TEXAS INSTRUMENTS

DSP-Codec Development Platform

User's Guide

September 2002

Data Acquisition Products

SLAU090

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 3.3 V described in the EVM User's Guide.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 60°C. The EVM is designed to operate properly with certain components above 60°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 operation and use of the DSP-codec development platform. A complete circuit description as well as schematic diagram and bill of materials are also included.

How to Use This Manual

This document contains the following chapters:

- Chapter 1 – Introduction and EVM Overview
- Chapter 2 – Digital Interface
- Chapter 3 – Support Functions
- Chapter 4 – EVM Bill of Materials and Schematic

Related Documentation From Texas Instruments

To obtain a copy of any of the following TI documents, call the Texas Instruments literature response center at (800) 477-8924 or the product information center (PIC) at (972) 644-5580. When ordering, please identify this booklet by its title and literature number. Updated documents can also be obtained through the TI website at www.ti.com.

Data Sheets:	**Literature Number:**
SN74LVC1G08DBVR	SCES217J
SN74LVC74ADR	SCAS287M
TPS70151PWP	SLVS222A

FCC Warning

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

Contents

Figures

Tables

Chapter 1

Introduction and EVM Overview

This chapter provides a brief overview of the DSP-codec development platform.

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1.1 Features

- Provides all necessary voltages for device under test
- Provides bit clock for codecs
- Flexible interface to popular TI DSPs
- General codec requirements are addressed

1.2 Introduction

The DSP-codec development platform provides all the supplementary control signals necessary to interface a range of TI codecs to TI DSP starter kits (DSKs).

The platform supports the following devices

- TLV320AIC1103
- TLV320AIC1106
- TLV320AIC1107
- TLV320AIC1109
- TLV320AIC1110
- TLV320AIC12
- TLV320AIC13
- TLV320AIC14
- TLV320AIC15
- TLV320AIC20
- TLV320AIC21
- TLV320AIC22
- TLV320AIC24

Chapter 2

Digital Interface

This chapter describes the digital interface of the DSP-codec development platform.

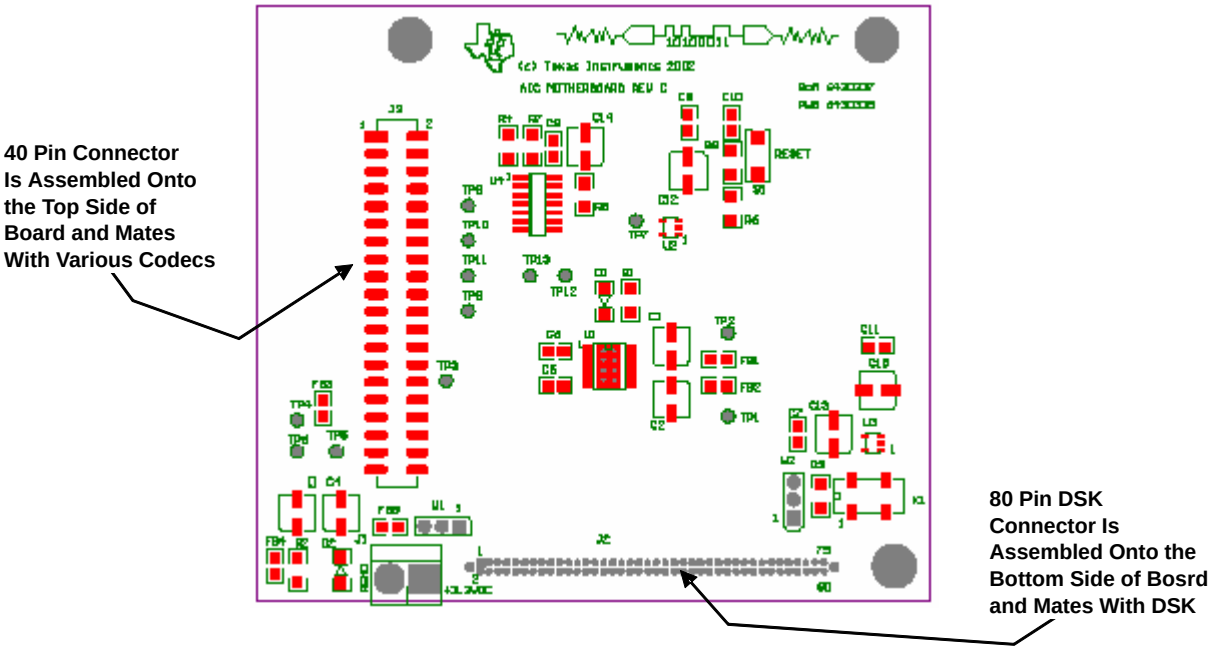
Topic **Page**

2.1 Introduciton

There are two sections within the digital interface of the development platform:

- DSP-to-platform
- Platform-to-codec

Figure 2-1. DSP-Codec Development Platform



2.2 DSP-to-Platform

The development platform mates with TI DSKs via the 80-pin Samtec connector located at J2. Consult the schematic for pinout details.

2.3 Platform-to-Codec

Codec EVMs mate with the development platform via a 40-pin Samtec connector located at J3. The mating connector (Samtec part number, SSW-120-22-F-D-VS-K) is used on the EVM board to provide the electrical connections necessary for various codec EVMs. Consult Samtec at www.samtec.com or 1-800-SAMTEC-9 for more information.

The pinout for the 40-pin connector is given in Table 2-1.

Table 2-1. J2 Connector Pinouts

Pin Number	Signal	Description
J2.1	MCLK	Master clock
J2.2	DGND	Digital ground
J2.3	SCLK	Serial data clock
J2.4	DGND	Digital ground
J2.5	DIN	Data in
J2.6	DGND	Digital ground
J2.7	DOUT	Data out
J2.8	Reserved	Reserved for future use
J2.9	FS	Frame sync
J2.10	Reserved	Reserved for future use
J2.11	CLKX	Transmit clock
J2.12	Reserved	Reserved for future use
J2.13	FSX	Frame sync transmit
J2.14	Reserved	Reserved for future use
J2.15	DX	Data transmit
J2.16	DR	Data receive
J2.17	$\overline{\text{RESET}}$	Global reset for all devices
J2.18	FSR	Frame sync receive
J2.19	$\overline{\text{PWDN}}$	Global power down for all devices
J2.20	CLKR	Receive clock
J2.21	CNTLb	GPIO pin
J2.22	CNTLa	GPIO pin
J2.23	STATb	Status pin
J2.24	STATa	Status pin
J2.25	3.3V_D	Digital 3.3 V
J2.26	Reserved	Reserved for future use
J2.27	3.3V_D	Digital 3.3 V
J2.28	DGND	Digital ground
J2.29	1.8V_D	Digital 1.8 V
J2.30	DGND	Digital ground
J2.31	1.8V_D	Digital 1.8 V

Table 2-1. J2 Connector Pinouts (Continued)

Pin Number	Signal	Description
J2.32	DGND	Digital ground
J2.33	3.3V_A_DRV	Output driver supply 3.3 V
J2.34	AGND	Analog ground
J2.35	3.3V_A_DRV	Output driver supply 3.3 V
J2.36	AGND	Analog ground
J2.37	3.3V_A	Analog 3.3 V
J2.38	AGND	Analog ground
J2.39	3.3V_A	Analog 3.3 V
J2.40	AGND	Analog ground

Chapter 3

Support Functions

This chapter provides a description of the codec support functions.

Topic **Page**

3.1 Introduction

The development platform supports a number of functions required by the codecs:

- MCLK generation
- Reset generation
- Power options

Alternatives for each function are described below.

3.1.1 MCLK Generation

MCLK is the clock required by the Sigma Delta converter. All other timing is derived from MCLK. The DSK provides a clock that can be used as MCLK for the codecs. Alternatively, a 100 MHz clock is available on the development platform. Jumper W2 selects the clock source.

Table 3-1. Jumper W2 Function

Position	Function
1-2	DSP Clock is selected
2-3	100 MHz clock from development platform is selected

3.1.2 Reset Generation

Reset may be generated by either the DSK via software, or manually by momentarily pressing SW1. Either of these options is valid and generates a $\overline{\text{RESET}}$ signal that is asynchronous to MCLK.

3.1.3 Power Options

System power may be supplied from either the DSK via connector J2, or an external source via connector J1. If an external source is used to supply system power, switch the position of jumper W1.

Table 3-2. Jumper W1 Function

Position	W1 Function
1-2	3.3 V is supplied via the DSK
2-3	3.3 V is supplied via the J1 screw terminals

3.2 Key Signal Synchronization

The reset and power-down signals must be synchronized to MCLK before being applied to any codec. As mentioned previously, $\overline{\text{RESET}}$ is generated by the DSK or the user, and is asynchronous to the MCLK. Synchronization is achieved by D-type flip-flop. Similarly, the $\overline{\text{PWDN}}$ signal is generated by the user's software, and is asynchronous to the MCLK signal. Synchronization of $\overline{\text{PWDN}}$ is also achieved by D-type flip-flop.

Chapter 4

EVM Bill of Materials and Schematic

The development platform bill of materials and schematic are provided in this chapter.

Topic **Page**

4.1 EVM Bill of Materials

The following table contains a complete bill of materials for the DSP-codec development platform. The schematic diagram is also provided for reference. Contact the product information center, or e-mail dataconvapps@list.ti.com if you have questions regarding this EVM.

Ref Des	Description	Vendor	Part number
C7, C8, C9, C10, C11	Capacitor, 0.1 µF 50 V, ceramic X7R 0805	Panasonic	ECJ-2YB1H104K
C5, C6	Capacitor, .22 µF 16 V ceramic X7R 0805	Panasonic	ECJ-2VB1C224K
C12, C13, C14, C15	Capacitor, 10 µF 16 V VS electrolytic SMD	Panasonic	ECE-V1CA100SR
C1, C2, C3, C4	Capacitor, 33 µF 10 V VS electrolytic SMD	Panasonic	ECE-V1AA330SR
FB1, FB2, FB3, FB4, FB5	Ferrite bead inductor	FairRite	2744044447
R1, R2	RES 270 Ω 1/8 W 5%, 1206 SMD	Panasonic	ERJ-8GEYJ271V
R8	RES 1.0 kΩ 1/8 W,5%, 1206 SMD	Panasonic	ERJ-8GEYJ102V
R3, R4, R5	Resistor 10 kΩ, 1/8 W 5%, 1206 SMD	Panasonic	ERJ-8GEYJ103V
R7			
R6	Resistor 130 kΩ, 1/8 W 5% 1206 SMD	Panasonic	ERJ-8GEYJ134V
D1, D2	LED, green, clear 1206 SMD	Chicago Miniature Lamp Inc	CMD5-21VGC/TR8
X1	100 MHz Oscillator	Epson	SG-8002JC100M-PCC
	TLV320 AIC motherboard		6430339
	TLV320 AIC motherboard DDB	Texas Instruments	6430338
U2, U3	Single 2-input positive-AND gate	Texas Instruments	SN74LVC1G08DBVR
U4	IC, dual D-type flip-flop 14-SOP	Texas Instruments	SN74LVC74ADR
U1	IC, dual 3.3/1.8 LDO Reg. 20 HTSSOP	Texas Instruments	TPS70151PWP
J1	2-Terminal screw connector	Lumberg	KRMZ2
W1, W2	3-position jumper	Samtec	TSW-103-07-L-S
J3	40-PIN SMT plug	Samtec	TSM-120-01-T-DV-P
J2	80-Pin 0.05” center	Samtec	TFM-140-31-S-D-A
S1	Switch, light touch 6X3.5 240 GF SMD	Panasonic	EVQ-PJU04K
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13	Test point	Keystone	5000

4.2 EVM Schematic

The full DSP-codec EVM schematic is on the following pages.

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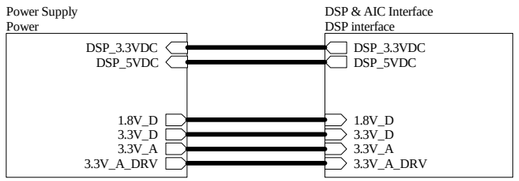
REV	ECN Number	Approved



Engineer:	
Drawn By:	
FILE:	CODEC Development system

12500 TI Boulevard. Dallas, Texas 75243

Title: DSP / CODEC Development Platform

DOCUMENTCONTROL # 6430338			REV: C
DATE: 9-Jul-2002	SIZE: C	SHEET: 1	OF: 3

Revision History		
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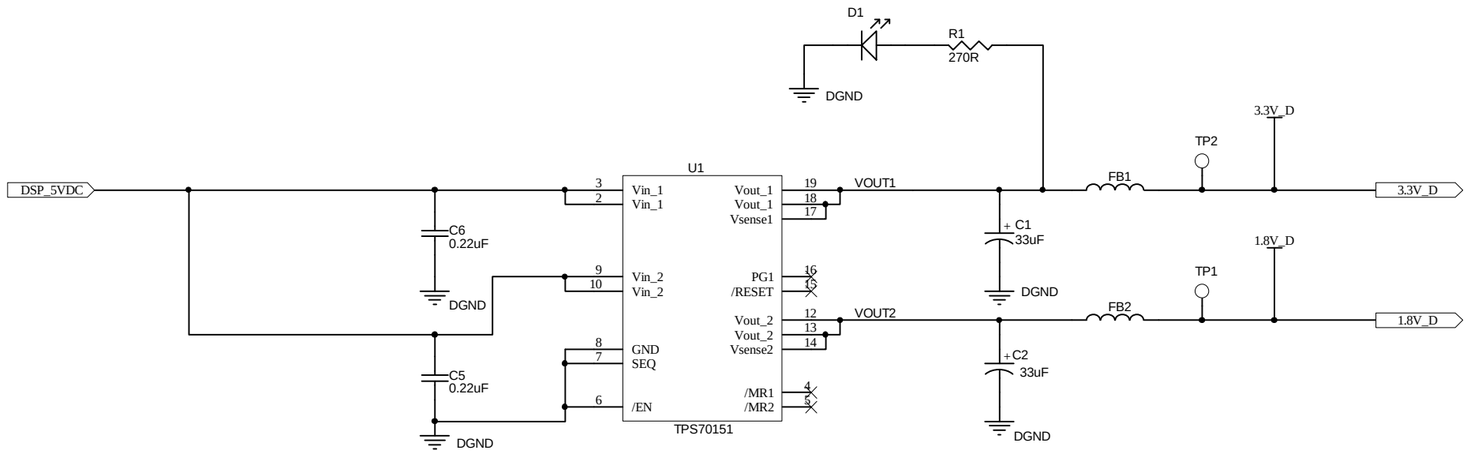
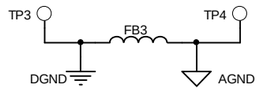
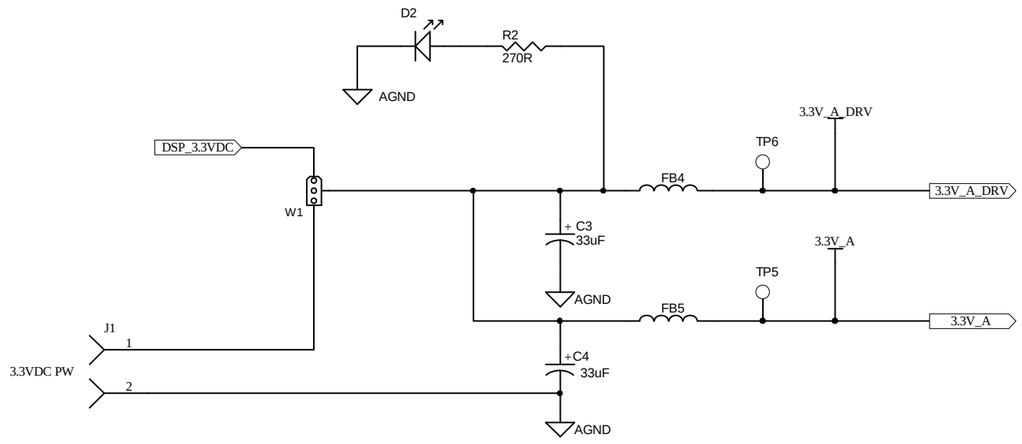






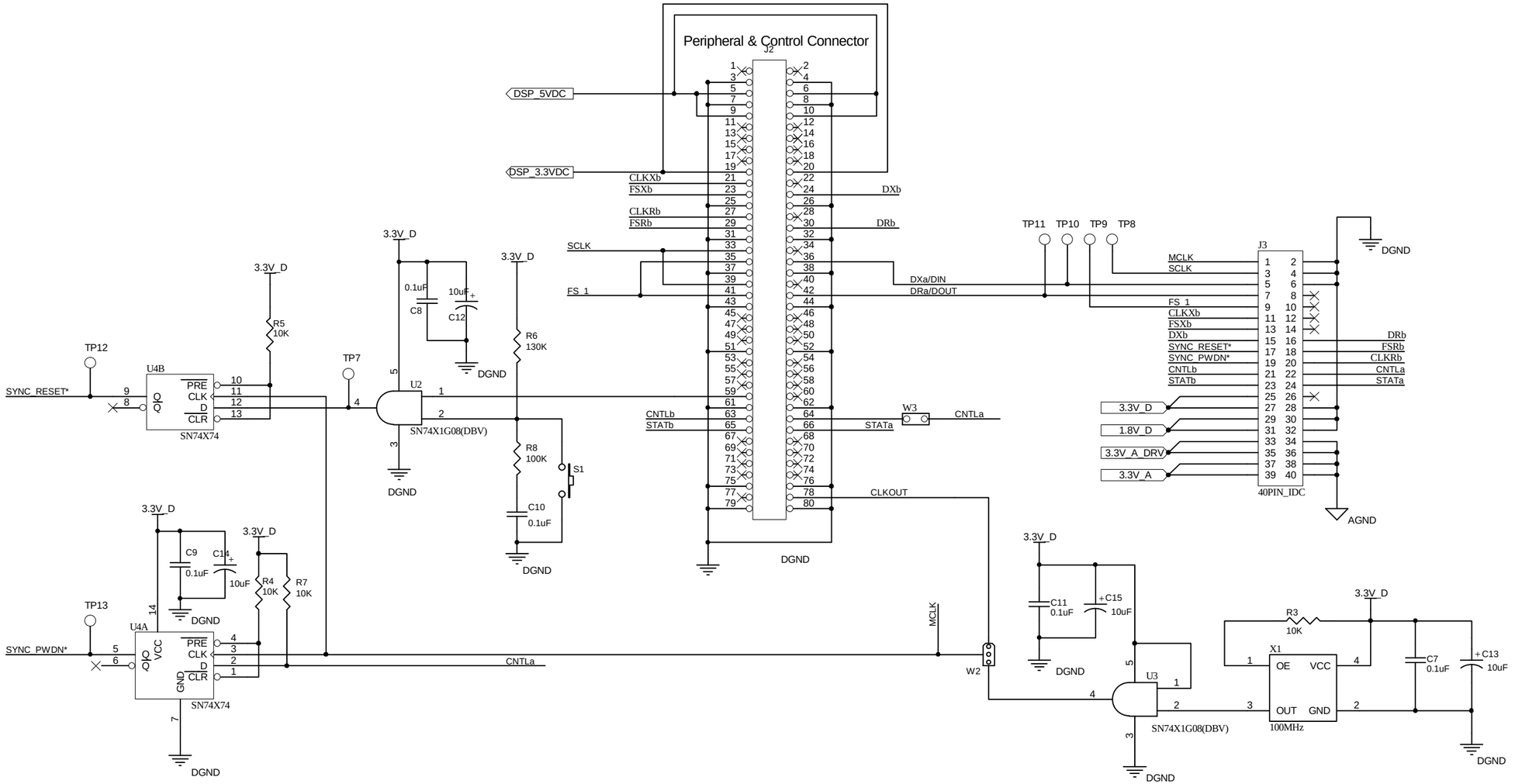
Engineer:	Wendy X. Fang
Drawn By:	Wendy X. Fang
FILE:	Power

12500 TI Boulevard. Dallas, Texas 75243

Title: DSP / CODEC Development Platform

DOCUMENTCONTROL # 6430338 REV: C

DATE: 9-Jul-2002 SIZE: B SHEET: 3 OF: 3



	12500 TI Boulevard. Dallas, Texas 75243
	Title: DSP / CODEC Development Platform
Engineer: Wendy X. Fang	DOCUMENTCONTROL # 6430338 REV: C
Drawn By: Wendy X. Fang	
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