ALLIED
Vision Technologies

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SOFTWARE SELECTOR GUIDE

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What‘s this guide about?

When a camera is to be connected to a PC, one has to ask “how?” before resolution or camera features can even be looked at. **How** do parameters get into the camera? **How** is the camera started? **How** do the images get into the PC? **How** do you plan to process the images?
AVT offers several software packages and library interfaces which help the user to develop powerful applications quickly and easily.

This interactive guide will help you to find the right AVT package for integrating AVT cameras into your application.

At the end of the brief interactive dialogue, you will get either a recommendation about which AVT software package to use or links and tips which should help you to obtain additional information or to know how to proceed.

If you have any recommendations to improve this selector guide or want to give some feedback about it, please write an email to: spsg-feedback@alliedvisiontec.com

How to use this document?

In the following you will be asked several questions. Please select the answers by clicking on the appropriate button, e.g. Answer or ‘Action Icon’ which is provided at the end of each page in the navigation bar (see below).
To be able to give the most suitable answer, for some questions a background information button is provided. Please read those notes carefully as they will help you to determine the appropriate answer. Each answer will bring you one step closer to the AVT-recommended package.
To navigate through the pages without problems please notice the meaning of the following icons:

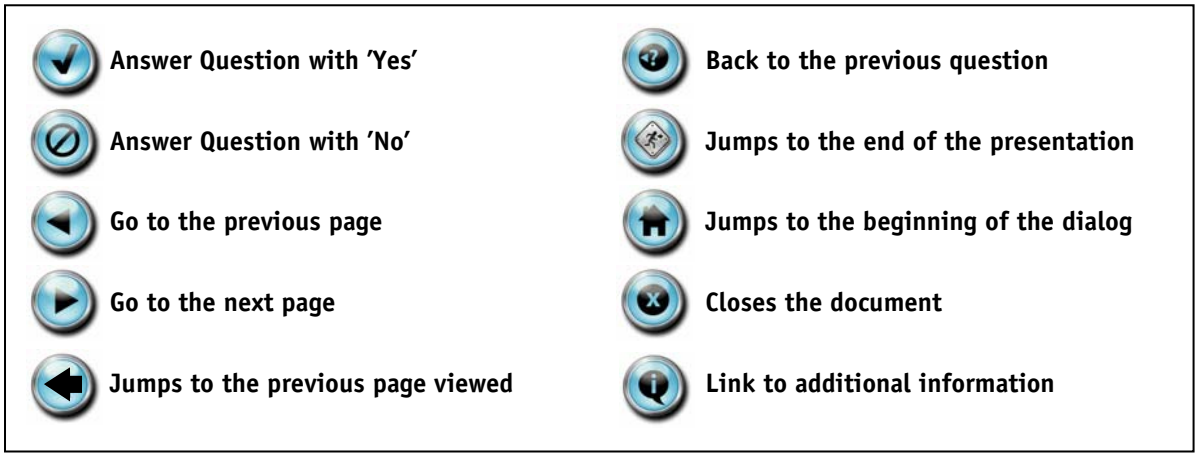

Figure 1: Action Icons and their meaning

Initial Question

Please select if you intend to use a 1394 or GigE Vision® camera

Please click on corresponding button to proceed …

FireWire and GigE cameras by Allied Vision Technologies and Prosilica

AVT offers a large choice of FireWire and GigE Vision® compliant cameras for machine vision, computer vision and other industrial or medical applications. Cameras by AVT and Prosilica include sensitive machine vision sensors (CCD and CMOS, VGA to 16 Megapixels) and fit a wide range of applications.

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Software Selector Guide for 1394 Cameras

Q-F1: Do you use already a 3rd party software solution to develop your image processing application?

AVT and 3rd party software solutions

AVT specializes in building extremely high featured DCAM compatible (IIDC 1.30 and 1.31) IEEE1394 and GigE Vision® cameras. These so-called AVT SmartFeatures can be used to enhance the image quality and prepare it for easy processing, and also to emulate traditional frame grabber functions inside the camera.
Together with professional and commercially available vision libraries and image acquisition & processing software solutions, AVT cameras with their embedded SmartFeatures become an extremely powerful tool for your vision application.

There is a wide range of third-party software solutions (like SDKs, integrated development environments, vision applications and tools) compatible with AVT cameras. In addition, for some of these solutions, AVT provides special integration packages to ensure a "plug & play" solution.

Please evaluate the best AVT or third-party software solution with your AVT distributor and/or AVT or the third-party support staff, relative to your particular application and preferences.

AVT camera compatibility with 3rd party software solutions

Allied Vision Technologies has many customers who successfully apply 3rd party software solutions together with our IEEE-1394 and GigE Vision® cameras. Click **here** to get an overview about certain third-party software solutions known to be compatible with AVT 1394 cameras, or refer to the corresponding page for our GigE Vision® compliant cameras. There may be many more solutions available, so the named solutions are just some of the most popular ones.

Nevertheless, to optimize the use of AVT cameras with 3rd party image processing solutions AVT works in close cooperation with its certified partners.

AVT CERTIFIED VISION SOFTWARE PARTNER

Q-F2: Which specific image processing tool or library do you intend to use or would like to know more about?

Company Website	AVT Compatibility Notes	Partner Status
a&b software	ActiveDcam	AVT CERTIFIED VISION SOFTWARE PARTNER
COGNEX	VisionPro	AVT CERTIFIED VISION SOFTWARE PARTNER
EURESYS	Open eVision	AVT CERTIFIED VISION SOFTWARE PARTNER
ImageJ Image Processing and Analysis in Java	ImageJ	
MATROX IMAGING	Matrox Imaging Library [MIL]	AVT CERTIFIED VISION SOFTWARE PARTNER
MediaCybernetics	Image-Pro Plus	
MVTec Software GmbH IMAGE ACQUISITION PARTNER	Halcon | ActivVisionTools	AVT CERTIFIED VISION SOFTWARE PARTNER
NATIONAL INSTRUMENTS	LabVIEW | NI Vision Builder AI	AVT CERTIFIED VISION SOFTWARE PARTNER
NEURO CHECK	NeuroCheck	
NORPIX Digital Video Recording Software	StreamPix | TroublePix	AVT CERTIFIED VISION SOFTWARE PARTNER
sourceforge	Open CV	
STEMMER IMAGING	Common Vision Blox	AVT CERTIFIED VISION SOFTWARE PARTNER
The MathWorks	MATLAB	AVT CERTIFIED VISION SOFTWARE PARTNER
TORDIVEL	Scorpion	AVT CERTIFIED VISION SOFTWARE PARTNER

None of the listed …

Note

This list is an overview of popular 3rd party software options for AVT customers, as identified by our staff, business partners, and customers. AVT is pleased to be a part of this community of providers, but cannot endorse one product or manufacturer relative to another.
AVT does not officially support third-party software. ***Therefore, any questions regarding such software should be directed to the respective manufacturer.***

AVT 1394 Cameras and ActiveDcam

Click on logo to learn more

ActiveDcam

is an ActiveX-based software solution designed to provide developers with an easy and efficient access to FireWire (IEEE-1394) digital cameras. Just drop an *ActiveDcam* control onto the surface of your application and have it immediately support multiple FireWire cameras.

AVT SW Package to install: None!

Supported AVT IEEE1394 cameras: All

Driver

Proprietary camera system driver based on the Microsoft 1394 OHCI bus driver architecture.

Restrictions

- Currently it is not possible to use ActiveDcam in parallel with **AVT's Active FirePackage**
- S800 (IEEE1394b) support for Windows Vista only with **AVT 1394 Bus Driver Package**

Links

a&b software is an AVT CERTIFIED VISION SOFTWARE PARTNER

- ActiveDcam - Brochure
- Check AVT website for A&B Software support

AVT 1394 Cameras and ActivTools Vision

Click on logo to learn more

ActivVisionTools

is based upon HALCON and is an application creator with graphical interface using a set of ActiveX controls with programmable interface. Thus ActivVisionTools inherits the speed, robustness, and accuracy of HALCON, but hides the complexity of image processing from the user.

AVT SW Package to install: None!

Supported AVT IEEE1394 cameras

All, except Guppy interlaced cameras (GF-038 and GF-044)

Allied Vision Technologies is also proud to be a member of the MVTec Image Acquisition Partner Program.

Driver

Intek FirePackage IEEE1394 bus driver

Restrictions

The 1394 bus driver used is identical with the one provided with *AVT FirePackage* and *AVT Universal Package* SDKs. It is not a capture device driver based on the Microsoft IEEE1394 driver stack, but a bus driver. This means that the Microsoft driver is replaced on all cards the driver is installed to, and the access for devices and applications that require the Microsoft driver is blocked.

Advantage:

The driver supports S800 data rates for 1394b cameras also for Windows XP (SP2/SP3) and Vista systems.

Links

is an

- Check AVT website for MVTec software support
- ActivVisionTools - Brochure
- ActivVisionTools – Getting Started Manual

AVT 1394 Cameras and COGNEX

Click on logo to learn more

VisionPro and Cognex Vision Library (CVL)

provide support for acquiring, processing, and displaying images from IEEE 1394 DCAM (FireWire) cameras. VisionPro provides a library of industrial-grade vision software tools. Whether you prefer drag and drop, scripting, or programming (VB.NET or C#), VisionPro seamlessly supports all modes of development … and everything in between.

AVT SW Package to install:

None!

Supported AVT IEEE1394 cameras

All – except Guppy interlaced cameras (GF-038 and GF-044).

Allied Vision Technologies is also proud to be a part of the Cognex Acquisition Alliance Program, and is listed as one of Cognex's Strategic Camera Suppliers.

Note

CVL or VisionPro use Camera Configuration Files (CCF) to interface DCAM cameras (V1.30 or higher) into any existing application. The CCFs can be created by the user for any configuration applicable for a camera. To use such a CCF file, copy it to the same \bin directory as other CCFs provided by Cognex.

Several CCF-files for AVT 1394 cameras can be found on the VisionPro product CD. Additionally, a ZIP file package containing CCF's for almost every AVT 1394 IIDC camera can be downloaded here.
In case you should require a CCF-file for a specific AVT camera with a defined configuration that is not part of this CCF-FilePackage, please contact our Software Support Team or you may build it yourself, with instructions found here.

Driver

Cognex DCAM Driver, a proprietary camera system driver based on the Microsoft 1394 OHCI bus driver architecture.

Restrictions

- S800 (maximum data rate for 1394b cameras) support is restricted due to OS limitations, as the Cognex driver is based on the Microsoft FireWire driver set (see note for details).

Note

Win XP SP2:
Microsoft Windows XP SP2 and XP SP3 do not correctly support IEEE 1394b FireWire adapters. Downgrading the Windows XP FireWire bus driver to the SP1 version is required for IEEE 1394a or 1394b FireWire cameras to work correctly on an IEEE 1394b adapter, or if you want to use a 1394b FireWire camera with an IEEE 1394a adapter.

*The **Cognex Driver Installer** will automatically launch a utility if this downgrade is required. This utility is named xpdcamfix.exe in Cognex Drivers Installer 2.6. In prior versions of the Cognex Driver Installer, it is named fixsp2.exe.*

The utility will prompt you for the downgrade and modifies only files needed for proper IEEE 1394b operation. It does not affect any other Microsoft XP drivers.

Windows Vista
*By default Microsoft Vista supports only the maximum 1394a transmission speed (S400) for both CVL and VisionPro, regardless of the FireWire cameras and adapters you use. The only option to achieve full IEEE 1394b support (S800 data rates) for Windows Vista is to use the driver of the **AVT 1394 Bus Driver Package***

- AVT SmartFeatures can only be used via direct register access, because of the *Cognex DCAM Driver*.
- Cognex vision software does not support camera hot-plugging. If you plug in a camera after you start your Cognex vision application, you must shutdown and restart the application for it to see the camera.

Links

- Cognex - Company is an AVT CERTIFIED VISION SOFTWARE PARTNER
- VisionPro – Product Info
- Check AVT website for COGNEX software support
- AVT Knowledge Base Article – Cognex CCF Files

AVT 1394 Cameras and Common Vision Blox

Click on logo to learn more

Common Vision Blox

offers the user an easy to use, comprehensive collection of optimized image processing functions, allowing the development of a vast range of machine vision applications. Classical programming via compilers as well as modern programming via GUI can be applied with this powerful software platform.

AVT SW Package to install: None!

Supported AVT IEEE1394 cameras: All

Driver

CVB VIN driver for AVT cameras (part of CVB), the driver is based on AVT FirePackage 1394 bus driver.

Restrictions

Cameras of other manufacturers can not be used in parallel on the same IEEE1394 bus without a corresponding bus driver license

Links

STEMMER IMAGING is an AVT CERTIFIED VISION SOFTWARE PARTNER

- Application Note – Using and controlling AVT cameras with CVB
  (registration required)
- CVB VIN Driver for AVT cameras
  (registration required)

CVB Driver Architecture for AVT 1394 Cameras

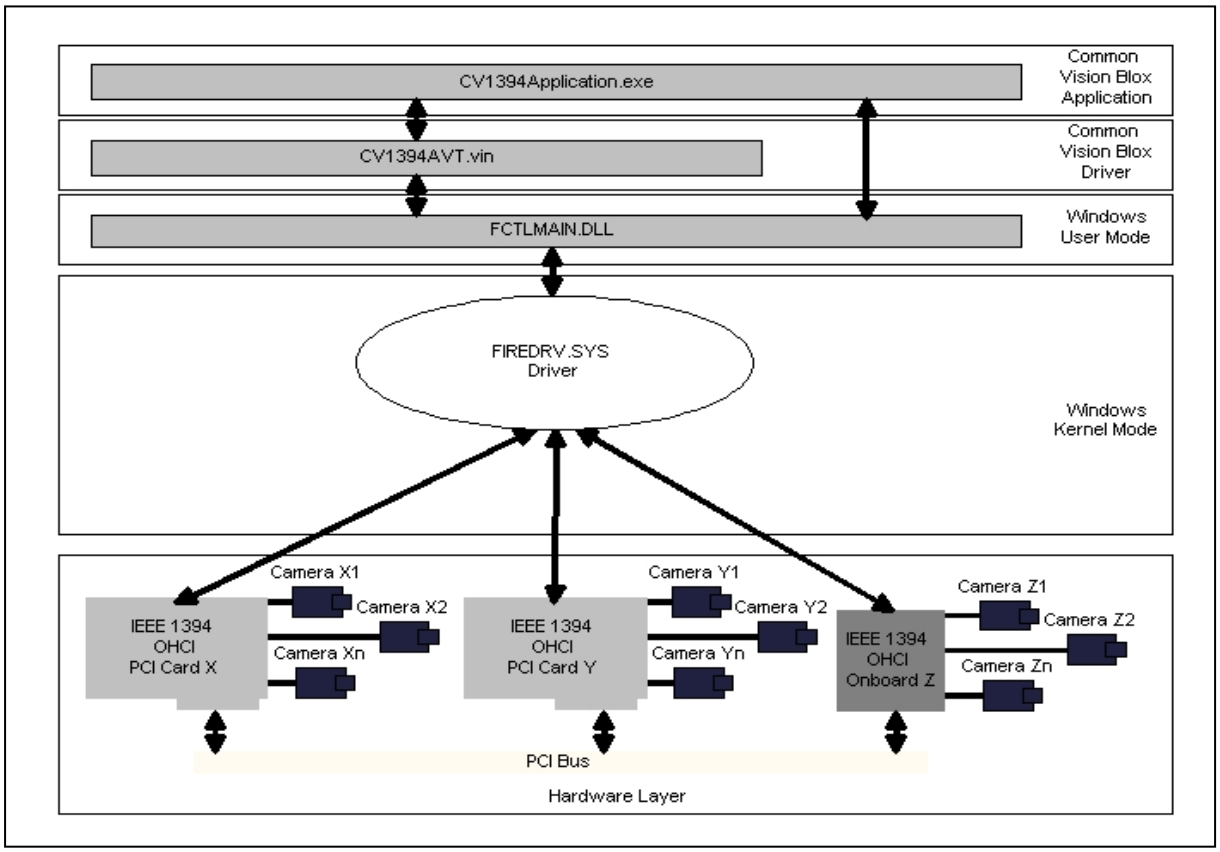


Figure 2: CVB driver architecture for AVT 1394 cameras

Note

The CVB AVT driver is based on the OHCI 1394 Bus driver that comes with the AVT FirePackage as shown in the drawing above. The driver is optimized for 1394 cameras and its usage results in better performance and a more stable system. However, when using this driver, only AVT cameras can be used. All other devices remain invisible to the operating system.

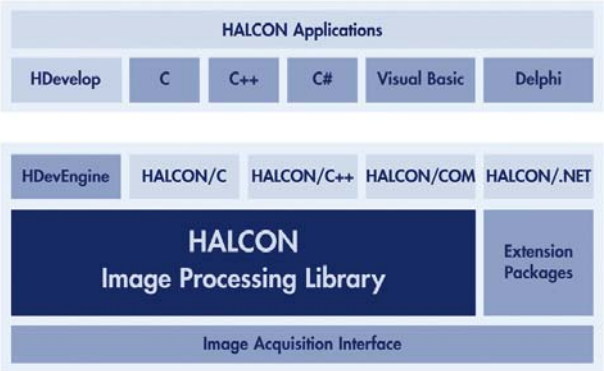
Communication between CVB and the DCAM AVT camera are handled via the cvAVT1394.vin driver.

AVT 1394 Cameras and HALCON

Click on logo to learn more

HALCON

is the comprehensive standard software library with an integrated development environment (IDE) for machine vision that is used worldwide. HALCON's flexible architecture facilitates rapid development of machine vision, medical imaging, and image analysis applications.



AVT SW Package to install:

None!

Supported AVT IEEE1394 cameras

All, except Guppy interlaced cameras (GF-038 and GF-044)

Allied Vision Technologies is also proud to be a member of the MVTec Image Acquisition Partner Program.

Driver

Intek FirePackage IEEE1394 bus driver.

Restrictions

The 1394 bus driver used is identical with the one provided with the *AVT FirePackage* and *AVT Universal 'package* SDKs. It is not a capture device driver based on the Microsoft IEEE1394 driver stack, but a bus driver. This means that the Microsoft driver is replaced on all cards the driver is installed to, and the access for devices and applications that require the Microsoft driver is blocked.

Advantage:

The driver supports S800 data rates for 1394b cameras also for Windows XP (SP2/SP3) and Vista systems.

Links

is an

Check AVT website for MVTec software support

HALCON – Overview

HALCON 9.0: Interfaces to Image Acquisition Devices

AVT 1394 Cameras and ImageJ

Image Processing and Analysis in Java

Click on logo to learn more

ImageJ

is a powerful image analysis program that can display, edit, analyze, process, save and print 8-bit, 16-bit and 32-bit images. ImageJ is in the public domain, therefore the source code is freely available. In addition, ImageJ runs on a variety of operating systems (amongst others Microsoft Windows, Mac OS X and Linux), provides extensibility via Java plug-ins and is updated frequently.

AVT SW Package to install: AVT UNIVERSAL PACKAGE V1.0+

The AVT Universal Package contains a plug-in for the Windows version of ImageJ. The plug-in is based on the AVT UniAPI and can also be used as an example for the usage of the UniAPI under Java.

Supported AVT IEEE1394 cameras

All, except Guppy interlaced cameras (GF-038 and GF-044)

Driver

IEEE1394 bus driver provided with the AVT Universal Package.

Restrictions

The AVT plug-in currently supports only Format7 and requires the Java-Runtime-Engine 6. Additionally, only 32-bit Windows operating systems are supported.

Links

- ImageJ – Basics (PDF)
- ImageJ – Download
- ImageJ – Documentation Portal

AVT 1394 Cameras and Image-Pro Plus

Click on logo to learn more

Image-Pro Plus

Image-Pro Plus provides tools for scientific and industrial image analysis in one software package to easily capture, enhance, process, and measure images.

AVT SW Package to install:

AVT ACTIVE FIRE PACKAGE

Supported AVT IEEE1394 cameras

All

Driver

TWAIN driver of the **AVT Active FirePackage**

Restrictions

- Access to AVT cameras only via TWAIN interface provided by the Active FirePackage
- *AVT SmartFeatures* currently can only be used via direct register access
- Support for 1394b cameras is restricted. Click **here** for more information.

Links

MediaCybernetics Company Info

Image-ProPlus – Brochure

AVT 1394 Cameras and MATLAB

Click on logo to learn more

MATLAB

MATLAB is a high-level language and interactive environment that enables you to perform computationally intensive tasks faster than with traditional programming languages such as C, C++, and Fortran.

MATLAB along with **Image Acquisition Toolbox** and **Image Processing Toolbox** provide a flexible environment for solving complex imaging problems in a wide range of applications including scientific imaging, medicine and biotechnology, aerospace and defense, security, and machine vision.

AVT SW Package to install

There are several ways to import or export images into and out of the MATLAB environment for processing. For example, the **Image Acquisition Toolbox** provides functions for acquiring images and videos from IEEE 1394 (FireWire) DCAM-compliant devices using the **CMU 1394 Digital Camera Driver** from Carnegie Mellon University.

Additionally, AVT has created an adapter to interface AVT 1394 cameras with MATLAB and Simulink, allowing users to access more camera features than available through open standards. With better access to AVT cameras in both MATLAB and Simulink, users can go farther in leveraging AVT cameras to solve image processing problems.

The ***AVT Adaptor for MATLAB Image Acquisition*** can be easily integrated into the Image Acquisition Toolbox and requires only the previous installation of:

AVT UNIVERSAL PACKAGE **V1.0+**

Note

Please contact our Software Support Team to obtain a preliminary version of the adapter supporting 1394 AVT cameras.
The final release is scheduled for July 2010, and will also support AVT GigE Vision® cameras.

Note

There are other options in obtaining images with MATLAB and AVT 1394 cameras, including:

- *DirectShow*
- *ActiveX control*

Please read our FAQ document for details!

Supported AVT IEEE1394 cameras: All

Driver

By default the Image Acquisition Toolbox provides functions for acquiring images and video from IEEE 1394 DCAM-compliant devices using the CMU DCAM Driver. Furthermore, the DirectShow drivers provided with the **AVT Active FirePackage** and **AVT Direct Stream Package** can be used together with the Image Acquisition Toolbox. For more information please refer to our FAQ document AVT and MATLAB.

Restrictions

- The CMU camera driver uses by default the Microsoft 1394 driver set. Therefore, support for 1394b cameras is restricted. Click **here** for more information.
- AVT SmartFeatures can only be used by direct register access unless the ***AVT Adaptor for MATLAB Image Acquisition*** is used.

Links

The MathWorks is an AVT CERTIFIED VISION SOFTWARE PARTNER

- MATLAB - Info
- CMU 1394 Digital Camera Driver - Download

AVT 1394 Cameras and MIL

Click on logo to learn more

MATROX Imaging Library (MIL)

MIL is a high-level, easy-to-use programming library with an extensive set of optimized functions for image capture, processing, analysis, display and archiving.

AVT SW Package to install:

It is possible to use the standard MIL driver by default, with the following restrictions:

- The **MIL driver** for IIDC compliant FireWire cameras uses by default the Microsoft 1394 driver set. Therefore, support for 1394b cameras is restricted.
  Click **here** for more information.
- *AVT SmartFeatures* can only be used by direct register access. This restriction for example may result in slow performance while transferring Shading Correction data or Look-Up Tables from/to the camera, because the MS 1394 bus driver allows restricted block transfer only.

Alternatively, AVT provides with AVT UNIVERSAL PACKAGE **V1.0+** an example that makes clear how a MIL compliant image can be captured for AVT 1394 and GigE Vision cameras by using the AVT UniAPI. With this approach improved camera control is possible, and even the AVT camera SmartFeatures can easily be used.

Supported AVT IEEE1394 cameras

All AVT 1394 cameras, except Guppy F038 and F044 with interlaced sensors.

Driver

Of course by default the MIL driver can be used. Nevertheless, for best performance with AVT 1394 cameras we recommend to use the bus driver provided with the *AVT Universal Package*.

Restrictions

Besides the restrictions when using the MIL driver (see above) the usage of the AVT UniAPI will cause that cameras of other manufacturers can not be used concurrently on the same IEEE1394 bus. Furthermore, please note that the UniAPI can only be used in conjunction with AVT cameras.

Links

MATROX – Company MIL – Data Sheet

Check AVT website for MATROX software support

MIL Driver Architecture

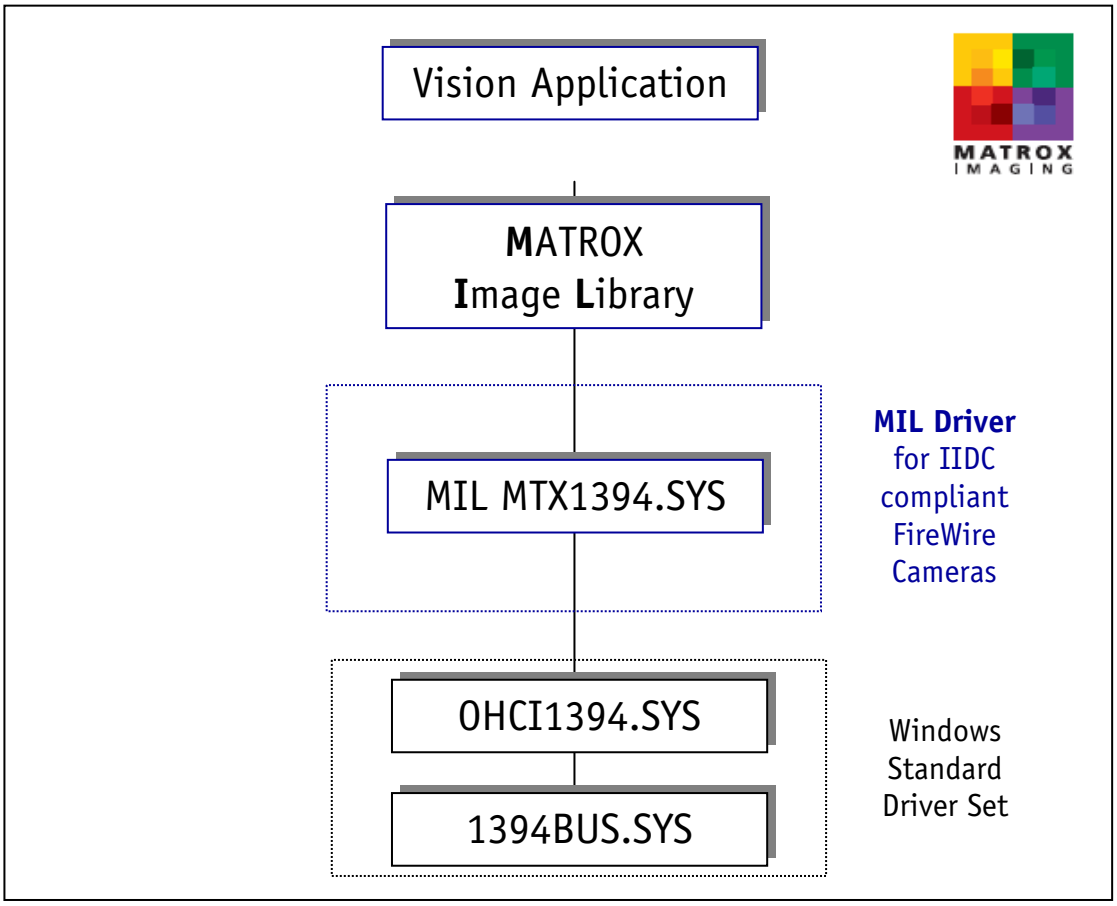


Figure 3: MIL driver architecture

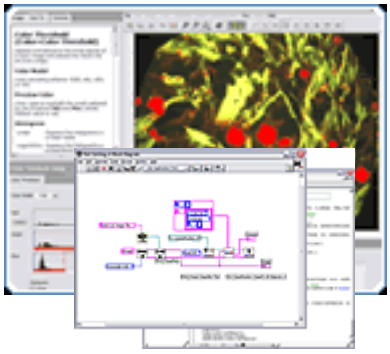
AVT 1394 Cameras and LabVIEW

Click on logo to learn more

LabView

is a graphical programming environment used to develop sophisticated measurement, test, and control systems using intuitive graphical icons and wires that resemble a flowchart. LabVIEW offers unrivaled integration with thousands of hardware devices and provides hundreds of built-in libraries for advanced analysis and data visualization. The LabVIEW platform is scalable across multiple targets and operating systems.

To process images, NI LabVIEW can be extended by specific image processing modules and tools like:



The Vision Development Module - A collection of image processing and machine vision functions for numerous programming languages, such as NI LabVIEW and Microsoft C++, Visual Basic, and .NET. With these functions it is possible to enhance images, check for presence, locate features, identify objects, and measure parts. Along with programming libraries, the NI Vision Development Module also includes NI Vision Assistant and NI Vision Acquisition software.

AVT SW Package to install: Optional AVT UNIVERSAL PACKAGE V1.0+

Note

NI LabVIEW provides the possibility to use commands of external libraries and to integrate those into so called VIs (Virtual Instruments). Based on its interface-independent Universal API (UniAPI), AVT provides an example collection for NI LabVIEW that focuses on the demonstration of AVT camera SmartFeatures. The examples are complete, fully functional top level applications that can be used with AVT's 1394 and GigE Vision® compliant cameras. Please note that when utilizing the AVT Sample Collection for NI LabVIEW the IMAQdx driver is replaced.

Please have a look at our Knowledge Base to learn more about this sample collection and to download the package.

Supported AVT 1394 cameras

Besides Guppy F038 and F044 cameras, all AVT 1394 cameras are supported, although currently not all of them are listed in NI's Industrial Camera Advisor.

Driver

NI IMAQdx Driver.

Note

Alternatively, when using the AVT Sample Collection for NI LabVIEW the IEEE1394 bus driver provided with the AVT Universal Package is used.

Restrictions

- *AVT SmartFeatures* can only be used via direct register access
- Certain video modes of some AVT cameras require to use the *UniTransform.dll* of the *AVT Universal Package* to acquire an image, e.g., plain color mode (Oscar), 12 bit packed RAW and MONO modes (Pike, Stingray and Guppy) and CYMG demosaicing RAW modes (GF038 and GF044)
- When using the NI standard drivers support for 1394b cameras is restricted. Click **here** for more information.

Links

For more information about the usage of AVT 1394 cameras together with NI's software solutions please contact our Support Team or refer to: http://www.ni.com/support

Additionally, we can recommend the following links

NATIONAL INSTRUMENTS is an AVT CERTIFIED VISION SOFTWARE PARTNER

- Check AVT website for NI software support
- Acquiring images from 1394 cameras with NI-IMAQdx
- AVT Knowledge Base Article: National Instruments (NI) - Labview
- NI KnowledgeBase
- To learn more about NI's Machine Vision Software click here!

AVT 1394 Cameras and NI Vision Builder AI

NI Vision Builder for Automated Inspection

is a configurable machine vision development environment that requires no programming. With Vision Builder AI, you can solve most machine vision application challenges without the use of a programming language or complicated customization tools. Vision Builder AI includes NI Vision Acquisition software, a set of drivers and utilities that acquire, display, and save images from any NI frame grabber, GigE Vision camera, or IEEE 1394 camera.

AVT SW Package to install: None!

Supported AVT IEEE1394 cameras

All AVT 1394 cameras are supported, although currently not all of them are listed in NI's Industrial Camera Advisor.

Driver

NI IMAQdx Driver

Restrictions

- *AVT camera smart features* can not be used.
- Certain video modes of some AVT cameras require to use the *UniTransform.dll* of the AVT Universal Package to acquire an image, e.g., plain color mode (Oscar), 12 bit packed RAW and MONO modes (Pike, Stingray and Guppy) and CYMG demosaicing RAW modes (GF038 and GF044).
- Support for 1394b cameras is restricted. Click **here** for more information.

Links

For more information about the usage of AVT 1394 cameras together with NI's software solutions please contact our Support Team or refer to: http://www.ni.com/support

Additionally, we can recommend the following links

NATIONAL INSTRUMENTS is an AVT CERTIFIED VISION SOFTWARE PARTNER

- Acquiring images from 1394 cameras with NI-IMAQdx
- To learn more about NI's Machine Vision Software click here!

AVT 1394 Cameras and NEURO CHECK

Click on logo to learn more

NeuroCheck

is a general purpose image processing system for industrial quality control. There is no programming involved; rapid visual point & click development takes the place of time-consuming compile and link cycles.

AVT SW Package to install:

The *AVT NeuroCheck Interface* is designed for NeuroCheck 5.1 (SP7+), which is the first version supporting the FireWire interface/bus. The package is free of charge, and provides very easy access to all AVT 1394 cameras and their *SmartFeatures*.

Note

The current AVT NeuroCheck Interface can not be used with NeuroCheck 6.0 or higher. Please contact our Support Team in case you are interested in AVT camera support for NC 6.0.

Supported AVT IEEE1394 cameras

All AVT 1394 cameras

Driver

IEEE1394 bus driver provided with the *AVT FirePackage*.

Restrictions

- The *AVT NeuroCheck Interface* can only be used on Win2000 and XP systems
- It is not recommended to use the interface with cameras of other manufacturers
- To support Stingray cameras additionally *AVT SmartView* v1.7.2+ is required, which is part of the *AVT FirePackage v2.8.1 or later*.

Links

- NeuroCheck – Company
- NeuroCheck - Brochures

AVT 1394 Cameras and Open eVision Image Analysis Tools

Click on logo to learn more

Open eVision

Open eVision is a suite of software tools for industrial vision and contains DLLs, ActiveX controls and .NET components for image processing and analysis.

The *Open eVision* libraries do not rely on any proprietary hardware device to run. They are able to process given-format bitmap images available in the host memory, whatever their origin. Thereby, color and monochrome images are supported. The images to be processed may come from any digital camera independent of its interface.

AVT SW Package to install: AVT UNIVERSAL PACKAGE V1.0+

The *AVT Universal Package* contains an example that makes clear how an Open eVision compliant image can be captured by using the AVT UniAPI.

Supported AVT IEEE1394 cameras

All

Driver

IEEE1394 bus driver provided with the AVT Universal Package.

Restrictions

Without a corresponding license 3rd party cameras can not be used concurrently on the same FireWire bus.

Link to

EURESYS is an AVT CERTIFIED VISION SOFTWARE PARTNER

AVT 1394 Cameras and OpenCV

Click on logo to learn more

Open Source Computer Vision Library

OpenCV is a collection of algorithms and sample code for various computer vision problems. Originally the library was developed by Intel, but now it is on sourceforge.net and therewith free for commercial and research use under a BSD license.

OpenCV is a pure image processing library mainly focusing on real-time image processing, as such, if it finds Intel's Integrated Performance Primitives (IPP) on a system, it will use these commercial optimized routines to accelerate itself.

OpenCV provides low level portable data types and operators, and a set of high level functions for video acquisition, image processing and analysis, structural analysis, motion analysis and object tracking, object recognition, camera calibration and 3D reconstruction. At a minimum a buffer containing image data is required.

Note

Please contact our support team to get information about how an image buffer with valid image data can be provided when using any AVT software packages.

AVT SW Package to install:

OpenCV can be used independently of the operating system used (Windows as well as Unix/Linux/Mac OS X) and the corresponding driver set. Therefore, any of the 32/64bit AVT software packages can be installed.

Note

To provide the optimum performance under Windows we recommend to use the AVT Universal Package

AVT UNIVERSAL PACKAGE **V1.0+**

which contains an AVT UniAPI based example that explains how to grab an OpenCV compliant image. Additionally, with this approach easy access to the AVT camera SmartFeatures is gained.
Alternatively, for a simple image acquisition the DirectShow capture source provided with AVT's Direct Stream Package can be used in conjunction with the video control interface provided with Open CV.

Supported AVT IEEE1394 cameras

All

Driver

For AVT 1394 cameras we recommend to use the bus driver provided with the *AVT Universal Package*.

Restrictions

- Supported programming languages: C++, Python, Visual Basic

Note *A .NET Framework Wrapper for Intel's OpenCV Package is available here.*

Links

- OpenCV – WikiPages
- OpenCV on Wikipedia
- OpenCV – Discussions and bug reports

Download files are available on: sourceforge

AVT 1394 Cameras and SCORPION VISION SOFTWARE

Click on logo to learn more

Scorpion

is an independent and open software tool for 2D and 3D industrial vision. It is designed to be a powerful and flexible tool to implement demanding tasks without any kind of programming.

AVT SW Package to install: AVT FIRE PACKAGE V2.8.1+

Supported AVT IEEE1394 cameras:

All

Driver

Proprietary Scorpion driver based on the AVT UniAPI, which is utilizing the high-performance 1394 bus driver provided with the *AVT FirePackage*.

Restrictions

- The Scorpion driver (uniAVTdriver.dll) can only be used with AVT cameras.
- Cameras of other manufacturers can not be used in parallel on the same IEEE1394 bus due to the used driver

Links

TORDIVEL is an AVT CERTIFIED VISION SOFTWARE PARTNER

- Scorpion – Overviewt
- Scorpion – Technical Data
- Scorpion – Camera Support

AVT 1394 Cameras and StreamPix

Click on logo to learn more

StreamPix

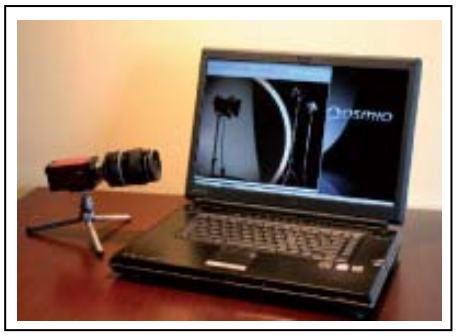


Figure 4: Laptop solution with AVT 1394 camera working at 200fps with a resolution of 640x480 pixels

StreamPix is a multiple camera digital video recording software package to acquire from a single up to eight or more cameras simultaneously compressed or uncompressed live videos directly to a hard-disk or into the RAM of a PC or laptop. Thereby, pre, post, and simultaneous triggering solutions are available. Furthermore, *StreamPix* provides a scripting language for complex time lapse requirements, and many more features.

AVT SW Package to install:

AVT FIRE PACKAGE V2.10+ for 32-bit applications

AVT 64 FIRE PACKAGE V1.1 for 64-bit applications

Note

For each software solution available for 32- and 64-bit systems, NorPix provides an optimized interface to AVT 1394 cameras that is based on the high-performance 1394 bus driver as well as the AVT UniAPI which are both part of the named AVT SDKs. Therefore, the NorPix interfaces for AVT cameras provide extended SmartFeature access and the possibility to support S800 data rates for 1394b cameras under Windows Vista.

Supported AVT IEEE1394 cameras

All AVT 1394 cameras

Driver

IEEE 1394 bus driver provided with the *AVT FirePackage*, plus special DLL provided with *StreamPix*

Restrictions

Cameras of other manufacturers can not be used in parallel on the same IEEE1394 bus.

Links

NORPIX Digital Video Recording Software is an AVT CERTIFIED VISION SOFTWARE PARTNER

- Check AVT website for NorPix software support
- StreamPix4 – Brochure | StreamPix5 – Brochure

AVT 1394 Cameras and TroublePix

Click on logo to learn more

TroublePix

is designed for event capture and trouble shooting applications with a simple easy to use GUI interface. Thus TroublePix is ideally suited for factory floors, laboratories or outdoor. TroublePix allows the user to acquire, view and review all sequences at the same time and is compatible with laptops and portable PCs.

AVT SW Package to install:

AVT FIRE PACKAGE V2.10+ for 32-bit applications

AVT 64 FIRE PACKAGE V1.1 for 64-bit applications

Note

For each software solution available for 32- and 64-bit systems, NorPix provides an optimized interface to AVT cameras that is based on the high-performance 1394 bus driver as well as the AVT UniAPI which are both part of the named AVT SDKs. Therefore, the NorPix interfaces for AVT cameras provide extended SmartFeature access and the possibility to support S800 data rates for 1394b cameras under Windows Vista.

Supported AVT IEEE1394 cameras

All AVT 1394 cameras

Driver

IEEE 1394 bus driver provided with the AVT FirePackage, plus special DLL provided with *TroublePix*

Restrictions

Cameras of other manufacturers can not be used in parallel on the same IEEE1394 bus.

Links

NORPIX Digital Video Recording Software is an AVT CERTIFIED VISION SOFTWARE PARTNER

- Check AVT website for NorPix software support
- TroublePix – Brochure

Q-F3: Which Operating System do you intend to use?

Microsoft Windows	Linux	Mac OS

Please select …

Q-F4: Which AVT software package might be best suited for your own application development?

The following table is designed to help you to determine which AVT software package might be best suited for your own application development. Please click on the corresponding icon to determine the best-suited AVT SDK for Windows.

Application Description	AVT UNIVERSAL PACKAGE	AVT ACTIVE FIRE PACKAGE	AVT DIRECT STREAM PACKAGE
High performance application with high determinism demands (100% bus control)	✓	✓	✗
Multi-camera applications (with AVT cameras only)	✓	✓	✓
Using **cameras of different manufacturers** and the Microsoft IEEE1394 driver set	✗	✓	✓
Full AVT **SmartFeature Usage**	✓	✓	✓
Video Streaming based on **DirectShow**	✗	✓	✓
Usage of **ActiveX Controls**	✗	✓	✗
TWAIN support	✗	✓	✗
1394a cameras used **on** a **1394b** bus	✓	✓	✓
1394b cameras used **on** a **1394a** bus	✓	✓	✓
1394b cameras used **on** a **1394b** bus	✓	✓	✓

In case the brief application descriptions are not sufficient please select the ***package buttons*** themselves to learn more about the corresponding AVT SDK.

Multi-vendor applications using the AVT UNIVERSAL PACKAGE

The IEEE1394 bus driver (Firedrv.sys) used in the AVT Universal Package is not a camera device driver based on the Microsoft IEEE1394 driver stack. It is a IEEE1394 bus driver that replaces the Microsoft driver on all cards the driver is installed to. Therefore, the access for devices and applications that require the Microsoft driver is blocked.
The big advantage of this approach is that the driver is highly efficient and stable and supports besides 1394a also 1394b at full S800 speed by default.

Besides this, the driver works with almost every IEEE1394a/b adapter, no matter whether OHCI or PCILynx, on board or PCI-Type or PCMCIA.

Feature currently not applicable

The feature you have selected is currently not available. Nevertheless, it might be possible to implement it, if we rate it as reasonable and sensible for a wide spectrum of customers or users.
Therefore, please do not hesitate to send us an email with your feature request to:

spsg-feedback@alliedvisiontec.com

Note

AVT generally is open to considering feature requests and we are happy if you would contribute to future enhancements by providing us your valuable input.

Deterministic behavior of camera drivers based on the IEEE1394 Microsoft driver set

Determinism is the ability to complete a task within a fixed amount of time. IEEE-1394 defines an elegant standard for "isochronous" data transfer that enables overall network determinism.

The Microsoft 1394 OHCI driver is a bus driver and not a device driver, which is an integral part of the plug&play system. Therefore, it is inevitable that all devices connected to the bus will be detected and integrated into the system. Thereby, unexpected situations can occur.

Although, errors are defined in the OHCI specification to which Microsoft has contributed itself, the OHCI IEEE1394 low level driver of Microsoft does not report error messages. Therefore, it is not possible to identify lost packets.

To avoid this non-deterministic behavior, AVT recommends to use the 1394 bus driver provided with the AVT Universal Package or FirePackage. This driver supports error checking for every DMA channel separately.

AVT SmartFeature Access Restrictions for AFP and DSP

The **AVT Active FirePackage** currently supports only direct register access to control the SmartFeatures of any AVT camera.

Although the **AVT Direct Stream Package** provides several methods to access an AVT camera's SmartFeatures not all SmartFeatures can be used due to certain DirectShow restrictions. Especially those SmartFeatures that affect dynamic and variable bandwidth control, like the sequence and deferred mode can not be used.

Please click on the info button to learn more about further **DirectShow restrictions**.

Using the AFP together with multiple AVT cameras

Currently the **AVT Active FirePackage** does not support broadcast packets for camera setup and one-shot.

DirectShow Support for

Important Note

Although the AVT Active FirePackage provides in its current version (v2.0.0) a DirectShow Capture Source, AVT can not guarantee that in future versions of the AFP DirectShow support will be available, or supported respectively. Therefore, all programmers who intend to build their application on DirectShow are recommended to use the **AVT Direct Stream Package**.

The DirectShow Capture Source provided with the *AVT Direct Stream Package* has the following advantages:

- For each AVT 1394 camera connected, a separate DirectShow Capture Source is available. It is not necessary to select the camera via the output pin properties.
- Plug & Play support
- AVT commitment to enhance feature support for the future

1394a cameras on a 1394b bus

Microsoft Windows 2000, Windows XP (SP1) and **Windows 7**
All operating systems support full 400Mbps through their built-in OHCI IEEE-1394 driver!

Microsoft Windows XP SP2/SP3
The performance of your 1394a or 1394b FireWire device may be (initially) decreased if you connect it to a 1394b port. This problem occurs because Windows XP SP2/SP3 changes 1394b ports to S100 speed.
To solve this problem there are several workarounds possible. Please refer to the next point to learn more about the possible alternatives.

Microsoft Windows Vista
The built-in OHCI IEEE-1394 driver supports by default S400 data rates for 1394a and 1394b cameras. So far, no high-speed (S800) support for 1394b is directly available in Windows Vista (see below -Alternative 3- for effective workarounds).

Workarounds for Win XP SP2/SP3 Systems to support S800

Alternative 1 – Replacing the Microsoft Driver to support S800 Data Rates
In case only AVT cameras will be used on the 1394 bus either the driver of the **AVT Universal Package** or the driver provided with the **AVT1394BusDriverPackage** can be installed.

Note

Both drivers replace the native Microsoft OHCI IEEE-1394 driver and enable by default S800 data rates for IEEE1394b cameras. Whereby, the AVT 1394 Bus Driver is 100% compliant to the driver of Microsoft. This means, applications using the MS1394 driver will continue to work.

Alternative 2 –Support of S400 Data Rates (applicable only with SP2)
Microsoft has released a hotfix (KB88522) that provides a partial solution to the S100 problem, by enabling S400 data rates at 1394b ports. Once the fix is in place, 1394a and 1394b devices can be used at S400 speed.
Nevertheless, the hotfix still fails to provide 800 Mbps required for 1394b cameras.

Alternative 3 – Support of S800 Data Rates
The driver of the Win XP SP1 supports data rates up to 800Mbps (S800) at 1394b ports. Therefore, to provide 800Mbps for 1394b cameras a partial driver rollback to the OHCI IEEE-1394 driver of SP1 needs to be done.

Important Note

To perform a rollback on an SP2 system, please make sure Microsoft hotfix KB885222 is not installed. If the hotfix KB885222 was already installed, uninstall the executable by running:

C:\WINDOWS\$NtUninstallKB885222$\spuninst

This should get your system back to a state where the driver versions match.

1394b cameras on a 1394a bus

- **Microsoft Windows 2000**
- **Microsoft Windows XP Service Pack 1 (SP1)**
- **Microsoft Windows XP SP2/SP3**
- **Microsoft Windows Vista**
- **Windows 7**

All of the named operating systems support full 400Mbps (S400) through their built-in OHCI IEEE-1394 driver!

1394b cameras on a 1394b bus

Microsoft Windows 2000, **Windows XP (SP1)**, and **Windows 7**
All operating systems support full 800Mbps through their built-in OHCI IEEE-1394 driver!

Important Note

Hot plug and unplug is not supported by XP SP1. Please refer to the following Microsoft article:
http://support.microsoft.com/kb/811789

Microsoft Windows XP SP2/SP3
The performance of a 1394b camera is greatly decreased if you connect it to a 1394b port, as the maximum data rate is reduced to 100Mbps (S100). Even SP3 of XP will not change this behaviour.
Therefore, for XP SP2/SP3 systems currently only the following two alternatives exist to support S800 data rate for AVT's 1394b cameras:

- Replace the Microsoft driver either by the 1394 driver of the AVT Universal Package or the driver provided with the **AVT1394BusDriverPackage**. Both drivers replace the native Microsoft OHCI IEEE-1394 driver and enable by default S800 data rates for IEEE1394b cameras. Whereby, the AVT 1394 Bus Driver is 100% compliant to the driver of Microsoft. This means, applications using the MS1394 driver will continue to work.
- Perform a **partial driver rollback** to the 1394 OHCI driver that comes with Windows XP SP1

Microsoft Windows Vista
The built-in OHCI IEEE-1394 driver supports by default only S400 data rates. Even SP1 and SP2 of Windows Vista does not support S800, despite previous announcements by Microsoft.
Therefore, the only alternative to support S800 data rate for AVT's 1394b cameras is to use either the driver of the AVT Universal Package or to install the driver provided with the **AVT1394BusDriverPackage**. Both drivers replace the Microsoft OHCI IEEE-1394 driver, but the second is 100% compliant to the driver of Microsoft. This means, applications using the MS1394 driver will continue to work.

Partial Windows XP SP2/SP3 Driver Rollback

To provide the maximum data rate (800 Mbps) for 1394b cameras under Windows XP with SP2/SP3, users have to perform a partial rollback to Microsoft's OHCI IEEE1394 driver of SP1. An instruction can be found either in the User Guide of the **AVT Active FirePackage** or under:

http://www.rme-audio.com/english/techinfo/fw800sp2.htm

Note

It is not necessary for Windows XP SP1 users to be concerned about this issue since the IEEE 1394b camera will be able to operate in S800 mode.

Important Note

XP SP1 does not support hot plug and unplug, therefore after performing the partial driver rollback, hot plug capability might no longer be available. Thus, after performing the partial rollback of the SP2/SP3 IEEE1394 drivers, unplugging a 1394a/b camera during acquisition might force the operating system to stop, whereby an error message could be displayed on a blue screen. Please refer to Microsoft for further information.

Caution

AVT can not guarantee that a rollback will work without problems on your system, as this depends also on the hardware used.

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AVT 1394 BUS DRIVER PACKAGE

AVT 1394 Bus Driver Package

Focus

Provide S800 support for AVT 1394b cameras under Windows Vista and XP.

Short Description

The AVT 1394BusDriver Package contains an alternative 1394 bus driver that is compliant to the native OHCI 1394 bus driver provided with Microsoft Windows. Unlike other proprietary 1394 bus drivers as for instance provided with the AVT Universal Package that are incompatible to the one provide with Microsoft Windows, with the AVT 1394 bus driver existing custom 1394 device drivers (e.g. for hard disks) will continue to work. Therefore, 1394 camera drivers provided with 3rd party solutions like Cognex's Vision Pro, NI's LabView, or MATROX's MIL, as well as the CMU (Carnegie Mellon University) 1394 camera driver can still be used with the AVT 1394 bus driver.

Key Features

- Optimized for high-throughput, low CPU load and fault-tolerant operation
- Supports all AVT 1394 cameras
- Supports all current IEEE 1394 standards (1394a and 1394b)
- Implementation conforms to the PCI driver model defined by the Windows Driver Model (WDM)
- No licensing fee when used with AVT 1394 cameras

Supported 32bit Operating Systems

- Win2000 (SP4)
- Windows XP (SP1 or higher)
- Windows Vista

Remark:
Please let us know if you are interested in a 64bit version of the driver. It doesn't yet exist, but we like to be responsive to our customers' interests, so please let us know if this would be important for you.

Hardware Requirements

- The AVT 1394 bus driver can be used with any 1394 device except 1394 cameras that are not manufactured by Allied Vision Technologies.
- The AVT 1394 bus driver supports in general all IEEE1394 OHCI (v1.0 & v1.1) compliant host controllers host controllers
- 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.

AVT UNIVERSAL PACKAGE

AVT Universal Package – Overview

Focus

Development of high performance applications with simplified control of the powerful AVT camera Smart Features

Short Description

The **AVT Universal Package** is a camera interface-independent Software Development Kit (SDK) designed for 32-bit Windows 7, Vista, and XP systems, which can be used with all AVT FireWire and GigE Vision® compliant cameras.
It is designed for experienced programmers who intend to develop high-end image processing applications and who especially would like to use the powerful AVT cameras' SmartFeatures.
The provided drivers are signed, and enable a reliable data transfer with high bandwidth and at a very low CPU load.

Supported Programming Languages

- **C, Visual C++** and **Visual Basic**
- **.Net languages** like C#, and VB.Net
- **Borland Delphi, and C++**
- **Java**, and others

Supported Operating Systems

- Windows 7
- Windows Vista
- Windows XP

Software Requirements

- .NET FrameWork 2.0 or higher (for .NET compatibility)

Hardware Requirements

- Graphics Card with min. 128MB RAM

AVT Universal Package – Advantages

Functional Highlights

- High-performance FireWire bus driver according to IEEE1394a/b supporting data rates up to 800Mbps (no OS related S800 restrictions). Thereby, the driver works with almost every IEEE1394a/b adapter, no matter whether OHCI or PCILynx, on board or PCI-Type or PCMCIA.
- Direct Bus Access for high performance and high speed applications
- GigE Vision® compliant filter driver ensuring reliable data transfer with high bandwidth and at a very low CPU load
- Universal API for camera interface independent camera control and simplified camera Smart Features access
- The package provides a convenient multi-camera viewer application - AVT UniCam - to configure AVT FireWire or GigE Vision® compliant cameras and to test several camera specific SmartFeatures, including video recording function
- Easy SmartFeature access and usage when applying the methods provided with the UniAPI (C-interface)

Note

Currently the AVT Universal Package supports only 32bit operating systems, but an update supporting 64bit OS is scheduled for Q4/2010.

AVT Universal Package – Restrictions

1394 bus driver related

The 1394 bus driver of the AVT Universal Package is not a capture device driver based on the Microsoft IEEE1394 driver stack, but a bus driver. This means that the Microsoft driver is replaced on all cards the driver is installed to, and the access for devices and applications that require the Microsoft driver is blocked.

Camera support

The AVT Universal Package supports all AVT 1394 and GigE Vision® compliant cameras. The only exception is that the feature Link Aggregated Group (LAG) is not supported for the Prosilica GX series.

Note

AVT Universal Package v1.1 will provide also LAG support for GX cameras. The update release is scheduled for Q3/2010.

AVT Universal Package – Conclusion

The **AVT Universal Package** is a comprehensive software package designed for 32-bit Windows systems (7, Vista, and XP). Due to its high performance IEEE1394 bus driver, the contained SDK provides full access to the FireWire bus and the corresponding image transmission for data rates of up to 800Mbps (1394b).

In combination with AVT cameras and their powerful SmartFeatures the AVT Universal Package enables programmers to develop high-performance machine vision application that require time-critical and asynchronous imaging, sometimes with rapidly changing data rates in single or multiple camera operation.

In addition, with the UniAPI this package provides a powerful and universal C programming interface optimized for AVT cameras. The API enables programmers to easily create their applications.

Further information about this SDK can be found under the points:

AVT Universal Package – Architecture & APIs

AVT Universal Package – Components

DOWNLOAD: Please click on the icon

AVT Universal Package – Architecture & API's

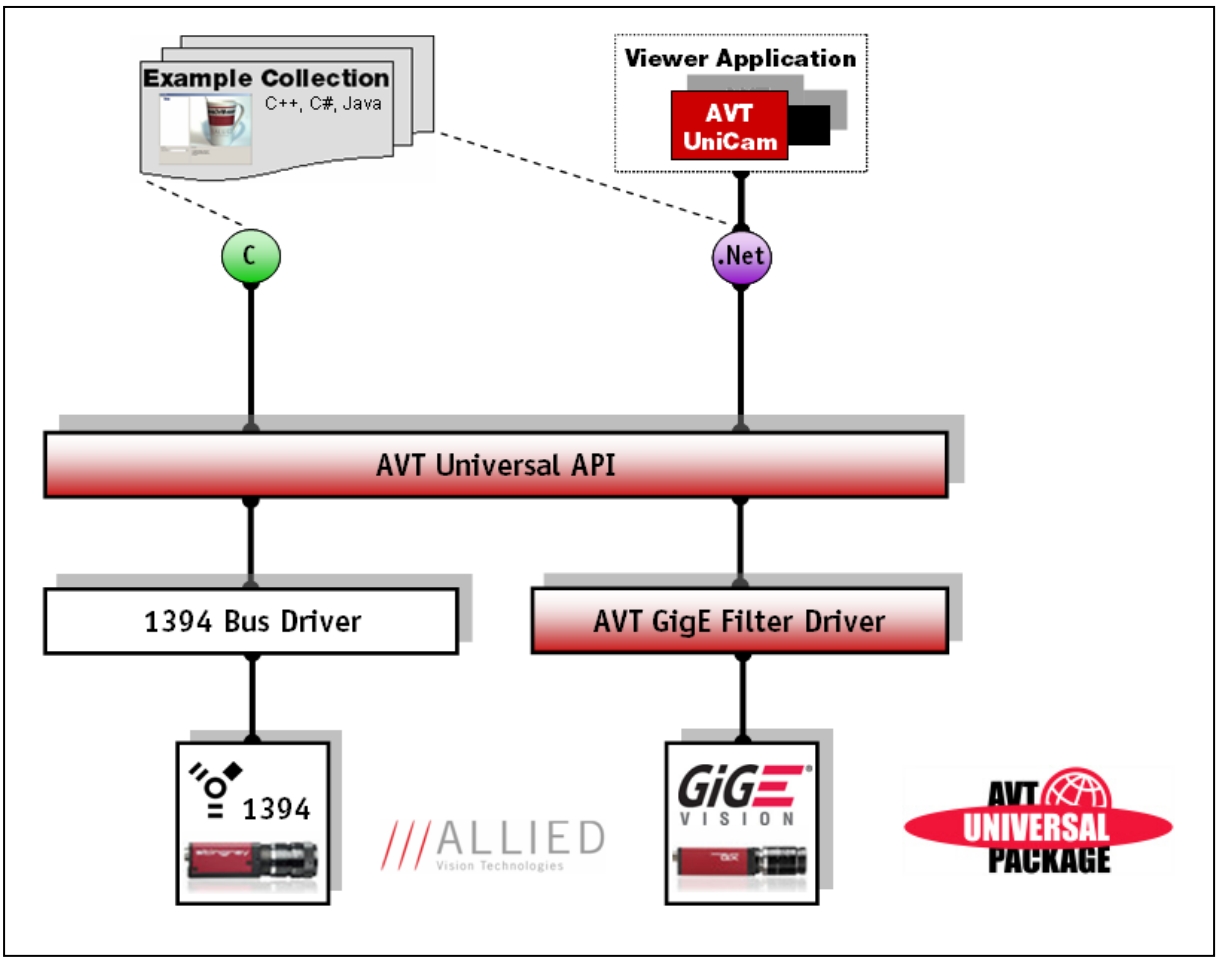

Figure 5: AVT Universal Package – SDK architecture and programming interfaces

AVT Universal Package – Components

High performance IEEE1394 bus driver

NDIS GigE Vision Filter Driver

Various application programming interfaces (APIs)

- **AVT Universal API**
  A universal C programming interface that is optimized for the usage with AVT cameras. The UniAPI consists of two modules:
  - **UniControl DLL** – this module provides methods to control the camera and to easily apply its SmartFeatures, as well as to grab images.
  - **UniTransform DLL**- 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).

  In addition for the UniAPI a **.Net wrapper**, **OMF-styled LIBs** of the dynamic link libraries, an **example collection,** as well as various **CHM help files** are provided.

Tools

- **Automatic 1394 bus driver installation tool**
- **AVT_UniCam** – to evaluate certain camera Smart Features, or just to test and configure the camera itself, including IP configuration for AVT GigE Vision® cameras.

User Guide

Software manual as PDF file

Programmer's reference manual

Provided as HTML online help (CHM file) describing the UniAPI and its usage

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AVT FIRE PACKAGE

AVT FirePackage – Overview

Focus

High-end programming with maximum bus and camera control, including full S800 (IEEE1394b) support under Windows 7, Vista, and XP.

Short Description

The **AVT FirePackage** is an IEEE1394 Software Development Kit (SDK) designed for 32-bit Windows 7, Vista, XP, 2000 and NT4 systems, which can be used with all AVT FireWire cameras. It is designed for experienced programmers who intend to develop high-end image processing applications and who especially would like to use the powerful AVT camera's SmartFeatures. Therefore, the SDK provides a high performance IEEE1394 bus driver that replaces the Microsoft driver on all cards it is installed to and thereby enables image transmission data rates of up to 800 Mbit/s (1394b) even on Vista systems. The driver is signed, and full control of the FireWire bus and AVT cameras is provided via several C and C++ APIs for which to some extent .Net wrappers are available.

Supported Programming Languages

- **C, Visual C++** and **Visual Basic** (via UniAPI)
- **.Net languages** like C#, and VB.Net
- **Borland Delphi, and C++** (via UniAPI)
- **Java** (via UniAPI), and others

Note

Future releases(after v2.11) of the AVT FirePackage will no longer contain the AVT UniAPI as this programming interface supports since v2.0+ also AVT GigE Vision® cameras. Therefore, the UniAPI is provided in AVT's new camera interface-independent SDK named AVT Universal Package.

Supported Operating Systems

- Windows 7
- Windows Vista
- Windows XP
- Win2000 (SP4)
- Windows NT4 or higher (no support for AVT UniAPI)

Software Requirements

- .NET FrameWork 2.0 or higher (for .NET compatibility)

Hardware Requirements

- Graphics Card with min. 128MB RAM

AVT FirePackage – Advantages

Functional Highlights

- High-performance FireWire bus driver according to IEEE1394a/b supporting data rates up to 800Mbps (no S800 restrictions)
- The package provides a convenient and powerful viewer application - AVT SmartView - to configure any AVT FireWire camera and to test the camera specific SmartFeatures
- Direct Bus Access for high performance and high speed applications
- '*Firmware update via FireWire*' by using the SmartView viewer application
- *Remark: This feature is only applicable for Guppy, Pike, and Stingray cameras.*
- The driver works with almost every IEEE1394a/b adapter, no matter whether OHCI or PCILynx, on board or PCI-Type or PCMCIA;
- Easy SmartFeature access and usage when applying the methods provided with the UniAPI (C-interface)
- 64bit version available that provides the same core core functionality as the 32bit version

AVT FirePackage – Restrictions

Driver related

- The driver of the AVT FirePackage is not a capture device driver based on the Microsoft IEEE1394 driver stack, but a bus driver. This means that the Microsoft driver is replaced on all cards the driver is installed to, and the access for devices and applications that require the Microsoft driver is blocked.
- The driver of the AVT FirePackage requires a license. This license is already embedded inside every AVT IEEE1394a/b camera.

Note

For non-AVT cameras a special license has to be acquired. There are several license types available based on the system, camera, or other IDs. Please contact our customer care to ask for a corresponding license.

Video Streaming

- No '*write AVI file*' functionality provided by the viewer application SmartView or any example code.

Note

For streaming applications please use **AVT Active FirePackage**, **AVT Direct Stream Package**, *or any other third-party application suitable for streaming.*

AVT FirePackage – Conclusion

The **AVT FirePackage** is a comprehensive software package designed for 32-bit Windows systems (Windows 7, Vista, XP, 2000 or NT4). Due to its high performance IEEE1394 bus driver, the contained SDK provides full access to and control of the FireWire bus and the corresponding image transmission for data rates of up to 800Mbps (1394b).

In combination with AVT cameras and their powerful SmartFeatures the AVT FirePackage enables programmers to develop high-performance machine vision application that require time-critical and asynchronous imaging, sometimes with rapidly changing data rates in single or multiple camera operation.

In addition, with the UniAPI this package provides a powerful and universal C programming interface optimized for AVT cameras. The API enables programmers to easily create their applications.

Further information about this SDK can be found under the points:

AVT FirePackage – Architecture & APIs

AVT FirePackage – Components Provided

DOWNLOAD:

Please click on the icon

AVT FirePackage – Architecture & API's

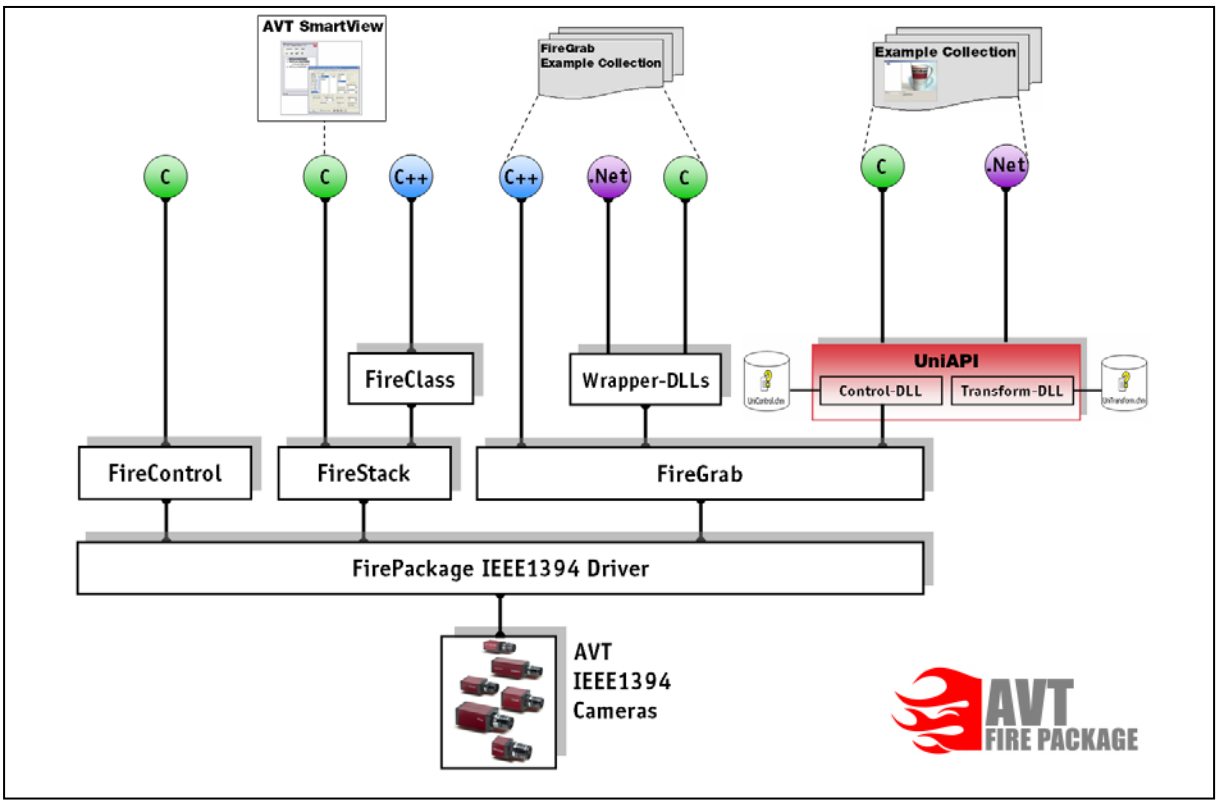

Figure 6: AVT FirePackage – SDK architecture and programming interfaces

AVT FirePackage – Components Provided

High performance IEEE1394 bus driver

Automatic driver installation tool

Various application programming interfaces (APIs)

- **AVT Universal API**
  A universal C programming interface that is optimized for the usage with AVT cameras. The UniAPI consists of two modules:
  - **UniControl DLL** – this module provides methods to control the camera and to easily apply its SmartFeatures, as well as to grab images.
  - **UniTransform DLL**- this 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).

  In addition for the UniAPI a **.Net wrapper**, **OMF-styled LIBs** of the dynamic link libraries, an **example collection,** as well as various **CHM help files** are provided.

  Note

  Future releases(after v2.11) of the AVT FirePackage will no longer contain the AVT UniAPI as this programming interface supports since v2.0+ also AVT GigE Vision® cameras. Therefore, the UniAPI is provided in AVT's new camera interface-independent SDK named AVT Universal Package.

- **FireGrab API**
  A simple C++ camera API to deal with calls to the driver in a quite simple way via a simplified camera interface. Additionally are provided: **C and .Net wrapper** as well as an **example collection** for FireGrab
- **FireControl and FireStack API**
  Two C-type APIs that provide low-level bus access commands to get 100% control over the IEEE1394 bus
- **FireClass API**
  C++ class model API built upon the FireStack API

Viewer Applications

- **FireView** – a simple viewer for IIDC-compliant cameras, only supporting standard features. Feature support is discontinued. Does not need any DLL, just the installed driver.
- **AVT_SmartView** – a comprehensive camera viewer optimized for the usage with AVT IEEE1394cameras to evaluate their SmartFeatures, or just to test and configure the camera itself.

User Guide

Software manual as PDF file

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SEEING IS BELIEVING

AVT 64
FIRE PACKAGE

AVT FirePackage64 – Overview

Focus

High-end programming with maximum bus and camera control, including full S800 (IEEE1394b) support under Windows XP and Vista.

Short Description

The **AVT FirePackage64** is an IEEE1394 Software Development Kit (SDK) designed for 64-bit Windows Vista and XP systems, which can be used with all AVT FireWire cameras. It is designed for experienced programmers who intend to develop high-end image processing applications and who especially would like to use the powerful AVT camera's SmartFeatures and the advantages of the 64bit technology. Therefore, the SDK provides a high performance IEEE1394 bus driver that replaces the Microsoft driver on all cards it is installed to and thereby enables image transmission data rates of up to 800Mbps (1394b). The driver is signed, and full control of the FireWire bus and AVT cameras is provided via several C and C++ APIs for which to some extent .Net wrappers are available.

Supported Programming Languages

- **C, Visual C++** and **Visual Basic** (via UniAPI)
- **.Net languages** like C#, and VB.Net
- **Borland Delphi, and C++** (via UniAPI)

Note

Future releases (after v1.1) of the AVT FirePackage64 will no longer contain the AVT UniAPI as this programming interface supports since v2.0+ also AVT GigE Vision® cameras. Therefore, the UniAPI is provided in AVT's new camera interface-independent SDK named AVT Universal Package.

Supported Operating Systems

- Windows Vista64
- Windows XP64

Note

The 64bit version of Windows 7 will be officially supported in the next release of the AVT FirePackage, which is scheduled for July 2010.

Software Requirements

- .NET FrameWork 2.0 or higher (for .NET compatibility)

Hardware Requirements

- Graphics Card with min. 128MB RAM

AVT FirePackage64 – Advantages

Functional Highlights

- High-performance FireWire bus driver acc. IEEE1394a/b supporting data rates up to 800Mbps (no S800 restrictions)
- The package provides a convenient and powerful viewer application - AVT SmartView - to configure any AVT FireWire camera and to test the camera specific SmartFeatures
- Direct Bus Access for high performance and high speed applications
- '*Firmware update via FireWire*' by using the SmartView application

  Remark: Applicable for Guppy, Pike, and Stingray only
- The driver works with almost every IEEE1394a/b adapter, no matter whether OHCI or PCILynx, on board or PCI-Type or PCMCIA;

AVT FirePackage64 – Restrictions

Driver related

- The driver of the AVT FirePackage64 is not a capture device driver based on the Microsoft IEEE1394 driver stack, but a bus driver. This means that the Microsoft driver is replaced on all cards the driver is installed to, and the access for devices and applications that require the Microsoft driver is blocked.
- The driver of the AVT FirePackage64 requires a license. This license is already embedded inside every AVT IEEE1394a/b camera.

Note

For non-AVT cameras a special license has to be acquired. There are several license types available based on the system, camera, or other IDs. Please contact our customer care to ask for a corresponding license.

Video Streaming

There is no '*write AVI file*' functionality provided by the *AVT SmartView* viewer application or any example code.

Note

For streaming applications please use **AVT Active FirePackage**, **AVT Direct Stream Package**, *or any other third-party application suitable for streaming.*

AVT FirePackage64 – Conclusion

The AVT FirePackage64 is a comprehensive software package designed for 64-bit Windows systems (Vista, XP). Due to its high performance IEEE1394 bus driver, the contained SDK provides full access to and control of the FireWire bus and the corresponding image transmission for data rates of up to 800Mbps (1394b).

In combination with AVT cameras and their powerful SmartFeatures the AVT FirePackage64 enables programmers to develop high-performance machine vision application that require time-critical and asynchronous imaging, sometimes with rapidly changing data rates in single or multiple camera operation.

Further information about this SDK can be found under the points:

AVT FirePackage64 – Architecture & APIs
AVT FirePackage64 – Components Provided

DOWNLOAD:

Please click on the icon

AVT FirePackage64 – Architecture & API's

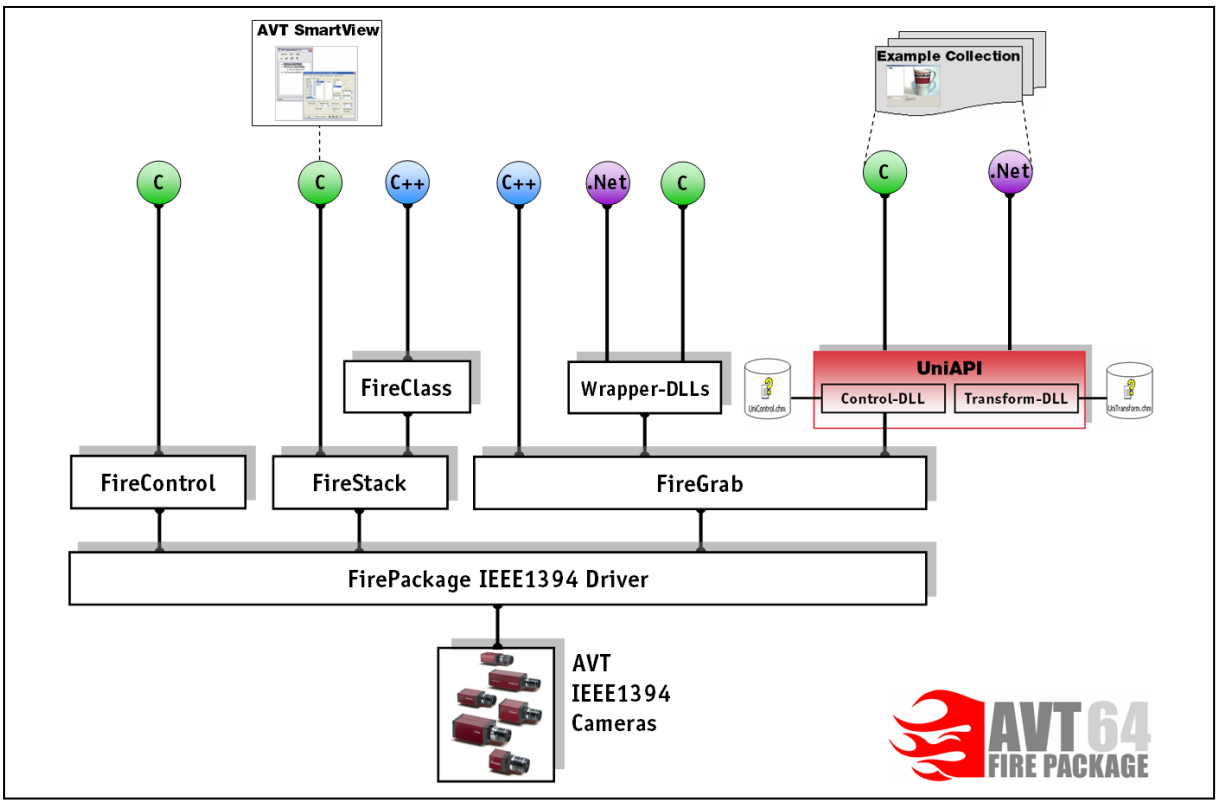

Figure 7: AVT FirePackage64 – SDK architecture and programming interfaces

AVT FirePackage64 – Components Provided

High performance IEEE1394 bus driver

Automatic driver installation tool

Various application programming interfaces (APIs)

- **AVT Universal API**
  A universal C programming interface that is optimized for the usage with AVT cameras. The UniAPI consists of two modules:
  - **UniControl DLL** – this module provides methods to control the camera and to easily apply its SmartFeatures, as well as to grab images.
  - **UniTransform DLL**- this 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).

  In addition for the UniAPI a **.Net wrapper**, an **example collection,** as well as various **CHM help files** are provided.

  Note

  Future releases(after v1.1) of the AVT FirePackage64 will no longer contain the AVT UniAPI as this programming interface supports since v2.0+ also AVT GigE Vision® cameras. Therefore, the UniAPI is provided in AVT's new camera interface-independent SDK named AVT Universal Package.

- **FireGrab API**
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Viewer Applications

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User Guide

Software manual as PDF file

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AVT ACTIVE FIRE PACKAGE

AVT Active FirePackage – Overview

Focus
ActiveX Control based programming!

Short Description
The **AVT Active FirePackage** has been created for programmers who are familiar with ActiveX Controls, COM, DirectShow or TWAIN, and who want to achieve their goals quickly in a comfortable way by using application development tools such as Visual Studio or Borland Delphi.

Supported Programming Languages
All COM compliant programming languages like:

- **Visual Basic** or **VB.NET**
- **Visual C**, **C++** and **C#**
- **Borland Delphi, C++**
- **Java**

and others.

Supported 32-bit Operating Systems
- Windows Vista (SP1)
- Windows XP (SP2/SP3)
- Win2000 (SP4)

Note

An update of the AVT Active FirePackage is currently in the development. This version will also support Windows 7.

Please contact our support in case you are interested in this update to learn more about its features and the scheduled release date, as at the time of writing it is open if also the 64bit version of Windows 7 will be supported.

Software
- Installation of Direct-X 9.0c (for DirectShow-based usage)
- .NET FrameWork 2.0 or higher (for .NET compatibility)

Hardware
- Graphics Card with min. 128MB RAM

AVT Active FirePackage – Advantages

Functional Highlights

- Drag & Drop compatibility with popular development environments like Visual Studio (.NET), Borland C++ Builder, Delphi, etc.
- Enhanced thread-scheduling for dual-CPU and hyper-threading support
- Very low CPU usage for color conversion and image display
- Ability to acquire images from several cameras simultaneously
- Adjust camera parameters in real-time
- Ability to save/reload camera settings in memory channels
- Save images in BMP, TIFF and JPEG formats
- Record AVI files or sequentially-named image files

AVT Active FirePackage – Restrictions

DirectShow

- It is not possible to select for each camera a separate capture source. This means, under DirectShow only an 'AVT 1394 Digital Camera' can be selected and the specific camera model has to be selected via the output pin properties of the *AVTCaptureSourceFilter*.

  Remark:
  AVT has successfully tested the following DirectShow-compliant applications together with the AFP: AmCap (v9.0+), Video Capturix (v7.08+).
- Microsoft's *MovieMaker* is currently incompatible with the driver of the AFP

Important Note

Although the AVT Active FirePackage provides in its current version (v2.0.0) a DirectShow Capture Source, AVT can not guarantee that in future versions of the AFP DirectShow support will be available, or supported respectively.
Therefore, all programmers who intend to build their application on DirectShow are recommended to use the AVT Direct Stream Package.

SmartFeature support only via direct register access

Camera support

AVT Pike F1100 and F1600 megapixel cameras require a patch. Please contact our Support Team to obtain the required files.

AVT Active FirePackage – Conclusion

The **AVT Active FirePackage** (AFP) is a software development kit (SDK) that has been created for programmers who are familiar with ActiveX controls, COM, DirectShow or TWAIN, and who want to achieve their goals quickly in a comfortable way by using application development tools such as Visual C++, Visual Basic, VB.NET, C#, Java, Delphi, or others.

As the name suggests, **AVT Active FirePackage** focuses on ActiveX Control based programming. Just drop an AVTActiveCam control on the surface of your application, which could even be Microsoft Word or PowerPoint and have a live video of any AVT camera connected to your system.

This SDK is compatible with Microsoft Windows (Vista, XP, 2000) and includes an IEEE1394 digital camera system driver that is based on the Windows Driver Model (WDM). The driver can be installed manually, or via an automatic driver install tool.

The AFP is a powerful alternative that offers high-performance color conversion and image display with very efficient CPU usage.

Further information about this SDK can be found under the points:

AVT Active FirePackage – SDK Architecture & APIs

AVT Active FirePackage – Components Provided

AVT Active FirePackage – Supported DirectShow Interfaces

DOWNLOAD: Please click on the icon

AVT Active FirePackage – SDK Architecture & API's

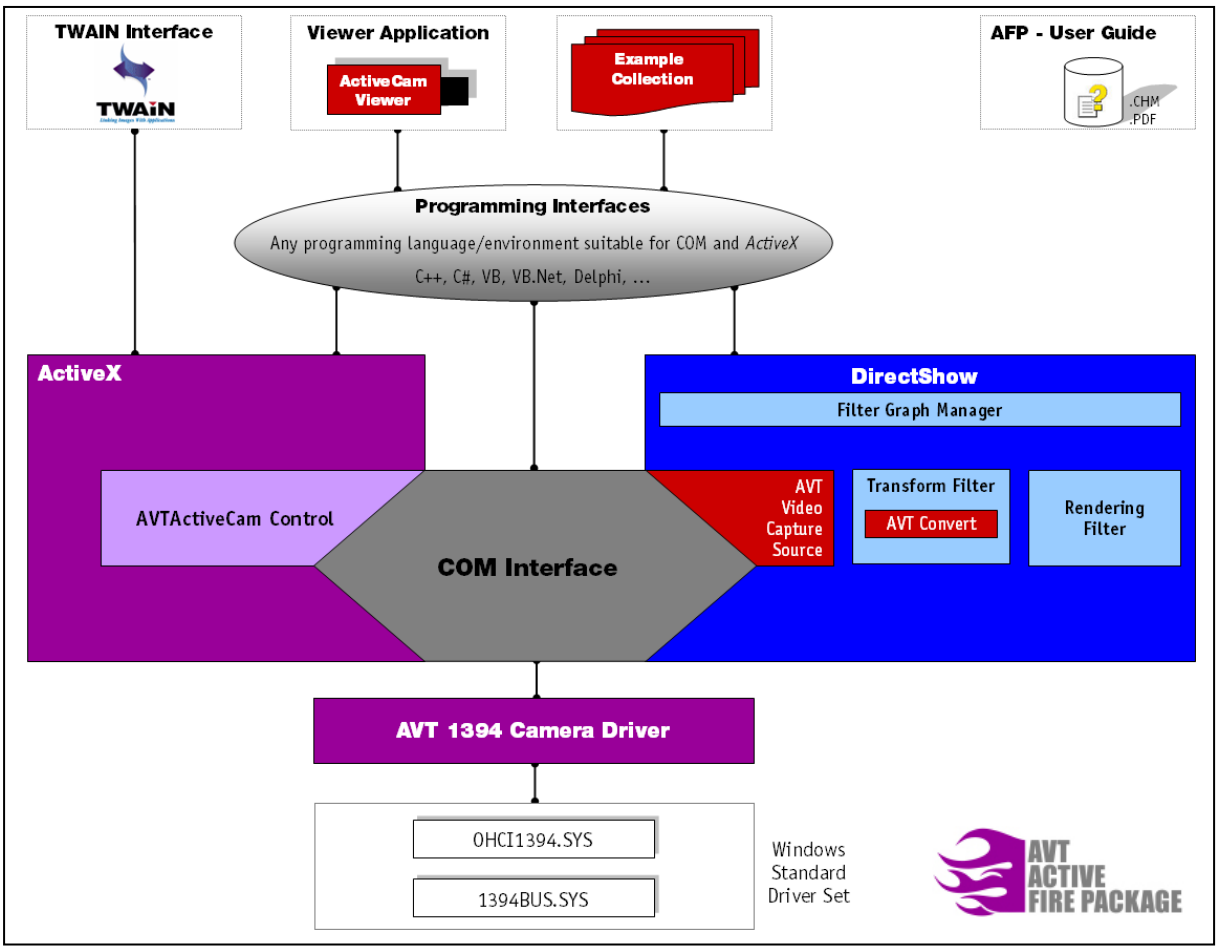

Figure 8: AVT Active FirePackage – SDK architecture and programming interfaces

AVT Active FirePackage – Components Provided

Camera system driver

This driver is based on the Microsoft IEEE1394 driver set, suitable for all AVT IEEE1394 cameras.

ActiveX Control

Powerful, multi-function COM interface that provides various PropertyPages to configure the camera and their image acquisition settings. Additionally, many event callbacks are supported.

DirectShow filter

In addition to a (WDM) Video Capture Source filter (see figure 8 for supported DirectShow interfaces) an AVT camera-specific transform filter for all camera output formats is provided to support DirectX based video streaming applications.

TWAIN driver

Standard interface to many third party imaging applications.

Demo viewer

Application with full-screen video window, to operate multiple cameras and save images in various formats.

Automatic Driver Install Tool

User controlled driver installer that enables both the installation of the driver for all AVT cameras connected to the system, as well as the required driver for the system integrated OHCI compliant host adapters, to guarantee a proper operation of the AFP.

User Guide

Extensive documentation available as CHM (HTML-based help file) and PDF file.

Example Collection

Lots of well documented examples for Visual C++, Visual Basic, VB.NET, C#, HTML showing ActiveX, COM, and DirectShow style programming to minimize programmer's learning time.

With all these components the *AVT Active FirePackage* is perfect for easy-to-use development of your own imaging applications.

AVT Active FirePackage – DirectShow Interfaces

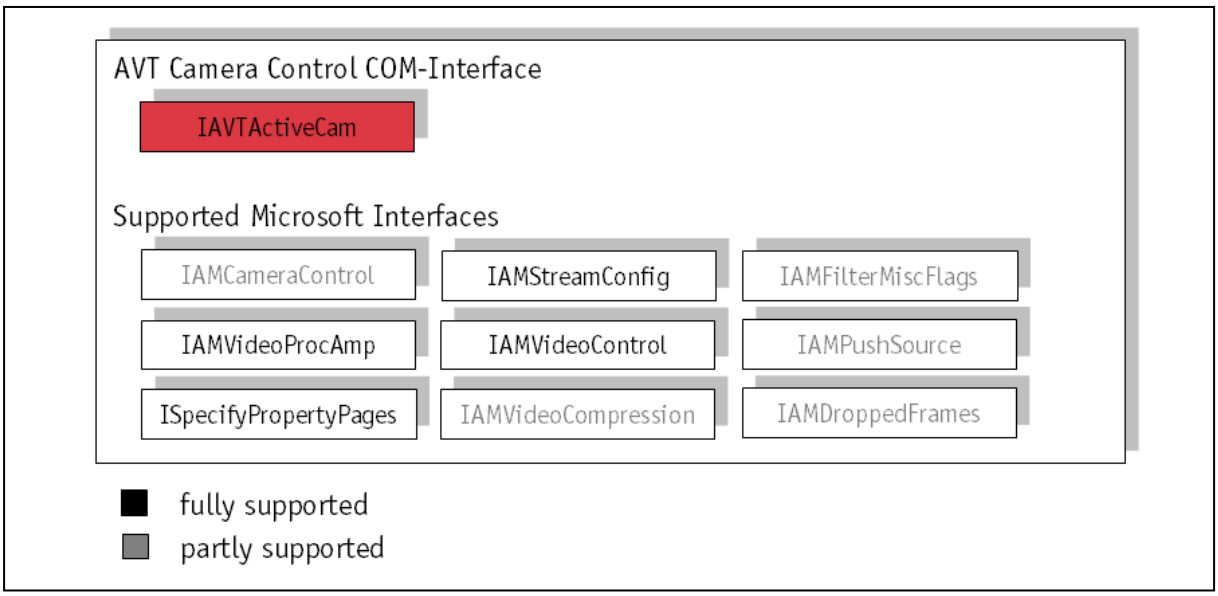

Figure 9: AVT Active FirePackage – Supported DirectShow interfaces

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AVT DIRECT STREAM PACKAGE

AVT Direct Stream Package – Overview

Focus

- DirectShow and COM-based programming
- Integration of AVT cameras into 3rd party solutions based on DirectShow

Short Description

The *AVT Direct Stream Package* focuses on DirectShow and COM-based application development. Besides that, it includes a DirectShow compatible StreamClass driver, so that AVT 1394 cameras can be operated with any DirectShow compatible imaging software.
The streaming driver is based on the Windows Driver Model (WDM). It controls the acquisition and the transport of the image data stream on operating system level (kernel mode) and thus supports plug & play of AVT 1394a/b cameras. This makes the DFP the ideal solution for interacting with 3rd party streaming applications.

Supported Programming Languages

All COM compliant programming languages like:

- **Visual Basic** or **VB.NET**
- **Visual C**, **C++** and **C#**

Note

Delphi (Pascal) can be used together with the C functions provided.

Supported Operating Systems

- Windows 7
- Windows Vista
- Windows XP (SP1 or higher)

Notes

*With Windows XP SP2/SP3, support for 1394b cameras is restricted. Click **here** for more information.*

Windows Vista by default supports no S800 data rates for 1394b cameras. But AVT provides an alternative solution to overcome this shortcut.

Software Requirements

- To run the DirectShow example (AVTAmCap.exe) Direct-X 9.0c is required
- To compile the provided example(s), you need Visual Studio 2005 or higher and a Platform SDK containing DirectShow and DirectX SDK.
- Optionally for .NET compatibility the installation of .NET FrameWork 2.0 or higher is required.

Hardware Requirements

- PC or laptop with 1 GHz 32-bit processor or better and a minimum of 1 GByte RAM
- Graphics Card with min. 128MB RAM

AVT Direct Stream Package – Advantages

- To receive an image no programming is required, because several DirectShow based 3rd party applications can be used to get an image
- Kernel (not user) mode streaming driver supports plug & play of AVT 1394a/b cameras
- Record AVI files by using *AVT AmCap* viewer sample

AVT Direct Stream Package – Restrictions

- FireWire speed S800 not officially supported by Microsoft for Windows Vista and XP (read more)
- Not all AVT SmartFeatures can be used (e.g. restricted use of SequenceMode, Deferred Mode, Trigger Modes)
- Further restrictions are caused by DirectShow itself. If you are not sure you know about them, please click the info icon

AVT Direct Stream Package – Conclusion

If rigorously deterministic system performance is less critical to you than DirectShow compatibility, and you want to create a simple application within a short time, the AVT Direct Stream Package may be the right package for you.

Further information about this SDK can be found under the points:

AVT Direct Stream Package – Driver Architecture
AVT Direct Stream Package – SDK Architecture
AVT Direct Stream Package – Components provided
AVT Direct Stream Package – Supported DirectShow Interfaces

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AVT Direct Stream Package – Driver Architecture

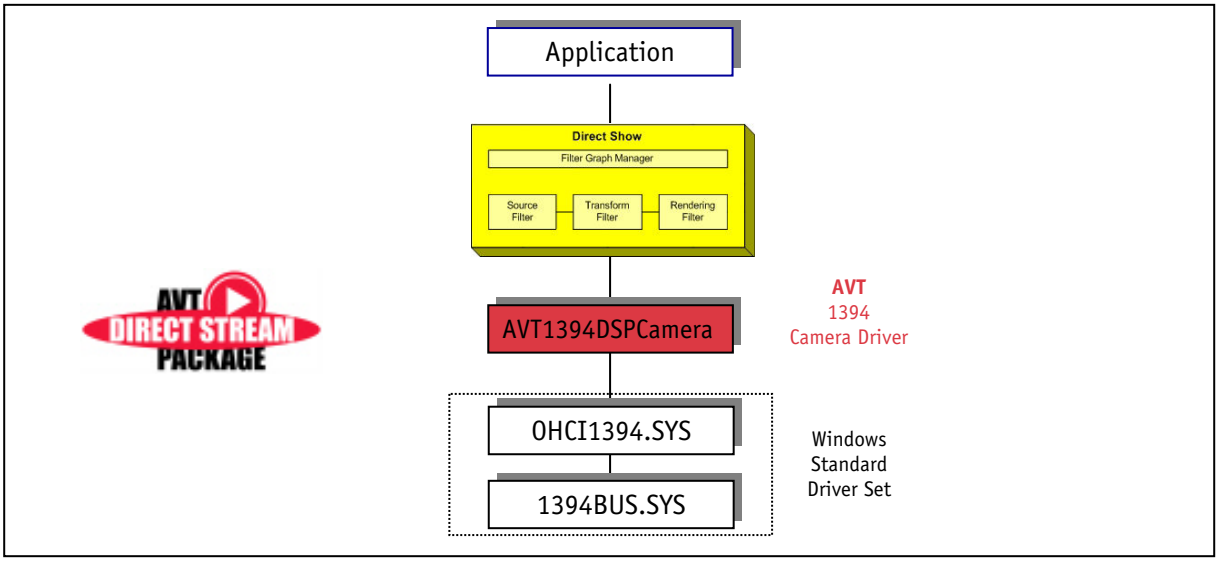


Figure 10: AVT Direct Stream Package – Driver architecture

AVT Direct Stream Package – SDK Architecture & APIs

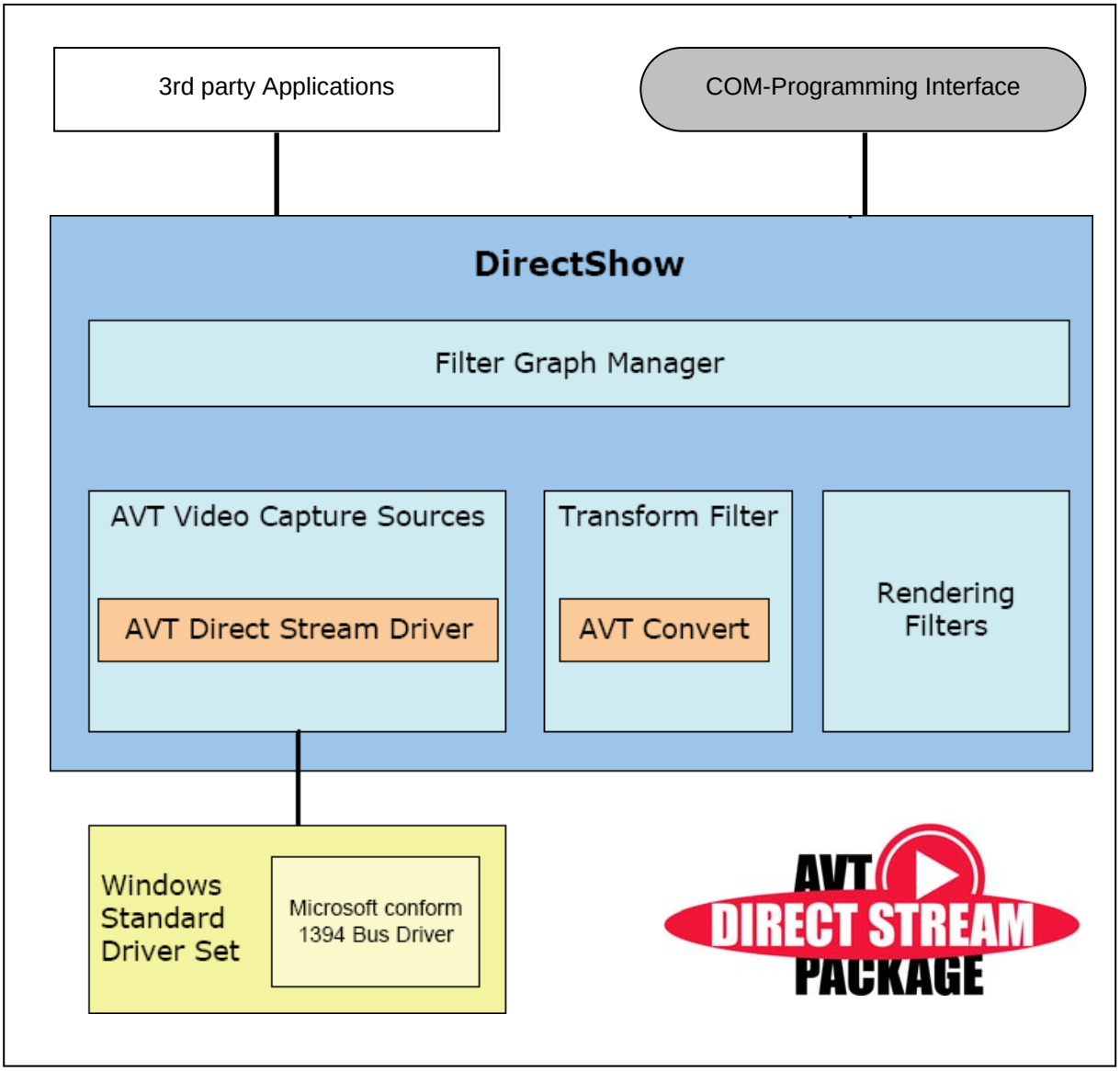


Figure 11: AVT Direct Stream Package – SDK architecture and programming interfaces

AVT Direct Stream Package – Components Provided

Type	Component	Description
Driver	**1394 DirectShow Capture Source**	This WDM-based kernel-mode streaming driver is based on the Microsoft IEEE1394 driver set, and is suitable for all AVT IEEE1394 cameras (click here for details). This driver is embedded in Microsoft DirectShow and allows that in all corresponding programs AVT cameras are made available as video capture devices. The capture source provided with the DSP supports several DirectShow interfaces. Please refer to the DSP User Guide for details.
API	**AVT Direct Stream Property Set**	Proprietary camera interface for controlling AVT 1394 camera features via COM, with additional GUI (property pages).
DirectShow Filter	**Image Format Transformation Filter**	The AVT Convert transform filter can be used to convert AVT camera image formats to displayable (such as RGB24, RGB32) and other usable image formats (such as YUV422). With the AVT Convert Filter additionally a property page (GUI) is provided to control the filter's attributes.
Tools	**AVT AmCap**	Example viewer for standard and advanced feature support
	DSP 1394 Driver Installer	User controlled camera and bus driver installer, inclusive 1394 bus driver rollback capability for Windows XP (click here for details – refer to Alternative 3)

Additionally, an API Reference Manual (as CHM file) for the AVT Direct Stream Property Set is available and a User Guide (as PDF file) is provided separately, which contains all information required to install and apply the SDK properly.

AVT Direct Stream Package – DirectShow Interfaces

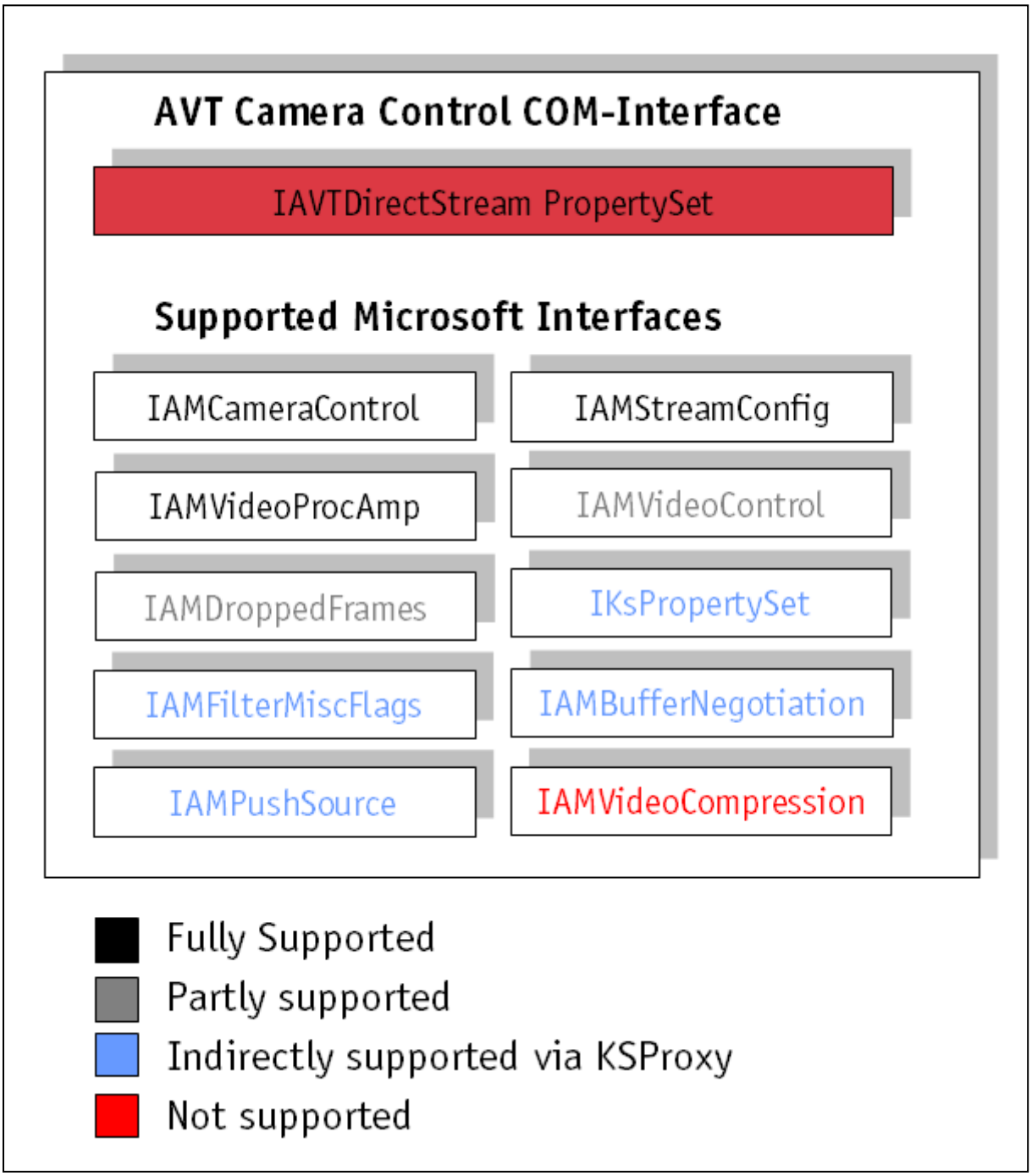


Figure 12: AVT Direct Stream Package – Supported DirectShow interfaces

AVT Direct Stream Package – Supported Cameras

Oscar – IEEE1394a
All

Marlin – IEEE1394a
All

Guppy – IEEE1394a
All

Pike – IEEE 1394b
All

Stingray – IEEE1394b
All

Notes Prosilica 1394 cameras EC and CV are not supported!

AVT Direct Stream Package – Write AVI Functionality

Integrated into the 'AVT AmCap' viewer application uncompressed AVI files can easily be recorded:

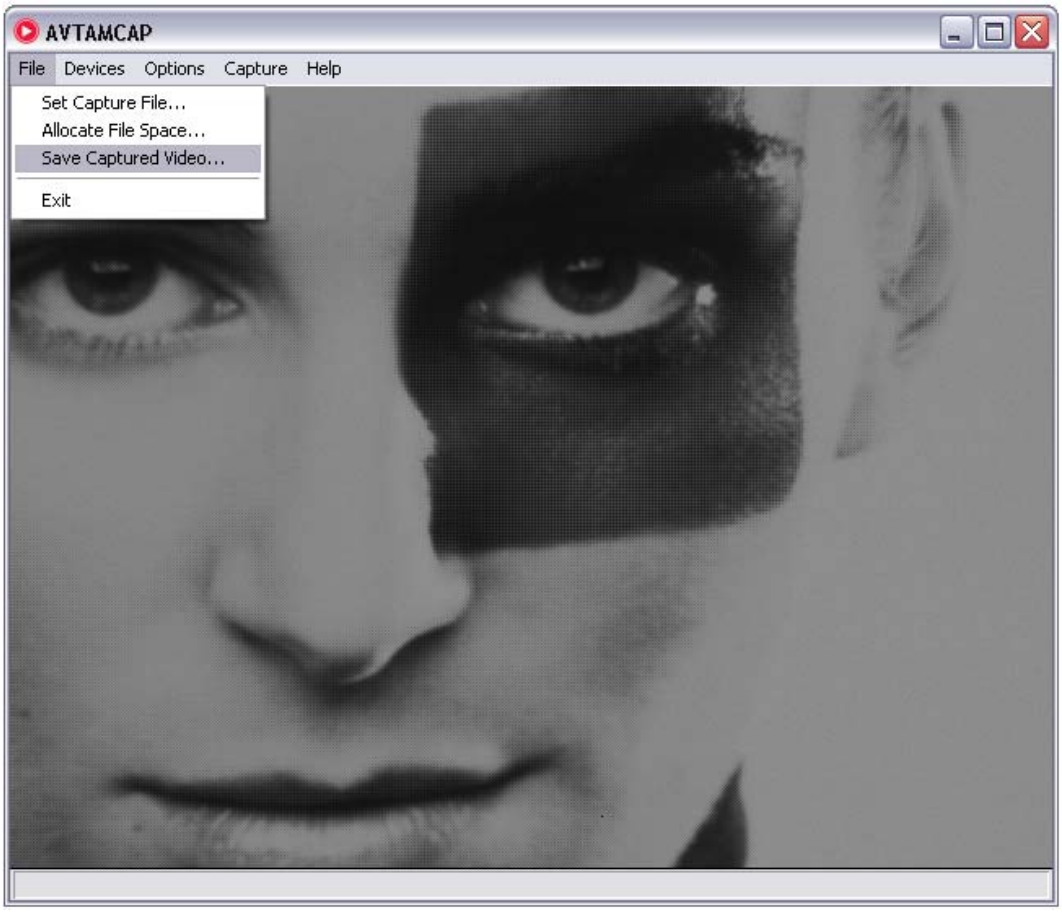


Figure 13: AVT Direct Stream Package – Video recording via AVT AmCap

DirectShow Restrictions

Restricted Dynamic Bus Bandwidth Allocation

By using Time Division Multiplexing (TDM) all cameras connected to the IEEE1394-FireWire bus can share the overall bandwidth. This means:

1. The sum of all individual camera bandwidths can not exceed the maximum available bandwidth of the FireWire bus.
2. The allocated bandwidth is reserved on the FireWire bus, even if the camera is not sending any image.

With DirectShow the allocated bandwidth for a camera can be modified, whereby the data stream has to be stopped and re-established again, as Windows administers the access to the FireWire bus. Therefore:

- Fast, dynamic, and just-in-time bandwidth allocation is not possible when using the **AVT Direct Stream Package**, as these operations require computing power.
- For applications requiring fast changes in resolution, format, or bandwidth the **AVT Direct Stream Package** is not suitable.

Restricted usage of the AVT SmartFeature 'SequenceMode'

Due to the bandwidth restriction described previously, DirectShow allows only a restricted use of the *SequenceMode* provided by AVT Stingray, Pike and Marlin cameras.

While AVT cameras in general enable certain image settings to be modified on the fly, e.g. gain and shutter can be changed by the host computer by writing into the gain and shutter register even while the camera is running, the *SequenceMode* has a different concept where the camera holds a set of different image parameters for a sequence of images. The parameter set is stored in the camera's volatile memory for each image to be recorded. This sequence of parameter sets is simply called a sequence. The advantage is that the camera can easily synchronize this parameter set with the images so that no uncertainty can occur. Many AVT CCD camera models support 32 different sequence parameters. Typical examples for using the SequenceMode are:

- For a sequence of images, each image can be recorded with a different shutter or gain to obtain different brightness effects. Changing these parameters in general doesn't cause changes in the allocated bus-bandwidth.
- The image area (AOI) of a sequence of images can automatically be modified, thus creating a panning or sequential split screen effect. Changing the AOI may cause changes in the allocated bus-bandwidth.

Additionally, it has to be considered that under DirectShow indeterminism of one or two images remains because normally the host does not know (especially with external trigger) when the next image will arrive.

Restricted usage of the AVT SmartFeature 'DeferredMode'

The advantage of the AVT Smart Feature *Deferred Mode* used in multi-camera applications is not applicable when using DirectShow.

Note *All AVT 1394 cameras, except the Guppy, support the Deferred Mode.*

In the Deferred Mode, the camera stores the images in its own buffer and sends the images to the PC only on request. In the illustration below, N cameras are taking a picture at the same time without having to take available bus bandwidth, DMA- and ISO-channels into account.

DirectShow with its fixed bandwidth allocation per DMA-channel does not support the successive read-out of the camera's image memory.
This means the advantage of an early image processing is not applicable. In addition, *N* DMA channels are required, which may result in additional hardware inside the PC, depending on the number of required cameras.

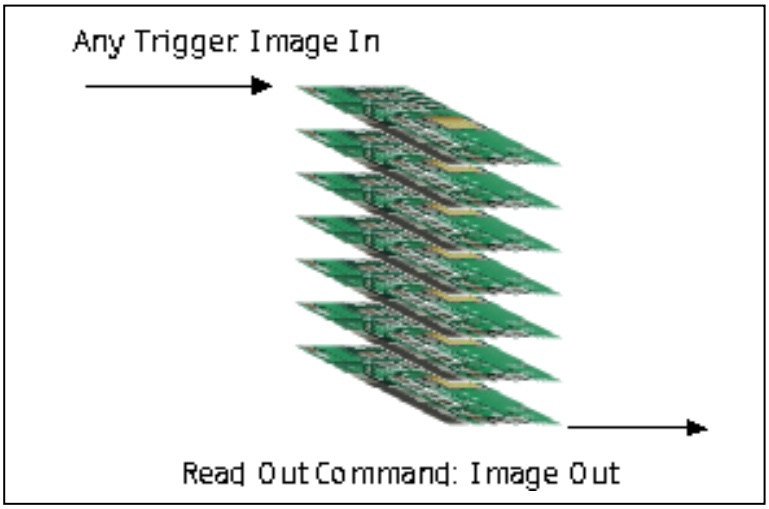


Figure 14: AVT SmartFeature functionality – Deferred Mode

Restricted usage of Look-Up Tables and Shading Correction Images

The **AVT Direct Stream Package** offers methods to up-/download LUTs and shading correction images to improve the image quality. Nevertheless, it takes too long until the complete data is transferred. This is because the Microsoft FireWire driver set has a limitation concerning data block transfer via the FireWire bus.

Note

When using the AVT SmartView application part of the AVT FirePackage this restriction does not exist. Here up to 850 000 Byte/s can be transmitted.

S800 Data Rates not officially supported for Windows XP and Vista Systems

At present Microsoft does not provide a FireWire driver which officially supports IEEE1394b. Thus, when using DirectShow an **AVT Pike** or **Stingray** camera can only be used at a maximum data rate of 400Mbps (IEEE1394a) instead of max. 800Mbps (IEEE1394b).

Please click on one of the following links to learn more about additional driver restriction in case:

- A **1394a** camera is connected to a **1394b** port
- A **1394b** camera is connected to a **1394a** port
- A **1394b** camera is connected to a **1394b** port

AVT
FIRE 4 LINUX

AVT Fire4Linux – Overview

Focus

Optimized control of AVT 1394 cameras under Linux.

Short Description

AVT Fire4Linux is an all-embracing SDK optimized for use with AVT 1394 cameras. Thereby the provided source code allows an easy migration to almost any Linux distribution. The package is based on standardized Linux drivers and libraries for FireWire cameras

Highlights:

The standard programming interface libdc1394 has been extended by specific methods to control special AVT 1394 camera features. With this, many AVT SmartFeatures can easily be applied in Linux based image processing solutions.
Additionally, the Fire4Linux package contains a high-featured viewer application to enable the comfortable control and testing of many AVT camera SmartFeatures as well as to capture images.
To ease the use of this SDK especially for Linux beginners the Fire4Linux is also available as RPM and DEB packages for selected distributions. Therewith, it is not necessary to install a complete development environment.

AVT Fire4Linux - The complete package for the Linux environment!

Supported Programming Languages

Since the libdc1394 only offers a C-interface, the enhanced libdc_avt is also restricted to this interface. Nevertheless, the provided C functions can also be invoked within code programmed in C++ or Kylix/Pascal. For example, the viewer cc1394 is programmed in C++ using Qt 4.3.

Supported Linux Distributions

The sources provided with the package are portable to all Linux distributions. Additionally, packages for(open)SUSE, Red Hat (Fedora), and Ubuntu are available.

Limited test have been performed on the following distributions:

Distribution	openSUSE v11.0, 64-bit	openSUSE v11.2, 32-bit	Ubuntu (2) v9.10, 64bit	Ubuntu V10.04, 32-bit	Fedora v12, 64-bit
Kernel	2.6.25	2.6.31	2.6.31	2.6.32	2.6.31
gcc	4.3	4.4	4.4.1	4.4.3	4.4.2
QT	4.4.0	4.5.3	4.5.3	4.6.2	4.5.3
SDL (1)	1.2	1.2	1.2.7	1.2.10	1.2

(1) Required for cc1394 viewer application
(2) No DEB file available for versions prior to release 10.04

Software Requirements

- Linux Kernel
  - 2.6.8 or higher in case the older IEEE1394 stack is used, respectively
  - 2.6.30 or higher in case the new Juju driver stack is installed
- Availability of kernel modules: raw1394, video1394, ieee1394, and ohci1394 (older IEEE1394 stack) or the new Juju stack
- Compiler Requirements:
  - **To run the cc1394 viewer application:**
    - Kernel system: 2.6.8+
    - Qt library: 4.3+
    - SDL library: 1.2+
  - **To create a binary final (compiling):**
    - Qt-development package ('qmake'): 4.3+
    - gcc version: 4.2+

Hardware Requirements

- 32bit and 64bit Intel and AMD based systems, or SMP (Symmetric Multi Processor) platform (whereby only Hyper Threading was tested extensively).
- IEEE1394 cards having a 'TI OHCI' chip-set on-board or 'multi-OHCI-platform' providing multiple 1394 busses.

AVT Fire4Linux – Advantages

- For 1394b cameras the maximum data rate of 800Mbps (S800) is supported by default
- All code samples as well as the AVT viewer application **CC1394** are free and come with free licenses (LGPL or BSD license)

AVT Fire4Linux – Restrictions

- Only AVT 1394 camera types are fully supported (more info…)
- Third-party IIDC1394-based digital cameras may also work, but only with standard feature support.

Note

For further information about the current limitations please refer to the corresponding Release Notes.

AVT Fire4Linux – Conclusion

The AVT Fire4Linux package is ideally suited for users who are looking for a standard and powerful alternative to Windows OS.

Further information about this SDK can be found under the points:

AVT Fire4Linux Package – SDK Architecture

AVT Fire4Linux Package – Components provided

Links

Further details on developing image processing applications under Linux can be found under the following links.

- Additional information about **using the libdc1394**
- **General FAQ** regarding libdc1394 v2.x
- **Read** AVT FAQ Article: ***Libdc1394 software development library, Coriander viewer***

DOWNLOAD:

Please click on the icon

AVT Fire4Linux – Architecture & API's

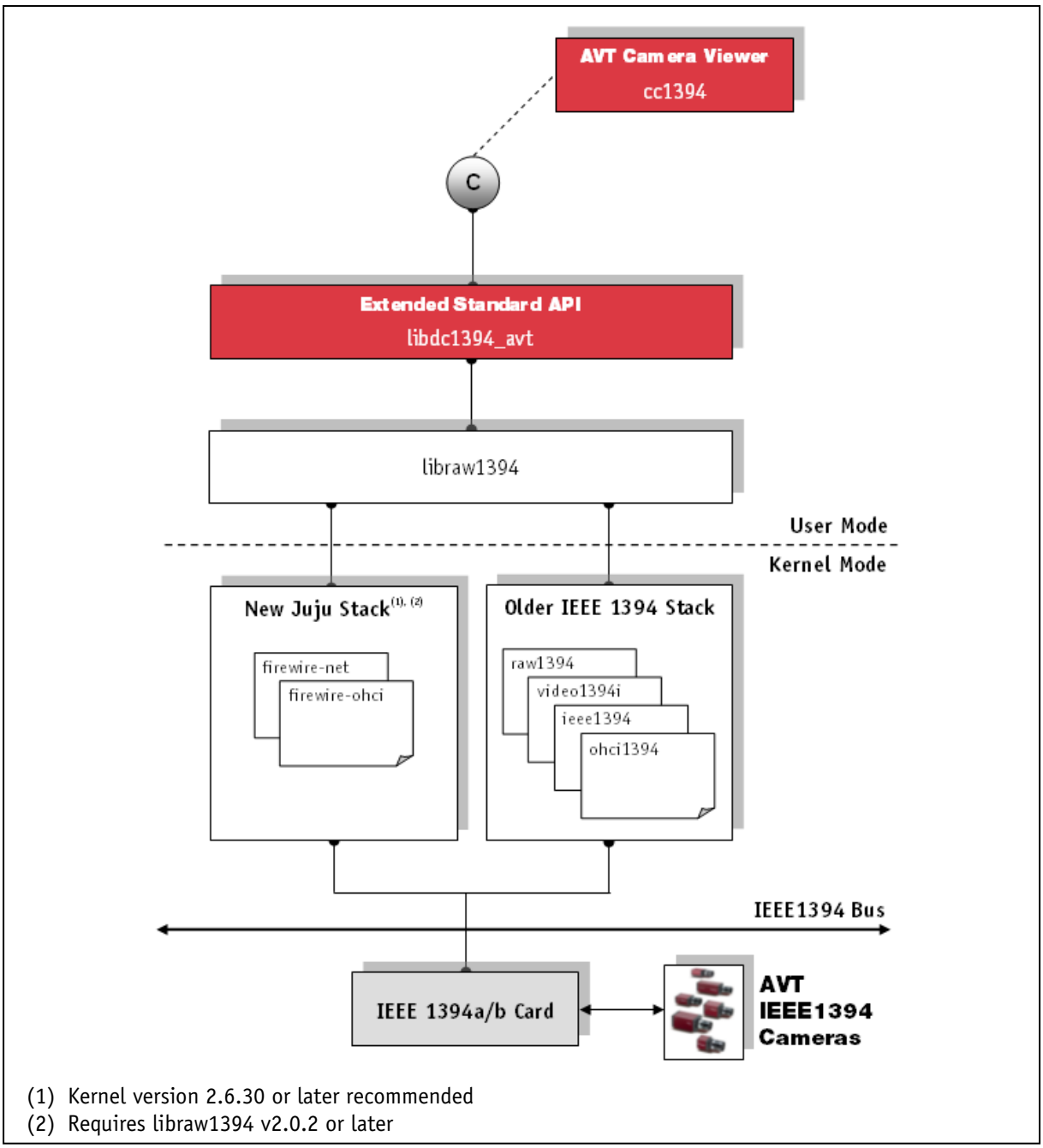


Figure 15: AVT Fire4Linux – SDK architecture and programming interfaces

Note

At the time of this writing the new FireWire kernel driver stack (alias Juju) is feature-complete and ready to replace the older ieee1394 stack. A brief migration to the new FireWire driver stack can be found here:

https://ieee1394.wiki.kernel.org/index.php/Juju_Migration

AVT Fire4Linux – Components Provided

The AVT Fire4Linux SDK is provided as open source and therewith is free of charge. It contains the following components:

libdc1394-avt [extended libdc1394, v2.1.2]
High-Level standard programming interface for IIDC/DCAM compliant 1394 cameras extended by AVT 1394 camera specific methods.
LGPL- licensed

This library is based on the commonly used libdc1394 version 2.1.2 available at:

Note

A detailed list with the AVT-specific extensions added to libdc1394can be found in the corresponding Release Notes.

Demo viewer – cc1394 v3.0
Comprehensive and easily operated viewer application with full-screen video window to test AVT cameras and to experiment with their special features without any programming

In the Download Area the package is provided in two different formats:

- **src.tar** –Contains the original sources as gziped tarballs. This version can be installed on all Linux distributions.
- **rpm.tar** – Contains the ready to use libs without sources as rpm (RedHat Package Manager) archives. RPM files can easily be handled by the corresponding package manager of the available distributions. Thereby, in each case the 32- and 64-bit versions are provided.

AVT Fire4Linux – Supported AVT 1394 Cameras

Oscar – IEEE1394a
All

Marlin – IEEE1394a
All

Guppy – IEEE1394a
All cameras without interlaced sensors (i.e. all except GF-038 and GF-044)

Note

Since the libdc1394_avt currently does not handle de-interlacing, the Guppy F038 and Guppy F044 cameras are the only AVT cameras which are not readily usable with the AVT Fire4Linux SDK.

Pike – IEEE1394b
All

Stingray – IEEE1394b
All

MAC OS Support – 1394 Cameras

The current release candidate of the Fire4Linux package should support also MAC OS systems, as the libdc1394 v2.x already can be used on MAC OS. Nevertheless, the libdc1394_avt has not been tested yet on MAC OS systems extensively in our labs.

This means, currently AVT does not have an official SDK for 1394 cameras supporting MAC OS. But we understand some customers are successfully using AVT cameras with MAC OS, by using alternate SDKs. Please refer to our Knowledge Base to learn more about the alternatives.

Note

*For GigE cameras AVT provides an SDK for Mac OS. For more information please click **here**.*

ALLIED
Vision Technologies

SEEING IS BELIEVING

Software Selector Guide for GigE Vision® Cameras

Q-G1: Do you use already a 3rd party software solution to develop your image processing application?

Please click on corresponding icon below …

GigE Vision cameras and 3rd party software solutions

Gigabit Ethernet cameras from AVT/Prosilica conform to the AIA GigEVision standard and are compatible with all GigE Vision-compliant software solutions. But there are further solutions the GigE cameras of AVT/Prosilica are compatible with. Please refer to the list below:

Company Website	Compatibility Notes
a&b software	ActiveGigE is an ActiveX SDK for GigE Vision compliant cameras. Furthermore, A&B also produces an image analysis package called ImageWarp. Both software solutions are compatible with AVT's GigE cameras. Details
COGNEX	AVT is part of the Cognex Acquisition Alliance program. The VisionPro software supports in general all GigE Vision cameras from AVT. Details
MATROX IMAGING	Matrox has developed their MIL GigE Vision® driver for their MIL/MIL-Lite 8.0 and following. AVT's GigE Vision cameras are fully supported. Details
MVTec Software GmbH	AVT is a member of the MVTec Image Acquisition Partner Program. Halcon offers a GigE Vision driver compatible with all Gigabit Ethernet cameras from AVT. Details
NATIONAL INSTRUMENTS	NI's Machine Vision Software includes full support for AVT's GigE Vision cameras. Details
NORPIX Digital Video Recording Software	Norpix's Streampix video recording software provides recording-to-disk capability for single or multiple numbers of AVT/Prosilica GigE Vision Gigabit Ethernet cameras. Details
STEMMER IMAGING	Stemmer's Common Vision Blox software (CVB) supports AVT's GigE Vision compliant Gigabit Ethernet cameras. Details
SVSi Southern Vision Systems, Inc.	SVSi created a video recording package called ProStream. that currently supports only GigE Vision compliant cameras from AVT/Prosilica. A time-limited demo version of ProStream is available here.
TORDIVEL	Tordivel's Scorpion machine vision software supports since v6.0 all of AVT's GigE Vision compliant Gigabit Ethernet cameras. Details

Please Note:
This list is as an overview of third-party software options for AVT/Prosilica customers, as identified by our staff, business partners, and customers. We are pleased to be a part of this community of providers, but cannot endorse one product or manufacturer relative to another.
AVT/Prosilica does not officially support third-party software. ***Therefore, any questions regarding such software should be directed to the respective manufacturer.***

Q-G2: Which Operating System do you intend to use?

Microsoft Windows | Linux | Mac OS | QNX

Please select …

Remark:
QNX *is a commercial Unix-like real-time operating system, aimed primarily at the embedded systems market.*

Q-G3: Do you want to use DirectShow or ActiveX programming techniques to develop your image processing application?

Please select …

If not, please click on the icon below to proceed.

Q-G4: Do you intend to develop an image processing application that might be used:

A

Platform independent

This means, it should be easy to port code written for any of Windows, Linux, Mac OS, or QNX operating system to any of the others.

B

Camera interface independent

This means, code written for a GigE Vision camera should be easily modifiable to control a 1394 "Firewire" camera, or vice versa.

Please select …

GigE Vision SDK for Windows OS

Focus

Programmatically control and capture images from AVT GigE Vision compliant gigabit Ethernet cameras.

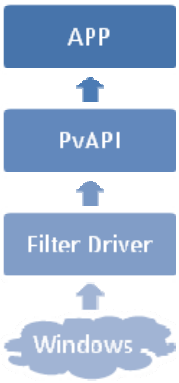
Short Description

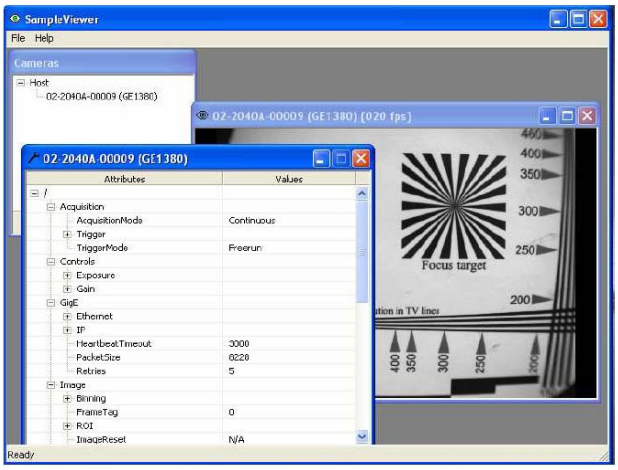
The *GigE Vision SDK* is an excellent platform for customers writing their own image processing application.

The **P**rogressive **V**ision **A**pplication **P**rogramming **I**nterface (PvAPI for short) enables a user to integrate any GigE Vision camera from AVT easily into the application.

Optionally, a very efficient *GigE Filter Driver* is provided that can be used to reduce CPU loading on the host computer remarkably.

A comprehensive reference manual, as well as a lot of sample code completes the SDK.





PvAPI based SampleViewer used on Windows

Separately, a PvAPI and MFC based *SampleViewer* is provided to operate any AVT GigE Vision camera and to explore camera features right out of the box. The complete source code for the sample viewer is included in the *GigE Vision SDK* so that programmers can use the *SampleViewer* as a starting point for developing their own vision applications.

Supported Programming Languages

The standard-call user DLL ("pvapi.dll") has a C interface, which is accessible by most programming languages. Therefore, the supported languages are:

- **C, Visual C++** and **Visual Basic**
- **.Net languages** like C#, and VB.Net
- **Borland Delphi, and C++**
- **Java**, and others

Note

Most compiled languages need an import library to call a DLL. An import library ("PvAPI.lib") for Microsoft Visual Studio 6.0 and later is included in the SDK. Most compilers come with a tool to generate an import library from a DLL; see your compiler's manual for more information

Supported Operating Systems

- Windows 2000
- Windows XP Professional or Home (32bit or 64bit)
- Windows Vista (32bit or 64bit)
- Windows 7 (32bit or 64bit)

Software

- When using .Net languages (C# or VB.Net) the .NET FrameWork is required

Hardware

- Gigabit Ethernet network adapter that optionally supports "Jumbo Frames" of at least 9kB size.

  Re*mark:*
  The use of Jumbo frames reduces the CPU load required to handle incoming data. Be sure to configure the network adaptor to handle Jumbo frames of 9kB or higher.

  Note

  In general any Ethernet adapter will work, but we advise PCI express from Intel or another reputable brand if maximum performance is requested.

- Graphics card with min. 128MB RAM

Note

More information about a suitable system set-up and optimization, as well as our GigE Vision compliant cameras can be found in our ***Knowledge Base****.*

Download

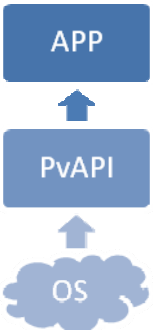
AVT / PROSILICA GIGE SDK Please click on the logo

GigE Vision SDK for Linux

Focus

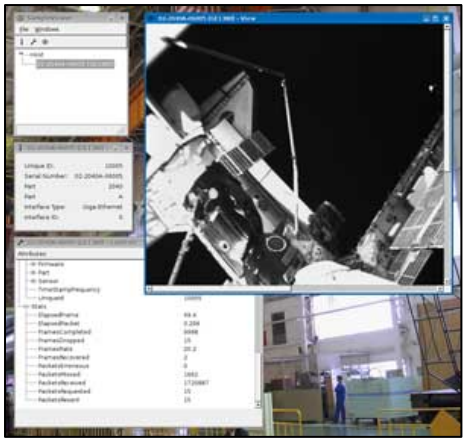
Programmatically control and capture images from AVT GigE Vision cameras operating in a Linux environment on either an Intel x86 (32- and 64-bit), PowerPC (32-bit), and ARM processors (little-endian).

Short Description



The *GigE Vision SDK for Linux* is an excellent platform for customers writing their own image processing application by using the **P**rogressive **V**ision **A**pplication **P**rogramming **I**nterface (PvAPI for short), which supports any GigE Vision camera from AVT.

Additionally, this SDK includes a *Reference Manual* and a lot of sample code allowing programmers to integrate GigE Vision cameras easily into their Linux-based application.



PvAPI based SampleViewer used on Linux

Also included is an WxWidgets based *SampleViewer* to operate any GigE Vision camera from AVT and to explore camera features right out of the box.

The complete source code for the sample viewer is included in the *GigE Vision SDK for Linux* so that programmers can use the *SampleViewer* as a starting point for developing their own vision applications.

Supported Programming Languages

The PvAPI library has a C interface, which is accessible by most programming languages. Additionally, a Java interface is provided.

Supported Linux Distributions

Linux distributions that have been specifically used with the *GigE Vision SDK for Linux* include the following: Ubuntu, Suse, MontaVista Linux, Redhat, Fedora Core

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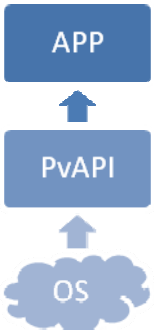
GigE Vision SDK for Mac OS X

Focus

Programmatically control and capture images from AVT's GigE Vision cameras operating in a Mac OS X environment on either an Intel x86 (32- and 64-bit), PowerPC (32-bit).

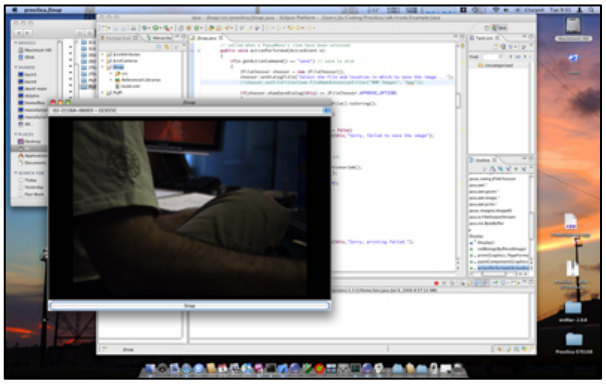
Short Description

The *GigE Vision SDK for Mac OS X* is an excellent platform for customers writing their own image processing application by using the **P**rogressive **V**ision **A**pplication **P**rogramming **I**nterface (PvAPI for short), which supports any GigE Vision camera from AVT.



Additionally, this SDK includes a *Reference Manual* and a lot of sample code allowing programmers to integrate GigE cameras easily into their OSX-based application.

Also included is an WxWidgets based *SampleViewer* to operate any GigE Vision compliant camera from AVT and to explore camera features right out of the box.



Running PvAPI based Java sample code on OSX

The complete source code for the sample viewer is included in the *GigE Vision SDK for Mac OS* so that programmers can use the *SampleViewer* as a starting point for developing their own vision applications.

Supported Programming Languages

The PvAPI library has a C interface, which is accessible by most programming languages. Additionally, a Java interface is provided.

Supported Operating Systems

- Mac OS X v10.4 and v10.5 (PPC & x86,x64)

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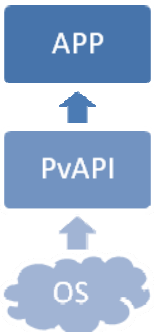
GigE Vision SDK for QNX

Focus

Programmatically control and capture images from AVT's GigE Vision cameras operating in a QNX environment on Intel x86 processors (32-bit only).

Short Description

The *GigE Vision SDK for QNX* is an excellent platform for customers writing their own image processing application by using the **P**rogressive **V**ision **A**pplication **P**rogramming **I**nterface (PvAPI for short). Thereby, the PvAPI supports any GigE Vision camera from AVT.



This SDK includes a lot of sample code allowing programmers to integrate GigE cameras easily into their QNX-based application.

Supported Programming Languages

The PvAPI library has a C interface, which is accessible by most programming languages.

Supported Operating Systems

- QNX v6.3 or v6.4

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Let's discuss!

Based on your selections, or upon when this document was written, the software selection (e.g. the vision library fit) isn't obvious. Please contact our support team or refer to our knowledge base. There may be new information, or together we can likely find a solution by discussing your application in more detail.

You can reach the **AVT Technical Software Support Team** 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

AVT Technical Software Support Team

Please do not hesitate to inform us about any problem, error, or bug you may discover. You can reach the **AVT Technical Software Support Team** 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

Feedback

Dear customer,
Thank you for using this interactive tool. We hope you found it easy to use, and helpful in identifying the best AVT software solution to develop your vision application.

If you have feedback or suggestions on this Software Selection Guide, please write to us at:

spsg-feedback@alliedvisiontec.com