

MEGA ENGINE

CD-ROM² PLAYER

THANK YOU FOR PURCHASING A MEGA ENGINE UNIT.

So what exactly is the MEGA ENGINE CD-Rom² Player?

The MEGA ENGINE's main purpose is to provide playback of physical PC Engine CD-Rom² discs as well as Mega-CD discs. The ME supports all types of PC Engine discs (classic CD-Rom² discs, Super CD-Rom² discs and Arcade CD-Rom² discs) and discs from all regions (so Japanese PC Engine CDs, American TurboGrafx-16 and Turbo-Duo CDs, Japanese Mega-CD, European Mega-CD and American Sega-CD discs just as well).

The ME also supports the playback of rom files for a multitude of systems. Pre-configured systems include Master System, Mega Drive (Genesis), NES, Neo Geo, PC Engine and SuperGrafx. More systems can be added. Disc images of PC Engine and Mega-CD discs are also supported.

The system outputs through HDMI, while controllers can be connected through USB or Bluetooth. The MEGA ENGINE system can also be run in low-res in RGB-like quality on classic CRTs (tube TVs or monitors) using a specific software preset along with a low-cost digital to analogue converter.

WHAT'S IN THE BOX?

Inside the ME packaging you will find the following items:

- MEGA ENGINE system unit
- MEGA ENGINE manual (which you're reading right now)
- controller quick reference card
- an optional USB-C to Micro-USB converter
- a PC Engine CD and Mega-CD software title each to get you started.



ADDITIONAL REQUIREMENTS

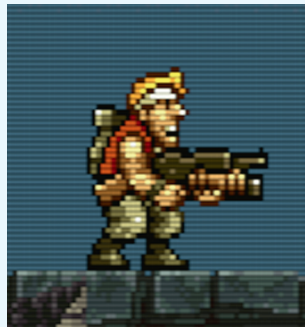
Next to the what you got in the box, you will need the following items to get your MEGA ENGINE setup up and running:

- a HDMI cable (any HDMI version will be fine)
- at least one USB controller (wired or with a driverless USB dongle)
- a matching power supply (Micro-USB with 5.25V at 3A)
- a USB keyboard (recommended for some advanced features)
- a video DAC (optional for connecting the ME to a CRT)

Video Shader: CRT Heavy Scanlines



Video Shader: CRT Light Scanlines



The MEGA ENGINE system supports almost any USB or Bluetooth controller, including but not limited to 8BitDo controllers, Playstation 4 or Xbox One controllers.

Our recommendation for a great controller is 8BitDo's M30 controller as a 2.4GHz RF version with an included USB dongle. The USB dongle can be connected internally, so it doesn't occupy any of the front-facing USB ports. If you're using a different controller, make sure that you got enough buttons available. While it is charming to use 8BitDo's PC Engine controllers on the ME, it's very hard to make full use of the system's capabilities with just two action buttons available.

For the initial setup you need a wired USB controller (or a 2.4GHz controller with a dedicated USB receiver). Bluetooth controllers can easily be connected at a later point.

The MEGA ENGINE requires a power supply with 5.25V at 3A and a Micro-USB connector. Our recommendations are the Taifu 5.25V PSU available from European Amazon sites or the Argon ONE Micro USB power supply available at Amazon.com. Of course there are lots of available power supplies, that you can use, and if you can't find anything, then a Raspberry Pi 4 power supply will be fine as well. To use a Pi 4 PSU, attach the included USB-C to Micro-USB converter dongle.

To run the MEGA ENGINE with a low-res 15khz output on a CRT an additional digital to analogue video converter is required. Check a later section in this pocket guide for details on that.

GETTING STARTED

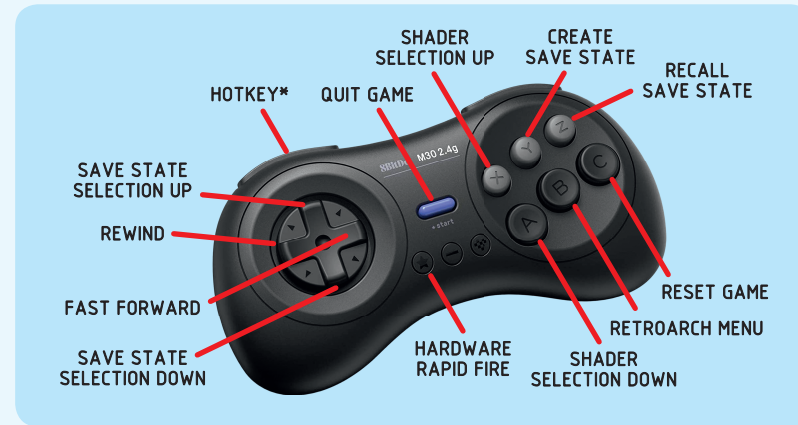
Connect the MEGA ENGINE system unit to a HDMI display of your choice and switch on the TV or monitor. Connect your controller and power supply. The system will boot on its own, once it's first powered (the same is true if you run the system from a switchable power strip).

The system gets shut down from the menu. If you want to switch it on again after that, press the button on the back of the unit. If you remove or plug in a HDMI cable while the system is in standby, it might also boot up. Hotplugging a HDMI cable isn't recommended, but it should be no problem. Pulling power from a running system can damage the file structure of the internal storage, so try to avoid that.



CONTROLLER LAYOUT

If you got a 8BitDo M30 controller, then you'll find the system pre-configured to the following controls:



If you plug in a controller unknown to the system, you'll get asked to configure your controller first. If you're asked to press any buttons or controls, that your controller might not have (for example analogue controls or additional pairs of shoulder buttons), just hold any button for 2 seconds to skip that input. Make sure to pick a HOTKEY that you can easily reach in combination with ANY other button. We always recommend the left shoulder button. The controller config can always be re-initiated from the main menu (by pressing START at any point). If you screw up the initial configuration, just pull your controller, plug it in again and start over.

When using a controller other than the M30 or any controller with a different button layout, your hotkey functions might be moved to other positions. That's alright for the moment and we'll get back to configuring those at a later point.

BASICS - STARTING YOUR FIRST GAME

Once the system has booted, you'll be greeted by the system's main menu (EmulationStation). You can move through the available systems by clicking left and right on your d-pad. You will find that a few rom files have been pre-installed to let you try your new system and get used to the menu and its functions.

By pressing the C-BUTTON (on controllers with four front buttons that's supposed to be the EAST-facing A-BUTTON - in classic SNES tradition) you can launch of game rom or pre-installed disc image. To quit a game and return to the main menu, hold down the HOTKEY while pressing the START-BUTTON on your controller.

If you're done playing, you can shut down the system by pressing START on the main menu and then selecting QUIT and SHUTDOWN SYSTEM from the on-screen menu. If you want to remove the power supply or disable power through a switchable power strip, make sure to wait about 10-15 seconds after shutting down the system before you remove power.

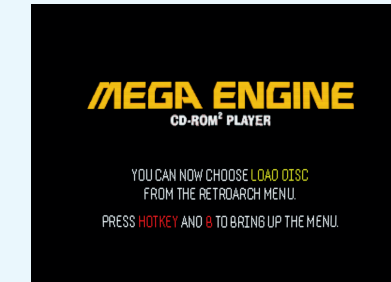
For daily use, we recommend to put the main menu into KIOSK mode. This way all the options (except for volume control and quit) are removed. If ever required, you can leave the kiosk mode by entering the classic Konami code (up, up, down, down, left, right, left, right, B, A) at any point in the main menu.

RUNNING PHYSICAL GAME DISCS

In the PC Engine CD and in the Mega-CD game system sections, you'll find an entry on top of your game list called LAUNCH PCE CD-ROM DISC (or LAUNCH MCD/SCD DISC). If you click on that, the system-specific emulator is launched and the system will be waiting for you to initiate the launch disc command.

If not already done, you can now insert a game CD into your drive and follow the instructions on screen: press HOTKEY+B to launch the Retroarch menu. From the main menu there (you might have to click B once to get there), click on LOAD DISC and confirm one more time by clicking on the listed drive. If you get a NO DISC error message, simply wait a few seconds for the drive to recognize your disc before trying again.

Prepare for Launch



Launch Disc



To eject your disc from the system, quit out of the game and find the EJECT DISC command listed on top of the MEGA ENGINE system options (to get there just press left or right multiple times when cycling through the systems).

How to handle discs swaps on MULTI-DISC GAMES?

Since you cannot access the EJECT DISC function during gameplay, simply create a SAVE STATE (check the back of this foldout manual on how to do this), once the game asks you to change discs. Then exit out of the game, eject the current disc as you learned above, insert the new disc, fire up the emulator again and restore your save state.



SYSTEM-SPECIFIC OPTIONS

Each system has its own set of emulator-specific options, which can be accessed by pressing HOTKEY+B during gameplay and navigating to SETTINGS/OPTIONS. Settings here include items like increasing a system's on-screen sprite limit, choosing a specific bios to run, overclocking the system to eliminate slow-down or adjusting how certain parts of the emulation are handled (like color palette options for NES or Yamaha sound options for the Mega Drive).



Any changes you make here are immediately saved and applied to your running gameplay sessions once you exit from the menu by either choosing RESUME or just by pressing HOTKEY+B once again.

While all the settings in this category are applied on a per-system basis (in other words: they will apply to all games using the emulator you're running right now), the bios selection for NEO GEO Games is saved on a per-game basis.

For a full description of the available video shaders, please refer to the other side of this pocket guide.

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RETROARCH FEATURES

The emulation on the **MEGA ENGINE** allows for some great comfort features, that will greatly enhance your gameplay experience.

While the majority of features can also be invoked from inside Retroarch's menu system (which you can access by pressing **HOTKEY+B** during your gameplay), it's much easier to use those through the dedicated function keys available on your controller.

All buttons mentioned here assume, that you're using a **M30** controller with the pre-defined button functions and as shown on the controller quick reference card. If you're using a different controller, the locations of your function keys might vary.

FAST FORWARD

To speed up your gameplay (e.g. during cut scenes) hold down both your **HOTKEY** and **RIGHT** on your d-pad. If you're running highly overclocked emulation (e.g. Neo Geo overclocked to eliminate any slowdown) the forwarding speed might be limited.

REWIND

To rewind your gameplay at any point, hold down both your **HOTKEY** and **LEFT** on your d-pad. Rewinding is a great feature, that eliminates the need for constant save state use. Rewind is not available on Playstation playback and the rewind speed is limited when playing physical game CDs (due to the slow red-book audio seek times).

SAVE STATES

To choose a save slot hold down your **HOTKEY** and press **UP** or **DOWN** down on your controller. To create a save state using the selected slot, hold down your **HOTKEY** and press **Y (WEST)** on your controller. To restore the selected save state, hold down your **HOTKEY** and press **Z (NORTH)** on your controller.

A NOTE ON SAVE STATES FOR PHYSICAL CD GAMES: while you can create up to 100 save states per rom file and save states of each game are exclusive to that title, save states are shared for CD games, so you get 100 save slots in total for your PC Engine discs and 100 slots in total for your Mega-CD games. Also note that the contents of your battery ram (high-scores or save games created by the games) are saved and restored **ALONG** with your save states, meaning that you will overwrite any existing battery ram by restoring an earlier created save state.



VIDEO SHADERS

By holding down your **HOTKEY** and pressing **A** or **X** on your controller you can cycle through a number of predefined video shaders.

LIGHT AND HEAVY SCANLINES

Add CRT scanlines to your image. The heavy ones resemble what you might see on a Sony PVM, while the light ones correspond with smaller consumer Sony TVs. Scrolling is shimmer-free in these modes.

LOW TVL A AND B

These two presets resemble what you might know from lower-end shadow mask CRTs, like a Commodore or Philips 14" monitor. The low TVL presets have less defined scanlines, but add in vertical lines instead. Scrolling is shimmer-free in these modes. (Tvl means TV lines and is a way to measure a CRT's horizontal resolution.)

LOW TVL A CURVED AND B CURVED

Same presets are above plus the simulation of a curved screen. Scrolling is shimmer-free in these modes.

NEAREST NEIGHBOUR

Gives you the sharpest possible output, but adds shimmer on horizontal scrolling scenes, unless you use integer scaling on both axis. **NOT** recommended, unless you know what you're doing.

OVERSAMPLING SOFT AND SHARP

The two oversampling modes present you with shimmer-free scrolling and a clean upscale without any CRT characteristics. Oversampling Sharp will be your preferred setting, if you dislike scanlines. Oversampling Soft is what you want to select for any CRT output from the **MEGA ENGINE**.

Out of the box, **ME** defaults to **LOW TVL B CURVED**, but this can of course be changed at any time. If you want to set a different default, click on **CONFIGURATION EDITOR** in the options menu and choose the top most option until you find the **VIDEO SHADER FILE** setting, where you can select your new default shader.

ADVANCED: ADDING MORE ROM FILES

Connect an empty USB stick to your **ME** and it will create a directory structure on it (takes about 30 seconds). Take that stick to your PC or MAC and copy your rom files into the matching folders. When you take the stick back to your ME, it will automatically copy all files from the USB stick to your **ME**'s internal storage. Games will be available once you reboot the system (or just restart EmulationStation). If you transfer a larger number of files, give the system a little time to copy everything over. The main menu might feel sluggish while the copy process is still running.

To change the name of a newly added rom file, you can either change the file name (using the File Manager or just before copying it over) or you edit the name by pressing **SELECT** directly in the game menu and changing the game's metadata (you need a keyboard connected for that). For this option to be available the main menu must be set to full mode, not to kiosk mode.

It's not recommended to boot the **ME** with a USB stick connected as this might scramble the internal drive letters and you might lose access to your previously created CD save states.

Larger numbers of files are usually easier transferred using the File Manager.

Disc Images for PC Engine, Mega-CD (and Playstation on an experimental basis) are supported in .bin/.iso/.wav/.cue format. Discs images for those systems and in that particular format can easily be created using **IMGBURN** on any Windows based system. **TURBORIP** can be used for PC Engine discs, but will create faulty images from Mega-CD discs.

ADVANCED: CONFIGURE YOUR FUNCTION BUTTONS

When you're using a controller other than the recommended **M30**, your function buttons might be scrambled around. We highly recommend that you re-configure your function keys to match what we recommend on our included quick reference card.

The reason why your functions might be assigned to different buttons is, that every controller reports its buttons as a series of numbers, e.g. from Button 01 to Button 10. Unfortunately there's no standard to which buttons carry which number and so the operating system can just take a guess.

To re-assign your function buttons, just launch Retroarch without starting any emulator (you do this by clicking on the **RETROARCH** entry in the Mega Engine options menu). Under **SETTINGS - INPUTS - HOTKEY ASSIGNS** you can then re-assign the button for each function. Once you're done, choose **CONFIGURATIONS - SAVE CURRENT CONFIGURATION** and quit Retroarch.

Retroarch might change your pre-selected aspect ratio to **CUSTOM** while doing so. You can change this back by opening the **CONFIGURATION EDITOR**, choosing the top option, until you see the **ASPECT RATIO** option and just setting a aspect ratio of your choice as a default. Due to the vertical underscan on most systems 5:4 is most often a better choice than the slightly wider 4:3 option.



ADVANCED: FILE MANAGER

With a keyboard connected to your **MEGA ENGINE**, you can access the file manager (Midnight Commander) via its entry in the **ME** config menu. The **FUNCTION** keys on your keyboard give you a number of specific commands, which you can use to modify, copy, transfer or delete files. The **TAB** key lets you change between the two sides. Triggering a copy or move command on one side makes the current location on the other side your target folder. Check the included controller reference card for details. **F10** quits the file manager and brings you back to your rom selection screens.

Common use of the file manager includes transferring data from or to USB drives (e.g. to create backups of your save states), editing config files for more complex settings or do other kinds of tweaks not accessible through the regular menus.

ADVANCED: PAL VS. NTSC TIMING IN GAMES

If you're limiting yourself to American and Japanese games, don't worry about this section. If you like to run PAL games, be aware that the playback of PAL roms (and European Mega-CD discs) defaults to their original 50Hz speed, while the output refresh rate of the system remains at 60Hz (to avoid breaking TV compatibility on NTSC setups). The game speed can usually be adjusted in the **CORE OPTIONS** (available from the Retroarch menu using the **HOTKEY+B** combination during gameplay). Changing the system output to 50Hz is more complex and not recommended, since it also affects all NTSC roms and playback of Japanese or American CDs.

EXPERT TIP: USING MEGA ENGINE ON A CRT

MEGA ENGINE can be used with native 15khz output on CRTs. The main menu will be running in 480i mode, while the actual gameplay will default to 240p.

On the software side **ME** comes with a preset for 15khz output. As long as your HDMI display supports 480i (almost all TVs do), you can easily switch the config while connected to your HD display. In the **ME** config menu you will find the entry **SET VIDEO OUT FOR CRT SETS**. Click on this and the system will reboot in 480i. After that visit the **CONFIGURATION EDITOR**, set the default **ASPECT RATIO** to **CUSTOM** and the default video shader to **OVERSAMPLING SOFT**. Don't try to launch any games with the system set to 15khz, while you're still connected to your HDMI display.

The internal Retroarch menu (from where you launch CDs) might present too narrow after that. To change that, edit the file **/OPT/RETROPIE/CONFIGS/ALL/RETROARCH.CFG** and change the option **RGUI_ASPECT_RATIO_LOCK** from 2 to 0.

On the hardware side you need a HDMI to component or a HDMI to RGB converter to connect to your analogue CRT (we recommend the Portta converters available from Amazon). The **ME** preset expects a component converter (to connect to a PVM or BVM for example). With some RGB converters you might get black crush this way. To change the RGB range, switch the option **HDMI_PIXEL_ENCODING** setting on the **/BOOT/CONFIG.TXT** to 1 for limited RGB range. Almost all component converters will expect this set to 2 for full range RGB. To connect to a **SCART TV** you might need an additional RGBHV to RGBS sync combiner. Check our website or get in touch for more details on that.

To change back from CRT use to a high-def HDMI connection, connect the **ME** to the HDMI display first, then find the entry **SET VIDEO OUT FOR HDTV SETS** in the config menu and click on it. After the reboot, set the aspect ratio back to 4:3 (or 5:4) and select a video shader of your choice.

EXPERT TIP: SPLASH SCREENS TO MATCH YOUR DISPLAY

In the **MEGA ENGINE** option menu you can find the entry **SPLASH SCREENS**. Here you can find a handful of images in 1080p 16:9, XGA 4:3 and SD resolutions and you can pick a resolution to match your connected display. The splash screen is what gets displayed during the system's boot up sequence. Using the file manager you can of course also add images of your own.

EXPERT TIP: USING A SMALL XGA SCREEN

The **MEGA ENGINE** defaults to 720p (in-game) and 1080p (menu system) output for 16:9 TVs or monitors. If you want to use a small 4:3 XGA screen (like the 8" or 10" IPS panels available from Amazon) instead, you can find a matching **CONFIG.TXT** file in the **OPT/MEGAENGINE** video presets folder. Copy the file to your **/BOOT** folder and copy the **VIDEOMODES.TXT** to your **/OPT/RETROPIE/CONFIGS/ALL** folder. In the **CONFIGURATION EDITOR** set the standard aspect ratio to 4:3 and disable integer scaling in the advanced options (otherwise you get a lot of underscan). On such small screens it's usually not required to run a video shader. XGA's vertical resolution might also be too high to run all shaders at full performance (**OVERSAMPLING SOFT** is especially taxing on the processor).

EXPERT TIP: UPGRADING THE INTERNAL STORAGE

The **MEGA ENGINE** comes with an internal storage of 32GB on a Micro SD card. You can replace this card at any time. Fresh image files for the OS are available from our website. As long as you're running a vanilla version of the OS, you just need to back up your rom folder, which you can easily restore afterwards using the file manager. To actually transfer your complete SD card with all of its settings to a bigger card, you need to create an image of that card, use **PI SHRINK** on that image and flash your new card with that image. **PI SHRINK** makes sure that the file system is resized on your first boot, so all the storage space on your new card is available for use. (Infos on **PI SHRINK** can be found at github.com/Drewsif/PIshrink).

Should you at any point screw up the OS (by changing settings you were not supposed to touch), you can always flash a fresh OS to the Micro SD card. To do so use **WIN32 DISK IMAGER** (for Windows) or **BALENA ETCHER** (for Windows, Mac OS and Linux)

On our website you can find downloads for three different image files. These are basically identical and just differ in which kind of display is pre-configured.

- I. pre-configured for HD output on a HDMI screen
- II. pre-configured for 15khz output using a HDMI to YPbPr (component) converter
- III. pre-configured for 15khz output using HDMI to RGBHV digital to analogue converter

To download a fresh image from our site you need a torrent client of your choice.

EXPERT TIP: UPGRADING THE SOC

The **MEGA ENGINE** case was designed to house a Raspberry Pi 3A+ or 3B at its core. The SOC (system on a core) can be upgraded to a more powerful board though. A Pi 4 for example would add support for most Dreamcast disc images and provide better Playstation playback. The back panel on the **ME** can be replaced to match your replacement SOC. Files for 3D printing a panel suitable for a Pi 4 are available on our website (.stl and .step). Replacement panels might also be available to buy from us - just get in touch. Keep in mind though, that a Pi 4 or other more powerful SOCs require active cooling.



In this printed pocket guide we only had space for so many functions and features. For additional information, tips, videos and downloads, please visit us at megaengine.pcworks.net.

