

# DAC128S085EVM Booster Pack User's Guide

## User's Guide



Literature Number: SNAU164  
July 2014

<b>1</b>	<b>DAC128S085 BoosterPack Components .....</b>	<b>4</b>
<b>2</b>	<b>Software Installation.....</b>	<b>5</b>
2.1	Graphical User Interface (GUI).....	5
2.2	Launchpad Firmware Upgrade.....	6
2.2.1	MSP430 Firmware Upgrade Application Installation .....	6
2.2.2	Firmware upgrade .....	6
<b>3</b>	<b>DAC128S085 BoosterPack Setup and Operation .....</b>	<b>11</b>
3.1	Connections .....	11
3.2	Launching the Software .....	11
<b>4</b>	<b>Board Layout .....</b>	<b>14</b>
<b>5</b>	<b>Schematic .....</b>	<b>19</b>
<b>6</b>	<b>Bill Of Materials.....</b>	<b>20</b>

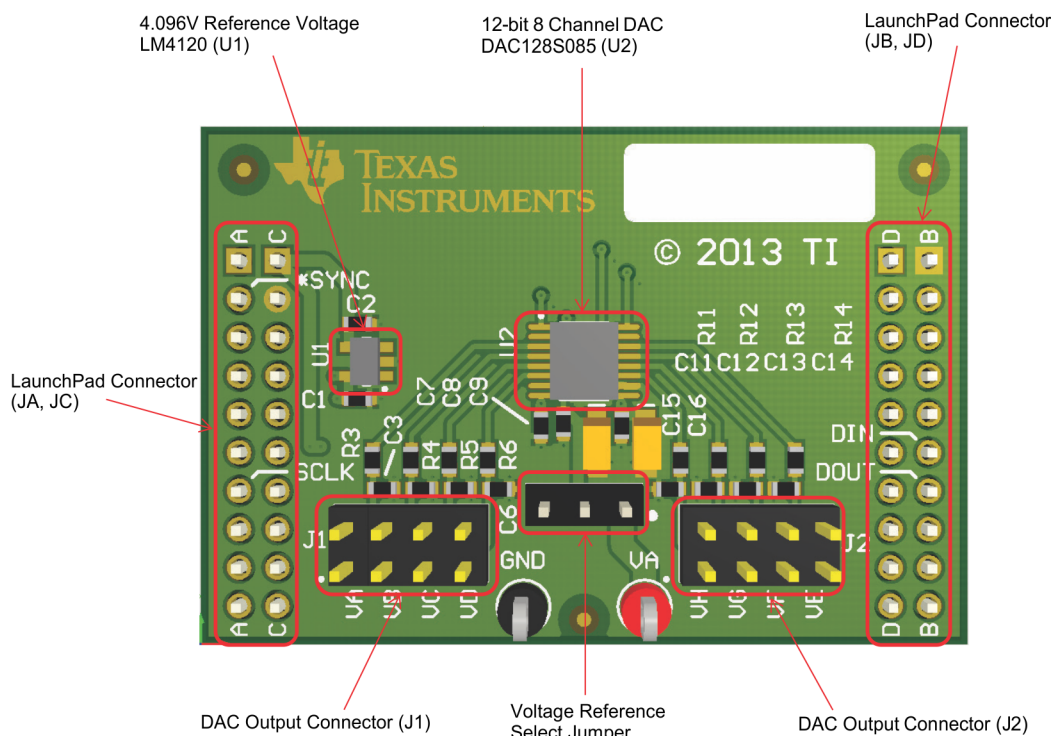
## List of Figures

1-1.	DAC128S085EVM Evaluation Board.....	4
2-1.	DAC12xSxxx Installation Directory .....	5
2-2.	USB Firmware Upgrade Window .....	6
2-3.	Driver Not Installed .....	8
2-4.	Driver Authentication Warning .....	9
2-5.	Driver Installed.....	10
3-1.	DAC128S085EVM Attached to MSP430.....	11
3-2.	Part Select.....	12
3-3.	Selectable Fields in GUI.....	13
4-1.	Top Assembly Layer .....	14
4-2.	Top Layer Routing .....	15
4-3.	Power Layer Routing .....	16
4-4.	Ground Layer Routing .....	17
4-5.	Bottom Layer Routing.....	18
5-1.	DAC128S085EVM Schematic .....	19

## List of Tables

1-1.	Device and Package Configurations .....	4
6-1.	DAC128S085 Bill of Materials .....	20

## DAC128S085 BoosterPack Components



**Figure 1-1. DAC128S085EVM Evaluation Board**

**Table 1-1. Device and Package Configurations**

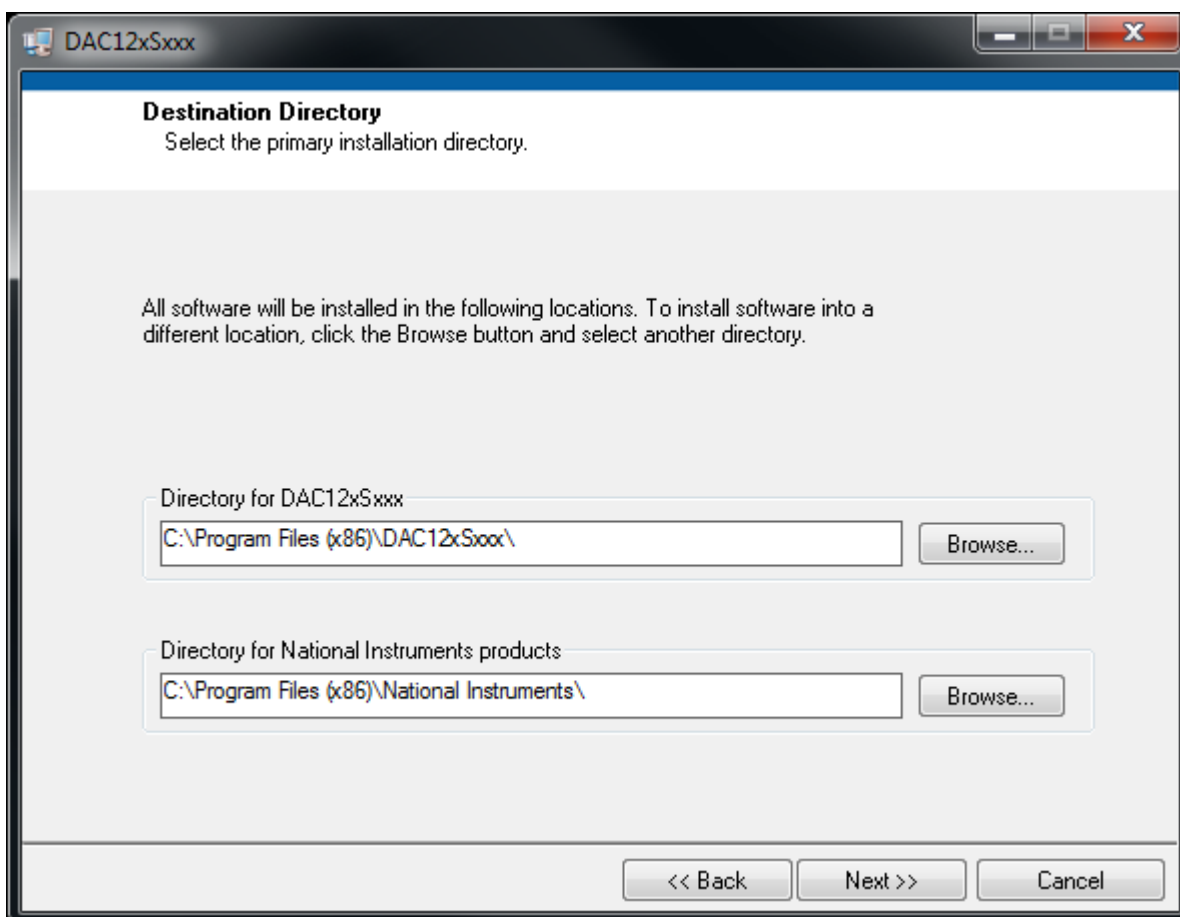
DEVICE	IC	Package
U1	LM4120IM5-4.1	SOT-23
U2	DAC128S085CIMT	TSSOP-16

## Software Installation

### 2.1 Graphical User Interface (GUI)

To use the DAC128S085EVM install the DAC12xSxxx Software:

1. If you are receiving the DAC128S085EVM from a FAE the software GUI will be in a .zip file. Otherwise, click this link <http://www.ti.com/product/dac128s085>, scroll down to the “software” section, and download the latest evaluation software.
2. Unzip the downloaded file into a known directory, and run the “setup.exe” file located in [Unzip location]\ DAC12xSxxx \EVM\_GUI\ DAC12xSxxx \_Installer\_v1.zip\ DAC12xSxxx \_Installer\Installer\Volume. Follow the pop-screen instructions by clicking the “Next” button to install the software.



**Figure 2-1. DAC12xSxxx Installation Directory**

3. When the installation is finished, please click “Finish” button.

## 2.2 Launchpad Firmware Upgrade

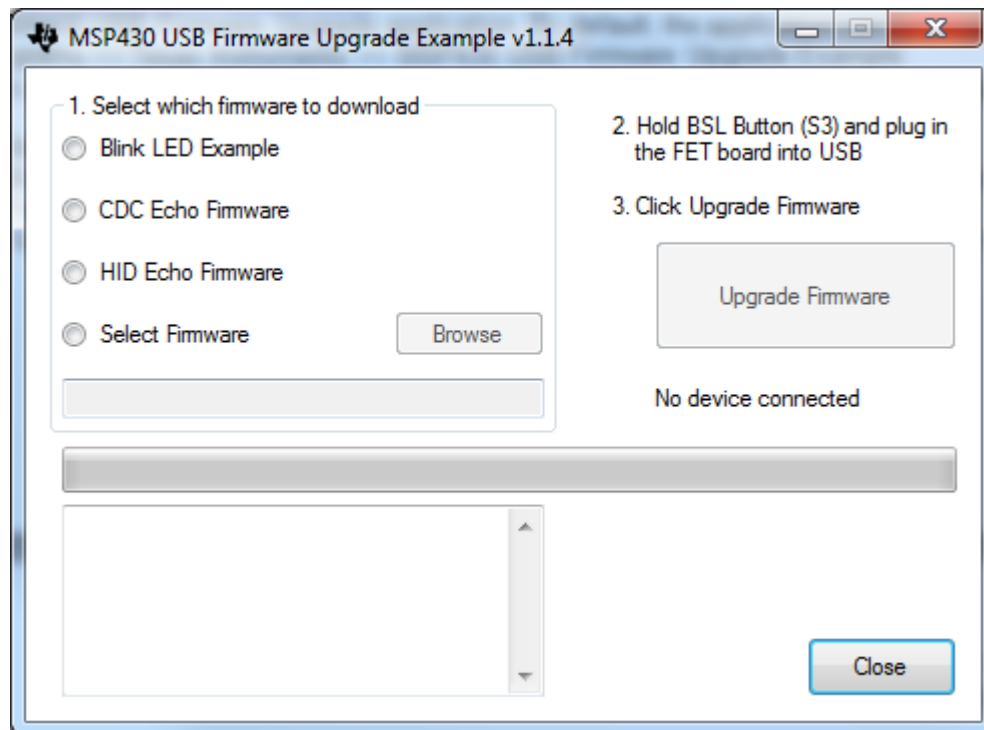
Note: This section is only needed with a brand new Launchpad. If a Launchpad is shipped with an DAC128S085 EVM then skip section 2.2.

### 2.2.1 MSP430 Firmware Upgrade Application Installation

1. 1. Navigate to <http://www.ti.com/tool/msp430usbdevpack> and click on Get Software.
2. 2. Scroll-down to the end of the page to find the USB Collateral Installers section.
3. 3. Click on MSP430\_USB\_Firmware\_Upgrade\_Example-x-x-x-Setup.exe to download the tool; the page will redirect to a submission form.
4. 4. Complete the information requested and submit the form; if approved, a download button will appear.
5. 5. Run the installation file and follow the on-screen instructions until completion. When asked about the setup type, select Application Only. Click Finish when done.

### 2.2.2 Firmware upgrade

1. If you are receiving the DAC128S085EVM from a FAE the firmware is a text file "DAC128S085EVM\_Firmware-v0.87.txt"
2. Open the MSP430 USB Firmware Upgrade application. By default, the application can be launched from Start >> Programs >> Texas Instruments >> MSP430 USB Firmware Upgrade Example.
3. Click Next to proceed on the first prompt; read and accept the license agreement and click Next to continue.



**Figure 2-2. USB Firmware Upgrade Window**

4. Enable the Select Firmware button and browse to open the downloaded firmware "DAC128S085EVM\_Firmware-v0.87.txt".
5. Press the BSL button on the MSP430 LaunchPad and connect to the PC with a USB cable; if detected, the text on the Firmware Upgrade tool will change from No device connected to Found 1 device.

6. Click on the Upgrade Firmware button to program the LaunchPad. Close the application when done.

**Update USB Driver**

1. Before launching the DAC12xSxxx software, connect the DAC128S085EVM board to a USB port of your PC. Go to Device Manager and find "MSP43-USB Example". Right click and select Update Driver Software.

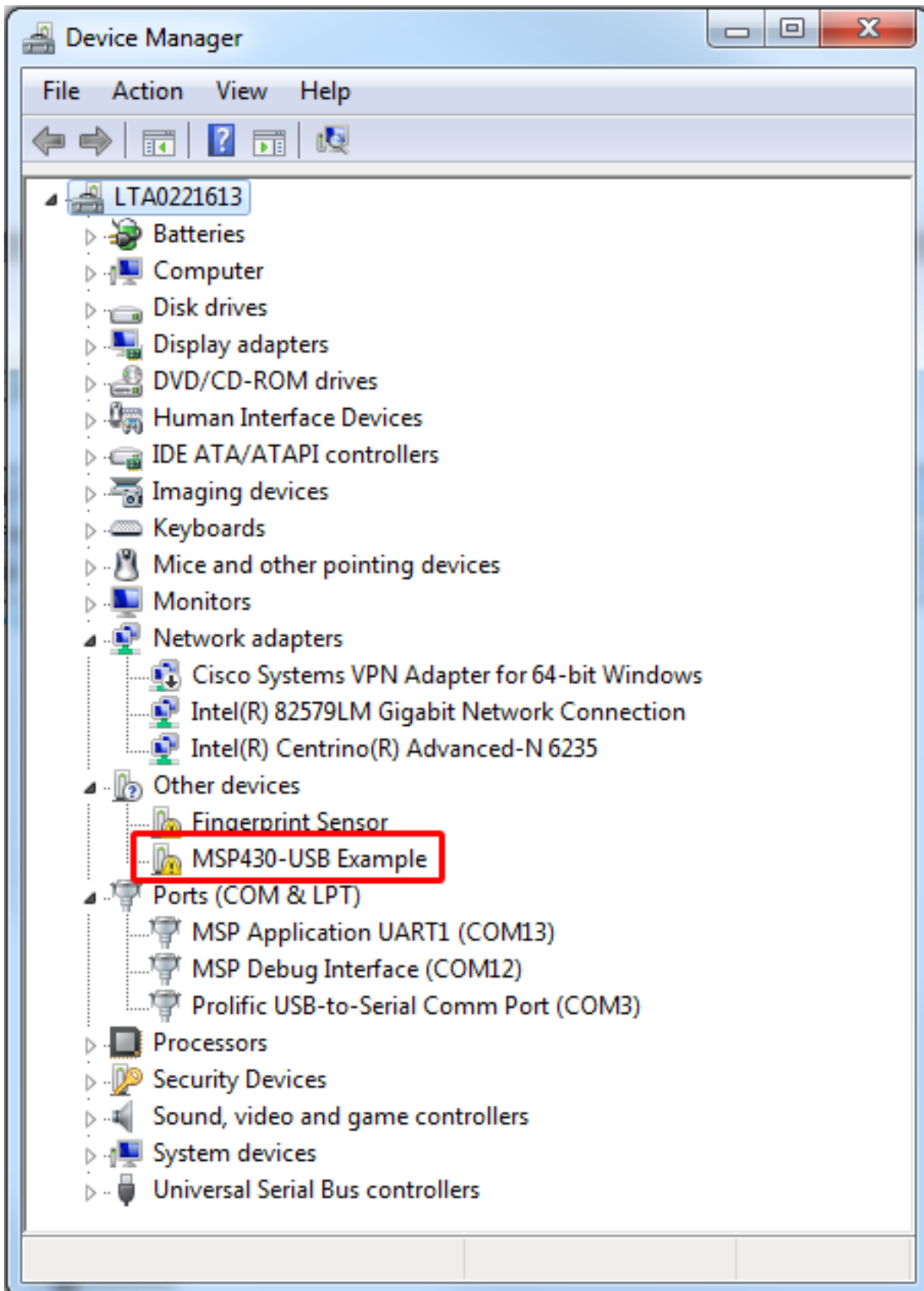
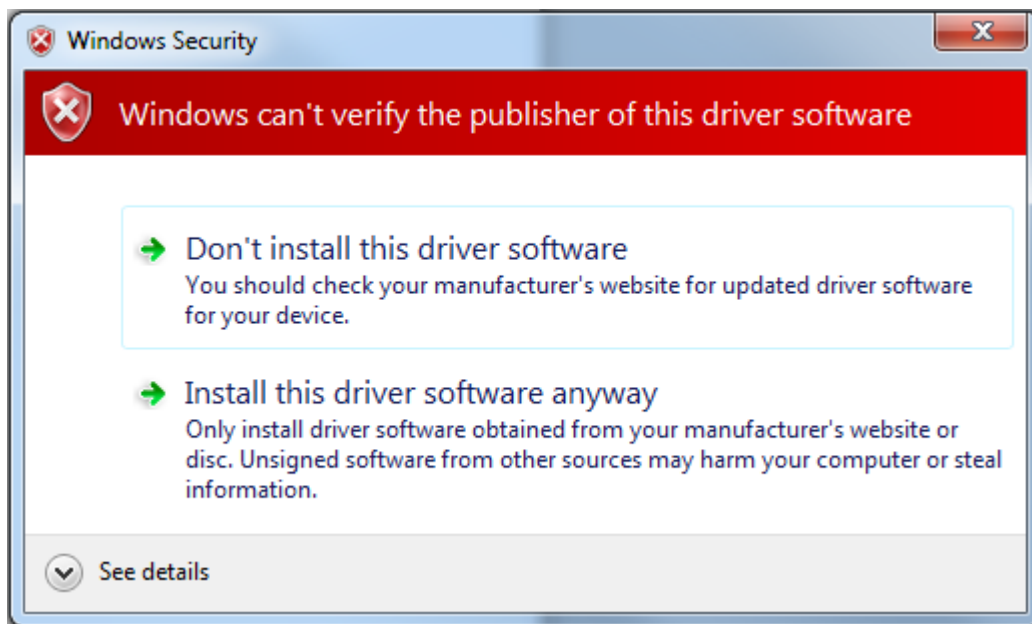


Figure 2-3. Driver Not Installed



2. On the next screen, select the "Browse my computer for driver software" option and go to the directory of your install files and select the "TI\_ADC\_DAC\_EVMs\_Driver.inf" file.
3. 3. If prompted with a warning window select "Install this Driver Anyway". Close the installation window when it is done. The device manager should now display a "TI\_ADC\_DAC\_EVMs" item followed by a COM port number.



**Figure 2-4. Driver Authentication Warning**

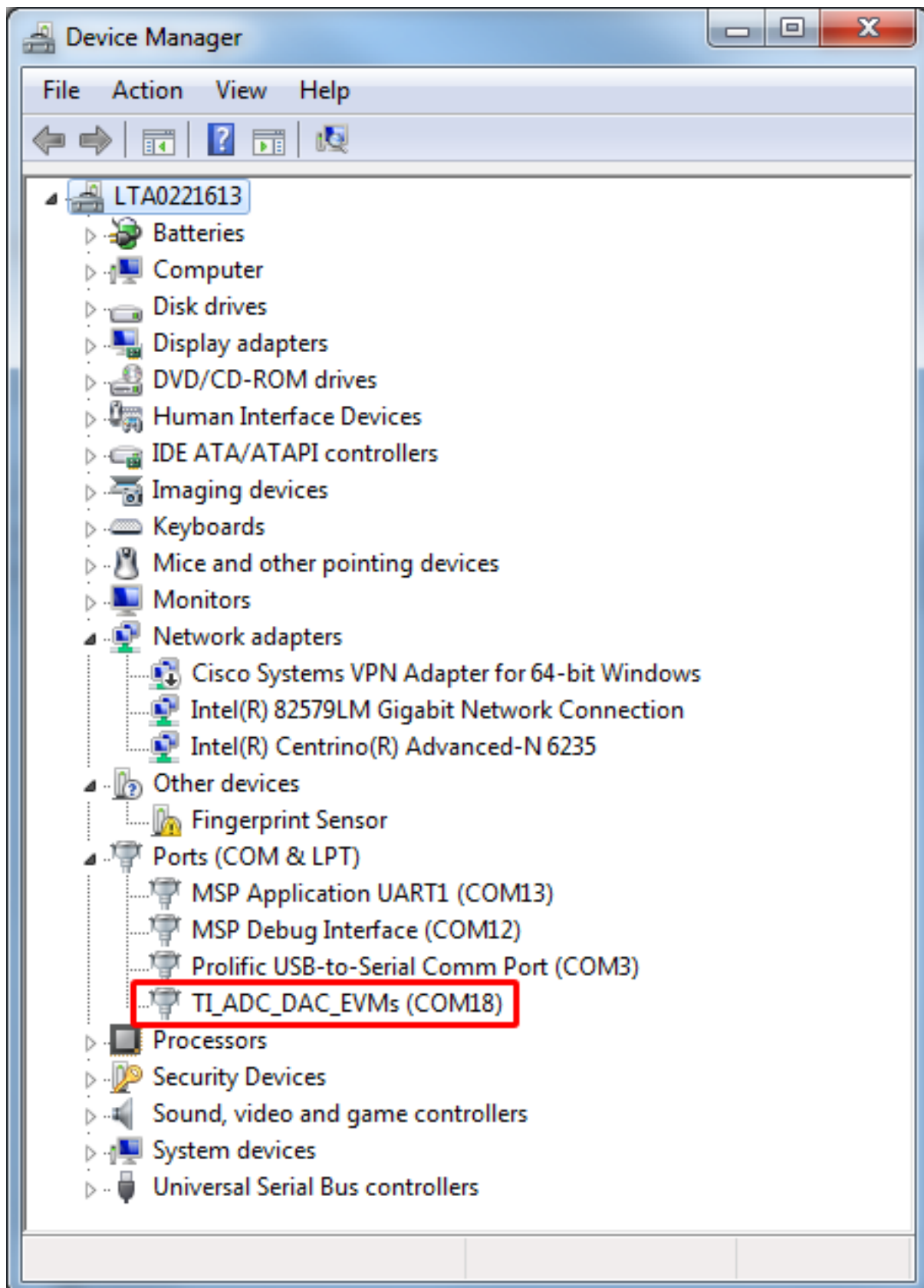
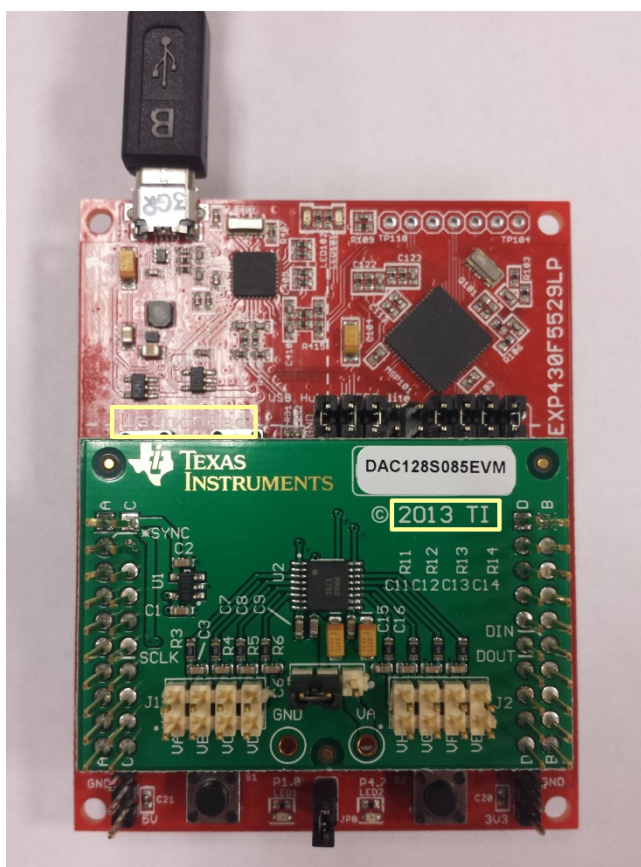


Figure 2-5. Driver Installed

## DAC128S085 BoosterPack Setup and Operation

### 3.1 Connections

1. Attach the DAC128S085EVM BoosterPack onto the MSP430 LaunchPad using connectors JA, JB, JC, JD. The proper orientation of the Launchpad and DAC128S085EVM is when the text “LaunchPad” and “2013 TI” are in the same direction.

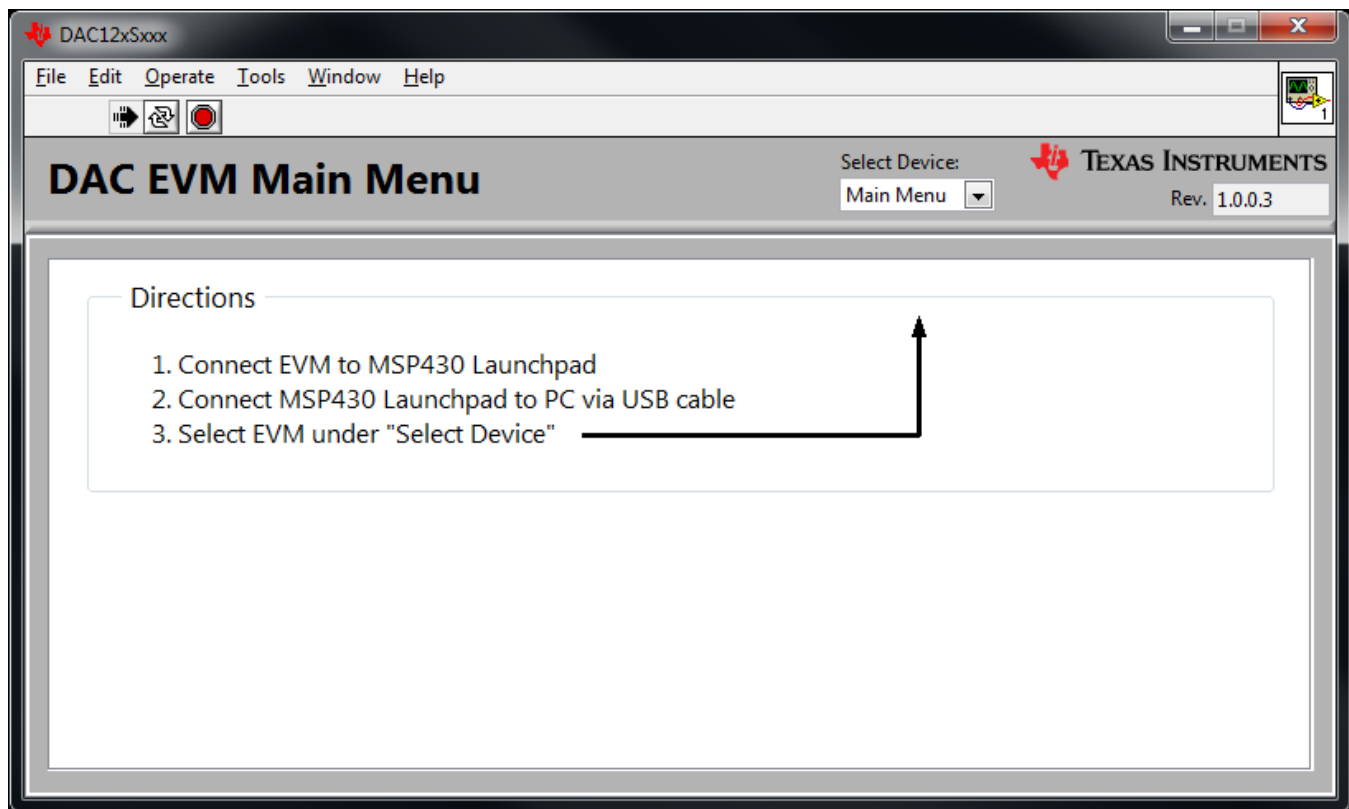


**Figure 3-1. DAC128S085EVM Attached to MSP430**

2. Connect the USB cable from the LaunchPad to the PC

### 3.2 Launching the Software

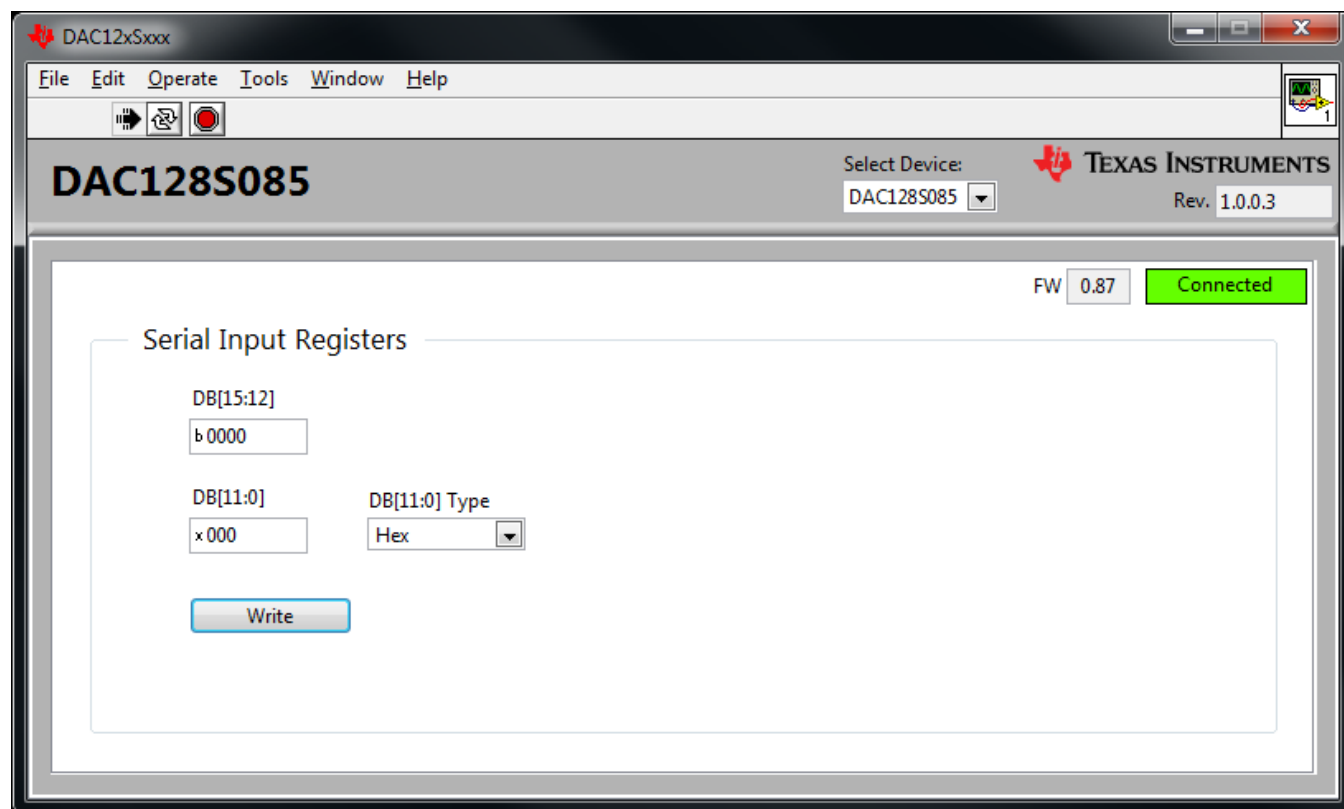
1. The DAC12xSxxx GUI software can be run by clicking on Start >> All Program >> DAC12xSxxx. After running the GUI select DAC128S085.



**Figure 3-2. Part Select**

## 2. GUI Descriptions

- DB[15:12]: These 4 bits control different write modes, channel selects, and special operation modes. See the DAC128S085 datasheet for more details.
- DB[11:0]: These 12 bits are for setting the DAC output codes.
- DB[11:0] Output Type: This field changes DB[11:0] to either binary, decimal, or hexadecimal type.

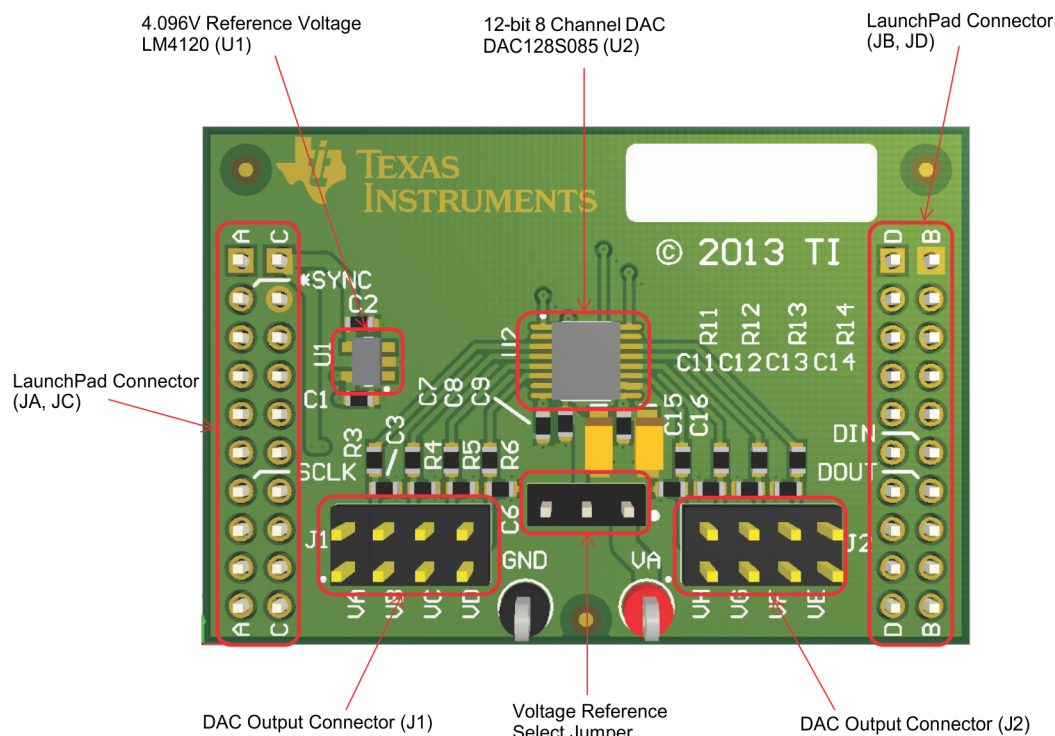


**Figure 3-3. Selectable Fields in GUI**

3. 3. Quick start:

- a. Write "1001" to DB[15:12] to switch into WTM mode
- b. Write "0000" to DB[15:12] and "800" to DB[11:0] to select channel A and set channel A output to Vref/2 of 2.048V.

## Board Layout



**Figure 4-1. Top Assembly Layer**

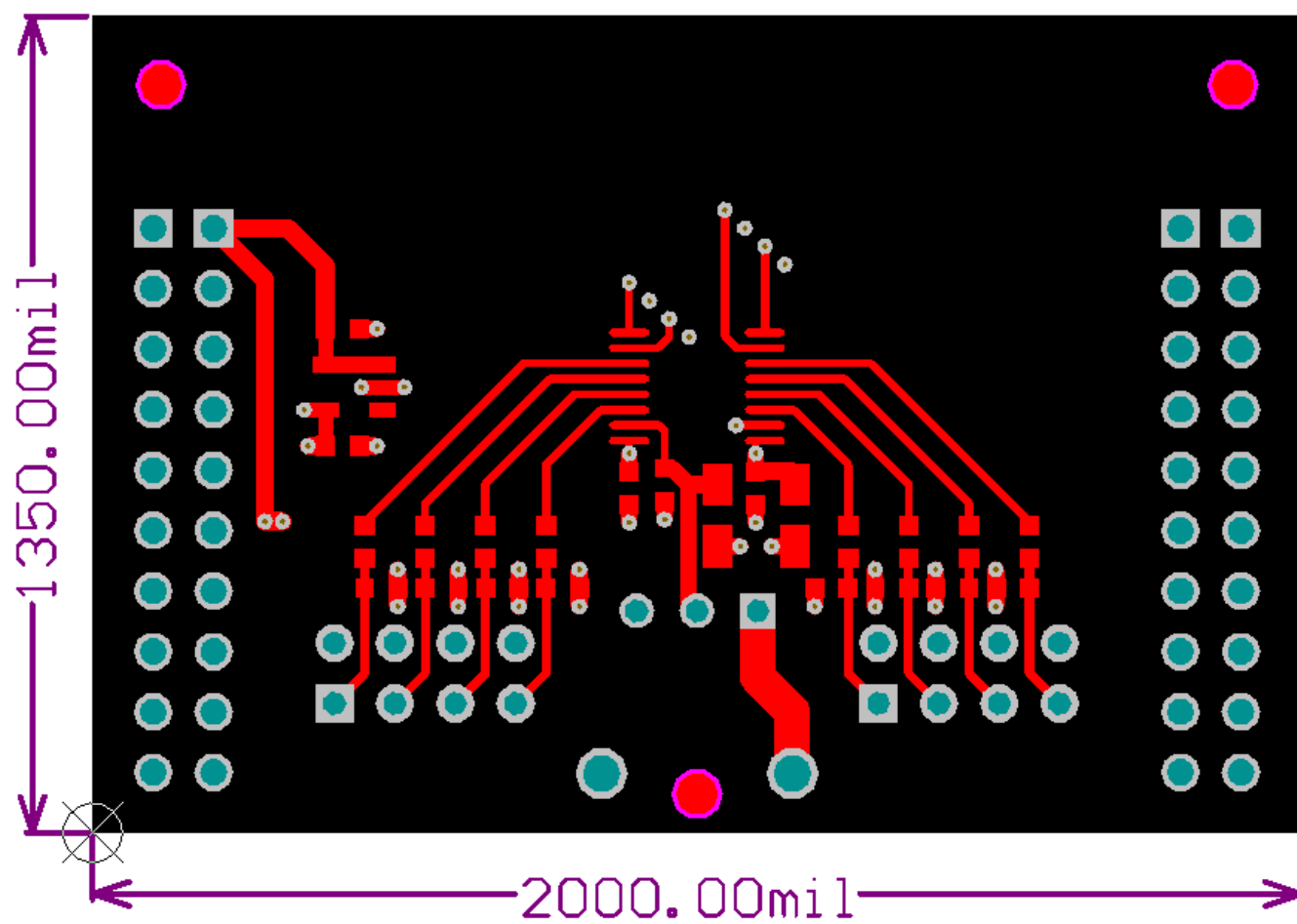


Figure 4-2. Top Layer Routing

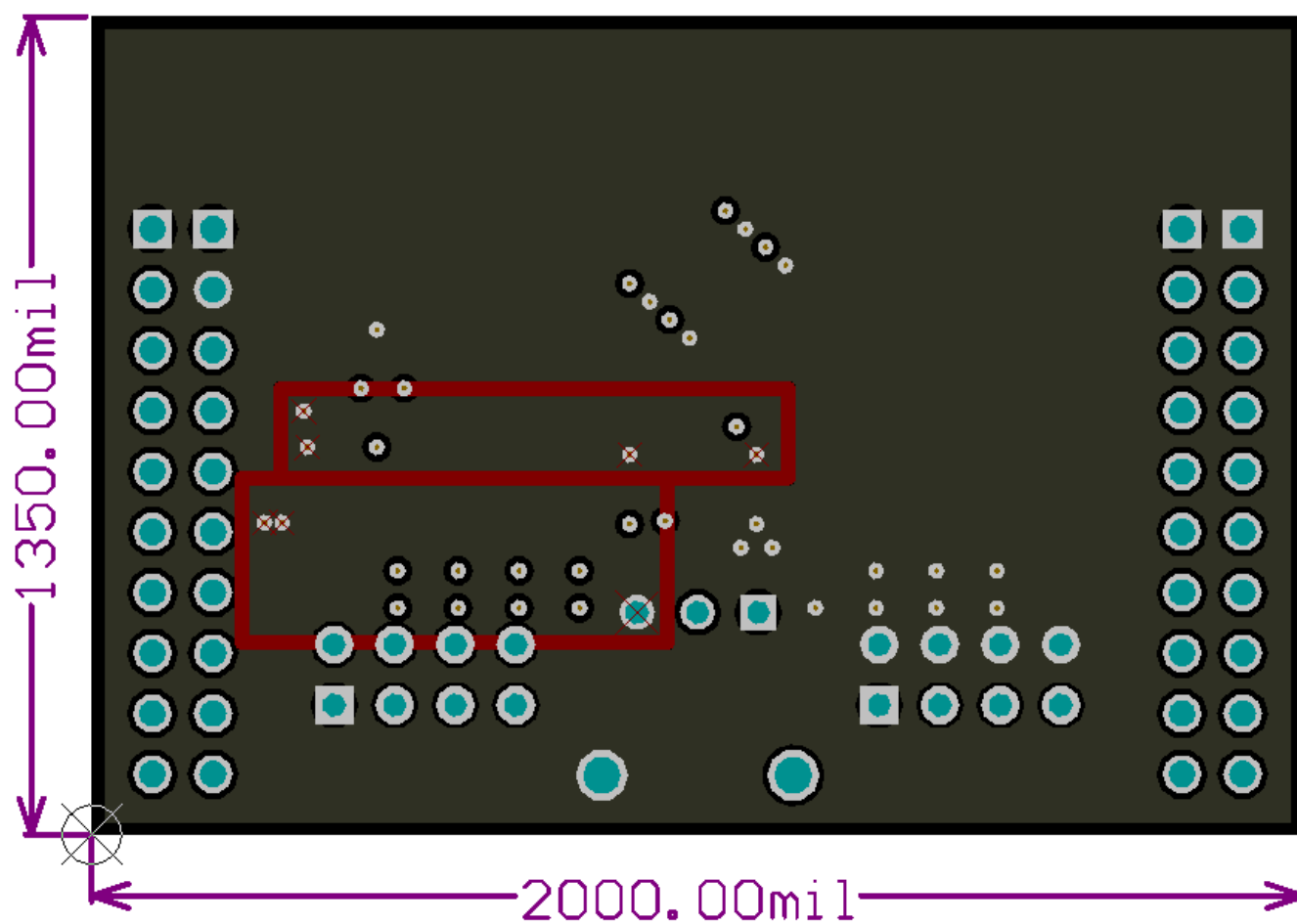


Figure 4-3. Power Layer Routing



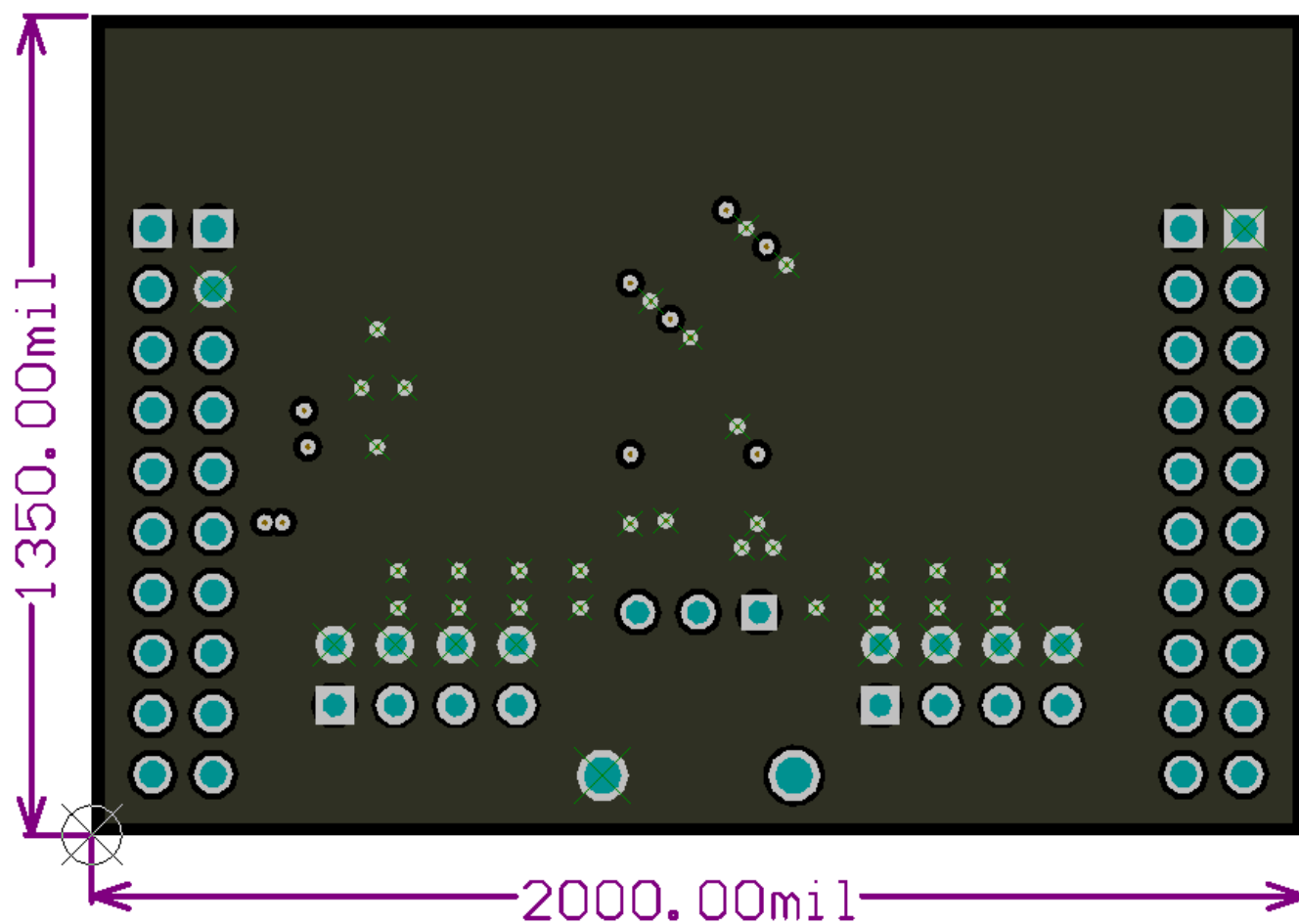


Figure 4-4. Ground Layer Routing

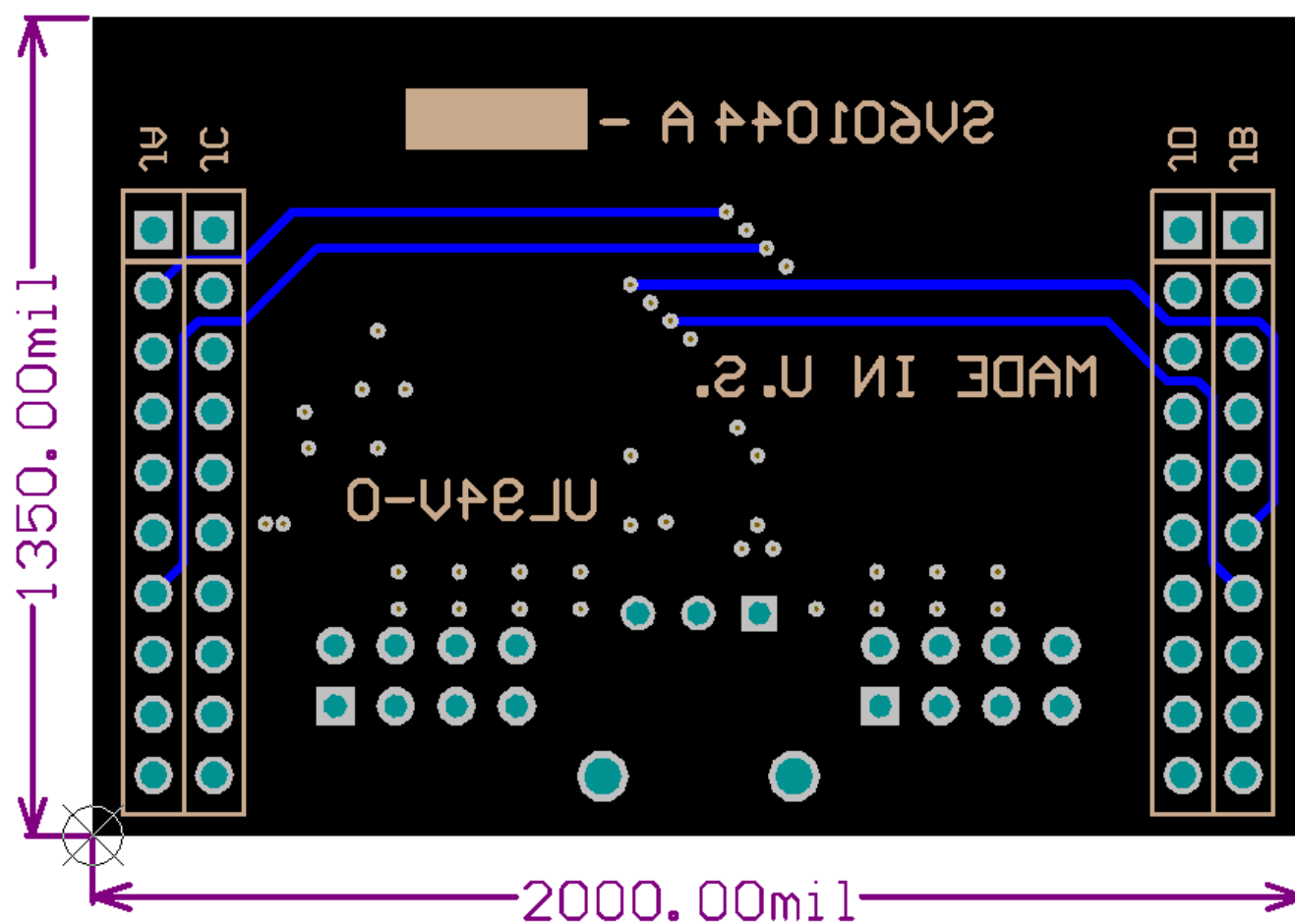


Figure 4-5. Bottom Layer Routing

## Schematic

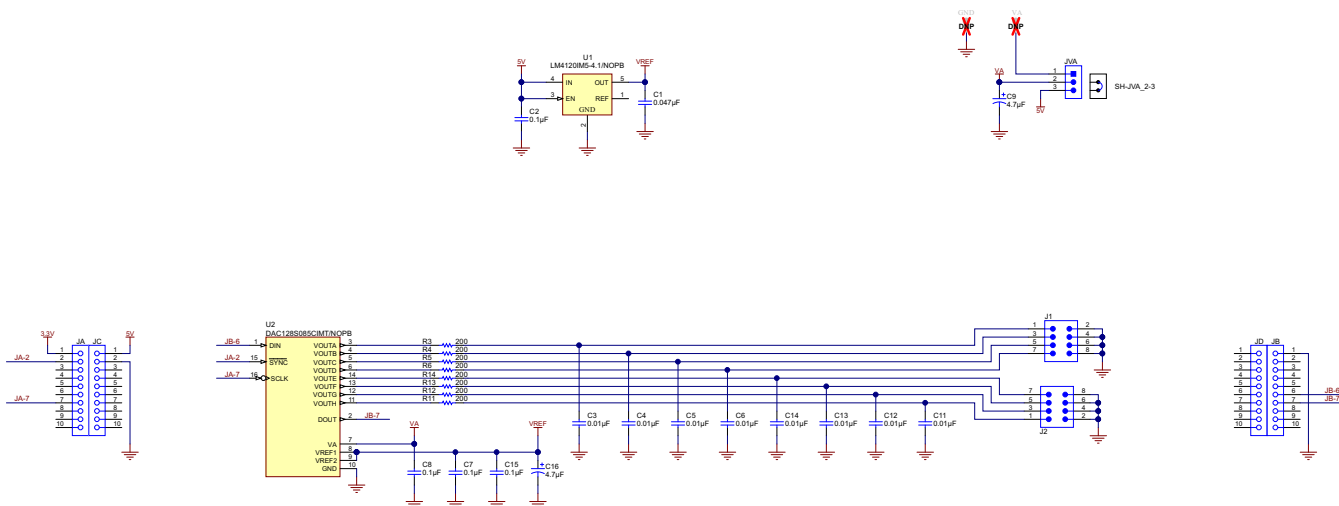


Figure 5-1. DAC128S085EVM Schematic

## *Bill Of Materials*

**Table 6-1. DAC128S085 Bill of Materials**

Designator	Quantity	Value	Description	PartNumber	Manufacturer
!PCB	1		Printed Circuit Board	SV601044	Any
C1	1	0.047uF	CAP, CERM, 0.047uF, 6.3V, +/-10%, X7R, 0603	GRM188R70J473K A01D	MuRata
C2, C7, C8, C15	4	0.1uF	CAP, CERM, 0.1uF, 10V, +/-10%, X7R, 0603	C0603C104K8RAC TU	Kemet
C3, C4, C5, C6, C11, C12, C13, C14	8	0.01uF	CAP, CERM, 0.01uF, 25V, +/-10%, X7R, 0603	GRM188R71E103K A01D	MuRata
C9, C16	2	4.7uF	CAP, TA, 4.7uF, 10V, +/-10%, 1.4 ohm, SMD	TPSA475K010R140 0	AVX
J1, J2	2		Header, TH, 100mil, 4x2, Gold plated, 230 mil above insulator	TSW-104-07-G-D	Samtec
JA, JB, JC, JD	4		Connector, Receptacle, 100mil, 10x1, Gold plated, TH	SSW-110-23-F-S	Samtec
JVA	1		Header, 100mil, 3x1, Tin plated, TH	PEC03SAAN	Sullins Connector Solutions
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	THT-14-423-10	Brady
R3, R4, R5, R6, R11, R12, R13, R14	8	200	RES, 200 ohm, 1%, 0.1W, 0603	CRCW0603200RFEA	Vishay-Dale
SH-JVA_2-3	1	1x2	Shunt, 100mil, Gold plated, Black	382811-6	AMP
U1	1		Precision Micropower Low Dropout Voltage Reference, 5-pin SOT-23, Pb-Free	LM4120IM5-4.1/NOPB	Texas Instruments
U2	1		12-Bit Micro Power OCTAL Digital-to-Analog Converter with Rail-to-Rail Outputs, 16-pin TSSOP, Pb-Free	DAC128S085CIMT/NOPB	Texas Instruments
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A
GND	0	Black	Test Point, TH, Multipurpose, Black	5011	Keystone Electronics
VA	0	Red	Test Point, TH, Multipurpose, Red	5010	Keystone Electronics

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

### Products

Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>
DLP® Products	<a href="http://www.dlp.com">www.dlp.com</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>
OMAP Applications Processors	<a href="http://www.ti.com/omap">www.ti.com/omap</a>
Wireless Connectivity	<a href="http://www.ti.com/wirelessconnectivity">www.ti.com/wirelessconnectivity</a>

### Applications

Automotive and Transportation	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
Communications and Telecom	<a href="http://www.ti.com/communications">www.ti.com/communications</a>
Computers and Peripherals	<a href="http://www.ti.com/computers">www.ti.com/computers</a>
Consumer Electronics	<a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>
Energy and Lighting	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
Industrial	<a href="http://www.ti.com/industrial">www.ti.com/industrial</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
Space, Avionics and Defense	<a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a>
Video and Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>

### TI E2E Community

[e2e.ti.com](http://e2e.ti.com)