SEMA® Installation Guide

(Applicable to SEMA Linux Version ≥ 4.4.0
and SEMA Windows Version ≥ 4.2.15)

January 9, 2026

Leading EDGE COMPUTING

ADLINK
LEADING EDGE COMPUTING

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Revision History

Revision	Release Date	Description of Changes
1.0	09/01/2026	Initial version of installation guide for SEMA Windows and Linux

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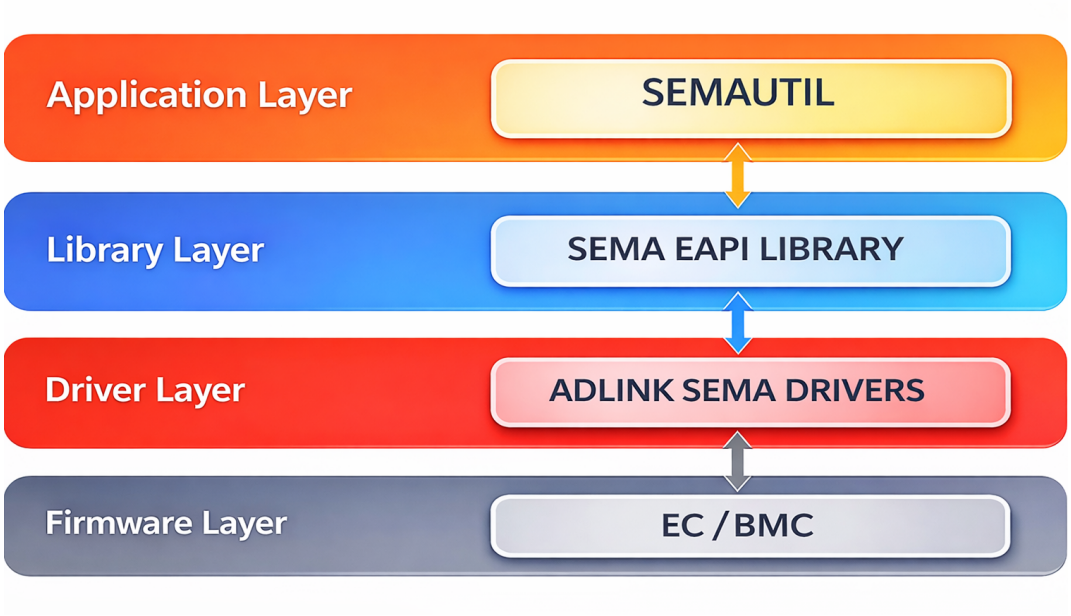
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1. Introduction

SEMA (Smart Embedded Management Agent) is a middleware developed by ADLINK to monitor, control, and manage embedded and industrial computing platforms. It provides a standardized interface (EAPIs) in compliance to PICMG EAPI specification providing access low-level hardware features that are managed by the Embedded Controller (EC) or BMC (Board Management Controller).

SEMA consists of the following components:

- Application Layer
- Library Layer (SEMA EAPI Library)
- Driver Layer (ADLINK SEMA Driver)
- Firmware Layer (EC / BMC)



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2. Supported Functionalities

- Board information and manufacturing data
- Hardware monitoring
- Watchdog control (Runtime and power-up)
- GPIO control
- I2C access
- Temperature monitoring
- Fan monitoring and control
- Non-volatile storage access (e.g., EEPROM)
- Backlight control (LVDS panels)
- Error logging

3. Supported Operating Systems

	SEMA Windows	SEMA Linux
Target Operating system	• Microsoft® Windows® 10 (x64) • Microsoft® Windows® 11 (x64)	• Ubuntu [Kernel 3.15 to 6.14] • Ubuntu 18.04 • Ubuntu 20.04 • Ubuntu 22.04 • Ubuntu 24.04 • RedHat Enterprise Linux 9.2 • RedHat Enterprise Linux 9.5 • Fedora • Debian • CentOS 7 • CentOS 10 • SUSE Linux 15

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4. Supported Platforms

Board Type	EC	BMC
COM-HPC	▪ COM-HPC-sIDH ▪ COM-HPC-cRLS ▪ COM-HPC-mMTL	N/A
COM (Type 6)	▪ Express-RLP ▪ Express-TL ▪ cExpress-R8 ▪ cExpress-RLP ▪ cExpress-ASL/ALN ▪ cExpress-MTL ▪ cExpress-TL ▪ cExpress-AR ▪ cExpress-EL	▪ Express-CFR ▪ Express-CF/CFE ▪ Express-KL/KLE ▪ Express-SL/SLE ▪ cExpress-WL ▪ cExpress-KL ▪ cExpress-AL ▪ cExpress-SL
COM (Type 7)	▪ Express-VR7 ▪ Express-ID7	▪ Express-DN7 ▪ Express-BD7
COM (Type 10)	▪ nanoX-EL	▪ nanoX-AL ▪ nanoX-BT
SMARC x86	▪ LEC-ALN / LEC-ASL ▪ LEC-EL	▪ LEC-AL
Qseven, ETX and other modules	▪ Q7-EL ▪ VPX3-TL	▪ Q7-AL ▪ Q7-BT ▪ ETX-BT
SMARC ARM (Supported only by SEMA Linux)	N/A	▪ LEC-RB5N ▪ LEC-IMX8MP ▪ LEC-IMX8M ▪ LEC-iMX6

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5. SEMA Installation

5.1. For Linux Platform

Step 1: Installation of Dependency Packages

Execute the following commands in the terminal to install the dependency packages.

```
$ sudo apt-get update && upgrade
$ sudo apt install build-essential git hexer i2c-tools uuid-dev
```

NOTE: For Ubuntu with kernel versions greater than 6.5 (such as Ubuntu 22.04.4, which comes with kernel 6.5.0-18-generic by default), gcc-12 does not get installed along with build-essential package. Therefore, gcc-12 needs to be installed using the following command.

```
$ sudo apt install gcc-12
```

Step 2: Clone SEMA Linux Source Code from GitHub

```
$ git clone https://github.com/ADLINK/sema-linux.git
```

Step 3: Build Procedure

Navigate to the cloned directory and build the source code.

```
$ cd sema-linux
$ sudo make clean
$ sudo make
$ sudo make install
$ sudo modprobe -a adl-bmc adl-bmc-boardinfo adl-bmc-vm \
adl-bmc-wdt adl-bmc-hwmon adl-bmc-nvmem adl-bmc-bklight \
adl-bmc-i2c adl-bmc-gpio adl-bmc-nvmem-sec
```

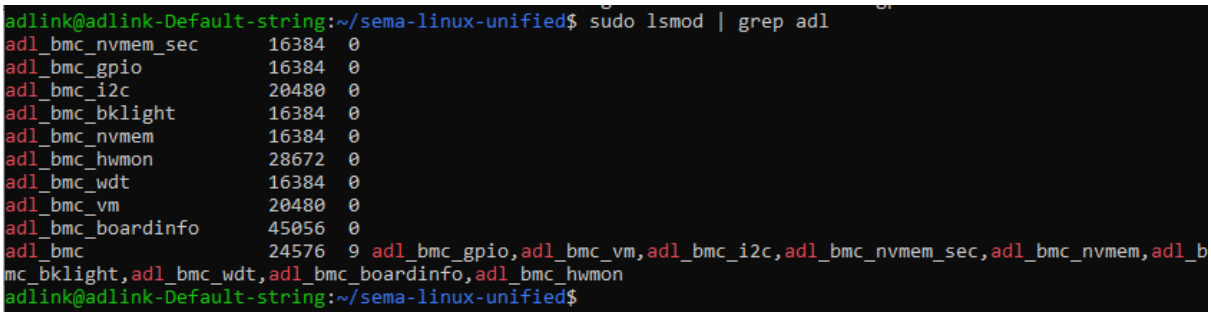

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Step 4: Check Driver Status

Ensure that the driver modules are present in the list of loaded Linux kernel modules using the below command.

```
$ sudo lsmod | grep adl
```



SEMA Software Components and Installation Paths

SEMA Component	Description	Installation path
semautil	SEMA Command line utility	/usr/bin/
libsema.so	SEMA EAPI shared library	/usr/lib/
adl-bmc.ko adl-bmc-boardinfo.ko adl-bmc-vm.ko adl-bmc-wdt.ko adl-bmc-hwmon.ko adl-bmc-nvmem.ko adl-bmc-bklight.ko adl-bmc-i2c.ko adl-bmc-gpio.ko adl-bmc-nvmem-sec.ko	ADLINK SEMA Driver modules	/lib/modules/`uname -r`/updates/driver/ (or) /lib/modules/`uname -r`/extra/driver/

To test the SEMA application, refer to the SEMA User Manual attached in the below link.

Link: Technical Resources | ADLINK.

To uninstall SEMA Linux, refer to the section SEMA uninstallation for Linux Platform.

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5.2. For Windows Platform

Step 1: Download the SEMA Windows Installer Package from GitHub

SEMA Windows download link: https://github.com/ADLINK/sema-windows/releases

Unzip the file and it includes,

- **Bin** - Driver, library and application binaries
- **Installer**
    - ADLINK_SEMA_Installer.exe and
    - ADLINK_SEMA_Installer.msi
- **Src** - Source code

Step 2: SEMA Installer Selection (.exe or .msi)

SEMA Windows Utility is available in two formats - ADLINK_SEMA_Installer.exe or ADLINK_SEMA_Installer.msi.

Installation Using ADLINK_SEMA_Installer.exe

Required Visual C++ Redistributable packages will be installed automatically.
Right click on ADLINK_SEMA_Installer.exe and run in administrator mode.

Installation Using ADLINK_SEMA_Installer.msi

Ensure that the Microsoft Visual C++ 2015–2022 Redistributable (x64) package is installed before running the installer. If not installed, download from the following link.

Download link: https://aka.ms/vs/17/release/vc_redist.x64.exe

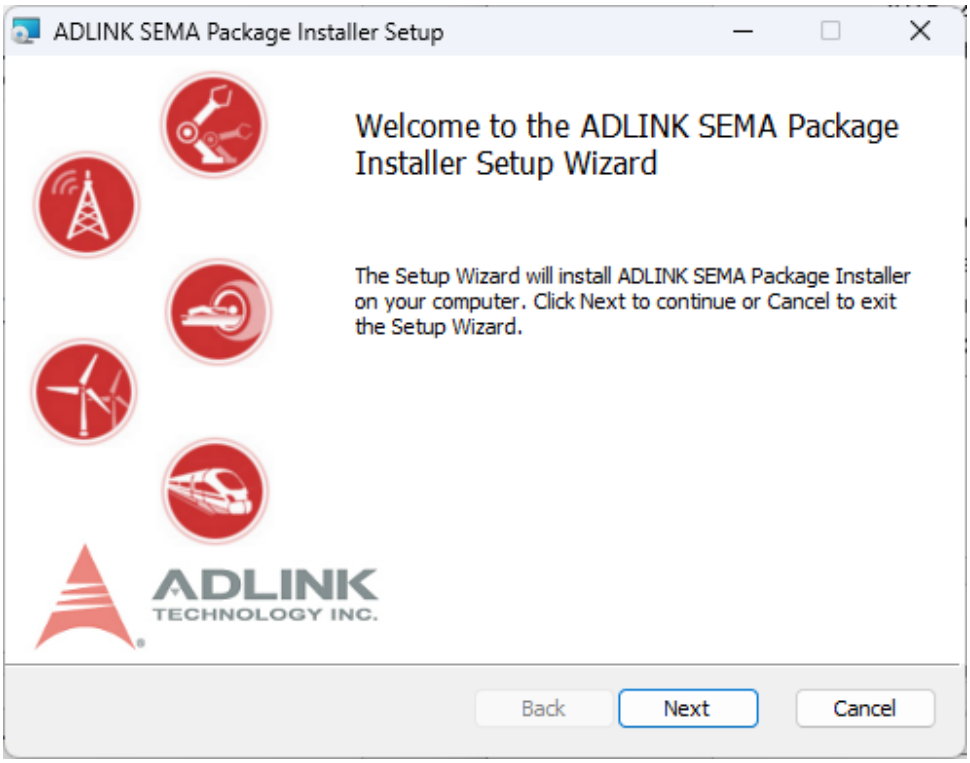
After download, run the vc_redist.x64.exe in administrator mode and install the Redistributable packages successfully.
Then proceed with installing SEMA package installer by double clicking on ADLINK_SEMA_Installer.msi.

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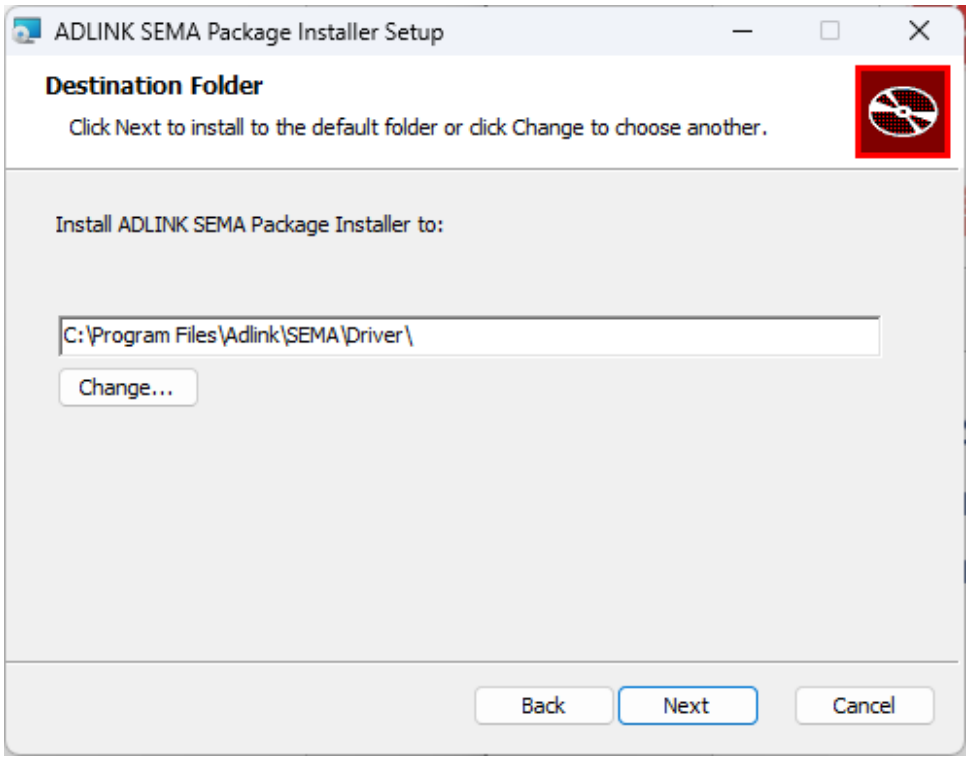
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Step 3: SEMA Installer Setup Instructions

Run the setup installer with admin privileges.



Mention the path to install the SEMA utility to proceed and complete the setup.

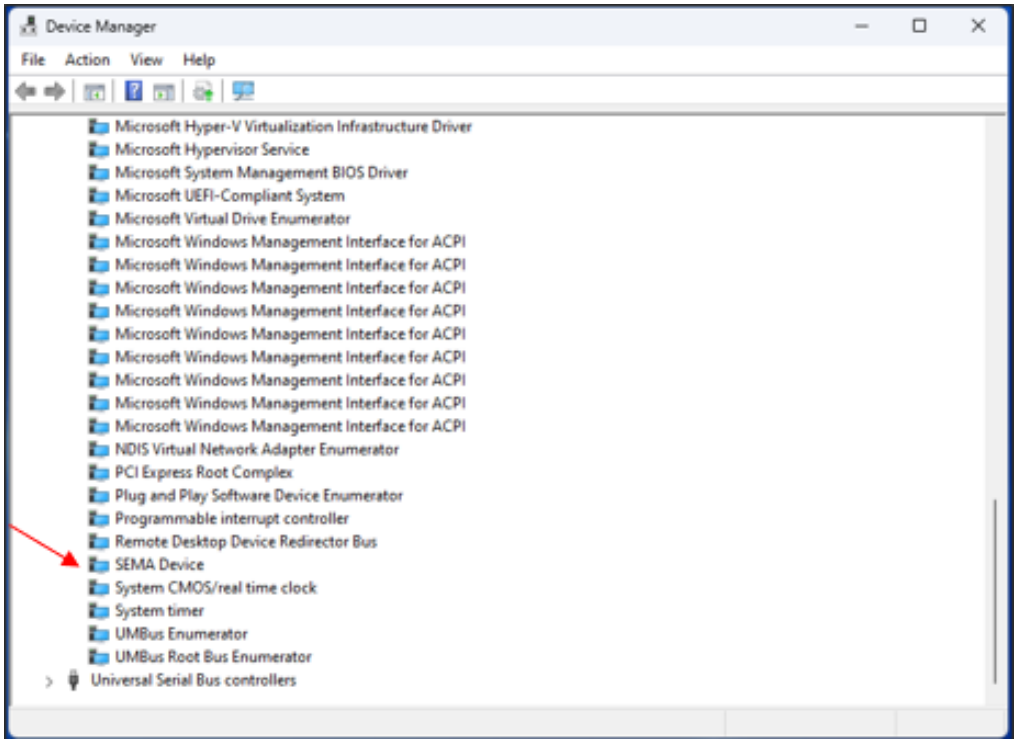


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Step 4: Check Driver Status

On successful installation of the SEMA installer, the device manager shows "SEMA Device" under System devices without any yellow bang.



SEMA Software Components and Installation Paths

SEMA Component	Description	Installation path
Semautil.exe	SEMA Command line utility	C:\Program Files\Adlink\SEMA\Application
Semaeapi.dll Semaeapi.lib	SEMA EAPI Dynamic link Library	C:\Program Files\Adlink\SEMA\Application
Sema4.cat Sema4.inf Sema4.sys	ADLINK SEMA KMDF Driver	C:\Program Files\Adlink\SEMA\Driver\Drv

To test the SEMA application, refer to the SEMA User Manual attached in the below link

Link: Technical Resources | ADLINK

To uninstall SEMA Windows, refer to the section SEMA uninstallation for Windows Platform

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6. SEMA Uninstallation

6.1. For Linux Platform

Follow the below steps to uninstall Unified SEMA in Linux.

Step1: Unloading SEMA Drivers

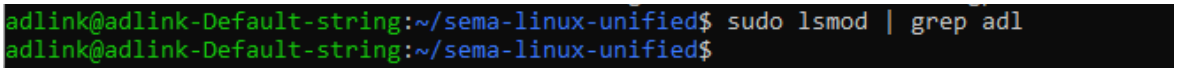
Execute the following command in the terminal and unload all the loaded drivers.

```
$ sudo modprobe -r adl-bmc-boardinfo adl-bmc-vm adl-bmc-wdt \
adl-bmc-hwmon adl-bmc-nvmem adl-bmc-bklight adl-bmc-i2c \
adl-bmc-gpio adl-bmc-nvmem-sec adl-bmc
```

Step 2: Check Driver Status

Ensure that the driver modules are removed from loaded Linux kernel modules list using the below command.

```
$ sudo lsmod | grep adl
```



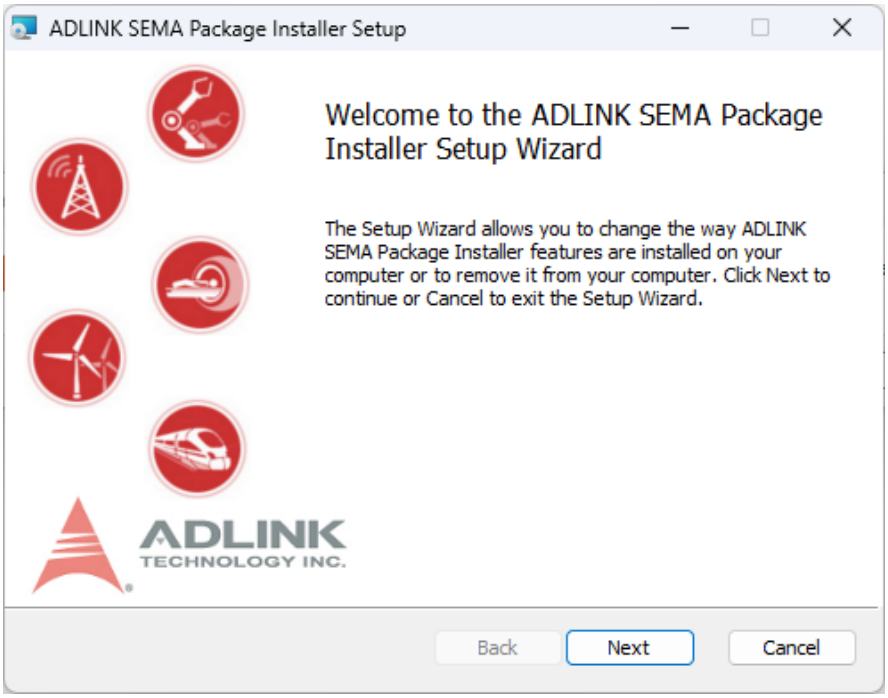
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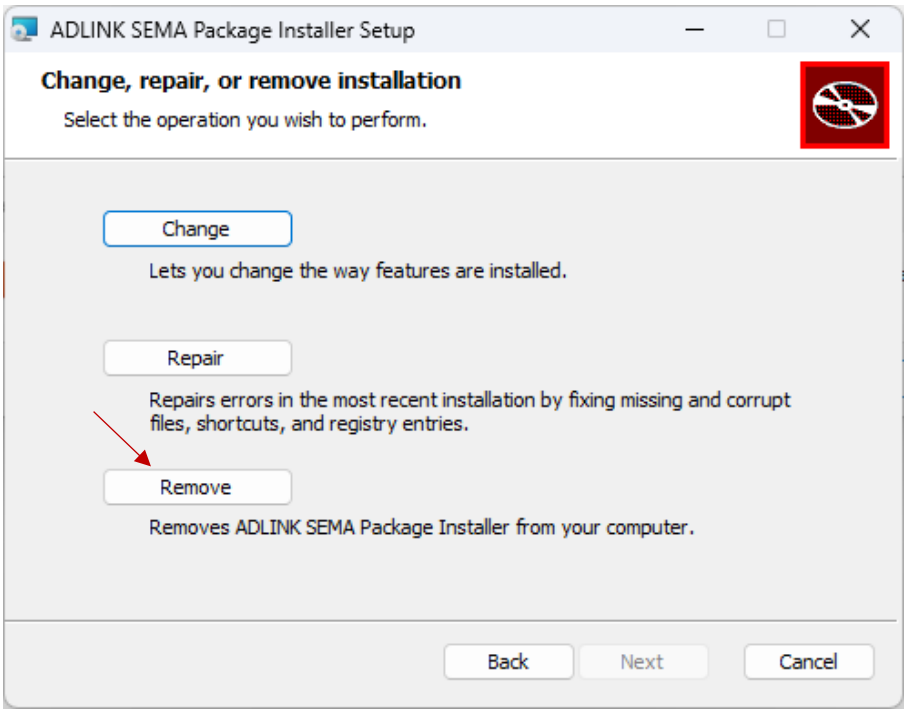
6.2. For Windows Platform

Step 1: Uninstall Using SEMA Installer

Run the SEMA Installer setup with admin privileges.



Select the "Remove" option to proceed and complete uninstallation.

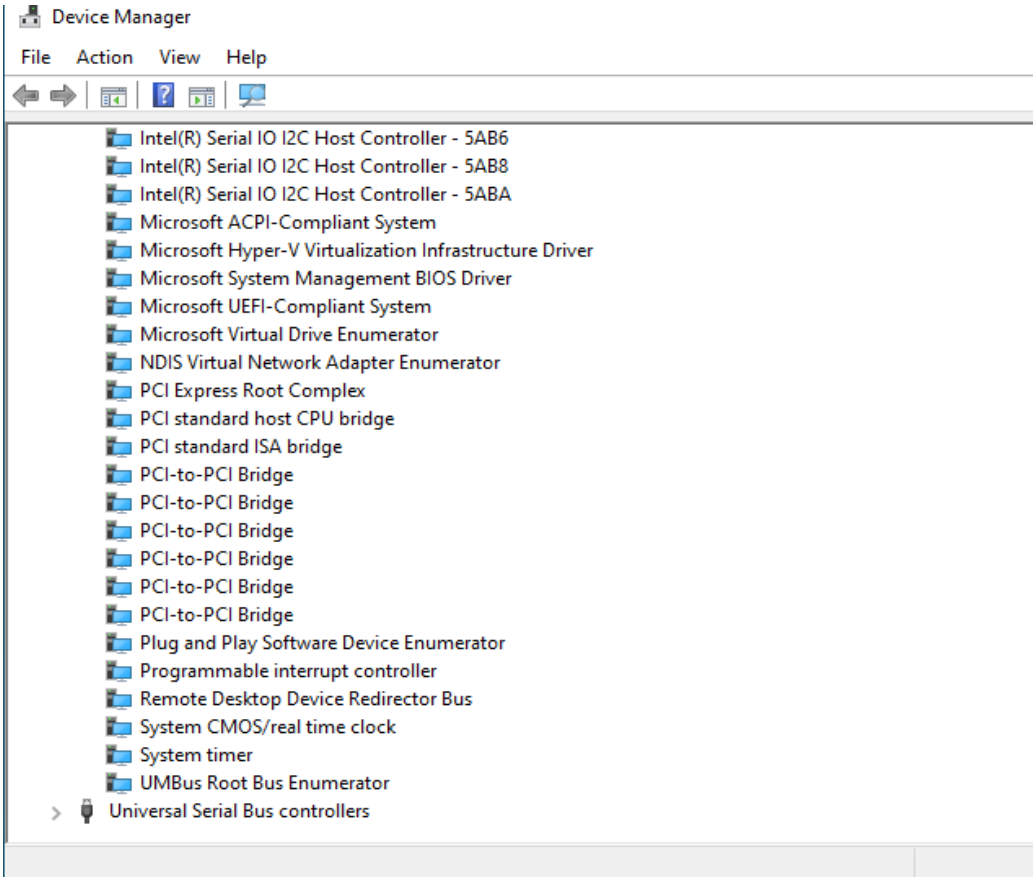


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Step 2: Check Driver Status

On uninstallation of the SEMA installer, "SEMA Device" node under System devices in Device manager and the installed files will be removed.

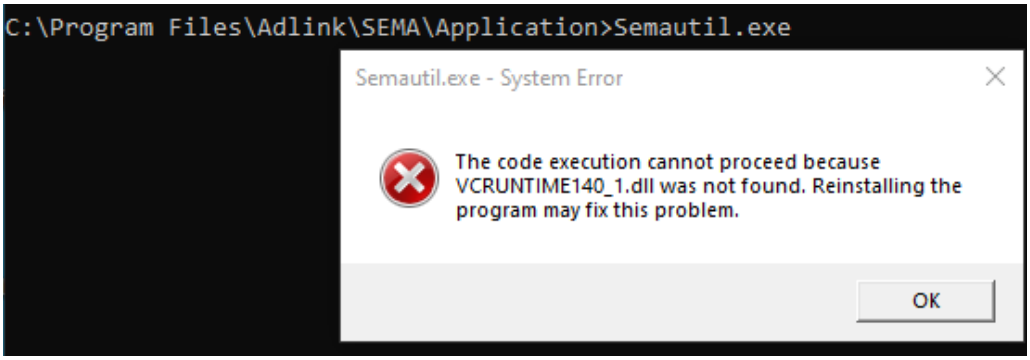


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7. FAQs & Troubleshooting

1. **DLL Not Found Error:**
   Platform: Windows 11
   Error Details: DLL not found messages are observed, such as vcruntime140_1.dll, VCRUNTIME140.dll, vccorlib140.dll, MSVCP140.dll.



   Solution: This indicates missing Visual C++ runtime dependencies.
   Redistributable packages download link: https://aka.ms/vs/17/release/vc_redist.x64.exe
   Install the redistributable package with admin privileges.

2. **Kernel Build Directory Missing Error:**
   Platform: Ubuntu 22.04 [Kernel: 6.1.80] and other Linux distributions.
   Error Details: "*** /lib/modules/6.1.80/build: No such file or directory" during installation of SEMA Linux.

```
adlink@adlink-Express-TL:~/Documents/SEMA-Linux_EC_1011/sema-linux-ec-sema-ec$ sudo make clean
make[1]: *** /lib/modules/6.1.80/build: No such file or directory.  Stop.
make: *** [Makefile:84: driver_clean] Error 2
adlink@adlink-Express-TL:~/Documents/SEMA-Linux_EC_1011/sema-linux-ec-sema-ec$ sudo make
make[1]: *** /lib/modules/6.1.80/build: No such file or directory.  Stop.
make: *** [Makefile:32: modules] Error 2
adlink@adlink-Express-TL:~/Documents/SEMA-Linux_EC_1011/sema-linux-ec-sema-ec$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 22.04.5 LTS
Release:        22.04
Codename:       jammy
adlink@adlink-Express-TL:~/Documents/SEMA-Linux_EC_1011/sema-linux-ec-sema-ec$ uname -r
6.1.80
```

   Solution: Install the kernel headers to resolve this issue.

```
$ sudo apt update
$ sudo apt install linux-headers-$(uname -r)
```


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3. **Config Error:**
   Platform: BMC boards with Linux distributions like RHEL, CentOS.
   Error Details: ADLINK watchdog driver is loaded. But the EAPI EApiWDogStart() failed with return code EAPI_STATUS_READ_ERROR.

   Solution: In Linux distribution such as RHEL and CentOS, the **CONFIG_WATCHDOG_SYSFS** and **CONFIG_NVMEM_SYSFS** is disabled by default. Enable this in kernel config and rebuild the kernel.

4. **Library (libsema.so) Access Failed Error:**
   Platform: RHEL 9.7 - 5.14.0-611.5.1.el9_7.x86_64
   Error Details: libsema.so is available in /usr/lib/. But still error is encountered "cannot open shared object file: No such file or directory".

```
[root@localhost sema-linux-unified]# lsmod | grep adl
adl_bmc_nvmem_sec      20480  0
adl_bmc_gpio           16384  0
adl_bmc_i2c            24576  0
adl_bmc_bklight        12288  0
adl_bmc_nvmem          12288  0
adl_bmc_hwmon          28672  0
adl_bmc_wdt            16384  0
adl_bmc_vm             20480  0
adl_bmc_boardinfo      53248  0
adl_bmc                28672  9 adl_bmc_gpio,adl_bmc_vm,adl_bmc_i2c,adl_bmc_nvmem_sec,adl_bmc_nvmem,
adl_bmc_bklight,adl_bmc_wdt,adl_bmc_boardinfo,adl_bmc_hwmon
[root@localhost sema-linux-unified]# semautil /i get_bd_info 1
semautil: error while loading shared libraries: libsema.so: cannot open shared object file: No such
file or directory
```

   Solution: This indicates that **the system's shared library cache** is not updated. Execute "ldconfig" command to locate and load shared libraries at runtime.

```
$ ldconfig
```

5. **Git Clone Error:**
   Platform: Ubuntu 20.04 [Kernel 5.15.0-139]
   Error Details: unable to access 'https://github.com/ADLINK/sema-linux-unified.git/': server certificate verification failed. CAfile: none CRLfile: none.

```
adlink@adlink-Default-string:~$ git clone https://github.com/ADLINK/sema-linux-bmc.git
Cloning into 'sema-linux-bmc'...
fatal: unable to access 'https://github.com/ADLINK/sema-linux-bmc.git/': server certificate verification failed. CAfile:
 none CRLfile: none
```

   Solution: Incorrect system time also causes SSL failures. Connect to ethernet and execute the following command to update date and time.

```
$ sudo timedatectl set-ntp true
```


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6. **Initialization Failed Error:**
   Platform: Ubuntu 20.04 [Kernel 5.15.0-139]
   Error Details: "Initialization Failed" while accessing Board name via semautil.

```
ledtknr21@ledtknr21-23450233:~/sema-linux-bmc$ sudo ./semautil /i get_bd_info 2
Initialization Failed
ledtknr21@ledtknr21-23450233:~/sema-linux-bmc$ sudo ./semautil /i get_bd_info 3
Initialization Failed
```

   Solution: Ensure the module for the functionality is loaded using the **"lsmod"** command.

```
$ sudo lsmod | grep adl
```


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