Boot loader Porting

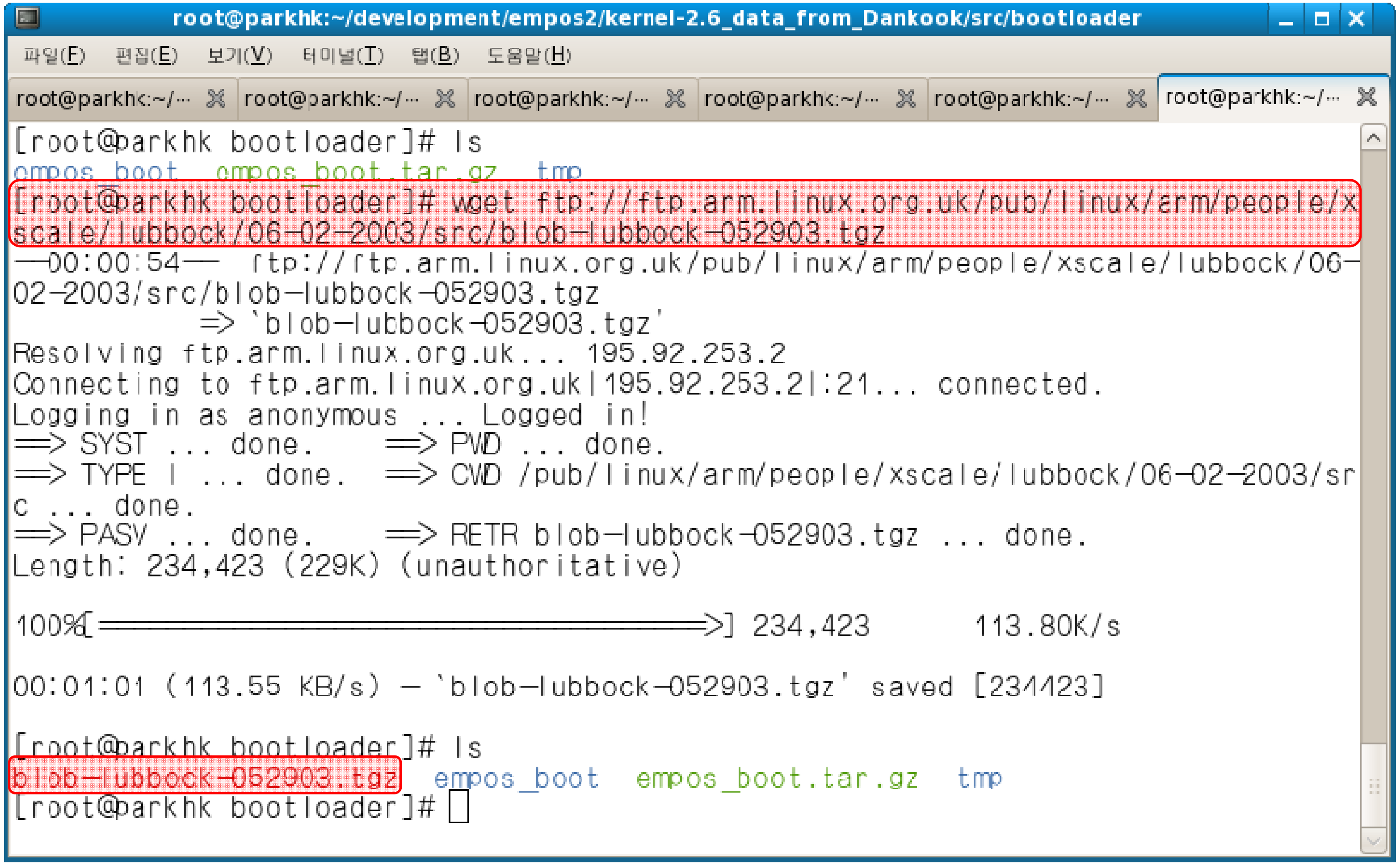
단국대학교
컴퓨터학과
2009
백승재
baeksj@dankook.ac.kr
http://embedded.dankook.ac.kr/~baeksj

blob boot loader porting

- 부트 로더 포팅 순서
  - ✓ 새로운 부트 로더 다운 로드
  - ✓ 새로운 보드 추가
  - ✓ 설정 변경
  - ✓ 보드에 fusing

blob boot loader porting

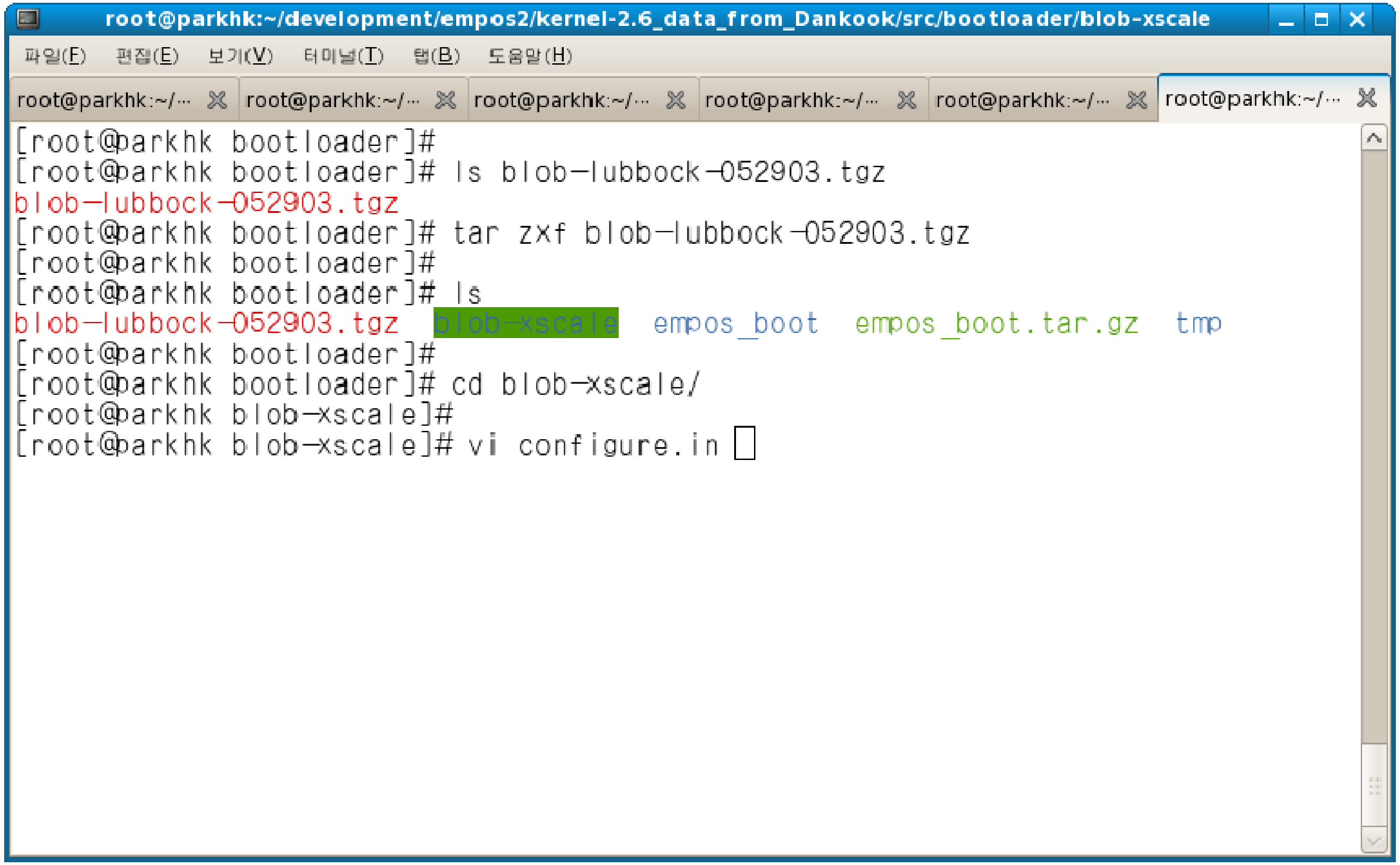
- blob download form internet


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...

```
[root@parkhk bootloader]# ls
empos_boot  empos_boot.tar.gz  tmp
[root@parkhk bootloader]# wget ftp://ftp.arm.linux.org.uk/pub/linux/arm/people/x
scale/lubbock/06-02-2003/src/blob-lubbock-052903.tgz
--00:00:54--  ftp://ftp.arm.linux.org.uk/pub/linux/arm/people/xscale/lubbock/06-
02-2003/src/blob-lubbock-052903.tgz
           => `blob-lubbock-052903.tgz'
Resolving ftp.arm.linux.org.uk... 195.92.253.2
Connecting to ftp.arm.linux.org.uk|195.92.253.2|:21... connected.
Logging in as anonymous ... Logged in!
==> SYST ... done.    ==> PWD ... done.
==> TYPE I ... done.  ==> CWD /pub/linux/arm/people/xscale/lubbock/06-02-2003/sr
c ... done.
==> PASV ... done.    ==> RETR blob-lubbock-052903.tgz ... done.
Length: 234,423 (229K) (unauthoritative)

100%[====================================>] 234,423      113.80K/s

00:01:01 (113.55 KB/s) - `blob-lubbock-052903.tgz' saved [234423]

[root@parkhk bootloader]# ls
blob-lubbock-052903.tgz  empos_boot  empos_boot.tar.gz  tmp
[root@parkhk bootloader]# 
```

blob boot loader porting

- 압축 해제 및 configure.in 파일 수정

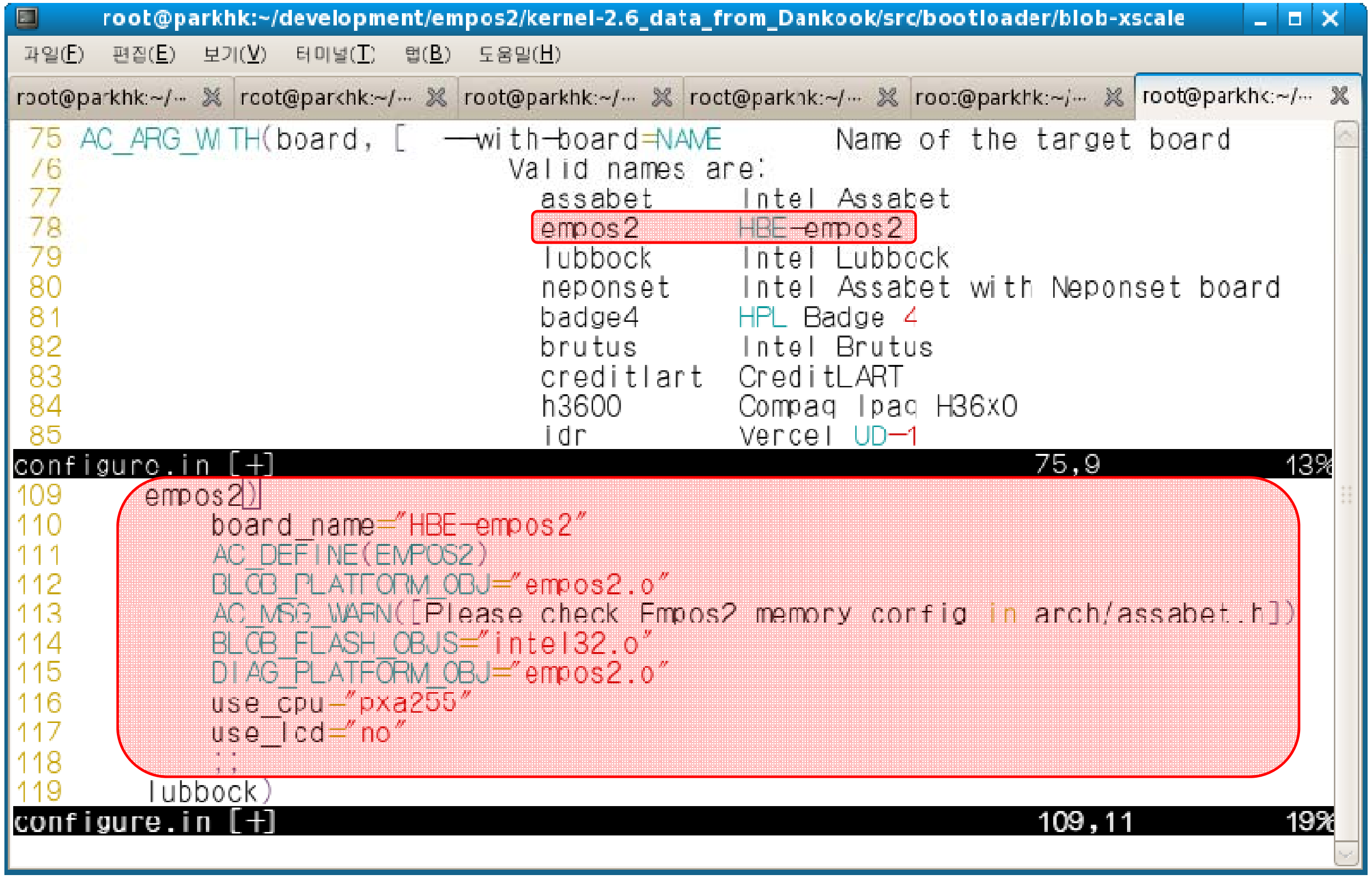


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/... root@parkhk:~/... root@parkhk:~/... root@parkhk:~/... root@parkhk:~/... root@parkhk:~/...

```
[root@parkhk bootloader]#
[root@parkhk bootloader]# ls blob-lubbock-052903.tgz
blob-lubbock-052903.tgz
[root@parkhk bootloader]# tar zxf blob-lubbock-052903.tgz
[root@parkhk bootloader]#
[root@parkhk bootloader]# ls
blob-lubbock-052903.tgz  blob-xscale  empos_boot  empos_boot.tar.gz  tmp
[root@parkhk bootloader]#
[root@parkhk bootloader]# cd blob-xscale/
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# vi configure.in
```

blob boot loader porting

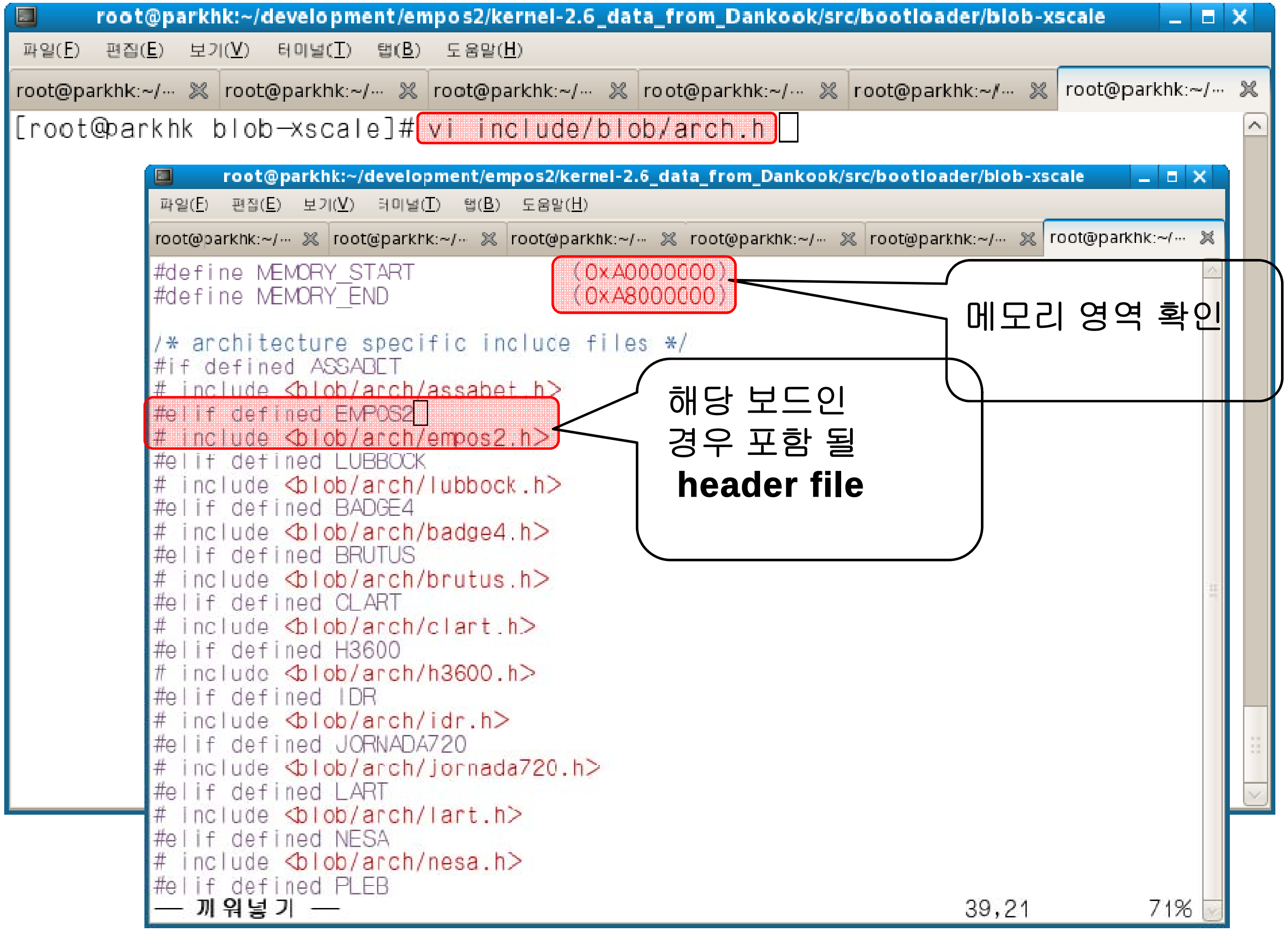
- configure.in 수정 부분
  - ✓ 새로운 보드 추가


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...

```
AC_ARG_WITH(board, [  --with-board=NAME       Name of the target board
                        Valid names are:
                          assabet     Intel Assabet
                          empos2      HBE-empos2
                          lubbock     Intel Lubbock
                          neponset    Intel Assabet with Neponset board
                          badge4      HPL Badge 4
                          brutus      Intel Brutus
                          creditlart  CreditLART
                          h3600       Compaq Ipaq H36x0
                          idr         Vercel UD-1
configure.in [+]                                                 75,9          13%
    empos2)
        board_name="HBE-empos2"
        AC_DEFINE(EMPOS2)
        BLOB_PLATFORM_OBJ="empos2.o"
        AC_MSG_WARN([Please check Empos2 memory config in arch/assabet.h])
        BLOB_FLASH_OBJS="intel32.o"
        DIAG_PLATFORM_OBJ="empos2.o"
        use_cpu="pxa255"
        use_lcd="no"
        ;;
    lubbock)
configure.in [+]                                                 109,11        19%
```

blob boot loader porting

- arch.h 수정


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/··· root@parkhk:~/··· root@parkhk:~/··· root@parkhk:~/··· root@parkhk:~/··· root@parkhk:~/···

```
[root@parkhk blob-xscale]# vi include/blob/arch.h
```

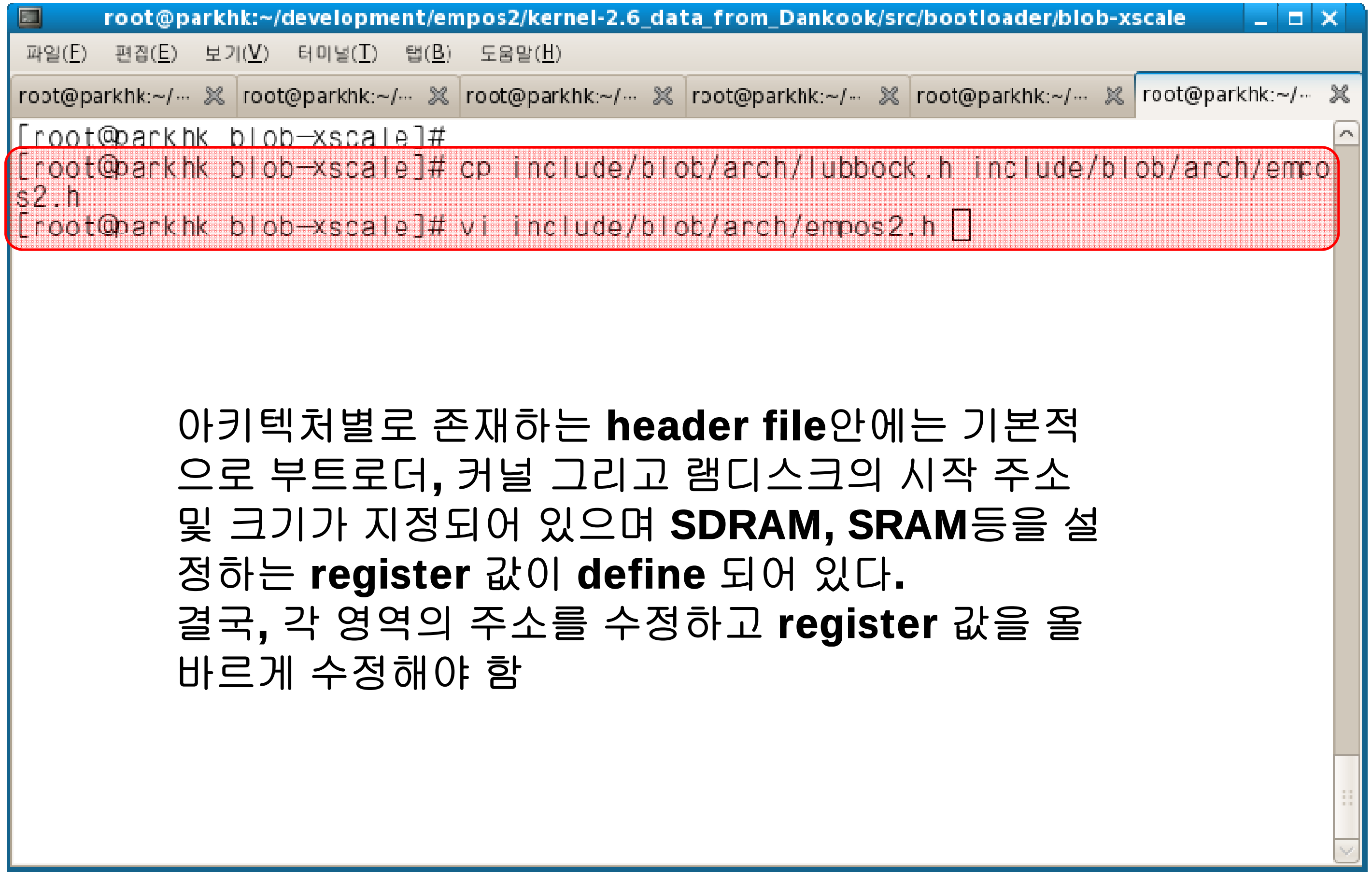
```
#define MEMORY_START                    (0xA0000000)
#define MEMORY_END                      (0xA8000000)

/* architecture specific incluce files */
#if defined ASSABET
# include <blob/arch/assabet.h>
#elif defined EMPOS2
# include <blob/arch/empos2.h>
#elif defined LUBBOCK
# include <blob/arch/lubbock.h>
#elif defined BADGE4
# include <blob/arch/badge4.h>
#elif defined BRUTUS
# include <blob/arch/brutus.h>
#elif defined CLART
# include <blob/arch/clart.h>
#elif defined H3600
# include <blob/arch/h3600.h>
#elif defined IDR
# include <blob/arch/idr.h>
#elif defined JORNADA720
# include <blob/arch/jornada720.h>
#elif defined LART
# include <blob/arch/lart.h>
#elif defined NESA
# include <blob/arch/nesa.h>
#elif defined PLEB
-- 끼워넣기 --                                            39,21          71%
```

메모리 영역 확인

해당 보드인 경우 포함 될 **header file**

blob boot loader porting

- xscale을 사용하는 lubbock 보드의 헤더 복사 및 수정

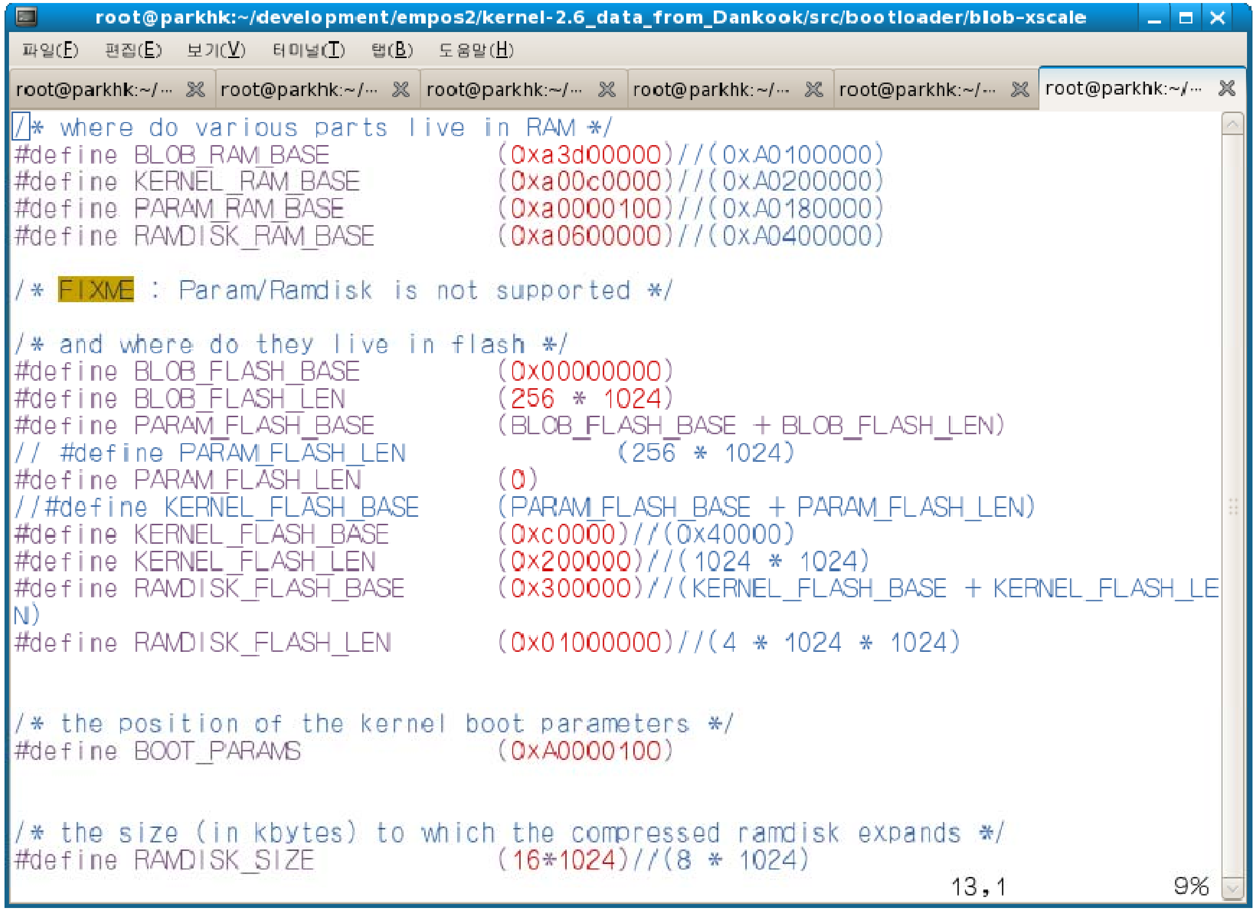

root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...

```
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# cp include/blob/arch/lubbock.h include/blob/arch/empo
s2.h
[root@parkhk blob-xscale]# vi include/blob/arch/empos2.h
```

아키텍처별로 존재하는 **header file**안에는 기본적으로 부트로더, 커널 그리고 램디스크의 시작 주소 및 크기가 지정되어 있으며 **SDRAM, SRAM**등을 설정하는 **register** 값이 **define** 되어 있다.
결국, 각 영역의 주소를 수정하고 **register** 값을 올바르게 수정해야 함

blob boot loader porting

- empos2.h 수정 내용(1/2)



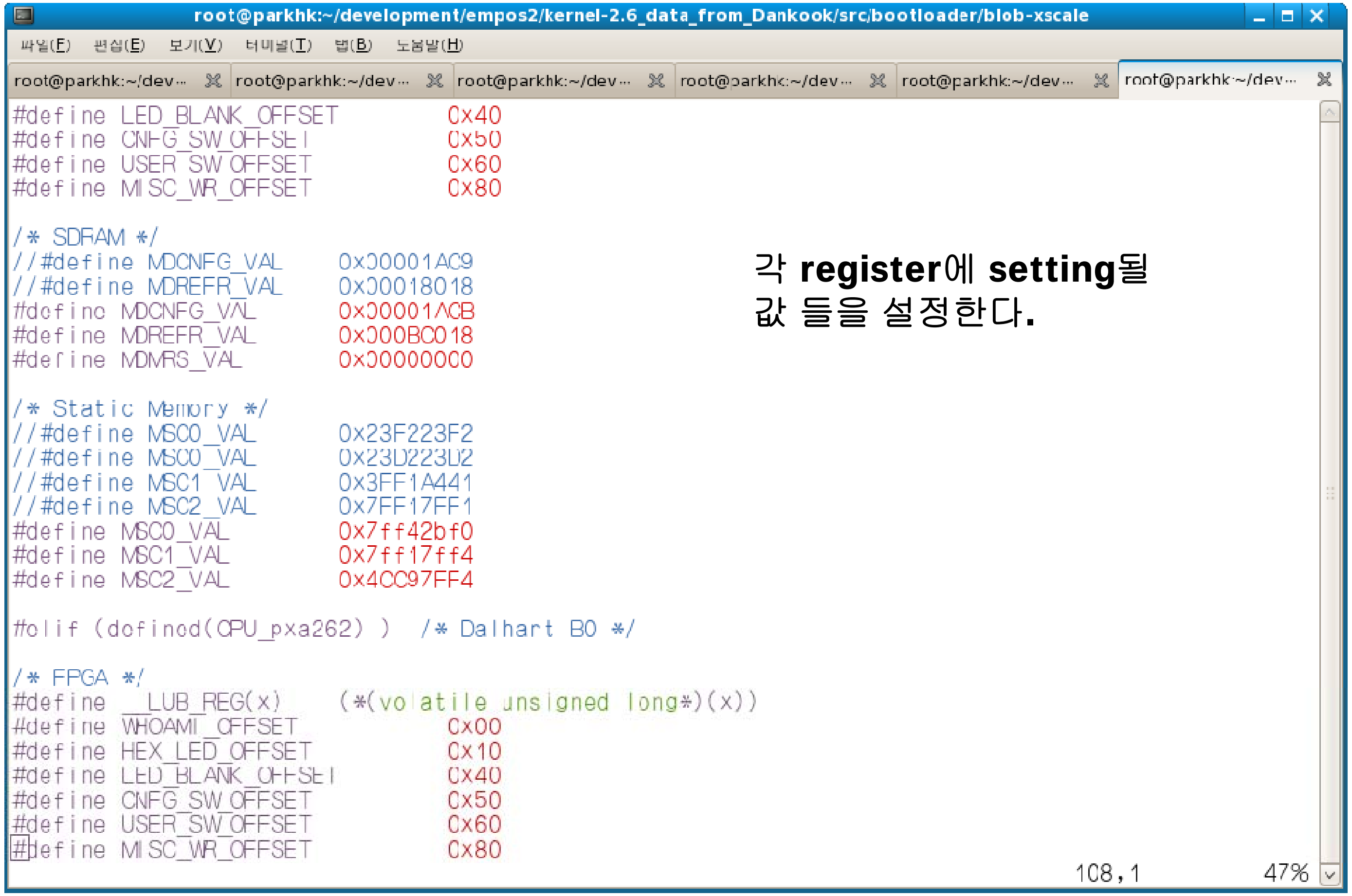
root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/…

```
/* where do various parts live in RAM */
#define BLOB_RAM_BASE                (0xa3d00000)//(0xA0100000)
#define KERNEL_RAM_BASE              (0xa00c0000)//(0xA0200000)
#define PARAM_RAM_BASE               (0xa0000100)//(0xA0180000)
#define RAMDISK_RAM_BASE             (0xa0600000)//(0xA0400000)

/* FIXME : Param/Ramdisk is not supported */

/* and where do they live in flash */
#define BLOB_FLASH_BASE              (0x00000000)
#define BLOB_FLASH_LEN               (256 * 1024)
#define PARAM_FLASH_BASE             (BLOB_FLASH_BASE + BLOB_FLASH_LEN)
// #define PARAM_FLASH_LEN                   (256 * 1024)
#define PARAM_FLASH_LEN              (0)
//#define KERNEL_FLASH_BASE          (PARAM_FLASH_BASE + PARAM_FLASH_LEN)
#define KERNEL_FLASH_BASE            (0xc0000)//(0x40000)
#define KERNEL_FLASH_LEN             (0x200000)//(1024 * 1024)
#define RAMDISK_FLASH_BASE           (0x300000)//(KERNEL_FLASH_BASE + KERNEL_FLASH_LE
N)
#define RAMDISK_FLASH_LEN            (0x01000000)//(4 * 1024 * 1024)


/* the position of the kernel boot parameters */
#define BOOT_PARAMS                  (0xA0000100)


/* the size (in kbytes) to which the compressed ramdisk expands */
#define RAMDISK_SIZE                 (16*1024)//(8 * 1024)
                                                          13,1           9%
```

각 영역의 시작 주소 및 크기를 수정한다.
(화면에는 안나와 있지만 소스 상단에 있는**LUBBOCK** 이라는 문자열을 **EMPOS2**로 변경)

blob boot loader porting

- empos2.h 수정 내용(2/2)

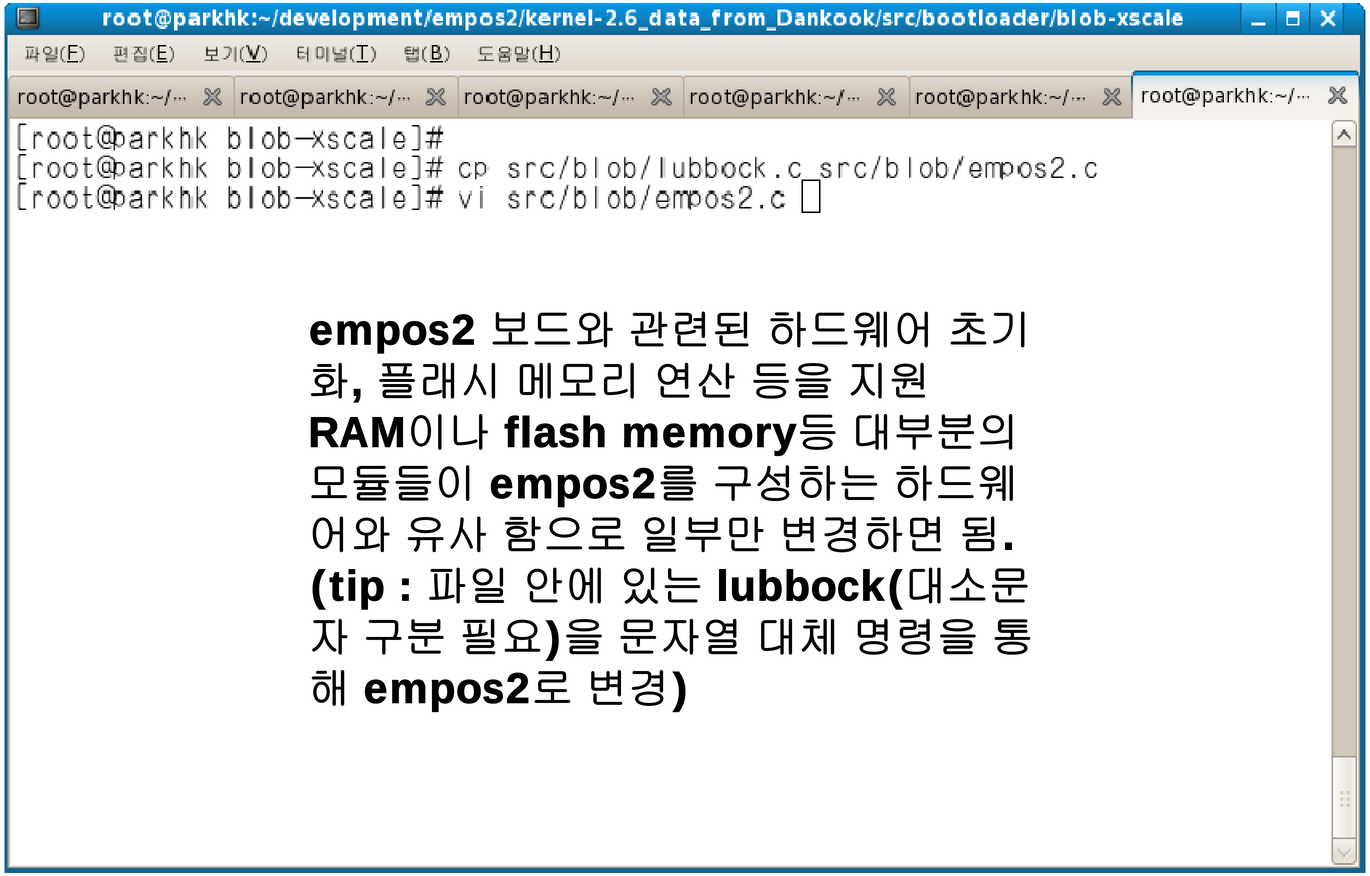

root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/dev...
root@parkhk:~/dev...
root@parkhk:~/dev...
root@parkhk:~/dev...
root@parkhk:~/dev...
root@parkhk:~/dev...

```
#define LED_BLANK_OFFSET        0x40
#define CNFG_SW_OFFSET          0x50
#define USER_SW_OFFSET          0x60
#define MISC_WR_OFFSET          0x80

/* SDRAM */
//#define MDCNFG_VAL     0x00001AC9
//#define MDREFR_VAL     0x00018018
#define MDCNFG_VAL       0x00001ACB
#define MDREFR_VAL       0x000BC018
#define MDMRS_VAL        0x00000000

/* Static Memory */
//#define MSC0_VAL       0x23F223F2
//#define MSC0_VAL       0x23D223D2
//#define MSC1_VAL       0x3FF1A441
//#define MSC2_VAL       0x7FF17FF1
#define MSC0_VAL         0x7ff42bf0
#define MSC1_VAL         0x7ff17ff4
#define MSC2_VAL         0x4CC97FF4

#elif (defined(CPU_pxa262) )  /* Dalhart B0 */

/* FPGA */
#define __LUB_REG(x)     (*(volatile unsigned long*)(x))
#define WHOAMI_OFFSET           0x00
#define HEX_LED_OFFSET          0x10
#define LED_BLANK_OFFSET        0x40
#define CNFG_SW_OFFSET          0x50
#define USER_SW_OFFSET          0x60
#define MISC_WR_OFFSET          0x80
                                                  108,1         47%
```

각 **register**에 **setting**될 값 들을 설정한다.

blob boot loader porting

- xscale을 사용하는 lubbock 보드의 아키텍처 초기화 관련 파일 복사 및 수정



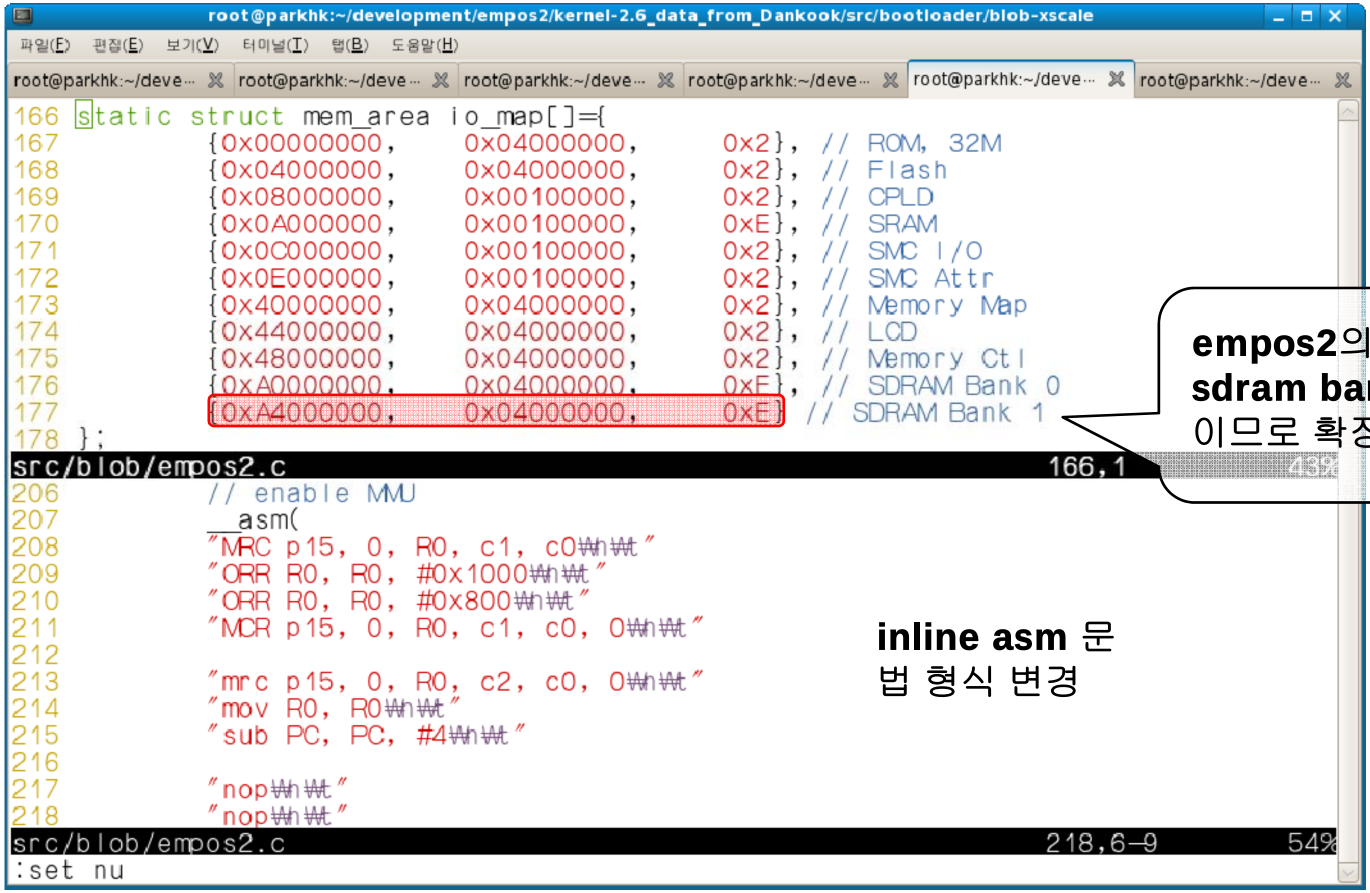
root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/…
root@parkhk:~/…
root@parkhk:~/…
root@parkhk:~/…
root@parkhk:~/…
root@parkhk:~/…

```
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# cp src/blob/lubbock.c src/blob/empos2.c
[root@parkhk blob-xscale]# vi src/blob/empos2.c
```

empos2 보드와 관련된 하드웨어 초기화**,** 플래시 메모리 연산 등을 지원
RAM이나 **flash memory**등 대부분의 모듈들이 **empos2**를 구성하는 하드웨어와 유사 함으로 일부만 변경하면 됨.
(tip : 파일 안에 있는 **lubbock(**대소문자 구분 필요**)**을 문자열 대체 명령을 통해 **empos2**로 변경**)**

blob boot loader porting

- empos2.c 수정내용


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/deve…
root@parkhk:~/deve…
root@parkhk:~/deve…
root@parkhk:~/deve…
root@parkhk:~/deve…
root@parkhk:~/deve…

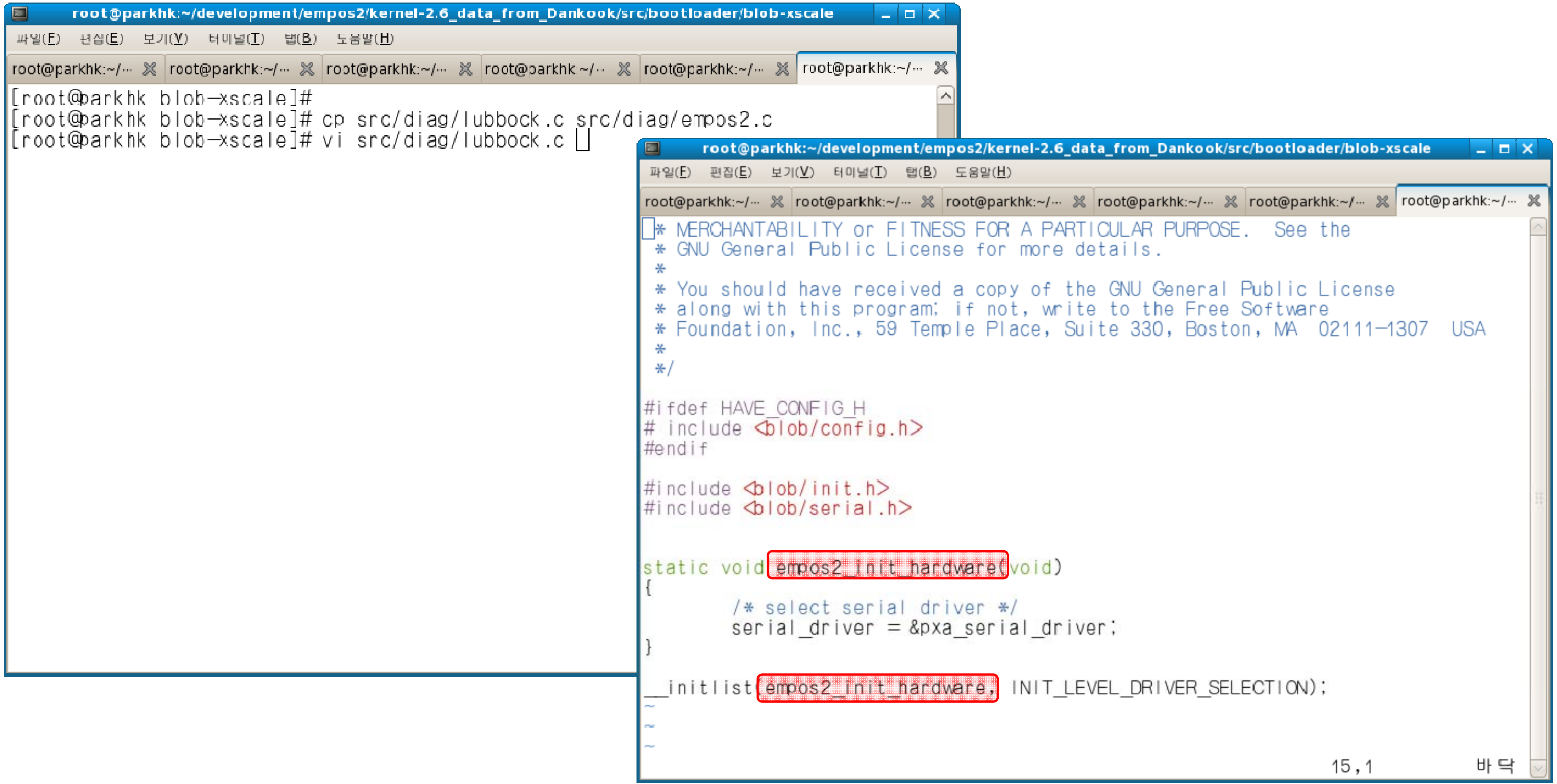
```
static struct mem_area io_map[]={
          {0x00000000,     0x04000000,      0x2}, // ROM, 32M
          {0x04000000,     0x04000000,      0x2}, // Flash
          {0x08000000,     0x00100000,      0x2}, // CPLD
          {0x0A000000,     0x00100000,      0xE}, // SRAM
          {0x0C000000,     0x00100000,      0x2}, // SMC I/O
          {0x0E000000,     0x00100000,      0x2}, // SMC Attr
          {0x40000000,     0x04000000,      0x2}, // Memory Map
          {0x44000000,     0x04000000,      0x2}, // LCD
          {0x48000000,     0x04000000,      0x2}, // Memory Ctl
          {0xA0000000,     0x04000000,      0xE}, // SDRAM Bank 0
          {0xA4000000,     0x04000000,      0xE} // SDRAM Bank 1
};
src/blob/empos2.c                                         166,1        43%
          // enable MMU
          __asm(
          "MRC p15, 0, R0, c1, c0₩n₩t"
          "ORR R0, R0, #0x1000₩n₩t"
          "ORR R0, R0, #0x800₩n₩t"
          "MCR p15, 0, R0, c1, c0, 0₩n₩t"

          "mrc p15, 0, R0, c2, c0, 0₩n₩t"
          "mov R0, R0₩n₩t"
          "sub PC, PC, #4₩n₩t"

          "nop₩n₩t"
          "nop₩n₩t"
src/blob/empos2.c                                         218,6-9      54%
:set nu
```

empos2의 경우
sdram bank가 **2**개
이므로 확장

inline asm 문
법 형식 변경

blob boot loader porting

- xscale을 사용하는 lubbock 보드의 아키텍처 초기화 관련 파일 복사 및 수정

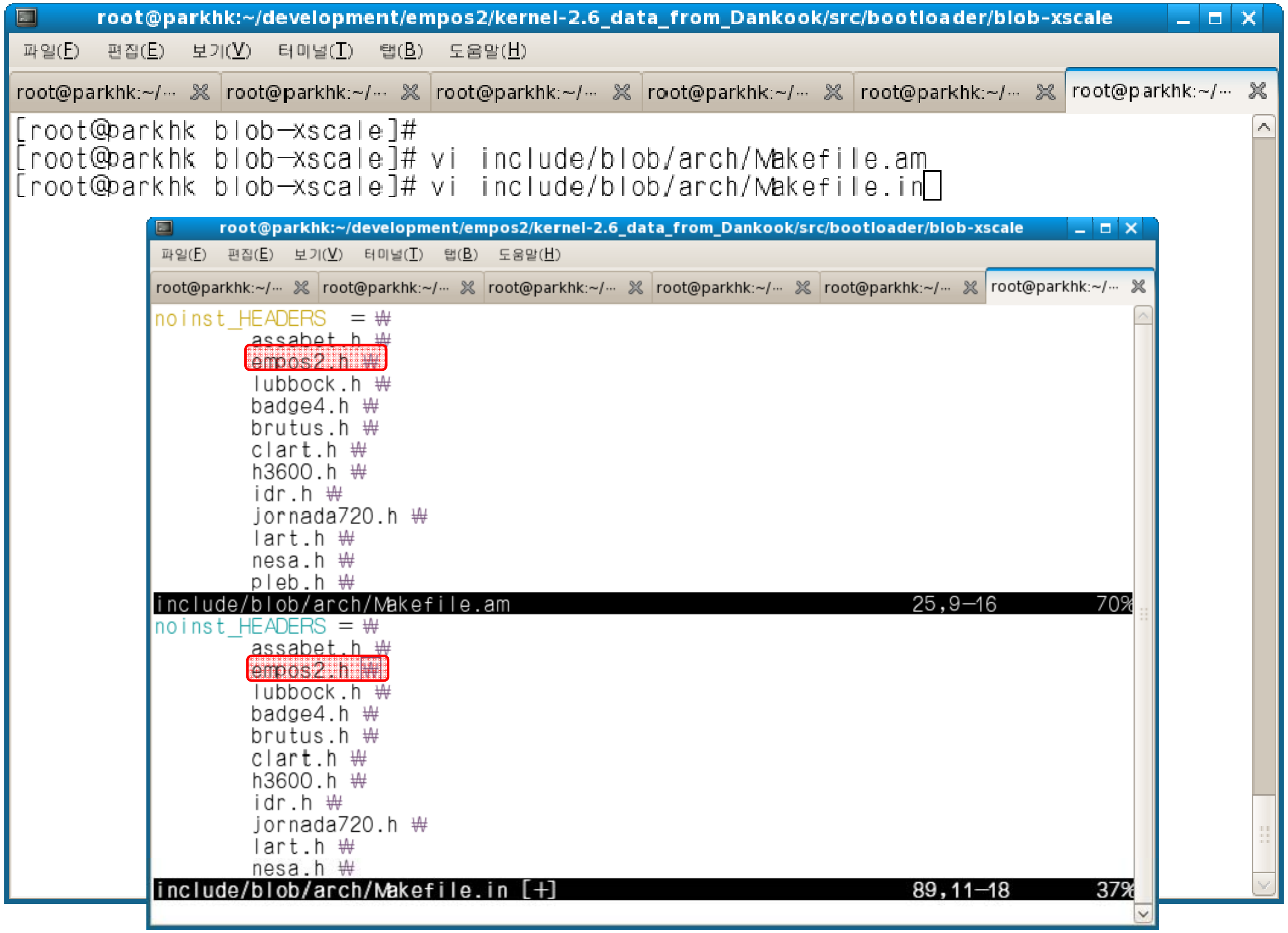

root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...
root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...

```
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# cp src/diag/lubbock.c src/diag/empos2.c
[root@parkhk blob-xscale]# vi src/diag/lubbock.c
```

```
 * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
 * GNU General Public License for more details.
 *
 * You should have received a copy of the GNU General Public License
 * along with this program; if not, write to the Free Software
 * Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA  02111-1307  USA
 *
 */

#ifdef HAVE_CONFIG_H
# include <blob/config.h>
#endif

#include <blob/init.h>
#include <blob/serial.h>


static void empos2_init_hardware(void)
{
        /* select serial driver */
        serial_driver = &pxa_serial_driver;
}

__initlist(empos2_init_hardware, INIT_LEVEL_DRIVER_SELECTION);
~
~
~
                                                    15,1          바닥
```

blob boot loader porting

- Makefile.am 및 Makefile.in 수정


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/…

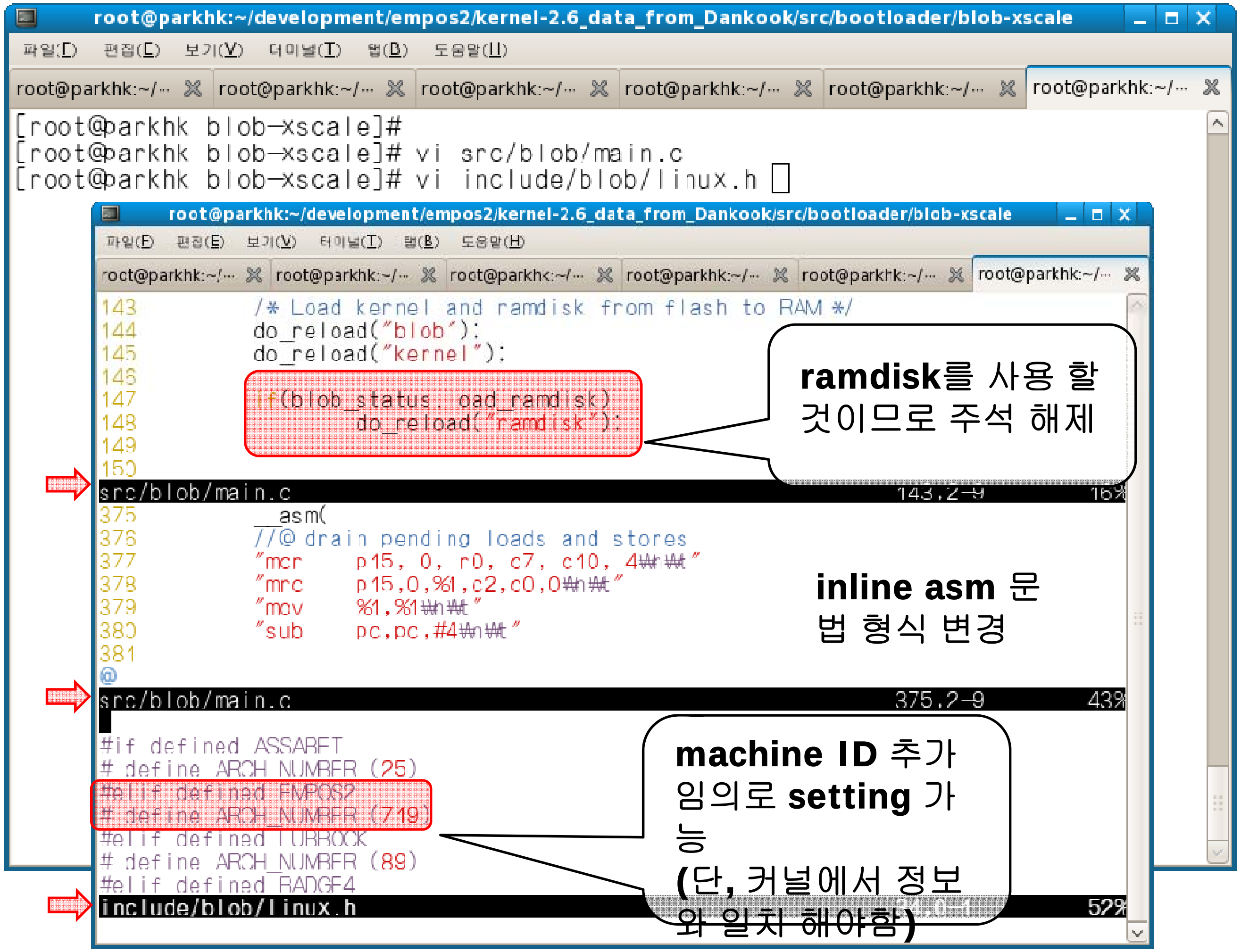
```
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# vi include/blob/arch/Makefile.am
[root@parkhk blob-xscale]# vi include/blob/arch/Makefile.in
```

root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/…

```
noinst_HEADERS   = ₩
        assabet.h ₩
        empos2.h ₩
        lubbock.h ₩
        badge4.h ₩
        brutus.h ₩
        clart.h ₩
        h3600.h ₩
        idr.h ₩
        jornada720.h ₩
        lart.h ₩
        nesa.h ₩
        pleb.h ₩
include/blob/arch/Makefile.am                                      25,9-16        70%
noinst_HEADERS = ₩
        assabet.h ₩
        empos2.h ₩
        lubbock.h ₩
        badge4.h ₩
        brutus.h ₩
        clart.h ₩
        h3600.h ₩
        idr.h ₩
        jornada720.h ₩
        lart.h ₩
        nesa.h ₩
include/blob/arch/Makefile.in [+]                                  89,11-18       37%
```

blob boot loader porting

- main.c 및 linux.h 수정



root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...

```
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# vi src/blob/main.c
[root@parkhk blob-xscale]# vi include/blob/linux.h
```

```
        /* Load kernel and ramdisk from flash to RAM */
        do_reload("blob");
        do_reload("kernel");

        if(blob_status.load_ramdisk)
                do_reload("ramdisk");


src/blob/main.c                                   143,2-9        16%
        __asm(
        //@ drain pending loads and stores
        "mcr    p15, 0, r0, c7, c10, 4₩n₩t"
        "mrc    p15,0,%1,c2,c0,0₩n₩t"
        "mov    %1,%1₩n₩t"
        "sub    pc,pc,#4₩n₩t"

@
src/blob/main.c                                   375,2-9        43%

#if defined ASSABET
# define ARCH_NUMBER (25)
#elif defined EMPOS2
# define ARCH_NUMBER (719)
#elif defined LUBBOCK
# define ARCH_NUMBER (89)
#elif defined BADGE4
include/blob/linux.h                              34,0-1         52%
```

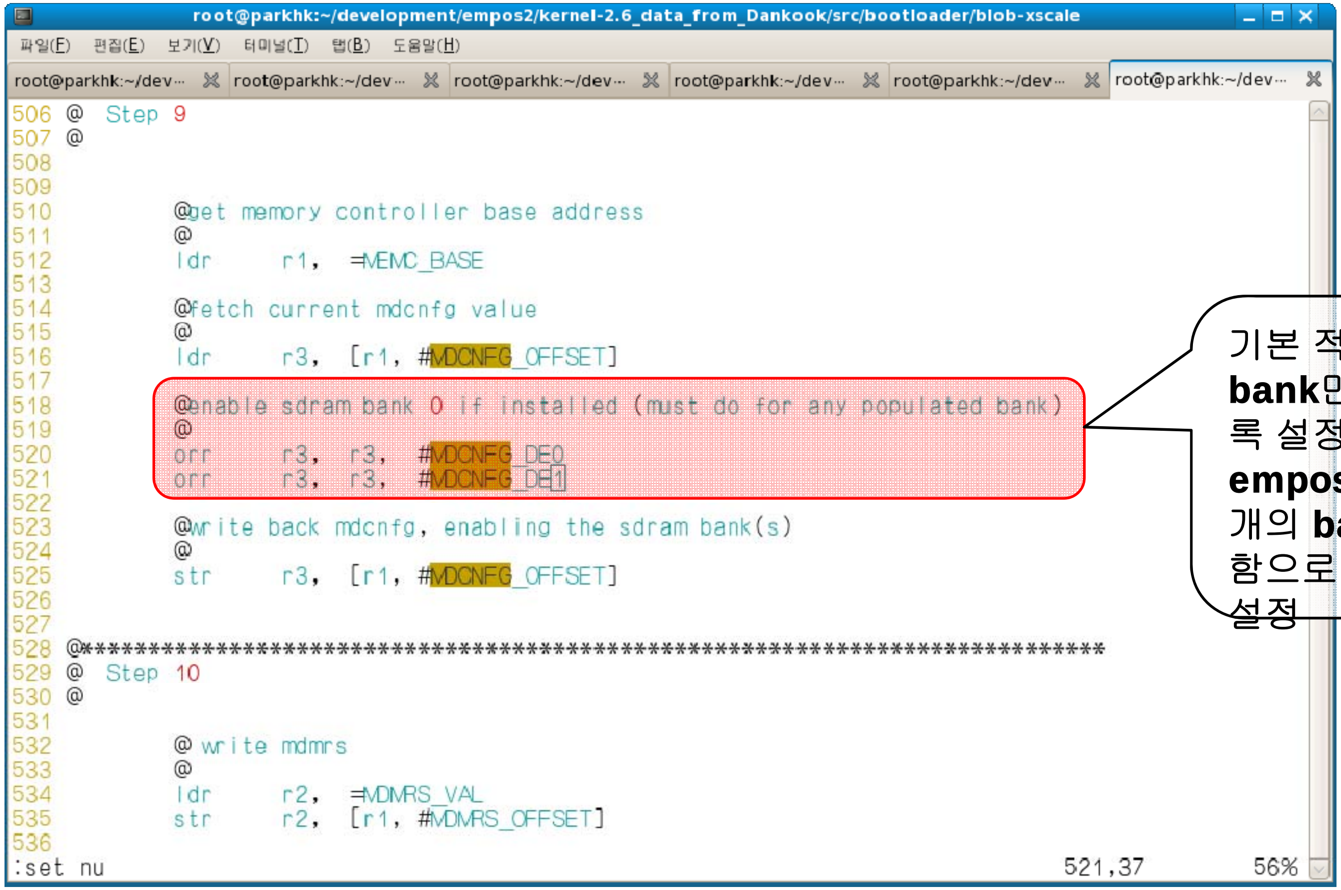
ramdisk를 사용 할 것이므로 주석 해제

inline asm 문법 형식 변경

machine ID 추가 임의로 **setting** 가능
(단**,** 커널에서 정보와 일치 해야함**)**

blob boot loader porting

- src/blob/memsetup.S 수정

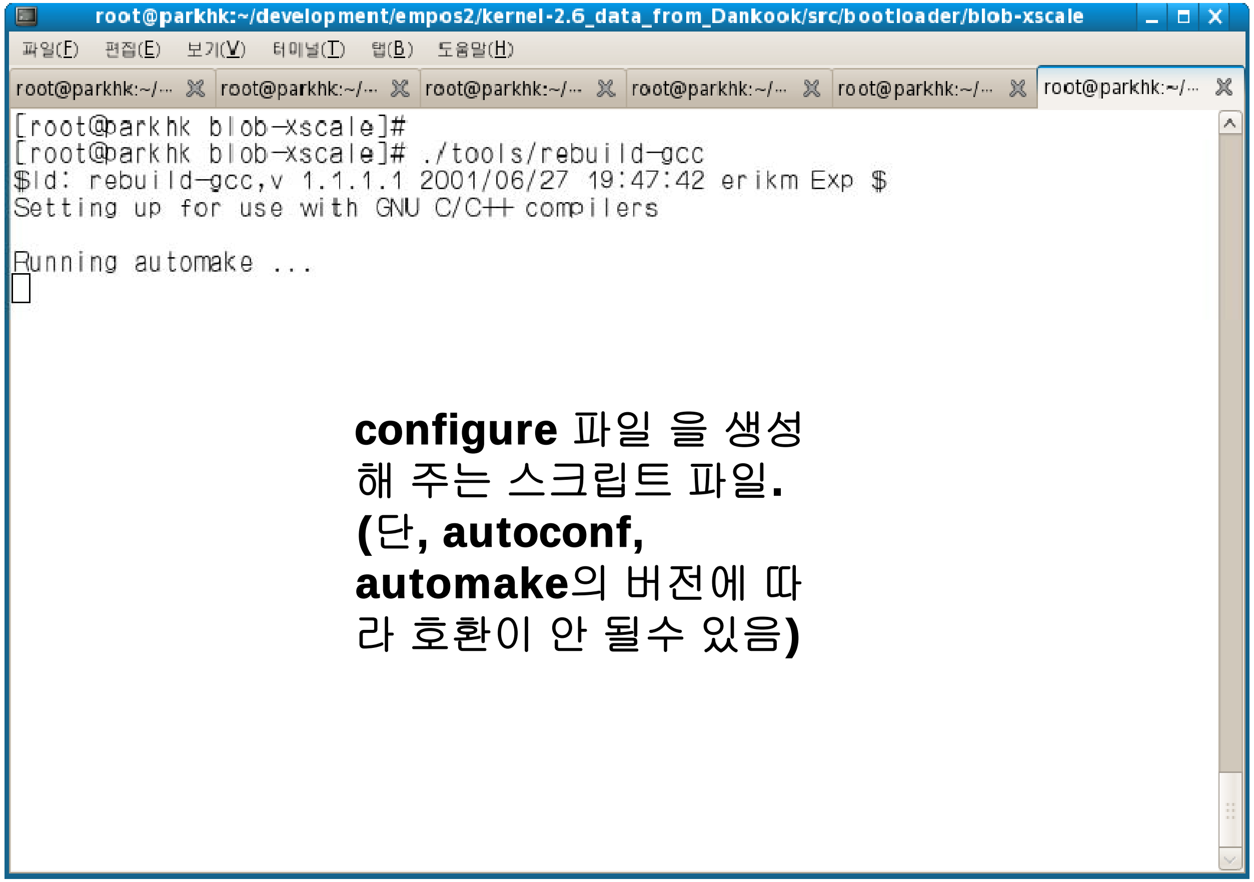

root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/dev···
root@parkhk:~/dev···
root@parkhk:~/dev···
root@parkhk:~/dev···
root@parkhk:~/dev···
root@parkhk:~/dev···

```
@ Step 9
@


        @get memory controller base address
        @
        ldr     r1, =MEMC_BASE

        @fetch current mdcnfg value
        @
        ldr     r3, [r1, #MDCNFG_OFFSET]

        @enable sdram bank 0 if installed (must do for any populated bank)
        @
        orr     r3, r3, #MDCNFG_DE0
        orr     r3, r3, #MDCNFG_DE1

        @write back mdcnfg, enabling the sdram bank(s)
        @
        str     r3, [r1, #MDCNFG_OFFSET]


@***************************************************************************
@ Step 10
@


        @ write mdmrs
        @
        ldr     r2, =MDMRS_VAL
        str     r2, [r1, #MDMRS_OFFSET]

:set nu                                                        521,37        56%
```

기본 적으로 **1**개의 **bank**만 사용하도록 설정 되어 있음. **empos2**의 경우 **2**개의 **bank**를 사용함으로 확장하도록 설정

blob boot loader porting

- ./tools/rebuild-gcc 실행

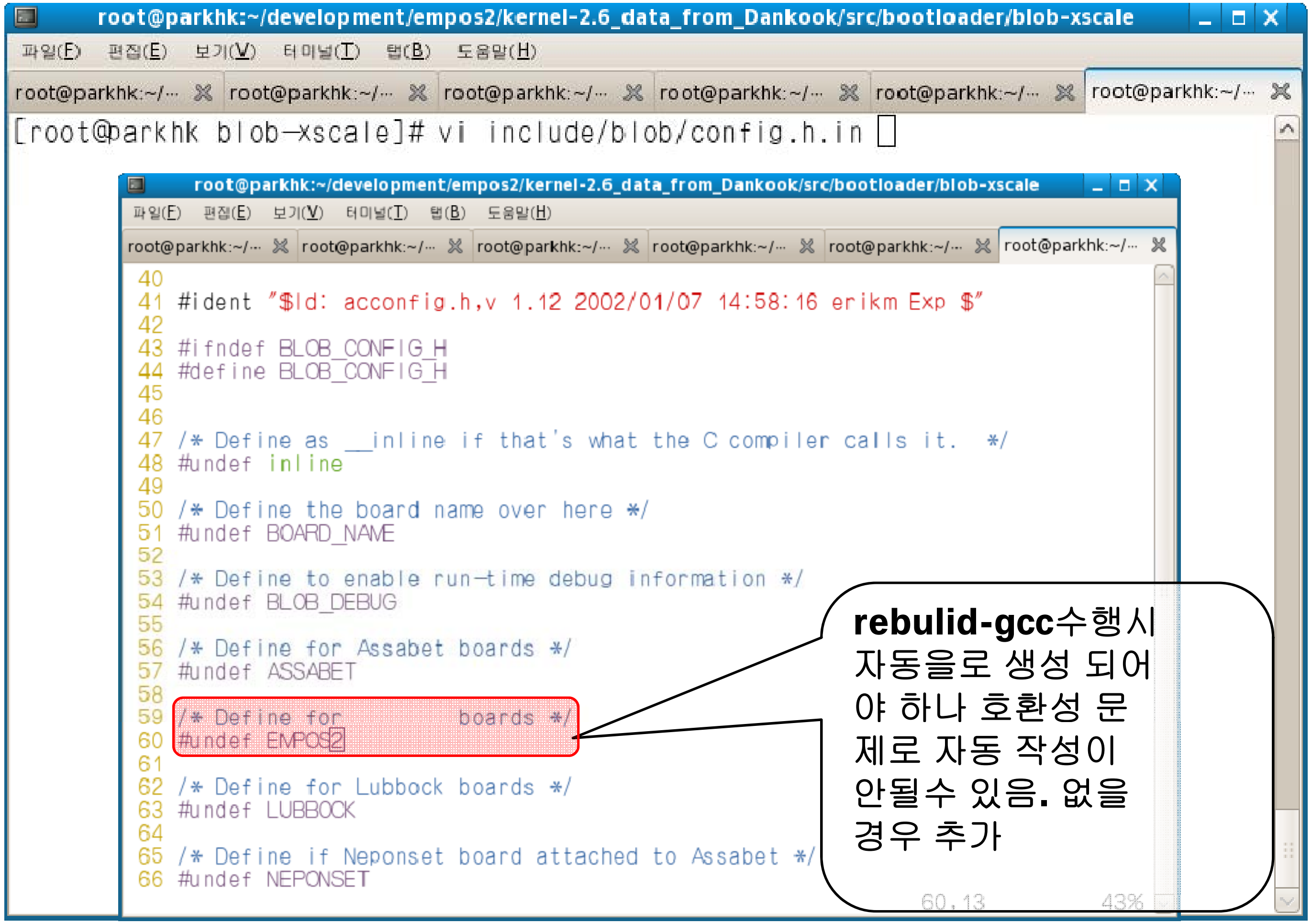

root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/... root@parkhk:~/... root@parkhk:~/... root@parkhk:~/... root@parkhk:~/... root@parkhk:~/...

```
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# ./tools/rebuild-gcc
$Id: rebuild-gcc,v 1.1.1.1 2001/06/27 19:47:42 erikm Exp $
Setting up for use with GNU C/C++ compilers

Running automake ...
```

configure 파일 을 생성 해 주는 스크립트 파일. (단, **autoconf**, **automake**의 버전에 따라 호환이 안 될수 있음)

blob boot loader porting

- config.h.in 확인


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/…

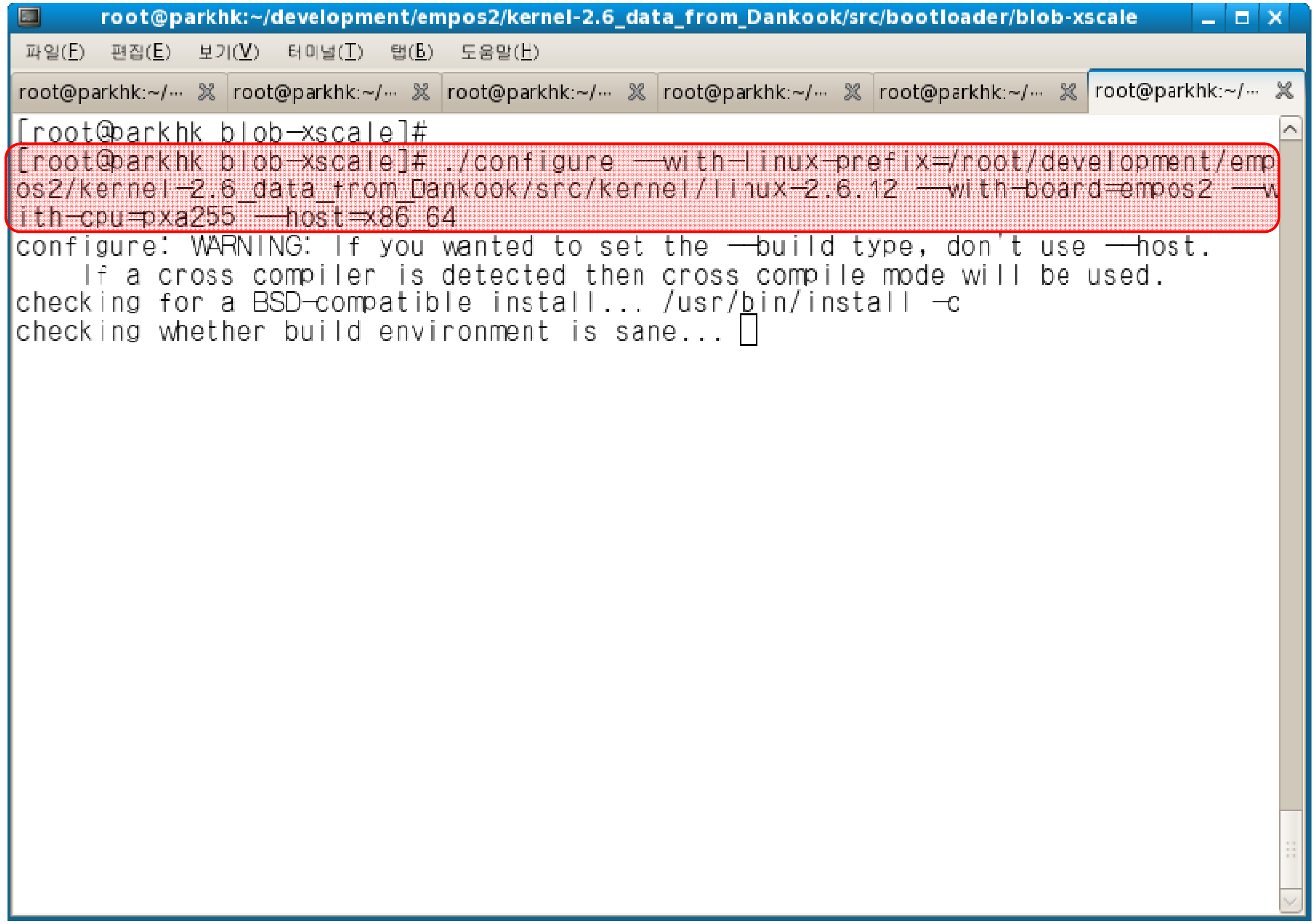
```
[root@parkhk blob-xscale]# vi include/blob/config.h.in
```

```

#ident "$Id: acconfig.h,v 1.12 2002/01/07 14:58:16 erikm Exp $"

#ifndef BLOB_CONFIG_H
#define BLOB_CONFIG_H


/* Define as __inline if that's what the C compiler calls it.  */
#undef inline

/* Define the board name over here */
#undef BOARD_NAME

/* Define to enable run-time debug information */
#undef BLOB_DEBUG

/* Define for Assabet boards */
#undef ASSABET

/* Define for              boards */
#undef EMPOS2

/* Define for Lubbock boards */
#undef LUBBOCK

/* Define if Neponset board attached to Assabet */
#undef NEPONSET
                                                      60,13        43%
```

rebulid-gcc수행시 자동을로 생성 되어야 하나 호환성 문제로 자동 작성이 안될수 있음. 없을 경우 추가

blob boot loader porting

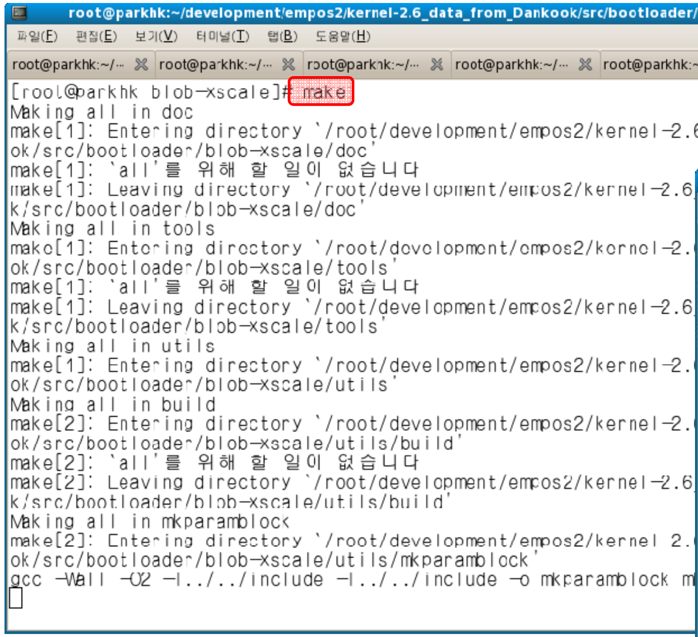
- 컴파일 환경 설정


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/… root@parkhk:~/…

```
[root@parkhk blob-xscale]#
[root@parkhk blob-xscale]# ./configure --with-linux-prefix=/root/development/emp
os2/kernel-2.6_data_from_Dankook/src/kernel/linux-2.6.12 --with-board=empos2 --w
ith-cpu=pxa255 --host=x86_64
configure: WARNING: If you wanted to set the --build type, don't use --host.
    If a cross compiler is detected then cross compile mode will be used.
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane...
```

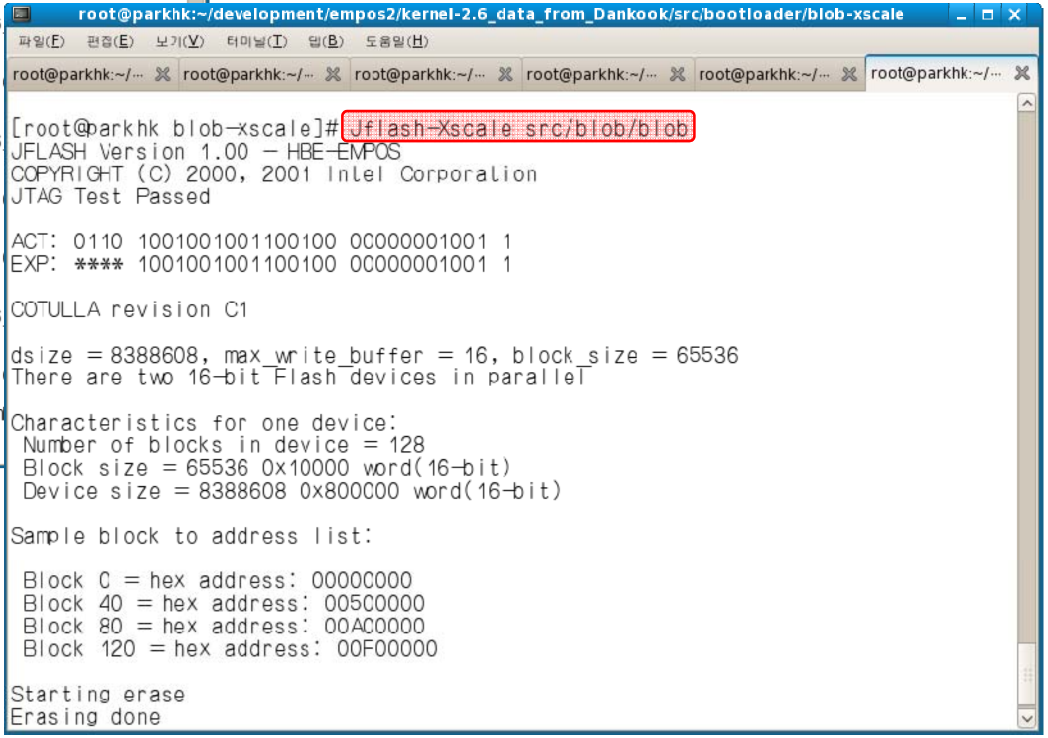
blob boot loader porting

- make 및 fusing



root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...

```
[root@parkhk blob-xscale]# make
Making all in doc
make[1]: Entering directory `/root/development/empos2/kernel-2.6_data_from_Danko
ok/src/bootloader/blob-xscale/doc'
make[1]: `all'를 위해 할 일이 없습니다
make[1]: Leaving directory `/root/development/empos2/kernel-2.6
k/src/bootloader/blob-xscale/doc'
Making all in tools
make[1]: Entering directory `/root/development/empos2/kernel-2.
ok/src/bootloader/blob-xscale/tools'
make[1]: `all'를 위해 할 일이 없습니다
make[1]: Leaving directory `/root/development/empos2/kernel-2.6
k/src/bootloader/blob-xscale/tools'
Making all in utils
make[1]: Entering directory `/root/development/empos2/kernel-2.
ok/src/bootloader/blob-xscale/utils'
Making all in build
make[2]: Entering directory `/root/development/empos2/kernel-2.
ok/src/bootloader/blob-xscale/utils/build'
make[2]: `all'를 위해 할 일이 없습니다
make[2]: Leaving directory `/root/development/empos2/kernel-2.6
k/src/bootloader/blob-xscale/utils/build'
Making all in mkparamblock
make[2]: Entering directory `/root/development/empos2/kernel 2.
ok/src/bootloader/blob-xscale/utils/mkparamblock'
gcc -Wall -O2 -I../../include -I../../include -o mkparamblock m
```

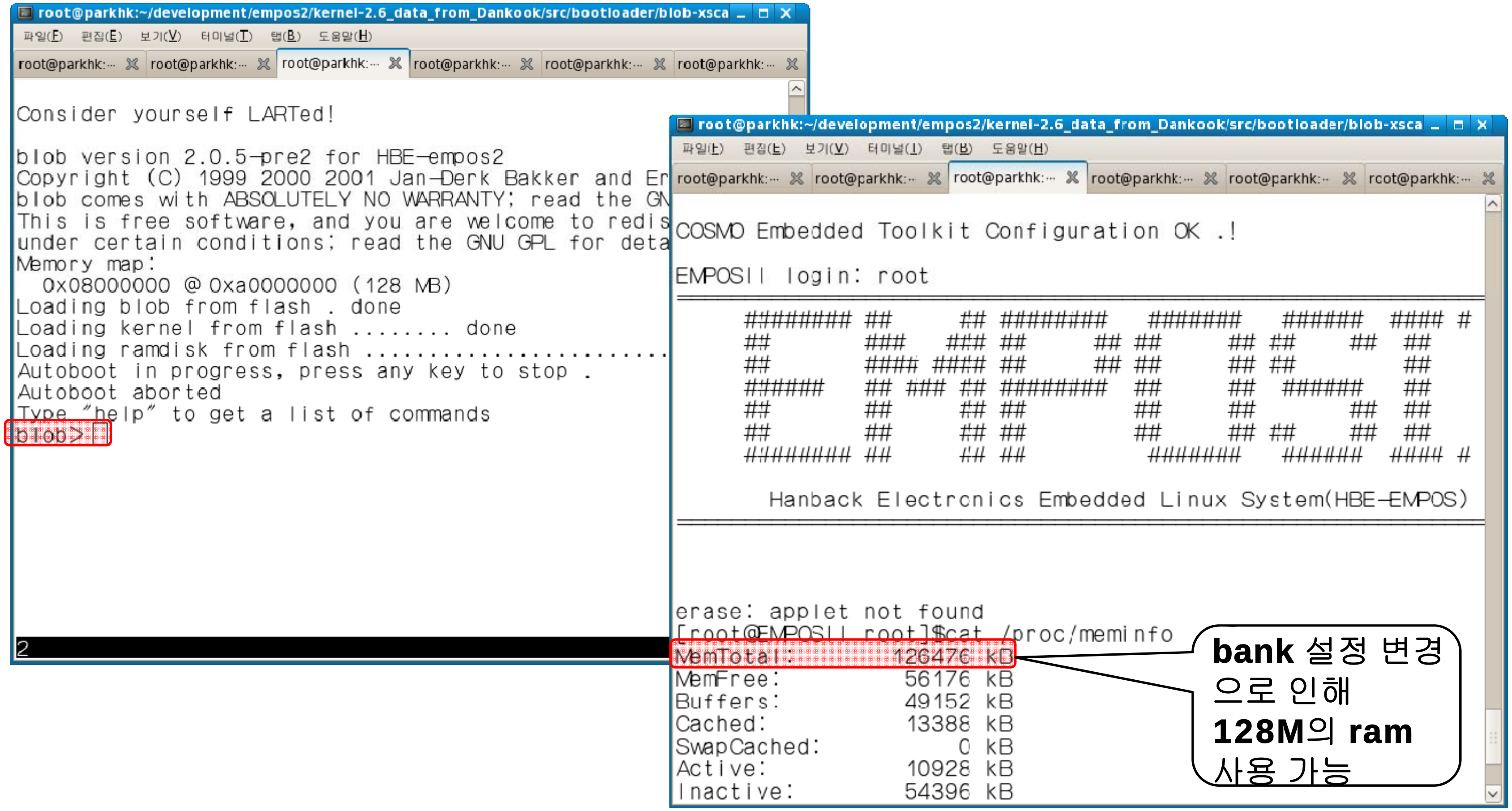


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xscale
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...
root@parkhk:~/...

```
[root@parkhk blob-xscale]# Jflash-Xscale src/blob/blob
JFLASH Version 1.00 - HBE-EMPOS
COPYRIGHT (C) 2000, 2001 Intel Corporation
JTAG Test Passed

ACT: 0110 1001001001100100 00000001001 1
EXP: **** 1001001001100100 00000001001 1

COTULLA revision C1

dsize = 8388608, max_write_buffer = 16, block_size = 65536
There are two 16-bit Flash devices in parallel

Characteristics for one device:
 Number of blocks in device = 128
 Block size = 65536 0x10000 word(16-bit)
 Device size = 8388608 0x800000 word(16-bit)

Sample block to address list:

 Block 0 = hex address: 00000000
 Block 40 = hex address: 00500000
 Block 80 = hex address: 00A00000
 Block 120 = hex address: 00F00000

Starting erase
Erasing done
```

blob boot loader porting

- blob command mode 화면 및 커널 부팅 후 화면


root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xsca
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:··· root@parkhk:··· root@parkhk:··· root@parkhk:··· root@parkhk:··· root@parkhk:···
root@parkhk:~/development/empos2/kernel-2.6_data_from_Dankook/src/bootloader/blob-xsca
파일(F) 편집(E) 보기(V) 터미널(T) 탭(B) 도움말(H)
root@parkhk:··· root@parkhk:··· root@parkhk:··· root@parkhk:··· root@parkhk:··· root@parkhk:···

```
Consider yourself LARTed!

blob version 2.0.5-pre2 for HBE-empos2
Copyright (C) 1999 2000 2001 Jan-Derk Bakker and Er
blob comes with ABSOLUTELY NO WARRANTY; read the GN
This is free software, and you are welcome to redis
under certain conditions; read the GNU GPL for deta
Memory map:
  0x08000000 @ 0xa0000000 (128 MB)
Loading blob from flash . done
Loading kernel from flash ........ done
Loading ramdisk from flash .........................
Autoboot in progress, press any key to stop .
Autoboot aborted
Type "help" to get a list of commands
blob>
2
```

```
COSMO Embedded Toolkit Configuration OK .!

EMPOSII login: root
=========================================================================
     ######## ##     ## ########   #######   ######  #### #
     ##       ###   ### ##     ## ##     ## ##    ##  ##
     ##       #### #### ##     ## ##     ## ##        ##
     ######   ## ### ## ########  ##     ##  ######   ##
     ##       ##     ## ##        ##     ##       ##  ##
     ##       ##     ## ##        ##     ## ##    ##  ##
     ######## ##     ## ##         #######   ######  #### #

       Hanback Electrcnics Embedded Linux System(HBE-EMPOS)
=========================================================================


erase: applet not found
[root@EMPOSII root]$cat /proc/meminfo
MemTotal:       126476 kB
MemFree:         56176 kB
Buffers:         49152 kB
Cached:          13388 kB
SwapCached:          0 kB
Active:          10928 kB
Inactive:        54396 kB
```

bank 설정 변경으로 인해 128M의 ram 사용 가능