OEM Spectrometer: AS-5216 Microprocessor Board

The AS-5216 microprocessor board provides both flexibility and ease of integration. It features high-speed USB 2.0 communication and can be used in combination with the following detectors:
- Sony ILX554B and ILX511B
- Toshiba 1304
- Hamamatsu S11155/S7031 and G92xx series with/without TEC
- Sensors Unlimited 256 and 512

The board is equipped with an HD26 digital I/O connector with 13 programmable I/O port (3 digital in, 10 digital out), 2 analog out ports and 2 analog in ports. One digital out port is generally used to control the flash rate of an AvaLight-XE pulsed Xenon light source, another digital out it used to control external TTL-shutter devices and a third is reserved for external control for flashing a laser source in LIBS applications. A digital in may be used for external hardware triggering.

A maximum of 127 AS-5216s can be coupled and synchronized through the USB 2.0 interface. This means easy and simultaneous sampling of 2-127 channels. The AS-5216 board can be synchronized with other AS-5216 boards to control the simultaneous data-sampling of multiple channels, all connected to USB2.0 high-speed interface. On-board signal processing allows data reduction to speed up scan transfer time.

Data reduction can be achieved by defining a start and stop pixel and On-Board Averaging.

This board is compatible with the extensive AvaSpec-DLL software development kit, enabling full control over the spectrometer in customer-designed software.

Technical Data

Microprocessor	Coldfire® 5216, 32-bit, 64 MHz
Memory	512 KB Flash Memory, 64KB RAM
A/D converter	16-bit, 2 channels for video signal
Integration time	2 µs – 10 minutes (detector dependent)
Data Transfer speed	1.8 ms/scan for Sony ILX554 2048 pixels, 2 MHz 1.8 ms /scan for Sony ILX511 2048 pixels, 2 MHz 1.1 ms/scan for TAOS 1401 2 MHz 3.7 ms /scan for Toshiba TCD1304, 1 MHz 2.09 ms/scan for Hamamatsu S11155, 1 MHz 5.22 ms/scan for Hamamatsu S7031, 250 kHz 1.56 ms/scan for Hamamatsu 92XX, 500 kHz 1.0 ms/scan for Sensors Unlimited NIR, 2.4 MHz
USB interface	2.0 high-speed, 480 Mbps
RS-232 interface	Baudrate 115200 bps, HD-26 female connector
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 3 Digital in, 12 Digital out, trigger, synchronization
Power supply	Default USB power, 350 mA 12 VDC, reverse polarity protection, 150 mA
Temperature range	0- 55 ºC

Ordering Information

AS-5216	• Microprocessor board 16-bit AD and USB2.0/RS-232 interface. Specify detector type, see below

Detector Types

- ILX	for Sony ILX554B detectors (AvaSpec-ULS2048-USB2)
-ILX511	for Sony ILX511B detectors (AvaSpec-ULS2048L-USB2)
- TOS3648	for Toshiba 1304 detectors (AvaSpec-3648-USB2)
- HAM2048XL	for Hamamatsu S11155 detectors (AvaSpec-ULS2048XL-USB2), extra pcb incl.
HAM1024x58	for Hamamatsu S7031 detectors (AvaSpec-HS1024x58/122-USB2), extra pcb incl.
- NIR256/512	Hamamatsu G92xx series InGaAs NIR detectors (AvaSpec-NIR256/512-1.7)
- NIR256/512TEC	Hamamatsu G92xx series with TEC InGaAs NIR detectors (AvaSpec-NIR256/512-2.5-HSC-EVO), extra pcb incl.
-NIRSU256/512	Sensors Unlimited 256/512 InGaAs NIR detectors (AvaSpec-NIR256/512-1.7-HSC-EVO)

OEM Spectrometer: AS-7010 Microprocessor board

The AS-7010 is the all new electronic platform and the base for Avantes' future spectrometer models.

It is equipped with a powerfull Xilinx Zynq 7010 microprocessor. It combines the software programmability of a Processor with the hardware programmability of an FPGA, resulting in unrivalled levels of system performance and flexibility. The generous 100 Mpixel memory enables onboard storage of spectra and custom programming. Equipped with 2 different AD convertors optimal performance for each detector type is assured.

The As-7010 comes with the ability of 2 communication ports: High Speed USB3.0 and GigaEthernet.

Also on board is the HD26 digital I/O connector with 13 programmable digital I/O ports, 2 analog out ports and 2 analog in ports. The connector is compatible with the AS-5216 I/O connector.

Technical Data

Microprocessor	Xilinx Zynq 7010
Memory	100 Mpixel
A/D converter	16-bit, 2 channels for video signal / 16-bit, high end – low noise (detector dependent)
Integration time	2 µs – 10 minutes (detector dependent)
USB interface	3.0 high-speed, 5 Gbps
ETHernet interface	Giga Ethernet, 1 Gbps
Digital IO	HD-26 connector, 2 Analog in, 2 Analog out, 13 Digital bidirectional, trigger, synchronization, strobe, laser
Power supply	Default USB3.0 power, 500 mA 12 VDC, reverse polarity protection, 300 mA
Temperature range	0- 55 ºC
Dimensions, weight	162,5 x 100 mm, 97 grams

Ordering Information

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AS-7010	• Microprocessor board 16-bit AD and USB3.0/Ethernet interface. Specify detector type, see below

Detector Types

- ILX511	for Sony ILX511B detectors (AvaSpec-ULS2048L-EVO)
- HAM11639	for Hamamatsu S11639 CMOS detectors (AvaSpec-ULS2048CL-EVO)
- HAM13496	for Hamamatsu S13496 CMOS detectors (AvaSpec-ULS4096CL-EVO)
- HAM2048XL	for Hamamatsu S11155 detectors (AvaSpec-ULS/HS2048XL-EVO), extra pcb incl.
- HAM1024x58	for Hamamatsu S7031 detectors (AvaSpec-HERO), extra pcb incl.
- HAM2048x64	for Hamamatsu 11071 or 11850 (AvaSpec-ULS2048x64(TEC)-EVO), extra pcb incl.
- NIR	for InGaAs NIR detectors (Specify model), extra pcb incl.

Developer kits for easy IO access

Printed circuit board for AS5216 boards
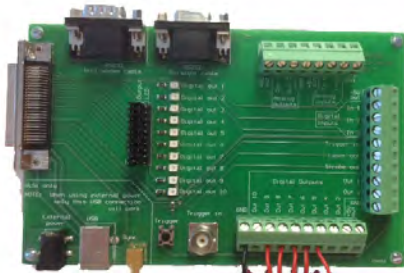
Avantes Spectrometers feature great flexibility offering multiple Input / Output connections. These IO can be used with Avasoft 8 (Time Series) or with customized applications. The DEVKITs are intended to make life easier in the development-stage. Instead of fabricating or soldering a cable with the right connections now it is easy to connect using the screw terminals.

The AVS-DEVKIT-AS(C)5216 contains the PCB-IO-EXT-BES Printed Circuit Board. This board has several screw terminals for easy connectivity to the IO points, a BNC con-

nector for the input trigger as well a push button for manual control. All outputs have a LED indicating their status (selectable with jumpers). Furthermore RS232 connectors are provided. For the ASC version a power, USB and SYNC connector are on the PCB. The PCB-IO-EXT-BES will be connected to the AvaSpec-ULS or AvaSpec-ULSi IO Connector with an interface cable.

Since the AS7010 and the AS5216 electronic boards share the same IO connections, the AVS-DEVKIT-AS5216 can also be used in combination with the AS7010.

Ordering Information

AVS-DEVKIT-AS5216	• Developer Kit consisting of: PCB-IO-EXT-BES Printed Circuit Board for connection to Avantes Spectrometers with AS5216 or AS7010 electronics boards, to easily control and connect signals to the IO connector. IC-IOEXT-DB26 connection cable to connect the board to DB26 connector.
Service-Mini-MKII-IO	• Service part: Set of mating connectors and wires for AvaSpec-MINI MKII IO connectors.(3 connectors/ 30 wires) This set consists: 3 x mating connector Wurth WTB series 665 010 113 322 and 30 x 150mm precrimped cable Wurth WTB series 665 010 130 115

The Developer Kit makes life easier in the development-stage. Connecting the screw terminals will enable you to get your application up and running in no-time!

OEM Spectrometer: Enclosures

For OEM (Original Equipment Manufacturer) customers, Avantes offers a line of enclosures for their spectrometers. There are multiple enclosures available for different combinations of AvaBenches and circuit boards.

AVS-HOUSING   AVS-HOUSING-EVO-ULS   AVS-HOUSING-DUAL   AVS-HOUSING-EVO-HSC

AVS-HOUSING-IND   AVS-HOUSING-DUAL-IND   AVS-HOUSING-HSC-OEM   AVS-HOUSING-NIR1.7-OEM

Ordering Information

AVS-HOUSING	• Aluminum housing to fit AvaBench-75 and AS-5216 board.
AVS-HOUSING-EVO-ULS	• Aluminum housing to fit AvaBench-75 and AS-7010 board.
AVS-HOUSING-DUAL	• Dual-channel aluminum housing to fit two AvaBench-75 and AS-5216/7010 boards.
AVS-HOUSING-EVO-HSC	• Aluminum housing to fit AvaBench-100 and AS-7010 board.
AVS-HOUSING-IND	• Neutral black aluminum housing to fit AvaBench-75 and AS-5216/7010 board with mounting ears
AVS-HOUSING-DUAL-IND	• Dual-channel neutral black aluminum housing to fit 2 AvaBench-75 and 2 AS-5216/7010 boards with mounting ears
AVS-HOUSING-HSC-OEM	• Stainless steel housing to fit AvaBench-100 and AS-7010 board.
AVS-HOUSING-NIR1.7-OEM	• Stainless steel housing to fit AvaBench-50 and AS-7010 board, with mounting ears.

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AvaSpec Spectrometer Interface Cables

Avantes offers a wide range of cables to connect your AvaSpec spectrometer to an AvaLight series light source or one of our many accessories (Fiber-optic switches, AvaTrigger, etc).

In the table below, the cable options for your light source or accessory application can be found. Please note that the cables generally are 2 meters long, but custom lengths are available on request.

Interface cables

USB2/EVO platform spectrometers (DB26 / SMB connector)

Connect to	Product code	Description
RS-232	IC-DB26/DB9-2	Interface cable AvaSpec-USB2 platform DB26 male to RS232 DB9 female cable, 2 m
AvaLight-S / AvaLight-XE	IC-DB26-2	Interface cable AvaSpec-USB2/EVO platform to DB15 for AvaLight-S with shutter for auto-save dark/ lamp off, AvaLight-XE control
BNC-Ext. hardware trigger	IC-DB26-EXTRIG-BNC-2	Interface cable AvaSpec-USB2/EVO platform to BNC plug External trigger, 2 m
External Hardware Trigger	IC-Extrig-USB2	Interface cable AvaSpec-USB2/EVO to External trigger pushbutton, 2 m
RS-232 AvaLight-S / AvaLight-XE	IC-DB26/DB9/DB15-2	Interface Y cable AvaSpec-USB2 platform to RS-232 (DB9) and AvaLight-S (DB15) with shutter for auto save dark/ lamp off, AvaLight-XE control
Avalight-S / Avalight-XE External Hardware Trigger	IC-DB26-Extrig-USB2	Interface Y-cable AvaSpec-USB2/EVO to External trigger pushbutton and AvaLight-S with shutter, 2 m
Other spectrometer	IC-COAX-SMB-0.25	Synchronization coax cable with 2 SMB connectors 0.25 m for AvaSpec-USB2/EVO platform