**MSX Pico quick manual v1.07**

Never insert or remove the cartridge when the MSX is powered on!

Thanks for buying the MSX Pico cartridge!

This cartridge is completely software defined, this means no FPGA or CPLD is involved in emulation of ROM mappers, SD card interface, dual PSG, SCC+ and MIDI. The software runs on a Raspberry Pi Pico clone with 16MB of FLASH memory and 256kByte of RAM. Future software updates of the cartridge will add more functionality.

Currently the following devices can be emulated:

* PSG emulation (in case 3.5mm output is used)
* Second PSG emulation at IO ports 0x10 and 0x11
* 8 bit audio DAC at IO ports 0xa0 and 0x91
* MIDI output at IO ports 0xe8 and 0xe9 (compatible with OCM MIDI output)
* ASCII 8, ASCII 16, Konami with SCC, Konami without SCC mappers in one main slot
* Nextor (MSXDOS2 with FAT16) with SD card access, SCC+ and a 224kByte RAM memory mapper in subslots

Devices using IO ports will be always available when cartridge is inserted.

**Compatibility**

* MSX2, MSX2+, Turbo-R
* Not able to run at 7MHz
* Not compatible with Turbo-R pause key because the MSX Pico uses loss of bus activity to detect reset

**Connections**

USB-C connector

Currently only used for software updates, but this might change in the future.

USB mini connector

This connector is used a MIDI port and can’t be used for USB communication. The pinout is compatible with the cable supplied by the MIDI PAC. It is compatible with the MIDI player program MDRDY.COM.

3.5mm connector

This connector supplies direct stereo audio from the built in audio DAC. Stereo output is created by sending the PSG audio to the left channel and sending the SCC / second PSG / 8 bit audio DAC to the right channel. MP3 files are played in stereo.

Output through cartridge slot

The right channel of the internal audio DAC is also connected to the sound input pin of the cartridge slot. So SCC / second PSG / 8 bit audio DAC are also available without using the 3.5mm connector.

**Built in menu**

After inserting the cartridge and power up a selection menu is shown on screen. It’s a selection of Nextor, fixed Konami games, ASCII games and a SCC demo. All these items can be started without a SD card inserted. Games with SCC will also produce SCC sound. For the Nextor manual, check the Nextor website.

By pressing the right cursor key the SD card contents is shown. In this screen the following files can be started:

* .ROM files (support for standard ROMs, ASCII 8, ASCII 16, Konami without SCC and Konami with SCC sound)
* .MP3 and .WAV files (48 kHz max)

Files can be deleted with the <DEL> key.

Help page is shown with the <H> key.

By pressing the <ESC> key the MSX will continue normal booting.

For disk images please use Nextor with Sofarun. Make sure the SD card if formatted at FAT16. This can be forced by using Nextor format utility. Type call fdisk in BASIC to create partitions and format the SD card.

**SCC+ implementation**

The SCC+ emulation currently involves the sound chip only. Konami ROMs will work without any modifications. VGMPLAY and SOFARUN can detect the SCC+ without any issues. To be able to detect the SCC+ properly by for instance SD Snatcher, the modified version of game need to be used. This might also apply to other games or demos.

**RGB LED**

* Purple when connected to PC by USB-C for software update
* Green blink when SD card is accessed when Nextor is used
* Red when MSX is reset, or software update is finished
* Blue blink when MIDI data is sent
* White fading when audio is played

For updates please check:

[www.github.com/jeroentaverne](http://www.github.com/jeroentaverne)

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