SQUIB Loadbox

Hardware version	1.0
Software version	
Technical data sheet version:	1.0
Created:	3/13/2017

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Safety instructions

To avoid damages to persons and devices the following safety instructions have to be noticed!

- Only qualified personnel are allowed to handle this device!
- Before any handling within the device the current supply has to be switched off!
- During operation the device have to be positioned, that enough air condition is supplied and no small parts can get into the ventilation slots.
- In case of any trouble the system has to be switched de-energized!
- The declared environmental conditions and max. voltage ranges have to be observed!
- To warranty the device remove all dust and dirt in periodically intervals.
- Make sure that the ventilation slots are unobstructed!

Intended Use:

The SQUIB Loadbox is engineered to simulate the Squibs which are integrated in the automotive technic and to simulate the block switches of the airbag-testing-systems.

- The device is only permitted to use for the intended use.
  Any other use results the deletion of the guarantee!

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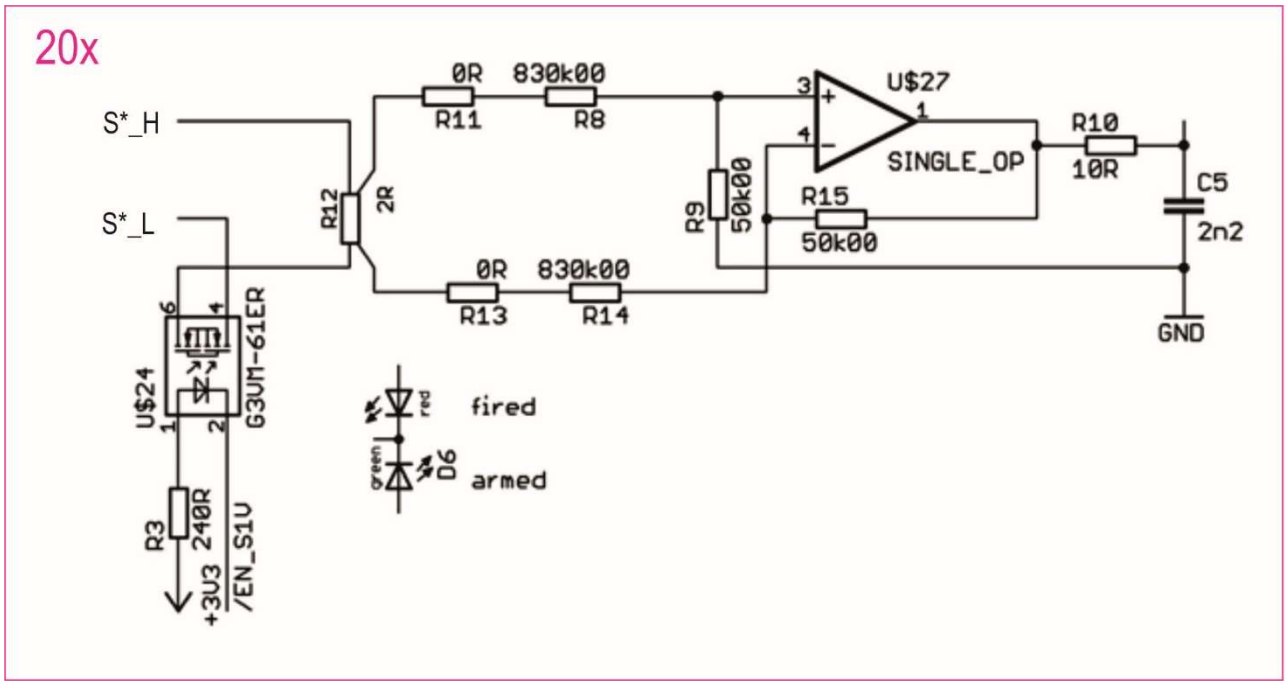
1. 20x Times SQUIB Load Simulation

The SQUIB-Board contains the switchable SQUIB-Stages. For the current measurement the voltage drop via a 2 Ohm SQUIB-Resistor will be used, gets processed via a difference amplifier and a 12-Bit AD Converter. The measurement takes place directly on the thermals of the 2 Ohm shunt.



Measurement range	U_{max}	Sampling rate
0 …2,5A	48V	20 µs (50 kHz)

The switching step can be switched selectively.
To prevent an overloading of the shunts and the load resistance, the opto-switch has a software controlled automatic switch-off.
For on-board-copper-traces and connectors the whole resistor-path becomes appr. 2.1 … 2.5 Ohm.
The opto-switch is a bounce-free opto-switch (R_{on} typical 0,1 Ohm).

Imax	U_{max}	R_{on}
2,5A	48V	0,1 Ohm

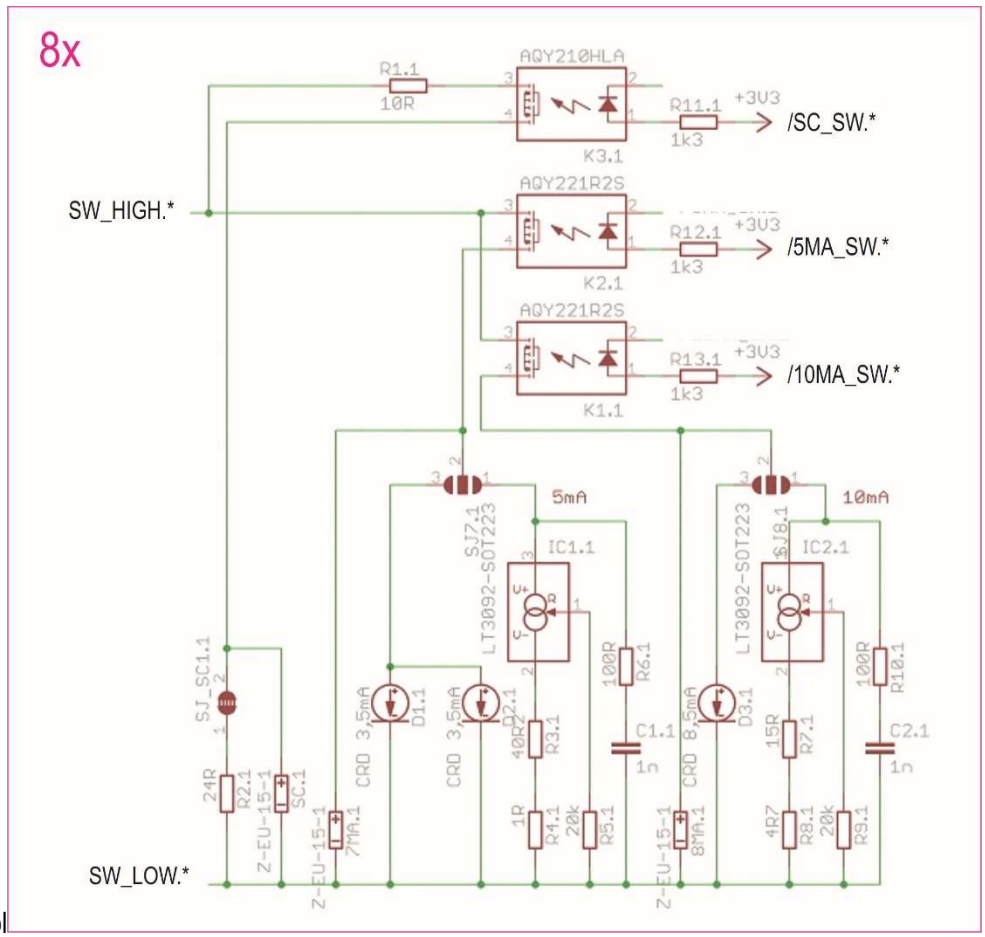
As the measurement is a pseudo-difference-measurement, the GND contact must be connected (4mm Banana-Jack between both WAGO Terminals) with the GND from the controller. The adaption endorse by the WAGO-Terminals.
A bicolor LED shows the state of each step.
Because of the selected measure arrangement and the internal circuit technique, the whole input voltage range must be considered (48V), but only a section (at 2,5A: 5V) becomes analyzed.

2. 8x Times Airbag Block Switch

The base board simulates the metrological switches which can be adapted via the female connector.

The following conditions can be simulated:

- Direct shortcut (app.35 Ohm)
- No connection (∞)
- Active switch (5/10/15 mA)



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Note:

In delivery conditions the LT3092 is used as the current source. By changing the solder strap from 2-1 to 3-2 the current mode diodes can be used.

The selection of each switch ensued via an Opto-Relais. The switching time of the used switches is in the region of 10ms because, for limiting the number of connection lines, we use a serial shift register. Optional only the switching state can be simulated, without simulating the short-cut or disconnection. With solder straps can be specified, that for each single current

- a current regulation diode,
- a constant current source,
- via soldering pins a self-adaptable component should be used.
  (The soldering pins for the self-adaptable component can be found on the solder side,
  so you also can use them after removing the case.)

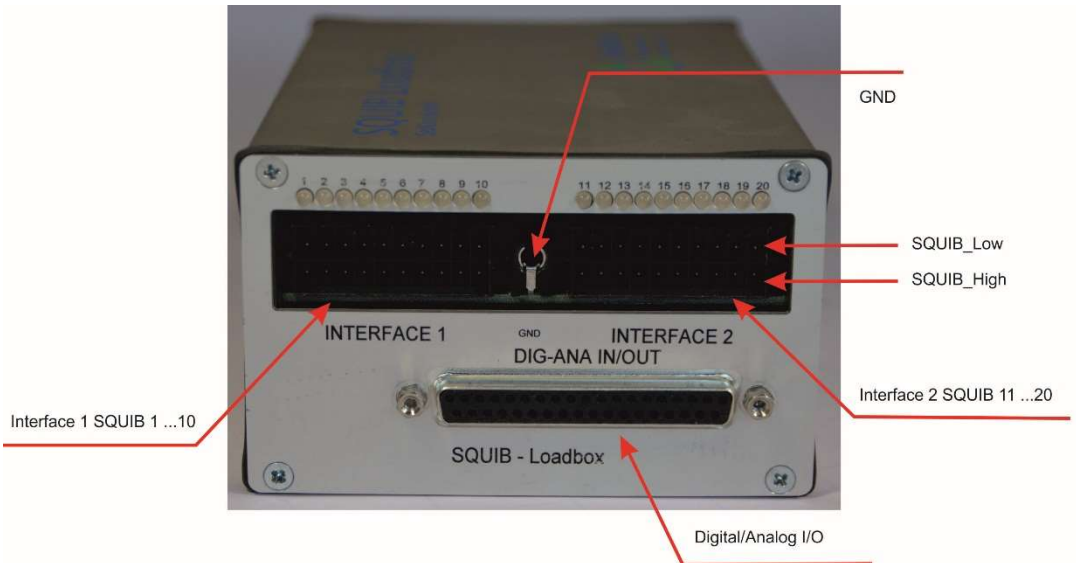
For pin savings, all Switch-Low can be set to GND.

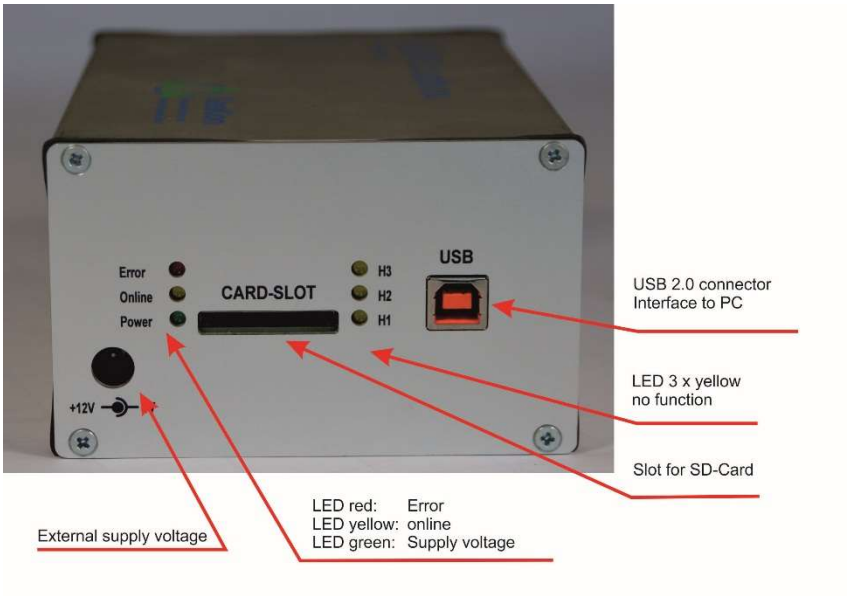
3. Technical Data

Dimensions	165 x 105 x 65 mm
Case material	Alu
Wight	1 kg
Operating temperature range	0°C ... 40°C
Acceleration	Max. 3g
Rel. humidity	Max. 85% not condensed
Supply voltage	5 Volt via USB Current consomption ca. 450 mA
Additonal voltage supply	12 Volt via external supply voltage

Usage sites are electronic engineering labours with corresponding ambient conditions.

4. Interfaces and LEDs

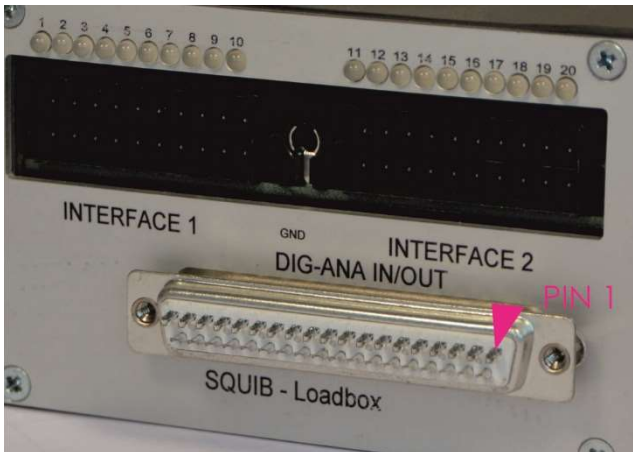




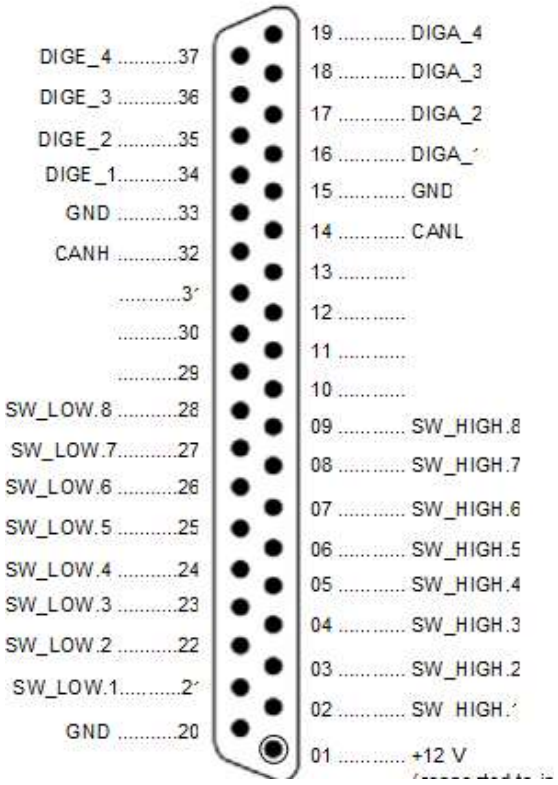
Note:
Supply voltage 12 V via external power adapter (1 Ampére)
Ground of the supply voltage is connected with case!
The cable signals must have the same ground!

5. Pin-assignment 37 pole SUB-D female connector

Pin No.	Base-board SUB-D 37 female
1	Connected to internal +12V via a 120 Ohm resistor for diagnostic purposes
2	Switch 1 High-side
3	Switch 2 High-side
4	Switch 3 High-side
5	Switch 4 High-side
6	Switch 5 High-side
7	Switch 6 High-side
8	Switch 7 High-side
9	Switch 8 High-side
10	n. c.
11	n. c.
12	n. c.
13	n. c.
14	CAN low
15	GND
16	Digital Output 1 (3,3/5V TTL)
17	Digital Output 2 (3,3/5V TTL)
18	Digital Output 3 (3,3/5V TTL)
19	Digital Output 4 (3,3/5V TTL)
20	GND
21	Switch 1 High-side
22	Switch 2 High-side
23	Switch 3 High-side
24	Switch 4 High-side
25	Switch 5 High-side
26	Switch 6 High-side
27	Switch 7 High-side
28	Switch 8 High-side
29	n. c.
30	n. c.
31	n. c.
32	CAN high
33	GND
34	Digital Input 1 (3,3/5V TTL) Used as Trigger-Input
35	Digital Input 2 (3,3/5V TTL)
36	Digital Input 3 (3,3/5V TTL)
37	Digital Input 4 (3,3/5V TTL)



37-pole SUB-D Plug



Connected with internal 12 V
via 150 Ohm resistor
for diagnostical purposes