Texas Instruments

TLV320AIC1103/1109/1110 EVMs

User's Guide

March 2003

Data Acquisition Products

SLAU092

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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 evaluation module (EVM) for the TLV320AIC1103 /1109 /1110 codec family. 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 – EVM Overview

Chapter 2 – Digital and Analog Interface

Chapter 3 – EVM Bill of Materials and Schematic

Related Documentation From Texas Instruments

To obtain a copy of any of the following 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:**
TLV320AIC1103	SLAS356
TLV320AIC1109	SLAS358
TLV320AIC1110	SLAS359

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

EVM Overview

This chapter provides an overview of the TLV320AIC1103 / 1109 / 1110 EVM.

Topic **Page**

1.1 Introduction

This EVM and user's guide supports the following devices:

TLV320AIC1103

TLV320AIC1109

TLV320AIC1110

These devices are voice-band audio processors, designed to perform transmit-encoding analog-to-digital (A/D) conversion, receive-decoding digital-to-analog (D/A) conversion, and transmit and receive filtering for voice-band communications systems.

The EVM can operate with a DSP development platform to provide the necessary power requirements and a convenient way to interface with TI's range of starter kits via the 80-pin expansion connector located on the DSK. Alternatively, the EVM can operate without a DSP development platform. In this case the user is responsible for providing a suitable interface to the host system.

System-level features for the chip are managed via 2 jumpers. Register programming is achieved via an I^2C interface.

Interfacing with the analog I/O is accomplished via 3 screw terminals.

Chapter 2

Digital and Analog Interface

This chapter describes the digital and analog interface for the TLV320AIC1103 / 1109 /1110 EVM.

Topic **Page**

2.1 Description

The digital signals required to operate this codec originate from the 40-pin connector—J1. There are two methods to drive the digital interface:

Create a custom interface between the codec EVM and the host system.

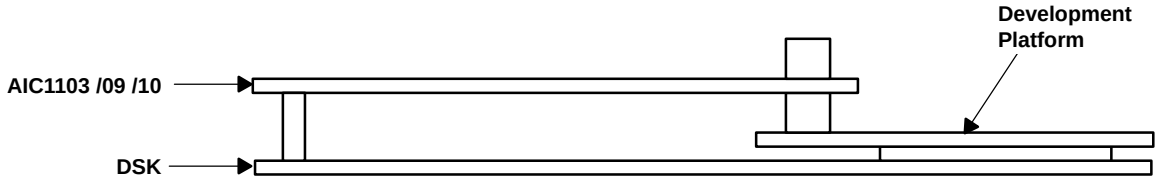
Alternatively, if a TI DSP starter kit (DSK) is the host system, a development platform is available from TI. This platform provides the additional functions that the codec requires in a convenient form factor.

2.2 Codec-to-Development Platform Interface

The EVM mates with TI's DSP starter kit systems (DSKs) via the development platform.

The development platform mates with the DSK, through which all the necessary power is provided. $\overline{\text{RESET}}$ can be manually furnished to the EVM via a switch on the development platform, or by the $\overline{\text{RESET}}$ signal on the DSK via the development platform.

Figure 2-1. Development Platform Mechanical Interface



Electrical interface to the development platform is via a 40-pin connector on the TLV320AIC1103/1109/1110 EVM. The connector mates with the development platform connector (Samtec part number, TSM-120-01-T-DV-P). 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. EVM J1 Connector Pinout

Pin Number	Signal	Description
J1.1	MCLK	Master system clock
J1.2	DGND	Digital ground
J1.3	SCLK	Serial data clock
J1.4	DGND	Digital ground
J1.5	DIN	Data in
J1.6	DGND	Digital ground
J1.7	DOUT	Data out
J1.8	N/A	Reserved
J1.9	FS	Frame sync
J1.10	N/A	Reserved
J1.11	SCL	I^2C Serial bus clock
J1.12	N/A	Reserved
J1.13	SDA	I^2C Serial bus address / data
J1.14	N/A	Reserved
J1.15	N/A	Reserved
J1.16	N/A	Reserved
J1.17	$\overline{\text{RESET}}$	Reset
J1.18	N/A	Reserved
J1.19	N/A	Reserved
J1.20	N/A	Reserved
J1.21	N/A	Reserved
J1.22	N/A	Reserved
J1.23	N/A	Reserved
J1.24	N/A	Reserved
J1.25	3.3V_D	Digital 3.3 V
J1.26	N/A	Reserved
J1.27	3.3V_D	Digital 3.3 V
J1.28	DGND	Digital ground
J1.29	N/A	Reserved
J1.30	DGND	Digital ground
J1.31	N/A	Reserved
J1.32	DGND	Digital ground
J1.33	N/A	Reserved
J1.34	AGND	Analog ground
J1.35	N/A	Reserved
J1.36	AGND	Analog ground
J1.37	3.3V_A	Analog 3.3 V
J1.38	AGND	Analog ground
J1.39	3.3V_A	Analog 3.3 V
J1.40	AGND	Analog ground

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

Manual reset generation

Power options

Convenient mechanical interface to TI's DSK

Refer to SLAU090 for details regarding the development platform.

2.3 Jumper Options

There are two jumpers on the EVM board that can be configured in various ways, depending upon the user's requirements. Their functions are briefly presented in the following tables.

Table 2-2. Jumper Options

Jumper	Function
W1	Default mode selected
P1.1 - P1.3	MCLK = PCMCLK (SCLK)

2.3.1 Default Mode

Default mode permits the codec to operate from power up without programming any registers via I^2C.

Table 2-3. Default Mode—W1 Jumper Options

W1		
Description	1-2	2-3
Default mode is selected	Inserted	Not inserted
Power-down mode	Not inserted	Inserted

See the appropriate data sheet for information regarding the default settings.

2.3.2 PCM Interface

The PCM interface transmits and receives data at the PCMO (DOUT) and PCMI (DIN) terminals respectively. The data is transmitted or received at the PCMCLK (SCLK) speed once every PCMSYN cycle (FS). The PCMCLK can be tied directly to a master 2.048 MHz clock (MCLK).

Table 2-4. PCM Interface—P1 Jumper Options

P1	
Description	P1.1 - P1.3
MCLK = SCLK	Inserted

2.4 Analog Interface

To make it as easy as possible to connect to a wide range of input and output devices, the analog interface features simple screw terminals—J2 and J3 for microphone inputs, and J4 for earphone output.

Chapter 3

EVM Bill of Materials and Schematic

This chapter provides a bill of materials and schematic for the TLV3201103/ 1109 / 1110 EVM.

Topic **Page**

3.1 EVM Bill of Materials

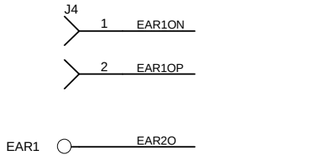
The following table contains a complete bill of materials for the TLV320AIC1103 /1109 /1110 EVM. The schematic diagram is also provided for reference. For further information contact the product information center (PIC) or E-mail questions regarding this EVM to dataconvapps@list.ti.com.

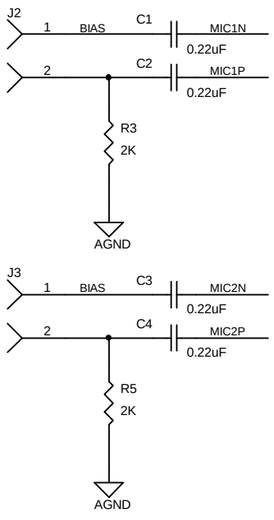
Quantity	Reference	Description
4	C1, C2, C3, C4	Capacitor, 0.22 μF 16 V ceramic X7R 1206
2	C5, C6	Capacitor, 10 μF 16 V tantalum TE series
2	C7, C8	Capacitor, 0.1 μF 16 V ceramic X7R 1206
2	R1, R2	Resistor, 10 kΩ 1/8 W 5% 1206 SMD
3	R3, R4, R5	Resistor, 2 kΩ 1/8W 5% 1206 SMD
1	R6	Resistor, 100 kΩ 1/8W 5% 1206 SMD
2	R7	Resistor, 4.7 kΩ 1/8W 5% 1206 SMD
1	R8	Resistor, 0 Ω 1/8W 5% 1206 SMD
1	U1	TLV320AIC1110 IC, PCM codec, Prog. MIC AMP 32TQFP
	Alternate	TLV320AIC1109 IC, PCM codec, Prog. MIC AMP 32TQFP
	Alternate	TLV320AIC1103 IC, PCM codec, Prog. MIC AMP 32TQFP
1		TLV320AIC1110 PWB
1	J1	40-Pin SMT socket
1	P1	40-Pin SMT plug
3	J2, J3, J4	2 Terminal screw connector
1	W1	2 Position jumper
5	BUZZCON1	0.025 Inch test point
	EAR1	
	MUXIN1	
	MUXOUT1	
	MUXOUT2	
2	See assembly drawing	1.000/4-40, nylon, hex thread, SP
2	See assembly drawing	4-40 × 1/4 inch, machine screw, panhead SS

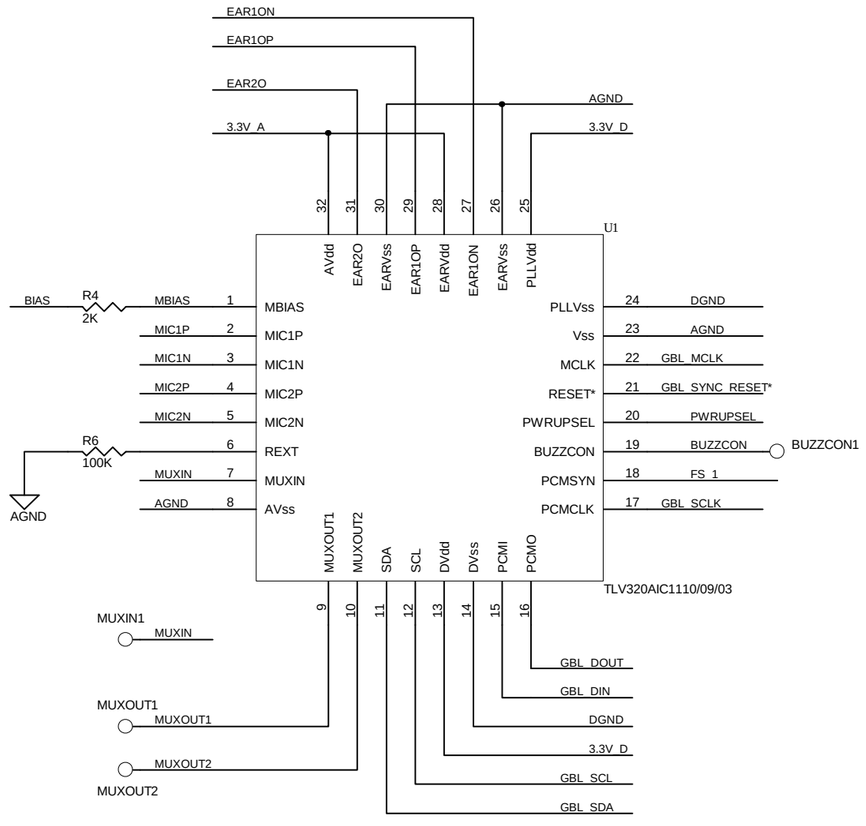
3.2 EVM Schematic

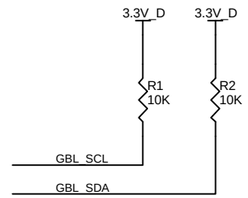
The schematic is on the following page.

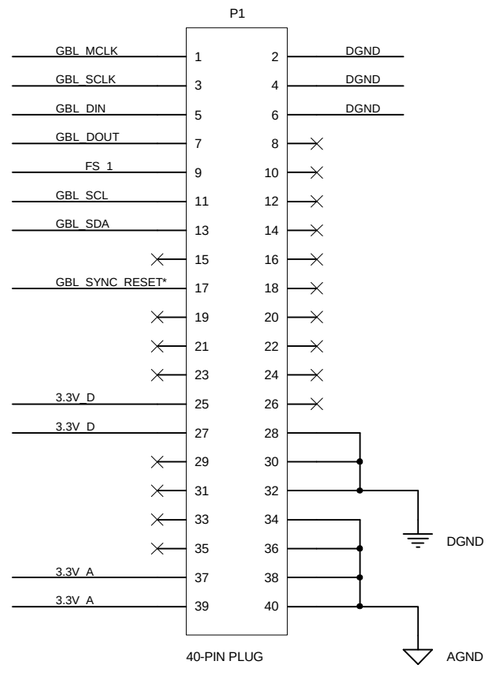
Revision History		
REV	ECN Number	Approved

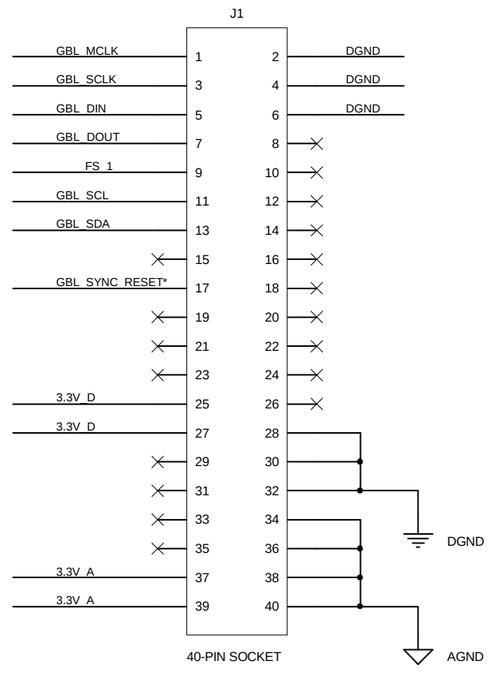


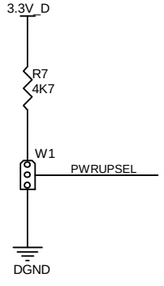


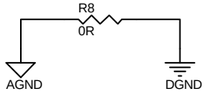


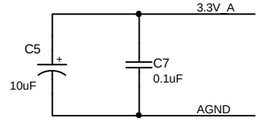


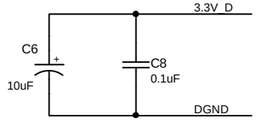












12500 TI Boulevard. Dallas, Texas 75243

Title: TLV320AIC1103/ 09 / 10 Schematic

Engineer: Joe Purvis	DOCUMENTCONTROL # 6437740		REV: A
Drawn By: Joe Purvis			
FILE: AIC1110 Rev A	DATE: 29-Aug-2002	SIZE:	SHEET: 1 OF: 1