Electronics & Software

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64ch DAQ system with BioWare

Type 5695B..

Data acquisition and analysis system for Biomechanics

Data acquisition system for connecting and controlling up to 8 multicomponent force plates with integral charge amplifiers. The system is connected to a USB 2.0 port of the PC and operated with the included software BioWare.

- Easy installation with USB 2.0
- Connection of up to 8 force plates
- Remote control of integral charge amplifiers
- Powerful data acquisition and signal processing
- Versatile digital control and synchronization options
- Analog output

Description

The DAQ system with BioWare Type 5695B1 consists of a connecting box for up to 8 Kistler multicomponent force plates and one integral 16-bit A/D converter to digitize the plates' analog output signals. All analog input signals are additionally availagle as unfiltered analog output on two 37-pol D-Sub female connectors. The system is connected to a USB 2.0 high speed port of the PC. The integral charge amplifiers of the connected Kistler force plates are supplied via the connecting box and controlled by means of the supplied software (measuring range and reset/operate).

The DAQ system Type 5695B... can also be controlled by 3rd party software that is utilizing the software interface (API) BioWare dataserver.dll. The software interface (API) Bioware dataserver.dll is available for download at the Kistler website.

Application

The DAQ system Type 5695B... is designed specifically to fully exploit the capabilities of Kistler's piezoelectric force plates Type 9260AA, 9281EA, 9286BA and 9287CA in biomechanics applications. The 16-bit resolution of the measurement signals and the high sampling rate in conjunction with Kistler force plates allow a very wide range of applications. The system as a whole is therefore equally ideal for measuring highly dynamic processes, very small measurands and slow phenomena. Furthermore, it is possible to acquire any other analog signals (0 ... ±10 VDC) instead of those of Kistler force plates.

The integrated analog anti-aliasing filters limit the bandwidth and increase the quality of the digitized data.

The additional options of acquiring any analog signals rather than just those from force plates, and the versatile digital control and synchronization options underscore the versatility of the system for use in basic research, sports science, gait analysis, neurology, ergonomics, etc., etc.

Technical data

General data

Dimensions	mm	208x70x265
Weight	kg	2.3
Operating temperature range	°C	0 ... 50

Power supply voltage

Galvanically isolated between input-, output- and control-GND (40 V max.)		
Power supply	VDC	10 ... 36
Power consumption max. (force plate connectors)	W	<10
Power consumption max (camera connectors) *	W	<25

A/D-converter

Number of channels		64
Resolution (per channel)	Bit	16
Input voltage range (software selectable)	V	±0.1; ±0.2; ±0.5; ±1; ±2; ±5; ±10
Input voltage (max.)	V	±20
Sampling rate max.	S/s	10,000

Analog anti-aliasing-filter

Cut-off frequency	Hz	500
Order		3.
Type		Butterworth

Connections

	USB 2.0
USB In (uplink to the PC)	USB Typ B, fem.

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Force plate 1 ... 8 — D-Sub25, fem.

Power supply per force plate	VDC	12
Supply current (max.)	mA	50

Control I/O — D-Sub9, fem.

Galvanically isolated between input-, output- and control-GND (40 V max.)		
Trigger Input/Sync Input (10 kΩ Pull-Down)		
High (+12 V max.)	VDC	>2,3
Low	VDC	<1
Trigger Output/Sync Output/Sampling Clock Output/Reserve Output		
High @Iout = 10 µA/2 mA	VDC	>4,9/>4,4
Low @Iout = 10 µA/2 mA	VDC	<0,1/<0,35

Camera 1 … 10* — Lemo 4p, fem.

Power supply	VDC	12
Supply current (max. per camera for 10)	mA	200
Sync Output		
High @ Iout = 10 µA/2 mA	VDC	>4.9 / >4.4
Low @ Iout = 10 µA/2 mA	VDC	<0.1 / <0.35

Start — 6.3mm Jack Plug

10kΩ Pull-Up to 5V		

Digital control and synchronization options

Trigger-Input
Sync Input
Trigger Output
Sync Output
Sampling Clock Output
Reserve Output

The instrument follows the Directives 2014/30/EU and conforms with the following standards:
- EN 61000-6-3 (Generic standards - Emission standard for residential, commercial and light-industrial environments)
- EN 61000-6-2 (Generic standards - Immunity standard for industrial environments)
- EN 61326-1 / Class A (Product standard - Electrical equipment for measurement, control and laboratory use)

Software
The DAQ system 5695B... can be operated with Kistler BioWare, MARS or by 3rd party software that is utilizing the software interface (API) BioWare dataserver.dll.
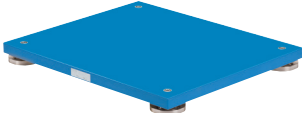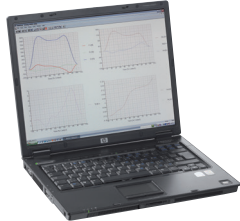* 5695BQ2 only

Typical measuring chains

Force plate with charge amplifier Type 9260AA6	Connection cable Type 1700A107A10	DAQ system (USB 2.0) Type 5695B1	Laptop (provided by user) with BioWare

Fig. 1:   Configuration of a typical measuring chain with DAQ system with BioWare
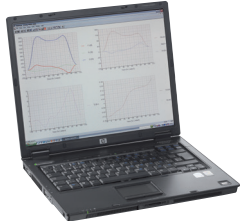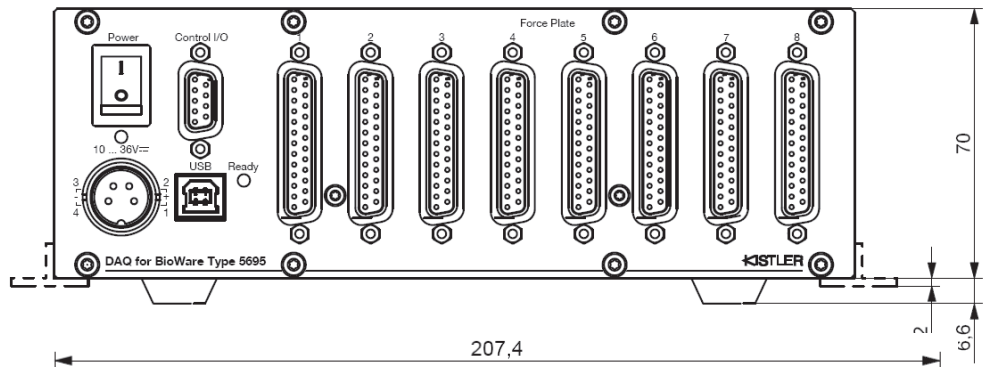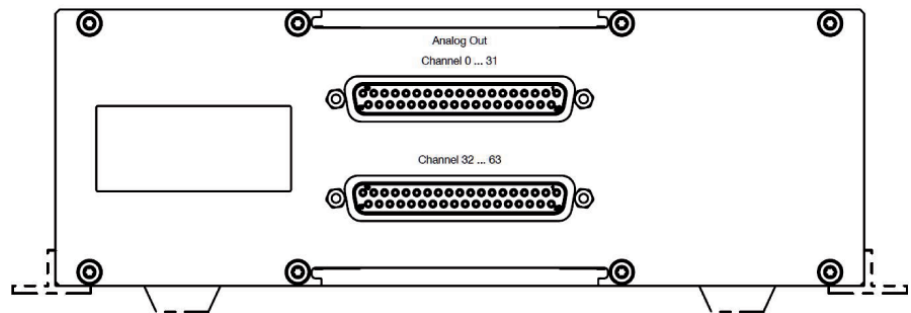

Force plate with charge amplifier Type 9281EA	Connection cable Type 1700A105A10	DAQ system (USB 2.0) Type 5695B	Laptop (provided by user) with utilization of BioWare dataserver.dll

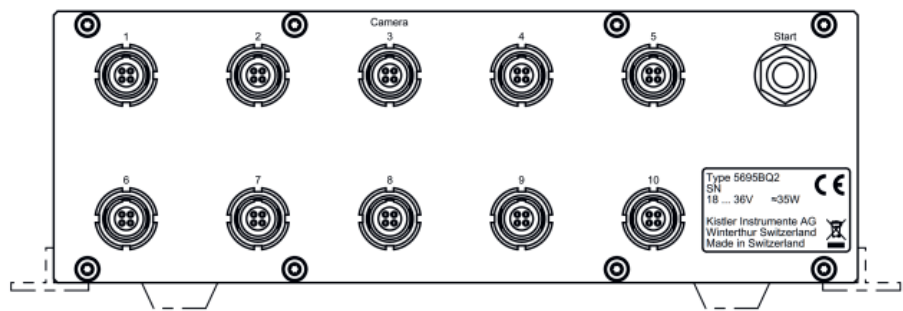Fig. 2:   Configuration of a typical measuring chain with DAQ system with BioWare dataserver.dll

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Front view

Back view Type 5695B

Back view Type 5695BQ2

Connections

Force Plate 1 ... 8

Pin	Function	Pin	Function
1	A (Range x,y select)	14	B (Range x,y select)
2	Operate	15	Control GND
3	Fy 2+3	16	Fx 3+4
4	Fx 1+2	17	Fy 1+4
5	Signal GND	18	n.u.
6	n.u.	19	n.u.
7	A' (Range z select)	20	B' (Range z select)
8	Fz 1	21	Fz 4
9	Fz 3	22	Fz 2
10	Signal GND	23	Test / no Test
11	n.u.	24	Overload (n.u.)
12	n.u.	25	Exct. 12 VDC
13	Exct. GND		

25-pol female

5695BQ2 only: Pin 4 (Fx1+2) is interrupted on Force Plate 8 (Ain 56 is used as Trigger signal for start system)

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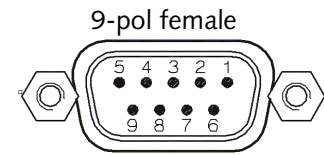
Connections (continuation)

Control I/O

Pin	Funktion	Pin	Funktion
1	3,3 V Input	6	Trigger Input
2	Sync Input	7	GND Input
3	Trigger Output	8	Sync Output
4	Reserve Output	9	Sampling Clock Output
5	GND Output		

9-pol female

Power 18 … 36 VDC

Pin	Funktion
1	18 … 36 VDC
2	18 … 36 VDC
3	GND
4	GND

M12   4-pol male
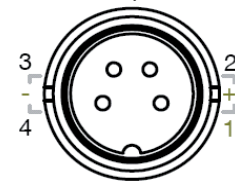
Camera 1...10

Pin	Funktion
1	GND Camera
2	+12V Camera
3	GND Camera
4	Sync Output

Start

Pin	Function
Tip	Trigger (internal Pull-Up to +5V)
Ring	n.u.
Sleeve	GND

6,3mm Jack Plug
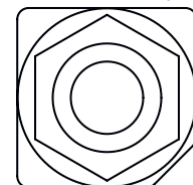
Analog out

Channels 0 … 31

Force Plate				Ch		Ch		Force Plate
Force Plate 1	Fx1+2	Ch 0		Ch 1	Fx3+4			Force Plate 1
	Fy1+4	Ch 2		Ch 3	Fy2+3			
	Fz1	Ch 4		Ch 5	Fz2			
	Fz3	Ch 6		Ch 7	Fz4			
Force Plate 2	Fx1+2	Ch 8		Ch 9	Fx3+4			Force Plate 2
	Fy1+4	Ch 10		Ch 11	Fy2+3			
	Fz1	Ch 12		Ch 13	Fz2			
	Fz3	Ch 14		Ch 15	Fz4			
Force Plate 3	Fx1+2	Ch 16		Ch 17	Fx3+4			Force Plate 3
	Fy1+4	Ch 18		Ch 19	Fy2+3			
	Fz1	Ch 20		Ch 21	Fz2			
	Fz3	Ch 22		Ch 23	Fz4			
Force Plate 4	Fx1+2	Ch 24		Ch 25	Fx3+4			Force Plate 4
	Fy1+4	Ch 26		Ch 27	Fy2+3			
	Fz1	Ch 28		Ch 29	Fz2			
	Fz3	Ch 30		Ch 31	Fz4			
		AGND		AGND				

Channels 32 … 63

Force Plate				Ch		Ch		Force Plate
Force Plate 5	Fx1+2	Ch 32		Ch 33	Fx3+4			Force Plate 5
	Fy1+4	Ch 34		Ch 35	Fy2+3			
	Fz1	Ch 36		Ch 37	Fz2			
	Fz3	Ch 38		Ch 39	Fz4			
Force Plate 6	Fx1+2	Ch 40		Ch 41	Fx3+4			Force Plate 6
	Fy1+4	Ch 42		Ch 43	Fy2+3			
	Fz1	Ch 44		Ch 45	Fz2			
	Fz3	Ch 46		Ch 47	Fz4			
Force Plate 7	Fx1+2	Ch 48		Ch 49	Fx3+4			Force Plate 7
	Fy1+4	Ch 50		Ch 51	Fy2+3			
	Fz1	Ch 52		Ch 53	Fz2			
	Fz3	Ch 54		Ch 55	Fz4			
Force Plate 8	Fx1+2	Ch 56		Ch 57	Fx3+4			Force Plate 8
	Fy1+4	Ch 58		Ch 59	Fy2+3			
	Fz1	Ch 60		Ch 61	Fz2			
	Fz3	Ch 62		Ch 63	Fz4			
		AGND		AGND				

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Synchronization

The synchronization signals are available at control-I/O connector. There are four basic functions:

A) The measurement is started on a key and stopped after time of scanning (BioWare). On each analog scan the "Sync Output" generates a pulse. On the first sample, the "Trigger Output" generates a pulse.
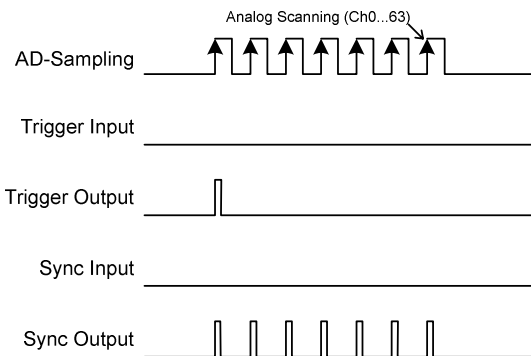
B) The measurement is started by "Trigger Input" and stopped after time of scanning (BioWare). On each analog scan the "Sync Output" generates a pulse. On the first sample, the "Trigger Output" generates a pulse.
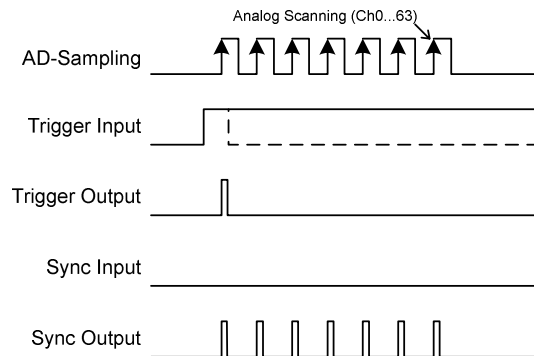

C) The measurement is started by "Trigger Input" and stopped after time of scanning (BioWare). The analog scans are synchronous to "Sync Input". On each analog scan the "Sync Output" generates a pulse. On the first sample, the "Trigger Output" generates a pulse.
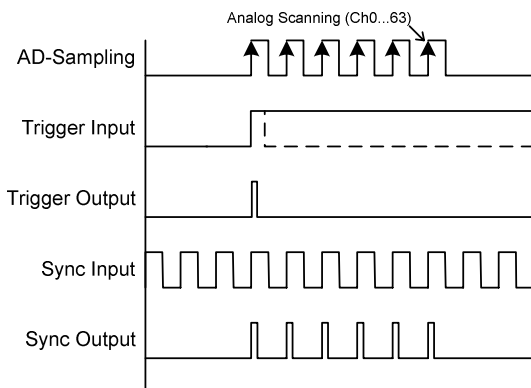
D) The measurement is exclusively controlled by "Sync Input". The DAQ board executes an analog scan on each pulse of "Sync Input". On each analog scan the "Sync Output" generates a pulse. On the first sample, the "Trigger Output" generates a pulse.
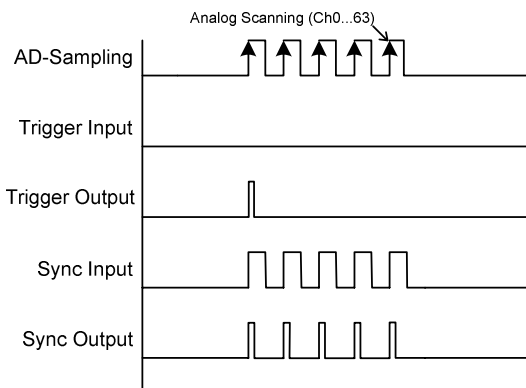
The polarity (rising edge, falling edge, active high or active low) of trigger and sync signals can be selected by the software.

The minimal pulse width of input signals is 10 µs. The signal "Sync Output" can be divided by 2 ... 16, to synchronize a fast force-acquisition (Force Plate) with a lower speed video analyzing system.
(Example: Force Plate Sampling Rate = 1 kS/s, Video Analyzing System = 100 Frames/s)

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Included accessories	Type/Mat. No.
For all Types	
• USB 2.0 cable, length 1.8 m	65009959
• 4x Self-adhesive feet, black, 20.5x7.6 mm	65008306
5695B	
• Universal AC/DC adapter, 100…240 V ~ to 24 VDC 24 W	65009193
5695B1	
• BioWare Software	2812A
• Universal AC/DC adapter, 100…240 V ~ to 24 VDC 24 W	65009193
5695B2	
• Kistler MARS Software, Full Version	2875A1
• Universal AC/DC adapter, 100…240 V ~ to 24 VDC 24 W	65009193
5695BQ2	
• Universal AC/DC adapter, 100…240 V ~ to 24 VDC 50.4 W	55140838
• 8x Protective cover DSub 25-pole f	55137572
• 1x Protective cover DSub 9-pole f	55140957
• 10x Protective cover Lemo-Connector	55170419

Ordering key

Type 5695B ☐

DAQ system

with BioWare*	–
with Kistler MARS	2

*Free download from Kistler website

Type 5695BQ2 ☐

DAQ system

with camera connectors (Lemo)	–

5695A_003-093e-07.21