



AS5216.DLL V2.X/8.X – AVASPEC.DLL 9.X

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1 Introduction

The EVO line AvaSpec spectrometers are equipped with the AS7010 electronic board, whereas the electronic board in the Avaspec-USB2 line spectrometers is named AS5216.

The name of the interface DLL for the AS5216 boards has been AS5216.DLL for a long time, but since the interface DLL also supports the AS7010 board and the AvaSpec-Mini, it has been renamed to AvaSpec.DLL.

2 History

Originally, the as5216.dll was developed in the Borland (Embarcadero) C++ Builder. This programming environment was used for all versions from 1.0 to 2.2.3. In this document, this C++ Builder version will be referred to as the AS5216.DLL v2.x version.

In order to support multiple platforms in general, and more specific the linux based AvaGigE, a new version of the AS5216.DLL was developed in 2012 in Visual C++ 2008. This programming environment was used for all versions from 8.0 to 8.3. In this document, this Visual C++ version will be referred to as the AS5216.DLL v8.x version.

The AvaSpec.DLL is the successor of the AS5216.DLL v8.x and will be the standard interface DLL for all AvaSpec spectrometers. However, the AS5216.DLL v2.x will be kept up to date for (OEM) customers who need the AS5216 board or AvaSpec-Mini with RS-232 interface or prefer to use the WinUSB driver over libusb for USB communication.

3 Differences Between the DLL Versions

Although the 3 different DLL versions are almost fully compatible at a functional level, there is one major difference concerning the platforms that are supported. Furthermore, a few minor differences will be described, like handling IO requests, performance at initialization, and USB driver differences.

The following differences will be listed in the next sections:

- Supported Platforms (RS-232, USB, Ethernet)
- Multiplatform support and USB driver (WinUSB, libusb)
- LabView callback function
- Allocation of spectrometer channels to different (instances of) applications.
- Handle IO request during pending measurements
- Performance AVS_Init() and AVS_Activate()



3.1 Supported Platforms (RS-232, USB, Ethernet)

	RS-232	USB	Ethernet
AS5216.DLL v2.x	Yes*	Yes	No
AS5216.DLL v8.x	No	Yes	By AvaGigE
AvaSpec.DLL	No	Yes	Onboard with EVO

*) The AvaSpec-SPU2-BT spectrometers, with Bluetooth interface and SD memory card also require AS5216.DLL v2.x.

The new AS7010 electronic board in the AvaSpec-EVO is only supported by the AvaSpec.DLL, the AS5216 board and AvaSpec-Mini are supported by all DLL versions:

	AvaSpec-USB2 (as5216)	AvaSpec-Mini	AvaSpec-EVO (as7010)
AS5216.DLL v2.x	Yes	Yes	No
AS5216.DLL v8.x	Yes	Yes	No
AvaSpec.DLL	Yes	Yes	Yes

3.2 Multiplatform Support and USB Driver (WinUSB, libusb)

	Multiplatform	USB driver
AS5216.DLL v2.x	No	WinUSB or AVSUSB2*
AS5216.DLL v8.x	Yes	libusb
AvaSpec.DLL	Yes	libusb

*) AVSUSB2 is the Avantes kernel driver that can be installed only on a 32-bit Windows operating system. The WinUSB driver runs at 32-bit and 64-bit Windows operating system and is the recommended driver during installation of the AS5216.DLL 2.x DLL interface package.

The *libusb* USB driver supports multiple platforms, e.g. Linux. By using the libusb driver with the interface DLL package, it also became possible to build libraries for Linux distributions. We have the Linux library available for a number of Linux distributions in the OEM download area of our website.

The libusb driver is not fully compatible with the WinUSB driver. In a rare occasion, communication over USB3.0 was not possible with AS5216.DLL 8.x or AvaSpec.DLL (libusb), whereas no problems were detected when using AS5216.DLL v2.x (WinUSB). Updating the driver for this chip set solved the problem also for libusb.

3.3 LabView Callback Function

The AvaSpec DLL uses Windows messages by preference to signal the arrival of new data to the user program. Unfortunately, LabVIEW does not support these Windows Messages very well. The AvaSpec DLL also supplies a function that allows you to poll for the arrival of new data, called AVS_PollScan(). This function should be called from a loop with a short delay in it, in order to let Windows handle updating of variables. If you call the AVS_PollScan() function from a tight loop, it will always return false, even though new data has arrived.

We have received some requests for faster processing than is possible with the AVS_PollScan() function. We have also received some reports of problems with this function, mainly on fast PCs with 32 bits Windows. For this reason, we have looked into other methods to signal data besides polling.



The LabView examples for the Avaspec.DLL and AS5216.DLL v8.x include a subdirectory with the name “events”. The demos in this folder (for one, two and four spectrometers) include the function AVS_MeasureLV(). This function will trigger a user event, that can be received in your LabVIEW program. This function is only available in AS5216.DLL v8.x and AvaSpec.DLL because these DLL’s are written in Microsoft C++, which is necessary to link the library from NI that supplies the PostLVUserEvent function used. AS5216.DLL v2.x is written in Borland/Embarcadero C++, which is not compatible with this library.

	LabView callback support
AS5216.DLL v2.x	No
AS5216.DLL v8.x	Yes
AvaSpec.DLL	Yes

3.4 Allocation of Different Spectrometer Channels to Different (instances of) Applications

AS5216.DLL v2.x: if multiple AvaSpec-USB2 and/or AvaSpec-MINI spectrometers are connected by USB, each channel can be activated or deactivated by using the AVS_Activate() and AVS_Deactivate() functions. Initially (before calling AVS_Activate()), and after calling AVS_Deactivate(), the status of an AvaSpec becomes AVAILABLE. After Activating one channel, the status becomes IN_USE_BY_APPLICATION.

Starting another instance of the same application (or by starting another application) will list all other channels with the status AVAILABLE, and also in this instance the remaining channels can be activated after which the status becomes IN_USE_BY_APPLICATION. The remaining channels are still AVAILABLE and can be used in a third (instance of the) application, etc.

AS5216.DLL v8.x and Avaspec.DLL don’t support this feature. The first application builds a list for all connected spectrometers. Starting a second instance of the application or another application will not find the spectrometers with the status USB_AVAILABLE, because these spectrometers are allocated by the first application.

3.5 Handle IO Request During Pending Measurements

The following functions are available for analog and digital IO:

- AVS_GetAnalogIn()
- AVS_GetDigIn()
- AVS_SetDigOut()
- AVS_SetPwmOut()
- AVS_SetAnalogOut()

When calling one of these functions with AS5216.DLL v2.x, it will be executed immediately. When calling one of these functions with AS5216.DLL v8.x or AvaSpec.DLL during a pending measurement, it will be executed after the pending measurement is finished.



3.6 Performance AVS_Init() and AVS_Activate()

The time needed for initializing the communication (AVS_Init()) and Activating an AvaSpec (AVS_Activate()) is much longer when using the AS5216.DLL v2.x. For USB connected spectrometers, the total time for initializing and activating an AvaSpec-USB2 spectrometer is about 3 seconds per spectrometer channel. When using the AS5216.DLL v8.x or AvaSpec.DLL, this has been reduced by a factor 10 to ca 0.3 seconds per channel. Note that initialization and activating the spectrometer(s) needs to be done only when starting the program.