BCAM 1394 Driver Release Notes
Version 1.8 SP1

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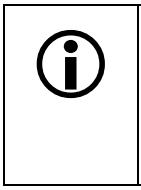

This document sometimes refers to the BCAM C++ API. This API is part of the BCAM Software Development Kit (SDK) and will only be present on your system if you have installed a BCAM package that includes the SDK. If you have installed a BCAM package that does not include the SDK, the BCAM C++ API will not be present.

Version 1.8 SP1

Changes

Support for Windows XP SP2

BCAM 1.8 SP1 has been reviewed and fully tested with Windows XP Service Pack 2.

DirectShow Video Capture Source Filter

BCAM 1.8 SP1 comes with a new DirectShow filter that allows DirectShow applications to connect directly to our cameras.

Support for Multiprocessor Machines and Hyper Threading CPUs

BCAM 1.8 SP1 has been reviewed and fully tested with multiple, hyper threading enabled CPUs.

Support for IIDC v1.31 Memory Channels

BCAM 1.8 SP1 supports memory channels according IIDC v1.31. This applies to the driver itself as well as to the user mode API.

Preparation for New and Future Basler Cameras

The setup program has been updated to associate the BCAM driver with the model names of newly available Basler cameras.

Support for WTL 7.0, 7.1 and 7.5

The Microsoft Visual Studio .NET versions of the samples and source code we provide can now be compiled with versions 7.0, 7.1 and 7.5 of the Windows Template Library (WTL).
(WTL 3.1 is still supported for Visual C/C++ 6.0.)

Known Restrictions

Windows 2000 Professional SP3, SP4 and Windows XP Professional SP1 and SP2 Only

Synopsis: BCAM 1.8 SP1 is released for Windows 2000 Professional SP3 or SP4 and Windows XP Professional SP1 and SP2 only.

BCAM 1.8 SP1 requires at least SP3 on Windows 2000 and SP1 or SP2 on Windows XP. It is not tested for Windows Server 2000, Windows XP Home Edition or Windows Server 2003.

Workaround: Avoid using configurations other than Windows 2000 Professional SP3 or SP4 or Windows XP Professional SP1 or SP2.

Fixed Bugs

Operations that result in the canceling of queued image buffers such as:

- submitting `IOCTL_BCAM_FLUSH` directly to the driver.
- issuing `CBcam::Cancel()` at the high level API.
- closing, disabling or removing the camera device while image buffers are queued to be grabbed.
- IEEE 1394 bus resets.

may lead to "Bug Checks" (blue screens) – you will often see Bug Check 0x50 - `PAGE_FAULT_IN_NONPAGED_AREA`. If encountered while using BCAM 1.8.33 under Windows XP, it can be distinguished from other problems by an instruction pointer value that has the significant offset of 0x0f22 from the base address of `bcam.sys`. With Bug Check 0x50, the current instruction pointer value causing the Bug Check is displayed as the 3rd parameter. If they can be identified by Windows, the name and the base address of the driver causing the Bug Check is also displayed.

Version 1.8

Changes

Completion of `IOCTL_BCAM_FLUSH` Deferred

`Bcam::CBcam::Cancel()` and its underlying I/O control code `IOCTL_BCAM_FLUSH` now are not completed until all pending isochronous receive buffers have been completed (at least up to an internal completion status). This doesn't mean that all affected buffers must be finally returned to a waiting thread at this point (see Fixed Bugs). In the past, the I/O control operation returned immediately after initiating the forced buffer completion. The new behavior better complies with the state machine documented in the Programmers Guide.

BCAM Viewer Performs White Balance Using Single Shots

To perform automatic white balance, the BCAM Viewer now uses a series of single shots rather than using continuous grabbing mode. This avoids problems with cameras that buffer images before they are transmitted (see Fixed Bugs).

Changed Behavior on IEEE 1394 Bus Resets

The behavior on bus resets has changed in two respects:

Bus resets are no longer ignored (more or less) by the asynchronous transaction handling (see Fixed Bugs). Instead, the affected asynchronous bus transaction is now repeated up to five times with a delay before each retry. If all retries fail, an error status is reported to the caller.

If isochronous resources have been allocated, they will be reclaimed with a changed strategy. For the most part, this makes it superfluous to return pending buffers to the client application on bus resets. The management of image acquisition at the client side should not be affected by this change.

Error Handling During 1394 Bus Transactions Changed

In addition to the changes described in "Changed Behavior on IEEE 1394 Bus Resets", in cases of transaction timeouts or busy devices, the retry is now delayed.

Slightly Changed Naming in `functions.h`

In the header file `functions.h`, the previously anonymous structures and enumerations now have names. This change improves the handling of the Class View of Microsoft Visual Studio as well as the navigation in the compiler generated source code browser databases (BSC files). This change has some impact on the generated reference material for this section (see "Known Restrictions" for more details).

New Color Codes

For all existing vendor specific color codes, a generic Name `DCSColor_VendorSpecific`*X* (with X [0..127]) was assigned.

Known Restrictions

IA32 Only

Synopsis: BCAM release 1.8 is built and tested on IA32 CPU machines only.

This means that BCAM 1.8 and its predecessors can not be used with Windows XP 64.

Workaround: You must only use BCAM 1.8 on PCs with IA32 CPUs.

Windows 2000 Professional SP3, SP4 and Windows XP Professional SP1 Only

Synopsis: BCAM 1.8 is released for Windows 2000 Professional SP3 or SP4 and Windows XP Professional SP1 only.

BCAM 1.8 requires at least SP3 on Windows 2000 and SP1 on Windows XP. It is not tested for Windows Server 2000, Windows XP Home Edition, or Windows Server 2003.

Workaround: Avoid using configurations other than Windows 2000 Professional SP3 or SP4 or Windows XP Professional SP1.

Detaching Camera While Grabbing

Synopsis: The system may crash if a camera is detached while grabbing.

Due to a bug in Microsoft Windows XP and Microsoft Windows XP Service Pack 1, the BCAM driver may crash if a camera device that is acquiring images is removed. Microsoft acknowledges this bug. Microsoft expects to fix it in the next service pack.

Workaround: Only the obvious 'don't do that'.

Bus Resets

Synopsis: Bus Resets may cause scrambled images.

Because the underlying system bus driver stack does not report any errors regarding this situation, we cannot guarantee that delivered images are unaffected.

Workaround: We strongly recommend that you **do not** issue bus resets in critical applications or situations.

Minimum Number of Isochronous Packets

Synopsis: Due to a bug in MS Windows 2000 (SP3) and MS Windows XP (SP1), the native 1394 bus driver only works properly when the number of isochronous packets in a frame is at least two.

Workaround: The current version of the BCAM driver checks this enforcement.

Solution: This restriction will be removed when the bus driver is fixed. Microsoft acknowledges this bug. Microsoft expects to fix it in the next service pack.

Sample Workspaces for Microsoft Visual Studio 2002

Synopsis: The Microsoft Visual Studio .NET related samples and source code are developed with Microsoft Visual Studio 2002 instead of Visual Studio 2003. This applies to all previous BCAM versions, even if this is not explicitly mentioned in the documentation.

Workaround: Stick to Microsoft Visual Studio 2002 or let Visual Studio 2003 perform the necessary workspace and project conversions automatically.

Solution: Because the underlying C/C++ compilers differ only negligibly for the purposes of the BCAM SDK, there should be no problem in converting the solutions to Microsoft Visual Studio 2003.

(**Note**: Visual Studio 6.0 workspaces are not affected by this problem.)

Structure Names Suppress Type Names in Low Level Interface Documentation

Synopsis: The names of the structures and enumerations appear in the current Low Level Interface documentation instead of the assigned type names used in past documentation.

Workaround: Navigate via the associated “File Member Index” → “Typedefs” to the detailed description of the type by clicking the link “functions.h”. You can get detailed member descriptions by clicking the underlying structure or enumeration name.

For the type and structure names of the arguments and results of the I/O control invocations, you can get more help by using the transformation rules:

`ArgAaaBbbCccDdd` → `_BCAM_AAA_BBB_CCC_DDD_IN` and

`ResAaaBbbCccDdd` → `_BCAM_AAA_BBB_CCC_DDD_OUT`

for the rest of the structure and enumeration type definitions:

`AaaBbbCcc` → `_AAA_BBB_CCC`

`ImageOnMode` is an exception and corresponds to `_TEST_IMAGE_MODE`.

If in doubt, refer directly to the header file `functions.h`.

Solution: Since all existing type names remain valid and their meanings are unchanged, programming is completely unaffected by this issue! This part of the documentation will be enhanced in a future BCAM release. Because the structure and enumeration names may be changed in the future to resolve this problem, please use the type names in your source code.

Fixed Bugs

- In the case of bus resets, the driver could complete asynchronous IEEE 1394 Bus transactions regardless of their result.
- If memory is used heavily, a D1 “DRIVER_IRQL_NOT_LESS_OR_EQUAL” bug check could occur.
- Cancellation of isochronous listen operations could cause Bug Check 1004 or error message “The device does not recognize the command.” This was especially noticeable on multi processor and fast machines.
- Auto white balance feature of the BCAM Viewer may fail for the A102f.
- Grab image timeout doesn’t cancel a pending one shot in the camera.
- BCAM driver doesn’t update its internal CSR cache when the color code is changed.
- Loaded camera configurations aren’t updated by the BCAM Viewer GUI immediately.
- Management of queued one shots could deadlock during heavy-load situations.
- The BCAM Viewer was checked for issues related to multiprocessor use.

Version 1.7

Changes

Plug and Play Handling Changed

The underlying completion port is no longer closed automatically on device removal. This change ensures reliable releasing of all previously enqueued frame buffers to clients. It also enables client code to enqueue custom notifications after a camera has been removed. The completion port will not be closed until invocation of `CBcam::Close`.

Utility class `CEvent` Moved From `Bcam.h` to `BcamUtility.h`

This provides better isolation of BCAM implementation auxiliary classes from BCAM core functionality and eases, for example, usage of ATL's multithreading support classes.

New Color Codes

The DCSColor_Mono16, DCSColor_Raw8, and DCSColor_Raw16 color codes were added.

Known Restrictions

Single Processor Machines Only

Synopsis: BCAM release 1.7 is tested only for single processor machines. No tests were performed for CPUs with hyper threading enabled.

Workaround: Using BCAM 1.7 on multiprocessor machines or on single processor machines with hyper threading enabled is not recommended.

IA32 Only

Synopsis: BCAM release 1.7 is built and tested on IA32 CPU machines only.

This means that BCAM 1.7 and its predecessors aren't available for Windows XP 64 resp. for 64 bit processors.

Workaround: You must use BCAM 1.7 on IA32 CPU PCs only.

Windows 2000 Professional SP3, SP4 and Windows XP Professional SP1 Only

Synopsis: BCAM 1.7 is released for Windows 2000 Professional SP3 or SP4 and Windows XP Professional SP1 only.

BCAM 1.7 requires at least SP3 on Windows 2000 and SP1 on Windows XP. It is not tested for Windows Server 2000, Windows XP Home Edition, or Windows Server 2003.

Workaround: Avoid using configurations other than Windows 2000 Professional SP3 or SP4 or Windows XP Professional SP1.

Detaching Camera While Grabbing

Synopsis: The system may crash if a camera is detached while grabbing.

Due to a bug in Microsoft Windows XP and Microsoft Windows XP Service Pack 1, the Bcam driver may crash if a camera device that is acquiring images is removed. Microsoft acknowledges this bug. Microsoft expects to fix it in the next service pack.

Workaround: Only the obvious 'don't do that'.

Bus Resets

Synopsis: Bus Resets may cause scrambled images.

On the occurrence of a bus reset, all image buffers are returned with an error. Because the underlying drivers do not report any errors, we cannot guarantee that all other buffers are unaffected.

Workaround: We strongly recommend that you **do not** issue bus resets in critical applications or situations.

Minimum Number of Isochronous Packets

Synopsis: Due to a bug in MS Windows 2000 (SP3) and MS Windows XP (SP1), the native 1394 bus driver only works properly when the number of isochronous packets in a frame is at least two.

Workaround: The current version of the BCAM driver checks enforcement.

Solution: This restriction will be removed when the bus driver is fixed. Microsoft acknowledges this bug. Microsoft expects to fix it in the next service pack.

Fixed Bugs

Online Help

Minor typographical errors in the online documentation.

BCAM Viewer

Unknown color codes not handled correctly in Video Format Properties.

BCAM Driver

Problems on the cancellation of grabs in some situations.

Problems during handling of frame buffer sizes less than or equal to one memory page size.

BCAM API

`CBCam::Close` not thread safe.

Problems while compiling `InterlockedExchangePointer`.

Version 1.6

Changes

Camera Driver

- If a bus reset occurs while grabbing, all image buffers in the queue are returned with an error STATUS_BCAM_BUS_RESET.
- A new device interface identifier is generated avoiding version clashes. Cameras must register to the new driver using the UpdateDriver utility. Programs using the old libraries must be recompiled and linked against the new libraries.

Documentation & Examples

- An extra section for the Topology driver is added.
- The BaccDemo sample shows basic tasks using the topology driver.
- The BcamTopologyViewCtl shows how to use the topology driver in a COM control.
- The BcamTopologyView is an example for using the BcamTopologyViewCtl.

SDK

The function CBcam::Open() and CBcam::GetDevices() compare the version of the library and the installed driver and throw an exception in case of a mismatch. This may be suppressed by compiling the library with the define OMIT_VERSION_CHECK=1.

Known Restrictions

MS Windows XP Embedded

Synopsis: The driver does not run on MS Windows XP Embedded.

The supported platforms are MS Windows XP Service Pack 1 and MS Windows 2000 Service Pack 3.

Detaching Camera while grabbing

Synopsis: The system may crash if a camera is detached while grabbing.

Due to a bug in Microsoft Windows XP RTM and Microsoft Windows XP Service Pack 1, the Bcam driver may crash if a camera device that is acquiring images is removed. Microsoft acknowledges this bug. Microsoft expects to fix it in the next service pack.

Workaround: Only the obvious 'don't do that'.

Bus Resets

Synopsis: Bus Resets may cause scrambled images.

On the occurrence of a bus reset, all image buffers are returned with an error. Because the underlying drivers do not report any errors, it cannot be guaranteed that no other buffers are affected.

Workaround: We strongly recommend that you **do not** issue bus resets in critical applications or situations.

Minimum Number of Isochronous Packets

Synopsis: Due to a bug in MS Windows 2000 (SP3) and MS Windows XP (SP1), the native 1394 bus driver only works properly when the number of isochronous packets in a frame is at least two.

Workaround: The current version of the BCAM driver checks enforcement.

Solution: This restriction will be removed when the bus driver is fixed. Microsoft acknowledges this bug. Microsoft expects to fix it in the next service pack.

Fixed Bugs

Camera Driver

Memory leak in non-paged pool: The problem occurred only if the combination of user buffer address and image size caused the image to end right on a page boundary, while at the same time the image size was not an integer multiple of the isochronous packet size.

Camera Viewer

Several minor bugs are fixed.

SDK

Timeout while unloading a DLL: While unloading DLLs linked with the BcamAPI, a 10 second timeout occurred. We recommend using the new CBcam::Cleanup() function prior unloading the DLL. See also the “Using the High Level Interface in a Dynamic Link Library” section in the programmer’s guide.

Documentation & Examples

None.

Version 1.5 (intermediate release)

Changes

Driver

- Support for MS Windows 2000 (SP3) and MS Windows XP (SP1). Currently two distinct drivers exist for MS Windows XP and MS Windows 2000.
- The AOI position change is now an uncritical parameter and may be changed while resources are allocated.
- The device interface identifier is changed. Programs using the old device interface identifier will not find cameras
- In Format 7, the BytesPerPacket value must be a multiple of 4.

Viewer

- The Viewer releases any camera that is not grabbing. To use the viewer in combination with another program, stop grabbing, select the root or select a different camera in the bus view, and close the camera window.
- A change made with a parameter slider will be immediately transmitted to the camera.
- A white balance function is implemented for color cameras. If the camera does not implement this function, a simple white balancing algorithm will be used.
- The device name is displayed on the camera info property page. The values on the info property page can be copied to the clipboard.
- Images can be copied to the clipboard.
- The most recent window layout and camera settings are stored for each camera. The camera settings can be stored/loaded explicitly.
- Grabbing images with an external trigger can be canceled.

Documentation & Examples

- Separate sections describe the BCAM API and the low-level interface.
- The Bitmap support file BcamDib.h is moved into a separate library (BvcDib).
- A new section called "Getting Started Quickly" shows the most common programming tasks performed with the Bcam API.
- A new section called "Advanced Sample Programs" describes the BCAM Viewer and other sample programs.

SDK

- The Bcam header file is split into Bcam, BcamException, and BcamPropertyBag.
- An example is added called "ChangeOnTheFly" showing how to change the area of interest while grabbing continuously.

- An example for using shading correction is added.
- An example for real-time grabbing is added.
- An example for using Intel's Image Processing Library is added.
- An example for using Device Notification is added.
- The functions CBcam::Open() and CBcam::GetDeviceNames() use device names without the device interface identifier.
- The functions CBcam::IsOpen() and CBcam::GetDeviceNames(&Names) are added.
- A persistency mechanism for camera settings is added; see CBcam::SaveSettingsToFile(), CBcam::RestoreSettingsFromFile(), CBcam::SaveSettingsToRegistry(), CBcam::RestoreSettingsFromRegistry().
- The function CBcam::SetCurrentThreadPriority() for setting the priority of a user thread is added. See also the RealTimeDemo example.
- The function CBcam::SetServerThreadPriority() for setting the priority of the driver's queue server thread is added.
- Improved handling of plug and play events. See the Programmer's Guide for a detailed description.

Setup

In the Bcam Utility Folder, a command line tool "updateDriver" is included for updating the driver for all attached Basler cameras. Open a command prompt, switch to the Bcam Utility Folder and execute updateDriver. Supply the absolute path to the bcam.inf file as a parameter (for instance by dropping the bcam.inf onto the command prompt window).

Known Restrictions

Minimum Number of Isochronous Packets

Synopsis: Due to a bug in MS Windows 2000 (SP3) and MS Windows XP (SP1), the native 1394 bus driver only works properly when the number of isochronous packets in a frame is at least two.

Workaround: The current version of the BCAM driver checks enforcement.

Solution: This restriction will be removed when the bus driver is fixed. Microsoft acknowledges this bug. Microsoft expects to fix it in the next service pack.

Known Bugs

Driver

None.

Viewer

- When the sliders in the viewer's toolbar are shuffled around, they will not align properly.
- The sliders in the viewer's toolbar cannot be reached by pressing the Tab key.

Documentation & Examples

None.

Fixed Bugs

Driver

- Model and vendor name were read incorrectly.
- In version 1.5 Beta (XP), frames are lost when grabbing continuously.
- Opening a camera twice resulted in a failure without an error message.
- WhiteBalance.OnePush() failed with STATUS_BCAM_ONE_PUSH_BUSY.
- Unexpected device remove notifications.

Viewer

- Images could not be saved or copied to the clipboard while a grab is running with the selected camera.
- When an edit box in the toolbar was used and then exited, the associated slider and the camera would not update.
- Viewer did not start when a camera was in use.
- Crashed when a camera was unplugged.

Documentation & Examples

- Incorrect description of Bcam::Cancel().
- Sample programs terminated when no cameras were attached.