

PinLightShield and SwitchShield

Quick Guide

Version 1.0

23. Mrz. 2015

PinLightShield

What should be included in your package:

1. The PinLightShield (1)
2. Parts according to part list (see below), if you ordered a DIY kit

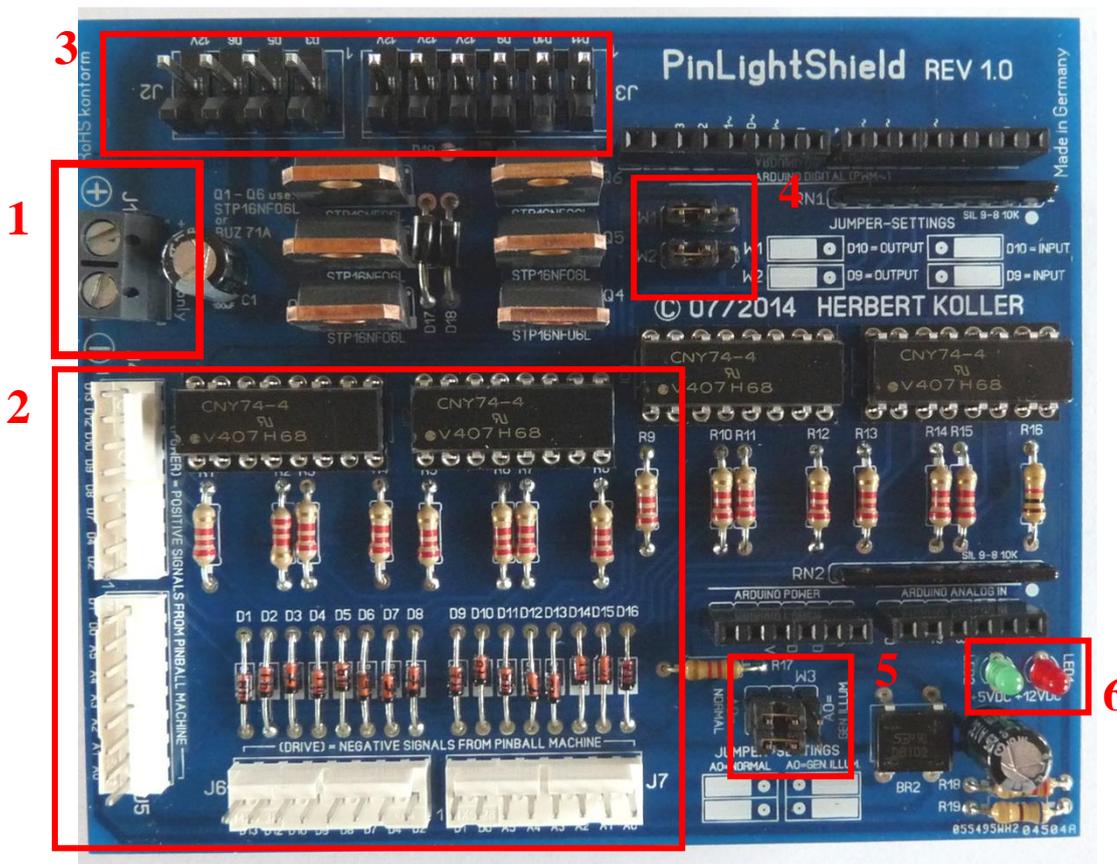
Optional (if you ordered it):

3. 8 pin IDC connectors 0.1" (2.54mm) (4)
4. 6 pin IDC connector 0.156" (3.96mm) (1)
5. 4 pin IDC connector 0.156" (3.96mm) (1)
6. fuseholder for Power connection (1)

What is not included in your package:

- a 12VDC Power Supply
- the Arduino Uno board
- the USB cable for the Arduino Uno
- the connectors you might need to grab the input signals from your pin
- LED strips etc.
- the software

Short description of the PinLightShield:

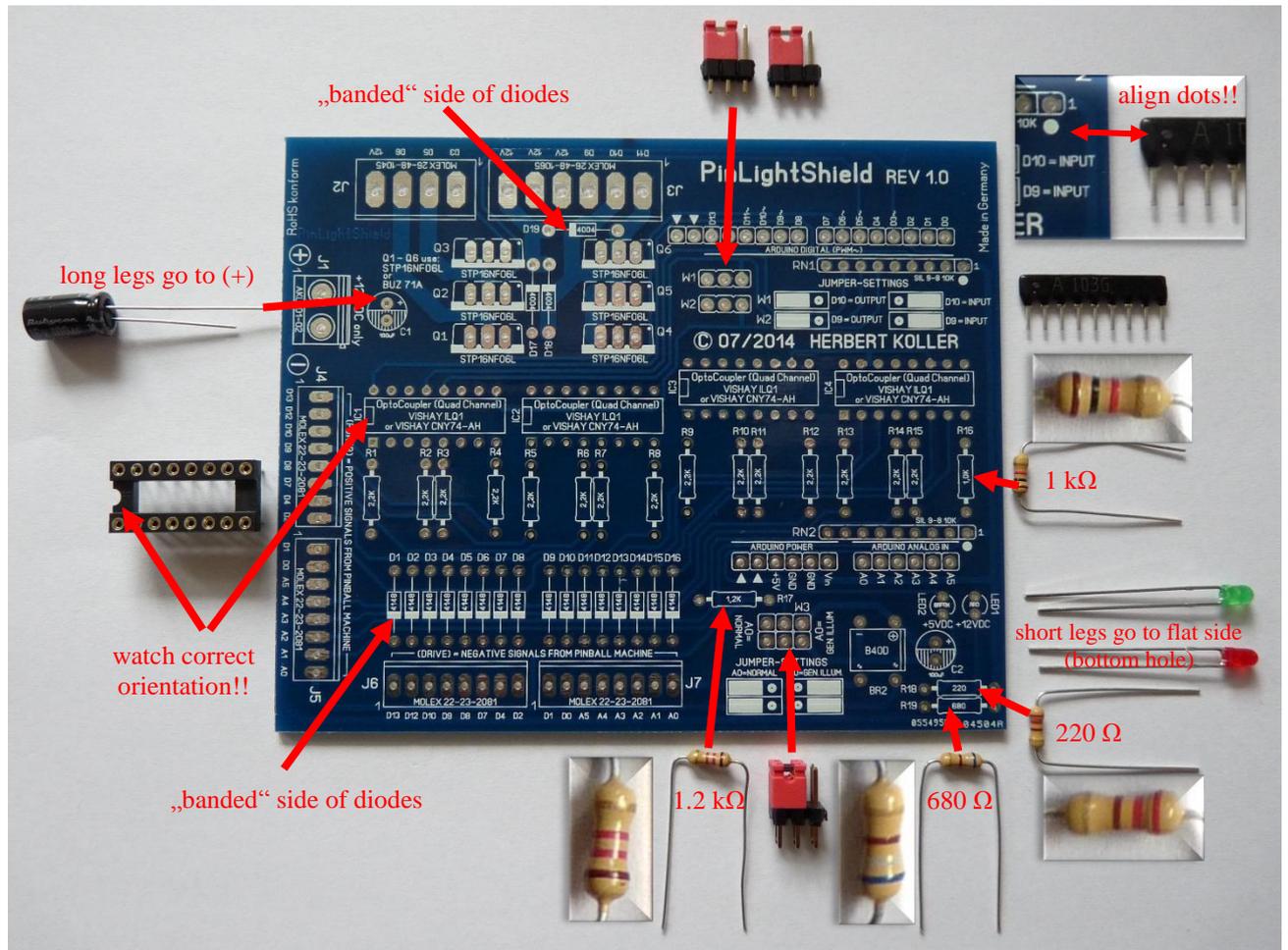


- 1: Power Supply connector J1 (connect to 12VDC, watch correct polarity)
- 2: Input connectors J4-J7 (connect to pinball signals)

- 3: Output connectors J2+J3 (connect to your output devices)
- 4: Jumpers to determine usage of D9 and D10 (W1+W2)
- 5: Jumpers to determine usage of A0 (GI or normal signal) (W3)
- 6: Power LEDs signaling 12 VDC (red) and 5 VDC (green)

Assembly (requires soldering):

The assembly of the PinLightShield should be pretty straightforward as all parts identifiers and values are printed on the board. Nevertheless here are some additional hints to avoid problems:



And here's the list of parts, that were included with your **PinLightShield**:

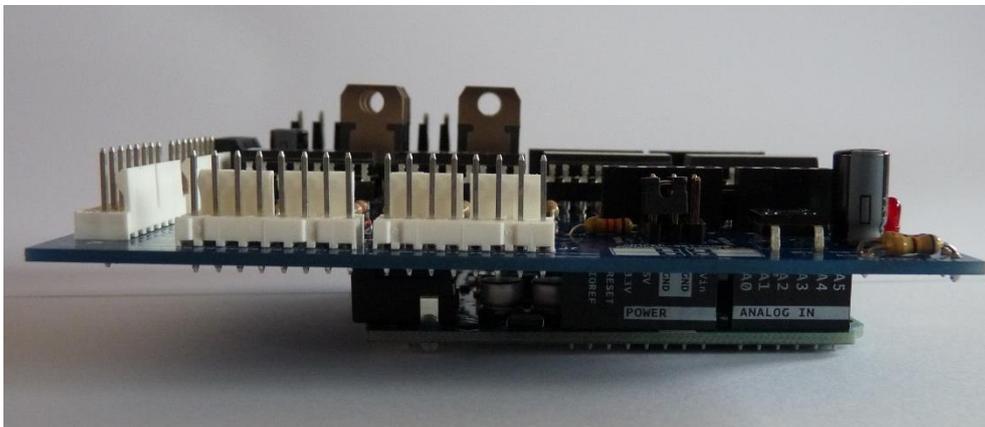
Count	Part	Value
15	R1-R15	2.2kΩ
1	R16	1.0kΩ
1	R17	1.2kΩ
1	R18	220 Ω
1	R19	680 Ω
2	RN1, RN2	8 x 10kΩ
2	C1, C2	100μF 16V
16	D1-D16	1N4148
3	D17-D19	1N4004

1	BR2	B40D
4	OK1-OK4	ILQ1 or CNY 74-4
6	Q1-Q6	STP16 or BUZ 71
1	J1	MKDSN1,5/2-5,08
1	J2	Molex KK-156-4
1	J3	Molex KK-156-6
4	J4-J7	Molex 22-23-2081
1	Arduino Stackable Headers	2 x 6, 2 x 8
4	Jumper 2,54mm	
2	W1, W2	Header 3 pins
1	W3	Header 2x3 pins
4	IC socket 16 pins	
1	LED1	LED red 3mm
1	LED2	LED green 3mm

Installation:



- If you have a PinLightShield REV 1.0 **make sure to** cover the top of the Arduino USB port with insulating tape, otherwise there could be a connection with the Power transistors on the PinLightShield causing potential damage.
- Install PinLightShield on top of Arduino Uno board as you see in the picture below. The rows of connectors sticking out from underneath the PinLightShield fit exactly into the corresponding connectors on the Arduino.



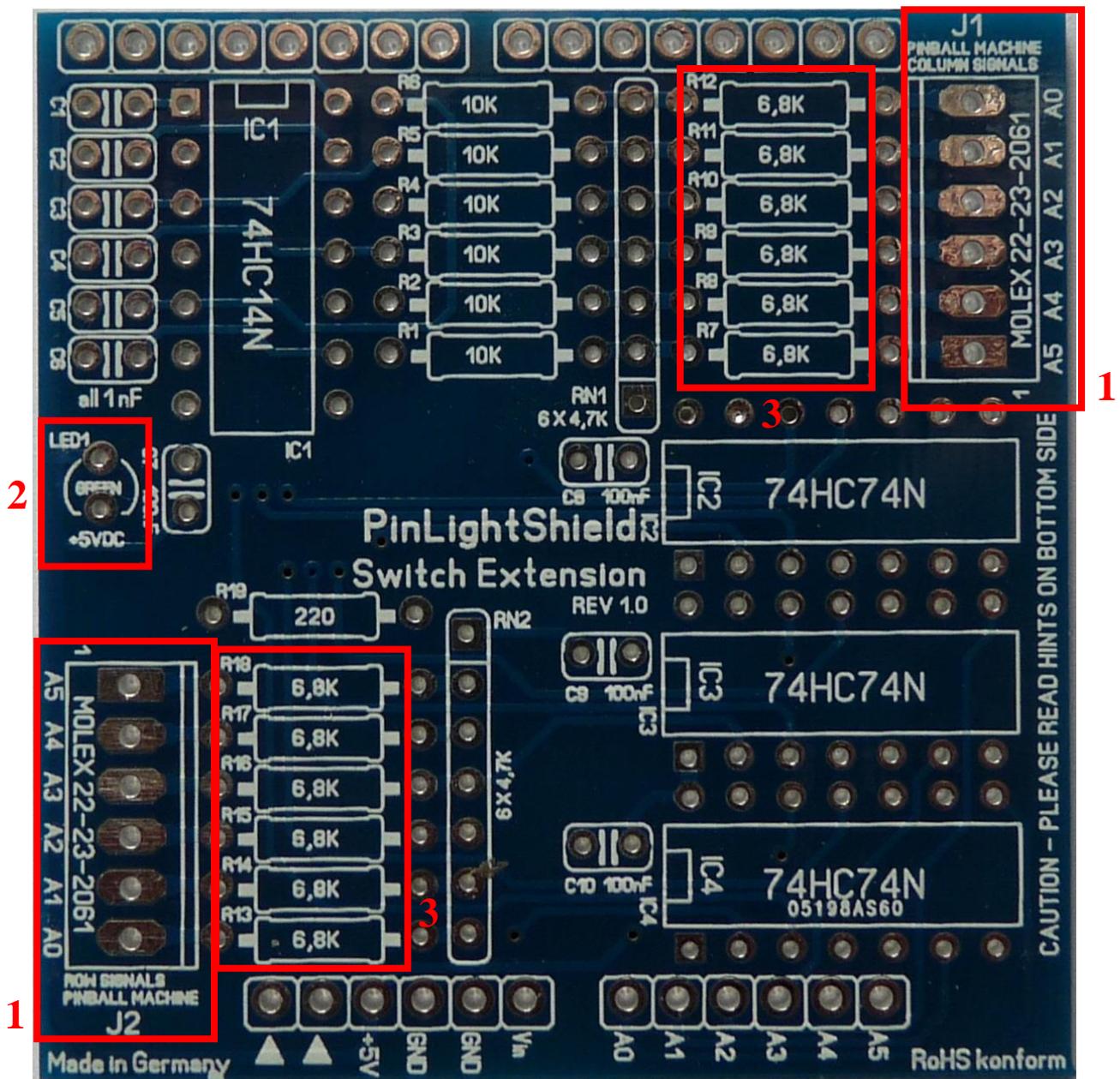
- Connect the PinLightShield to a 12VDC power supply (don't forget to put the fuse in between) and see if both Power LEDs come on.
- Now you are ready to connect your pin with the PinLightShield, connect your output devices and start programming your show!!

SwitchShield

What should be included in your package:

1. The SwitchShield (1)
 2. Parts according to part list (see below), if you ordered a DIY kit
- Optional (if you ordered it):
3. 6 pin IDC connectors 0.1" (2.54mm) (2)

Short description of the SwitchShield:

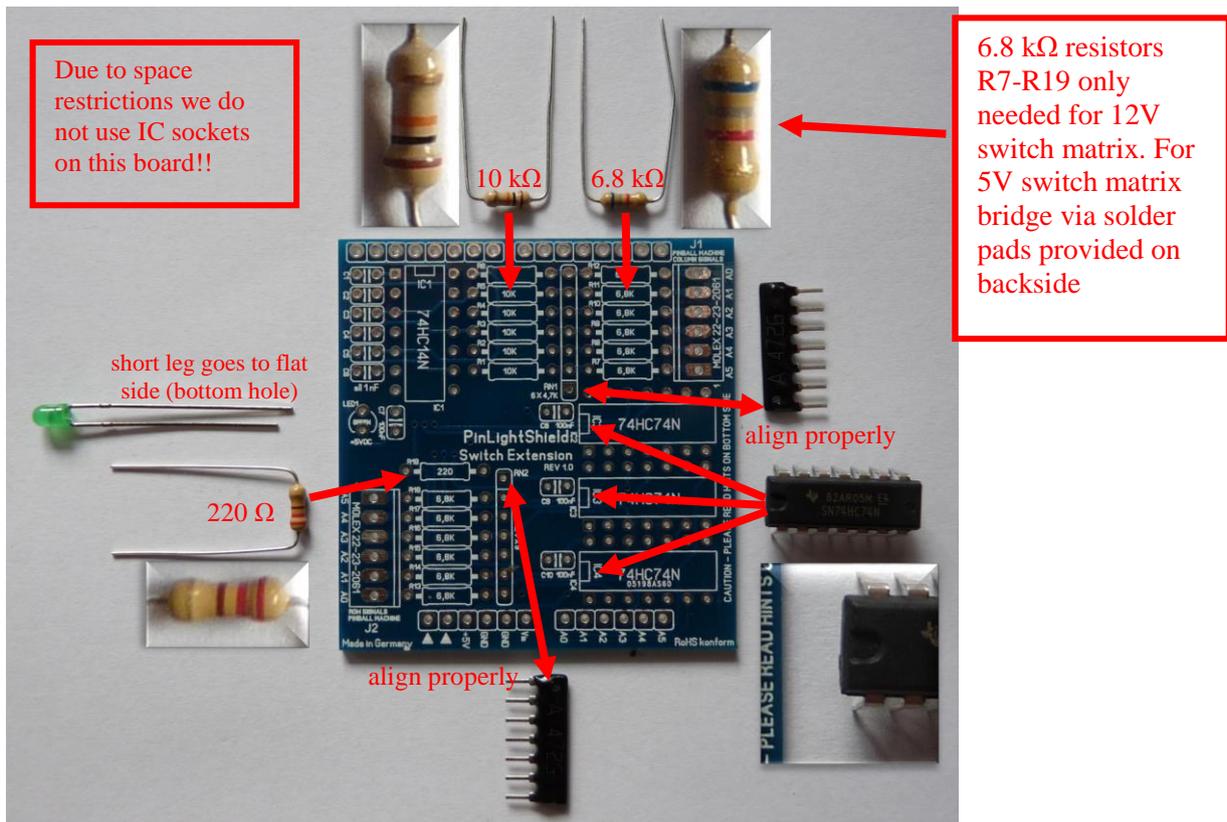


- 1: input connections to Pinball switch matrix (J1 = column signal, J2 = row signal)
- 2: Power LED signaling 5 VDC (green)

3: the 12 resistors that determine, whether the Shield is configured for a 12V or a 5V switch matrix

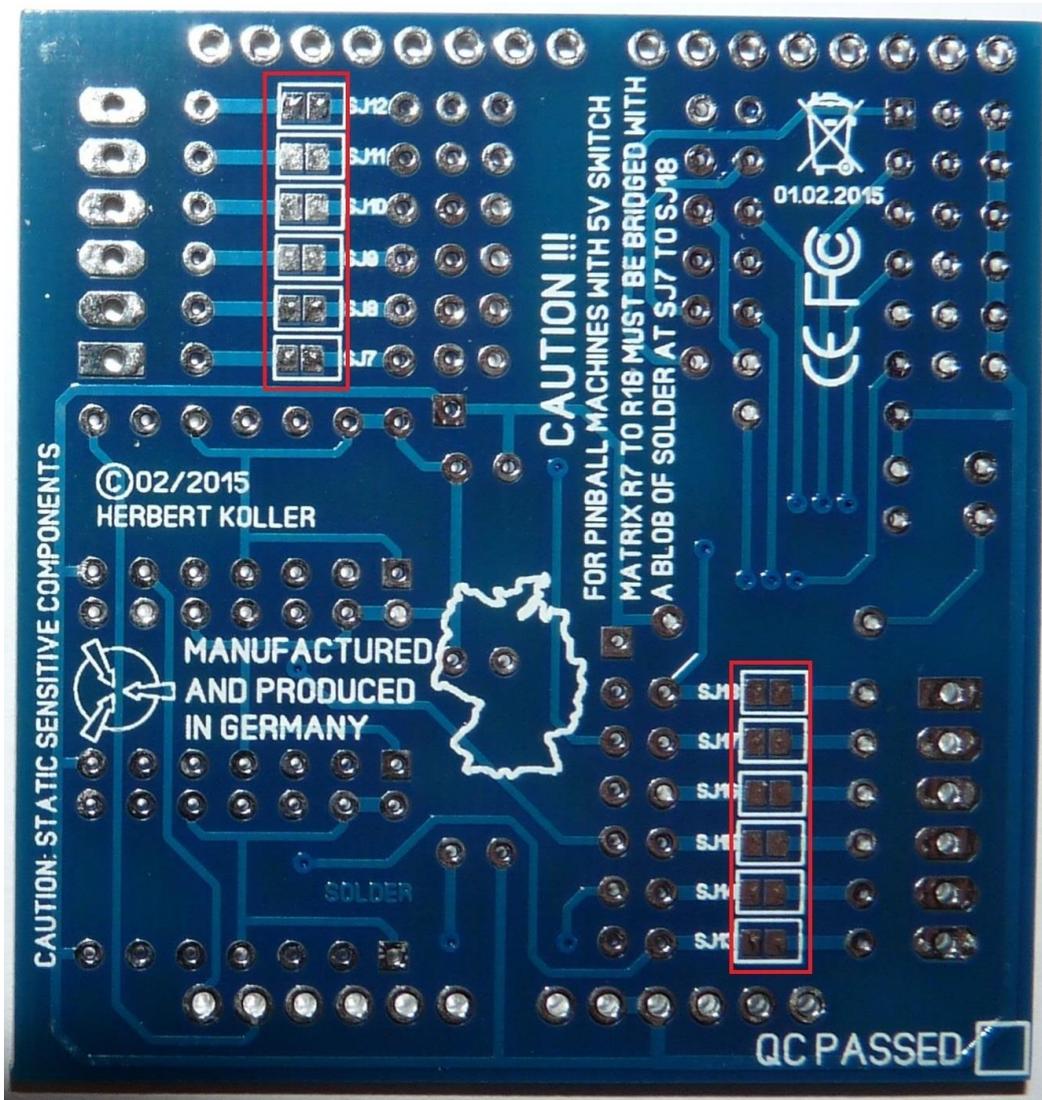
Assembly (requires soldering):

The assembly of the SwitchShield should be pretty straightforward as all parts identifiers and values are printed on the board. Nevertheless here are some additional hints to avoid problems:



Please note, that the resistors R7-R19 (6.8 k Ω) are needed for operation in a Pinball machine with a 12V switch matrix (e.g. WPC)!!

These resistors can be bridged via solderpads that are provided on the bottom side of the board (see following picture):



If R7-R19 are bridged via these solder pads and you install the SwitchShield in a Pinball machine with a 12V switch matrix the ICs on the board will almost certainly get damaged.

If R7-R19 are installed (and not bridged) and you install the SwitchShield in a Pinball machine with a 5V switch matrix the switch detection will not work, but the board will not get damaged.

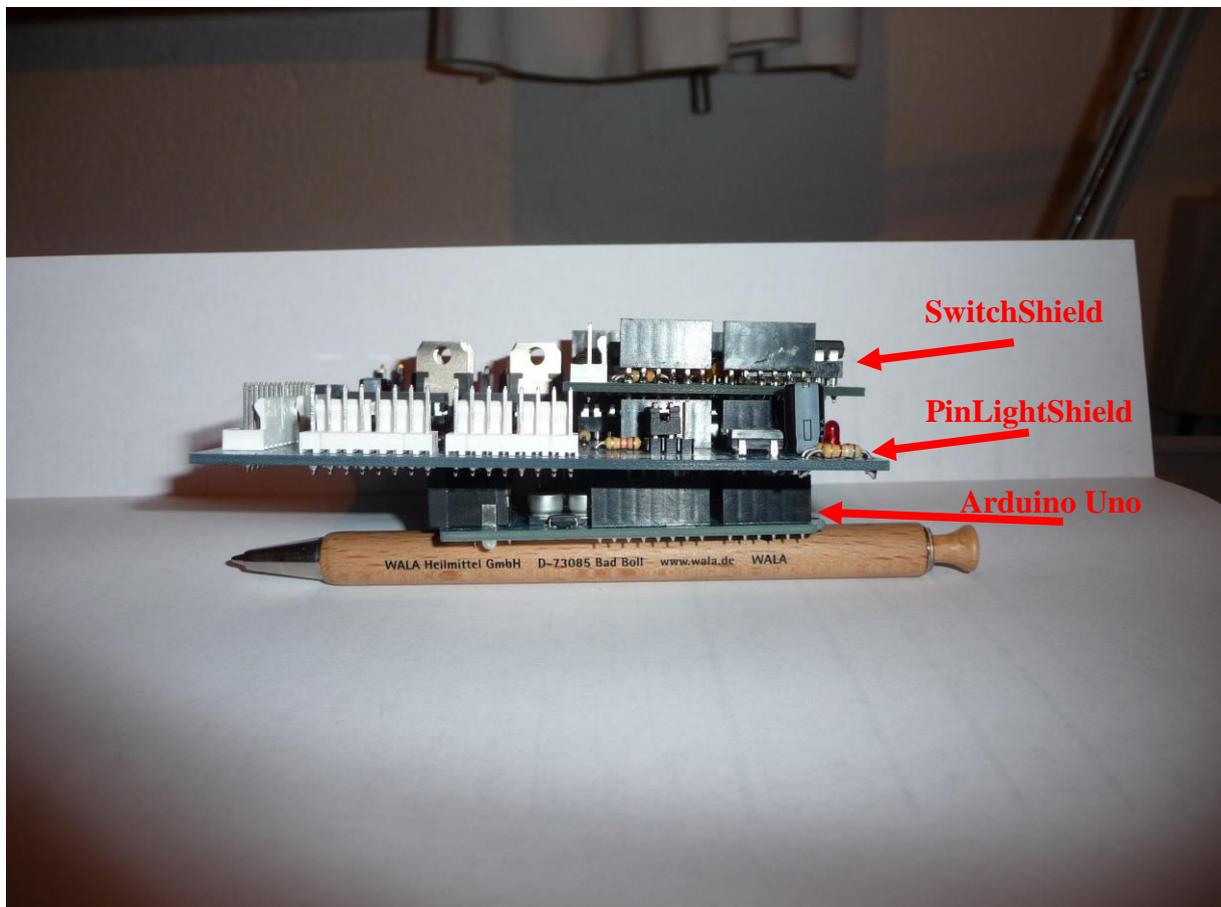
And here's the list of parts, that were included with your **SwitchShield**:

Count	Part	Value
6	R1-R6	10 kΩ
12	R7-R18	6,8 kΩ
1	R19	220 Ω
2	RN1, RN2	6 x 4,7 kΩ
1	LED1	LED green 3mm
3	IC2-IC4	74HC74

1	IC1	74HC14
6	C1-C6	1nF
4	C7-C10	100nF
1	Arduino Stackable Headers	2 x 6, 2 x 8
2	J1, J2	Molex 22-23-2061

Installation:

- Install the SwitchShield on top of the PinLightShield or directly on top of an Arduino Uno board as you see in the picture below. The rows of connectors sticking out from underneath the SwitchShield fit exactly into the corresponding connectors on the PinLightShield or the Arduino.



- Connect the PinLightShield or the Arduino to a 12VDC power supply (don't forget to put the fuse in between) and see if the Power LED on the SwitchShield comes on.
- Now you are ready to connect your pin with the PinLightShield and the SwitchShield, connect your output devices and start programming your show!!

Have fun

Herbert