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msxDS v.0.94 Manual  
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## Introduction

msxDS is an emulator of [MSX/MSX2/MSX2+](#) computers for Nintendo DS/DS Lite. Requires a flash card adapter with DLDI support to work.

msxDS is based on fmsxDS v.0.07 from Nyagosu but since then, several bugfixes and improvements have been added. Moreover, emulation has become much faster.

## Download

Please download msxDS on the official website at the following address.

<http://alternate-fmsxds.webs.com/index.html>

## Setup

1. Unzip the archive and copy the [fmsxDS.nds](#) file on your flash card.
2. Copy the [/msxds](#) folder that contains [Carts.crc](#), [CMOS.ROM](#), [data.001](#), [data.002](#), [data.003](#) and [data.004](#) files at the root of your flash card.



3. Copy MSX/MSX2/MSX2+ japanese BIOS, FM-PAC BIOS and Kanji ROM into this folder. Here's the list of the different files:

- [MSX.ROM](#) = BIOS MSX1 & BASIC from National CF-2000 or FS-4000 (CRC32: [EE229390](#) or [071135E0](#))
- [MSX2.ROM](#) = BIOS MSX2 & BASIC from National FS-4700 or FS-5000 (CRC32: [9B3E7B97](#) or [A44EA707](#))
- [MSX2EXT.ROM](#) = MSX2 Extended ROM from National FS-4700 or FS-5000 (CRC32: [4A48779C](#) or [43E7A7FC](#))
- [DISK.ROM](#) = Disk Basic & BDOS ROM from Panasonic FS-FD1 FDD extension (CRC32: [697EAF4E](#) or [4C9B8214](#))
- [FMPAC.ROM](#) = FM-PAC BIOS ROM from Panasonic SW-M004 cartridge (CRC32: [0E84505D](#))
- [KANJI.ROM](#) = JIS 1st+2nd Class kanjis ROM from Panasonic FS-A1WSX (CRC32: [1F6406FB](#)) (256KB)
- [MSX2P.ROM](#) = MSX2+ BIOS & BASIC ROM from Panasonic FS-A1WSX (CRC32: [19771608](#))
- [MSX2PEXT.ROM](#) = MSX2+ Extended ROM from Panasonic FS-A1WSX (CRC32: [B8BA44D3](#))
- [A1WXXDR.ROM](#) = Kanji Basic ROM from Panasonic FS-A1WSX or FS-A1WX (CRC32: [B4FC574D](#) or [A068CBA9](#))
- [CMOS.ROM](#) = To save parameters of SRAM used into MSX 2/2+.

Check out the checksums for optimum functioning. DLDI patch is required.

Note: For the Supercard SD/miniSD, please use the following DLDI driver.

<http://alternate-fmsxds.webs.com/msxds/dldi.scp-neoDS.7z>

Unzip the archive and copy the [dldi.scp](#) file into micro SD root directory. The DLDI patch will be applied automatically at launch. NeoDS works fine too with this driver.

# Main Menu

When you launch msxDS, a menu with icons is displayed. Here's their description.



- Button to turn ON or OFF the MSX.



- MSX1 mode.



- MSX2 mode.



- MSX2+ mode.



- Slot-1 emulation. Touch this icon to launch your ROM image files. Only the '.rom' files are displayed.



- Slot-2 emulation. Touch this icon to launch your ROM image files. Only the '.rom' files are displayed.



- Floppy disk drive A emulation. Touch this icon to insert your floppy disk image files in the drive A. Only the '.dsk' files are displayed.



- Floppy disk drive B emulation. Touch this icon to insert your floppy disk image files in the drive B. Only the '.dsk' files are displayed.



- Tape player emulation. Touch this icon to insert your tape image files in the player. Only the '.dsk' files are displayed.



- Touch this icon to load the last saved MSX state. (Previously You must select the corresponding ROM, floppy(s) and/or tape.)



- Double tap this icon to save the MSX state.



- This icon allow to open the options menu. (see Options Menu)



- When this icon is selected the MSX screen will be down scaled to the DS screen size. (It's useful only in mode MSX2/2+)



- The 20 lines from the bottom of the MSX 2/2+ screen will be displayed on the DS bottom screen.



- The 20 lines from the top of the MSX screen will be displayed on the DS bottom screen. (It's useful only in MSX 2/2+ screen mode)



- When this icon is selected the Sound emulation mode is PSG only at 40Kz.



- The Sound emulation mode is PSG and SCC/SCC+ at 22Kz.



- The Sound emulation mode is PSG and FM (MSX-Music) at 7.5Kz.



- Closing the Menu (and turns ON the MSX if it's OFF).

You can place your image ROM/DSK/CAS files into any folder into your flash card.

## Buttons Description

In general, the DS buttons have the following functions:

- A = OK / Button 1 of MSX joystick / Left mouse button
- B = Back to previous folder / Button 2 of MSX joystick / Right mouse button
- Y = Cartridge, Floppy or Tape ejection
- Start = Main menu Display
- Pad = Pad of MSX Joypad 1 (Cursor keys or Joypad 2 possible)

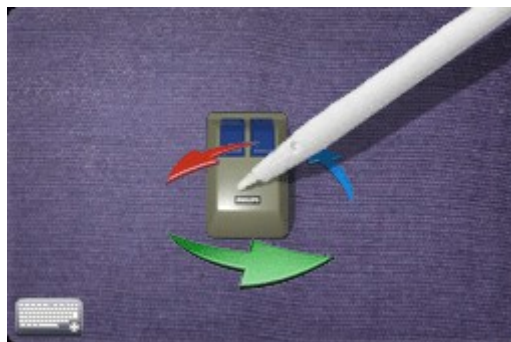
In some cases, certain buttons may change function depending from the started game.  
With 'Fire Ball' or 'Roller Ball' in ROM version, L and R triggers are used to control the flippers.  
With 'Metal Gear' 1 or 2 in ROM version, L and R triggers are used to press F2 and F3 keys faster, etc.

## Using the Mouse

msxDS emulates the mouse since version 0.87. To activate it, do a double-tap on the icon corresponding to the mouse plugged into port 1 or 2 under the keyboard on the left.



The mouse appears on the bottom screen. Therefore, you can manipulate it. Drag the stylus on the mouse to move the MSX cursor. Touch the screen around the mouse to move the mouse. Basically, it works like a trackpad.



To click, you have three options:

1. Touch the mouse buttons directly.
2. Press the Down Arrow key to right-click and Left Arrow to left-click.
3. Press the B button to right-click and the A button to left-click. (For left-handed user)

The keyboard icon at the bottom left corner allows to go back to the keyboard with a double-tap. However, the mouse is still connected. To unplug a mouse, touch the orangy icon for some time until it becomes again grey.



## Using the Arkanoid paddle controller

The paddle controller emulation starts automatically when launching a Arkanoid ROM that support it. Only the versions edited by Nidecom supports the paddle controller. During emulation the paddle controller replaces the keyboard on the bottom screen.



To move the "Vaus" spacecraft to the left or right, drag the stylus over the paddle representing Vaus on the bottom screen in one of two directions.

To shoot, tap the paddle or press L / R button.

Note: You can use the paddle controller with another game with the options menu. Therefore the handling will be made instead of the mouse.

## Using the ASCII paddle controller

The paddle controller emulation starts automatically when launching the Breakout game ROM edited by ASCII. During emulation the paddle controller replaces the keyboard on the bottom screen.



To move the paddle to left or right, drag the stylus on the paddle represented by a white rectangle on the bottom screen in one of two directions.

Note: You can use this paddle controller with another game with the options menu. Therefore the handling will be made instead of the mouse.

## Options Menu

The options menu brings together different parameters of emulator. This menu contains the following options.

1. The D-Pad option allows you to replace the D-Pad mapping. You can choose the cursor keys, the joystick 1 (default) or the joystick 2. The buttons A and B will correspond to selected joystick. If cursor keys is selected, the Space key will be allowed to the button A and N key to button B .
2. The joystick port options allows to replace the mouse by a paddle of Arkanoïd or ASCII.
3. The "frame rate" option is used to set the number of frames per second. Full frame is useful in DSi mode only.

The options will be enabled by touching "Exit" to close the window.

## Versions history

### Version 0.94 (2012-08-29)

- Fixed a stack overflow that made the emulator unstable.
- Fixed a state save bug with megarom mapped in 16 KB.
- Supports up to 1024 files (ROM, DSK and CAS) in each folder.
- Compiled with devkitARM r41, libFAT 1.0.11 and libnds 1.5.6+.
- The folder image is no longer displayed if it's already displayed.
- The /Pics folder and file names beginning with a dot are no longer displayed in files list.

### Version 0.93 (2012-01-01)

- Fixed a small bug in the save state.
- Improved speed of screen10 and screen12 modes.

### Version 0.92 (2011-12-26)

- Fixed FM-PAC mapper (SRAM included).
- Fixed Game-Master 2 mapper (SRAM included).
- Fix the Kanji ROM driver size.
- Improved display of screen10 and screen12 modes.
- Compiled with devkitARM r36 et libnds 1.5.4+.
- Ability to display on the top screen the MSX software media image corresponding to the selected file. (Cartridge, floppy disk and tape) (*For more information, see FAQ*)

### Version 0.91 (2011-09-24)

- New management of buttons that allows to configure X and Y. (Push Y to use the radio in Metal Gear)
- Fixed the VDP status register 4.
- Adding the options menu.
- The using the paddle controller is possible with your softwares.
- Added ASCII paddle controller emulation. (used in Break Out)
- Fixed LDIR & LDDR instructions of the z80. (Goody, etc, work now)
- Taking into account of CE bit of the status register 2 of VDP before a disk access. (Improved compatibility with floppy disks.) (Undealene, Fray, etc, work fine now)

### Version 0.90 (2011-06-12)

- Optimized display engine. (Thanks to Pixador for the suggestion for sprites)
- Improved MSX1 VDP registers emulation.
- Some optimizations in sound and Z80 emulation.
- Added R register emulation of Z80.
- Updated libnds (v1.5.0). Now MsxDS supports the DSI mode of CycloDS iEvo!
- New ITCM memory management to put the most useful routines according to selected MSX mode.
- Fixed colors values of screen 8 mode.
- Fixed bug of color 0.
- Added Key mapping to L,R for ROM versions of Angma Jidae - Devil zone (Uttum Soft).
- Fixed bug in error messages.
- Updated [Carts.crc](#) file.
- Fixed a SCC detection problem for ROM games.

### Version 0.89 (2011-02-13)

- Fixed the colors table for sprites of Screen 8 mode.



- Fixed bug in the Z80 of the 0.88 version. (Ikari Warrior)
- Fixed values cycles of z80 instructions. (Retaliot, Seleniak and Sweet Acorn work fine now)
- Fixed vblank interrupts register.
- Added a frame limiter (the games that ran too fast, works with good speed now.)
- Automatic disabling of disk controller for Nausicaa in order to avoid having to press Shift at boot. (ROM version only)

#### Version 0.88 (2010-12-25)

- Z80 emulation code optimization.
- Added Arkanoid paddle controller emulation.
- Added Key mapping to L,R for the following games (ROM versions only.): Borfes to 5-nin no Akuma (L/R= ESC), Chaos Begins (L=F1, R=F2), Dragon Slayer 4 (L=ESC, R=RET), Higemaru Makaijima (L/R= F1), Hi no Tori (L=F2, R=F3), King kong 2 (L/R=F2), The Maze of Galious (L/R=F1), The Treasure of USAS (L=F1, R=F2), Xorz (A=SPACE, B=m) and Yaksa (L=F1, R=F2).

#### Version 0.87 (2010-12-11)

- Updated [Carts.crc](#) file for several megarom from Spain (CAS converted to ROM), etc.
- The LED of CAP and Kana keys are now truly emulated.
- Mouse Emulation.
- Key mapping F2,F3 to L,R for Metal Gear. (ROM versions only.)
- Using the Z80 emulation source code of fMSX v.3.51.
- Z80 emulation code optimization.
- Fixed bug of color 0 in the save state.
- PDF User's manual.

#### Version 0.86 (2010-09-18)

- Added scrolling file names with the stylus.
- Now we must do a double-tap on the save-state icon.
- Modified the routine of collision of MSX1 sprites for Pitfall II.
- Small improvement of the UI.
- MSX2 mode by default (because it is faster than the MSX2+ mode).
- Fixed some bugs in the patching of the ROM disk. (Improved DSK images support.)
- SCC+ emulation (for SD Snatcher, Konami Game collections, etc...).
- Fixed of the screen12 color contour which was managed like the screen8.
- Removal of some useless display conditions. (msxDS is still a bit faster!)

#### Version 0.85 (2010-08-22)

- Updated [Carts.crc](#) file for many megarom from Korea.
- Fixed 32KB ROM mirrors.
- Rewrote sprites routines. (full emulation)
- Super Pierrot mapper support.
- Some small fixes in the megaroms mappers routines.
- Fixed status register 0 of VDP in MSX1 mode. (Zaxxon published by Electric Software works.)
- Added Kanji BASIC support. (The a1wxkdr.rom file is now required.)
- MSX2+ logo is displayed.
- Use of TCM memory for several graphics routines. (msxDS is a bit faster!)
- Double-tap on a file name to select it (and close the window).
- Use of L and R triggers for 'Fire Ball' and 'Roller Ball' pinballs. (ROM versions only)

#### Version 0.84 (2010-06-25)

- Fixed a small bug in the keyboard.
- Added Kanji ROM support. You can also input Kanjis in BASIC by loading the kanji driver ROM (CRC32: B4FC574D/32KB) into SLOT 1 or 2.
- Added emulation clock (RTC).
- Improved ROM support. The [Carts.crc](#) file is required for some megaroms.

#### Version 0.83 (2010-05-26)

- Fixed a bug in the management of background color for screen 0.
- Added tape emulation. Support files CAS with fMSX-DOS format.
- Usually, to load a game tape, select a file CAS with the tape icon and turn on the MSX with SHIFT pressed until the sound "Beep" and then enter [RUN"CAS:](#) or [BLOAD"CAS:","R](#) or [CLOAD](#) in Basic.
- Improved keyboard.
- Improved folders management.

#### Version 0.82 (2010-05-10)

- Compiled with devkitARM r30 and Libnds 1.4.3+.
- Fixed a bug in the management of color 0 for screen 6 mode.
- Added a filter to improve the display quality of high resolution modes.
- There are now three sound modes (PSG at 40Khz, PSG+SCC at 22Khz, PSG+FM at 8Khz).
- Fixed the path of instant save file that was saved by mistake at the root.
- The selection of cartridges, MSX type and sound mode is blocked when the MSX is ON.
- Improved change of display mode.

#### Version 0.81 (2010-03-20)

- MsxDS no longer crashes after MSX reboots.
- Scrolling of file name selected when it exceeds the frame.
- Memorization of location of last opened folder.

#### Version 0.8 (2010-03-03)

Already 3 years that I had not coded it. This year I am pleased to finally offer an update with many changes which are not all visible to the user but necessary. This is main changes.

- Compiled with devkitARM r27 and libnds 1.4.0+.
- Using of the libfifo optimised by Cooper.
- New sound routine (It's more clean & faster).
- Loader window is bigger and more convenient.

#### Version 0.7+ (2007-09-19)

- Add MSX2+ scrolling.
- Loader rewritten.
- Improved sprites.
- New icons.
- Add screens modes.

## Known issues

- The video memory of V99x8 is still managed as fMSX. I.e. in one block of 128KB instead of 2 x 64K. This causes graphics bugs in some games.
- The keyboard support a Japanese Bios only.
- The keyboard is malfunctioning with a few softwares.

## Tip & Tricks

1. Run a European game on tape at 50Hz.

Enter first the following instruction in MSX2 mode before launch the game.

`VDP(10) = VDP(10) OR 2`

2. Run a soft that crashes on launch.

Edit the BASIC launcher of corresponding soft, seek instruction `POKE-1,0` or `POKE-1,255` then replace it by `POKE-1,(NOT(PEEK(-1))AND240)*1.0625`

## FAQ

### Q. How to get the crc32 of ROM?

A. There are several ways such as using special software, some softwares compression, etc.. Here are some examples:

- [Winrar](#), a famous compression software for Windows, has an option to display the crc32 of most compressed files.
- On Windows, [Arpoon Checksum](#) provides the crc32 (and other checksums) of one or more files at time.
- On Mac OSX, the `crc32 FileName.ext` command of terminal can easily get the crc32 of a file. Drag and drop a ROM on the terminal window to obtain the "FileName.ext".
- [Checksum+](#) is a software for Mac OS X that allows to obtain the crc32 (and other checksums) of one or more files at time.

### Q. How to Saving a game of Metal Gear 1 ?

A. Metal Gear has 3 ways of saving games:

1. The usual way. This is the save option from the game itself.
  - The first time you need create an empty `FileName.cas` file (or use the `Empty.cas` file of `/msxDS` folder).
  - Copy this file on your flash card and select it with msxDS.
  - In game, press F1 to do a pause and then F5 to open save menu.
  - Input a name and you can save on tape.

- Skip the verification step because no need to verify it.

Note: Saving in this way is only useful after reaching the elevator. You will continue in the last used elevator.

Loading method:

- Select the file [FileName.cas](#) with msxDS and Metal Gear.
- Touch F1 to do a pause and then F4 to open load menu.
- Input a name and you can load from tape.

Note: A bug (of Metal gear?) crashes the game when the save is not found at the end of tape. To avoid this, do not input a wrong name and eject the tape before reload the same save.

2. The second way. This is done with the Game Master 2 cartridge into SLOT 1.

- After booting, select "GAME" to start Metal Gear.
- At any time during the game, tap the STOP key then Tap CTRL key to open the save menu. (Touch CTRL again to unpress it)
- Insert a user disk (a blank disk in first time) in the msxDS disk drive.
- Choose "DISK SAVE" from the menu.
- Choose "GAME DATA" in the "DISK-SAVE" menu.
- Input a filename for your save game. The game will now be saved to disk image. After saving, choose "END" and press the STOP key again. The game will resume.

Loading method:

- Start Metal Gear as described upper.
- In the save menu, choose "DISK LOAD".
- Insert the disk image on which your save game was saved.
- Choose "GAME DATA".
- The game will list the files on the disk that are savegame files. Select the one you want to load and it will be loaded.
- Choose "END" and press the STOP key to resume the game.

3. There is a save-state mechanism yet in msxDS. This is the easiest method. (Need two taps on save state icon to save.)

### **Q. How to do a DSK image of a MSX floppy disk on Mac OS X ?**

A. You must first get a USB floppy drive. Most PC floppy drives are supported by Mac OS X. Having found no software for it, the terminal is necessary.

Procedure:

1. Connect the floppy disk into a free USB port.
2. Insert the floppy disk to convert to making sure it's write protected.
3. Dismount the disk with Disk Utility in Mac OS X if necessary.

4. Open a terminal window and enter the following command. (Copy / Paste is possible)  
(See notes for details)

```
dd if=/dev/disk1 of=/Users/UserName/Desktop/DiskImageName.dsk conv=notrunc,noerror,sync
```

5/ After input the command, the `DiskImageName.dsk` file will be created on the desktop.

Notes:

- `UserName` must be replaced by the name of current user folder of Mac OS X.
- `DiskImageName` can be any name.
- `conv=notrunc,noerror,sync` is used to ignore errors. Add this option if necessary.
- `disk1` is the disk identifier. To know it run the Disk Utility of Mac OS X, select the floppy drive icon in the left column and then click the Info icon (or press Command+i).

### Q. How to create the image of a MSX media?

- A. First create the image of size 256x192 in PNG format. Next convert the image format NDS with 'GRIT'. This utility comes with [devkitARM](#). To convert a PNG image, enter the following command line.

```
grit filename.png -W3 -gT! -gzl -gB16 -m! -ftb
```

Warning: case-sensitive!

If devkitARM is not installed on your PC, you must specify the full folder path to the image and GRIT.

If your image contains color gradients, you will get a better result by pre-converting the image to 32,768 colors with dithering. On Windows you can use [PhotoFiltre](#) (with a plug-in for dithering) and on Mac OS use [Graphic Converter](#). Otherwise, [Gimp](#) can do it with a result more or less successful.

The converted images with grit will have the `.img.bin` extension. They must be renamed by `.bin` and copied into a folder called `/pics` created in the folder of your ROM, DSK or CAS files. The name of these images must be the same as the corresponding file.

Example :

```
~/MSX-ROM/Antarctic Adventure.rom
```

```
~/MSX-ROM/pics/Antarctic Adventure.bin
```

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Manual by ProgDS

Thanks to Copper, Marat Fayzullin, Pixador, Nyagosu, Mars2000 and ProgDS.

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