# **K2GEVM**

## **TABLE OF CONTENTS**

PAGE	CONTENTS			
01	TABLE OF CONTENTS			
02	REVISION HISTORY			
03	BLOCK DIAGRAM - K2G EVM			
0 4	BLOCK DIAGRAM - BMC			
05	BLOCK DIAGRAM - XDS200			
06	POWER FLOW DIAGRAM			
07	BOARD POWER SEQUENCE DIAGRAM			
08	I2C ADDRESS TABLE & McASP CONFIGURATION			
09	MCASP TREE			
10	SOC CLOCK & RESET			
11	SoC GPIO & RESERVED PINS			
12	SoC POWER1			
13	SoC POWER2			
14	DDR3 DEVICES			
15	DDR3 ECC & TERMINATIONS			
16	QSPI, I2C EEPROM & SPI NOR FLASH			
17	EMMC FLASH			
18	NAND FLASH & MICRO SD CARD			
19	HDMI OR LCD MUX			
2.0	LCD & TOUCH SCREEN CONNECTOR			
21	HDMI TRANSMITTER			
22	AUDIO CODEC			
23	MCASP2 BUFFERS FOR COM8 , HDMI& AUDIO CODEC			
24	ETHERNET PHY			
25	PCIE x1 CONNECTOR			
26	USB DUAL ROLE & HOST			
27	UARTO & UART1			
28	UART2			
29	COM8 CONNECTOR			
30	MLB CONNECTOR			
31	DCAN			
32	McASP & AUDIO EXPANSION CONNECTOR			
33	SERIAL & EHRPWM EXPANSION CONNECTOR			
34	SERIAL CONTROL INTERFACES & I/O EXPANDER			
35	CLOCK DISTRIBUTION 1			
36	CLOCK DISTRIBUTION 2			

PAGE	CONTENTS
37	EMU & MIPI60 CONNECTOR
38	JTAG_XDS200_1
39	JTAG_XDS200_2
40	JTAG_XDS200_3
41	JTAG_XDS200_4
42	JTAG_XDS200_CPLD
43	XDS200 POWER
44	BOARD MANAGEMENT CONTROL_1 (BMC)
45	BOARD MANAGEMENT CONTROL_2 (BMC)
46	BOARD MANAGEMENT CONTROL_3 (BMC)
47	PMIC POWER1
48	PMIC POWER2
49	12V DC IN, 5V & DDR3 POWER GENERATION
50	OVER VOLTAGE PROTECTION
51	

REV	А	
VER	1.00	

Designed for TI by Mistral Solutions Pvt Ltd TEXAS INSTRUMENTS



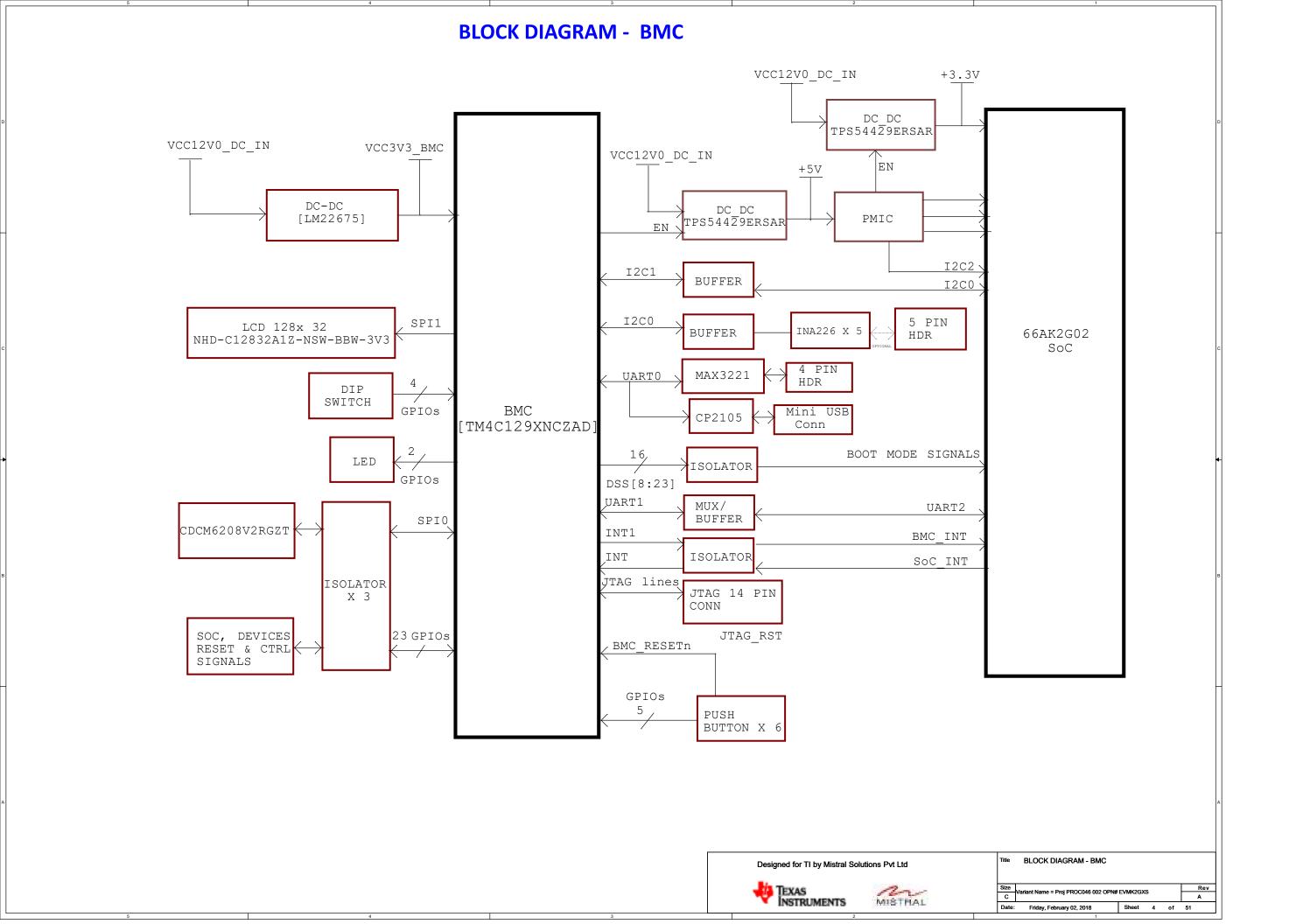
Title TABLE OF CONTENTS | Size | Variant Name = Proj PROC046 002 OPN# EVMK2GXS | Date: Friday, February 02, 2018 | Sheet |

### **REVISION HISTORY**

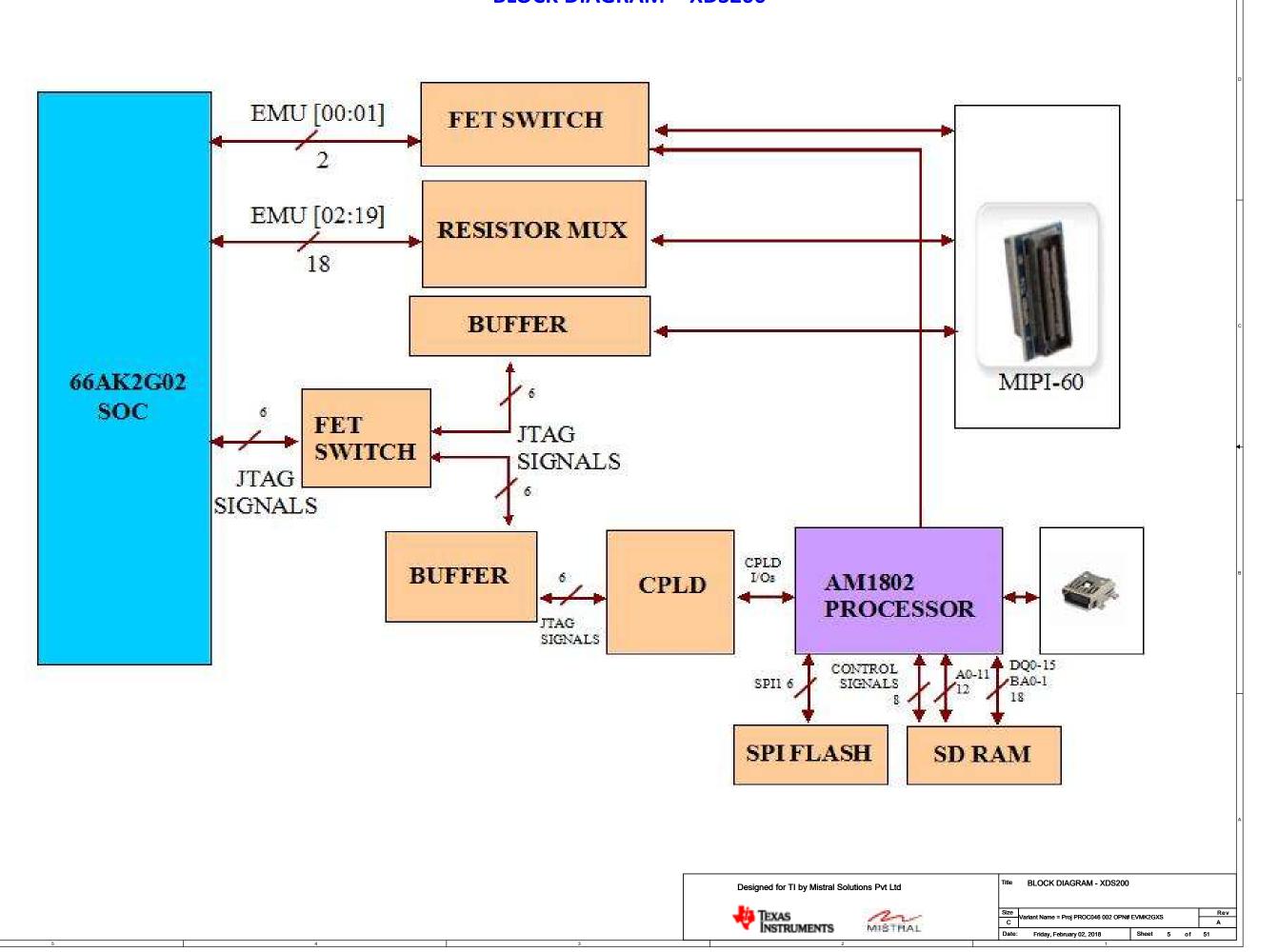
VER #	DATE	DESCRIPTION OF CHANGES	AUTHOR
0.1	17th July 2017	Drafted from "MS_TI_K2GEVM_SCH_REVD_1V5" document.	Mistral Design Team
0.2	17th July 2018	- Changed 66AK2G02 (600MHz) to X66AK2G12ABY100(1GHz) Part - Changed PMIC IC TPS659118 to TPS65911A - Changed Load switch TPS22907YZTR to TPS22913BYZVR	Mistral Design Team
0.3	18th July 2019	For Review	Mistral Design Team
1.0	18th July 2018	Baselined	Mistral Design Team

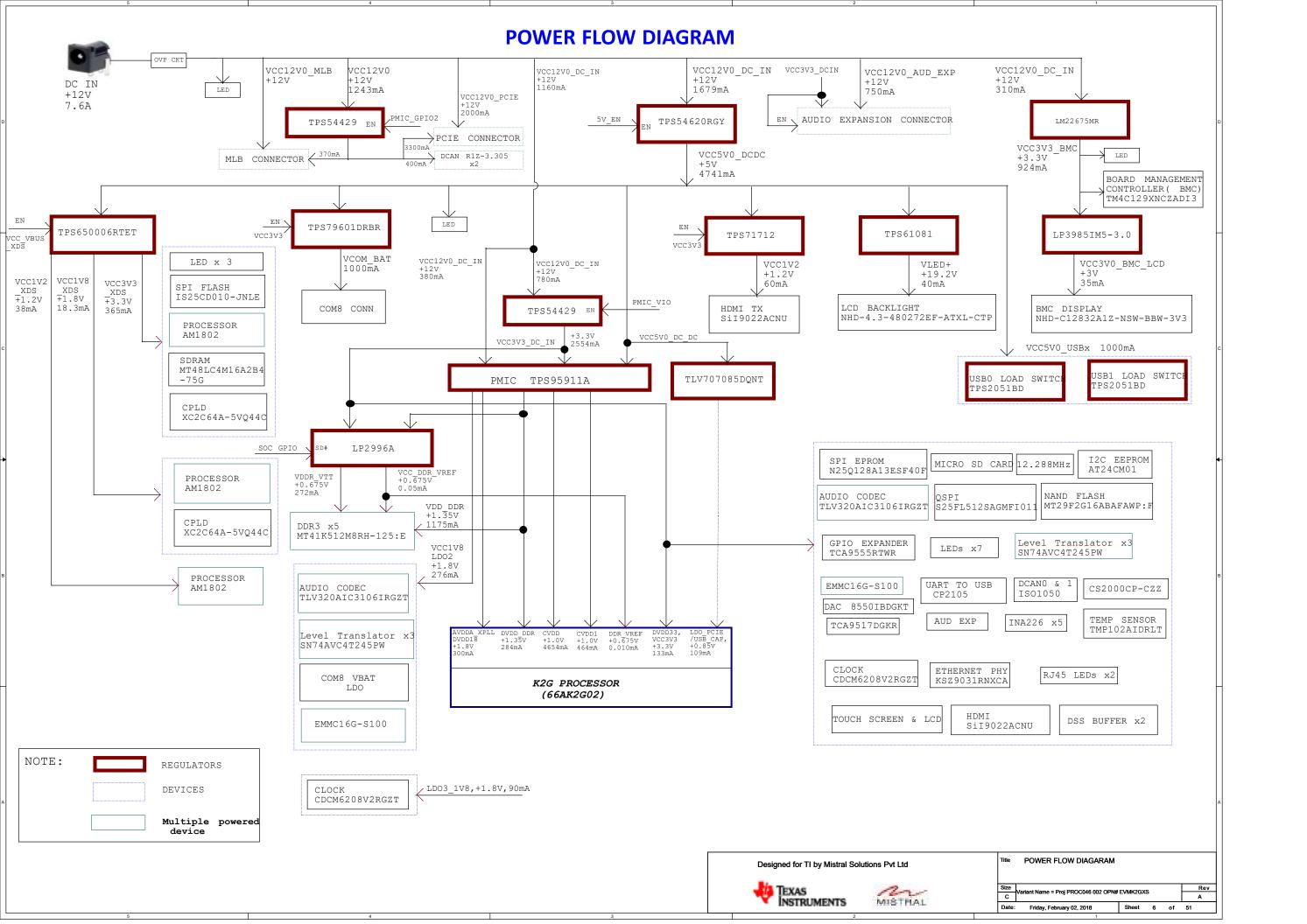
NOTE: Refer to MS\_TI\_K2GEVM\_REVD\_ECR\_ECN document for changes implemented on version 1.6

#### **BLOCK DIAGRAM - K2GEVM** Serial expansion header NSS (RGN 25 MHz Xtal KSZ9031RNX Mini-USB - XD\$200 NSS /MDI JTAG / EMU Muxes Buffers GPIO / EMU[19:2] JTAG / EMU[1:0] Timer0 Timer1 eCAPO, 1 eHRPWM3, 4, 5 eHRPWM0, 1, 2 SPI0 SPI1 SPI2 SPI3 66AK2G02 SPI NOR FLASH SoC DB9 Conn - RS232 UARTO CAN xovr UART2 Console heade CAN xovr CP2105 Mini USB McBSP Audio GPIOs expansion header SmartReflex 1200 MMC0 (3.3V) USB2.0 Type A socke SN74AVC4T245PWR McASP1 USB1 - 2.0pa 1x PCle Card-Edge Connector -PCI CE Reference Clock-DDR3 devices DDR3 EMIF (x38) MINI USB CP2105 MT41K512M8RH (qty 5) SYSCLK 24 MHz (LVD8 NOTE: all port DSS -Isolator Console header USBOCLK 24 MHz (LVCMOS) MAX3221 numbers within the USB1CLK BMC block are BMC To K2G SOC 12C1 PH[3:0] DIP Switch Bank (4) port numbers, not DDRCLK 100 MHz (LVDS) PCIECLK 100 MHz (CML) SoC port numbers. PJ0, PJ1, RSTn PB Switch Bank (4) BMC, WARM, FULL RESETS 24MHz XO CPTSREFCLK 250 MHz (LVD) LED x4 JTAG AUDIOOSC 14-pin header To INA226 UART1 Rx BMC LP2996A TLV70708 PMIC - TPS95911A DUT Adj. Supply #5 DVDD\_DDR Supply #2 DSP Core Fixed Core "CVDD1" (+1.0V) Supply #3 "DVDD18" DSP IO / PLL (+1.8V) Supply #4 \*DVDD33\* DSP IO 12C2 SERDES L.V. Supply "LDO\_PCIE/ USB\_CAP" (+0.85V) (+1.35V) (+3.3V) DDR VTT (+0.675V) 16x2 LCD character display To 5 pin header/ BMC Title BLOCK DIAGRAM - K2G EVM Designed for TI by Mistral Solutions Pvt Ltd Size C TEXAS INSTRUMENTS Rev A MISTHAL riant Name = Proj PROC046 002 OPN# EVMK2GXS Date: Friday, February 02, 2018 Sheet 3 of 51

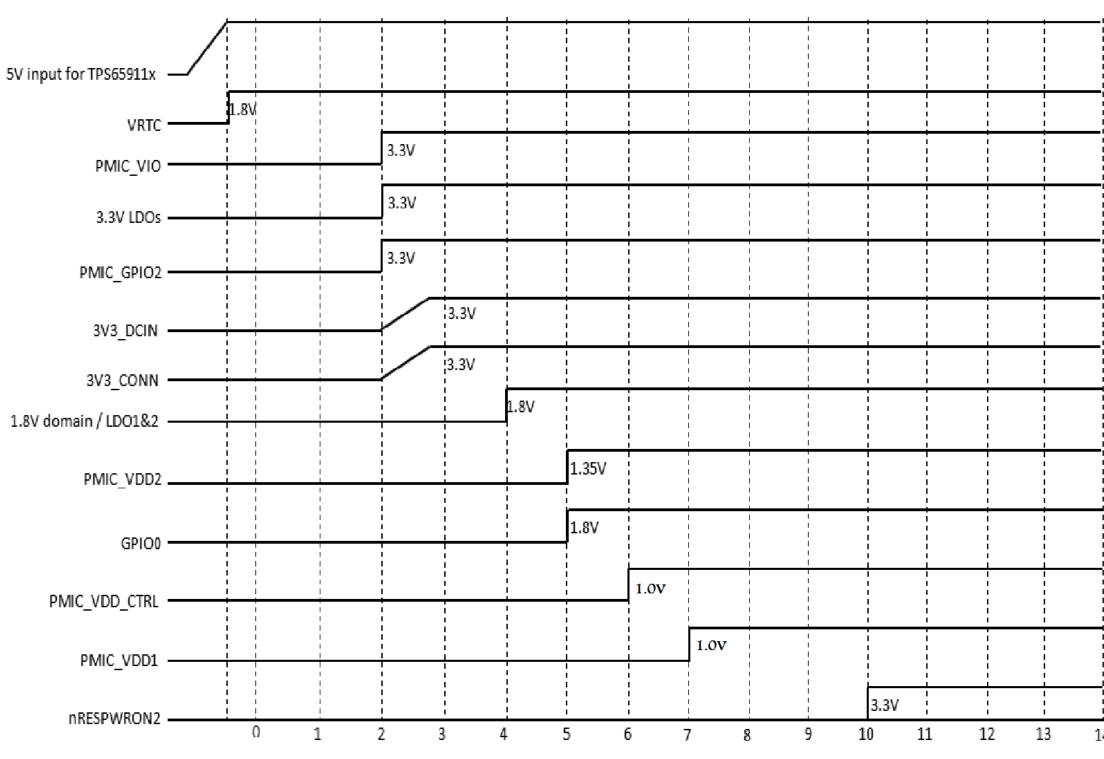


### **BLOCK DIAGRAM - XDS200**





# **BOARD POWER UP SEQUENCE**



Time slot (2ms between slots)

TEXAS INSTRUMENTS

Designed for TI by Mistral Solutions Pvt Ltd

MISTHAL

Date: Friday, February 02, 2018

# **SoC I2C ADDRESS TABLE**

I2CO DEVICES	7 BIT ADDRESS
EEPROM	0x50 (PAGE 0)
	0x51 (PAGE 1)
BMC	0x0 (PROGRAMMABLE)
SERIAL EXPANSION CONNECTOR	TBD
PCIe CONNECTOR	TBD

I2C2 DEVICES	7 BIT ADDRESS
PMIC	0x2D (GENERAL PURPOSE) TBD
	0x12 (VOLTAGE SCALING) TBD

I2C1 DEVICES	7 BIT ADDRESS
	0x3B
HDMI TRANSMITTER	0x3F
	0×62
AUDIO CODEC	0x1B
TOUCH SCREEN	0x70 (WRITE)
	0x71 (READ)
I/O EXPANDER	0x20
TEMPERTURE SENSOR	0x48
MLB CONNECTOR	TBD
AUDIO EXPANSION CONNECTOR	0x4A,0x4B,0x4C,0x4D
CLOCK GENREATOR (CS2000CP-CZZ)	0×4F

### **BMC I2C ADDRESS TABLE**

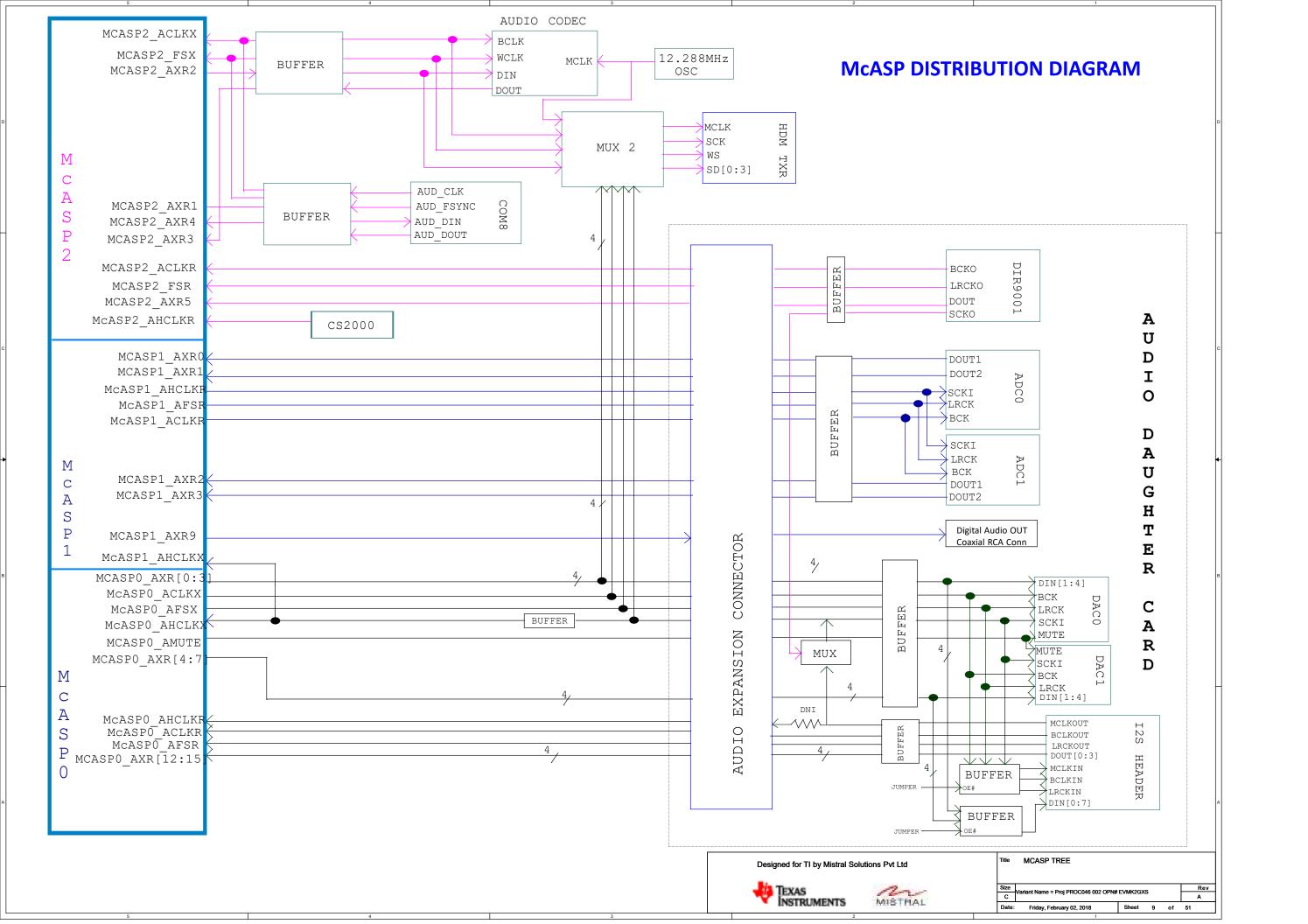
BMC 12C0 DEVICES	7 BIT ADDRESS
	0x40 : 3.3V
PMBUS	0x41 : CVDD
	0x42 : CVDD1
	0x43 : 1.8V
	0x44 : DVDD_DDR

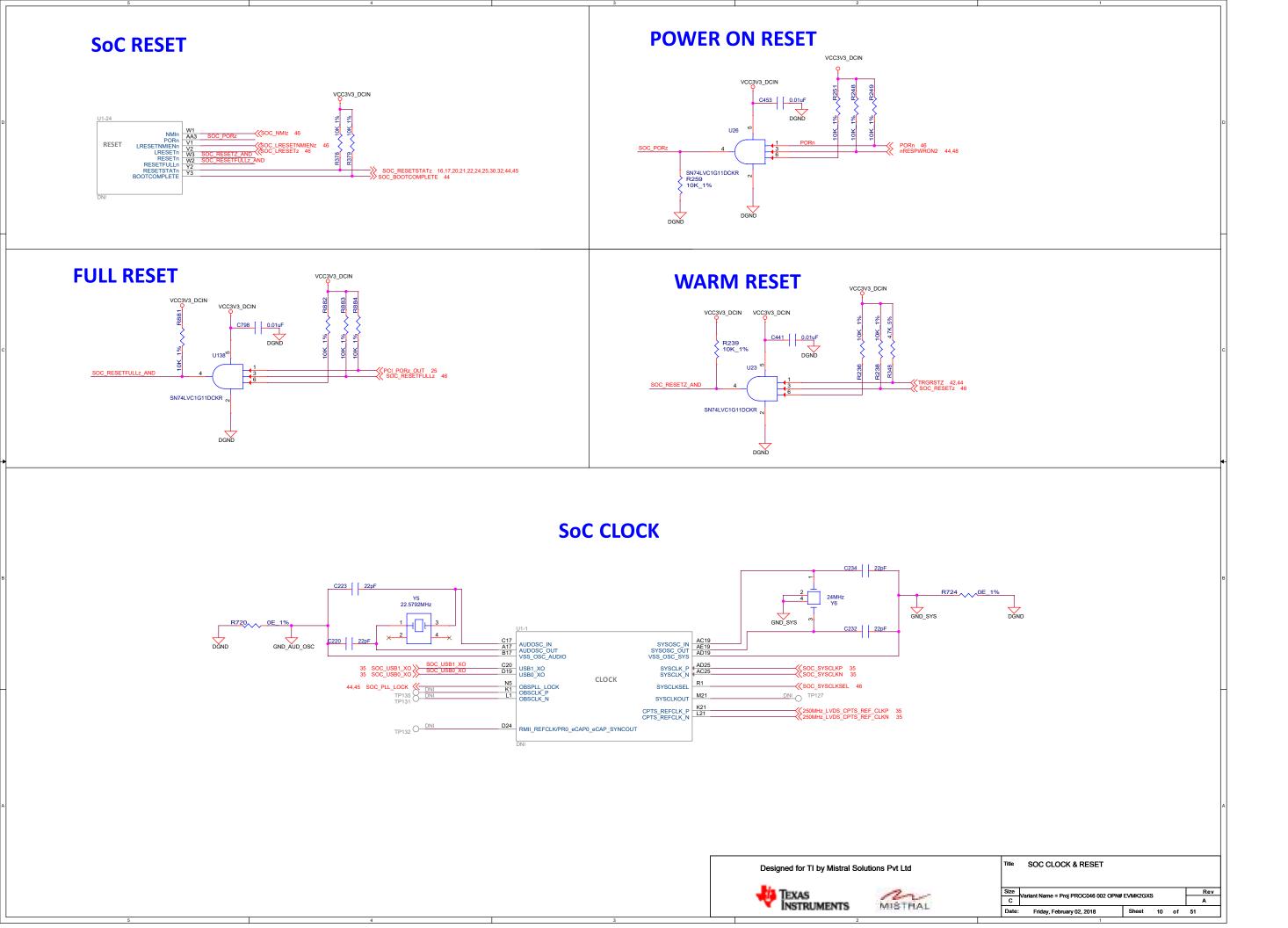
BMC I2C1 DEVICES	7 BIT ADDRESS	
PROCESSOR	ALWAYS MASTER	

# McASP CONFIGURATION

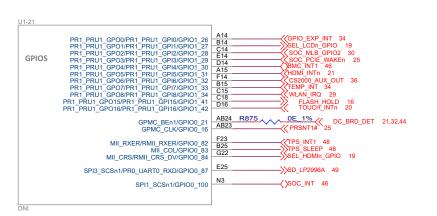
McASP PORT	DEVICES	DEVICE MODE	
McASP0	DAC- PCM1690 x2	SLAVE	
	I2S HEADER	MASTER	
McASP1	ADC- PCM1865 x2	SLAVE	
McASP2	HDMI TRANSMITTER (DEFAULT)	SLAVE	
	AUDIO CODEC AIC3106		
	DIR9001 (DEFAULT)	- MASTER	
	COM8		

Designed for TI by Mistral Solutions Pvt Ltd		Title		I2C TREE				
Jis Tryac		Size	e Variant Name = Proj PROC046 002 OPN# EVMK2GXS			Rev		
INCTRIMENTO	MISTHAL	С	vai	mant Name = Proj PROC046 002 OPN#	EVMRZGAS	•		Α
INSTRUMENTS	MISTHAL	Date:	:	Friday, February 02, 2018	Sheet	8	of	51

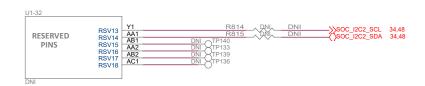


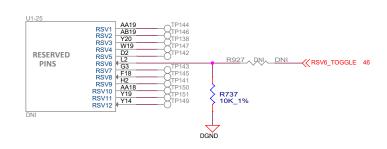


### **SoC GPIOs**



### **RESERVED PINS**



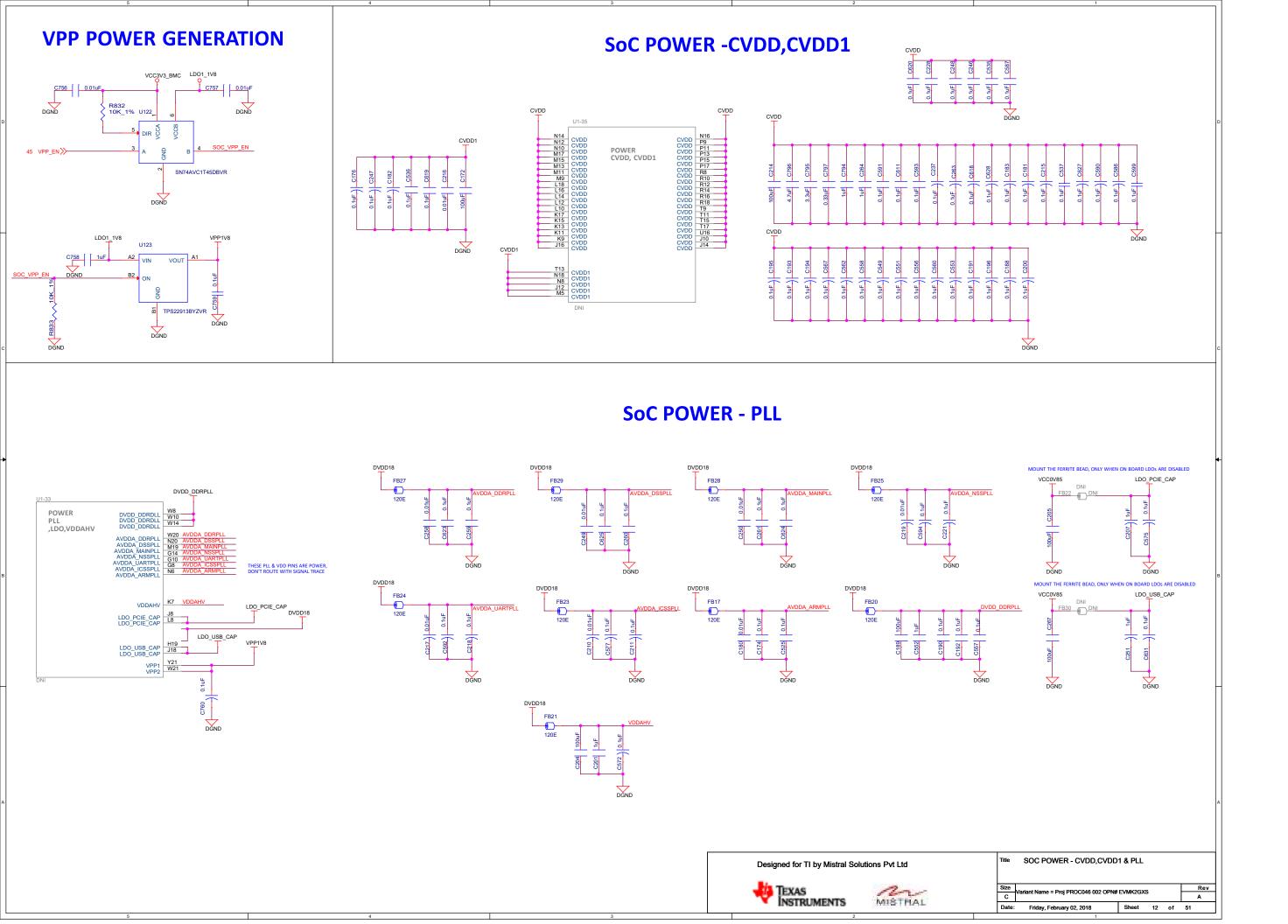


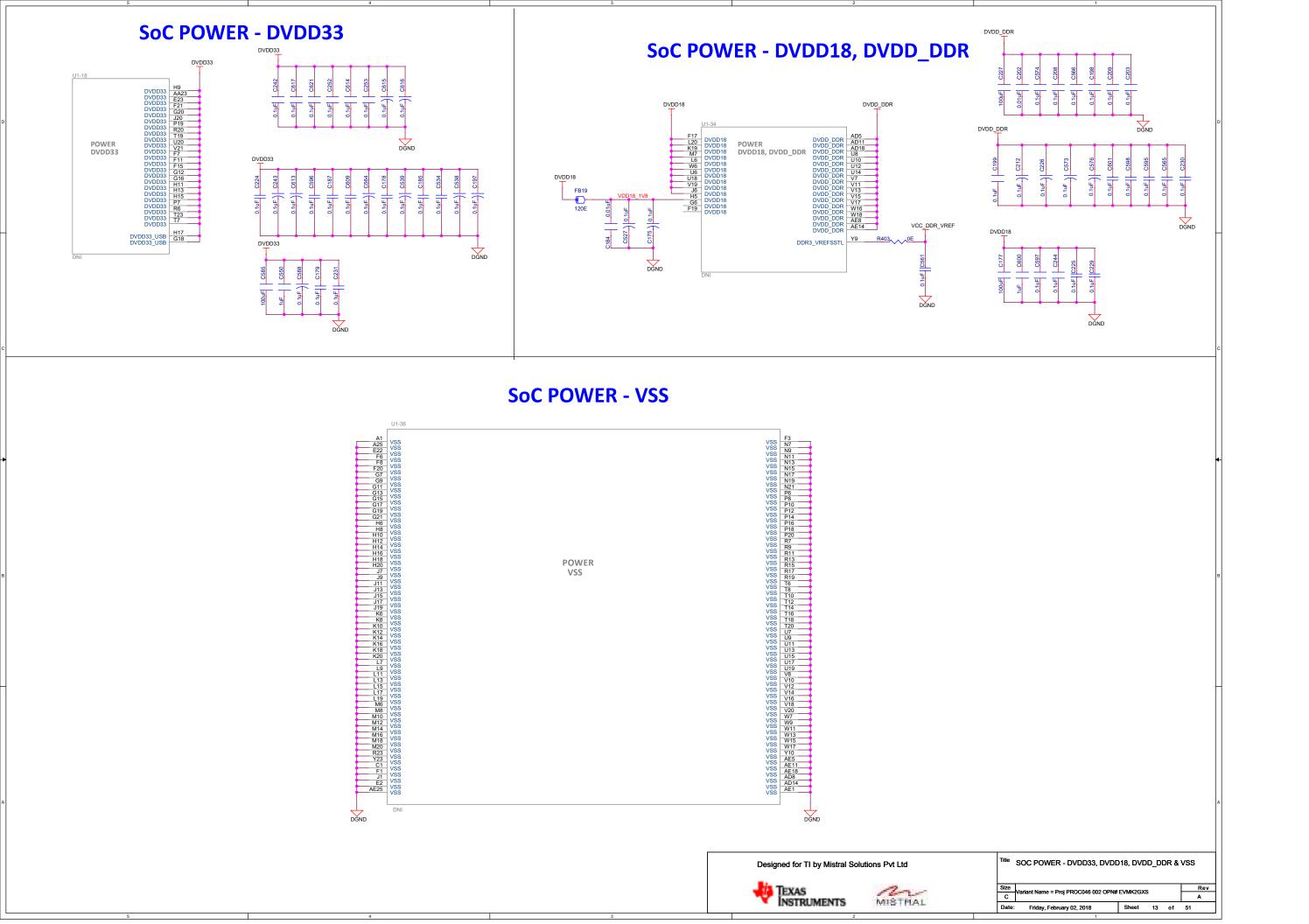
Designed for TI by Mistral Solutions Pvt Ltd

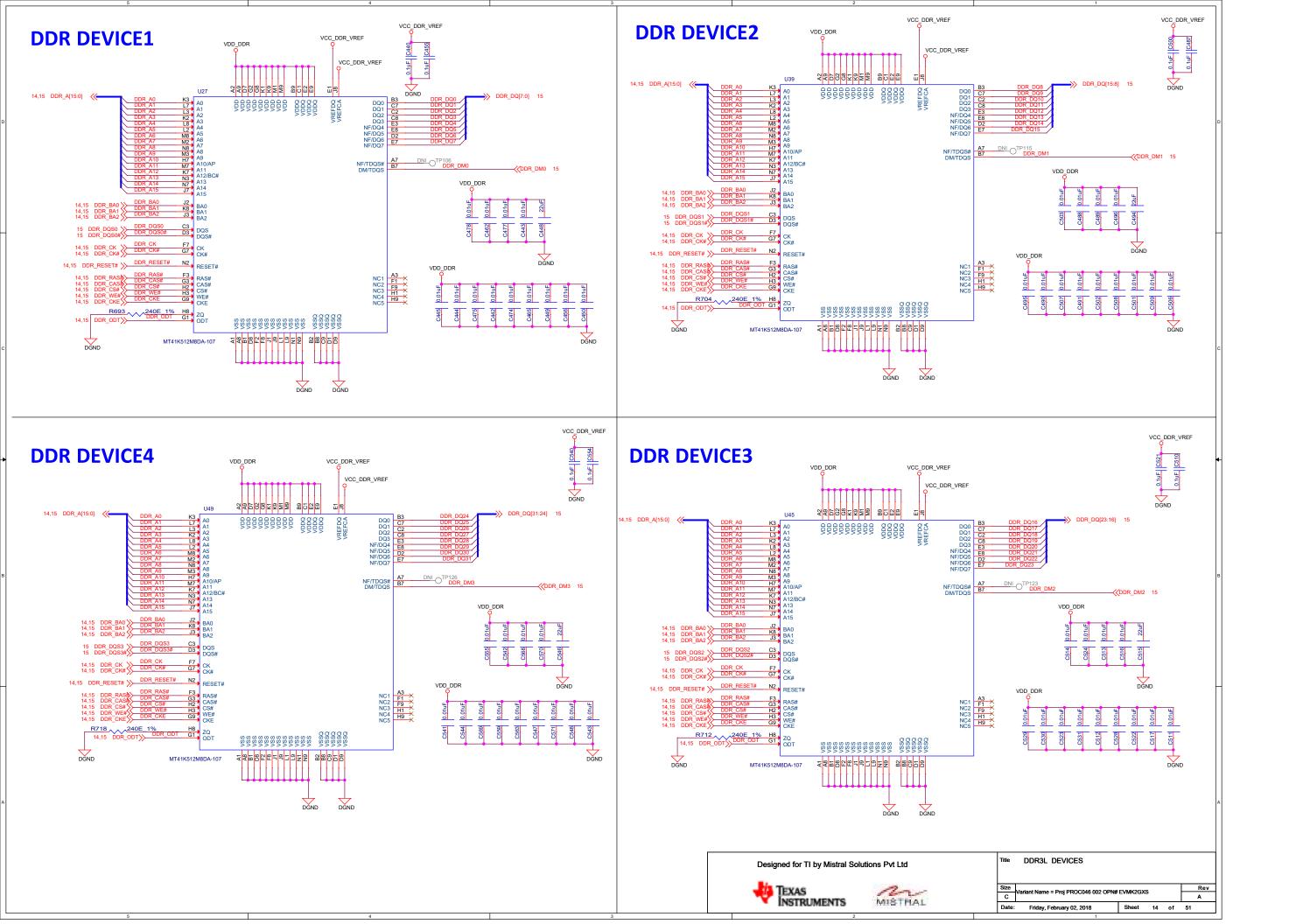
Title SOC GPIO, SMART REFLEX & TEST OUT

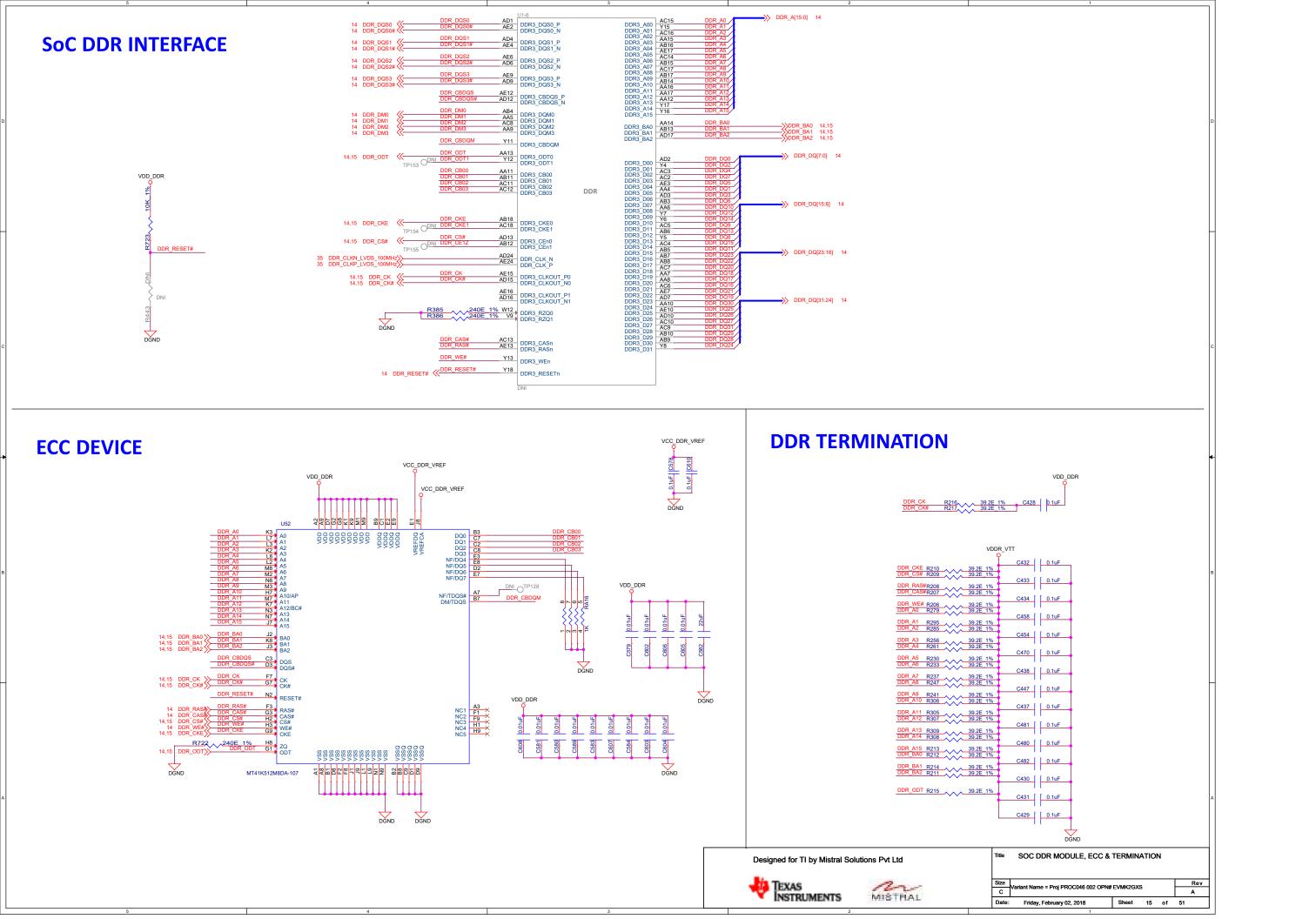
Size Variant Name = Proj PROC046 002 OPN# EVMK2GXS Rev A

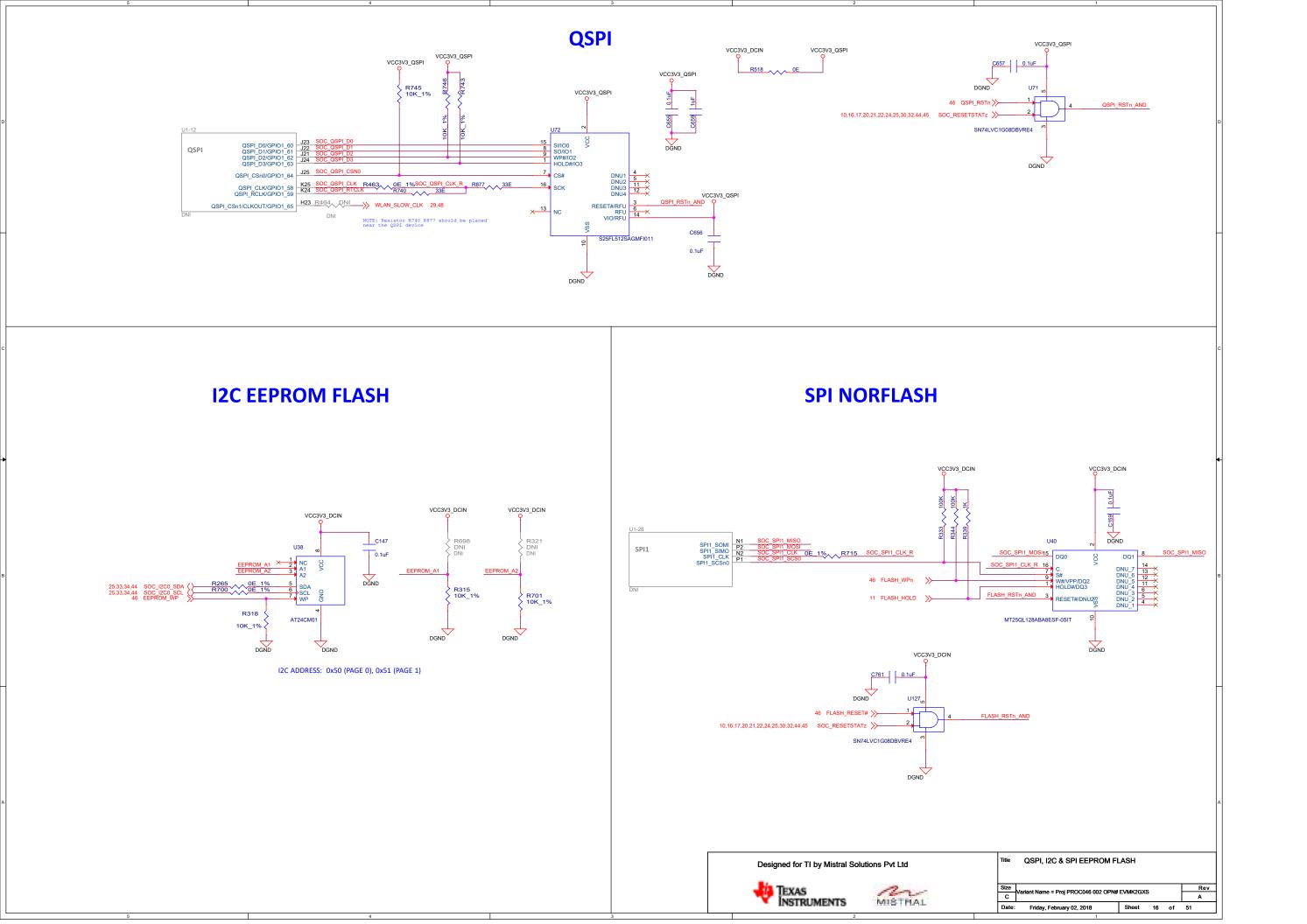
Date: Friday, February 02, 2018 Sheet 11 of 51

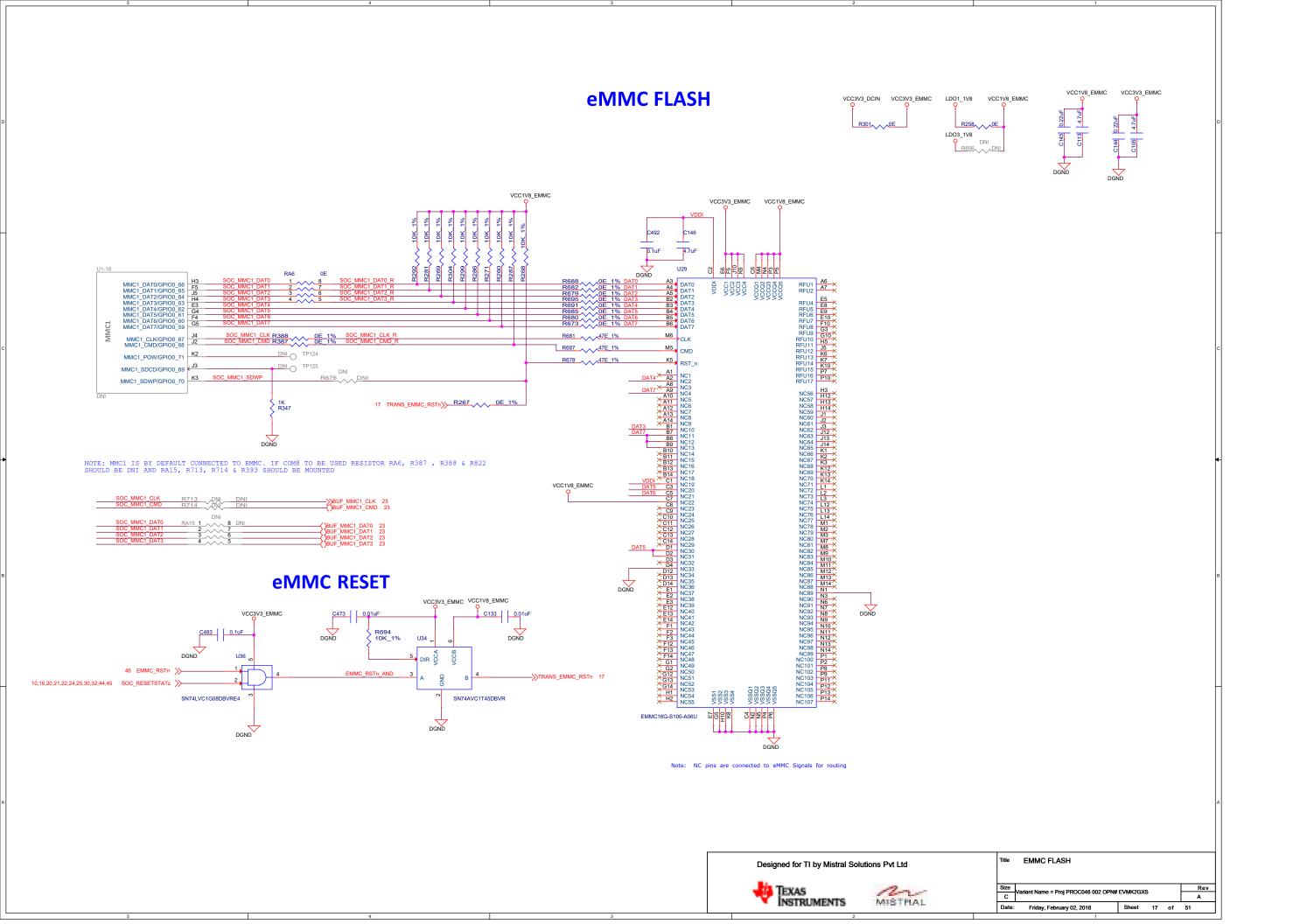


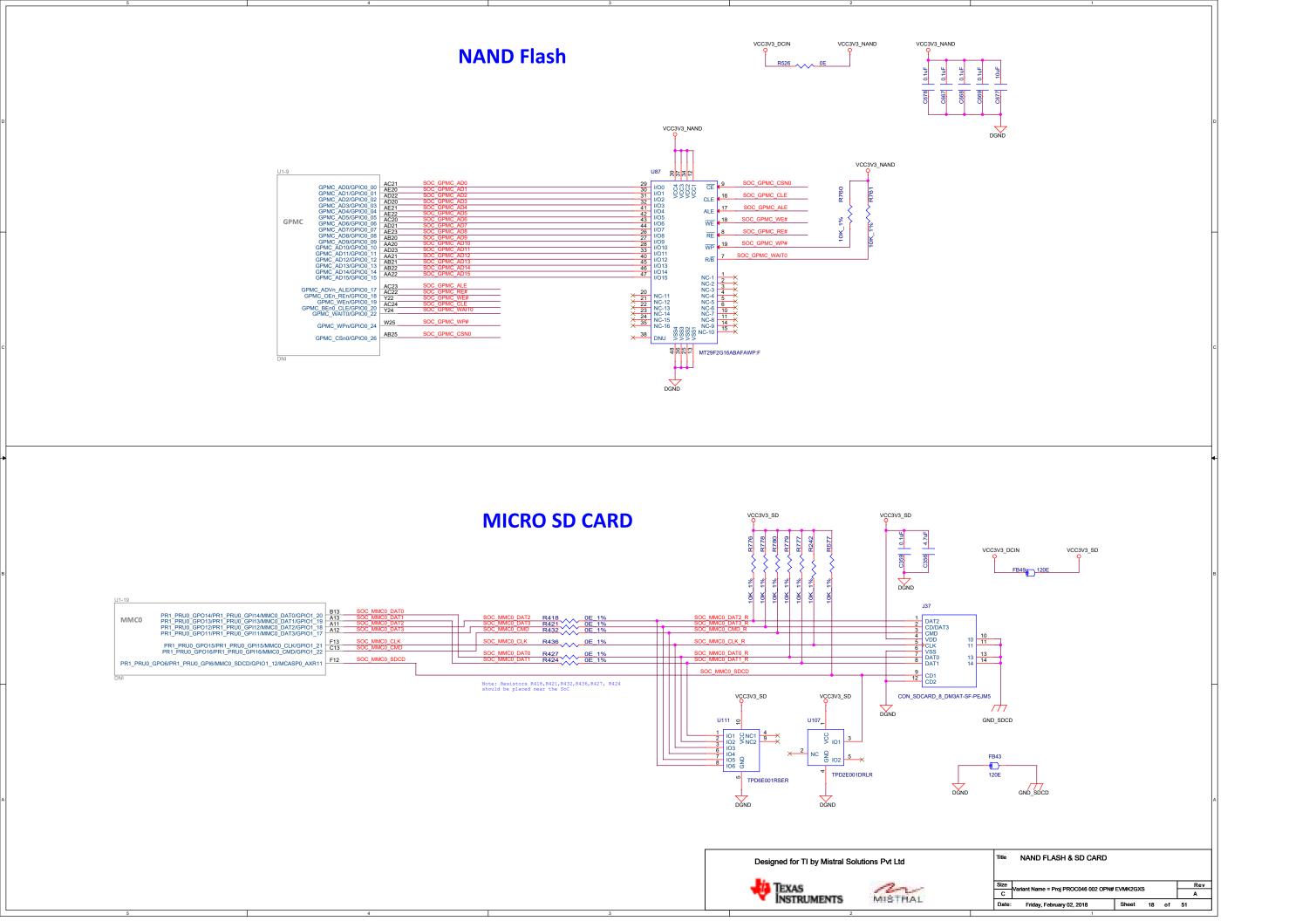


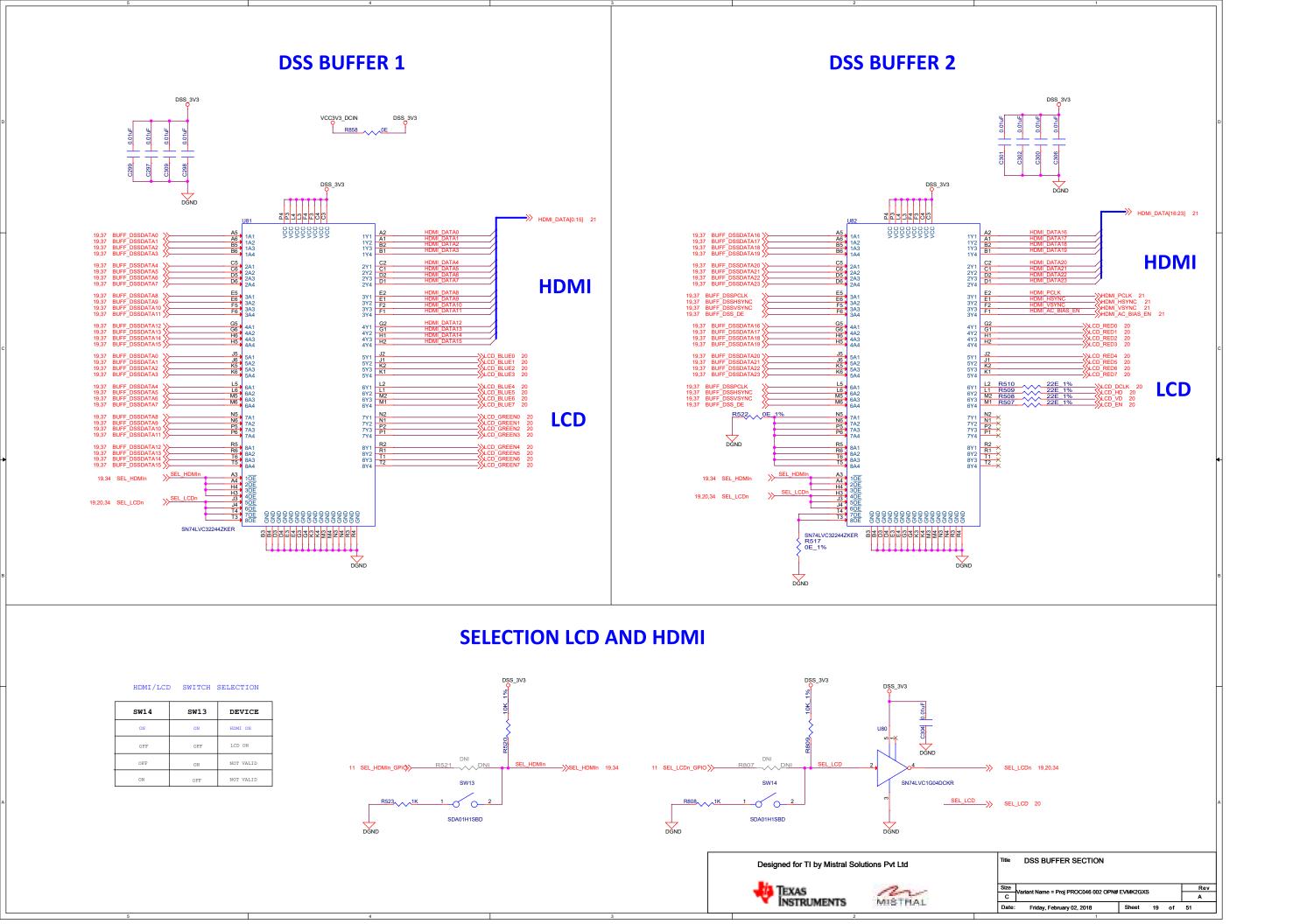


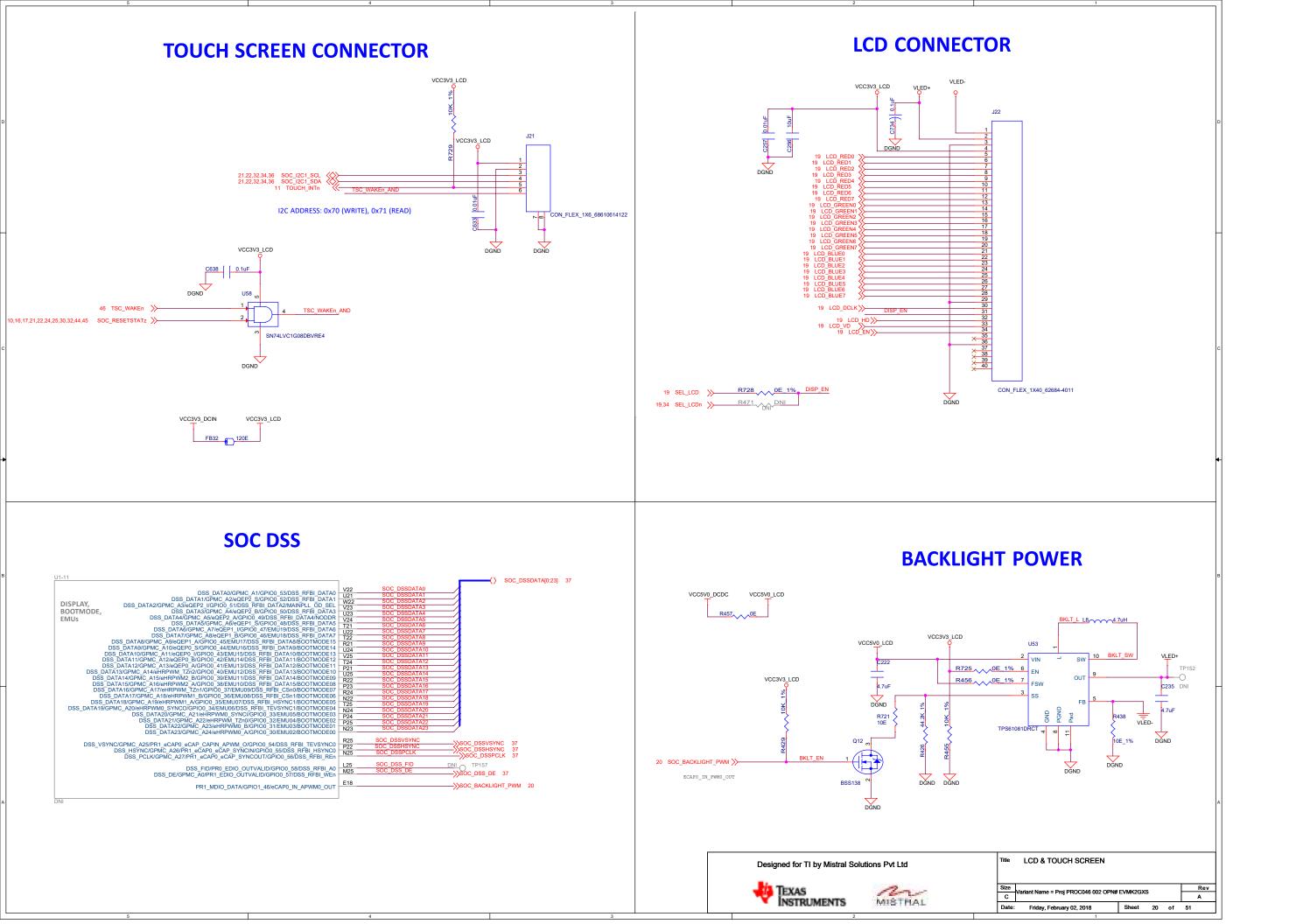


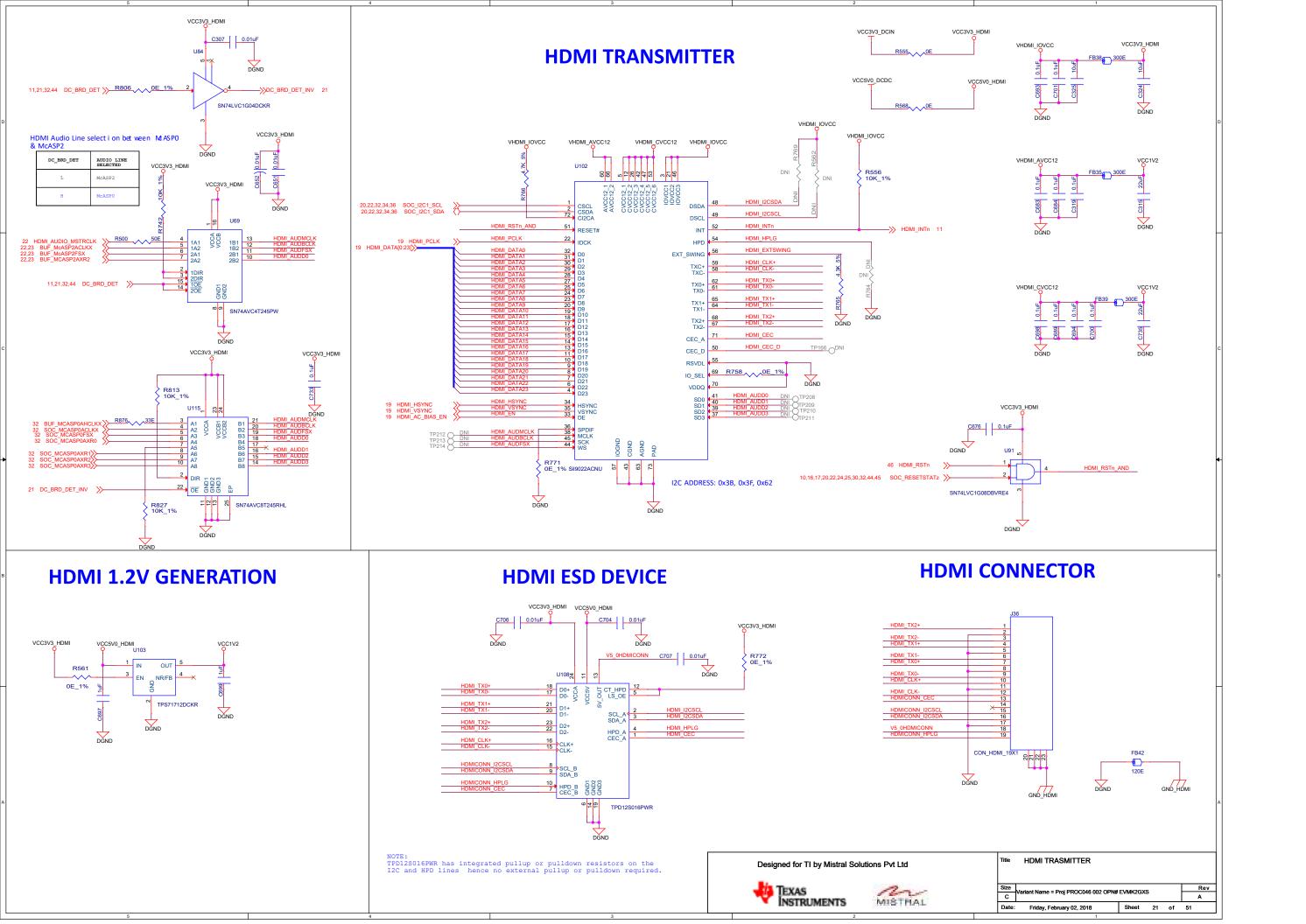




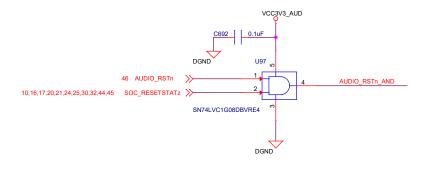






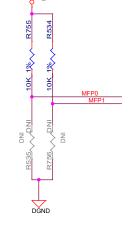


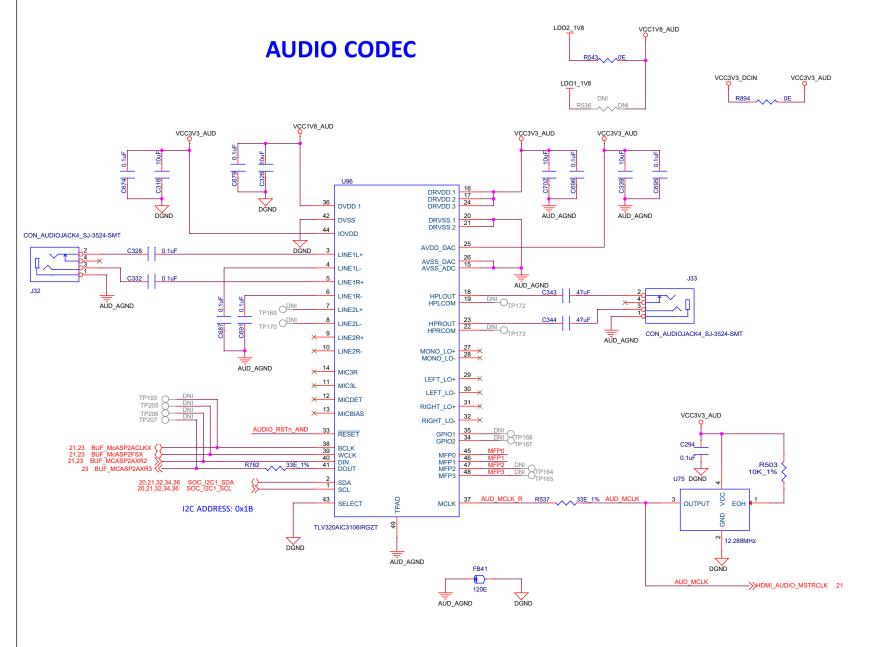
### **AUDIO CODEC RESET**

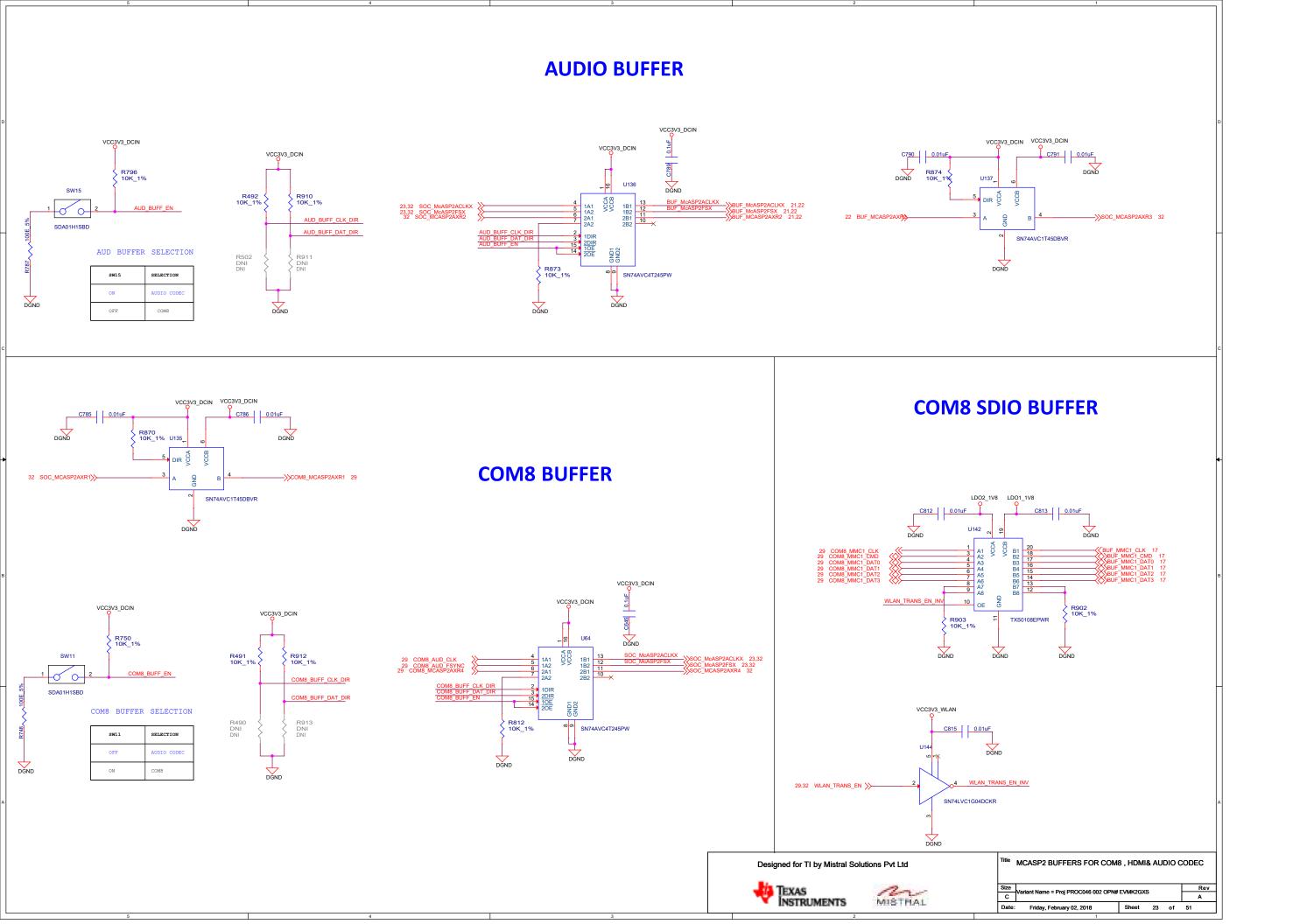


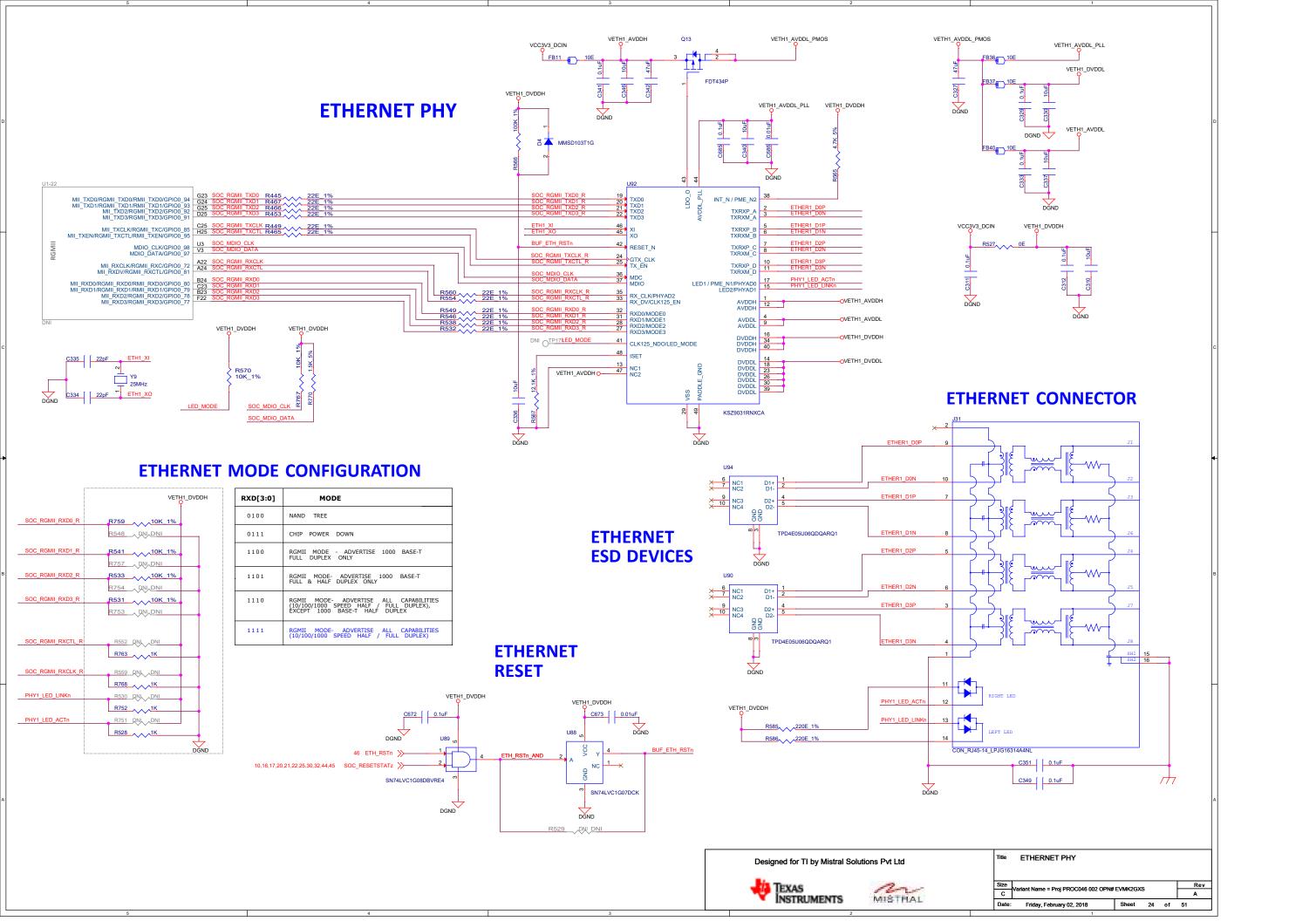
CODEC 12C ADDRESS SELECTION

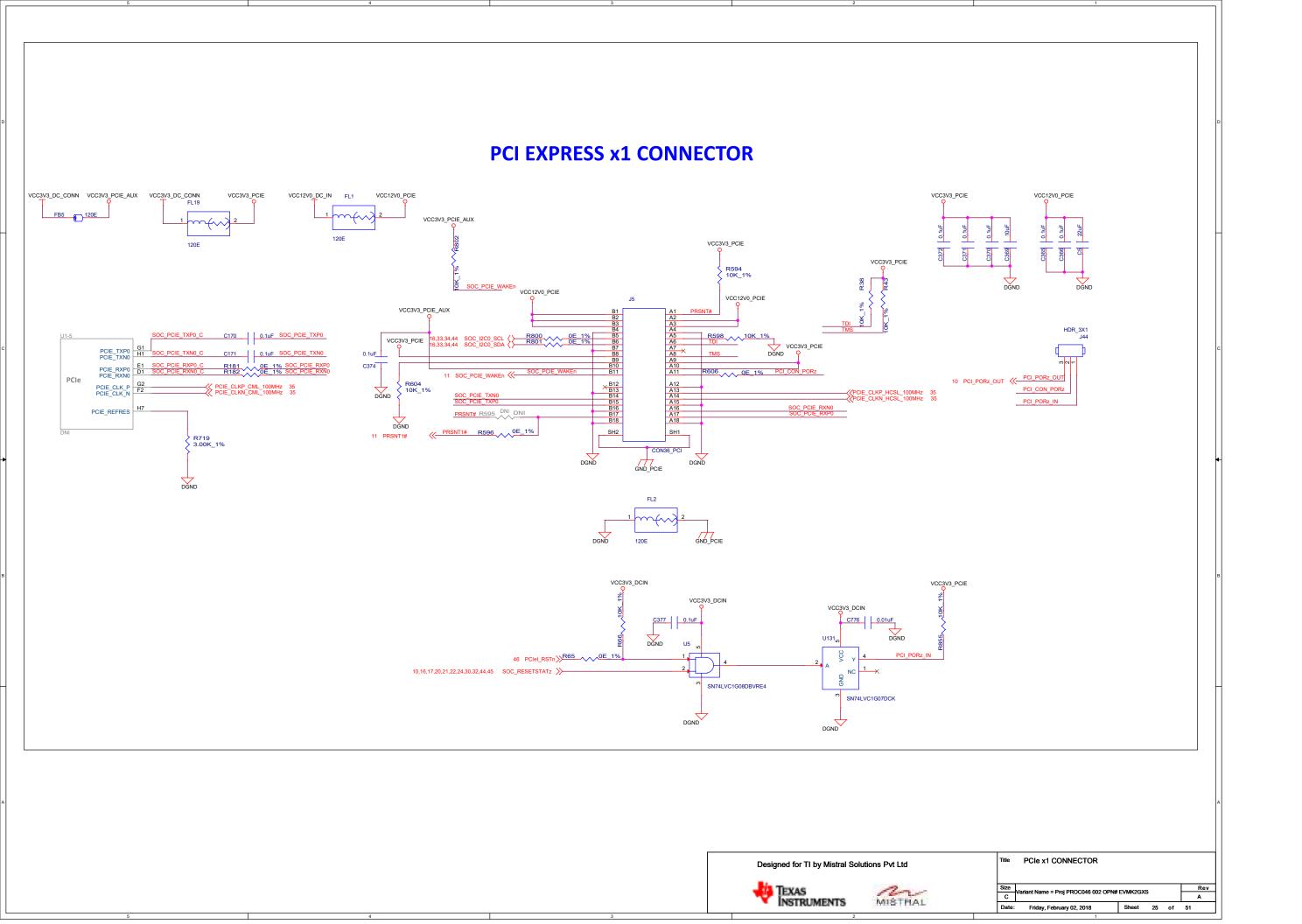
MFP0	MFP1	ADDRESS			
L	L	1A			
L	Н	1B			
Н	L	10			
н	н	1D			

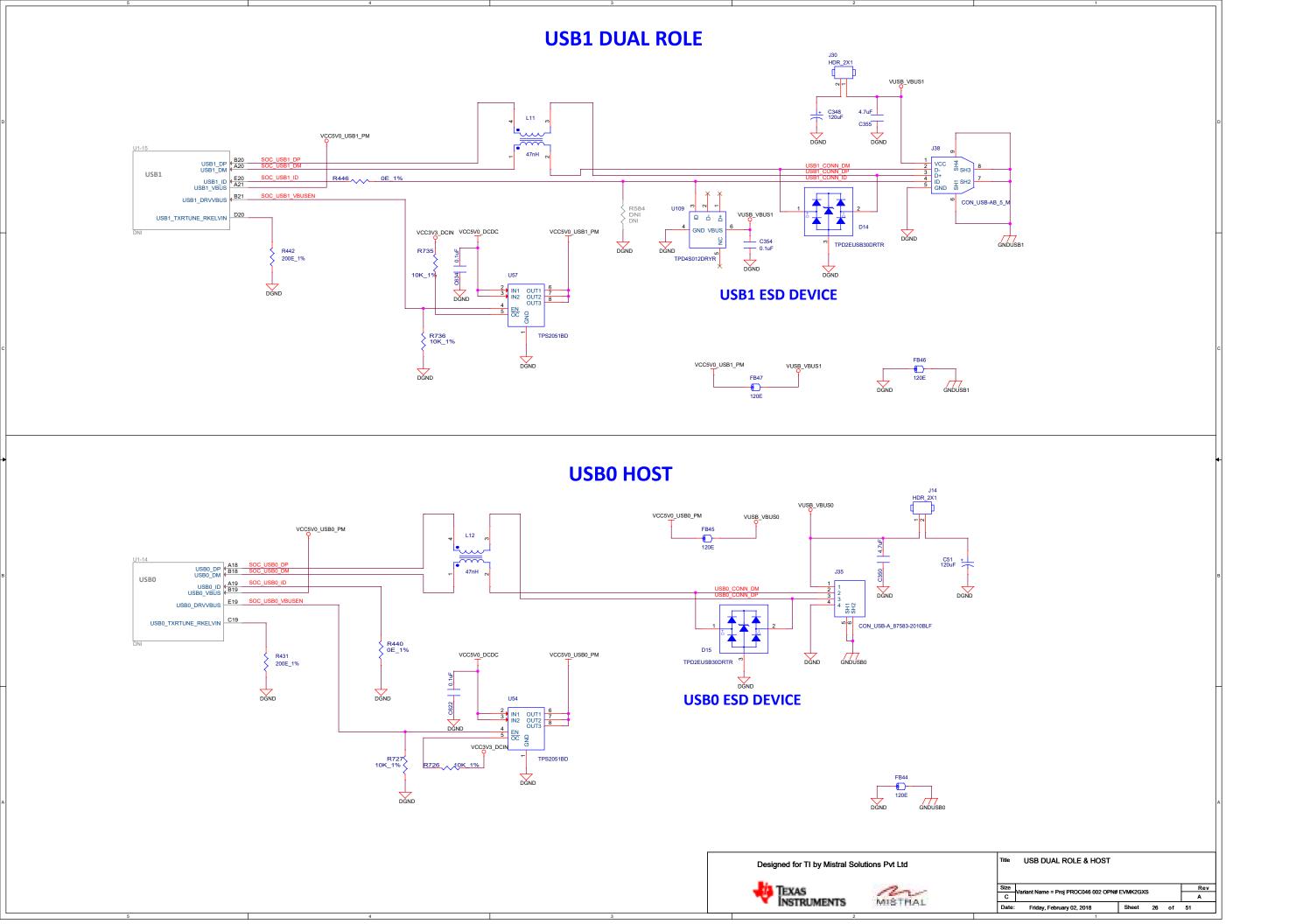


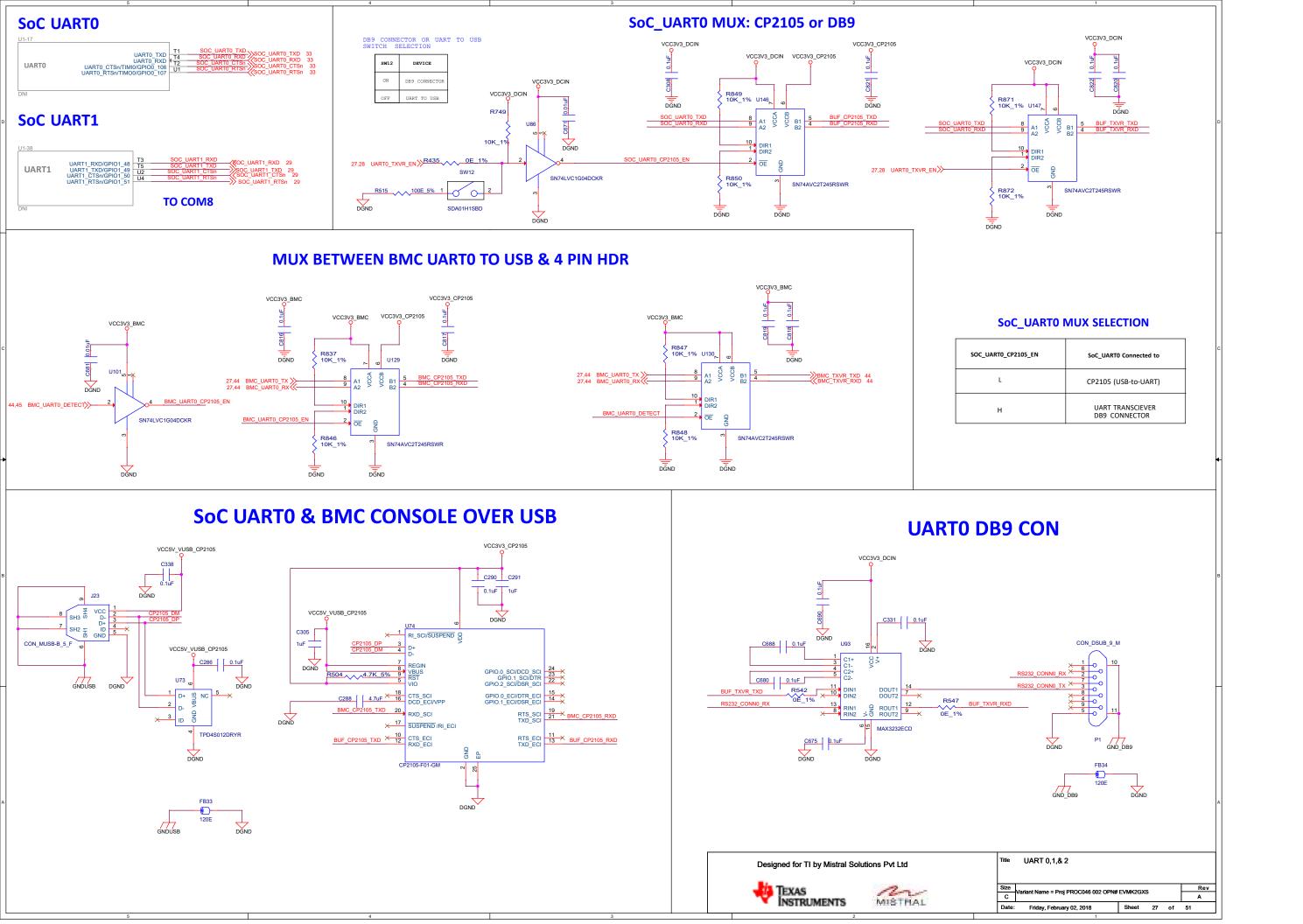




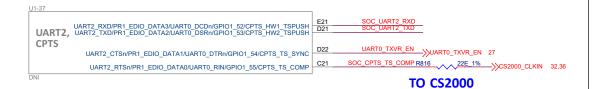




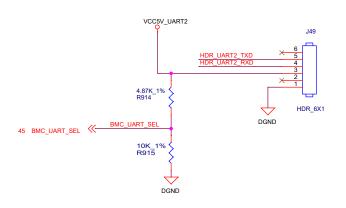




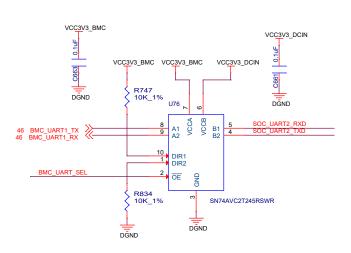
# SoC UART2

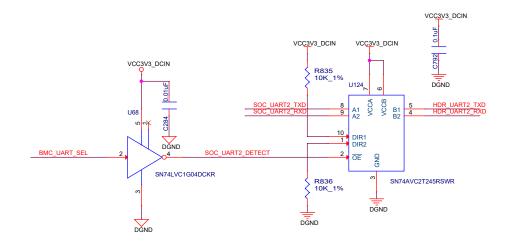


### **UART2 HEADER**



### **SoC UART2 MUX - BMC or UART2 Header**





#### **SoC\_UART2 MUX SELECTION**

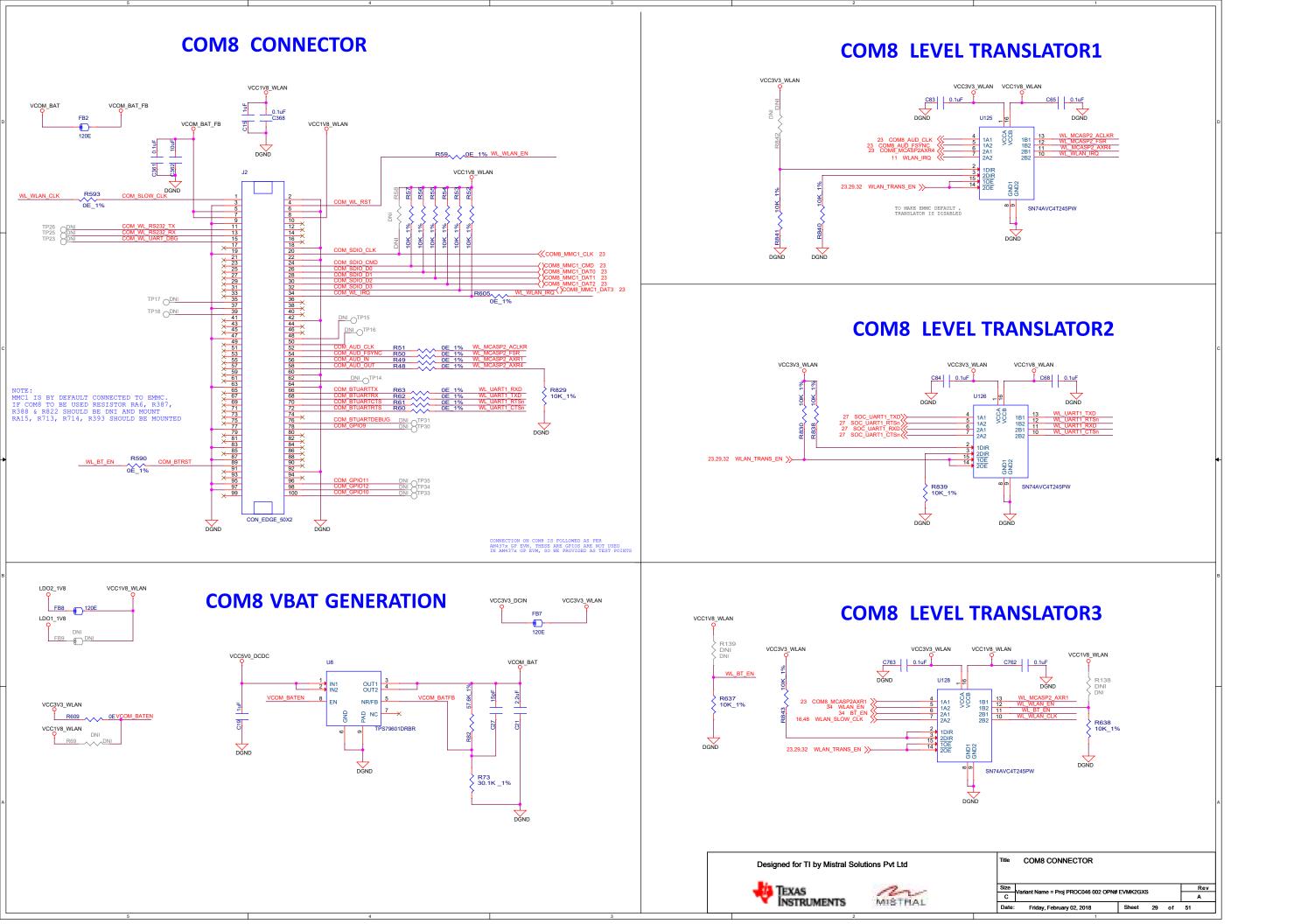
BMC_UART_SEL	SoC_UART2 Connected to
L	вмс
н	UART2 HEADER (J49)

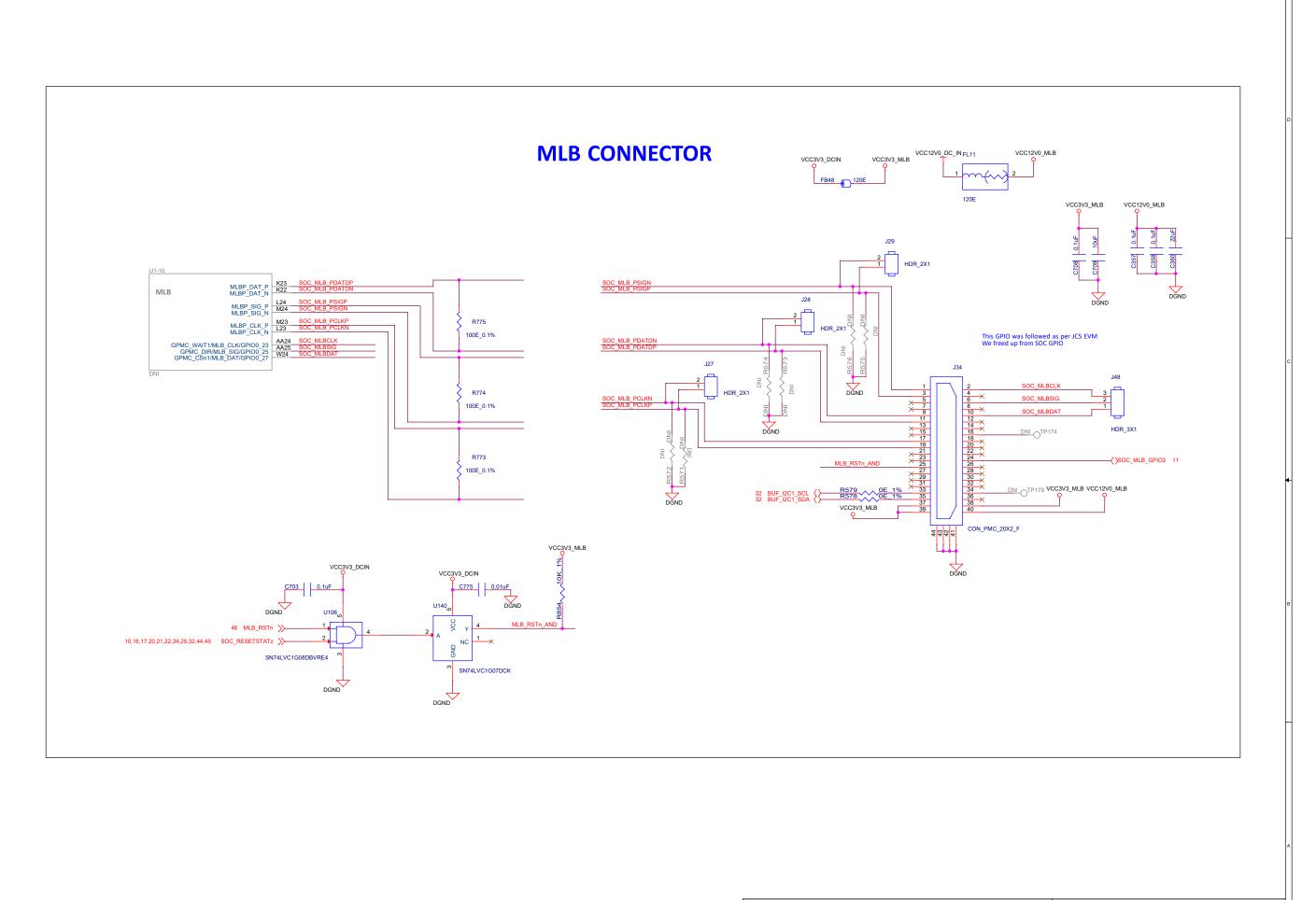
Designed for TI by Mistral Solutions Pvt Ltd

Title UART2

Size Variant Name = Proj PROC046 002 OPN# EVMK2GXS Rev A

Date: Friday, February 02, 2018 Sheet 28 of 51



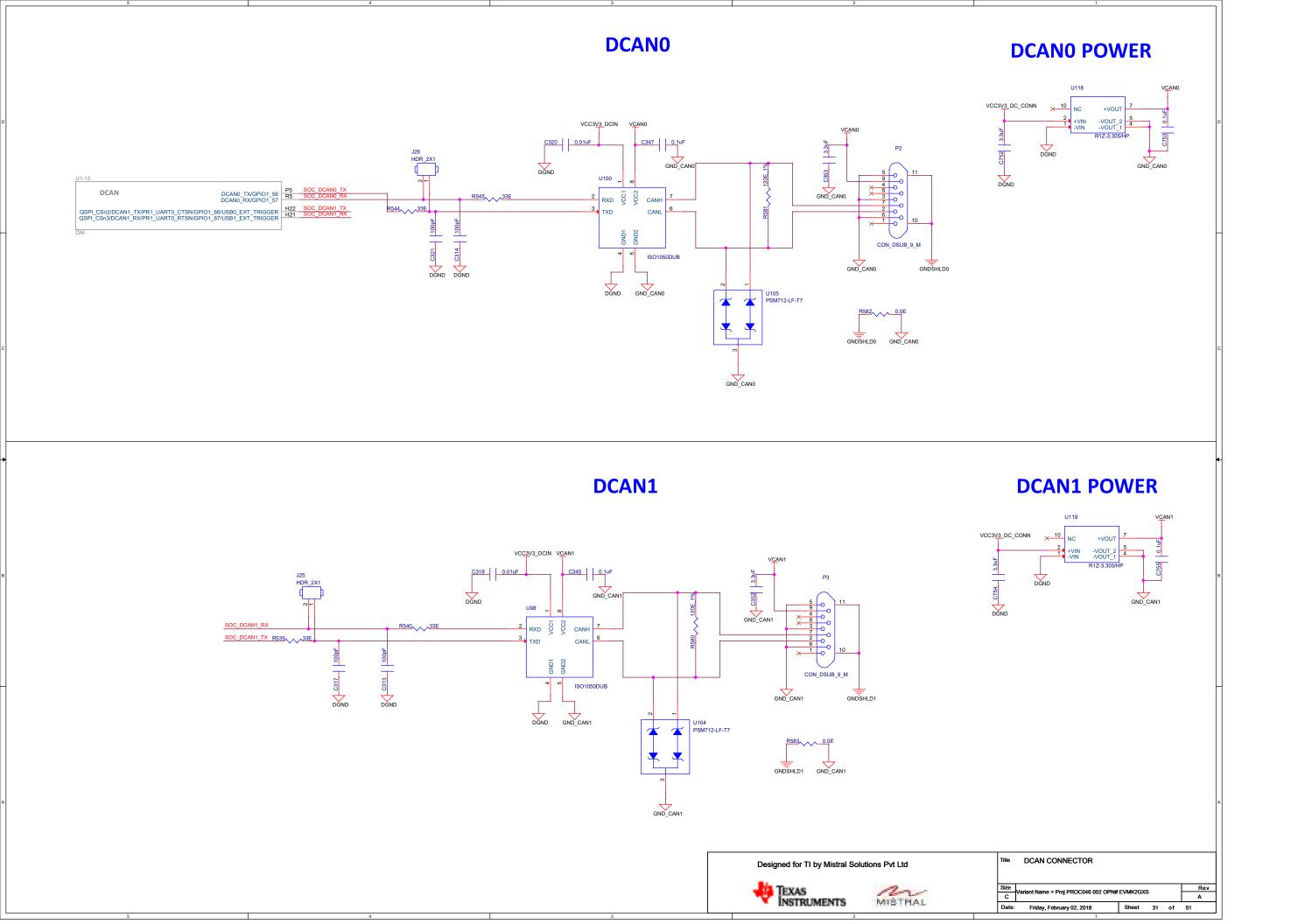


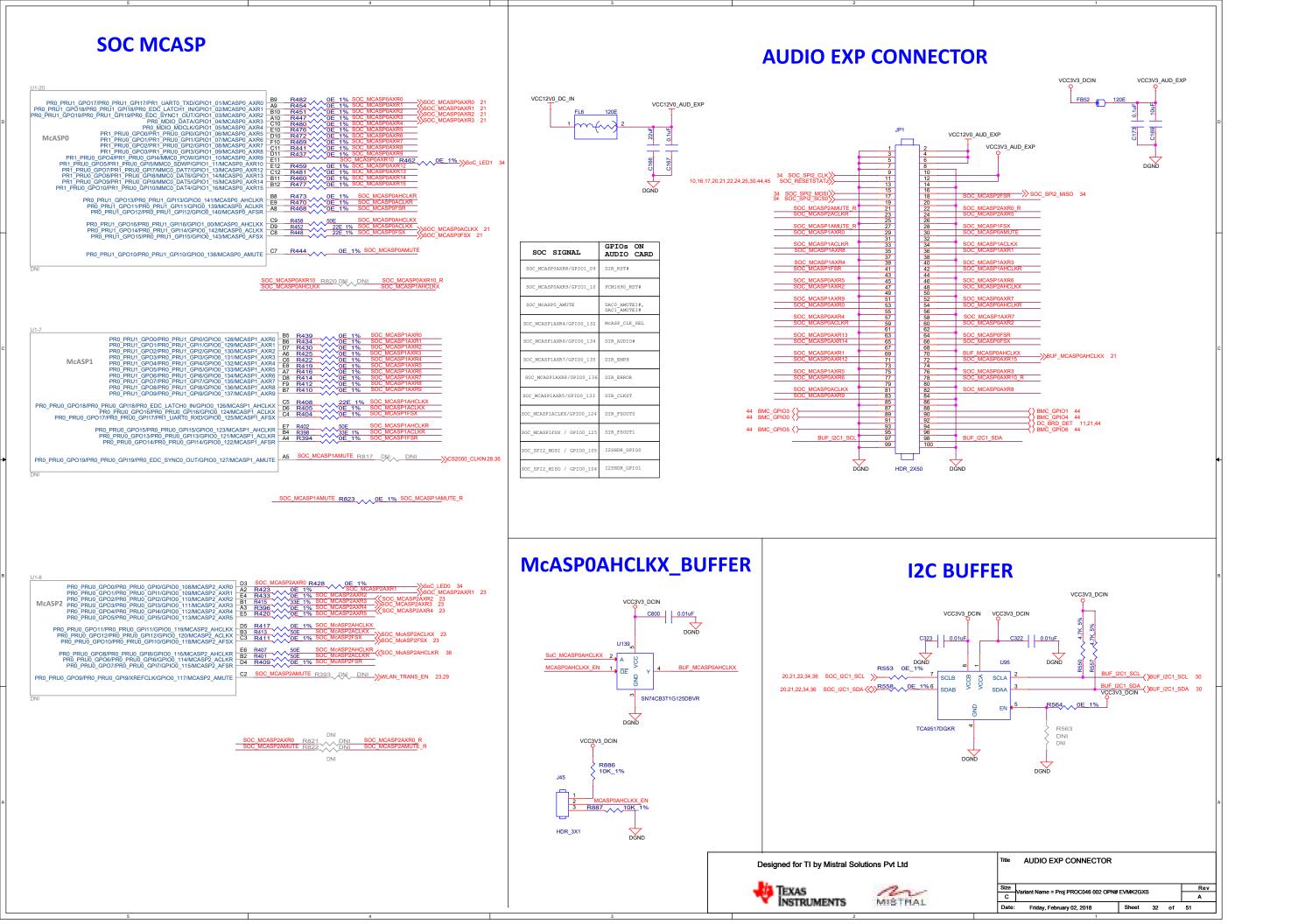
Designed for TI by Mistral Solutions Pvt Ltd

Title MLB CONNECTOR

Size Variant Name = Proj PROC046 002 OPN# EVMK2GXS Rev A

Date: Friday, February 02, 2018 Sheet 30 of 51





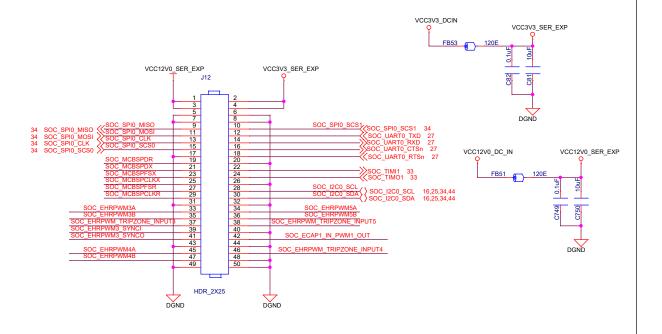
### **SoC McBSP**



### **SoC PWM**



### **SERIAL EXPANSION CONNECTOR**

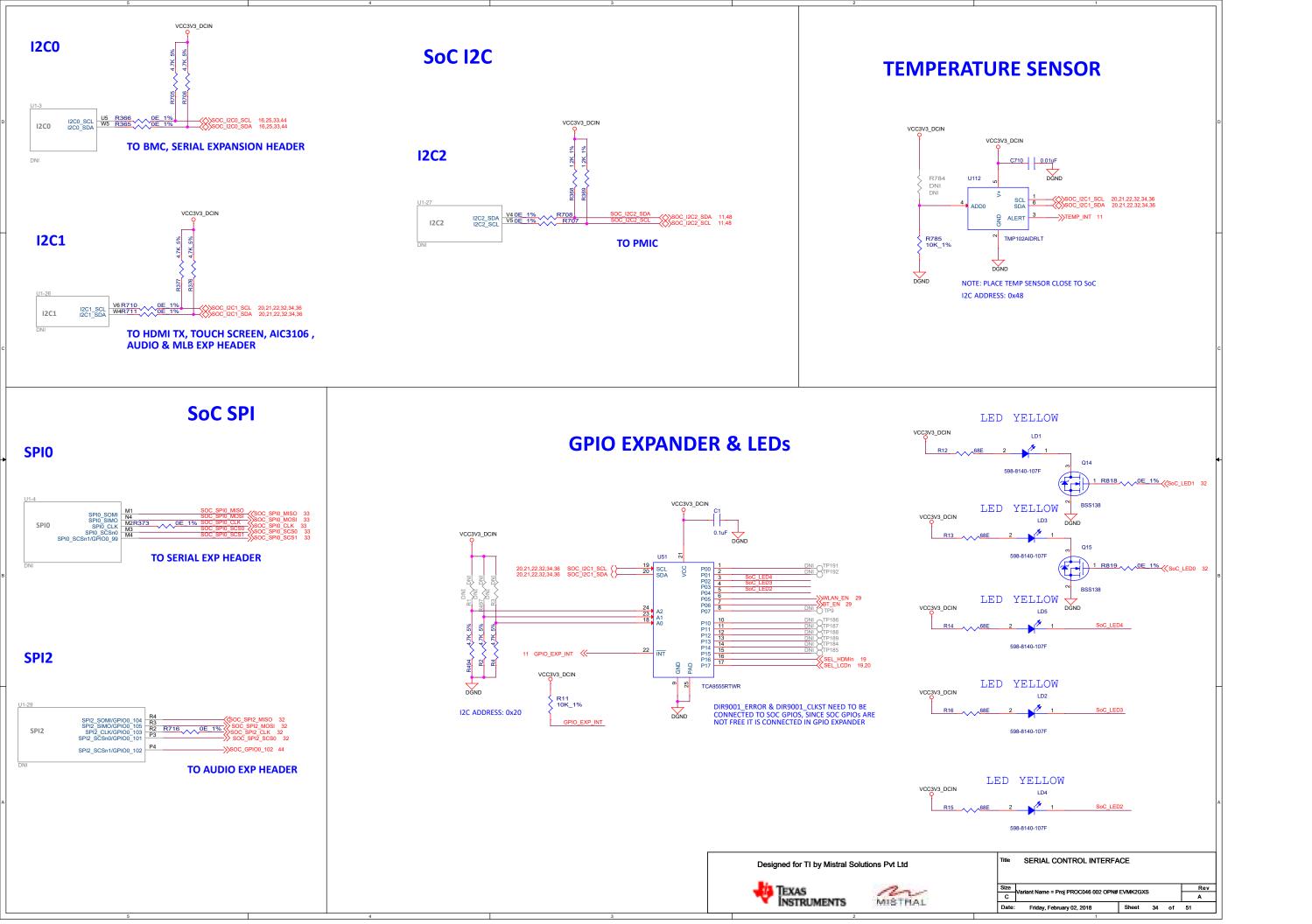


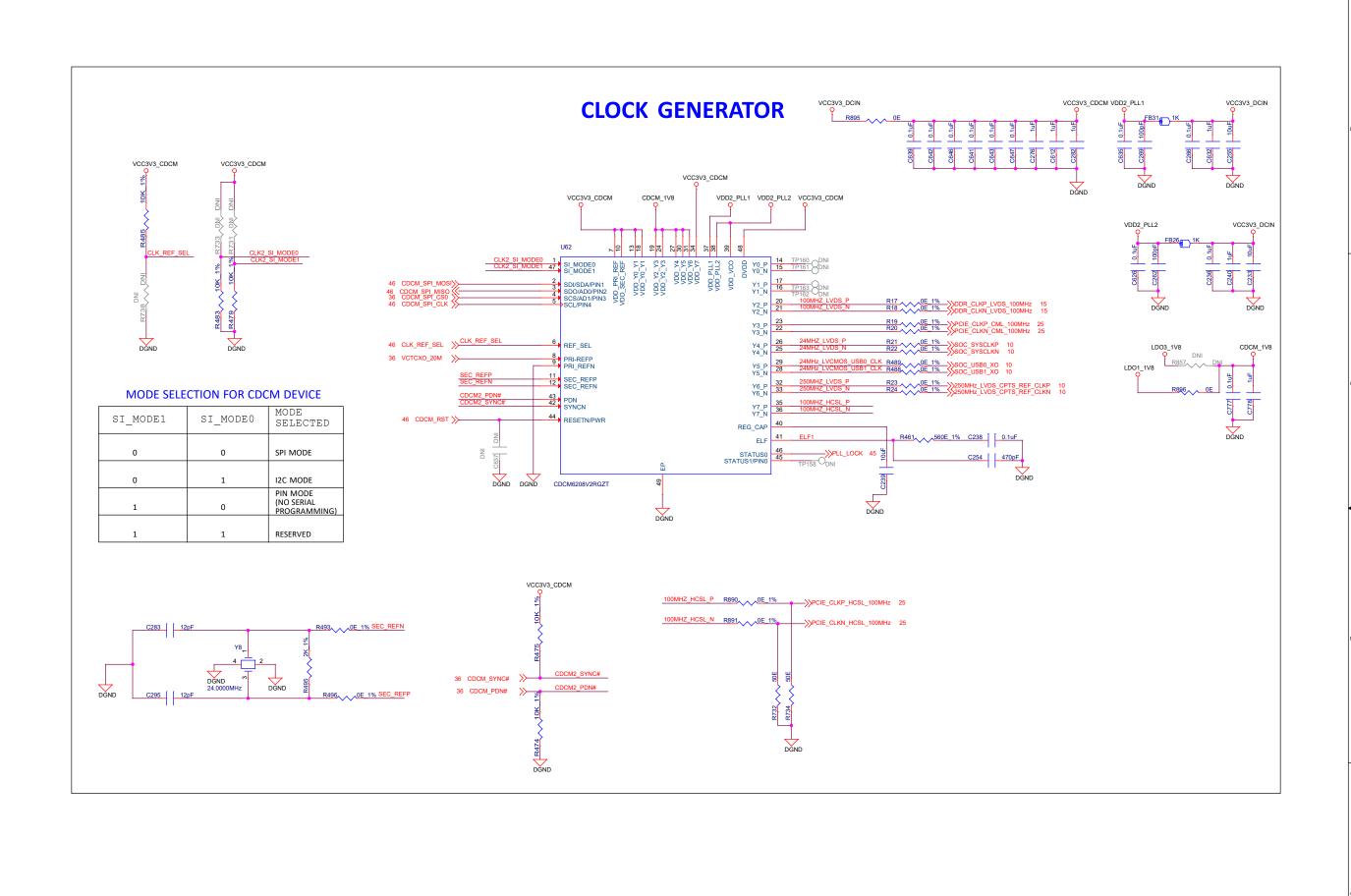
Designed for TI by Mistral Solutions Pvt Ltd

Title SERIAL & EHRPWM EXP CONNECTOR

Size C Variant Name = Proj PROC046 002 OPN# EVMK2GXS A

Date: Friday, February 02, 2018 Sheet 33 of 51

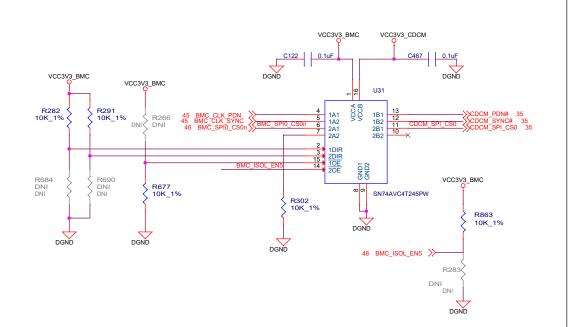




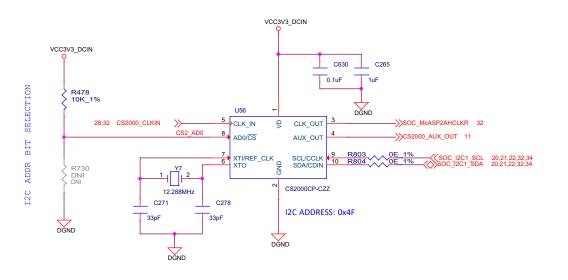
Title CLOCK DISTRIBUTION 1 Designed for TI by Mistral Solutions Pvt Ltd TEXAS INSTRUMENTS MISTHAL Rev A riant Name = Proj PROC046 002 OPN# EVMK2GXS Date: Friday, February 02, 2018

Sheet 35 of 51

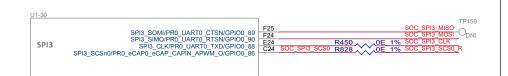
# **BMC ISOLATOR 5**



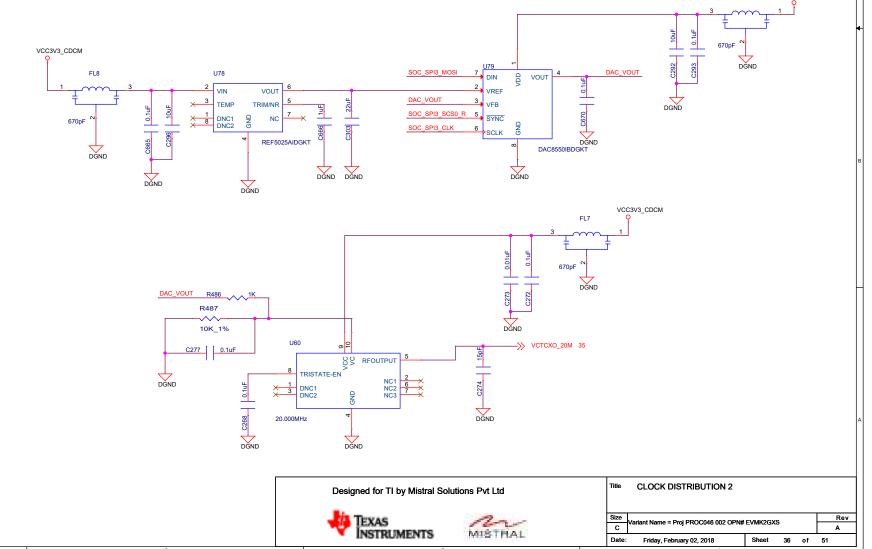
### **GENERATOR - AUDIO CLOCK DOMAIN**

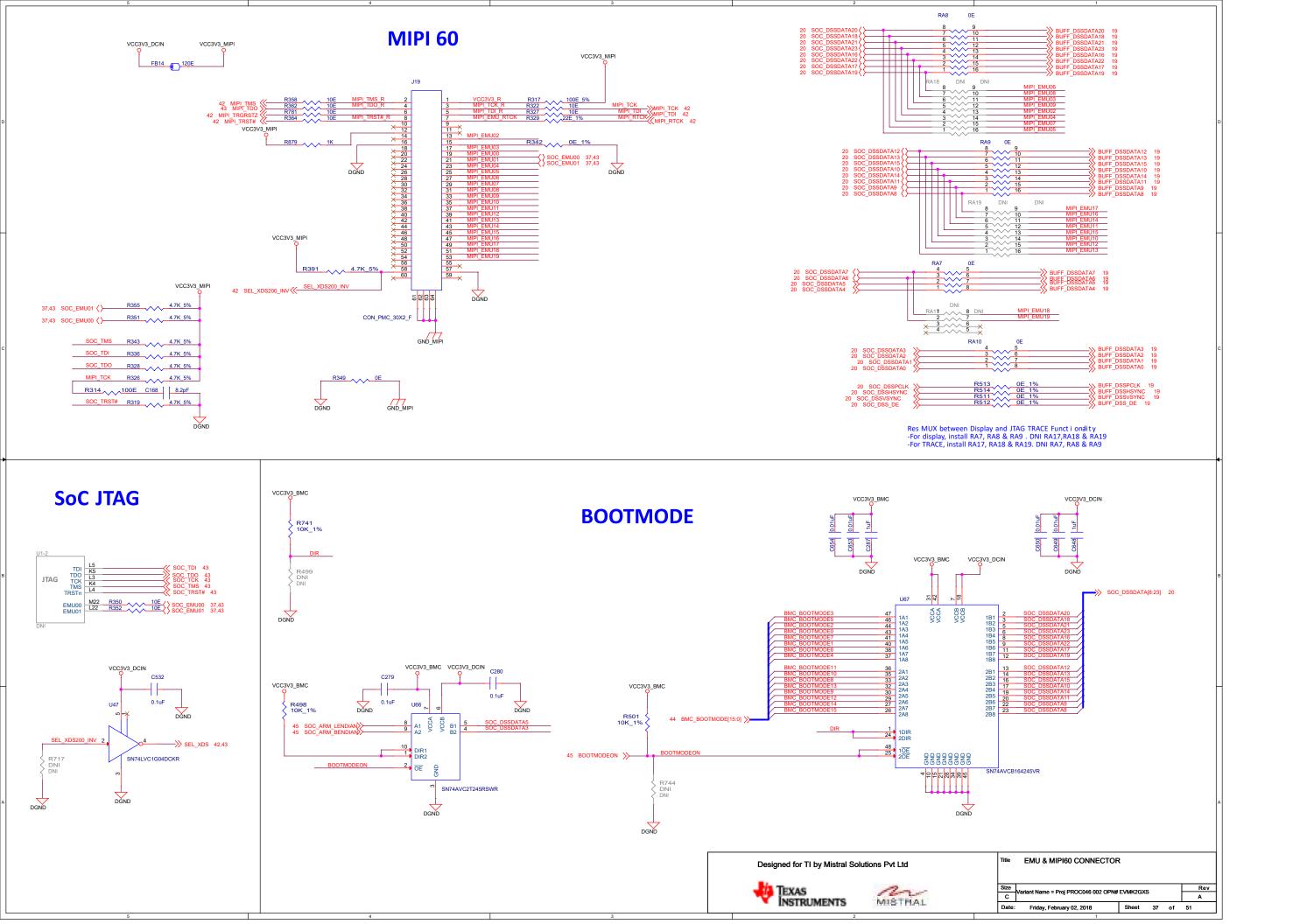


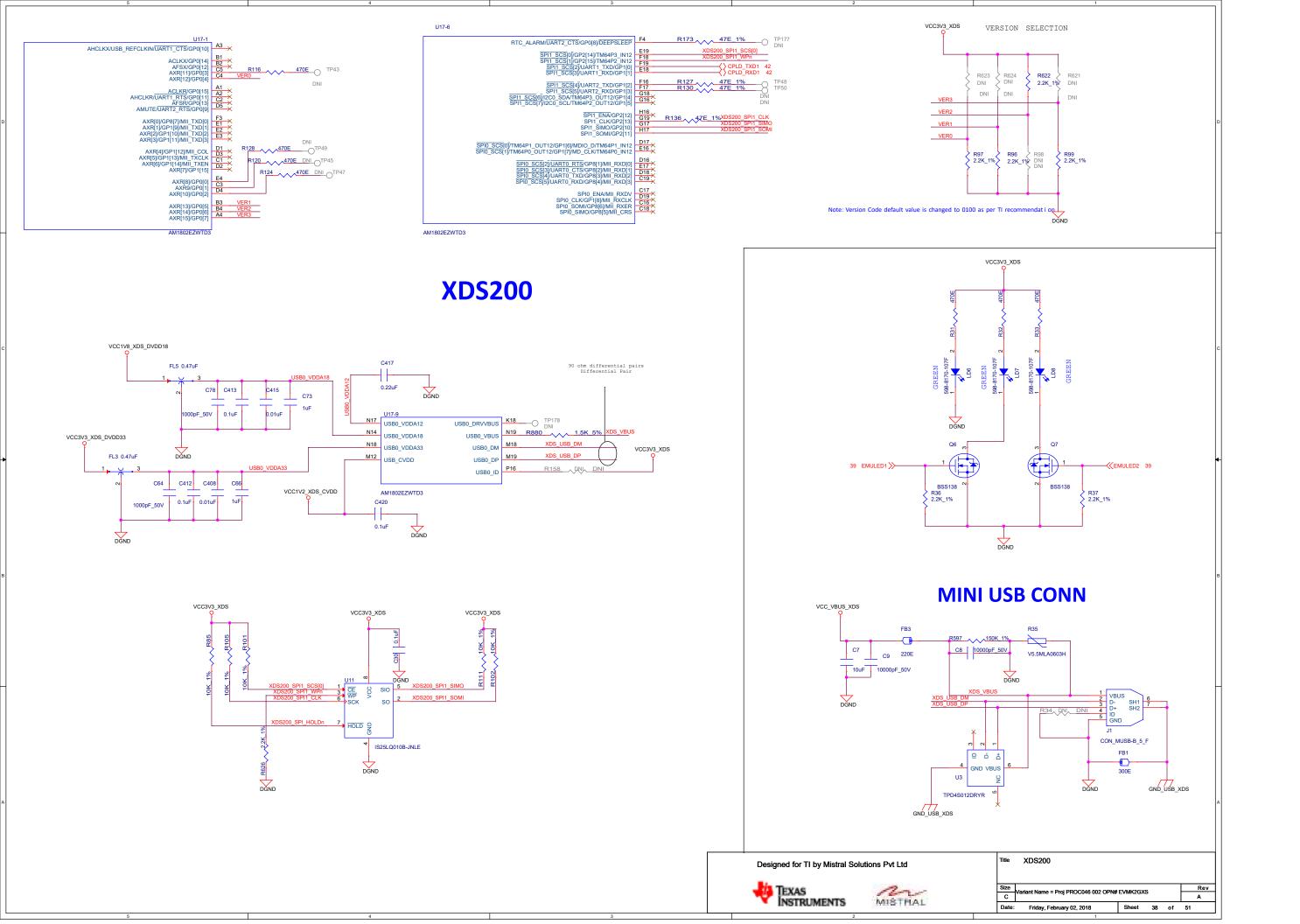
# SoC SPI3

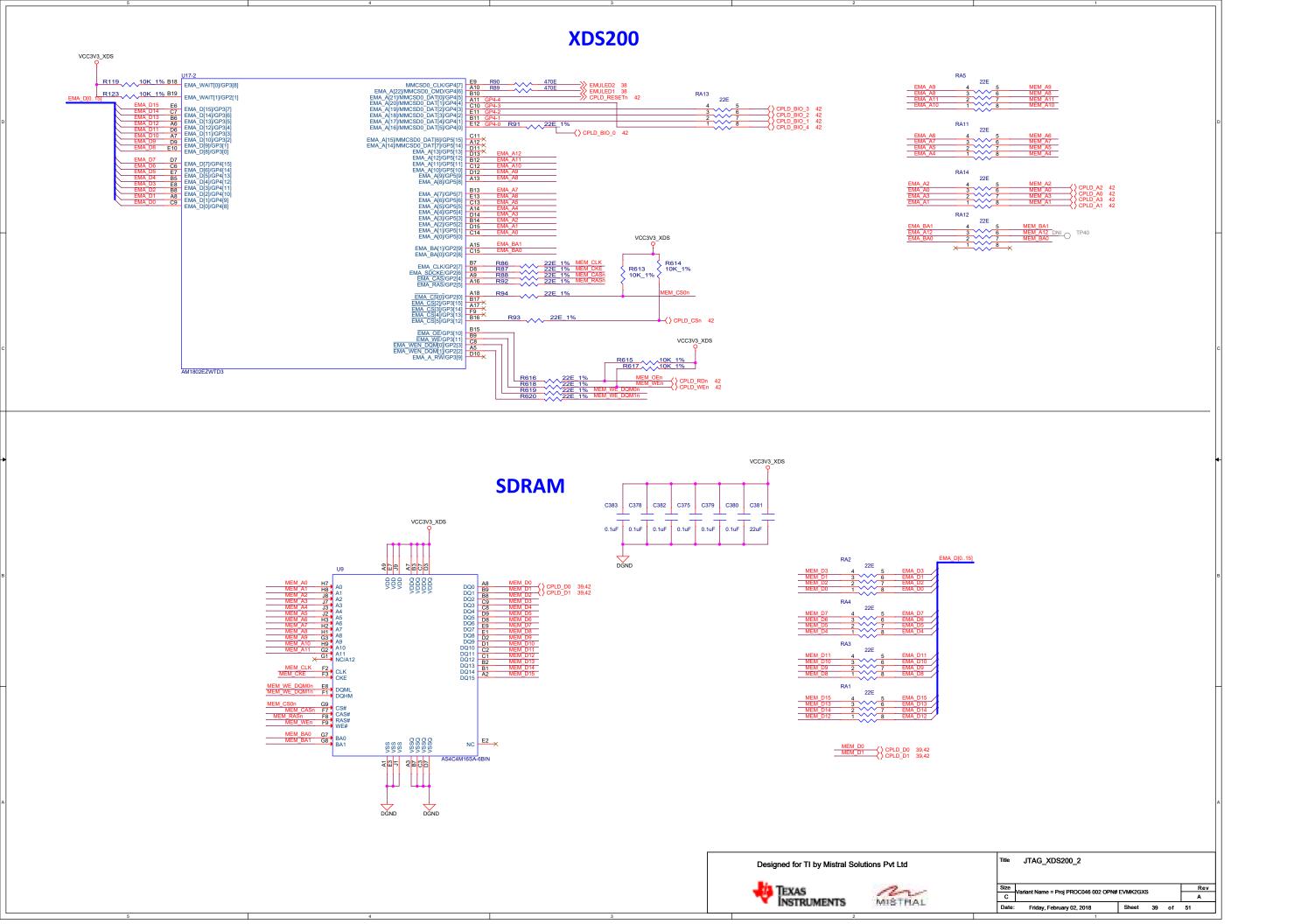


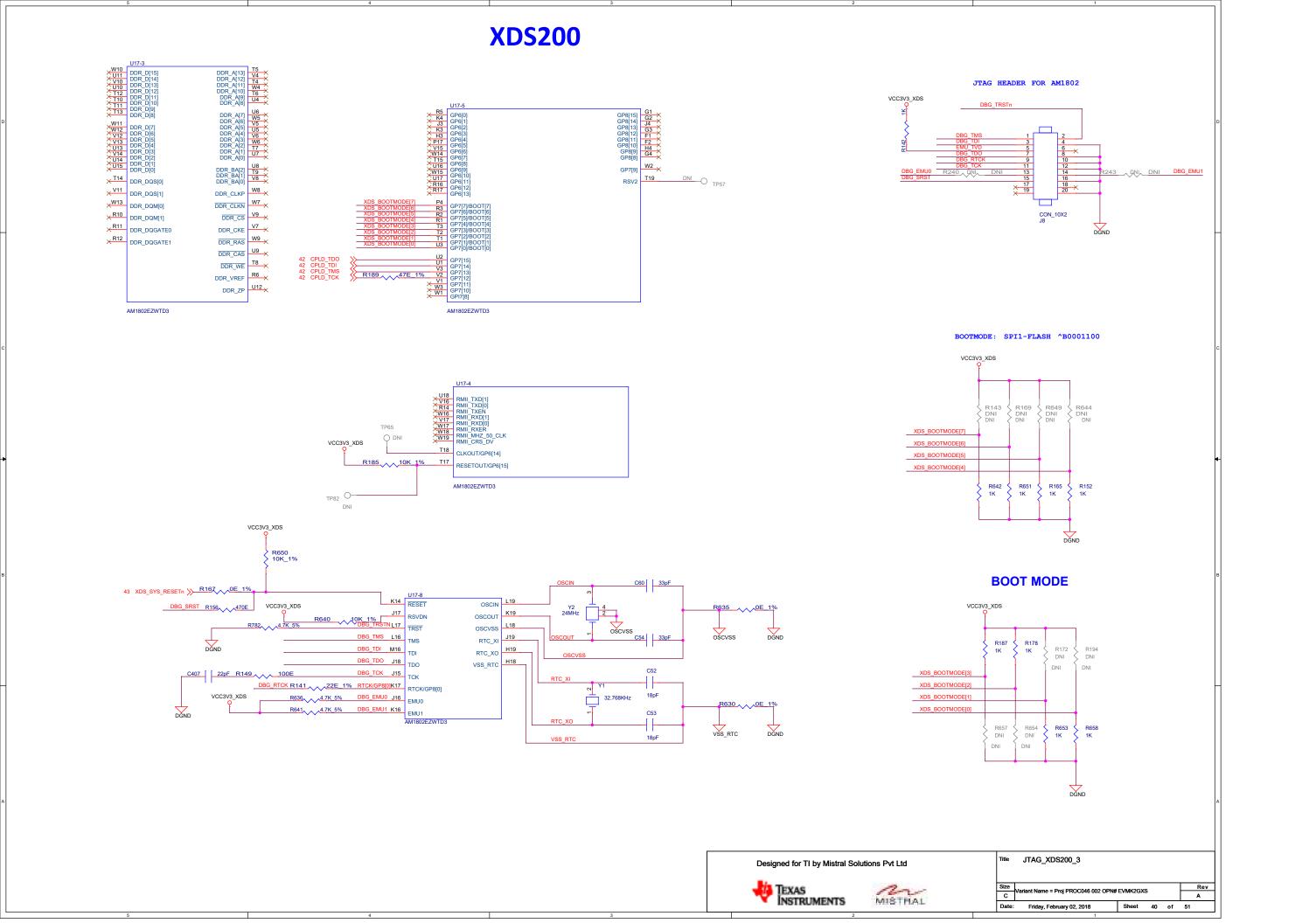
### **AVB CLOCK GENERATOR- 1588 CLOCK DOMAIN**

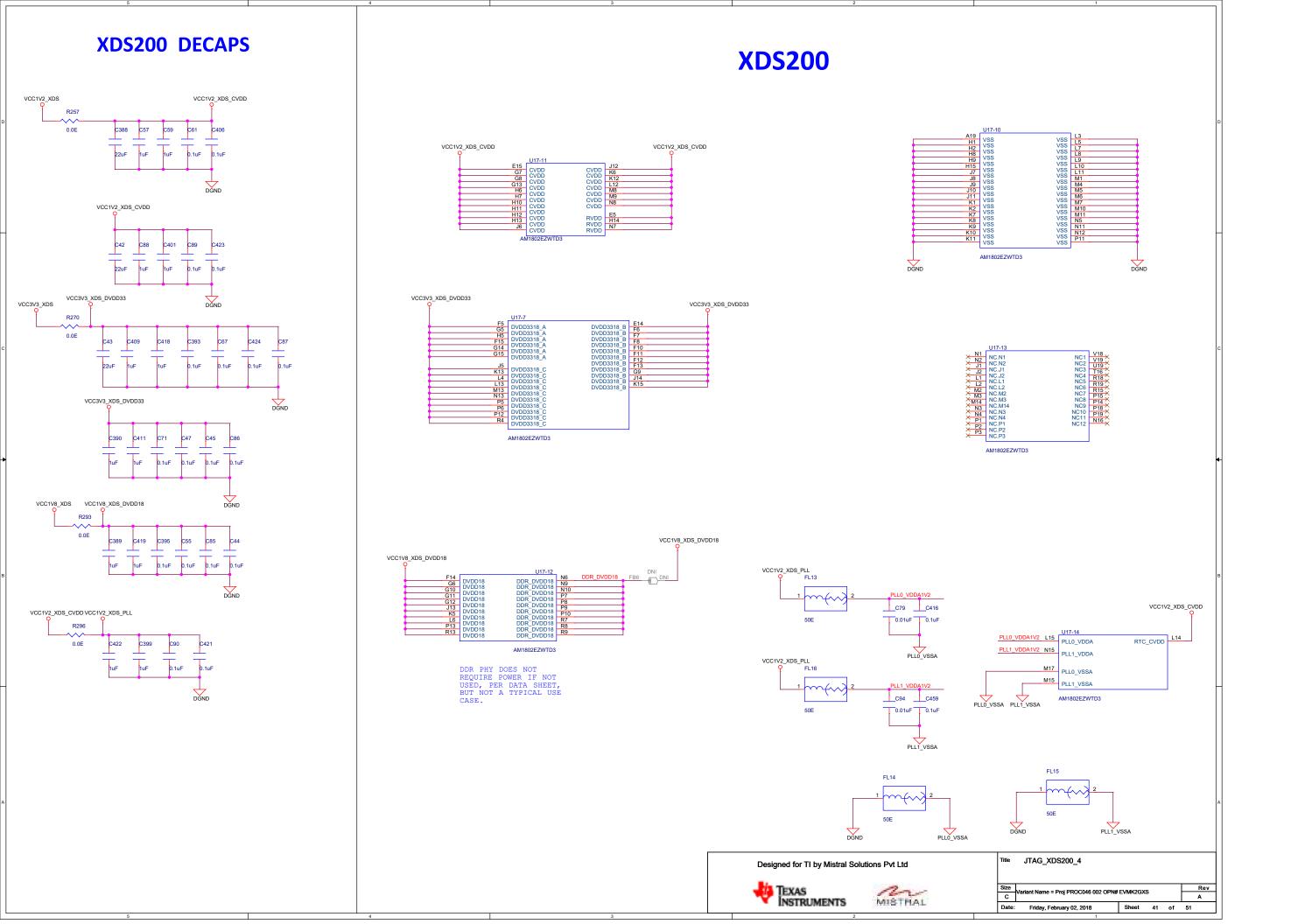


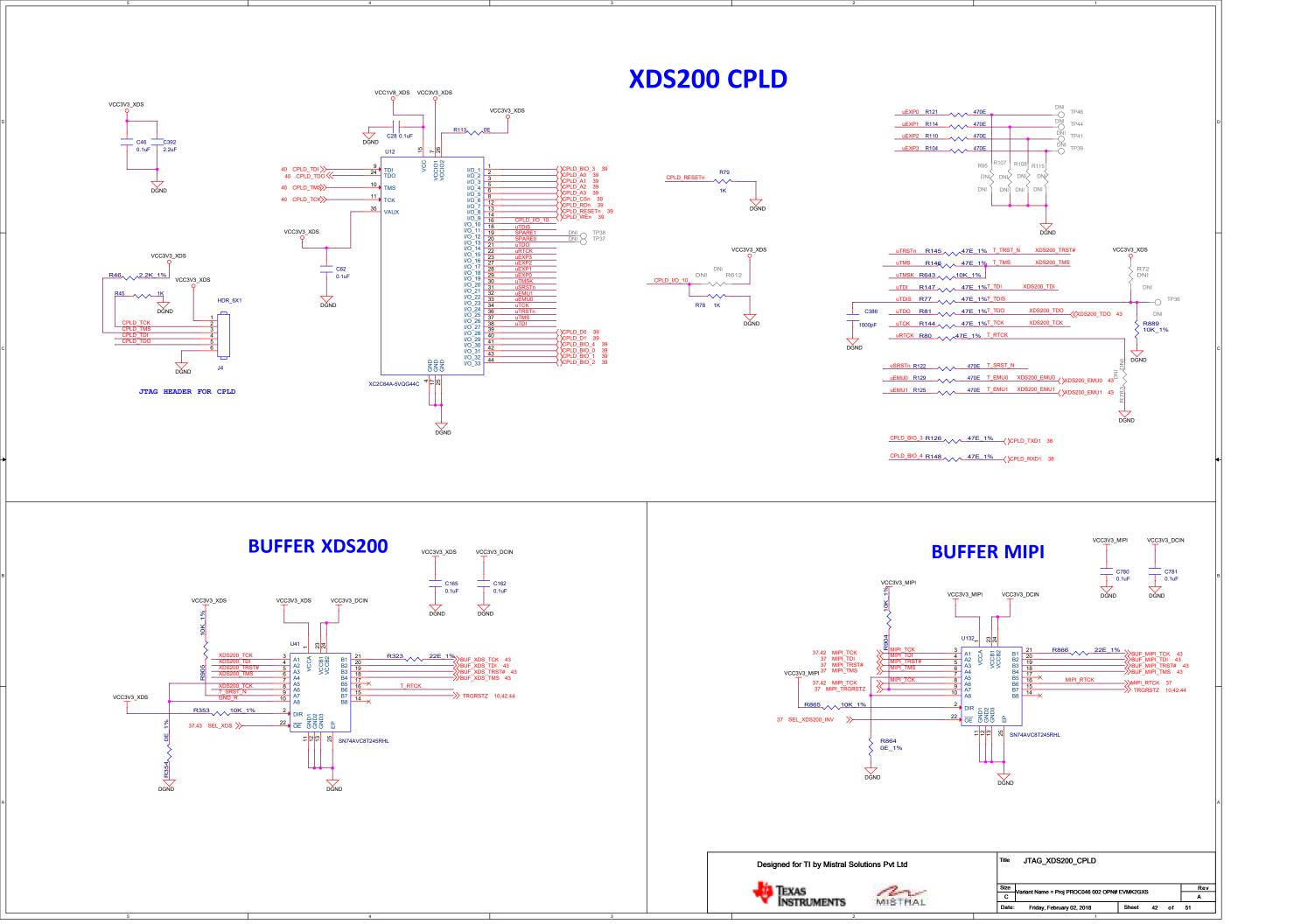


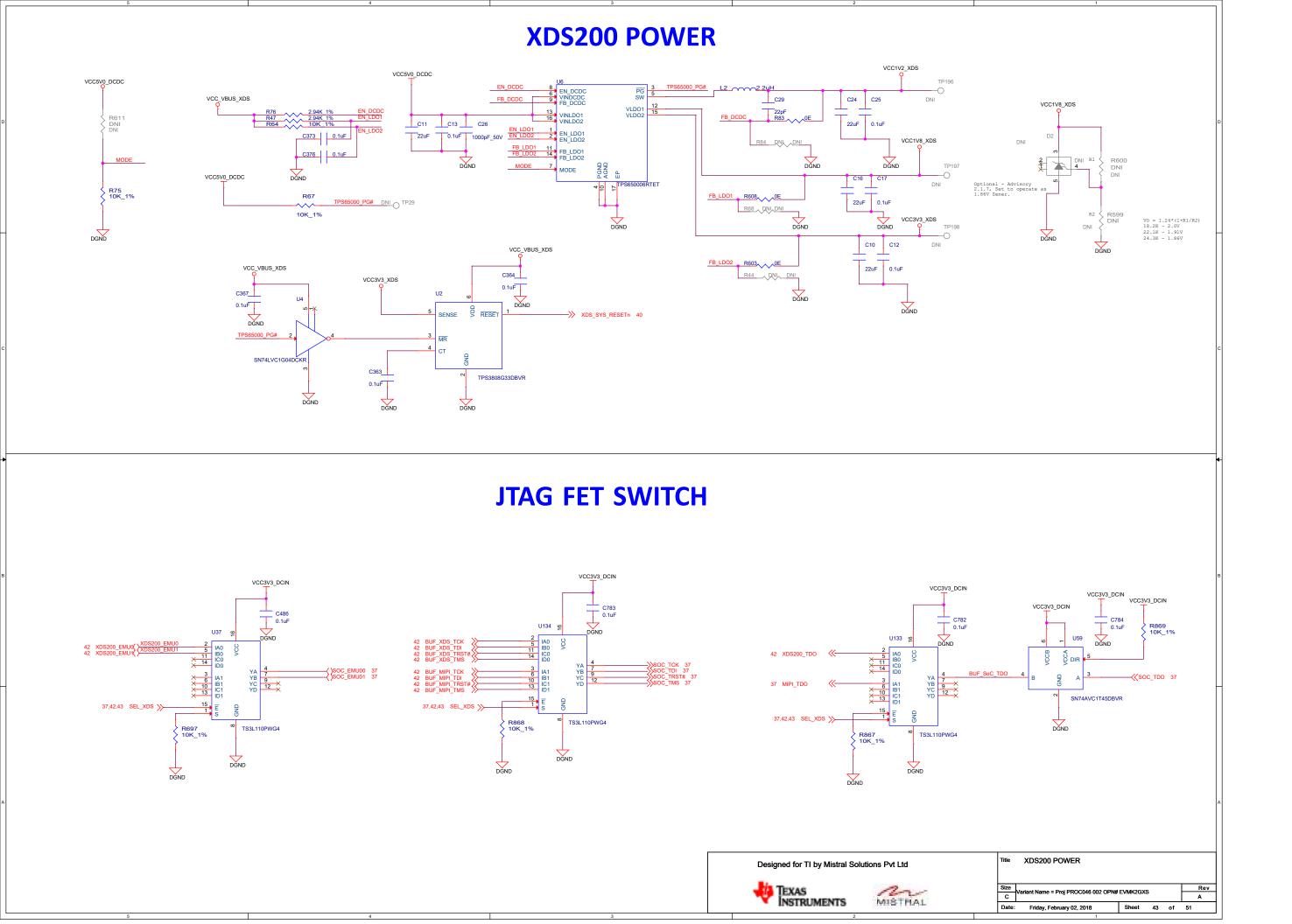


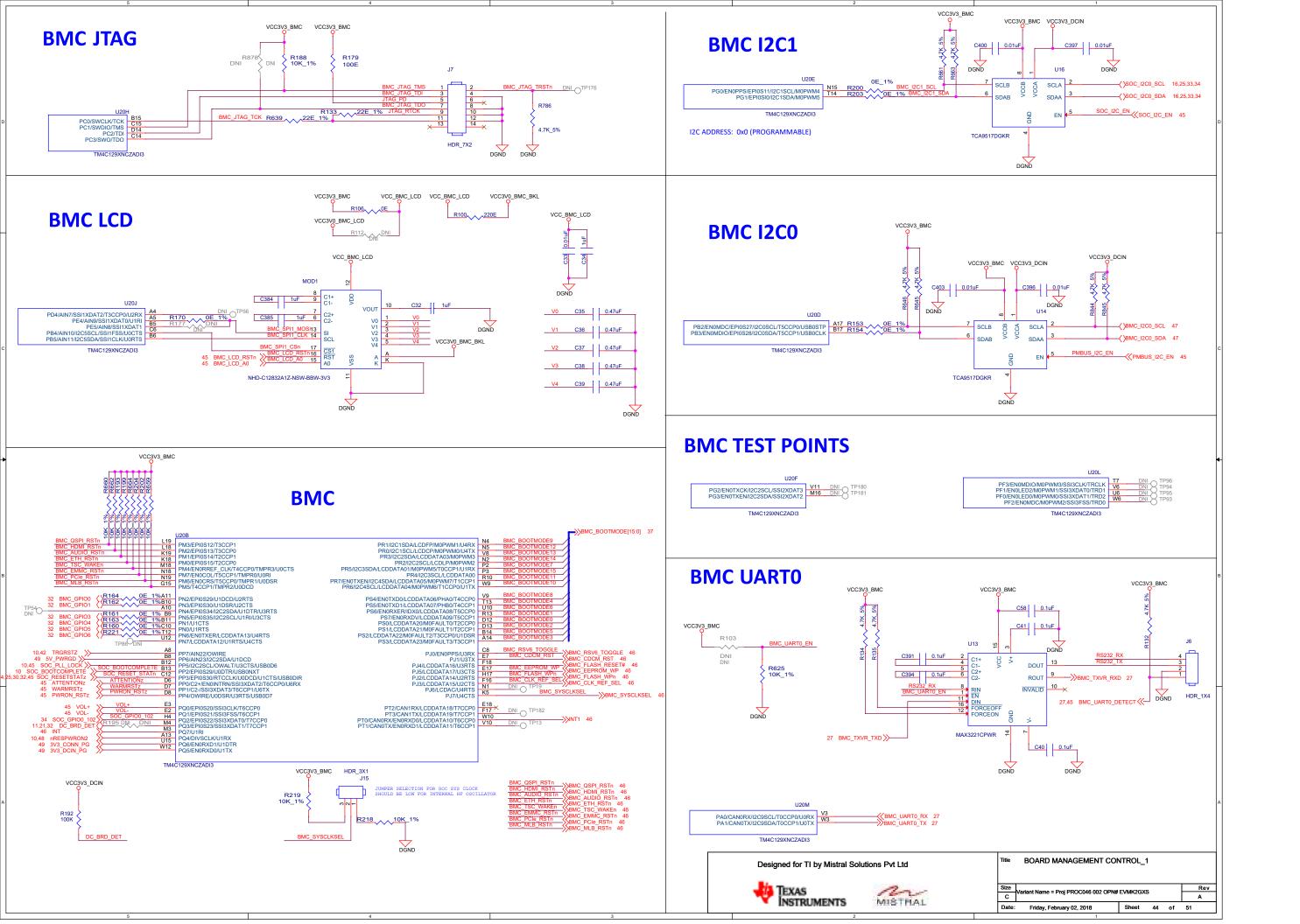


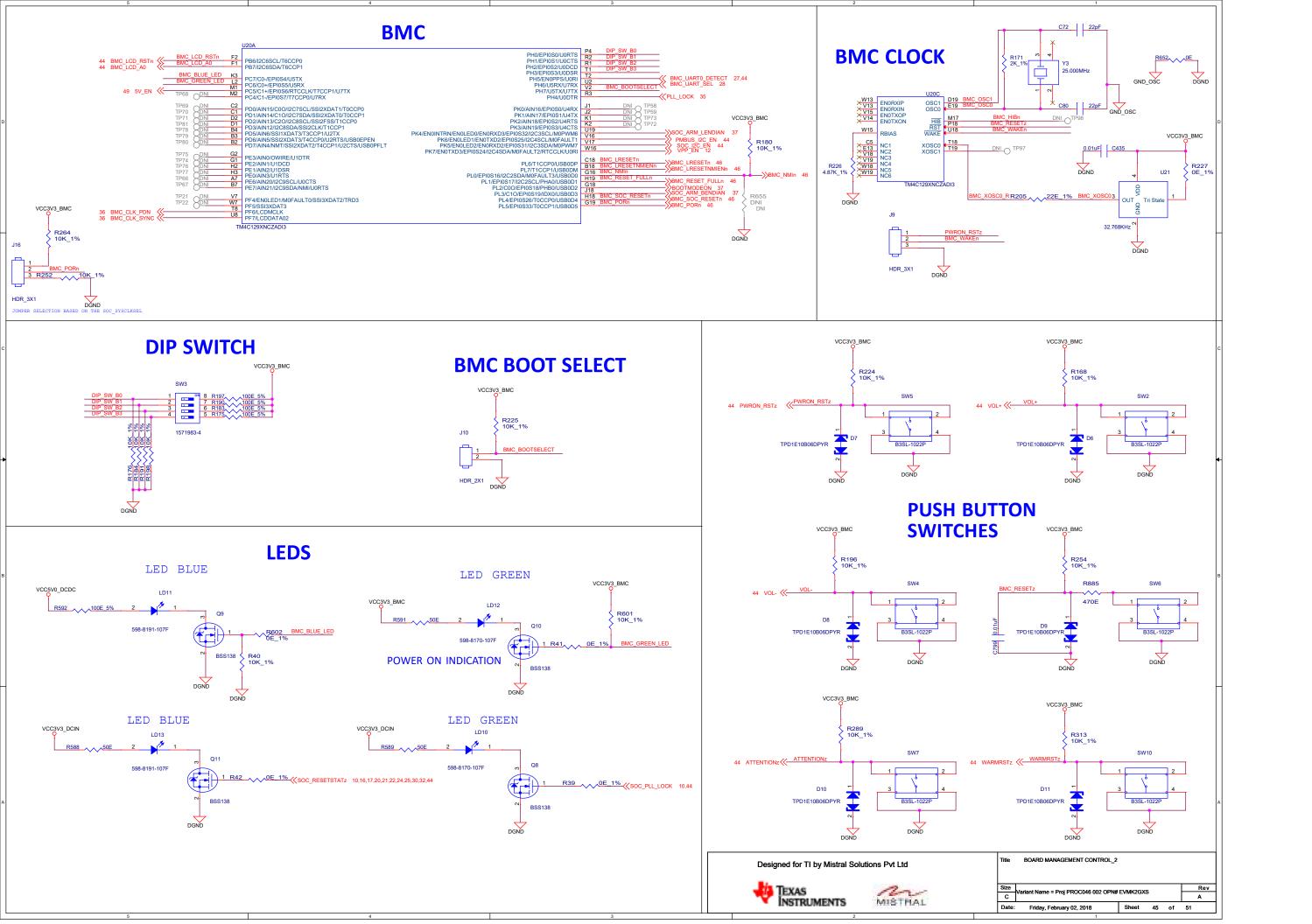


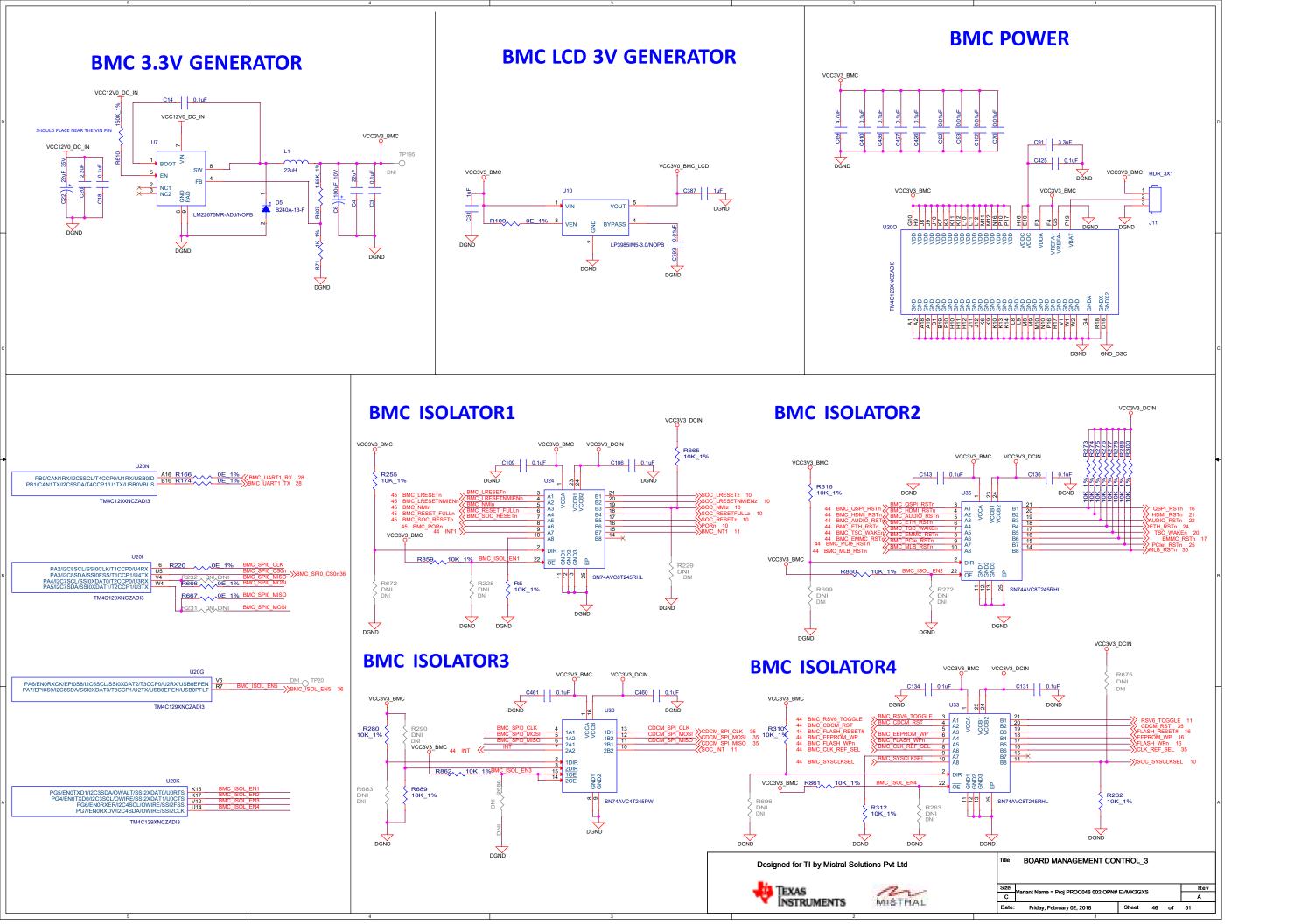


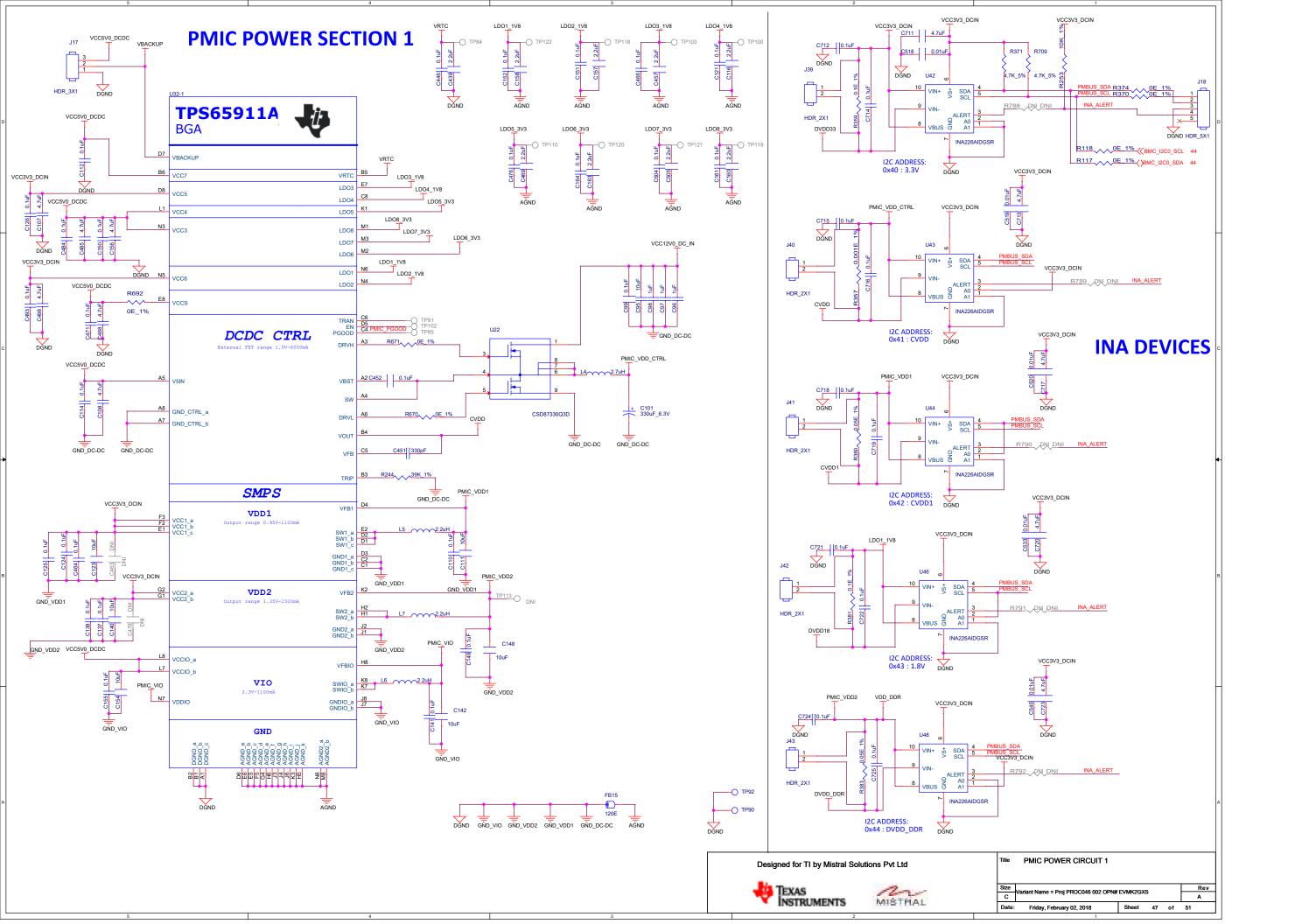




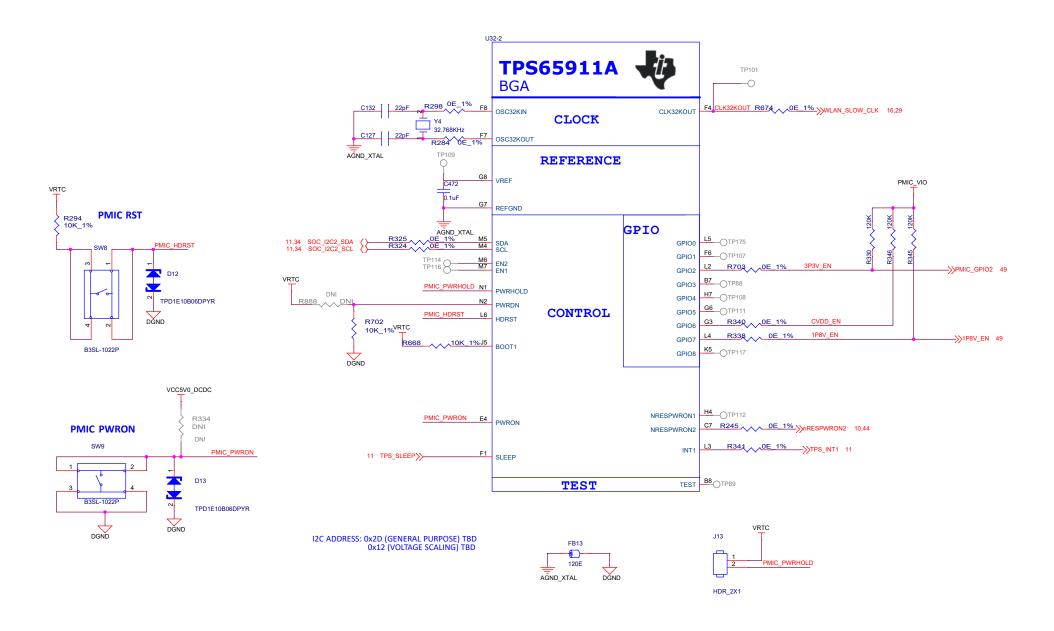


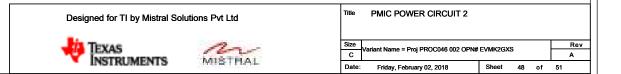


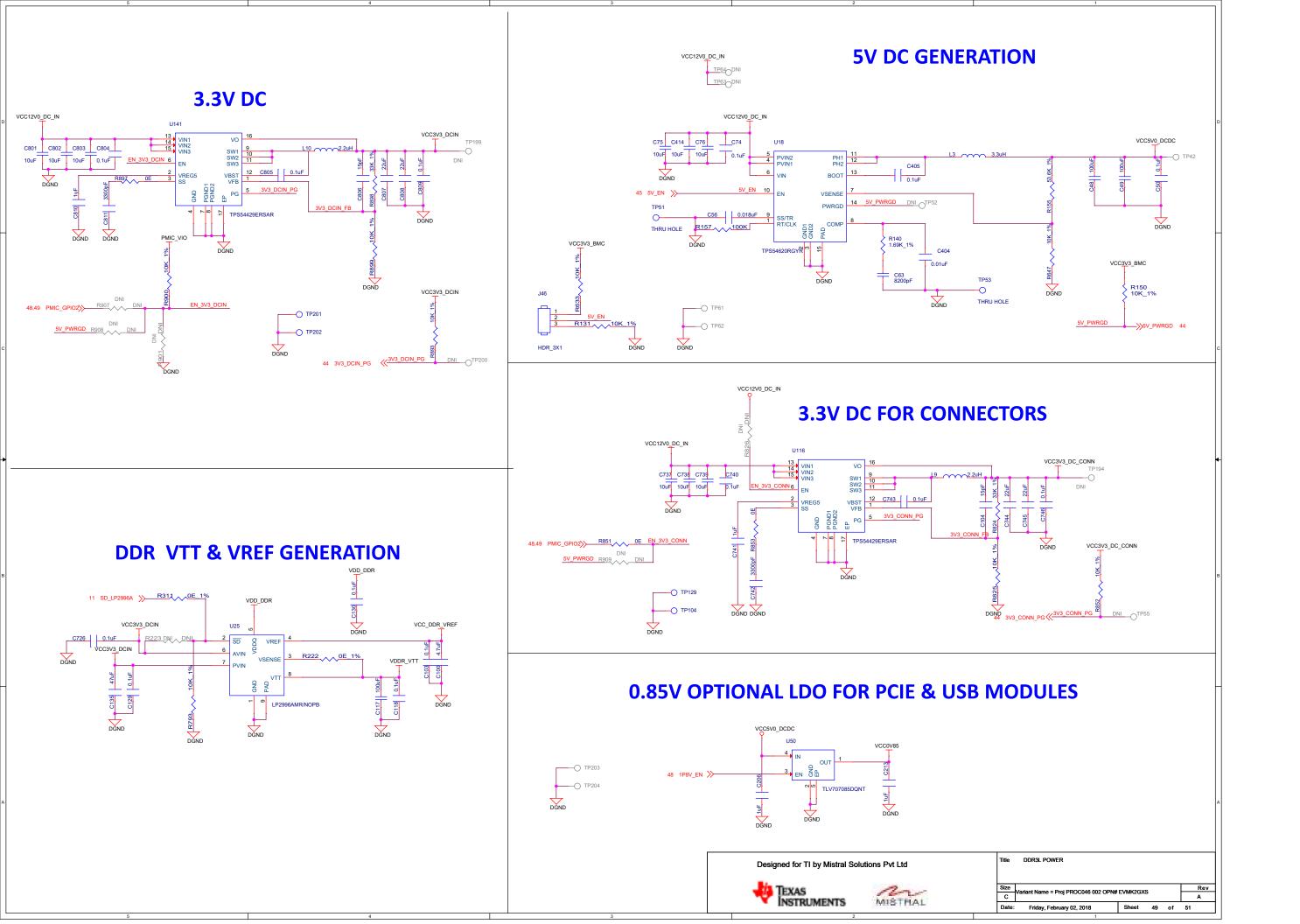




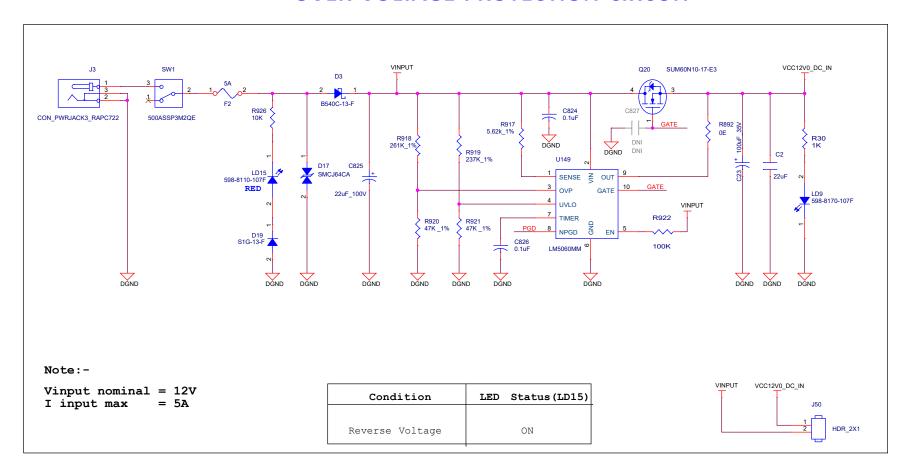
## **PMIC POWER SECTION 2**

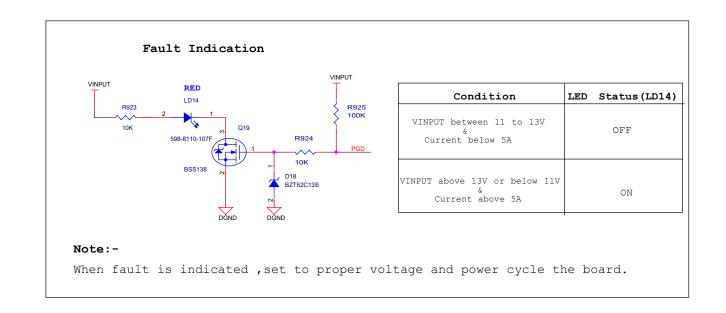


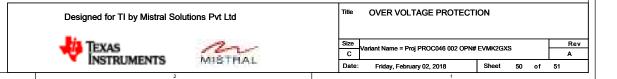


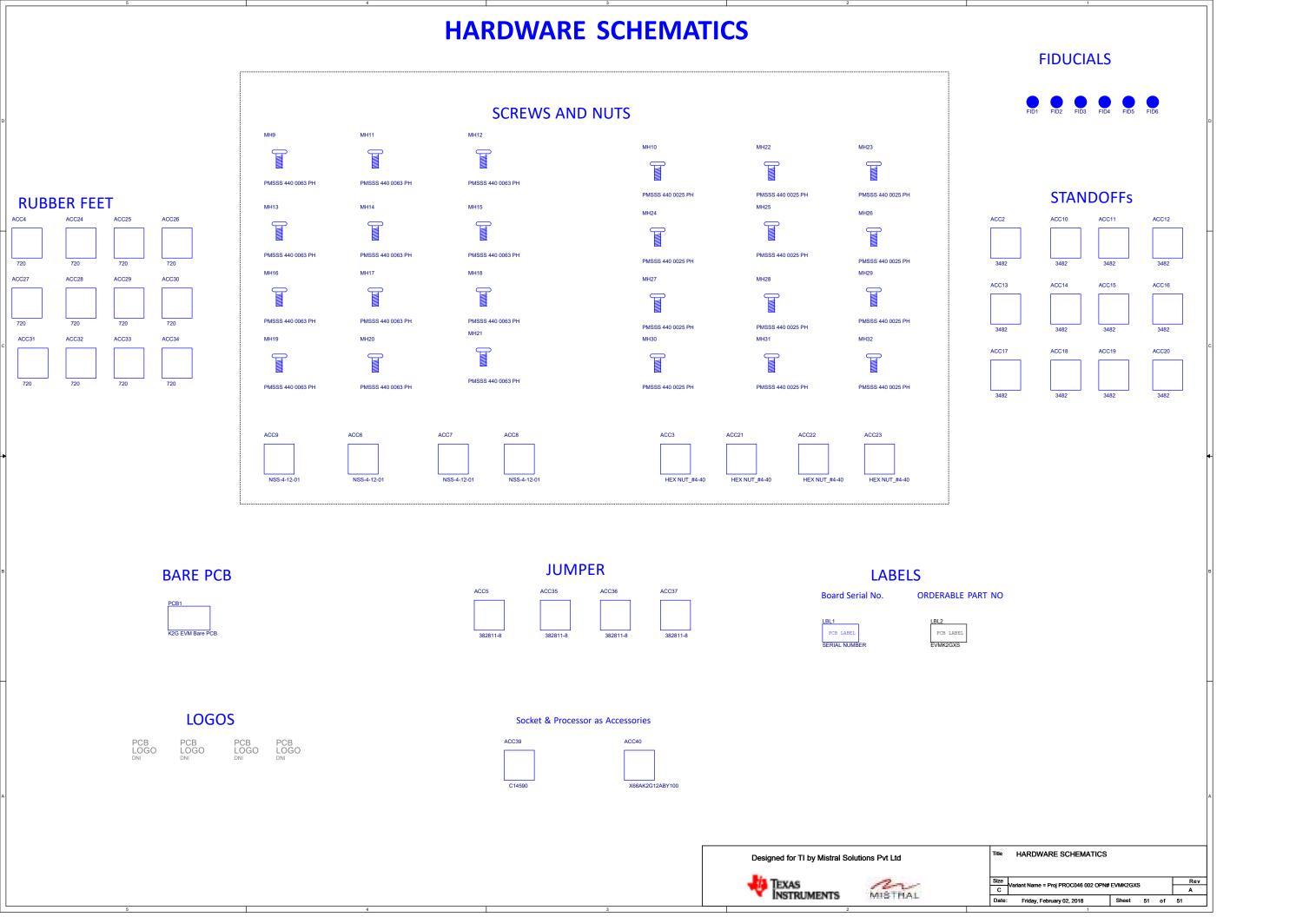


## **OVER VOLTAGE PROTECTION CIRCUIT**









## IMPORTANT NOTICE FOR TI DESIGN INFORMATION AND RESOURCES

Texas Instruments Incorporated ('TI") technical, application or other design advice, services or information, including, but not limited to, reference designs and materials relating to evaluation modules, (collectively, "TI Resources") are intended to assist designers who are developing applications that incorporate TI products; by downloading, accessing or using any particular TI Resource in any way, you (individually or, if you are acting on behalf of a company, your company) agree to use it solely for this purpose and subject to the terms of this Notice.

TI's provision of TI Resources does not expand or otherwise alter TI's applicable published warranties or warranty disclaimers for TI products, and no additional obligations or liabilities arise from TI providing such TI Resources. TI reserves the right to make corrections, enhancements, improvements and other changes to its TI Resources.

You understand and agree that you remain responsible for using your independent analysis, evaluation and judgment in designing your applications and that you have full and exclusive responsibility to assure the safety of your applications and compliance of your applications (and of all TI products used in or for your applications) with all applicable regulations, laws and other applicable requirements. You represent that, with respect to your applications, you have all the necessary expertise to create and implement safeguards that (1) anticipate dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions. You agree that prior to using or distributing any applications that include TI products, you will thoroughly test such applications and the functionality of such TI products as used in such applications. TI has not conducted any testing other than that specifically described in the published documentation for a particular TI Resource.

You are authorized to use, copy and modify any individual TI Resource only in connection with the development of applications that include the TI product(s) identified in such TI Resource. NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT OF TI OR ANY THIRD PARTY IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information regarding or referencing third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of TI Resources may require a license from a third party under the patents or other intellectual property of TI.

TI RESOURCES ARE PROVIDED "AS IS" AND WITH ALL FAULTS. TI DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, REGARDING TI RESOURCES OR USE THEREOF, INCLUDING BUT NOT LIMITED TO ACCURACY OR COMPLETENESS, TITLE, ANY EPIDEMIC FAILURE WARRANTY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY YOU AGAINST ANY CLAIM, INCLUDING BUT NOT LIMITED TO ANY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON ANY COMBINATION OF PRODUCTS EVEN IF DESCRIBED IN TI RESOURCES OR OTHERWISE. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, DIRECT, SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF TI RESOURCES OR USE THEREOF, AND REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

You agree to fully indemnify TI and its representatives against any damages, costs, losses, and/or liabilities arising out of your non-compliance with the terms and provisions of this Notice.

This Notice applies to TI Resources. Additional terms apply to the use and purchase of certain types of materials, TI products and services. These include; without limitation, TI's standard terms for semiconductor products <a href="http://www.ti.com/sc/docs/stdterms.htm">http://www.ti.com/sc/docs/stdterms.htm</a>), evaluation modules, and samples (<a href="http://www.ti.com/sc/docs/sampterms.htm">http://www.ti.com/sc/docs/sampterms.htm</a>).

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265 Copyright © 2018, Texas Instruments Incorporated