AVT 1394 Bus Driver

AVT 1394 BUS DRIVER PACKAGE

User Guide

V2.0.2

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ALLIED Vision Technologies

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Introduction

Microsoft Windows operating systems include a bus driver and various class drivers to support the IEEE 1394 high performance serial bus. However, current driver support is limited to controllers and devices that are compliant to the IEEE 1394a standard. The features introduced with the 1394b standard cannot be used in Windows based applications and device drivers. Furthermore, there are some known stability issues that cause problems in industrial and professional applications with high reliability demands. The current version of the Microsoft 1394 bus driver provided for Windows Vista does not support S800 data rates.

The **AVT 1394 Bus Driver** provides a solution to these problems. It replaces the Microsoft driver and exposes a compatible programming interface to upper layers. In-box class drivers and existing custom device drivers will continue to work.

The **AVT 1394 Bus Driver** supports all current IEEE 1394 standards (1394a and 1394b). It implements topology parsing and automatic speed selection. Applications can achieve the maximum data transfer rate that is possible for a connection between any two nodes. This allows the use of high-speed, long-haul and optical connections as defined by the IEEE 1394b standard. The bus driver supports OHCI-compliant host controllers. Its implementation conforms to the PCI driver model defined by WDM and is optimized for high-throughput, low CPU load and fault-tolerant operation.

Document history

Version	Date	Remarks
V2.0.0	09.12.08	New Manual - RELEASE status
V2.0.1	17.12.08	New AVT 1394 Bus Driver logo on title page. Some smaller corrections in Chapter Using AVT 1394 Bus Driver with third party solutions on page 28.
V2.0.2	18.12.08	Changed Table 5: Description of AVT 1394 Bus Driver architecture on page 24.

Table 1: Document history

Manual overview

The manual overview describes each chapter of this manual shortly.

- Chapter System requirements on page 7 lists conditions for hardware and operating systems. Read the special advice when working with Windows Vista (**UAC** = **U**ser **A**ccount **C**ontrol).
- Chapter Components overview on page 9 describes the **AVT 1394 Bus Driver** in general and its components.
- Chapter Installing the AVT 1394 Bus Driver on page 11 describes how to install the **AVT 1394 Bus Driver** either manually or via **AVT 1394 Bus Driver Installer**.
- Chapter AVT 1394 Bus Driver architecture on page 24 gives you an overview of the **AVT 1394 Bus Driver** architecture.
- Chapter Using the AVT 1394 Bus Driver with AVT Active FirePackage on page 26 describes details when using **AVT Active FirePackage**.
- Chapter Using AVT 1394 Bus Driver with third party solutions on page 28 describes details when using third party solutions.

Conventions used in this manual

To give this manual an easily understood layout and to emphasize important information, the following typographical styles and symbols are used:

Styles

Style	Function	Example
Bold	Programs, inputs or highlighting important things	**bold**
Courier	Code listings etc.	`Input`
Upper case	Register	REGISTER
Italics	Modes, fields	*Mode*
Parentheses and/or blue	Links	(Link)

Table 2: Styles

Symbols

Note This symbol highlights important information.

Caution

This symbol highlights important instructions. You have to follow these instructions to avoid malfunctions.

www

This symbol highlights URLs for further information. The URL itself is shown in blue.

Example:

http://www.alliedvisiontec.com

Before operation

We place the highest demands for quality on our software.
The **AVT 1394 Bus Driver User Guide** describes the installation of the **AVT 1394 Bus Driver** and detailed descriptions when using **AVT Active FirePackage**, third party solutions (MATLAB, NI LabVIEW, VisionPro).

Note

Please read through this manual carefully before installing AVT 1394 Bus Driver.

System requirements

This chapter describes the requirements for installing **AVT 1394 Bus Driver**:

- Hardware requirements
- Operating system requirements

... and gives a special advice when working with Windows Vista.

Hardware requirements

The **AVT 1394 Bus Driver** supports the following IEEE 1394 OHCI host controllers:

- OHCI Version 1.0 compliant host controllers
- OHCI Version 1.1 compliant host controllers (IEEE 1394a and 1394b)

Note

AVT offers a wide range of IEEE 1394 adapters, both 1394a or 1394b for different requirements.

Testing at Allied Vision Technologies has been performed on host controllers that are based on OHCI chip sets from Texas Instruments. Nevertheless, the driver should run also on host controllers that are based on OHCI chip sets from other vendors.

However, if there are any problems please feel free to contact us.

FireWire hot plug precautions

Note

Although FireWire devices can be hot-plugged without powering down equipment, **we recommend turning the computer power off, before connecting a digital camera to the system via a FireWire cable.**

Operating system requirements

The **AVT 1394 Bus Driver** supports the following operating systems:

- Windows 2000 SP4
- Windows XP SP2 and SP3 on Intel x86 architecture (IA-32)
- Windows Vista on Intel x86 architecture (IA-32)

Special advice when working with Windows Vista

This chapter gives you a short introduction to a new technology that Microsoft introduced with Visa operating systems: the so-called **User Account Control**.

Basic information

User **A**ccount **C**ontrol (**UAC**) is a technology and security infrastructure for Windows **Vista** operating systems. It aims at improving the security of Windows Vista by limiting application software to standard user privileges until an administrator authorizes an increase in privilege level. In this way, only applications that the user trusts receive higher privileges, and malware is kept from receiving the privileges necessary to compromise the operating system. So a user account may have administrator privileges assigned to it, but applications that the user runs do not have those privileges automatically unless the user explicitly authorizes them to have higher privileges.

UAC warning

An example of an **UAC warning** when a program (e.g. **AVT 1394 Bus Driver** installation program) wants to write in a system folder is the following:

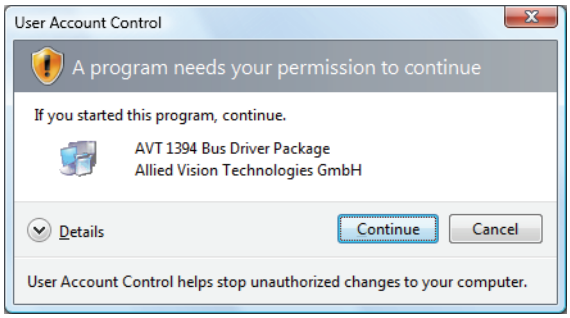


Figure 1: UAC warning: example

Perform the following steps:

1. In this case just click **Continue** because the shown program needs to write certain files to the system folder for general use.
2. Go on working.

Note

You may prevent this UAC warning by right-clicking the **AVT1394BusDriverPackage.exe** and select **Run as administrator** before you install the software.

Components overview

This chapter describes the following:

- What is the **AVT 1394 Bus Driver**?
- Why using the **AVT 1394 Bus Driver**?
- What are the advantages of the **AVT 1394 Bus Driver**?
- Description of package content of **AVT 1394 Bus Driver Package**

What is the AVT 1394 Bus Driver?

The **AVT 1394 Bus Driver** completely replaces the Microsoft driver stack and enables the usage of S800 data rates under Windows Vista and Windows XP by default.

Why using the AVT 1394 Bus Driver?

Currently, Windows Vista does not support S800 data rates, and Windows XP (SP2/SP3) enables this feature only in case a driver rollback to the MS IEEE1394 bus driver of SP1 is performed.

To overcome this problems we strongly recommend using the **AVT 1394 Bus Driver** which supports all properties of IEEE 1394b standard by default under Windows Vista and Windows XP.

What are the advantages of the AVT 1394 Bus Driver?

- The **AVT 1394 Bus Driver** substitutes the Windows driver with a driver that supports the full bandwidth of S800.
- The **AVT 1394 Bus Driver** supports S800 for the operating systems Windows Vista and Windows XP.
- The **AVT 1394 Bus Driver** avoids hub problems you otherwise get with the Microsoft driver. For more information see Hub problem Microsoft driver on page 26.

Package content

The **AVT 1394 Bus Driver** consists of the following files:

Driver related file	Description
AVT1394bus.sys	Bus driver file
AVT1394bus.inf	Appropriate information file An .inf file consists of a number of sections which describe the installation tasks. These tasks include descriptions of the target location of the files, shortcuts, and registry settings.
AVT1394bus_proppage.dll	This dll sets the properties of the bus driver in the device manager.
AVT1394BusDriverInstaller.exe	Driver install tool This tool: • installs the **AVT1394bus.sys** driver and • replaces the corresponding 1394 Microsoft bus driver. All other files required for a proper operation are installed to predefined directories and all necessary registry entries are set in the background. In addition, a rollback to the installed 1394 Microsoft bus driver is possible.
AVT1394bus_devinst.dll	This .dll is used by the **AVT 1394 Bus Driver Installer**.

Table 3: AVT 1394 Bus Driver components

Note

For information on the **AVT 1394 Bus Driver** architecture see Chapter AVT 1394 Bus Driver architecture on page 24.

Installing the AVT 1394 Bus Driver

Overview

We assume that you have already installed the IEEE1394 interface card in your system. What happens when you do this is the following:

First of all Plug and Play will find the IEEE1394 interface card and starts searching for appropriate drivers. Normally the standard Microsoft driver for OHCI cards will be installed.

After the IEEE1394 interface card installation is completed, you have to replace the standard Microsoft OHCI driver with the **AVT 1394 Bus Driver**.

As the first step, install the **AVT 1394 Bus Driver Package** on your computer.
At the end of this step, the **AVT 1394 Bus Driver** is installed (via **AVT 1394 Bus Driver Installer**).

If you wish to change your driver installation after the package has been installed (e.g. if you install a 1394 card later on), you can do this in two ways:

- Use the **AVT 1394 Bus Driver Installer** or
- Install the driver **manually**

Installing AVT 1394 Bus Driver Package

To install **AVT 1394 Bus Driver Package**, perform the following steps:

1. Save and exit out of all currently running applications.
2. Insert the AVT Product CD into your CD-ROM drive or download the **AVT 1394 Bus Driver** zip file (AVT1394BusDriver_XvY.zip) from the AVT web site. Unpack it and start the corresponding *.exe.

   The **Windows Installer** box with a progress bar will appear while setup prepares to start the installation process.

   Now you are ready to start installing **AVT 1394 Bus Driver Package**.

The **Welcome** dialog box will appear:

Figure 2: **AVT 1394 Bus Driver** setup: Welcome

3. Read the information in the **Welcome** dialog box.
   - If any programs are running on your system, click **Cancel** to quit the setup program, then close any programs you have running.
   - If you already closed all your programs, click **Next** to continue the installation.

   The **Readme Information** dialog box will appear:

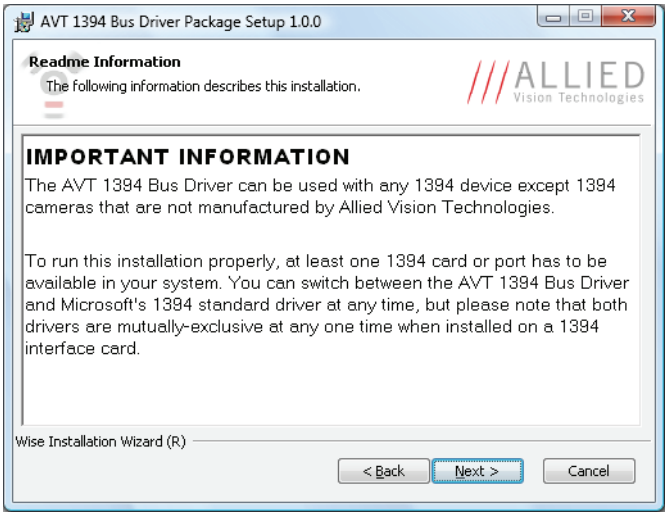


Figure 3: **AVT 1394 Bus Driver** setup: Readme Information

4. Read the **IMPORTANT INFORMATION**.
5. Click **Next** to proceed.

The **Destination Folder** dialog box will appear:

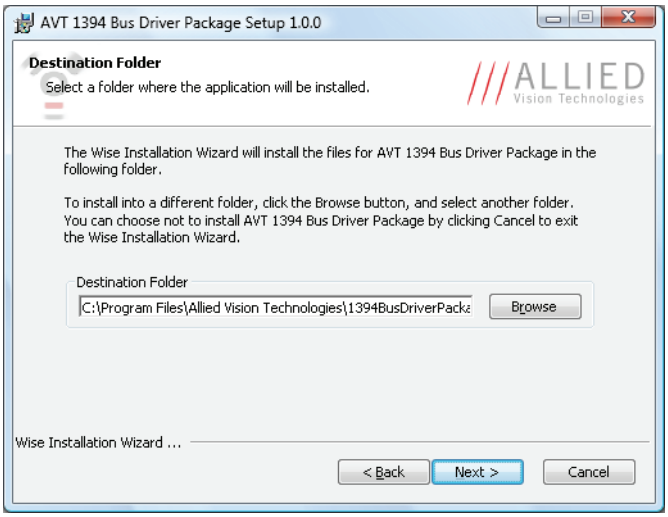


Figure 4: **AVT 1394 Bus Driver** setup: Destination Folder

The default location of **AVT 1394 Bus Driver** files is
`C:\Program Files\Allied Vision Technologies\1394BusDriverPackage`

6. If you want to change the location, enter the path for the desired folder.
7. Click **Next**.

The **Select Features** dialog box will appear:

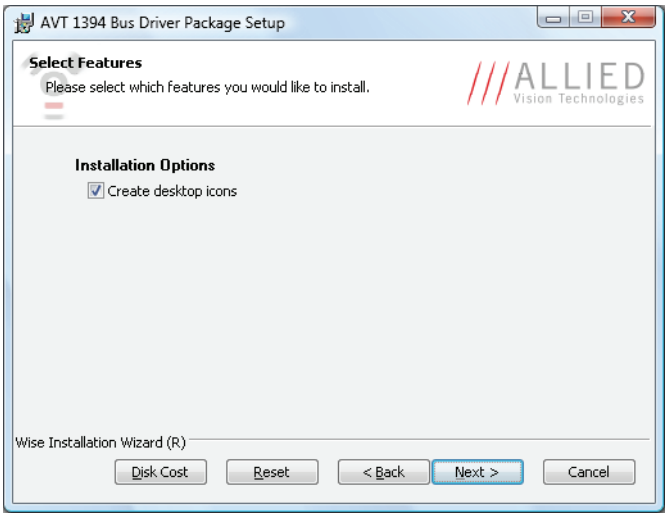


Figure 5: **AVT 1394 Bus Driver** setup: Select Features

8. Here you set a general **Installation Option**: This option controls the creation of desktop icons.
   Click **Next**.

The following dialog will appear:

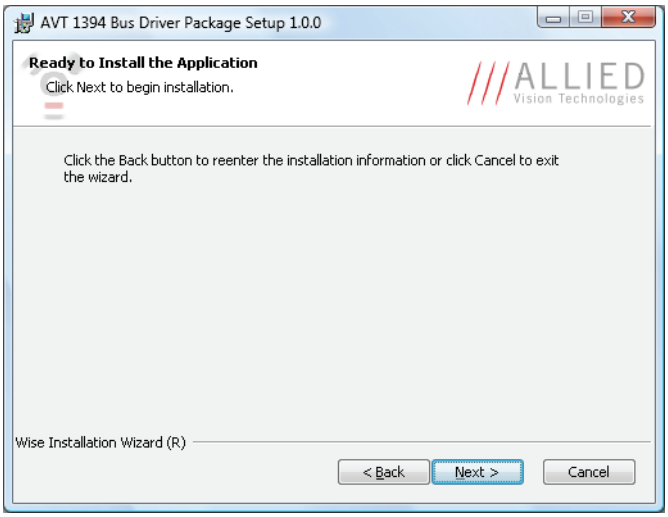


Figure 6: **AVT 1394 Bus Driver** setup: Ready to Install the Application

9. Click **Next**.

The following dialog will appear:

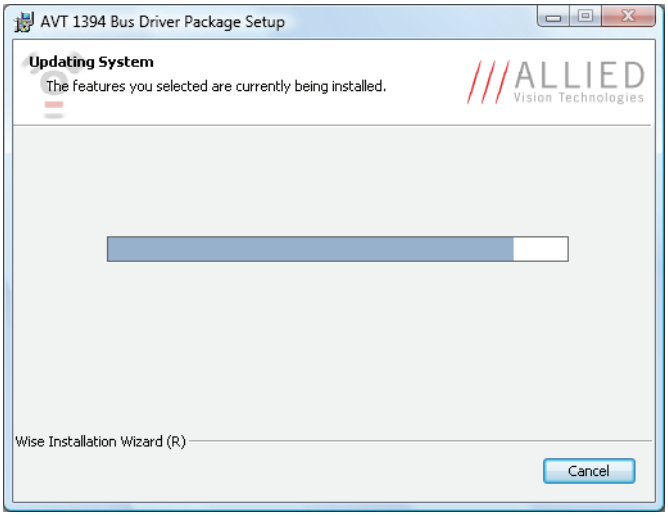


Figure 7: **AVT 1394 Bus Driver** setup: Updating System

AVT 1394 Bus Driver will be installed.

Once the installation is finished, the following dialog box will appear:

Figure 8: **AVT 1394 Bus Driver** setup: Successfully installed

10. **Show Release Notes** check box is already activated, so that you can read the release notes with the last informations immediately after the installation is finished.
    Install driver now check box is already activated, so that the **AVT 1394 Bus Driver Installer** will start automatically immediately after the package installation is finished. If you want to configure the **AVT 1394 Bus Driver** later separately, deactivate **Install driver now** check box.

Note

If you deactivate **Install driver now** check box, the old 1394 driver on your system will be used.

But you can switch from the old driver to the new **AVT 1394 Bus Driver** at any time (see Table 4: AVT 1394 Bus Driver Installer: Changing 1394 driver on page 19).

11. Click **Finish** to exit the installer.

Note

Depending on your operating system you might need to reboot your system at this point. You will be prompted if a reboot is required; if a message appears, follow the on-screen instructions.

Driver management

If you have chosen not to install the **AVT 1394 Bus Driver** during package installation or if you want to change a driver that is bound on a device (e.g. changing from Microsoft 1394 driver to **AVT 1394 Bus Driver**), you have the following two choices to do this:

- Using **AVT 1394 Bus Driver Installer** (see Chapter Using the AVT 1394 Bus Driver Installer on page 16) or
- Installing driver manually (see Chapter Installing driver manually on page 20)

Using the AVT 1394 Bus Driver Installer

Perform the following steps:

1. Start **AVT 1394 Bus Driver Installer**.

   You have two choices to open the **AVT 1394 Bus Driver Installer**:

   – **First choice:** Double-click icon on desktop:

Note

This is only possible if you accepted the activated **create desktop icons** check box during the installation process.

   – **Second choice:**
   Start → All Programs → Allied Vision Technologies → 1394BusDriverPackage → Install or remove 1394 driver.

In both cases the following window will appear:

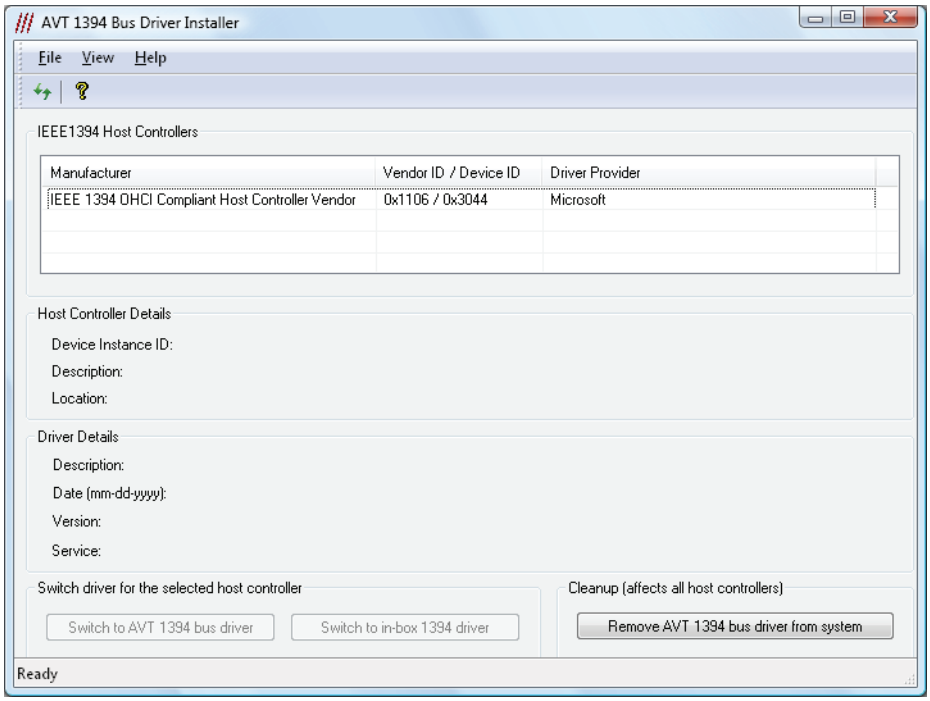


Figure 9: **AVT 1394 Bus Driver Installer**: Initial

In the list you find one entry per 1394 host controller.

2. Choose the 1394 host controller on which the driver should be changed.

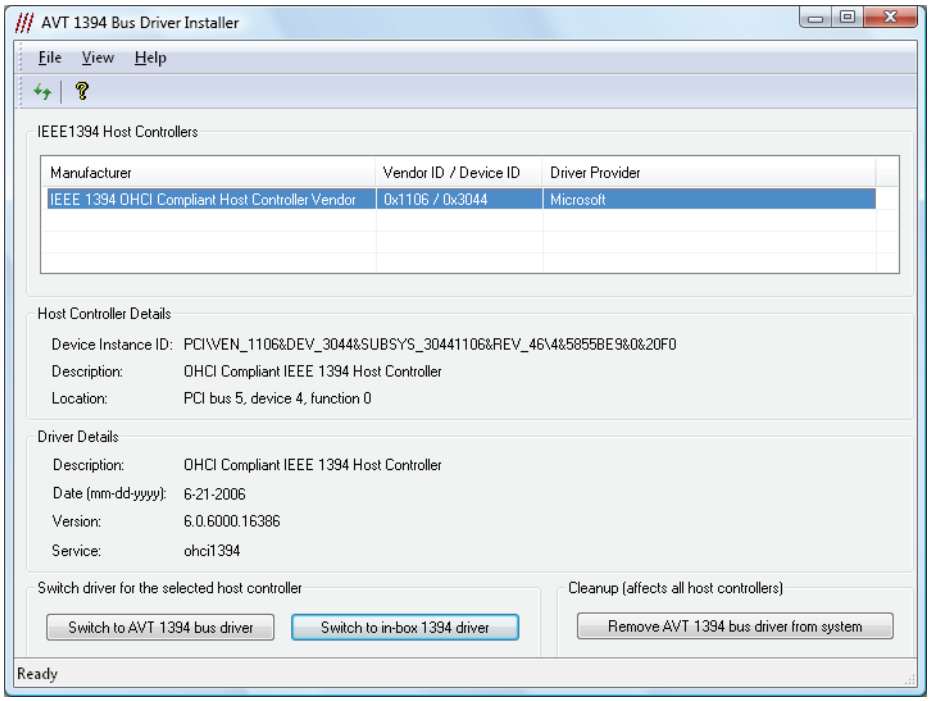


Figure 10: **AVT 1394 Bus Driver Installer**: Choosing 1394 host controller

Now also the following two buttons are available:

- **Switch to AVT 1394 bus driver** button
- **Switch to in-box 1394 driver** button

3. Perform one of the following actions:

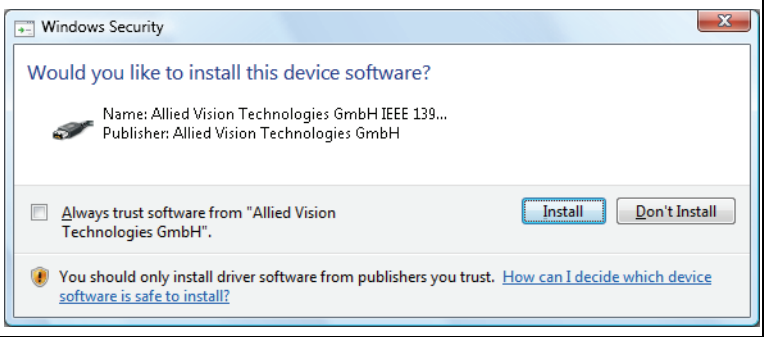
Windows element	Description
Switch to AVT 1394 bus driver	Deinstalls the current 1394 driver from **selected** host controller. Installs the **AVT 1394 Bus Driver**. **Note** If a **Windows Security** window appears, click **Install** to continue. See screen-shot below.
	
Switch to in-box 1394 driver	Deinstalls the current 1394 driver from **selected** host controller. Installs the Microsoft 1394 bus driver.
Remove AVT 1394 bus driver from system	Deinstalls the **AVT 1394 Bus Driver** from **all** host controllers. Replaces the **AVT 1394 Bus Driver** with the Microsoft 1394 bus driver.

Table 4: **AVT 1394 Bus Driver Installer**: Changing 1394 driver

Note If you installed a driver manually, click  .

This refreshes the list of host controllers.

Installing driver manually

In most cases we recommend an installation via the **AVT 1394 Bus Driver Installer** (see Chapter Using the AVT 1394 Bus Driver Installer on page 16.)

But there may be scenarios where it's advisable to install the driver manually, e.g.:

- If an unknown FireWire card cannot be identified by the **AVT 1394 Bus Driver Installer**, you have to install the driver manually.

To install the driver manually, perform the following steps under Windows Vista. (Under Windows XP, a similar procedure is necessary.)

1. Call the device manager: click on **Start**, right-click **Computer**, click **Properties** and then click **Device Manager**.

   The **Device Manager** window will appear:

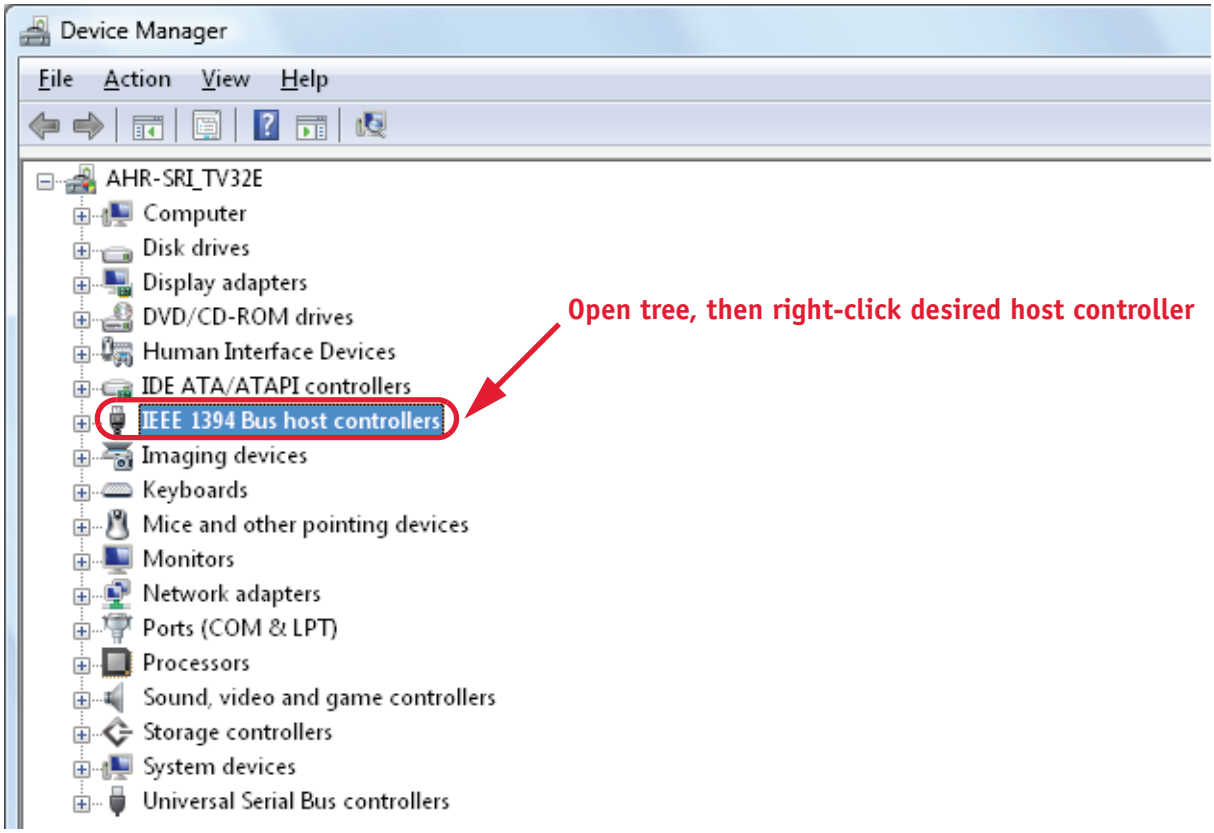


Figure 11: **AVT 1394 Bus Driver**: manual driver installation (Device Manager)

2. Open the **IEEE 1394 Bus host controllers** tree, right-click the desired host controller and choose **Update Driver Software...** .

The following dialog will appear:

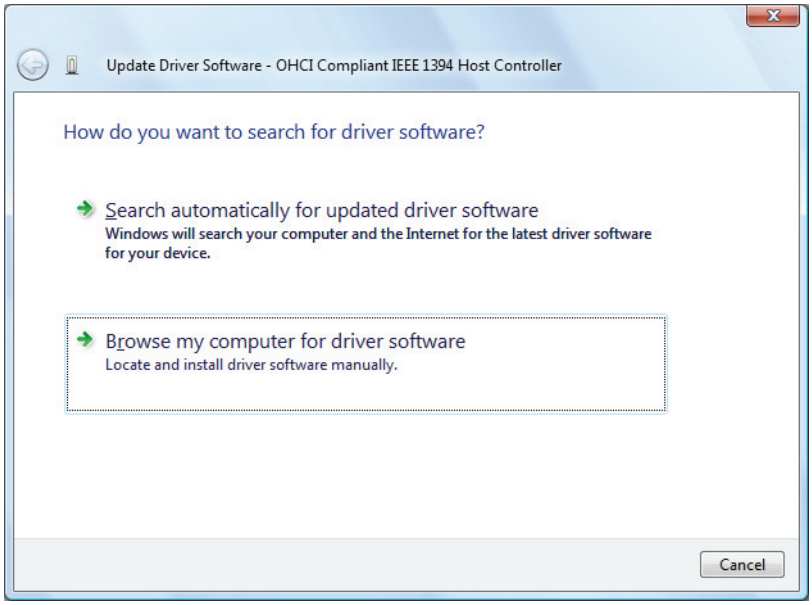


Figure 12: **AVT 1394 Bus Driver**: manual driver installation (locate driver manually)

3. Choose **Browse my computer for driver software.**

   The following dialog will appear:

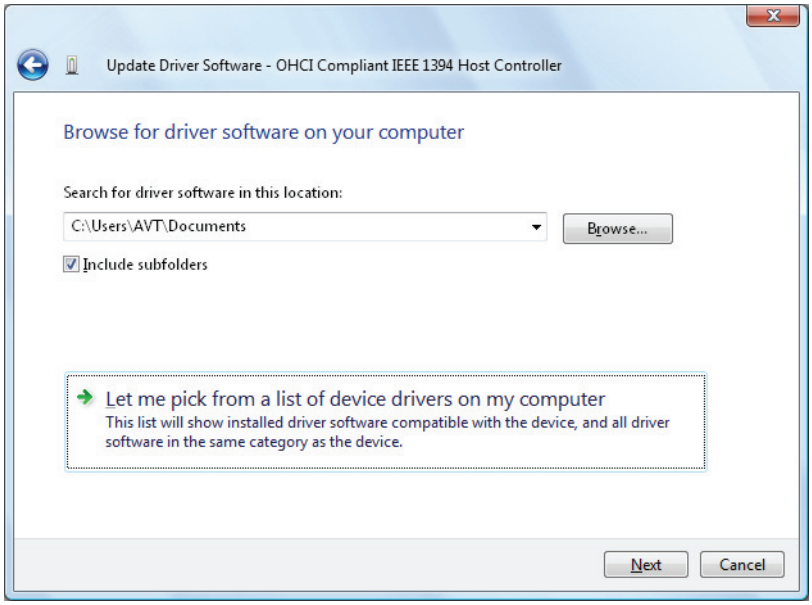


Figure 13: **AVT 1394 Bus Driver**: manual driver installation (pick from a list)

4. Choose **Let me pick from a list of device drivers on my computer.**

The following dialog will appear:

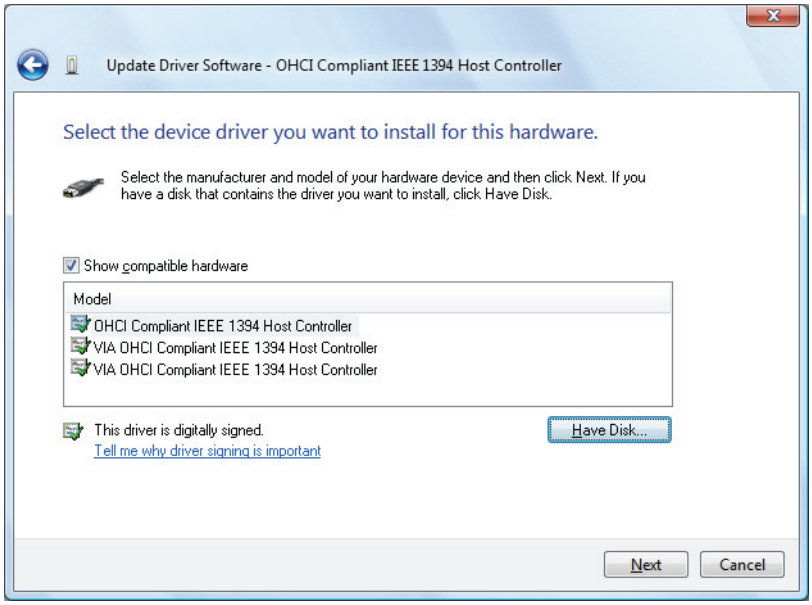


Figure 14: **AVT 1394 Bus Driver**: manual driver installation (Select device driver)

5. Click on **Have Disk...** .

The following dialog will appear:

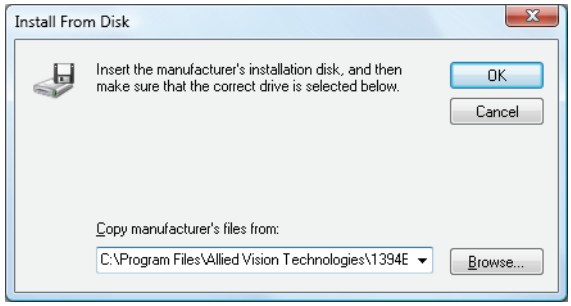


Figure 15: **AVT 1394 Bus Driver**: manual driver installation (Copy manufacturer's files)

6. Enter the path to where the **AVT1394bus.inf** has been copied to and click **OK**. The default path is:

```
C:\Program Files\Allied Vision Technologies\1394BusDriverPackage\Driver
```

The following dialog will appear:

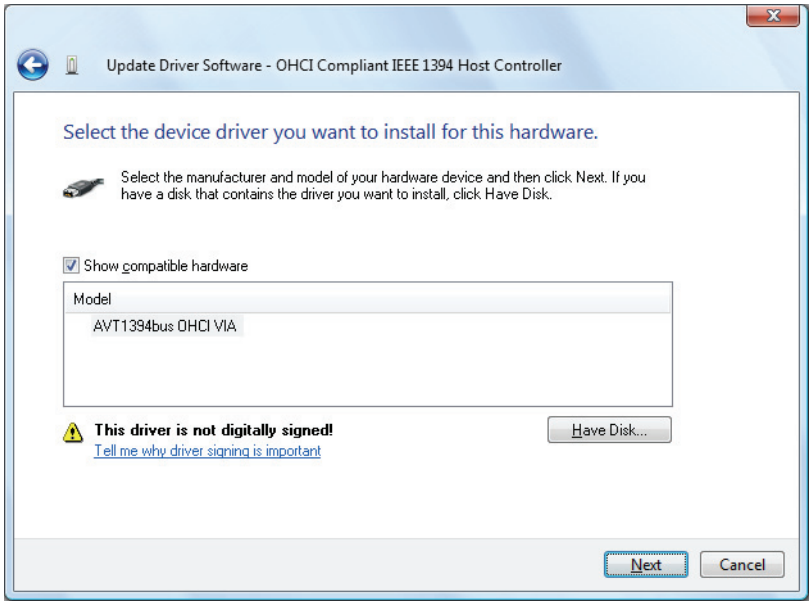


Figure 16: **AVT 1394 Bus Driver**: manual driver installation (Choose AVT1394bus OHCI VIA driver)

7. Select **AVT1394bus OHCI VIA** and click **Next**.
8. Ignore all signature warnings and continue until you reach the following dialog:

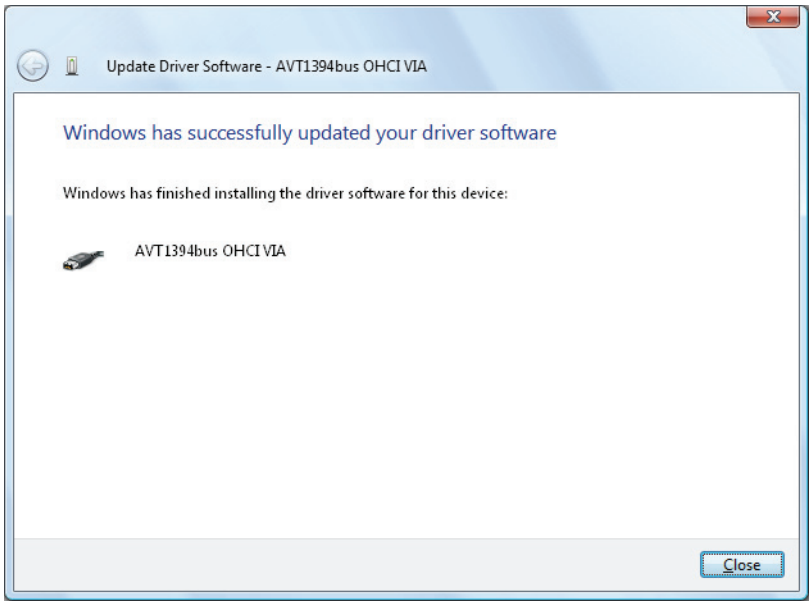


Figure 17: **AVT 1394 Bus Driver**: manual driver installation (finished installing driver)

9. Click on **Close**.

The manual driver installation process is completed.

AVT 1394 Bus Driver architecture

The following diagram describes the architecture of the **AVT 1394 Bus Driver**:

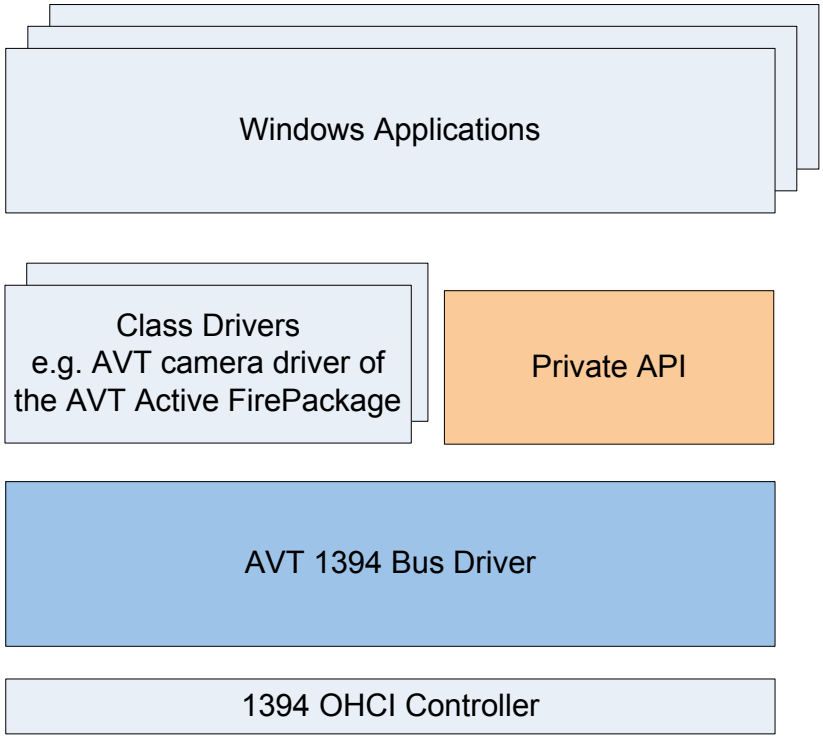


Figure 18: Architecture of **AVT 1394 Bus Driver**

Element	Description
Windows Applications	Examples for Windows applications are: AVT ActiveCamViewer, 1394 Camera Demo viewer of the CMU driver, AmCap, VirtualDub, Movie-Maker, ...
Private API	**API** = **A**pplication **P**rogramming **I**nterface Private API is for example the **AVT Active FirePackage** API, in general an API that corresponds to the class drivers.

Table 5: Description of **AVT 1394 Bus Driver** architecture

Element	Description
Class Drivers	Device driver, for example AVT camera driver of the **AVT Active FirePackage**
AVT 1394 Bus Driver	The **AVT 1394 Bus Driver** (AVT1394bus.sys) replaces the Microsoft bus driver and supports the IEEE 1394b standard by default. AVT1394bus.sys is the IEEE 1394 bus driver that manages all devices connected to the IEEE 1394 bus and performs some basic control tasks.
1394 OHCI Controller	IEEE 1394 host controller is the hardware component which implements the physical interface between the PC and the IEEE 1394 bus.

Table 5: Description of **AVT 1394 Bus Driver** architecture

Using the AVT 1394 Bus Driver with AVT Active FirePackage

In this chapter you get some information what you should notice when using the **AVT 1394 Bus Driver** with **AVT Active FirePackage**.

Installation order

Keep the following installation order:

1. First install **AVT Active FirePackage** incl. **camera driver**.

   The standard Microsoft bus driver and the camera driver for the plugged-in AVT camera are installed.

2. Proceed in the following way:
   - If the **AVT 1394 Bus Driver Package** is not installed on your computer: see Installing the AVT 1394 Bus Driver on page 11.
   - If the **AVT 1394 Bus Driver Package** is already installed on your computer: see Chapter Driver management on page 16. We recommend Using the AVT 1394 Bus Driver Installer on page 16.

The standard Microsoft OHCI driver is replaced with the **AVT 1394 Bus Driver.**

Hub problem Microsoft driver

Consider the following scenario:

- You connect an IEEE 1394 standard-based camera to an IEEE 1394 standard-based external hub.
- You connect the IEEE 1394 standard-based external hub to an IEEE 1394 standard-based port on a computer that is running Windows Vista.

In this scenario, Device Manager in Windows Vista displays the camera device as expected. However, when you unplug the camera cable, the camera device does not unload successfully in Device Manager.

Note

For a hotfix from Microsoft see:

http://support.microsoft.com/kb/944151

We strongly recommend to use the **AVT 1394 Bus Driver** to avoid this hub problem.

User Account Control (UAC)

Note

For more information on Microsoft Vista User Account Control (UAC) read Chapter Special advice when working with Windows Vista on page 8.

UAC warning

An example of an **UAC warning** when a program wants to write in a system folder is the following:

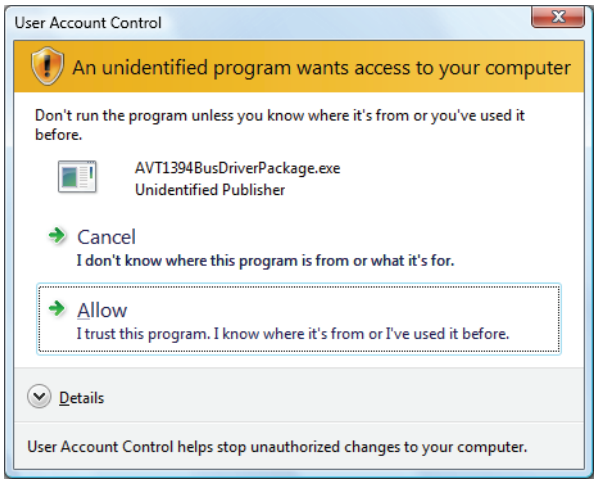


Figure 19: UAC warning: example

In this case just click **Allow** and go on working.

Using AVT 1394 Bus Driver with third party solutions

In this chapter you get some information what you should pay attention to when using the **AVT 1394 Bus Driver** with third party solutions like **NI LabVIEW**, **Cognex VisionPro**, etc.

Installation order

For applications using a camera driver that is built on top of the Microsoft bus driver, we recommend installing the **AVT 1394 Bus Driver** after the applications and their camera drivers.

Therefore keep the following installation order:

1. First install the third party solution like MATLAB, NI LabVIEW, Cognex VisionPro incl. **camera driver**.
2. Then install the **AVT 1394 Bus Driver Package**: see Installing the AVT 1394 Bus Driver on page 11.

Compatibility notes

We have tested third party solutions like **NI LabVIEW**, **Cognex Vision Pro**, **ActiveDcam** (A&B Software), as well as the **CMU** camera driver to be fully compatible with the **AVT 1394 Bus Driver**, enabling them to use S800-capable AVT cameras at full speed.

Redistributing

To redistribute the **AVT 1394 Bus Driver** with your software, add the following files to your package (if it is Active FirePackage-based, for example):

- AVT1394bus.inf
- AVT1394bus.sys
- AVT1394bus_proppage.dll

If you would also like to add the **AVT 1394 Bus Driver Installer**, you have to add also the following files to your installer project:

- AVT1394BusDriverInstaller.exe
- AVT1394bus_devinst.dll

Make sure to keep the directory structure of the
AVT 1394 Bus Driver Package for the driver installer to be able to find the driver files.

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