

Nextor 2.0 Alpha 2 Getting Started Guide

By Konamiman, 8/2011

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1. Introduction

Nextor is an enhanced version of MSX-DOS 2, the disk operating system for MSX computers. It is based on MSX-DOS 2.31, with which it is 100% compatible.

This document provides a walkthrough of the features that Nextor adds to MSX-DOS in the form of a step-by-step guide. In order to make it easier for everyone, this guide assumes that the blueMSX emulator will be used for the walkthrough together with an emulated Sunrise IDE controller. Users of other emulators will need to adapt the steps of section 2 appropriately; on the other hand, users of real MSX hardware should take a look at section 2.1.

The reader of this document is assumed to have experience with MSX-DOS 2 at least at the user level. Also, it is a good idea to get acquainted with Nextor by reading *Nextor 2.0 Alpha 2 User Manual* prior to (or in parallel with) this document.

Note: in this guide the following Nextor tools will be used: MAPDRV.COM, LOCK.COM and RALLOC.COM. The other tools are simple enough for not needing a step-by-step usage explanation; remember however that all the Nextor tools are explained in the *Nextor 2.0 Alpha 2 User Manual* and that you can get help for any of the tools by issuing a TYPE command directly on the command file (for example `TYPE FASTOUT.COM`).

WARNING: Nextor is in alpha state. This means that it has not been thoroughly tested, so please backup your valuable data before using it. Also, not all the planned features are implemented yet.

2. Setting up blueMSX

This section explains the steps needed to setup blueMSX in order to follow this guide. The blueMSX emulator can be downloaded at <http://www.bluemsx.com>.

- a. Download the following files from [Konamiman's MSX page](http://www.konamiman.com#nextor) (<http://www.konamiman.com#nextor>):
 - Nextor kernel with Sunrise IDE driver
 - Nextor tools disk image
- b. Run blueMSX and select the *Tools - Machine Editor* menu.
- c. Select the machine configuration named "MSX2".
- d. Select the *Memory* tab and press the *Add...* button.
- e. In the *Slot* list select "Slot 1". In the *Type* list select "Sunrise IDE".
- f. In the *File* box browse the Nextor kernel file you have downloaded in step a (or simply paste the whole file path). Then press the *Ok* button to close the window.
- g. Press the *Save as...* button and save the machine configuration with the name "MSX2 with Sunrise IDE and Nextor". Then press the *Close* button to close the window.

h. Select the *File - Disk Drive A - Insert* menu. Select the Nextor tools disk image file you have downloaded in step a.

i. Select the *File - Hard Disk - IDE Sunrise Primary - Insert New Disk Image* menu. In the *Disk Size* list select "100 MB". Give the disk image any name you want and click the *Open* button.

Now you have an emulated MSX2 with a Sunrise IDE controller that has the Nextor kernel in its flash ROM and a 100MB hard disk as the master device. Also, you have the Nextor utils disk in the floppy disk drive.

2.1. Setting up a real MSX

If you want to follow the steps of this guide by using a real MSX computer with a Sunrise IDE controller and a floppy disk drive instead of an emulator, you will need to do the following:

- Download the Nextor kernel with Sunrise IDE driver.
- Copy the NEXTOR.SYS and COMMAND2.COM files and the Nextor tools to a floppy disk. You have two options:
 - Download the Nextor tools disk image file and transfer its contents to a floppy disk.
 - Download the Nextor tools LZH file and uncompress it to a floppy disk, together with the NEXTOR.SYS and COMMAND2.COM files.

Note: The Nextor kernel, NEXTOR.SYS and the Nextor tools are available at [Konamiman's MSX page](http://www.konamiman.com#nextor) (<http://www.konamiman.com#nextor>).

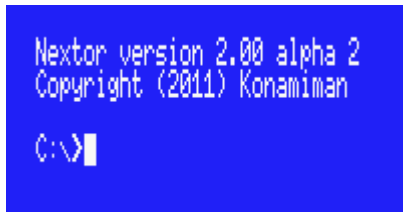
- Copy the MSXDOS.SYS and COMMAND.COM files to the floppy disk, these are necessary for the steps that involve booting in MSX-DOS 1 mode. These files are included in the Nextor tools disk image file, but can be found on other places on Internet too (search for "MSXDOS.SYS" on any search engine).
- Insert the floppy disk in the drive and attach an IDE device (hard disk or compact flash card) of at least 100MB to the Sunrise IDE controller as the master device, or to the first card slot if you are using a CF reader. The device should be completely blank, that is, it should not contain any partition or filesystem; otherwise you may get different results from these described in the next section until you repartition the device.

Please note that if you use an existing IDE device, following the steps of this guide will delete all the data on the device.

3. Booting and creating partitions

Once all the hardware (real or emulated) is in place, now we'll see what happens when we try to boot without having defined any partition for the IDE device, then we'll create and prepare some partitions.

- a. Boot your MSX. You will see that you boot in the COMMAND2 prompt in drive C:, as in the following image:



What has happened? Nextor has assigned two drives to the Sunrise IDE driver (A: and B:) and another two drives to the floppy disk drive (C: and D:). Then it has attempted to search a suitable FAT12 or FAT16 partition in the attached hard disk in order to assign it to drive A:, but since the hard disk has no partitions yet, drive A: has been left unassigned (we'll see later what happens with drive B:). Drive C:, assigned to the floppy disk, is the first valid drive, and so it is used as the boot drive.

- b. Type BASIC and then CALL FDISK to invoke the device partitioning tool.
- c. Press "1" to select the Sunrise IDE driver, then "1" again to select the hard disk, then "1" again to select the first (and only) logical unit.
- d. If you were using an already partitioned device, press "D" to delete the existing partitions.
- e. Press "P" to add a partition. Type "50" to create a 50MB partition.
- f. Repeat step e but this time create a 25MB partition.
- g. Repeat step e but this time create a 16MB partition.
- i. Press "A" to use all the remaining disk space (9214K) for yet another partition.
- j. Press "S" to see the defined partitions. You should see four partitions, as in the following image:



- k. Press ESC to return to the main menu, then press "W" to create the partitions on the disk. Press "y" on the data destroy warning prompt.
- l. Reset your MSX. You will see that the computer boots in the BASIC prompt.

What has happened? Nextor has assigned drives A: and B: to the IDE controller again. However, since now the attached device has valid partitions, Nextor has assigned the first suitable partition found (the one that is 50MB big) to drive A:, so this is now the boot drive. But since the partition has not the Nextor boot files yet, the system boots in the BASIC prompt.

m. Copy the Nextor system files from the floppy disk to drive A: by executing the following commands:

```
COPY "C:NEXTOR.SYS" TO "A:"  
COPY "C:COMMAND2.COM" TO "A:"
```

n. Reset your computer and you will see that now it boots in the COMMAND2.COM prompt from drive A:. Issue a `DIR` command and you should see the following (notice the 50M free space):



```
Nextor version 2.00 alpha 2  
Copyright (2011) Konamiman  
  
A:\>dir  
Volume in drive A: has no name  
Directory of A:\  
  
NEXTOR   SYS      4595 06-07-31 15:53  
COMMAND2 COM    23935 10-29-30  2:44  
27K in 2 files 51052K free  
A:\>█
```

NOTE: Please be patient with the `DIR` command, especially if you are not using a MSX Turbo-R computer. Calculating the free space of a 50MB partition will take quite a few time to your MSX. If you are using an emulator, you can probably increase the speed of the emulated machine.

4. Mapping partitions and changing the boot partition

So far we have seen that Nextor has performed an automatic drive to partition mapping. Now we'll see how to instruct Nextor to select a different partition at boot time, and how perform manual mapping after the system has booted.

a. Assign partition 2 to drive B: by executing with the following command:

```
C:MAPDRV B: 2-0 1 1
```

("2-0" is the primary partition 2, and "1 1" means "driver in slot 1, device index 1". Issue a `TYPE C:MAPDRV.COM` command for more details.)

b. Perform a `DIR B:` command. Check that drive B: has indeed 25MB of free space.

c. Copy the Nextor system files to drive B: with the following commands:

```
COPY NEXTOR.SYS B:  
COPY COMMAND2.COM B:
```

- d. Create an empty file named NEXTOR.DAT in drive B:. You can achieve this by executing a `COPY CON B:NEXTOR.DAT` command, then pressing CTRL+Z, then pressing Enter.
- e. Reset your MSX, and when you are in the COMMAND2 prompt, perform a DIR command and check that this time drive A: is assigned to the second (25MB big) partition:

```
Nextor version 2.00 alpha 2
Copyright (2011) Konaminan

A:\>dir
Volume in drive A: has no name
Directory of A:\

NEXTOR   SYS      4595 06-07-31 15:53
COMMAND2 COM    23935 10-29-30  2:44
NEXTOR   DAT         0 07-11-11 15:44
27K in 3 files 25552K free
A:\>|
```

What has happened? When performing the automatic drive to device and partition mapping assignment at boot time, Nextor normally selects the first valid (FAT12 or FAT16) partition available. But if there are partitions with a file named “NEXTOR.DAT” in the root directory, then these partition have preference in the assignment process. The contents of the NEXTOR.DAT file are irrelevant in this version of Nextor.

5. Booting in MSX-DOS 1 mode

Now we will see what happens with the automatic partition assignment process when we try to boot in MSX-DOS 1 mode.

- a. Map partition 3 to drive B: by executing the following:

```
C:MAPDRV B: 3-0 1 1
```

- b. Copy the MSX-DOS 1 system files to drive B: by executing the following:

```
COPY C:MSXDOS.SYS B:
COPY C:COMMAND.COM B:
```

- c. Reset the computer while keeping pressed the “1” key. You will boot in MSX-DOS 1 mode and in the COMMAND.COM prompt. Issue a DIR command and you should see the following (notice the 16M free space):

```
MSX-DOS version 1.8
Copyright 1986 by Microsoft

COMMAND version 1.12

A>dir
MSXDOS  SYS      2432  9-22-20  20:48
COMMAND COM      7168  9-22-20  20:48
      2 files 16711680 bytes free
A>|
```

What has happened? When booting in MSX-DOS 1 mode, Nextor assigns two drives to the IDE driver and performs an automatic drive to device and partition assignment, as when booting in normal mode. However, this time the partitions that can't be handled in MSX-DOS 1 mode are skipped during the assignment procedure; MSX-DOS 1 can handle only FAT12 partitions with three or less sector per FAT. The first partition (50MB big) is skipped because it is FAT16. The second partition (25MB big) is skipped because it is FAT12 but has more than three sectors per FAT. Thus the third partition (16MB big) becomes the first one available, and it is then mapped to drive A:.

Remember that all partitions of 16MB or less created with the Nextor built-in partitioning tool are MSX-DOS 1 compatible.

- d. Reboot the computer in normal mode again.
- e. Map partition 4 to drive B: by executing the following:

```
C:MAPDRV B: 4-0 1 1
```

- f. Copy the MSX-DOS 1 system files to drive B: as you did in step b, then create an empty NEXTOR.DAT file in drive B: as you did in the previous section.
- g. Boot the computer while keeping pressed the "1" key. You will boot in MSX-DOS 1 mode and in the COMMAND.COM prompt again. Issue a DIR command and you should see the following (notice the 9M free space):

```
MSX-DOS version 1.8
Copyright 1986 by Microsoft

COMMAND version 1.12

A>dir
MSXDOS  SYS      2432  9-22-20  20:48
COMMAND COM      7168  9-22-20  20:48
NEXTOR  DAT         0  7-12-11  15:36
      3 files 9388832 bytes free
A>|
```

What has happened? The rule "give priority to partitions holding a file named NEXTOR.DAT at the root directory during the automatic drive to device and partition assignment at boot time" is valid when booting in MSX-DOS 1 mode too, but this time only the MSX-DOS 1 compatible partitions are checked (partitions 3 and 4 in this case, being partition 4 the "winner" partition).

The remaining steps will leave the environment ready for the next section.

- h. Boot the computer in normal mode.
- i. You should have booted with partition 2 (the one 25M big) mapped to drive A:. If so, simply delete the NEXTOR.DAT file in that drive (`DEL NEXTOR.DAT`). If not, map partition 2 to drive B: (`C:MAPDRV B: 2-0 1 1`) and then delete the file (`DEL B:NEXTOR.DAT`).
- j. Map partition 4 to drive B: and then delete the NEXTOR.DAT file.

6. Using a second storage device

Now we will see what happens when we add a second storage device to the IDE controller.

Step a applies when using the blueMSX emulator. If you are using a different emulator, you should perform the appropriate steps to attach a second 100M emulated hard disk as the slave device to the IDE controller. If you are using a real MSX, you should attach an (at least 100M big) real device configured as slave to the IDE controller, or insert an additional card in the second card slot.

- a. Select the *File - Hard Disk - IDE Sunrise Secondary - Insert New Disk Image* menu. In the *Disk Size* list select “100 MB”. Give the disk image any name you want and click the *Open* button.
- b. Reset the computer, go to BASIC and invoke the device partitioning tool with `CALL FDISK`.
- c. Partition the device as you did in section 2. This time, however, you should select device 2 in the device selection screen; and you should create just two partitions, the first one having a size of 85M and the second one of 15M.
- d. Reset the computer. Once in the COMMAND2 prompt, issue a `DIR` command and check that drive A: has 50M free. Then issue a `DIR B:` command and check that drive B: has 85M free (again, please be patient, especially with the second DIR command):

```
Nextor version 2.00 alpha 2
Copyright (2011) Konamiman

A:\>dir
Volume in drive A: has no name
Directory of A:\

NEXTOR   SYS      4595 06-07-31 15:53
COMMAND2 COM    23935 10-29-30  2:44
27K in 2 files 51052K free
A:\>dir b:
Volume in drive B: has no name
Directory of B:\

0 bytes in 0 files    86852K free
A:\>|
```


What has happened? Drive A: has been mapped to the first available partition on the first available device, as usual. However, once this has been done, Nextor searches for more suitable partitions on additional devices; if one is found, it is mapped to the second drive assigned to the driver, B: in this case. So drive A: is mapped to the first partition in the master device (50M big) and drive B: is mapped to the first partition in the slave device (85M big).

e. Create an empty NEXTOR.DAT file in drive B:. Also, copy the NEXTOR.SYS and COMMAND2.COM files to drive B:.

f. Reset your computer and issue a `DIR` command, then a `DIR B:` command. Notice that the mapping is reversed relative to the previous case (A: is mapped to the 85M partition on slave device, B: is mapped to the 50M partition on master device):

```
Nextor version 2.00 alpha 2
Copyright (2011) Konamiman

A:\>dir
Volume in drive A: has no name
Directory of A:\

NEXTOR.DAT      0 07-13-11 13:48
NEXTOR.SYS      4595 06-07-31 15:53
COMMAND2.COM    23935 10-29-30  2:44
27K in 3 files 86822K free
A:\>dir b:
Volume in drive B: has no name
Directory of B:\

NEXTOR.SYS      4595 06-07-31 15:53
COMMAND2.COM    23935 10-29-30  2:44
27K in 2 files 51052K free
A:\>█
```

What has happened? The rule “give priority to partitions holding a file named NEXTOR.DAT at the root directory during the automatic drive to device and partition assignment at boot time” applies to all partitions on all devices, not only to the first device. Taking in account both the master and the slave devices, the only partition having a NEXTOR.DAT file is the first partition on the slave device, and therefore this one is assigned to drive A:. After this is done, other devices are scanned for a partition to be mapped to drive B:; in this case the only “other device” available is the master device, and thus its first partition is mapped to drive B:.

g. Map partition 2 of slave device to drive B: (`C:MAPDRV /L B: 2-0 1 2`). Copy the MSXDOS.SYS and COMMAND.COM files to drive B:. (Notice the “/L” parameter in the MAPDRV command, we’ll return at it in the next section).

h. Reset the computer while keeping pressed the “1” key. You will boot in MSX-DOS 1 mode and in the COMMAND.COM prompt. Issue a `DIR` command, then a `DIR B:` command. Notice that in the first case you get 16M of free space, and in the second case you get 15M:

```

MSX-DOS version 1.8
Copyright 1986 by Microsoft

COMMAND version 1.12

A>dir
MSXDOS  SYS      2432  9-22-20  20:48
COMMAND  COM      7168  9-22-20  20:48
      2 files 16711680 bytes free
A>dir b:
MSXDOS  SYS      2432  9-22-20  20:48
COMMAND  COM      7168  9-22-20  20:48
      2 files 15679488 bytes free
A>

```

What has happened? Drive A: has been mapped to the first available partition on the master device, and drive B: has been mapped to the first available partition on the slave device, as in the previous case. However, this time only the MSX-DOS 1 compatible partitions have been taken in account. These are partitions 3 and 4 in the master device (partition 3, 16M big, is selected) and partition 2 in the slave device (15M big).

- i. Create an empty NEXTOR.DAT file in drive B:.
- j. Reset the computer while keeping pressed the “1” key. You will boot in MSX-DOS 1 mode and in the COMMAND.COM prompt. Issue a `DIR` command, then a `DIR B:` command. Notice that the mapping is reversed relative to the previous case (A: is mapped to the 15M partition on slave device, B: is mapped to the 16M partition on master device):

```

MSX-DOS version 1.8
Copyright 1986 by Microsoft

COMMAND version 1.12

A>dir
NEXTOR   DAT        1  7-12-11  18:34
MSXDOS   SYS      2432  9-22-20  20:48
COMMAND  COM      7168  9-22-20  20:48
      3 files 15663104 bytes free
A>dir b:
MSXDOS   SYS      2432  9-22-20  20:48
COMMAND  COM      7168  9-22-20  20:48
      2 files 16711680 bytes free
A>

```

What has happened? You should have guessed it already: both devices have been scanned for partitions, only the MSX-DOS 1 partitions have been taken in account, and the partition having a NEXTOR.DAT file has been given priority in the mapping process and thus it has been mapped to drive A:.

- k. Delete the NEXTOR.DAT from drive A:.. Reset your computer in normal mode, delete the NEXTOR.DAT from drive A: again, and reset once more. You should be in the COMMAND2 prompt and have the 50M partition mapped to drive A:.

7. Locking drives

In this section we'll try the drive lock feature. The first batch of steps assumes that you are using the experimental Sunrise IDE driver that is shipped with the Alpha 2 version of Nextor. This driver assumes that both the master and slave devices are removable, and it always reports a change status of "Unchanged" for the master device and a status of "Unknown" (the driver doesn't know if the attached device has changed or not since the last status check) for the slave device. This is designed this way on purpose to easy testing while Nextor is in Alpha state.

- a. Map the second partition of the slave device to drive B: (`C:MAPDRV B: 2-0`). Notice that this time we don't specify driver slot and device number, since drive B: is already mapped to another partition in the same driver and device.
- b. Issue a `DIR B:` command. See that the free space is 15M, which is indeed the size of the second partition on the slave device.
- c. Issue a `DIR B:` command again. Notice that this time the free space is 86M and the files listed are different as well: drive B: has been automatically mapped to the first partition of the slave device again:

```
Nextor version 2.00 alpha 2
Copyright (2011) Konamiman

A:\>c:mapdrv b: 2-0

A:\>dir b:
Volume in drive B: has no name
Directory of B:\

MSXDOS  SYS      2432 09-22-20 20:48
COMMAND  COM      7168 09-22-20 20:48
 9K in 2 files 15312K free
A:\>dir b:
Volume in drive B: has no name
Directory of B:\

NEXTOR   SYS      4595 06-07-31 15:53
COMMAND2 COM    23935 10-29-30  2:44
27K in 2 files 86822K free
A:\>|
```

What has happened? Whenever Nextor is about to access the device mapped to a certain drive, and when the device is removable, it asks the driver if the storage media has changed. If the answer is "Yes" or "I don't know" (as is always the case with the slave device on the experimental driver used), then it assumes that the previous mapping state is no longer valid, and assigns to the drive the first available partition on the device (which in this case is the first partition, 85M big). The first DIR succeeds because the media change is not actually checked on each device access, but after a certain amount of time has passed (this time is very small: if the partition had contained more files, you would have got a "Wrong disk for file reading file B:" error).

- d. Map the second partition of the slave device to drive B: again, but this time adding a "/L" parameter to the MAPDRV command line: `C:MAPDRV /L B: 2-0`

e. Issue a DIR B: command twice. Notice that now the partition assignment is persistent (you get 15M free both times):

```
A:\>c:\mapdrv /l b: 2-0

A:\>dir b:
Volume in drive B: has no name
Directory of B:\

MSXDOS  SYS      2432 09-22-20 20:48
COMMAND COM      7168 09-22-20 20:48
 9K in 2 files 15312K free
A:\>dir b:
Volume in drive B: has no name
Directory of B:\

MSXDOS  SYS      2432 09-22-20 20:48
COMMAND COM      7168 09-22-20 20:48
 9K in 2 files 15312K free
A:\>|
```

What has happened? By adding the “/L” parameter to the MAPDRV command line, the drive is locked immediately after performing the mapping. When a drive is locked, Nextor will never ask the driver for media change status, assuming instead that the media will never change. Doing this is necessary when mapping drives to removable devices handled by drivers that can’t supply proper media change status information.

f. Execute the following command: C:LOCK C: ON

g. Issue a DIR C: command. You will see a directory listing of the Nextor tools floppy disk.

h. Remove the floppy disk from the drive (if you are using blueMSX, select the *File - Disk Drive A - Eject: nextor.dsk* menu option).

i. Issue a DIR C: command again. You will see the same directory listing again instead of getting a “Not Ready” error, even though the disk has been removed from the drive.

What has happened? Nextor allows locking any drive, not only the drives controlled by a Nextor driver. In this case, we have locked the floppy disk drive, whose change status would otherwise be checked on each disk access (floppy disk drives usually report a change status of “Unknown” always). When issuing the second DIR command, Nextor assumes that the disk has not changed, and since it still has the directory and FAT sectors cached in memory, it can display the disk contents even if the disk has been removed from the drive.

Nextor will clear then cached sector for a drive at the moment of locking it, therefore if you had reversed the order of steps f and g you would have effectively got a “Not Ready” error.

j. Insert the Nextor tools floppy disk in its drive again.

8. The reduced allocation information mode

Now we will set the reduced allocation mode on the FAT16 partition available on each device and see what happens.

- a. Reset your computer. Check that drive A: is mapped to the 50M partition on the master device, and drive B: is mapped to the 85M partition on the slave device.
- b. Issue a `VOL A:50M` command, then a `VOL B:85M` command, in order to help identifying the partitions without having to rely on its free size:

```
A:\>vol a:50M
A:\>vol b:85M
A:\>dir a:
Volume in drive A: is 50M
Directory of A:\

NEXTOR   SYS      4595 06-07-31 15:53
COMMAND2 COM    23935 10-29-30  2:44
 27K in 2 files 51052K free
A:\>dir b:
Volume in drive B: is 85M
Directory of B:\

NEXTOR   SYS      4595 06-07-31 15:53
COMMAND2 COM    23935 10-29-30  2:44
 27K in 2 files 86822K free
A:\>█
```

- c. Execute the following commands:

```
C:\RALLOC A: ON
C:\RALLOC B: ON
```

- d. Issue a `DIR` command, then a `DIR B:` command. Notice that now the free space reported is 32M for both partitions, and the free space is calculated in much less time:

```
A:\>c:ralloc a: on
The following drives are in reduced allocation information mode:
A:

A:\>c:ralloc b: on
The following drives are in reduced allocation information mode:
A: B:

A:\>dir
Volume in drive A: is 50M
Directory of A:\

NEXTOR   SYS      4595 06-07-31 15:53
COMMAND2 COM     23935 10-29-30  2:44
 27K in 2 files 32766K free
A:\>dir b:
Volume in drive B: is 85M
Directory of B:\

NEXTOR   SYS      4595 06-07-31 15:53
COMMAND2 COM     23935 10-29-30  2:44
 27K in 2 files 32766K free
A:\>█
```

What has happened? When a drive is in reduced allocation information mode, the Nextor function ALLOC, which returns information about the total and free space on a drive and is used by COMMAND2.COM to display the free space, stops calculating free space when it reaches the amount of 32MB and returns this number instead of the real amount. This causes the free space calculation time for FAT16 partitions to be significantly shortened, especially for very large partitions.

9. Contact

You can get the latest version of Nextor and the associated tools at Konamiman's MSX page:

<http://www.konamiman.com>

For bug reports or suggestions, please write at:

konamiman@konamiman.com