



OPT8241-CDK-EVM SB REV2P0V1

This schematic is provided 'as is'
with no expressed or implied warranty.
The author accepts no liability if it causes any damage
to your system or any other equipment.

For evaluation only; not FCC approved for resale.

| | | | |
|--------------------------------|---------------------------|---------------|----------|
| Organisation Texas Instruments | | | |
| Title | | | |
| OPT8241-CDK-EVM-SB REV2P0V1 | | | |
| Size B | Document Number | | Rev 2.0. |
| | Title | | |
| Date: | Tuesday, October 27, 2015 | Sheet 1 of 22 | |

ChangeLog:

Rev1p0: First Revision.
Rev1p1:
Changed all the obsolete part numbers.
Added controllability on the negative voltage supply.
Over voltage and reverse voltage protection added.
I2C level and other schematic bugs corrected.
Test points added according to feedback.
Rev2p0:
Optimised power supply assignnment.
Optimised IB supply layout for lower conduction losses.
Reduced indicator LED brightness.
Changed soldermask to black.
Rev2p0v1:
Version changed for matching IB change of increasing hole diameter.

Errata:

Pin D6 of U11 should ideally be connected to VCC_LDOAO. Please connect to VCC_LDOAO in new designs.

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| Title OPT8241-CDK-EVM-SB REV2P0V1 | | | |
| Size A | Document Number ChangeLog | | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 2 of 22 | |

Globals

I2C_AUX_SDA
I2C_AUX_SCL

I2C_SLV_SDA_3V3
I2C_SLV_SCL_3V3

I2C_SLV_SDA
I2C_SLV_SCL

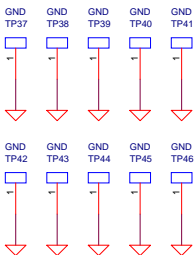
SYS_RESETz
INT_PMIC

DC_JACK_UNPLUG

DC_JACK_UNPLUG goes high if the DC power supply is lower than 4V AND lower than USB supply voltage.

USB_NEGOTIATION_PASS

USB_NEGOTIATION_PASS goes high when FX2 can negotiate with the host for getting 500mA. It enables the ILLUM limit switch.



RAM

EXT_TIC_CONFIGZ_IN
EXT_TIC_DCLK_IN
EXT_TIC_DATA_0_IN
EXT_TIC_CONF_DONE_OUT
EXT_TIC_INIT_DONE_OUT
EXT_TIC_STATUSZ_OUT

DM[1:0] DDR2_DM[1:0]
DQS[1:0] DDR2_DQS[1:0]
DATA[15:0] DDR2_DATA[15:0]
ADDR[12:0] DDR2_ADDR[12:0]
BA[1:0] DDR2_BA[1:0]
RASz
CASz
WEz
CKz
CKE
ODT
CSz

USB

SYS_RESETz
USB_NEGOTIATION_PASS
DC_JACK_UNPLUG
I2C_SCL
I2C_SDA
INIT_DONE
TIC_CEz
SL_FIFO_PKTEND
SL_FIFO_FLAG[1:0]
SL_FIFO_ADDR[1:0]
SL_FIFO_DATA[7:0]
SL_FIFO_WRx
TIC_MISO
TIC_MISOz
TIC_CS0z
SL_FIFO_CLK
SLEEP_OUT
INT_IN
RESETz_OUT
DP
DM

FX2

OPT8221

EXT_TIC_CONFIGZ_IN
EXT_TIC_DCLK_IN
EXT_TIC_DATA_0_IN
EXT_TIC_CONF_DONE_OUT
EXT_TIC_INIT_DONE_OUT
EXT_TIC_STATUSZ_OUT

DM[1:0] DDR2_DM[1:0]
DQS[1:0] DDR2_DQS[1:0]
DATA[15:0] DDR2_DATA[15:0]
ADDR[12:0] DDR2_ADDR[12:0]
BA[1:0] DDR2_BA[1:0]
RASz
CASz
WEz
CKz
CKE
ODT
CSz

INT_PMIC

CLKOUT
TIC_CLK
CONF_DONE
TIC_STATUSz
TIC_CONFIGz
I2C_SCL
I2C_SDA
INIT_DONE
TIC_CEz
FX2_FLAG[1:0]
FX2_ADDR[1:0]
FX2_DQ[7:0]
FX2_WRx
TIC_MISO
TIC_MISOz
TIC_CS0z
FX2_CLK
SLEEP
INT
RESETz
DP
DM

TFC

ILLUM_N
ILLUM_P
COMP_MOD_REF
COMP_MOD_FB

TFC_RESETz_IN
TFC_DATA_0_IN
TFC_VD_IN
TFC_PHASE_AUX_OUT
TFC_FE_OUT

TFC_HD_BO_OUT
TFC_OP_DCLK_OUT
TFC_INT_OUT
TFC_DQ_OUT[7:0]
TFC_READY_IN

TFC_SLEEP_IN
TFC_SYSCLK_IN
TFC_OVERFLOW_IN
TFC_OP_CS_OUT
TFC_FRM_VD_OUT

I2C_AUX_SCL
I2C_AUX_SDA

CAP_FRM_CLK[1:0]
CAP_BIT_CLK[1:0]
CAP_DATA_DIFF_0[1:0]
CAP_DATA_DIFF_1[1:0]
CAP_DATA_SUM[1:0]
SENS_GPI[1:0]
SENS_GPO[1:0]
SENSOR_RESETz
VSYNC

SENSOR_MCLK
DEMODO_CLK

HD_OD
VD_OD
VD_SF
VD_FR

ILLUM_REF
ILLUM_SW_1
ILLUM_SW_2
ILLUM_FB

ILLUM_Conn

ILLUM_SW_1
ILLUM_SW_2
ILLUM_REF
ILLUM_EN
ILLUM_N
ILLUM_P
COMP_MOD_REF
COMP_MOD_FB

ILLUM_Conn

Connectors

EXT_RESETz_IN
EXT_VD_IN
EXT_PHASE_AUX_OUT
EXT_FE_OUT
EXT_HD_BO_OUT
EXT_OP_DCLK_OUT
EXT_INT_OUT
EXT_OP_DATA[7:0]
EXT_READY_IN
EXT_SLEEP_IN
EXT_SYSCLK_IN
EXT_OVERFLOW_IN
EXT_OP_CS_OUT
EXT_FRM_VD_OUT

Connectors

CAP_FRM_CLK[1:0]
CAP_BIT_CLK[1:0]
CAP_DATA_DIFF_0[1:0]
CAP_DATA_DIFF_1[1:0]
CAP_DATA_SUM[1:0]
SENS_GPI[1:0]
SENS_GPO[1:0]
RESETz
VSYNC

OPT8241

Sensor

ILLUM_EN
ILLUM_P
ILLUM_N
HD_OD
VD_OD
VD_SF
VD_FR
DEMODO_CLK
MCLK

ILLUM_FB

ILLUM_SW_1

ILLUM_SW_2

ILLUM_REF

ILLUM_EN

ILLUM_N

ILLUM_P

COMP_MOD_REF

COMP_MOD_FB

EXT_I2C_AUX_SDA

EXT_I2C_AUX_SCL

EXT_I2C_SLV_SDA

EXT_I2C_SLV_SCL

DP

DM

EXT_TIC_CONFIGZ_IN

EXT_TIC_DCLK_IN

EXT_TIC_DATA_0_IN

EXT_TIC_CONF_DONE_OUT

EXT_TIC_INIT_DONE_OUT

EXT_TIC_STATUSZ_OUT

I2C_AUX_SCL

I2C_AUX_SDA

DP

DM

EXT_TIC_CONFIGZ_IN

EXT_TIC_DCLK_IN

EXT_TIC_DATA_0_IN

EXT_TIC_CONF_DONE_OUT

EXT_TIC_INIT_DONE_OUT

EXT_TIC_STATUSZ_OUT

I2C_AUX_SCL

I2C_AUX_SDA

DP

DM

EXT_TIC_CONFIGZ_IN

EXT_TIC_DCLK_IN

EXT_TIC_DATA_0_IN

EXT_TIC_CONF_DONE_OUT

EXT_TIC_INIT_DONE_OUT

EXT_TIC_STATUSZ_OUT

I2C_AUX_SCL

I2C_AUX_SDA

DP

DM

EXT_TIC_CONFIGZ_IN

EXT_TIC_DCLK_IN

EXT_TIC_DATA_0_IN

EXT_TIC_CONF_DONE_OUT

EXT_TIC_INIT_DONE_OUT

EXT_TIC_STATUSZ_OUT

MHS

MH

MH4

MH

MH1

MH

MH2

MH

MH6

MH

MH3

MH

MH7

MH

MH8

MH

MH

MH

MH

MH

MH

MH

MH

MH

MH

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MH

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MH

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MH

MH

MH

MH

MH

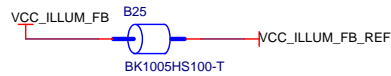
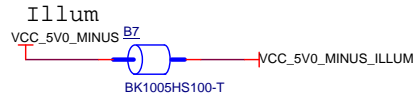
MH

MH

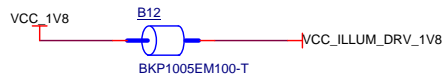
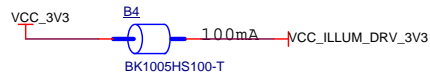
MH

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| Organisation: Texas Instruments | | |
| Title: OPT8241-CDK-EVM-SB REV2P0V1 | | |
| Size: C | Document Number: TOP | Rev: 2.0.1 |
| Date: Tuesday, October 27, 2015 | Sheet: 3 | of: 22 |

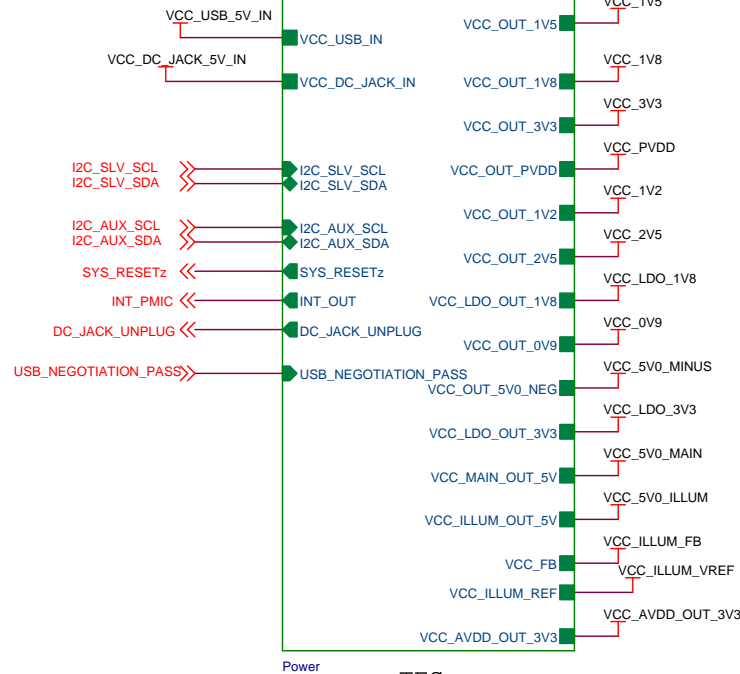
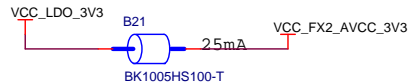
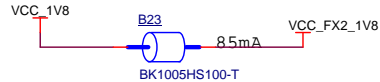
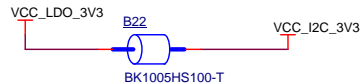
I2C_SLV_SDA_3V3
I2C_SLV_SCL_3V3



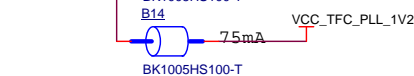
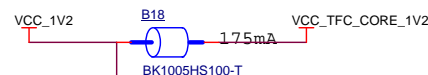
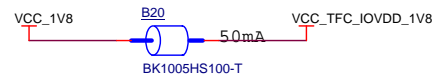
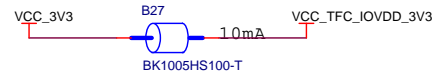
3V3 and 1V8 powered from main power supply to ensure power to EEPROMs etc if illum supply cuts off. Use judiciously.



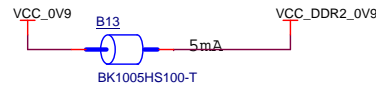
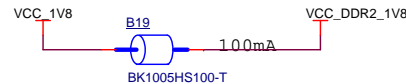
FX2



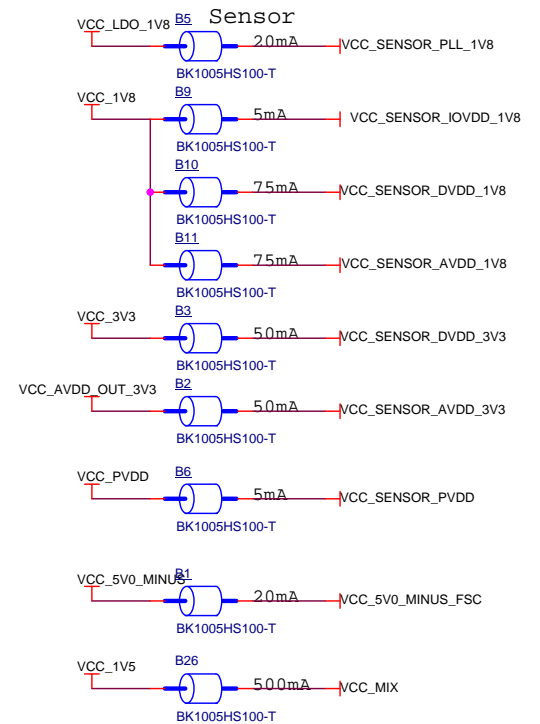
TFC



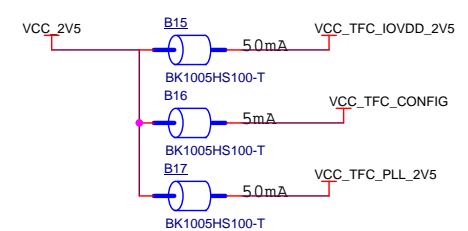
DDR2



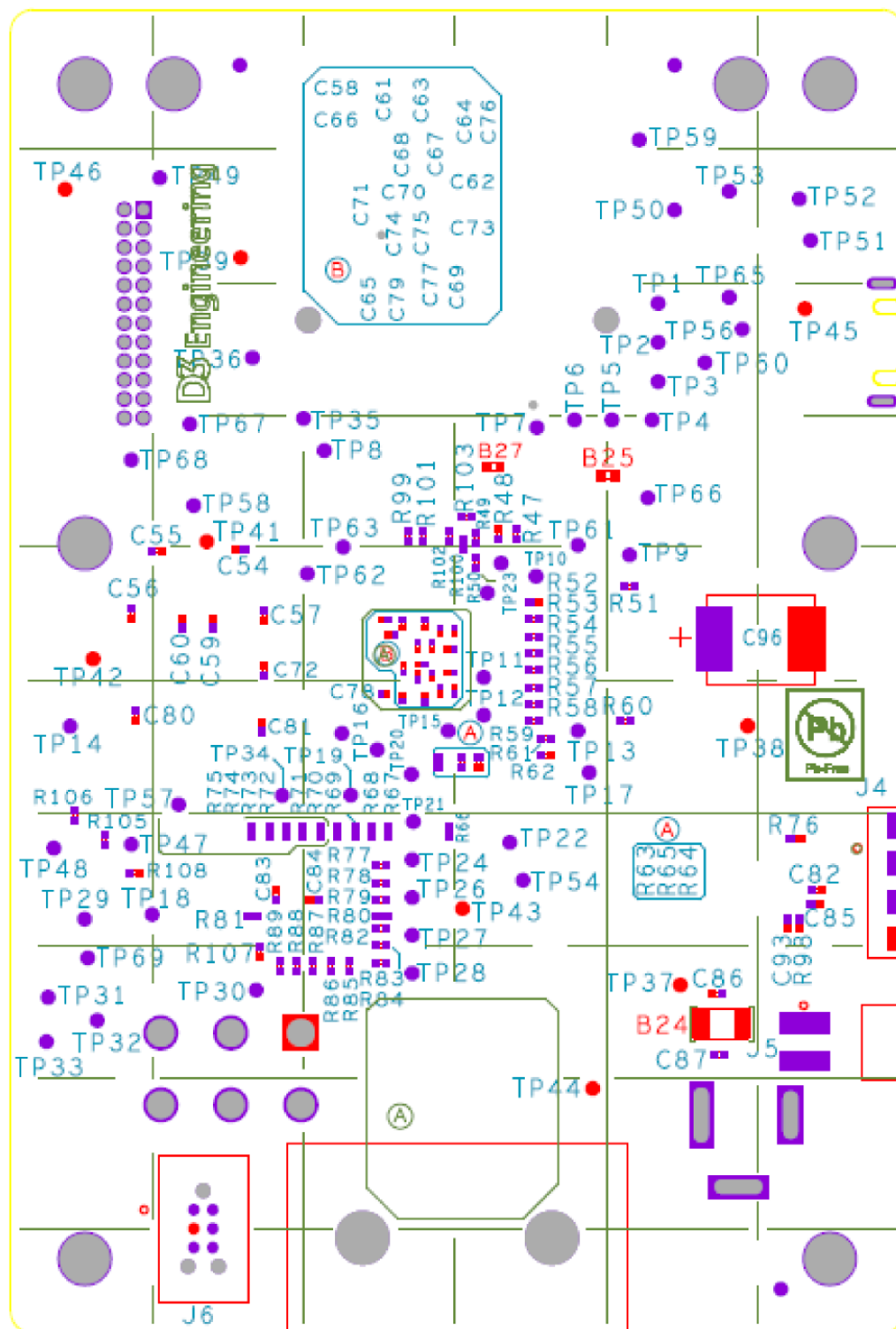
Sensor

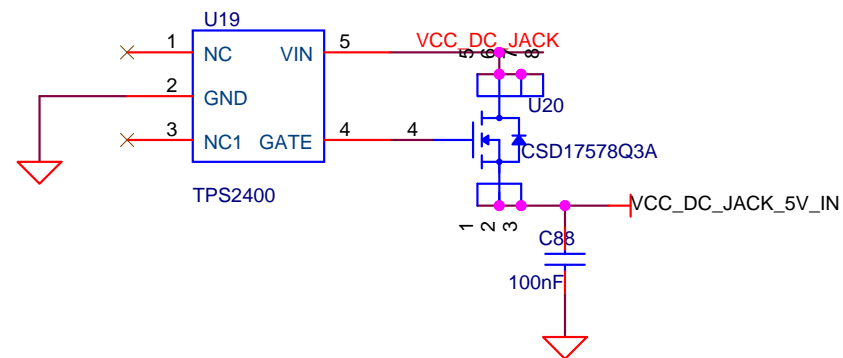
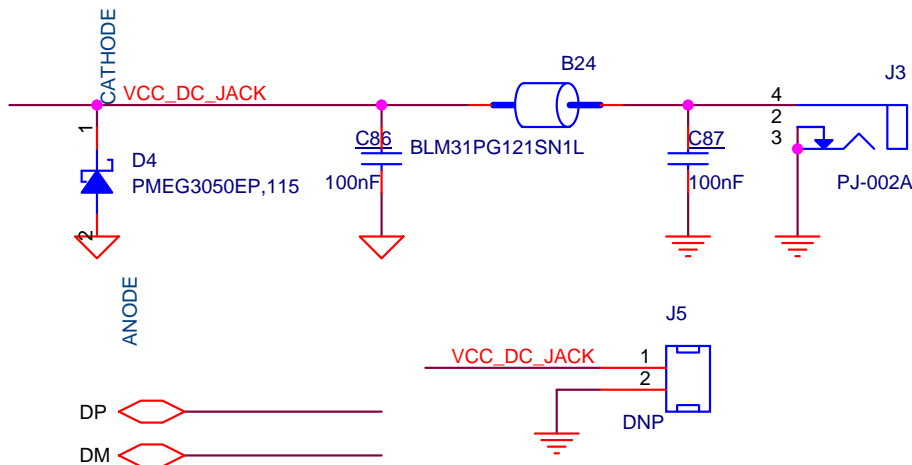
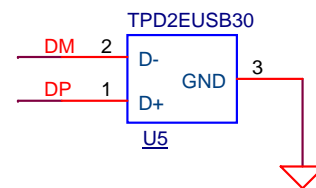
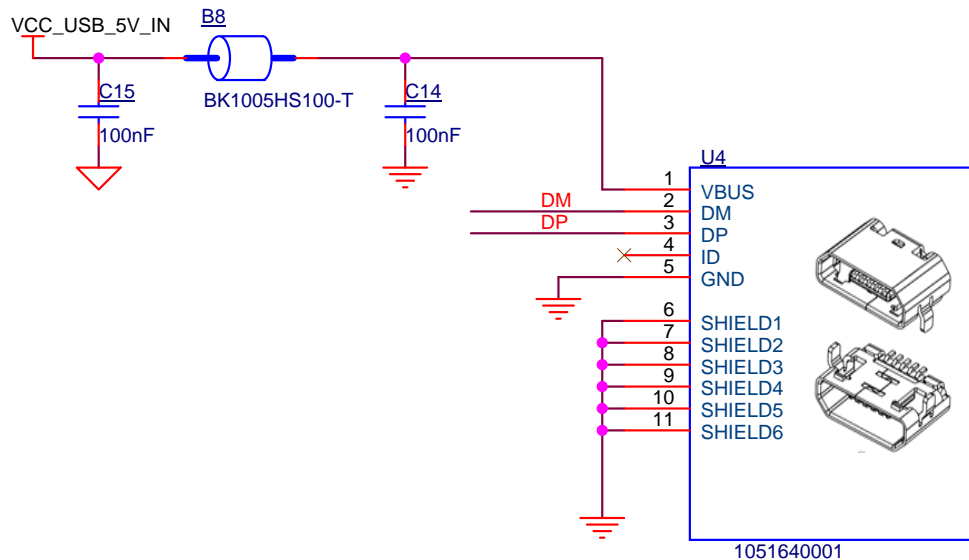


TFC

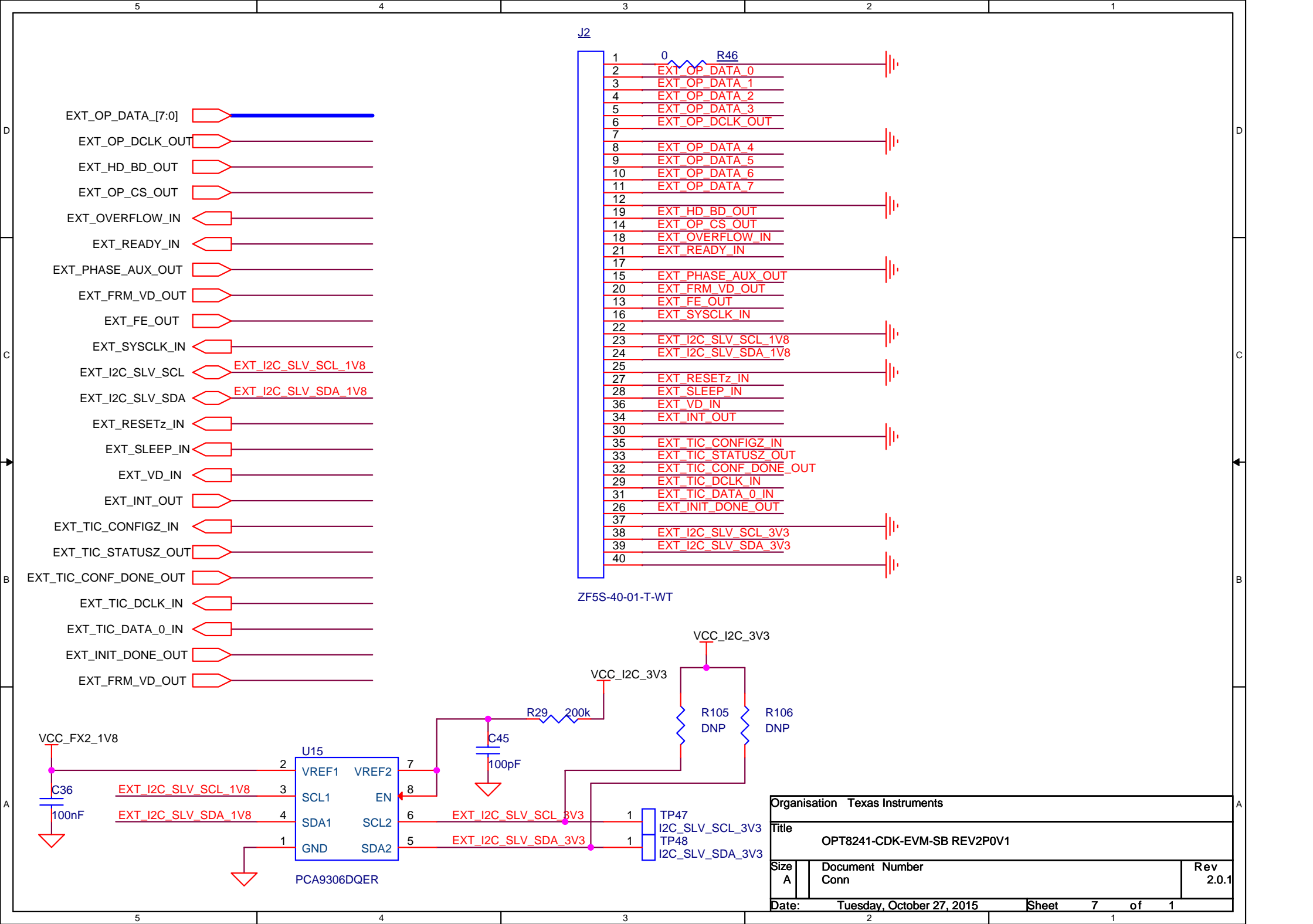


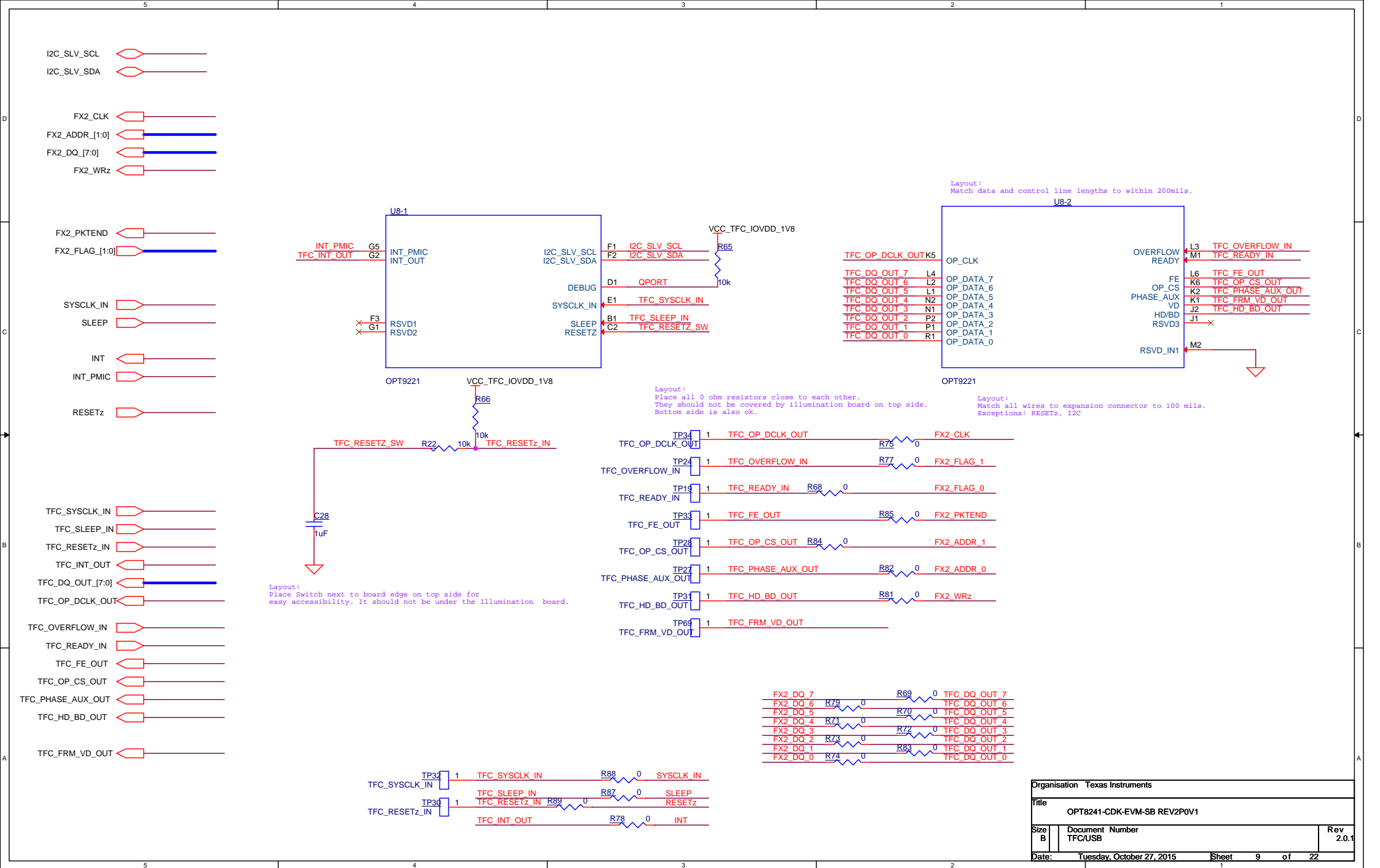
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| Organisation Texas Instruments | | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | | |
| Size B | Document Number PowerTree | | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 4 of 22 | |

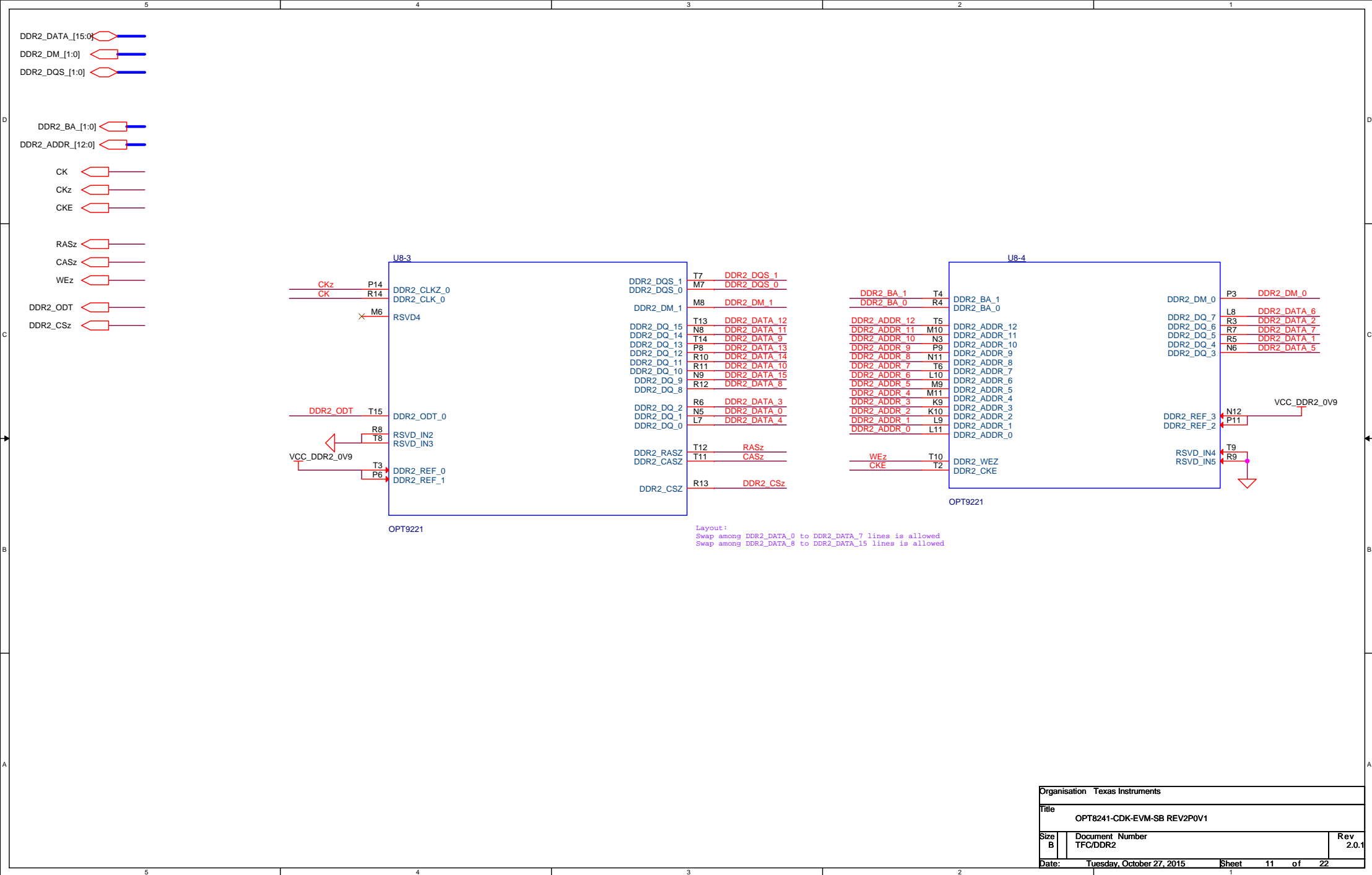


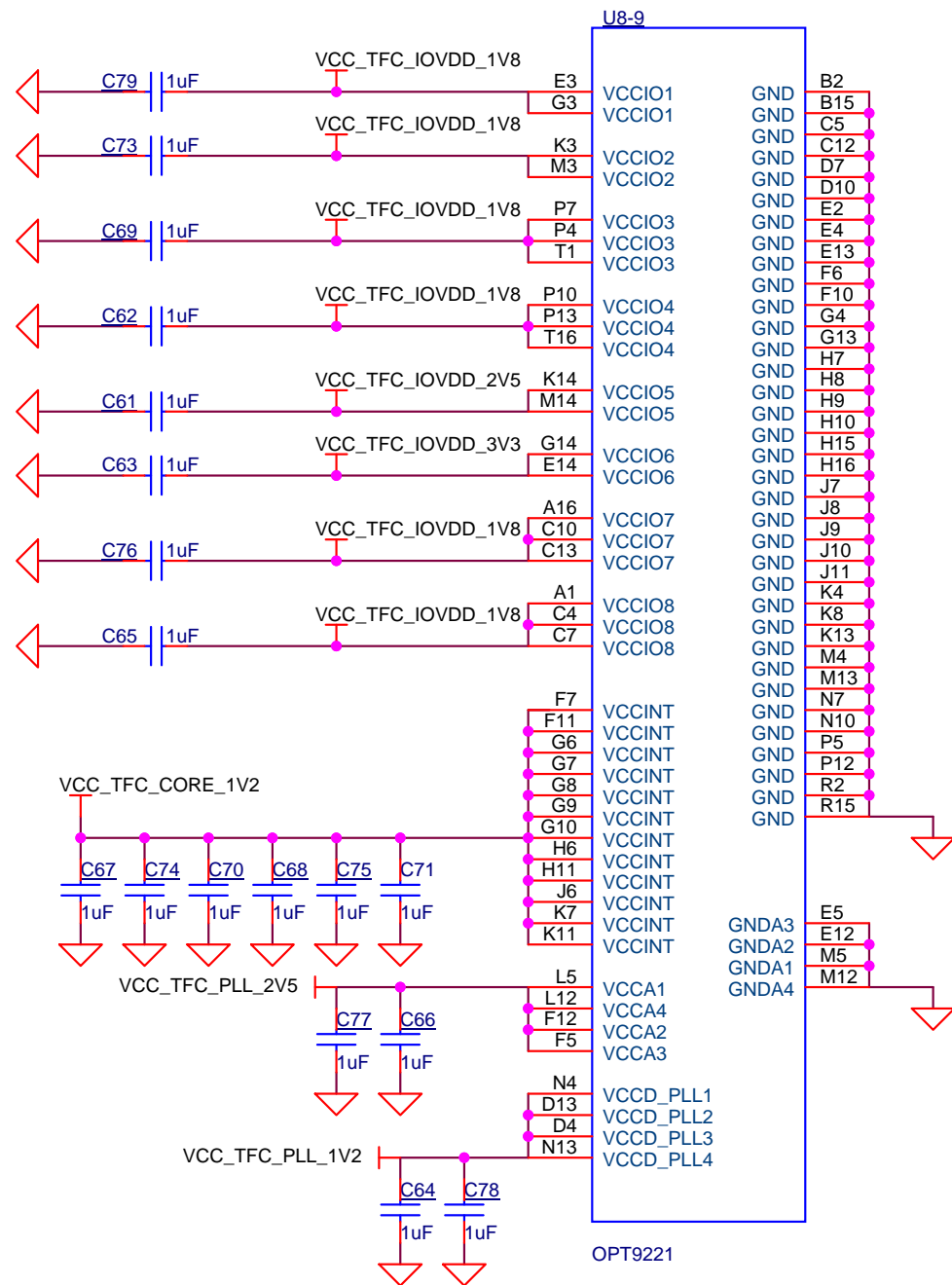


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| Organisation Texas Instruments | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | |
| Size A | Document Number Conn | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 6 of 1 |

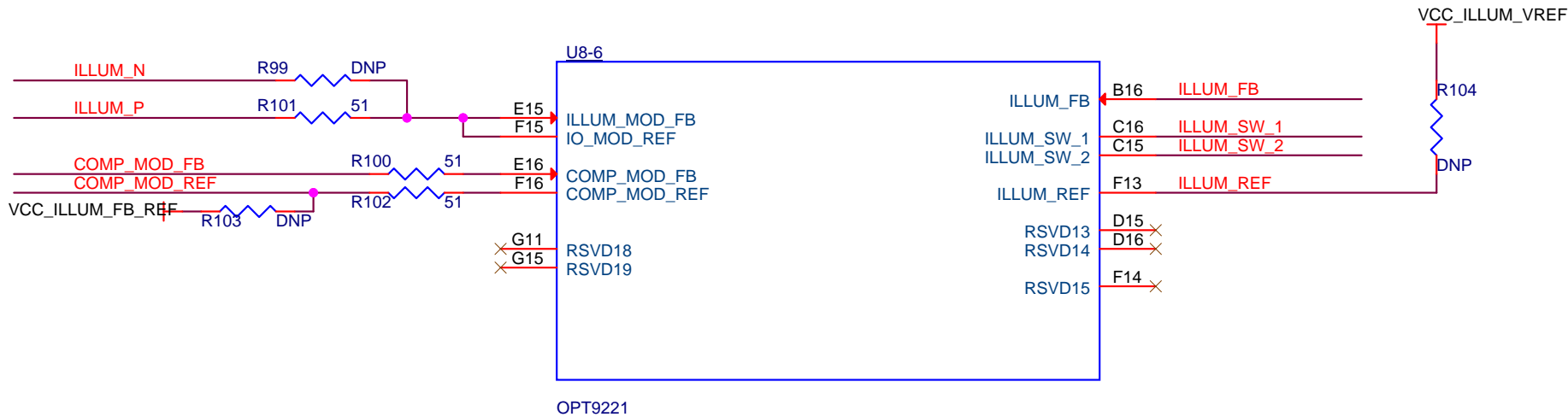
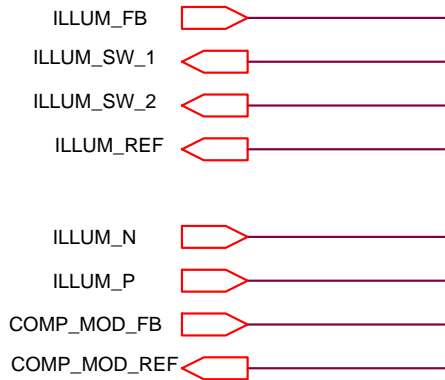




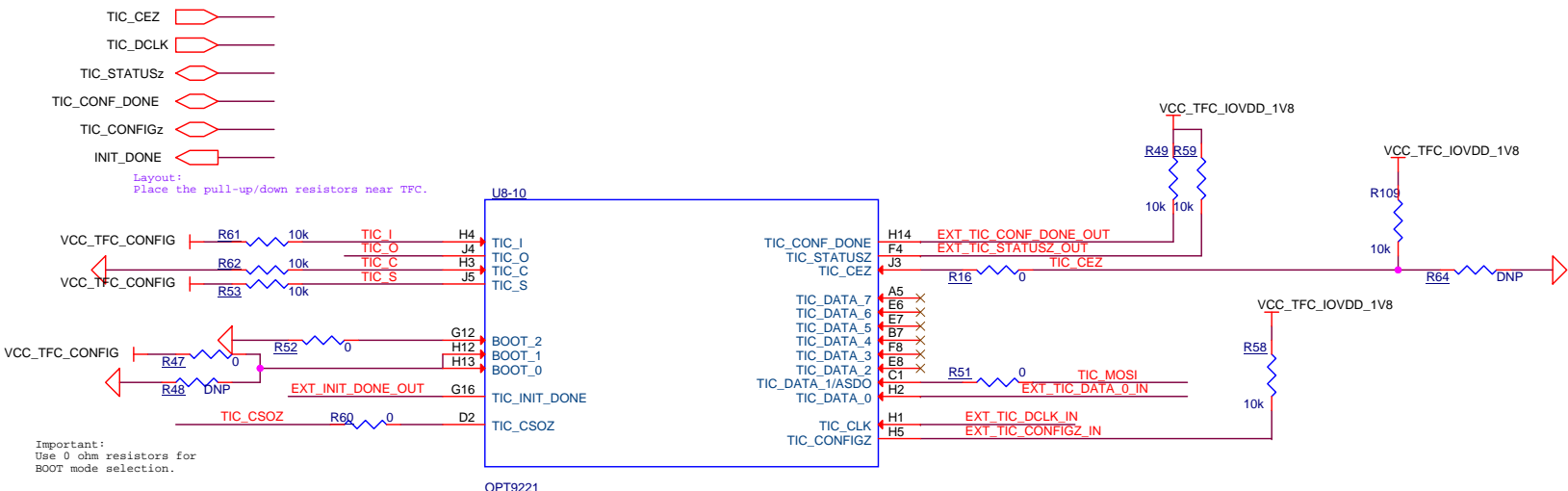




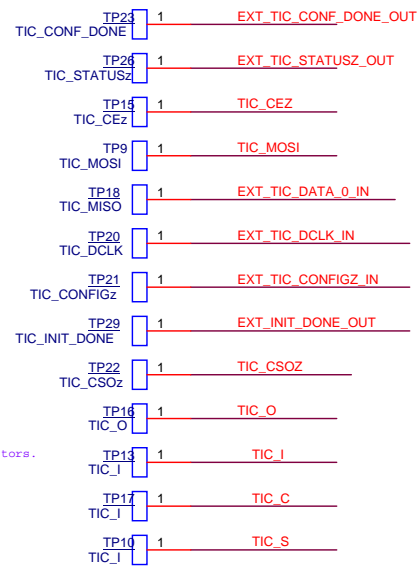
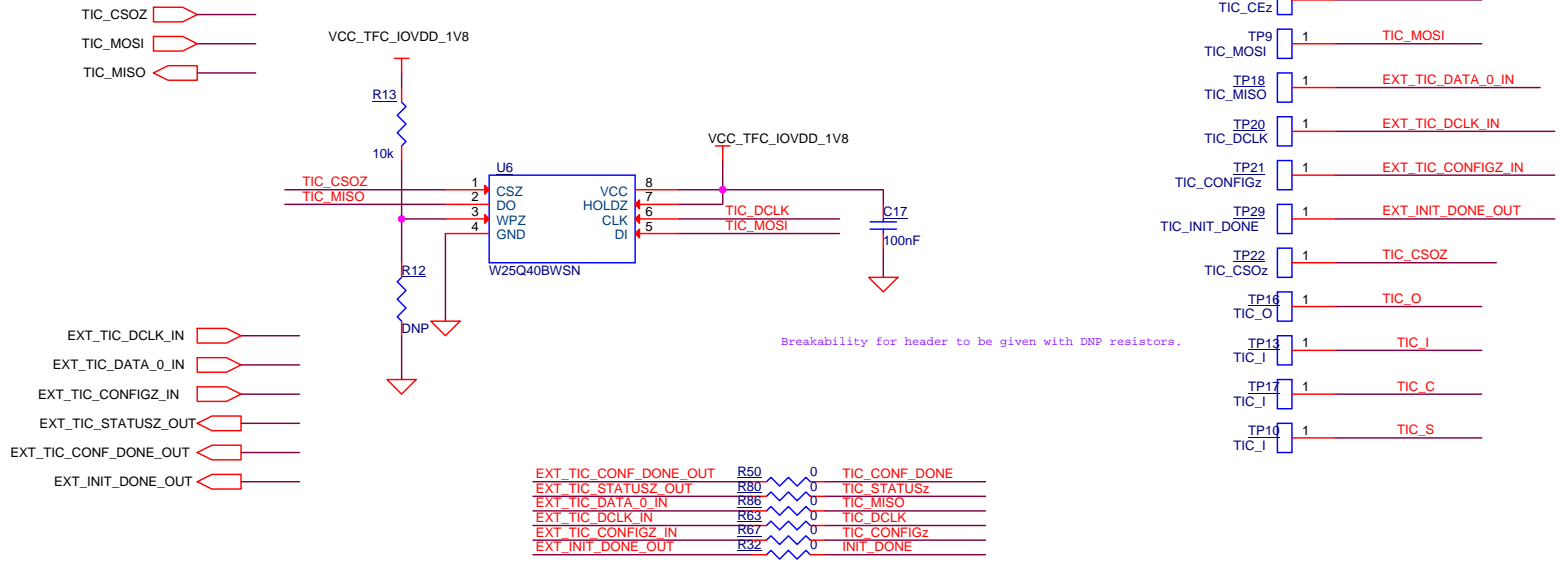
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| Organisation Texas Instruments | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | |
| Size A | Document Number TFC/Power | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 12 of 22 |

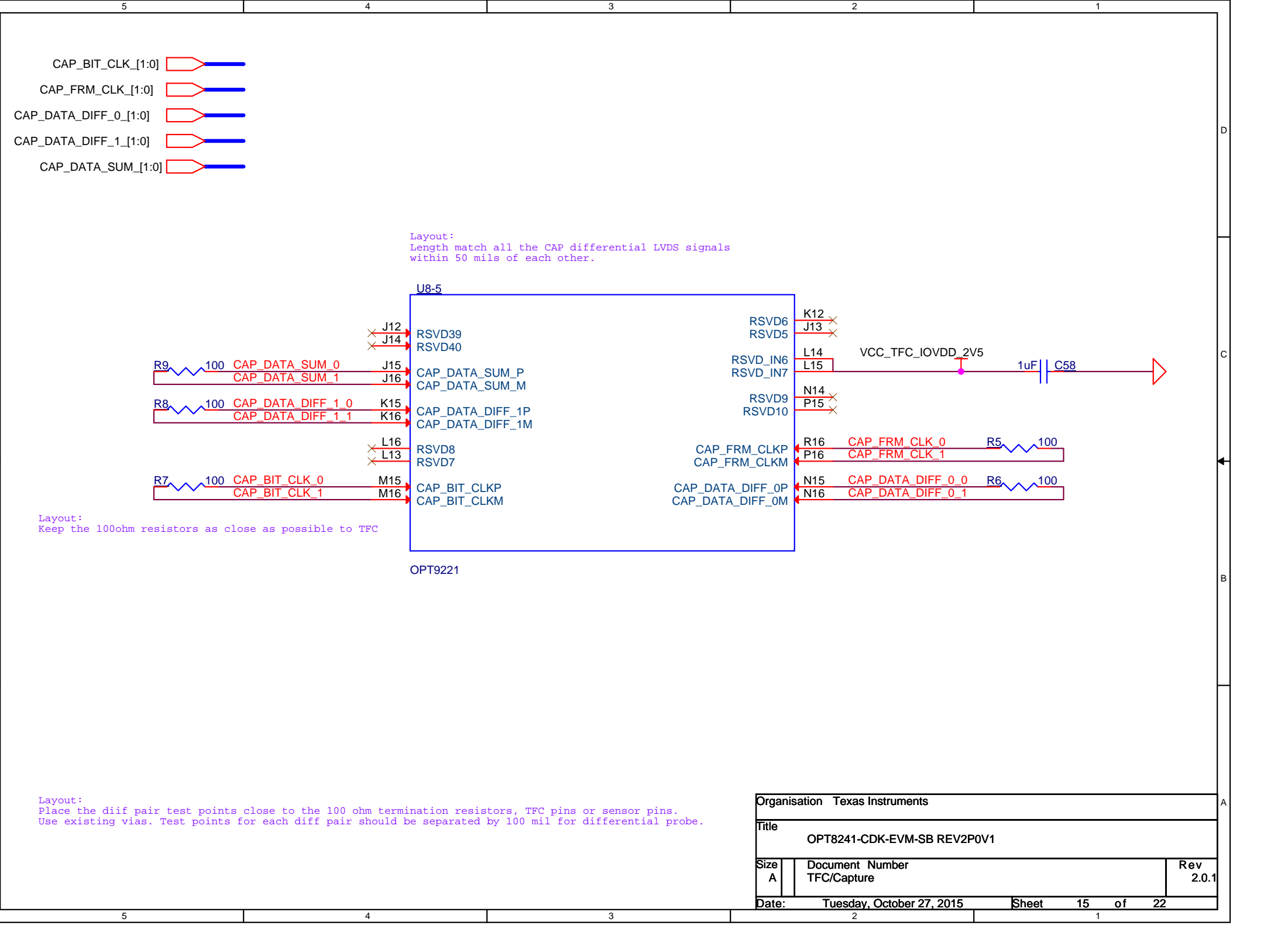


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| Organisation Texas Instruments | | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | | |
| Size A | Document Number TFC/Illum | | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 13 of 22 | |



BOOT[2:0]=000 => Slave serial boot
BOOT[2:0]=011 => Master serial boot



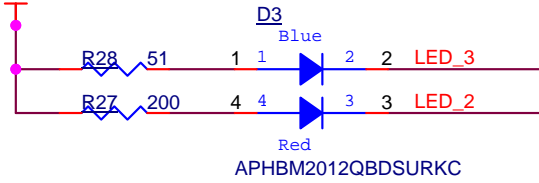


I2C_AUX_SCL

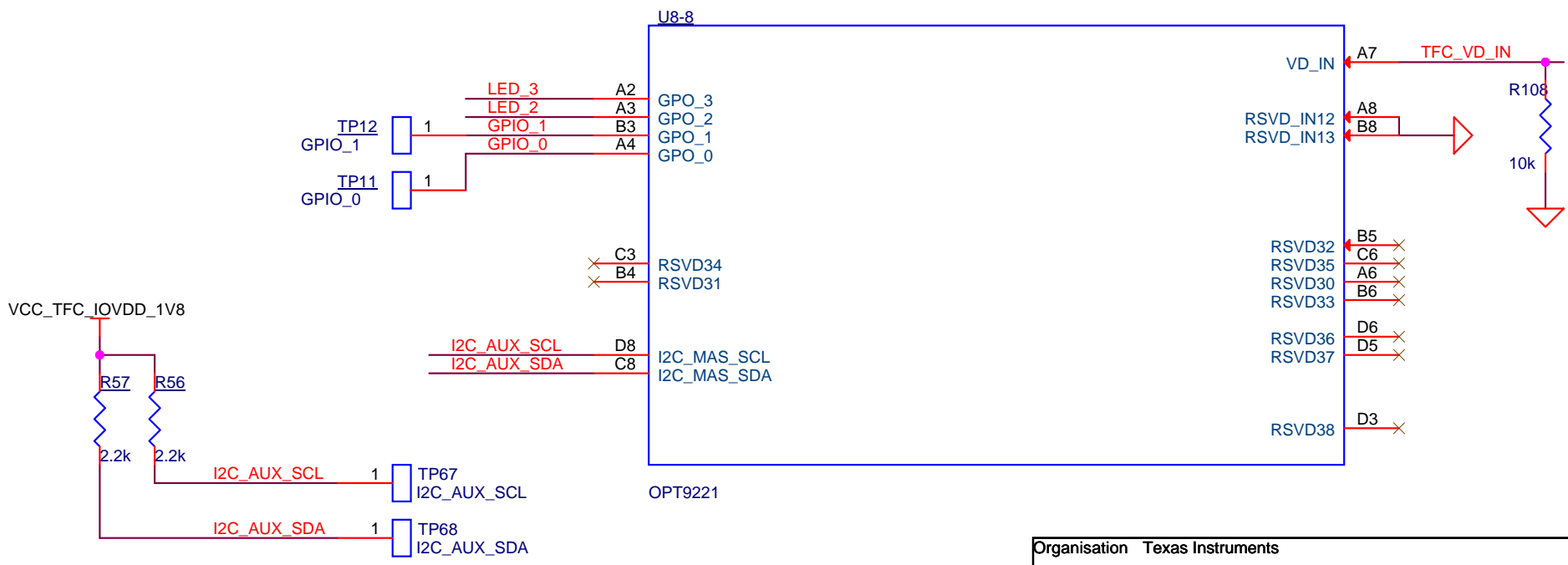
I2C_AUX_SDA

TFC_VD_IN

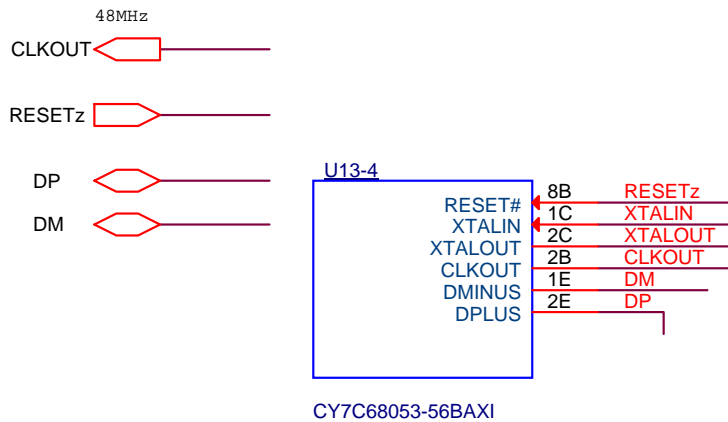
VCC_SENSOR_DVDD_3V3



Layout:
The bi-colour LEDs should be on top side.
They should not be covered by the illumination board.



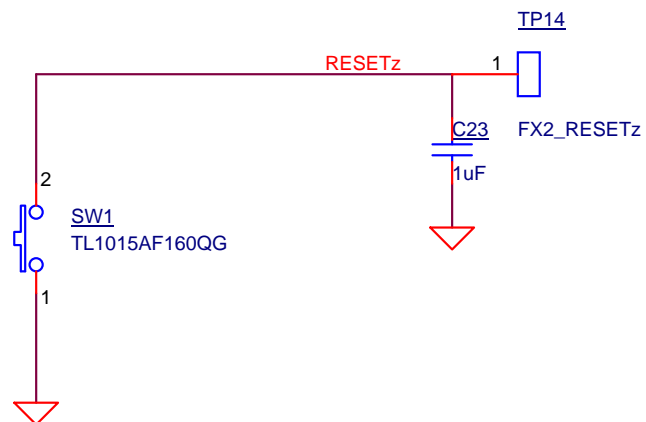
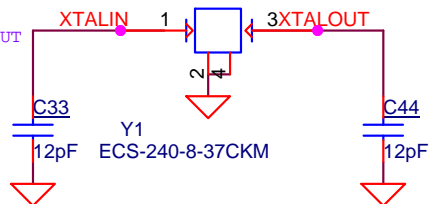
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| Organisation Texas Instruments | | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | | |
| Size A | Document Number TFC/ADC | | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 16 of 22 | |



Layout:
Isolate DP,DM signals by sandwiching them between ground planes.
Also, isolate them sideways using guard ground tracks

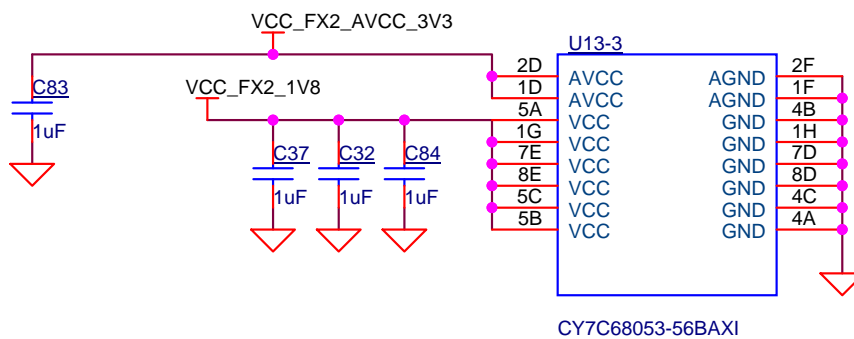
FX2 requires 5ms of reset.
TPS659122 gives a reset of 28ms.

Layout:
No vias on XTALIN and XTALOUT

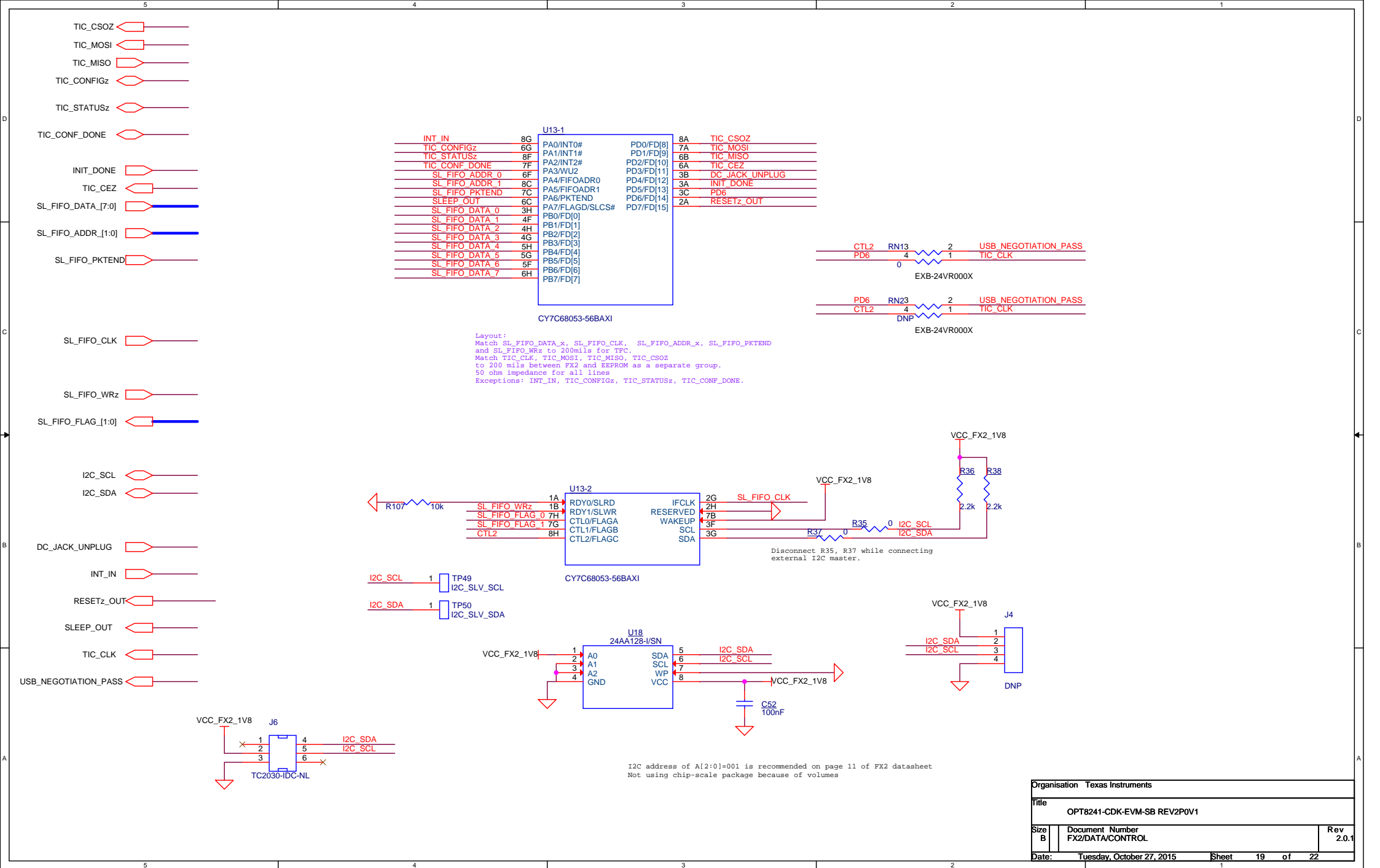


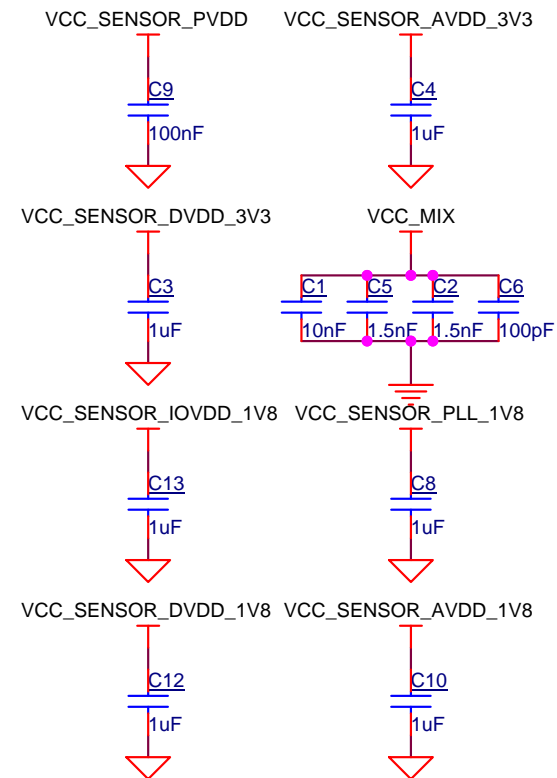
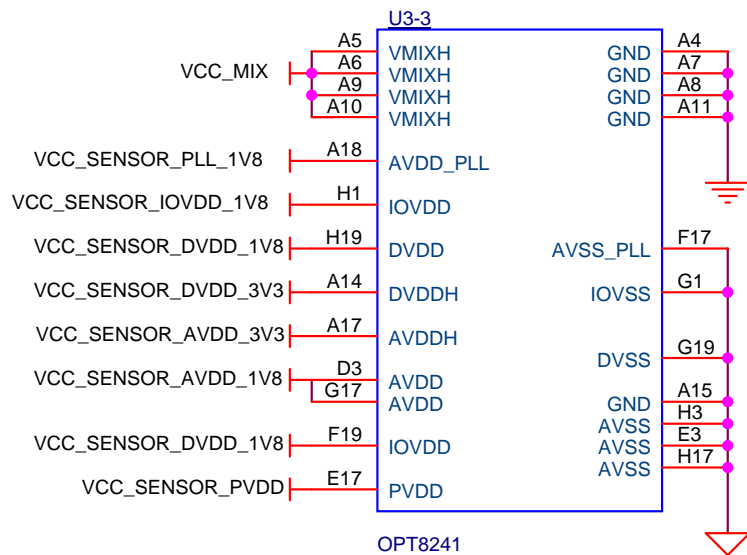
Layout:
Place Switch next to board edge on top side for
easy accessibility. It should not be under the Illumination board.

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| Organisation Texas Instruments | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | |
| Size A | Document Number FX2/BUS | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 17 of 22 |



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|--------------------------------------|------------------------------|----------------|
| Organisation Texas Instruments | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | |
| Size A | Document Number FX2/Power | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 18 of 22 |





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|-----------------------------------|------------------------------|----------------|-----------|
| Organisation Texas Instruments | | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | | |
| Size A | Document Number Sensor/Power | | Rev 2.0.1 |
| Date: | Tuesday, October 27, 2015 | Sheet 20 of 22 | |

CAP_BIT_CLK_[1:0]

CAP_FRM_CLK_[1:0]

CAP_DATA_DIFF_0_[1:0]

CAP_DATA_DIFF_1_[1:0]

CAP_DATA_SUM_[1:0]

RESETz

DEMOD_CLK

MCLK

VSUNC

ILLUM_EN

ILLUM_N

ILLUM_P

SENS_GPO_[1:0]

HD_QD

VD_QD

VD_UF

VD_FR

I2C_SNS_SDA i2C_SDA

I2C_SNS_SCL i2C_SCL

CAP_BIT_CLK_0 M18

CAP_BIT_CLK_1 L19

CAP_FRM_CLK_0 M14

CAP_FRM_CLK_1 M15

CAP_DATA_DIFF_0_0 M16

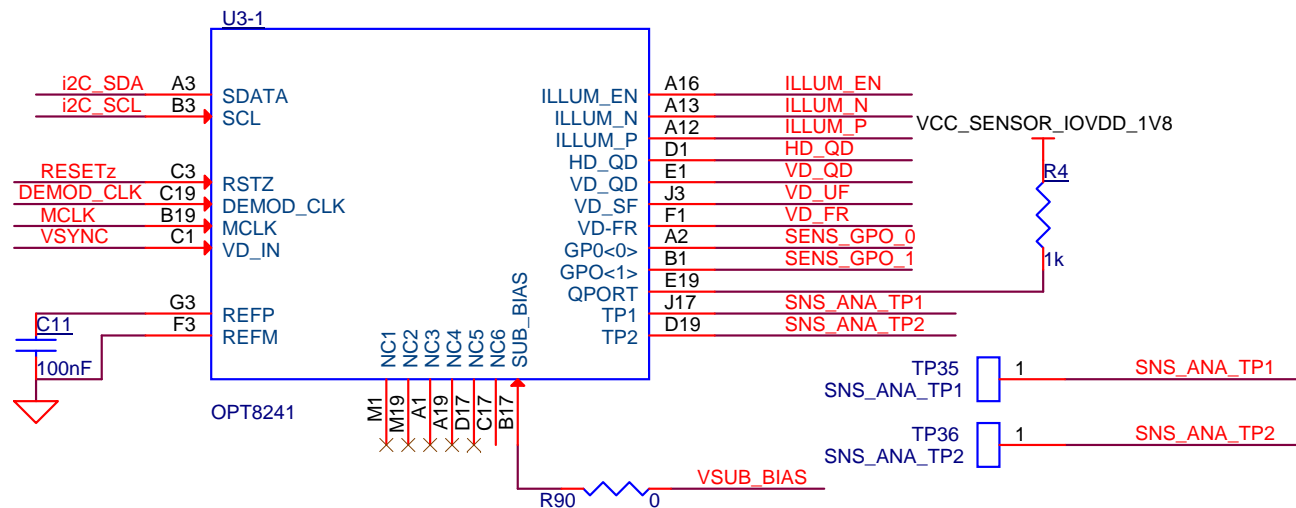
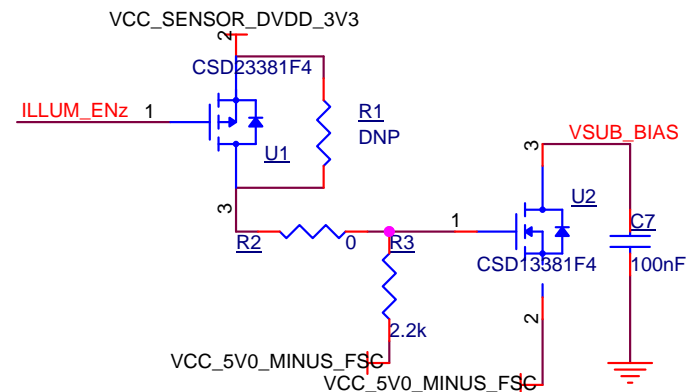
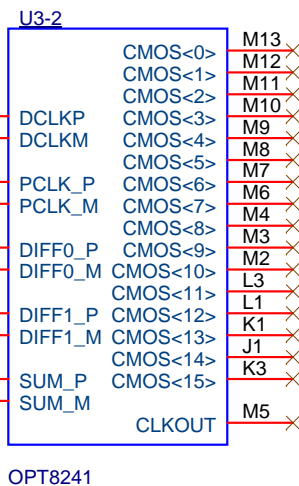
CAP_DATA_DIFF_0_1 M17

CAP_DATA_DIFF_1_0 L17

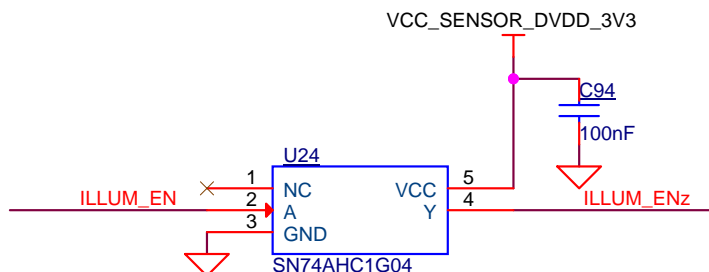
CAP_DATA_DIFF_1_1 K19

CAP_DATA_SUM_0 K17

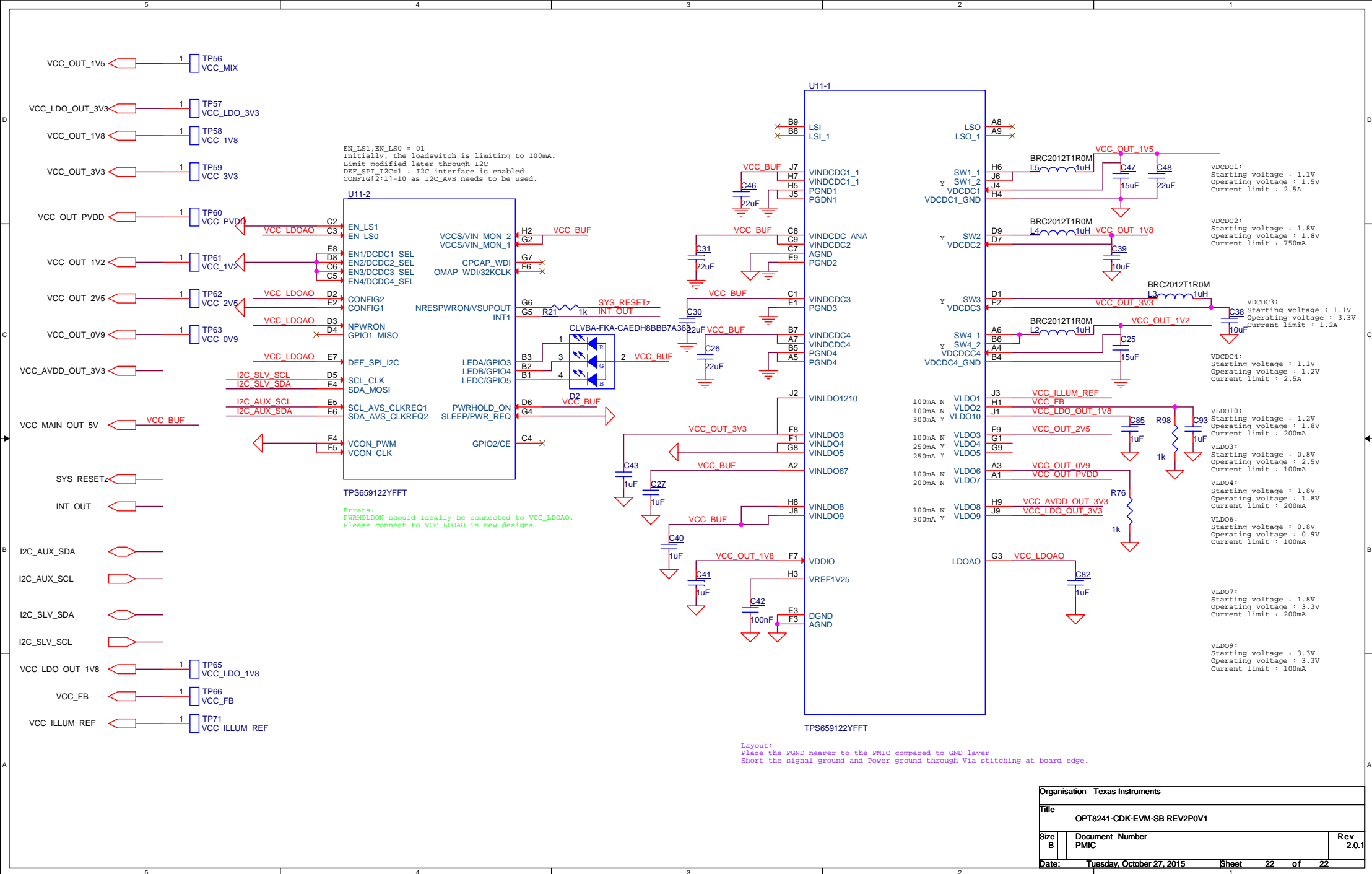
CAP_DATA_SUM_1 J19

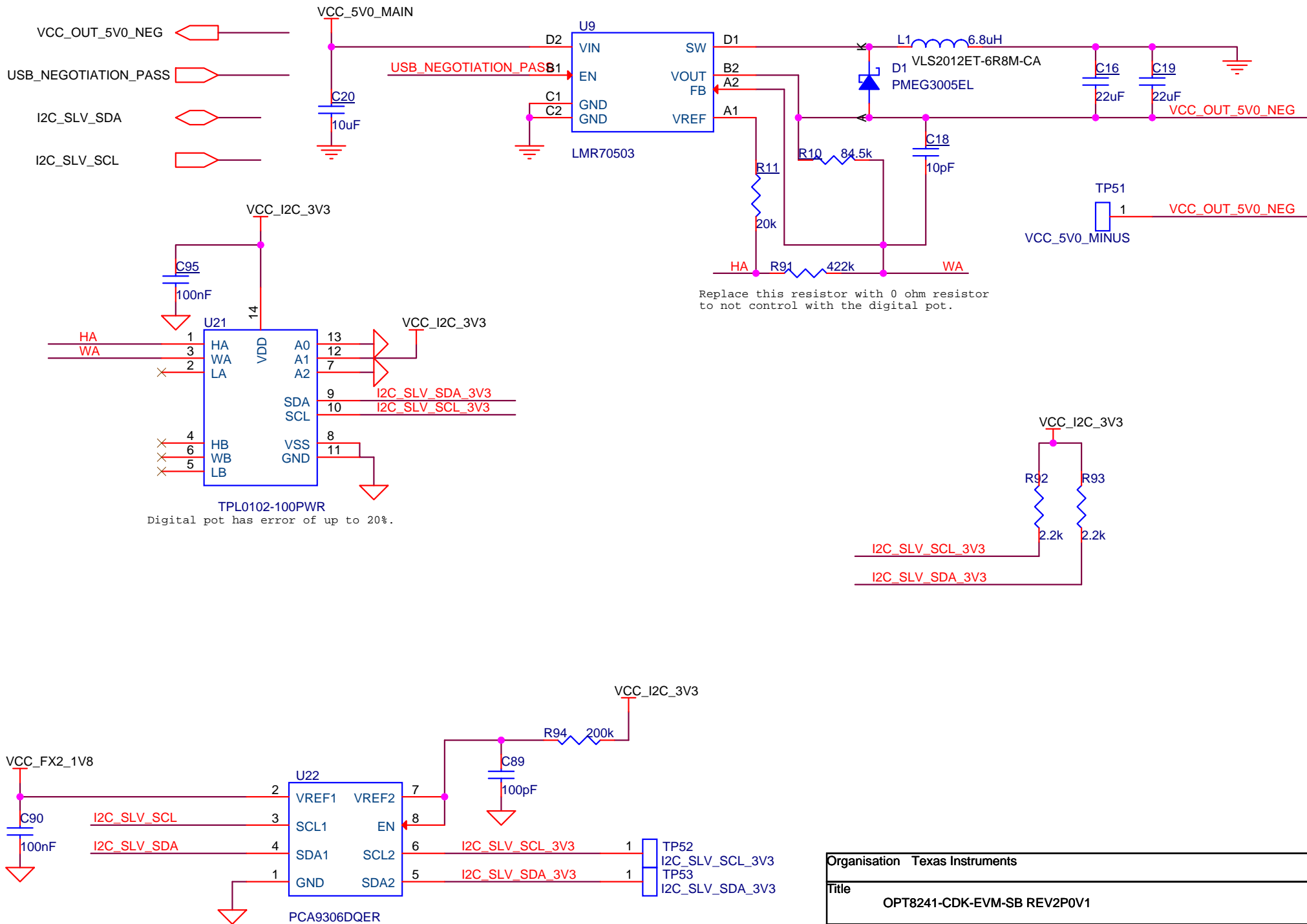


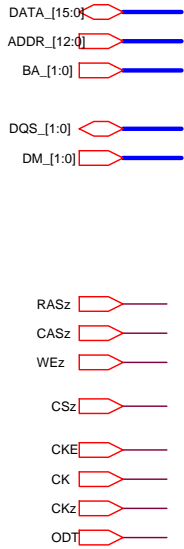
Caution:
ILLUM_EN, ILLUM_P, ILLUM_N IO levels are taken from DVDD 3v3.



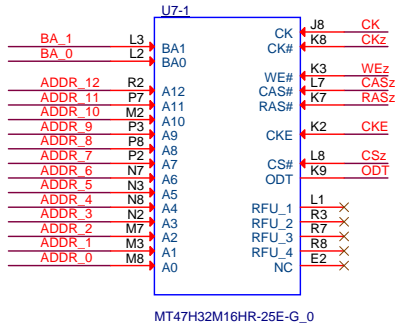
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|-----------------------------------|-------------------------------|-----------|
| Organisation Texas Instruments | | |
| Title OPT8241-CDK-EVM-SB REV2P0V1 | | |
| Size A | Document Number Sensor/Signal | Rev 2.0.1 |
| Date: Tuesday, October 27, 2015 | Sheet 21 | of 22 |







ADDRESSING / CONTROL



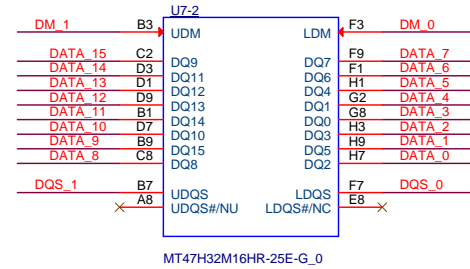
Layout:

100 mil matching between addr/control lines.

50 ohm impedance

Clock pair : 100 ohm differential impedance

DATA



Layout:

50 mil matching between data lines.

50 ohm impedance

POWER

