ADS527xEVM Evaluation Module

The ADS527xEVM is designed for ease of use in evaluating the performance of the ADS527x of 10- and 12-bit analog-to-digital converters (ADCs) with low-voltage differential signal (LVDS) outputs.

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1 Description

The ADS527xEVM is designed to provide ease of use in evaluating the performance of the ADS527x family of 10- and 12-bit ADCs with LVDS outputs. When combined with the ADSDeSer-50EVM, a complete evaluation of the ADS527x family can be performed. The ADS527xEVM has the following features:

- Easy testing of the ADS527x family of 10 and 12-bit data converters
- Single-ended, transformer-coupled inputs.
- PC interface to control internal registers.

2 Power Supplies

The ADS527x EVM requires four supplies:

- AVDD – 3.3V DUT analog supply
- DVDD – 3.3V Digital supply for the microcontroller and RS232 level shifter
- LVDD – 1.8V to 3.3V LVDS output driver supply

- AW – 3.3V Clock driver supply

All of the supplies can be connected to one 3.3V supply for ease of connectivity.

3 Signals

3.1 External Reference

By default, the ADS527x EVM defaults to an internally generated referenc. However, by asserting SW3, the ADS527x will use the REFT and REFB supplied on P1 as its references.

3.2 Inputs Signals

The input signals are applied to SMA connectors J1, J3, J5, J7, J9, J11, J13 AND J15. The input signals are transformer-coupled to the inputs of the ADC. There are no coupling capacitors, only resistors in series with the converters inputs to the transformers.

3.3 Output Signals

The LVDS outputs from the ADC are sent to P6. P6 is used to connect the ADS527xEVM to the ADSDeSer-50EVM to provide a means for deserializing the data for external processing.

3.4 Clock Signal

Enter a clean, low jitter, 3Vpp clock on J17. The maximum clock frequency should be set with the aid of the device data sheet. Either a sinusoidal or square-wave clock input can be expected.

4 Operation

When power is applied to the board, the EVM performs an initialization sequence that sets the initial operation of the ADS527x. The Ref LED lights up to signify that the Int/Ext reference is set to internal. The RST LED is illuminated while a reset pulse is provided to the ADS527x to reset the device for proper operation. The EVM is now operational. If it is connected to the ADSDESer-50EVM and the reset pushbutton is pressed on the deserializer board, parallel data should be available on each channel output, and a clock should be present on the clock output.

4.1 Pushbuttons and Indicator LEDs

The ADS527xEVM has three pushbuttons and four indicator LEDs, as shown in Figure 1. The pushbuttons and their corresponding LEDs are defined as follows:

- **SW1 – RST** – ADS527x device reset (resets only the ADS527x device).
- **SW2 – PD**– ADS527x device power-down (LED on signifies that only the ADS527x device is in complete power-down).
- **SW3 – Ref**– Internal/$\overline{\text{External}}$ Reference Selection (LED on signifies Internal reference).

When illuminated, the fourth LED (SDI) signifies that data has been received from the PC through the serial link.

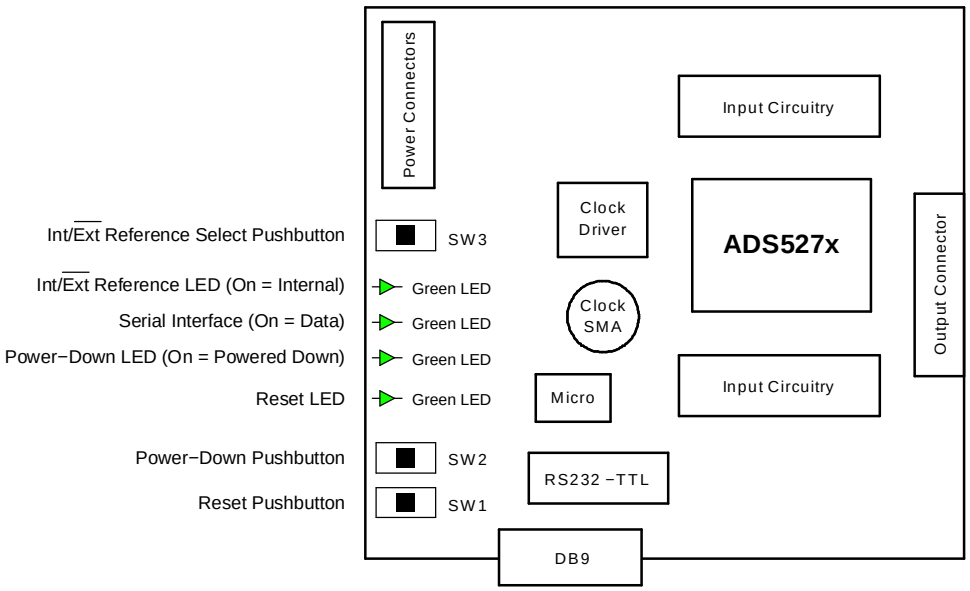


Figure 1. Evaluation Board Overview

4.2 Serial Data In

The Serial Data In (DB-9) connector is used to connect the EVM to a PC for accessing the internal registers of the ADS527x device. This allows extended flexibility of the device beyond the simple power-up mode.

4.3 Accessing the Internal Registers

The ADS527x family has several internal registers that offer flexibility to the end user. In order to facilitate using these registers, the evaluation program is used. With the combination of a serial port on a PC, EVM software, a serial link cable (provided), and the ADS527xEVM, the user has the ability to access the internal registers on the ADS527x family of data converters.

4.4 Installing the Software

Software installation is straightforward. Insert the included CD and double click on the Setup.exe file. This will install the program and all necessary files to the PC.

Note: The installation files are also available for download from the TI web site at www.ti.com.

Once the installation process is complete go to the *START* > *Programs* > *ADS527xEVM_Software* > *ADS527xEVM_Software* icon to start the program.

4.5 Using the Software

After clicking on the ADS527xEVM_Software icon, an initial startup screen will be displayed, as shown in Figure 2. The COM Port Selection prompt, as shown in Figure 3, will appear in front of Figure 2.

Figure 2. Initial Startup Screen

Figure 3. COM Port Selection Prompt

Click *OK* and then select the proper COM port from the drop-down list, as shown in Figure 4. The program lists all available COM ports on your system to choose from. Once a COM port is selected, the main program window will open. (This example only shows two COM ports listed. Results will vary based on your actual system configuration.)

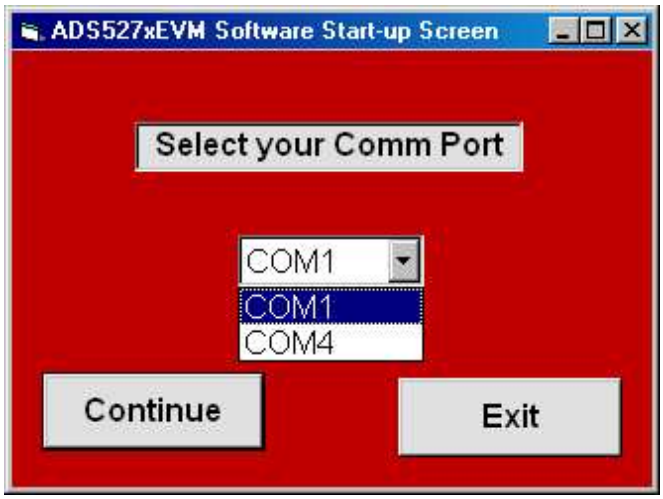


Figure 4. COM Port Drop-Down Selection List

The main program window (see Figure 5) allows the user to access the registers of the ADS527x family. With this program, it is easy to change operating characteristics, send out test patterns, or power down any of the eight channels of the ADS527x converter. The software also contains the ability to reset the ADS remotely from the PC in addition to the pushbutton on the EVM board itself.

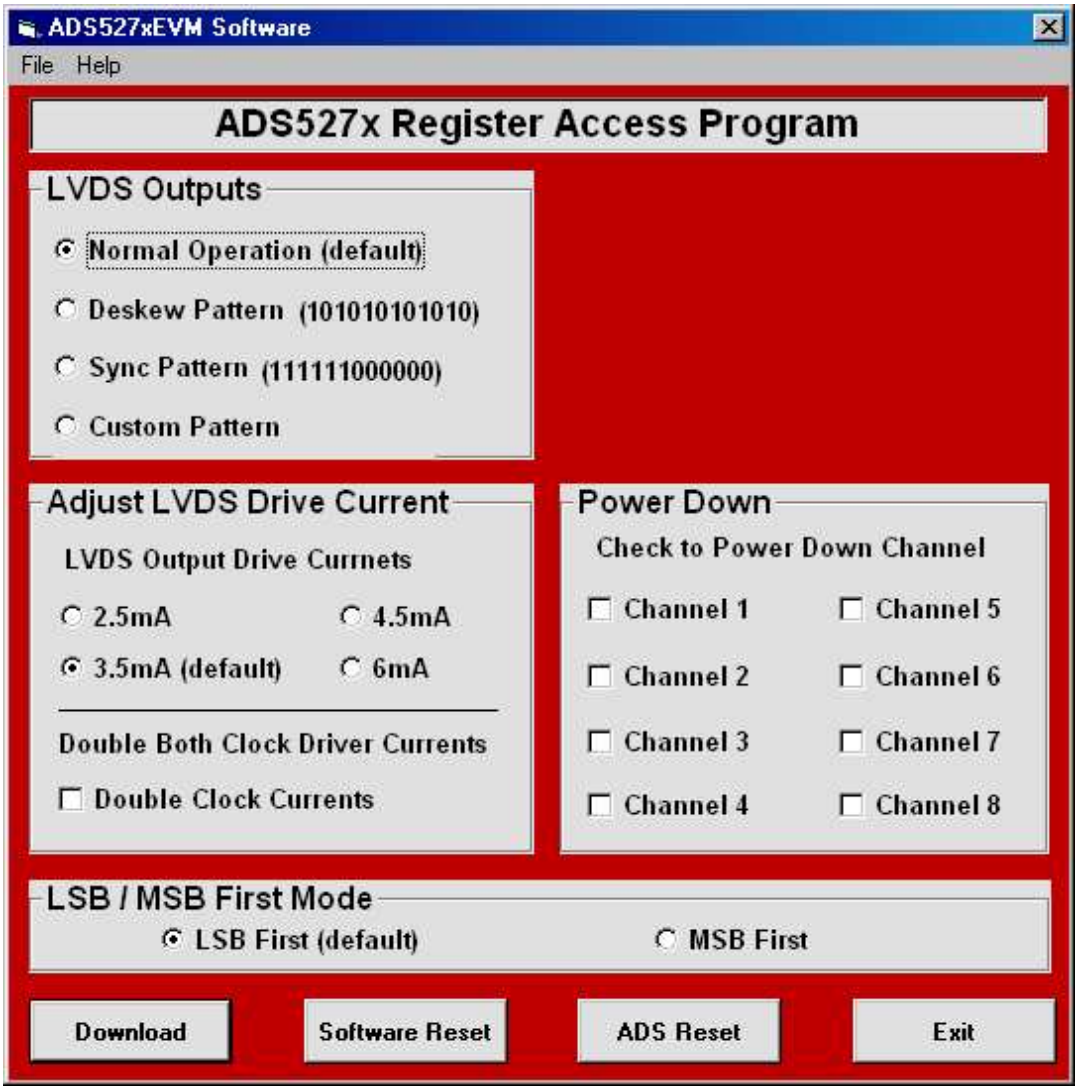


Figure 5. Register Access Program Screen

Once again, program operation is straightforward. Make your selection and press the *Download* button. The proper codes are then sent from the PC to the ADS527xEVM board. A software reset is provided to reset all choices to their default values. To exit the program, click the the *Exit* command button or go to the File menu and select *Exit*.

4.6 Custom Pattern Generation

When using the custom pattern option, as shown in Figure 6, all of the values are entered in a binary format (e.g., 101011001111).

Note: Even when using a 10-bit device (ADS5277), both the internally-generated patterns and the custom pattern are 12 bits in length.

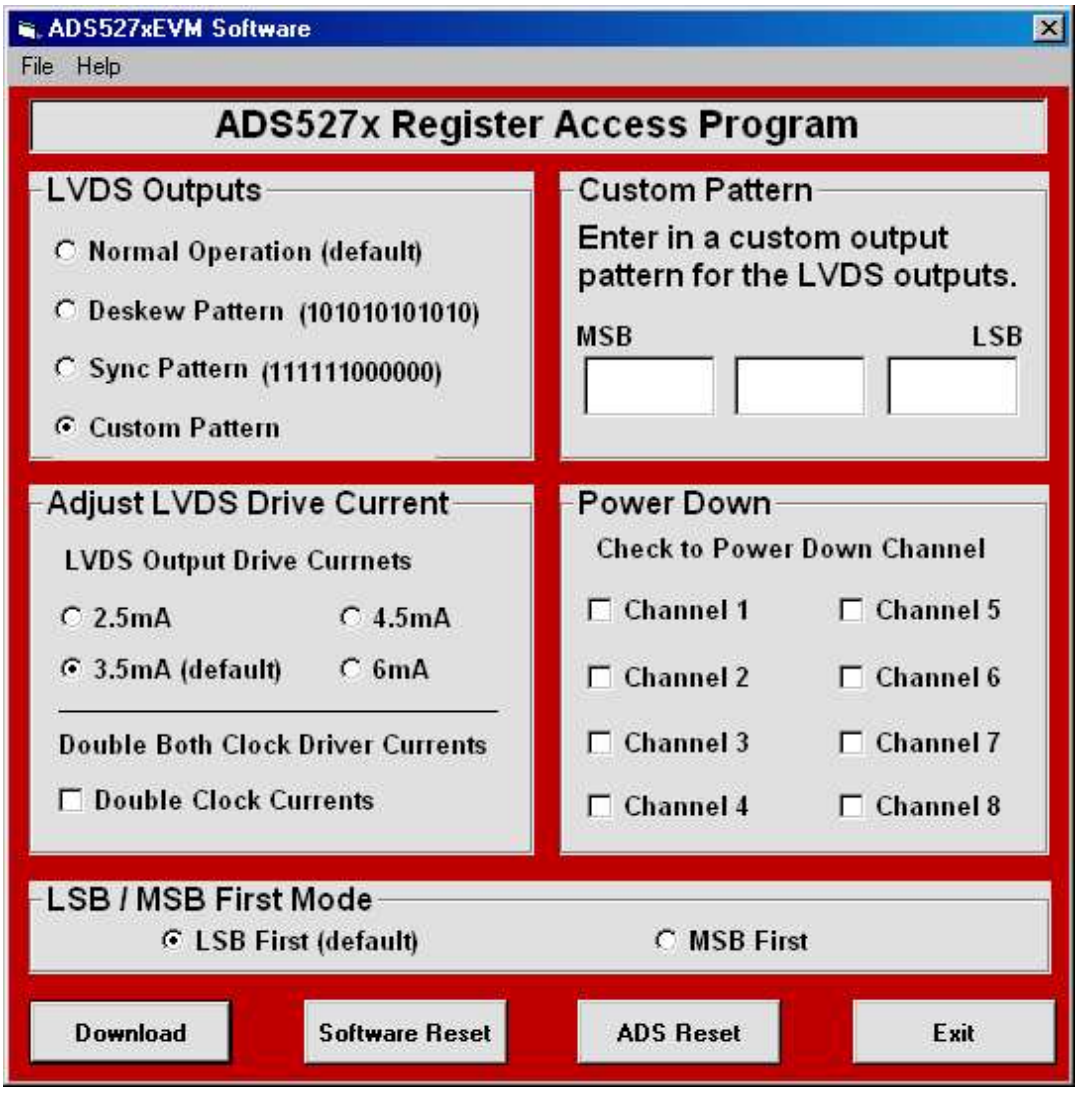


Figure 6. Register Access Program Screen – Custom Pattern Option

4.7 LSB/MSB First Mode

The default mode of data out of the ADS527x device is LSB first. This mode can be changed by selecting the *MSB First* option in the software, as shown in Figure 5 and Figure 6. This option increases the flexibility of the device.

Note: Changing to MSB First also reverses the internally-generated test patterns and the custom pattern. This will show up on the Register Access screen as blue text.

5 Bill of Materials

Table 1. Component List

MFG PART #	INSTALLED REF DES	DESCRIPTION	MFG	DO NOT INSTALL	COMMENTS
ADS527xPFC	U1	IC, 10/12-BIT, 40-70MSPS, LVDS, 8-CHANNEL A.D.C.			**See Note 1 (NOT IN SOURCE)**
CRCW040210R0F	R1, R2	RES, 10 Ω, 0.1W, 1%, 0402 CHIP, THICK FILM	VISHAY/DALE		
CRCW040249R9F	R6, R8, R9, R13, R14, R18,R19, R23, R24,R28, R29, R33,R34, R38, R39,R43, R44, R54,R55, R56–R69, R83	RES, 49.9 Ω, 0.1W, 1%, 0402 CHIP, THICK FILM	VISHAY/DALE		
CRCW0402000RF	R4, R7, R10–R12, R15–R17, R20–R22M R25–RR27, R30–R32, R35–R37, R40–R42, R45, R46	RES, 0.0 Ω, 0.1W, 1%, 0402 CHIP, THICK FILM	VISHAY/DALE	R5, R7, R11, R12, R16, R17, R21, R22, R26, R27, R31, R32, R36, R37, R41, R42, R46	
CRCW0402332RF	R49–R52	RES, 332 Ω, 0.1W, 1%, 0402 CHIP, THICK FILM	VISHAY/DALE		
CRCW1206000	R70–R72	RES, 0.0 Ω, 0.125W, 0%, CHIP-JUMPER	DALE		
CRCW04024751F	R47, R48, R53	RES, 4.75 kΩ, 0.1W, 1%, 0402 CHIP, THICK FILM	VISHAY/DALE		
CRCW04025622F	R3	RES, 56.2 kΩ, 0.1W, 1%, 0402 CHIP, THICK FILM	VISHAY/DALE		
ERJ-2RKF4990X	R80–R82	RES, 499 Ω, 0.1W, 1%, 0402, CHIP	Panasonic		
CY8C27243-24PVXI	U4	IC, MICROCONTROLLER, 8-bit PSoC			**See Note 2 (NOT IN SOURCE)**
DEKL-9SAT-F	P5	CONN, DB9, RTANG RECPT 0.318 W/ SCRW. LCKS.	CINCH		
ECJ0EB1A104K	C2, C3, C5, C14, C18, C21, C23, C24–C26, C30, C31, C33, C35, C37, C39, C41, C43–C45, C47–C49, C51–C53, C55–C57, C59–C61, C63–C65, C67–C69, C71–C78	CAP, 0.1 µF, 10VDC, 10%, CERAMIC MULTILAYER CHIP	Panasonic		
ECJ0EB1C103K	C16, C17, C80	CAP, 0.01 µF, 16VDC, 10%, CERAMIC MULTILAYER CHIP	Panasonic		
ECJ0EB1H102K	C19, C20, C22, C27–C29, C32, C34, C36, C38, C40	CAP, 0.001 µF, 50V DC, 10% CERAMIC MULTILAYER 0402	Panasonic		
ECJ0EC1H100K	C42, C46, C50, C54, C58, C62, C66, C70	CAP, 10 pF, 50V DC, 10% CERAMIC MULTILAYER 0402	Panasonic		
ECJ1VB1C104K	C6, C9, C10, C12	CAP, 0.1 µF, 16VDC, 10%, CERAMIC MULTILAYER CHIP	Panasonic		
EVQPJB04K	SW1–SW3	SWITCH, SPST, PCB MOUNT			
MAX3221CDB	U3	No PDB description available			
MC100EPT21DT	U2	IC, 3.3V TRANSLATOR, DIFFERENTIAL LVPECL to LVTTL	On Semiconductor		
PTR AK550 3	P1–P3	TERM. BLK, 3 POS POWER CONNECTOR			
QTH-040-01-F-D-DP-A	P6	CONN, 80 PIN SMT, HI SPEED TERMINAL STRIP	SAMTEC		
SML-LX1206-GC-TR	CR1–CR4	LED, SMT 1206, GREEN			
TTWB-4-B	T1–T8	XFMR, RF, 0.1–1500 MHz	COILCRAFT		
T491B225K016AS	C1, C4	CAP, 2.2 µF, 16V, 10%, TANTALUM CHIP-MOLDED	KEMET		
T491B475K016AS	C7, C8, C11, C13	CAP, 4.7 µF, 16V, 10%, TANTALUM CHIP-MOLDED	KEMET		

Table 1. Component List (continued)

MFG PART #	INSTALLED REF DES	DESCRIPTION	MFG	DO NOT INSTALL	COMMENTS
142-0701-201	J1, J3, J5, J7, J9, J11, J13, 15, J17	CONN, SMA JACK 0.2CC LO-COST		J2, J4, J6, J8, J10, J12, J14, J16	
102203-3	P4	CONN, HEADER, 6 POSITION, RIGHT ANGLE, SINGLE ROW			
SRS4-8-01	1/2" Stand offs		Richo Inc.		

6 Schematic and PCB

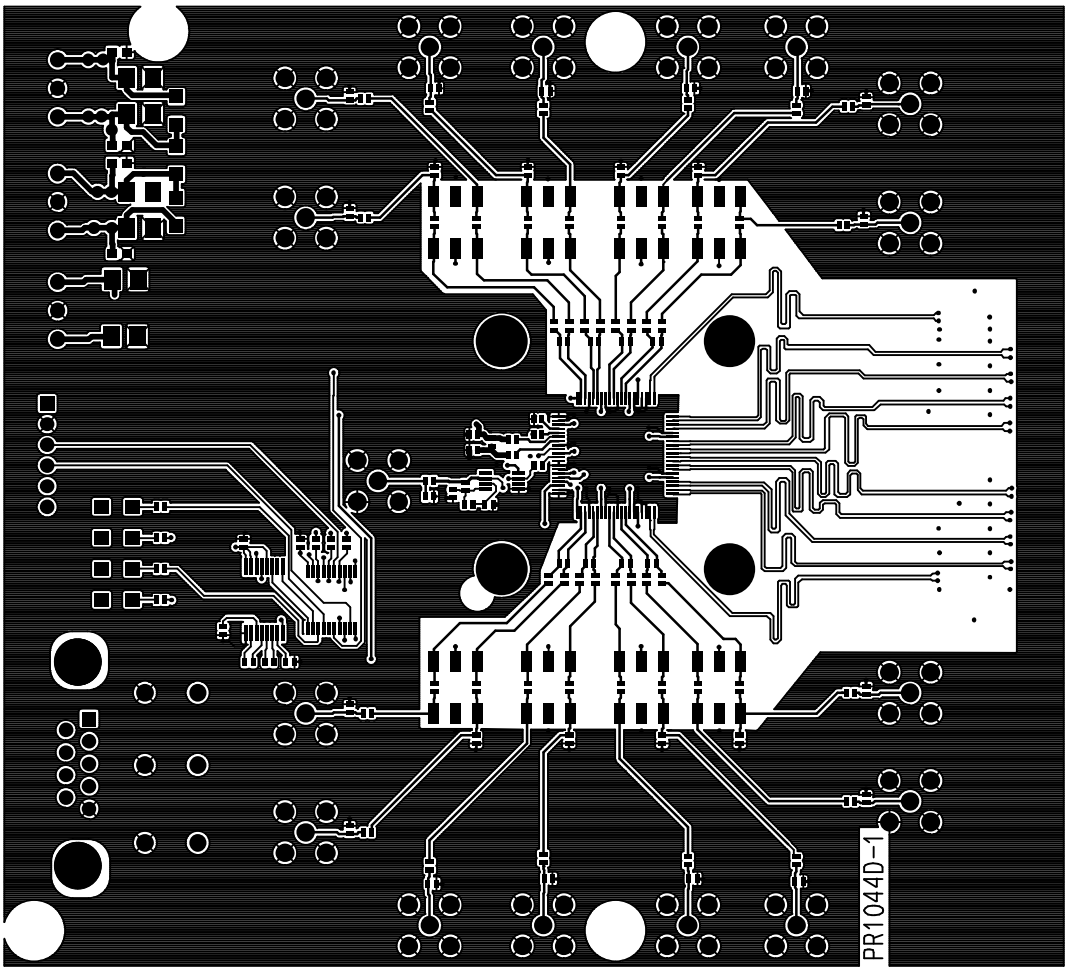


Figure 7. ADS527xEVM PCB – Top Layer

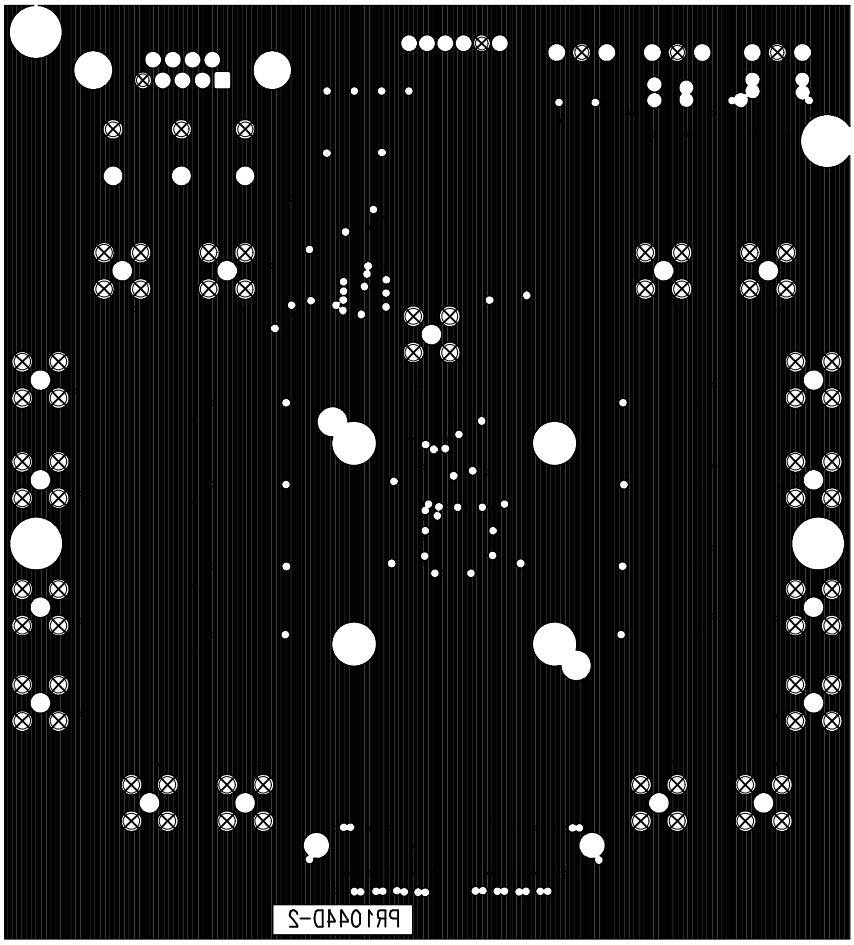


Figure 8. ADS527xEVM PCB – Ground Layer

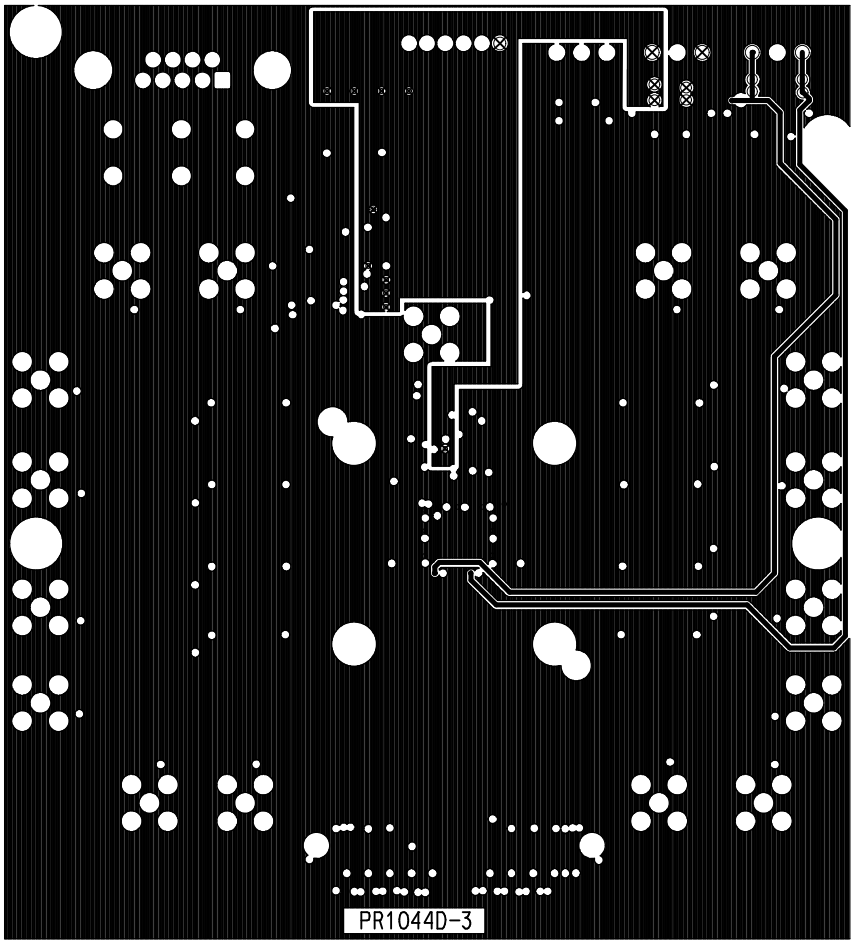


Figure 9. ADS527xEVM PCB – Power Layer

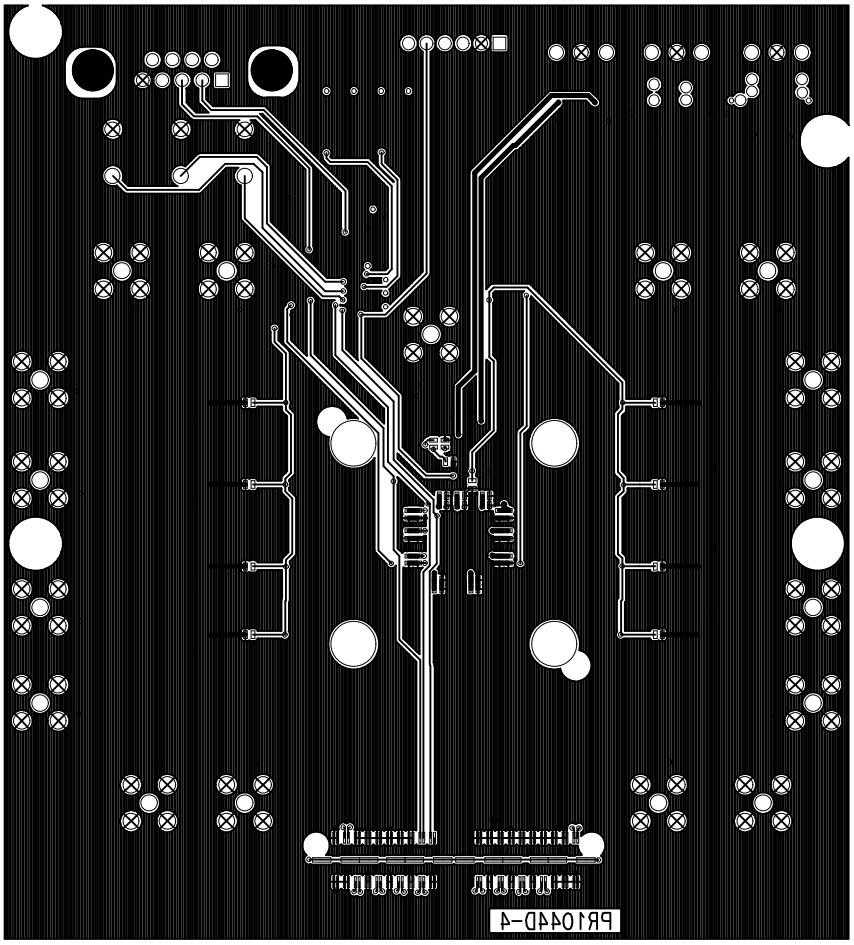
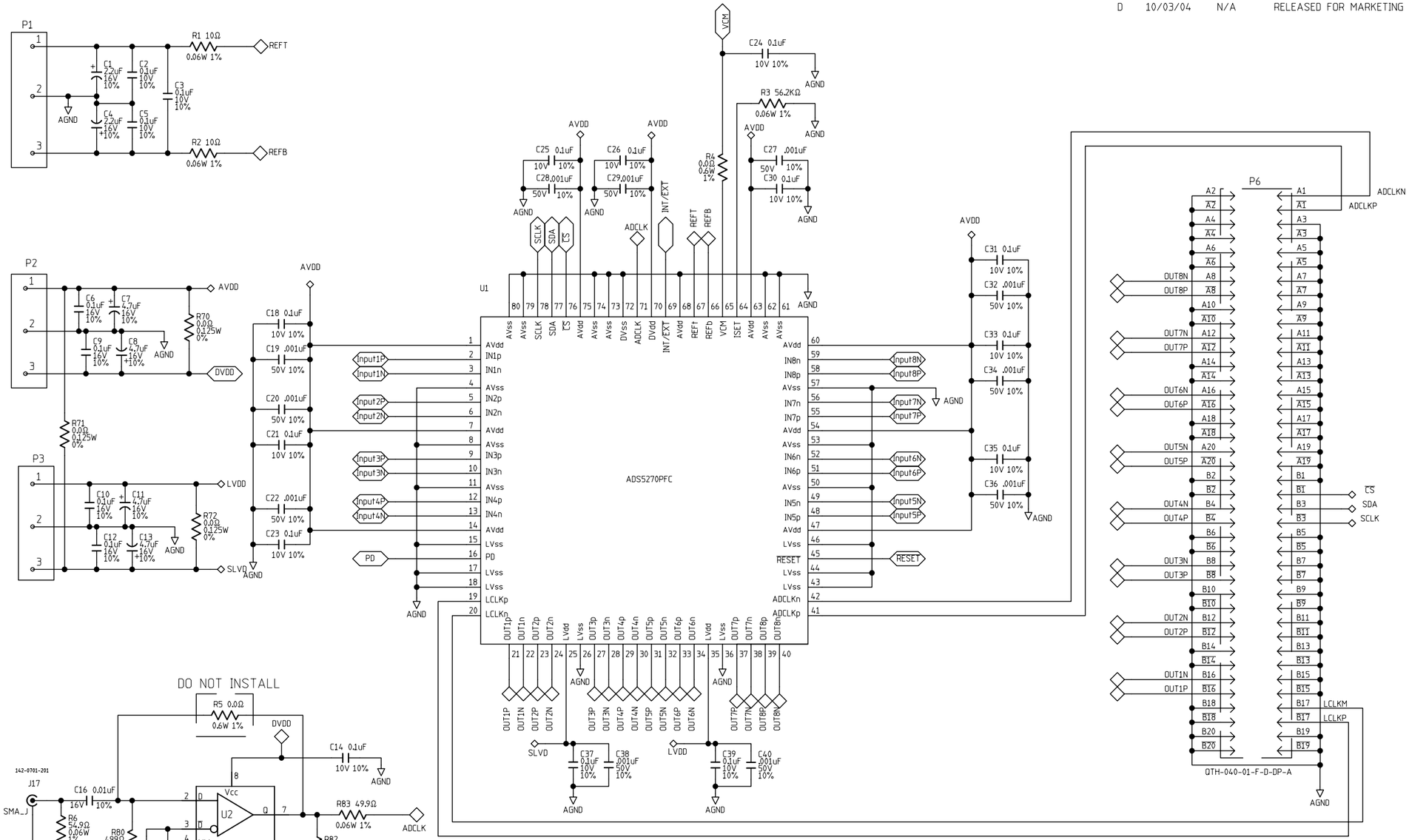


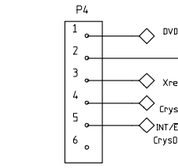
Figure 10. ADS527xEVM PCB – Bottom Layer

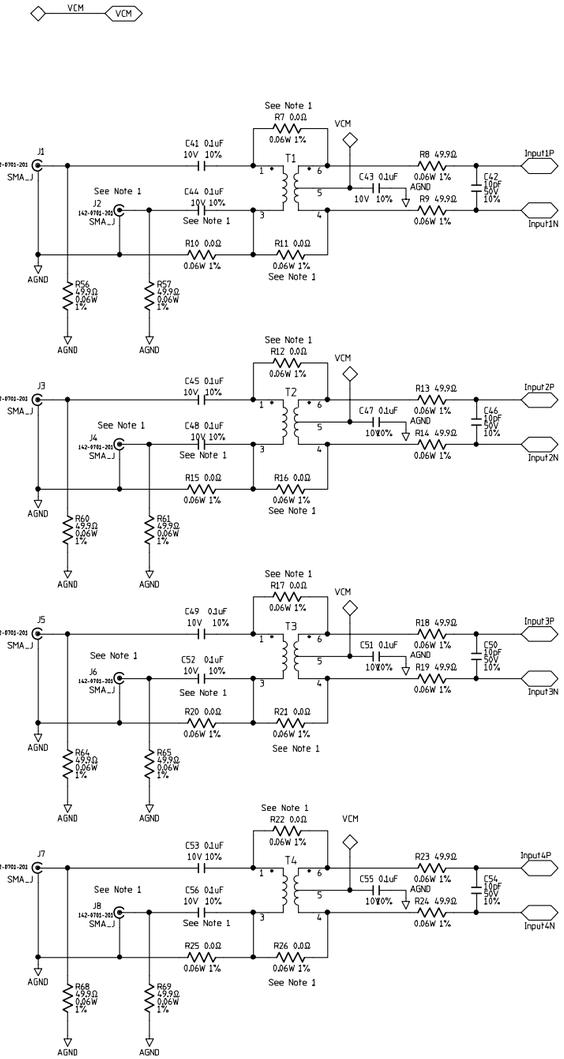
REVISIONS			
REV	DATE	DCR #	DESCRIPTION
A	10/07/03	N/A	NOT DOCUMENTED
B	12/22/03	N/A	NOT DOCUMENTED
C	08/16/04	N/A	NOT DOCUMENTED
D	10/03/04	N/A	RELEASED FOR MARKETING

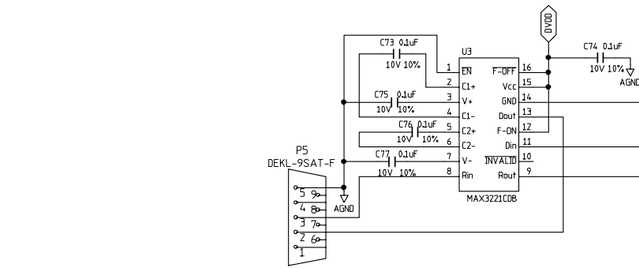


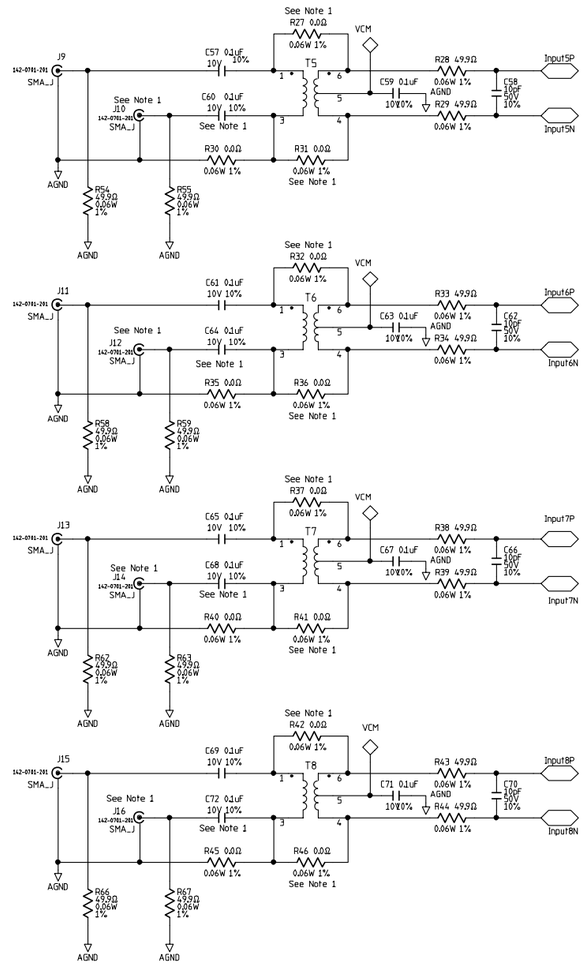
CAD ORIGINAL ON VBDC

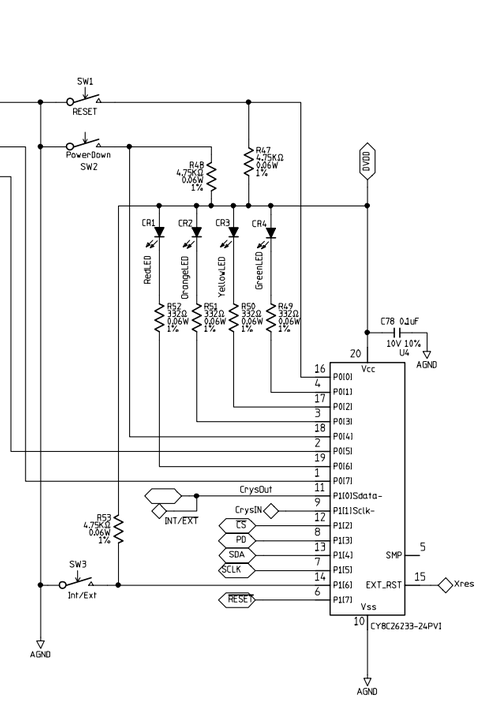
USED ON PR1044	TEXAS INSTRUMENTS TUCSON CORP. P.O. BOX 11400-TUCSON, ARIZONA 85734
CONTRACT NO.	
APPROVALS / DATE	CIRCUIT DIAGRAM: ADS5270PFC PQFP-80 EVM BOARD
DRAWN P. LUONG 10/07/03	
CHECKED D. NORRGARD 10/09/03	SIZE C · CAGE CODE 13919 · DWG. NO. PR1044 · REV D
ISSUED	
PR1044 -D	SCALE: · SHEET 1 of 2











NOTE: DO NOT INSTALL
J2, J4, J6, J8, J10, J12, J14, J16,
C15, C44, C48, C52, C56, C60, C64, C68, C72,
R7, R11, R12, R16, R17, R21, R22, R26,
R27, R31, R32, R36, R37, R41, R42, R46.

CAD ORIGINAL ON VBDC

SIZE	CAGE CODE	DWG. NO.	REV
D	13919	PR1044	D
SCALE:		SHEET	2 of 2

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