

# Mango64R3 How to NAND Flash Write

<http://www.mangoboard.com/>

<http://cafe.naver.com/embeddedcrazyboys>

Crazy Embedded Laboratory

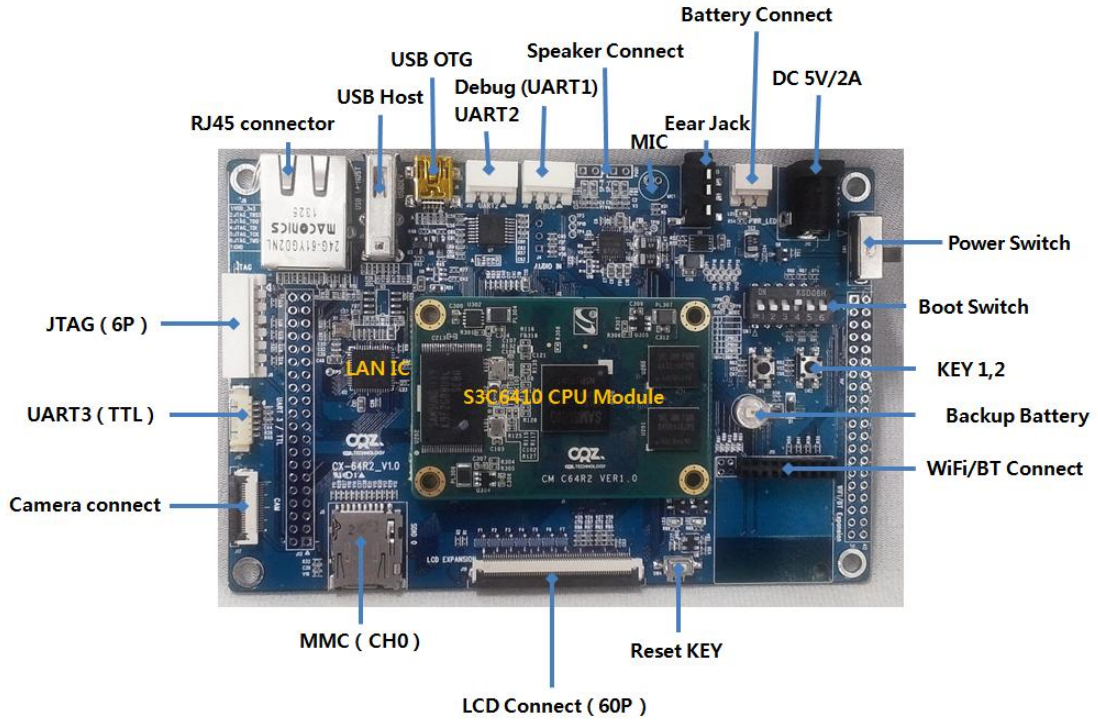
# Document History

Revision	Date	Change note

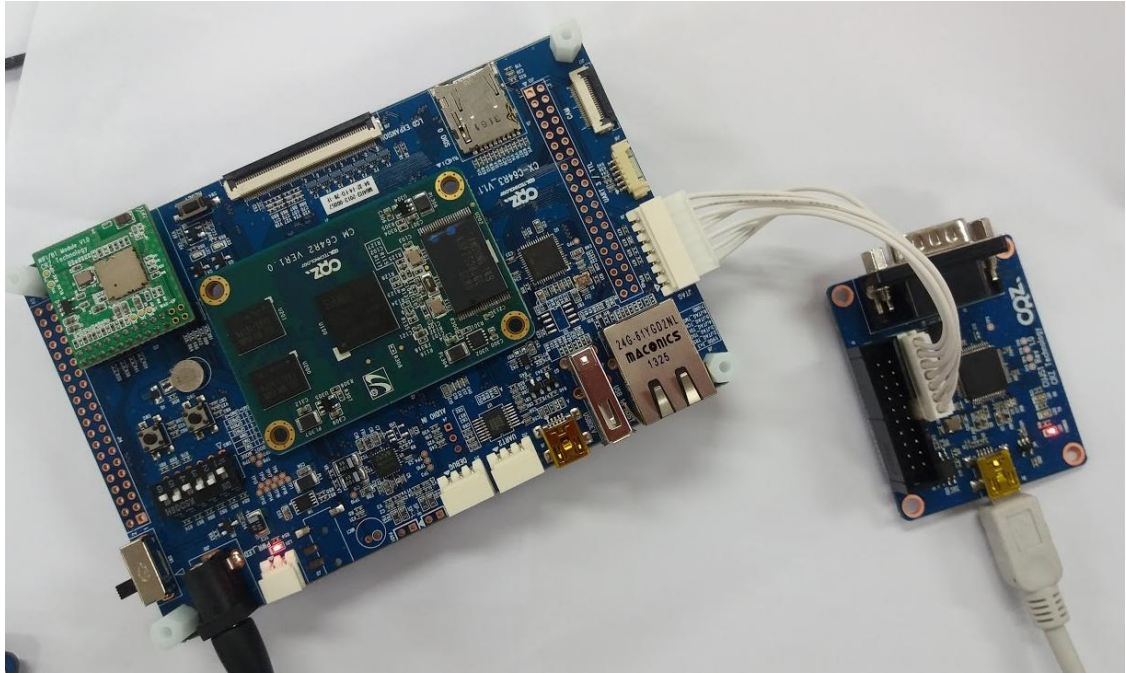
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# 1. Mango64R3 Connection

## 1.1. Mango64R3 부품배치도



## 1.2. Mango64R3 전원 및 Cable 연결 방법



보드에는 전원, 3pin Serial Cable(UART1 Port에 연결) , JTAG, Lan Cable를 연결합니다.

## 2. u-boot 이미지를 NAND Flash에 write하기

### 2.1. Openocd Program Download and run

Openocd 프로그램은 <http://crztech.ipstime.org:8080/Release/mango64R3/openocd/20131107/>

다운로드 합니다.

보드와 연결을 아래와 같이 합니다.

JTAG <-> FT2232 usb jtag 보드 <-> MINI USB cable <-> Host PC (Window PC )

압축을 푼 후

Mango64R3-OpenOCD-Cygwin 이동

도스 Command 창을 실행을 합니다.

```
$ openocd.exe -f mango64.cfg
```

아래와 같이 에러 발생 시 조치

```
C:\Mango64R3-OpenOCD-Cygwin>openocd.exe -f mango64.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
Warn : Unable to open FTDI Device tried: 'Dual RS232' and 'Dual RS232 A'
Error: unable to open ftdi device: 2
Error: ListDevices: 2
Error: 0: "Dual RS232-HS A"
Error: 1: "Dual RS232-HS B"
Runtime error, file "command.c", line 456:

C:\Mango64R3-OpenOCD-Cygwin>openocd.exe -f mango64.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
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
```

Mango64.cfg파일에서 아래와 같이 수정한다.

```
#ft2232_device_desc "Dual RS232 A"
ft2232_device_desc "Dual RS232-HS A"
```

실행을 합니다.

실행 결과

```
y:\work\mango64R3\Mango64R3-OpenOCD-Cygwin>openocd.exe -f mango64.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
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
```

## 2.2. How to Connection Telnet

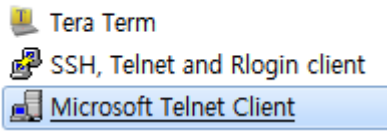
또 다른 command 창을 실행을 합니다.

Window XP 32 bit에서는 아래와 같이 실행합니다.

```
$ telnet localhost 4444
```

Window 7 64bit에서는 아래와 같이 실행합니다.

프로그램 (7)



```
$ open localhost 4444
```

입력 후 실행합니다.

아래는 실행 결과

```
Open On-Chip Debugger
>
```

## 2.3. How to run a script

“mango64-uboot.tcl” 스크립트를 실행하기 전에 터미널 프로그램을 실행합니다.

```
script mango64-uboot.tcl
```

입력을 합니다. Enter를 입력합니다.

실행 결과

```
> script mango64-uboot.tcl
JTAG tap: s3c6410.unknown tap/device found: 0x2b900f0f (Manufacturer: 0x787, Part: 0xb900, Version: 0x2)
JTAG Tap/device matched
JTAG tap: s3c6410.cpu tap/device found: 0x07b76f0f (Manufacturer: 0x787, Part: 0x7b76, Version: 0x0)
JTAG Tap/device matched
```

```
found ARM1176
cpsr (/32): 0x000000D3
MRC p15, 0, R0 (#0x70000013), c15, c2, 4
MRC p15, 0, R0, c15, c2, 4 = 0x70000013 (1879048211)
TAP s3c6410.cpu:
value captured during scan didn't pass the requested check:
captured: 0x00 check_value: 0x01 check_mask: 0x1F
in_handler: w/o "in_value", mismatch in SIR
0x7e00f01c: 00000003
0x7e001004: 00000000
0x7e001004: 00000000
0x7e001000: 000008c5
Enabled memory write burst mode.
183628 byte written at address 0x57e00000
downloaded 183628 byte in 4.302000s
BUG: keep_alive() was not invoked in the 1000ms timelimit. GDB alive packet not
sent! (4537)
0x57e00000: ea000013 e59ff014 e59ff014 e59ff014 e59ff014 e59ff014 e59ff014 e59ff
014
0x57e00020: 57e00140 57e001a0 57e00200 57e00260 57e002c0 57e00320 57e00380 12345
678
0x57e00040: 57e00000 57e00000 57e00000 57e2cd4c 57e41748 e10f0000 e3c0001f e3800
0d3
0x57e00060: e129f000 e3a00000 ee070f17 ee080f17 ee110f10 e3c00c23 e3c00087 e3800
002
0x57e00080: e3800a01 ee010f10 e3a00207 e3800013 ee0f0f92 eb0001b8 e59f0348 e1cf1
000
0x57e000a0: e51f2068 e1c22000 e1510002 0a000001 e3a00a01 eb000009 e59fd32c e51f0
078
0x57e000c0: e51f1078 e3a02000 e5802000 e2800004 e1500001 dafffff b e51ff004 57e02
d64
0x57e000e0: e1a0a00e e1a09000 e51fd0ac e24dd00c e3a0b000 e3a09a01 eb000117 e3100
000
0x57e00100: 1a000009 e3a00303 e51f10cc e4903004 e4914004 e1330004 1a000005 e2599
004
0x57e00120: 1afffff9 e1a0e00a e1a0f00e e1a00000 eafffff d e1a00000 eafffff d e1a00
000
0x57e00140: e51fd100 e24dd941 e24dd088 e58de000 e14fe000 e58de004 e3a0d013 e169f
```



```
00d
0x57e00160: e1a0e00f e1b0f00e e24dd048 e88d1fff e51f2130 e2422941 e2422088 e8920
00c
0x57e00180: e28d0048 e28d5034 e1a0100e e885000f
'arm11 target' JTAG communication error SCREG SCAN OUT 0x1f (expected 0x10)
in_handler: w/o "in_value", mismatch in SDR
TAP s3c6410.cpu:
value captured during scan didn't pass the requested check:
captured: 0x1F check_value: 0x01 check_mask: 0x1F
in_handler: w/o "in_value", mismatch in SIR
Runtime error, file "mango64-uboot.tcl", line 62:

in procedure 'script' called at file "command.c", line 456
called at file "embedded:startup.tcl", line 122
>
```

**스크립트 실행 시 에러 발생 시 “mango64-uboot.tcl” 파일 내용을 모두 복사 후 Command 창에 붙여넣기 하여 실행하기 바랍니다.**

u-boot가 터미널 프로그램에서 아래와 같이 실행이 되면 됩니다.

```
U-Boot 1.3.4 (Mar 18 2012 - 11:38:33) for MANGO64 uboot-1.3.4-pooh11

CPU:      S3C6410@532MHz
          Fclk = 532MHz, Hclk = 133MHz, Pclk = 66MHz, Serial = CLKUART (SYNC Mode)
Board:    MANGO64
DRAM:     128 MB
Flash:    0 kB
NAND:     256 MB
s3c-nand: ECC uncorrectable error detected
*** Warning - bad CRC or NAND, using default environment

sizeof(default_environment): 302
CFG_ENV_SIZE: 16384, ENV_SIZE: 16380
In:       serial
Out:      serial
Err:      serial
Hit any key to stop autoboot:  0
```

## 2.4. NAND Scrub

Nand flash를 erase를 합니다.

```
nand scrub
```

아래와 같이 NAND flash를 scrub할 것인지 묻습니다.

```
Really scrub this NAND flash? <y/N>
```

"y" 입력합니다.

실행결과

```
MANGO64 # nand scrub

NAND scrub: device 0 whole chip
Warning: scrub option will erase all factory set bad blocks!
    There is no reliable way to recover them.
    Use this command only for testing purposes if you
    are sure of what you are doing!

Really scrub this NAND flash? <y/N>
Erasing at 0x2140000 -- 13% complete.
NAND 256MiB 3,3V 8-bit: MTD Erase failure: -5
Erasing at 0x5ea0000 -- 37% complete.
NAND 256MiB 3,3V 8-bit: MTD Erase failure: -5
Erasing at 0xe8e0000 -- 91% complete.
NAND 256MiB 3,3V 8-bit: MTD Erase failure: -5
Erasing at 0xffe0000 -- 100% complete.
Scanning device for bad blocks
s3c-nand: ECC uncorrectable error detected
s3c-nand: ECC uncorrectable error detected
s3c-nand: ECC uncorrectable error detected
s3c-nand: ECC uncorrectable error detected
s3c-nand: ECC uncorrectable error detected
s3c-nand: ECC uncorrectable error detected
OK
```

```
MANGO64 #
```

Nand flash에 Write 할 u-boot 이미지를 tftp server 디렉토리에 copy를 합니다.

```
$ cp image/u-boot.bin /home/tftp/m64r3
```

## 2.5. U-boot 이미지를 NAND Flash에 Write하기

아래와 같이 입력합니다.

사용자 환경에 맞게 ipaddr, gatewayip, serverip를 설정해야 합니다.

ipaddr : 보드 ip address

serverip" : Host server ip address

gatewayip : Gateway ip address

```
setenv ipaddr 192.168.57.33;setenv gatewayip 192.168.57.255;setenv serverip 192.168.57.21
nand erase 0 40000;tftp 51000000 /m64r3/u-boot.bin;nand write 51000000 0 40000
```

실행 결과

```
MANGO64 # setenv ipaddr 192.168.57.33;setenv gatewayip 192.168.57.255;setenv serverip
192.168.57.21
MANGO64 # nand erase 0 40000;tftp 51000000 /m64r3/u-boot.bin;nand write 51000000 0 40000

NAND erase: device 0 offset 0x0, size 0x40000
Erasing at 0x20000 -- 100% complete.
OK
smc911x: initializing
smc911x: detected LAN9220 controller
smc911x: phy initialized
smc911x: MAC 00:40:5c:26:0a:5b
TFTP from server 192.168.57.21; our IP address is 192.168.57.33
Filename '/m64r3/u-boot.bin'.
Load address: 0x51000000
Loading: #####
done
Bytes transferred = 203944 (0x31ca8)

NAND write: device 0 offset 0x0, size 0x40000
```

```
Main area write (2 blocks):
```

```
262144 bytes written: OK
```

```
MANGO64 #
```

Jtag Dos command를 닫습니다.

그리고, 부팅 스위치를 NAND Mode로 부팅을 합니다.

NAND Mode : 2,3 ON, 나머지 Off

### 3. Kernel 이미지를 NAND Flash에 Write하기

Nand flash에 Write 할 kernel 이미지를 tftp server 디렉토리에 copy를 합니다.

```
$ cp image/zImage /home/tftp/m64r3
```

아래와 같이 입력합니다.

사용자 환경에 맞게 ipaddr, gatewayip, serverip를 설정해야 합니다.

ipaddr : 보드 ip address

serverip" : Host server ip address

gatewayip : Gateway ip address

```
setenv ipaddr 192.168.57.33;setenv gatewayip 192.168.57.255;setenv serverip 192.168.57.21
```

```
saveenv
```

```
nand erase 40000 400000; tftp 51000000 /m64r3/zImage ;nand write 51000000 40000 400000
```

실행결과

```
MANGO64 # setenv ipaddr 192.168.57.33;setenv gatewayip 192.168.57.255;setenv serverip 192.168.57.21
```

```
MANGO64 # saveenv
```

```
Saving Environment to NAND...
```

```
Erasing Nand...
```

```
Erasing at 0x20000 -- 100% complete.
```

```
Writing to Nand... done
```

```
MANGO64 # nand erase 40000 400000; tftp 51000000 /m64r3/zImage ;nand write 51000000 40000 400000
```

```
NAND erase: device 0 offset 0x40000, size 0x400000
```

```
Erasing at 0x420000 -- 100% complete.
```

```

OK
smc911x: initializing
smc911x: detected LAN9220 controller
smc911x: phy initialized
smc911x: MAC 00:40:5c:26:0a:5b
TFTP from server 192.168.57.21; our IP address is 192.168.57.33
Filename '/m64r3/zImage'.
Load address: 0x51000000
Loading: #####
#####
#####
#####
#####
#####
#####
#####
#####
done
Bytes transferred = 2956304 (0x2d1c10)

NAND write: device 0 offset 0x40000, size 0x40000
Main area write (32 blocks):
 4194304 bytes written: OK
MANGO64 #

```

## 4. Filesystem 이미지를 NAND Flash에 Write하기

아래와 같이 입력합니다.

```
nand erase 400000; tftp 51000000 /m64r3/rootfs.yaffs2
```

실행결과

```

MANGO64 # nand erase 400000; tftp 51000000 /m64r3/rootfs.yaffs2

NAND erase: device 0 offset 0x400000, size 0xfc00000
Skipping bad block at 0x02d40000
Skipping bad block at 0x06140000
Skipping bad block at 0x08120000

```

```

Skipping bad block at 0x09660000
Skipping bad block at 0x0ce80000
Skipping bad block at 0x0d520000
Skipping bad block at 0x0ff80000
Erasing at 0xffe0000 -- 100% complete.
OK
smc911x: initializing
smc911x: detected LAN9220 controller
smc911x: phy initialized
smc911x: MAC 00:40:5c:26:0a:5b
TFTP from server 192.168.57.21; our IP address is 192.168.57.33
Filename '/m64r3/rootfs.yaffs2'.
Load address: 0x51000000
Loading: #####
          #####
          #####
          32 MB received
          #####
          #####
          #####
done
Bytes transferred = 45933888 (0x2bce540)
MANGO64 #

```

중간에 ##### <<다운로드과정이 2페이지 정도 나와서 로그를 지웠습니다.

```

#####
#####
#####
#####
done
Bytes transferred = 45933888 (0x2bce540)
MANGO64 # tftp 51000000 /m64r3/rootfs.yaffs2<INTERRUPT>
MANGO64 # nand write.yaffs 51000000 400000 2bce540
NAND write: device 0 offset 0x400000, size 0x2bce540
Writing data at 0x1af0000 -- 54% complete.

```

위에서 "tftp 51000000 /m64r3/rootfs.yaffs2"를 입력 후  
tftp를 통해 Filesystem이미지를 전송 받아오면 위와 같이 16진수로 사이즈가 출력됩니다.  
"nand write.yaffs 51000000 400000 2bce540" 입력하여 nand flash에 write 시

위에서 확인한 사이즈를 입력합니다.

아래와 같이 입력합니다.

```
nand write.yaffs 51000000 400000 2bce540
```

실행결과

```
MANGO64 # nand write.yaffs 51000000 400000 2bce540

NAND write: device 0 offset 0x400000, size 0x2bce540

Bad block at 0x2d40000 in erase block from 0x2d40000 will be skipped
Writing data at 0x2e9a000 -- 100% complete.
 45933888 bytes written: OK
MANGO64 #
```

아래와 같이 환경변수 값을 입력합니다.

[환경변수 ]

```
setenv bootargs "root=/dev/mtdblock2 rootfstype=yaffs2 console=ttySAC1,115200"
setenv bootcmd "nand read 50008000 40000 400000;bootm 50008000"
saveenv
```

재부팅하면 됩니다.