

- Altera EP1C6 Q240C8N L BCE9S0719A
- Altera EPM3128 ATC100-10N
- Samsung K4S643232H-UC60
- JYEC 80 Mhz
- T61117

0x00000000 [0,0]

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## EP1C6

### Configuration Scheme

```
0 0 AS
1 0 PS
1 1 JTAG
```

## Quantus

EP1C needs Quantus II 11 web pack (last supported) in squeeze chroot

```
root@nuc:/nuc# debootstrap --arch i386 squeeze altera-squeeze http://archive.debian.org/debian
$ sudo mount blue:/bluez/FPGA/Altera-x300/11.0spl_quartus_free_linux /nuc/altera-squeeze/mnt/
```

```
# mount /proc into chroot
# chroot into it
```

```
root@altera:/mnt$ bash setup --help
```

```
apt-get install -y `bash /mnt/setup --help 2>&1 | grep 'cannot open shared object file' | cut -d:
```

if setup dies, look at log in /tmp/ and continue installation of families:

```
140 "/root/altera/11.0sp1/quartus/bin/quartus_sh" --qinstall -qda "/mnt/altera_installer/bin/.
141 "/root/altera/11.0sp1/quartus/bin/quartus_sh" --qinstall -qda "/mnt/altera_installer/bin/.
```

try to start

```
root@altera:/$ /root/altera/11.0sp1/quartus/bin/quartus
quartus: error while loading shared libraries: libpng12.so.0: cannot open shared object file: No
```

or

[http://download.altera.com/akdlm/software/acdsinst/13.0sp1/232/ib\\_installers/cyclone-13.0.1.232.qdz](http://download.altera.com/akdlm/software/acdsinst/13.0sp1/232/ib_installers/cyclone-13.0.1.232.qdz)

Quartus II 13.0.1.232 tries to open following device files:

```
dpavlin@blue:/bluez/FPGA/Altera-x300$ grep qdz /tmp/foo
lstat64("/bluez/FPGA/Altera-x300/arria_web-13.0.1.232.qdz", 0xff9b166c) = -1 ENOENT (No such file
lstat64("/bluez/FPGA/Altera-x300/cyclone_web-13.0.1.232.qdz", 0xff9b166c) = -1 ENOENT (No such fi
lstat64("/bluez/FPGA/Altera-x300/cyclonev-13.0.1.232.qdz", 0xff9b166c) = -1 ENOENT (No such file
lstat64("/bluez/FPGA/Altera-x300/max_web-13.0.1.232.qdz", 0xff9b166c) = -1 ENOENT (No such file o
```

## pinout

- <https://docs.google.com/spreadsheets/d/1ecJCOOo5Ake2j6uSbuVpluRWHWXim99me3aXbe0EV-o/>

## JTAG

### openocd

```
pi@picam /nuc/picam/x300-pci $ sudo openocd -f raspberrypi-native.cfg
Open On-Chip Debugger 0.10.0-dev-00024-gd28ab08 (2015-09-12-02:20)
Licensed under GNU GPL v2
For bug reports, read
    http://openocd.org/doc/doxygen/bugs.html
BCM2835 GPIO config: tck = 4, tms = 27, tdi = 22, tdo = 17
BCM2835 GPIO config: trst = 18
trst_only separate trst_push_pull
adapter speed: 100 kHz
jtag
Info : BCM2835 GPIO JTAG/SWD bitbang driver
Info : JTAG only mode enabled (specify swclk and swdio gpio to add SWD mode)
Info : clock speed 100 kHz
Warn : There are no enabled taps.  AUTO PROBING MIGHT NOT WORK!!
Info : JTAG tap: auto0.tap tap/device found: 0x171280dd (mfg: 0x06e, part: 0x7128, ver: 0x1)
Warn : AUTO auto0.tap - use "jtag newtap auto0 tap -irlen 2 -expected-id 0x171280dd"
Error: IR capture error at bit 2, saw 0x3FFFFFFFFFFFFD55 not 0x...3
Warn : Bypassing JTAG setup events due to errors
Warn : gdb services need one or more targets defined
```

OK, let's try config:

```
# XXX dpavlin x300 pci
bcm2835gpio_jtag_nums 4 27 22 17

# not really used for altera jtag, but we have to define it to make openocd happy
bcm2835gpio_trst_num 18
# reset_config trst_only
reset_config none

adapter_khz 30
transport select jtag

jtag newtap x300pci tap -irlen 10 -expected-id 0x171280dd -irmask 0x3 -ircapture 0x1
```

## urjtag bug with gpio pin 4

using urjtag has bug which doesn't allow usage of pin 4 for anything (DUH!)

following patch fixes this problem:

```
--- a/urjtag/src/tap/cable/gpio.c
+++ b/urjtag/src/tap/cable/gpio.c
@@ -45,11 +45,11 @@
 
 /* pin mapping */
 enum {
-    GPIO_TDI = 0,
+    GPIO_REQUIRED = 0,
+    GPIO_TDI,
+    GPIO_TCK,
+    GPIO_TMS,
-    GPIO_TDO,
-    GPIO_REQUIRED
+    GPIO_TDO
 };

typedef struct {
```

## run urjtag

```
pi@picam ~/x300-pci $ sudo jtag

jtag> cable gpio help
Usage: cable gpio tdi=<gpio_tdi> tdo=<gpio_tdo> tck=<gpio_tck> tms=<gpio_tms>

# it seems that tck pin is not accepted!
jtag> cable gpio tck=4 tdo=17 tms=27 tdi=22
```

```
jtag> cable gpio tms=27 tdi=22 tdo=17 tck=4
```

## urjtag + usbblaster

```
jtag> cable usbbldster
Connected to libftdi driver.
jtag> detect
IR length: 10
Chain length: 1
Device Id: 00010111000100101000000011011101 (0x171280DD)
  Manufacturer: Altera (0x0DD)
  Part(0):      EPM7128AETC100 (0x7128)
  Stepping:     1
  Filename:     /usr/local/share/urjtag/altera/epm7128aetcl00/epm7128aetcl00
```

```
jtag> discovery
```

```
Detecting DR length for IR 0000000000 ... 288
Detecting DR length for IR 0000000111 ... 32
Detecting DR length for IR 0001010101 ... 288
Detecting DR length for IR 0001011001 ... 32
```

## dump all pin states

```
dpavlin@nuc:~$ cat epm3l28-pins.sh
( grep signal /usr/local/share/urjtag/altera/epm7128aetcl00/epm7128aetcl00
| echo -e "cable usbblaster\ndetect\ninstruction SAMPLE/PRELOAD\nshift ir\nshift dr\n$(cat | sed
| sudo jtag ) | tee pins.`date +%Y-%m-%d_%H:%M:%S`
```

# instruction

```
jtag> instruction usercode
jtag> shift ir
jtag> shift dr
jtag> dr
111111111111111111111111111111111111 (0xFFFFFFFF)
jtag>
```

```
jtag> instruction extest
jtag> shift ir
jtag> shift dr
jtag> dr
```

```
jtag> print
```

No.	Manufacturer	Part	Stepping	Instruction	Register
0	Altera	EPM7128AETC100	1	EXTEST	BSR

