

AVT Universal Package



Release Information

V2.1

18. August 2011

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1 Overview

The AVT Universal Package is a software development kit (SDK) designed for the 32- and 64-bit Windows operating systems: Windows 7, Vista, and XP. The SDK can be used with all AVT IEEE 1394¹ and GigE Vision[®] cameras and is free of charge.

This document provides an overview about the components and their versions provided with the AVT Universal Package. Additionally, the package architecture (see figure 1) is shown.

2 Package content

The current version (v2.1) of the AVT Universal Package contains the following components:

Type	Component	Description
Driver	1394 Bus Driver	high performance IEEE1394 bus driver
	GigE Vision Filter Driver	NDIS driver reducing the CPU load significantly
API	AVT Universal API [UniAPI]	<p>The UniAPI is a universal C programming interface optimized for usage with AVT cameras. The UniAPI consists of two main modules:</p> <ul style="list-style-type: none"> o UniControl – this module provides methods to control the camera and to easily apply its SmartFeatures, as well as to grab images. o UniTransform - this driver independent UniAPI component allows the conversion of image formats and the application of color correction. This module is especially designed to support color cameras that only supply RAW images (e.g. Guppy). <p>Furthermore, a .Net wrapper, OMF-styled LIBs of the dynamic link libraries, a comprehensive example collection, as well as a Programmer’s Reference Guide as CHM help files are provided for the UniAPI.</p>
Tools	AVT UniCam	A camera interface independent viewer application to evaluate certain camera SmartFeatures, or just to test and configure the camera itself, inclusive IP configuration for AVT GigE Vision [®] cameras. Thereby, it is also possible to operate multiple cameras simultaneously and to save images in a number of still formats, plus as an AVI video file.
	AVT 1394 Bus Driver Installer	An easy-to-use bus driver install tool for AVT 1394 cameras

In addition an **User Guide** is provided as PDF file, which contains all information required to install and apply the SDK properly.

¹ Prosilica 1394 cameras EC and CV are not supported!

3 Package architecture

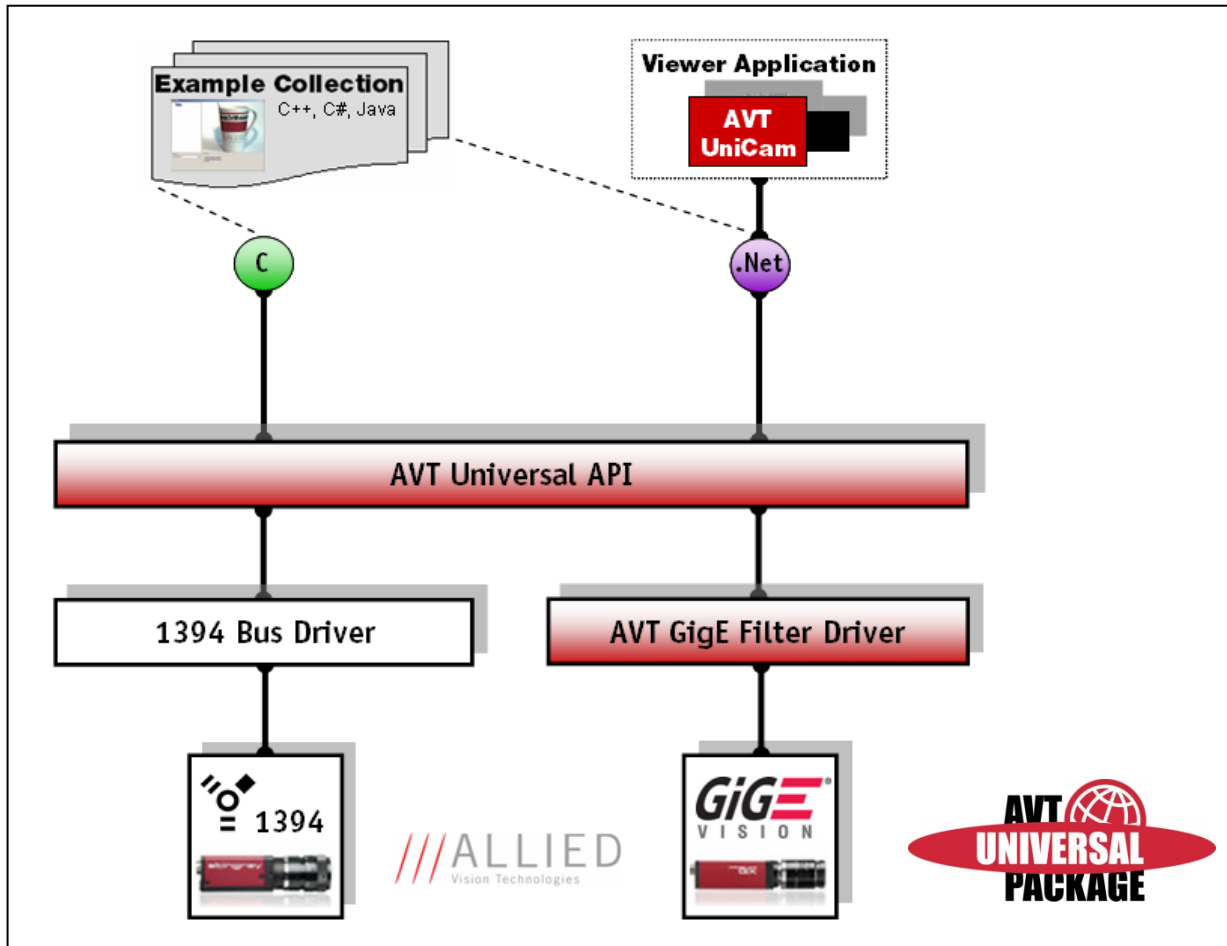


Figure 1: Architecture of the AVT Universal Package v2.1

4 System requirements

Software

The AVT Universal Package is a software development kit (SDK) designed for the 32- and 64-bit Windows operating systems:

- Windows 7
- Windows Vista (SP1)
- Windows XP (SP3)

Note This SDK should also work on older service pack releases. However, testing has been performed on the service pack versions listed above.



Optional for .NET compatibility the installation of .NET Framework 2.0 or higher is required.

Hardware

PC or laptop with 1 GHz 32-bit (x86) or 64-bit (x64) processor or better.

Additionally, when using AVT 1394 cameras a built-in IEEE 1394 interface or (OHCI) adapter card (one or more) for PCI or PCI Express bus or PC card or an ExpressCard with IEEE 1394 port(s) is required.

Note Testing has been performed on host controllers that are based on OHCI chip sets from Texas Instruments. The driver should run on host controllers that are based on OHCI chip sets from other vendors, too. However, if there are any problems please feel free to contact our Technical Software Support (see below).



Note AVT Universal Package supports only AVT 1394 cameras. Prosilica EC and CV cameras, as well as any other 3rd-party 1394 camera are not supported.



Furthermore, when using AVT GigE Vision cameras a built-in Gigabit Ethernet network interface or Gigabit Ethernet network card (one or more) is required. Recommended specifications are stated in the camera manuals and hardware installation guides.

5 Quick version overview

The components provided with current AVT Universal Package v2.1 have the following version numbers:

	32-bit	64-bit
Drivers		
▪ 1394 Bus Driver (firedrv.sys)	2.8.0.3	2.8.0.3
▪ NDIS GigE Vision Filter Driver (psligvfilter.sys)	1.18.0.0	1.18.0.0
Universal Application Programming Interface		
Camera interface independent and easy to use		
▪ UniAPI C Interface		
UniControl	2.1.2.0	2.1.2.0
UniTransform	2.1.2.0	2.1.2.0
UniControl_F	2.1.3.2	2.1.3.2
UniControl_P	2.2.0.3	2.2.0.3
▪ UniAPI.NET .NET wrappers for the UniAPI DLLs		
UniControl.Net	2.1.2.0	2.1.2.0
UniTransform.Net	2.1.2.0	2.1.2.0
Tools		
▪ AVTUniCam Viewer Application		1.2.0.2
▪ AVT 1394 Bus Driver Install Tool	2.0.2.0	2.0.2.0
utilizing intek Driver Installation Tool (svcinst.exe)	1.3.0.0	1.2.0.0

Note *Components with a **bold** version number have been changed compared to the previous AVT Universal Package v2.0.*



Furthermore, an API Reference Manual (as CHM file) as well as a comprehensive example collection is provided.

In addition a User Guide (as PDF file) is separately applicable that describes the installation of the SDK and provides an overview about the package content.

6 List of changes

In this chapter the revision history of the components provided with the AVT Universal Package is listed. Thereby, only the changed components are listed for each release. Furthermore, a **bold version number** indicates a component version number that was published in an official release of the AVT Universal Package. Version numbers in parentheses indicate a component version number that was never published in an official release of the AVT Universal Package.

6.1 AVT Universal Package v2.1

Release date: 1st of August 2011

The major change of this release is the addition of LUT control capabilities as well as support for MONO12 and RAW12 image formats for AVT GigE cameras (e.g. Manta). Additionally, several bugs have been fixed. Please refer to the list of changes below for further details.

Driver Components

Component	Version		Description of changes
	32-bit	64-bit	
1394 Bus Driver [firedrv.sys]	2.8.0.3	2.8.0.3	This driver update was required to avoid problems on 64 bit Windows operating systems that occurred when running SmartView application (part of AVT FirePackage).
	(2.8.0.2)	(2.8.0.2)	1394 cards with LSI PHY no longer cause system freeze at driver install time.

UniAPI Components

Component	Version		Description of changes
	32-bit	64-bit	
UniControl incl. UniControl_F and UniControl_P and UniControl.Net	2.1.2.0	2.1.2.0	<p>Added LUT control for AVT GigE cameras supporting this feature</p> <p>-----</p> <p>Enable usage of MONO12 and RAW12 (Bayer12packed) image formats for GigE cameras supporting these formats</p> <p>-----</p> <p>Bug-fixes:</p> <ul style="list-style-type: none"> o UCC_SaveSettings no longer returns an unclassified error when using Prosilica G* cameras running with firmware 1.42 o For 1394 cameras UCC_SaveSettings now writes the recently changed Shutter value to xml o UCC_SetFeatureValue(E_FEAT_TIMEBASE) no longer returns "Parameter 3 is invalid" although valid values have been used. o UCC_LoadSettings also sets the AutoShutter value correctly o Min and Max values can be set correctly for cameras supporting the feature HighSNR

UniAPI Components (continued)

Component	Version		Description of changes
	32-bit	64-bit	
UniControl incl. UniControl_F and UniControl_P and UniControl.Net	2.1.2.0	2.1.2.0	Bug-fixes: <ul style="list-style-type: none"> ○ UCC_SetFeatureValue can also be applied for ChannelGainBalance feature Workaround: Applying UCC_OpenCamera with Stingray cameras no longer return an unclassified error
UniTransform and UniTransform.Net	2.1.2.0	2.1.2.0	Bug-fix: <ul style="list-style-type: none"> ○ Corrected image transform functions utilizing 2x2 LCAA debayering algorithm

Tools

Component	Version	Description of changes
AVT UniCam Viewer [AVTUniCam.exe]	1.2.0.2	Added Load/Save LUT from/to file functionality for GigE cameras ----- Bug-fixes: <ul style="list-style-type: none"> ○ Viewer no longer crashes on 64-bit systems when debayering RAW12/RAW 16 images ○ RAW8 images are no longer debayered incorrectly on 64-bit systems when selecting debayering mode 2x2 LCAA Application no longer crashes when starting acquisition for Prosilica GE cameras running with firmware 1.42

6.2 AVT Universal Package v2.0

Release date: 9th of December 2010

The major change of this release is the addition of 64-bit Windows OS support. Furthermore, some minor bug-fixes have been performed, which are listed in details below.

UniAPI Components

Component	Version		Description of changes
	32-bit	64-bit	
UniControl incl. UniControl_F and UniControl_P	2.1.1.0	2.1.1.0	Added 64-bit version ----- Bug-fixes: <ul style="list-style-type: none"> o UCC_GetCameraCapabilities returns correct maximal possible bit depth for SF-504B o Starting a second camera no longer stops generation of FrameReadyNotification
UniTransform	2.1.1.0	2.1.1.0	Added 64-bit version
UniControl.Net	2.1.1.0	2.1.1.0	Added 64-bit version ----- Bug-fixes: <ul style="list-style-type: none"> o After re-initializing a camera now OnFrameReadyEvents are sent
UniTransform.Net	2.1.1.0	2.1.1.0	Added 64-bit version

Tools

Component	Version	Description of changes
AVT UniCam Viewer [AVTUniCam.exe]	1.1.2.0	Added support for Prosilica GC 640/750/1280 cameras. ----- Viewer no longer crashes because of wrong registry entries.
Example Collection	N/A	The ImageJ plugin will not be installed on 64-bit operating systems.

6.3 AVT Universal Package v1.1

Release date: 7th of October 2010

The major change of this release is that LAG support for Prosilica GX cameras has been added. Furthermore, a lot of functional improvements and extensions have been realized, which are listed in details below.

Driver Components

Component	Version	Description of changes
1394 Bus Driver [firedrv.sys]	2.8.0.1	Date limited license bug removed (unintentionally introduced in v2.7.0.3). ----- Maximal twenty (was ten) 1394 host controller cards allowed per system.
	(2.8.0.0)	Enabled user buffer allocation for 64-bit systems.
GigE Vision Filter Driver [psligvfilter.sys]	1.18.0.0	Added LAG support for GX cameras

UniAPI Components

Component	Version	Description of changes
UniControl incl. UniControl_F and UniControl_P	2.1.0.4	<p>New/extended features:</p> <ul style="list-style-type: none"> o General: <ul style="list-style-type: none"> - Added methods for controlling the color correction matrix - Added feature state E_FEATSTATE_ONEPUSH for feature E_FEAT_COLORCORRECTION to load preset values - Added method for UCC_SetAOI() for setting Area of interest for the current mode - Added E_FEAT_TRIGGERCOUNTER to reset and read back trigger counter value - Added methods for controlling the hue feature in degrees <p>New/extended features: (continued)</p> <ul style="list-style-type: none"> o 1394 cameras (only): <ul style="list-style-type: none"> - Added E_FEAT_DO_CARDRESET to do a soft reset of the card a 1394 camera is connected to if used with UCC_SetFeatureStatus() and E_FEATSTATE_ONEPUSH, or a specific card [UCC_SetFeatureValue()] - Added E_CAMINFO_CARD_ID - Modified and extended error notification for grabbing o GigE Vision cameras (only): <ul style="list-style-type: none"> - Added member E_DATABITRATE_G2000 to E_UNI_DATABITRATE for LAG support - Extend trigger control to all available input pins from GigE cameras (was limited to pin 1 only)

UniAPI Components (continued)

Component	Version	Description of changes
<p>UniControl incl. UniControl_F and UniControl_P</p>	<p>2.1.0.4</p>	<p>Improvements:</p> <ul style="list-style-type: none"> ○ General: <ul style="list-style-type: none"> - Improved UCC_MultiShotStart() method - UCC_SetFeatureValue(E_FEAT_STARTIMMEDIATELY) is no longer an invalid operation - UCC_GetCameraInfoString now supports all E_UNI_CAMERA_INFO members - UCC_OpenCamera no longer requires a prior call of UCC_GetCameras - Cameras with uneven sensor sizes now can be opened - Corrected E_CAMINFO_VENDOR for Manta cameras - UniAPI feature E_FEAT_COLORCORRECTION now works correctly - Corrected upper limits for E_FEAT_AUTOFUNCTIONAOI* - Adjusted constraints for E_FEAT_AUTOFUNCTIONAOI_XUNITS / _YUNITS. ○ 1394 cameras (only): <ul style="list-style-type: none"> - UCC_SetStreamSpeed E_SPEED800 now fails in legacy mode (1394b camera connected to 1394a port). - DESC_FEAT_DO_BUSTRIGGER "E_FEAT_DO_BUSTRIGGER" now works correctly. ○ GigE Vision cameras (only): <ul style="list-style-type: none"> - Fixed UCC_EnumFreeModes() for GigE cameras with no binning or uneven sensor sizes. Additionally, binning is limited to max 8 pixels. - Setting Bandwidth of 1000 per-mille for GigE cameras no longer fails. - Inaccessible modes of GigE cameras are no longer listed by using UCC_EnumFreeModes.

UniAPI Components (continued)

Component	Version	Description of changes
UniControl.Net	2.1.0.4	<p>New/extended features:</p> <ul style="list-style-type: none"> - Added member "G2000" to AlliedVisionTech::UniFoundationNet::enUniDataBitRate to enable LAG support. - Class added: AlliedVisionTech::UniFoundationNet::ColorCorrectionMatrix - Class TriggerCtrlInfo moved from namespace AlliedVisionTech::UniFoundationNet to AlliedVisionTech::UniControlNet - Added member "Manta" and "GuppyPRO" to AlliedVisionTech::UniFoundationNet::enUniCameraFamily - Property ColorCorrectionMatrix added to class AlliedVisionTech::UniControlNet::UniCamera - Properties for hue feature control in degrees added to class AlliedVisionTech::UniControlNet::UniCamera - Properties AlliedVisionTech::UniControlNet::UniCamera::InputPin and AlliedVisionTech::UniControlNet::UniCamera::OutputPin changed. Return value is now an enumerable collection - Trigger settings can additionally be changed directly by modifying the properties of the class AlliedVisionTech::UniControlNet::TriggerCtrlInfo and calling its update method
		<p>Improvements:</p> <ul style="list-style-type: none"> - Documentation for delegate definitions added in CHM file - Unexpected <code>FrameStart</code> events are no longer fired when registered for both <code>FrameStart</code> and <code>FrameReady</code> events.
UniTransform	2.0.0.5	Improved <code>UIT_IRaw8CYGMIImageTransform</code> method by enabling to select a height not a multiple of 4
		Calling <code>YUV444ToBGR</code> for images from GigE cameras no longer result in "LSD" images.
		UniTransform.chm now can be opened

Note

More detailed information about the UniAPI related changes can be found in the corresponding CHM help files.



Tools

Component	Version	Description of changes
AVT UniCam Viewer [AVTUniCam.exe]	1.1.0.4	Added controls for: <ul style="list-style-type: none"> - Hue - Saturation, - Color correction matrix - Sharpness - Output pins - Selecting and uploading a look-up table. <hr/> Extend trigger settings to use all available input pins from GigE cameras. <hr/> Added histogram window. <hr/> 16 bit images can now be saved as TIFF file. <hr/> Added support for LAG.
1394 Bus Driver Installer [AVT1394BusDriverInstaller.exe]	2.0.2.0	Added button to re-install the current driver

Besides this, the *ImageJ* plug-in now supports also AVT GigE Vision cameras.

6.4 AVT Universal Package v1.0

Release date: 2nd of February 2010

Although this is the initial release of the AVT Universal Package it utilizes some components that are also part of other AVT SDKs and thus have already a release history (see below). This are:

- The 1394 bus driver (firedrv.sys) and corresponding driver install utility (svrinst.exe) tool, which are also part of the **AVT FirePackage**
- The 1394 bus driver installer, which is also part of the **AVT 1394 Bus Driver Package**
- GigE Vision filter driver, which is also part of the **PvAPI SDK**, formerly developed by Prosilica (now part of AVT).

Furthermore, please note that the UniAPI was part of the AVT FirePackage from release 2.7 to 2.11. With the initial release of the AVT Universal Package the UniAPI will no longer be part of any future AVT FirePackage. This is, because from UniAPI v2.x it can also be applied for GigE Vision compliant cameras from AVT. Therefore, for the sake of completeness the changes to the UniAPI version provided with FirePackage v2.11 are listed here.

Driver Components

Component	Version	Description of changes
1394 Bus Driver [firedrv.sys]	2.7.0.4	Support for OHCI host controller from JMicro ----- Added DMA pointer check for low cost 1394 cards with 0 IsoDMAs to avoid blue screen in case the card initialization failed
	(2.7.0.3)	Was also used in AVT FirePackage v2.11. Please refer to the corresponding release information for details.
GigE Vision Filter Driver [psligvfilter.sys]	1.17.16	Branded the driver for AVT (&Prosilica)

UniAPI Components

Component	Version	Description of changes
UniControl	2.0.0.4	New Features: <ul style="list-style-type: none"> - 1394 and GigE Vision cameras: <ul style="list-style-type: none"> - Setting AOI position during grab - Trigger delay - Channel gain balance - GigE Vision cameras (only): <ul style="list-style-type: none"> - Support for additional color codes (YUV444, RGBA8) - Open cameras in read-only mode (no image display possible) - Automatic detection of externally controlled cameras - Setting of network parameters - Introduced 'Virtual Modes' to control binning modes of GigE Vision cameras

UniAPI Components (continued)

Component	Version	Description of changes
UniControl	2.0.0.4	<p>New parameters supported:</p> <ul style="list-style-type: none"> - 1394 and GigE Vision camera information parameters: InterfaceType, ImageEndianness, ImageAlignment and CurrentBusLoad - GigE Vision network related status parameters and statistical counters <hr/> <p>New & modified methods:</p> <ul style="list-style-type: none"> - Added image acquisition methods: UCC_GrabNativeImageEx and UCC_GetNativeImageEx to get images in camera's transport format - The methods UCC_GetCameras and UCC_GetCamerasEx might be delayed by up to 2 seconds because of additional GigE Vision camera discovery process <hr/> <p>Deprecated items:</p> <ul style="list-style-type: none"> - StreamSpeed, this parameter should be replaced by DataBitRate - Method UCC_GrabBitmapImage, should be replaced by UCC_GrabBitmap8Image or UCC_GrabBitmap24Image - Method UCC_GetBitmapImage should be replaced by UCC_GetBitmap8Image or UCC_GetBitmap24Image
	(1.4.0.0)	Was used in AVT FirePackage v2.11. Please refer to the corresponding release information for details.
UniControl_F	2.0.0.4	Initial release.
UniControl_P	2.0.0.4	Initial release.
UniControl.Net	2.0.0.4	<p>New Features:</p> <ul style="list-style-type: none"> o 1394 and GigE Vision cameras: <ul style="list-style-type: none"> - Setting AOI position during grab - Trigger delay - Channel gain balance - Load LUT from CSV file o GigE Vision cameras (only): <ul style="list-style-type: none"> - Support for additional color codes (YUV444, RGBA8) - Open cameras in read-only mode (no image display possible) - Automatic detection of externally controlled cameras - Setting of network parameters - Introduced 'Virtual Modes' to control binning modes of GigE Vision cameras
		<p>New parameters supported:</p> <ul style="list-style-type: none"> - 1394 and GigE Vision camera information parameters: InterfaceType, ImageEndianness, ImageAlignment and CurrentBusLoad - GigE Vision network related status parameters and statistical counters - Added new property CameraId in UniControlException

UniAPI Components (continued)

Component	Version	Description of changes
UniControl.Net	2.0.0.4	<p>New & modified methods:</p> <ul style="list-style-type: none"> - Added image acquisition methods: <code>GrabNativeImageEx</code> and <code>GetNativeImageEx</code> to get images in camera's transport format, as well as <code>GetImage</code> to get images in bitmap format - The methods <code>GetCameras</code> and <code>GetCamerasEx</code> might be delayed by up to 2 seconds because of additional GigE Vision camera discovery process <hr/> <p>Deprecated items:</p> <ul style="list-style-type: none"> - <code>StreamSpeed</code>, this parameter should be replaced by <code>DataBitRate</code>
	(1.4.0.0)	Was used in AVT FirePackage v2.11. Please refer to the corresponding release information for details
UniTransform	2.0.0.4	<p>New methods added to convert YUV444 or RGBA8 images to other formats.</p> <hr/> <p>The methods <code>UIT_Raw16</code> and <code>UIT_Y16</code> have become deprecated. Instead we recommend using <code>UIT_Raw16ImageTransformEx</code> and <code>UIT_Y16ImageTransformEx</code> respectively.</p>
	(1.6.0.0)	Was used in AVT FirePackage v2.11. Please refer to the corresponding release information for details.
UniTransform.Net	2.0.0.4	<p>New methods added to convert YUV444 or RGBA8 images to other formats.</p> <hr/> <p>The methods <code>Raw16</code> and <code>Y16</code> have become deprecated. Instead we recommend using <code>Raw16ImageTransformEx</code> and <code>Y16ImageTransformEx</code>, respectively.</p>
	(1.6.0.0)	Was used in AVT FirePackage v2.11. Please refer to the corresponding release information for details.

Note



More detailed information about the UniAPI related changes can be found in the corresponding CHM help files.

Tools

Component	Version	Description of changes
AVT UniCam Viewer [AVTUniCam.exe]	1.0.0	Initial release.
1394 Bus Driver Installer [AVT1394BusDriverInstaller.exe]	2.0.0	Added intek 1394 bus driver install option.
	(1.0.0)	Was used in AVT 1394 Bus Driver Package v1.0. Please refer to the corresponding release information for details.
1394 Bus Driver Installer Utility [SvrInst.exe]	(1.3.0.0)	Was also used in AVT FirePackage v2.11. Please refer to the corresponding release information for details.

7 Known issues

Correlations with other AVT Software Packages

AVT FirePackage

If you plan to use the AVT FirePackage in parallel with the AVT Universal Package, please make sure to install the AVT FirePackage v3.0 first, before installing AVT Universal Package.

Note



Removing the AVT Universal Package might break the AVT FirePackage (v3.0) installation. In that case you should start the AVT FirePackage installer again and click on "Repair".

AVT FirePackage64

If you previously installed AVT FirePackage64 and are using one of the very early releases of the AVT UniAPI, please uninstall this SDK before installing AVT Universal Package v2.0 on your 64-bit Windows system.

In case you intend to apply any other component provided with the AVT FirePackage64 please use AVT FirePackage v3.0, which is designed for both 32-bit and 64-bit operating systems, but no longer contains the UniAPI.

PvAPI based GigE Sample Viewer or AVT PvAPI (GigE) SDK Installer

If you plan to use one of these software packages in parallel to the AVT Universal Package, please make sure to use only version **1.24** of these packages.

Note



Removing the AVT Universal Package might break the installation of these packages. In that case you should remove the corresponding package via "Control Panel" → "Software" and re-install it.

UniAPI

Trying to load the UniAPI .NET in Borland Developer Studio 2006 v10.0 raises the error "Invalid assembly". Please contact our support for further details.

LUT support for GigE cameras doesn't cover the camera's entire capabilities:

- Only one LUT can be activated simultaneously
- The LUT can only be used in luminance mode
- LUT and Gamma cannot be used simultaneously
- No LUT is supported while opening the camera in read-only mode
- LUTs won't be stored in user sets. To save or load the current LUT use UCC_SetFeatureStatus with E_FEAT_LUT and E_FEATSTATE_SAVEDATA or E_FEATSTATE_LOADDATA.

Running a 32 bit application on 64 bit Windows causes acquisition errors after more than 4095 single shots.

UniAPI Examples

Some examples cannot be compiled with Microsoft Visual Studio 2010 due to a problem during the automatic conversion. Please adjust in this case any include path for the UniAPI manually.

AVT UniCam Viewer

If multiple FireWire and GigE cameras are connected to the system and the AVT UniCam viewer is opened, it might in rare cases happen that the GigE cameras are not listed at first. Pressing <F5> or clicking on *View* → *Refresh* in the main view fixes the problem.

8 Support

Please do not hesitate to inform us about any problem, error, or bug you may discover. You can reach the **AVT Technical Software Support** via the corresponding contact form for your region:

Asia Pacific

<http://www.alliedvisiontec.com/apac/support/contact-support.html>

Europe, Middle East and Africa

<http://www.alliedvisiontec.com/emea/support/contact-support.html>

Germany

<http://www.alliedvisiontec.com/de/support/support-kontaktieren.html>

The Americas

<http://www.alliedvisiontec.com/us/support/contact-support.html>