# TLV320AIC3268EVM-U Evaluation Module

This User's Guide describes the operation, use, and features of the TLV320AIC3268EVM-U. For questions and support go to the E2E forums (e2e.ti.com).

The main contents of this document are:

- Hardware descriptions and implementation
- Start up procedure using PurePath™ Console 2 (PPC2) software with the AIC3268 plug-in

**Table 1. Related Documents**

| Document Title | Literature Number |
|---|---|
| TLV320AIC3268 Data Sheet | SLAS953 |
| PurePath Graphic Development Suite | PurePath Console |

**Contents**



**List of Figures**



PurePath is a trademark of Texas Instruments.
Windows is a registered trademark of Microsoft Corporation.

# 1 Features

- Full featured EVM with the TLV320AIC3268 Audio Codec
- USB connection to PC provides power, control and streaming audio for quick evaluation
- Easy-to-use PurePath Console 2 software provides graphical user interface to configure and control AIC3268

# 2 Introduction

This specific evaluation module (EVM) is a programmable USB audio device that features the TLV320AIC3268 Audio Codec with miniDSP.

## *2.1 Electrostatic Discharge Warning*

Many of the components on the EVM are susceptible to damage by electrostatic discharge (ESD). Users are advised to observe proper ESD handling precautions when unpacking and handling the EVM, including the use of a grounded wrist strap at an approved ESD workstation.

**CAUTION**

Failure to observe ESD handling procedures can result in damage to EVM components.

## 2.2 Unpacking the EVM

On opening the TLV320AIC3268EVM-U package, ensure that the following item is included:

- One TLV320AIC3268EVM-U board using one TLV320AIC3268 (Figure 1 and Figure 2)

If either of the board or the TLV320AIC3268 device is missing, contact the Texas Instruments Product Information Center to inquire about a replacement.

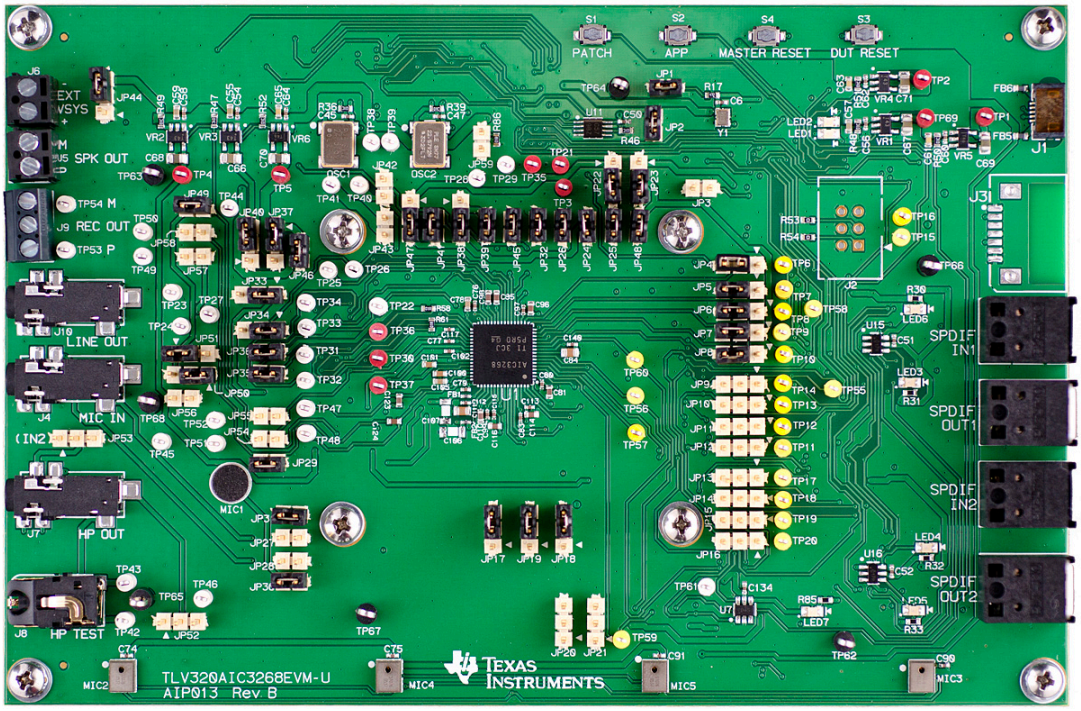


**Figure 1. TLV320AIC3268EVM-U Top Board Photo**

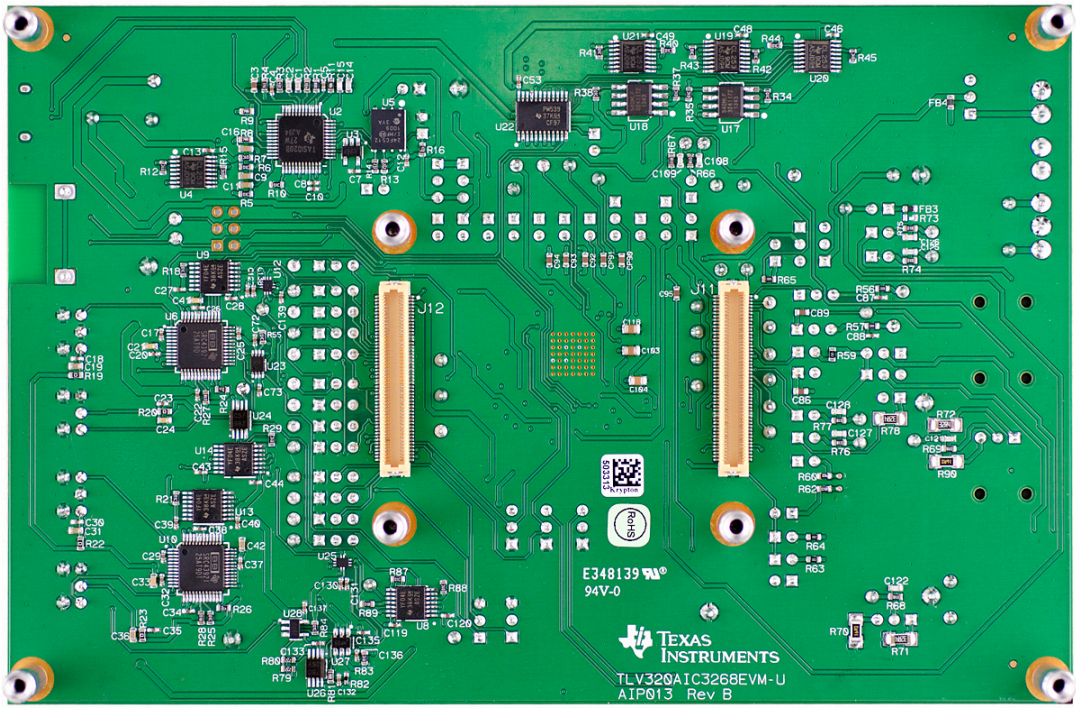


**Figure 2. TLV320AIC3268EVM-U Bottom Board Photo**

# 3 Getting Started

1. Request and download the PPC2 software located in the EVM product folder on the web.
2. Connect the EVM to USB port, LED lights LED1 and LED2 should illuminate once the EVM is detected by Windows® PC. Also, in the Windows Device Manager, the EVM should be recognized as a USB composite device, a USB audio device and an HID-compliant device.
3. Connect headphones to jack J7, labeled HP OUT.
4. Open PPC2 and in the *Command Buffer Interface* select *Open*.
5. Download the most up-to-date scripts from the product folder. Navigate to that folder and select script 1.1 and click *Execute*.
6. Play audio through any media tool. Make sure that the playback (and recording) device is USB-AudioEVM in the Windows control panel.
   - To adjust playback volume, open Sound in control panel, select the USB-AudioEVM device and click *Properties*.
   - Similarly, the other example configurations can be tried and sound can be recorded using the microphone available on the board.
7. Install jumpers on the EVM as per the requirements to make the right signal connections.

# 4 PurePath Console 2 Software

## *4.1 Installation*

1. Request and download the PPC2 software located in the TLV320AIC3268 product folder.
2. Open the self-extracting installation file, and extract contents to a known folder.
3. Install the software by double clicking the setup executable and follow the directions.
4. Connect the EVM to a USB port using a micro-USB cable and open PurePath Console 2. If prompted, select the appropriate EVM name.

## 4.2 Graphical User Interface (GUI)

### 4.2.1 Main panel window

The main panel, shown in Figure 3, provides direct access to the I2C settings of the AIC3268. On the main panel, users can configure the registers through the single byte write and read or through the *Command Buffer Interface*. The analog setup, digital setup, audio inputs, audio outputs, DRC, AGC, SAR and headset detection can be configured through this interface.

The EVM status, which reflects the hardware connection of the EVM, is shown on the bottom left of the main panel.

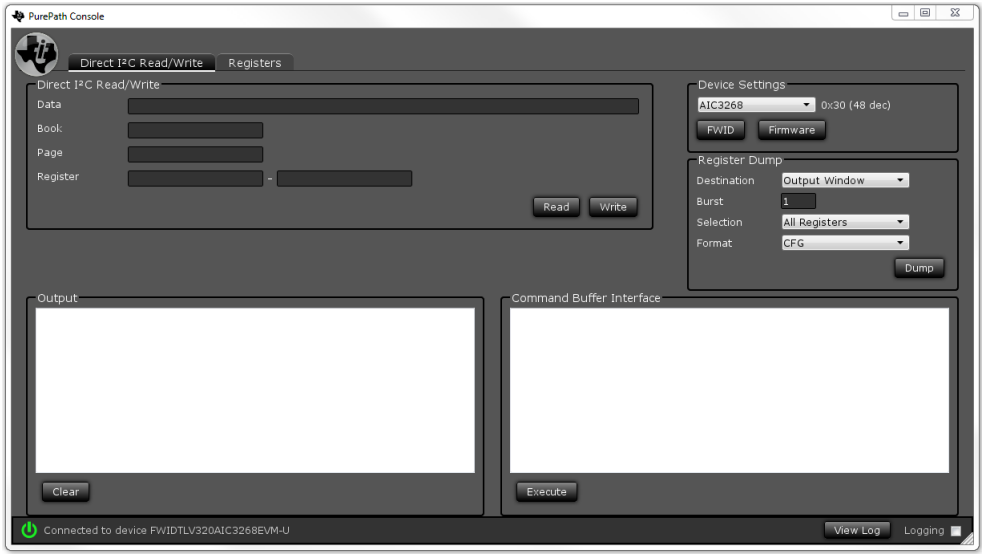


**Figure 3. Main Panel**

### 4.2.2 Typical Configuration

In the product folder there are example scripts for typical playback and record applications. These configurations are used through the *Command Buffer Interface*.

### 4.2.3 I2C Logger

The *Command Buffer Interface* communicates with the TLV320AIC3268 using a simple scripting language (described in Section 9). The TAS1020B USB controller handles all communication between the PC and the codec. A script is loaded into the command buffer, either by loading a script file using the Open button or by pasting text from the clipboard. Click Run to execute the command buffer.

To record the I2C communication between the PC and the device, there is an I2C Logger in the bottom right of the GUI. The I2C Logger records all register writes sent to the codec when the Logging box is checked. The recorded register values along with their page numbers are displayed in the *I2C Logger Window*. Pressing the Clear button clears the content of the logger.

### 4.2.4 Register Inspector

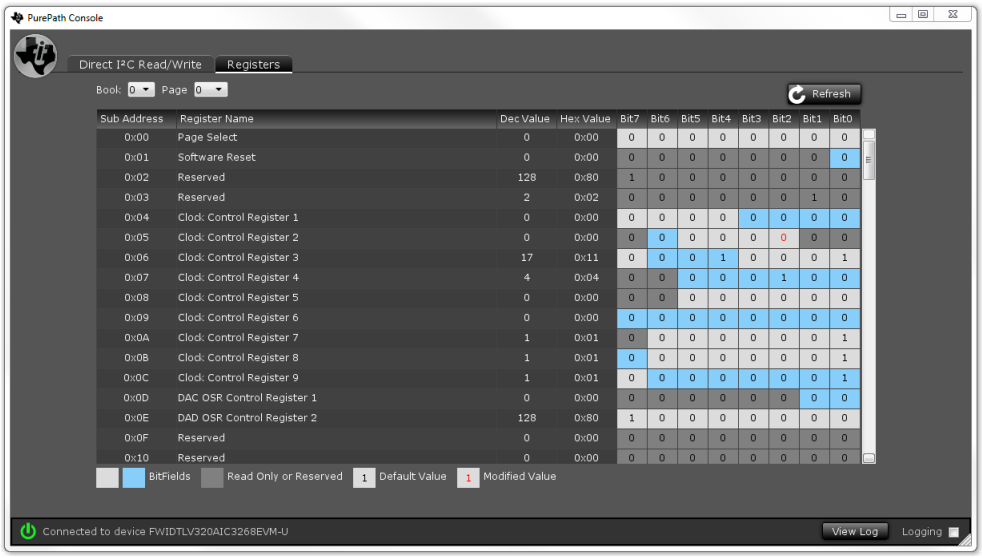


**Figure 4. Register Inspector Window**

The contents of the TLV320AIC3268 register map can be accessed through the Registers tab in PPC2. The Page number control selects the page to be displayed in the register table. The register table contains information such as register name, current register value and the bit field of the current register value. Specify the page number when using the register inspector table. Once the page is specified, the register value can then be inspected or changed by either entering the hex value of the register or changing the corresponding bits for that register.

# 5 TLV320AIC3268EVM-U Default Jumper Locations

Table 2 displays the default jumper location information.

**Table 2. Default Jumper Locations**

| Jumper | Position | | Jumper | Position |
|---|---|---|---|---|
| JP1 | Shorted | | JP31 | Shorted |
| JP2 | Shorted | | JP32 | Shorted |
| JP3 | Open | | JP33 | 1-2 |
| JP4 | 2-3 | | JP34 | 1-2 |
| JP5 | 2-3 | | JP35 | Shorted |
| JP6 | 2-3 | | JP36 | Shorted |
| JP7 | 2-3 | | JP37 | 1-2 |
| JP8 | 2-3 | | JP38 | 2-3 |
| JP9 | 2-3 | | JP39 | Shorted |
| JP10 | 2-3 | | JP40 | 2-3 |
| JP11 | 2-3 | | JP41 | Shorted |
| JP12 | 2-3 | | JP42 | Open |
| JP13 | 2-3 | | JP43 | Open |
| JP14 | 2-3 | | JP44 | 2-3 |
| JP15 | 2-3 | | JP45 | Shorted |
| JP16 | 2-3 | | JP46 | Open |
| JP17 | 2-3 | | JP47 | Open |
| JP18 | 2-3 | | JP48 | Shorted |
| JP19 | 2-3 | | JP49 | Shorted |
| JP20 | 1-2 | | JP50 | 1-2 |
| JP21 | 1-2 | | JP51 | 1-2 |
| JP22 | 1-2 | | JP52 | Open |
| JP23 | 1-2 | | JP53 | Open |
| JP24 | Shorted | | JP54 | Open |
| JP25 | Shorted | | JP55 | Open |
| JP26 | Shorted | | JP56 | Open |
| JP27 | Open | | JP57 | Open |
| JP28 | Open | | JP58 | Open |
| JP29 | Shorted | | JP59 | Open |
| JP30 | Shorted | | | |

# 6 TLV320AIC3268EVM-U EVM Schematics

The schematics for the TLV320AIC3268EVM-U are shown in Figure 5 through Figure 12.

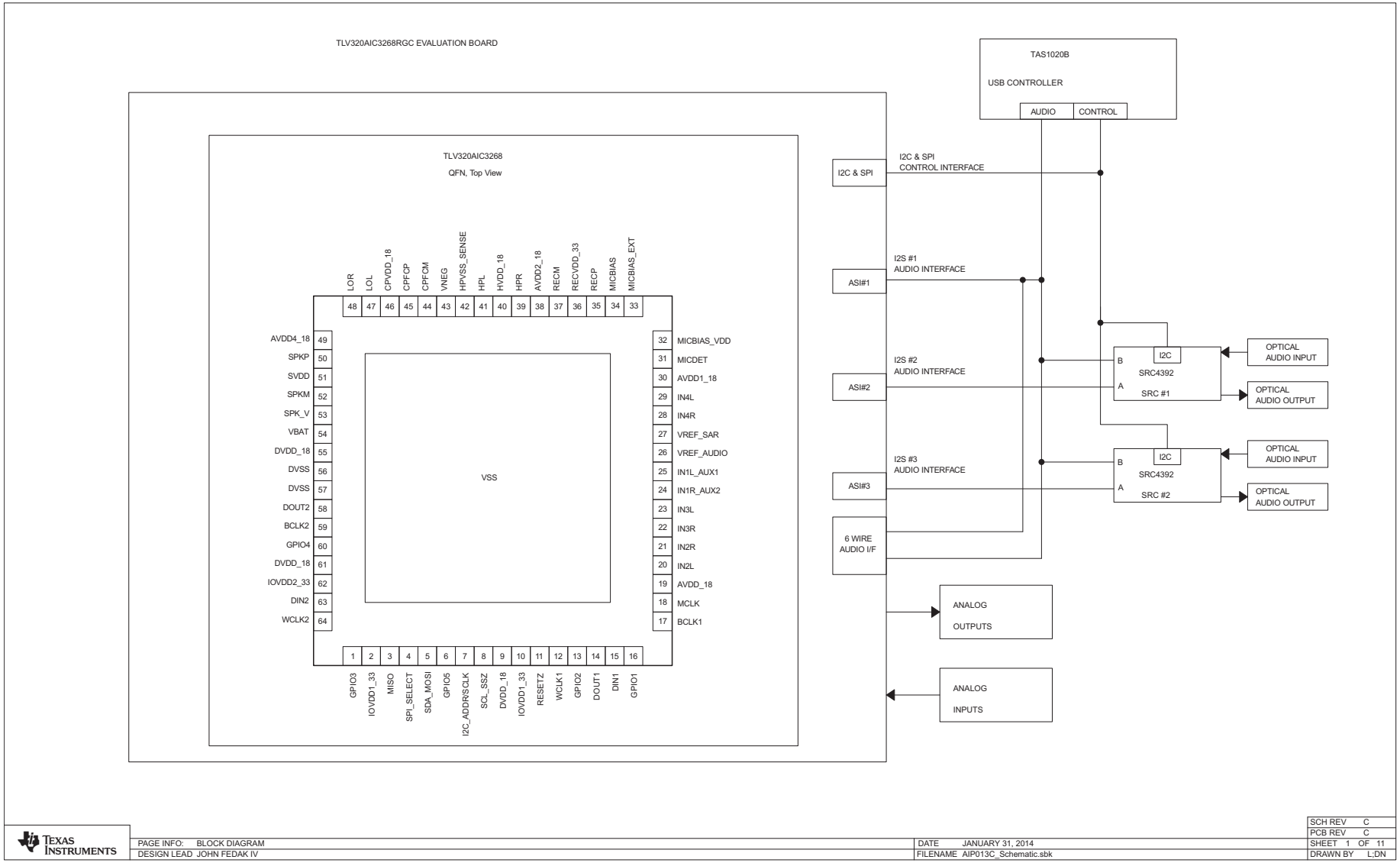


**Figure 5. TLV320AIC3268RGC Block Diagram**

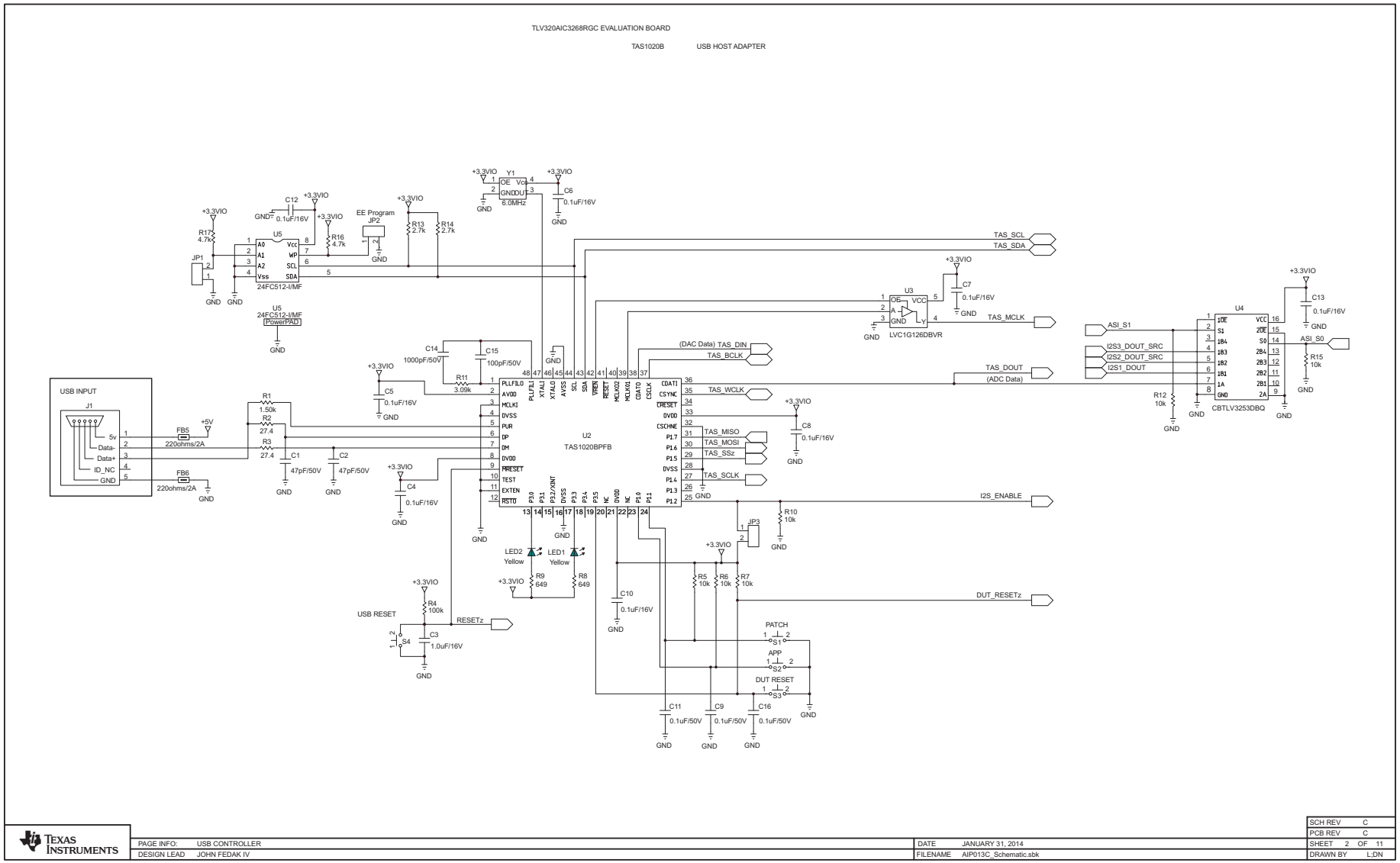


**Figure 6. TAS1020BPFB USB Controller**

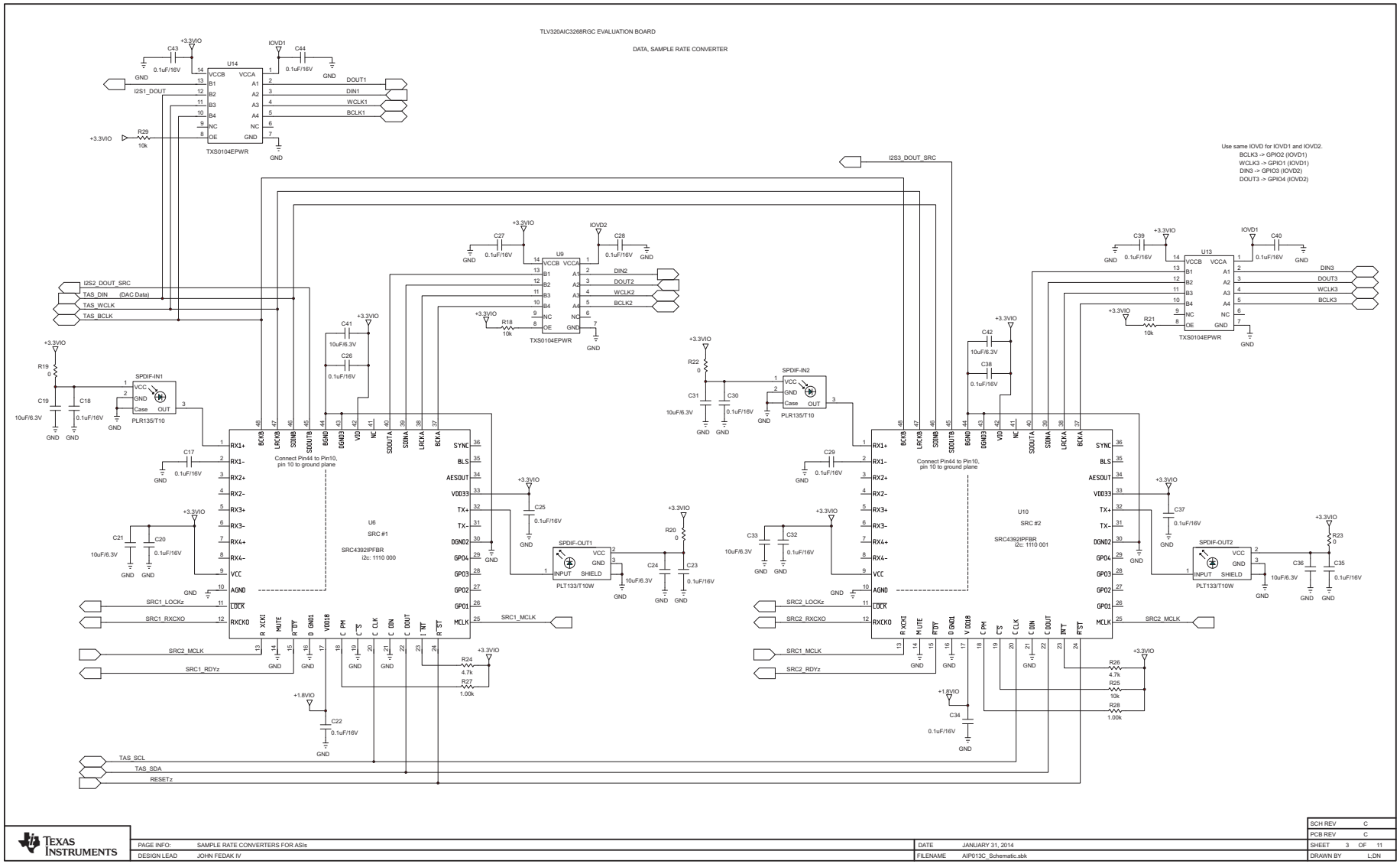


**Figure 7. Sample Rate Converters for ASIs**

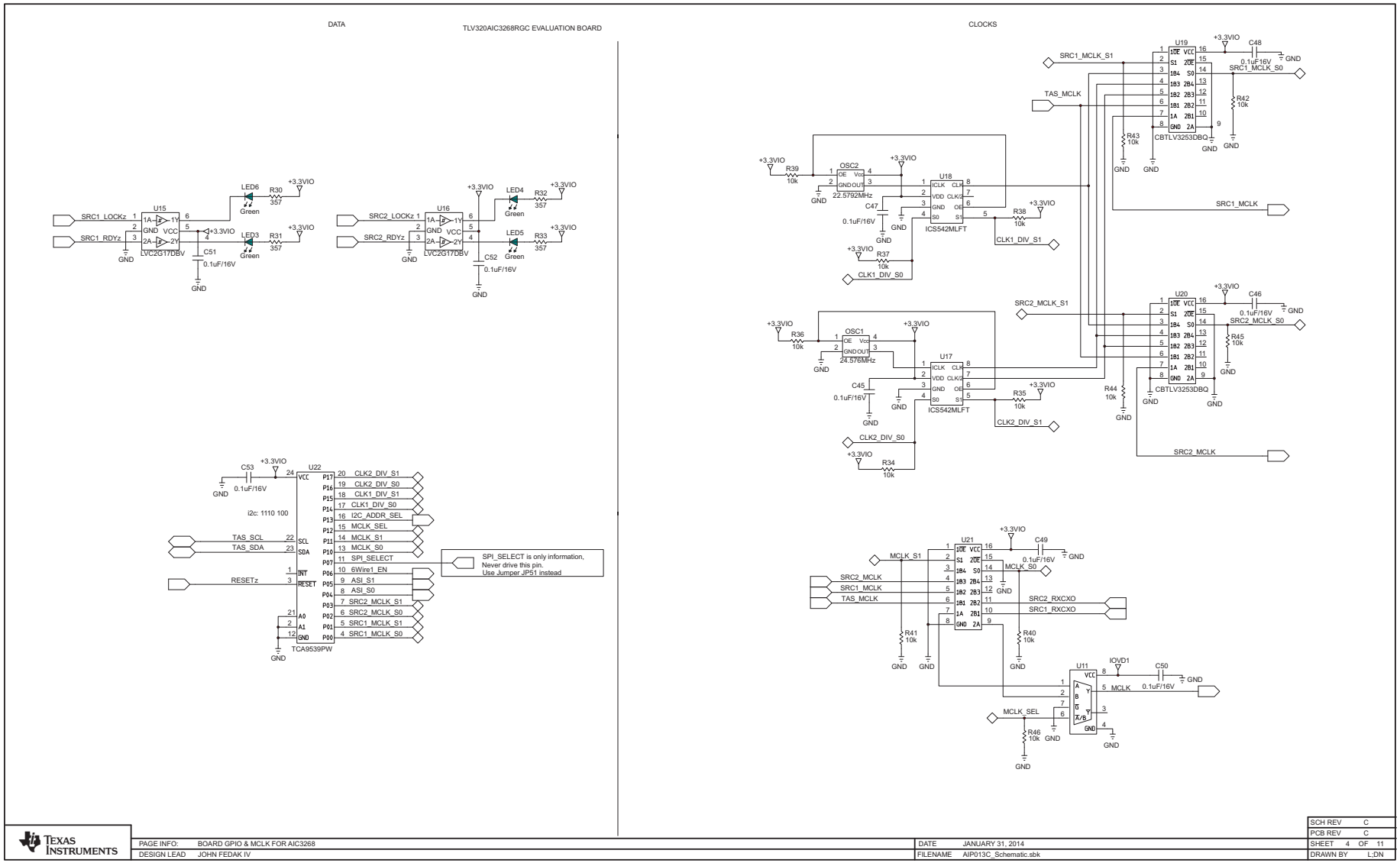


**Figure 8. GPIO and MCLK for AIC3268**

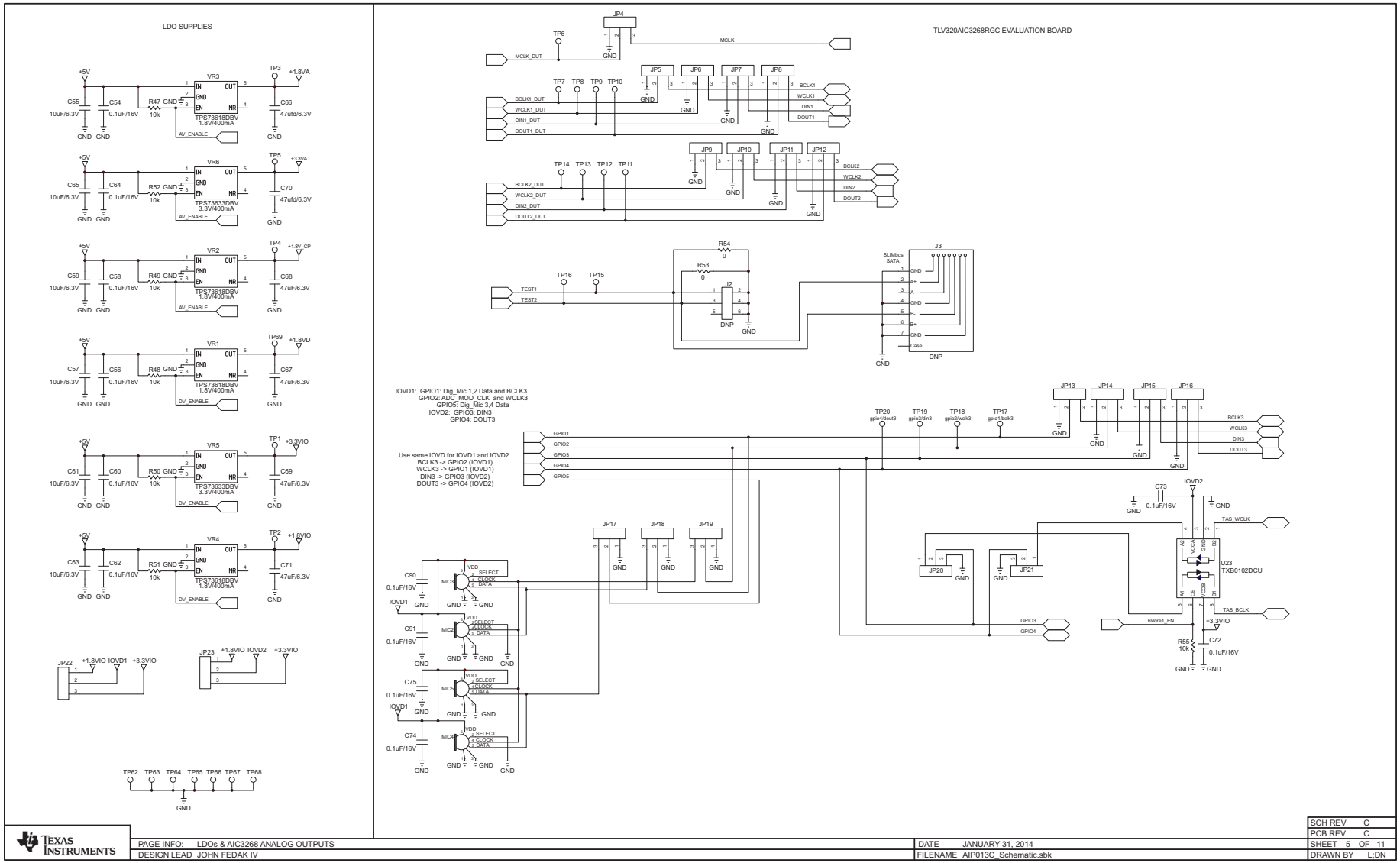


**Figure 9. LDO Supplies and Analog Outputs**

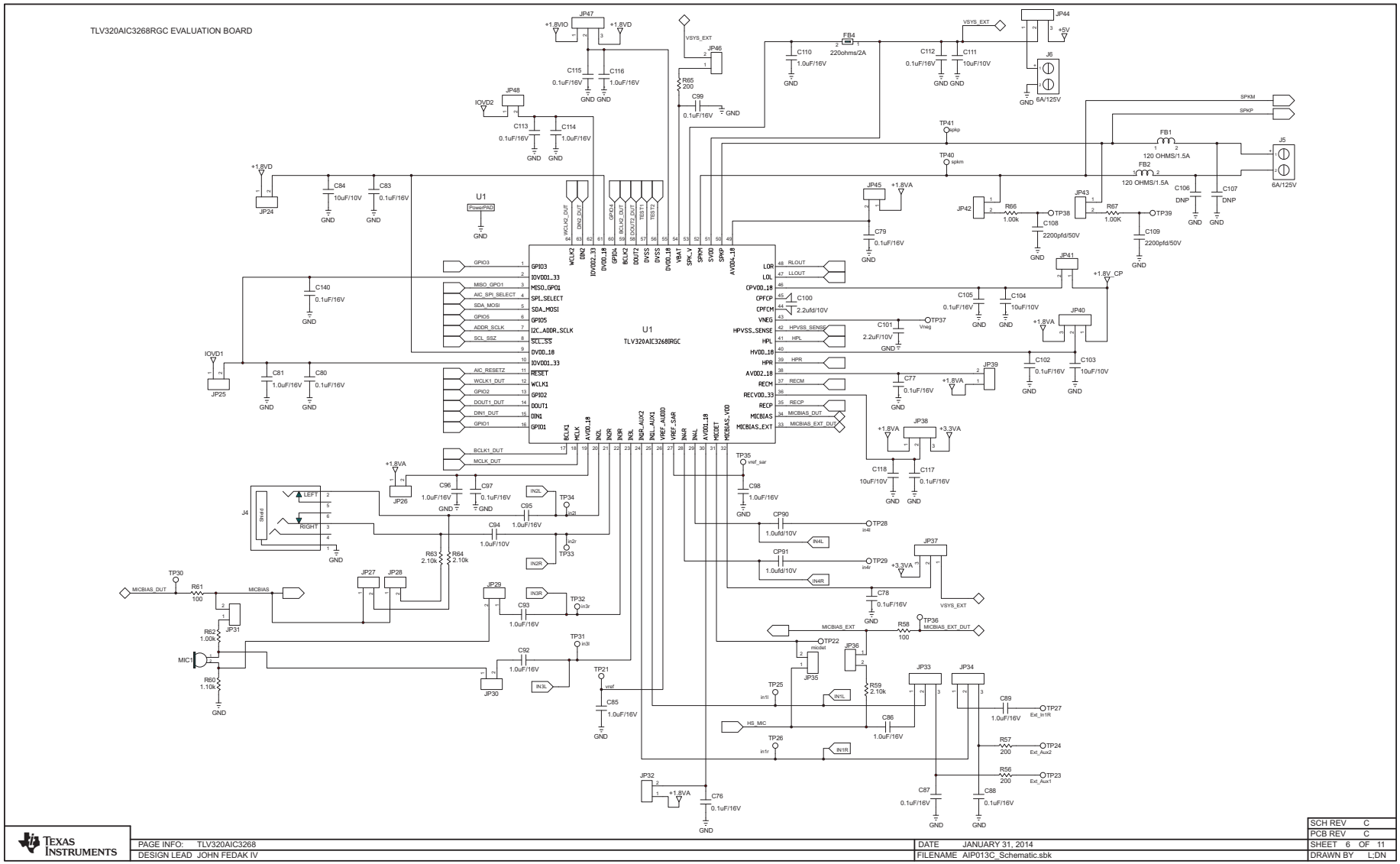


**Figure 10. TLV320AIC3268 Schematic**

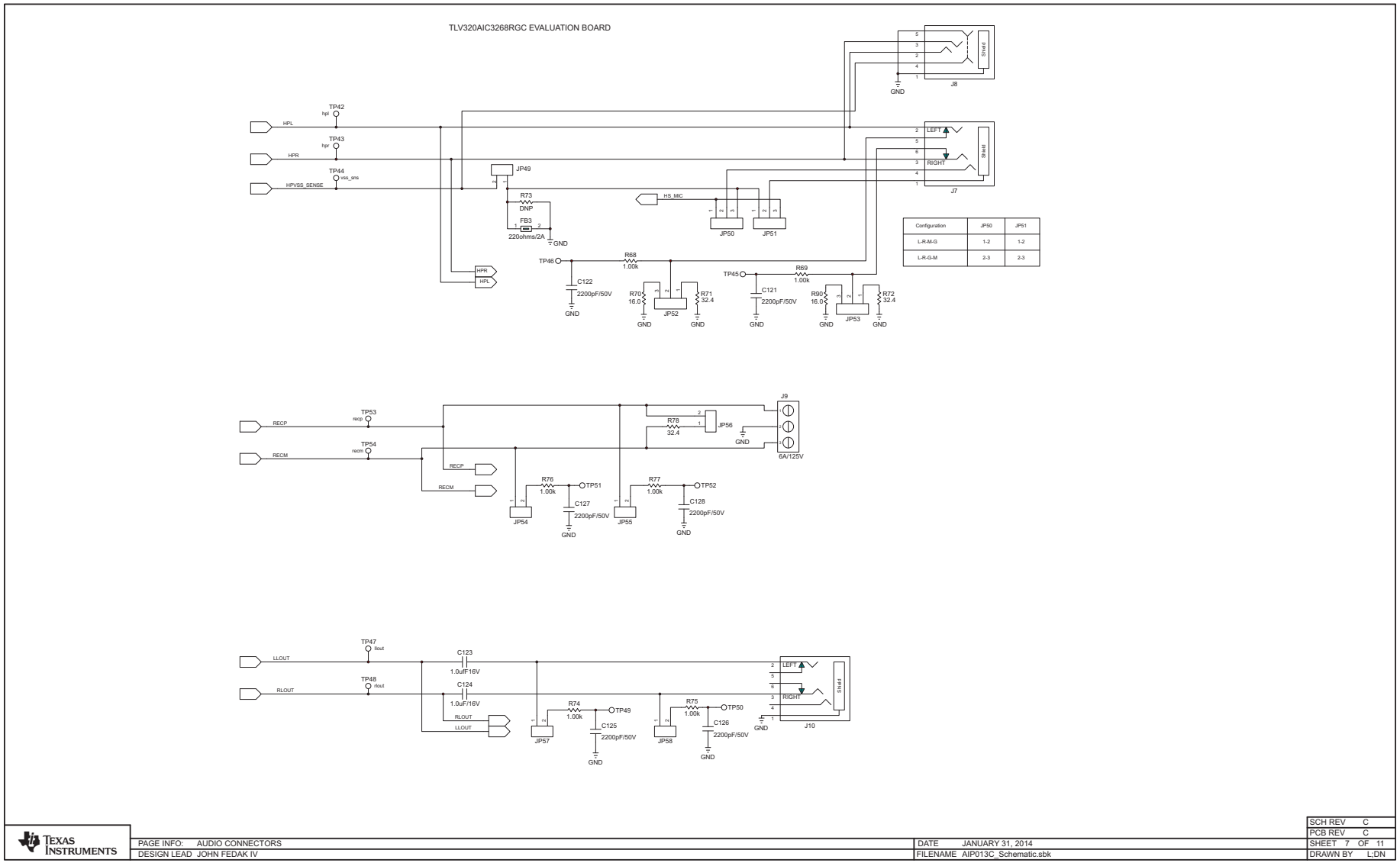


**Figure 11. Audio Connectors**

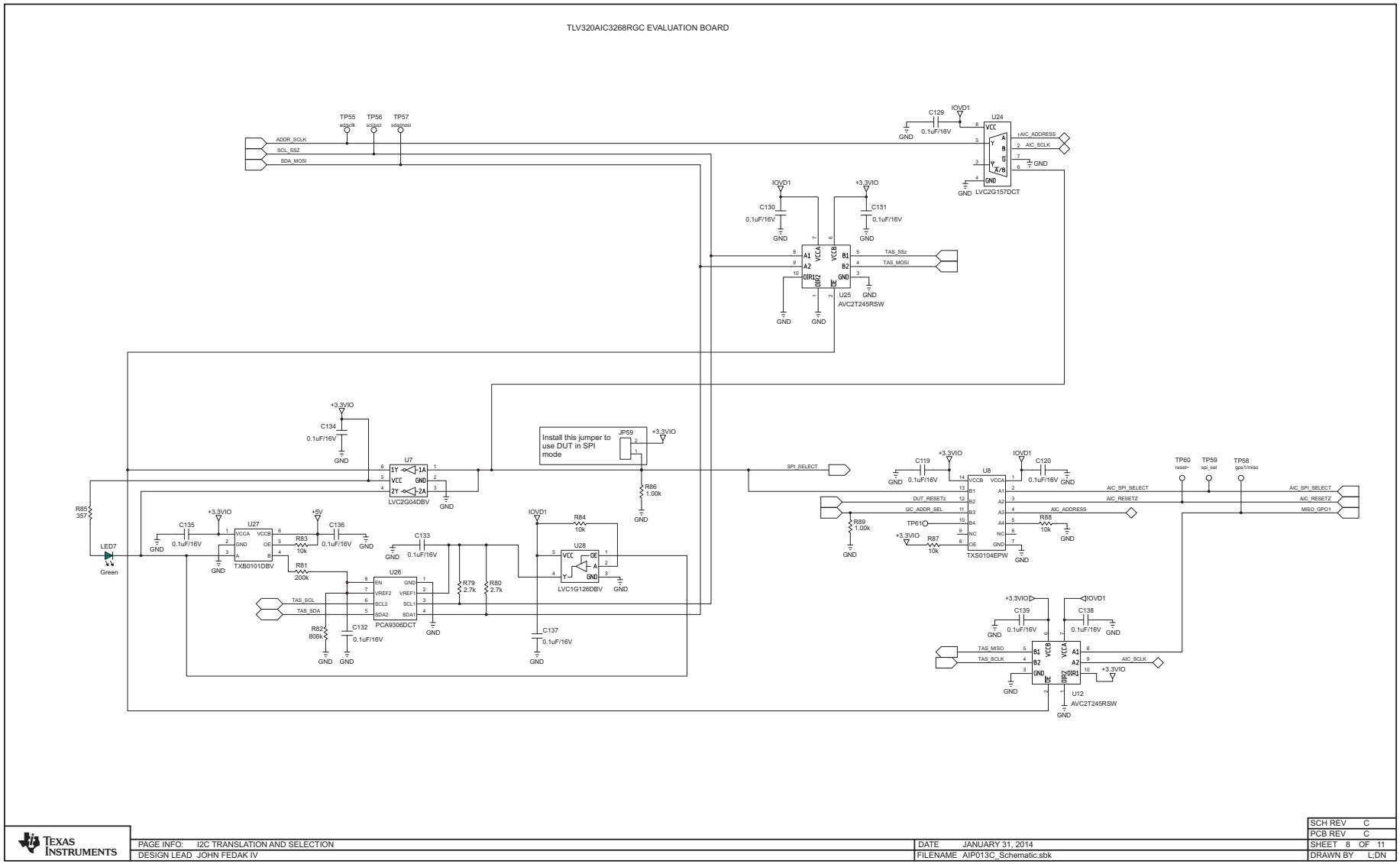


**Figure 12. I²C Translation and Selection**

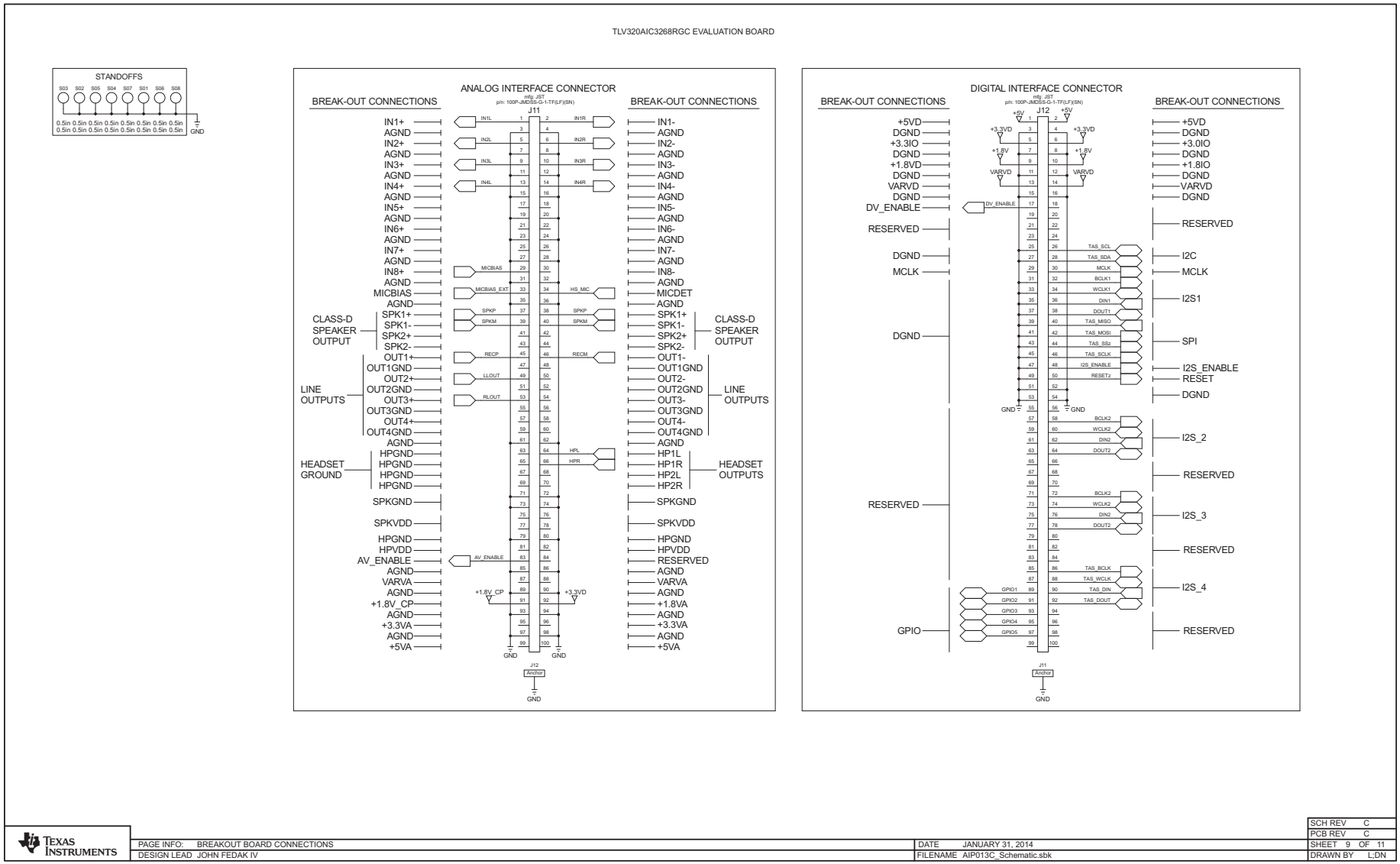


**Figure 13. Breakout Board Connections**

## 7 TLV320AIC3268EVM-U EVM Board Layout

Figure 14 through Figure 16 illustrate the TLV320AIC3268EVM-U EVM board layouts.

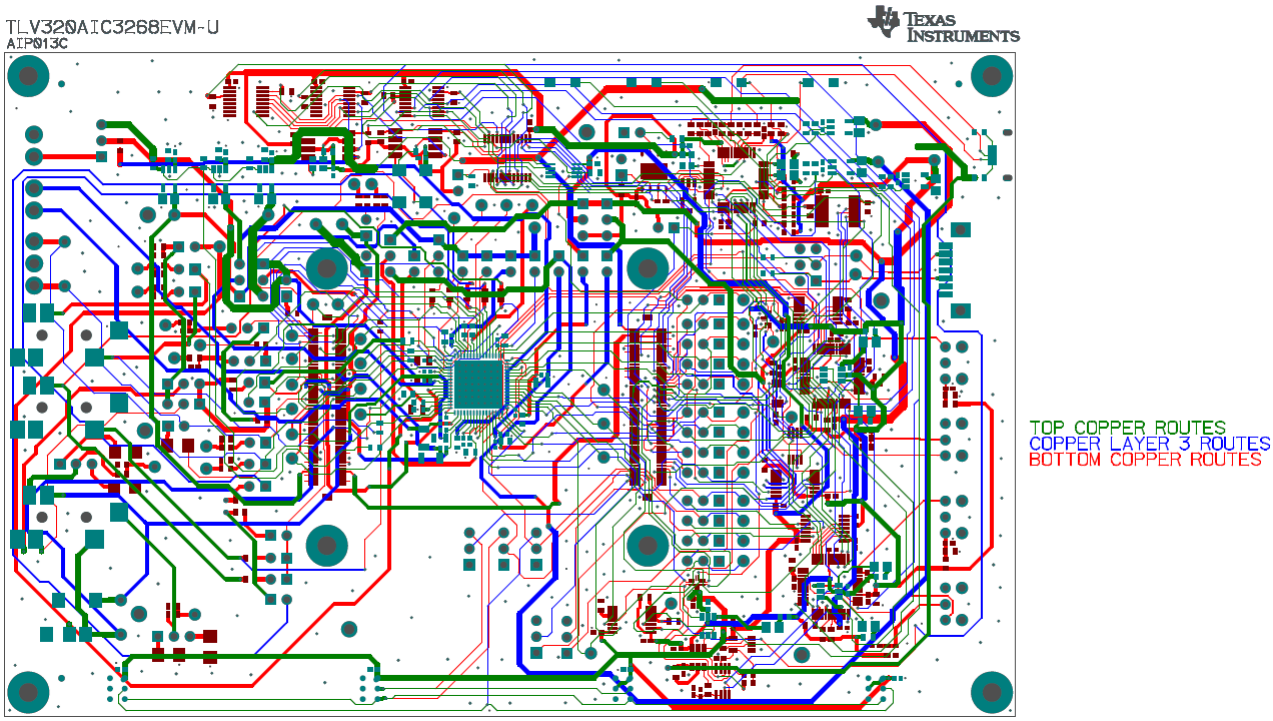


**Figure 14. Top Xray View**

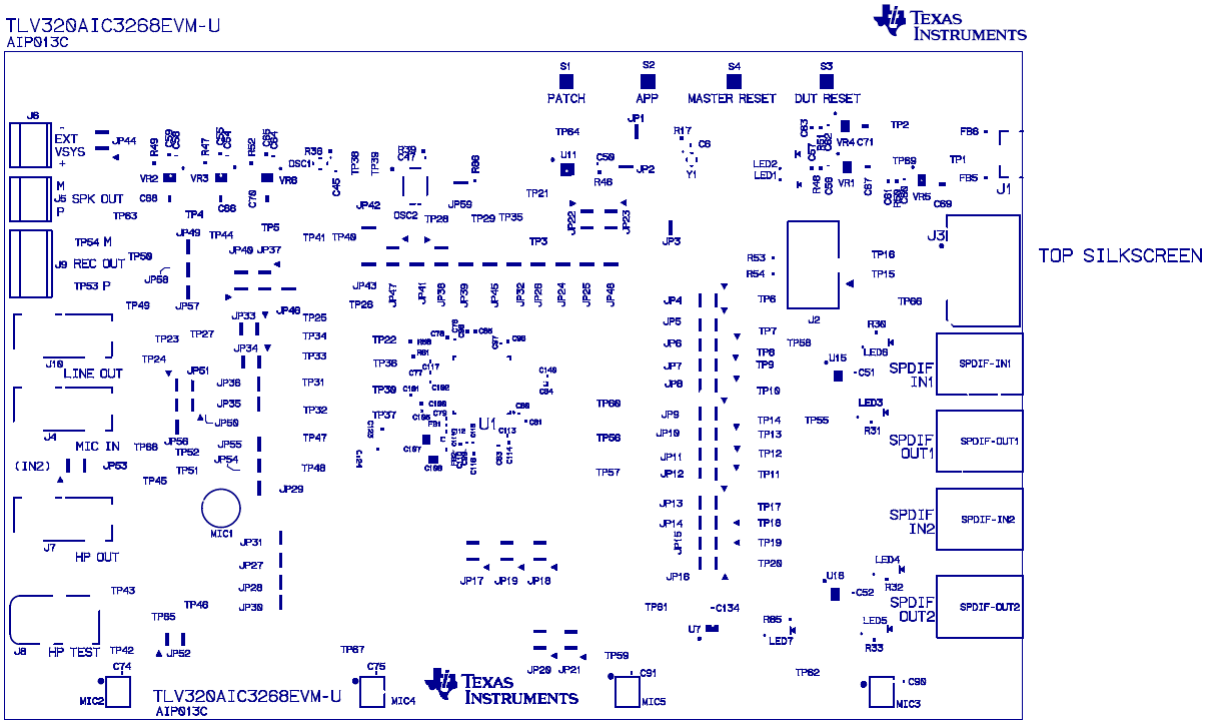


**Figure 15. Silkscreen Top**

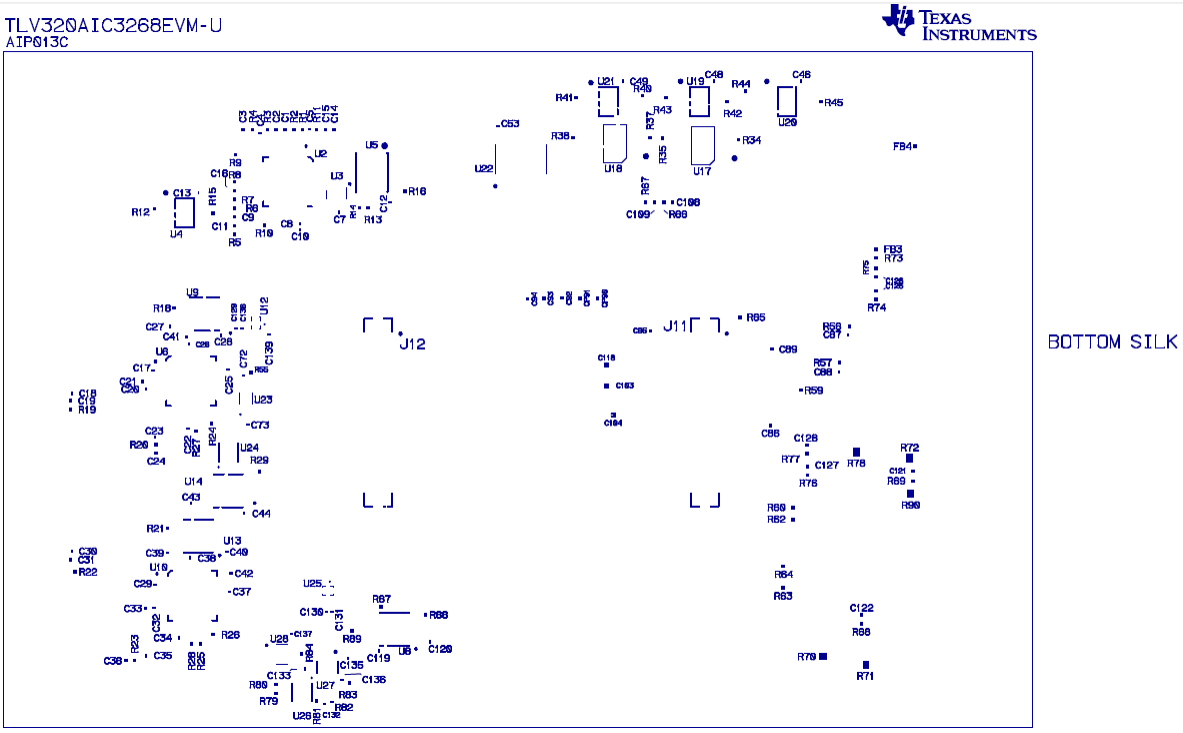


**Figure 16. Silkscreen Bottom**

# 8 TLV320AIC3268EVM-U Bill of Materials

Table 3 contains the BOM for the TLV320AIC3268EVM-U.

**Table 3. TLV320AIC3268EVM-U Bill of Materials**

| Item | MANU PART NUM | MFG | QTY | REF DESIGNATORS | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | TLV320AIC3268IRGC | TEXAS INSTRUMENTS | 1 | U1 | STEREO AUDIO CODEC WITH DIRECT PATH HEADPHONE AND CLASS-D |
| 2 | TAS1020BPFB | TEXAS INSTRUMENTS | 1 | U2 | USB STREAMING CONTROLLER TQFP48-PFB ROHS |
| 3 | SN74LVC1G126DBVR | TEXAS INSTRUMENTS | 2 | U3, U28 | SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT SOT23-DBV5 ROHS |
| 4 | SN74CBTLV3253DBQR | TEXAS INSTRUMENTS | 4 | U4, U19, U20, U21 | LO VOLT DUAL 1OF4 FET MUX/DEMUX SSOP16-DB ROHS |
| 5 | 24FC512-I/MF | MICROCHIP | 1 | U5 | 512K I2C SERIAL EEPROM DFN8-MF ROHS |
| 6 | SRC4392IPFBR | BURR-BROWN | 2 | U6, U10 | 2 CHAN,ASYNC,SAMPLE RATE CONV W/DIG AUDIO REC/XMTR ROHS |
| 7 | SN74LVC2G04DBVR | TEXAS INSTRUMENTS | 1 | U7 | DUAL INVERTER GATE SOT23-DBV6 ROHS |
| 8 | TXS0104EPWR | TEXAS INSTRUMENTS | 4 | U8, U9, U13, U14 | 4-BIT BIDIR LEVEL TRANSLATOR TSSOP14-PW ROHS |
| 9 | SN74LVC2G157DCTR | TEXAS INSTRUMENTS | 2 | U11, U24, | MUX/DATA SELECTOR 2 TO 1 SSOP8-DCT ROHS |
| 10 | SN74AVC2T245RSWR | TEXAS INSTRUMENTS | 2 | U12, U25 | 2BIT XCVR CONFIGURABLE TRANSLATION 3-STATE OUTS QFN10-RSW ROHS |
| 11 | SN74LVC2G17DBVR | TEXAS INSTRUMENTS | 2 | U15, U16 | DUAL SCHMITT-TRIGGER BUFFER SOT23-DBV6 ROHS |
| 12 | ICS542MLFT | IDT | 2 | U17, U18 | CLOCK DIVIDER,SOP8-D,ROHS |
| 13 | TCA9539PWR | TEXAS INSTRUMENTS | 1 | U22 | REMOTE 16B I2C SMBUS LO PWR IO EXPNDR INT OUT TSSOP24-PW ROHS |
| 14 | TXB0102DCUR | TEXAS INSTRUMENTS | 1 | U23 | 2-BIT BIDIR LEVEL TRANSLATOR VSSOP8-DCU ROHS |
| 15 | PCA9306DCTR | TEXAS INSTRUMENTS | 1 | U26 | DUAL BIDIR I2C BUS AND SMBUS VOLT LEVEL TRANS SSOP8-DCT ROHS |
| 16 | TXB0101DBVR | TEXAS INSTRUMENTS | 1 | U27 | 1-BIT BIDIR LEVEL TRANSLATOR SOT23-DBV6 ROHS |
| 17 | TPS73618DBVT | TEXAS INSTRUMENTS | 4 | VR1, VR2, VR3, VR4 | VOLT REG 1.8V 400MA LDO CAP FREE NMOS SOT23-DBV5 ROHS |
| 18 | TPS73633DBVT | TEXAS INSTRUMENTS | 2 | VR5, VR6 | VOLT REG 3.3V 400MA LDO CAP FREE NMOS SOT23-DBV5 ROHS |
| 19 | PLR135/T10 | EVERLIGHT ELECTRONICS | 2 | SPDIF-IN1, SPDIF-IN2 | PHOTOLINK FIBER OPTIC RECEIVER 2.4-5.5V 15MB PCB-RA SHUTTER ROHS |
| 20 | PLT133/T10W | EVERLIGHT ELECTRONICS | 2 | SPDIF-OUT1, SPDIF-OUT2 | PHOTOLINK FIBER OPTIC TRANSMITTER 2.4-5.5V 15MB PCB-RA SHUTTER ROHS |
| 21 | SML-LXT0805YW-TR | LUMEX OPTO | 2 | LED1, LED2 | LED, YELLOW 2.0V SMD0805 ROHS |
| 22 | SML-LXT0805GW-TR | LUMEX OPTO | 5 | LED3, LED4, LED5, LED6, LED7 | LED, GREEN 2.0V SMD0805 ROHS |
| 23 | FXO-HC736R-22.5792 | FOX ELECTRONICS | 1 | OSC1 | OSCILLATOR SMT 3.3V 24.576MHz ROHS |
| 24 | 625L3C024M57600 | CTS FREQUENCY CONTROLS | 1 | OSC2 | OSCILLATOR SMT 3.3V 22.5792MHz ROHS |
| 25 | 625L3I006M00000 | CTS FREQUENCY CONTROLS | 1 | Y1 | OSCILLATOR SMT 6.0MHz 3.3V OUT-ENABLE ROHS |
| 26 | GRM1885C1H470JA01D | MURATA | 2 | C1, C2 | CAP SMD0603 CERM 47PFD 50V 5% COG ROHS |
| 27 | C1608X7R1C105K | TDK | 3 | C3, C123, C124 | CAP SMD0603 CERM 1.0UFD 16V 10% X7R ROHS |
| 28 | GRM155R71C104KA88D | MURATA | 77 | C4, C5, C6, C7, C8, C10, C12, C13, C17, C18, C20, C22, C23, C25, C26, C27, C28, C29, C30, C32, C34, C35, C37, C38, C39, C40, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C56, C58, C60, C62, C64, C72, C73, C74, C75, C76, C77, C79, C80, C83, C87, C88, C90, C91, C97, C99, C102, C112, C113, C115, C117, C119, C120, C129, C130, C131, C132, C133, C134, C135, C136, C137, C138, C139, C140 | CAP SMD0402 CERM 0.1UFD 16V X7R 10% ROHS |
| 29 | C1608X7R1H104K | TDK | 3 | C9, C11, C16 | CAP SMD0603 CERM 0.1UFD 50V 10% X7R ROHS |
| 30 | C1608C0G1H102J | TDK CORP. | 1 | C14 | CAP SMD0603 CERM 1000PFD 50V 5% COG ROHS |
| 31 | GRM1885C1H101JA01D | MURATA | 1 | C15 | CAP SMD0603 CERM 100PFD 50V 5% COG ROHS |
| 32 | GRM188R60J106ME47D | MURATA | 14 | C19, C21, C24, C31, C33, C36, C41, C42, C55, C57, C59, C61, C63, C65 | CAP SMD0603 CERM 10UFD 6.3V 20% X5R ROHS |
| 33 | JMK212BJ476MG-T | TAIYO YUDEN | 6 | C66, C67, C68, C69, C70, C71 | CAP SMD0805 CERM 47UFD 6.3V 20% X5R ROHS |

**Table 3. TLV320AIC3268EVM-U Bill of Materials (continued)**

| Item | MANU PART NUM | MFG | QTY | REF DESIGNATORS | DESCRIPTION |
|---|---|---|---|---|---|
| 34 | GRM188R71C104KA01D | MURATA | 2 | C78, C105 | CAP SMD0603 CERM 0.1UFD 16V 10% X7R ROHS |
| 35 | EMK107B7105KA-T | TAIYO YUDEN | 6 | C81, C96, C98, C110, C114, C116 | CAP SMD0603 CERM 1.0UFD 16V 10% X7R ROHS |
| 36 | GRM21BR71A106KE51L | MURATA | 5 | C84, C103, C104, C111, C118 | CAP SMD0805 CERM 10UFD 10V10% X7R ROHS |
| 37 | GRM188R71A105KA61D | MURATA | 9 | C85, C86, C89, C92, C93, C94, C95, CP90, CP91 | CAP SMD0603 CERM 1.0UFD 10V 10% X7R ROHS |
| 38 | GRM188R71A225KE15D | MURATA | 2 | C100, C101 | CAP SMD0603 CERM 2.2UFD 10V 10% X7R ROHS |
| 39 | NA | NA | 0 | C106, C107 | CAP SMD1206 VALUE TBD |
| 40 | GRM188R71H222KA01D | MURATA | 8 | C108, C109, C121, C122, C125, C126, C127, C128 | CAP SMD0603 CERM 2200PFD 50V 10% X7R ROHS |
| 41 | ERJ-3EKF1501V | PANASONIC | 1 | R1 | RESISTOR SMD0603 1.50K OHM 1% THICK FILM 1/10W ROHS |
| 42 | ERJ-3EKF27R4V | PANASONIC | 2 | R2, R3 | RESISTOR SMD0603 27.4 OHMS 1% 1/10W ROHS |
| 43 | ERJ-3EKF1003V | PANASONIC | 1 | R4 | RESISTOR SMD0603 100K OHM 1% THICK FILM 1/10W ROHS |
| 44 | ERJ-3GEYJ103V | PANASONIC | 34 | R5, R6, R7, R10, R12, R15, R18, R21, R25, R29, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R55, R83, R84, R87, R88 | RESISTOR SMD0603 10K 5% 1/10W ROHS |
| 45 | RC0603FR-07649RL | YAGEO | 2 | R8, R9 | RESISTOR SMD0603 THICK FILM 649 OHMS 1% 1/10W ROHS |
| 46 | ERJ-3EKF3091V | PANASONIC | 1 | R11 | RESISTOR SMD0603 3.09K OHM 1% THICK FILM 1/10W ROHS |
| 47 | ERJ-3GEYJ272V | PANASONIC | 4 | R13, R14, R79, R80 | RESISTOR SMD0603 2.7K OHMS 5% 1/10W ROHS |
| 48 | ERJ-3GEYJ472V | PANASONIC | 4 | R16, R17, R24, R26 | RESISTOR SMD0603 4.7K OHMS 5% 1/10W ROHS |
| 49 | ERJ-3GEY0R00V | PANASONIC | 6 | R19, R20, R22, R23, R53, R54 | RESISTOR,SMT,0603,ZERO OHM,5%,,1/10W,ROHS |
| 50 | RC0603FR-071KL | YAGEO | 13 | R27, R28, R62, R66, R67, R68, R69, R74, R75, R76, R77, R86, R89 | RESISTOR SMD0603 THICK FILM 1.00K OHM 1% 1/10W ROHS |
| 51 | ERJ-3EKF3570V | PANASONIC | 5 | R30, R31, R32, R33, R85 | RESISTOR SMD0603 357 OHM 1% THICK FILM 1/10W ROHS |
| 52 | CRCW0603200RFKEA | VISHAY | 3 | R56, R57, R65 | RESISTOR SMD0603 200 OHMS 1% 1/10W ROHS |
| 53 | ERJ-3EKF1000V | PANASONIC | 2 | R58, R61 | RESISTOR SMD0603 100 1% THICK FILM 1/10W ROHS |
| 54 | ERJ-3EKF2101V | PANASONIC | 3 | R59, R63, R64 | RESISTOR SMD0603 2.10K OHMS 1% THICK FILM 1/10W ROHS |
| 55 | ERJ-3EKF1101V | PANASONIC | 1 | R60 | RESISTOR SMD0603 1.10K OHMS 1% THICK FILM 1/10W ROHS |
| 56 | CRCW120616R0JNEA | VISHAY | 2 | R70, R90 | RESISTOR,SMT,1206,16.0 OHM,5%,1/4W,ROHS |
| 57 | RC1206FR-0732R4L | YAGEO | 3 | R71, R72, R78 | RESISTOR SMD1206 32.4 OHMS 1% 1/4W ROHS |
| 58 | ERJ-3GEY0R00V | PANASONIC | 0 | R73 | RESISTOR,SMT,0603,ZERO OHM,5%,,1/10W,ROHS |
| 59 | ERJ-3GEYJ204V | PANASONIC | 1 | R81 | RESISTOR SMD0603 200K OHMS 5% 1/10W ROHS |
| 60 | ERJ-2RKF8063X | PANASONIC | 1 | R82 | RESISTOR SMD0402 THICK FILM 806K OHMS 1/10W 1% ROHS |
| 61 | BLM15EG121SN1D | MURATA | 2 | FB1, FB2 | FERRITE BEAD SMD0402 120 OHMS 1.5A ROHS |
| 62 | MPZ1608S221A | TDK | 4 | FB3, FB4, FB5, FB6 | FERRITE CHIP, 220 OHMS 2A 100MHZ SMD 0603 ROHS |
| 63 | ZX62WD1-B-5PC | HIROSE | 1 | J1 | JACK USB FEMALE TYPEB MICRO SMT-RA 5PIN ROHS |
| 64 | 75869-131LF | FCI | 0 | J2 | HEADER SHROUDED 100LS MALE GOLD 2x3 PINS ROHS |
| 65 | 5607-4200-SH | 3M | 0 | J3 | CONNECTOR-SATA 7 PIN SMT-RA SERIES 5607 ROHS |
| 66 | SJ-43516-SMT | CUI STACK | 3 | J4, J7, J10 | JACK AUDIO-STEREO MINI(3.5MM ,4-COND SMT-RA ROHS |
| 67 | ED555/2DS | ON SHORE TECHNOLOGY | 2 | J5, J6 | TERMINAL BLOCK 2PIN 6A/125V GRAY 3.5mm PITCH 16-28AWG ROHS |
| 68 | SJ-435105 | CUI STACK | 1 | J8 | JACK AUDIO MINI(3.5MM ,4-COND SMT-RA ROHS |
| 69 | ED555/3DS | ON SHORE TECHNOLOGY | 1 | J9 | TERMINAL BLOCK 3PIN 6A/125V GRAY 3.5mm PITCH 16-28AWG ROHS |
| 70 | 100P-JMDSS-G-1-TF(LF)(SN) | JST | 2 | J11, J12 | PLUG SMD 2x50 FEMALE JMDSERIES 0.5MM LS GOLD ROHS |

**Table 3. TLV320AIC3268EVM-U Bill of Materials (continued)**

| Item | MANU PART NUM | MFG | QTY | REF DESIGNATORS | DESCRIPTION |
|---|---|---|---|---|---|
| 71 | PBC02SAAN | SULLINS | 28 | JP1, JP2, JP3, JP24, JP25, JP26, JP27, JP28, JP29, JP30, JP31, JP32, JP35, JP36, JP39, JP41, JP42, JP43, JP45, JP46, JP48, JP49, JP54, JP55, JP56, JP57, JP58, JP59 | HEADER THRU MALE 2 PIN 100LS 120 TAIL GOLD ROHS |
| 72 | PBC03SAAN | SULLINS | 31 | JP4, JP5, JP6, JP7, JP8, JP9, JP10, JP11, JP12, JP13, JP14, JP15, JP16, JP17, JP18, JP19, JP20, JP21, JP22, JP23, JP33, JP34, JP37, JP38, JP40, JP44, JP47, JP50, JP51, JP52, JP53 | HEADER THRU MALE 3 PIN 100LS 120 TAIL GOLD ROHS |
| 73 | WM-63PRT | PANASONIC | 1 | MIC1 | MICROPHONE ELECTRET OMNIDIRECTIONAL DUAL BAND 2PIN ROHS |
| 74 | SPM0423HD4H-WB | KNOWLES | 4 | MIC2, MIC3, MIC4, MIC5 | MIC DIGITAL MIMI-SISONIC HALOGEN FREE 6PIN ROHS |
| 75 | 5000 | KEYSTONE ELECTRONICS | 11 | TP1, TP2, TP3, TP4, TP5, TP21, TP30, TP35, TP36, TP37, TP69 | PC TESTPOINT, RED, ROHS |
| 76 | 5002 | KEYSTONE ELECTRONICS | 30 | TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP31, TP32, TP33, TP34, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, TP47, TP48, TP49, TP50, TP51, TP52, TP53, TP54, TP61 | PC TESTPOINT, WHITE, ROHS |
| 77 | 5004 | KEYSTONE ELECTRONICS | 21 | TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP55, TP56, TP57, TP58, TP59, TP60 | PC TESTPOINT, YELLOW, ROHS |
| 78 | 5011 | KEYSTONE ELECTRONICS | 7 | TP62, TP63, TP64, TP65, TP66, TP67, TP68 | PC TESTPOINT BLACK 063 HOLE ROHS |
| 79 | TL1015AF160QG | E-SWITCH | 4 | S1, S2, S3, S4 | SWITCH, MOM, 160G SMT 4X3MM ROHS |
| 80 | 3480 | KEYSTONE ELECTRONICS | 8 | STANDOFFS | STANDOFF 4-40 0.5IN 0.220 DIA ALUM RND F-F ROHS |
| 81 | 4862 | KEYSTONE ELECTRONICS | 8 | STANDOFF SCREWS | MACHINE SCREW 4-40 PHILIPS 0.25 LENGTH ROHS |
| 82 | INTLWSS 004 | KEYSTONE ELECTRONICS | 8 | STANDOFF WASHERS | WASHER INTERNAL TOOTH #4 STAINLESS STEEL ROHS |
| 83 | 969102-0000-DA | 3M | 38 | JP1, JP2, JP4, JP5, JP6, JP7, JP8, JP17, JP18, JP19, JP22, JP23, JP24, JP25, JP26, JP29, JP30, JP31, JP32, JP33, JP34, JP35, JP36, JP37, JP38, JP39, JP40, JP41, JP44, JP45, JP46, JP47, JP48, JP49, JP50, JP51, JP52, JP53 | SHUNT BLACK AU FLASH 0.100LS OPEN TOP ROHS |
| | | TOTAL | 491 | | |
| SPECIAL NOTES TO THIS BILL OF MATERIALS | | | | | |
| SN1 | These assemblies are ESD sensitive, ESD precautions shall be observed. | | | | |
| SN2 | These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable. | | | | |
| SN3 | These assemblies must comply with workmanship standards IPC-A-610 Class 2. | | | | |
| SN4 | Ref designators marked with an asterisk ('**') cannot be substituted. All other components can be substituted with equivalent MFG's components. | | | | |

# 9 Writing Scripts

A script is simply a text file that contains data to send to the serial control buses.

Each line in a script file is one command. No provision is made for extending lines beyond one line, except for the > command. A line is terminated by a carriage return.

The first character of a line is the command. Commands are:

**l—** Set interface bus to use

**r—** Read from the serial control bus

**w—** Write to the serial control bus

**>—** Extend repeated write commands to lines below a **w**

**#—** Comment

**b—** Break

**d—** Delay

**f—** Wait for Flag

The first command, **l**, sets the interface to use for the commands to follow. This command must be followed by one of the following parameters:

**i2cstd—** Standard mode $I^2C$ bus

**i2cfast—** Fast mode $I^2C$ bus

**spi8—** SPI bus with 8-bit register addressing

**spi16—** SPI bus with 16-bit register addressing

For example, if a fast mode $I^2C$ bus is to be used, the script begins with:

**l i2cfast—** A double-quoted string of characters following the **b** command can be added to provide information to the user about each breakpoint. When the script is executed, the software's command handler halts as soon as a breakpoint is detected and displays the string of characters within the double quotes.

The Wait for Flag command, **f**, reads a specified register and verifies if the bitmap provided with the command matches the data being read. If the data does not match, the command handler retries for up to 200 times. This feature is useful when switching buffers in parts that support the adaptive filtering mode. The command f syntax follows:

```
f [i2c address] [register] [D7][D6][D5][D4][D3][D2][D1][D0]

where 'i2c address' and 'register' are in hexadecimal format

and 'D7' through 'D0' are in binary format with values of 0,

1 or X for don't care.8
```

Anything following a comment command **#** is ignored by the parser, provided that it is on the same line.

The delay command **d** allows the user to specify a time, in milliseconds, that the script pauses before proceeding. Note: The delay time is entered in decimal format.

A series of byte values follows either a read or write command. Each byte value is expressed in hexadecimal, and each byte must be separated by a space. Commands are interpreted and sent to the TAS1020B by the program.

The first byte following an **r** (read) or **w** (write) command is the I²C slave address of the device (if I²C is used) or the first data byte to write. (If SPI is used, note that SPI interfaces are not standardized on protocols, so the meaning of this byte varies with the device being addressed on the SPI bus.) The second byte is the starting register address that data will be written to (again, with I²C; SPI varies). Following these two bytes are data, if writing; if reading, the third byte value is the number of bytes to read, (expressed in hexadecimal).

For example, to write the values 0xAA 0x55 to an I²C device with a slave address of 0x30, starting at a register address of 0x03, the user writes:

```
#example script

I i2cfast

w 30 03 AA 55

r 30 03 02e
```

This script begins with a comment, specifies that a fast I²C bus is used, then writes *0xAA 0x55* to the I²C slave device at address 0x30, writing the values into registers 0x03 and 0x04. The script then reads back two bytes from the same device starting at register address 0x03. Note that the slave device value does not change. It is unnecessary to set the R/$\overline{W}$ bit for I²C devices in the script; the read or write commands does that.

If extensive repeated write commands are sent and commenting is desired for a group of bytes, the > command can be used to extend the bytes to other lines that follow. A usage example for the > command follows:

```
#example script for '>' command

I i2cfast

# Write AA and BB to registers 3 and 4, respectively

w 30 03 AA BB

# Write CC, DD, EE and FF to registers 5, 6, 7 and 8, respectively

> CC DD EE FF

# Place a commented breakpoint

b "AA BB CC DD EE FF was written, starting at register 3"

# Read back all six registers, starting at register 3

r 30 03 06b
```

The following example demonstrates usage of the Wait for Flag command, **f**:

```
#example script for 'wait for flag' command

I i2cfast

# Switch to Page 44

w 30 00 2C

# Switch buffer

w 30 01 05

# Wait for bit D0 to clear. 'x' denotes a don't care.

f 30 01 xxxxxxx0
```

Any text editor can be used to write these scripts; jEdit is an editor that is highly recommended for general usage. For more information, go to: www.jedit.org.

Once the script is written, it can be used in the command window by running the program, and then selecting *Open Script File*... from the File menu. Locate the script and open it. The script then is displayed in the command buffer. The user also can edit the script once it is in the buffer and save it by selecting *Save Script File*... from the File menu.

Once the script is in the command buffer, it can be executed by pressing the *Execute Command Buffer* button. If breakpoints are in the script, the script executes to that point, and the user is presented with a dialog box with a button to press to continue executing the script. When ready to proceed, the user pushes that button and the script continues.

# Revision History

| Changes from Original (February 2014) to A Revision | Page |
|---|---|
| • Deleted link to the Application Reference Guide from the Related Documents table. | 1 |
| • Deleted section titled Operation. | 4 |

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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3 *Regulatory Notices:*

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      3.1.1 *Notice applicable to EVMs not FCC-Approved:*

      This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

      3.1.2 *For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:*

      **CAUTION**

      This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

      Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

      **FCC Interference Statement for Class A EVM devices**

      *NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

**FCC Interference Statement for Class B EVM devices**

*NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210*

**Concerning EVMs Including Radio Transmitters:**

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

**Concernant les EVMs avec appareils radio:**

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

**Concerning EVMs Including Detachable Antennas:**

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

**Concernant les EVMs avec antennes détachables**

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265