

***TMS320VC5505 eZdsp<sup>TM</sup>***  
***USB Stick***

*Technical  
Reference*



TMS320VC5505 eZdsp™  
USB Stick  
Technical Reference

512325-0001 Rev. A  
August 2009

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Code Composer Studio IDE is a trademark of Texas Instruments

"eZdsp" is a trademark of Spectrum Digital, Inc.

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## About This Manual

This document describes the board level operations of the TMS320VC5505 eZdsp USB Stick (eZdsp Stick). The eZdsp Stick is based on the Texas Instruments TMS320VC5505 Digital Signal Processor.

The TMS320VC5505 eZdsp Stick is a USB based printed circuit board (PCB) that allows engineers and software developers to evaluate certain characteristics of the TMS320VC5505 DSP.

## Notational Conventions

This document uses the following conventions.

The TMS320VC5505 eZdsp USB Stick will sometimes be referred to as the VC5505 Stick, VC5505 USB Stick, or VC5505 eZdsp.

Program listings, program examples, and interactive displays are shown in a special italic typeface. Here is a sample program listing.

```
equations  
!rd = !strobe&rw;
```

## Information About Cautions

This book may contain cautions.

***This is an example of a caution statement.***

A caution statement describes a situation that could potentially damage your software, or hardware, or other equipment. The information in a caution is provided for your protection. Please read each caution carefully.

## Related Documents

Texas Instruments Code Composer Studio IDE Users Guide  
Data sheet for the TMS320VC5505

# Chapter 1

## Introduction to the TMS320VC5505 DSP Stick

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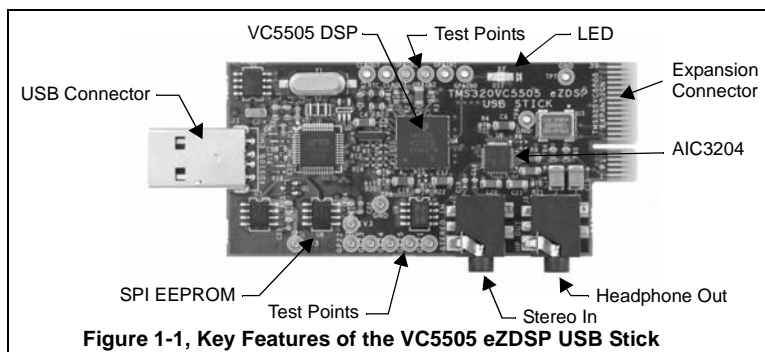
This chapter provides you with a description of the VC5505 eZDSP USB Stick along with the key features.

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1.1 Key Features of the TMS320VC5505 eZDSP USB Stick	1-2

## 1.0 Overview of the VC5505 eZDSP USB Stick

The VC5505 eZDSP USB Stick is an evaluation tool for the Texas Instruments TMS320VC5505 Digital Signal Processor (DSP). This USB bus powered tool allows the user to evaluate the following items:

- The TMS320VC5505 processor along with its peripherals
- The TLV320AIC3204 codec
- The Code Composer Studio IDE™ software development tools



### 1.1 Key Features of the VC5505 eZDSP USB Stick

The VC5505 eZDSP USB Stick has the following features:

- Texas Instrument's TMS320VC5505 Digital Signal Processor
- Texas Instruments TLV320AIC3204 Stereo Codec (stereo in, headphone out)
- 512K-bit SPI EEPROM
- User controlled LED
- Embedded USB XDS100 JTAG emulator
- Expansion connector
- User accessible test points
- Power provided by PC/laptop USB bus
- Compatible with Texas Instruments Code Composer Studio v4



# Chapter 2

## Physical Description

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This chapter describes the physical layout of the TMS320VC5505 eZDSP USB Stick.

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## 2.0 Board Layout

The VC5505 eZDSP USB Stick is a 3.15 x 1.5 inch six (6) layer printed circuit board which is powered off the USB bus of personal computer or laptop computer. This means this board does not require an external power supply.

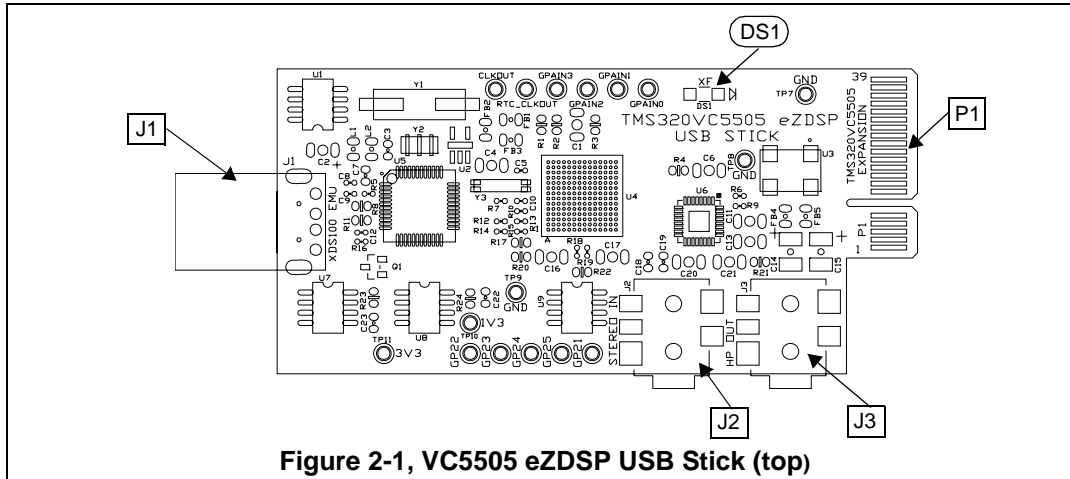


Figure 2-1, VC5505 eZDSP USB Stick (top)

## 2.1 Connector Index

The VC5505 eZDSP USB Stick has four (4) connectors which provide the user access to various signals on the V5505 Stick. These connectors are shown in the table below.

Table 1: VC5505 eZDSP USB Stick Connectors

Connector	# Pins	Function	Schematic Page	Board Side
J1	2	USB	9	Top
J2	2	Stereo In	7	Top
J3	2	Headphone Out	7	Top
P1	20 x 2	Expansion	8	Top/Bottom

The following manufacturer and parts numbers can be used to interface to the connectors on the VC5505 eZDSP:

Table 2: VC5505 eZDSP Mating Connectors

Connector	Manufacturer	Part #
J1	PC or laptop	
J2	CUI Inc	CUI SP-3501, Digi-Key CP-3502-ND
J3	CUI Inc	CUI SP-3501, Digi-Key CP-3502-ND
P1	Samtec	Samtec MEC1-120-02-S-D-A, Digi-Key SAM8117-ND

### 2.1.1 J1, XDS100 USB Connector

The USB connector, J1, is used to attach the VC5505 eZDSP stick to a personal computer or laptop. The signals on the pins of this connector are shown below.

**Table 3: J1, USB Connector**

Pin #	Signal Name
1	5V_USB
2	D+
3	D-
4	GND
5	GND via capacitor
6	GND via capacitor

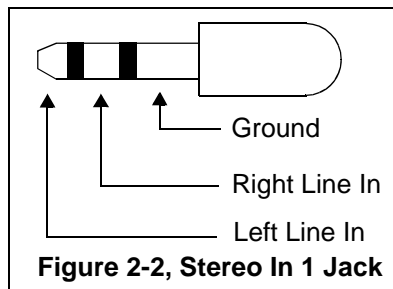
### 2.1.1 J2, Stereo In Connector

The Stereo In connector, J2, is used to bring signals into the TLP320AIC3204 codec. The signals on the pins of this connector are shown below.

**Table 4: J2, Stereo In Connector**

Pin #	Signal Name	AIC3204 Pin #
1	GND-A	
2	AIC_LINE2L	15
3	AIC_LIN2R	16
4	No connect	
5	No connect	

The figure below shows a typical stereo jack.



**Figure 2-2, Stereo In 1 Jack**

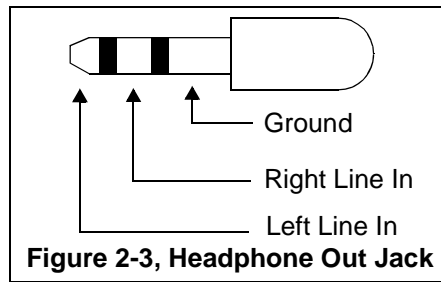
**2.1.3 J3, Headphone Out Connector**

The Headphone Out connector, J3, is used to bring signals from the TLP320AIC3204 codec. The signals on the pins of this connector are shown below.

**Table 5: J3, Headphone Out Connector**

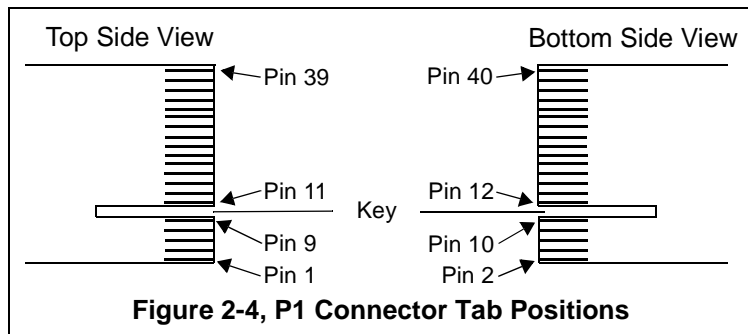
Pin #	Signal Name	AIC3204 Pin #
1	GND-A	
2	HEADPHONE_LOUT	25
3	HEADPHONE_ROUT	27
4	No connect	
5	No connect	

The figure below shows a typical headphone jack.



**2.1.4 P1, Expansion Connector**

The Expansion connector, P1, is used to bring signals from VC5505 DSP out to a connector for user interface. This card edge connector has all of the odd number (1,3,...,39) tabs on the top side of the board and all of the even number tabs (2,4,...,40) on the bottom side of the board. The diagram below shows the position of these tabs.



The table below lists the signals that appear on each of the tabs of connector P1. The signals on the pins of this connector are shown below.

**Table 6: P1, Expansion Connector**

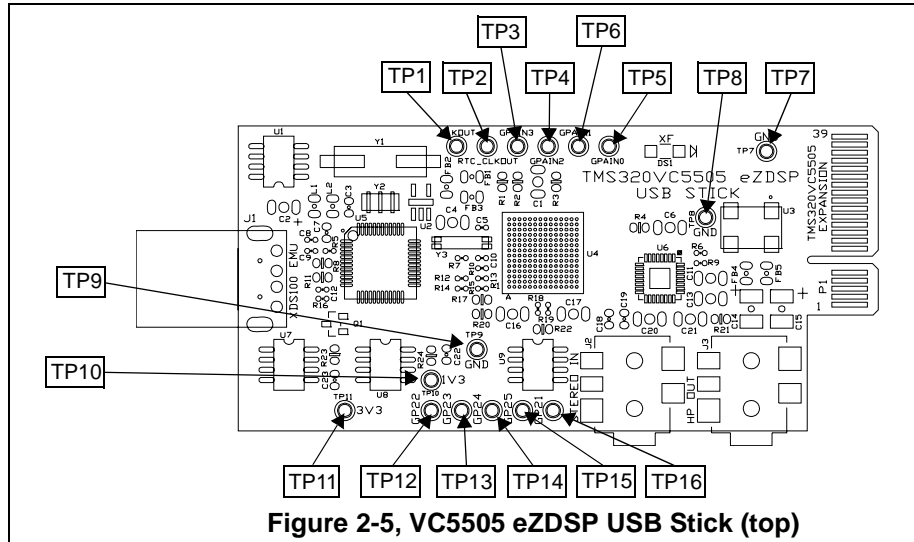
Pin # Top	Signal Name	Pin # Bottom	Signal Name
1	GND	2	GND
3	SPIO_CS1	4	GPIO13
5	SPIO_CLK	6	GPIO12
7	SPIO_DX	8	GPIO14
9	SPIO_RX	10	GPIO15
11	GND	12	GND
13	I2C_SDA	14	GPIO16
15	I2C_SCL	16	GPIO17
17	GND	18	GND
19	I2S2_CLK	20	GPIO11
21	I2S2_RX	22	GPIO10
23	I2S2_DX	24	GPIO5
25	I2S2_FS	26	GPIO4
27	GND	28	GND
29	I2S1_CLK	30	UART_RTS
31	I2S1_RX	32	UART_CTS
33	I2S1_DX	34	UART_RX
35	I2S1_FS	36	UART_TX
37	VCC_3V3	38	VCC_3V3
39	VCC_3V3	40	VCC_3V3

## 2.2 System LED

The VC5505 eZDSP USB Stick has one green Light Emitting Diode (LED). This LED is software controlled via the XF status bit and XF pin on the DSP.

### 2.3 Test Points

The VC5505 eZDSP USB Stick has sixteen (16) test points for the monitoring of signals. The location of the test points are shown in the figure below.



**Figure 2-5, VC5505 eZDSP USB Stick (top)**

The signals on the test points are shown in the table below.

**Table 7: Test Points**

TP #	Schematic Page	Signal Name
TP1	3	CLKOUT, Pin A7, VC5505
TP2	3	RTC_CLKOUT, Pin D8, VC5505
TP3	2	GPAIN3, Pin C11, VC5505
TP4	2	GPAIN2, Pin B11, VC5505
TP5	2	GPAIN1, Pin A11, VC5505
TP6	2	GPAIN0, Pin D10, VC5505
TP7	3	GND
TP8	7	GND
TP9	5	GND
TP10	6	Vcore, VCC_1V3, Pin 7,8 U8
TP11	6	3V3, VCC_3V3, Pin 7,8 U7
TP12	4	GPIO22, Pin E2, VC5505
TP13	4	GPIO23, Pin F2, VC5505
TP14	4	GPIO24, Pin G2, VC5505
TP15	4	GPIO25, Pin G4, VC5505
TP16	4	GPIO21, Pin N1, VC5505

# Appendix A

## Schematics

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This appendix contains the schematics for the TMS320VC5505 DSP Stick.

<p>NOTES, UNLESS OTHERWISE SPECIFIED:                  1. RESISTANCE VALUES IN OHMS.                  2. CAPACITANCE VALUES IN MICROFARADS.                  3. REFERENCE DESIGNATORS USED:                  4. ALL 0.1 uF AND 0.01uF CAPACITORS ARE DECOUPLING CAPS UNLESS OTHERWISE NOTED. THEY ARE SHOWN ON THE INTEGRATED CIRCUITS THEY SHOULD BE PLACED NEAR.</p>	<p style="text-align: center;">Schematic Contents</p> <p>01 - TITLE PAGE                  02 - TMS320VC5505 GPIO / MMC / SPI / I2C -- SPI EEPROM                  03 - TMS320VC5505 CLOCKS / JTAG / USB                  04 - TMS320VC5505 EMIF                  05 - TMS320VC5505 Power                  06 - POWER 3V3, 1V3                  07 - CODEC                  08 - EXPANSION CONNECTOR                  09 - XDS100 INTERFACE</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">REVISIONS</th> </tr> <tr> <th>Revision</th> <th>DESCRIPTION</th> </tr> <tr> <td style="text-align: center;">A</td> <td>Initial Release.</td> </tr> <tr> <td style="text-align: center;">B</td> <td>Changed USB Connector to type A, added Capacitance to 1.3Volt supply to reduce VCORE Ripple</td> </tr> </table>	REVISIONS		Revision	DESCRIPTION	A	Initial Release.	B	Changed USB Connector to type A, added Capacitance to 1.3Volt supply to reduce VCORE Ripple
REVISIONS										
Revision	DESCRIPTION									
A	Initial Release.									
B	Changed USB Connector to type A, added Capacitance to 1.3Volt supply to reduce VCORE Ripple									
5	4	3	2	1						

REVISION STATUS OF SHEETS				
REV	SHEET	DATE	BY	APP
A	1	05/13/2009	R.R.F.	
B	1	05/13/2009	T.W.K.	
C	1	05/13/2009	R.R.F.	
D	1	05/13/2009	R.R.F.	
E	1	05/13/2009	C.M.D.	
F	1	05/13/2009	R.R.F.	
G	1	05/13/2009	R.R.F.	

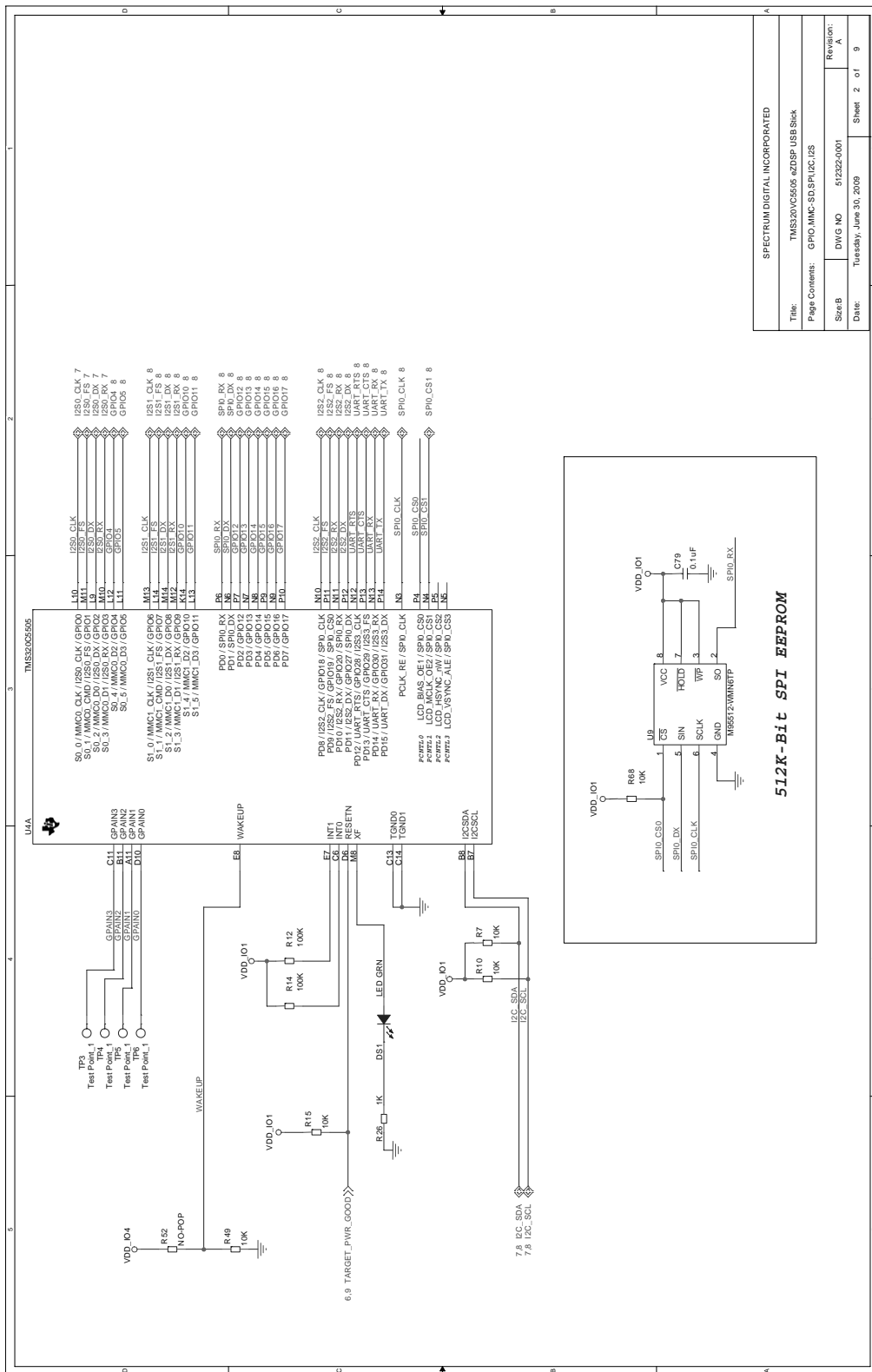
  

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9		9	

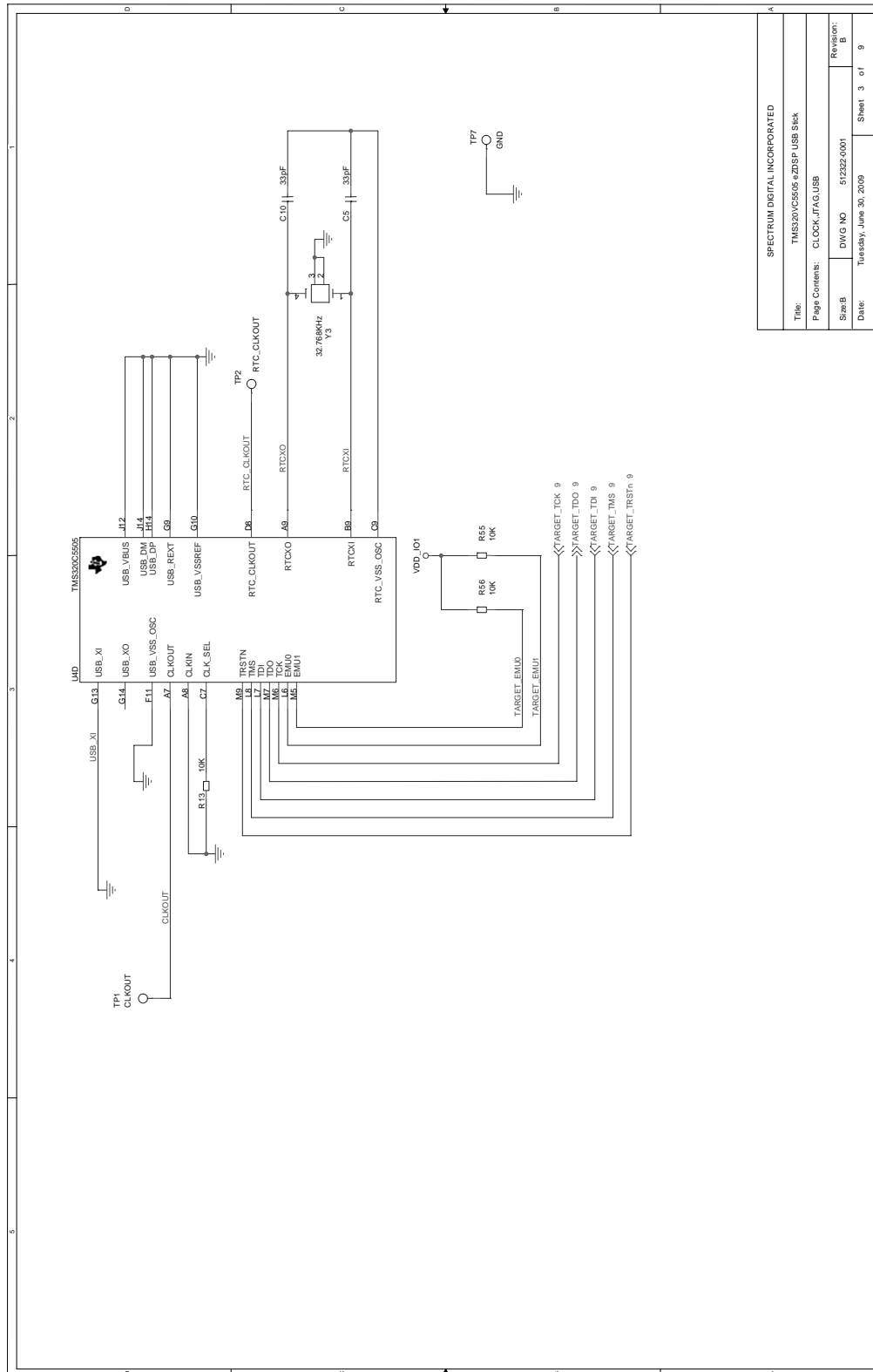
  

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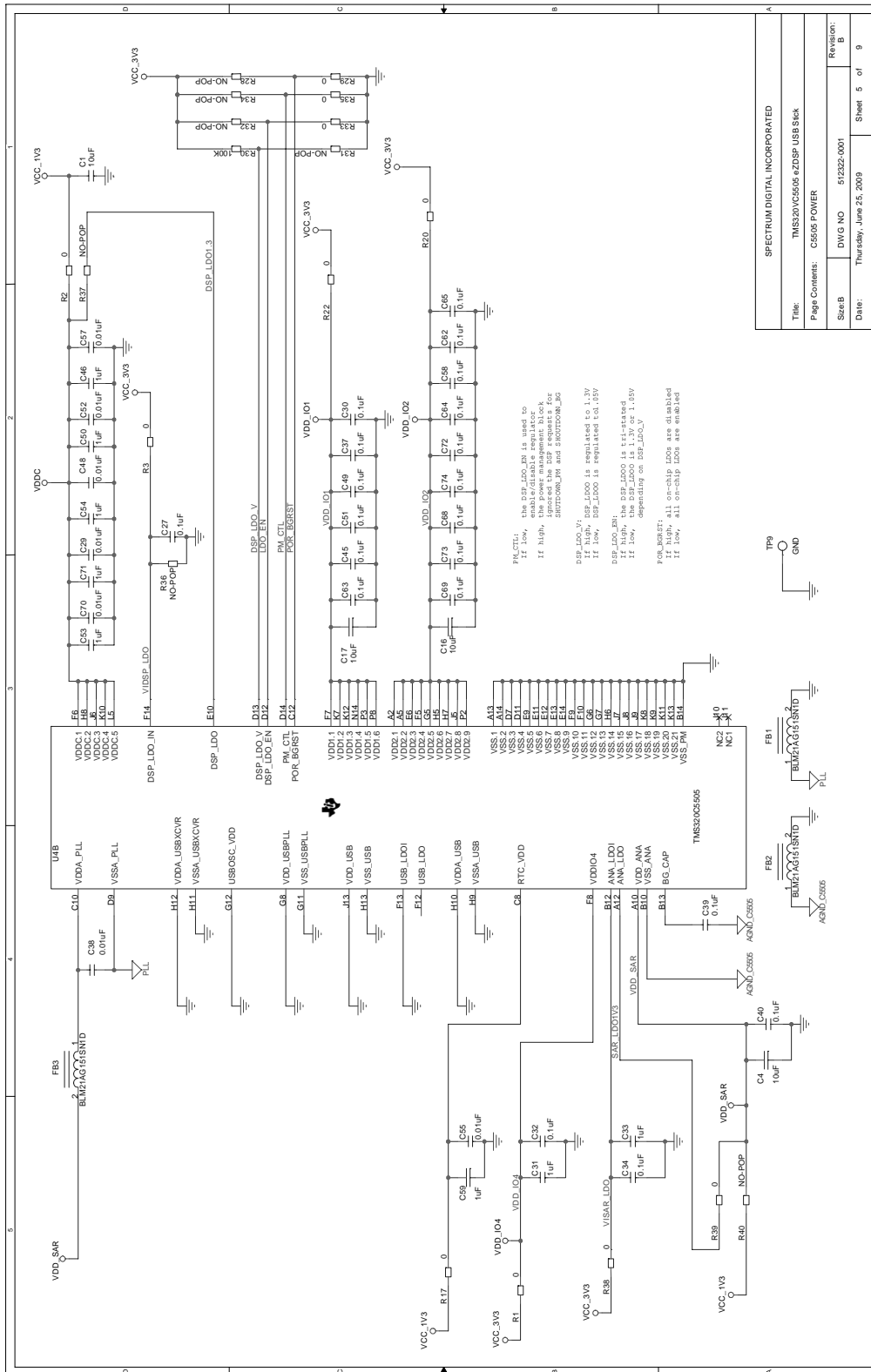


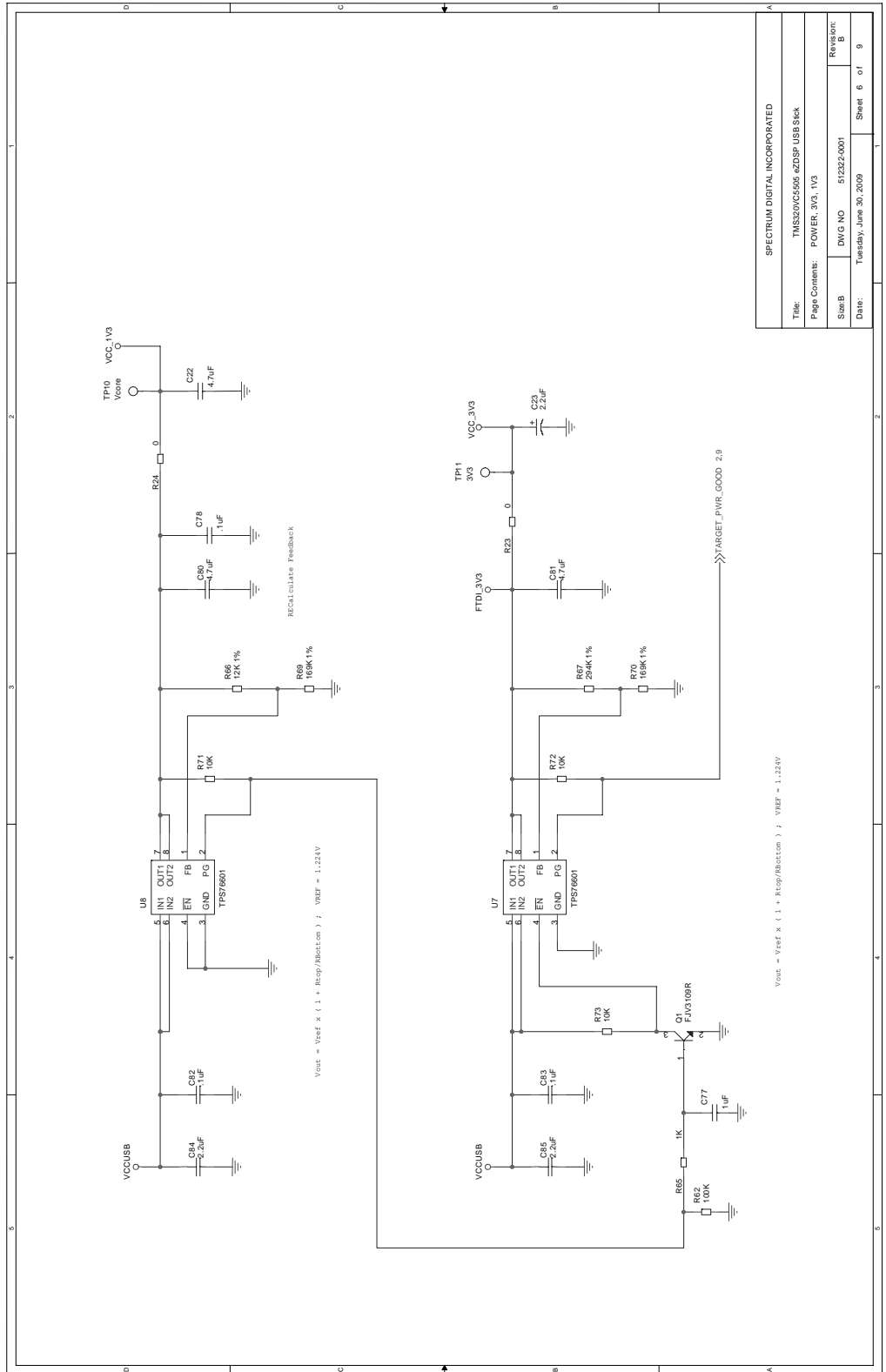
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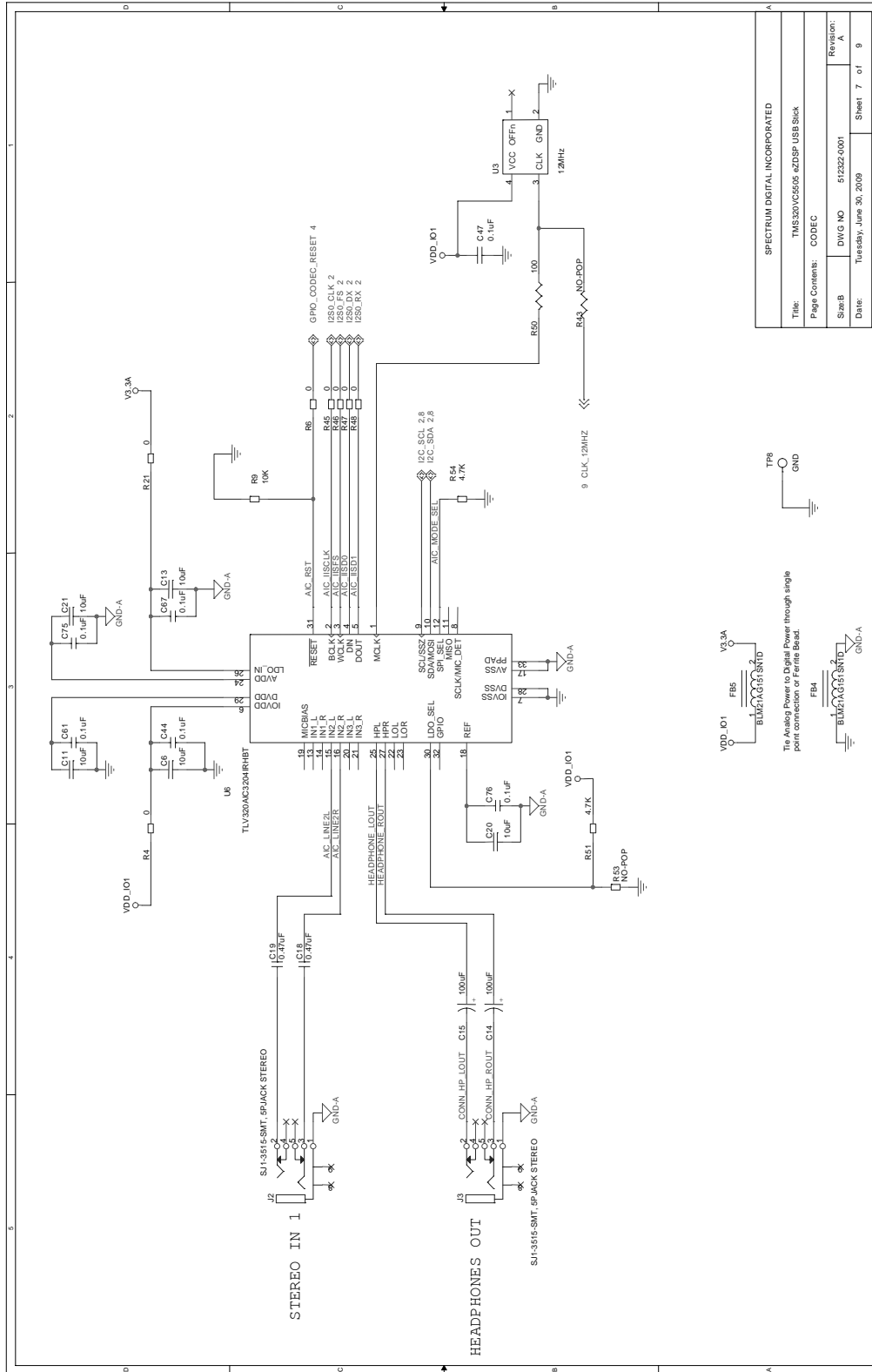
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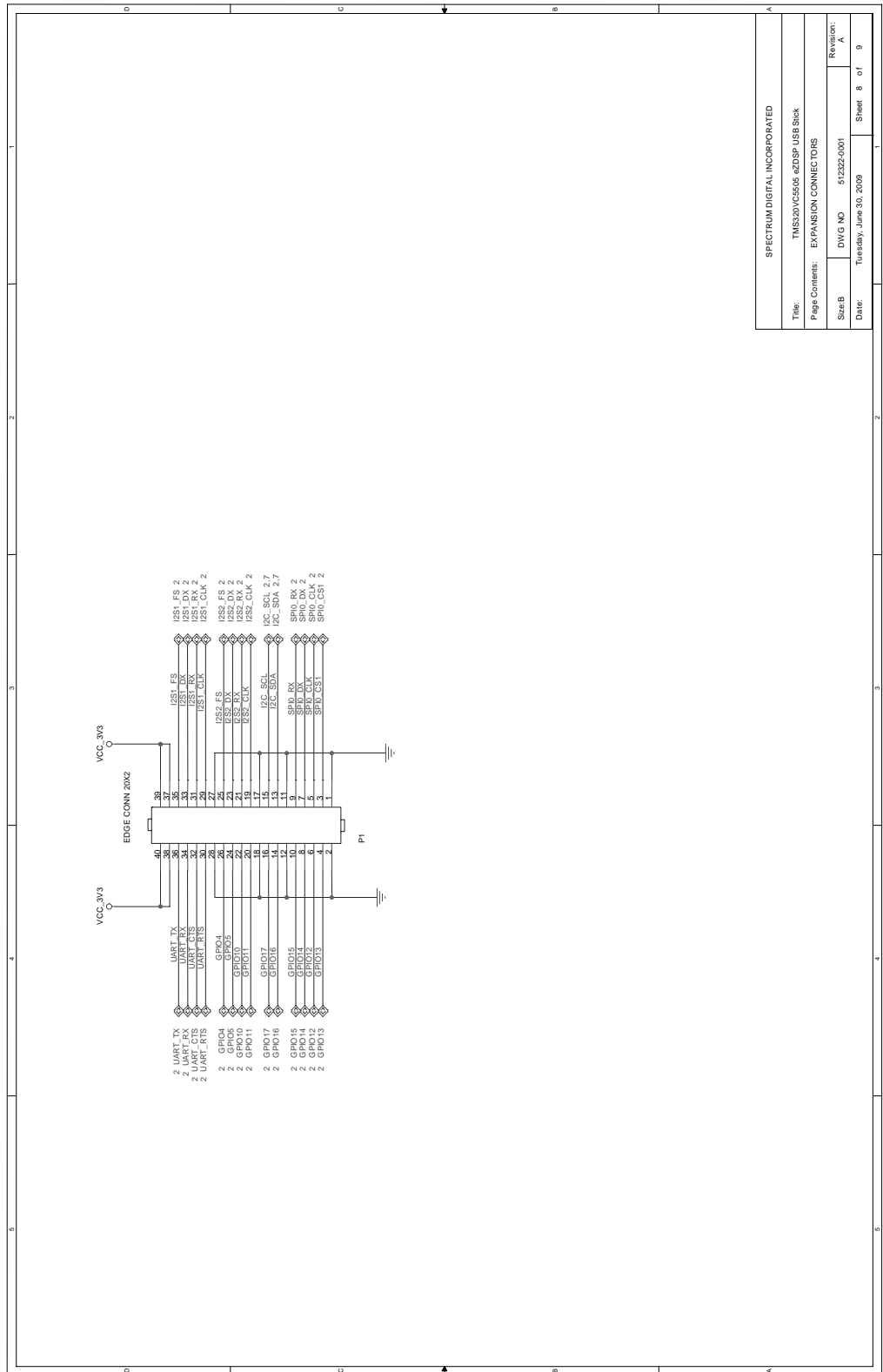




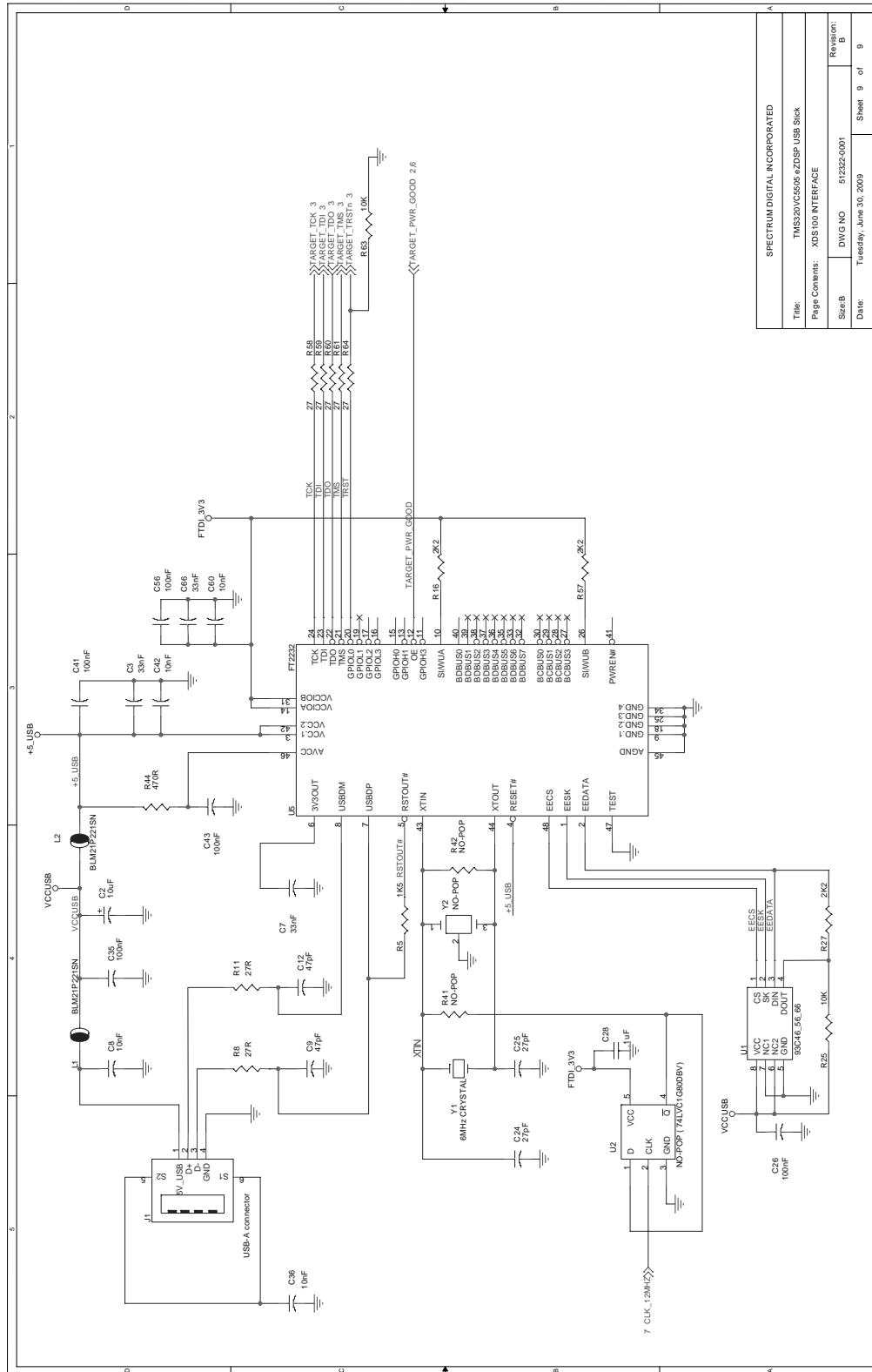
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Date: Tuesday, June 30, 2009			



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Size/B	DWG NO 512322-001
Date:	Thursday, June 30, 2009
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Page Contents:	EXPANSION CONNECTORS
Sheet:	8 of 9
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Revision:	A
Sheet:	8 of 9





# Appendix B

## Mechanical Information

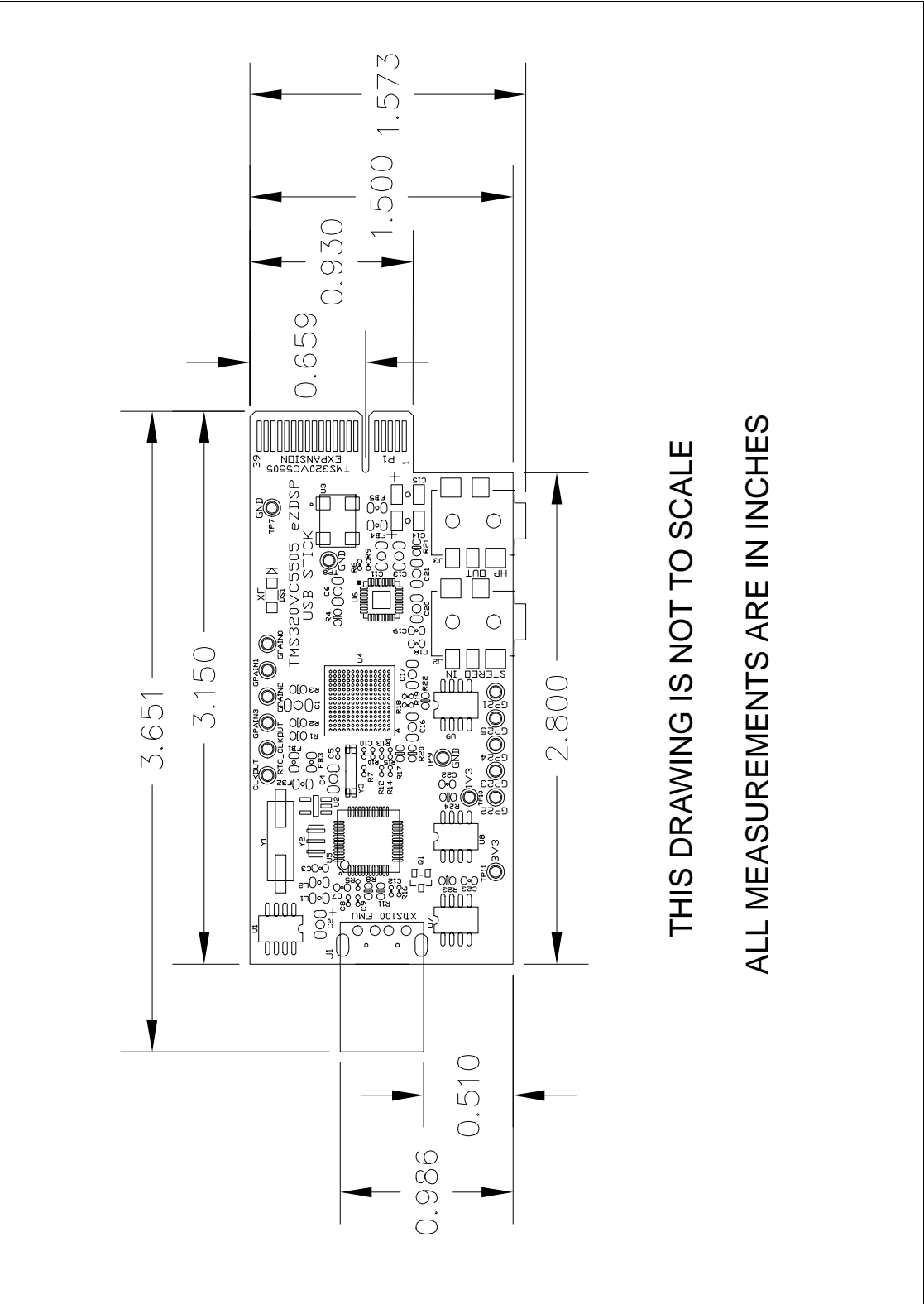
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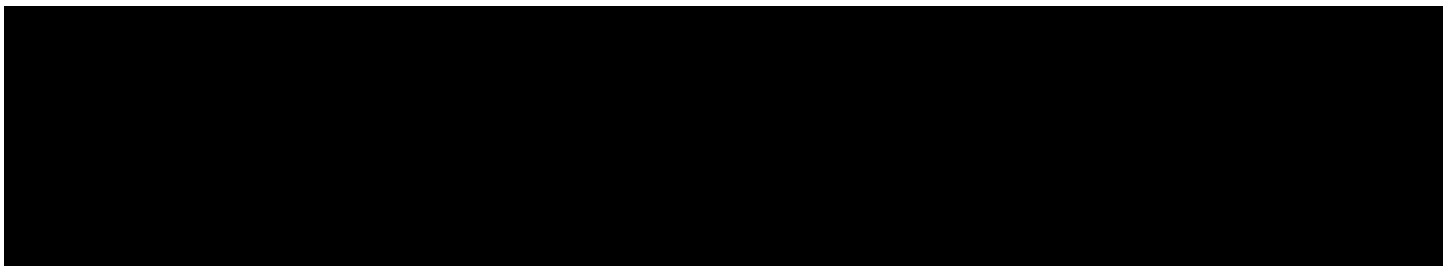
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This appendix contains the mechanical information about the TMS320VC5505 DSP Stick produced by Spectrum Digital.



THIS DRAWING IS NOT TO SCALE  
 ALL MEASUREMENTS ARE IN INCHES





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