

GSV-6PI

6-channel measuring amplifier shield for Raspberry PI

5x input configurable:

strain gauges full, half, quarter bridge, 120- 350- 1000 Ohm, PT1000, $\pm 10V$

1x input strain gauge full bridge

suitable for force / torque sensors K6D / F6D

Configuration of digital filters by setting the data frequency

Low pass filters configurable from 0.1Hz to 1kHz

Additional digital filters IIR of 4th order and FIR of 14th order are individually configurable

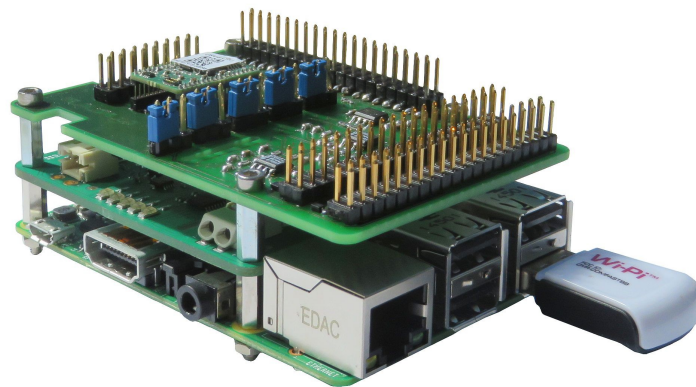
resolution < 250 nV/V

Data frequency configurable

10 Hz... 2kHz for 1...3 channel applications

10Hz ... 500Hz for 4...6 channel applications

OpenSource scripts on <http://github.com/me-systeme>



Description

The product GSV-6PI enables the connection of the GSV-6CPU to a Raspberry PI.

The GSV-6PI contains a Raspberry PI 2B, a shield with uninterrupted power supply "S.USV pi advanced" from Seprotronic, as well as a shield with GSV-6CPU from me-systeme.

The GSV-6PI is suitable for data acquisition of 6 analog signals with 16Bit resolution at data frequencies up to 500Hz.

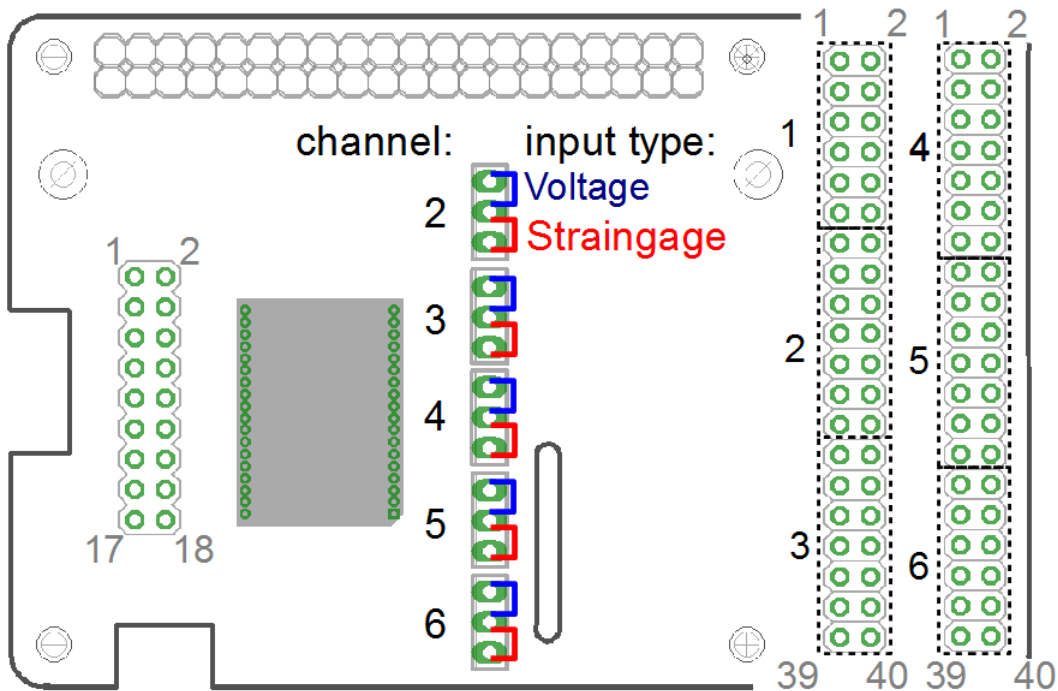
The analog inputs 2 to 6 are configurable for



- strain gauges (full bridges, half bridges, quarter bridges)
- voltage +-10V
- PT1000

The analog input no. 1 is for strain gauges only (full bridges, half bridges, quarter bridges).

Pin assignment



18 pol. pin strip

Description	Symbol	PIN	PIN	Symbol	Description
Pos. operating voltage 5V	5V_Raspi	1	2	GND	Mass operating voltage
	SPI_MOSI	3	4	SPI_MISO	
	SPI_SCK	5	6	SPI_CS	
	RX_TTL_3,3 V	7	8	TX_TTL_3,3 V	
	CAN_RX	9	10	CAN_TX	
	I ² C_SCL	11	12	I ² C_SDA	
	Scale	13	14	Tara	
	SW1	15	16	TED	
	SW3	17	18	SW2	
	GND	19	20	3,3V_GSV	



40 pol pin strip No. 1

Description	Symbol	PI N	PIN	Symbol	Description
pos. bridge supply K1	US+_K1	1	2	UF+_K1	pos. sensor cable K1
pos. differential input K1	Ud+_K1	3	4	UD-_K1	neg. differential input K1
neg. sensor cable K1	UF-_K1	5	6	US-_K1	neg. bridge supply K1
completion half bridge K1	HB_K1	7	8	QB120_K1	completion quarter bridge 120 Ω K1
completion quarter bridge 350 Ω K1	QB350_K1	9	10	QB1k_K1	completion quarter bridge 1 k Ω K1
pos. operating voltage 5V	5V_Raspi	11	12	GND	mass operating voltage
mass voltage input K2	GND_K2	13	14	Uin_K2	voltage input K2
pos. bridge supply K2	US+_K2	15	16	UF+_K2	pos. sensor cable K2
pos. differential input K2	Ud+_K2	17	18	UD-_K2	neg. differential input K2
neg. sensor cable K2	UF-_K2	19	20	US-_K2	neg. bridge supply K2
completion half bridge K2	HB_K2	21	22	QB120_K2	completion half bridge 120 Ω K2
completion half bridge 350 Ω K2	QB350_K2	23	24	QB1k_K2	completion half bridge 1 k Ω K2
pos. operating voltage 5V	5V_Raspi	25	26	GND	mass operating voltage
mass voltage input K3	GND_K3	27	28	Uin_K3	voltage input K3
pos. bridge supply K3	US+_K3	29	30	UF+_K3	pos. sensor cable K3
pos. differential input K3	Ud+_K3	31	32	UD-_K3	neg. differential input K3
neg. sensor cable K3	UF-_K3	33	34	US-_K3	neg. bridge supply K3
completion half bridge K3	HB_K3	35	36	QB120_K3	completion half bridge 120 Ω K3
completion quarter bridge 350 Ω K3	QB350_K3	37	38	QB1k_K3	completion quarter bridge 1 k Ω K3
pos. operating voltage 5V	5V_Raspi	39	40	GND	mass operating voltage

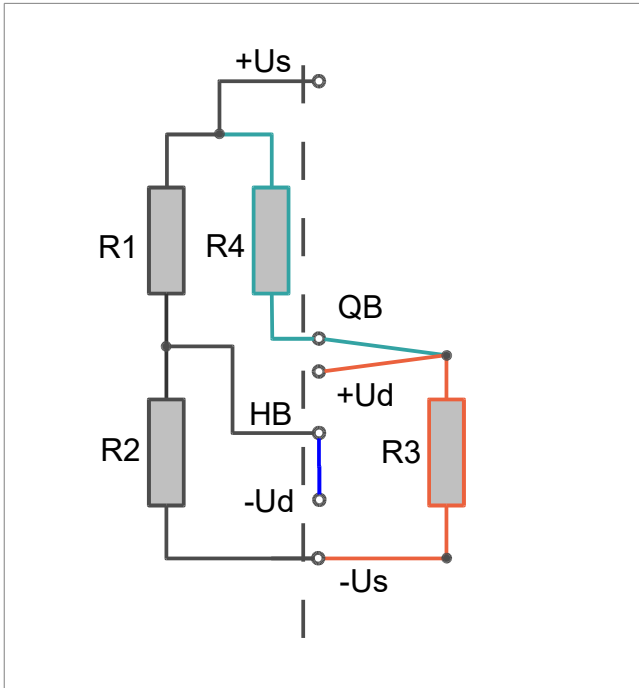
40 pol pin strip No. 2

Description	Symbol	PIN	PIN	Symbol	Description
mass voltage input K4	GND_K4	1	2	Uin_K4	voltage input K4
pos. bridge supply K4	US+_K4	3	4	UF+_K4	pos. sensor cable K4
pos. differential input K4	Ud+_K4	5	6	UD-_K4	neg. differential input K4



Description	Symbol	PIN	PIN	Symbol	Description
neg. sensor cable K4	UF_-K4	7	8	US_-K1	neg. bridge supply K4
completion half bridge K4	HB_K4	9	10	QB120_K4	Completion quarter bridge 120 Ω K4
completion quarter bridge 350 Ω K4	QB350_K4	11	12	QB1k_K1	Completion quarter bridge 1 k Ω K4
pos. operating voltage 5V	5V_Raspi	13	14	GND	mass operating voltage
mass voltage input K5	GND_K5	15	16	Uin_K5	voltage input K5
pos. bridge supply K5	US+_K5	17	18	UF+_K5	pos. sensor cable K5
pos. differential input K5	Ud+_K5	19	20	UD_-K5	neg. differential input K5
neg. sensor cable K5	UF_-K5	21	22	US_-K5	neg. bridge supply K5
completion half bridge K5	HB_K5	23	24	QB120_K5	completion quarter bridge 120 Ω K5
completion quarter bridge 350 Ω K5	QB350_K5	25	26	QB1k_K5	completion quarter bridge 1 k Ω K5
pos. operating voltage 5V	5V_Raspi	27	28	GND	mass operating voltage
mass voltage input K6	GND_K6	29	30	Uin_K6	voltage input K6
pos. bridge supply K6	US+_K6	31	32	UF+_K6	pos. sensor cable K6
pos. differential input K6	Ud+_K6	33	34	UD_-K6	neg. differential input K6
neg. sensor cable K6	UF_-K6	35	36	US_-K6	neg. bridge supply K6
completion half bridge K6	HB_K6	37	38	QB120_K6	completion quarter bridge 120 Ω K6
completion quarter bridge 350 Ω K6	QB350_K6	39	40	QB1k_K6	completion quarter bridge 1 k Ω K6

Connection of strain gauge quarter bridge

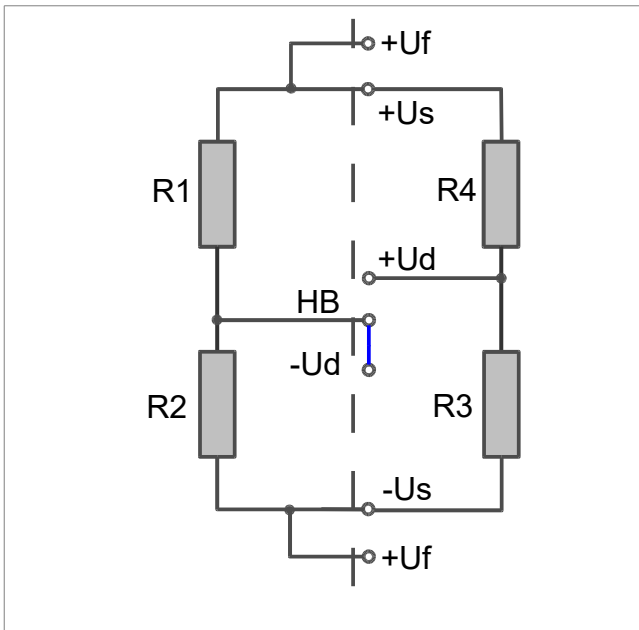


The active strain gauge R3 is connected in 3-wire technology.

At connection QB supplementary resistances 120 Ohm (QB = Q120), 30 Ohm (QB = Q350) and 1 kOhm (QB = Q1k) are carried out.

The internal half bridge R1, R2 is activated with a bridge from HB to -Ud.

Connection of strain gauge half bridge

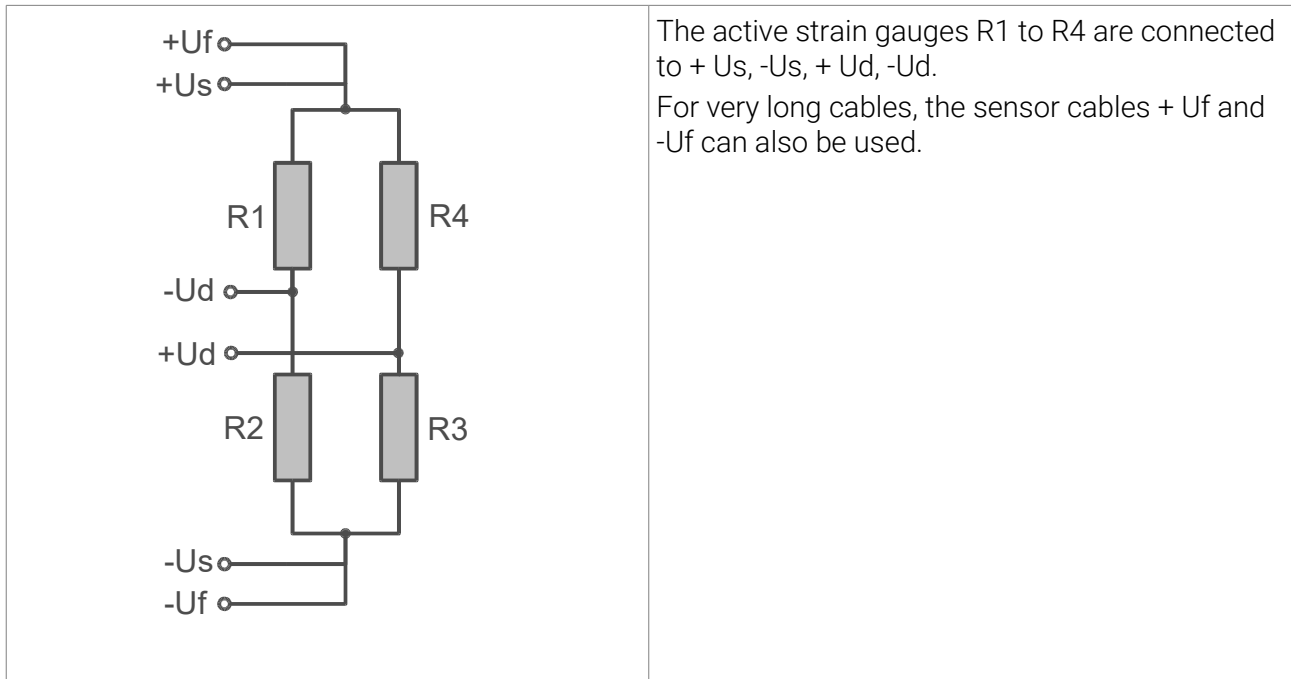


The active strain gauges R3 and R4 are connected to +Us, +Ud and -Us.

For very long cables, the sensor cables +Uf and -Uf can be used.

The internal half bridge R1, R2 is activated with a bridge from HB to -Ud.

Connection of strain gauge full bridge



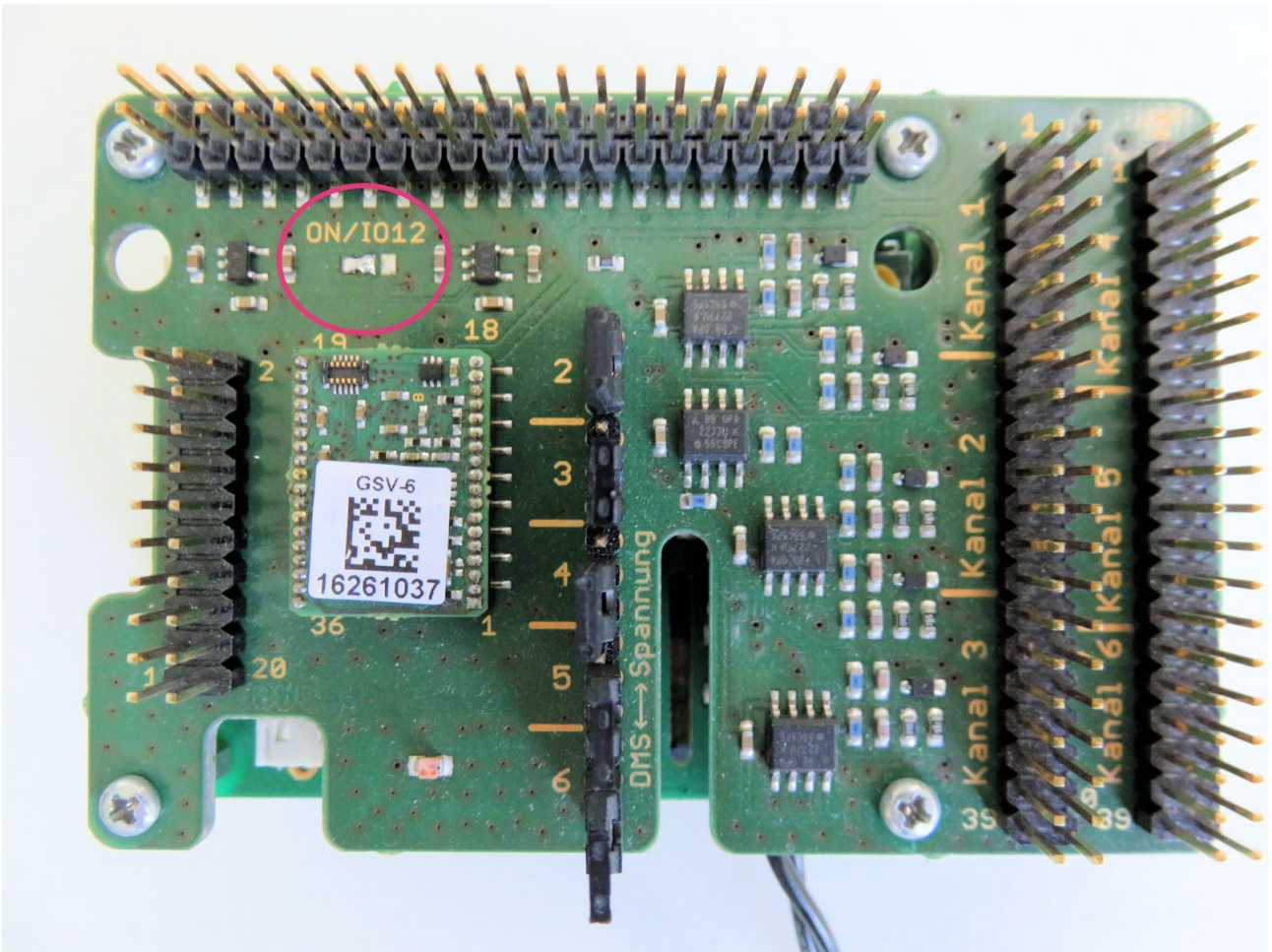
Connection of active sensors

The voltage signal from active sensors is applied to Ue and GNDE. Potentiometric sensors can be powered by + Us. The supply of active sensors with energy can optionally take place via galvanically insulated voltage VCCIO and GNDIO.

GPIO Ports of Raspberry PI

The GSV-6CPU communicates with the Raspberry PI via the UART interface (GPIO 14, TXD0, GPIO15, RXD0).

Via the GPIO12 it is possible to switch the GSV-6CPU on and off. By default, the solder bridge is in the "ON" position. The GSV-6CPU is permanently on. Opening the ON position and closing the IO12 position activates this function. In this case, the GSV-6CPU will be on only if there is a high level on GPIO12.



Changelog

Version	Datum	Änderungen
ba-gsv6pi_ver1.odt	07/16 2016	Initial Version
ba-gsv8_ver1.1.odt	05/29.2018	Documentation of GPIO added