FORTEC GROUP

User Manual

Fortec Integrated

Artista-M4 Raspbian

Industrial ARM platform based on Raspberry Pi CM4/CM5

PA-45-XXX

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Table of Contents

1 Revision History

Date	Rev. No.	Description	Created By	Page
12.11.2025	1.0	Initial version	Chayma Hajjem	All

2 Introduction

Artista-M4 is an industrial ARM platform based on Raspberry Pi Compute Module CM4 / CM4 Lite, CM5 and ArtistaMedia-IV Base Board. The base board carries the Compute Module and has been developed by Fortec Integrated.

Per default the product is delivered with a preinstalled Raspberry Pi OS. This is intended to be a well-known demo system to show and test the features of Artista-M4. The preinstalled Raspberry Pi OS is not intended to be used in a commercial embedded product.

WARNING:
The standard Raspberry Pi OS installation is not robust against power fail situations. Thus, the OS always needs to be shut down properly before powering off the device. Otherwise, the flash disc image might be corrupted, and the OS will not boot any longer and must be completely overwritten with a new image!

3 Flashing Raspberry Pi OS Disk Images to Artista-M4

The Compute Module has an on-board eMMC device connected to the primary SD card interface. That means, the Raspberry Pi OS disk image must be programmed to that flash memory via USB. The Compute Module cannot boot from the external SD card of the ArtistaMedia-IV Base Board.
With Lite compute module, an eMMC will not be included on module and boot will be from an external SD Card.

A general description, how to flash the eMMC on the Raspberry Pi Compute Module can be found here:
https://www.raspberrypi.com/documentation/computers/compute-module.html

Since the instruction above is written for using the Raspberry Pi Compute Module I/O board, the differences for Artista-M4 with ArtistaMedia-IV Base Board are described below.

3.1 Connecting to the Compute Module eMMC as USB Mass Storage Device

To flash the Compute Module eMMC, you either need a Linux or Windows host system. A software tool on the host system and an USB connection between the host and Artista-M4 is required.

3.1.1 For Linux Users

To mount the eMMC flash memory of the Raspberry Pi Compute Module as USB Mass Storage Device under Linux the tool “usbboot” is required.

A detailed description, how to get, build and use it can be found in the section “Building rpiboot on your host system (Cygwin/Linux)” at the link below:
https://www.raspberrypi.com/documentation/computers/compute-module.html

3.1.2 For Windows Users

For those who just want to enable the Compute Module eMMC as a USB Mass Storage Device under Windows, the stand-alone software tool called “RPiBoot.exe” is the recommended option. It has been tested on Windows 11 (32 and 64 bit) but previous Windows versions should also work.

A detailed description, how to get and install it can be found in the section “Windows Installer” at the link below:
https://www.raspberrypi.com/documentation/computers/compute-module.html

3.1.3 Required Hardware

Beside a host system with Linux or Windows operating system, a standard USB-A to USB-C adapter cable is required. It is used to connect the host system with CON26 of Artista-M4.

Part	Part Number	Part Description
Type C USB Cable		

3.2 Writing the OS Disk Image to Compute Module eMMC

Before the operating system disk image can be flashed to the on-board eMMC memory of the Raspberry Pi Compute Module, it must be connected to the host system as USB mass storage device. A description how to do this can be found in the section above.

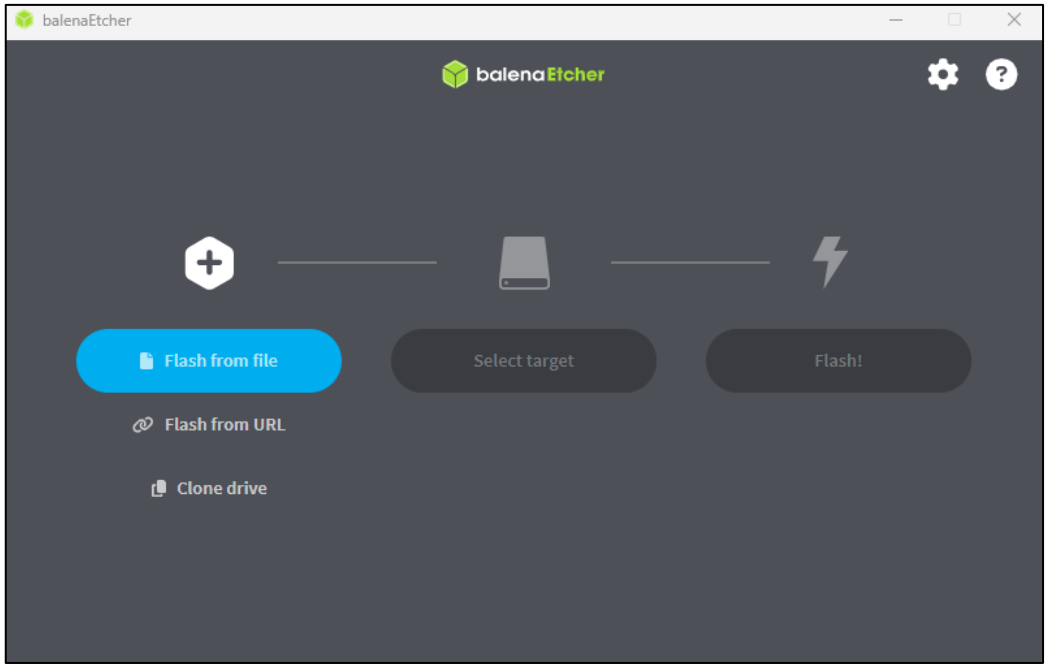
3.2.1 For Linux Users

A detailed description, how to write the operating system disk image to the Compute Module eMMC under Linux can be found in the section “Writing to the eMMC (Linux)” at the link below:
https://www.raspberrypi.com/documentation/computers/compute-module.html

3.2.2 For Windows Users

A useful tool to write operating system disk images to an USB Mass Storage Device under Windows is “Balena Etcher”.

Its installer can be downloaded from the Balena etcher page at the link below:
https://etcher.balena.io/



3.3 Step by Step Instruction for the Flash Process with Artista-M4

This section describes how an operating disk image can be installed on the Raspberry Pi Compute Module of Artista-M4 via USB.

1.) Disconnect power supply from Artista-M4

2.) Connect the standard USB-A to USB-C adapter cable to your PC and CON26 of ArtistaMedia-IV

3.) Enable MSD mode using ROSD tools

4.) Start “usbboot” (Linux) or „rpiboot.exe“ (Windows)

5.) Connect power supply to Artista-M4

6.) Raspberry Pi Compute Module 4 / 5 now boots to a special mode, where you can access the on-board eMMC flash memory from the PC as USB Mass Storage Device

7.) Use “dd” (Linux) or “Balena Etcher” (Windows) to write the system image to Raspberry Pi Compute Module eMMC

8.) Disable MSD mode using ROSD tools

9.) Artista-M4 is now ready for booting

4 Adapting Standard Raspberry Pi OS Disk Images for Artista-M4

If you already have a system disk image for a standard Raspberry Pi 4 and want to install this on Artista-M4 the following things must be considered:

1.) The disk image must be installed into the on-board eMMC of the Raspberry Pi Compute Module:

The disk image must fit into the eMMC flash memory of the Raspberry Pi Compute Module of Artista-M4. This flash device has a size of 0, 8, 16 or 32 GiB for CM4 and 0, 8,16, 32 or 64 GiB for CM5 and is connected to the primary SD card interface of the Raspberry Pi SoC.
With lite module (0Gib eMMC), it is possible to boot the system from an external SD card.

2.) Copy custom “dtblob.bin” into the “boot” partition of your Raspberry Pi disk image

3.) Modify “config.txt” in the “boot” partition of your Raspberry Pi disk image

4.1 Custom “dtblob.bin” for Artista-M4

Distec provides a custom “dtblob.bin” file for Artista-M4. This file is required to configure the hardware interfaces of Artista-M4T properly.

This file must be copied into the “boot” partition of the Raspberry Pi disk image.

The custom “dtblob.bin” comes with the preinstalled Raspberry Pi OS of Artista-M4.
If you don’t have access to this file, please ask your sales contact in the FORTEC Group to get it.

Please refer to section “Connecting to the Compute Module eMMC as USB Mass Storage Device” to see, how you can access to the “boot” partition of Artista-M4.

General information about the “dtblob.bin” file can be found here:
https://www.raspberrypi.com/documentation/computers/configuration.html

4.2 Adapting “config.txt” for Artista-M4

The Raspberry Pi uses a configuration file called “config.txt” to store system configuration parameters. It is in the “boot” partition of the Raspberry Pi disk image.

This file must be adapted to support Artista-M4 properly.

The adapted “config.txt” comes with the preinstalled Raspberry Pi OS of Artista-M4.

Please refer to section “Connecting to the Compute Module eMMC as USB Mass Storage Device” to see, how you can access to the “boot” partition of Artista-M4.

General information about the “config.txt” file can be found here:
https://www.raspberrypi.com/documentation/computers/configuration.html

4.2.1 Standard Adaptations for Artista-M4

Per default, the following entries must be added to the end of your “config.txt” file to support Artista-M4:

```
# Enable audio (loads snd_bcm2835)
dtparam=audio=on

# Automatically load overlays for detected cameras
camera_auto_detect=1

# Automatically load overlays for detected DSI displays
display_auto_detect=1

# Enable DRM VC4 V3D driver
dtoverlay=vc4-kms-v3d
max_framebuffers=2

# Run in 64-bit mode
arm_64bit=1

# Hotplug muss für HDMI1 (externer Ausgang) aktiviert sein:
hdmi_force_hotplug:1=1

# Force selection of 60Hz refresh rate at HDMI out
hdmi_enable_4kp60=1

# Disable compensation for displays with overscan
disable_overscan=1

[cm4]
# Enable host mode on the 2711 built-in XHCI USB controller.
# This line should be removed if the legacy DWC2 controller is required
# (e.g. for USB device mode) or if USB support is not required.
```

```
otg_mode=1

[all]

[pi4]
# Run as fast as firmware / board allows
arm_boost=1

[all]
# Automatically load overlays for detected cameras
dtoverlay=ov5647,cam1

# Use "Power" button as shutdown button
dtoverlay=gpio-shutdown,gpio_pin=3

# Use "Rescue" button as shutdown button
dtoverlay=gpio-shutdown,gpio_pin=16

# Enable PCM audio output (CM4 GPIO18, GPIO19, GPIO21)
dtoverlay=i2s-dac

# Enable serial communication via VCP at CON20 (CM4 GPIO14, GPIO15)
# Serial Linux console must be disabled to use this feature
dtoverlay=uart1

# Enable serial communication via UART at CON10 (CM4 GPIO4, GPIO5)
dtoverlay=uart3

# Enable serial communication with System Controller (CM4 GPIO12, GPIO13)
dtoverlay=uart5

# Enable serial Linux console via VCP at CON20 (CM4 GPIO14, GPIO15)
enable_uart=1


# Use PCF8523 RTC on I2C0
dtparam=i2c0=on
dtoverlay=i2c-rtc,pcf8523,i2c0

# SPI-Verbindung zwischen STM32 und CM4:
dtoverlay=spi0-1cs

# I2C-0:
#  Auskommentiert, da dieser von der Kamera verwendet wird und über den dt-blob.bin gesetzt werden muss (Zuweisung I2C zur Kamera):
#  Wird automatisch über den dt-blob gemultiplext, sodass der I2C sowohl an Pin 44/45, als auch auf Pin 0/1 verfügbar ist
#dtoverlay=i2c0
dtoverlay=i2c1
dtoverlay=i2c4,pins_6_7
dtoverlay=i2c6
```

4.2.2 Supporting the Goodix I2C Touch Screen of the Artista-M4 Starter Kit

Support for the Goodix I2C touch screen of the Artista-M4 Starter Kit is available in the current Raspberry Pi Linux kernel (version 6.1 and above).

Fortec Integrated provides an overlay for the touch screen “GT911_AM4.dtbo” file for Artista-M4. This file is required to configure the hardware interfaces properly with the touch screen.

To enable it, the following entries must be added to the end of your “config.txt” file:

```
# Activate Goodix Touch:
dtoverlay=GT911_AM4
```

The touch screen overlay comes with the preinstalled Raspberry Pi OS of Artista-M4.
If you don’t have access to this file, please ask your sales contact in the FORTEC Group to get it.

Please refer to section “Connecting to the Compute Module eMMC as USB Mass Storage Device” to see, how you can access to the “boot” partition of Artista-M4.

Our company network supports you worldwide with offices in Germany, Austria, Switzerland, the UK and the USA. For more information please contact:

FORTEC Elektronik AG | Augsburger Straße 2b | 82110 Germering
+49 89 894450-0
info@fortecag.de | www.fortecag.de

FORTEC Integrated GmbH | Augsburger Straße 2b | 82110 Germering
+49 89 894363-0
info@fortec-integrated.de | www.fortec-integrated.de

FORTEC Power GmbH | Lise-Meitner-Straße 3 | 64560 Riedstadt
+49 6158 8285-0
weborder@fortec-power.de | www.fortec-power.de

Autronic Steuer- und Regeltechnik GmbH | Siemensstraße 17
74343 Sachsenheim
+49 7147 24-0
vertrieb@autronic.de | www.autronic.de

FORTEC Electronic Design and Solution Egypt SMLC | Linx Business Park
Unit B318 | Smart Village | Giza Governorate
info@fortec-integrated.de | www.fortec-integrated.de

FORTEC Czech Republic s.r.o. | Přátelství 275 | 330 02 Dýšina
+49 89 894363-0
info@fortec.cz | www.fortec.cz

FORTEC United States, Corp. | 87 Raynor Avenue Unit 1 | Ronkonkoma
NY | 11779 | +1 631 5804360
info@fortec.us | www.fortec.us