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STEVAL-ILL030V1

LED lighting control demonstration board using DMX512 based on the STM32F103C6 and STCS1A

Data brief

Features

- Jumper settings to configure the board in transmitter, receiver or standalone mode
- The STCS1A device provides dimming control of the on-board LEDs
- Over/undervoltage protection using the STBP120 voltage protection device
- Uses the ESDAULC6-3BP6 ESD protection device for advanced USB protection
- Option of powering the LEDs through an external power supply, or through a 5 V power supply output from the STBP120
- Board uses an internal clock source, without a crystal
- Mini-B type USB connector can be used if power for LEDs is supplied separately from external source
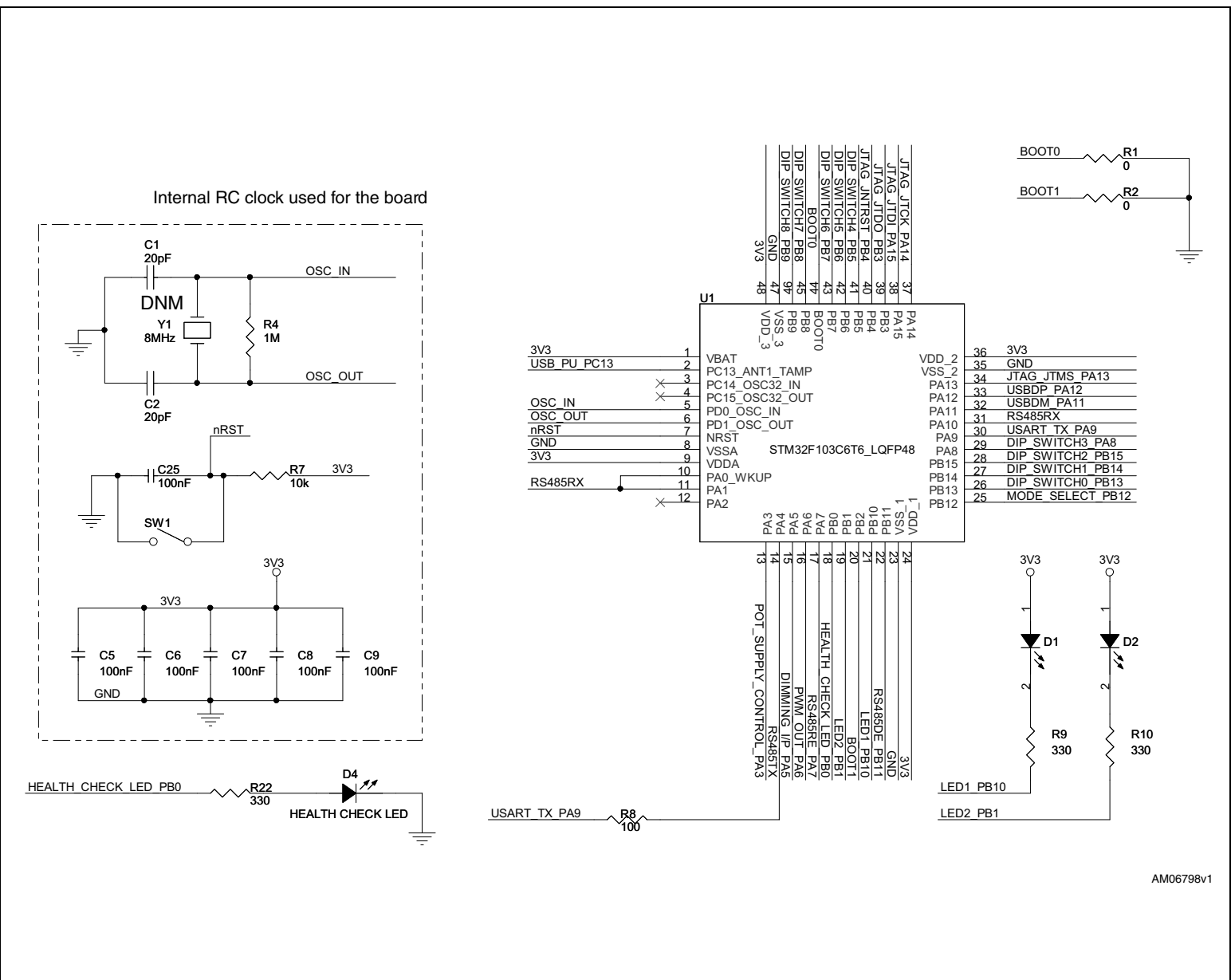- RoHS compliant
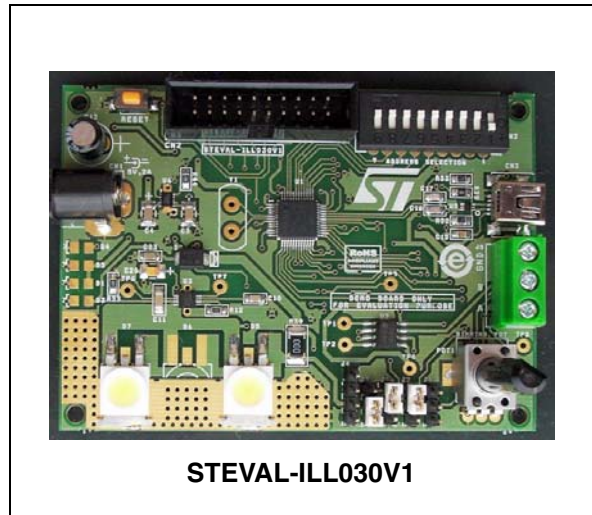
STEVAL-ILL030V1

Description

The purpose of the STEVAL-ILL030V1 demonstration board is to demonstrate the performance of ST devices in an LED lighting control application, using the DMX512 communication protocol demonstration firmware in transmitter, receiver and standalone modes.

The USART (universal synchronous asynchronous receiver transmitter) module of the STM32F103C6 ARM 32-bit Cortex™-M3 microcontroller is used to transmit/receive data via an RS-485 transceiver. The transmitter sends DMX512 packets with a NULL START code, according to the DMX512 2008 standard.

1 Schematic diagrams
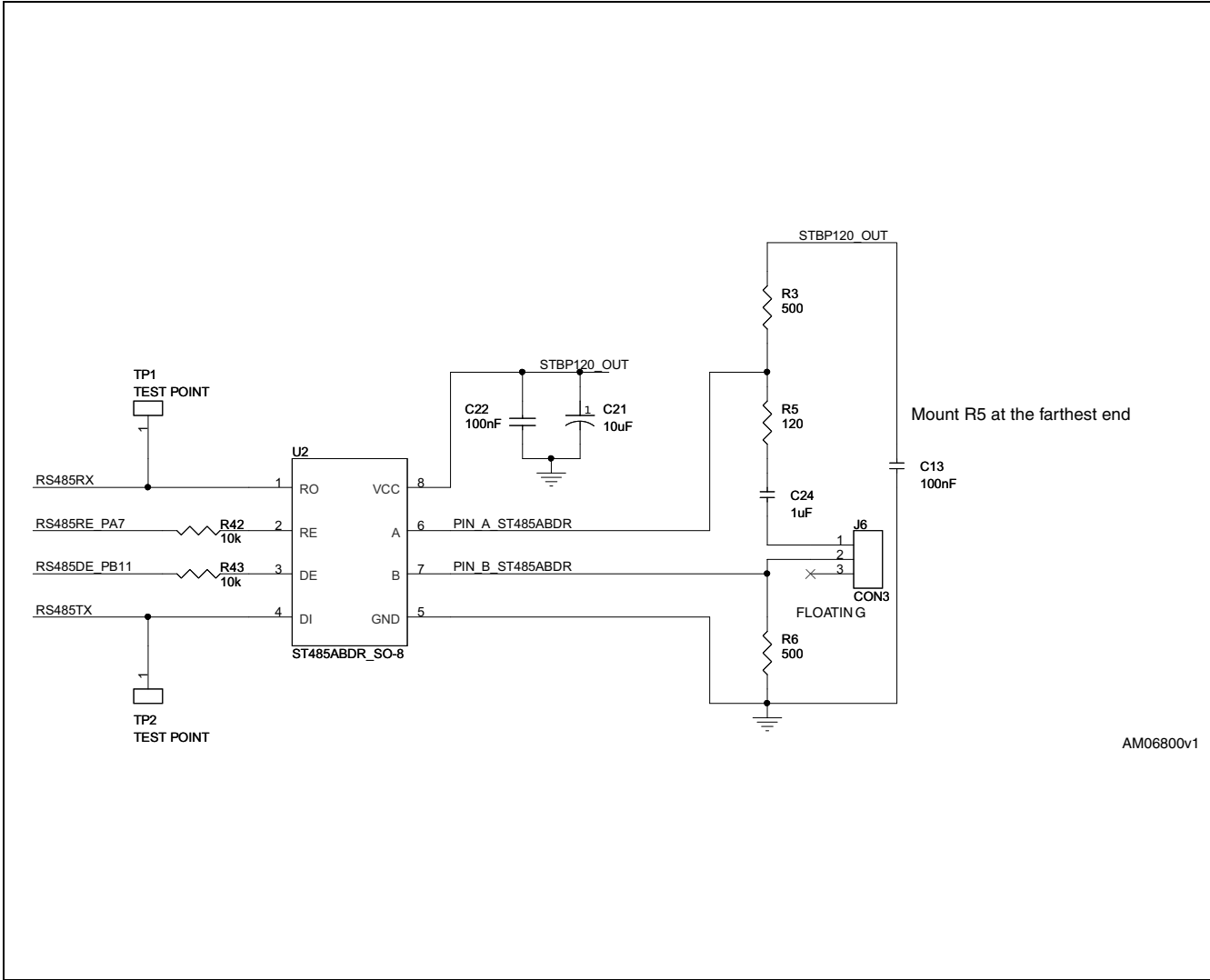
Figure 1. STM32F103C6 microcontroller section

Internal RC clock used for the board

BOOT0 — R1 0

BOOT1 — R2 0

C1 20pF

DNM

Y1 8MHz

R4 1M

C2 20pF

OSC_IN

OSC_OUT

nRST

C25 100nF

R7 10k

3V3

SW1

3V3

3V3

C5 100nF C6 100nF C7 100nF C8 100nF C9 100nF

GND

U1

STM32F103C6T6_LQFP48

Pin	Signal
1	VBAT
2	PC13_ANT1_TAMP
3	PC14_OSC32_IN
4	PC15_OSC32_OUT
5	PD0_OSC_IN
6	PD1_OSC_OUT
7	NRST
8	VSSA
9	VDDA
10	PA0_WKUP
11	PA1
12	PA2

3V3 — 1 VBAT
USB_PU_PC13 — 2 PC13_ANT1_TAMP
3 PC14_OSC32_IN
4 PC15_OSC32_OUT
OSC_IN — 5 PD0_OSC_IN
OSC_OUT — 6 PD1_OSC_OUT
nRST — 7 NRST
GND — 8 VSSA
3V3 — 9 VDDA
10 PA0_WKUP
RS485RX — 11 PA1
12 PA2

36 VDD_2 — 3V3
35 VSS_2 — GND
34 PA13 — JTAG_JTMS_PA13
33 PA12 — USBDP_PA12
32 PA11 — USBDM_PA11
31 PA10 — RS485RX
30 PA9 — USART_TX_PA9
29 PA8 — DIP_SWITCH3_PA8
28 PB15 — DIP_SWITCH2_PB15
27 PB14 — DIP_SWITCH1_PB14
26 PB13 — DIP_SWITCH0_PB13
25 PB12 — MODE_SELECT_PB12

Top pins:
37 PA14 — JTAG_JTCK_PA14
38 PA15 — JTAG_JTDI_PA15
39 PB3 — JTAG_JTDO_PB3
40 PB4 — JTAG_JNTRST_PB4
41 PB5 — DIP_SWITCH4_PB5
42 PB6 — DIP_SWITCH5_PB6
43 PB7 — DIP_SWITCH6_PB7
44 BOOT0 — BOOT0
45 PB8 — DIP_SWITCH7_PB8
46 PB9 — DIP_SWITCH8_PB9
47 GND — GND
48 VDD_3 — 3V3

Bottom pins:
13 PA3 — POT_SUPPLY_CONTROL_PA3
14 PA4 — RS485TX
15 PA5 — DIMMING_I/P_PA5
16 PA6 — PWM_OUT_PA6
17 PA7 — RS485RE_PA7
18 PB0 — HEALTH_CHECK_LED_PB0
19 PB1 — LED2_PB1
20 PB10 — LED1_PB10
21 PB11 — RS485DE_PB11
22 GND — GND
23 VDD_1 — 3V3
24 VSSA_1

3V3   3V3

D1   D2

R9 330   R10 330

LED1_PB10

LED2_PB1

HEALTH_CHECK_LED_PB0 — R22 330 — D4 — HEALTH CHECK LED

USART_TX_PA9 — R8 100

AM06798v1

Figure 2. ST485AB section

TP1
TEST POINT

TP2
TEST POINT

RS485RX

RS485RE_PA7   R42
               10k

RS485DE_PB11   R43
               10k

RS485TX

U2

1	RO	VCC	8
2	RE	A	6
3	DE	B	7
4	DI	GND	5

ST485ABDR_SO-8

STBP120_OUT

C22
100nF

C21
10uF

PIN_A_ST485ABDR

PIN_B_ST485ABDR

STBP120_OUT

R3
500

R5
120

C24
1uF

R6
500

J6

| 1 |
| 2 |
| 3 |

CON3
FLOATING

C13
100nF

Mount R5 at the farthest end

AM06800v1

STEVAL-ILL030V1

Figure 3.   DIP switch section

3V3

3V3

| R13 100k | R14 100k | R15 100k | R16 100k | R17 100k | R18 100k | R19 100k | R20 100k | R21 100k |

SW2

DIP_SWITCH0_PB13   1
DIP_SWITCH1_PB14   2
DIP_SWITCH2_PB15   3
DIP_SWITCH3_PA8   4
DIP_SWITCH4_PB5   5
DIP_SWITCH5_PB6   6
DIP_SWITCH6_PB7   7
DIP_SWITCH7_PB8   8
DIP_SWITCH8_PB9   9

EG-4517-ND

R24 100k   3V3

R25 0

-

AM06801v1
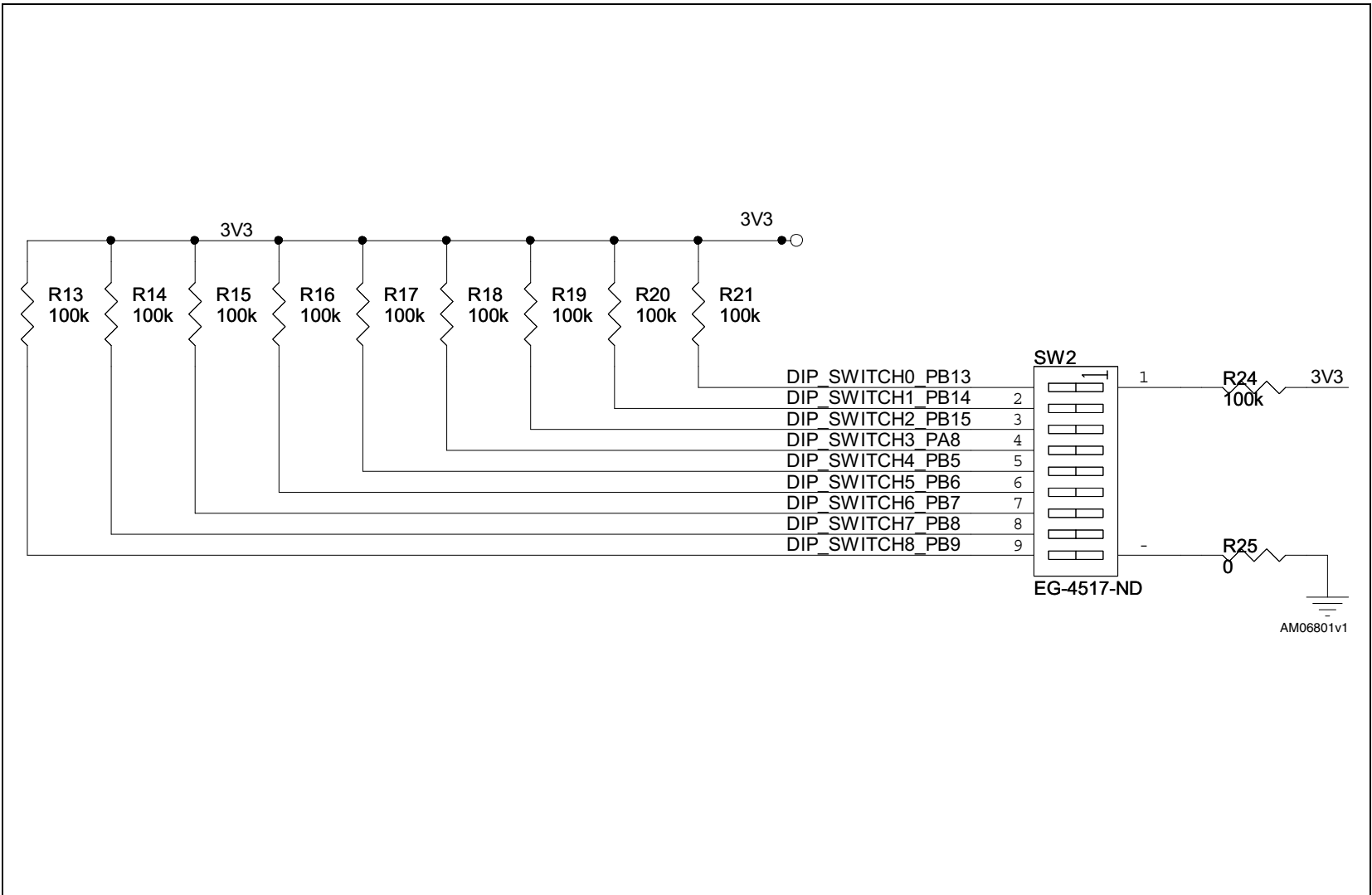
Figure 4.   3.3 V output section

AM08251v1
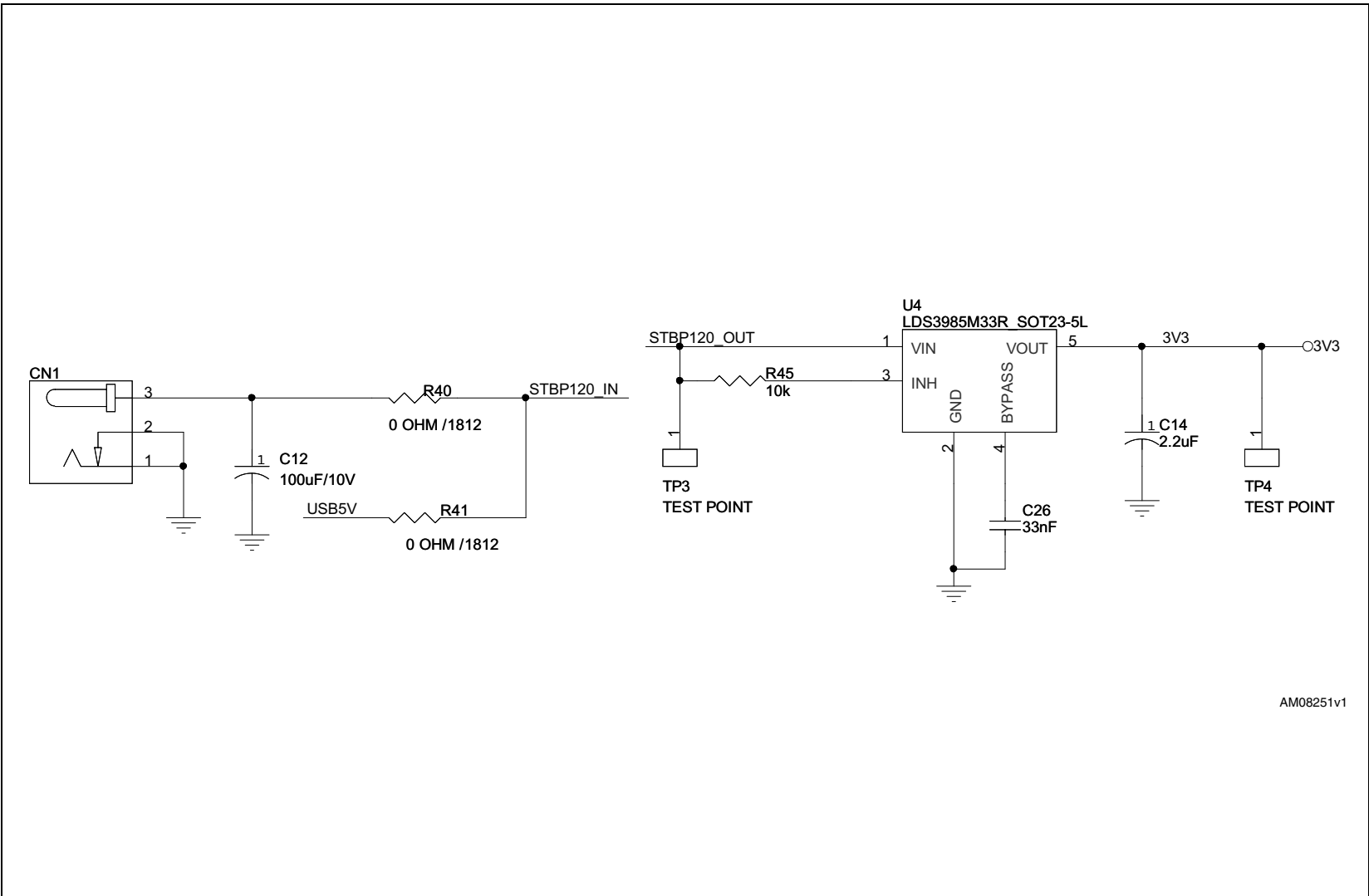
Figure 5.   JTAG connector section
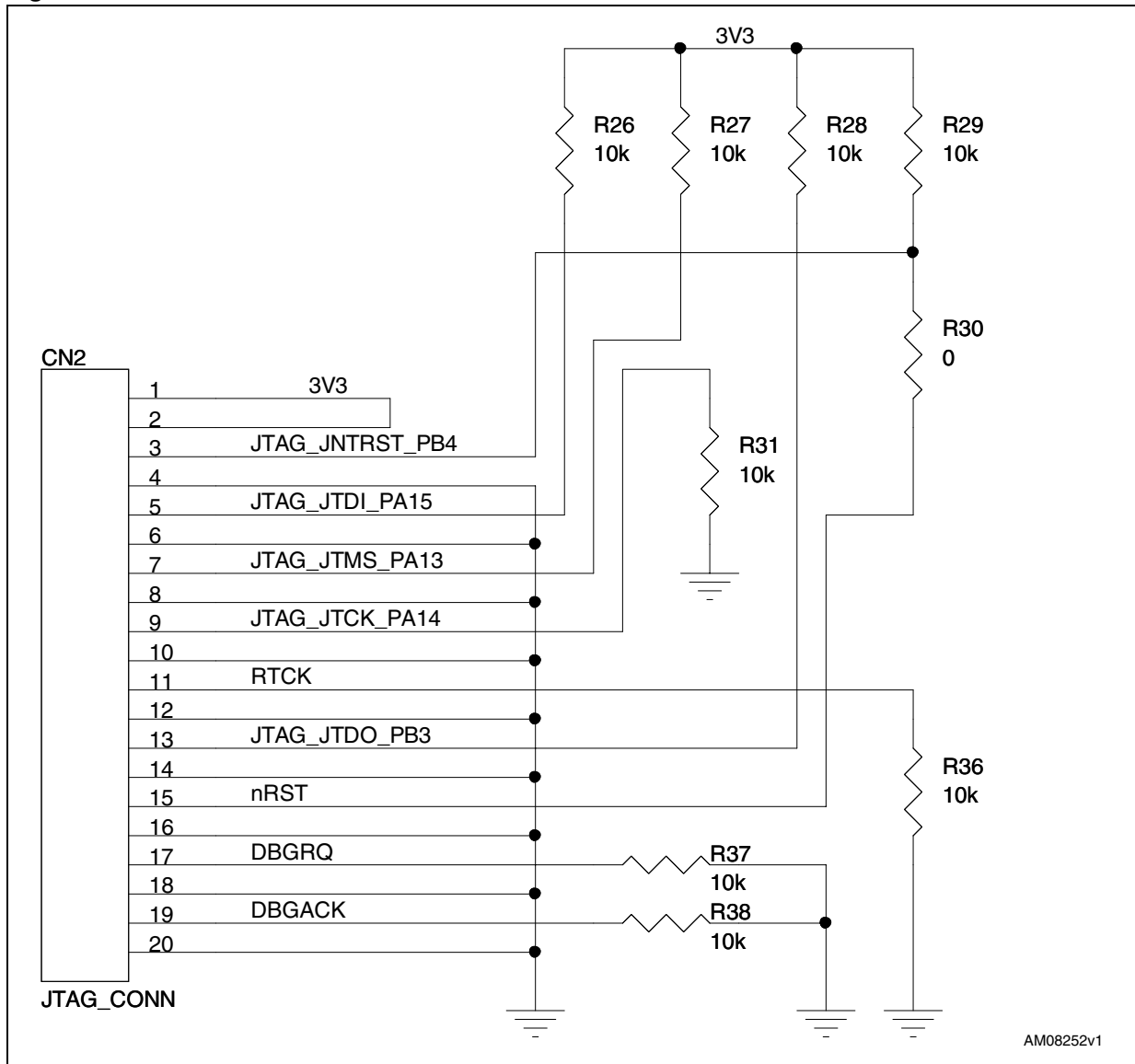
Figure 6.   USB section
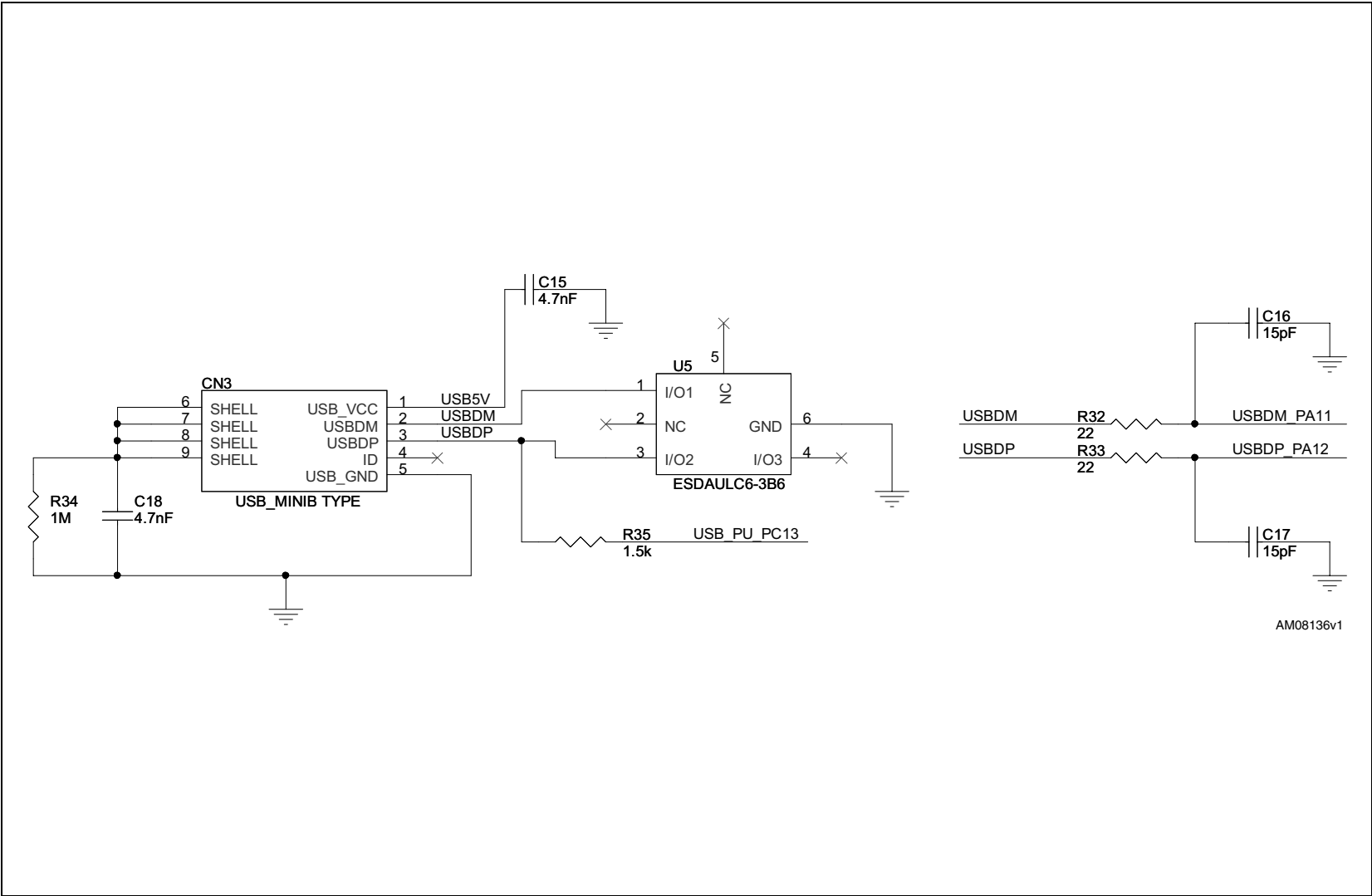
AM08136v1

Figure 7.   STCS1A LED driver section

AM08276v1
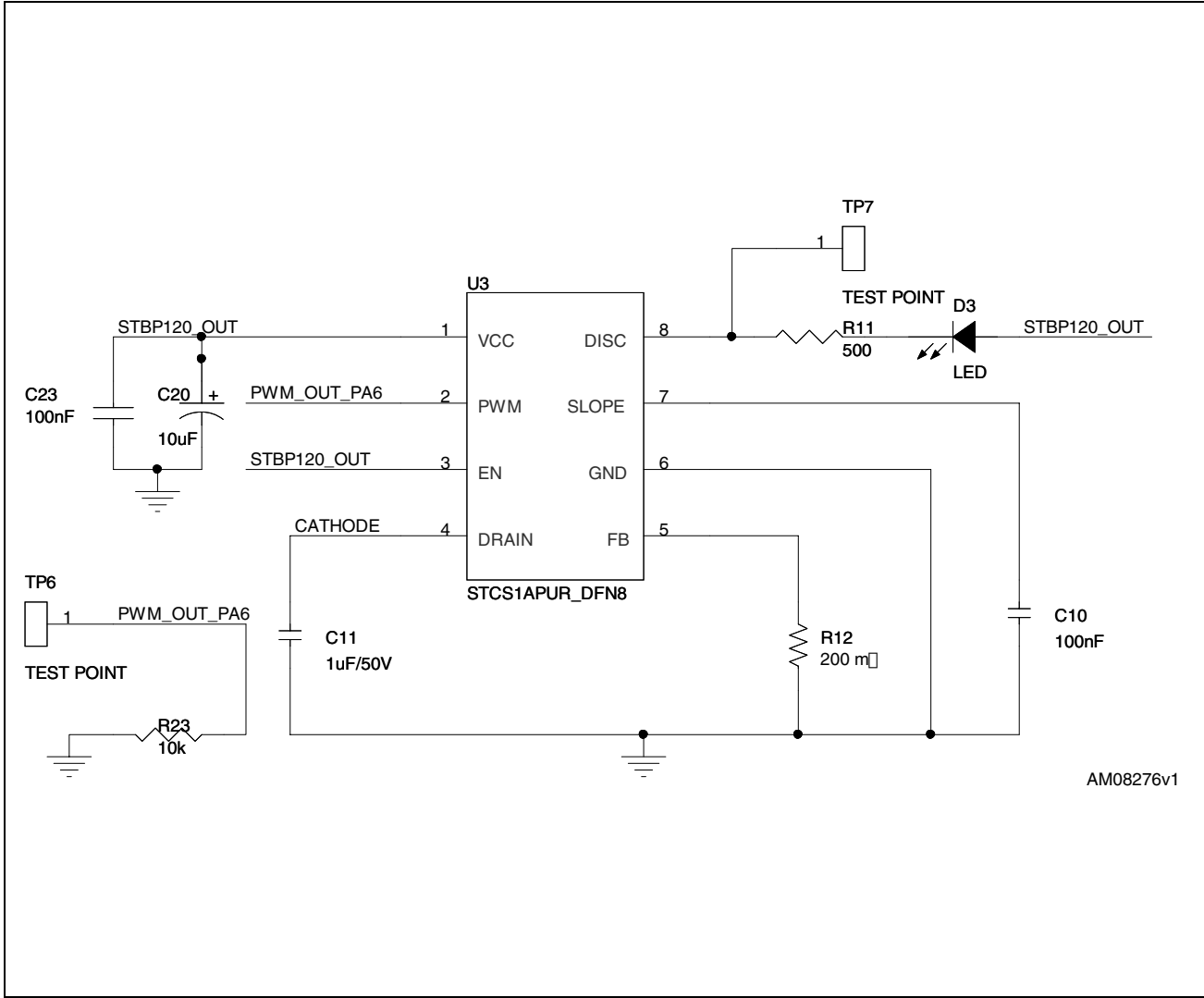
Figure 8.   STBP120 section

AM08253v1

Figure 9.   Jumpers

AM08137v1
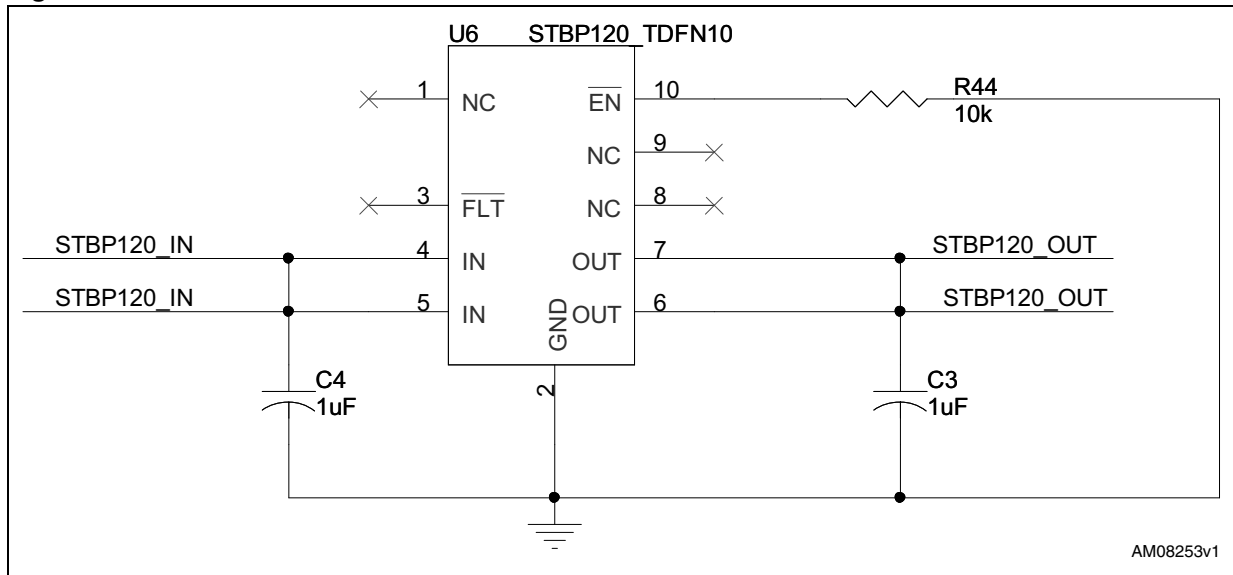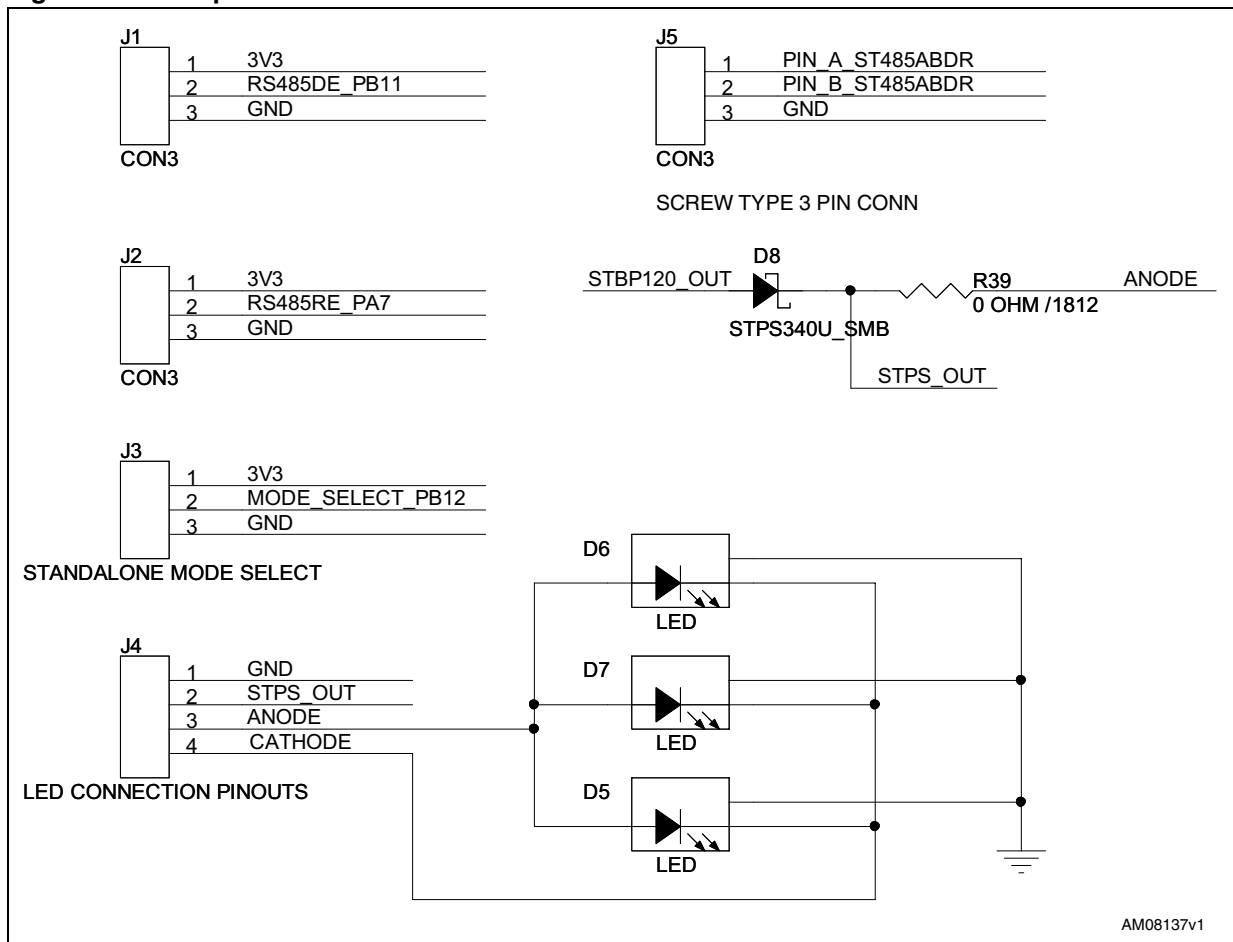
Figure 10. Dimming input POT

POT_SUPPLY_CONTROL_PA3

POT1

10K

DIMMING_I/P_PA5

SET = 0.5

C19

100nF

TP5

TEST POINT

GND WITH STAR CONNECTION
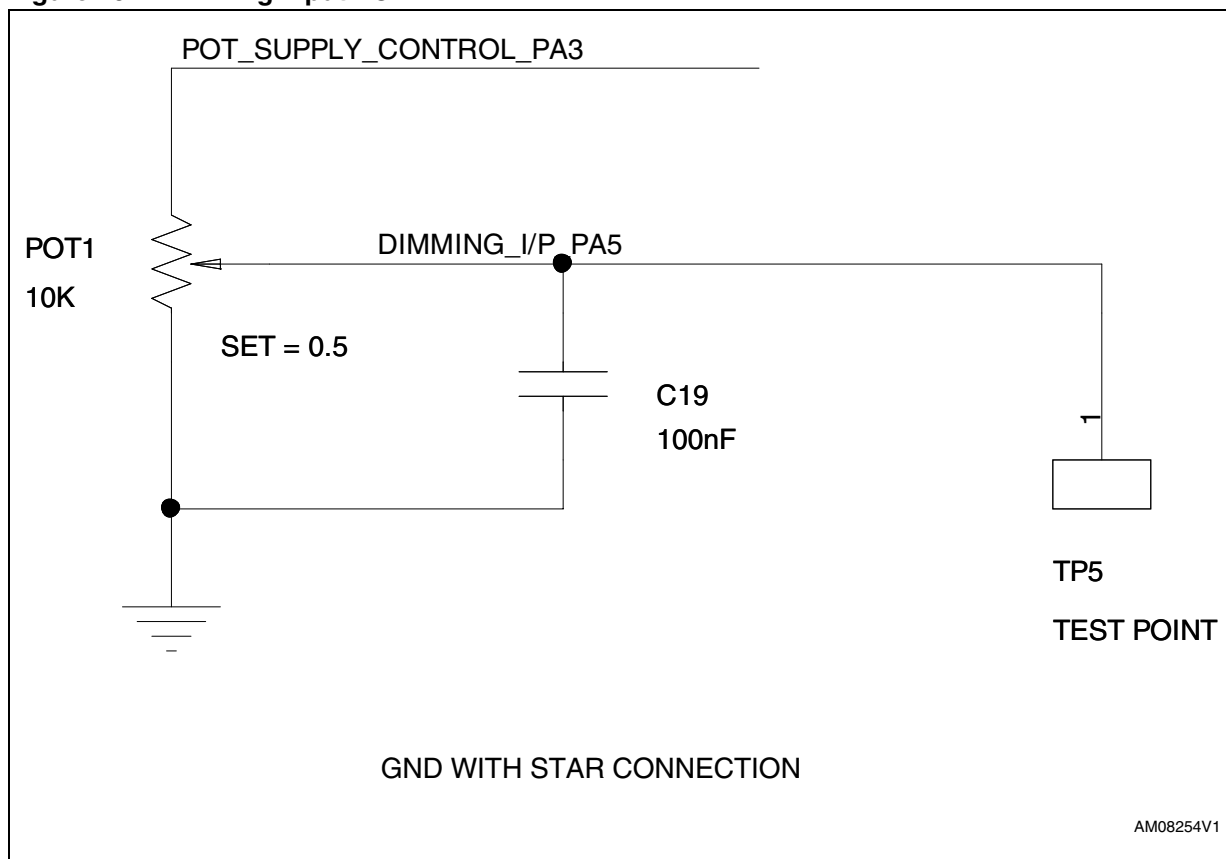
AM08254V1

2   Revision history

Table 1.   Document revision history

Date	Revision	Changes
24-Nov-2010	1	Initial release.

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