



Swakeup

PROJECT REPORT

within the lecture of
Programming Embedded Systems

at Uppsala University
in the Departement of Information Technology

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2 Background and Analysis

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The image shows a complex PCB layout for a custom board. The layout is divided into several sections, each containing different components and their connections.

Section A: Contains a USB 5-pin connector (H2), a USB 2.0 controller (CP_2102), and a USB 2.0 module (OEL Display Module). It also includes a USB 2.0 module (OEL Display Module) and a USB 2.0 module (OEL Display Module).

Section B: Contains a USB 2.0 module (OEL Display Module) and a USB 2.0 module (OEL Display Module).

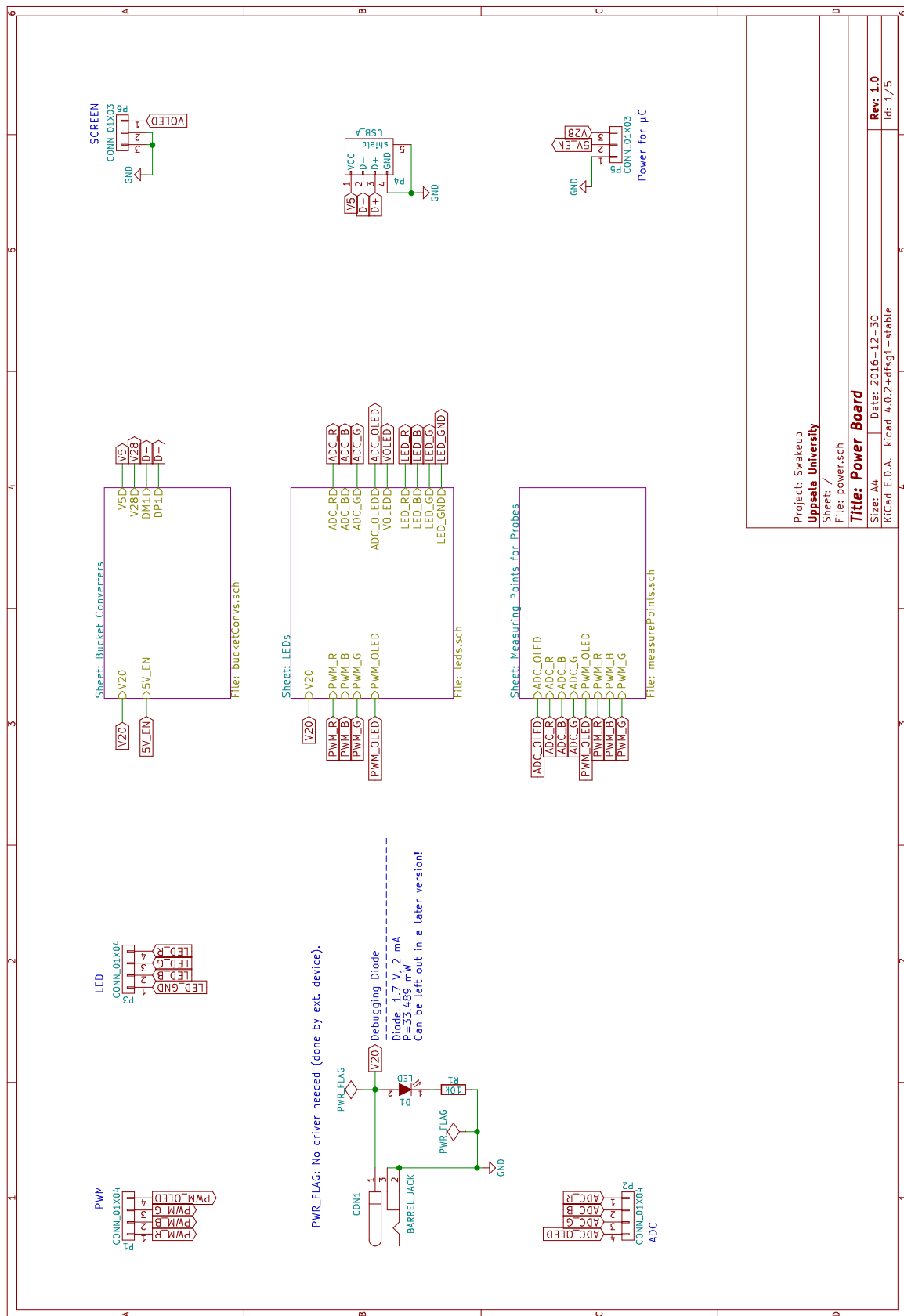
Section C: Contains a USB 2.0 module (OEL Display Module) and a USB 2.0 module (OEL Display Module).

Section D: Contains a USB 2.0 module (OEL Display Module) and a USB 2.0 module (OEL Display Module).

Title Block:

Title		SwakeUpp.PptPeb	
Size		Uppsala University	
Number		A	
Date		3/9/2017	
File		C:\Users\j...atmega.SchDoc	
Revision		Rev 2	
Sheet of		3	
Drawn By:		4	

B Schematics Power Board



2.8 V for μC

$$V_{out} = 0.765 \text{ V} \left(1 + \frac{27k}{10.15k} \right) = 2.8 \text{ V}$$

Debugging Diode
Diodes: 1.7 V, 2 mA
P=0.61 mW
Can be left out in a later version!

5V for Mobile Phone

$$V_{out,max} = 5 \text{ V}$$

$$A_{out,max} = 2A$$

Debugging Diode
Diodes: 1.7 V, 2 mA
P=0.26 mW
Can be left out in a later version!

USB Dedicated Charging Port Control.

Simple SOT-23-6 IC for detecting proprietary and open standards used by a device and providing the corresponding electrical signature at the data lines (voltage or impedance).

TPS25140DBV U3

Sheet:	/Bucket Converters/ File: bucketConv.sch
Title:	Bucket Converters for 5 V and 2.8 V
Size:	A4
Date:	2016-12-30
KiCad E.D.A.	kicad 4.0.2+dfsg1--stable
Upsala University	

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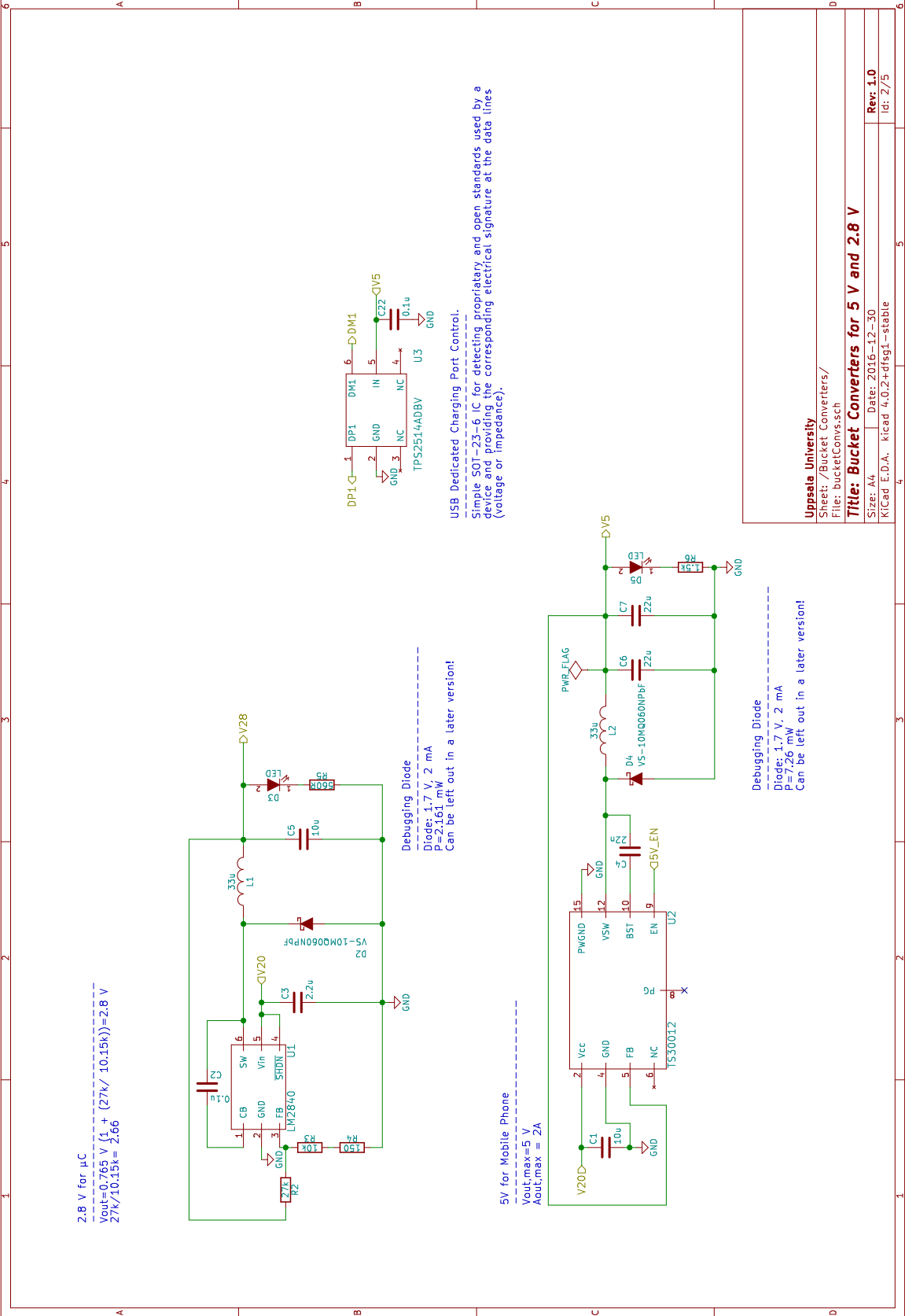
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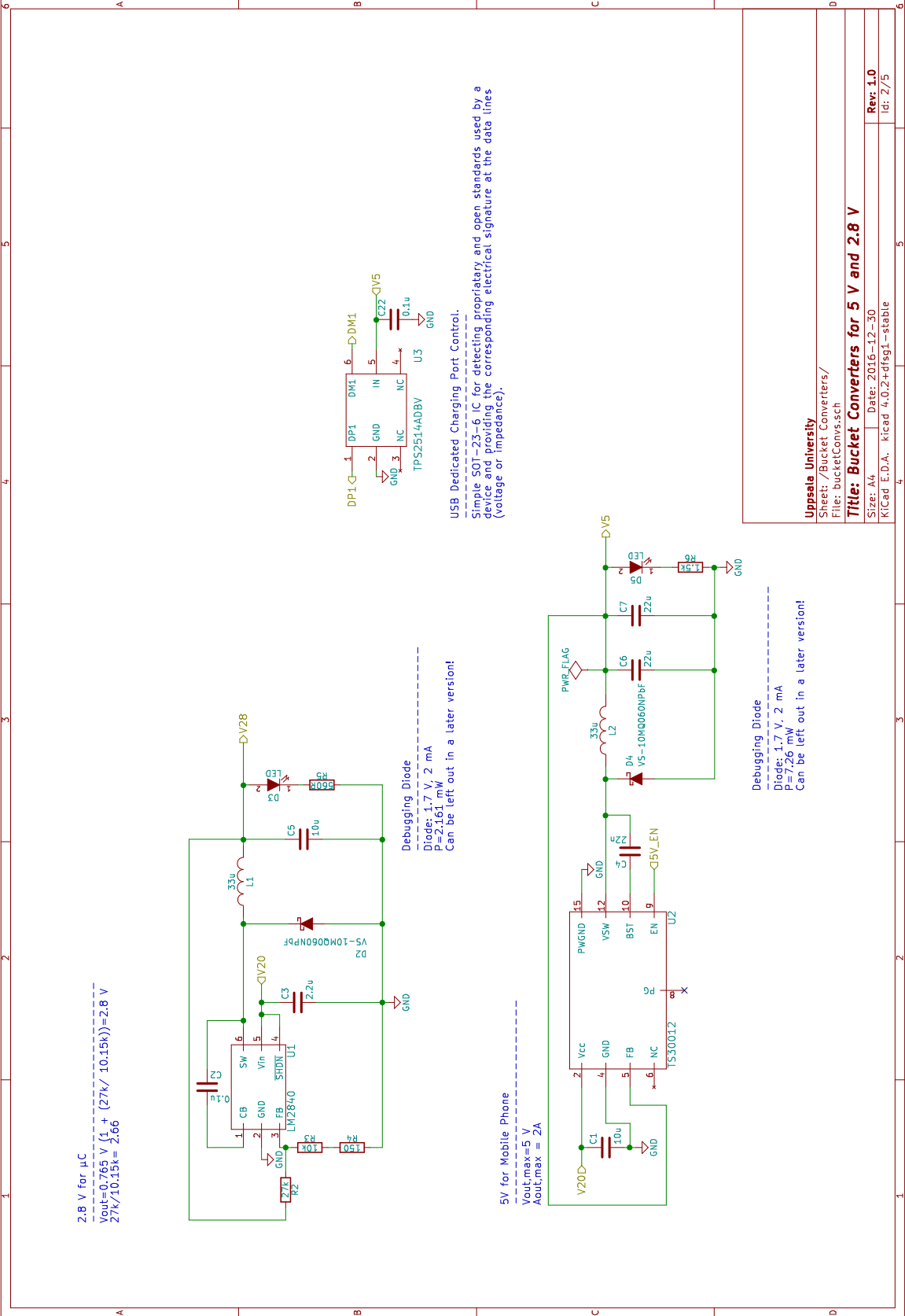
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Upsala University
Rev: 1.0
Id: 2/5



2.8 V for μC

$$V_{out} = 0.765 \text{ V} \left(1 + \frac{(27k / 10.15k)}{10} \right) = 2.8 \text{ V}$$

Debugging Diode
Diodes: 1.7 V, 2 mA
 $P=0.61 \text{ mW}$
Can be left out in a later version!

5V for Mobile Phone

$$V_{out,max} = 5 \text{ V}$$

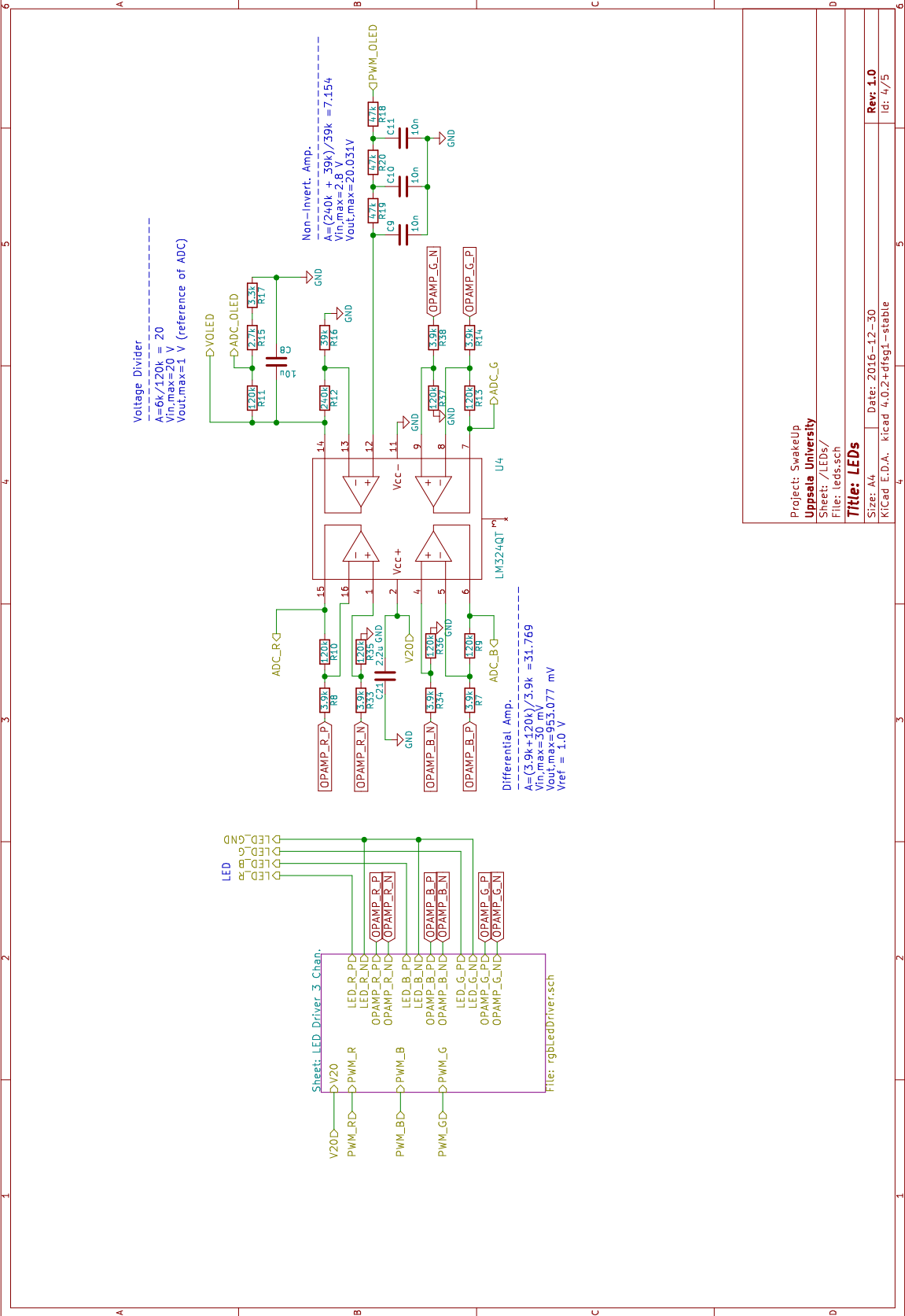
$$A_{out,max} = 2A$$

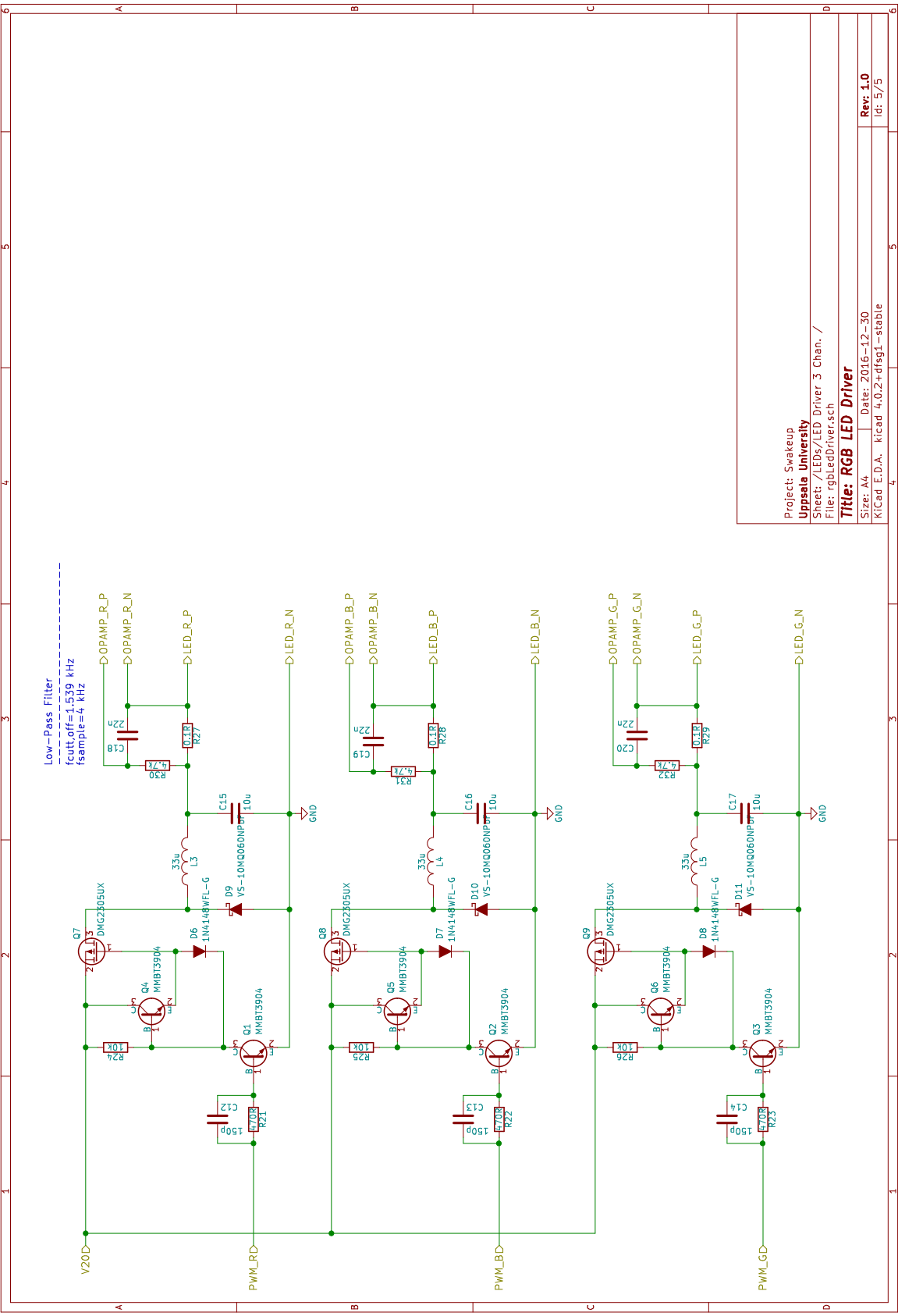
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Rev: 1.0 Id: 2/5	





C USART interrupt generation

```
1  #define USARTRXCISR(NAME, PORT, USART_ID, REC_FC) \
2  ISR(NAME##_RXC_vect) { \
3      uint8_t read = PORT.DATA; \
4      if (writeInBuf(read, &PORT)) { \
5          REC_FC(read); \
6          uint8_t i = 0; \
7          for (; i < UART_MAX_DELIMITERS; i++) { \
8              if (delimiters[USART_ID][i].delimiter != 0) { \
9                  delimiters[USART_ID][i].length++; \
10                 if (read == delimiters[USART_ID][i].delimiter) { \
11                     delimiters[USART_ID][i].port = &PORT; \
12                     event_fire(&EVENT_UART_DELIMITER, \
13                             SYSTEM_ADDRESS_CAST (&delimiters[USART_ID][i])); \
14                 } \
15             } \
16         } \
17     } else { /*buffer full */ \
18         CP_PORT.CTRLA &= ~(USART_RXCINTLVL_LO_gc); \
19     } \
20 } \
21 \
22 #define USARTDREISR(NAME, PORT, USART_ID)\
23 ISR(NAME##_DRE_vect) { \
24     uint8_t size = uartStatus[USART_ID].outBuffer_size; \
25     if (size > 0) { \
26         if (softlock(USART_ID)) {\
27             uint8_t tail = uartStatus[USART_ID].outBuffer_tail;\
28             PORT.DATA = outBuffer[USART_ID][tail]; \
29             uartStatus[USART_ID].outBuffer_size--;\
30             tail++; \
31             if (tail >= UART_MAX_OUT_BUFFER) tail = 0;\
32             uartStatus[USART_ID].outBuffer_tail = tail;\
33             unlock(USART_ID); \
34         } \
35     } else {\
36         sending[USART_ID] = 0;\
37         PORT.CTRLA &= ~(USART_DREINTLVLO_bm);\
38     } \
39 }
```