CRZ S3C6410 Mango6410-R2 Enviroment and Boot Mode

http://www.mangoboard.com/
http://cafe.naver.com/embeddedcrazyboys
Crazy Embedded Laboratory

Document History

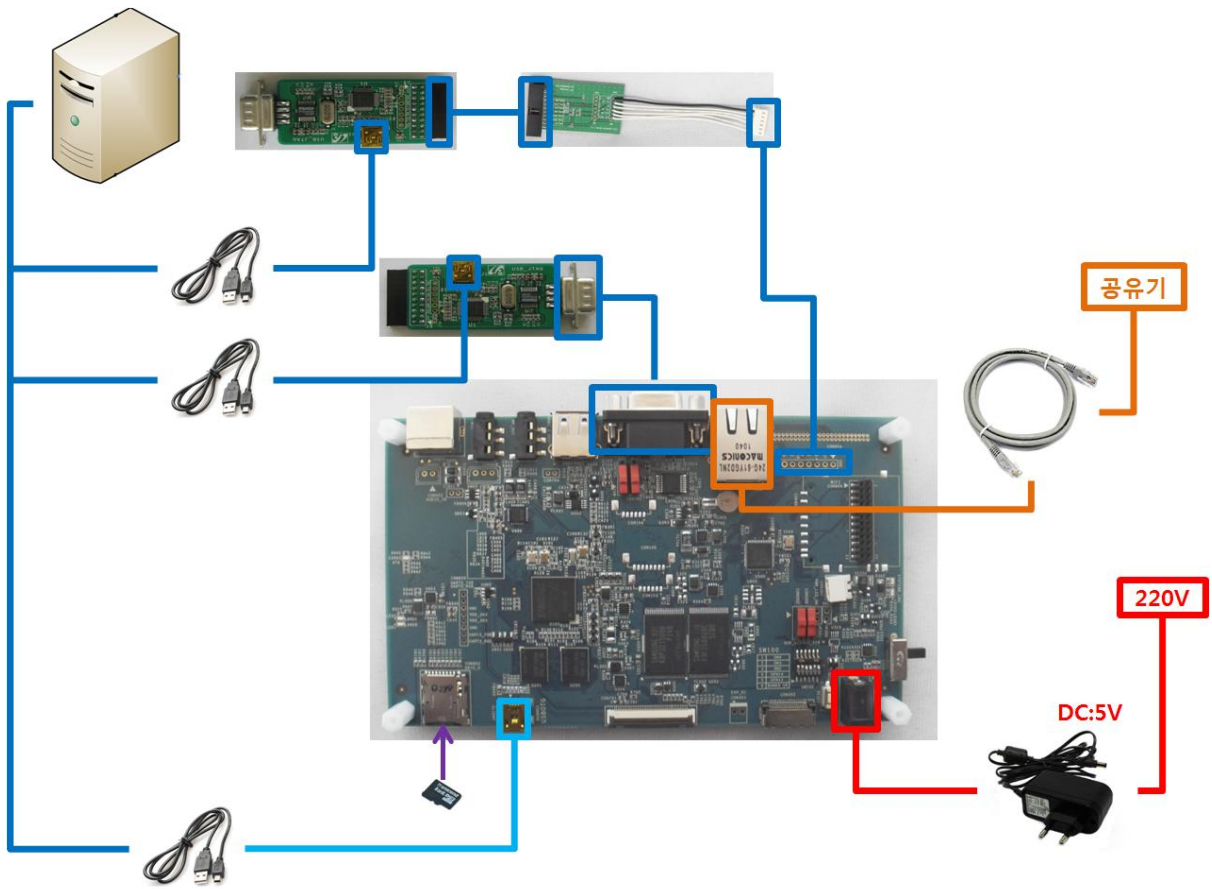
Revision	Date	Change note

목차

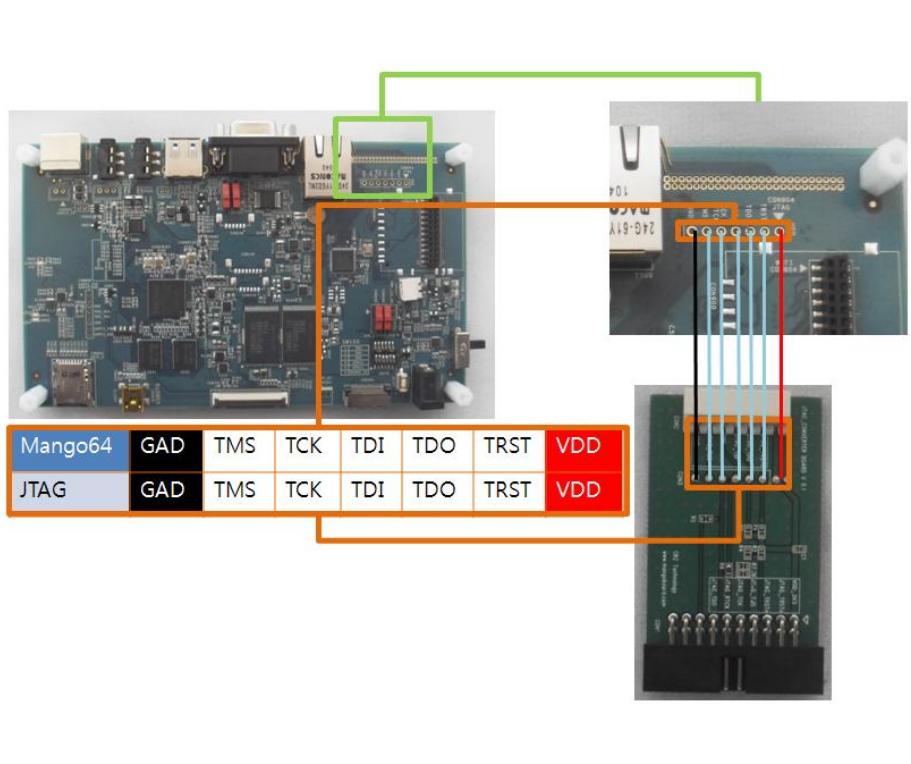
1. S3C6410 Mango-R6410 환경구성 및 부팅모드

1.1. Mango_R6410 연결

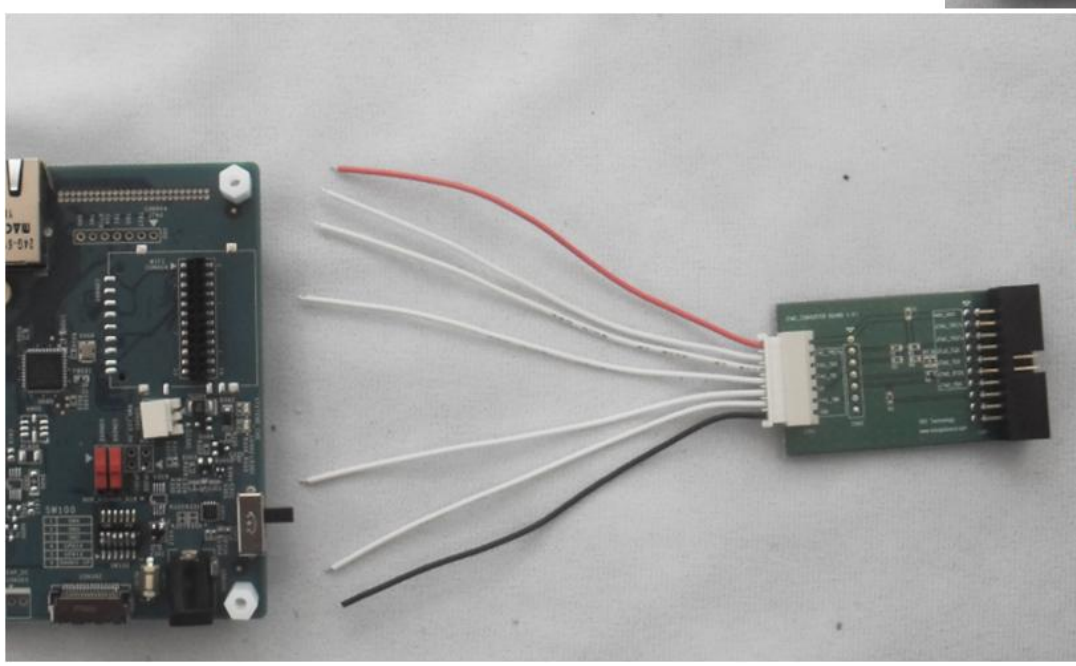
1.1.1. 전체연결

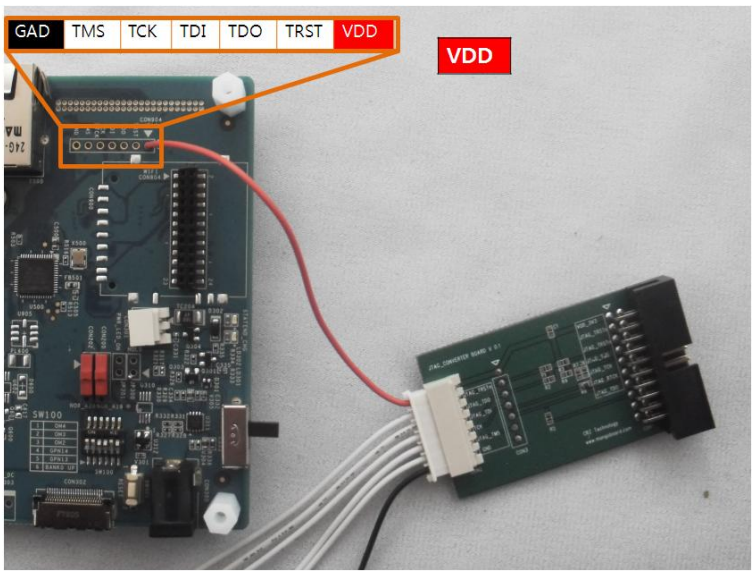


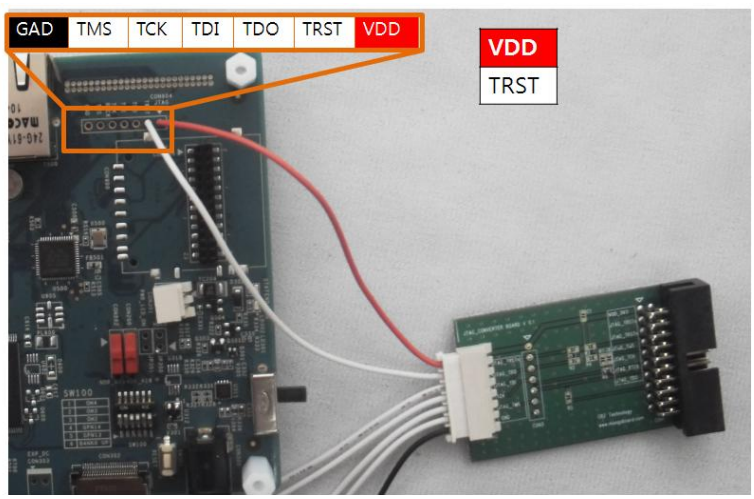
1.1.2. JTAG 연결

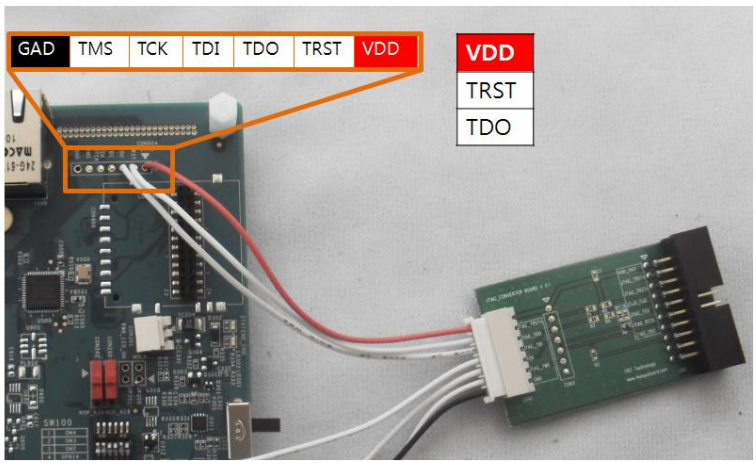


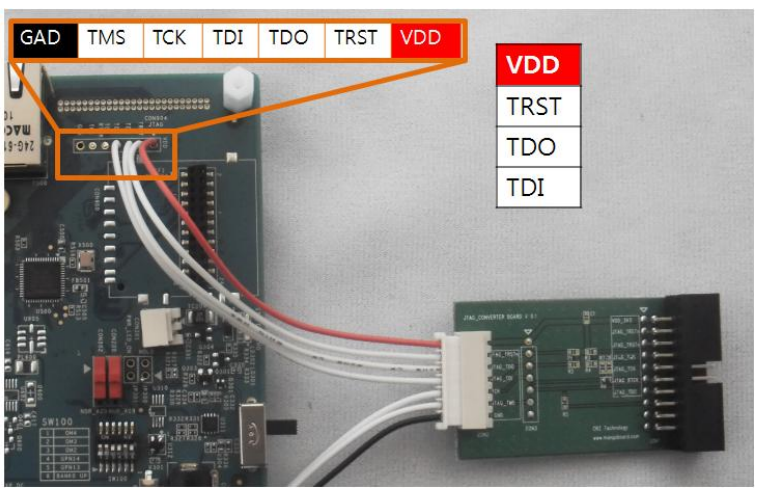
Mango64	GAD	TMS	TCK	TDI	TDO	TRST	VDD
JTAG	GAD	TMS	TCK	TDI	TDO	TRST	VDD

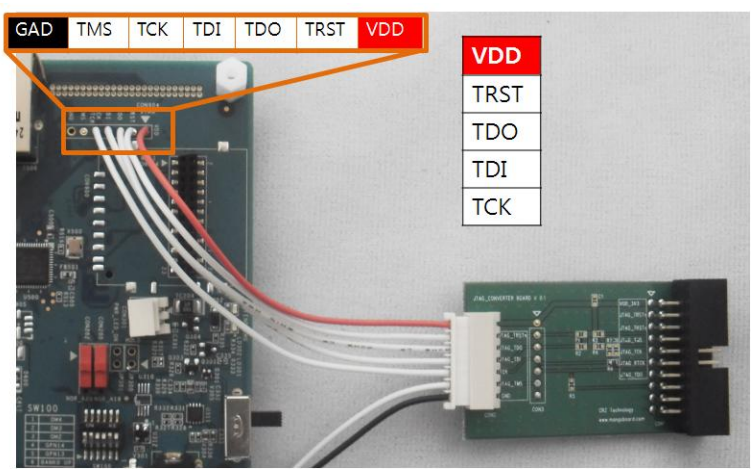


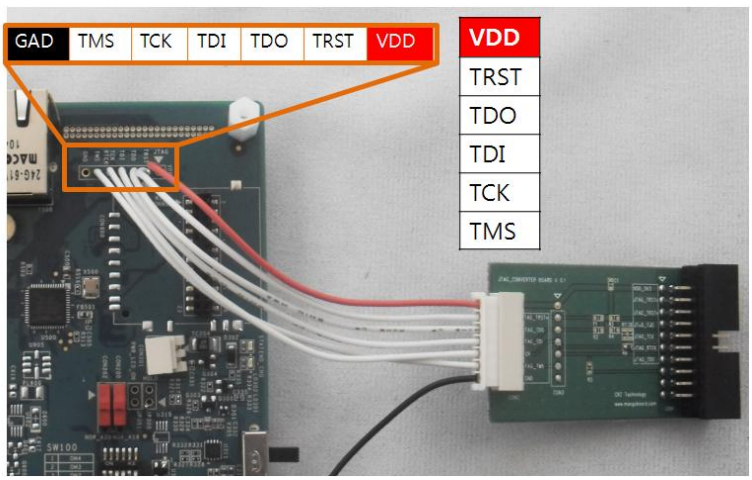

GAD
TMS
TCK
TDI
TDO
TRST
VDD
VDD

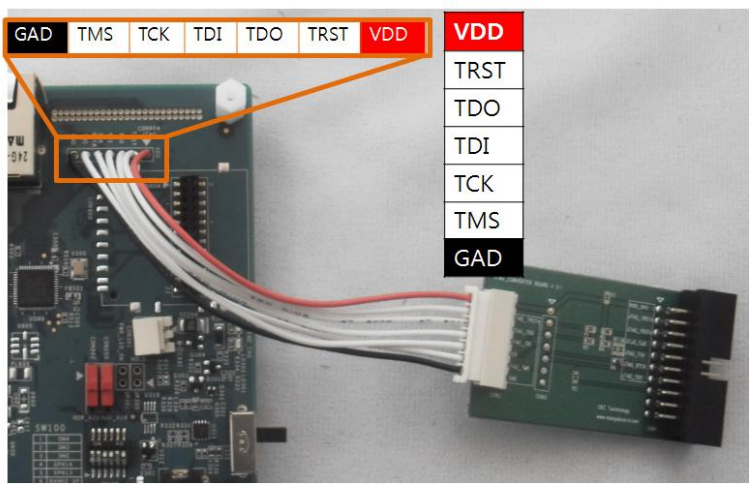

GAD
TMS
TCK
TDI
TDO
TRST
VDD
VDD
TRST


GAD
TMS
TCK
TDI
TDO
TRST
VDD
VDD
TRST
TDO


GAD
TMS
TCK
TDI
TDO
TRST
VDD
VDD
TRST
TDO
TDI

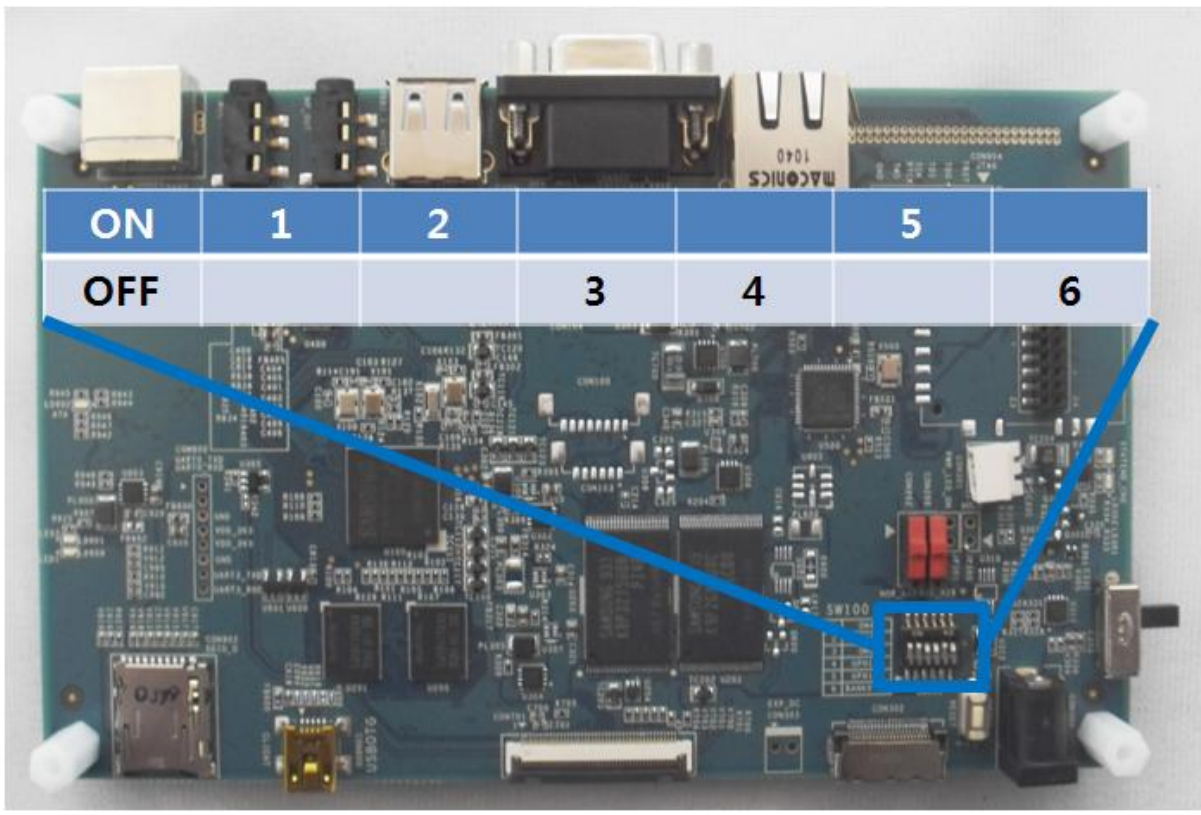

GAD
TMS
TCK
TDI
TDO
TRST
VDD
VDD
TRST
TDO
TDI
TCK


GAD
TMS
TCK
TDI
TDO
TRST
VDD
VDD
TRST
TDO
TDI
TCK
TMS

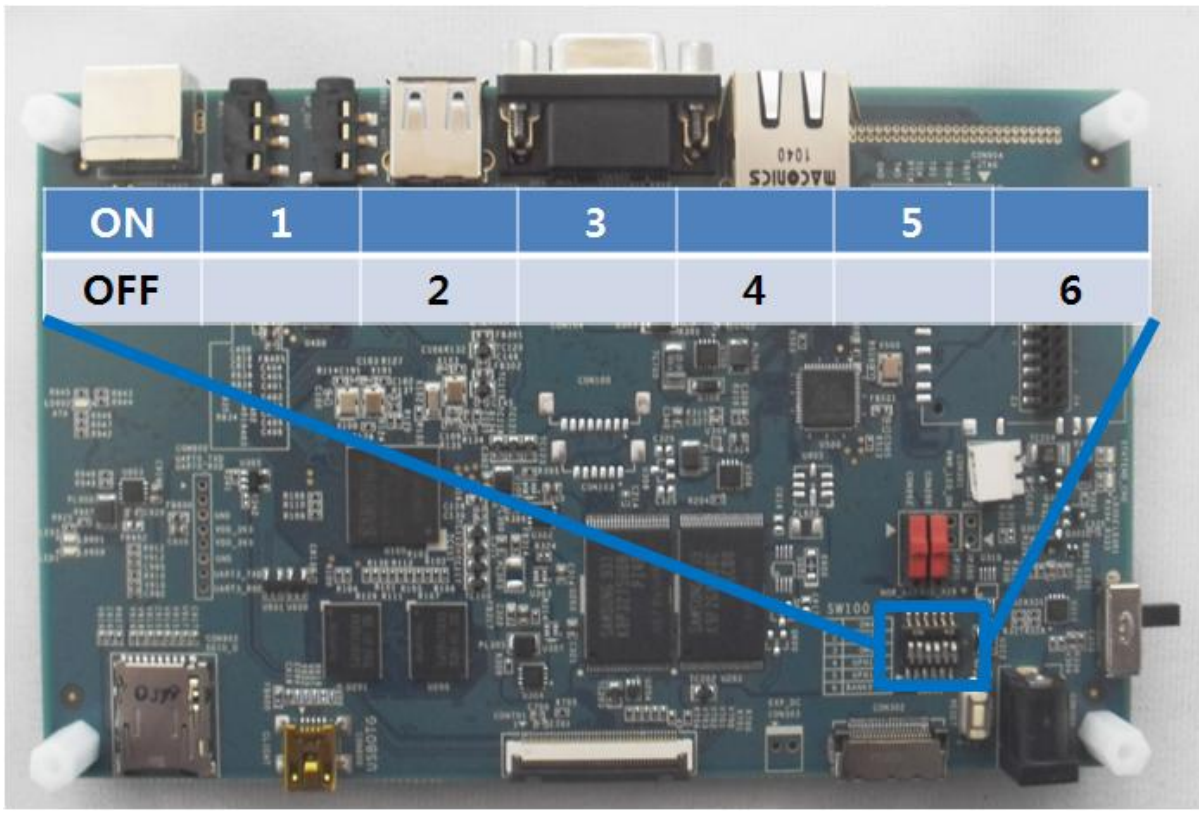

GAD
TMS
TCK
TDI
TDO
TRST
VDD
VDD
TRST
TDO
TDI
TCK
TMS
GAD

1.2. Mango_R6410 부팅모드 설정

1.2.1. NAND Boot



1.2.2. NOR Boot



1.3. Nor Flash Write하기

1.3.1. 환경구성

버전은 Openocd 0.1.0 버전입니다.

```
> version
Open On-Chip Debugger 1.0 (2009-04-30-01:48) svn:1547
```

망고64 보드를 Nor Flash boot Mode로 SW100 스위치를 변경 및 shunt switch CON202,CON200을 0,1로 변경을 해야 합니다.

1.3.2. OponOCD 연결하기

그리고, 보드에 FT2232 usb jtag 보드를 연결합니다.

전원을 인가 후 Dos Command창을 실행합니다.

물론 , openocd.exe 파일이 있는 디렉토리에서 실행해야 합니다.

첨부파일에서

>openocd.exe –f mango64nor.cfg

입력하면 됩니다.

```
J:₩Mango_project₩Work₩Mango-JTAG₩Mango64-OpenOCD-Cygwin-091210>openocd.exe -f mango64nor.cfg
Open On-Chip Debugger 1.0 (2009-04-30-01:48) svn:1547


BUGS? Read http://svn.berlios.de/svnroot/repos/openocd/trunk/BUGS


$URL: svn://svn.berlios.de/openocd/trunk/src/openocd.c $
jtag_speed: 5
1000 kHz
Info : JTAG tap: s3c6410.unknown tap/device found: 0x2b900f0f (Manufacturer: 0x787, Part: 0xb900, Version: 0x2)
Info : JTAG Tap/device matched
Info : JTAG tap: s3c6410.cpu tap/device found: 0x07b76f0f (Manufacturer: 0x787, Part: 0x7b76, Version: 0x0)
Info : JTAG Tap/device matched
Info : found ARM1176
Warn : no telnet port specified, using default port 4444
Warn : no gdb port specified, using default port 3333
Warn : no tcl port specified, using default port 6666
Info : accepting 'telnet' connection from 0
Open On-Chip Debugger 1.0 (2009-04-30-01:48) svn:1547
```

openocd 실행

Mango64nor.cfg 파일을 살펴보면,

```
source [find ./mango64.cfg]
$_TARGETNAME configure -work-area-phys 0x0c000000 -work-area-size 0x2000
flash bank cfi 0x00000000 0x00400000 2 2 $_TARGETNAME
```

mango64nor.cfg

위의 내용을 살펴보면,

$_TARGETNAME configure -work-area-phys 0x0c000000 -work-area-size 0x2000

은 OpenOCD가 steppingstone(SRAM) 영역을 사용하겠다는 의미 입니다.

flash bank cfi 0x00000000 0x00400000 2 2 $_TARGETNAME

CFI(Common Flash interface) 의 약자입니다.

0x00000000: 시작 address(정하기 나름)

0x00400000 : 망고64에 달려있는 Flash Size입니다.

2 : flash chip width

2: bus width

$_TARGETNAME : target

http://openocd.berlios.de/doc/html/Flash-Commands.html

에 자세히 설명이 나와 있습니다.

또 다른 DOS Command 창을 실행 후

>telnet localhost 4444

실행합니다.

실행 후

1.3.3. Flash 정보 보기

>flash banks

명령을 입력합니다.

```
> flash banks
#0: cfi at 0x00000000, size 0x00400000, buswidth 2, chipwidth 2
>
```

flash banks 실행모습

#0 : 현재 연결 된 bank number입니다.

>flash probe 0

명령을 수행합니다.

```
> flash probe 0
Target not halted
unknown error when probing flash bank '#0' at 0x00000000

> halt
Debug entry: JTAG HALT
target state: halted
target halted due to debug-request
cpsr: 0x000001db pc: 0x00000004

> flash probe 0
Flash Manufacturer/Device: 0x00ec 0x257e
flash 'cfi' found at 0x00000000
```

flash probe 실행모습

Flash에 Manufacture/Device 값을 읽어 옵니다.

이것은 flash(K8P3215UQB)의 datasheet를 참조하시면 됩니다.

Table 7. K8P3215UQB Autoselect Codes, (High Voltage Method)

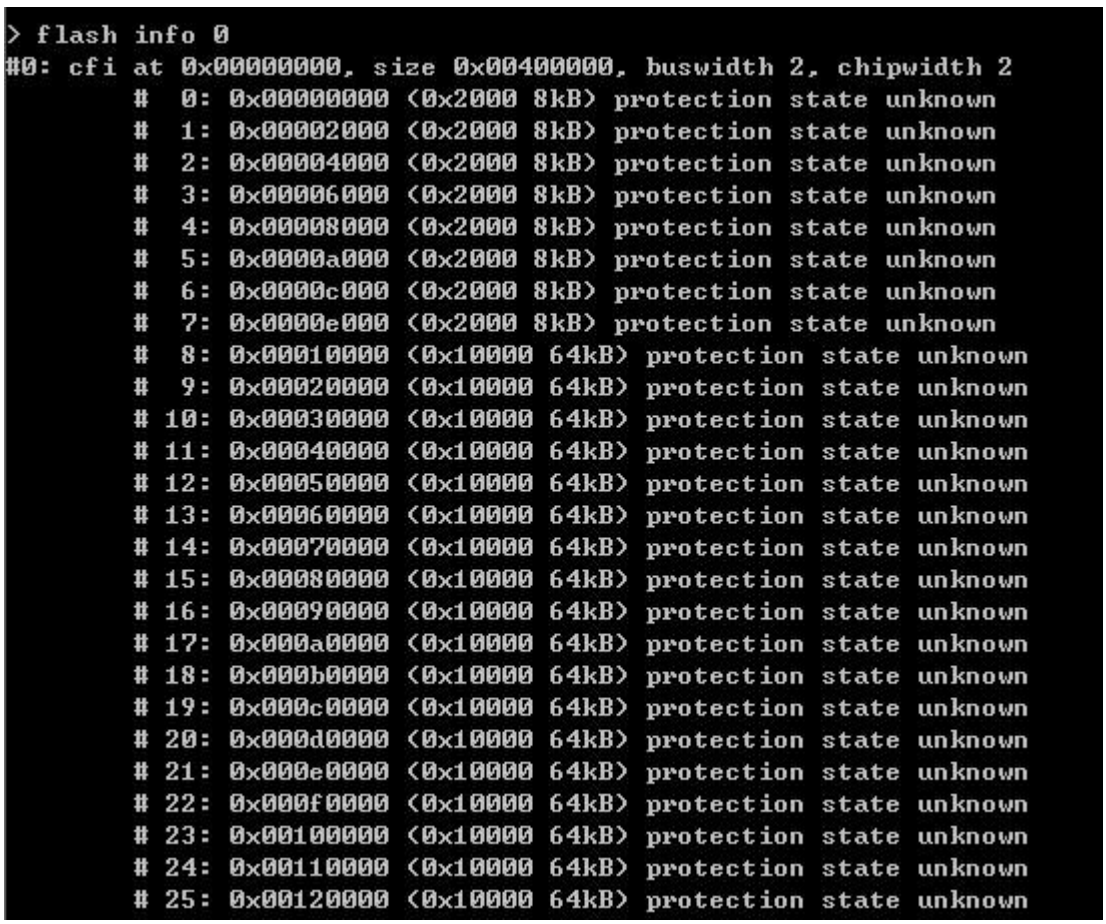
Description		$\overline{CE}$	$\overline{OE}$	$\overline{WE}$	A20 to A12	A10	A9	A8	A7	A6	A5 to A4	A3	A2	A1	A0	DQ15 to DQ8	DQ7 to DQ0
Manufacturer ID		L	L	H	DA	X	Vio	X	L	L	X	L	L	L	L	X	ECH
Device ID	Read Cycle 1	L	L	H	DA	X	Vio	X	L	L	L	L	L	L	H	25H	7EH
	Read Cycle 2											H	H	H	L	25H	03H
	Read Cycle 3											H	H	H	H	25H	01H

Manufacturer ID는 0xEC 이고, Device ID는 0x257E 라는 것을 알 수가 있습니다.

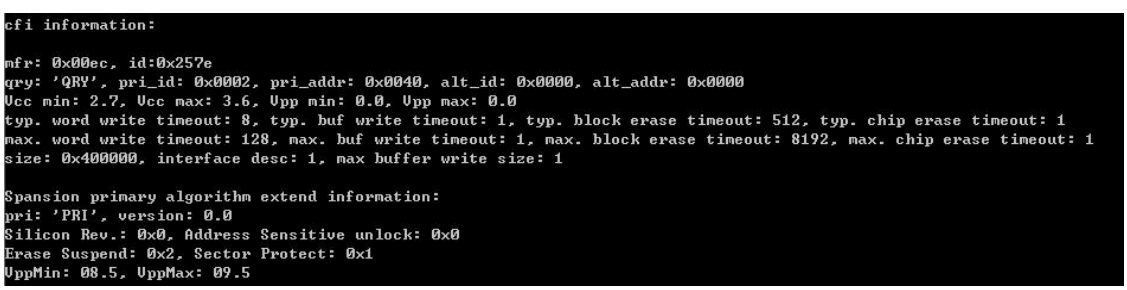
명령을 수행한 값과 동일하다는 것을 알 수 있습니다.

>flash info 0

명령을 수행 해 보겠습니다.



flash info 실행모습



flash info 실행모습 2

훨씬 많은 정보를 볼수가 있습니다. Manufacture ID와 VCC 전압까지 나오고,
Spansions primary algorithm을 사용 했다는 내용까지 나옵니다.
멋집니다.

1.3.4. Flash 정보 및 erase 하기

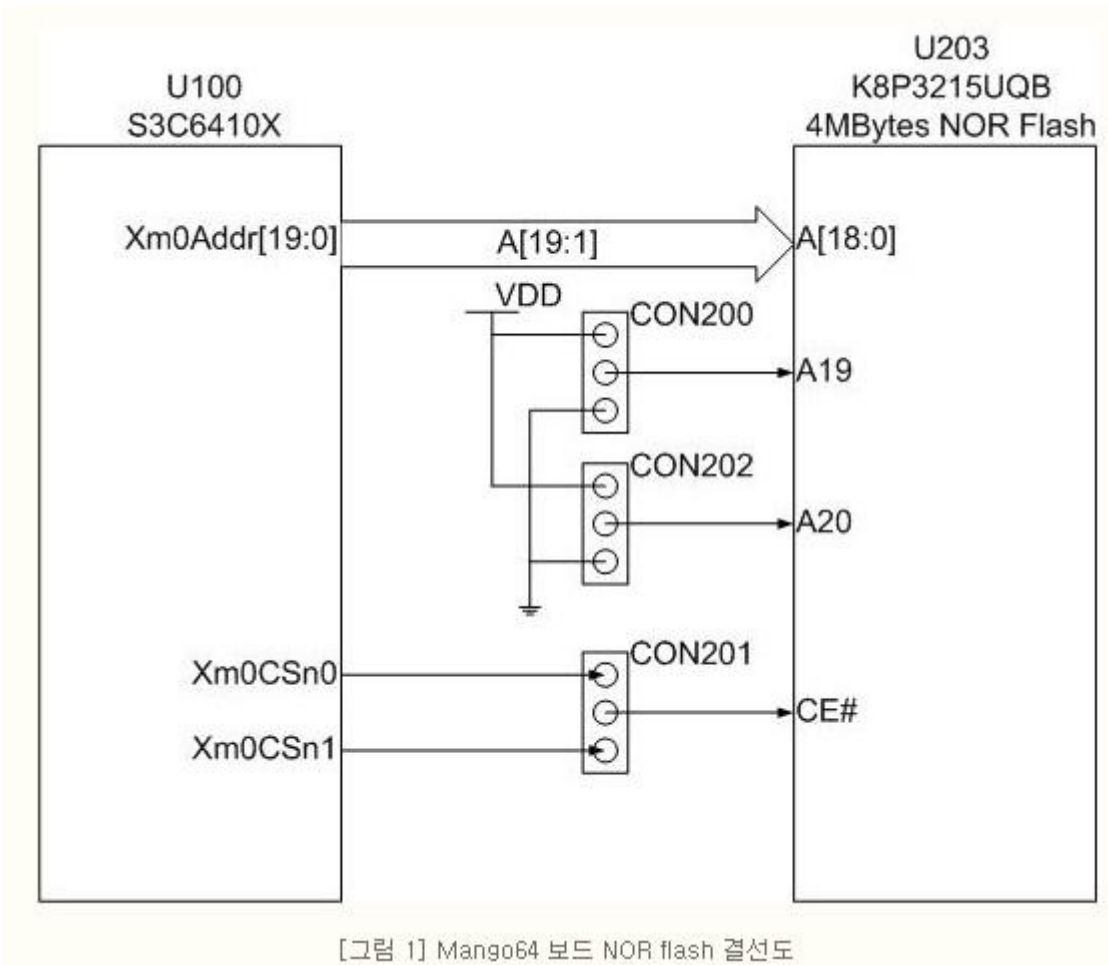
>flash info 0

명령으로 보면, 23번 sector부터 1Mbyte가 시작됩니다.

현재 Shunt Switch를 조정을 해 놓았기 때문에 0x00100000부터 Write하면,됩니다.

http://cafe.naver.com/embeddedcrazyboys/1606

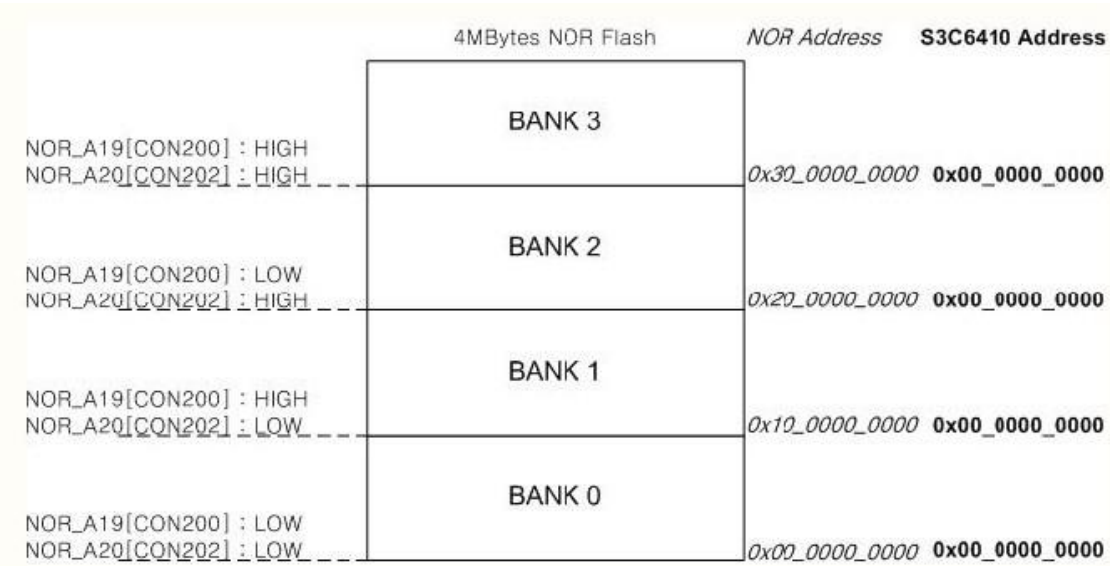
참조 하시기 바랍니다.



[그림 1] Mango64 보드 NOR flash 결선도

Mango64 보드 Nor Flash 결선도

Nor flash 메모리 MAP을 살펴보면 아래와 같습니다.



[그림 2] NOR Flash 주소 공간 분할 구조

NOR Flash 주소 분할 구조

결국, S3C6410입장에서는 시작번지는 0입니다. 현재 CON200: High, CON202: Low 상태로 해 놓았습니다.

>flash erase_address 0x00100000 0x10000

명령을 살펴보면, 0x00100000 시작해서, 0x10000(64KB) 만큼 erase합니다.

64KB만 erase하는 이유는 6410nor.bin 이 51436Byte 사이즈이기 때문입니다.

대충 봐도 64KB를 넘지 않습니다.

```
> flash erase_address 0x00100000 0x10000
erased address 0x00100000 length 65536 in 0.469000s
```

flash erase address 실행모습

또 다른 방법은 Block Number로 지우는 방법입니다.

```
> flash info 0
#0: cfi at 0x00000000, size 0x00400000, buswidth 2, chipwidth 2
        #  0: 0x00000000 (0x2000 8kB) protection state unknown
        #  1: 0x00002000 (0x2000 8kB) protection state unknown
        #  2: 0x00004000 (0x2000 8kB) protection state unknown
        #  3: 0x00006000 (0x2000 8kB) protection state unknown
        #  4: 0x00008000 (0x2000 8kB) protection state unknown
        #  5: 0x0000a000 (0x2000 8kB) protection state unknown
        #  6: 0x0000c000 (0x2000 8kB) protection state unknown
        #  7: 0x0000e000 (0x2000 8kB) protection state unknown
        #  8: 0x00010000 (0x10000 64kB) protection state unknown
        #  9: 0x00020000 (0x10000 64kB) protection state unknown
        # 10: 0x00030000 (0x10000 64kB) protection state unknown
        # 11: 0x00040000 (0x10000 64kB) protection state unknown
        # 12: 0x00050000 (0x10000 64kB) protection state unknown
        # 13: 0x00060000 (0x10000 64kB) protection state unknown
        # 14: 0x00070000 (0x10000 64kB) protection state unknown
        # 15: 0x00080000 (0x10000 64kB) protection state unknown
        # 16: 0x00090000 (0x10000 64kB) protection state unknown
        # 17: 0x000a0000 (0x10000 64kB) protection state unknown
        # 18: 0x000b0000 (0x10000 64kB) protection state unknown
        # 19: 0x000c0000 (0x10000 64kB) protection state unknown
        # 20: 0x000d0000 (0x10000 64kB) protection state unknown
        # 21: 0x000e0000 (0x10000 64kB) protection state unknown
        # 22: 0x000f0000 (0x10000 64kB) protection state unknown
        # 23: 0x00100000 (0x10000 64kB) protection state unknown
        # 24: 0x00110000 (0x10000 64kB) protection state unknown
        # 25: 0x00120000 (0x10000 64kB) protection state unknown
```

block number 23

Block Number 23이 64Kbyte를 영역을 가지고 있습니다.

>flash erase_sector 0 23 23

하면 됩니다. 명령 형식은 아래와 같습니다.

```
flash erase_address         erase address range <address> <length>
flash erase_check           check erase state of sectors in flash bank <num>
flash erase_sector          erase sectors at <bank> <first> <last>
```

flash erase sector 형식

실행 결과 입니다.

```
> flash erase_sector 0 23 23
erased sectors 23 through 23 on flash bank 0 in 0.500000s
```

flash erase sector 결과

1.3.5. Flash 에 Write하기

명령은

>flash write_bank 0 6410nor.bin 0x100000

```
flash write_bank          write binary data to <bank> <file> <offset>
```

flash bank write 형식

살펴 보면, bank은

>flash banks 명령을 보면 0입니다.

File은 PC에 6410nor.bin 파일이름을 입력합니다.

Offset은 0x100000가 Write하기 위한 시작 address입니다.

실행 결과

```
> flash write_bank 0 6410nor.bin 0x100000
not enough working area available(requested 32768, free 8096)
not enough working area available(requested 16384, free 8096)
not enough working area available(requested 8192, free 8096)
Debug entry: breakpoint
target state: halted
target halted due to breakpoint
cpsr: 0x600001d3 pc: 0x0c00005c
Debug entry: breakpoint
target state: halted
target halted due to breakpoint
cpsr: 0x600001d3 pc: 0x0c00005c
```

flash bank write 실행 결과

1.3.6. Verify image 하기

명령은

>verify_image 6410nor.bin 0x00100000 bin

명령 형식을 보면,

```
verify_image              verify_image <file> [offset] [type]
```

verify_image 형식

<file> : flash에 Write한 이미지 이름

<offset>: Write 시작 address

<type>: binary,axf, 등 format형태

실행 결과

```
> verify_image 6410nor.bin 0x00100000 bin
checksum mismatch - attempting binary compare
BUG: keep_alive() was not invoked in the 1000ms timelimit. GDB alive packet not sent! (55484)
verified 51436 bytes in 55.437000s
```

verify 실행결과

또 다른 방법은

>dump_image nordump.bin 0x00100000 0x10000

명령으로 ,nordump.bin과 6410nor.bin을 비교해 보는 방법입니다.

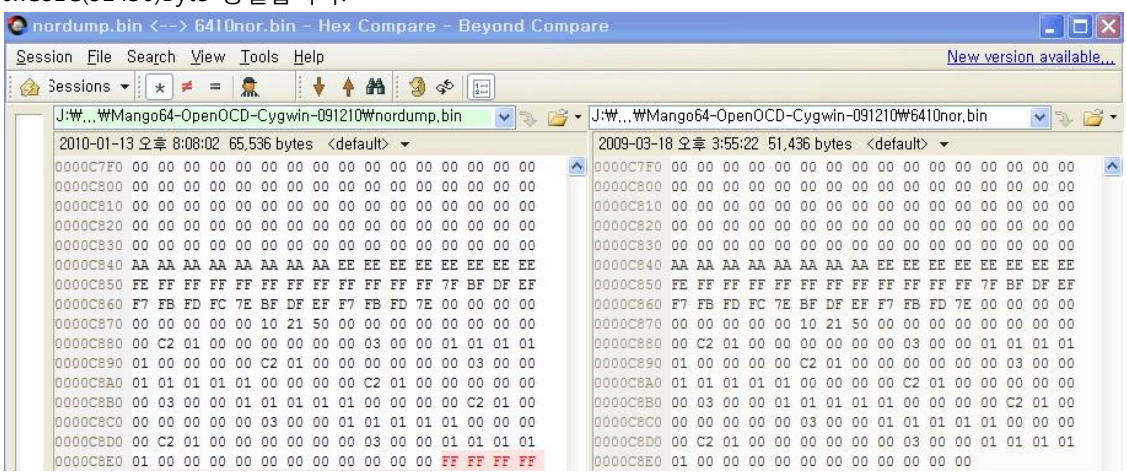
작은 이미지인 경우만 사용하세요. 이미지 크기가 크면, 하 세월입니다.

```
> dump_image nordump.bin 0x00100000 0x10000
dumped 65536 byte in 70.655998s
```

dump image 실행결과

Beyond Compare 프로그램으로 비교결과 값이 동일합니다.

0xC8EC(51436)Byte 동일합니다.



compare 결과