

NUC980 SD Root Filesystem

Root Filesystem Image Production

Buildroot Configuration

File system production

```

> Filesystem images
                                Filesystem images
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys.
Pressing <Y> selects a feature, while <N> excludes a feature. Press <Esc><Esc> to exit, <?> for Help, </> for Search.
Legend: [*] feature is selected [ ] feature is excluded

[ ] axfs root filesystem
[ ] btrfs root filesystem
[ ] cloop root filesystem for the target device
[*] cpio the root filesystem (for use as an initial RAM filesystem)
[ ] cramfs root filesystem
[ ] erofs root filesystem
[*] ext2/3/4 root filesystem
    ext2/3/4 variant (ext4) --->
    (rootfs) filesystem label (NEW)
    (60M) exact size (NEW)
    (0) exact number of inodes (leave at 0 for auto calculation) (NEW)
    (5) reserved blocks percentage (NEW)
    (-0 ^64bit) additional mke2fs options (NEW)
        Compression method (no compression) --->
[ ] f2fs root filesystem
[*] initial RAM filesystem linked into linux kernel
[ ] jffs2 root filesystem
[ ] romfs root filesystem
[ ] squashfs root filesystem
[*] tar the root filesystem
    Compression method (no compression) --->
    () other random options to pass to tar
[ ] ubi image containing an ubifs root filesystem
[ ] ubifs root filesystem
[ ] yaffs2 root filesystem

```


Kernel Configuration (1)

Enable SD Support

```

.config - Linux/arm 5.10.140 Kernel Configuration
> Device Drivers > MMC/SD/SDIO card support
MMC/SD/SDIO card support
x Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). High
x <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Hel
x built-in [ ] excluded <M> module < > module capable
x
x l
x x      --- MMC/SD/SDIO card support
x x      <*>   HW reset support for eMMC
x x      <*>   Simple HW reset support for MMC
x x      <*>   MMC block device driver
x x      (8)   Number of minors per block device
x x      < >   SDIO UART/GPS class support
x x      < >   MMC host test driver
x x      *** MMC/SD/SDIO Host Controller Drivers ***
x x      [ ]   MMC host drivers debugging
x x      < >   Secure Digital Host Controller Interface support
x x      < >   MMC/SD/SDIO over SPI
x x      <*>   Nuvoton NUC980 SD Card support
x x      -*-*  Nuvoton NUC980 FMI-SD support
x x      < >   Synopsys DesignWare Memory Card Interface

```


Kernel Configuration (2)

Disable Ram Disk Support

```
.config - Linux/arm 5.10.140 Kernel Configuration
> General setup
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters a
<Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search
built-in [ ] excluded <M> module < > module capable

[*] uselib syscall
[ ] Auditing support
IRQ subsystem --->
Timers subsystem --->
Preemption Model (Preemptible Kernel (Low-Latency Desktop)) --->
CPU/Task time and stats accounting --->
RCU Subsystem --->
< > Kernel .config support
< > Enable kernel headers through /sys/kernel/kheaders.tar.xz
(17) Kernel log buffer size (16 => 64KB, 17 => 128KB)
(13) Temporary per-CPU printk log buffer size (12 => 4KB, 13 => 8KB)
Scheduler features ----
[ ] Control Group support ----
[*] Namespaces support --->
[ ] Checkpoint/restore support
[ ] Automatic process group scheduling
[ ] Enable deprecated sysfs features to support old userspace tools
[*] Kernel->user space relay support (formerly relayfs)
[ ] Initial RAM filesystem and RAM disk (initramfs/initrd) support
[ ] Boot config support
```


Kernel Configuration (3)

Boot command setting

```

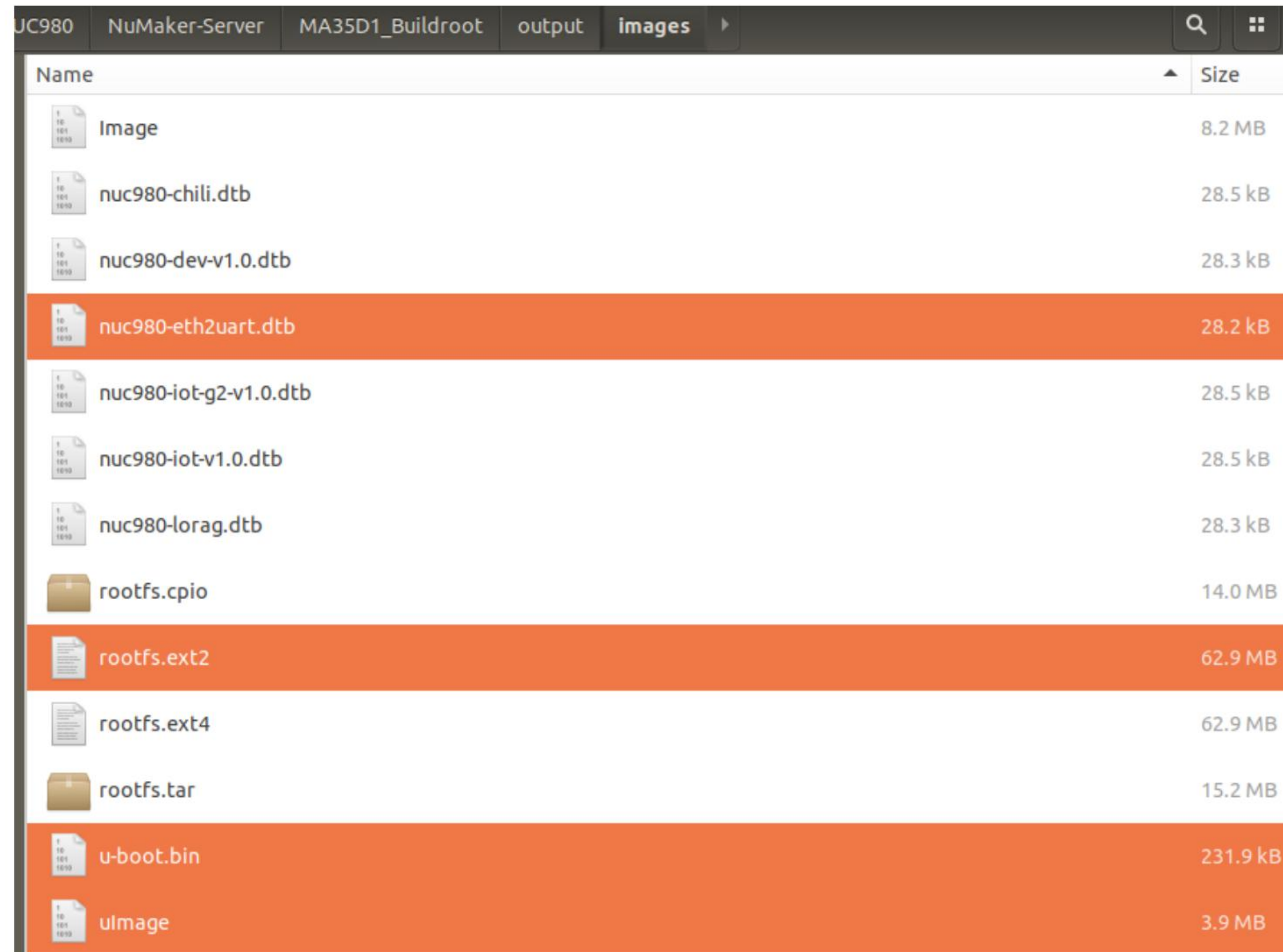
config - Linux/arm 5.10.140 Kernel Configuration
> Boot options
Boot options
* Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing
* <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*]
* built-in [ ] excluded <M> module < > module capable
*
*
* [*] Flattened Device Tree support
* [*] Support for the traditional ATAGS boot data passing
* [ ] Provide old way to pass kernel parameters
* (0) Compressed ROM boot loader base address
* (0) Compressed ROM boot loader BSS address
* [ ] Use appended device tree blob to zImage (EXPERIMENTAL)
* (c) console=ttyS0,115200n8 noinitrd rootfstype=ext4 root=/dev/mmcblk0p1 rw rootwait mem=64M Default

```


Compile

```
user@ubuntu:~/NUC980/NuMaker-Server/MA35D1_Buildroot$ make linux-rebuild && make -j4
support/dependencies/check-host-python3.sh: 23: [: Illegal number: error
rm -f /home/user/NUC980/NuMaker-Server/MA35D1_Buildroot/output/build/linux-custom/.stamp_installed
rm -f /home/user/NUC980/NuMaker-Server/MA35D1_Buildroot/output/build/linux-custom/.stamp_staging_installed
rm -f /home/user/NUC980/NuMaker-Server/MA35D1_Buildroot/output/build/linux-custom/.stamp_target_installed
rm -f /home/user/NUC980/NuMaker-Server/MA35D1_Buildroot/output/build/linux-custom/.stamp_images_installed
rm -f /home/user/NUC980/NuMaker-Server/MA35D1_Buildroot/output/build/linux-custom/.stamp_host_installed
rm -f /home/user/NUC980/NuMaker-Server/MA35D1_Buildroot/output/build/linux-custom/.stamp_built
>>> linux custom Configuring
... linux custom Building
```

Output Images



Name	Size
Image	8.2 MB
nuc980-chili.dtb	28.5 kB
nuc980-dev-v1.0.dtb	28.3 kB
nuc980-eth2uart.dtb	28.2 kB
nuc980-iot-g2-v1.0.dtb	28.5 kB
nuc980-iot-v1.0.dtb	28.5 kB
nuc980-lorag.dtb	28.3 kB
rootfs.cpio	14.0 MB
rootfs.ext2	62.9 MB
rootfs.ext4	62.9 MB
rootfs.tar	15.2 MB
u-boot.bin	231.9 kB
ulmage	3.9 MB

Uboot environment variables

980env-emmc.txt

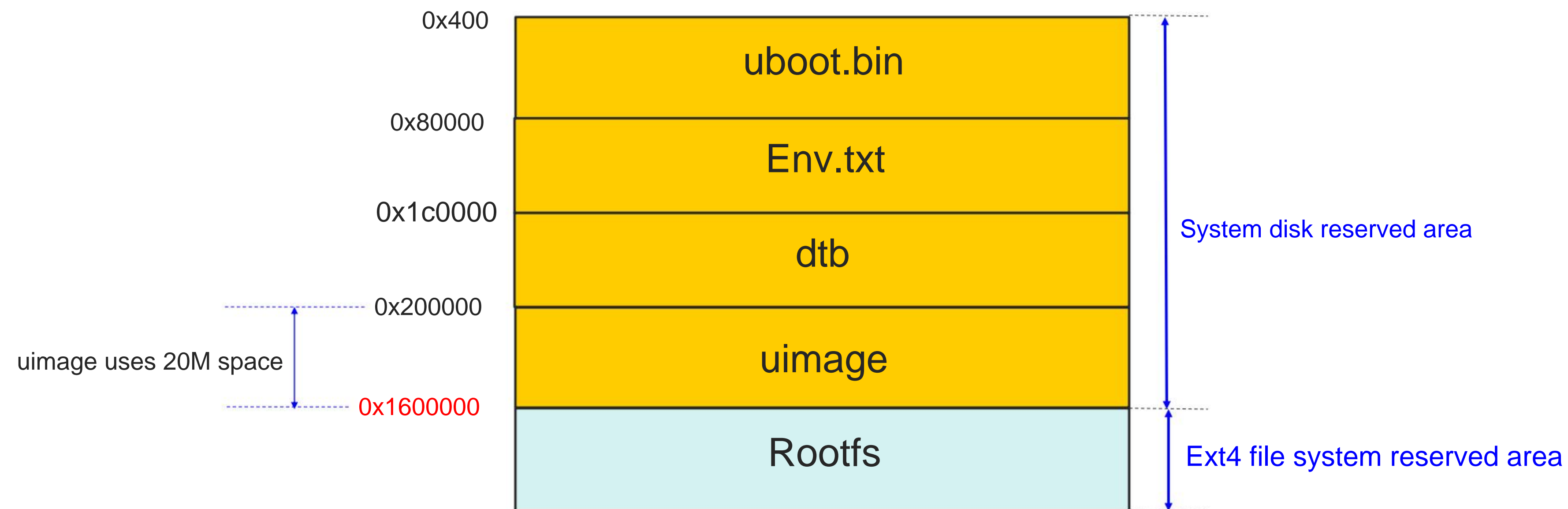
```
baudrate=115200
bootdelay=1
stderr=serial
stdin=serial
stdout=serial
loadkernel=mmc read 0x7fc0 0x1000 0x6000
loaddtb=mmc read 0x1400000 0xE00 0x256
bootargs=noinitrd root=/dev/mmcblk0p1 rootfstype=ext4 rw rootwait console =ttyS0 rdinit=/sbin /init mem=64M bootcmd=run loadkernel;run
loaddtb;bootm 0x7fc0 - 0x1400000
```


SD Card Partition Layout

Plan the SD card into two usage areas: 1. System

disk reserved area 2. File

system reserved area

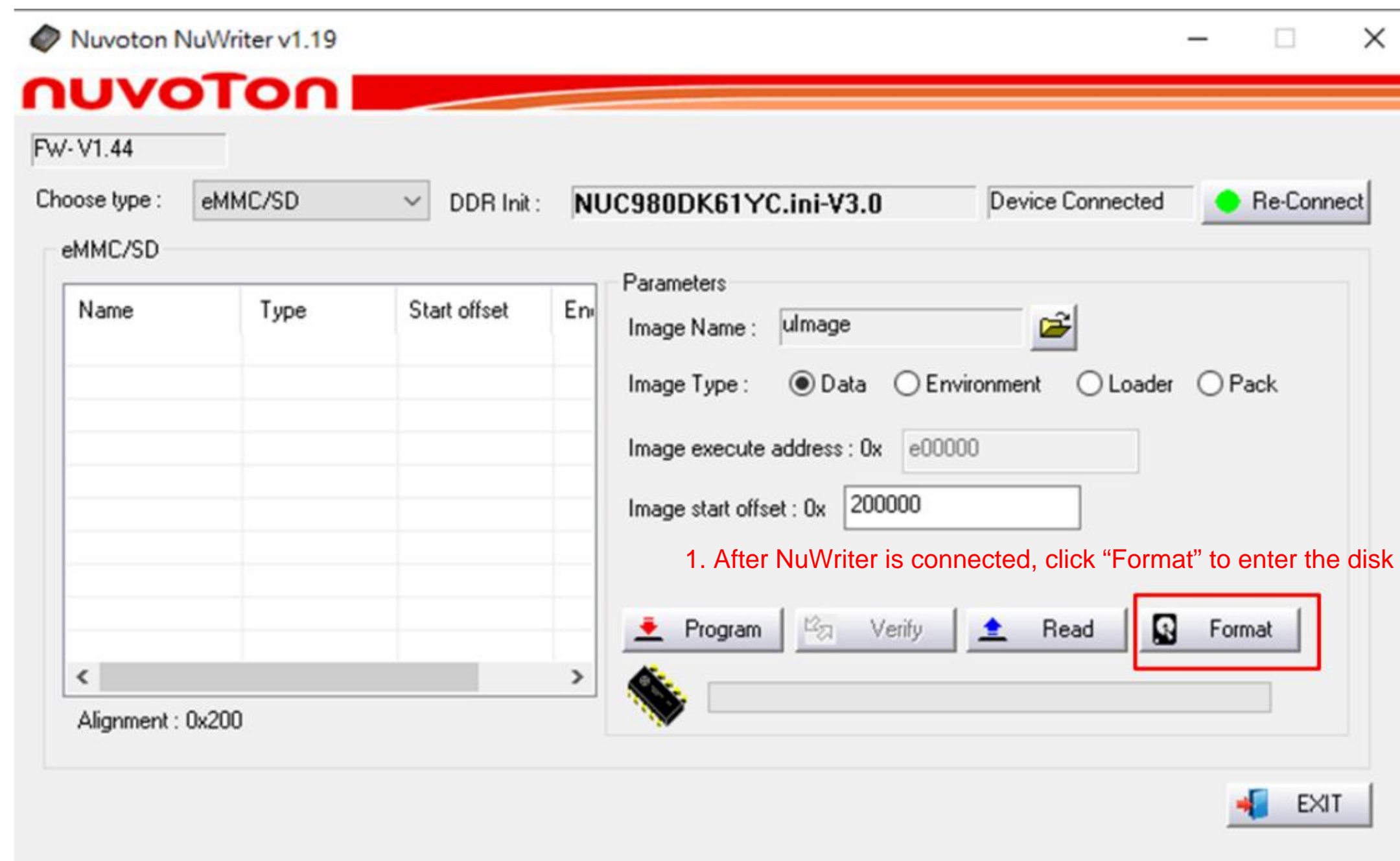


SD Card Partition creation-system disk reserved area setting (1)

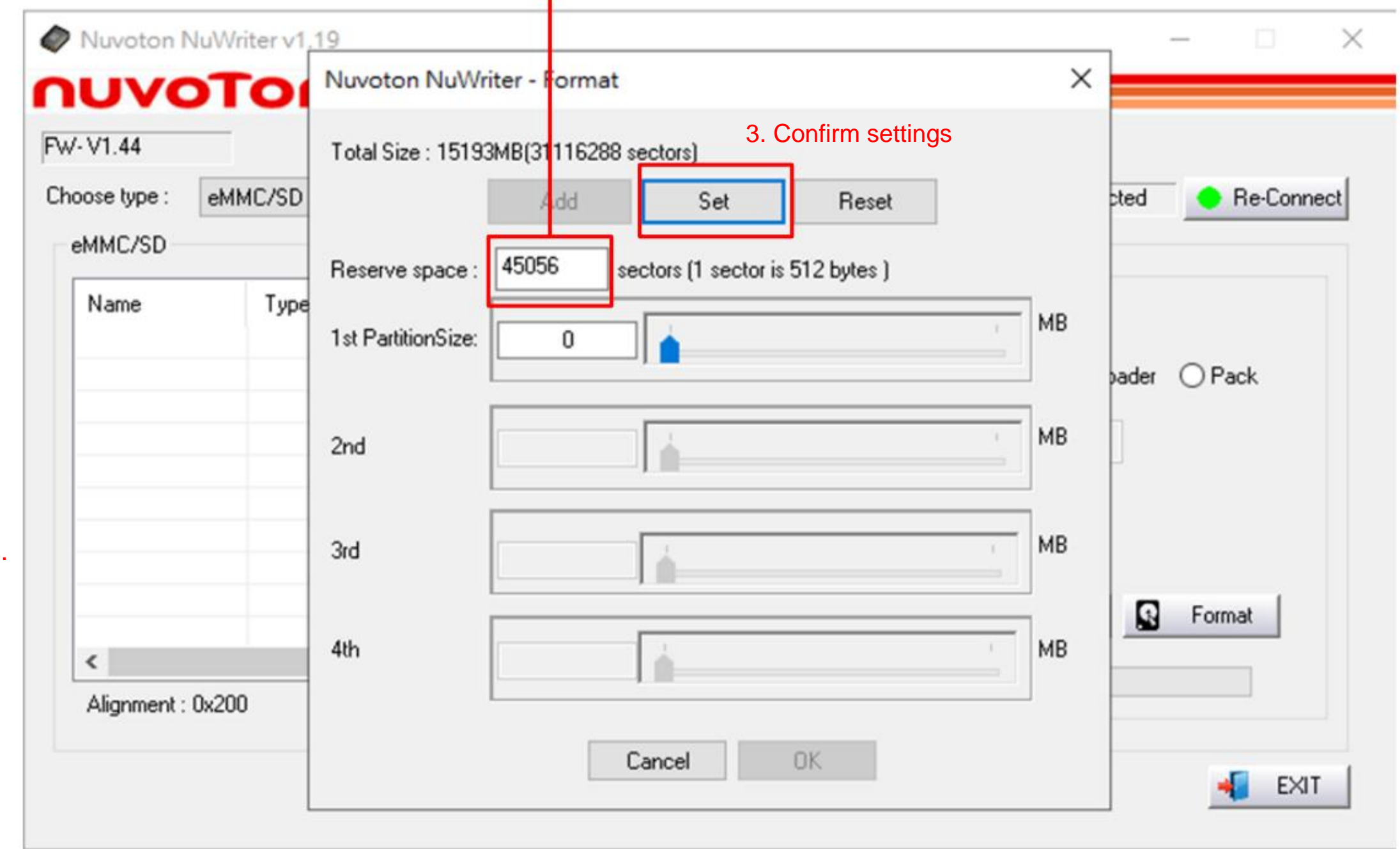
Use NuWriter to reserve disk space required for system burning

2. Specify the system disk reserved area: 0x1600000

$0x1600000 / 512 = 45056$



1. After NuWriter is connected, click "Format" to enter the disk settings.

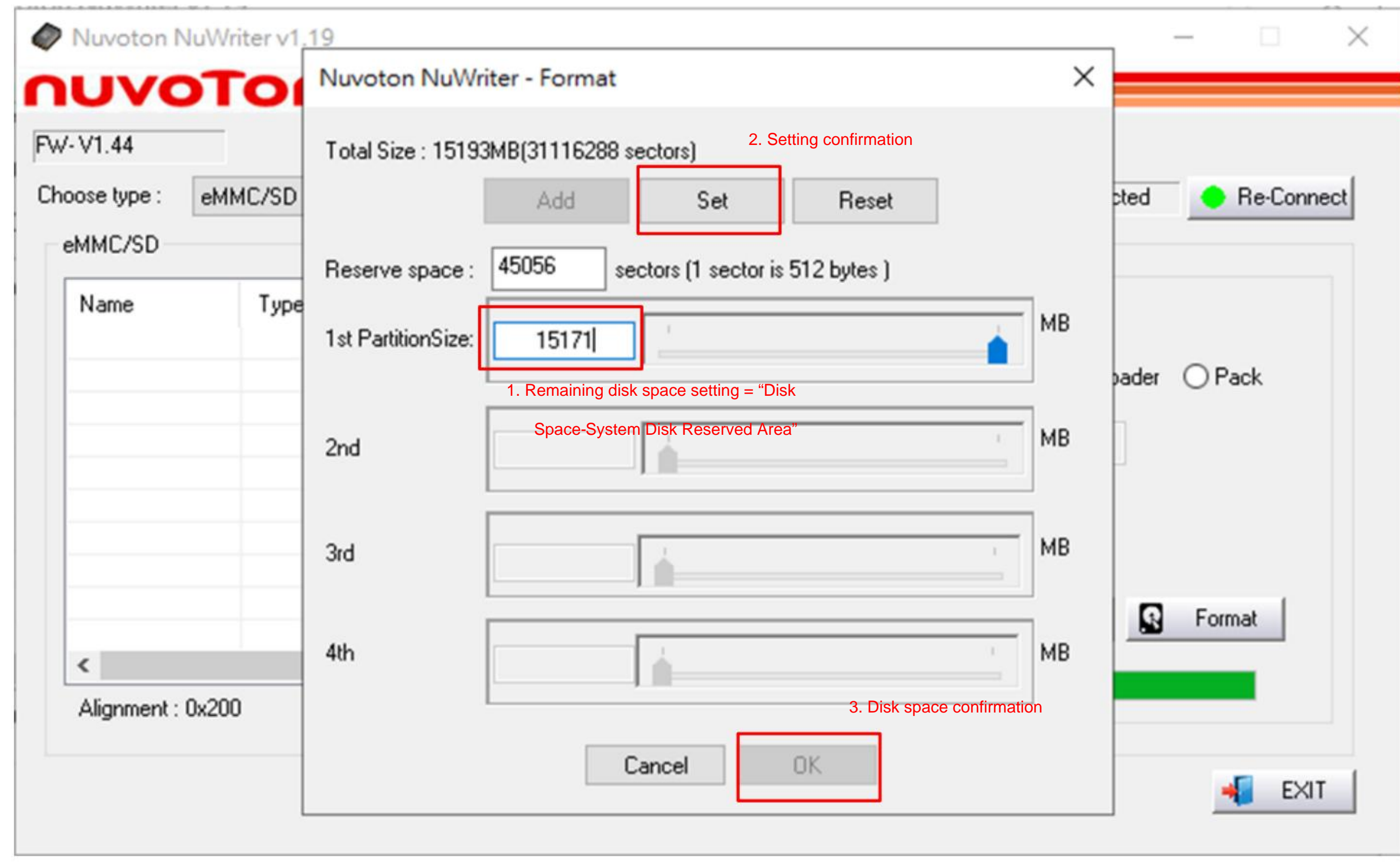


3. Confirm settings

SD Card Partition creation-system disk reserved area setting (2)



Remaining disk space settings



Burn

The screenshot shows the Nuvoton NuWriter v1.19 software interface. At the top, the title bar reads "Nuvoton NuWriter v1.19". Below the title bar is the Nuvoton logo. The main window contains several fields and controls:

- FW-V1.44**: A text field containing the firmware version.
- Choose type :** A dropdown menu set to "eMMC/SD".
- DDR Init :** A text field containing "NUC980DK61YC.ini-V3.0".
- Device Connected**: A status indicator with a green light.
- Re-Connect**: A button to refresh the device connection.

The "eMMC/SD" section features a table with the following data:

Name	Type	Start offset	End
rootfs	DATA	0x1600000	0x5
ulmage	DATA	0x200000	0x5
nuc980-eth2uart	DATA	0x1c0000	0x1
980env--mmc	ENV	0x80000	0x9
u-boot	uBOOT	0x400	0x3

A red box highlights the "rootfs" row, with a red arrow pointing to the text "rootfs.ext2" located to the left of the table.

The "Parameters" section includes:

- Image Name :** A text field containing "rootfs" with a folder icon to its right.
- Image Type :** Radio buttons for "Data" (selected), "Environment", "Loader", and "Pack".
- Image execute address :** A text field containing "0xe00000".
- Image start offset :** A text field containing "0x1600000".

At the bottom of the Parameters section, there are four buttons: "Program" (with a red arrow icon), "Verify" (with a yellow arrow icon), "Read" (with a blue arrow icon), and "Format" (with a black icon). Below these buttons is a green progress bar and a small chip icon.

At the bottom right of the window is an "EXIT" button.

Test

```
~ #ls
bin    lib    lost+found opt    run tmp
dev    lib32 media proc linuxrc mnt    sbin  usr
etc                                root  sys   var
```

```
~ #touch 123
```

```
~ #ls
123    lib    media root tmp
      lib32 mnt linuxrc run    usr
bindev opt lost+found sbin  var
etc    proc ~ # sync    sys
```

```
~ # reboot
```

```
NUC980 IBR 20180813
```

```
Boot from SD
```

```
DDR-OK
```

```
finish SD dow yoad
```

```
U-Boot 2016.11 (Jul 19 2023 - 17:53:15 +0800 )
```

```
CPU: NUC980
```

```
Board: NUC980
```

```
DRAM: 64 MiB
```

```
MMC: NUC980 eMMC: 0
```

```
In: serial
```

```
Out: serial
```

```
Err: serial
```

```
Net: Net Initialization Skipped
```

```
No ethernet found.
```

```
Hit any key to stop autoboot : 0
```

```
...
```

```
~ #ls
123    lib    media root tmp
      lib32 mnt linuxrc run    usr
bindev opt lost+found sbin  var
etc    proc ~ # sync    sys
```