TEXAS INSTRUMENTS

ADS1625 and ADS1626 EVM

User's Guide

December 2003

Data Acquistion

SLAU123

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During normal operation, some circuit components may have case temperatures greater than 70°C. The EVM is designed to operate properly with certain components above 0°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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Preface

Read This First

About This Manual

This user's guide describes the characteristics, operation, and use of the ADS1625/26 EVM 18-bit Analog-to-Digital Evaluation Board. A complete circuit description as well as schematic diagram and bill of materials are included. Contact the Product Information Center or e-mail dataconvapps@list.ti.com for questions regarding this EVM.

How to Use This Manual

This document contains the following chapters:

- Chapter 1 – EVM Overview
- Chapter 2 – Digital Interface
- Chapter 3 – Power Distribution
- Chapter 4 – Getting the Most From Your EVM
- Chapter 5 − EVM BOM, ADS1625/26EVM Layouts and Schematics

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Data Sheets:	Literature Number:
ADS1625/ADS1626	SBAS280
REF02	SBVS003A
OPA2822	SBOS188A

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Contents

1 EVM Overview 1-1
1.1 Features 1-2
1.2 Introduction 1-2
1.3 Analog Interface 1-2
1.4 Analog Input 1-3
1.5 External Reference 1-3
1.6 Modulator Clock 1-4

2 Digital Interface 2-1
2.1 Board-Level Control 2-2
2.1.1 DIP Switch Options 2-2
2.1.2 Jumper Options 2-2
2.1.3 Resetting the ADS1625 and ADS1626 2-3
2.1.4 Out of Range Indication 2-3
2.1.5 Interrupt Source 2-3
2.1.6 Base Address 2-3
2.1.7 Base Address and Chip Select 2-3
2.2 External Interface 2-4
2.3 Data Connector Pinout 2-5
2.3.1 Control Connector Pinout 2-5

3 Power Distribution 3-1

4 Getting the Most From Your EVM 4-1
4.1 Stand-Alone EVM 4-2
4.2 DSP Interface 4-2
4.2.1 TMS320C6711 Interface 4-2

5 EVM BOM, ADS1625/26 EVM Layouts and Schematics 5-1
5.1 EVM Bill of Materials 5-2
5.2 ADS1625/26 EVM Layout Details 5-10
5.3 ADS1625/26 EVM Schematics 5-13

Figures

1−1 Default Configuration Used by the EVM 1-3
1−2 Block Diagram 1-4
2−1 Arrangement of DSK, Interface Card and EVM 2-4
4−1 Jumper Settings for J13 and J14 on the 5−6K Interface Card 4-3
4−2 CCS Project Menu 4-4
4−3 CCS Project Open Dialog 4-4
4−4 CCS Project View 4-5
4−5 CCS Context Menu 4-6
4−6 CCS Graph Property Windows 4-7
4−7 CCS Window With Graph 4-8
5−1 Top Tracking Layer 5-10
5−2 Internal Power and Ground Layers 5-11
5−3 Bottom Tracking Layer 5-12

Tables

1−1 Analog Interface 1-2
1−2 Selection Between Internal/External Reference 1-3
1−3 External Reference 1-3
1−4 Modulator Clock Settings 1-4
2−1 Switch Function Control 2-2
2−2 FIFO Settings 2-2
2−3 Jumper Options 2-2
2−4 Memory Space Address 2-4
2−5 Assignment and Function at J2/P2 2-5
2−6 Assignment and Function at J3/P3 2-5
3−1 Power Connector P4/J4 3-1
4−1 Jumper Settings for J13 and J14 on the 5−6K Interface Card 4-3
5−1 ADS1625 Bill of Materials 5-2
5−2 ADS1626 Bill of Materials 5-6

Chapter 1

EVM Overview

Topic Page

1.1 Features 1-2
1.2 Introduction 1-2
1.3 Analog Interface 1-2
1.4 Analog Input 1-3
1.5 External Reference 1-3
1.6 Modulator Clock 1-4

1.1 Features

- ❑ Evaluation Board featuring the ADS1625 ADC (order ADS1625 EVM) or ADS1626 (order ADS1626 EVM)
- ❑ Onboard reference, with recommended buffer circuitry
- ❑ Onboard signal conditioning.
- ❑ Basic system-level logic decoding.

1.2 Introduction

The ADS1625 EVM is a high speed, high-resolution, delta sigma ($\Delta\Sigma$) analog-to- digital converter. It features a data rate of 1.25 MSPS, a bandwidth (−3 dB) of 615 kHz and a passband ripple of less than $\pm$0.0025 dB.

The evaluation module (EVM) is a stand-alone, full-featured system that offers data sheet performance. Additionally, the EVM conforms to a common electrical and mechanical pinout for analog I/O, digital I/O, and power, enabling the EVM to be quickly adapted to various host platforms.

1.3 Analog Interface

The analog interface consists of the following subsections:

- ❑ Analog input
- ❑ External reference
- ❑ Modulator clock

Each portion of the analog interface can be adapted to some extent. The modifications are summarized in Table 1−1 and discussed in detail in the appropriate subsection of this chapter.

Table 1−1. Analog Interface

Reference Designator	Description	Factory Set Condition	
		1−2	2−3
Analog Input options			
W1	Selects AIN_N source	Installed	Not installed
W2	Selects AIN source	Installed	Not installed
Reference voltage options			
W3	Selects VREFN source	Installed	Not installed
W4	Selects VCOM source	Installed	Not installed
W5	Selects VREFP source	Installed	Not installed
W6	Connects VCM for on board reference	Installed	
Modulator clock options			
W7	Modulator clock source	Installed	Not installed

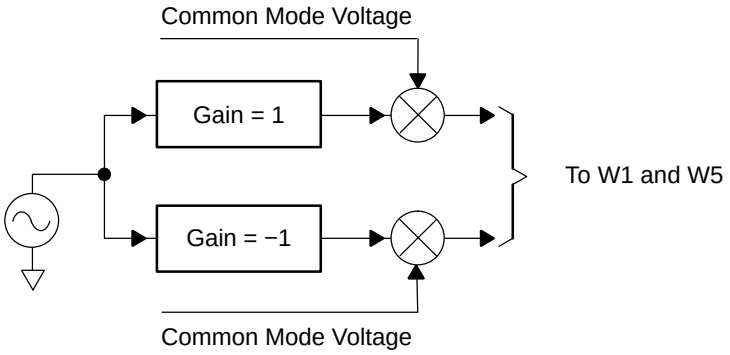
1.4 Analog Input

Various options are available to deliver the signal to the ADC:

- ❑ Single-ended via SMA connector at J6.
- ❑ Single-ended via socket strip/header at J1/P1 connector.
- ❑ Differentially via socket strip/header at J1/P1 connector.

The default configuration used by the EVM is shown in Figure 1−1. It provides a convenient method to convert a single-ended bipolar signal into a differential signal. The signal is centered on a common mode voltage derived from the reference section of the EVM.

Figure 1−1. Default Configuration Used by the EVM



The differential signal is routed via W1 and W5, which enables the user to provide an external signal.

1.5 External Reference

The selection between the device's internal reference and an external reference is made by SW1. 8−9

Table 1−2. Selection Between Internal/External Reference

Reference Designator	Voltage Reference Selection	
SW1 8−9	**Internal**	**External**
0	Not selected	Selected
1	Selected	Not selected

To use the external reference voltage, the user must apply an input voltage via J7, the voltage supplied must be between 8 V and 40 V.

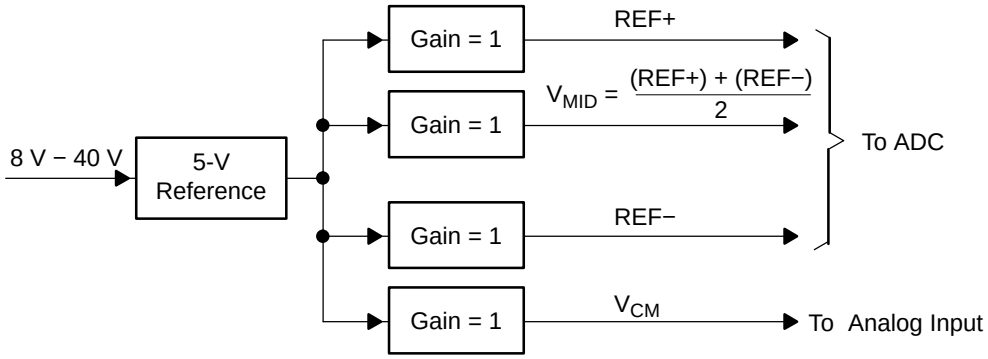
The external reference voltage is generated differentially and can be adjusted by three potentiometers, detailed in Table 1−3.

Table 1−3. External Reference

Reference Designator	Function
RV2	Adjusts main +5 V
RV1	Adjusts REF+ voltage
RV3	Adjusts REF− voltage

Figure 1−2 shows a block diagram of the configuration.

Figure 1−2. Block Diagram



1.6 Modulator Clock

The ADS1625 and ADS1626 partition the modulator clock as part of the analog section. Two options are available. The clock can either be supplied via the onboard 40-MHz oscillator, or externally via J5. This option is useful for low-jitter coherent sampling during testing.

Table 1−4. Modulator Clock Settings

Reference Designator	Description	Factory-Set Condition	
		1−2 Clock ≥40 MHz	2−3 Clock ≥J5
W7	Modulator Clock Source	Installed	Not installed

Chapter 2

Digital Interface

This chapter describes the EVM digital interface consists of the following subsections:

Topic **Page**

2.1	Board-Level Control	2-2
2.2	External Interface	2-4
2.3	Data Connector Pinout	2-5

2.1 Board-Level Control

2.1.1 DIP Switch Options

The optional settings for the ADS1625/26 are set and controlled manually via a DIP switch – SW1. The functions controlled by this switch are summarized below.

Table 2−1. Switch Function Control

Switch		Factory-Set Condition	
Position	**Function**	**1**	**0**
8	External reference	External reference is selected	Internal reference is selected
7	Power down	Device is not powered down	Device is powered down
6	Reserved		
5	Reserved		
4	Reserved		
3	FIFO 0	Only applicable to ADS1626, See Table 2−2	
2	FIFO 1		
1	FIFO 2		

Table 2−2. FIFO Settings

FIFO 2	FIFO 1	FIFO 0	FIFO Buffer Level
0	0	0	0
0	0	1	2
0	1	0	4
0	1	1	6
1	0	0	8
1	0	1	10
1	1	0	12
1	1	1	14

More information on the operation and use of the FIFO can be found in the ADS1625/26 data sheet.

2.1.2 Jumper Options

There are 5 jumpers associated with the digital control section. Their functions are detailed in Table 2−3.

Table 2−3. Jumper Options

Reference Designator	Description	Factory-Set Condition	
		1−2	**2−3**
W9	Select $\overline{\text{RESET}}$ source	Derived from W10	Directly from J3 pin 3
W10	Select $\overline{\text{WR}}$ source	Derived from digital interface	Manual, via SW2
W11	Select $\overline{\text{DRDY}}$ source	Falling edge interrupt	Rising edge interrupt
J8 1−2	Address line A2	High	
J8 3−4	Address line A3	High	

2.1.3 Resetting the ADS1625 and ADS1626

The ADS1625 and ADS1626 are synchronously reset on the EVM when the $\overline{\text{RESET}}$ pin is asserted LOW. This can be accomplished by issuing a write command ($\overline{\text{WR}}$) via the host system or momentarily depressing switch SW2. Whichever option is chosen, the reset signal is then synchronized with the modulator clock and is available for application to the $\overline{\text{RESET}}$ pin of the device. Alternatively, the user can apply the $\overline{\text{RESET}}$ signal directly via W9.

2.1.4 Out of Range Indication

LED D1 indicates if an out of range (OTR) event has occurred. This LED does not affect the device's performance. To clear the LED, the device has to be reset either manually or via SW2.

2.1.5 Interrupt Source

Some microprocessors only recognize falling edge interrupts; others only recognize rising edge interrupts whereas others may be programmed to recognize either. By using W11, the user can choose either rising edge interrupts or falling edge interrupts.

2.1.6 Base Address

The EVM can be mapped into a memory location by setting one of four possible base addresses. The base address is set by J8. When the logic state of the two external address signals matches the logic state setup by the two jumpers on J8 and the access is a valid memory access, the EVM generates a $\overline{\text{CS}}$ signal for the ADC. This can then be further qualified as a read cycle or a write ($\overline{\text{RESET}}$) cycle.

2.1.7 Base Address and Chip Select

An installed jumper is equivalent to logic 0 on the corresponding address line. An uninstalled jumper is equivalent to logic 1 on the corresponding address line.

The TMS320C6711 DSK provides two memory spaces for daughter boards. The two memory-space enables (CE2 and CE3) are buffered versions of the DSP outputs and are not generated by decode logic on the DSK. The 5−6K EVM uses CE2 to indicate that the access is valid. This places the daughter card at an address space beginning at A0000000.

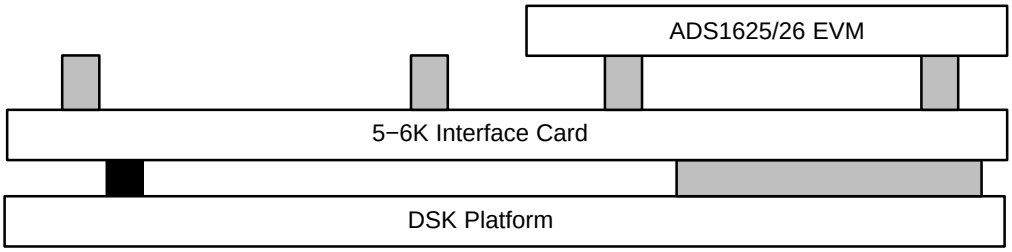
Table 2−4. Memory Space Address

J8		Address Selected
1−2	3−4	
0	0	0xA0000000
0	1	0xA0000004
1	0	0xA0000008
1	1	0xA000000C

2.2 External Interface

The pinout for the EVM has been arranged to easily mate with a growing range of interface adapters. The premise of this arrangement is to ensure a high degree of modularity without committing the EVM to be used in only one particular platform. The interface card that is available at this time is the 5−6K interface card http://focus.ti.com/lit/ug/slau104/slau104.pdf. This card enables any TMS320C5000™ DSP Platform or TMS320C6000™ DSP Platform-based DSK with standard expansion connectors to connect to the EVM. Figure 2−1 shows the arrangement of DSK, interface card, and EVM.

Figure 2−1. Arrangement of DSK, Interface Card and EVM



For interfaces to other platforms, such as C2000™ DSP and programmable logic systems, contact the PIC.

2.3 Data Connector Pinout

The data from the ADC is available at J2/P2. The assignment and function of each pin is given in Table 2−5.

Table 2−5. Assignment and Function at J2/P2

Pin Number	Function	Pin Number	Function
1	D00	2	IO Ground
3	D01	4	IO Ground
5	D02	6	IO Ground
7	D03	8	IO Ground
9	D04	10	IO Ground
11	D05	12	IO Ground
13	D06	14	IO Ground
15	D07	16	IO Ground
17	D08	18	IO Ground
19	D09	20	IO Ground
21	D10	22	IO Ground
23	D11	24	IO Ground
25	D12	26	IO Ground
27	D13	28	IO Ground
29	D14	30	IO Ground
31	D15	32	IO Ground
33	D16	34	IO Ground
35	D17	36	IO Ground
37	Not Connected	38	IO Ground
39	Not Connected	40	IO Ground

2.3.1 Control Connector Pinout

The ADC is controlled by the signals that originate from J3/P3. The assignment and function of each pin is given in Table 2−6.

Table 2−6. Assignment and Function at J3/P3

Pin Number	Function	Pin Number	Function
1	$\overline{CS}$	2	IO Ground
3	$\overline{WR}$	4	IO Ground
5	$\overline{RD}$	6	IO Ground
7	Not Connected	8	IO Ground
9	Not Connected	10	IO Ground
11	A2	12	IO Ground
13	A3	14	IO Ground
15	Not Connected	16	IO Ground
17	Not Connected	18	IO Ground
19	DRDY_OUT	20	IO Ground

Chapter 3

Power Distribution

The ADS1625/26EVM board requires various power sources for operation.

- A dual ±6-V dc supply
- Two 5-V dc supply
- A single 3-V dc supply
- A single 8-V – 40-V dc supply

The simplest way to provide these voltages is to use the power connector P4/J4 and derive the voltages elsewhere, preferably via linear supplies.

The pinout for this connector is shown in Table 3−1.

Table 3−1. Power Connector P4/J4

Signal	P4/J4 Pin Number		Signal
+VA	**1**	**2**	−VA
+5VA	**3**	**4**	−5VA
AGND	**5**	**6**	DGND
+1.8VD	**7**	**8**	VD1
+3.3VD	**9**	**10**	+5VD

Should the user decide to use a TI DSK, the digital requirements can be supplied by the DSK.

Chapter 4

Getting the Most From Your EVM

Generally, the user can take two hardware directions with the EVM.

Topic **Page**

4.1 Stand-Alone EVM 4-2

4.2 DSP Interface 4-2

4.1 Stand-Alone EVM

The EVM can be used on its own. Using the EVM in this manner obliges the user to provide a custom digital interface between the EVM and a host system. Users are responsible for ensuring that proper timing requirements are met in addition to providing any glue logic necessary. Users must also provide the necessary analog interface and supply power to the EVM.

4.2 DSP Interface

Depending on the DSP that the user chooses, a number of TI DSKs are available. DSKs are ***D***SP ***S***tarter ***K***its, and provide users with a DSP starter system. They contain all the necessary hardware and software to quickly begin prototype construction.

4.2.1 TMS320C6711 Interface

4.2.1.1 Example Program

This section is a step-by-step description of how to use one of the example programs supplied. The goal of the program is to display the digitized analog input of the ADS1625 on the PC, as shown in Figure 4−7.

The hardware is setup as follows:

- ❏ TMS320C6711 DSK
- ❏ 5−6K Interface card
- ❏ ADS1625 EVM

Given this configuration, the hardware is assembled as shown in Figure 2.1.

The example program uses the driver files created with the Data Converter Plug-in of Code Composer Studio™, which can be downloaded from the TI website at http://www.ti.com/sc/dcplug−in . For the example programs available with the ADS1625 EVM, the plug-in is not needed, as all the files are provided.

The program itself performs the following steps:

- ❏ Initialization of global variables by calling the function *dc_configure()* with the settings of the ADS1625. These settings are stored in the *Ads1605_1* data structure (defined in the file *t1625_fn.h*) which contains the information about the physical address of the converter, the interrupt in use and its polarity and other settings used by the driver. If the initialization fails for any reason, an error message appears in the *stdout* window of Code Composer Studio.
- ❏ Enabling of the interrupts of the DSP.
- ❏ Reading a block of data from the ADS1625 by calling the *dc_rblock()* function (residing in the file t1625_ob.c) with the settings of the ADS1625, the address of the memory block where the date should be written to and the block size. Once the transfer is complete, the semaphore *Ads1625_1.xferInProgress* is reset and a new transfer is initiated.

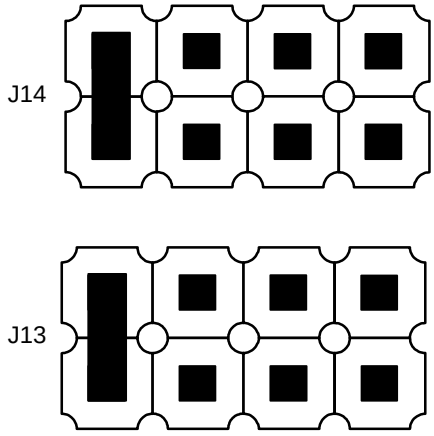
In order to get the expected result, the following steps need to be performed.

❑ Make sure that the jumpers on the 5−6K interface card are set according to the following Table 4−1 and Figure 4−1.

Table 4−1. Jumper Settings for J13 and J14 on the 5−6K Interface Card

Reference Designator	Position	
	1−2	2−3
W1	Installed	
W2	Not Installed	Installed
W3	Not Installed	Installed
W4	Not Installed	Installed
W5	Not Installed	Installed
W6	Installed	Not Installed

Figure 4−1. Jumper Settings for J13 and J14 on the 5−6K Interface Card



❑ Make sure that all jumpers on the ADS1625/1626 EVM are set to the factory defaults, as described in the Chapters 1 and 2 of this User's Guide.

Additionally, set the jumper W11 to position 2−3 to configure the interrupt for the rising edge. As described in Chapter 2, paragraph 2.1.5.

❑ Apply power to the DSP starter kit and also to the EVM, as described in Chapter 3.

❑ Apply an analog signal on either J6 or pin 4 of J1. For example, apply a 10-kHz sine wave with 1 V_{pp} and 0-V offset.

❑ Start Code Composer Studio (CCS).

❑ In Code Composer Studio, open the project for your DSP hardware platform by clicking on *Project −> Open* on Code Composer Studios menu bar and loading the respective project for your hardware/ starter kit from the path, where you copied the example projects to:

- For the TMS320VC5510 DSK: Open *ADS1625−C5510.pjt*
- For the TMS320C6711 DSK: Open *ADS1625−C6711.pjt*
- For the TMS320C6713 DSK: Open *ADS1625−C6713.pjt*
- For the TMS320C6416 DSK: Open *ADS1625−C6414.pjt*

Figure 4−2. CCS Project Menu

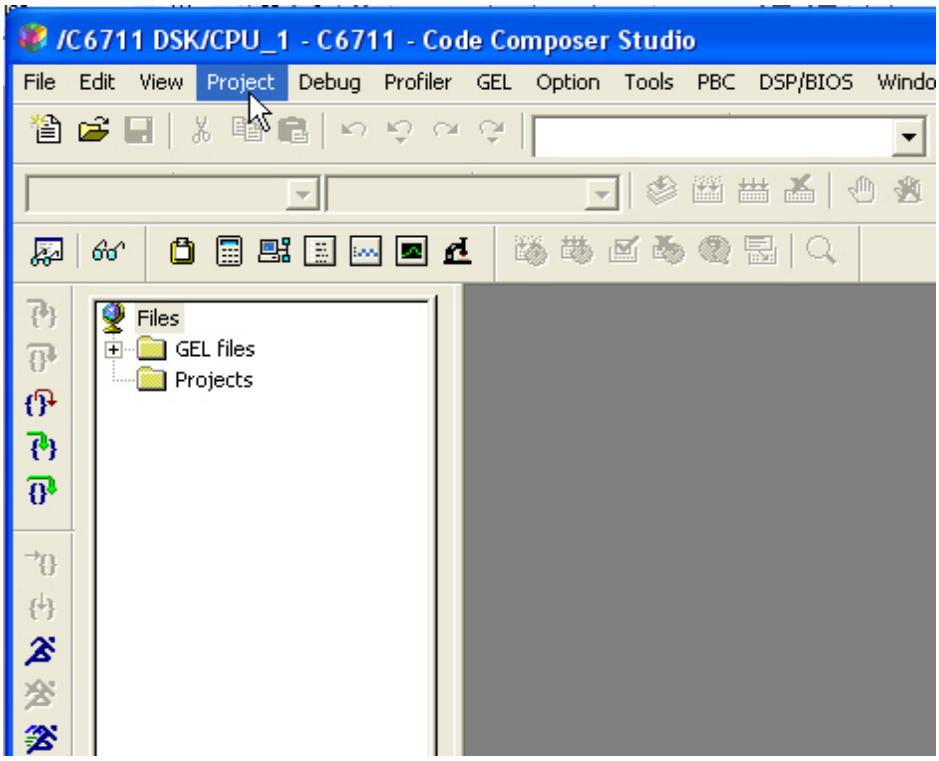
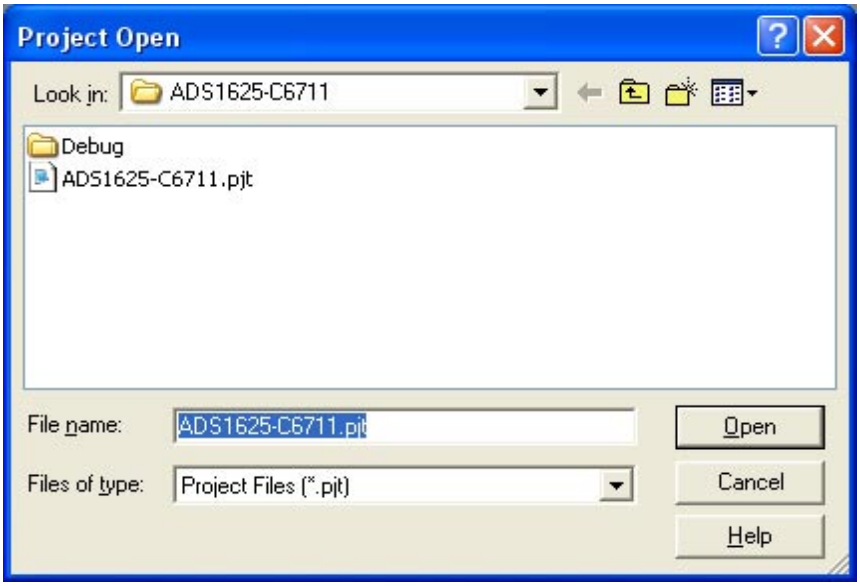
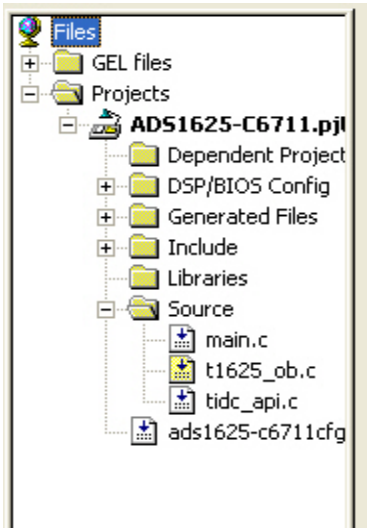


Figure 4−3. CCS Project Open Dialog



❑ Once the project is open, expand the project tree by clicking on the (+) in front of it and expand the source files as well. The project window should look like the one in Figure 4−4.

Figure 4−4. CCS Project View



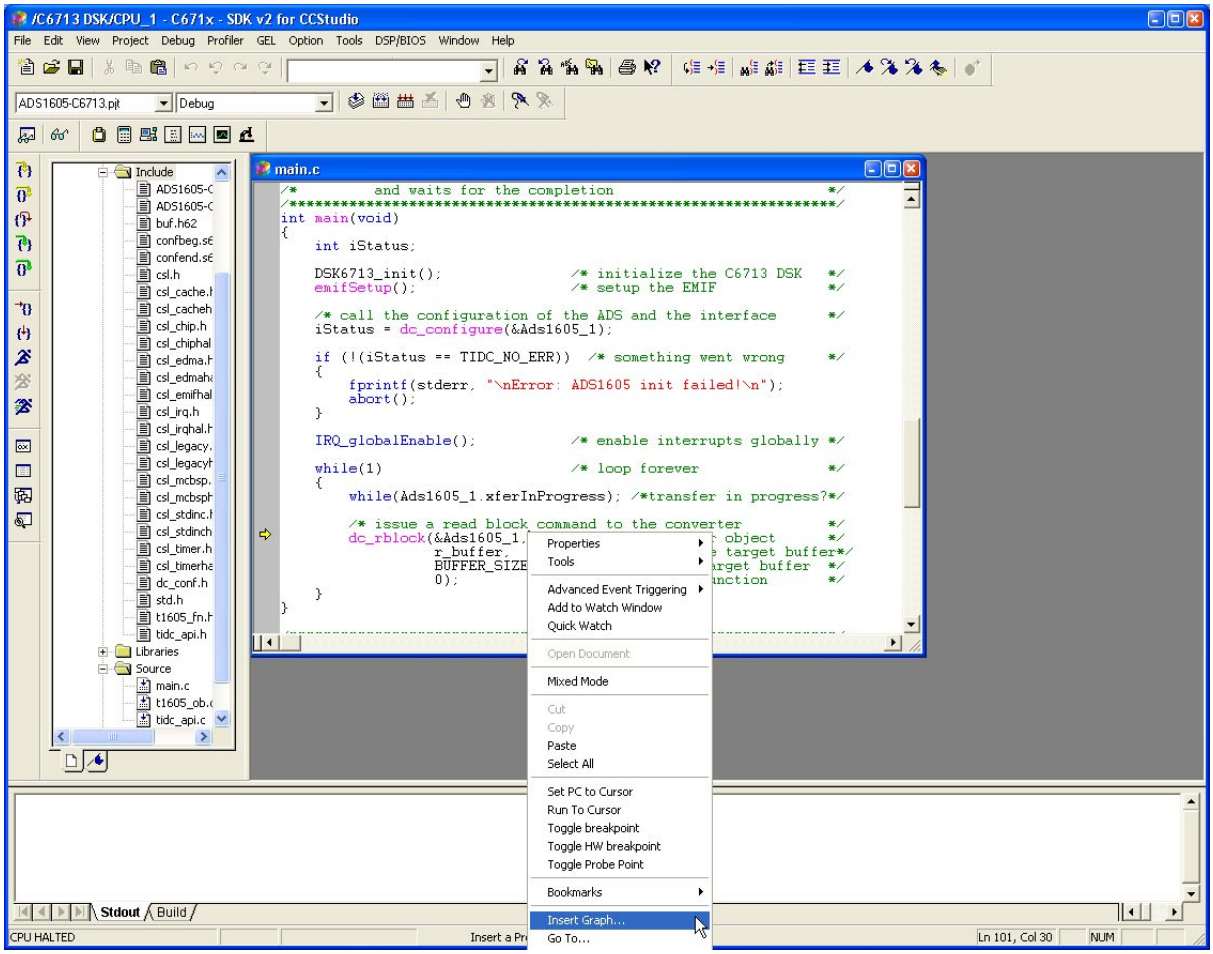
- Next, load the executable program provided into the DSP by clicking *on File → Load Program* and selecting the file *ADS1625−CXXXX.out* from the *Debug* submenu, where the XXXX in the filename stands for the platform you use (5510, 6711, 6713, 6416).

- Now open the *main.c* source file by double-clicking on the file name in the project view and scroll down to the line, where the read command for the ADS1625 is issued (*dc_rblock()* function). This line reads:

```
/* issue a read block command to the converter      */
dc_rblock(&Ads1625_1,  /* data converter object     */
   r_buffer,         /* address of the target buffer */
   BUFFER_SIZE,       /* size of the target buffer   */
    0);               /* no callback function        */
```

- Set the cursor in front of the *dc_rblock()* command and right click in this line. A new pop-up menu opens; select *Insert Graph*.

Figure 4−5. CCS Context Menu



❑ With this done, a new dialog window with the properties of the graph appears. Here, a few values must be entered, whereas most of the settings can be left in the default position:

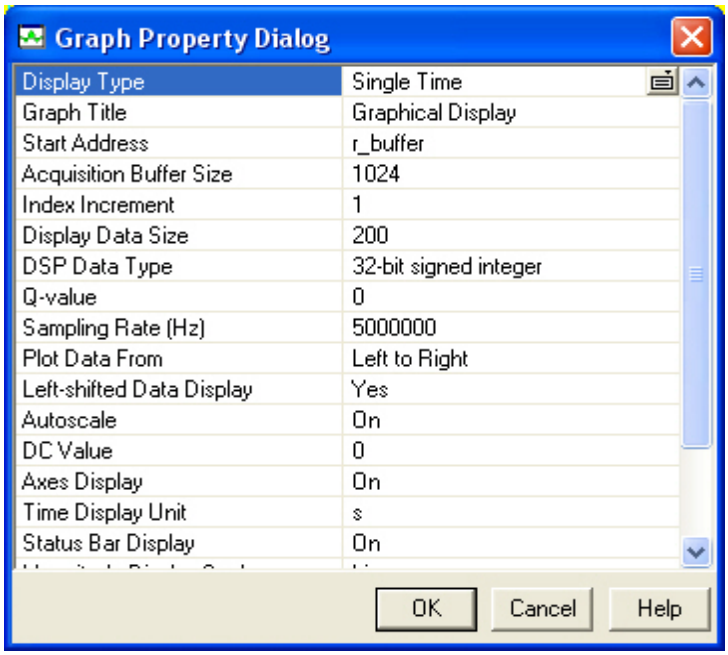
- **Start Address**: This is the starting location of the acquisition buffer containing the data to be graphed. When the graph is updated, the acquisition buffer, starting at this location, is fetched from the target board. This acquisition buffer then updates the display buffer, which is graphed. In the case of the sample program, set it to ***r_buffer***.
- **Acquisition Buffer Size**: This is the size of the acquisition buffer you are using on your target board. In the case of the sample program, the size of the *r_buffer* is defined with the symbol *BUFFER_SIZE* in the *main.c* file and should be set to ***1024*** in the dialog window.
- **Display Data Size**: This is the size of the display buffer that you use. The contents of the display buffer are graphed on your screen. The display buffer resides on the host, so a history of your signal can be displayed even though it no longer exists on the target board. When using the sample program, set it to ***1024*** as well.
- **DSP Data Type**: Select 16−bit signed integer from the drop-down list.

- **Sampling Rate (Hz)**: This field contains the sampling frequency for acquisition buffer samples, such as for analog to digital conversion. The sampling rate is used to calculate the time and frequency values displayed on the graph. For a time domain graph, this field calculates the values for the time axis. The axis is labeled from 0 to (Display Data Size × 1/Sampling Rate). For the sample program, set it to ***5000000*** (5 MHz).

More information on the different settings can be found in the help file of Code Composer Studio.

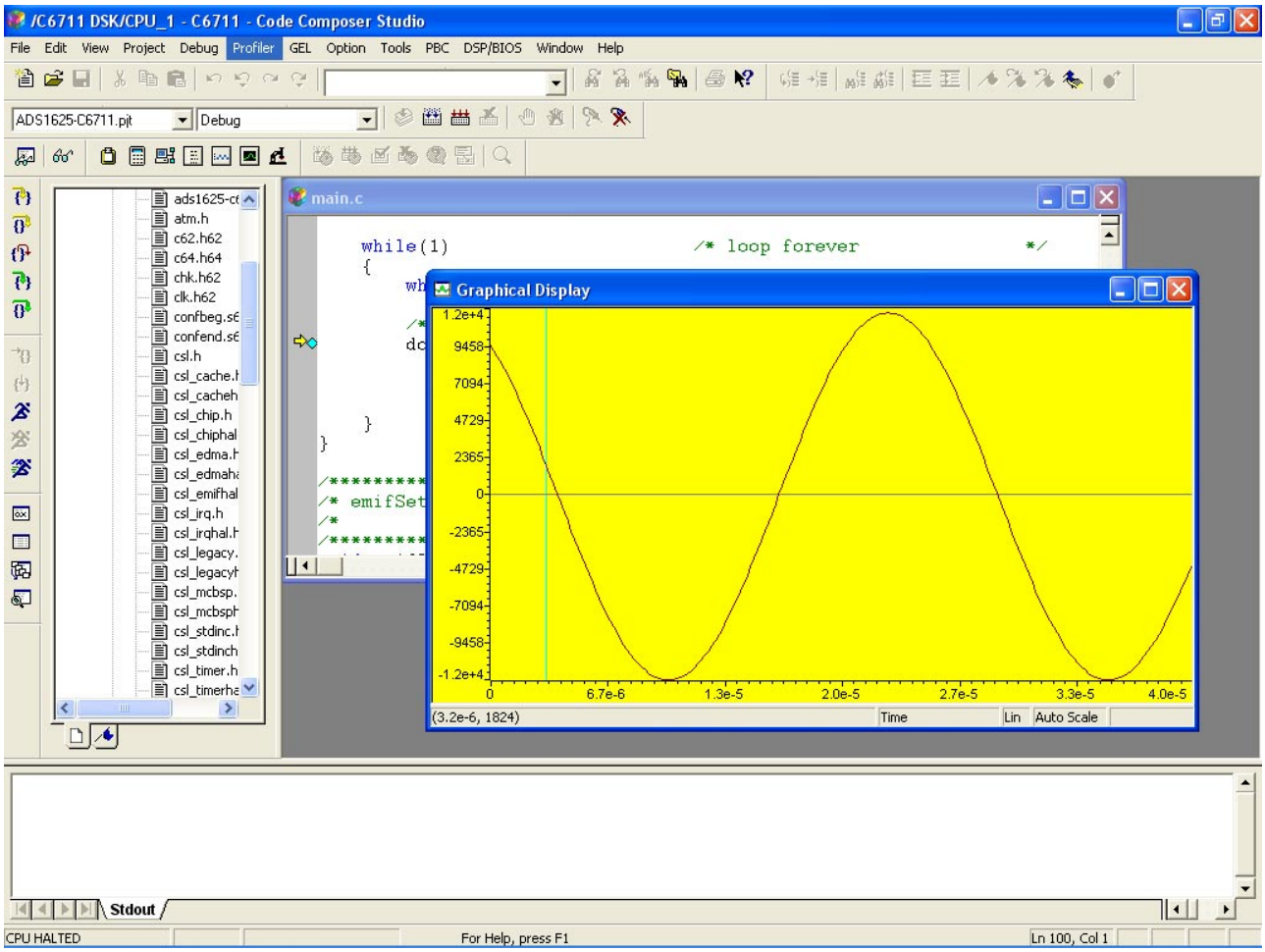
Once all settings are entered, click on the *OK* button to close the dialog. The graph window appears, currently with no useful values, as the program has not started yet.

Figure 4−6. CCS Graph Property Windows



❑ Start the program by pressing the <F5> key on your keyboard. After a short time, the graph window should be updated to show the waveform of the analog signal (see Figure 4−7).

Figure 4−7. CCS Window With Graph



Chapter 5

EVM BOM, ADS1625/26 EVM Layouts, and Schematics

This chapter contains the bill of material, EVM layouts, and the schematics for the ADS1625/26.

Topic **Page**

5.1 EVM Bill of Materials 5-2
5.2 ADS1625/26 EVM Layout Details 5-10
5.3 ADS1625/26 EVM Schematics 5-13

5.1 EVM Bill of Materials

The following tables contains a complete Bill of Materials for the ADS1625 and ADS1626 EVM.

Table 5−1. ADS1625 Bill of Materials

Qty	Value	Ref Des	Description	Vendor	Part number
5	0.001 µF	C6, C9, C16, C17, C66	Capacitor ceramic 1000 pF 5% 50 V NP0 0603	AVX Corporation	06035A102JAT2A
4	0.01 µF	C1, C22, C28, C58	Capacitor 10000 pF 50 V ceramic X7R 0603	Kemet	C0603C103J5RACTU
6	0.01 µF	C8, C10, C21, C23, C25, C64	Capacitor 10000 pF 200 V ceramic X7R 0805	Panasonic	ECJ-2YB2D103K
4	0.1 µF	C39, C40, C41, C53	Capacitor 0.1 µF 10 V ceramic X5R 0402	Panasonic	ECJ-0EB1A104K
1	0.01 µF	C56	Capacitor 0.01 µF 25 V ceramic X7R 0402	Panasonic	ECJ-0EB1E103K
32	0.1 µF	C12, C14 C15, C38 C44, C46 C49, C50 C57, C65 C67, C70 C73, C75 C76, C78 C80, C81 C89, C93 C95, C97 C98, C100 C102, C103 C104, C105 C106, C107 C108, C112	Capacitor 0.1 µF 25 V ceramic X7R 0603	Panasonic	ECJ-1VB1E104K
5	0 R	R5, R11, R34, R35, R40	Resistor 0 Ω 1/16W 5% 0402 SMD	Panasonic - ECG	ERJ-2GE0R00X
2	1 K	R38, R39	Resistor 1.00 kΩ 1/10W 1% 0805 SMD	Panasonic	ERJ-6ENF1001V
10	1 µF	C45, C47, C51, C52, C79, C86, C87, C90, C94, C101	Capacitor 1.0 µF 16 V ceramic X5R 0603	Panasonic	ECJ-1VB1C105K
15	1 µF	C5, C7, C20, C24, C32, C34, C37, C61, C62, C88, C91, C99, C109, C110, C111	Capacitor 1 µF 16 V ceramic 0805 X5R	Panasonic	ECJ-2FB1C105K
1	1 µF	C54	Capacitor 1 µF 50 V ceramic X5R 1210	Panasonic	ECJ-4YB1H105K
1	2.2 R	R44	Resistor 2.2 Ω 1/4W 5% 1206	Panasonic	ERJ-8GEYJ2R2V

Qty	Value	Ref Des	Description	Vendor	Part number
1	2.2 µF	C3	Capacitor ceramic 2.2 µF 10 V X5R 080	Panasonic	ECJ-2FB1A225K
1		W6	2 Position jumper _ 0.1” spacing	Samtec	TSW-102-07-L-S
2	3.01 K	R2, R19	SMD thin film chip resistor 0805 3.01 K 0.1% 25 PPM	KOA Speer	RN732ALTD3011B25
10		W1, W2, W3, W4, W5, W7, W8, W9, W10, W11	3-position jumper	Samtec	TSW-103-07-L-S
3	4.7 µF	C42, C48, C85	Capacitor 4.7 µF/10 V TEH SER SMD	Panasonic	ECS-H1AX475R
2	4.12 K	R3, R18	Thin film chip resistor, 0805 4.12 K 0.1% 25 PPM	KOA Speer	RN732ALTD4121B25
2	5 K	RV1, RV3	Trimpot 5 kΩ 4 MM top adj SMD	Bourns	3224W-1-502E
1		J4	2 x 5 x 0.1 SMT square post header	Samtec	TSM-105-01-T-DV-P
1		P4	5 x 2 x 0.1 SMT connector	Samtec	SSW-105-22-F-D-VS-K
1	9.09 K	R1	0805 SMD thin film chip resistor 9.09 K 0.1% 25 PPM	KOA Speer	RN732ALTD9091B25
1	10 K	RP6	Resnet 16 pos isolat 10 kΩ SOIC	Bourns	2NBS16-TJ1-103
7	10 K	R4, R20, R36, R43, R45, R48, R49	Resistor 10 kΩ 1/8 W 5% 0805 SMD	Panasonic	ERJ-6GEYJ103V
1	10 K	RV2	Trimpot 10 kΩ 4 MM top adj SMD	Bourns Inc	3224W-1-103E
9	10 µF	C11, C18, C27, C30, C59, C60, C71, C72, C84	Capacitor 10 µF 10 V ceramic F 0805	Panasonic	ECJ-2FF1A106Z
4	10 µF	C2, C4, C29, C31	Capacitor 10 µF 16 V ceramic X5R 1206	Panasonic	ECJ-3YB1C106M
1	10 µF	C55	Capacitor 10 µF 50 V ceramic F 1210	Panasonic	ECJ-4YF1H106Z
1	10 µF	C43	Capacitor TANT 10 µF 10 V 20% SMT	Kemet	T494B106M010AS
1	12.1 K	R24	0805 SMD thin film chip resistor 12.1K 0.1% 25 PPM	KOA Speer	RN732ALTD1212B25
2	22 pF	C13, C19	Capacitor ceramic 22 pF 50 V NP0 0805	BC Components	0805N220J500NT
3	22 µF	C26, C82, C83	Capaciator 22 µF 6.3 V ceramic X5R 1206	Panasonic	ECJ-3YB0J226M
1	22 µF	C68	Capacitor TANT 22 µF 10 V 20% SMD	Kemet	T494A226M010AS
5	33 R	RP1, RP2, RP3, RP4, RP5	Resistor array 33 Ω 8-terminal 4-resistor SMD	CTS Corporation	742C083330JTR

Qty	Value	Ref Des	Description	Vendor	Part number
1	36.5 K	R33	Resistor 36.5 kΩ 1/10W 1% 0805 SMD	Panasonic	ERJ-6ENF3652V
1		J2	2 x 20 x 0.1 SMT square post header	Samtec	TSM-120-01-T-DV
1		P2	2 x 20 x 0.1 SMT	Samtec	SSW-120-22-F-D-VS-K
6	47 µF	C63, C69, C74, C77, C92, C96	Capacitor 47 µF 16 V tantalum TE SMD	Panasonic	ECS-T1CD476R
4	49.9 R	R14, R31, R32, R42	Resistor 49.9 Ω 1/10W 1% SMD 0603	Yageo America	9T06031A49R9FBHFT
1	100 R	R50	Resistor 100 Ω 1/10W 5% 0603 SMD	Panasonic	ERJ-3GEYJ101V
2	100 pF	C33, C35	Capacitor ceramic 100 pF 50V NP0 0805	BC Components	0805N101J500NT
1	130 K	R47	Resistor 130 kΩ 1/8W 5% 0805 SMD	Panasonic	ERJ-6GEYJ134V
1	169 K	R46	Resistor 169 kΩ 1/10W 1% 0805 SMD	Panasonic	ERJ-6ENF1693V
4	220 µH	L1, L2, L3, L4	Inductor 220 µH 10% SA Type SMD	Panasonic - ECG	ELJ-SA221KF
1	390 pF	C36	Capacitor ceramic 390 pF 50V NP0 0805	BC Components	0805N391J500NT
17	392 R	R6, R7, R8, R9, R10, R12, R13, R17, R21, R22, R23, R25, R26, R27, R28, R29, R30	0805 Resistor 0.1% tolerance 10 PPM 392 R	Holsworthy	279-RN73CA-392R
1			ADS1625 PWB		6455115
1		U6	IC 16 Bit 1.25 MSPS ADC 64-TQFP	Texas Instruments	ADS1625IPAPT
1		SW1	Switch dip 8 pos halh pitch SMT	ITT Industries	TDA08H0SK1
2		J1, J3	2 x 10 x 0.1 SMT	Samtec	SSW-110-22-F-D-VS-K
2		P1, P3	2 x 10 x 0.1 SMT square post header	Samtec	TSM-110-01-T-DV-P
1		J8	2 x 2 x 0.1 SMT square post header	Samtec	TSM-102-01-T-DV
2		R15, R16	Resistor 0 Ω 1/16W 5% 0402 SMD	Panasonic-ECG	ERJ-2GE0R00X
3		U2, U3, U4	IC dual wdband op amp 8-VSSOP	Texas Instruments	OPA2822U
1		X1	Oscillator, 40 MHz low jitter	Vapley Fisher Corporation	VF3 SH-40
1		U1	IC +5 V voltage reference 8-SOIC	Texas Instruments	REF02BU
1		J7	2-pole screw terminal 3,5 mm pitch black	On Shore Technology	ED-555-2-BK

Qty	Value	Ref Des	Description	Vendor	Part number
2		J5, J6	Right angle SMA connector	Johnson Components Inc.	142-0701-301
1		D1	Red LED, SMT 1206	Chicago Miniature Lamp Co.	CMD15-21VRC/TR8
2		U10, U15	IC single inverter gate SOT23-5	Texas Instruments	SN74AHC1G04DBVR
1		U5	IC SGL 2 in pos-or gate SOT23-5	Texas Instruments	SN74AHC1G32DBVR
2		U7, U9	IC SGL 2 in ex-or gate SOT23-5	Texas Instruments	SN74AHC1G86DBVR
1		U11	IC quad 2-in pos-or gate 14TSSOP	Texas Instruments	SN74AHC32PWR
1		U8	IC dual edg-trg DTYP F-F 14TSSOP	Texas Instruments	SN74AHC74PWR
3		U12, U13, U14	Octal buffers/drivers with 3-state outputs	Texas Instruments	SN74AHC541PWR
1		SW2	Switch LT touch 6 X 3.5 240GF SMD	Panasonic	EVQ-PJU04K
2		AIN, TP1, TP2, TP3, TP4, VREF	SMT test point	Keystone Electronics	5015
2		AGND IO_GND	Turret terminal test point	Cambion	180-7337-02-05
1		U16	Silicon transistor NPN	Infineon	SMBT3906INCT-ND

Table 5−2. ADS1626 Bill of Materials

Qty	Value	Ref Des	Description	Vendor	Part number
5	0.001 µF	C6, C9, C16, C17, C66	Capacitor ceramic 1000 pF 5% 50 V NP0 0603	AVX Corporation	06035A102JAT2A
4	0.01 µF	C1, C22, C28, C58	Capacitor 10000 pF 50 V ceramic X7R 0603	Kemet	C0603C103J5RACTU
6	0.01 µF	C8, C10, C21, C23, C25, C64	Capacitor 10000 pF 200 V ceramic X7R 0805	Panasonic	ECJ-2YB2D103K
4	0.1 µF	C39, C40, C41, C53	Capacitor 0.1 µF 10 V ceramic X5R 0402	Panasonic	ECJ-0EB1A104K
1	0.01 µF	C56	Capacitor 0.01 µF 25 V ceramic X7R 0402	Panasonic	ECJ-0EB1E103K
32	0.1 µF	C12, C14 C15, C38 C44, C46 C49, C50 C57, C65 C67, C70 C73, C75 C76, C78 C80, C81 C89, C93 C95, C97 C98, C100 C102, C103 C104, C105 C106, C107 C108, C112	Capacitor 0.1 µF 25 V ceramic X7R 0603	Panasonic	ECJ-1VB1E104K
5	0 R	R5, R11, R34, R35, R40	Resistor 0 Ω 1/16W 5% 0402 SMD	Panasonic - ECG	ERJ-2GE0R00X
2	1 K	R38, R39	Resistor 1.00 kΩ 1/10W 1% 0805 SMD	Panasonic	ERJ-6ENF1001V
10	1 µF	C45, C47, C51, C52, C79, C86, C87, C90, C94, C101	Capacitor 1.0 µF 16 V ceramic X5R 0603	Panasonic	ECJ-1VB1C105K
15	1 µF	C5, C7, C20, C24, C32, C34, C37, C61, C62, C88, C91, C99, C109, C110, C111	Capacitor 1 µF 16 V ceramic 0805 X5R	Panasonic	ECJ-2FB1C105K
1	1 µF	C54	Capacitor 1 µF 50 V ceramic X5R 1210	Panasonic	ECJ-4YB1H105K
1	2.2 R	R44	Resistor 2.2 Ω 1/4W 5% 1206	Panasonic	ERJ-8GEYJ2R2V
1	2.2 µF	C3	Capacitor ceramic 2.2 µF 10 V X5R 080	Panasonic	ECJ-2FB1A225K
1		W6	2 Position jumper _ 0.1” spacing	Samtec	TSW-102-07-L-S
2	3.01 K	R2, R19	SMD thin film chip resistor 0805 3.01 K 0.1% 25 PPM	KOA Speer	RN732ALTD3011B25

Qty	Value	Ref Des	Description	Vendor	Part number
10		W1, W2, W3, W4, W5, W7, W8, W9, W10, W11	3-position jumper	Samtec	TSW-103-07-L-S
3	4.7 µF	C42, C48, C85	Capacitor 4.7 µF/10 V TEH SER SMD	Panasonic	ECS-H1AX475R
2	4.12 K	R3, R18	Thin film chip resistor, 0805 4.12 K 0.1% 25 PPM	KOA Speer	RN732ALTD4121B25
2	5 K	RV1, RV3	Trimpot 5 kΩ 4 MM top adj SMD	Bourns	3224W-1-502E
1		J4	2 x 5 x 0.1 SMT square post header	Samtec	TSM-105-01-T-DV-P
1		P4	5 x 2 x 0.1 SMT connector	Samtec	SSW-105-22-F-D-VS-K
1	9.09 K	R1	0805 SMD thin film chip resistor 9.09 K 0.1% 25 PPM	KOA Speer	RN732ALTD9091B25
1	10 K	RP6	Resnet 16 pos isolat 10 kΩ SOIC	Bourns	2NBS16-TJ1-103
7	10 K	R4, R20, R36, R43, R45, R48, R49	Resistor 10 kΩ 1/8 W 5% 0805 SMD	Panasonic	ERJ-6GEYJ103V
1	10 K	RV2	Trimpot 10 kΩ 4 MM top adj SMD	Bourns Inc	3224W-1-103E
9	10 µF	C11, C18, C27, C30, C59, C60, C71, C72, C84	Capacitor 10 µF 10 V ceramic F 0805	Panasonic	ECJ-2FF1A106Z
4	10 µF	C2, C4, C29, C31	Capacitor 10 µF 16 V ceramic X5R 1206	Panasonic	ECJ-3YB1C106M
1	10 µF	C55	Capacitor 10 µF 50 V ceramic F 1210	Panasonic	ECJ-4YF1H106Z
1	10 µF	C43	Capacitor TANT 10 µF 10 V 20% SMT	Kemet	T494B106M010AS
1	12.1 K	R24	0805 SMD thin film chip resistor 12.1K 0.1% 25 PPM	KOA Speer	RN732ALTD1212B25
2	22 pF	C13, C19	Capacitor ceramic 22 pF 50 V NP0 0805	BC Components	0805N220J500NT
3	22 µF	C26, C82, C83	Capaciator 22 µF 6.3 V ceramic X5R 1206	Panasonic	ECJ-3YB0J226M
1	22 µF	C68	Capacitor TANT 22 µF 10 V 20% SMD	Kemet	T494A226M010AS
5	33 R	RP1, RP2, RP3, RP4, RP5	Resistor array 33 Ω 8-terminal 4-resistor SMD	CTS Corporation	742C083330JTR
1	36.5 K	R33	Resistor 36.5 kΩ 1/10W 1% 0805 SMD	Panasonic	ERJ-6ENF3652V
1		J2	2 x 20 x 0.1 SMT square post header	Samtec	TSM-120-01-T-DV
1		P2	2 x 20 x 0.1 SMT	Samtec	SSW-120-22-F-D-VS-K

Qty	Value	Ref Des	Description	Vendor	Part number
6	47 µF	C63, C69, C74, C77, C92, C96	Capacitor 47 µF 16 V tantalum TE SMD	Panasonic	ECS-T1CD476R
4	49.9 R	R14, R31, R32, R42	Resistor 49.9 Ω 1/10W 1% SMD 0603	Yageo America	9T06031A49R9FBHFT
1	100 R	R50	Resistor 100 Ω 1/10W 5% 0603 SMD	Panasonic	ERJ-3GEYJ101V
2	100 pF	C33, C35	Capacitor ceramic 100 pF 50V NP0 0805	BC Components	0805N101J500NT
1	130 K	R47	Resistor 130 kΩ 1/8W 5% 0805 SMD	Panasonic	ERJ-6GEYJ134V
1	169 K	R46	Resistor 169 kΩ 1/10W 1% 0805 SMD	Panasonic	ERJ-6ENF1693V
4	220 µH	L1, L2, L3, L4	Inductor 220 µH 10% SA Type SMD	Panasonic - ECG	ELJ-SA221KF
1	390 pF	C36	Capacitor ceramic 390 pF 50V NP0 0805	BC Components	0805N391J500NT
17	392 R	R6, R7, R8, R9, R10, R12, R13, R17, R21, R22, R23, R25, R26, R27, R28, R29, R30	0805 Resistor 0.1% tolerance 10 PPM 392 R	Holsworthy	279-RN73CA-392R
1			ADS1626 PWB		6455115
1		U6	IC 16 Bit 1.25 MSPS ADC 64-TQFP W FIFO	Texas Instruments	ADS1626IPAPT
1		SW1	Switch dip 8 pos halh pitch SMT	ITT Industries	TDA08H0SK1
2		J1, J3	2 x 10 x 0.1 SMT	Samtec	SSW-110-22-F-D-VS-K
2		P1, P3	2 x 10 x 0.1 SMT square post header	Samtec	TSM-110-01-T-DV-P
1		J8	2 x 2 x 0.1 SMT square post header	Samtec	TSM-102-01-T-DV
2		R15, R16	Resistor 0 Ω 1/16W 5% 0402 SMD	Panasonic-ECG	ERJ-2GE0R00X
3		U2, U3, U4	IC dual wdband op amp 8-VSSOP	Texas Instruments	OPA2822U
1		X1	Oscillator, 40 MHz low jitter	Vapley Fisher Corporation	VF3 SH-40
1		U1	IC +5 V voltage reference 8-SOIC	Texas Instruments	REF02BU
1		J7	2-pole screw terminal 3,5 mm pitch black	On Shore Technology	ED-555-2-BK
2		J5, J6	Right angle SMA connector	Johnson Components Inc.	142-0701-301
1		D1	Red LED, SMT 1206	Chicago Miniature Lamp Co.	CMD15-21VRC/TR8
2		U10, U15	IC single inverter gate SOT23-5	Texas Instruments	SN74AHC1G04DBVR

Qty	Value	Ref Des	Description	Vendor	Part number
1		U5	IC SGL 2 in pos-or gate SOT23-5	Texas Instruments	SN74AHC1G32DBVR
2		U7, U9	IC SGL 2 in ex-or gate SOT23-5	Texas Instruments	SN74AHC1G86DBVR
1		U11	IC quad 2-in pos-or gate 14TSSOP	Texas Instruments	SN74AHC32PWR
1		U8	IC dual edg-trg DTYP F-F 14TSSOP	Texas Instruments	SN74AHC74PWR
3		U12, U13, U14	Octal buffers/drivers with 3-state outputs	Texas Instruments	SN74AHC541PWR
1		SW2	Switch LT touch 6 X 3.5 240GF SMD	Panasonic	EVQ-PJU04K
2		AIN, TP1, TP2, TP3, TP4, VREF	SMT test point	Keystone Electronics	5015
2		AGND IO_GND	Turret terminal test point	Cambion	180-7337-02-05
1		U16	Silicon transistor NPN	Infineon	SMBT3906INCT-ND

5.2 ADS1625/26 EVM Layout Details

Figure 5−1. Top Tracking Layer

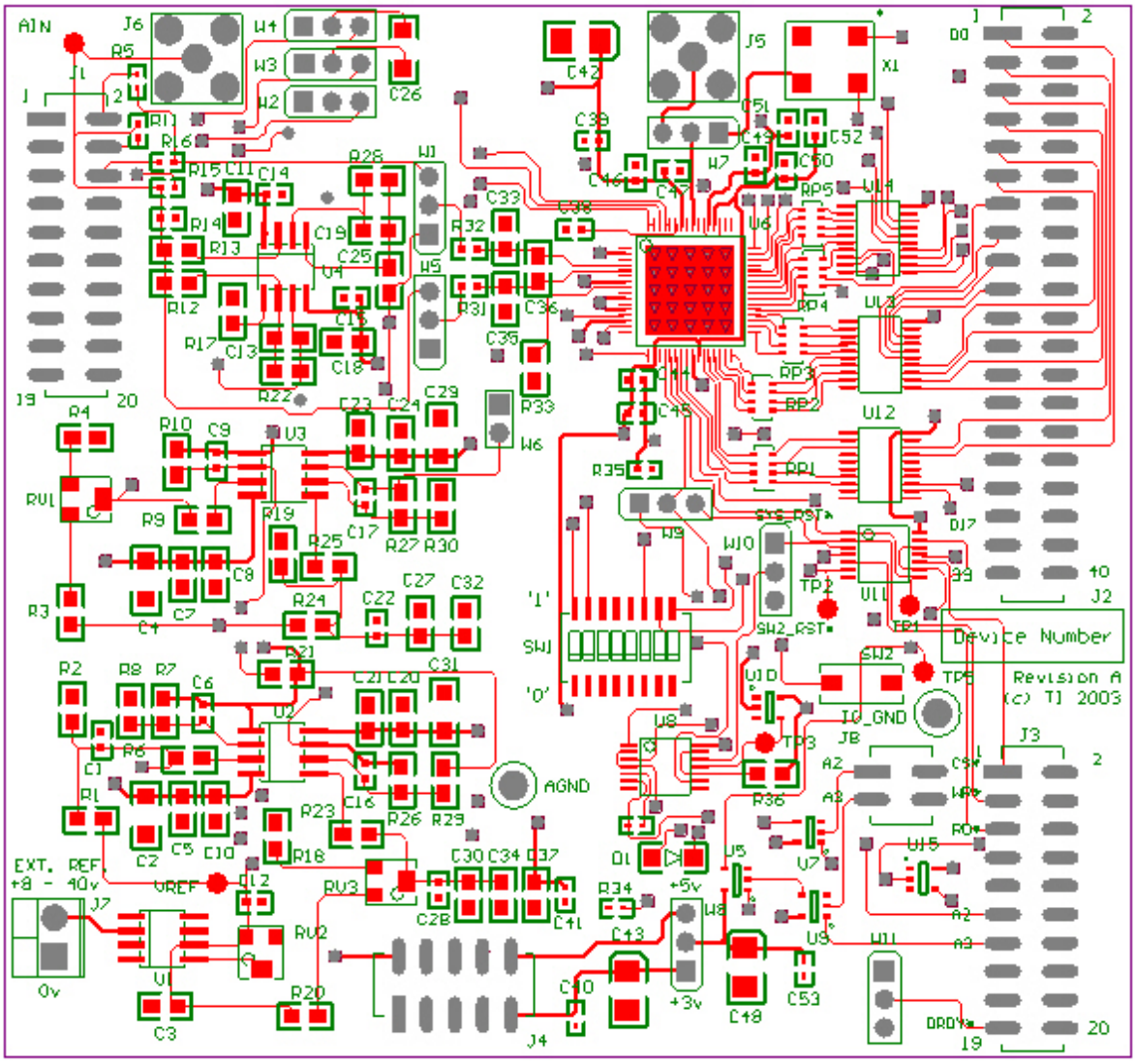


Figure 5−2. Internal Power and Ground Layers

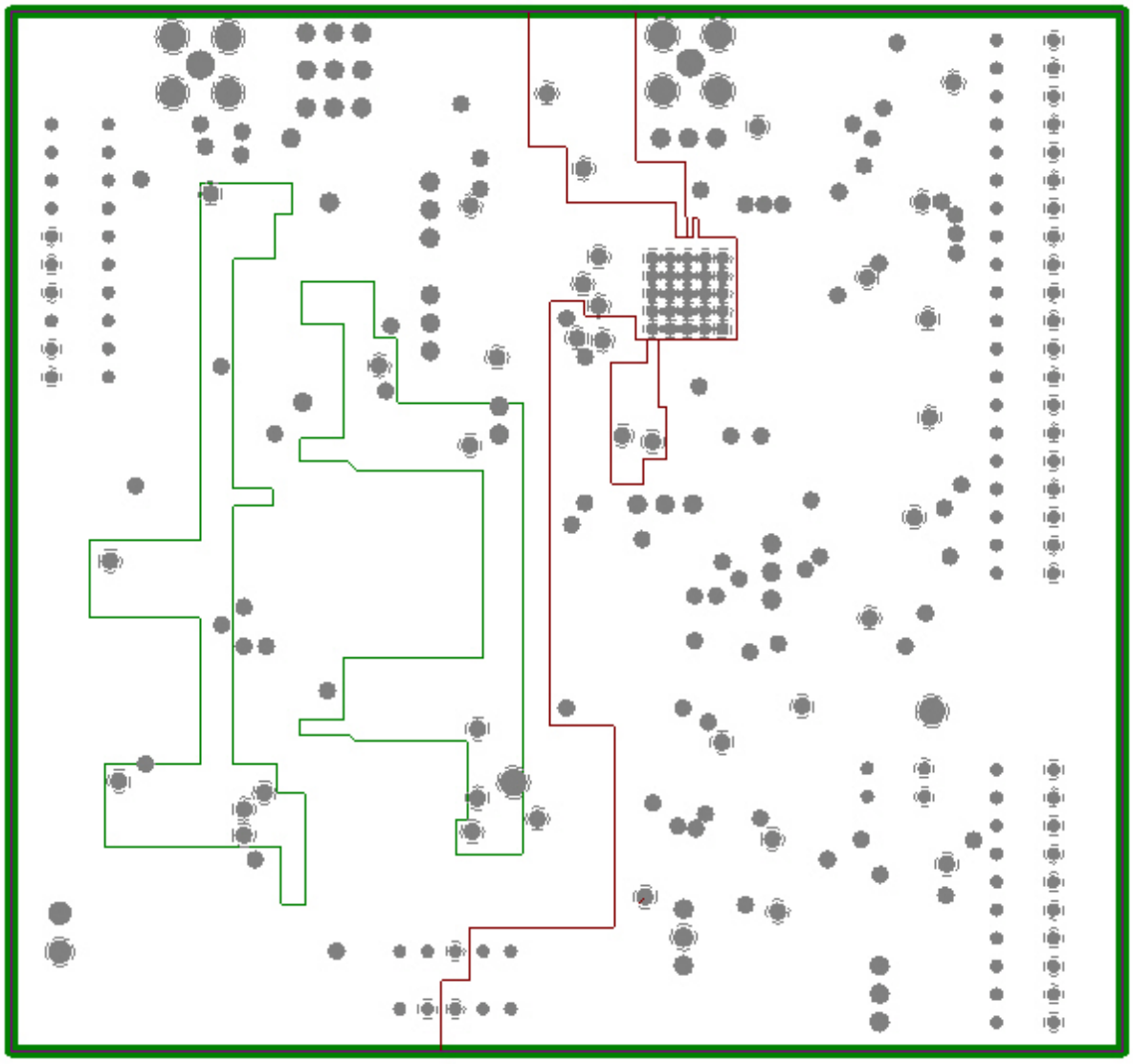
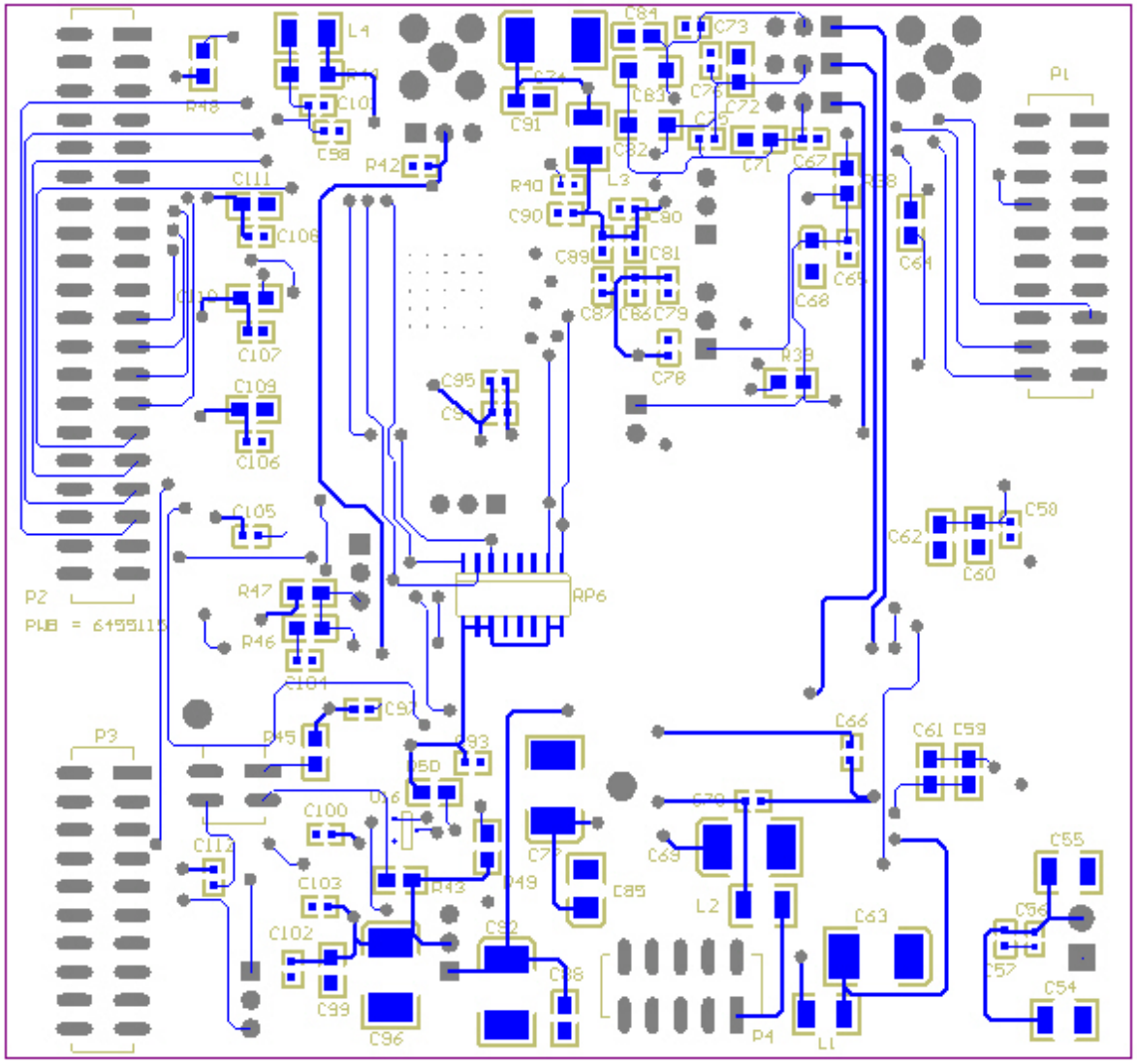


Figure 5−3. Bottom Tracking Layer



5.3 ADS1625/26 EVM Schematics

The schematics are shown on the following pages.

Revision History		
REV	ECN Number	Approved

Analog Input

J1 / P1

R5 0R

R11 0R

R16 NI

R15 NI

VCOM

REF-

REF+

AGND

AIN_N

AIN

AINP

AINN

VCM

J5

IO_GND

ADS1625_26

EXT_CLK

AINP

AINN

REF+ W2 VREFP

VCOM W4 VMID

REF- W3 VREFN

Interface (2 of 2)

PD*

REFEN*

SEL_FIFO(0)

SEL_FIFO(1)

SEL_FIFO(2)

ADS1605_CS*

BDSEL*

RD*

RESET*

CLK

Data bus buffers

B00 B01 B02 B03 B04 B05 B06 B07 B08 B09 B10 B11 B12 B13 B14 B15 B16 B17

B_DRDY

B_OTR

D00 D01 D02 D03 D04 D05 D06 D07 D08 D09 D10 D11 D12 D13 D14 D15 D16 D17

DRDY

OTR

J2/P2

40-PIN HEADER

IO_GND

Voltage Reference

VCM

VREFP

VMID

VREFN

J7

2

1

+12v

AGND

Interface (1 of 2)

HOST_CSa*

HOST_WR*

HOST_RD*

DRDY

OTR

HOST_A2

HOST_A3

DRDY_OUT

J3/P3

HEADER 10 X 2

IO_GND

Power

TEXAS INSTRUMENTS

12500 TI Boulevard. Dallas, Texas 75243

Title: ADS1625 / 26 Block Diagram

DOCUMENTCONTROL # 6455116

REV: A

Engineer: Joe Purvis

Drawn By: Joe Purvis

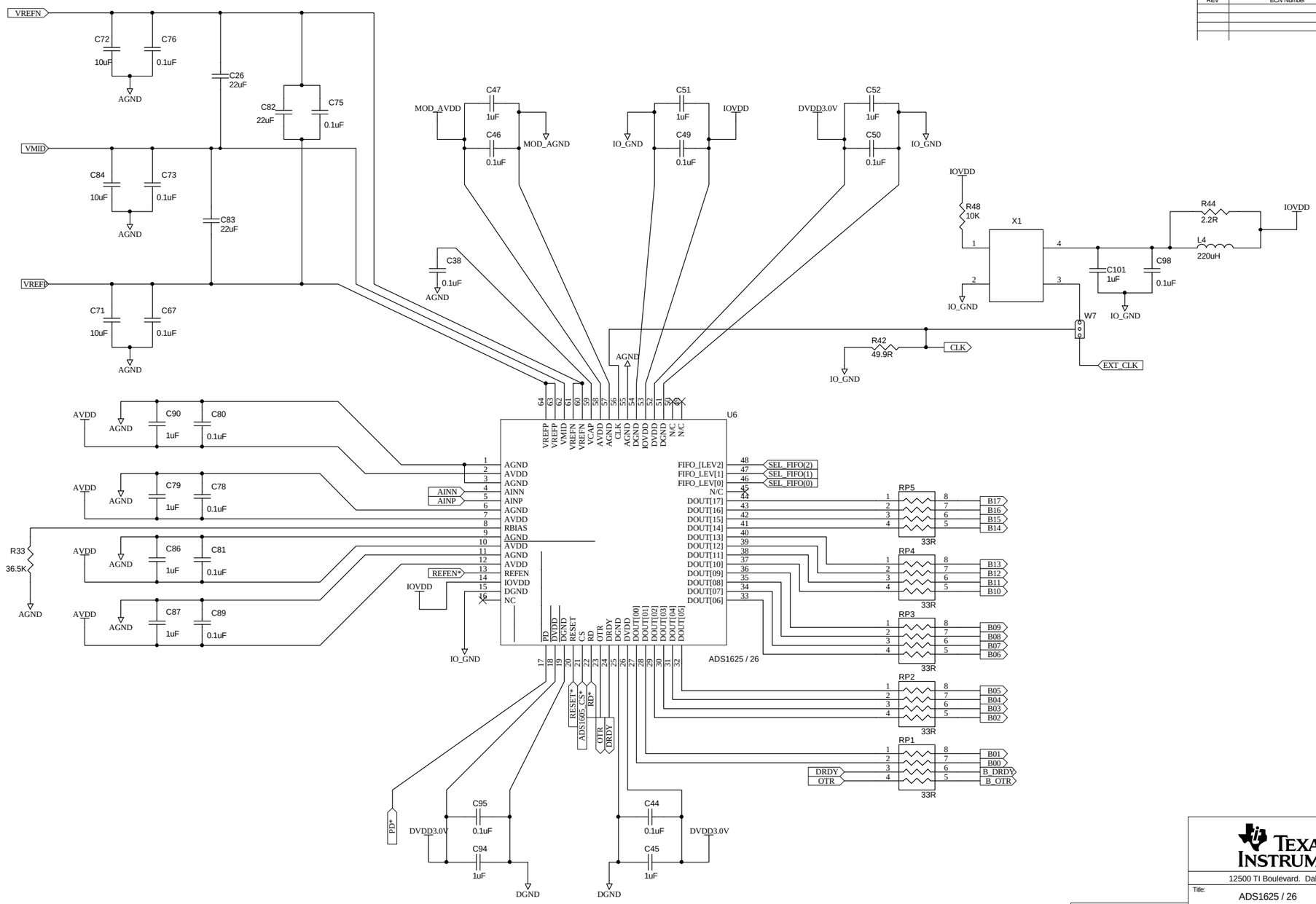
FILE: Block Diagram.Sch

DATE: 17-Nov-2003

SIZE:

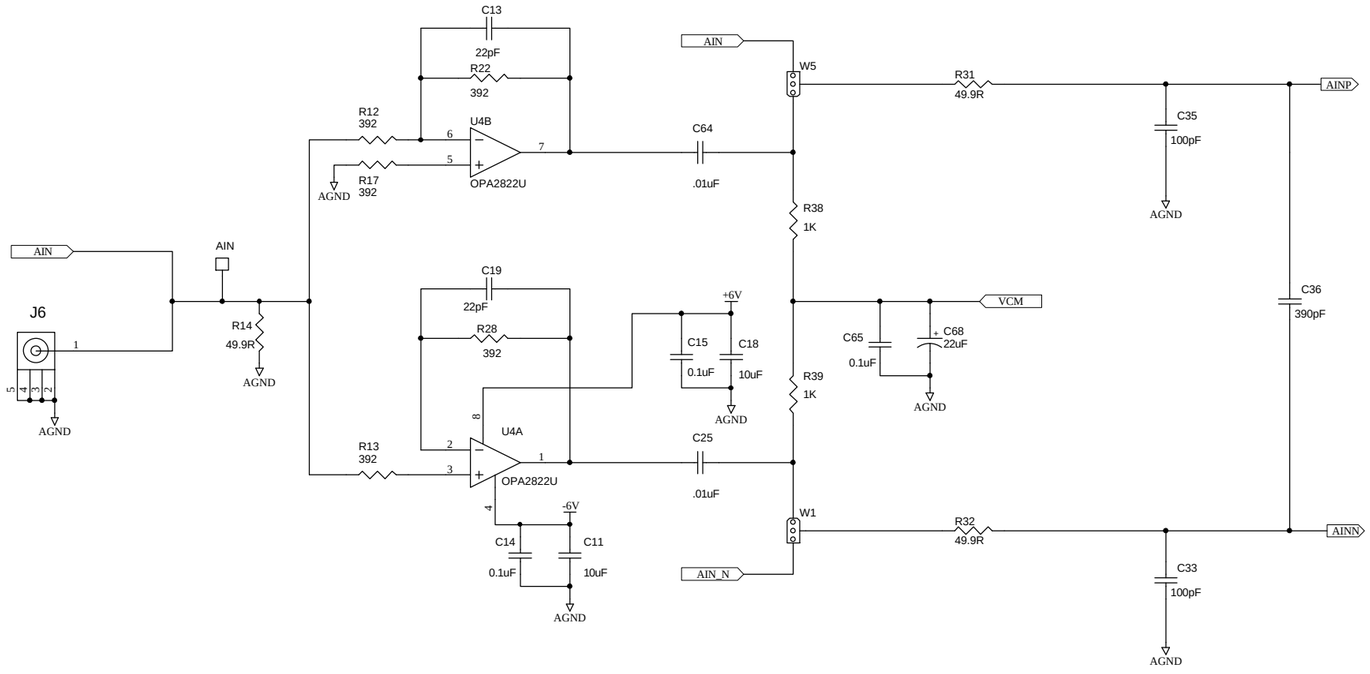
SHEET: 1 OF: 7

Revision History		
REV	ECN Number	Approved



TEXAS INSTRUMENTS
12500 TI Boulevard. Dallas, Texas 75243

Title: ADS1625 / 26			
Engineer: Joe Purvis	DOCUMENTCONTROL # 6455116		REV: A
Drawn By: Joe Purvis	DATE: 17-Nov-2003	SIZE: B	SHEET: 2 OF: 7
FILE: ADS1625_26.Sch			



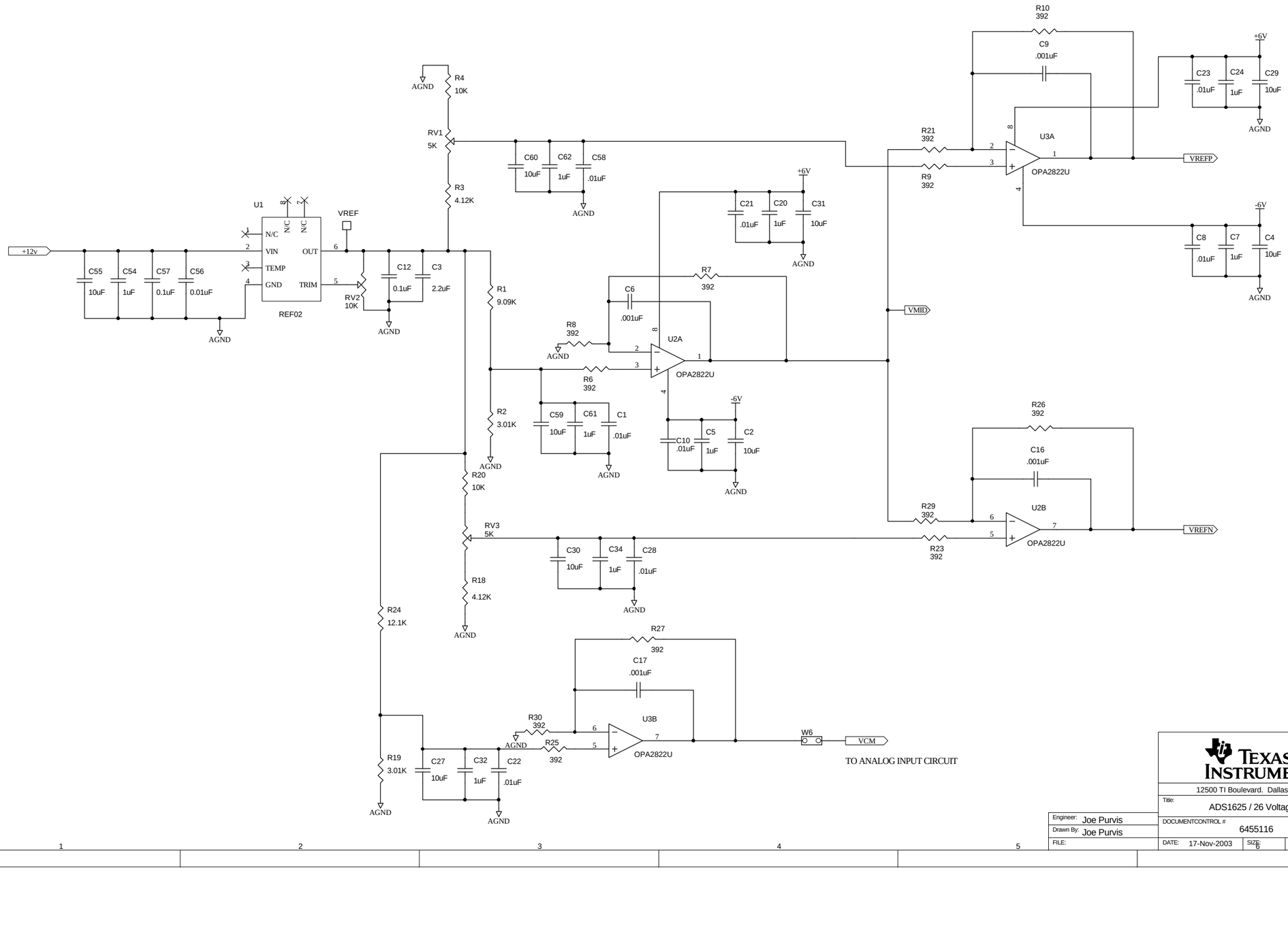
Engineer:	Joe Purvis
Drawn By:	Joe Purvis
FILE:	

TEXAS INSTRUMENTS

12500 TI Boulevard. Dallas, Texas 75243

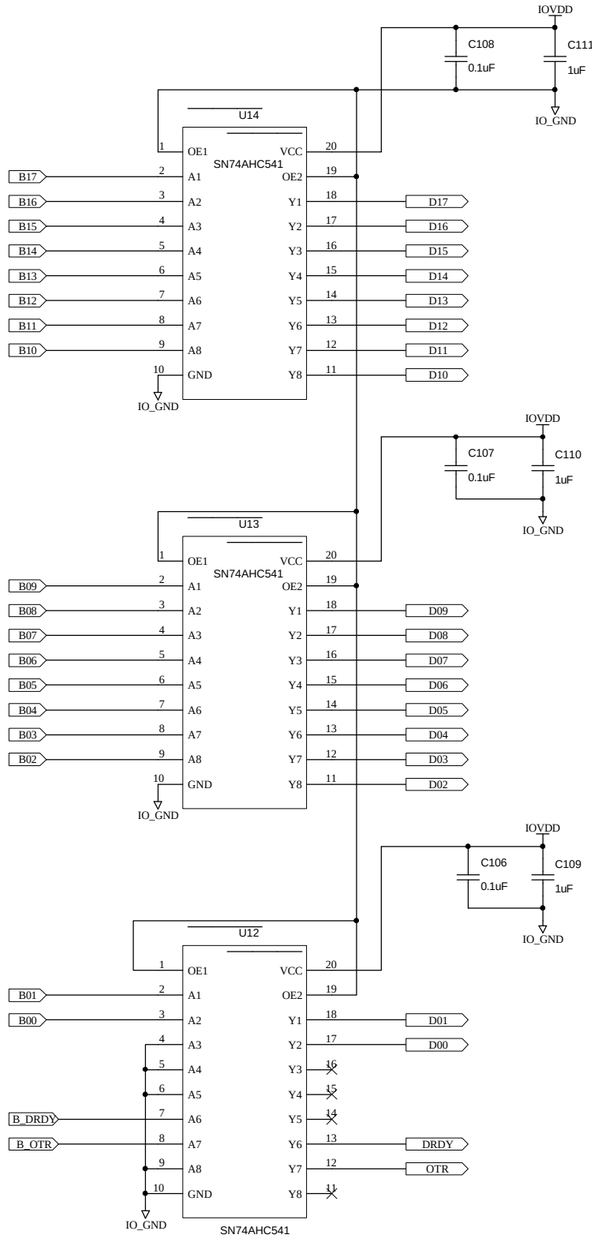
Title: ADS1625 / 26 Analog Input

DOCUMENTCONTROL #	6455116		REV: A
DATE: 17-Nov-2003	SIZE: B	SHEET: 3	OF: 7



TEXAS INSTRUMENTS
12500 TI Boulevard. Dallas, Texas 75243

Title:	ADS1625 / 26 Voltage Reference
Engineer:	Joe Purvis
Drawn By:	Joe Purvis
FILE:	
DOCUMENTCONTROL #	6455116
REV:	A
DATE:	17-Nov-2003
SIZE:	B
SHEET:	4 OF: 7

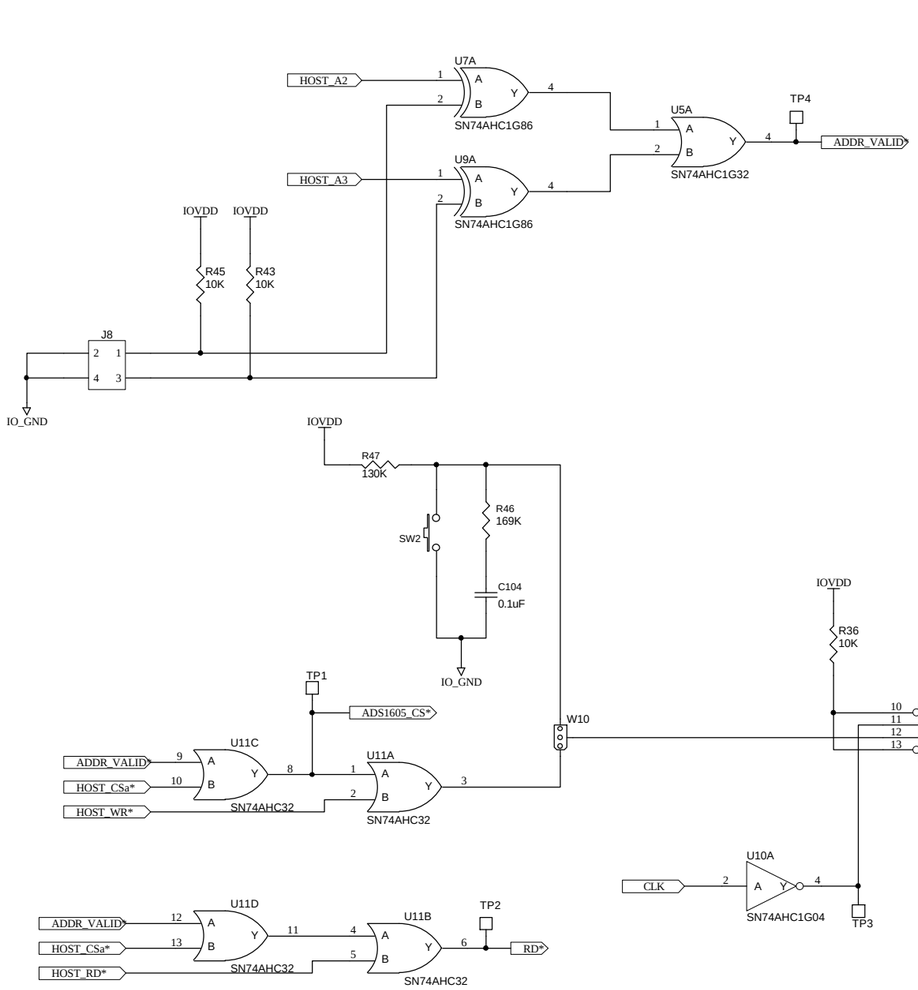


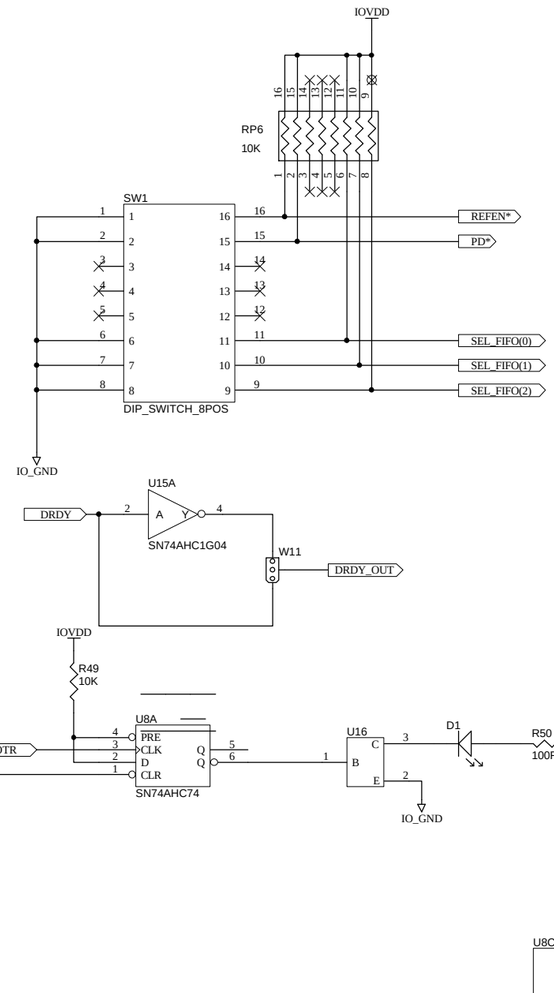
TEXAS INSTRUMENTS

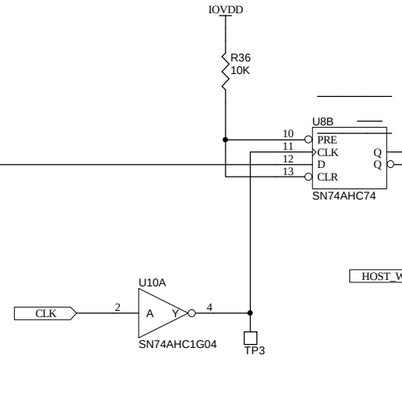
12500 TI Boulevard. Dallas, Texas 75243

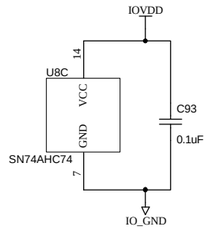
Title: ADS1625 / 26 Data Bus Buffers

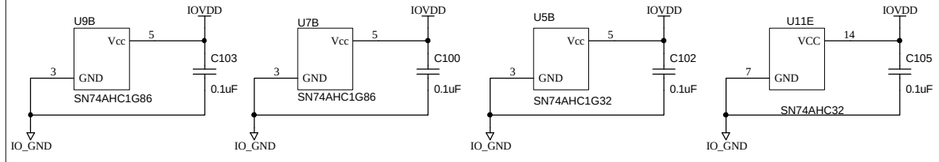
Engineer: Joe Purvis	DOCUMENTCONTROL # 6455116		REV: A
Drawn By: Joe Purvis			
FILE:	DATE: 17-Nov-2003	SIZE: B	SHEET: 5 OF: 7











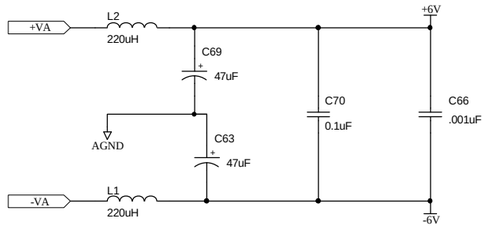
TEXAS INSTRUMENTS

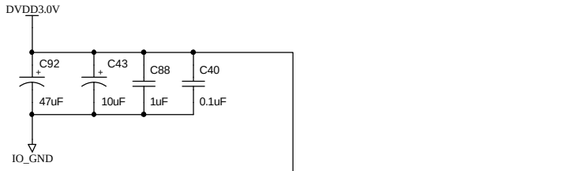
12500 TI Boulevard. Dallas, Texas 75243

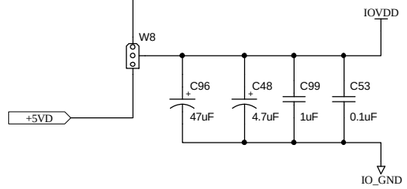
Title: ADS1625 / 26 Digital Interface

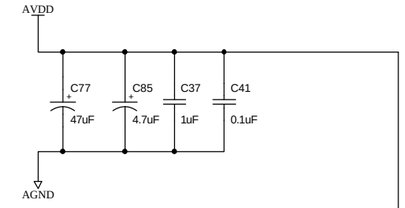
Engineer: Joe Purvis	DOCUMENTCONTROL # 6455116		REV: A
Drawn By: Joe Purvis	DATE: 17-Nov-2003	SIZE: B	SHEET: 6 OF: 7
FILE:			

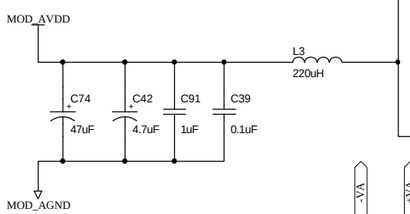
Revision History		
REV	ECN Number	Approved

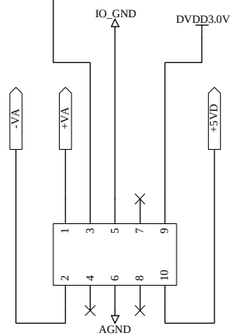




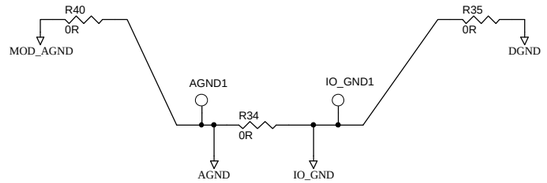








J4/P4



TEXAS INSTRUMENTS

12500 TI Boulevard. Dallas, Texas 75243

Title:	ADS1625 / 26 Power
Engineer:	Joe Purvis
Drawn By:	Joe Purvis
FILE:	Power.Sch
DOCUMENTCONTROL #	6455116
REV:	A
DATE:	17-Nov-2003
SIZE:	B
SHEET:	7 OF: 7