LAUNCHXL-F28377S overview

The C2000™ Delfino™ LaunchPad™, LAUNCHXL-F28377S, is a complete low-cost development board for the Texas Instruments Delfino F2837xS devices. The LAUNCHXL-F28377S kit features all the hardware and software necessary to develop applications based on the F2837xS microprocessor. The LaunchPad is based on the superset F28377S device, and easily allows users to migrate to lower cost F2837xS devices once the design needs are known. It offers an on-board JTAG emulation tool allowing direct interface to a PC for easy programming, debugging, and evaluation. In addition to JTAG emulation, the USB interface provides a UART serial connection from the F2837xS device to the host PC.

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Trademarks

1 Introduction

Users can download an unrestricted copy of the latest version of Code Composer Studio™ IDE version 6 to write, download, and debug applications on the LAUNCHXL-F28377S board. The debugger is unobtrusive, allowing the user to run an application at full speed with hardware breakpoints and single stepping available while consuming no extra hardware resources.

As shown in Figure 1, the LAUNCHXL-F28377S C2000 LaunchPad features include:

- USB debugging and programming interface via a high-speed galvanically isolated XDS100v2 debug probe featuring a USB/UART connection
- Superset F28377S device that allows applications to easily migrate to lower cost devices
- Two user LEDs
- Device reset pushbutton
- Easily accessible device pins for debugging purposes or as sockets for adding customized extension boards
- Dual 5V quadrature encoder interfaces
- CAN Interface with integrated transceiver
- Boot selection switches

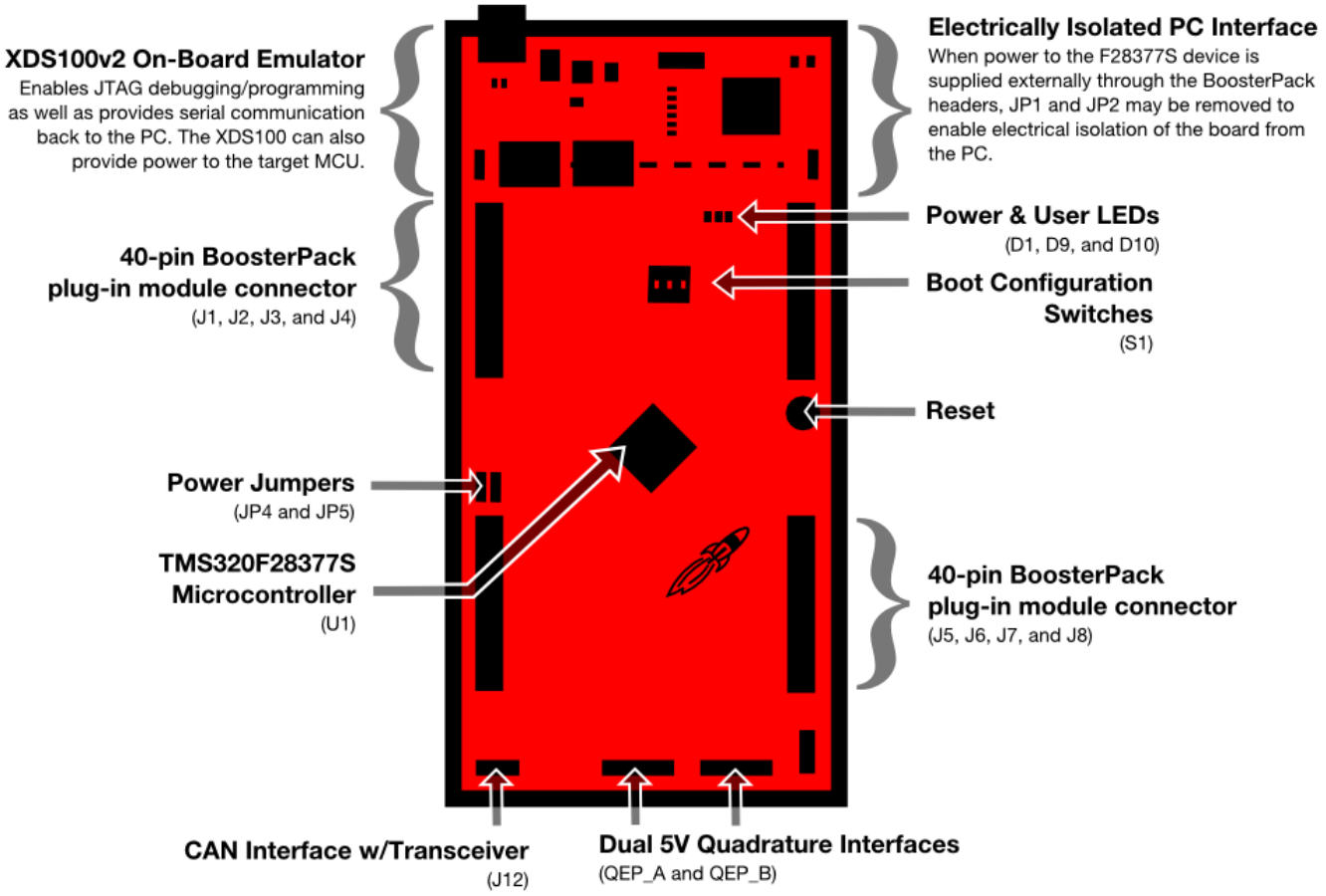

Figure 1. LAUNCHXL-F28377S Board Overview

2 Kit Contents

The LAUNCHXL-F28377S LaunchPad experimenter kit includes the following items:

- C2000 Delfino LaunchPad Board (LAUNCHXL-F28377S)
- Mini USB-B Cable, 0.5m
- Quick Start Guide

2.1 Revisions

The first production revision of the LAUNCHXL-F28377S in 2016 was Revision 1.0.

All Revisions:

- Resistor R7 in the oscillator circuit is incorrectly placed or should not be installed. This resistor may impact startup time or robustness of the clocking circuit over the full operating range of the MCU or different physical layouts of this circuit. The probability is low that this resistor will have any impact on the functionality of this EVM as is not intended to be operated outside of Standard Temperature and Pressure in a lab or prototype environment. Do not use this circuit as reference. Follow the requirements for the Oscillator schematic as documented in the MCU Datasheet.

3 Installation

The F28377S LaunchPad is supported in Code Composer Studio.

3.1 Code Composer Studio

3.1.1 Download the Required Software

Code Composer Studio IDE is available for free without any restriction when used with the XDS100 debug probe on the C2000 LaunchPad. The software can be downloaded from the C2000 LaunchPad page at ti.com/launchpad. At this site, you can also download a copy of controlSUITE that includes drivers, examples, and other support software needed to get started.

3.1.2 Install the Software

Once downloaded, install Code Composer Studio and the controlSUITE package.

3.1.3 Install the Hardware

After Code Composer Studio is installed, plug the supplied USB cable into the C2000 LaunchPad board and into an available USB port on your computer.

Windows® will automatically detect the hardware and ask you to install software drivers. Let Windows run a search for the drivers and automatically install them. After Windows successfully installs the drivers for the integrated XDS100v2 debug probe, your LaunchPad is now ready for use.

4 Getting Started with the LAUNCHXL-F28377S

4.1 Getting Started

The first time the LAUNCHXL-F28377S is used, a demo application automatically starts when the board is powered from a USB host. If your board does not start the demo application, try placing S1 in the following positions and resetting the board: UP - UP - DOWN. To start the demo, connect the LAUNCHXL-F28377S with the included mini-USB cable to a free USB port. The demo application starts with the LEDs flashing to show the device is active.

4.2 Demo Application, ADC Sampling

The LAUNCHXL-F28377S includes a pre-programmed TMS320F28377S device. When the LaunchPad is connected via USB, the demo starts with an LED flash sequence. After a few seconds the device switches into an ADC sample mode.

Each second the ADC is sampled and the sample data is relayed to you. If the sample is above mid-scale (2048), the red LED will light. However, if the sample is below mid-scale the blue LED will light.

In addition to the LED display, sample information is also displayed on your PC through the USB/UART connection. To view the UART information on your PC, first figure out the COM port associated with the LaunchPad. To do this in Windows, right click on *My Computer* and click on *Properties*. In the dialog box that appears, click on the Hardware tab and open *Device Manager*. Look for an entry under Ports (COM & LPT) titled "USB Serial Port (COMX)", where X is a number. Remember this number for when you open a serial terminal. The demo applications UART data was written and debugged using PuTTY, and for the best user experience we recommend you use PuTTY to view the UART data. PuTTY can be downloaded from the following URL:

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

Open your serial terminal program and open the COM port you found previously in device manager with the following settings: 115200 Baud, 8 data bits, no parity, 1 stop bit. After opening the serial port in your serial terminal, reset the Launchpad with the reset push button and observe the serial terminal for a surprise.

4.3 Program and Debug the ADC Sample Demo Application

The project and associated source code for the C2000 Delfino LaunchPad demo is included in the controlSUITE software package and should automatically be found by the TI Resource Explorer in Code Composer Studio v6. In the resource explorer, open the controlSUITE folder and then the Development Tools entry and look for the C2000 LaunchPad line item. Expand this item and LAUNCHXL-F28377S, then select the LaunchPad Demo Application. Follow the steps in the main pane of the resource explorer to import, build, debug, and run this application.

4.4 Using other Examples

Including the LaunchPad demo example described above, controlSUITE provides many examples demonstrating a majority of the features of the F2837x MCU. Most examples are configured by default to use the other hardware which has a different on-board clocking circuit. As such, some examples may not work as intended without minor modification. To make this easier on the designer, compiler switch has been added to automatically pick the proper clock configuration based on adding "_LAUNCHXL_F28377S" as a predefined symbol in the project properties. Refer to for more information on how and where to define this symbol.

5 Hardware Configuration

The F28377S LaunchPad provides users with several options on how to configure the board.

5.1 ADC Resolution

While the F28377S device has a 16 bit ADC, this development kit has been designed to use the ADC in its 12-bit mode. The user can use the ADC in its 16-bit mode by driving the proper differential signals into the ADC. Performance will not be on par with the data sheet [1] due to the reference circuitry being designed to match the ADC's 12-bit mode.

5.2 Power Domain

The F28377S LaunchPad has several different power domains to enable JTAG isolation. Jumpers JP1, JP2, JP4, and JP5 configure where power is passed.

Jumper	Power Domain
JP1	Enable 3.3 V from USB (disables isolation)
JP2	Enable GND from USB (disables isolation)
JP4	Connects target MCU 3.3 V to second set of BoosterPack headers
JP5	Connects target MCU 5 V to second set of BoosterPack headers

5.3 Boot Mode Selection

The LaunchPad's F28377S device includes a boot ROM that performs some basic start-up checks and allows for the device to boot in many different ways. Most users will either want to perform an emulation boot or a boot to flash (if they are running the application standalone). S1 has been provided to allow users to easily configure the pins that the bootROM checks to make this decision. The switches on S1 correspond to:

Switch	Function
1	GPIO84
2	GPIO72
3	TRSTn

Keep in mind that the debugger does not connect if the device is not in the emulation boot mode (TRST switch in the up position). More information about boot mode selection can be found in the *Boot ROM* section of the *TMS320F2837xS Delfino Microcontrollers Technical Reference Manual* (SPRUHX5).

5.4 Connecting a BoosterPack

The F28377S LaunchPad is the perfect experimenter board to start hardware development with the F2837xS devices. All of the connectors are aligned in a 0.1-in (2.54-mm) grid to allow easy and inexpensive development of add on boards called BoosterPacks. These satellite boards can access all of the GPIO and analog signals. The the pin out of the connectors can be found in Section 5.

5.5 Device Migration Path

Applications developed on the LAUNCHXL-F28377S can easily be migrated to any of these lower cost devices in the F2837xS family:

Part Number	Description
TMS320F28377S	32 Bit Real Time Microcontroller, 200 Mhz, 1024KB Flash, 164KB RAM, 16 Bit ADC
TMS320F28376S	32 Bit Real Time Microcontroller, 200 Mhz, 512KB Flash, 132KB RAM, 16 Bit ADC
TMS320F28375S	32 Bit Real Time Microcontroller, 200 Mhz, 1024KB Flash, 164KB RAM, 12 Bit ADC
TMS320F28374S	32 Bit Real Time Microcontroller, 200 Mhz, 512KB Flash, 132KB RAM, 12 Bit ADC

6 LAUNCHXL-F28377S Hardware

6.1 Device Pin Out

..Table 1 through Table 4 lists the pin out and pin mux options for the C2000 LaunchPad. Additional muxing options are available and can be found in the *TMS320F2837xS Delfino Microcontrollers Data Manual* (SPRS881).

Table 1. F28377S LaunchPad Pin Out and Pin Mux Options - J1, J3

Mux Value				J1 Pin	J3 Pin	Mux Value			
3	2	1	0			0	1	2	3
			+3.3 V	1	21	+5 V			
	EM1D13		GPIO71	2	22	GND			
EM1DQM2	EM1A17		GPIO90	3	23	ADCIN14			
EM1DQM1	EM1A16		GPIO89	4	24	ADCINB1			
	EM1A3		GPIO41	5	25	ADCINB4			
			NC	6	26	ADCINB2			
EM2D8	EM1D24	MCLKRB	GPIO60	7	27	ADCINA0			
EM2D7	EM1D23	MFSRB	GPIO61	8	28	ADCINB0			
			GPIO43	9	29	ADCINA1			
			GPIO42	10	30	NC			

Table 2. F28377S LaunchPad Pin Out and Pin Mux Options - J4, J2

Mux Value				J4 Pin	J2 Pin	Mux Value			
3	2	1	0			0	1	2	3
MDXB	CANTXB	EPWM7A	GPIO12	40	20	GND			
MDRB	CANRXB	EPWM7B	GPIO13	39	19	GPIO4	EPWM3A		
MCLKXB	SCITXDB	EPWM8A	GPIO14	38	18	GPIO62	SCIRXDC	EM1D22	EM2D6
MFSXB	SCIRXDB	EPWM8B	GPIO15	37	17	NC			
OUTPUTXBAR7	CANTXB	SPISIMOA	GPIO16	36	16	RESET#			
OUTPUTXBAR8	CANRXB	SPISOMIA	GPIO17	35	15	GPIO58	MCLKRA	EM1D26	EM2D10
CANTXB	MDXA	EQEP1A	GPIO20	34	14	GPIO59	MFSRA	EM1D25	EM2D9
CANRXB	MDRA	EQEP1B	GPIO21	33	13	GPIO72		EM1D12	
			DAC1	32	12	GPIO73		EM1D11	XCLKOUT
			DAC2	31	11	GPIO78		EM1D6	

Table 3. F28377S LaunchPad Pin Out and Pin Mux Options - J5, J7

Mux Value				J5 Pin	J7 Pin	Mux Value			
3	2	1	0			0	1	2	3
			+3.3V	41	61	+5V			
			NC	42	62	GND			
EM1RAS	EM1A14		GPIO87	43	63	ADCIN15			
EM1CAS	EM1A13		GPIO86	44	64	ADCINA2			
			NC	45	65	ADCINA5			
			NC	46	66	ADCINB5			
	EM1D19		GPIO65	47	67	ADCINA3			
			NC	48	68	ADCINB3			
	EM1D15		GPIO69	49	69	ADCINA4			
	EM1D18		GPIO66	50	70	NC			

Table 4. F28377S LaunchPad Pin Out and Pin Mux Options - J8, J6

Mux Value				J8 Pin	J6 Pin	Mux Value			
3	2	1	0			0	1	2	3
		EPWM2A	GPIO2	80	60	GND			
		EPWM2B	GPIO3	79	59	GPIO91		EM1A18	EEM1DQM3
ADCSOCB0	CANRXB	EPWM6A	GPIO10	78	58	NC			
OUTPUTXBAR7	SCIRXDB	EPWM6B	GPIO11	77	57	NC			
CANRXA	SCITXDB	SPICLKA	GPIO18	76	56	RESET#			
CANTXA	SCIRXDB	SPISTEA	GPIO19	75	55	GPIO63	SCITXDC	EM1D21	EM2D5
			NC	74	54	GPIO64		EM1D20	EM2D4
			NC	73	53	GPIO99			EM2A1
			DAC3	72	52	GPIO92		EM1A19	EM1BA1
			DAC4	71	51	NC			

6.2 Schematics

Figure 2 shows the F28377S LaunchPad schematic.

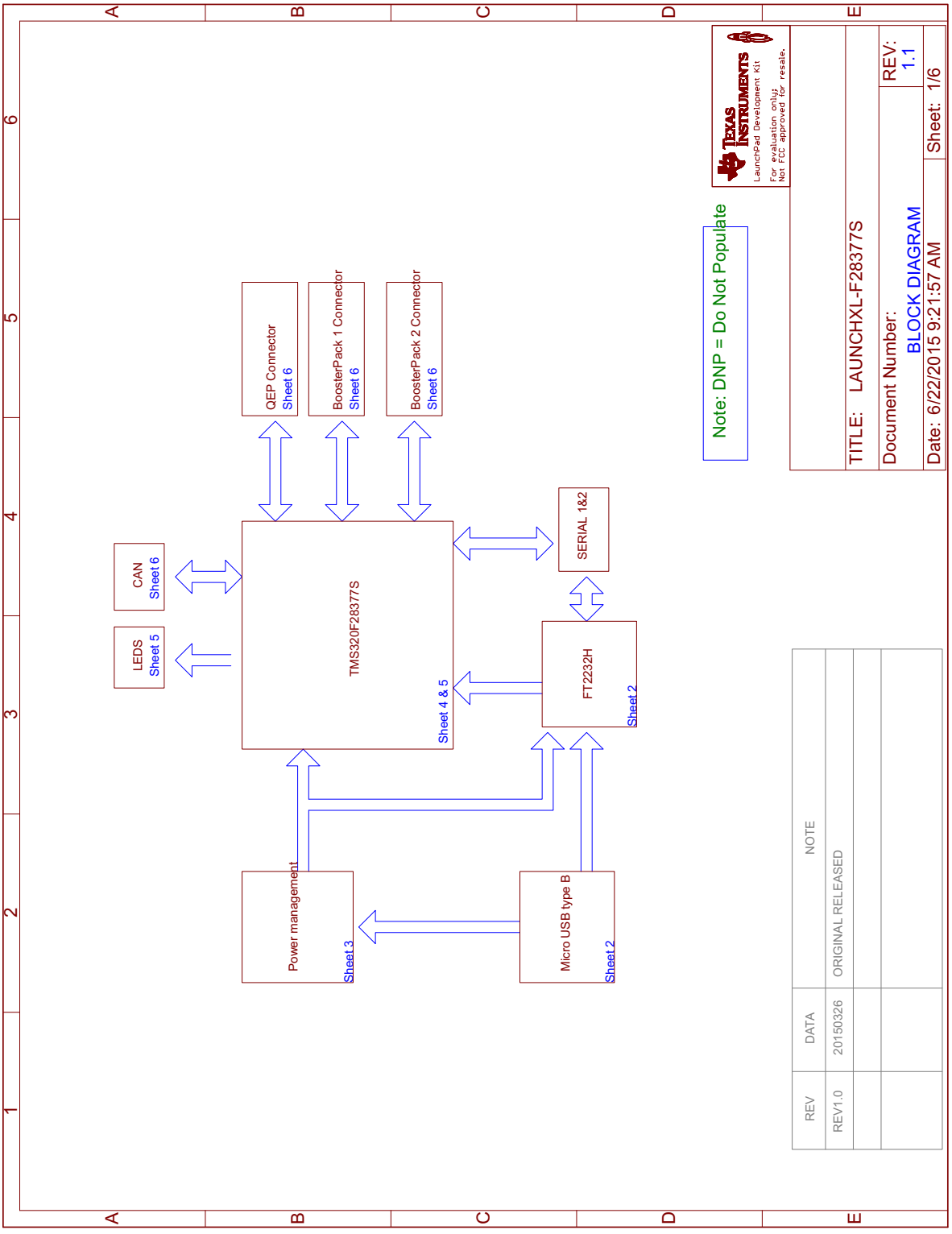

Figure 2. LAUNCHXL-F28377S_B Block Diagram Schematic

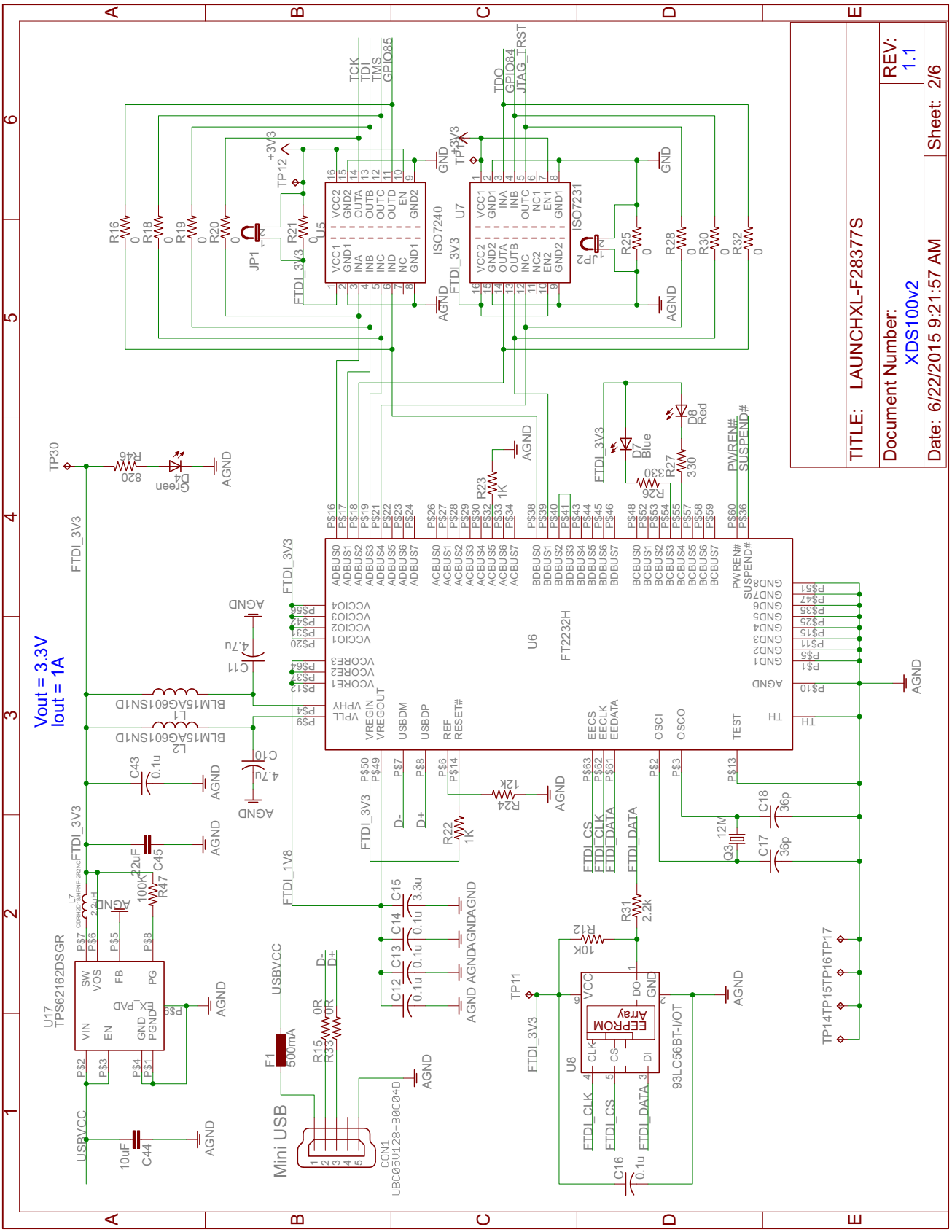

Figure 3. LAUNCHXL-F28377S XDS100v2 Schematic

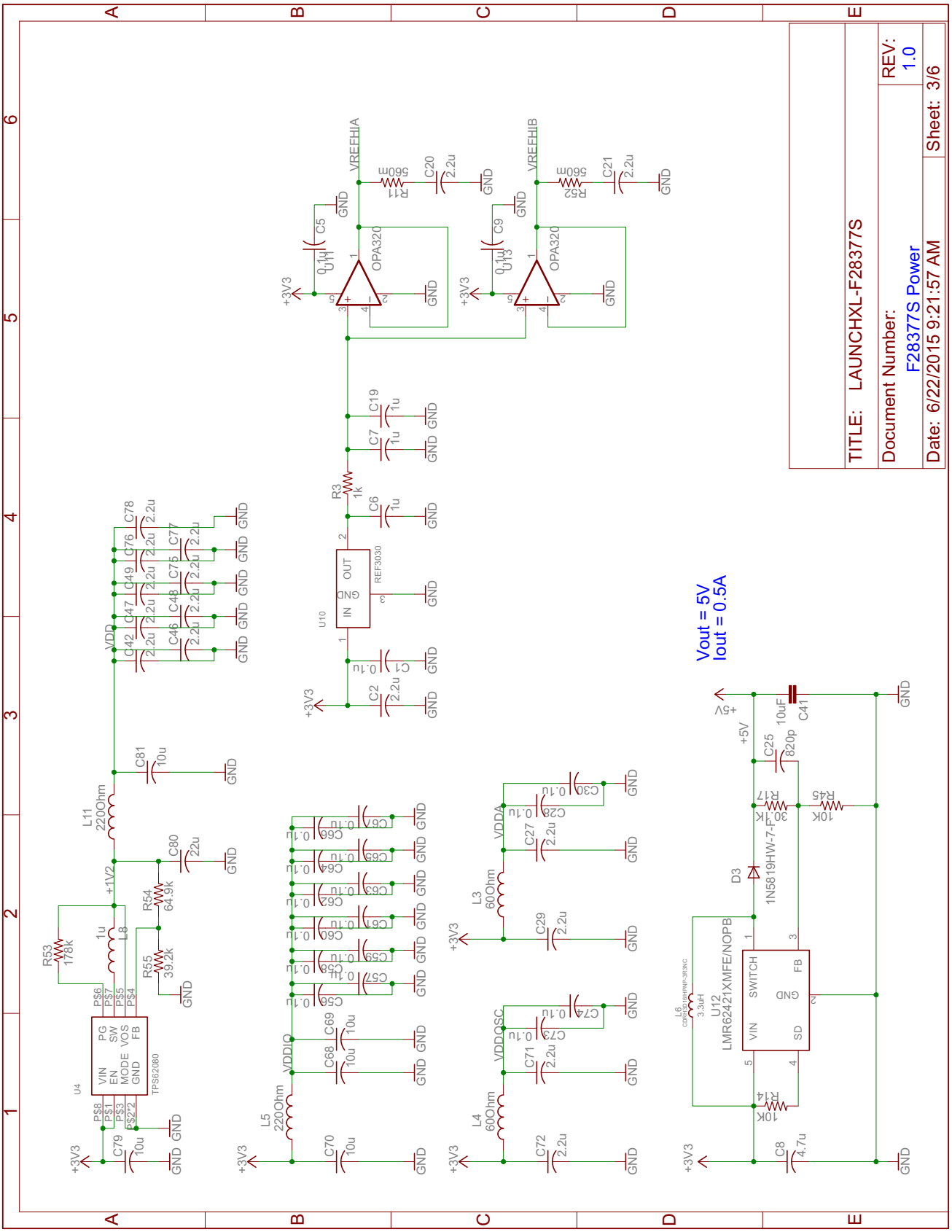

Figure 4. LAUNCHXL-F28377S Power Schematic

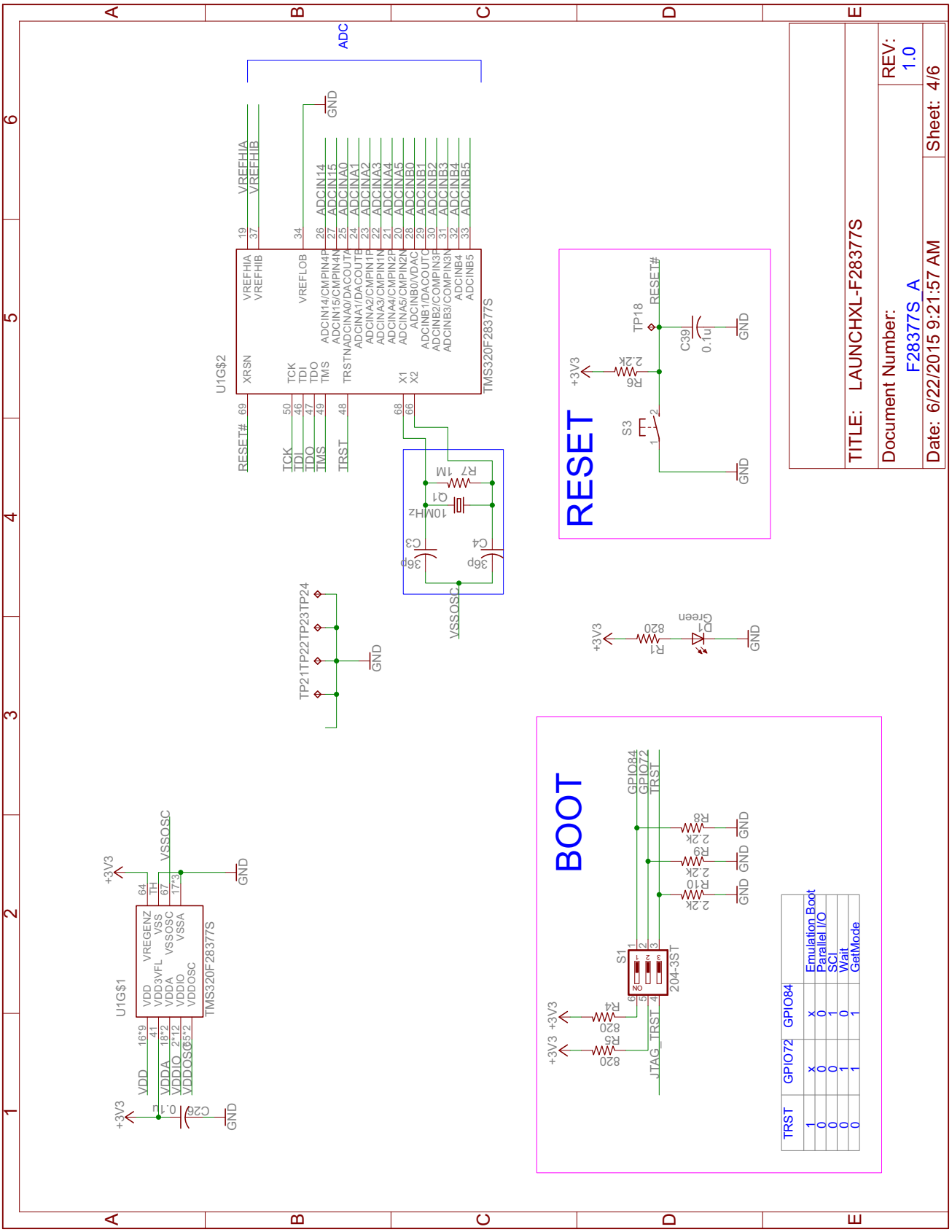

Figure 5. LAUNCHXL-F28377S_A Schematic

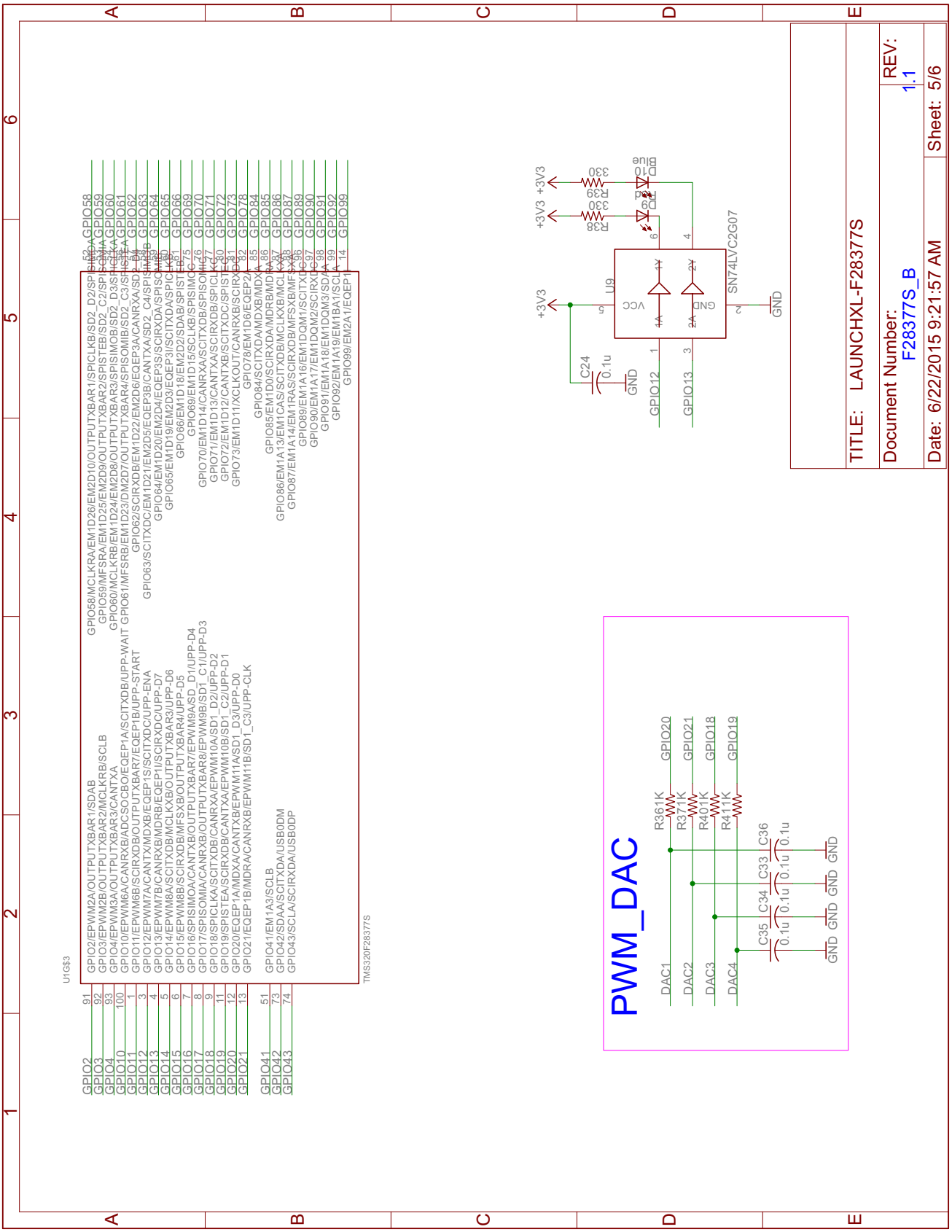

Figure 6. LAUNCHXL-F28377S_B Schematic

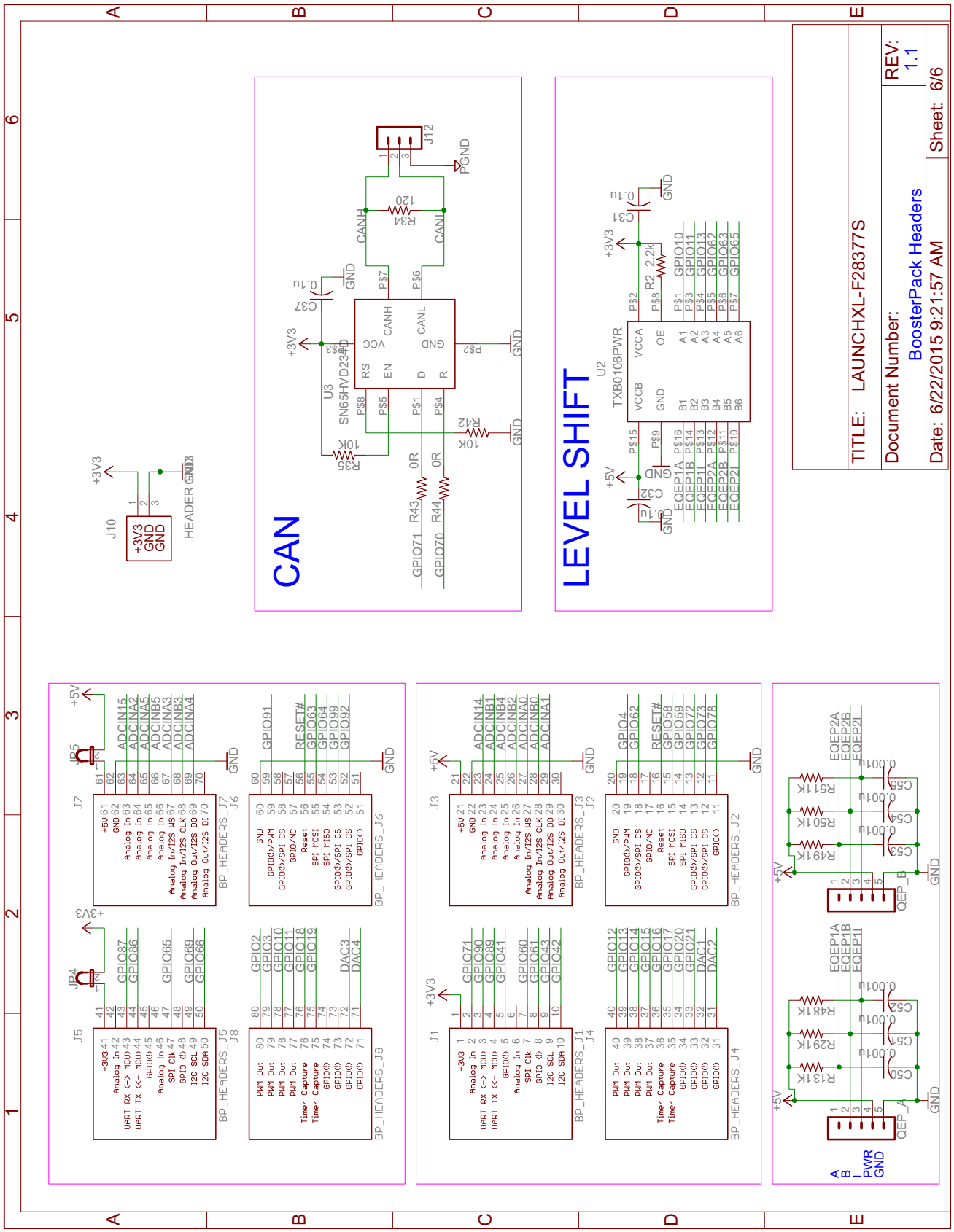

Figure 7. LAUNCHXL-F28377S BoosterPack Schematic

6.3 PCB Layout

Figure 8 through Figure 13 shows the LAUNCHXL-F28377S PCB layout.

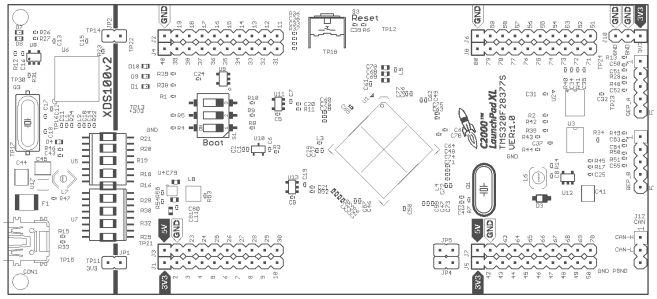

Figure 8. Top Silk

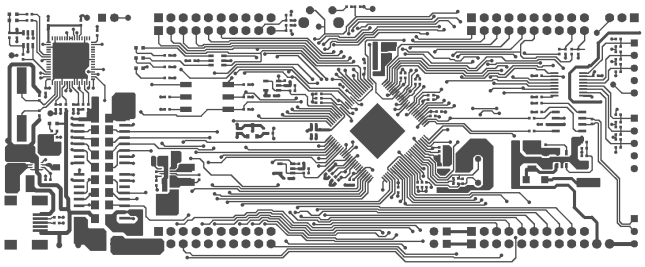

Figure 9. Top Copper

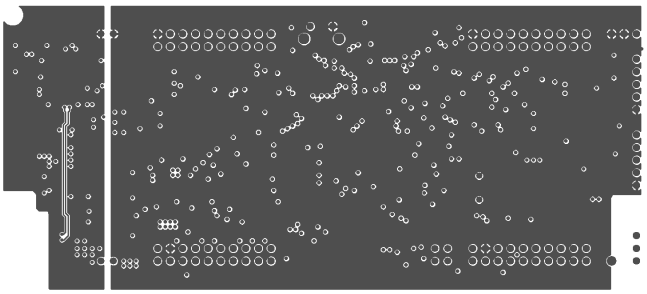

Figure 10. Inner Copper 1

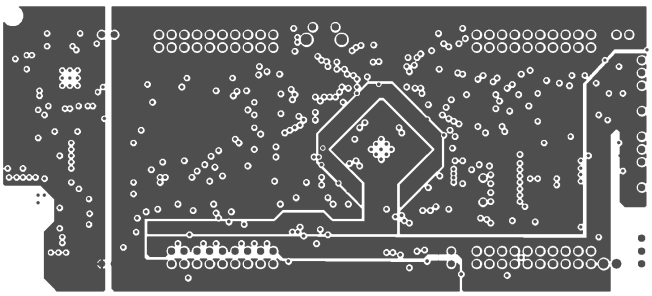

Figure 11. Inner Copper 2

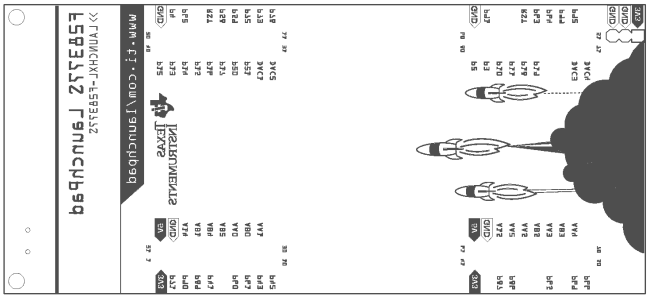

Figure 12. Bottom Silk

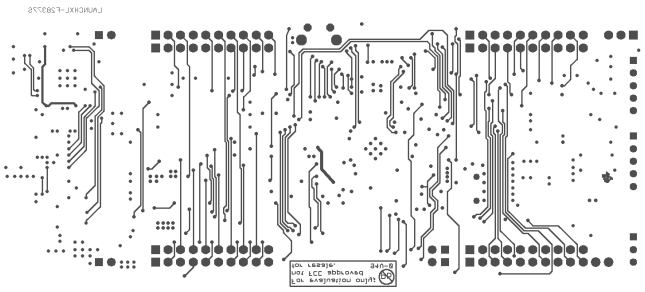

Figure 13. Bottom Copper

6.4 Bill of Materials (BOM)

Table 5 lists the LAUNCHXL-F28377S bill of materials.

Table 5. LAUNCHXL-F28377S Bill of Materials

Item	Ref	Varient	Qty	Description	Mfg	Part Number	Vendor	Stk Number
	S3	All	1	SWITCH TACTILE SPST-NO 0.05A 24 V	Omron Electronics Inc-EMC Div	B3F-3152	Digikey	SW410-ND
	S1	All	1	SWITCH TAPE SEAL 3 POS SMD 50 V	CTS Electrocomponents	219-3MST	Digikey	CT2193MST-ND
	F1	All	1	PTC RESETTABLE .50A 15 V 1812	Bourns Inc.	MF-MSMF050-2	Digikey	MF-MSMF050-2TR-ND
	Q1	All	1	Crystal 10.0000MHz 30ppm 18 pF 60 Ω -40°C - 85°C Through Hole HC49/US	CTS-Frequency Controls	ATS100B-E	Digikey	CTX919-ND
	Q3	All	1	CRYSTAL 12.0000 MHZ 18 pF SMD	Abracon Corporation	ABLS2-12.000MHZ-D4Y-T	Digikey	535-9869-2-ND
	JP1, JP2, JP4, JP5	All	4	CONN HEADER 2 POS 2.54	Wurth Electronics Inc	61300211121	Digikey	732-5315-ND
	JP1, JP2, JP4, JP5	All	4	SHUNT JUMPER .1" BLACK GOLD	3M	969102-0000-DA	Digikey	3M9580-ND
	J12, J10	All	2	CONN HEADER 3 POS 2.54	Wurth Electronics Inc	61300311121	Digikey	732-5316-ND
	QEP_A, QEP_B	All	2	CONN HEADER 5 POS 2.54	Wurth Electronics Inc	61300511121	Digikey	732-5318-ND
	J1, J2, J3, J4, J5, J6, J7, J8	All	4	LaunchPad Headers	Major League Electronics	SSHQ-110-D-08-G-LF	Major League Electronics	SSHQ-110-D-08-G-LF
	R16, R18, R19, R20, R21, R25, R28, R30, R32	DNP	9	RES 0.0 Ω 1/4W 1206 SMD	Panasonic - ECG	ERJ-8GEY0R00V	Digikey	P0.0ETR-ND
	CON1	All	1	CONN RECEPT MINI-USB TYPE B SMT	Mill-Max Manufacturing Corp.	897-43-005-00-100001	Digikey	ED90341TR-ND
	C50, C51, C52, C53, C54, C55	All	6	CAP CER 1000 pF 50 V 10% X7R 0402	Murata Electronics North America	GRM155R71H102KA01D	Digikey	490-1303-1-ND
	C1, C5, C9, C12, C13, C14, C16, C24, C26, C28, C30, C31, C32, C33, C34, C35, C36, C37, C39, C43, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C73, C74	All	34	CAP CER 0.1 µF 10 V 10% X5R 0402	Murata Electronics North America	GRM155R61A104KA01D	Digikey	490-1318-1-ND
	C68, C69, C70, C79, C81	All	5	CAP CER 10 µF 4 V 20% X6S 0603	Murata Electronics North America	GRM188C80G106ME47D	Digikey	490-10470-1-ND
	C41, C44	All	2	CAP CER 10 µF 25 V Y5V 1210	Murata Electronics North America	GRM32NF51E106ZA01L	Digikey	490-1893-1-ND
	C2, C20, C21, C27, C29, C42, C46, C47, C48, C49, C71, C72, C75, C76, C77, C78	All	16	CAP CER 2.2 µF 4 V 20% X5R 0402	Murata Electronics North America	GRM155R60G225ME15D	Digikey	490-4518-1-ND

Table 5. LAUNCHXL-F28377S Bill of Materials (continued)

Item	Ref	Varient	Qty	Description	Mfg	Part Number	Vendor	Stk Number
	C8, C10, C11	All	3	CAP CER 4.7 µF 6.3 V 20% X5R 0402	Murata Electronics North America	GRM155R60J475ME47D	Digikey	490-5915-1-ND
	C6, C7, C19	All	3	CAP CER 1 µF 6.3 V 10% X5R 0402	Murata Electronics North America	GRM155R60J105KE19D	Digikey	490-1320-1-ND
	C80	All	1	CAP CER 22 µF 4 V 20% X6S 0603	Murata Electronics North America	GRM188C80G226MEA0D	Digikey	490-7196-1-ND
	C45	All	1	CAP CER 22 µF 10 V 10% X7R 1210	Murata Electronics North America	GRM32ER71A226KE20L	Digikey	490-1876-1-ND
	C15	All	1	CAP CER 3.3 µF 4 V 20% X5R 0402	TDK Corporation	C1005X5R0G335M050BB	Digikey	445-7397-1-ND
	C25	All	1	CAP CER 820 pF 50 V 10% X7R 0402	Murata Electronics North America	GRM155R71H821KA01D	Digikey	490-3250-1-ND
	C3, C4, C17, C18	All	4	CAP CER 36 pF 50 V C0G 0402	TDK Corporation	C1005C0G1H360J	Digikey	445-4903-2-ND
	R15, R33, R43, R44	All	4	RES SMD 0.0 Ω JUMPER 1/10W	Panasonic Electronic Components	ERJ-2GE0R00X	Digikey	P0.0JCT-ND
	R11, R52	All	2	RES SMD 0.56 Ω 1% 1/6W 0402	Panasonic Electronic Components	ERJ-2BQFR56X	Digikey	P.56AKCT-ND
	R47	All	1	RES SMD 100K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1003X	Digikey	P100KLCT-ND
	R12, R14, R35, R42, R45	All	5	RES SMD 10K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1002X	Digikey	P10.0KLCT-ND
	R34	All	1	RES SMD 120 Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1200X	Digikey	P120LCT-ND
	R24	All	1	RES SMD 12K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1202X	Digikey	P12.0KLCT-ND
	R53	All	1	RES SMD 178K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1783X	Digikey	P178KLCT-ND
	R3, R13, R22, R23, R29, R36, R37, R40, R41, R48, R49, R50, R51	All	13	RES SMD 1K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1001X	Digikey	P1.00KLCT-ND
	R7	All	1	RES SMD 1M Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF1004X	Digikey	P1.00MLCT-ND
	R2, R6, R8, R9, R10, R31	All	6	RES SMD 2.2K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF2201X	Digikey	P2.20KLCT-ND
	R17	All	1	RES SMD 30.1K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF3012X	Digikey	P30.1KLCT-ND
	R26, R27, R38, R39	All	4	RES SMD 330 Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF3300X	Digikey	P330LCT-ND
	R55	All	1	RES SMD 39.2K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF3922X	Digikey	P39.2KLCT-ND

Table 5. LAUNCHXL-F28377S Bill of Materials (continued)

Item	Ref	Varient	Qty	Description	Mfg	Part Number	Vendor	Stk Number
	R54	All	1	RES SMD 64.9K Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF6492X	Digikey	P64.9KLCT-ND
	R1, R4, R5, R46	All	4	RES SMD 820 Ω 1% 1/10W 0402	Panasonic Electronic Components	ERJ-2RKF8200X	Digikey	P820LCT-ND
	D3	All	1	DIODE SCHOTTKY 40 V 1A SOD123	Diodes Incorporated	1N5819HW-7-F	Digikey	1N5819HW-FDICT-ND
	D1, D4	All	2	LED 1X0.5 MM 570NM GN WTR CLR SMD	Kingbright	APHHS1005CGCK	Digikey	754-1101-1-ND
	D8, D9	All	2	LED 1X0.5 MM 630NM RD WTR CLR SMD	Kingbright	APHHS1005SURCK	Digikey	754-1104-1-ND
	D7, D10	All	2	LED BLUE 470NM WTR CLEAR SMD	Kingbright	APHHS1005QBC/D	Digikey	754-1504-1-ND
	L8	All	1	FIXED IND 1 UH 1.62A 40 MOHM SMD	Murata Electronics North America	LQH3NPN1R0NJ0L	Digikey	490-5342-1-ND
	L7	All	1	FIXED IND 2.2 UH 1.9A 60 MOHM SMD	Sumida America Components Inc	CDRH2D18/ HPNP-2R2NC	Digikey	308-2295-1-ND
	L6	All	1	FIXED IND 3.3 UH 1.8A 85 MOHM SMD	Sumida America Components Inc	CDRH3D16/ HPNP-3R3NC	Digikey	308-1981-1-ND
	L5, L11	All	2	FERRITE BEAD 220 Ω 0402	Taiyo Yuden	BKP1005EM221-T	Digikey	587-3290-1-ND
	L3, L4	All	2	FERRITE CHIP 60 Ω 1700MA 0402	Murata Electronics North America	BLM15PD600SN1D	Digikey	490-5201-1-ND
	L1, L2	All	2	FERRITE CHIP 600 Ω 300MA 0402	Murata Electronics North America	BLM15AG601SN1D	Digikey	490-1006-1-ND
	U8	All	1	IC EEPROM 2K-BIT 3 MHZ SOT23-6	Microchip Technology	93LC56BT-I/OT	Digikey	93LC56BT-I/OTTR-ND
	U6	All	1	IC USB HS DUAL UART/FIFO 64-QFN	FTDI, Future Technology Devices International Ltd	FT2232HQ-REEL	Digikey	768-1025-2-ND
	U5	All	1	ISOLAT DGTL 2.5KVRMS 4CH 16-SOIC	Texas Instruments	ISO7240CDWR	Digikey	ISO7240CDWR-ND
	U7	All	1	ISOLAT DGTL 3KVRMS 3CH 16-SOIC	Texas Instruments	ISO7231CDWR	Digikey	ISO7231CDWR-ND
	U12	All	1	IC REG BOOST ADJ 2.1A SOT23-5	Texas Instruments	LMR62421XMFE/ NOPB		LMR62421XMFE/NOPB CT-ND
	U3	All	1	IC CAN TRANSCEIVER 3.3 V 8-SOIC	Texas Instruments	SN65HVD234DR	Digikey	296-27991-1-ND
	U9	All	1	IC BUFF/DVR DL NON-INV SOT236	Texas Instruments	SN74LVC2G07DBVR	Digikey	296-13494-2-ND
	U1	All	1	IC MCU 32-BIT 1024KB 100LQFP	Texas Instruments	TMX320F28377SPZPT	Digikey	296-39644-ND

Table 5. LAUNCHXL-F28377S Bill of Materials (continued)

Item	Ref	Varient	Qty	Description	Mfg	Part Number	Vendor	Stk Number
	U4	All	1	IC REG BUCK SYNC ADJ 1.2A 8WSON	Texas Instruments	TPS62080ADSGT	Digikey	296-30360-1-ND
	U17	All	1	IC REG BUCK SYNC 3.3 V 1A 8WSON	Texas Instruments	TPS62162DSGT	Digikey	296-29897-1-ND
	U2	All	1	IC 6BIT NON-INV TRANSLTR 16TSSOP	Texas Instruments	TXB0106PWR	Digikey	296-23759-1-ND
	U11, U13	All	2	IC OPAMP GP 20 MHZ RRO SOT23-5	Texas Instruments	OPA320AIDBVR	Digikey	296-29480-1-ND
	U10	All	1	IC VREF SERIES 3 V SOT23-3	Texas Instruments	REF3030AIDBZR	Digikey	296-26323-1-ND

7 References

The following documents describe the C2000 devices. Copies of these documents are available on the Internet at http://www.ti.com/c2000 and www.ti.com/c2000-launchpad, or click on the links below:

1. *TMS320F2837xS Delfino Microcontrollers Data Manual* (SPRS881)
2. *TMS320F28377S, TMS320F28376S, TMS320F28375S, TMS320F28374S Delfino Microcontrollers Silicon Errata* (SPRZ422)
3. *TMS320F2837xS Delfino Microcontrollers Technical Reference Guide* (SPRUHX5)
4. *TMS320C28x Extended Instruction Sets Technical Reference Manual* (SPRUHS1)
5. *TMS320C28x Instruction Set Simulator Technical Overview* (SPRU608)
6. *TMS320C28x Optimizing C/C++ Compiler v6.1 User's Guide* (SPRU514)
7. *TMS320C28x Assembly Language Tools v6.1 User's Guide* (SPRU513)

8 Frequently Asked Questions (FAQ)

1. Can other programming and debug tools (such as an XDS510 debug probe) be used with the C2000 LaunchPad?
2. What versions of Code Composer Studio can be used to develop software for the C2000 LaunchPad?
   - While a user could potentially connect an external debug probe to the F28377S device present on the LaunchPad, it would require some rework of the board. It is recommended that users who want to use an external debug probe purchase a controlCard and docking station that includes an external JTAG connector.
   - It is highly recommend that novice users develop applications with Code Composer Studio v6. The drivers, examples, and other associated software are tailored to make the user experience as smooth as possible in Code Composer Studio v6.
3. Why can't I connect to the LaunchPad in Code Composer Studio?
   - There are a number of things that could cause this and they all have an easy fix.
     – Is S1 switch 3 in the down position?

       This is the TRST pin that enables and disables JTAG functionality on the chip. This switch must be in the up position for the debug probe to be able to connect.
     – Are both power LEDs lit?

       The board has two power domains because of the isolated JTAG interface. For low-voltage application development, JTAG isolation is not needed and the power domains can be combined to allow for convenience (that is, the board can be powered completely through the USB). Ensure that jumpers are placed on the posts of JP1 and JP2.
     – Are drivers correctly installed for the XDS100v2 present on the LaunchPad?

       Right click on *My Computer* and select properties. Navigate to the *Hardware* tab in the dialog box and open the device manager. Scroll to the bottom of the list and expand the *USB Serial Bus controllers* item. Are there two entries for *TI XDS100 Channel A/B*? If not, try unplugging and replugging in the board. Does Windows give you any messages in the system tray? In Device Manger, do either of the entries have a yellow exclamation mark over their icon? If so, try reinstalling the drivers.
4. Why is the serial connection not working?
   - Are you using the correct COM port?

   Right click on *My Computer* and select properties. Navigate to the *Hardware* tab in the dialog box and open the device manager. Scroll to *Ports (COM & LPT)* and expand this entry. Is there a USB Serial Port listed? If so, read the COM number to the right of the entry; this is the COM number you should be using.
   - Are you using the correct baud rate?

   Most, if not all, of the examples are configured for a baud rate of 115200 when the CPU is running at 200 MHz. If you have changed the PLL settings or written your own application you may have to recalculate the baud rate for your specific application. For information on how to do this, see the *TMS320F2837xS Delfino Microcontrollers Technical Reference Guide* (SPRUHX5).
5. Why is my program operating at half the frequency of what I expected?
   - By default many of the controlSUITE examples are configured to operate on hardware which has a different clocking circuit, where the external clock is 20 MHz instead of 10 MHz as found on this EVM.
   - A compiler switch was added to various functions to allow a user to change the clocking configuration based on the status of a predefined symbol.
   - To ensure the PLL is correctly configured for the LAUNCHXL-F28379D, Add "_LAUNCHXL_F28377S" to the predefined symbols list.
   - Access the Predefined symbols list by accessing the Project Properties, Navigating to Build » C2000 Compiler » Advanced Options » Predefined Symbols.

Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from C Revision (April 2017) to D Revision	Page
• Global Replace of "emulator" with "debug probe".	1
• Section 2.1. was added.	3
• Added Section 4.4 to describe how to use other examples.	4
• Added FAQ for programs operating at a different frequency than expected.	20

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