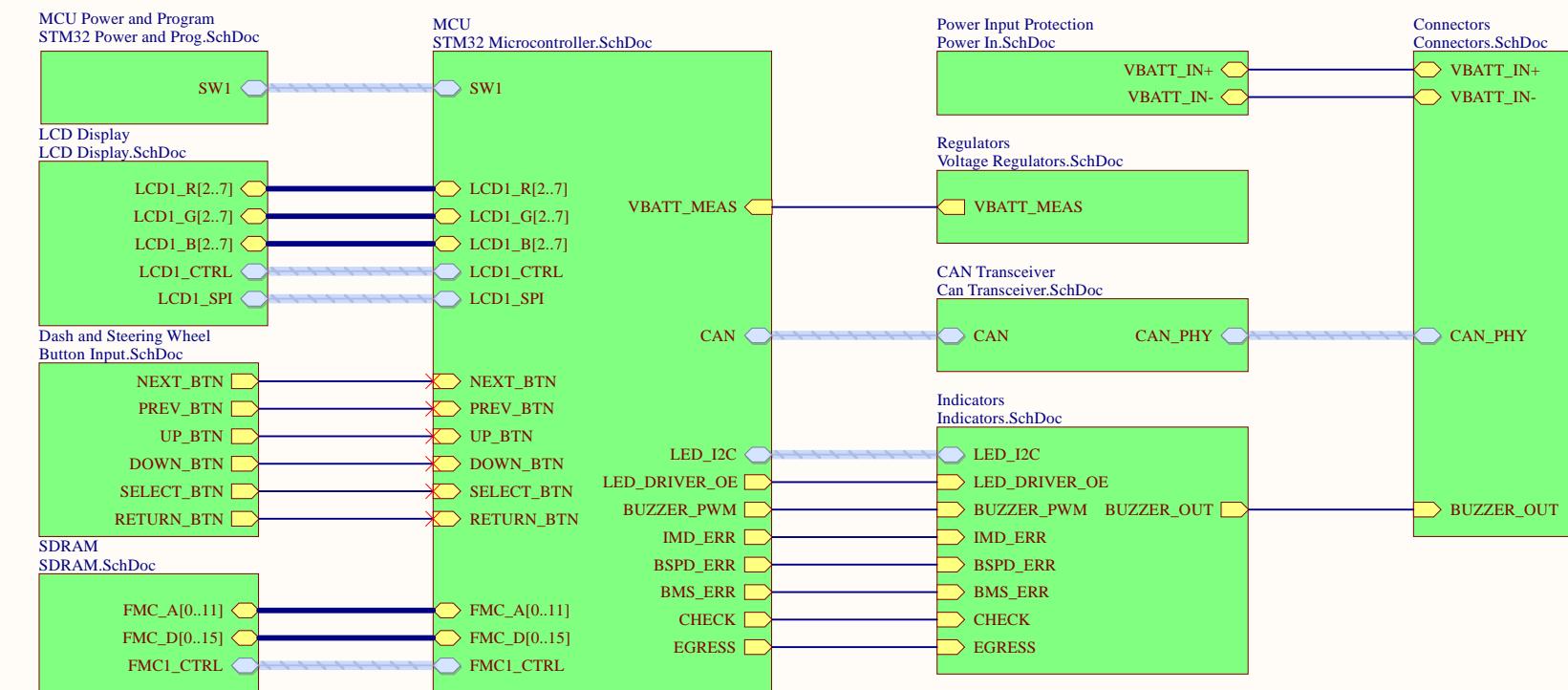


A

A

Driver Interface Module



B

B

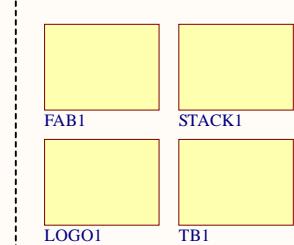
C

C

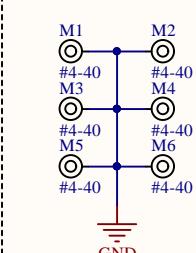
D

D

PCB Components



Mounting Holes



Title: Driver Interface Module - Main

Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
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System: GLV	Rev: 2.0
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Date: 4/5/2016	Sheet: 1 of 13
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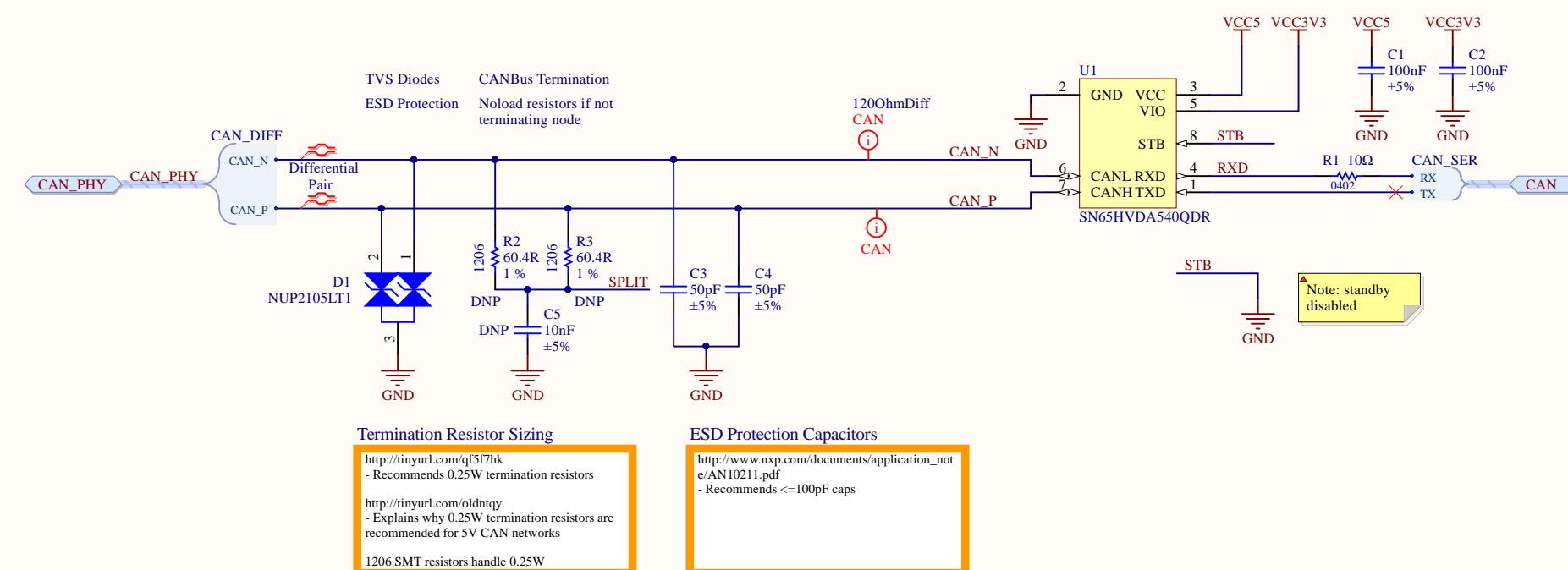
A

A

CAN

B

B



C

C

D

D

Title: Driver Interface Module - CAN	
Engineer: Tom Eliot Shepard Emerson Daniel Gorzilgia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 2 of 13

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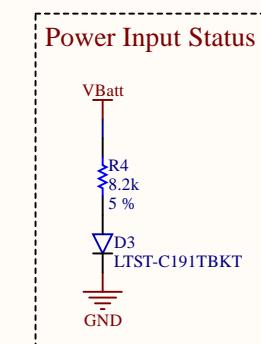
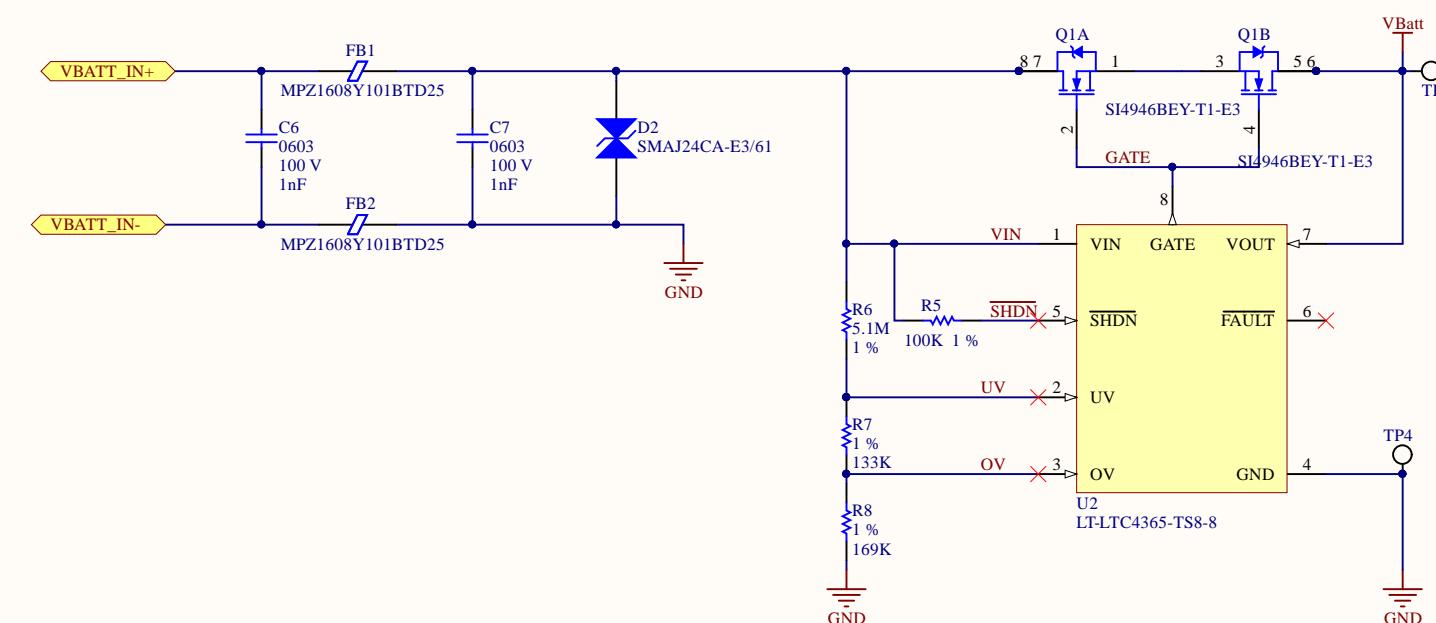
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A

A

Power In

Under / Over / Reverse Voltage Protection

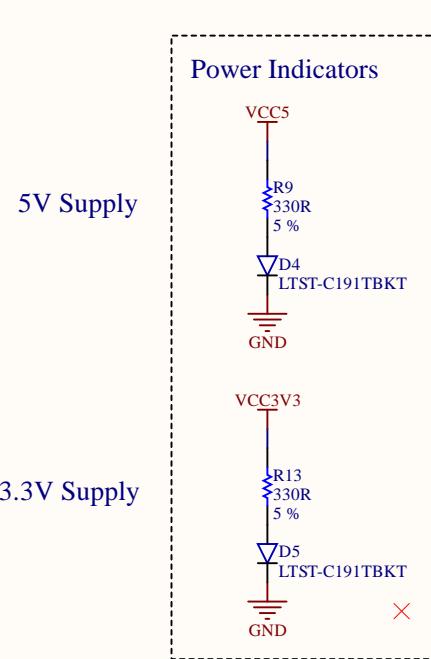


Title: Driver Interface Module - Power In	
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 3 of 13

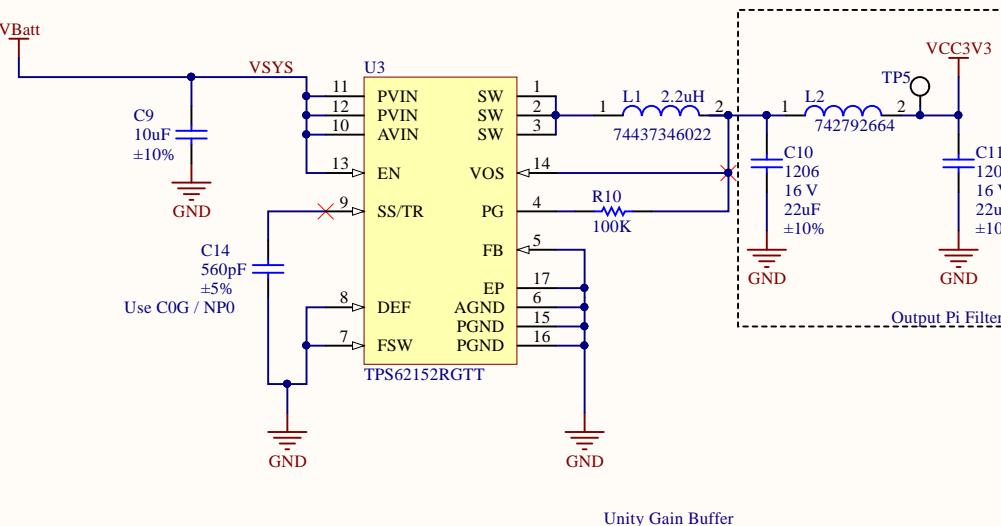
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Power



Switching Regulator, 3-17V input 3.3V output



Clamping Diodes & Voltage Divider

Clamping diodes max If (forward current) = 120mA
Vf (forward voltage) = 1V max at 120mA

Voltage between divider resistors: $5V + Vf = 6V$

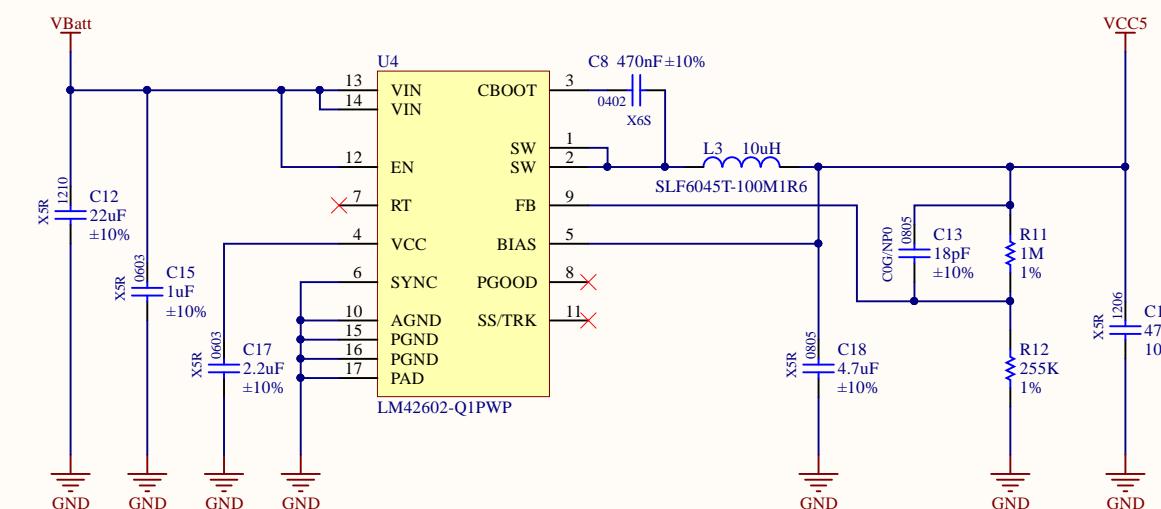
Maximum over/undervoltage with 1kohm resistor at 120mA:
 $(V_{max} - 6V) / 10K = 120mA$; $V_{max} = 126V$ (really high)

So, limiting factor in resistors is current leakage from VBatt to AGND in sensing.

1mA leakage to ground: $17V$ (worst case) / $1mA = 17k\Omega$, so use resistor total > $17k\Omega$ for leakage less than 1mA.

$12K / 5K$ yields 17:5 divider ratio, adding up to $17k\Omega$.

Switching Regulator, 3.5-36V input 5V 2A output



VCC12 / GND

VCC5 / GND

AVCC5 / AGND

Device	Current Draw (max)	Device	Current Draw (max)	Device	Current Draw (max)
PUMP_L_PWR	3 A	CAN Trans.	70 mA	MCU	30 mA
PUMP_R_PWR	3 A	L_Pump Switch	1.3 mA	VREF	20 mA
FAN_PWR	5.5 A	R_Pump Switch	1.3 mA	ADC Cond.	60 mA
BRAKE_PWR	300 mA	Fan Switch	3.3 mA	(est)	
VCC5	53.1 mA	Brake Switch	1.6 mA	Diag LEDs	50 mA
Total (max)	11.85 A	Diag LEDs (est)	50 mA	Sensors (est.)	1A
		Total	127.5 mA @ 5v = .6375 W	Total	1.16 A

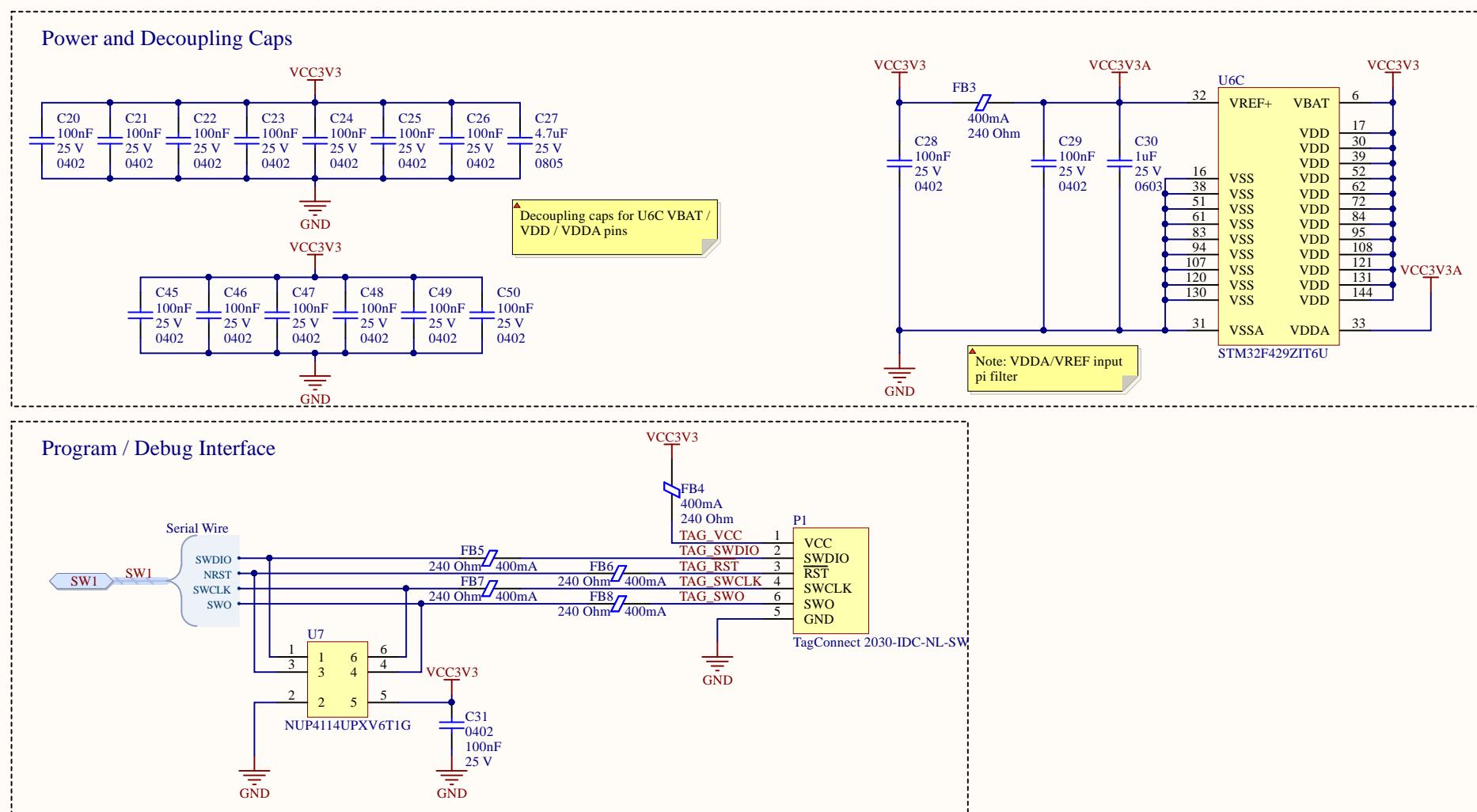
Title: Driver Interface Module - Regulators

Engineer: Tom Eliot
Shepard Emerson
Daniel Gorziglia
Daniel Haddox

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STM32 Power and Programming



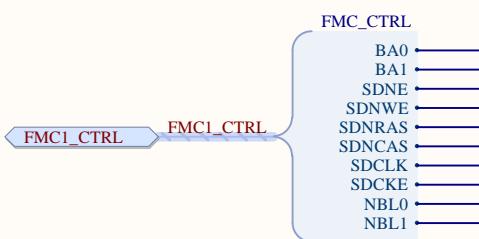
Title: Driver Interface Module - MCU PWR/PROG	
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 5 of 13

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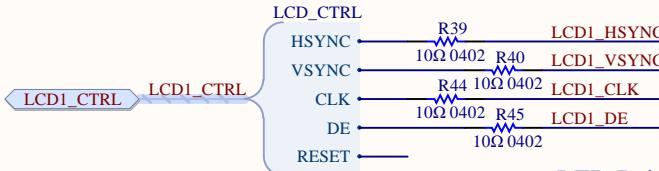
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Microcontroller

A



B

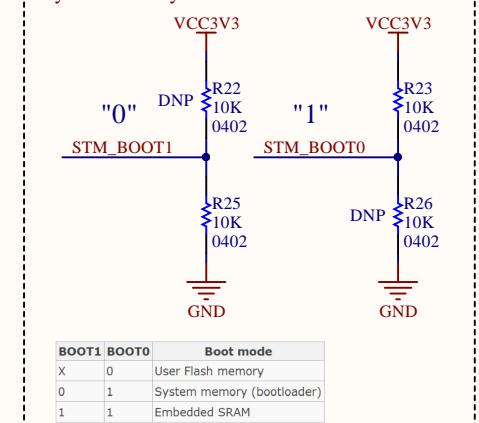


LED Driver Control

REVIEW: reset not hooked up

LED_I2C → LED driver control

Boot Configuration System Memory



D

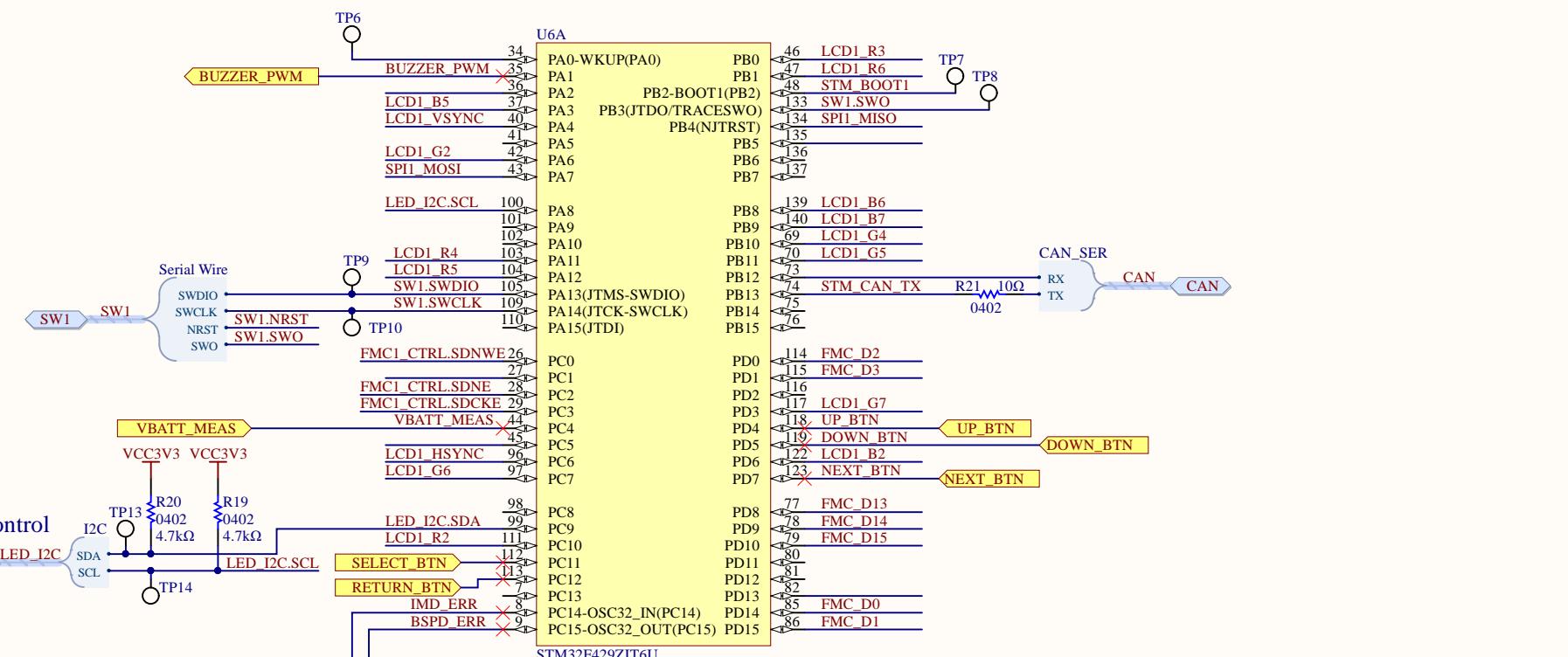
Reset Indicator / Switch

VCC3V3 → D7 → LTST-C191TBKT

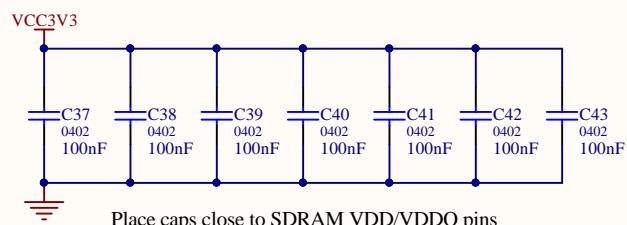
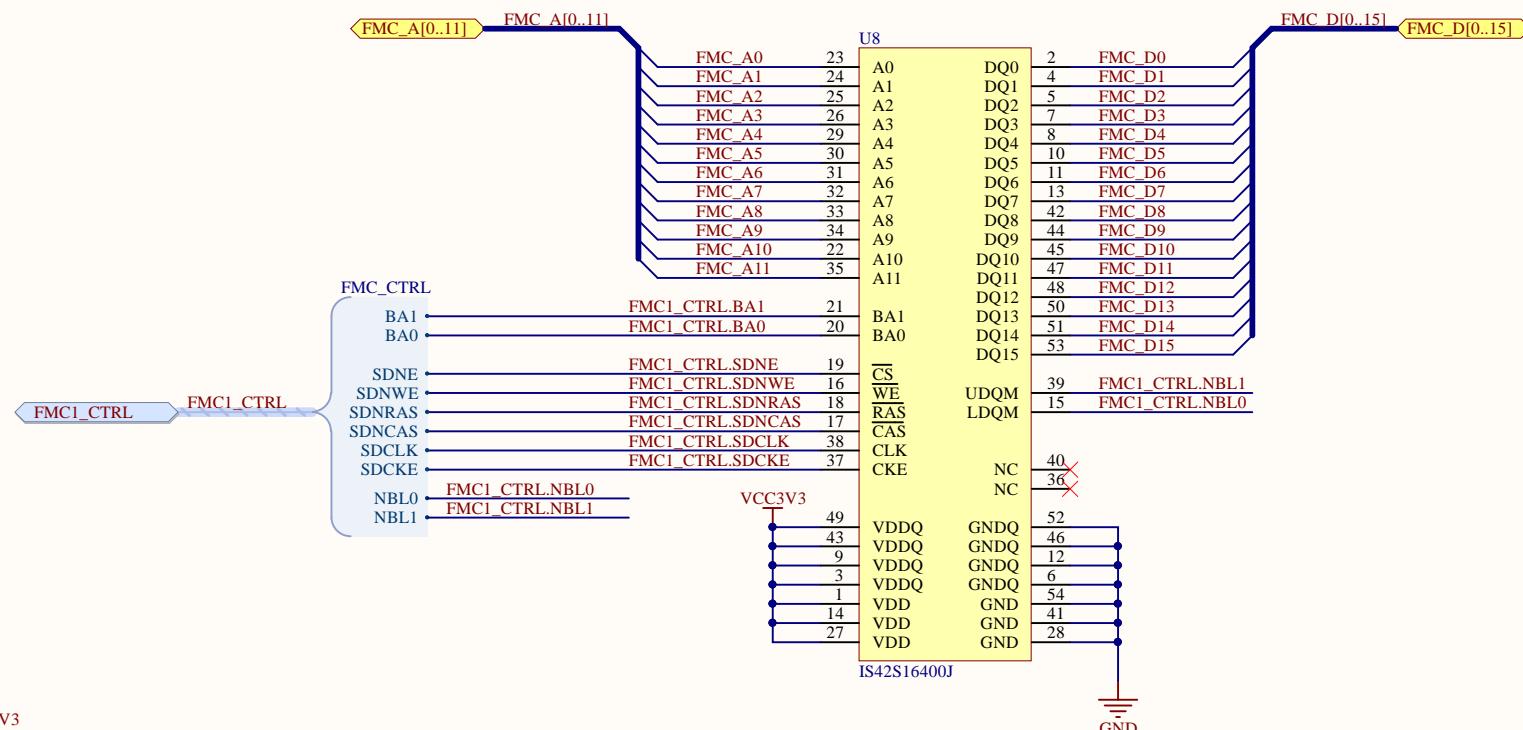
STM_NRST → R24 → 1.6k → 5 %

S1 Momentary Switch → STM_NRST

GND



SDRAM



Title: Driver Interface Module - SDRAM	
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 7 of 13

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A

A

B

B

C

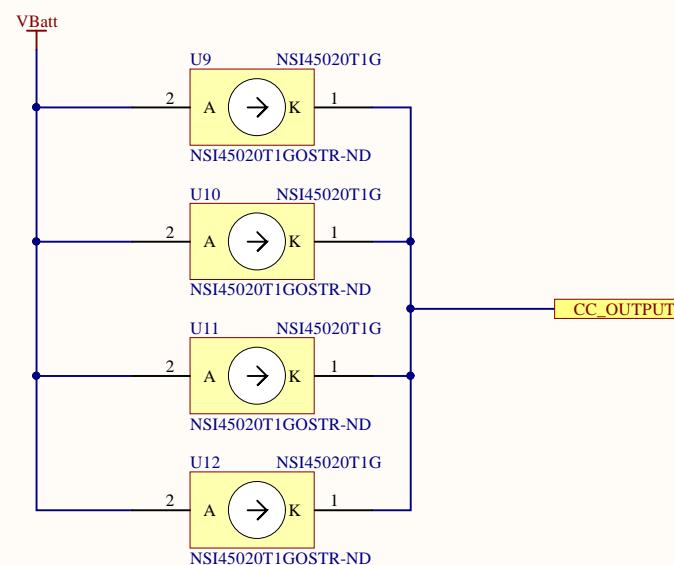
C

D

D

Constant Current Driver

80mA Output



Title: Driver Interface Module - LCD Driver

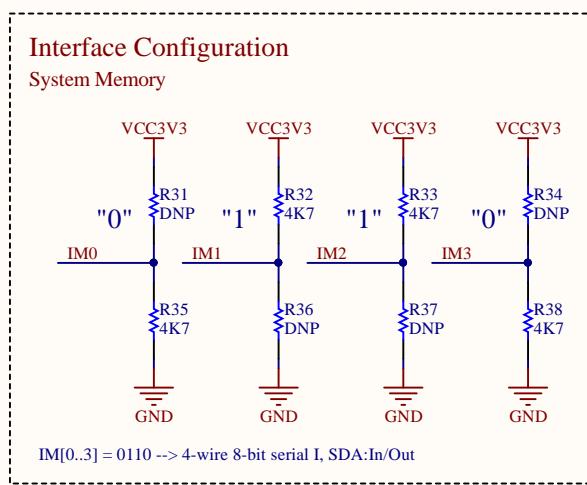
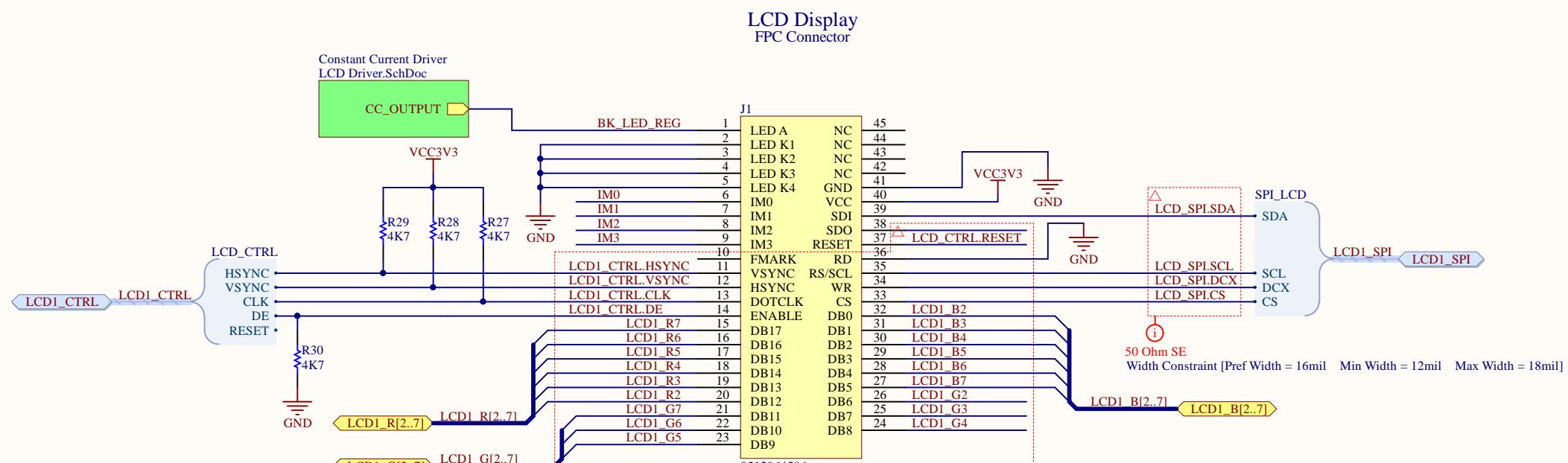
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
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System: GLV	Rev: 2.0
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Date: 4/5/2016	Sheet: 8 of 13
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LCD Display

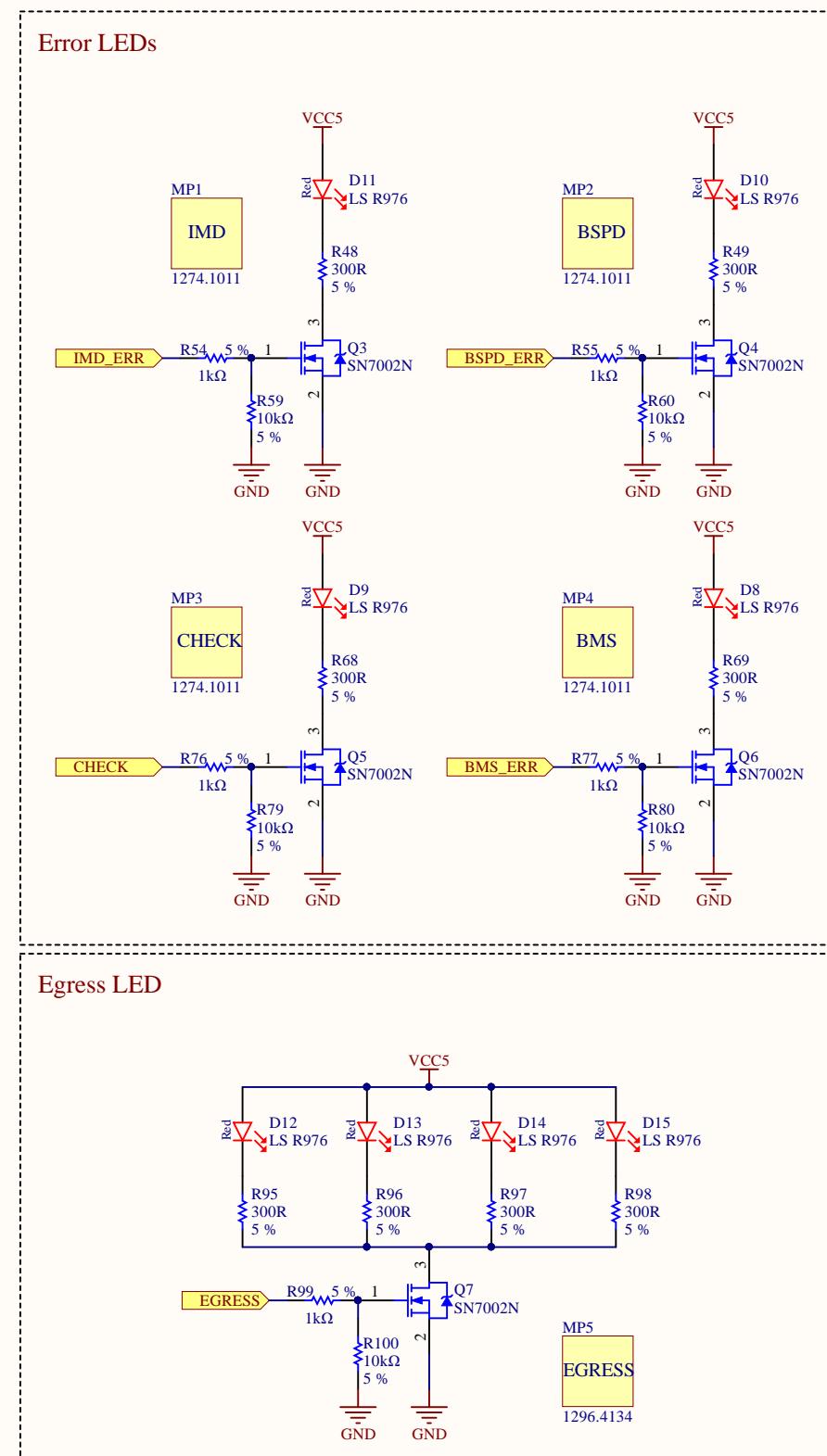


Title: Driver Interface Module - LCD Display	
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 8 of 13

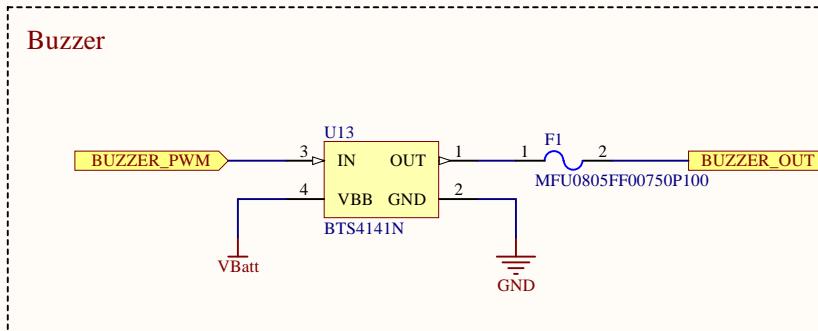
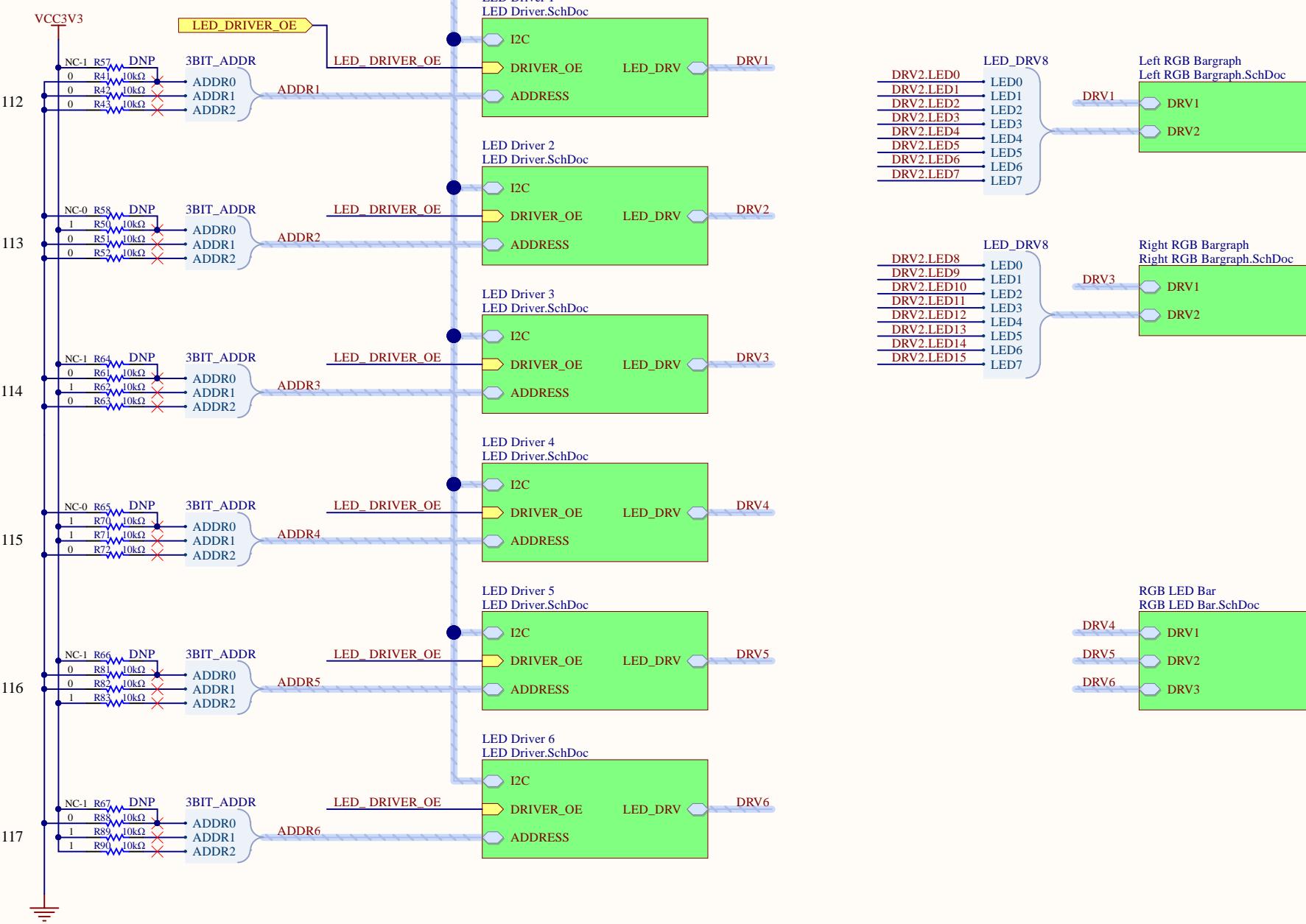
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Indicators



I2C Address Configuration



Title: Driver Interface Module - Indicators		Carnegie Mellon Racing
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00	
System: GLV		Rev: 2.0
Date: 4/5/2016		Sheet: 9 of 13

A

A

B

B

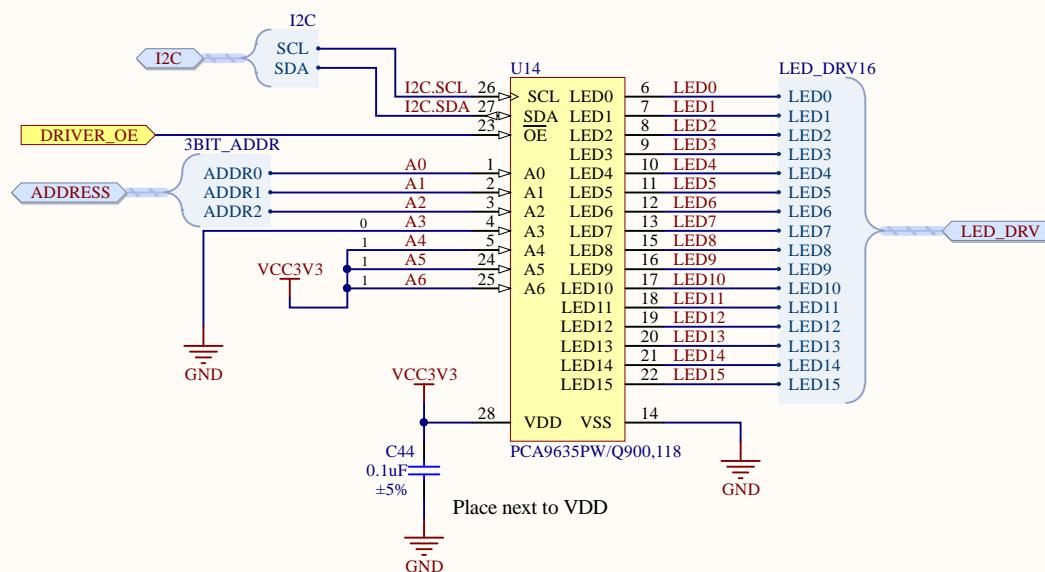
C

C

D

D

LED Driver



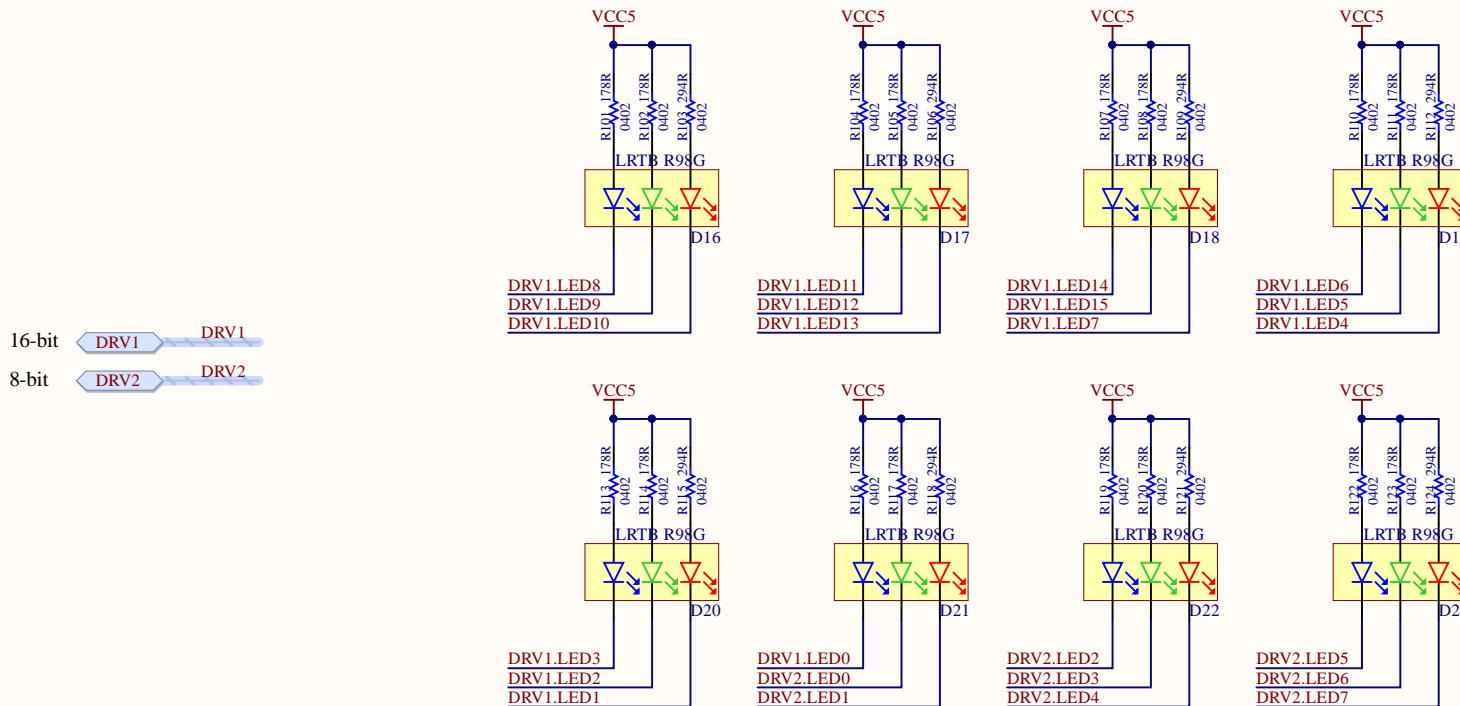
Note: The ground pin on these ICs can sink up to 400mA on full power. Lay out accordingly

Title: Driver Interface Module - LED Driver	
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 10f 13

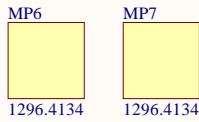
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Right RGB Bargraph



Light Guides



Title: Driver Interface Module - RGB Bargraph

Engineer: Tom Eliot
Shepard Emerson
Daniel Gorziglia
Daniel Haddox

P/N: DIM20-00

System: GLV

Rev: 2.0

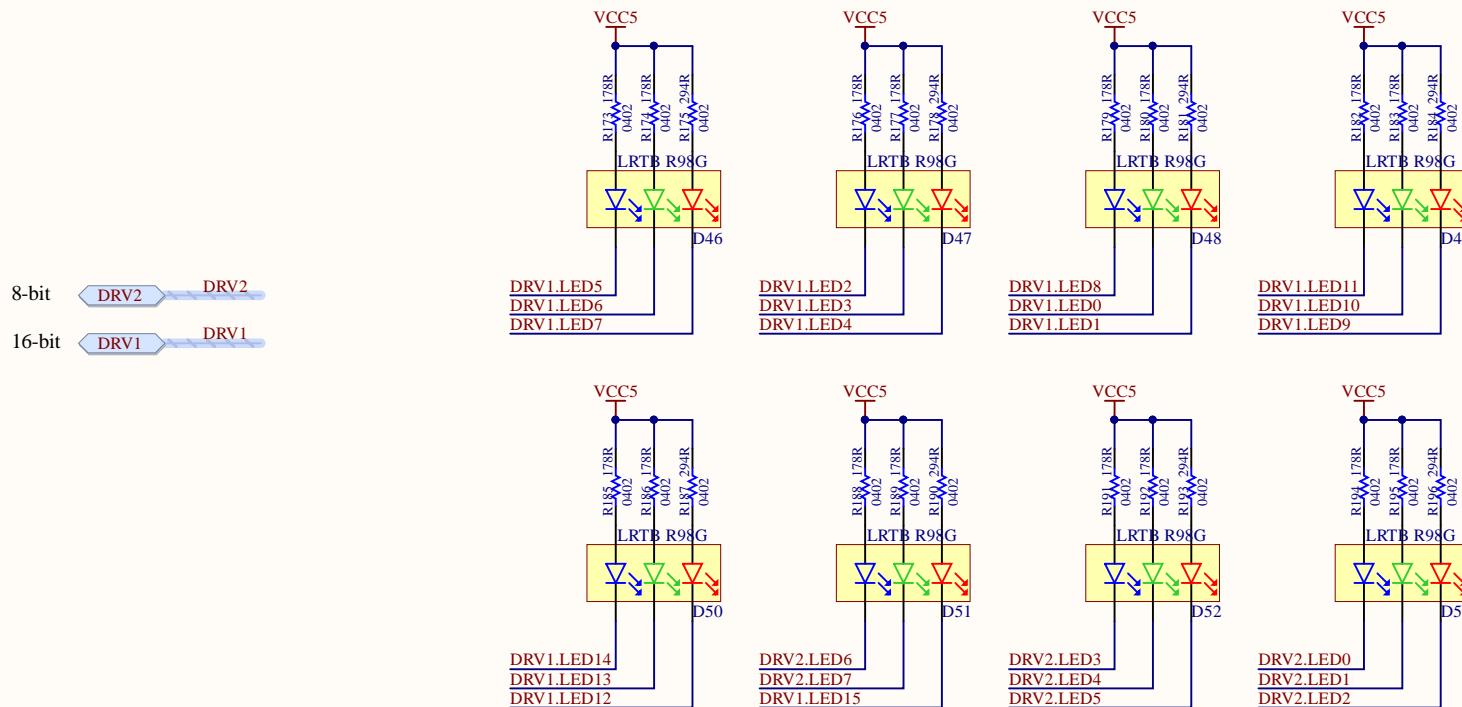
Date: 4/5/2016

Sheet: 1bf 13

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Left RGB Bargraph

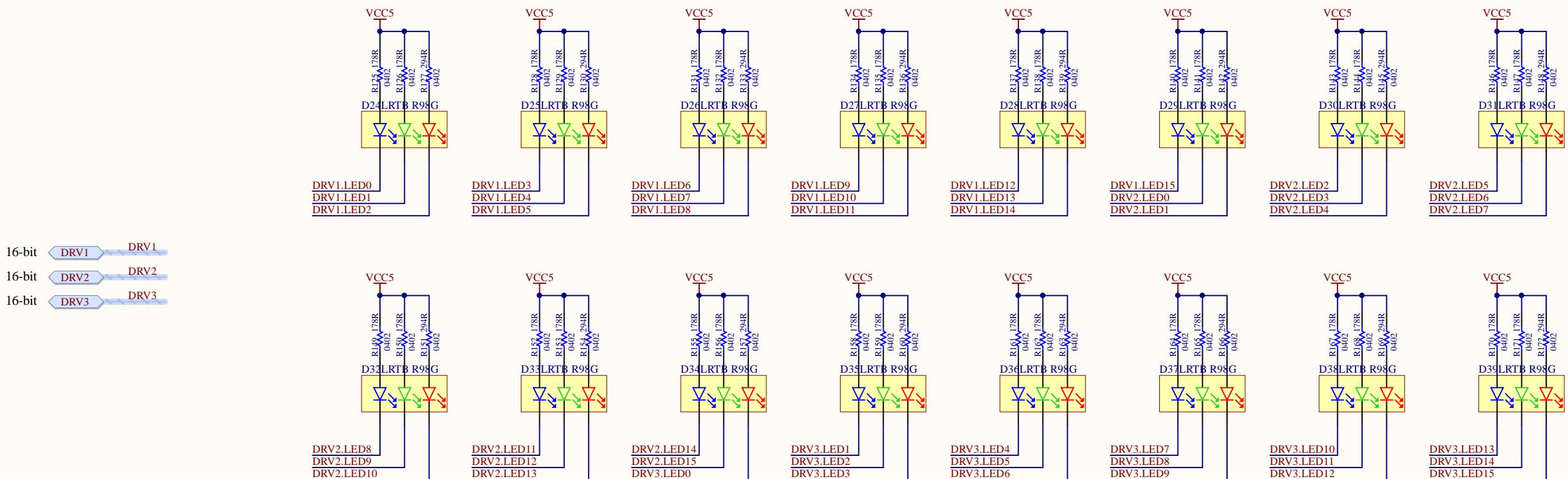


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RGB LED Bar

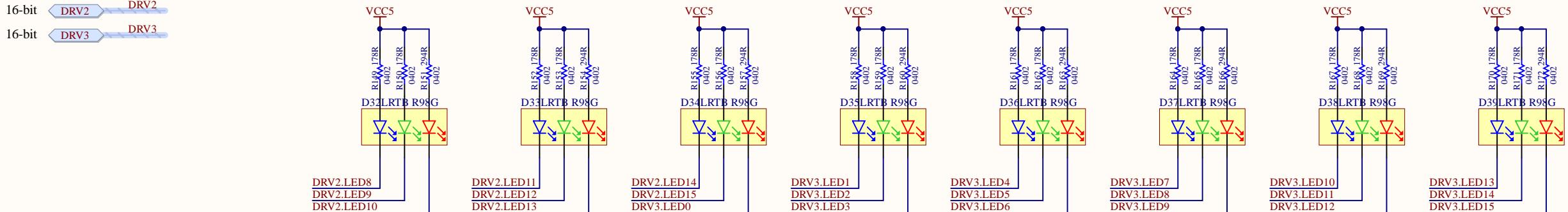
A



B

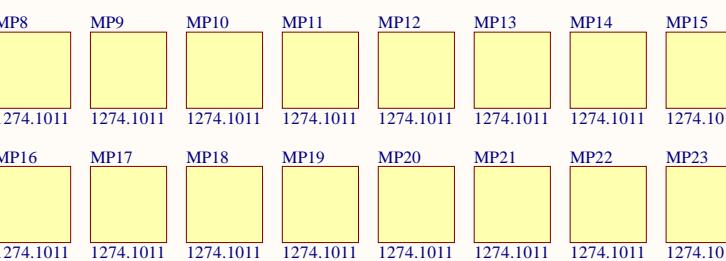
16-bit DRV1
16-bit DRV2
16-bit DRV3

C



D

Light Guides



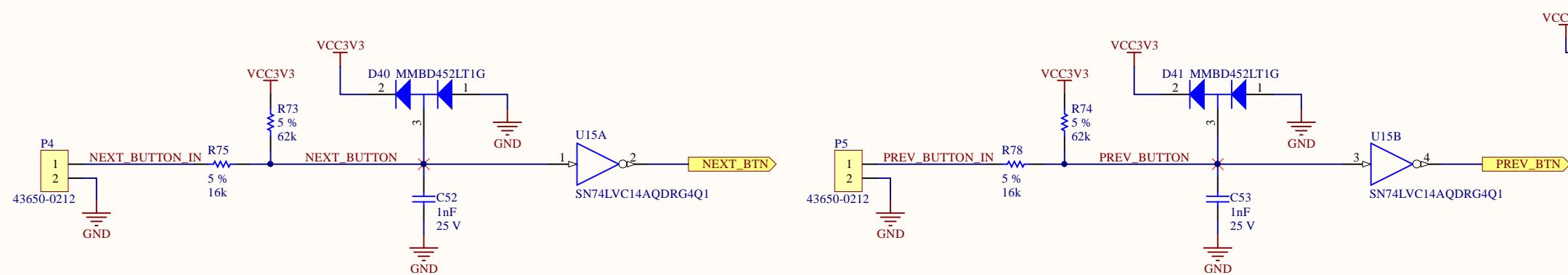
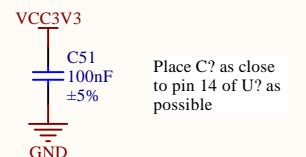
Title: Driver Interface Module - RGB LED Bar	
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 12f 13

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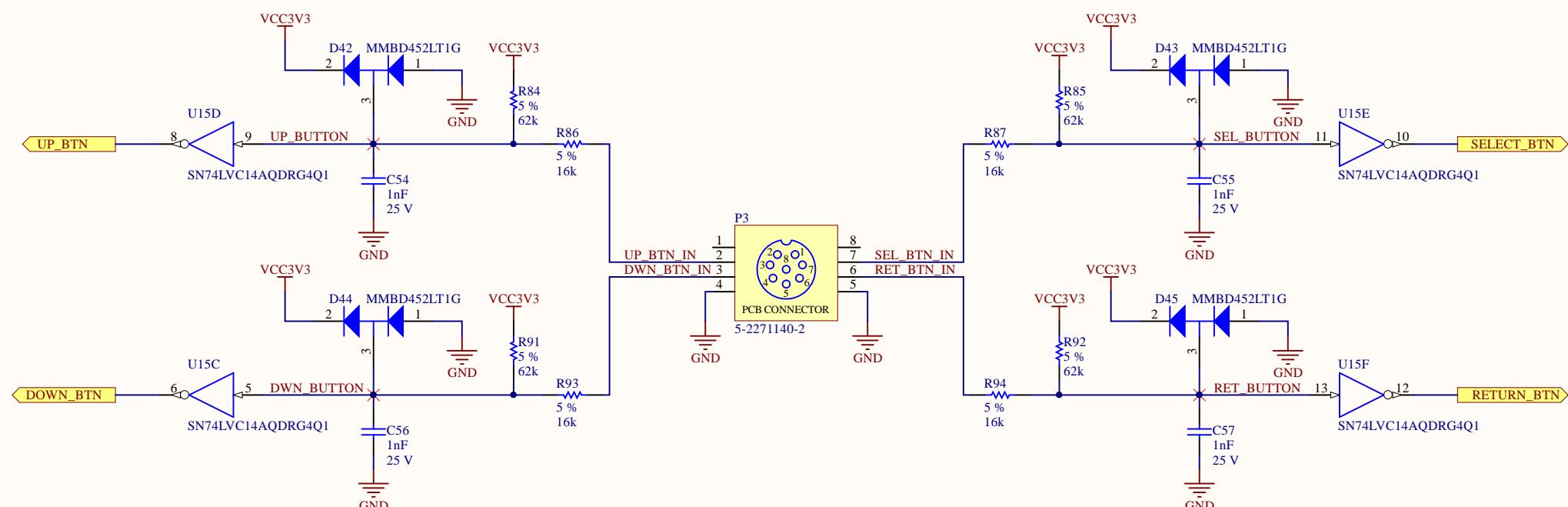
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A

Button Input Protection



B

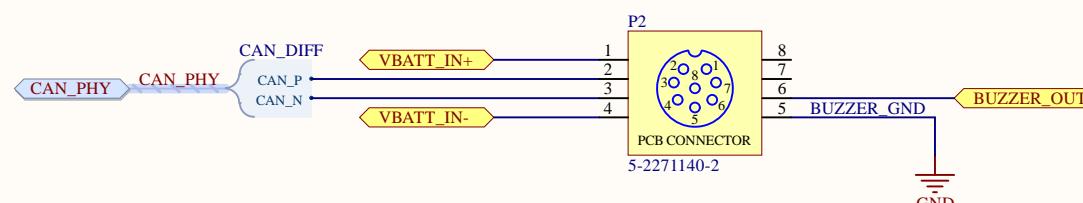


C

D

Title: Driver Interface Module - Conditioning	
Engineer: Tom Eliot Shepard Emerson Daniel Gorzilgia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 13 of 13
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Connectors



Cannot open file C:\Users\Daniel Haddox\Documents\CMR Altium Repository 2015-2016\GLV\Driver Interface Module\Design\circ_circ_pinout1.PNG

Cannot open file C:\Users\Daniel Haddox\Documents\CMR Altium Repository 2015-2016\GLV\Driver Interface Module\Design\circ_circ_pinout2.PNG

Title: Driver Interface Module - Connectors	
Engineer: Tom Eliot Shepard Emerson Daniel Gorziglia Daniel Haddox	P/N: DIM20-00
System: GLV	Rev: 2.0
Date: 4/5/2016	Sheet: 13 of 13



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