The AT32AP7000 is not an MCU (microcontroller) with the internal ram, but a CPU (processor) are running code on the parallel Flash or SDRAM. The kit comes with Flash already programmed with UBoot above and SDRAM empty. With UBoot we will work and it is important not to erase UBoot Flash memory. Otherwise, you will need a cable JTAG ICE MK-II Atmel.

Connect the RS-232 cable to your kit ATNGW100 with a program like the MTK-2 programmer DS89C450, run mode Dumb Terminal.

- Disable Options-> Toggle DTR on connect / disconnect.
- Options-> Configure serial port. Port: COM1, Speed: 115200.
- Target-> Open COM1 at 115200 baud.
- Put the kit on food.
- Press the space bar and close the supply kit.

```
U-Boot 1.1.4-at0 (Jan  3 2007 - 10:30:09)
U-Boot code: 00000000 -> 000144f7  data: 24000000 -> 24002d80
SDRAM: 32 MB at address 0x10000000
Testing SDRAM...OK
malloc: Using memory from 0x11fc0000 to 0x12000000
Flash:  8 MB at address 0x00000000
DRAM Configuration:
Bank #0: 10000000 32 MB
In:    serial
Out:   serial
Err:   serial
Net:   macb0, macb1
Press SPACE to abort autoboot in 1 seconds
U-Boot>
```

Let see the memory before you even begin to erase data.

Flash parallel (8.389 MB – Offset 0x000000)		
Address (3 Octets – int64)	Size	Description
0x000000 @ 0x01FFFF	131.071 K	UBoot
0x020000 @ 0x7EFFFF	8.192 MB	Linux core or standalone application
0x7F0000 @ 0x7FFFFF	65.535 K	UBoot Parameter
SDRAM (33.554 MB – Offset 0x10000000)		
0x10000000 @ 0x11FBFFFF	33.292 MB	SDRAM
0x11FC0000 @ 0x12000000	262.144 KB	Memory allocation (Malloc)

You have three ways to update UBoot. But before, it is recommended you plug your kit on a 9 or 12 volts, to prevent a power interruption during the operation. In is paper we use the method number 2.

- UBoot
- Flash-update program
- JTAGICE mk-II

To use the Flash-update program, you must have an SD card. For my part, I use an old Canon 16 MB card.

1. Format the SD card by naming the volume UBoot
2. Download and burn to CD to install Ubuntu.
3. Restart now and run the Ubuntu CD in English, without altering your system.
4. In Ubuntu Application / Utilities / Terminal (it is case sensitive)
    a. Type "sudo su".
    b. Insert the SD card, type "df" and locate the media UBoot.
    c. Type "sudo umount / dev/sdc1".
    d. Type "sudo mke2fs-L UBoot / dev/sdc1".
    e. Run Firefox without close the terminal.
    f. Download the following two files and close FireFox
        i. flash-upgrade-atngw100-v2008.10.uimg
        ii. flash-upgrade-atngw100-v2008.10-oldmagic.uimg
    g. Type "cp Download / * / media / UBoot in terminal
    h. Remove your SD card and insert it in the kit.
    i. Reboot in Windows 7.
5. Restart UBoot with MTK-2
    a. U-Boot> Mmcinit

```
mmc: command 55 failed (status: 0x00100025)
Manufacturer ID:       06
OEM/Application ID:    0001
Product name:          16M
Product Revision:      0.1
Product Serial Number: 3382861569
Manufacturing Date:    11/08
CSD data: 8c0e012a 0ff981e9 f6d901e1 8a4000b7
CSD structure version:   1.2
MMC System Spec version: 3
Card command classes:    0ff
Read block length:       512
Supports partial reads
Write block length:      512
Does not support partial writes
Supports group WP:       2
Card capacity:           16056320 bytes
File format:             0/0
Write protection:
mmc: Using 6144 cycles data timeout
(DTOR=0x46)
```

    b. U-Boot> ext2load mmc 0:1 0x10400000 /flash-upgrade-atngw100-v2008.10.uimg

```
.............................................
.............................................
.............................................
.............
70447 bytes read
```

c. U-Boot> Bootm 0x10400000. If you have this, use the flash file-upgrade-ATNGW100-v2008.10-oldmagic.uimg to step b.

```
## Booting kernel from Legacy Image at 10400000 ...
   Image Name:   AVR32 Flash Upgrade Utility v0.2
   Image Type:   Blackfin Linux Kernel Image (gzip compressed)
   Data Size:    70383 Bytes = 68.7 kB
   Load Address: 10000000
   Entry Point:  90000000
   Verifying Checksum ... OK
Unsupported Architecture 0x11
ERROR: can't get kernel image!
```

Otherwise you will get this:

```
## Booting kernel from Legacy Image at 10400000 ...
   Image Name:   AVR32 Flash Upgrade Utility v0.2
   Image Type:   AVR32 Linux Kernel Image (gzip compressed)
   Data Size:    70383 Bytes = 68.7 kB
   Load Address: 10000000
   Entry Point:  90000000
   Verifying Checksum ... OK
   Uncompressing Kernel Image ... OK
Starting kernel at 90000000 (params at 11f71008)...
AVR32 Flash upgrade utility version 0.2
HSMC configuration: 0x00030001 0x06030504 0x00090009 0x00001103
Atmel AT49BV642D found at address 0x00000000
cfi: using AMD/Fujitsu command set
cfi: 2 erase regions (total size: 8388608 bytes)
  0 8 sectors, 8192 bytes each
  1 127 sectors, 65536 bytes each
Going to copy 104024 bytes to offset 0x00000000 in flash
Press `y' to continue, or any other key to abort
Erasing... 0x00000000-0x00001fffErasing... 0x00002000-
0x00003fffErasing... 0x00004000-0x00005fffErasing...
0x00006000-0x00007fffErasing... 0x00008000-0x00009fffErasing...
0x0000a000-0x0000bfffErasing... 0x0000c000-0x0000dfffErasing...
0x0000e000-0x0000ffffErasing... 0x00010000-0x0001ffffErasing...
done
Programming... 0x00000000-0x00001fffProgramming... 0x00002000-
0x00003fffProgramming... 0x00004000-0x00005fffProgramming...
0x00006000-0x00007fffProgramming... 0x00008000-
0x00009fffProgramming... 0x0000a000-0x0000bfffProgramming...
0x0000c000-0x0000dfffProgramming... 0x0000e000-
0x0000ffffProgramming... 0x00010000-0x00019657Programming...
done
Verifying... done
Flash upgrade successful. Please press reset or cycle power.
```

d. Press "Y" and when finished press reset your kit.

e. Note the new version to install UBoot

```
U-Boot 2008.10 (Apr 16 2009 - 10:33:49)
U-Boot code: 00000000 -> 00010f98  data: 000178d8 -> 0004e2e8
malloc: Using memory from 0x11f71000 to 0x11fb1000
DMA: Using memory from 0x11f6d000 to 0x11f71000
Flash:  8 MB at address 0x00000000
DRAM Configuration:
Bank #0: 10000000 32 MB
In:    serial
Out:   serial
Err:   serial
Net:   macb0, macb1
Press SPACE to abort autoboot in 1 seconds
U-Boot>
```

Now here's the new configuration of your flash memory..

Flash parallel (8.389 MB – Offset 0x000000)		
Address (3 Octets – int64)	Size	Description
0x000000 @ 0x01FFFF	131.071 K	UBoot
0x020000 @ 0x7EFFFF	8.192 MB	Linux core or standalone application
0x7F0000 @ 0x7FFFFF	65.535 K	UBoot Parameter
SDRAM (33.554 MB – Offset 0x10000000)		
0x10000000 @ 0x11F6CFFF	32.952 MB	SDRAM
0x11F6D000 @ 0x11F70FFF	16.383 KB	DMA
0x11F71000 @ 0x11FB1000	262.144 KB	Memory allocation (Malloc)
0x11FB1001 @ 0x12000000	323.583 KB	SDRAM

6. You can reformat your SD card in FAT. And if there is a new development to eventually replace step 5.b by: fatload mmc 0:1 0x10400000 /flash-upgrade-ATNGW100-v2008.10.uimg

TO DO

- CREATE First Standalone C program
- Copy program to FLASH
- Modify and create macro with setenv like UPDATE (SD to FLASH), Welcome Mesagge, RUN, VER…
- Recreate Board from schematic but only (CPU, RAM, SD) for future prototyping.
- Recreate board with altium.