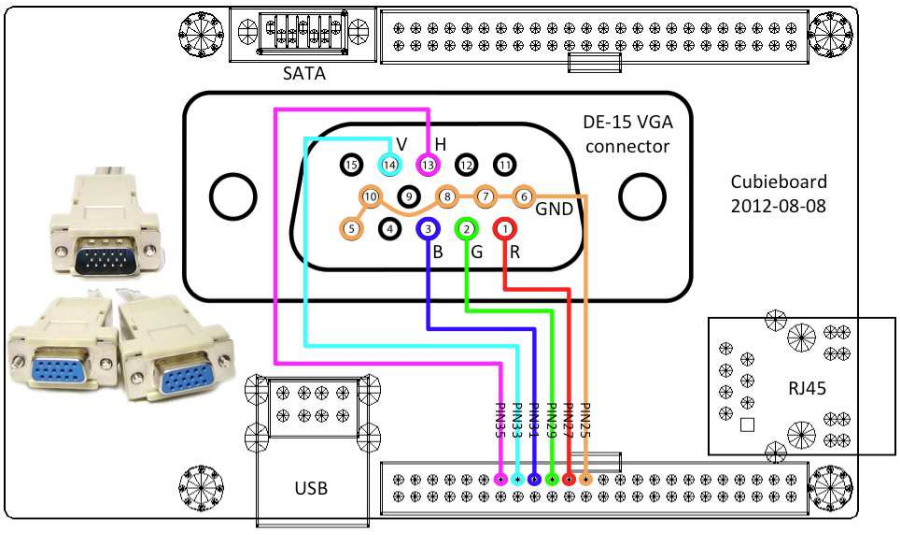
Cubieboard pin	Cubieboard description	VGA connector pin
conn. U15 – pin 25	Ground	5,6,7,8,10
conn. U15 – pin 27	VGA – Red	1
conn. U15 – pin 29	VGA – Green	2
conn. U15 – pin 31	VGA – Blue	3
conn. U14 – pin 27	VGA – VSYNC	14
conn. U14 – pin 30	VGA - HSYNC	13

Do not use pins 33 and 35 on connector U15. It is HSYNC and VSYNC for LVDS, not VGA.

Because the HSYNC and VSYNC signals from cubieboard are 3.3V levels, they should be buffered by CMOS gates to 5V levels to reach the VGA specifications, but I found out, that every monitor I have tryed handled 3.3V signals without buffers, directly connected to VGA connector.

Each VGA analog signal (red, green and blue) should be loaded by nominal impedance of VGA. That means 75R resistors connected between color signal and ground. Without them the analog signa is very messy and picture on the monitor is quite ugly like on following photo.

That means, the minimal schematic diagram can look like this:



Much better schematic is on the next picture. The 5V can be found on conn. U15 – pin 1.

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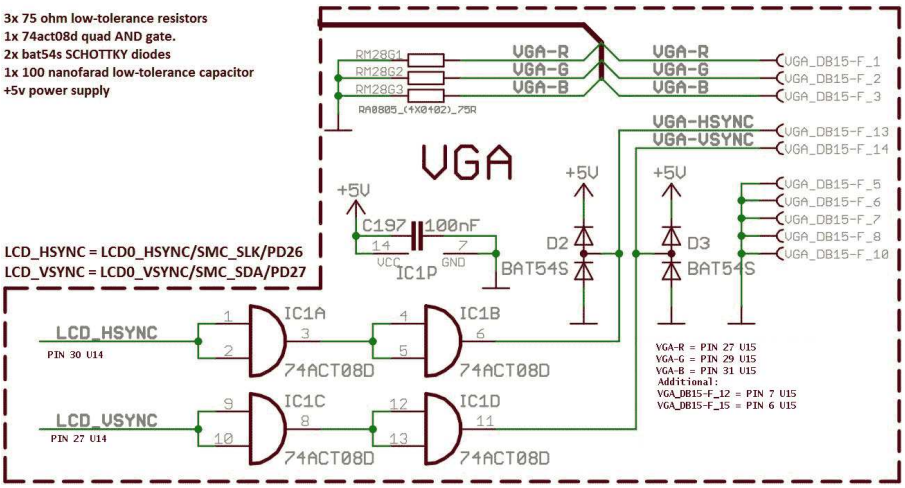

Sunxi-tools instalation

Install required packages

```
apt-get install libusb-1.0-0-dev pkg-config
```

download the sinxi-tools source and compile it

```
git clone git://github.com/linux-sunxi/sunxi-tools/
cd sunxi-tools
make
```

VGA output configuration

Backup the script.bin

```
cp /boot/script.bin /boot/script.bin.bck
```

Convert the script.bin into .fex file (text config file)

```
./bin2fex /boot/script.bin /boot/script.fex
```

Open the script.fex with some text editor

```
nano /boot/script.fex
```

Find the block starting with „[disp_init]“ and edit the lines by following values:

- **disp_init_enable:** 0 to disable;**1 to enable**
- **disp_mode**: Display mode to use:

Value	Mode
0	**screen0(screen0, fb0)**
1	screen1(screen1, fb0)
2	two_diff_screen_diff_contents(screen0, screen1, fb0, fb1)
3	two_same_screen_diff_contents(screen0, screen1, fb0)
4	two_diff_screen_same_contents(screen0, screen1, fb0)

- **screen0_output_type:** Output type for screen0:

Value	Type

0	none
1	lcd
2	tv
3	hdmi
4	**vga**

- **screen1_output_type:** Output type for screen1: same as previous
- **screen0_output_mode:** Output mode for screen0:

Mode	Used for tv/hdmi output	Used for vga output
0	480i	1680*1050
1	576i	1440*900
2	480p	1360*768
3	576p	1280*1024
4	**720p50**	**1024*768**
5	720p60	800*600
6	1080i50	640*480
7	1080i60	
8	1080p24	
9	1080p50	
10	1080p60	1920*1080
11	pal	1280*720
14	ntsc	

- **screen1_output_mode:** Output mode for screen1: same as previous
- **fb0_framebuffer_num:** fb0 buffer number, **use 2 for double buffering**
- **fb1_framebuffer_num:** fb1 buffer number, **use 2 for double buffering**
- **fb0_format:** pixel format for fb0:

Value	Format
4	RGB655
5	RGB565
6	RGB556
7	ARGB1555
8	RGBA5551
9	RGB888
10	**ARGB8888**
12	ARGB4444

- **fb1_format:** pixel format for fb1: same as previous
- **fb0_pixel_sequence:** fb0 pixel sequence (0 generally for linux, 2 for android):

Value	Sequence

0	ARGB
1	BGRA
2	ABGR
3	RGBA

- **fb1_pixel_sequence:** fb1 pixel sequence (0 generally for linux, 2 for android): same as previous
- **fb0_scaler_mode_enable:** 0 to disable; **1 to enable**
- **fb0_scaler_mode_enable:** 0 to disable; **1 to enable**

so the part of .fex file can look like this:

```
[disp_init]
disp_init_enable = 1
disp_mode = 0
screen0_output_type = 4
screen0_output_mode = 4
screen1_output_type = 2
screen1_output_mode = 14
fb0_framebuffer_num = 2
fb0_format = 10
fb0_pixel_sequence = 0
fb0_scaler_mode_enable = 1
fb1_framebuffer_num = 2
fb1_format = 10
fb1_pixel_sequence = 0
fb1_scaler_mode_enable = 1
```

It is configured for vga output with resolution 1024x768 on screen0 with framebuffer tb0 double buffered. The screen1 is disabled by „disp_mode=0“ and screen1 parameters are ignored.

Convert the edited script.fex back into .bin file

```
./fex2bin /boot/script.fex /boot/script.bin
```

Turn of the cubieboard

```
shutdown -h now
```

and then disconnect the powerplug for a few seconds and connect it back. Now you should see the booting cubian system on your VGA monitor.

Useful links

Fex Guide: http://linux-sunxi.org/Fex_Guide#.5Bdisp_init.5D

Sunxi-tools: http://linux-sunxi.org/Sunxi-tools#Building

Forum thread about vga: http://www.cubieforums.com/index.php/topic,104.0.html

Other vga tutorial: http://taqlim.blogspot.de/2013/04/vga-out-for-cubieboard.html