

DESIGN NOTE



Demo Board Power LED's with Slider Ceramic Power LEDs & LED Driver Module & Wireless

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1. Introduction

This design note refers to the 158 997 Power LEDs Slider Demo Board. With the LDHM MagI³C Power Module the feasibility of the colored as well as the white ceramic Power LEDs can be demonstrated. To run this board, the user can switch between two modes: the battery mode or via wireless power transfer. In the PCB, a capacitive touch sensor enables the adjustment of the dimming level.

2. Features

Input Voltage:

- Power Supply 1: 4 x AAA Batteries = (6 Vin)
- Or Power Supply 2: Qi compliant Wireless Power
- Or Power Supply 3: external Power Supply (4.5 – 10 Vin)

Output Current:

- 350 mA (can be adjusted with 2 resistors; refer to table "ILED" on the Board)

Dimming:

- 15 Dimming Levels @ 4 kHz

White LEDs:

- 2700 K – 3000 K – 4000 K – 5000 K – 6000 K

Color LEDs:

- Red (625 nm) – Yellow (590 nm) – Green (525 nm) – Blue (460 nm)

Wireless Power Receiver Coil

- 16,7 µH – IR= 2.0 A (Qi compliant)



Figure 1: 158 997 Demo Board with part descriptions in packaging

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3. Description / Manual

Battery Mode:

In order to choose the battery mode, slide the switch to the position "Bat.". To experience the light intensity, push the tact switch next to one of the LEDs on the board and hold it. Simultaneously tap on the touch control panel on the surface of the PCB and the LED will light up. Sliding over this area controls the dimming function. The touch signal is registered by a microcontroller (MCU), subsequently transformed to a PWM signal (15 steps @ 4 kHz) and transmitted to the DIM Pin of the LED driver module. The LED driver controls the dimming level of the LED. After 30 seconds the demo board will turn off automatically. To restart the demo board, tap on the "touch me" area again.

Please Note: Move the slide switch to the WPC position to save energy and avoid an early emptying of the battery.

WPC Mode:

Move the slide switch to the WPC position. Take a Qi compliant WPC transmitter and put the demo board centered above it. The other functions are equal to the battery mode ("Bat.").

4. Bill of Materials

Parts	Device / Value	Size	Order Code	Supplier
L2	10 μ H	1210	744 764 10	Würth Elektronik
H1	LED White 2700 K	PLCC2_3535	158 353 027	Würth Elektronik
H2	LED White 3000 K	PLCC2_3535	158 353 030	Würth Elektronik
H3	LED White 4000 K	PLCC2_3535	158 353 040	Würth Elektronik
H4	LED White 5000 K	PLCC2_3535	158 353 050	Würth Elektronik
H5	LED White 6000 K	PLCC2_3535	158 353 060	Würth Elektronik
D2	LED Driver	TO-263-7	172 946 001	Würth Elektronik
H10, H11, H12, H13	19.1 mm Spacer	WA-SNSR	702 937 000	Würth Elektronik
S1, S2, S3, S4, S5, S6, S7, S8, S9	Tact Switch Washable	6*6 mm	430 481 035 816	Würth Elektronik
SW1	Mini Slide Switch	2.54 mm	450 301 014 042	Würth Elektronik
L1	Wireless Power Charging Coil	3830	760 308 103 204	Würth Elektronik
C9, C10	470n / 25 V	KERKO0603	885 012 206 075	Würth Elektronik
C3	1n5 / 50 V	KERKO0603	885 012 206 084	Würth Elektronik
C17, C19	10n / 50 V	KERKO0603	885 012 206 089	Würth Elektronik
C11, C18, C21	22n / 50 V	KERKO0603	885 012 206 091	Würth Elektronik
C2, C4, C5, C6, C12	100n / 50 V	KERKO0603	885 012 206 095	Würth Elektronik

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CIN, COUT	2u2 / 16 V	KERKO1210	885 012 209 012	Würth Elektronik
H6	LED Blue	PLCC2_3535	150 353 BS 745 00	Würth Elektronik
H7	LED Green	PLCC2_3535	150 353 GS 745 00	Würth Elektronik
H9	LED Red	PLCC2_3535	150 353 RS 745 00	Würth Elektronik
H8	LED Yellow	PLCC2_3535	150 353 YS 745 00	Würth Elektronik
C1, C20, C22	4u7 / 16 V	KERKO0603	885 012 207 053	Würth Elektronik
IC1	8Bit MCU	MLF-32	ATMega88A-MU	Atmel
D1	Integrated WPC Receiver IC	DSBGA	BQ51013BRHL	Texas Instruments
IC3	Voltage Regulator	SOP08	LP2951D	Texas Instruments
LP1, LP2, LP3, LP4, LP5	do not place	PAD-R		
RIADJ	0R	R-EU_R0603		
R5, R6, R15	100k	R0603-SMD		
R1, R2, R3, R4, R7, R8, R9, R10, R12, R13	10k	R0603-SMD		
R11	180R	R0603-SMD		
R14	300R	R0603-SMD		
RVREF	do not place	R-EU_R0603		
S18, S19	do not place	QTOUCH_SESLIDER8_ENDE		
S11, S12, S13, S14, S15, S16	do not place	QTOUCH_SSLIDER8_MITTE		
TP1	do not place	TESTTP08DK		
V3	BC847B	NPNSOT23		
V2	BSS138	N-FETSOT23		
V1	IRLML6402PBF	P-FETSOT23		
X1, X2	Pad for battery connection	PADRUND_8		
X3, X4	do not place	PADSTANDARD		
X5	do not place	ST-6POL		
_2	Battery holder 4xAAA			

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5. Schematics

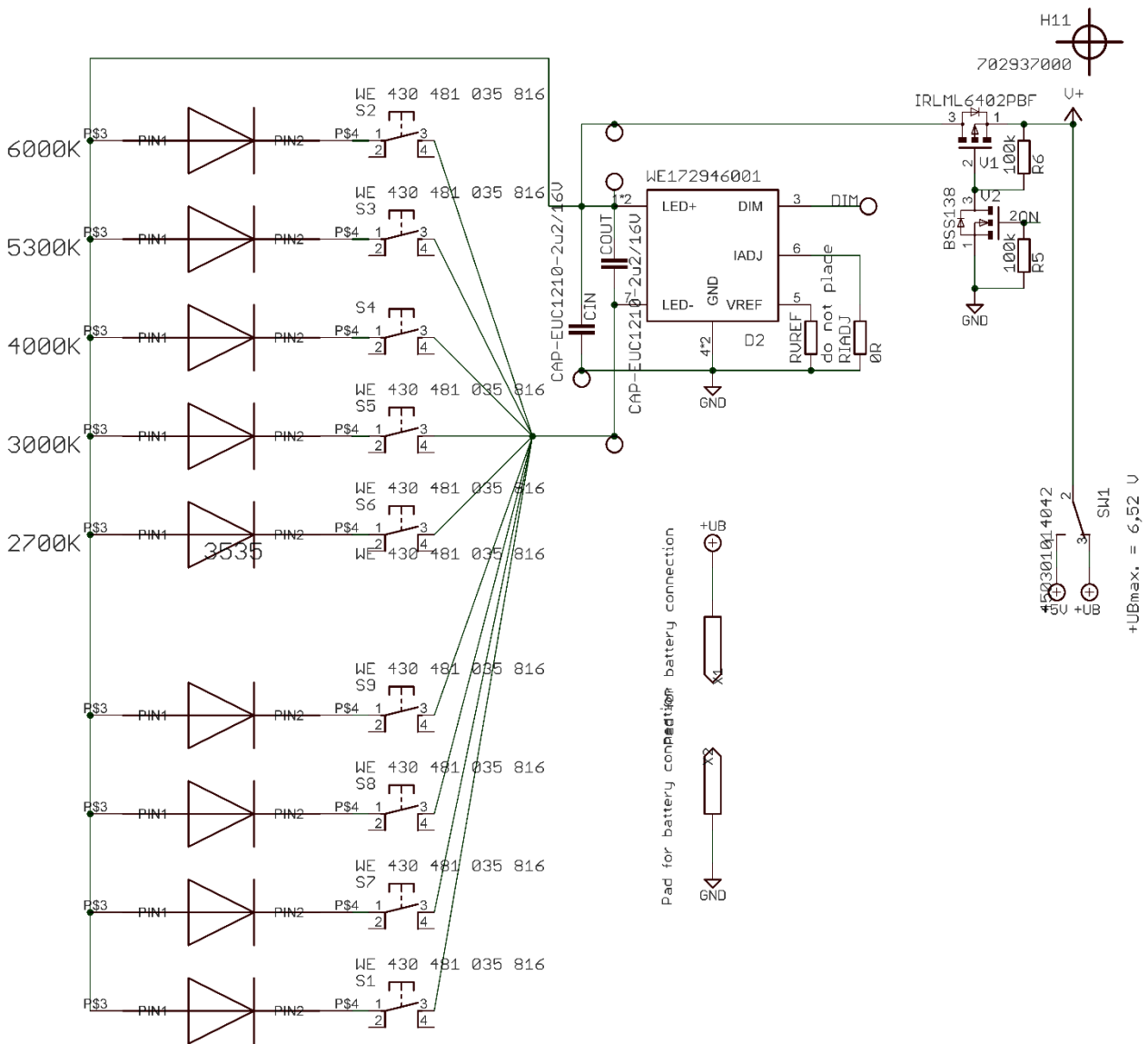


Figure 2: Schematic of the LEDs and LED driver

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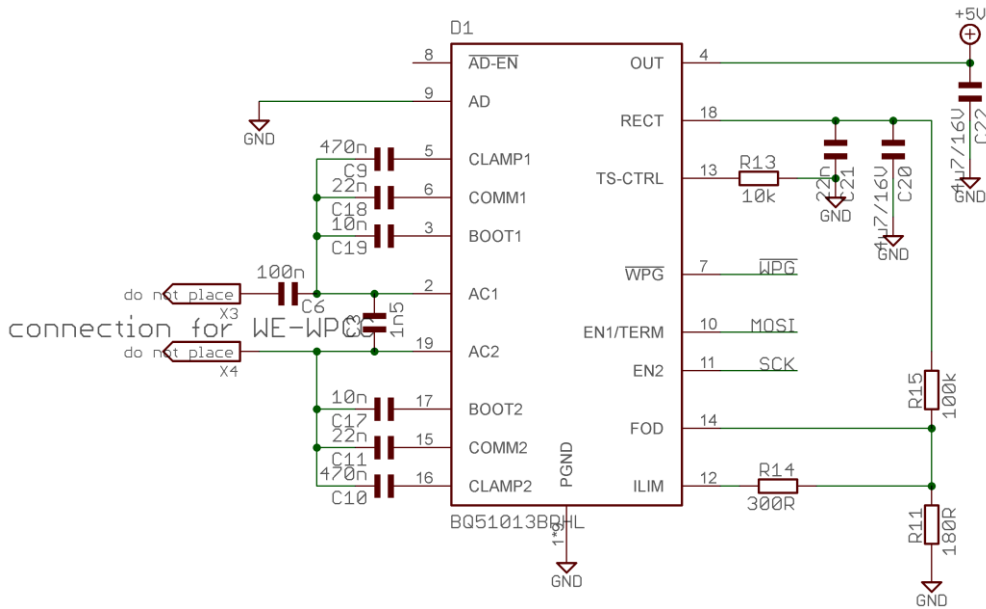


Figure 3: Schematic of the Wireless Power Unit

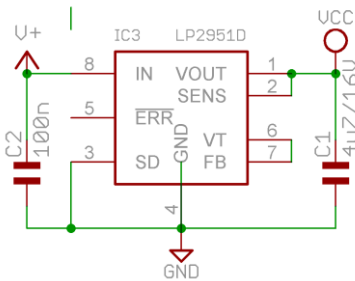


Figure 4: Schematic of the Voltage Regulation Unit

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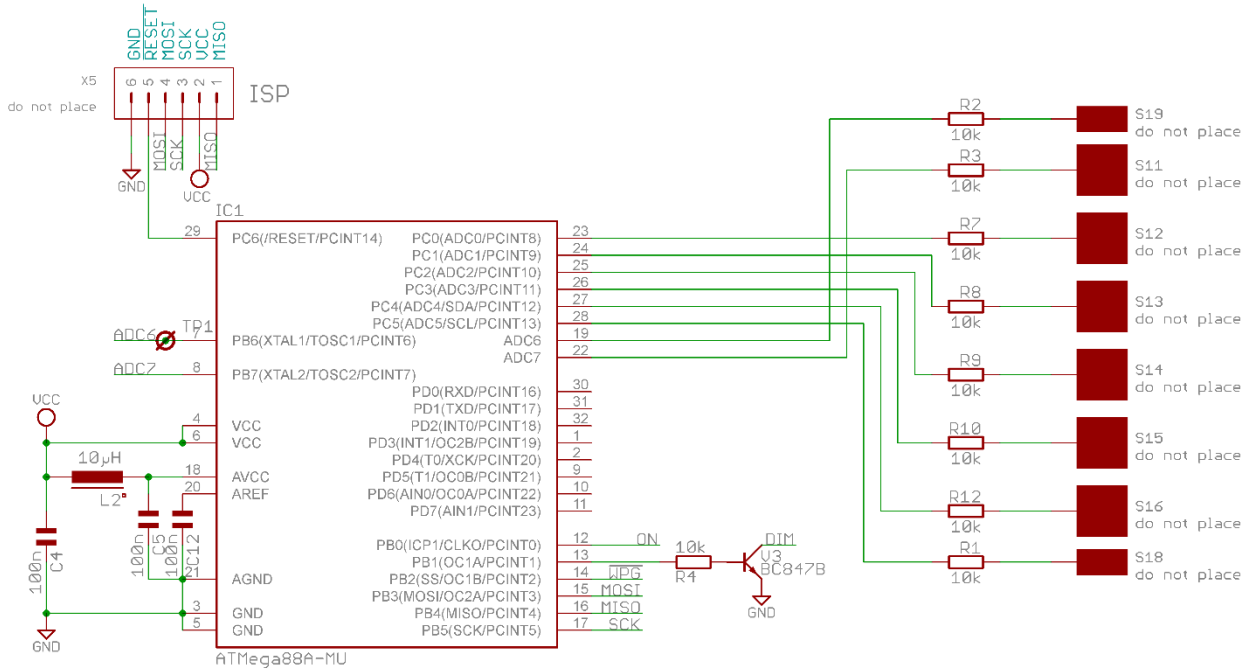


Figure 5: MCU Unit

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Application Notes:

<http://www.we-online.com/app-notes>

REDEXPERT Design Tool:

<http://www.we-online.com/redexpert>

Toolbox:

<http://www.we-online.com/toolbox>

Product Catalog:

<http://katalog.we-online.de/en/>

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