



User Guide

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Introduction

AVT Universal Package is a camera interface independent SDK for the following 32-bit and 64-bit operating systems: Windows XP, Windows Vista and Windows 7 that can be applied for both, **AVT 1394** and **AVT GigE Vision** cameras.

The additionally provided **UniCam Viewer** application allows customers to operate multiple cameras and save images in a number of formats. Also included are ready-for-use example programs provided as source code. With **AVT Universal Package**, your application immediately supports AVT's 1394a / 1394b digital cameras as well as AVT's GigE Vision cameras.

- | | |
|---------------------|--|
| Advantages | <ul style="list-style-type: none">• according IEEE1394a/b up to 800 Mbit/s supported• GigE cameras according GigE Vision standard supported• Convenient and powerful viewer application (UniCam Viewer) is provided to explore every AVT /GigE camera and some of their smart features• The AVT Universal Package provides C, C++ and .NET APIs. |
| Restrictions | <ul style="list-style-type: none">• When using the AVT driver set other devices requiring a different 1394 bus driver will not work. |

Document history

Version	Date	Remarks
V2.0.0	20.01.2010	New AVT Universal Package User Guide – RELEASE status
V2.1.0	24.11.10	Minor corrections: Dropped the word <i>fixed</i> in Chapter Configure a format on page 35. (The example 320 x 200 is not a fixed format) Hot plug precautions and step by step instructions to shut down the system, before connecting a 1394 camera: Due to costumer problems hot-plugging a 1394 camera, added second and third hot plug precautions, not to hotplug a 1394 camera: See the following additional safety instructions: • Caution on page 13 and • Caution on page 27. Added step by step instructions to shut down the system, before connecting a 1394 camera: • See step 2. If using a FireWire camera: Shut down your system. on page 13. • See step 12. Shut down your system. on page 27. New file format: • Changed file format from FM7 to FM9 New AVT Universal Package Logo: • See title page AVT Universal Package can additionally be used by 64-bit operating systems: • See Chapter Operating system requirements on page 10 • Changed location of license file: – see Chapter Licensing on page 36 – see Chapter Intek license requirements on page 37

Table 1: Document history

Manual overview

The manual overview describes each chapter of this manual shortly.

- Chapter [System requirements](#) on page 9 lists conditions for hardware, operating system and software.
 - **Read the Chapter [Special advice when working with Windows Vista/Windows 7](#) on page 10 (UAC = User Account Control).**
- Chapter [Package installation](#) on page 12 describes how to install **AVT Universal Package** incl. **intek** 1394 bus driver / **AVT** 1394 bus driver as well as support for GigE cameras. You can install both 1394 bus drivers automatically or manually.
- Chapter [Components overview](#) on page 29 describes the SDK components of **AVT Universal Package** and the example projects.
- Chapter [Package architecture](#) on page 31 gives you an overview of the package architecture.
- Chapter [Quick start for programmers](#) on page 32 describes how to work with UniAPI under Visual Studio 2005. The code snippets are for immediate use in your own projects.
 - **Read the explanations to the User Account Control (UAC) very carefully before starting any project.**
 - **Read the UniAPI online help files for more information.**
- Chapter [Licensing](#) on page 36 describes the licensing procedure for AVT cameras.
 - **Read the license information before starting any AVT camera.**
- Chapter [Redistribution of AVT Universal Package components](#) on page 37 describes procedures and requirements when distributing **AVT Universal Package**-based software.

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

Table 2: Styles

Style	Function	Example
Italics	Modes, fields	<i>Mode</i>
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 Universal Package User Guide** describes the installation of the **AVT Universal Package** and gives also a quick start for programmers.

Note Please read through this manual carefully before operating **AVT 1394** or **AVT GigE Vision cameras with AVT Universal Package**.



System requirements

This chapter describes the requirements for installing

AVT Universal Package:

- Hardware requirements
- Operating system requirements
- Software requirements
- Special advice when working with Windows 7 / Windows Vista (UAC)

Hardware requirements

- PC or laptop with 1 GHz 32-bit (x86) or 64-bit (x64) processor
- For **AVT 1394 cameras**:
 - Built-in IEEE 1394 interface or IEEE 1394 adapter (OHCI) card (one or more) for PCI or PCI Express bus or PC card or ExpressCard with IEEE 1394 port(s)
 - One or more AVT 1394a/1394b cameras connected to the system
- For **AVT GigE cameras**:
 - Built-in Gigabit Ethernet interface or GigE adapter card
 - One or more AVT GigE cameras connected to the system

Note



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

AVT supports a wide range of standard GigE accessories (network cards and cables).

www



For **more information on accessories and on ordering** go to:

<http://www.alliedvisiontec.com/emea/products/accessories.html>

hot plug precautions

Note



Although 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 cable.**

Operating system requirements

AVT Universal Package can be used on the following 32-bit or 64-bit operations systems:

- Windows 7
- Windows Vista
- Windows XP

Software requirements

- .NET Framework 2.0 or higher
- **AVT Universal Package installation file**
AVTUniversalPackage.exe

Note

The **AVT Universal Package** includes a special IEEE 1394 bus driver from INTEK suitable for all AVT 1394 cameras.



Special advice when working with Windows Vista/Windows 7

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

Basic information

User Account Control (UAC) is a technology and security infrastructure for Windows Vista / Windows 7 operating systems. It aims at improving the security of Windows Vista / Windows 7 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.

Effects

Windows Vista / Windows 7 **User Account Control (UAC)** prevents the compilation of example projects if those are opened directly from a location protected by UAC (i.e. C:\Program Files\...).

Therefore, to compile the **AVT Universal Package** example projects under Windows Vista / Windows 7, copy the project to a user-writable location as described in Chapter [Workaround for UAC problems](#) on page 32.

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

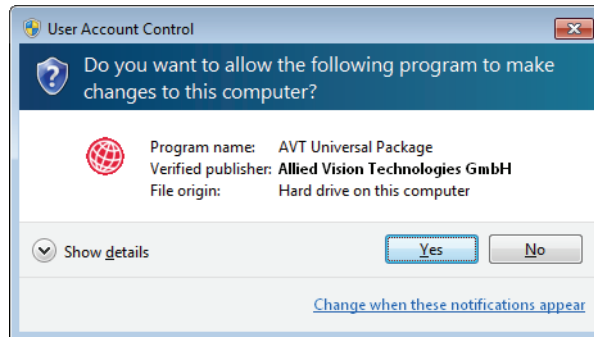


Figure 1: UAC warning: example

Perform the following steps:

1. In this case just click **Allow** because the shown program (**AVT Universal Package**) is the installer of the **AVT Universal Package** and 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 **AVT Universal Package** and select **Run as administrator** before you install the software.

Package installation

Overview

We assume that you have already put the IEEE1394 interface card / Gigabit Ethernet network card in your system (but not installed any driver).

What happens now is the following:

FireWire	Gigabit Ethernet
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 so-called intek 1394 bus driver (firedrv.sys). In the following we call this driver intek driver for abbreviation purposes. This replacement is done automatically with the installation of AVT Universal Package (if an IEEE1394 interface card is in your system).	Install driver delivered with your Gigabit Ethernet network card. Note For more information on installation procedures and IP settings see GigE Hardware Installation Guide.  With AVT Universal Package the AVT & Prosilica GigE Vision Filter Driver is automatically installed and bound to all network cards in your system.
If you have more than one FireWire card in your system and you want to use other FireWire devices: - Only replace the intek driver for those cards that shall be owned by the standard Microsoft driver. - The intek driver can live side by side with the Microsoft driver when multiple cards are present in your system. For more information see Chapter Using the AVT 1394 Bus Driver Installer on page 20.	If you have more than one Gigabit Ethernet network card in your computer, the AVT & Prosilica GigE Vision Filter Driver is only necessary for those cards connected directly to your GigE cameras. If necessary you can deactivate the AVT & Prosilica GigE Vision Filter Driver for all other network cards. For more information see Chapter Deactivating (activating) AVT & Prosilica GigE Vision Filter Driver on page 27.

Table 3: Comparison overview between FireWire and Gigabit Ethernet installations

Installing AVT Universal Package

To install **AVT Universal Package**, perform the following steps:

1. Save and exit out of all currently running applications.

Caution



Although FireWire devices can be hot-plugged without powering down equipment, **we recommend turning the computer power off, before connecting a 1394 digital camera to the system via a FireWire cable.**

If you hot-plug a 1394 digital camera, it may be damaged.

2. **If using a FireWire camera: Shut down your system.**
3. **If using a FireWire camera: Turn computer power off.**
4. Connect your camera to the 1394 (FireWire)/GigE port.
5. Turn computer power on.
6. Restart your system.
7. Download the **AVT Universal Package** zip file from the AVT web site. Unpack it and start the corresponding *.exe.

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

Now you are ready to start installing **AVT Universal Package**.

The **Welcome** dialog box will appear:



Figure 2: **AVT Universal Package** setup: Welcome

8. Read the information in the **Welcome** dialog box.
 - If any applications 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:

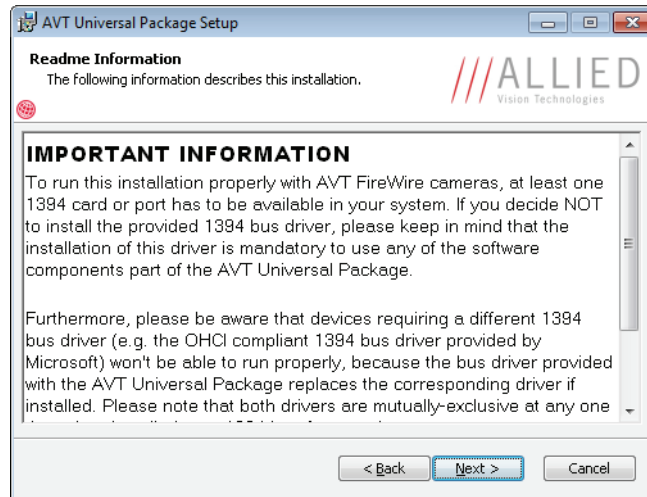


Figure 3: **AVT Universal Package** setup: Readme Information

9. Read the **IMPORTANT INFORMATION**.

10. Click **Next** to proceed.

The **Choose Setup Type** dialog box will appear.

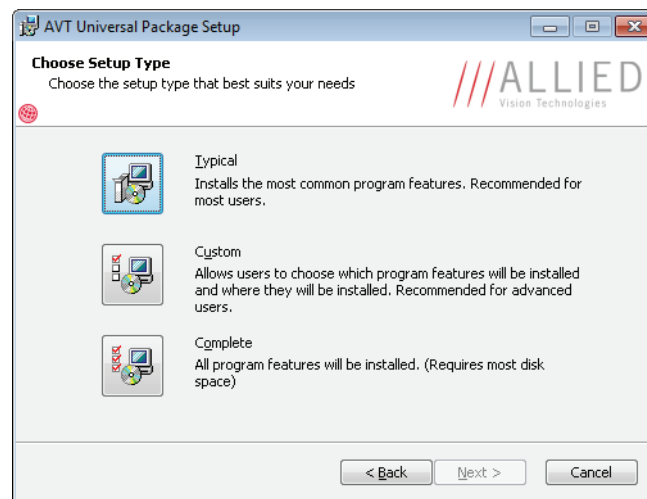


Figure 4: **AVT Universal Package** setup: Choose Setup Type

11. Select the setup type by clicking on its icon: You can choose between **Typical**, **Custom** and **Complete**.

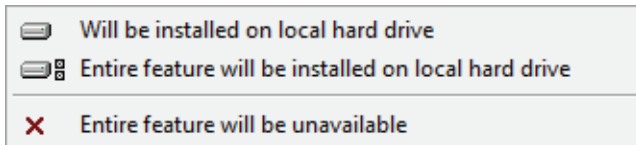
Setup type	Description								
Typical	In most cases this will be the setup type suitable for most users . Compared to the Complete type less features are installed: The Typical setup does not install UniAPI sample executables.								
Custom	Note: This setup type is recommended for advanced users. If you click the Custom icon, the Select Features dialog box will appear: Here you can choose which components will be installed. Click on the icons to change current settings:  Click Reset to go back to standard settings. Click Disk Usage to show available disk space on different volumes. <table border="1"> <tr> <td>UniAPI</td><td>Choose to install 1394 components or GigE components or both. 1394: supports AVT 1394 cameras (FireWire) - GigE: supports AVT GigE Vision cameras </td></tr> <tr> <td>UniCam</td><td>Choose to install UniCam Viewer or not. The UniCam Viewer is a viewer application for both: AVT 1394 cameras and AVT GigE cameras based on AVT UniAPI.</td></tr> <tr> <td>Documentation</td><td>Choose to install the documentation for AVT UniAPI or not. Documentation will be installed as CHM Online Help and contains information about the different UniAPI modules, their methods and their usage: - Command Reference of UniAPI Control module (C and .NET) - Command Reference of Transform module (C and .NET) - Additional information how to apply the UniAPI </td></tr> <tr> <td>Programming examples</td><td>Choose to install programming examples or not. Here the source files for example applications are installed, which show how to use various features of the AVT UniAPI. See Table 7: AVT Universal Package example collection on page 30</td></tr> </table>	UniAPI	Choose to install 1394 components or GigE components or both. 1394: supports AVT 1394 cameras (FireWire) - GigE: supports AVT GigE Vision cameras	UniCam	Choose to install UniCam Viewer or not. The UniCam Viewer is a viewer application for both: AVT 1394 cameras and AVT GigE cameras based on AVT UniAPI.	Documentation	Choose to install the documentation for AVT UniAPI or not. Documentation will be installed as CHM Online Help and contains information about the different UniAPI modules, their methods and their usage: - Command Reference of UniAPI Control module (C and .NET) - Command Reference of Transform module (C and .NET) - Additional information how to apply the UniAPI	Programming examples	Choose to install programming examples or not. Here the source files for example applications are installed, which show how to use various features of the AVT UniAPI. See Table 7: AVT Universal Package example collection on page 30
UniAPI	Choose to install 1394 components or GigE components or both. 1394: supports AVT 1394 cameras (FireWire) - GigE: supports AVT GigE Vision cameras								
UniCam	Choose to install UniCam Viewer or not. The UniCam Viewer is a viewer application for both: AVT 1394 cameras and AVT GigE cameras based on AVT UniAPI.								
Documentation	Choose to install the documentation for AVT UniAPI or not. Documentation will be installed as CHM Online Help and contains information about the different UniAPI modules, their methods and their usage: - Command Reference of UniAPI Control module (C and .NET) - Command Reference of Transform module (C and .NET) - Additional information how to apply the UniAPI								
Programming examples	Choose to install programming examples or not. Here the source files for example applications are installed, which show how to use various features of the AVT UniAPI. See Table 7: AVT Universal Package example collection on page 30								
Complete	Installs all program features and requires therefore most disk space.								

Table 4: Setup types

The **Installation options** dialog box will appear:

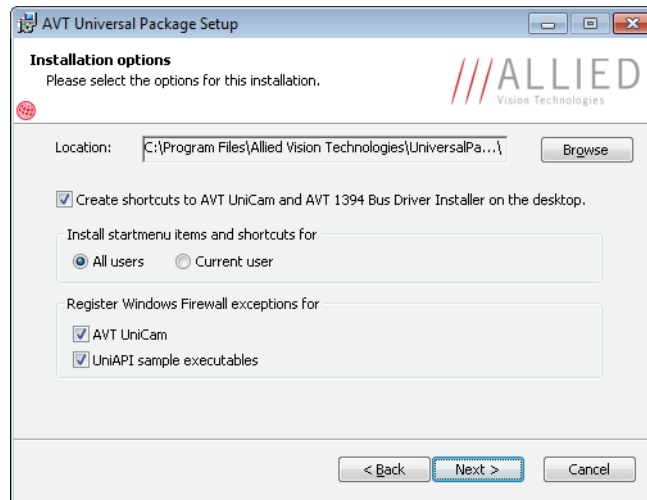


Figure 5: **AVT Universal Package** setup: Installation options

The default location of **AVT Universal Package** files is

C:\Program Files\Allied Vision Technologies\UniversalPackage

12. If you want to change the location, click **Browse**, enter drive and path for the desired folder and click **OK**.

13. Furthermore you set a few general **Installation Options**:

Check box / option	Description
Create shortcuts ... on the desktop.	When chosen: for AVT 1394 Bus Driver Installer and AVT UniCam Viewer shortcuts for desktop are created.
Install startmenu items and shortcuts for...	Choose an option to install the items/shortcuts for - All users - Current user
Register Windows Firewall exceptions for: AVT UniCam	- Activate this check box: This allows AVT UniCam Viewer application to ignore Windows firewall. - Deactivate this check box: Windows firewall blocks AVT UniCam Viewer
UniAPI sample executables	- Activate this check box: This allows UniAPI sample executables to ignore Windows firewall. - Deactivate this check box: Windows firewall blocks all UniAPI sample executables.

Table 5: **AVT Universal Package** setup: Installation options (shortcuts/firewall exceptions)

14. Click **Next** to proceed.

The **Ready to Install the Application** dialog box will appear.

15. Click **Install** to continue.

The following dialog will appear:

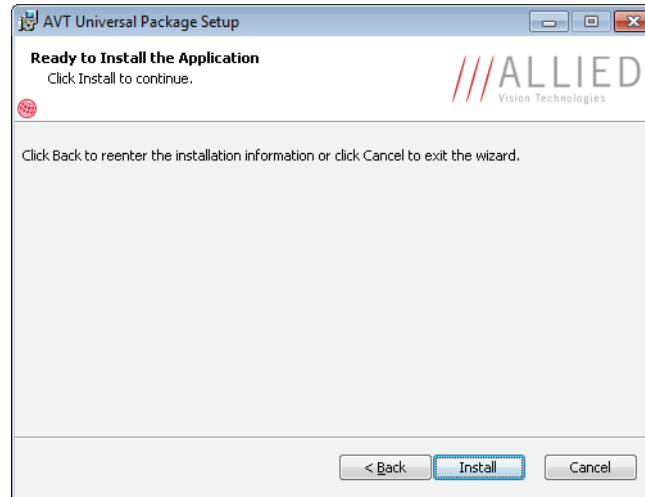


Figure 6: **AVT Universal Package** setup: Ready to Install the Application

16. Click **Install**.

The following dialog will appear:

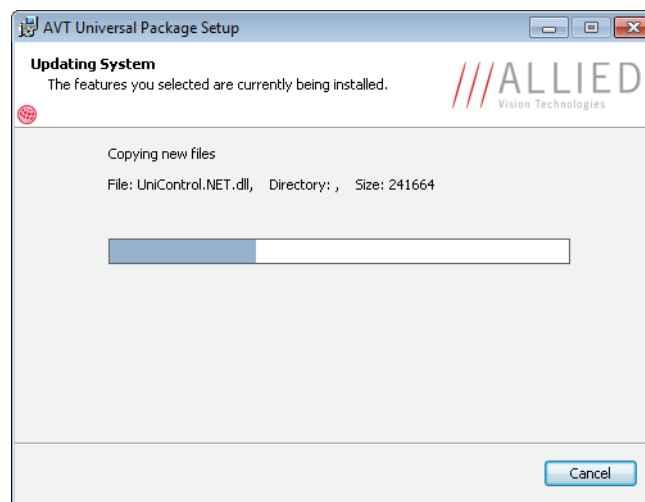


Figure 7: **AVT Universal Package** setup: Updating System

AVT Universal Package will be installed.

Note



Be patient and wait. It may take 1 or more minutes until you see any progress.

Sometimes dialogs appear behind the install dialog that need user response. Be aware of flashing icons in task bar.

Note

During the installation process you may get messages from the User Account Control (e.g. An unidentified program wants access to your computer).

- AVTUniversalPackage.exe

Click **Allow** to continue.

Note

During the installation process you may get messages from Windows Security (e.g. Would you like to install this device software?).

- Name: Allied Vision Technologies GmbH Network ...
- Name: Intek (Darmstadt) IEEE1394 Bus host con...

The Publisher will always be:

- Publisher: Allied Vision Technologies GmbH

Click **Install** each time when you get such message or

Activate once check box **Always trust software from „Allied Vision Technologies GmbH“**.

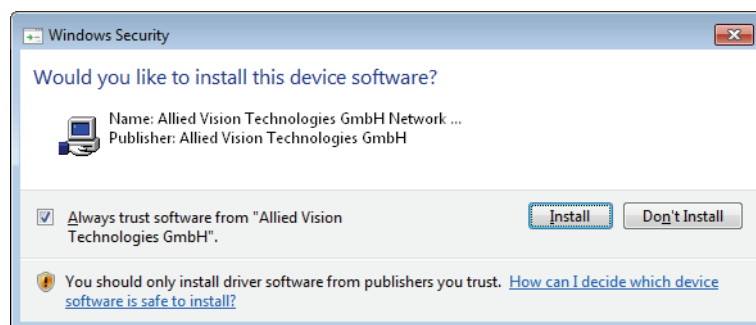


Figure 8: AVT Universal Package setup: Example of security message

Note

During the installation process you get several times the information:

Time remaining: 0 seconds

Be patient and wait. It may take 1 or more minutes until the installation is finished.

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

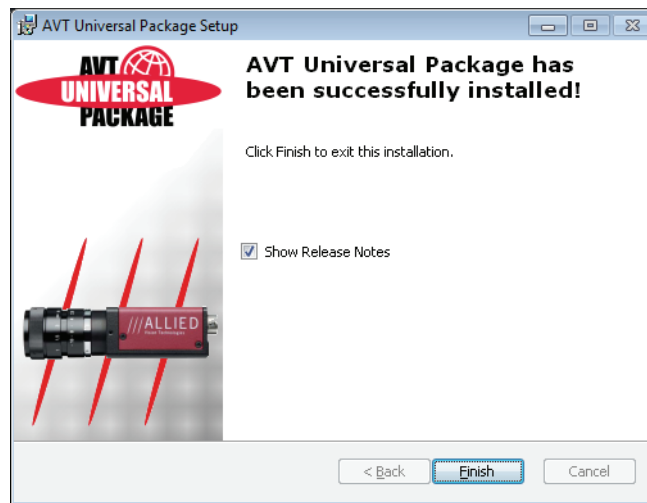


Figure 9: **AVT Universal Package** setup: Successfully installed

17. Activate **Show Release Notes**, if you want to read the release notes with the latest informations.
18. 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.

If you selected the **Create shortcuts ... on the desktop** check box, you will find the following icons on your desktop:



Figure 10: **AVT Universal Package** setup: Desktop icons

FireWire driver management

If you want to change a driver that is bound on a device (e.g. changing from Microsoft 1394 driver to **intek** 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 20) or
- Installing driver manually (see Chapter [Installing driver manually](#) on page 23)

Note

Description and screenshots in this chapter were done under **Windows 7**.



The procedure under Windows XP / Vista is similar.

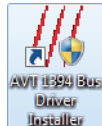
Using the AVT 1394 Bus Driver Installer

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 activated **Create shortcuts ... on the desktop** check box during the installation process.



- **Second choice:**
Start → All Programs → Allied Vision Technologies → Universal Package → AVT 1394 Bus Driver Installer.

In both cases the following window will appear:

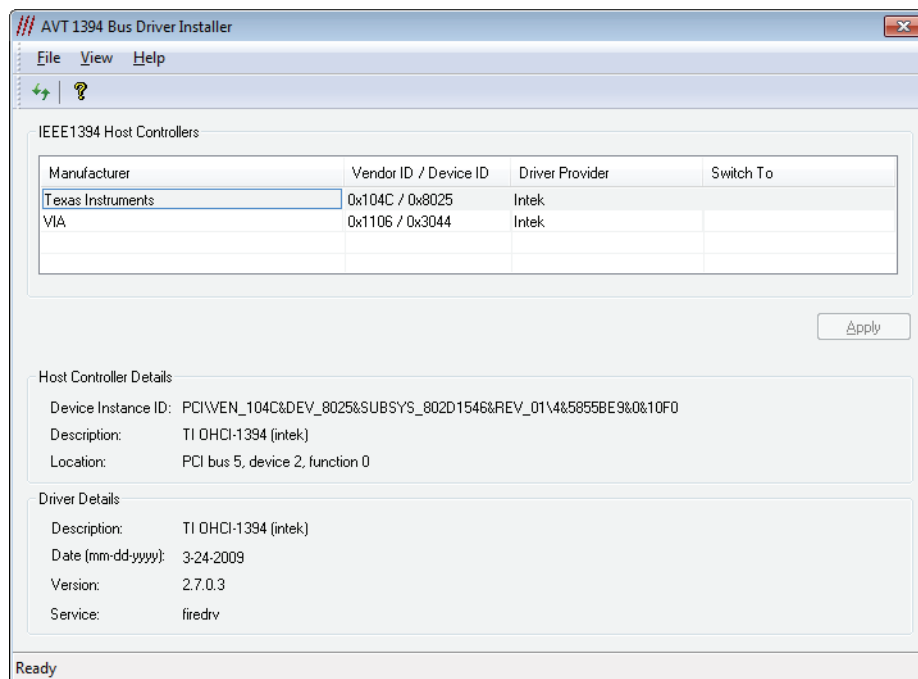


Figure 11: **AVT 1394 Bus Driver Installer**: Initial

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

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

Driver Provider column shows the driver which is currently in action: **Microsoft** or **intek** or **AVT**. A tooltip lists the AVT software packages for which the driver is suitable.

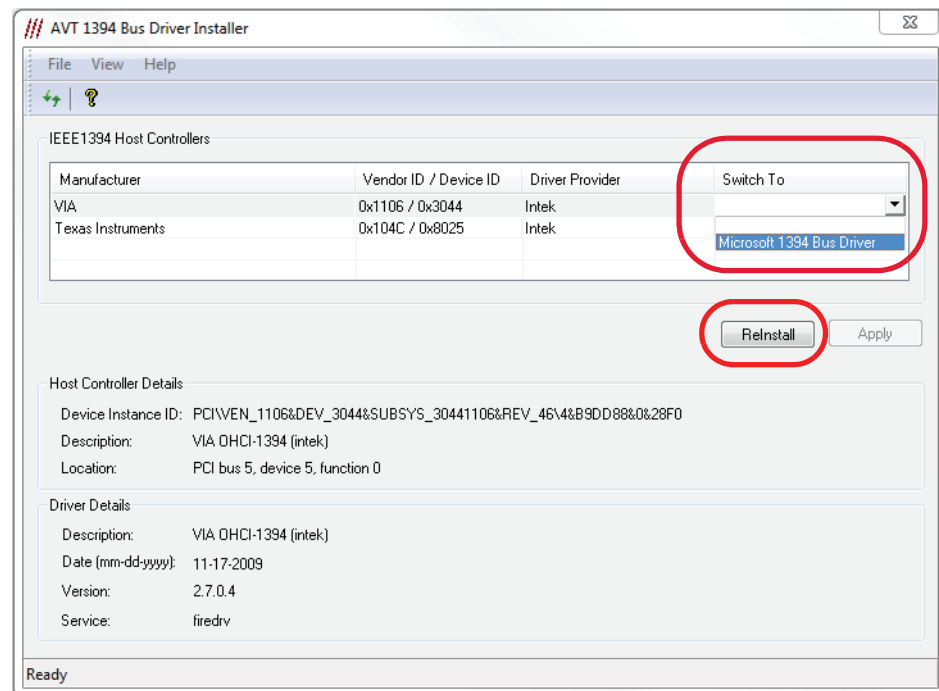


Figure 12: **AVT 1394 Bus Driver Installer**: Choosing 1394 host controller

3. In the **Switch To** column click in the appropriate cell.
A combo box will appear.
 - Having the **intek** driver active, you can switch to the Microsoft driver (**Microsoft 1394 Bus Driver**).
 - Having the Microsoft driver active, you can switch to the **intek** driver (**Intek 1394 Bus Driver**).
4. If necessary, click on **ReInstall**:
This can be useful to:
 - Uninstall currently used driver.
 - Install the driver again.
 - Do a driver reset.
5. Click **Apply**.

Note



The drivers shown in the combo box depend on what packages you have installed on your system.

If **AVT 1394 Bus Driver Package** is installed on your system, the combo box lists also the **AVT 1394 Bus Driver**.

For more information see **AVT 1394 Bus Driver User Guide**.

If a **Windows Security** window appears, click **Install** to continue.

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 20.)

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 7. (Under Windows Vista/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:

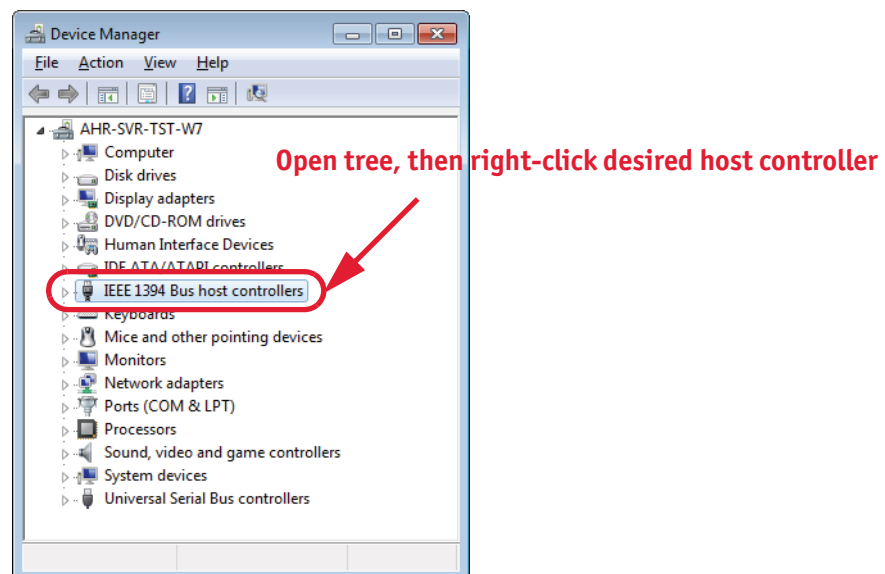


Figure 13: **intek** driver: manual driver installation (Device Manager)

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:

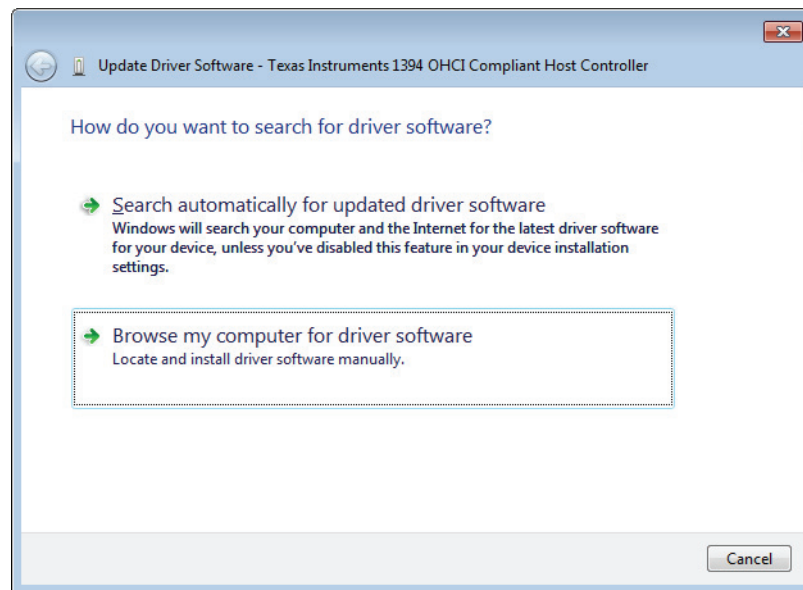


Figure 14: **AVT 1394 Bus Driver:** manual driver installation (locate driver manually)

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

The following dialog will appear:

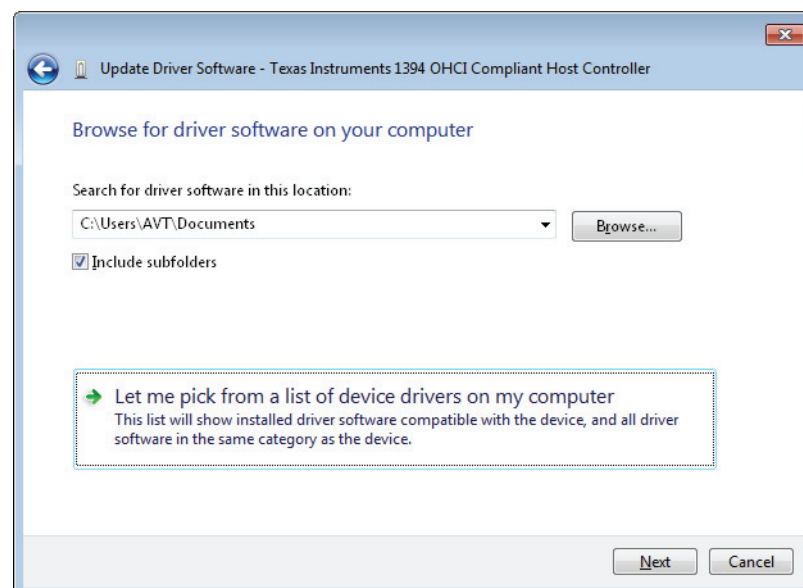


Figure 15: **AVT 1394 Bus Driver:** manual driver installation (pick from a list)

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

The following dialog will appear:

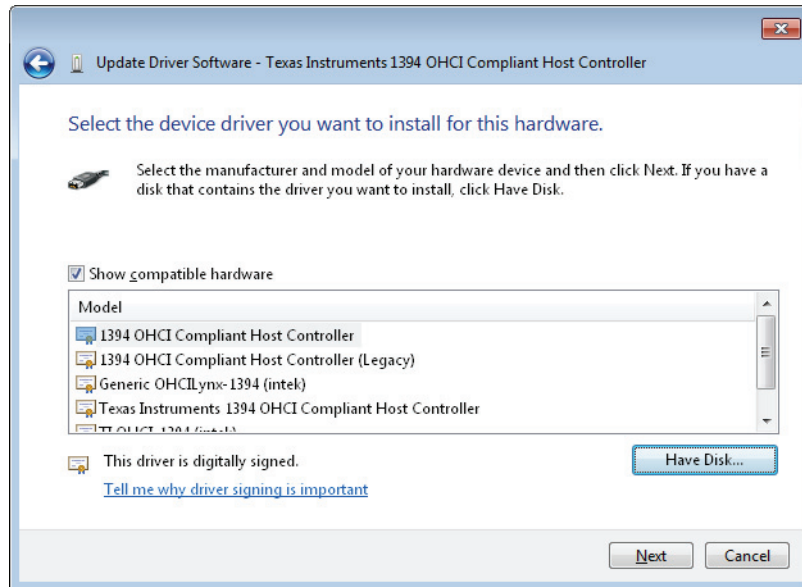


Figure 16: **AVT 1394 Bus Driver:** manual driver installation (Select device driver)

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

The following dialog will appear:

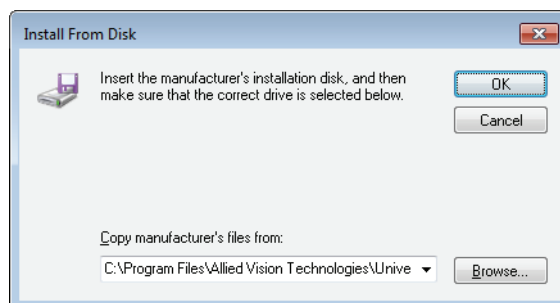


Figure 17: **AVT 1394 Bus Driver:** manual driver installation (Copy manufacturer's files)

6. Enter the path to where the **FIREDRV.inf** has been copied to and click **OK**.

The default path is:

C:\Program Files\Allied Vision Technologies\
Universal Package\Driver\FireWire

The following dialog will appear:

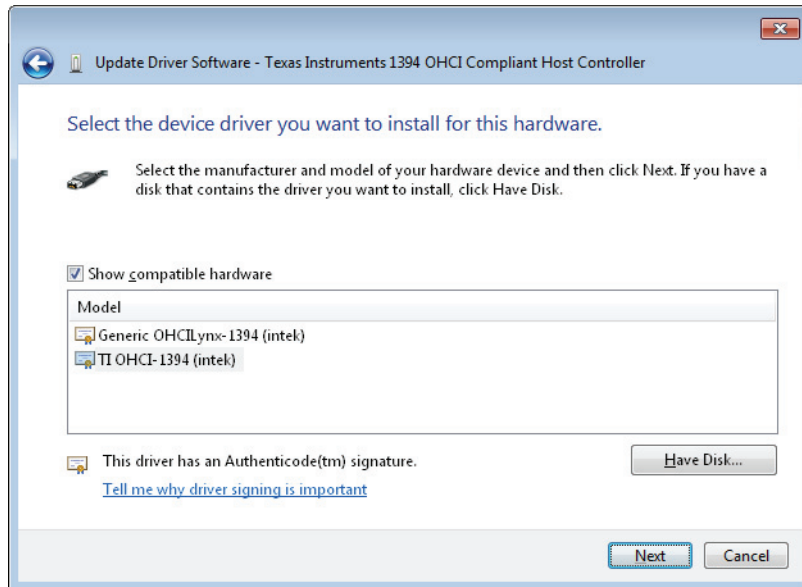


Figure 18: **AVT 1394 Bus Driver:** manual driver installation (Choose AVT1394bus OHCI VIA driver)

7. Select **TI OHCI-1394 (intek)** and click **Next**.
8. Ignore all signature warnings and continue until you reach the following dialog:

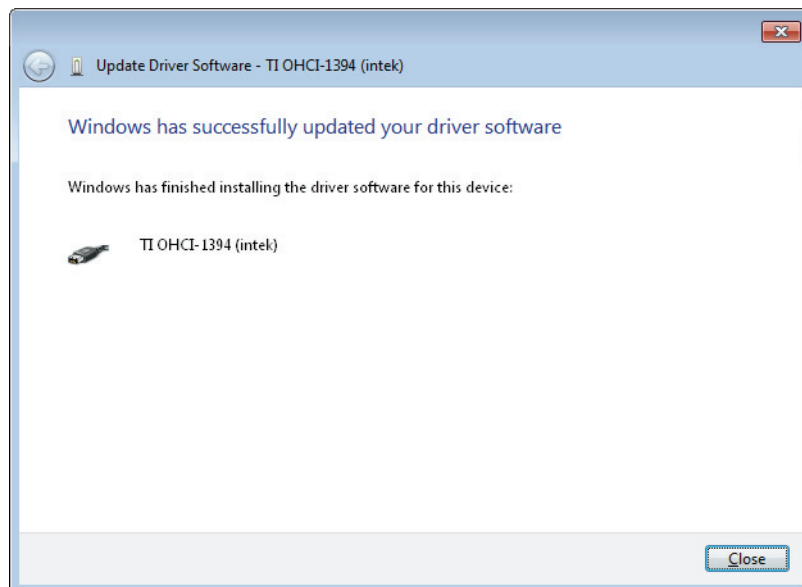


Figure 19: **AVT 1394 Bus Driver:** manual driver installation (finished installing driver)

9. Click **Close**.

The manual driver installation process is completed.

Caution

Although FireWire devices can be hot-plugged without powering down equipment, **we recommend turning the computer power off, before connecting a 1394 digital camera to the system via a FireWire cable.**

If you hot-plug a 1394 digital camera, it may be damaged.

10. If you have not connected your camera to the 1394 (FireWire) port so far, **do not hot-plug your camera, because it may be damaged.**
11. Close all open applications.
- 12. Shut down your system.**
- 13. Turn computer power off.**
14. Connect your camera to the 1394 (FireWire) port.
15. Turn computer power on.

AVT & Prosilica GigE Vision Filter Driver

Contrary to the AVT 1394 Bus Driver Installer, there is no GigE Driver Installer. If you have several network cards in your system: with installation of **AVT Universal Package** the **AVT & Prosilica GigE Vision Filter Driver** will be installed **automatically** on all network cards in your system.

AVT & Prosilica GigE Vision Filter Driver is ...

- ... only necessary for network cards connected to GigE cameras. In this case image transfer to applications is accelerated. GigE applications will also run without filter driver, but need significant more CPU time.
- ... not harmful to any network card in your system (e.g. LAN, etc.)

Deactivating (activating) AVT & Prosilica GigE Vision Filter Driver

If necessary, you can deactivate (activate) **AVT & Prosilica GigE Vision Filter Driver** for all network cards that are **not** connected to GigE cameras.

Under Windows XP / Windows Vista / Windows 7 perform the following steps for those network cards:

1. **Windows XP: Start → Control Panel → Network and Internet connections → Network connections**
Windows Vista: Start → Control Panel → View network status and tasks → Manage network connections
Windows 7: Start → Control Panel → View network status and tasks → Change adapter settings

2. In the list search for your network card for which you wish to deactivate the filter driver.
3. Right-click that network card → **Properties** → Deactivate (activate) **AVT & Prosilica GigE Vision Filter Driver**

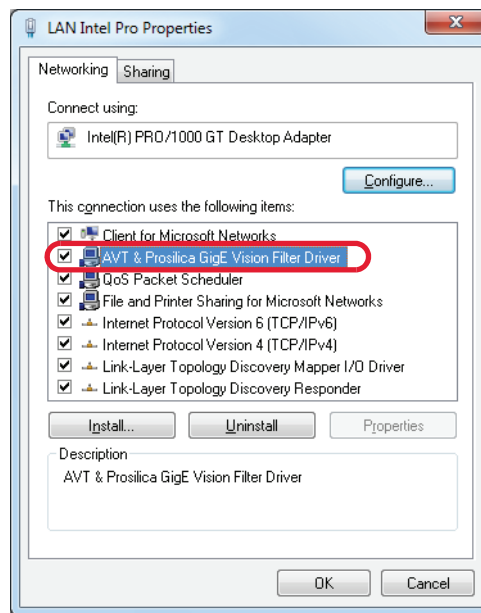


Figure 20: (De-)Activating **AVT & Prosilica GigE Vision Filter Driver** (Windows 7)

4. Click **Close**.

IP configuration of GigE Vision cameras

AVT UniCam Viewer has a built-in IP Configuration tool. For details see **GigE Hardware Installation Guide**, chapter *Start viewer application and configure IP settings*.

Components overview

This chapter describes the **package content** and the **package architecture** of **AVT Universal Package**.

Package content

The **AVT Universal Package** consists of the following SDK components:

SDK component	Description
Firedrv.sys	High performance IEEE1394 bus driver
AVT 1394 Bus Driver Installer	Easy-to-use driver installation tool ()
pslignvfilter.sys	GigE Vision filter driver
AVT Universal API	Universal C programming interface that is optimized for usage with AVT cameras. The UniAPI consists of two modules: • UniControl DLL Provides methods to control the camera and to easily apply its SmartFeatures and to grab images. • UniTransform DLL Driver independent UniAPI component: allows the conversion of image formats and the transaction of color correction. This module is especially designed to support color cameras that only supply RAW images (e.g. GUPPY). Additionally, .NET wrappers for these DLLs are provided. Also help files are provided: for each module one *.chm file.
AVT UniCam Viewer	Comprehensive camera viewer optimized for usage with AVT IEEE 1394 cameras and AVT GigE cameras: • Evaluate selected SmartFeatures • Test AVT cameras • Configure AVT cameras

Table 6: AVT Universal Package SDK components

In addition for the UniAPI an example collection as well as various CHM help files are provided.

Together with the **AVT Universal Package** the following examples are provided:

Example	Programming language	Description
Grab2Con Projects	C / C++	Minimal console example
MicroView Projects	C / C++	Simple viewer projects (mostly only single images) There is one Base viewer project and several extension projects for demonstrating specific aspects of the UniAPI, e.g. for: • deinterlacing of GUPPY interlaced images (with or without geometrical correction) • enumerating camera formats • demonstrating the secure image signature (SIS) • grabbing images continually
Grab2Con.NET Project	.NET	Minimal console example for UniAPI.NET wrapper
MicroView.NET Project	.NET	Base viewer project for .NET
ImageJ Plugin	JAVA	Plugin for the image processing and analysis software ImageJ

Table 7: **AVT Universal Package** example collection

Package architecture

The following diagram describes the package architecture of **AVT Universal Package**:

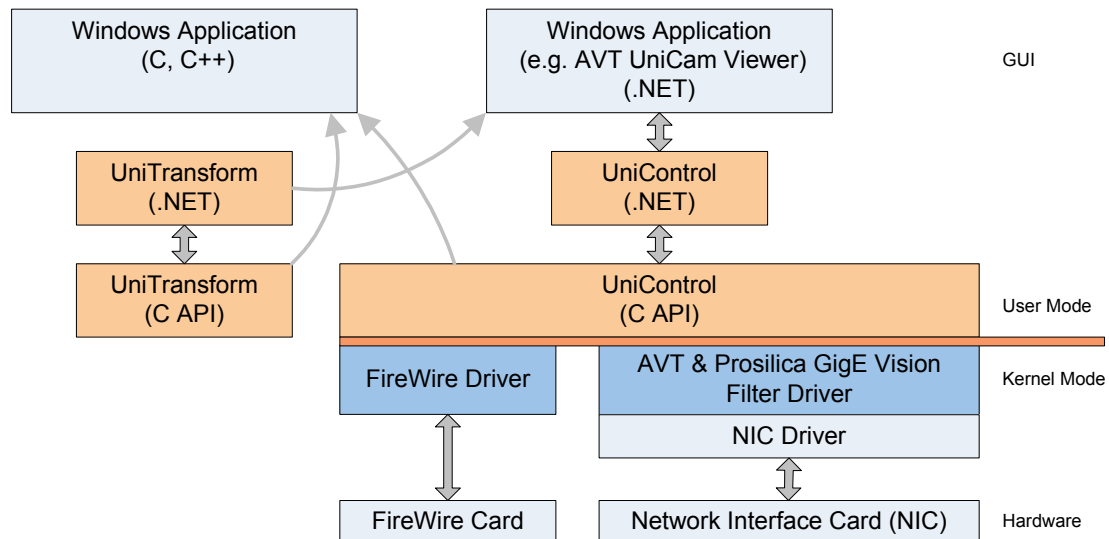


Figure 21: Architecture of **AVT Universal Package**

Quick start for programmers

In this chapter you learn how to grab your first images with your AVT camera, open a project under Visual studio and use the given examples to do some typical image acquisition.

Note

For detailed information either see online help **UniControl.chm** or the other documentation PDFs.



Working with examples

As already mentioned in [Table 7: AVT Universal Package example collection](#) on page 30, **AVT Universal Package** comes with example projects for UniAPI. You can open these projects and adjust them to your needs.

Note



If **User Account Control (UAC)** is activated, the example projects cannot be compiled directly (i.e. from the `C:\Program Files` directory).

In this case you get one or more error messages:

e.g. *Could not create output directory*

The reason for these messages are missing write permission due to **User Account Control (UAC)**.

Read Chapter [Workaround for UAC problems](#) on page 32.

For basic information on **User Account Control (UAC)** read Chapter [User Account Control \(UAC\)](#) on page 33.

Workaround for UAC problems

To solve the compiling problems under UAC, perform the following steps:

1. Locate the installation directory:

e.g.

`C:\Program files\Allied Vision Technologies\UniversalPackage`

2. Copy `UniversalPackage` directory to your desktop (or one of your user directories).
3. On desktop open `Samples` directory and search for `*.sln`.
4. Doubleclick desired `*.sln`.

Visual Studio opens this file.

5. You can work with this files as usual (e.g. compile) without getting the error messages listed above.

User Account Control (UAC)

Compiling projects To compile the example projects under Windows Vista, copy the project to a user-writable location as described in Chapter [Workaround for UAC problems](#) on page 32.

Note



For more information on Microsoft Vista User Account Control (UAC) read Chapter [Special advice when working with Windows Vista/Windows 7](#) on page 10.

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

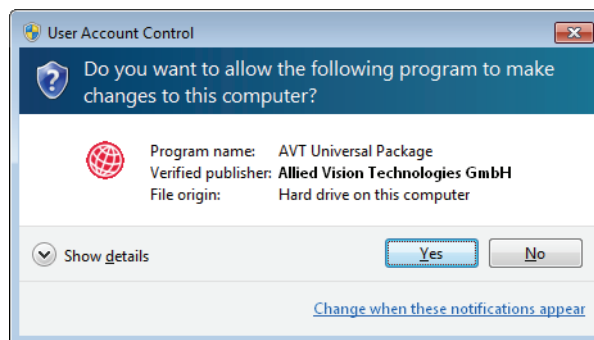


Figure 22: UAC warning: example

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

Using the UniAPI under Visual Studio

To create your own projects under Visual Studio using the UniAPI perform the following steps:

1. Open **Visual Studio** and create a project using the built-in wizard.
2. Add the following include lines:

```
#include "UniControl.h"
#include "UniTransform.h"
```

3. According to your needs you can add source code: see Chapter [Example code \(code snippets\)](#) on page 34.
4. Go to **Project settings** → **Linker** → **Input** → **Additional Dependencies** and enter the following libraries:
UniControl.lib UniTransform.lib
5. Save and compile your project in the usual way.

Example code (code snippets)

Here are some short code snippets you can use in your projects. The code snippets are well documented.

Initializing API

The following code initializes the API and opens the first camera listed:

```

if ( FAILED( UCC_Init() ) )
{
    ; // todo: error handling, init failed
}

// create an array for up to 64 camera ids
UINT32_TYPE arrId[64], nCnt=64;

// get camera ids
if ( FAILED( UCC_GetCameras( &nCnt, arrId ) ) )
{
    ; // todo: error handling, UCC_GetCameras failed
}
if ( nCnt == 0 )
{
    ; // todo: error handling, no camera found
}
else
{
    // select the first camera listed
    ID_TYPE nCamId = arrId[0];

    // open camera
    if ( FAILED( UCC_OpenCamera(nCamId) ) )
    {
        ; // todo: error handling, UCC_OpenCamera failed
    }

    // image acquisition code may be added here...
}

```

Figure 23: Code snippet: Initialize API and open first camera listed

Configure a format

The following example shows how to configure a resolution of 320 x 200 pixels and YUV422 color format:

```
UINT32_TYPE nMode = 0;
UINT32_TYPE nColorFormat = E_CC_YUV422;
UINT32_TYPE nHorizontalResolution = 320;
UINT32_TYPE nVerticalResolution = 200;
UCC_PrepareFreeGrab ( nCamId, &nMode, &nColorFormat, &nHorizontalResolution,
                     &nVerticalResolution, NULL, NULL, NULL, NULL);
```

Figure 24: Code snippet: Configure 320x200 and YUV422

Grabbing a single image

The following example shows how to grab a single image.

The example code uses **UCC_GrabBitmapImage** to grab a single image in **BGR** bitmap format. The bitmap buffer of an **ATL: : CImage** is used for data storage. The example assumes that the utilized camera is a color model.

```
// The variables below are expected to be defined properly.
// The 'extern' declaration is only chosen for syntactical correctness
// as stand-alone example.
extern ID_TYPE nCamId; // id of an already opened camera
extern UINT32_TYPE nHorizontalResolution; // the currently configured image size
extern UINT32_TYPE nVerticalResolution; //

ATL::CImage Image;
Image.Create( nHorizontalResolution , -1 * nVerticalResolution , 24 );
UNI_RETURN_TYPE hr = UCC_GrabBitmapImage( nCamId , (UINT8_TYPE*) Image.GetBits() , INFINITE );
```

Figure 25: Code snippet: Grab a single image in BGR bitmap format

Note



For more information see **UniControl.chm** online help: Related pages, Chapter **Code snippets**.

You find this online help in the installation directory, subdirectory doc, i.e. (standard installation) the following directory:

C:\Program Files\Allied Vision Technologies\Universal Package\Doc

For a more detailed description of how to get started with Uni-API see **UniControl.chm** online help: Chapter **Getting started**.

Licensing

Note

The license described in this chapter is necessary only for AVT 1394 cameras.



AVT GigE cameras and Prosilica GigE cameras can be used without license.

In order to run a camera with **AVT Universal Package**, your system (PC or laptop) or your camera needs a license. All AVT cameras have an embedded license.

This license will be read out with the help of a license file on the PC.

The system determines which license file will be used. Thereby, the system examines the file specified by the subkey `LicenseFile` in

`[HKEY_LOCAL_MACHINE\SOFTWARE\intek\FirePackage]`

Note

The **AVT Universal Package** installer uses by default the following file:



`avtfplic.txt`

in the following directory:

`[CommonAppDataFolder]\Allied Vision Technologies\Firepackage\`

If no registry key is found, the file name **LICENSE.TXT** is assumed, which has to be in the `system32` directory.

A typical license file for AVT cameras looks like this:

```
* FireControl License File
1EEAF9B450220075 Devicecontained Offset=F1000008 (AVT)
...
...
```

After the top line starting with `*`, each line contains one license. The line after the top line is exactly as shown above.

The license file will be read from top to bottom until a valid license is found.

Redistribution of AVT Universal Package components

Distribution of **AVT Universal Package**-based software also requires the redistribution of **AVT Universal Package** components. The actual set of necessary components depends on the utilized API. This section describes the redistribution of components on a file basis. When this approach is chosen, it lies in the responsibility of the packager that all required components are installed on the target system. Alternatively, the whole installer package provided by AVT may be integrated in third-party installers.

Note



To assure compatibility with installers provided by AVT, predetermined component GUIDs should be used for all redistributed components. Component GUIDs are listed at the end of this chapter.

Mandatory requirements

The following requirements are mandatory for the installation of any other **AVT Universal Package** component to be installed on a target system.

Note



The **intek** license and **intek** driver requirements described in the following two sections is only required, if AVT 1394 cameras are used.

Intek license requirements

A valid **intek** license file needs to be present in the path pointed to by the registry key entry

`HKLM\SOFTWARE\intek\FirePackage\LicenseFile`

This registry key is not overwritten during a subsequent **AVT Universal Package** installation.

Intek driver requirements

The **intek** host controller driver needs to be installed for each 1394 controller to be used with **AVT Universal Package** components.

In dependency of the operating system used the driver files can be found at different locations:

Windows 7, Windows Vista, Windows XP

Driver files can be found inside the **AVT Universal Package** installation folder under `Driver\WDM`.

Table 8: Locations for driver files

.NET Framework requirements

.NET components of the **AVT Universal Package** require the .NET Framework version 2.0 to be installed on the target computer. Furthermore, redistributed **.NET** components need to be installed either side by side with the application or into the target system's Global Assembly Cache.

www



For detailed information see

[http://msdn2.microsoft.com/en-us/library/yx7xezcf\(VS.80\).aspx](http://msdn2.microsoft.com/en-us/library/yx7xezcf(VS.80).aspx)

Requirements matrix for UniAPI files

For the development of an application, different files need to be installed on the target system. The following table provides an overview about the files that belong to Uni API.

C++/C	.NET
UniControl.dll (1)	UniControl.dll (1)
UniControl_P.dll (1)	UniControl_P.dll (1)
UniControl_F.dll (1)	UniControl_F.dll (1)
UniTransform.dll (1)	UniTransform.dll (1)
	UniControl.Net.dll (2)
	UniTransform.Net.dll (2)

Table 9: File requirement reference matrix for **AVT Universal Package API**

(1) These files have to be stored in the application folder or in a folder referenced in the PATH variable (usually %SYSTEMROOT%\system32)

(2) These files have to be referenced in the target application project directly, and are found by the application via global assembly cache.

Requirements matrix for the usage of AVT UniCam

In case the AVT UniCam application should be used, the following files need to be installed on the target system:

- UniControl.dll (1)
- UniControl_P.dll (1)
- UniControl_F.dll (1)
- UniTransform.dll (1)
- UniControl.Net.dll (2)
- UniTransform.Net.dll (2)
- AVTUniCam.exe has to be installed

(1) This file has to be stored in the application folder or in a folder referenced in the PATH variable (usually %SYSTEMROOT%\system32)

(2) These files have to be referenced in the target application project directly, and are found by the application via global assembly cache.

Component GUIDs

The MSI installer engine allows a single file to be installed by more than one installer package at a time. However, special care needs to be taken to prevent conflicts between installation packages redistributing AVT components and a possibly installed **AVT Universal Package**.

When installed to the mentioned location, the files below should be installed as single-file **MSI Components** and the following **Component GUIDs** should be used:

File	Component GUID
%SYSTEMROOT%\system32\UniControl.dll	{28D51CD2-0722-4743-A0E9-D4C7C7D9B991}
%SYSTEMROOT%\system32\UniControl_F.dll	{682708C6-DAA1-4082-B418-3F102443EBB0}
%SYSTEMROOT%\system32\UniControl_P.dll	{D716D740-0544-4FED-BB62-F459595657E8}
%SYSTEMROOT%\system32\UniTransform.dll	{E36218E9-603F-442D-B85F-B84F41079680}

Table 10: MSI components and component GUIDs

File	Component GUID
<global assembly cache>\UniControl.NET.dll	{A84476F7-5DED-44e8-8729-278AB35DD2A4}
<global assembly cache>\UniTransform.NET.dll	{620B9B48-3BE7-4592-87CC-274487E91973}

Table 10: MSI components and component GUIDs

If these files are installed to locations other than %SYSTEMROOT%\system32, self-generated GUIDs should be used instead.

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