

# **INSTALLATION GUIDE**

# Altair Embed® 2025.2

Altair Embed Pro, Altair Embed SE, and Altair Embed Personal Altair Embed/Digital Power Designer and Altair/Embed eDrives Altair Embed Viewer





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# **System requirements**

• Operating System: Windows 10 or 11

• RAM: 100 MB

Available Hard Drive Space: 4 GB

Processor: Single-core x86 Pentium-based

Graphics Card: Not applicable

## Main installation procedure

This procedure steps you through installing Embed Pro, Embed Personal, Embed SE, Embed Viewer, optional modules, and optional add-ons.

**Important:** 1.) Before starting the installation, temporarily disable antivirus software on your computer. You can re-enable it after the installation is complete. 2.) Regardless of the Embed product you are installing, you may need to install one or more <u>third-party products</u>. 3.) The installer no longer supports automatic back-up of installed files. You can manually back up files prior to the installation or install to a different directory. You must also save the corresponding vissim.ini file.

- 1. Double-click the 64-bit executable file for the product you want to install to launch the installation program:
  - Embed Pro: Use Altair\_Embed\_2025.2\_64.exe
  - Embed SE: Use Altair\_Embed\_SimulationEdition\_2025.2\_64.exe
  - Embed Personal: Use Altair\_Embed\_PersonalEdition\_2025.2\_64.exe
  - Embed Viewer: Use Altair Embed Viewer 2025.2 64.exe

**Note:** Running the installer requires Admin privileges. When you see the **User Account Control** dialog, click **YES**. If you do not see this dialog, **right-click** the **installer** and select **Run as Administrator**.

- 2. If you are installing **Embed Pro or Embed Personal**, follow the prompts to select toolchains and utilities for the devices you are targeting. **Embed SE** users will not see these prompts and can proceed to step 3.
  - If you are targeting Texas Instruments™ ARM® Cortex® M3/M4, Delfino™, F280x, F281x, F28377x,
     Piccolo™, or MSP430™ devices, the install program automatically installs the corresponding compiler if it does not detect the compiler on your computer.
  - If you are targeting Arduino®, Linux® AMD64™ or Raspberry Pi™, or STMicroelectronics® devices and you have not yet installed the corresponding toolchain, the installation halts and provides a link to the compiler installer. After you install the compiler, you can proceed with the installation.



Target	Toolchain and Utility	
AMD64	Windows Subsystem for Linux. A popular WSL is Ubuntu24.04.1LTS.	
Arduino Leonardo, Mega 2560, Nano, and Uno	Arduino 2.3.4. If you are installing v2.x.x, you must also install the Arduino AVR Boards by Arduino.	
Raspberry Pi 1, 2, 3, 4, 5, Zero, and Zero 2W	Bullseye: raspberry-gcc10.2.1-r2.exe Bookworm: raspberry-gcc12.2.0-r2.exe	
STMicroelectronics STM32 F0x, F103x, F3x, F4x, F7x, G0x, G4x, H7, L4x, and WBx	ARM Gnu toolchains v12.3 and v13.2. Scroll down to find and select the v12.3.rel1-mingw-w64-i686-arm-none-eabi.exe or v13.3.rel1-mingw-w64-i686-arm-none-eabi.exe. <u>USB drivers</u> for ST-Link devices.	
Texas Instruments ARM Cortex M3/M4, Delfino, F280x, F281x, F28377x, Piccolo, and MSP430	The installer automatically installs these compilers if necessary:  • ARM Cortex M3 CCSv8: ti-cgt-armllvm_4.0.1.LTS  • C2000 CCSv8: ti-cgt-c2000_22.6.1.LTS  • MSP430 CCSv8: ti-cgt-msp430_21.6.1.LTS	

**Notes:** 1.) If you choose not to install a C compiler, you can still generate C code; however, you cannot download and run the code on the target device. You will need to install the compiler and then re-run this installation. 2.) If you are targeting the Raspberry Pi and an older version of the ARM-Linux GCC compiler is installed on your computer and you want to install a newer version, you must uninstall the older version first.

- Follow the prompt to select and install the Real-Time Analog/Digital I/O optional module. Note that you need to
  download and install the <u>corresponding drivers</u> on your computer. If you choose not to select this module and later
  decide you want it, you must re-run this installation procedure.
- 4. Follow the prompts to select and install the following optional add-ons to extend Embed's modeling and simulation capabilities. These add-ons are additional cost modules; however, if you are installing Embed Personal, you can install them without purchasing them.

Install this add-on	If you want to
Digital Power Designer	Design, simulate, and generate code for power supply and digital power components and controls. After you complete the installation and invoke Embed, Digital Power is added to the menu bar and includes digital power application blocks and numerous examples that help you quickly come up to speed with the block set and with digital power design techniques. The Digital Power Designer User Guide is under Help > Modules > DPD.
eDrives	Develop variable speed and controllers for electric drives. After you complete the installation, an eDrives category is added to the <b>Toolbox</b> menu and includes a comprehensive set of eDrive and eMotor (Legacy) blocks for electric motor drive development. To help you quickly come up to speed with the block sets, explore the examples under <b>Examples &gt;</b> eDrives. The eDrives Advanced User Guide is under <b>Help &gt; Modules &gt; eDrives</b> .



- 5. Follow the prompts and select an installation location for your Embed product. If your target is:
  - Raspberry Pi: Install Raspberry Pi OS and Embed support files on your Raspberry Pi before activating your license.
  - AMD64: Install the <u>Linux support files along with the necessary libraries</u> before activating your license.

**Note:** Because Embed may write files to the installation location during execution, it is recommended not to install Embed in a folder where write permissions may be denied to standard users, such as C:\Program Files.

When the installation completes, you can activate your **Embed license**.

## **Installing third-party software**

Regardless of the type of installation you are performing, you may need to install one or more third-party products on your computer before you install Embed. The table below describes why you would need these products.

Install this product	If you want to
Texas Instruments Code Composer Studio	Use the JTAG drivers for communication between your Texas Instruments device and Embed Pro or Personal. These drivers are included in the Embed Pro and Personal installs.
Texas Instruments UniFlash	Flash code to Texas Instruments C2000 and/or ARM Cortex M3/M4 devices.
Microsoft Visual Studio®	<ul> <li>Generate code from a diagram that can then run on a PC.</li> <li>Create custom DLLs.</li> </ul>
National Instruments™ and/or Measurement Computing™ real-time I/O drivers	Interface with real-time I/O boards from National Instruments and/or Measurement Computing.
USB PCAN-View drivers	Read and write CAN Peak data.



#### **Installing Texas Instruments Code Composer Studio IDE**

If you are installing **Embed Pro** or **Embed Personal** and you want to hand code in C and integrate the code into Embed, you need to install Texas Instruments Code Composer Studio (CCS) IDE on your computer.

CCS IDE also includes JTAG drivers for communicating with your Texas Instruments devices. **Embed Pro** and **Embed Personal** automatically install these drivers.

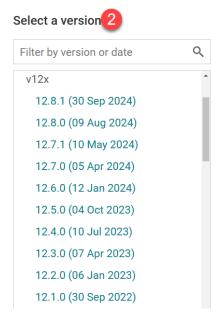
Note: Embed was developed and validated with Code Composer Studio IDE through version 12.

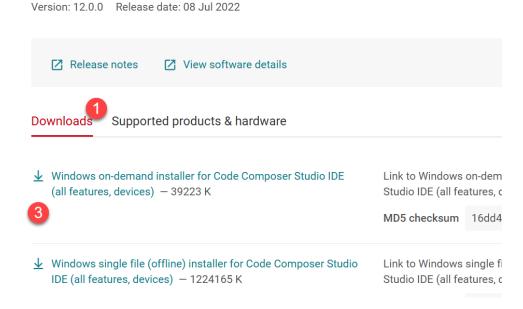
#### To install Texas Instruments CCS IDE

- Go to the <u>TI CCS download page</u>.
- Click Downloads, select a version, then download the Windows Installer for CCS IDE.

## **CCSTUDIO**

Code Composer Studio™ integrated development environment (IDE)







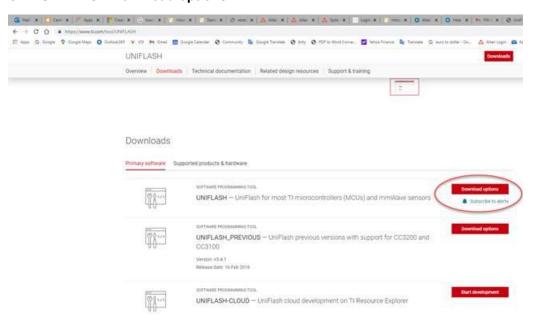
#### **Installing Texas Instruments UniFlash**

If you are installing **Embed Pro** or **Embed Personal** and you want to flash code to Texas Instruments C2000 and ARM Cortex M3 devices, you need to install Texas Instruments UniFlash.

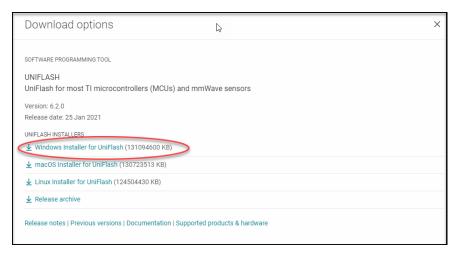
Note: Embed was developed and validated with UniFlash versions 3.x, 4.2.2, 5.0.0.2289, and 6.2.0.3059.

#### To install Texas Instruments UniFlash

- 1. Go to the TI UniFlash download page.
- Click UNIFLASH Download options.



3. Click Windows Installer for UniFlash to download UniFlash to the Downloads folder on your PC.



4. After the download is complete, start the UniFlash Setup Wizard.

At the completion of the installation, the **UniFlash** icon is placed on your PC desktop.



#### Installing Microsoft Visual Studio and Altair Embed Add-On DLL Wizard

If you want to create a block that has custom C/C++ code for simulation and/or code generation, you need Microsoft Visual Studio (MSVS) with the C++ desktop development components and optionally the Altair Embed Add-On DLL Wizard 2020 or 2022.

Note: When you install Embed, it detects the version of MSVS installed on your computer.

- If it detects MSVS 2017 or older, Embed automatically installs a complementary Altair Embed Add-On DLL Wizard.
- If MSVS 2019 or MSVS 2022 is installed on your computer, you may install an Altair Embed Add-On DLL Wizard, as described below.
- If you install MSVS on your computer after the Embed installation, we recommend you re-install Embed to properly configure code
  generation internals for the PC Host target.

#### To install MSVS

- 1. Go to the Microsoft Visual Studio download webpage. If you want an older version, click here.
- Follow the directions on the webpage to download and install the version you want to use. Additionally, under Workloads, select and install Desktop development with C++.

#### To install the Altair Embed Add-On DLL Wizard 2020 or 2022

The Altair Embed Add-on DLL Wizards simplify the task of creating custom blocks and corresponding dialog boxes. The Altair Embed Add-On DLL Wizards are located in your *Embed-installation-folder*. The version of the DLL Wizard that you install depends on the MSVS version you are using. The Altair Embed Add-On Wizards support the Community, Professional, and Enterprise editions of MSVS.

- 1. In File Explorer, go to Altair > Embed2025xxx.
- 2. Start the Altair Embed Add-On DLL Wizard installation:
  - For MSVS v2019 installation, double-click DLLWIZ20.VSIX.
  - For MSVS v2022 installation, double-click DLLWIZ22.VSIX.
- 3. Follow the on-screen directions.

#### Installing real-time I/O drivers

If you are using real-time I/O boards from National Instruments or Measurement Computing, you need to download and install the NI or MCC DAQmx ecosystem of drivers on your computer.

For this board	Go to
National Instruments	https://www.ni.com/en/support/downloads/drivers/download.ni-daq-mx.html#565026
Measurement Computing	https://digilent.com/reference/software/daqami/start



#### **Installing USB PCAN drivers**

If you want to read and write CAN Peak data, you need to download and install the PCAN-View drivers v4.4+ on your computer.

For	Go to
USB PCAN-View v4.4+	https://www.peak-system.com/PCAN-USB.199.0.html?L=1

# **Downloading Embed Viewer**

**Note:** If you want to download STMicro firmware for an Embed diagram and run the diagram in the Viewer, you must <u>download the</u> USB drivers for ST-Link devices.

- 1. Go to Altair One and sign in. If you have not yet registered, do so now and then sign in.
- 2. Under Support & Services, click Marketplace.
- 3. In the upper left corner, enter Embed.
- 4. Scroll down to Embed Viewer.
- 5. Select the Embed Viewer tile.
- Under Downloads in the right windowpane, select the appropriate Embed Viewer executable. You may have to click Show 5 more to display the Viewer downloads.
- 7. Click here for instructions on installing the Viewer.

Click here for instructions on uninstalling the Viewer.

# **Activating your license**

The process of activating your Embed Pro or Embed SE license depends on the type of license you are using. There are four license types:

- Altair One Unit license
- Local license file
- Network license file
- Trial license

To activate an Embed Personal license, click <u>here</u>. If you are unsure of the type of license you have, ask your Altair account administrator. For answers to commonly asked licensing questions, click <u>here</u>.

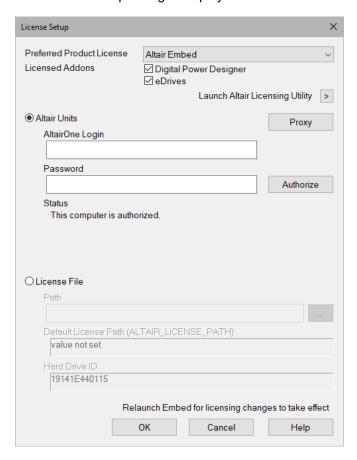


## Activating an Altair One Unit license - standard procedure

Embed software must be installed on your computer, and you must already have an Altair One account with Altair Units. If you have any questions, contact your Altair Account Manager.

#### 1. Start Embed.

The License Setup dialog is displayed.



- Confirm or make the following selections:
  - a. Under Preferred Product License, select the license you are activating.
  - b. Under Licensed Addons, select the addon licenses you have purchased.
  - c. Activate Altair Units.
  - d. Under AltairOne Login and Password, enter your credentials.
- 3. Click Authorize.

The Status is updated with a message that your license has been successfully activated.

**Note:** If the authorization fails, you may need to use an alternate method to activate your license or provide proxy server settings. Or, you may not have enough Altair Units to run Embed. If this is the case, the Status may be updated with a message that indicates the option to run Embed in trial mode.

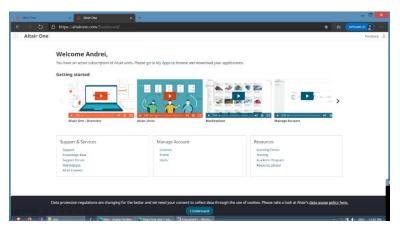
Click **OK**.



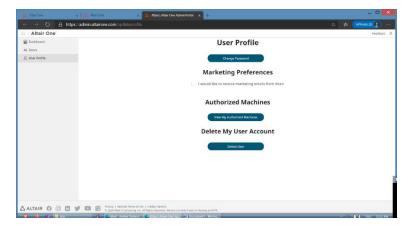
#### **Alternate Altair One Unit license activation procedure**

If you were unsuccessful activating your license using the standard procedure, follow this procedure.

1. Log in to your Altair One account and go to your Dashboard.



2. Under Manage Accounts, click Profile.



3. Under Authorized Machines, click View My Authorized Machines.



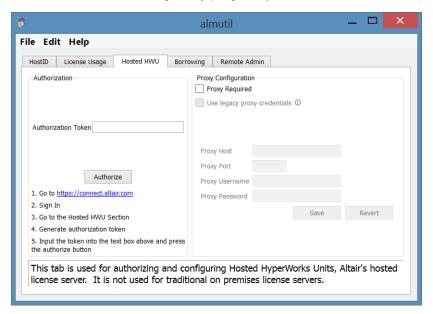
4. In the upper right corner, click Generate Auth Code.

The window is updated with an **authorization code** for your computer.

Copy the code.



6. Launch the Altair Licensing Utility program (under **Start > Altair Embed 2025.2**).



- Paste the code into the Authorization Token text box and click Authorize.
- 8. Authorization may fail if your network has a proxy server. Contact your Local Network Administrator and ask if proxy server settings need to be provided.

**Note:** Authorization may fail if our network has a proxy server. Contact your Local Network Administration and ask if proxy server settings need to be provided. Or, you may not have enough authorized Altair Units to run Embed. If this is the case, the Status may be updated with a message that indicates the option to <u>run Embed in trial mode</u>.

9. Start Embed.

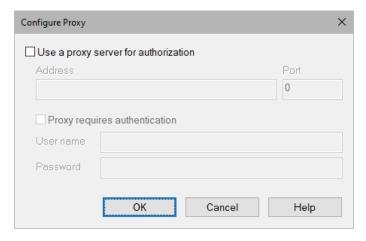


#### Activating an Altair One Unit license on a proxy server

If you are using a proxy server, you will need to configure the server before your license can be activated.

- 1. Perform steps 1 and 2 under Activating an Altair One Unit license.
- 2. Click Proxy.

The following dialog appears:



- 3. Activate Use a proxy server for authorization and enter the server address and port number.
- 4. If your proxy server requires authentication, activate **Proxy requires authentication** and enter your proxy server **User Name** and **Password**.
- Click OK.

Authentication is performed and the License Setup dialog is updated with a successful status message.

**Note:** Authorization may fail if you have an SSL proxy in your environment that re-encrypts traffic with your own certificate. To correct this on Windows, set the system environment variable to ALM\_HHWU\_USE\_WININET=1. Or you may not have enough Altair Units to run Embed. If this is the case, the Status may be updated with a message that indicates the option to run Embed in trial mode.

6. Click OK.

#### **Activating Altair One Unit licenses on multiple computers**

This procedure requires access to an Altair One account with units on it. Typically, this procedure is performed by the license maintainer who has a login and password for the Altair One account and the user on whose computer the unit license is to be activated.

There can be multiple users and multiple computers sharing units from a single Altair One account. The number of instances of Embed running simultaneously depends on the number of units in the account.

#### To activate an Altair Unit license for Embed for a specific computer

- 1. Install Embed, if it is not already installed. If you do not have authorization to install Embed, see your system administrator.
- Launch Embed.



- 3. In the Setup License dialog, do the following:
  - a. Select your **Preferred Product License**, activate **Altair Units**, and enter the **AltairOne Login** and **Password**. If you do not have authorization to activate Embed, see your license maintainer.
  - b. Click Authorize.

**Note:** If you do not have enough units to run a licensed version of Embed on a specific computer, you may be able to run <a href="Embed in trial mode">Embed in trial mode</a>.

c. Click OK.

#### **Using your Altair One Unit license offline**

Your Altair One Unit license can be checked out and used in offline mode for up to two weeks. You must have an internet connection in order to check the license in and out.

- 1. Start the Altair Licensing Utility (under Altair Embed 2025.2 Software in the Start menu).
- Click the Borrowing tab.
- 3. Do the following:
  - a. Select the product you want to run offline.
  - b. Select the amount of time you want to run offline.
  - c. Click Borrow.

When you have reached your time limit, your product no longer works offline.

#### To check units back in

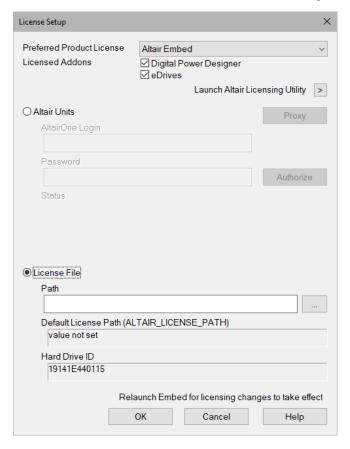
- 1. Start the Altair Licensing Utility (under Altair Embed 2025.2 in the Start menu).
- 2. Click the Borrowing tab.
- 3. Click Return All.



### **Activating a local license**

Before you begin, obtain a valid license file from your Altair account manager and copy it to your preferred location on your computer.

- 1. Invoke Embed.
- 2. If Embed cannot find a valid license file, the following dialog appears:



- 3. Do the following:
  - Under Preferred Product License, confirm or select the license you are activating.
  - b. Under Licensed Addons, confirm or select the add-on modules you have purchased.
  - c. Activate License File.
  - d. Next to Path, click ... to select the license file.
  - e. Click OK.

**Note:** If you do not have a valid license, the Status may be updated with a message that indicates the option to <u>run Embed in trial mode</u>.



## **Activating a trial license**

If you do not have enough authorized Altair Units to run Embed, and you have not used Embed before, you have a one-time option to run Embed in 30-day trial mode. If this is the case, when you start Embed, the following dialog appears:



To activate the trial license, click **Activate Trial License**. Embed is fully functional during the 30-day trial. If a proper license becomes available during the trial period, it overwrites the trial license.

## Setting up a network license

There are three steps to set up a network license:

- 1. Install the license server.
- Activate the license server.
- 3. Connect the client computers to the license server.

Please read all the steps before you begin the set-up procedure.



#### Installing the license server

You can install the license server on Windows, Mac OS X, or Linux. If you have issues or questions, contact your Altair Account Manager.

- 1. Download the latest license server installer file.
  - a. Sign into your Altair One account.
  - b. Go to the Marketplace.
  - c. In the upper left corner, enter Embed.
  - d. In the pop-up on the right, select License Manager.
  - e. Under Suite Version, select 2025; under Operating System, select the appropriate operating system.
  - f. Download License Manager 2025 or higher.
- 2. Launch the license server installer.
- 3. The **Altair Licensing Installation** dialog appears. Proceed through the next few dialogs, entering information for the installation path.
- 4. Click Next.
- 5. Do one of the following:
  - If you have an existing server license file, choose **Yes** and enter the location of the license file. After finishing the installation, the license server will automatically start. Skip to Step 7 under <u>Activating the license server</u>.
  - If you do not have a license file, choose **No**, then click **Next**. You will proceed without a license file and add it later to the appropriate location.
- Review the installation directory and disk space information, then click Install.
- 7. Click **OK** when the Information for obtaining a license file dialog appears.
- 8. Click **Done** to close the license server installation.

#### **Activating the license server**

- 1. Rename the license file sent to you to altair\_lic.dat. Make sure you are showing extensions for known file types.
- 2. Drag and drop the license file into the server installation's root directory using Windows Explorer. (The default location is C:\Program Files\Altair\2025.2). This action overwrites the empty altair\_lic.dat file already found in that directory.
- 3. From the same directory, open altair-serv.cfg in a text editor and confirm that the following line appears:
  - LICENSE FILE = C:\Program Files\Altair\licensing2025.2\altair lic.dat
- 4. In the taskbar, click the **Start** button and navigate to the **Altair License Server 2025** folder.
- Click on ALMUtil.

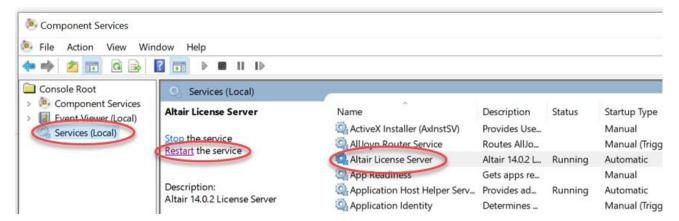


6. In the **almutil** dialog, click the **License Usage** tab. Under the **Tree** tab, you should only see the name of your server computer.



In the taskbar, click Start and begin typing component into the search bar; then click Component Services in the pop-up menu.

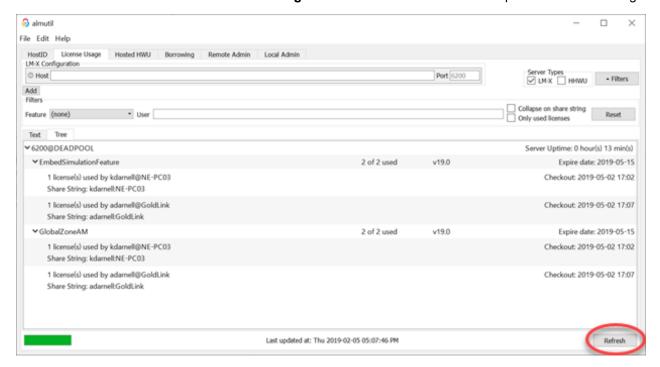
The Component Services dialog appears.



8. Click Services (Local), then select Altair License Server. When the Stop/Restart Service appears, click Restart the service.



9. Go back to ALMUtil and click the License Usage tab. Then click Refresh. The output looks like the image below:



The server is now up and running.

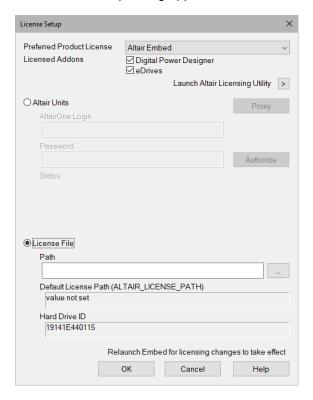


#### Connecting a client computer to the network license server

Make sure you have the port and host name of your license server. This information is required to connect to an existing license server and should have been provided to you by your system administrator. The default Altair port is 6200.

- 1. Download and install Embed on the client computer. See your system administrator for the Embed install executable.
- Start Embed.

The License Setup dialog appears.



- 3. Select **License File** and enter the port@host into the **Path** text box. The default Altair port is 6200. For example, 6200@192.168.100.5 or 6200@company\_server\_name.
- 4. Click OK.

#### Monitoring license usage

You can monitor license usage through the ALMUtil program under the License Usage tab. To access ALMUtil, click **Start** in the taskbar and navigate to the **Altair License Server 2025** folder; then click on **ALMUtil**.

The License Usage window includes the following information: number of licenses and features available, licenses currently in use (including user name and computer name), software version, and license expiration.

If your users are regularly hitting the license usage limit, contact your Altair account manager to purchase additional seats.

## Activating a local or network license with a Windows environment variable

Some companies prefer to use environment variables for licensing. For directions on how to specify a license with a Windows environment variable, see the *Altair Licensing and Installation Guide*.



## **Activating an Embed Personal license**

The first time you start up Embed Personal, your license is automatically activated for 180 days.

# If you need licensing help

Licensing problems sometimes occur when you try to activate your Embed license.

If you cannot launch Embed after installing it, follow the steps under Activating your license.

If you were able to launch Embed in the past, but today Embed refuses to launch, read the sections below that describe how to check your license status and what Altair support needs to know to quickly resolve the problem.

## What flavor of Embed are you using

There are three main flavors of Embed:

- Altair Embed Pro: Full product version that includes C code generation
- Altair Embed SE: Simulation only version that does not include C code generation
- Altair Embed Personal: Full product version, but limits license to 180 days; not for commercial use

There are several add-on modules that require their own licenses:

- Altair Embed/Comm: Third-party product for data communication modeling; go to <u>qbeam</u> for information on Embed/Comm
- Altair Embed/Digital Power Designer: For designing digital power supplies and power conversion equipment
- Altair Embed/eDrives: For designing control systems for electric drives

## What licensing type are you using

There are two main licensing types:

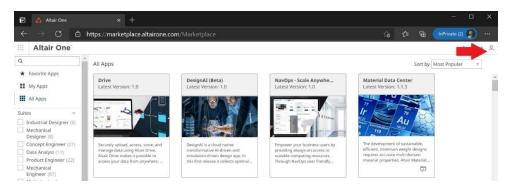
- Altair Units: This license is stored on a cloud server. If you have an account on AltairOne.com, and you did not
  receive a license file through an e-mail, then your licensing is most likely Altair Units.
- License File: This license is stored locally. If you received a license file from Altair, then you have file based license.

If Embed did not launch, the License Setup dialog shows the last used licensing attempt.



#### **Checking the status of your Altair Unit license**

- 1. Log in to Altair One Marketplace using your user name and password.
  - If you do not have an account on this site, you cannot use Altair Units.
- 2. Click user icon in the top right corner.

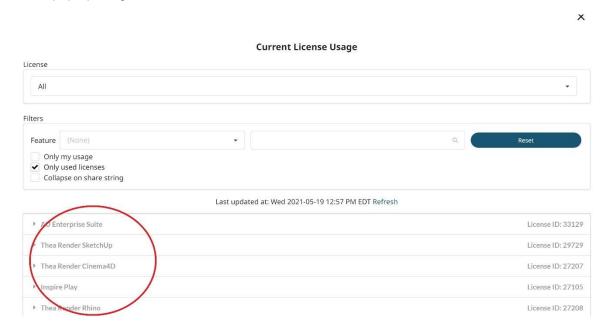


3. Select Hosted Licenses in the drop down menu.



4. On the next screen, note how many units you have, then click View License Usage.

The pop-up image shows all available license features.





- 5. Look for one of these:
  - HWEmbedCodeGen allows you to launch Altair Embed Pro
  - HWEmbedSimulation allows you to launch Altair Embed SE
  - HWEmbedDigitalPower required to use the Digital Power Designer add-on
  - HWEmbedeDrives required to use the eDrives add-on
- 6. On the right hand side, there are expiration dates for each license. Confirm that your license has not expired.

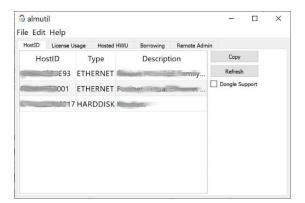
#### Checking the status of your license file

If you are using a locally-stored license, there is a corresponding license file (altair\_lic.dat) located in your Altair Embed directory under \security. The license file contains important information about your Embed license, including the enabled feature codes, license expiration date, and server stats.

Feature codes and server stats are described below:

- EmbedCodeGenFeature allows you to launch Altair Embed Pro
- EmbedDigitalPowerFeature required to use the Digital Power Designer add-on
- EmbedeDrivesFeature required to use the eDrives add-on
- EmbedSimulationFeature allows you to launch Altair Embed Simulation Edition
- The server info must match one of your computer IDs

To get your computer's actual IDs, launch the Altair Licensing Utility from the Start menu.





## Reading the licensing log file

When you activate your license, Embed automatically logs any errors it encounters in the licensing.log file, located in your Altair Embed directory under \security. The log file is a text file and can be read by any text editor.

## **Contact technical support**

When you contact technical support at <a href="mailto:embed-support@altair.com">embed-support@altair.com</a>, include the following information:

- The <u>flavor of Embed</u> you are using
- The type of license you are using
- The status of your Altair Unit license or license file
- Your <u>licensing.log</u> file

## Invoking Embed Pro, Embed SE, or Embed Personal

After you complete the installation process, you can invoke your Embed product from the Windows Start menu or the desktop icon, if you chose to create it. The first time you invoke your Embed product, you have to <u>activate your license</u>.

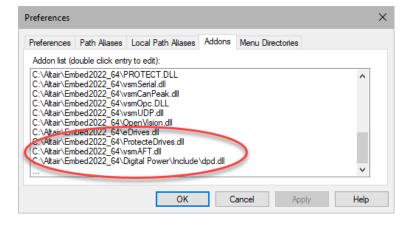
# Uninstalling Embed Pro, Embed SE, Embed Personal, Embed/DPD, Embed/eDrives, or Embed Viewer

To uninstall your Embed product, use the following Uninstallers, which you can access from the Start menu under:

- Altair Embed 2025.2 Software > Uninstall
- Altair EmbedSE 2025.26 Software > Uninstall
- Altair Embed Personal 2025.2 Software > Uninstall
- Altair Embed Viewer 2025.26 Software > Uninstall

You can also access the uninstallers from the Control Panel.

To uninstall individual modules and targets, but not the entire Embed product, use the corresponding uninstaller in Embed-installation-folder\Uninstallers. If you are uninstalling Embed/eDrives and/or Embed/DPD, you must additionally remove the corresponding DLLs from the **Edit > Preferences > Addons** list.





# **Targeting the Raspberry Pi**

This section describes how to:

- Install the Raspberry Pi Bullseye and Bookworm operating systems on your Raspberry Pi
- Display Raspberry Pi output with a Raspberry Pi or USB camera
- Configure additional I2C, SPI, and UART ports on the Raspberry Pi 4B

For additional information on Raspberry Pi, see the Raspberry Pi official website.

### Software requirements

Before installing the Raspberry Pi Bullseye or Bookworm OS and Embed support files, make sure you have already installed <a href="Embed Pro">Embed Pro</a> or <a href="Embed Personal">Embed Pro</a> or <a href="Embed Personal">Embed Personal</a> on your computer. During the installation procedure, the installer checks for the presence of the SYSGCC compiler and provides a link to download and install SYSGCC, if it was not detected. Make sure it is installed before installing the Raspberry Pi OS on your SD card.

### **Hardware requirements**

- Raspberry Pi board (5, 4B, 3A+, 3B+, 3B, 2B, 1A+, 1B+, Zero, Zero 2W)
- 1 SD card 8GB+
- SD card reader (if your computer does not have a built-in reader)
- USB data cable
- LAN cable or Wi-Fi dongle for Raspberry Pi (only required for 1A+ and 1B+)
- HDMI cable, monitor, and keyboard

If you are using a Raspberry Pi 4B, click <a href="here">here</a> for additional requirements.

If you are using a Raspberry Pi 5, the SPI and I2C blocks are not supported.



## Installing the Raspberry Pi OS

Embed supports two Raspberry Pi operating systems: Bookworm 32-bit and Bullseye 32-bit. If Bullseye is already installed on your computer, you can skip to Step 8. If you have not yet installed an operating system, we recommend you install Bookworm 32-bit.

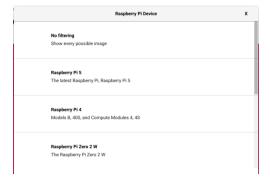
1. Download and install the Raspberry Pi imager from <a href="https://www.raspberrypi.com/software/">https://www.raspberrypi.com/software/</a>.



- Insert the SD card into either your computer or card reader connected to your computer.
- 3. Run the **Raspberry Pi Imager**. The following window appears:

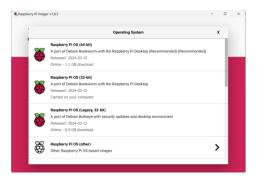


- 4. Click **CHOOSE DEVICE** to select the Raspberry Pi operating system image.
- Choose the appropriate Raspberry Pi device.





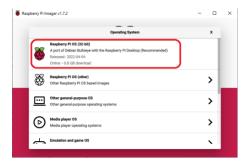
6. Click **Choose OS** to select the Raspberry Pi operating system image.



7. Choose the storage.



8. Choose RASPBERRY PI OS (32-bit).

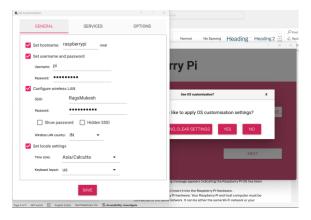


- 9. Click CHOOSE STORAGE to write to the SD card connected to your PC.
- 10. Click **Next** and the following window appears:

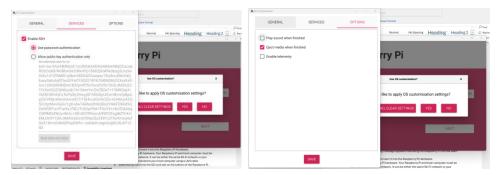


11. Click EDIT SETTINGS.

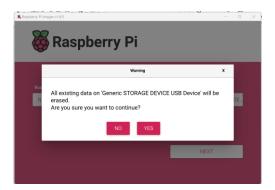




- 12. Under the General tab, make the changes shown above.
  - a. Under **Set username and password**, make sure to retain the following parameters:
    - Username: pi
    - Password: raspberry
  - b. Configure Wifi by providing the SSID and Password.
- 13. Under the **Services** and **Options** tabs, retain the default settings to enable SSH and eject the media when finished.



14. Confirm to continue.





15. Click Write. The following message appears indicating the Raspberry PI OS has been written to your SD card:

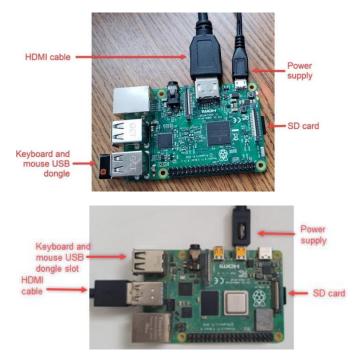


- 16. Remove the SD card and insert it into the Raspberry Pi Hardware.
- 17. Configure the Raspberry Pi hardware.

Your Raspberry Pi and host computer must be connected to the same network. It can be the same Wi-Fi network or your Raspberry Pi can be connected to your host computer using a LAN cable.

- a. Insert the SD card into the SD card slot on the bottom of the Raspberry Pi.
- b. Connect a monitor using an HDMI cable.
- c. Connect a **USB keyboard** and **USB mouse** using their **USB dongles**. We recommend the Logitech K400+ monitor, which combines a mousepad with a keyboard.
- d. Connect the 5V 2amp power supply that came with your Raspberry Pi.

Below are examples of Raspberry Pi 3 and 4.



The Raspberry Pi begins booting up as soon as the power supply is connected. Some power supplies have an ON/OFF switch that must be turned ON.





- e. If your Raspberry Pi is not wired to the network, click in the top right corner of the monitor and select your **Wi-Fi location** from the drop-down list. If you have difficulty configuring and connecting the Wi-Fi, go to <a href="https://www.raspberrypi.org/documentation/configuration/wireless/wireless-cli.md">https://www.raspberrypi.org/documentation/configuration/wireless/wireless-cli.md</a>.
- f. If you have not yet enabled SSH, go to Raspberry > Preferences > Raspberry Pi Configuration.
- g. Choose **Interfaces** and enable **SSH**. If you have difficulty enabling SSH, go to https://www.raspberrypi.org/documentation/remote-access/ssh/README.md.
- h. If you are connected to a wired network, you need to enable the Ethernet connection on the Raspberry Pi. To set the static IP in Bookworm, do the following:
  - i. Click the Network icon.
  - ii. Select Advanced Options.
  - iii. Select Edit Connection.
  - iv. Select Wired Connection 1.
  - v. Click the Gear icon.
  - vi. Select the IPV4 Settings tab.
  - vii. Change from Automatic to Manual.
  - viii. Under Addresses, click Add.
- i. Enter the IP address, gateway, and other information required.

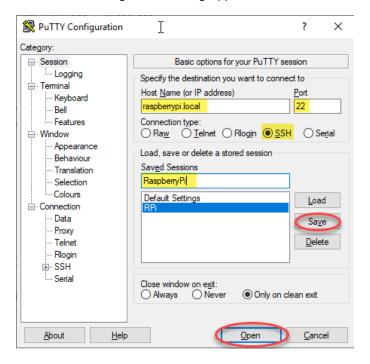


# Installing the Embed support files from the Altair repository on your Raspberry Pi

The Altair repository stores files and libraries that are required for Embed (a Windows-based application) to communicate with your Raspberry Pi (a Linux-based device). These files include fileTransferDaemon and shared libraries that Mosquitto and OpenCV functions can link to at runtime.

- 1. If PuTTY is not installed on your host computer, download and install it from here.
- 2. Launch PuTTY.

The PuTTY Configuration dialog appears:



- 3. Do the following:
  - Set the Host Name to raspberrypi.local.
  - b. Confirm that Port is set to 22 and Connection type is set to SSH.
  - Under Saved Sessions, enter a name to save your settings and press Save. (This allows you to open your saved session later in the installation procedure.)
  - d. Click Open.
- 4. If a Security Alert message is displayed, click Yes.
- A new terminal window appears prompting you to log in to your Raspberry Pi terminal.
  - The default user name is pi
  - The default password is raspberry

The default user name and password are not secure. We recommend that you change them after you log in.



6. Once you have successfully logged in, enter the **hostname** command to make sure you can talk to your Raspberry Pi.

```
pi@raspberrypi:~ $ hostname -I
```

This command gets the current IP address of your Raspberry Pi.

If you are unable to SSH to your Raspberry Pi using the hostname raspberrypi.local, connect to your Raspberry Pi using the monitor and mouse; then open a terminal window and enter the following command:

```
pi@raspberrypi:~ $ hostname -I
```

This command returns the hostname. Use that hostname (instead of raspberrypi.local) to connect using PuTTY.

- You are now ready to download, install, and run fileTransferDaemon and enable the SPI and I2C peripherals on your Raspberry Pi.
  - a. For Bookworm, enter the following commands:
    - i. pi@raspberrypi:~ \$ sudo wget --show-progress -O /home/pi/raspi\_repo.tar.gz
       https://vazcdn.altair.com/altair/products/embed/raspifiletrfr\_Bookworm\_1.0.3.tar.gz -O | tar -xz

When you copy and paste the above command, CR or LF characters may be inserted into the command causing it to fail. If this happens, copy and paste the command into Notepad and remove the extraneous characters. Then copy and paste the edited command into the command window. The following results are displayed:

```
| Popular as: pi
| Popular apperrypi.local's password:
| Linux raspberrypi.local's password:
| Linux raspber
```

ii. pi@raspberrypi:~\$ sh installEmbedSupportBookworm.sh

**Note:** If the screen freezes, press **q** to reboot your Raspberry Pi.



#### The following results are displayed:

```
Assemblercypir- 1 ab AnnitalishedesSpeportNockworm.eh
Reading package lints... Done
Building dependency tree... Done
Building dependency will be installed:
Gupraded, 1 meky installed, 0 to remove and 73 not upgraded.
Beed to get 52.9 MB of archives.
Building defendency tree... 15876 files and directories currently installed.)
Fetched 52.9 MB in 18 (66.8 MM/s)
Selecting proviously unselected package at-spi2-core (a. 50.0-1-bpi2/srpi1_armif.deb ...

Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
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Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
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Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) ...
Setting up at-spi2-core (2.50.0-1-bpi2/srpi1) .
```

This reboots your Raspberry Pi.

#### b. For Bullseye, enter the following commands:

i. pi@raspberrypi:~ \$ sudo wget -O /home/pi/raspi\_repo.tar.gz
 https://vazcdn.altair.com/altair/products/embed/raspifiletrfr\_Bullseye\_2.0.1.tar.gz -O - | tar -xz

When you copy and paste the above command, CR or LF characters may be inserted into the command causing it to fail. If this happens, copy and paste the command into Notepad and remove the extraneous characters. Then copy and paste the edited command into the command window.

The following results are displayed:

```
The programs included with the Debian GRO/Linux system are free software;
the exact distribution terms for each program are described in the
individual lites in /usr/bare/doc/*c/opytight.

Debian GRO/Linux comes with ARSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Jul 4 05:51:45 2024

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk please login as the 'pi' user and type 'passwd' to set
a new placeword.

Pil 18 a security risk please login as the 'pi' user and type 'passwd' to set
a new placeword.

Pil 28 a security risk please login as the 'pi' user and type 'passwd' to set
a new placeword.

Pil 28 a security risk please login as the 'pi' user and type 'passwd' to set
a new placeword.

Pil 28 a security risk please login as the 'pi' user and type 'passwd' to set
a new placeword.

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a new placeword.

Pil 28 a security risk please login as the 'pi' user and type 'passwd' to set
a new placeword.

Pil 28 a security risk please login as the 'pi' user and type 'passwd' to set
a new placeword.

Pil 28 a security risk please login as the 'pi' user has not been changed.

Pil 28 a security risk please login as the 'pi' user has not been changed.

Pil 28 a security risk please login as the 'pi' user has not been changed.

Pil 28 a security risk please login as the 'pi' user has not been changed.

Pil 28 a security risk please login as the 'pi' user has not been changed.

Pil 28 a security risk please login as the 'pi' user has not been changed.

Pil 28 a security risk please login as the 'pi' user has not been changed.

Pil 28 a security risk please login.

Pi
```



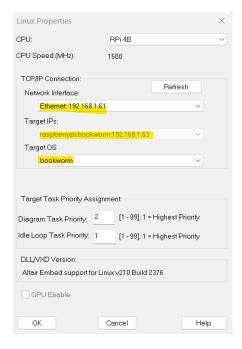
ii. pi@raspberrypi:~ \$ sh installEmbedSupportBullseye.sh

**Note:** If the screen freezes, press **q** to reboot your Raspberry Pi.

The following results are displayed:

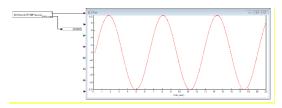
This reboots your Raspberry Pi.

- 8. Confirm the OS installation.
  - a. Under Examples > Embedded > Linux > Raspberry Pi > Applications, open SineWaveOnRPi3Bplus.
  - b. Right-click over Linux RPI 3BPlus configuration block.
  - Confirm the Network Interface and Target IPs are set correctly.





- d. Select Tools > Code Gen.
- e. In the Code Generation dialog, click Compile.
- f. Under Examples > Embedded > Linux > Raspberry Pi > Applications, open SineWaveOnRPi3Bplus-d.
- g. Click Go.
- h. You will see one of the following:
  - If Raspberry Pi target has been successfully added to Embed:



If Raspberry Pi target has not been successfully added to Embed:



- i. Open PuTTY and restart your network with the following command:
  - sudo service altair\_file\_transfer start
- ii. Check the status with the following command:
  - sudo service altair\_file\_transfer status

```
pl@rampberrypi: 8 sudo service altair_file_transfer statu

refrageberrypi: 8 sudo service altair_file_transfer.service; snabled;
Active: active (running) since Fri 2024-08-02 20:47:54 13T; 19min ago

Nain PID: 860 typthon)

refrageberrypi: 1433)

CGC. 15478.

CGC. 15478.

CGC. 15478.

CGC. 15478.

CGC. 15478.

Aug 02 21:03:25 respberrypi python[660]; Got Connection From (132.168.1.61', 62-
Aug 02 21:03:26 respberrypi sudo[1489]; pam_unis(sudo:session); session closed.

Aug 02 21:03:26 respberrypi sudo[1489]; pam_unis(sudo:session); session closed.

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:SinMavenRRIBERLUS.cC

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:SinMavenRRIBERLUS.cC

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:SinMavenRRIBERLUS.cC

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:SinMavenRBIBERLUS.cC

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:SinMavenRBIBERLUS.cC

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:SinMavenRBIBERLUS.cC

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:SinMavenGBIBERLUS.cC

Loaded: Conded (7.110/system) status full the child process

altair_file_transfer.service - Altair Automatic File transfer.service; enabled)

Tanks: 3 (Limit: 1433)

CCC: 3.0572

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:51 135T; 135tin ago

Tanks: 3 (Limit: 1433)

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:51 135T; 135tin ago

Tanks: 3 (Limit: 1433)

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:51 135T; 135tin ago

Tanks: 3 (Limit: 1433)

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:51 135T; 135tin ago

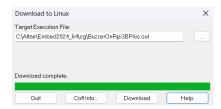
Tanks: 3 (Limit: 1433)

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:51 135T; 135tin ago

Aug 02 21:03:26 respberrypi python[660]; Received: 35:2476:51 135T; Auto
```

iii. After completing these steps, any code download should proceed without issues.

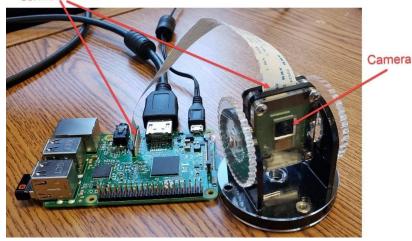




## Displaying Raspberry Pi output with a camera

Sometimes, you may want to view Raspberry Pi camera output. To do so, make sure you have connected a monitor and keyboard to your Raspberry Pi with an HDMI cable. To connect your camera to your Raspberry Pi, use a camera ribbon cable, as shown below.





You do not have to enable the camera on Bookworm OS; however, you may need to enable it on Bullseye OS.

- On the Raspberry Pi monitor, click Raspberry > Preferences > Raspberry Pi Configuration.
- Choose Interfaces and enable the Legacy Camera.

To test camera output on Raspberry Pi:

• Open the ReadCamera diagram, under Examples > Embedded > Linux > Raspberry Pi > OpenVision > Signal Producer.

When you generate an OUT file and download it to your Raspberry Pi, camera output is displayed on the monitor.



## Configuring I2C, SPI, and UART ports on Raspberry Pi 4B

The Raspberry Pi 4B has additional ports not found on other Raspberry Pi devices. These ports are disabled by default. The ports should be enabled only on an as-needed basis. If all the ports are enabled at once, the Raspberry Pi fails to boot.

I2C	UART	SPI*
I2C-3	UART-1	SPI-3
I2C-4	UART-2	SPI-4
I2C-5	UART-3	SPI-5
I2C-6	UART-4	SPI-6
	UART-5	

<sup>\*</sup> The additional SPI ports are not supported in Embed v2025.2.

#### **Enabling additional I2C ports**

To enable the additional I2C ports, add the following overlay lines to the /boot/config.txt file:

[all]

dtparam=i2c arm=on

dtoverlay=i2c1

dtoverlay=i2c3

dtoverlay=i2c4

dtoverlay=i2c5

dtoverlay=i2c6

Additionally, in order for i2c4 to work, SPI should be switched off because SPI-0 uses GPIO-07.

#### **Enabling additional UART ports**

To enable the additional UART ports, add the following overlay lines to the /boot/config.txt file:

[all]

enable\_uart=1

dtoverlay=uart2

dtoverlay=uart3

dtoverlay=uart4

dtoverlay=uart5

When you try to enable UARTS when the pins are already in use, the kernel either rejects the enable request or disables what was using the pins.



# **Targeting the AMD64**

## Downloading and installing Embed files from the repository to your AMD64

The Altair repository stores files that are required for Embed (a Windows-based application) to communicate with AMD64 (a Linux-based system).

- 1. On your host computer, launch PuTTY, if it is not already running.
- In the PuTTY Configuration dialog, enter the hostname (IP address) of your AMD64 and login using your user name and password.
- 3. Execute the following commands to download, install, and run fileTransferDaemon on AMD64:
  - \$ sudo wget -qO- https://vazcdn.altair.com/altair/products/embed/AMD64filetrfr 3.0.0.tar.gz | tar -xz
  - \$ cd fileTransferDaemon
  - \$ sh installEmbedSupportAMD64.sh

## Installing libmosquitto C library for AMD64

Open a Linux Terminal, then copy, paste, and execute the following commands, one at a time, at the command line prompt:

sudo apt-get update

sudo apt install make

sudo apt install -y gcc

sudo apt install -y q++

sudo apt install -y libmosquitto-dev

sudo apt install -y libgtk-3-dev libavutil-dev libavformat-dev libavcodec-dev libswscale-dev libdc1394-dev