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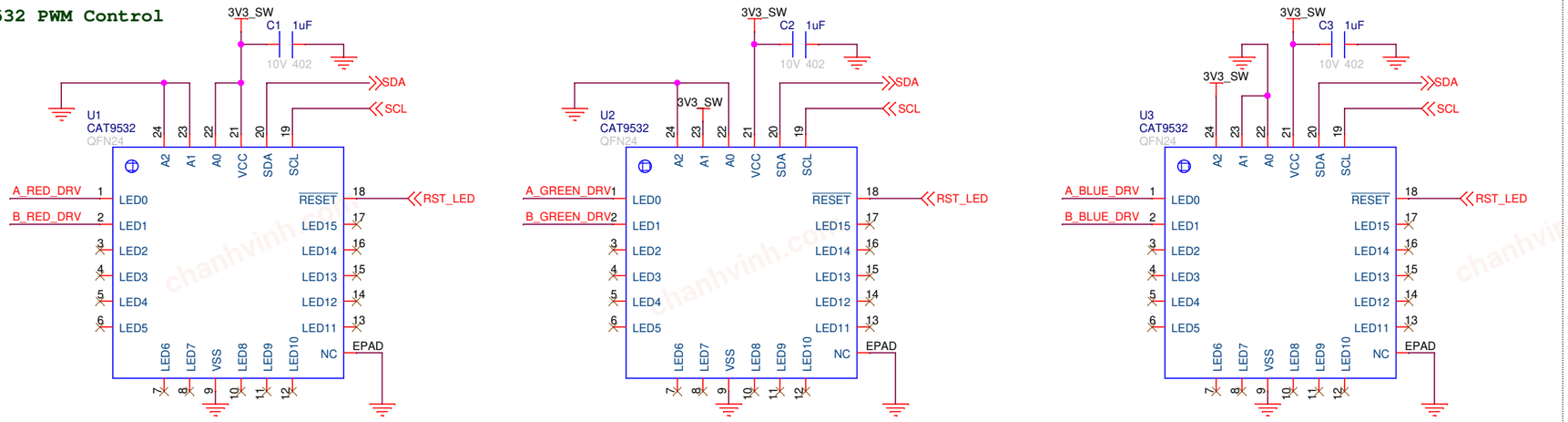
ONSEC-18-030
Yaquina Bay LED Board

ON Semiconductor		
Title: Yaquina Bay LED Board		
Size: Custom	Document Number: ONSEC-18-030	Rev: REV1
Date: Monday, February 04, 2019	Sheet 1 of 8	

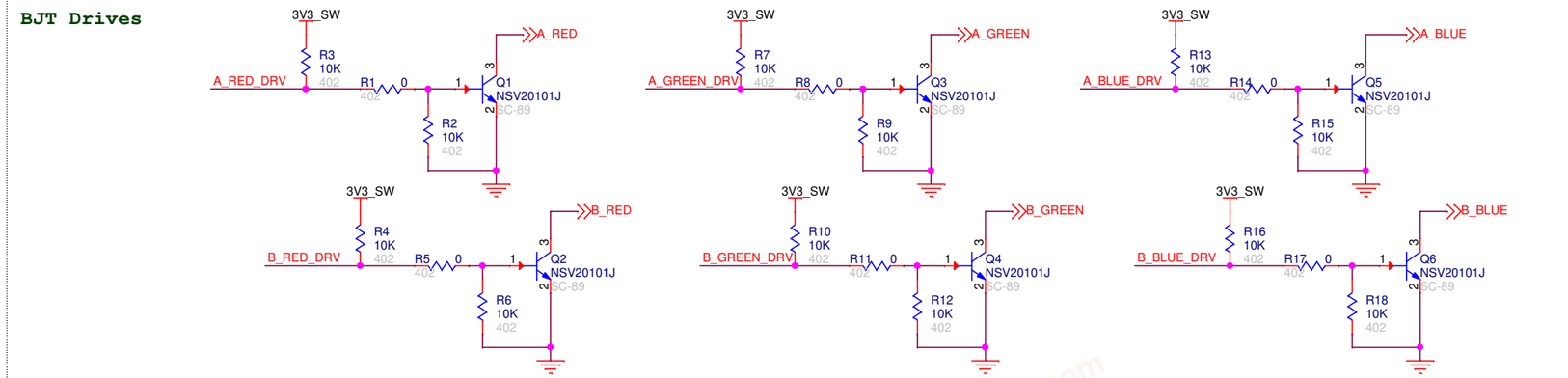
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PULSE - 2 Channel PWM RGB

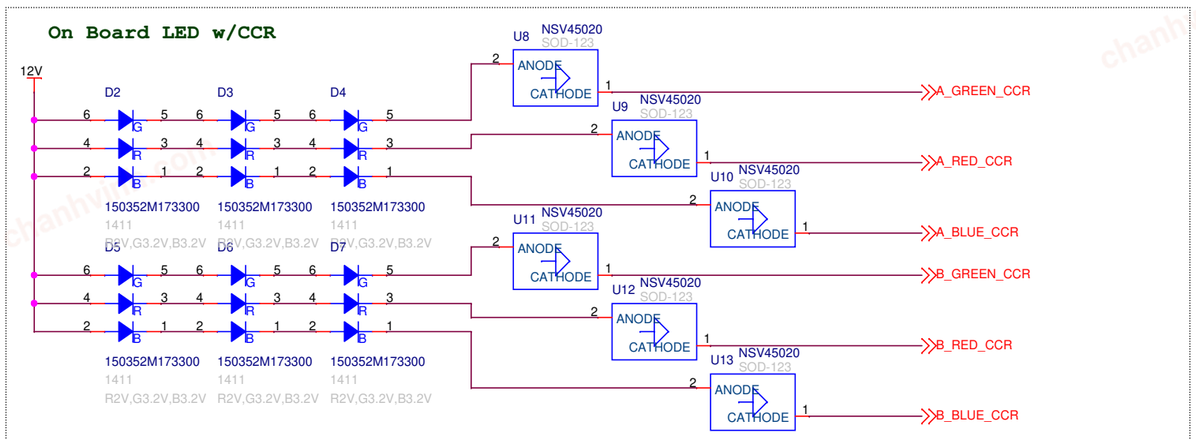
CAT9532 PWM Control



BJT Drives



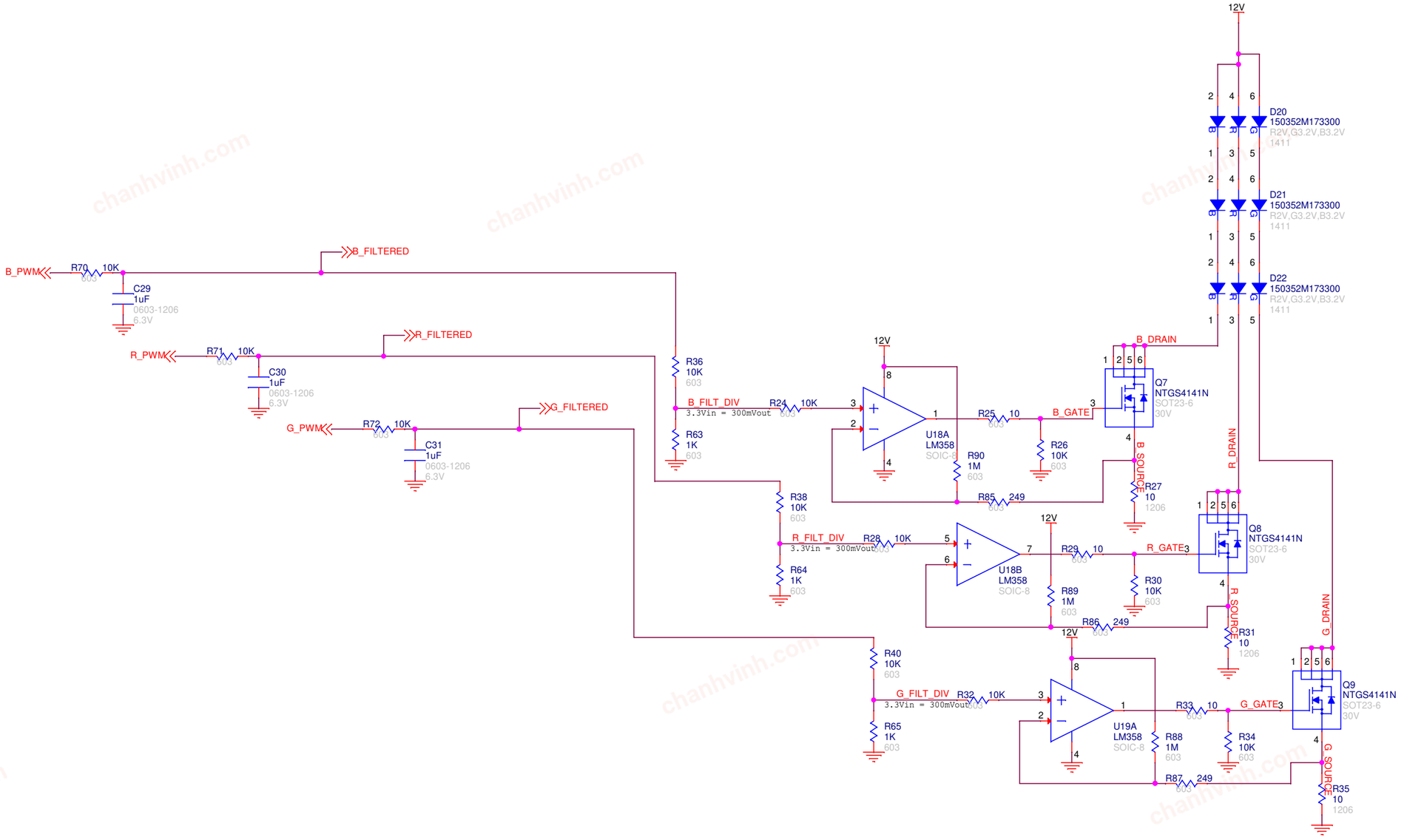
On Board LED w/CCR



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LINEAR - 1 Channel DC RGB



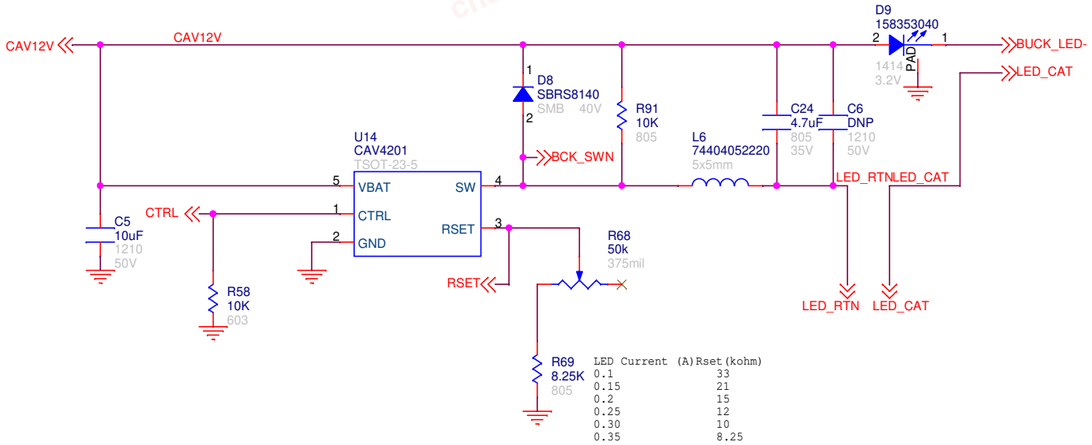
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BUCK - High Current AECQ Buck Controller

High Power Buck – 350mA

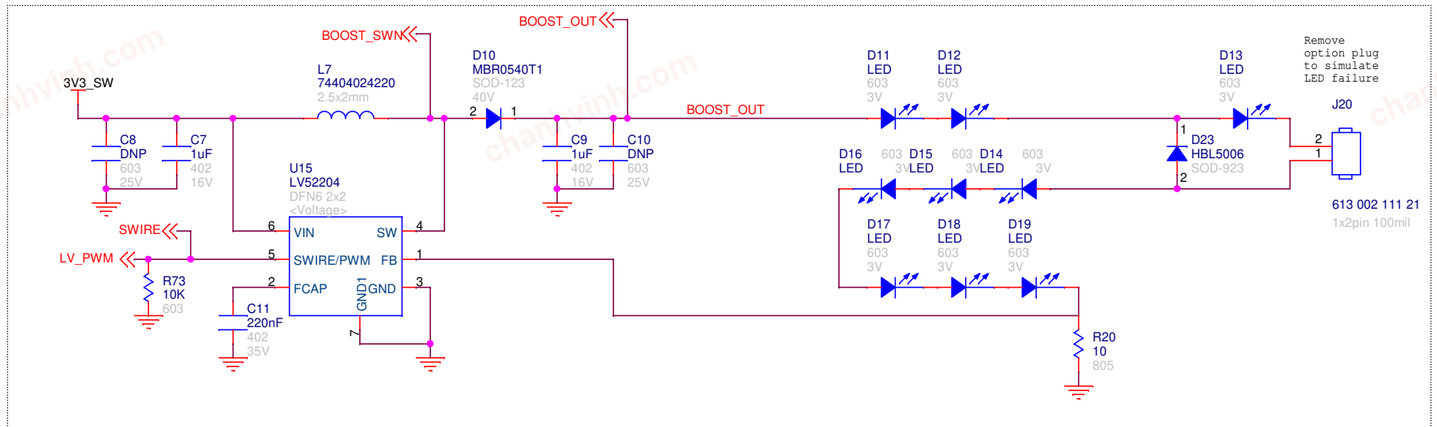


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BOOST - SMPS for LED Backlighting

SMPS Boost (Backlight) – 30mA max

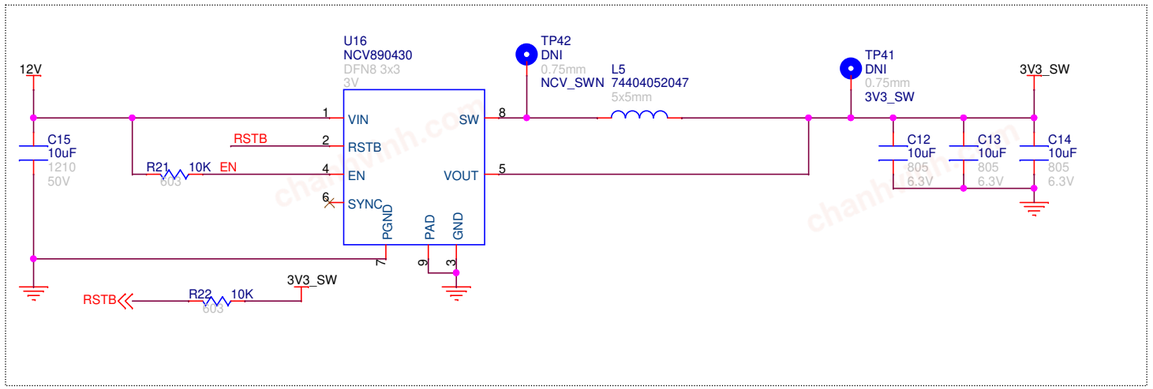


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Title: Yaquina Bay LED Board		
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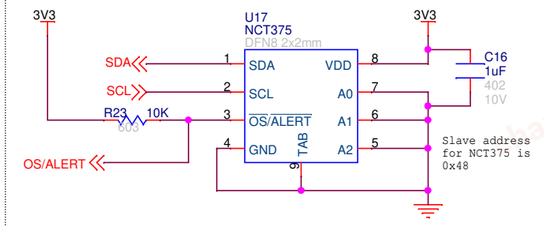
Power and Telemetry

3.3V SMPS

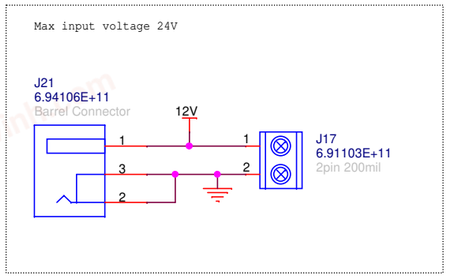


BUCK – Temp Monitor

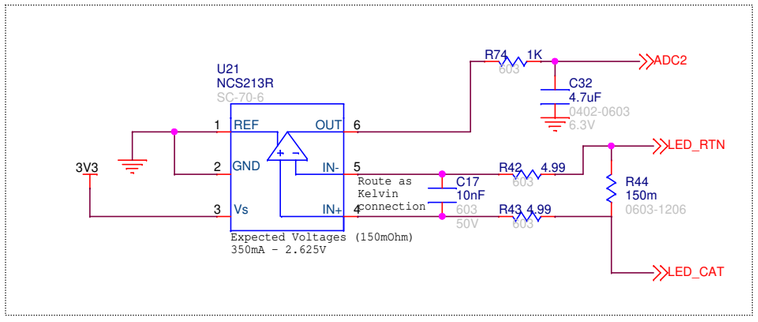
Place near high power LED



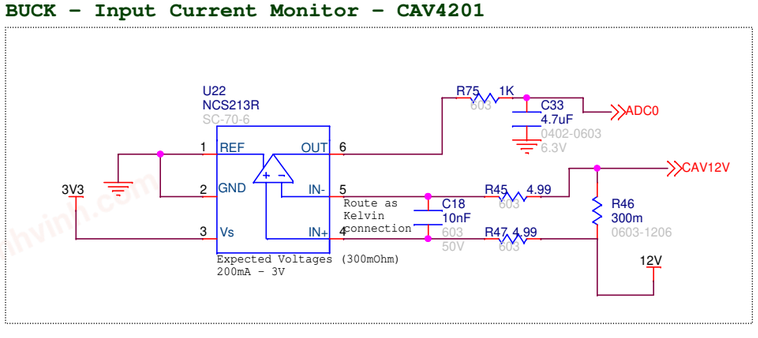
Input Power



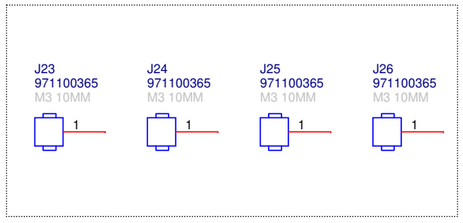
BUCK – LED Current Monitor – CAV4201



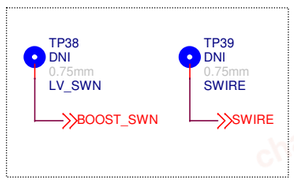
BUCK – Input Current Monitor – CAV4201



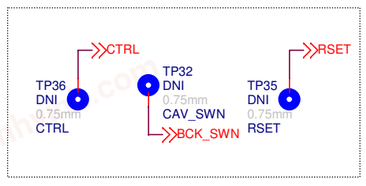
Mounting Holes for LED Cover



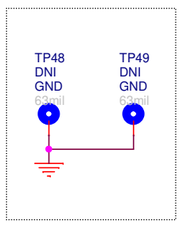
BOOST – Test Points



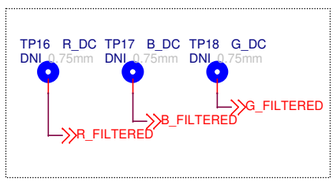
BUCK – Test Points



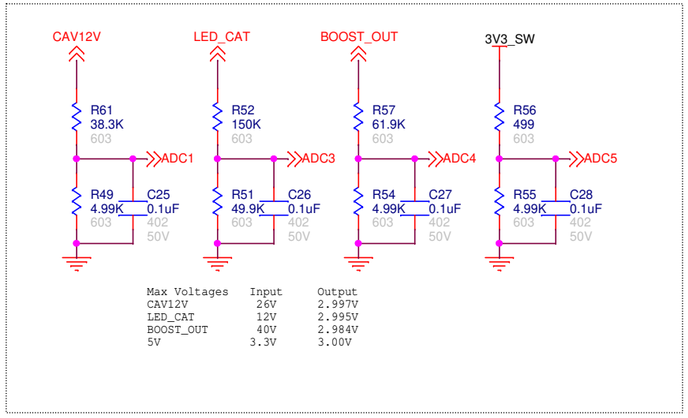
GND Holes



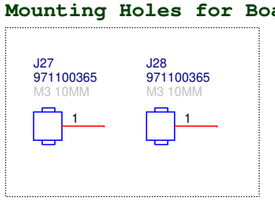
LINEAR – Test Points



Voltage Monitoring



Mounting Holes for Board



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External Connections

PULSE
External Connections

RGB flexible strip connection

J7
613 004 111 21
1x4pin 100mil

12V
1 — A_GREEN_EXT
2 — A_RED_EXT
3 — A_BLUE_EXT
4

J8
613 004 111 21
1x4pin 100mil

12V
1 — B_GREEN_EXT
2 — B_RED_EXT
3 — B_BLUE_EXT
4

PULSE
Option Selector

Option plug determines external or on board LED

J1
613 003 111 21
1x3pin 100mil
1 — A_GREEN_CCR
2 — A_GREEN
3 — A_GREEN_EXT

J11
613 003 111 21
1x3pin 100mil
1 — B_GREEN_CCR
2 — B_GREEN
3 — B_GREEN_EXT

J9
613 003 111 21
1x3pin 100mil
1 — A_RED_CCR
2 — A_RED
3 — A_RED_EXT

J12
613 003 111 21
1x3pin 100mil
1 — B_RED_CCR
2 — B_RED
3 — B_RED_EXT

J10
613 003 111 21
1x3pin 100mil
1 — A_BLUE_CCR
2 — A_BLUE
3 — A_BLUE_EXT

J13
613 003 111 21
1x3pin 100mil
1 — B_BLUE_CCR
2 — B_BLUE
3 — B_BLUE_EXT

BUCK – Option Selector

Option plug determines external or on board LED

BUCK_LED-
LED_CAT
3
2
1
J15
613 003 111 21
1x3pin 100mil

CAV12V
1
2
J14
6.91103E+11
2pin 200mil

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U6
EFM32GG380F1024
QFP100 14x14

PA0 * EBI_AD09 #0/1/2 * TIM0_CC0 #0/1/4 * I2C0_SDA #0 * LEU0_RX #4 * PRS_CH0 #0 * GPIO_EM4WU0
PA1 * EBI_AD10 #0/1/2 * TIM0_CC1 #0/1 * I2C0_SCL #0 * CMU_CLK1 #0 * PRS_CH1 #0
PA2 * EBI_AD11 #0/1/2 * TIM0_CC2 #0/1 * CMU_CLK0 #0 * ETM_TD0 #3
PA3 * EBI_AD12 #0/1/2 * TIM0_CDTI0 #0 * U0_TX #2 * LES_ALTEX2 #0 * ETM_TD1 #3
PA4 * EBI_AD13 #0/1/2 * TIM0_CDTI1 #0 * U0_RX #2 * LES_ALTEX3 #0 * ETM_TD2 #3
PA5 * EBI_AD14 #0/1/2 * TIM0_CDTI2 #0 * LEU1_TX #1 * LES_ALTEX4 #0 * ETM_TD3 #3
PA6 * EBI_AD15 #0/1/2 * LEU1_RX #1 * ETM_TCLK #3 * GPIO_EM4WU1
PA7 * EBI_CSTFT #0/1/2
PA8 * EBI_DCLK #0/1/2 * TIM2_CC0 #0
PA9 * EBI_DTEN #0/1/2 * TIM2_CC1 #0
PA10 * EBI_VSNC #0/1/2 * TIM2_CC2 #0
PA11 * EBI_HSNC #0/1/2
PA12 * EBI_A00 #0/1/2 * TIM2_CC0 #1
PA13 * EBI_A01 #0/1/2 * TIM2_CC1 #1
PA14 * EBI_A02 #0/1/2 * TIM2_CC2 #1
PA15 * EBI_AD08 #0/1/2 * TIM3_CC2 #0

PB0 * EBI_A16 #0/1/2 * TIM1_CC0 #2
PB1 * EBI_A17 #0/1/2 * TIM1_CC1 #2
PB2 * EBI_A18 #0/1/2 * TIM1_CC2 #2
PB3 * EBI_A19 #0/1/2 * PCNT1_S0IN #1 * US2_TX #1
PB4 * EBI_A20 #0/1/2 * PCNT1_S1IN #1 * US2_RX #1
PB5 * EBI_A21 #0/1/2 * US2_CLK #1
PB6 * EBI_A22 #0/1/2 * US2_CS #1
PB7 * LFXTAL_P * TIM1_CC0 #3 * US0_TX #4 * US1_CLK #0
PB8 * LFXTAL_N * TIM1_CC1 #3 * US0_RX #4 * US1_CS #0
PB9 * EBI_A03 #0/1/2 * U1_TX #2
PB10 * EBI_A04 #0/1/2 * U1_RX #2
PB11 * DAC0_OUT0 * OPAMP_OUT0 * LETIM0_OUT0 #1 * TIM1_CC2 # * I2C1_SDA #1
PB12 * DAC0_OUT1 * OPAMP_OUT1 * LETIM0_OUT1 #1 * I2C1_SCL #1
PB13 * HFXTAL_P * US0_CLK #4/5 * LEU0_TX #1
PB14 * HFXTAL_N * US0_CS #4/5 * LEU0_RX #1

PC0 * ACMP0_CH0 * DAC0_OUT0ALT #0 * OPAMP_OUT0ALT * EBI_A23 #0/1/2 * TIM0_CC1 #4 * PCNT0_S0IN #2 * US0_TX #5 * US1_TX #0 * I2C0_SDA #4 * LES_CH0 #0 * PRS_CH2 #0
PC1 * ACMP0_CH1 * DAC0_OUT0ALT #1 * OPAMP_OUT0ALT * EBI_A24 #0/1/2 * TIM0_CC2 #4 * PCNT0_S1IN #2 * US0_RX #5 * US1_RX #0 * I2C0_SCL #4 * LES_CH1 #0 * PRS_CH3 #0
PC2 * ACMP0_CH2 * DAC0_OUT0ALT #2 * OPAMP_OUT0ALT * EBI_A25 #0/1/2 * TIM0_CDTI0 #4 * US2_TX #0 * LES_CH2 #0
PC3 * ACMP0_CH3 * DAC0_OUT0ALT #3 * OPAMP_OUT0ALT * EBI_NANDREn #0/1/2 * TIM0_CDTI1 #4 * US2_RX #0 * LES_CH3 #0
PC4 * ACMP0_CH4 * OPAMP_P0 * EBI_A26 #0/1/2 * TIM0_CDTI2 #4 * LETIM0_OUT0 #3 * PCNT1_S0IN #0 * US2_CLK #0 * I2C1_SDA #0 * LES_CH4 #0
PC5 * ACMP0_CH5 * OPAMP_N0 * EBI_NANDWEn #0/1/2 * LETIM0_OUT1 #3 * PCNT1_S1IN #0 * US2_CS #0 * I2C1_SCL #0 * LES_CH5 #0
PC6 * ACMP0_CH6 * EBI_A05 #0/1/2 * I2C0_SDA #2 * LEU1_TX #0 * LES_CH6 #0 * ETM_TCLK #2
PC7 * ACMP0_CH7 * EBI_A06 #0/1/2 * I2C0_SCL #2 * LEU1_RX #0 * LES_CH7 #0 * ETM_TD0 #2
PC8 * ACMP1_CH0 * EBI_A15 #0/1/2 * TIM2_CC0 #2 * US0_CS #2 * LES_CH8 #0
PC9 * ACMP1_CH1 * EBI_A09 #1/2 * TIM2_CC1 #2 * US0_CLK #2 * LES_CH9 #0 * GPIO_EM4WU2
PC10 * ACMP1_CH2 * EBI_A10 #1/2 * TIM2_CC2 #2 * US0_RX #2 * LES_CH10 #0
PC11 * ACMP1_CH3 * EBI_ALE #1/2 * US0_TX #2 * LES_CH11 #0

PD0 * ADC0_CH0 * DAC0_OUT0ALT #4 * OPAMP_OUT0ALT * OPAMP_OUT2 #1 * PCNT2_S0IN #0 * US1_TX #1
PD1 * ADC0_CH1 * DAC0_OUT1ALT #4 * OPAMP_OUT1ALT * TIM0_CC0 #3 * PCNT2_S1IN #0 * US1_RX #1 * DBG_SWO #2
PD2 * ADC0_CH2 * EBI_A27 #0/1/2 * TIM0_CC1 #3 * USB_DMPU #0 * US1_CLK #1 * DBG_SWO #3
PD3 * ADC0_CH3 * OPAMP_N2 * TIM0_CC2 #3 * US1_CS #1 * ETM_TD1 #0/2
PD4 * ADC0_CH4 * OPAMP_P2 * LEU0_TX #0 * ETM_TD2 #0/2
PD5 * ADC0_CH5 * OPAMP_OUT2 #0 * LEU0_RX #0 * ETM_TD3 #0/2
PD6 * ADC0_CH6 * OPAMP_P1 * LETIM0_OUT0 #0 * TIM1_CC0 #4 * PCNT0_S0IN #3 * US1_RX #2 * I2C0_SDA #1 * LES_ALTEX0 #0 * ACMP0_O #2 * ETM_TD0 #0
PD7 * ADC0_CH7 * OPAMP_N1 * LETIM0_OUT1 #0 * TIM1_CC1 #4 * PCNT0_S1IN #3 * US1_TX #2 * I2C0_SCL #1 * CMU_CLK0 #2 * LES_ALTEX1 #0 * ACMP1_O #2 * ETM_TCLK #0
PD8 * BU_VIN * CMU_CLK1 #1
PD9 * EBI_CS0 #0/1/2
PD10 * EBI_CS1 #0/1/2
PD11 * EBI_CS2 #0/1/2
PD12 * EBI_CS3 #0/1/2

PE0 * EBI_A07 #0/1/2 * TIM3_CC0 #1 * PCNT0_S0IN #1 * U0_TX #1 * I2C1_SDA #2
PE1 * EBI_A08 #0/1/2 * TIM3_CC1 #1 * U0_RX #1 * PCNT0_S1IN #1 * I2C1_SCL #2
PE2 * BU_VOUT * EBI_A09 #0 * TIM3_CC2 #1 * U1_TX #3 * ACMP0_O #1
PE3 * BU_STAT * EBI_A10 #0 * U1_RX #3 * ACMP1_O #1
PE4 * EBI_A11 #0/1/2 * US0_CS #1
PE5 * EBI_A12 #0/1/2 * US0_CLK #1
PE6 * EBI_A13 #0/1/2 * US0_RX #1
PE7 * EBI_A14 #0/1/2 * US0_TX #1
PE8 * EBI_AD00 #0/1/2 * PCNT2_S0IN #1 * PRS_CH3 #1
PE9 * EBI_AD01 #0/1/2 * PCNT2_S1IN #1
PE10 * EBI_AD02 #0/1/2 * TIM1_CC0 #1 * US0_TX #0 * BOOT_TX
PE11 * EBI_AD03 #0/1/2 * TIM1_CC1 #1 * US0_RX #0 * LES_ALTEX5 #0 * BOOT_RX
PE12 * EBI_AD04 #0/1/2 * TIM1_CC2 #1 * US0_RX #3 * US0_CLK #0 * I2C0_SDA #6 * CMU_CLK1 #2 * LES_ALTEX6 #0
PE13 * EBI_AD05 #0/1/2 * US0_TX #3 * US0_CS #0 * I2C0_SCL #6 * LES_ALTEX7 #0 * ACMP0_O #0 * GPIO_EM4WU5
PE14 * EBI_AD06 #0/1/2 * TIM3_CC0 #0 * LEU0_TX #2
PE15 * EBI_AD07 #0/1/2 * TIM3_CC1 #0 * LEU0_RX #2

PF0 * TIM0_CC0 #5 * LETIM0_OUT0 #2 * US1_CLK #2 * I2C0_SDA #5 * LEU0_TX #3 * DBG_SWCLK #0/1/2/3
PF1 * TIM0_CC1 #5 * LETIM0_OUT1 #2 * US1_CS #2 * I2C0_SCL #5 * LEU0_RX #3 * DBG_SWDIO #0/1/2/3 * GPIO_EM4WU3
PF2 * EBI_ARDY #0/1/2 * TIM0_CC2 #5 * LEU0_TX #4 * ACMP1_O #0 * DBG_SWO #0 * GPIO_EM4WU4
PF5 * EBI_REn #0/2 * TIM0_CDTI2 #2/5 * USB_VBUSEN #0 * PRS_CH2 #1
PF6 * EBI_BL0 #0/1/2 * TIM0_CC0 #2 * U0_TX #0
PF7 * EBI_BL1 #0/1/2 * TIM0_CC1 #2 * U0_RX #0
PF8 * EBI_WEn #1 * TIM0_CC2 #2 * ETM_TCLK #1
PF9 * EBI_REn #1 * ETM_TD0 #1
PF10 * U1_TX #1 * USB_DM
PF11 * U1_RX #1 * USB_DP
PF12 * USB_ID

RESETn
USB_VBUS
USB_VREGI
USB_VREGO
AVDD_0
AVDD_1
VDD_DREG
IOVDD_0
IOVDD_1
IOVDD_2
IOVDD_3
IOVDD_5
DECOUPLE
GND0
GND1
GND2
GND3

B_PWM
R_PWM
G_PWM
LV_PWM
LFXTAL_P
LFXTAL_N
MCU_U1_TX
MCU_U1_RX
CTRL
HFXTAL_P
HFXTAL_N
SDA
SCL
ADC0
ADC1
ADC2
ADC3
ADC4
ADC5
RSTB
RST_LED
OS/ALERT
DBG_SWCLK
DBG_SWDIO
DBG_SWO
LINK

36 RST_MCU#
C34 0.1uF 402 50V
79
72
73
45
41
57
8
17
31
44
82
59
C39 1uF 402 16V
16
32
58
83

C35 4.7uF 402 6.3V
C23 4.7uF 402 6.3V
C36 4.7uF 402 6.3V
C37 4.7uF 402 6.3V
3V3

J16
FTSH-105-01-F-DV-K
2x5pin 50mil Cortex Debug
MCU debug and programming header
3V3
DBG_SWDIO
DBG_SWCLK
DBG_SWO

5V
50mA max in switch
SW3
4.34153E+11
MOM1 SMD
TP59
DNI
RST
1mm Circle
3V3_FT
R92 100 402
RST_FT#
~10ms switch debounce
R93 2.32K 402
R94 100 603
Q10
2N7002W
SOT-323
60V
3V3
R19 100 402
RST_MCU#
Q11
2N7002W
SOT-323
60V
RST
C38 10uF 603 25V
Master reset, use RST (active high) with FET/pull up for all other circuits that should be reset with MCU and FT

5V_USB
FB1
220@100M
805
VBUS
Route USB_DX 45 ohm single ended
J29
65100516121
Mini USB1/2 B
USB_DM
USB_DP
VBUS
D-
D+
ID
GND
SH1
SH2
SH3
SH4
Optionally short 5VIN and 5V_USB when no external supplies are being used, only 5V_USB
5VIN
JP1
DNI
D24
SESD7L
SOT-723
5.5V
C40 1uF 402 16V
Maximum 10uF on VBUS
D25
NSR20F20NX
DSN2 0603
20V
D1
NSR20F20NX
DSN2 0603
20V
U23
NCP705
WDFN6
IN
OUT
NC
ADJ/NC
EN
GND
EPAD
C42 1uF 402 16V
R95 10K 402
C41 4.7uF 402 6.3V
MCU power domain only!! Connect only MCU and devices/signals that need to communicate to MCU on 3.3V!

3V3
R96 10K 402
MODE#
Detects VBUS disconnect to disable serial communication
Q12
2N7002W
SOT-323
60V
TP57
DNI
TX
1mm Circle
TP58
DNI
RX
1mm Circle
FT230X is powered down during loss of VBUS
U7
FT230X
QFN16 4x4
3V3_FT
5V_USB
3V3OUT
VCCIO
VCC
USBDm
USBDp
TXD
RXD
RTS
CTS
RESET
CBUS0
CBUS1
CBUS2
CBUS3
GND1
GND2
EPAD
MCU_U1_RX
MCU_U1_TX
RTS
CTS
RST_FT#
C43 4.7uF 402 6.3V
C44 1uF 402 16V
C45 0.1uF 402 50V
R97 5.11K 402
R98 8.87K 402
R99 9.76K 402
R100 665 402
150060RS75000
150060GS75000
150060BS75000
150060YS75000
D26 RX 603 5V
D27 TX 603 5V
D28 5V 603 5V
D29 LINK 603 5V
LINK

Y1
32.768 kHz
2 pin w/ shell
LFXTAL_P
LFXTAL_N
C4 12.5pF 402 25V
C46 12.5pF 402 25V

Y2
48MHz
5x3.2mm
HFXTAL_P
HFXTAL_N
C47 7.5pF 402 50V
C48 7.5pF 402 50V

TP50 DNI 0.75mm 5V
TP51 DNI 0.75mm 3V3
TP52 DNI 0.75mm 5V_USB
TP53 DNI 0.75mm 5VIN
TP54 DNI 0.75mm 3V3_FT
TP55 DNI 1mm Circle RTS
TP56 DNI 1mm Circle CTS

ON Semiconductor

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