

TAS5612L-TAS5614LDDVEVM

This user's guide provides specifications for the evaluation module (EVM) for TAS5612L and TAS5614L Digital Input Class-D Power Stages with the TAS5538 Digital Audio Processor with PWM Output from Texas Instruments. The user's guide also describes operation of the EVM and provides design information including schematic, bill of materials, and PCB layout.

Contents

1	Introduction	2
1.1	TAS5612L-TAS5614LDDVEVM Features	5
1.2	EVM Physical Structure	5
2	Quick Setup Guide	6
2.1	Electrostatic Discharge Warning	6
2.2	Unpacking the EVM	7
2.3	Power Supply Setup	7
2.4	Speaker Connection	7
2.5	Output Configuration BTL and PBTL	8
2.6	GUI Software Installation and EVM Startup	9
2.7	Self-Protection and Fault Reporting	11
3	Related Documentation from Texas Instruments	11
3.1	Additional Documentation	11
Appendix A	Design Information	12

List of Figures

1	TAS5612L-TAS5614LDDVEVM	3
2	Input-USB Board3.....	4
3	Integrated PurePath Digital™ Amplifier System	5
4	Physical Structure of the TAS5612L-TAS5614LDDVEVM (Approximate Layout).....	6
5	PBTL Mode Configuration	8
6	TAS5538 GUI Window	9
7	Channel and Master Volume GUI	10
8	Top Composite PCB Layer.....	15
9	Bottom Composite PCB Layer.....	16

List of Tables

1	TAS5612L-TAS5614LDDVEVM Specification	2
2	Recommended PVDD Power Supply Voltages	7
3	Related Documentation from Texas Instruments	11
4	Bill of Materials for TAS5614LDDVEVM	12

1 Introduction

The TAS5612L-TAS5614LDDVEVM PurePath™ EVM demonstrates the current version of TAS5612LDDV or TAS5614LDDV integrated circuit power stage with TAS5538DGG from Texas Instruments (TI).

The TAS5612L and TAS5614L are high-performance, integrated Stereo Feedback Digital Amplifier Power Stages designed to drive 4Ω speakers at up to 150W per channel for TAS5614LDDV and 125W per channel for TAS5612LDDV. They require only a passive demodulation filter to deliver efficient high quality audio amplification.

TAS5538DGG is a high performance 32 bit (24 bit input) multi channel PurePath™ Digital Pulse Width Modulator (PWM) with fully symmetrical AD modulation scheme. The device also has Digital Audio Processing (DAP) that provides 48 bit signal processing, advanced performance and a high level of system integration.

This EVM can be configured as 2 BTL channels for stereo evaluation or 1 PBTL (parallel BTL) channel for subwoofer evaluation. Together with a TI Input-USB Board 3, it provides a complete stereo digital audio amplifier system which includes digital input (S/PDIF), analog inputs, interface to PC and DAP features like digital volume control, input and output mixers, automute, tone controls, loudness, EQ filters and dynamic range compression (DRC). There are configuration options for power stage failure protection.

NOTE: TAS5612L-TAS5614LDDVEVM IS SHIPPED WITH THE CURRENT VERSION OF TAS5614L INSTALLED. TO EVALUATE THE CURRENT VERSION OF TAS5612L PLEASE VISIT THE PRODUCT FOLDER AT www.ti.com AND REQUEST A FREE SAMPLE; AND, REPLACE THE TAS5614L WITH TAS5612L.

Table 1. TAS5612L-TAS5614LDDVEVM Specification

Key Parameters	Values
TAS5614L Power Supply Voltage	12 - 38 Vdc
TAS5612L Power Supply Voltage	12 - 34 Vdc
Number of Channels	2 x BTL or 1 x PBTL
Load Impedance BTL	4-8 Ohm
Load Impedance PBTL	2-4 Ohm
TAS5614L Output power BTL	150W / 4Ohm / 10%THD+N
TAS5614L Output power PBTL	300W / 2Ohm / 10%THD+N
TAS5612L Output power BTL	125W / 4Ohm / 10%THD+N
TAS5612L Output power PBTL	250W / 2Ohm / 10%THD+N
Dynamic Range (DNR)	>105 dB
PWM Processor	TAS5538DGG
Output Stage	TAS5614LDDV or TAS5612LDDV

NOTE: The heatsink in TAS5612L-TAS5614LDDVEVM is designed to comply with time requirements of the "Amplifier Rule", US Federal Trade Commission 16 CFR 432, when the EVM is operated at power levels specified above. If continuous operation at specified output power is required it is necessary to provide forced air flow through the heatsink.

(The FTC regulation specifies operation in 25°C ambient temperature for one hour at 1/8 specified output power (18.75W per channel for TAS5614LDDVEVM, 15.63W per channel for TAS5612LDDVEVM) and then for 5 minutes at specified output power (150W per channel for TAS5614LDDVEVM, 125W per channel for TAS5612LDDVEVM). Then distortion vs. output power can be measured. TAS5612L-TAS5614LDDVEVM provides specified output power for several minutes or more without thermal shutdown. THD is not specified for this test but is typically near 10%.)

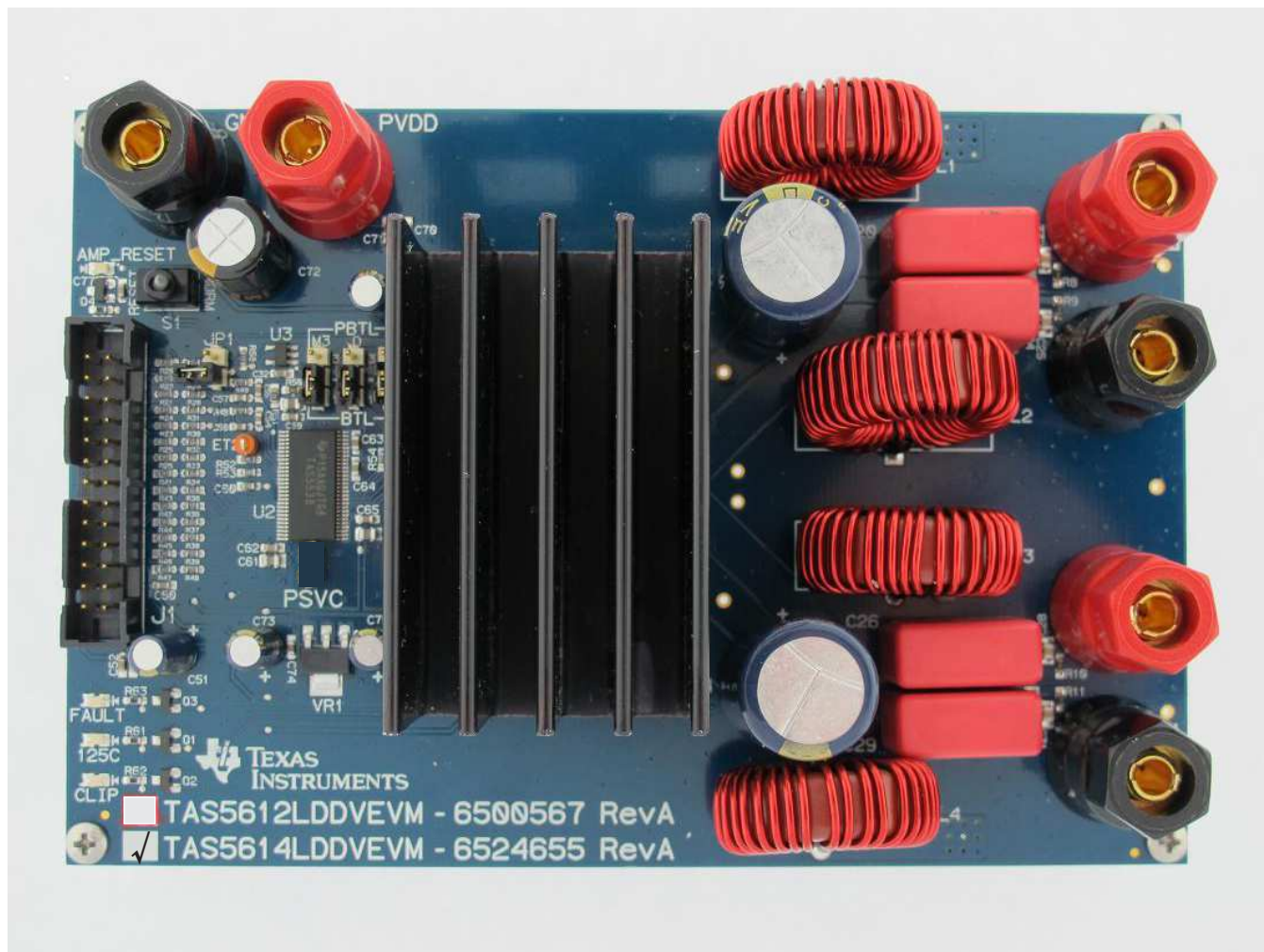


Figure 1. TAS5612L-TAS5614LDDVEVM

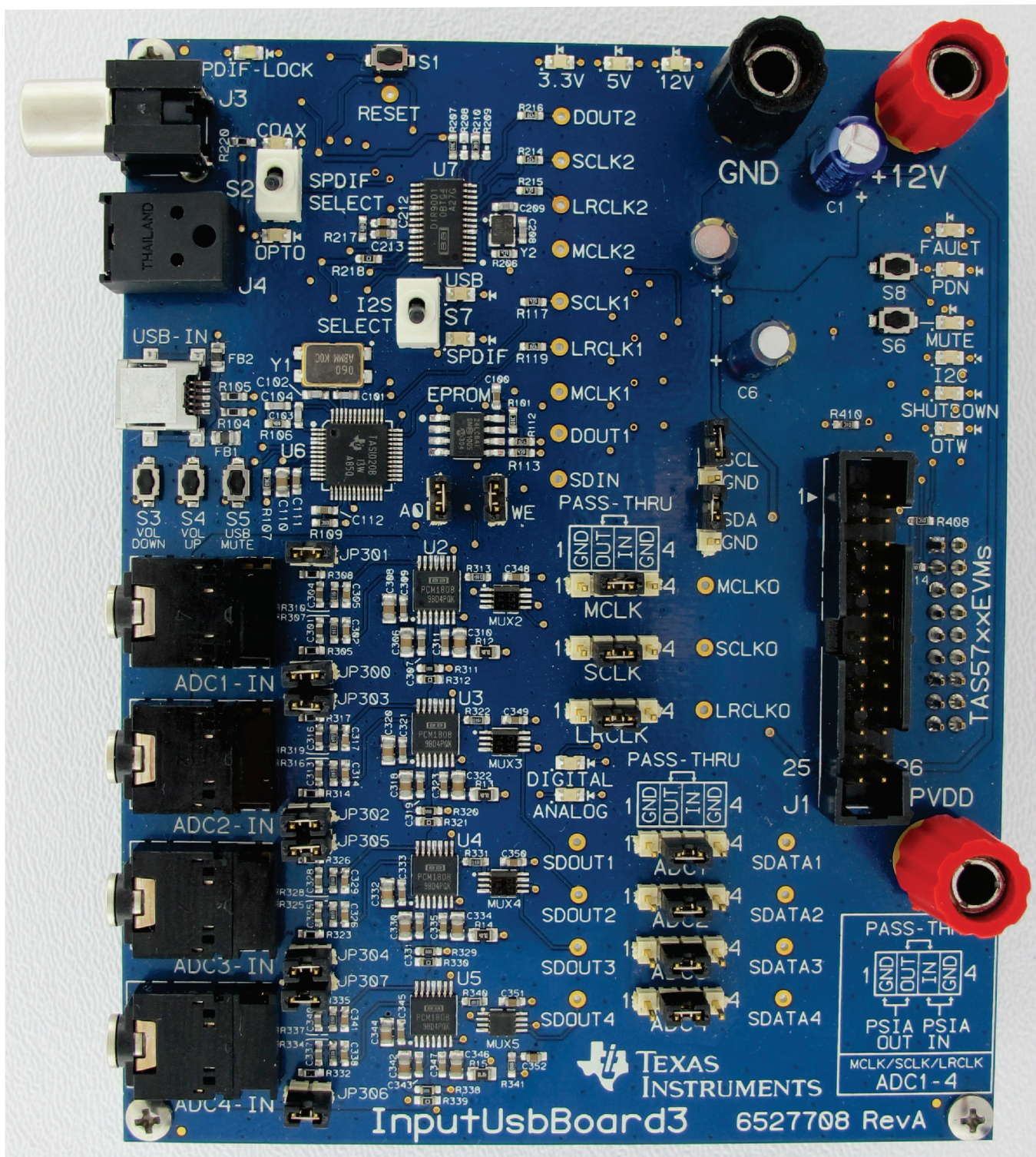


Figure 2. Input-USB Board3

Gerber (layout) files are available at: <http://www.ti.com>.

The EVM is delivered with cables and a TI Input-USB Board 3 to connect to an input source and to a PC for control. Refer to the section "Unpacking the EVM" below.

1.1 TAS5612L-TAS5614LDDVEVM Features

- Stereo PurePath Digital™ evaluation module.
- Self-contained protection system (overcurrent, overtemperature, undervoltage and missing PWM input).
- Standard I²S and I²C™ / Control connector for TI input board
- Double-sided plated-through PCB layout.

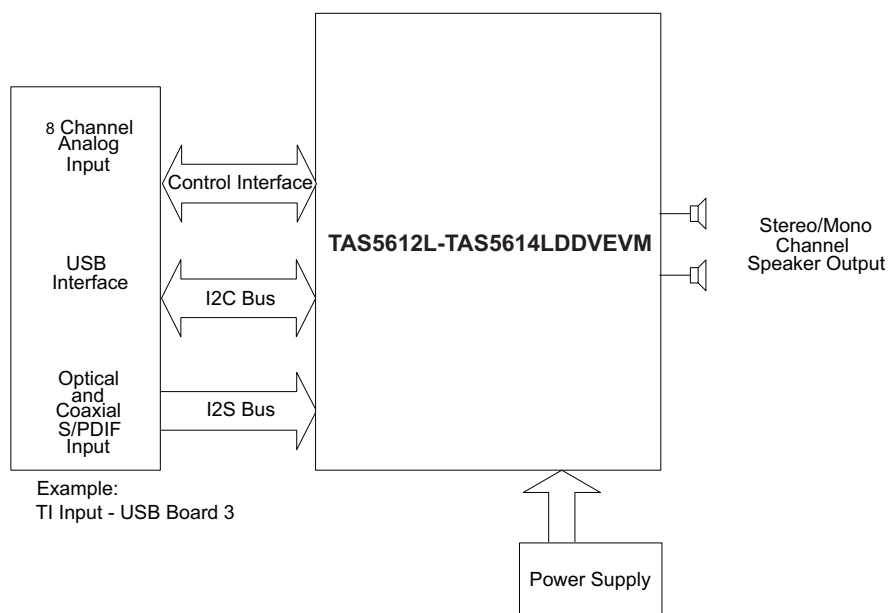


Figure 3. Integrated PurePath Digital™ Amplifier System

1.2 EVM Physical Structure

Physical structure of the TAS5612L-TAS5614LDDVEVM is illustrated in [Figure 4](#).

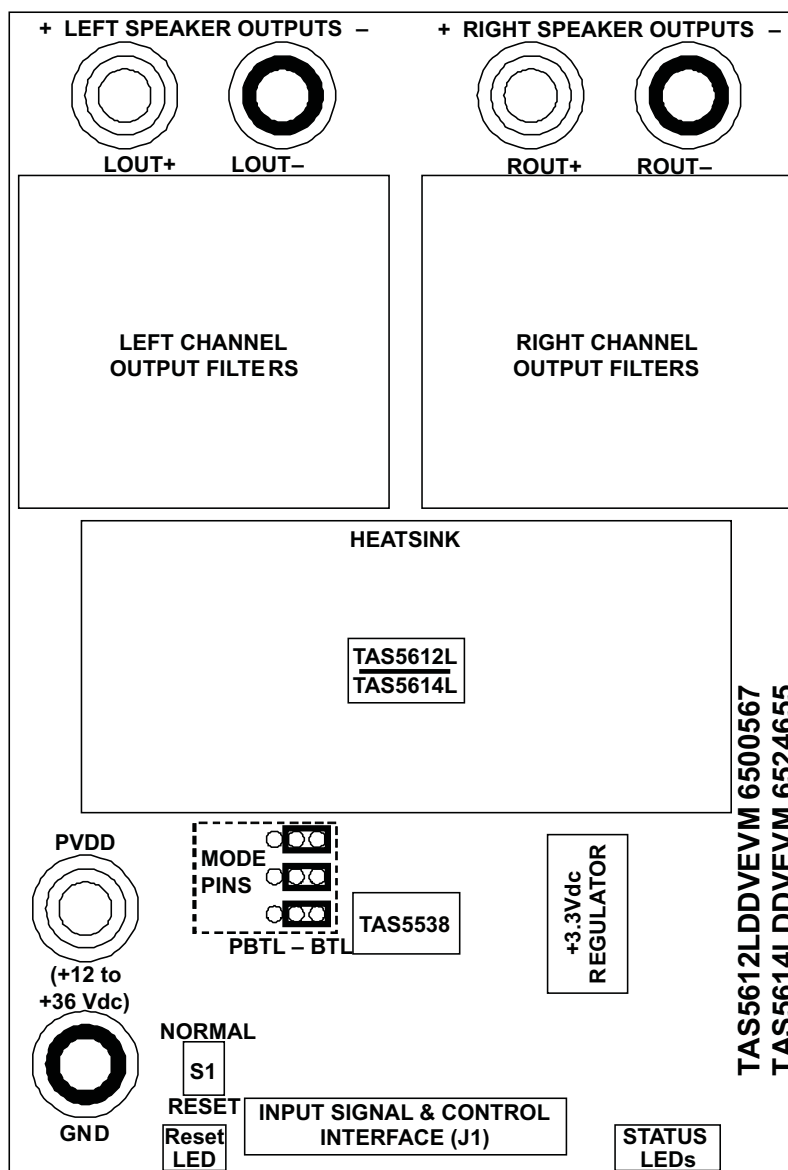


Figure 4. Physical Structure of the TAS5612L-TAS5614LDDVEVM (Approximate Layout)

2 Quick Setup Guide

This section describes the TAS5612L-TAS5614LDDVEVM power supplies and system interfaces. It provides information regarding handling and unpacking, absolute operating conditions, and switch and jumper positions. It also provides a step-by-step guide to setting up the TAS5612L-TAS5614LDDVEVM for device evaluation.

2.1 Electrostatic Discharge Warning

Many of the components of the TAS5612L-TAS5614LDDVEVM are susceptible to damage by electrostatic discharge (ESD). Customers 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

Upon opening the TAS5612L-TAS5614LDDVEVM package, check to make sure that the following items are included:

- 1 pc. TAS5612L-TAS5614LDDVEVM using 1 TAS5538DGG and 1 TAS5612LDDV or TAS5614LDDV.
- 1 pc. TI Input-USB Board 3 for interfacing TAS5612L-TAS5614LDDVEVM to SPDIF/analog sources and PC for control.
- 1 pc. Signal and Control Interface IDC cable for connection to an I²S front-end like the Input-USB Board 3.
- 1 pc. Cable for connecting Input-USB Board 3 to a USB port on a PC for TAS5538 control by software.
- If any of these items are missing, contact the nearest Texas Instruments Product Information Center to inquire about a replacement.

Connect the Input-USB Board 3 to the TAS5612L/14LDDVEVM using the delivered IDC cable.

2.3 Power Supply Setup

2 power supplies are needed to power the TAS5612L-TAS5614LDDVEVM. Voltage and current requirements for the PVDD power supply are shown in the table below. Connect this power supply to the EVM using banana cables or wires secured to the power supply binding posts PVDD and GND. A second power supply, 12Vdc at 500mA, is required to power Input-USB Board 3. Connect the 12V power supply to the Input-USB Board 3 using banana cables or wires secured to the power supply binding posts +12V and GND.

Table 2. Recommended PVDD Power Supply Voltages

Description	Voltage Range	Current Requirements	Binding Post
TAS5614L Power Supply Voltage	12 - 38 Vdc	16 A	PVDD
TAS5612L Power Supply Voltage	12 - 34 Vdc	14 A	PVDD

CAUTION

NOTE: Applying voltages above specifications in [Table 2](#) can cause permanent damage to the hardware. Verify polarity of power supply connections before powering the EVM.

NOTE: The length of the power supply cable must be minimized. Increasing length of PSU cable is likely to increase distortion for the amplifier at high output levels and low frequencies.

2.4 Speaker Connection

CAUTION

Both positive and negative speaker outputs are floating and cannot be connected to ground (e.g. through an oscilloscope). To measure a BTL output connect an oscilloscope probe to each side of the output, connect both ground clips to EVM ground and use the oscilloscope math functions to show the difference between the 2 probe signals.

2.5 Output Configuration BTL and PBTL

When changing mode from BTL to PBTL, make sure that the AMP_RESET switch is set to RESET before changing shunts on Mode headers M3, D and C.

- For BTL mode place a shunt on pins 1 and 2 of each header, at the positions marked BTL.
- For PBTL mode place a shunt on pins 3 and 2 of each header, at the positions marked PBTL.

In PBTL mode the load must be connected according to [Figure 5](#):

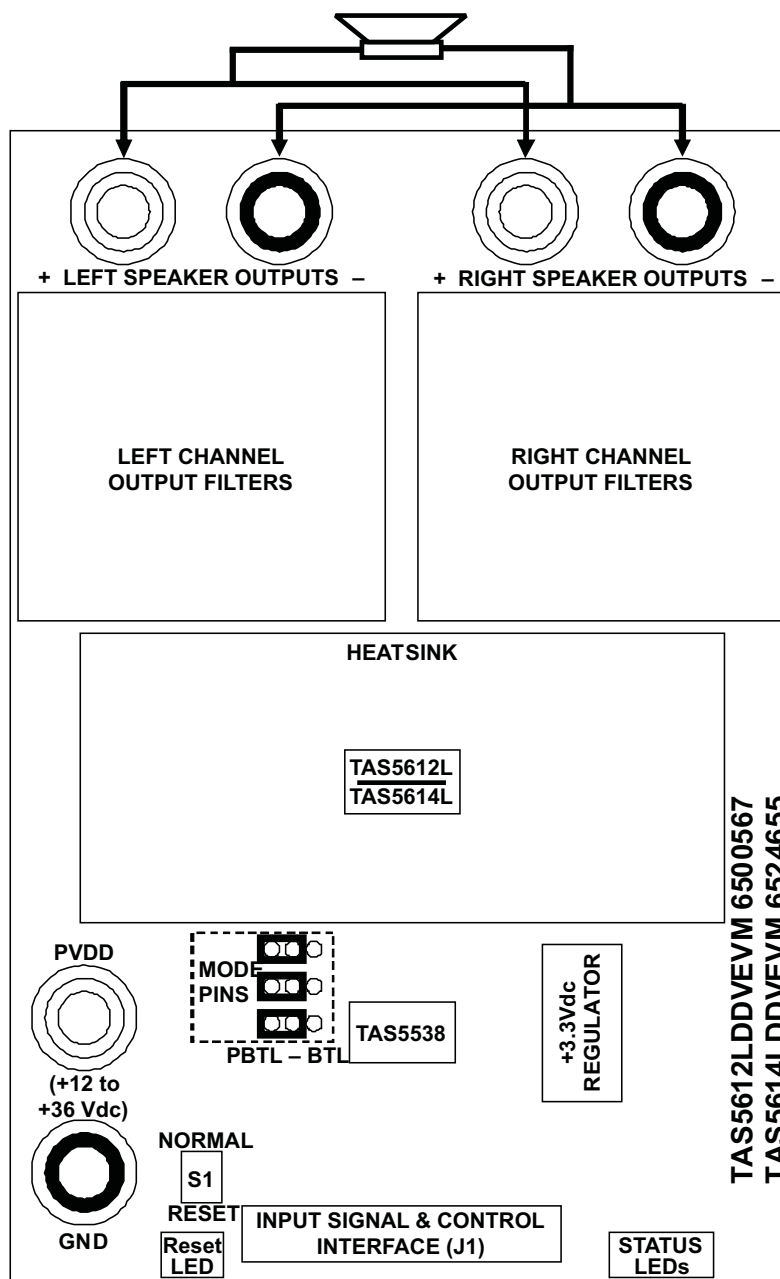


Figure 5. PBTL Mode Configuration

2.6 GUI Software Installation and EVM Startup

The TAS5612L-TAS5614LDDVEVM is controlled by the Input-USB Board 3 with the TAS5538 GUI. The TAS5538 GUI provides control of all registers in TAS5538. Download the current version of the GUI zip file "TAS5538_xxxx.zip" from the TAS5612LDDVEVM folder or the TAS5614LDDVEVM folder on <http://www.ti.com> to a convenient location on the host PC. Create a new folder at a convenient location and extract the files from the zip file to the new folder. Be sure to check the box labeled "Use folder names" during extraction. Then connect the USB cable between the host PC and jack USB-IN on the Input-USB Board 3. Then turn on the 12V power supply and the PVDD power supply in that order.

Start the GUI by opening "TAS55XX_GUI.exe" in the new folder. Startup will take a few seconds and the following window will open.

Click CONNECT and then READ, to verify that the data in register **0x00** read **6C**.

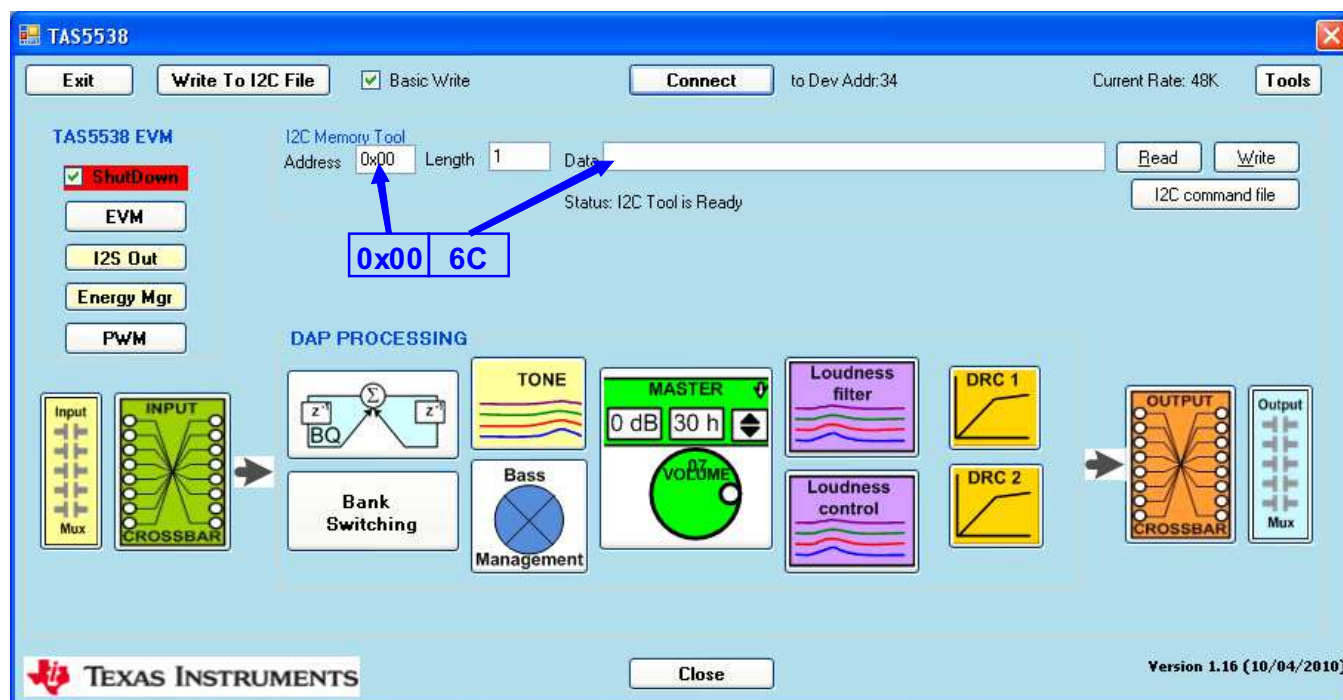


Figure 6. TAS5538 GUI Window

NOTE: If the address that is read is not **6C**, make sure the USB is connected to the PC and check for HID enumeration.

- Open the PC device manager. Right-click My Computer on desktop and open Properties, then Hardware, then Device Manager.
- Expand "Human Interface Devices".
- Plug and unplug the USB cable from Input-USB Board 3 and confirm that an HID icon appears.

Uncheck "ShutDown" and click the "Master Volume" icon to open the following window.

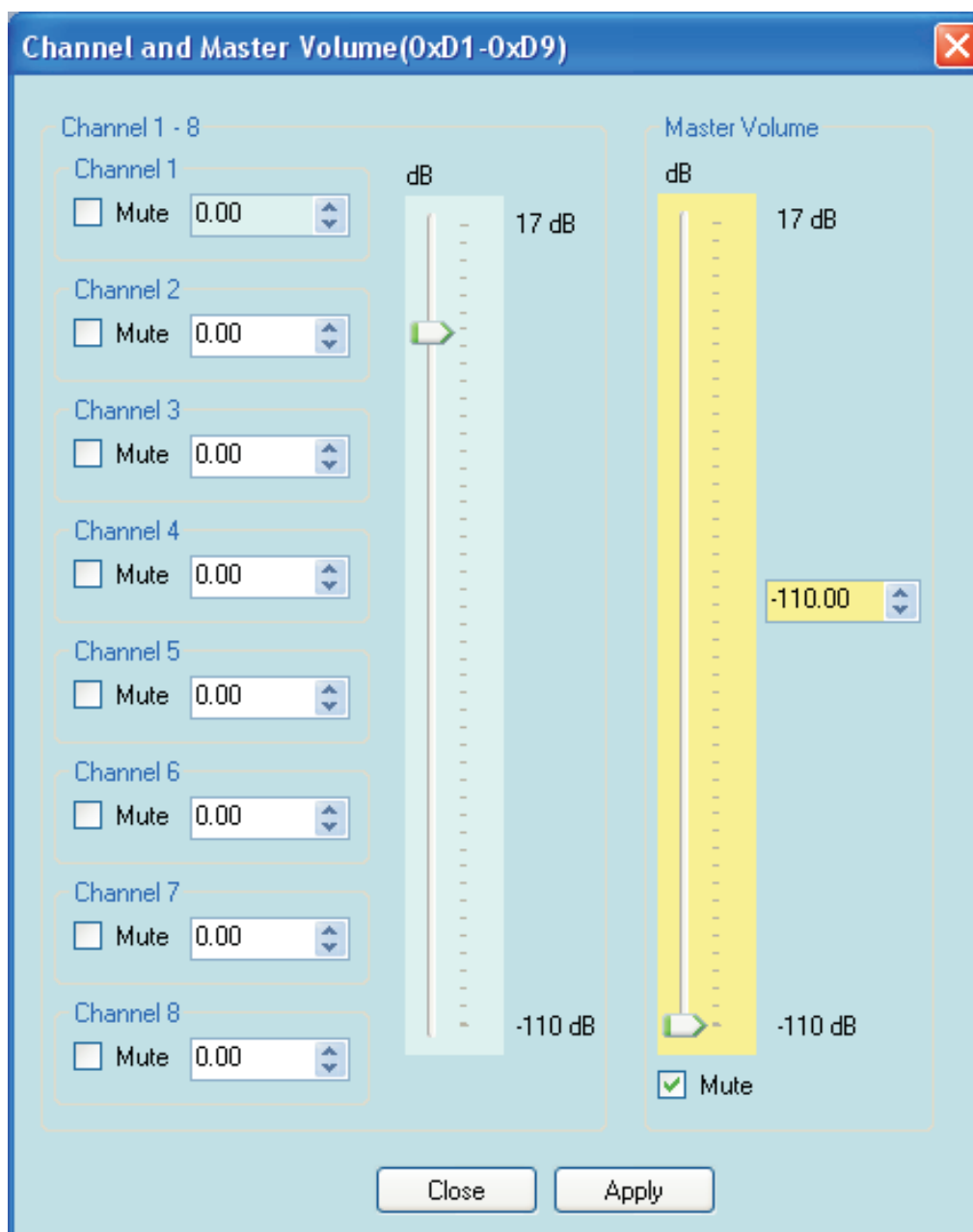


Figure 7. Channel and Master Volume GUI

Uncheck mute and increase volume to the desired level, and close the window. Then press the MUTE switch on Input-USB Board 3 to extinguish the MUTE LED. The EVM should now operate.

NOTE: In some cases when power is cycled on the DUT or Input-USB Board 3 but the GUI is not closed, it will be necessary to take an action like checking and unchecking mute to force I2C communication to refresh TAS5538. In some cases the startup process must be repeated.

An SPDIF input may be provided to Input-USB Board 3 by coax to jack COAX or by optical connection to jack OPTO. Alternatively an analog input may be connected to jack ADC1_IN. An analog input will override an SPDIF input.

2.7 Self-Protection and Fault Reporting

The TAS5612L and TAS5614L are self-protecting devices that provide overtemperature, overcurrent, undervoltage and missing-PWM-input protection, with extensive fault reporting. For full descriptions of these functions consult data sheet SLAS847 for TAS5612LA and data sheet SLAS846 for TAS5614LA.

3 Related Documentation from Texas Instruments

The following table lists data sheets that provide detailed descriptions of integrated circuits from TI that are used in the TAS5612L-TAS5614LDDVEVM. These data sheets can be obtained at <http://www.ti.com>.

Table 3. Related Documentation from Texas Instruments

Part Number	Literature Number
TAS5538	SLES255
TAS5612LA	SLAS847
TAS5614LA	SLAS846
TPS3825-33	SLVS165
TLV1117-33C	SLVS561

3.1 Additional Documentation

1. System Design Considerations for True Digital Audio Power Amplifiers ([SLAA117](#))
2. Digital Audio Measurements ([SLAA114](#))
3. PSRR for PurePath Digital Audio Amplifiers ([SLEA049](#))
4. Power Rating in Audio Amplifier ([SLEA047](#))
5. PurePath Digital AM Interference Avoidance ([SLEA040](#))
6. Click & Pop Measurements Technique ([SLEA044](#))
7. Power Supply Recommendations for DVD-Receivers ([SLEA027](#))
8. Implementation of Power Supply Volume Control ([SLEA038](#))

Appendix A Design Information

This appendix includes design information for the TAS5612L-TAS5614LDDVEVM. This information is presented in the following order.

- [Table 4](#) Bill of Materials for TAS5614LDDVEVM
- [Section A.1](#) EVM Custom Component Vendors
- [Section A.2](#) TAS5612L-TAS5614LDDVEVM PCB SPECIFICATION
- [Section A.3](#) EVM PCB Layers
- [Section A.4](#) EVM and Input-USB Board 3 Schematics

Table 4. Bill of Materials for TAS5614LDDVEVM

Manu Part No.	Qty.	Ref Des	Vendor Part No.	Description	Vendor	Manu.
TI-SEMICONDUCTORS						
TAS5614LDDV	1	U1	TAS5614LDDV	150W-STEREO/300W-MONO PUREPATH DIGITAL AMP HTSSOP44-DDV ROHS	Texas Instruments	Texas Instruments
TAS5538DGG	1	U2	TAS5538DGG	8 CHANNEL HD COMPATIBLE AUDIO PROCESSOR TSSOP56-DGG ROHS	Texas Instruments	Texas Instruments
TPS3825-33DBVT	1	U3	296-2636-1	PROCESSOR SUPERVISORY CIRCUITS 2.93V 200ms SOT23-DBV5 ROHS	Digi-Key	Texas Instruments
TLV1117-33CDCYR	1	VR1	296-21112-1-ND	VOLT REG LDO 3.3V 800mA SOT223-DCY ROHS	Digi-Key	Texas Instruments
SEMICONDUCTORS						
2N7002	4	Q1, Q2, Q3, Q4	2N7002NCT	N-FET 60V 115mA 200mW 7.5 OHM@10V SOT23-DBV3 ROHS	Digi-Key	Fairchild
SML-LXT0805SRW-TR	3	125C, FAULT, AMP_RESET	67-1555-1	LED, RED 2.0V SMD0805 ROHS	Digi-Key	Lumex Opto
SML-LXT0805YW-TR	1	CLIP	67-1554-1	LED, YELLOW 2.0V SMD0805 ROHS	Digi-Key	Lumex Opto
CAPACITORS						
C1206C102K1RACTU	4	C21, C24, C27, C30	399-1222-1	CAP SMD1206 CERM 1000PFD 100V 1% C0G ROHS	Digi-Key	Kemet
GRM188R71H472KA01D	2	C54, C55	490-1506-1	CAP SMD0603 CERM 4700PFD 50V 10% X7R ROHS	Digi-Key	Murata
GRM21BR72A103KA01L	5	C22, C25, C28, C31, C70	490-1652-1	CAP SMD0805 CERM 0.01UFD 100V 10% X7R ROHS	Digi-Key	Murata
GRM188R71H333KA61D	4	C16, C17, C18, C19	490-3286-1-ND	CAP SMD0603 CERM 0.033UFD 50V 10% X7R ROHS	Digi-Key	Murata
GRM188R71C473KA01D	2	C56, C57	490-1529-1	CAP SMD0603 CERM 0.047UFD 16V 10% ROHS	Digi-Key	Murata
GRM188R71C104KA01D	17	C2, C3, C4, C7, C32, C50, C52, C53, C59, C60, C62, C63, C64, C65, C74, C76, C77	490-1532-1-ND	CAP SMD0603 CERM 0.1UFD 16V 10% X7R ROHS	Digi-Key	Murata
MKP4 -.68/250/20	4	C20, C23, C26, C29	MKP4 -.68/250/20	CAP POLYPRO FILM MKP4 0.68UFD 250V 20% ROHS	WIMA	WIMA
C1608X7R1C105K	2	C5, C6	445-1604-1	CAP SMD0603 CERM 1.0UFD 16V 10% X7R ROHS	Digi-Key	TDK
GRM21BR71H105KA12L	5	C8, C9, C10, C11, C71	490-4736-1-ND	CAP SMD0805 CERM 1.0UFD 50V 10% X7R ROHS	Digi-Key	Murata
GRM21BR61C106KE15L	3	C58, C61, C66	490-3886-1	CAP SMD0805 CERM 10UFD 16V 10% X5R ROHS	Digi-Key	Murata
CAPACITORS						
EEU-FC1C470	4	C1, C51, C73, C75	P11196	CAP 47UFD 16V RAD ALUM ELEC FC ROHS	Digi-Key	Panasonic
UKZ1H470MPM	1	C72	493-3194	CAP ALUM ELEC KZ RADIAL 47UFD 50V 20% ROHS	Digi-Key	Nichicon
EEU-FC1H102	2	C12, C14	P10333-ND	CAP ALUM ELEC FC RADIAL 1000UFD 50V 20% ROHS	Digi-Key	Panasonic

Table 4. Bill of Materials for TAS5614LDDVEVM (continued)

Manu Part No.	Qty.	Ref Des	Vendor Part No.	Description	Vendor	Manu.
RESISTORS						
RMCF0402ZT0R00	2	R12, R13	RMCF0402ZT0R00CT	ZERO OHM JUMPER SMT 0402 0 OHM 1/16W,5% ROHS	Digi-Key	Stackpole Electronics
ERJ-3GEY0R00V	1	R51	P0.0GCT	RESISTOR SMD0603 0.0 OHM 5% THICK FILM 1/10W ROHS	Digi-Key	Panasonic
ERJ-3GEYJ1R0V	1	R50	P1.0GCT	RESISTOR SMD0603 1.0 OHMS 1% THICK FILM 1/10W ROHS	Digi-Key	Panasonic
ERJ-3GEYJ3R3V	8	R1, R7, R8, R9, R10, R11, R14, R60	P3.3GCT	RESISTOR SMD0603 3.3 OHMS 5% 1/10W ROHS	Digi-Key	Panasonic
ERJ-3GEYJ470V	19	R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R54, R55, R56, R57, R58	P47GCT	RESISTOR SMD0603 47 OHMS 5% 1/10W ROHS	Digi-Key	Panasonic
CRCW0603100RFKEA	3	R4, R5, R6	541-100HCT	RESISTOR SMD0603 100 OHM 1/10W 1% ROHS	Digi-Key	Vishay
ERJ-3GEYJ471V	2	R48, R49	P470GCT	RESISTOR SMD0603 470 OHMS 5% 1/10W ROHS	Digi-Key	Panasonic
ERJ-3GEYJ472V	4	R61, R62, R63, R65	P4.7KGCT	RESISTOR SMD0603 4.7K OHMS 5% 1/10W ROHS	Digi-Key	Panasonic
ERJ-3EKF1002V	14	R20, R21, R22, R23, R24, R25, R26, R41, R42, R43, R44, R45, R46, R47	P10.0KHCT	RESISTOR SMD0603 10.0K 1% THICK FILM 1/10W ROHS	Digi-Key	Panasonic
RMCF0603FT15K0	1	R52	RMCF0603FT15K0CT	RESISTOR SMD0603 15.0K OHMS 1% 1/10W ROHS	Digi-Key	Stackpole Electronics
RC0603FR-0718KL	1	R53	311-18.0KHRCT	RESISTOR SMD0603 THICK FILM 18.0K OHMS 1% 1/10W ROHS	Digi-Key	Yageo
RC0603FR-0730KL	1	R2	311-30.0KHRCT	RESISTOR SMD0603 THICK FILM 30.0K 1% 1/10W ROHS	Digi-Key	Yageo
ERJ-3GEYJ473V	1	R3	P47KGCT	RESISTOR SMD0603 47K OHMS 5% 1/10W ROHS	Digi-Key	Panasonic
INDUCTORS						
MA5172-AE	4	L1, L2, L3, L4	MA5172-AE	SHIELDED POWER INDUCTOR 10uH 10A ROHS	Coil Craft	Coil Craft
HEADERS						
N2526-6002-RB	1	J1	MHC26K-ND	HEADER SHROUDED 100LS MALE GOLD 2X13 PINS ROHS	Digi-Key	3M
PBC02SAAN	1	JP1	S1011E-02-ND	HEADER THRU MALE 2 PIN 100LS GOLD ROHS	Digi-Key	Sullins
PBC03SAAN	3	C, D, M3	S1011E-03-ND	HEADER THRU MALE 3 PIN 100LS GOLD ROHS	Digi-Key	Sullins
TESTPOINTS AND SWITCHES						
5003	1	ET2	5003K	PC TESTPOINT, ORANGE, ROHS	Digi-Key	Keystone Electronics
G12AP-RO	1	S1	360-1758	SWITCH THRU SPDT STRAIGHT ULTRA MINIATURE ROHS	Digi-Key	NKK
BINDING POSTS						
5018-0	3	GND, LOUT-, ROUT-	565-5018-0	BINDING POST, BLACK 60V 30A GOLD ROHS	Mouser	Pomona
5018-2	3	PVDD, LOUT+, ROUT+	565-5018-2	BINDING POST, RED 60V 30A GOLD ROHS	Mouser	Pomona
SHUNTS						
SPC02SYAN	4	JP1, C(1-2), D(1-2), M3(1-2)	S9001	SHUNT, BLACK AU FLASH 0.100LS	Digi-Key	Sullins
HEAT SINKS AND HARDWARE						
ATSTI10P-563-C1-R0	1	HS1	ATSTI10P-563-C1-R0	HEATSINK ALUMINUM ATS 36x54mm 36.8mm PITCH ROHS	ATS	ATS

Table 4. Bill of Materials for TAS5614LDDVEVM (continued)

Manu Part No.	Qty.	Ref Des	Vendor Part No.	Description	Vendor	Manu.
92000A118	2	HS1	92000A118	PHILIPS PANHEAD SCREW M3x8mm STAINLESS STEEL ROHS	McMaster- Carr	McMaster- Carr
92148A150	2	HS1	92148A150	SPLIT WASHER M3 STAINLESS STEEL ROHS	McMaster- Carr	McMaster- Carr
STANDOFFS AND HARDWARE						
94868A178	4	NA	94868A178	STANDOFF M3x25mm 4.5mm DIA HEX STAINLESS STEEL F-F ROHS	McMaster- Carr	McMaster- Carr
92000A118	4	NA	92000A118	PHILIPS PANHEAD SCREW M3x8mm STAINLESS STEEL ROHS	McMaster- Carr	McMaster- Carr
92148A150	4	NA	92148A150	SPLIT WASHER M3 STAINLESS STEEL ROHS	McMaster- Carr	McMaster- Carr
Component Count:	163					
COMPONENTS NOT ASSEMBLED						
CR1, CR2, CR3, CR4, L+, L-, OA, OB, OC, OD, R+, R-, PVDD_AB, PVDD_CD, M1, M2, GNDx2, PSVC						

A.1 EVM Custom Component Vendors

TAS5612LDDVEVM and TAS5614LDDVEVM include inductors and heatsinks from 2 custom component vendors designed specifically for the EVMs. These vendors carry stock for small orders on their shelves.

Advanced Thermal Solutions (ATS), in Norwood, MA, USA, provide a heatsink optimized for these EVMs, ATS-TI1OP-563-C1. Information on this heatsink can be obtained from Leonard Alter at alter@qats.com. ATS design and manufacture a large line of off-the-shelf and patented high performance heatsinks. They also design and manufacture research quality thermal test and measurement equipment and offer thermal evaluation and design services. Information about their products and services is available at www.qats.com.

Coilcraft, in Cary, IL, USA, provide a 10μH inductor optimized for these EVMs, MA5172-AE. Information on this component can be found in the data sheet for the MA5172 inductor family at www.coilcraft.com. Coilcraft make a variety of other inductors for Class D amplifiers, most of which are AEC-Q200 Grade 1 certified for automotive applications. Free evaluation samples and on-line ordering are available at www.coilcraft.com.

A.2 TAS5612L-TAS5614LDDVEVM PCB SPECIFICATION

PCB IDENTIFICATION:	TAS5612L-TAS5614LDDVEVM_RevA
PCB TYPE:	DOUBLE-SIDED PLATED-THROUGH
PCB SIZE:	142 x 96 mm
LAMINATE TYPE:	FR4
LAMINATE THICKNESS:	1.6mm
COPPER THICKNESS:	70 μm (2 ounce) (INCLUDING PLATING EXTERIOR LAYER)
COPPER PLATING IN HOLES:	70 μm (2 ounce)
MINIMUM HOLE DIAMETER:	0.3 mm (12 mils)
SILKSCREEN:	WHITE - REMOVE SILKSCREEN FROM SOLDER & PRE-TINNED AREAS
SOLDER MASK:	BLUE
APPROX. HOLE COUNT:	570
PROTECTIVE COATING:	ENIG (ELECTROLESS NICKEL / IMMERSION GOLD)
ELECTRICAL TEST:	PCB MUST BE ELECTRICAL TESTED
COMMENTS:	FAB NOTES ARE IN THE DRILL DRAWING FILE

A.3 EVM PCB Layers

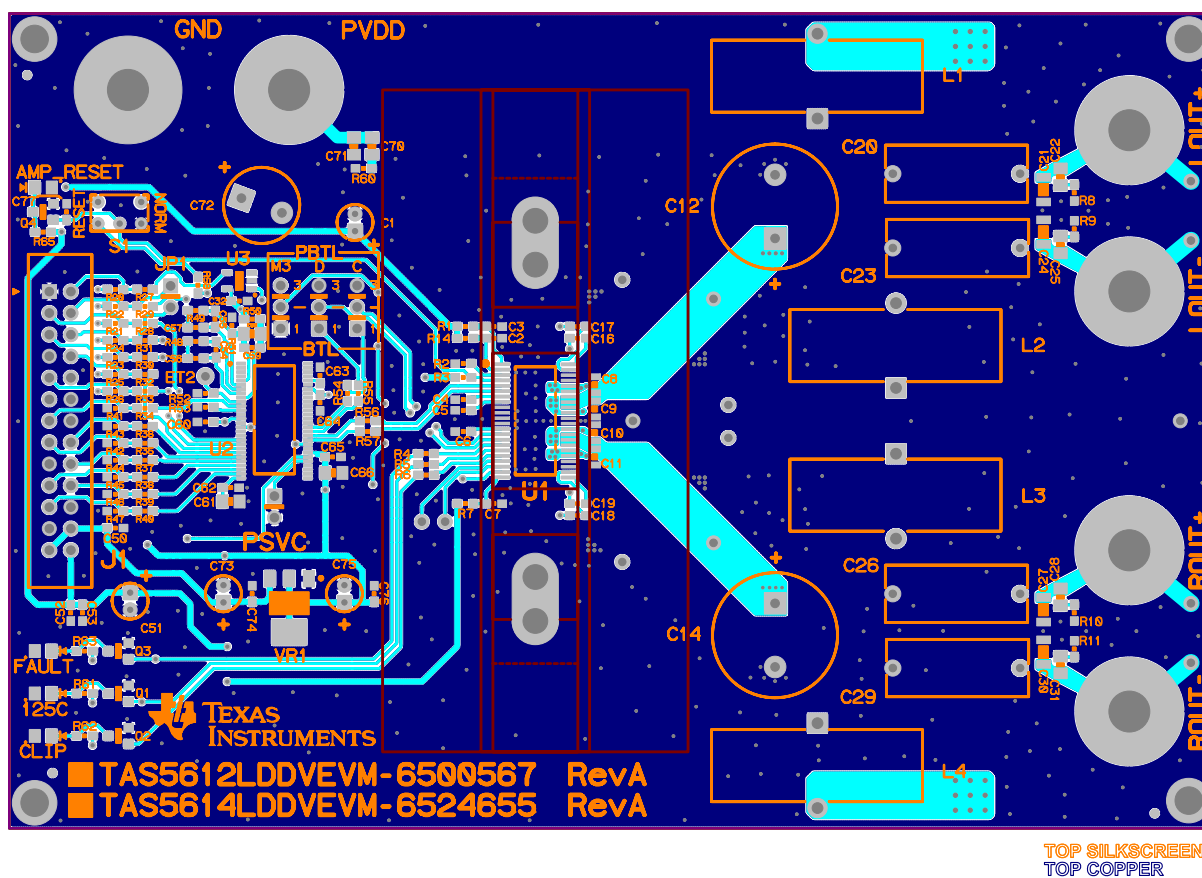


Figure 8. Top Composite PCB Layer

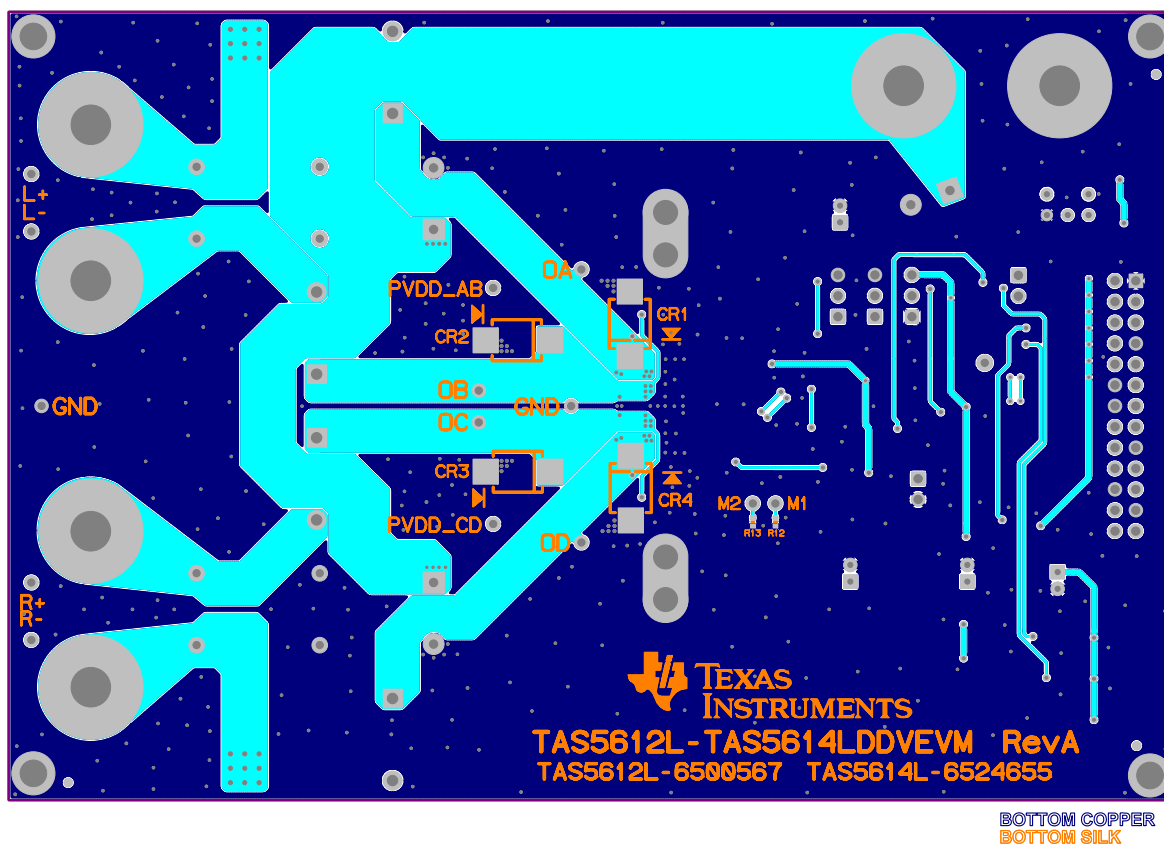
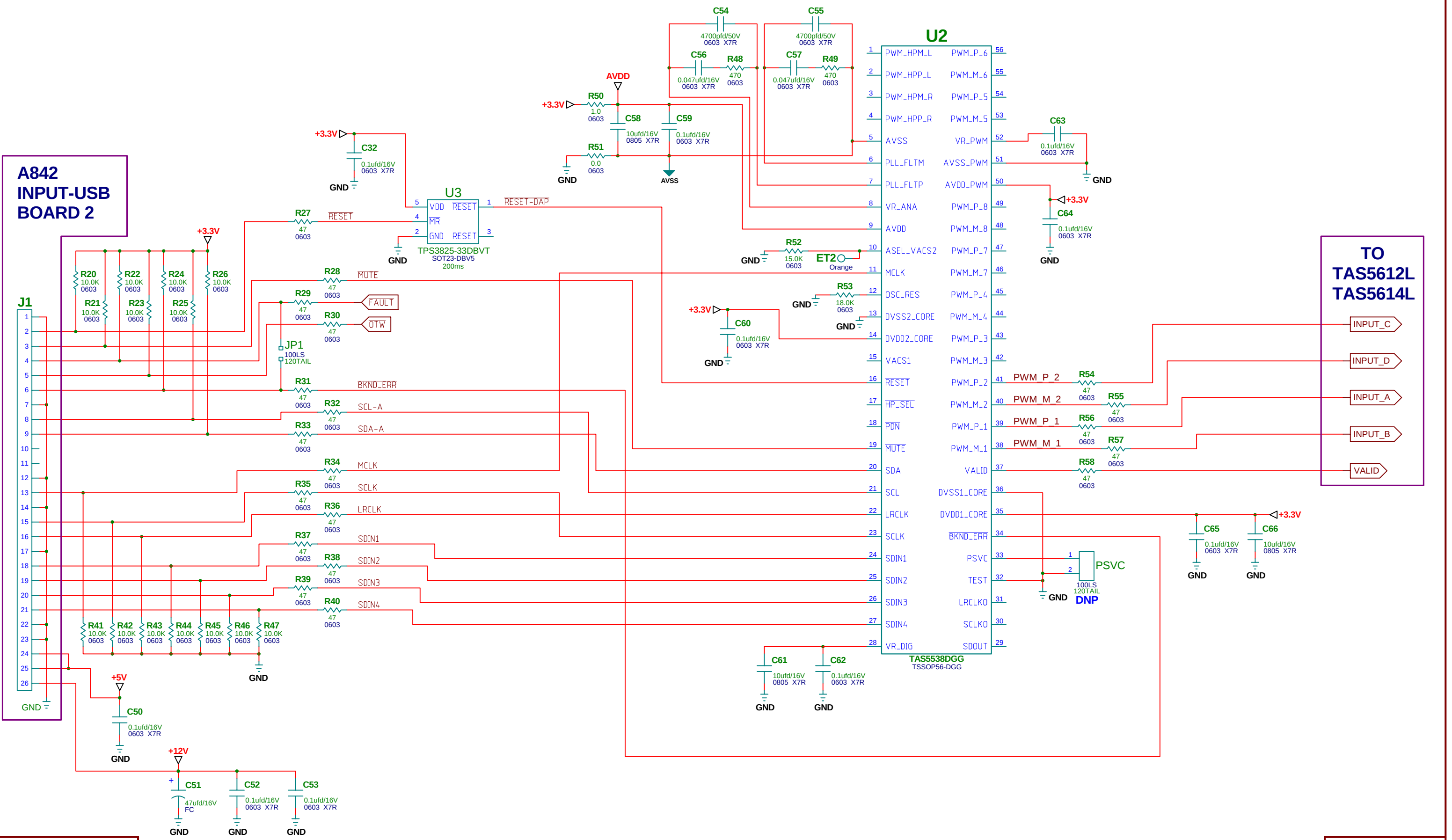


Figure 9. Bottom Composite PCB Layer

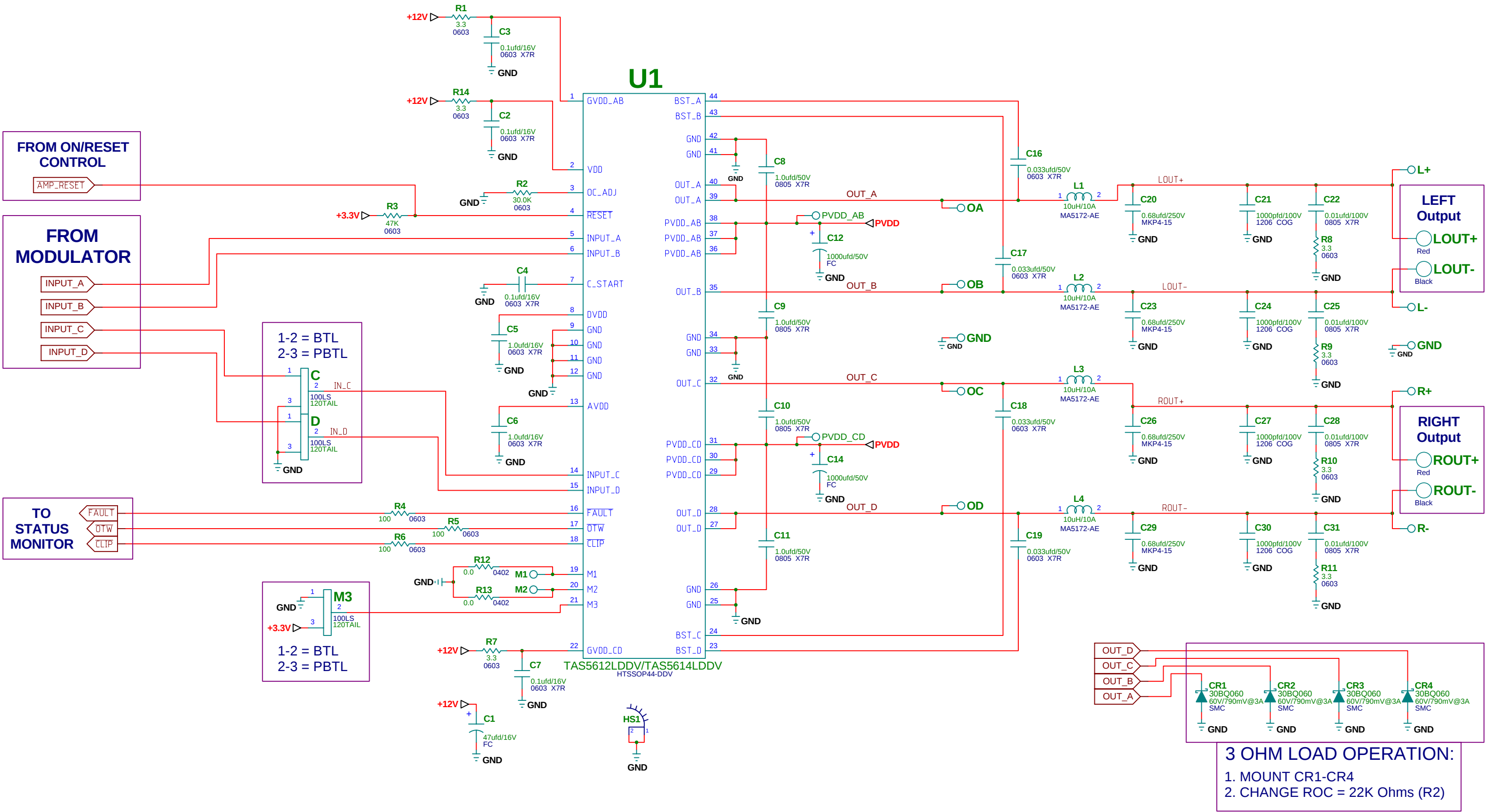
A.4 EVM and Input-USB Board 3 Schematics

The EVM and Input-USB Board 3 schematics are appended to this User's Guide PDF.

TAS5612LDDV/TAS5614LDDV EVALUATION BOARD

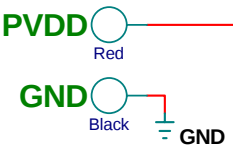


TAS5612LDDV/TAS5614LDDV EVALUATION BOARD

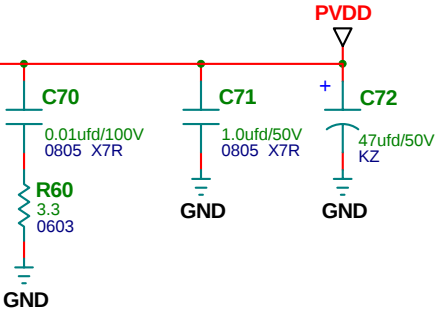


TAS5612LDDV/TAS5614LDDV EVALUATION BOARD

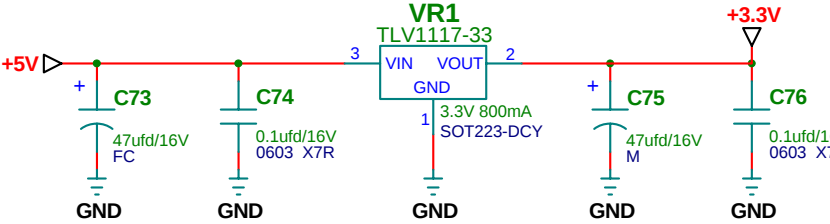
MAIN POWER IN



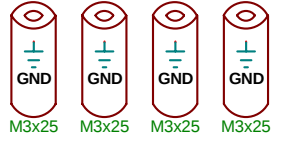
PVDD RANGE= xxV-38V



5V TO 3.3V DC-DC CONVERTER



HARDWARE



STANDOFFS



WASHERS

SCREWS

FROM U1



STATUS MONITORS

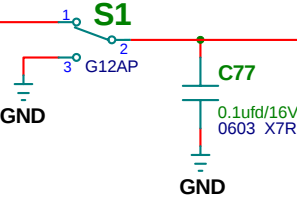


FROM MODULATOR



ON/RESET CONTROL

S3 SETTINGS
1-2/6-5 ON
3-2/4-5 RESET



TO U1



TAS5612LDDV/TAS5614LDDV EVALUATION BOARD

REVISION HISTORY

REVISION	DESCRIPTION	DATE	APPROVAL
A	INITIAL RELEASE	MARCH 7, 2012	SC



TEXAS INSTRUMENTS DISCLAIMER

The information and materials ("Materials") provided here are provided by Texas Instruments Incorporated ("TI") as a service to its customers and/or suppliers, and may be used for informational purposes only, and only subject to the following terms. By downloading or viewing these Materials, you are signifying your assent to these terms.

1.) These preliminary evaluation schematics are intended for use for PRELIMINARY ENGINEERING DEVELOPMENT AND EVALUATION PURPOSES ONLY and are not considered by Texas Instruments to be fit as a basis for establishing production products or systems. This information may be incomplete in several respects, including but not limited to information relating to required design, marketing, and/or manufacturing-related protective considerations and product safety measures typically found in the end-product incorporating the goods.

2.) Accordingly, neither TI nor its suppliers warrant the accuracy or completeness of the information, text, graphics, links or other items contained within the Materials. TI may make changes to the Materials, or to the products described therein, at any time without notice. TI makes no commitment to update the Materials.

3.) TI assumes no liability for applications assistance, customer product design, software performance, or services that may be described or referenced in the Materials. The user assumes all responsibility and liability for proper and safe design and handling of goods. Accordingly, the user indemnifies TI from all claims arising from its use of the Materials.

4.) TI currently deals with various customers for products, and therefore our arrangement with the user will not be exclusive. TI makes no representations regarding the commercial availability of non-TI components that may be referenced in the Materials.

5.) No license is granted under any patent right or other intellectual property right of TI covering or relating to any combination, machine, or process in which such TI products or services might be or are used. Except as expressly provided herein, TI and its suppliers do not grant any express or implied right to you under any patents, copyrights, trademarks, or trade secret information.

6.) Performance tests and ratings, to the extent referenced in the Materials, are measured using specific computer systems and/or components and reflect the approximate performance of TI products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing.

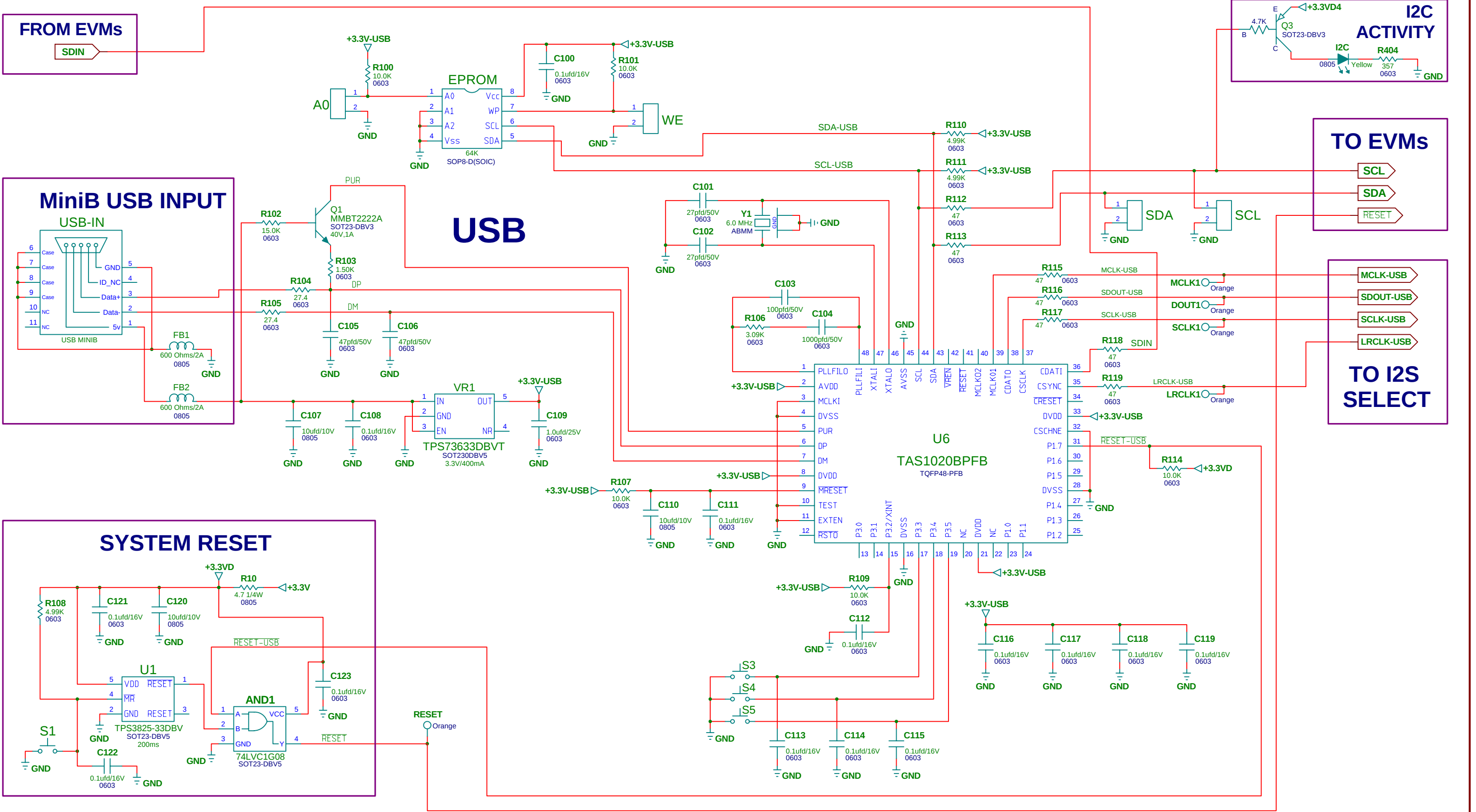
7.) Resale of TI's products or services with statements different from or beyond the parameters stated by TI for that product or service in official TI data books or data sheets voids all express and any implied warranties for the associated TI product or service, and is an unfair and deceptive business practice, and TI is not responsible for any such use.

8.) The Materials are copyrighted and any unauthorized use may violate copyright, trademark, and other laws. You may only download one copy for your internal use only, unless you are specifically licensed to do otherwise by TI in writing. This is a license, not a transfer of title, and is subject to the following restrictions: You may not:

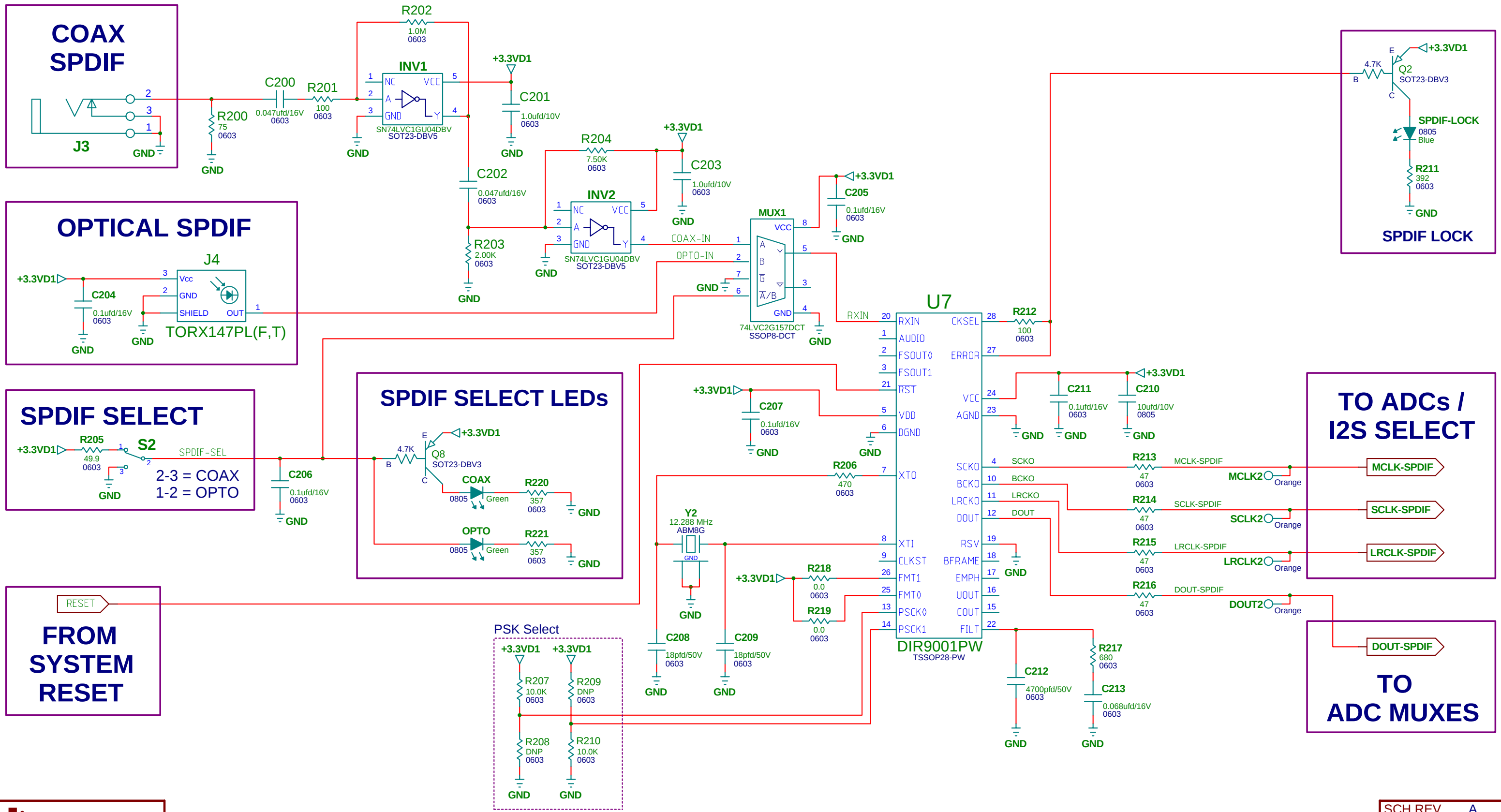
- (a) modify the Materials (including any associated warranties, conditions, limitations or notices) or use them for any commercial purpose, or any public display, performance, sale or rental;
- (b) decompile, reverse engineer, or disassemble software Materials except and only to the extent permitted by applicable law;
- (c) remove any copyright or other proprietary notices from the Materials;
- (d) transfer the Materials to another person. You agree to prevent any unauthorized copying of the Materials. TI may terminate this license at any time if you are in breach of the terms of this Agreement. Upon termination, you will immediately destroy the Materials.

9.) THE MATERIALS ARE PROVIDED "AS IS" WITHOUT ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND INCLUDING WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT OF INTELLECTUAL PROPERTY, OR FITNESS FOR ANY PARTICULAR PURPOSE. IN NO EVENT SHALL TI OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, LOSS OF INFORMATION) ARISING OUT OF THE USE OF OR INABILITY TO USE THE MATERIALS, EVEN IF TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

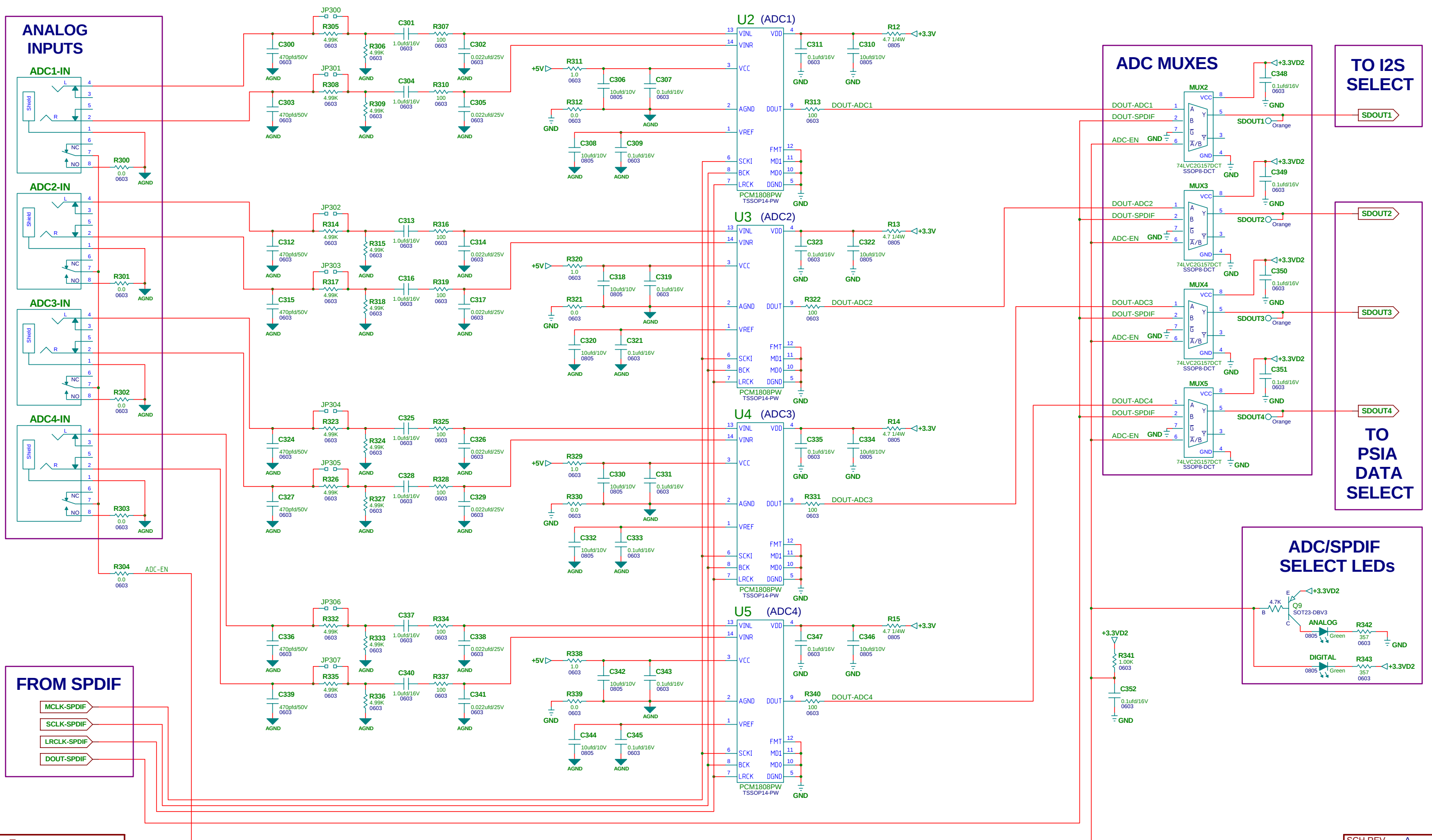
INPUT-USB BOARD #3



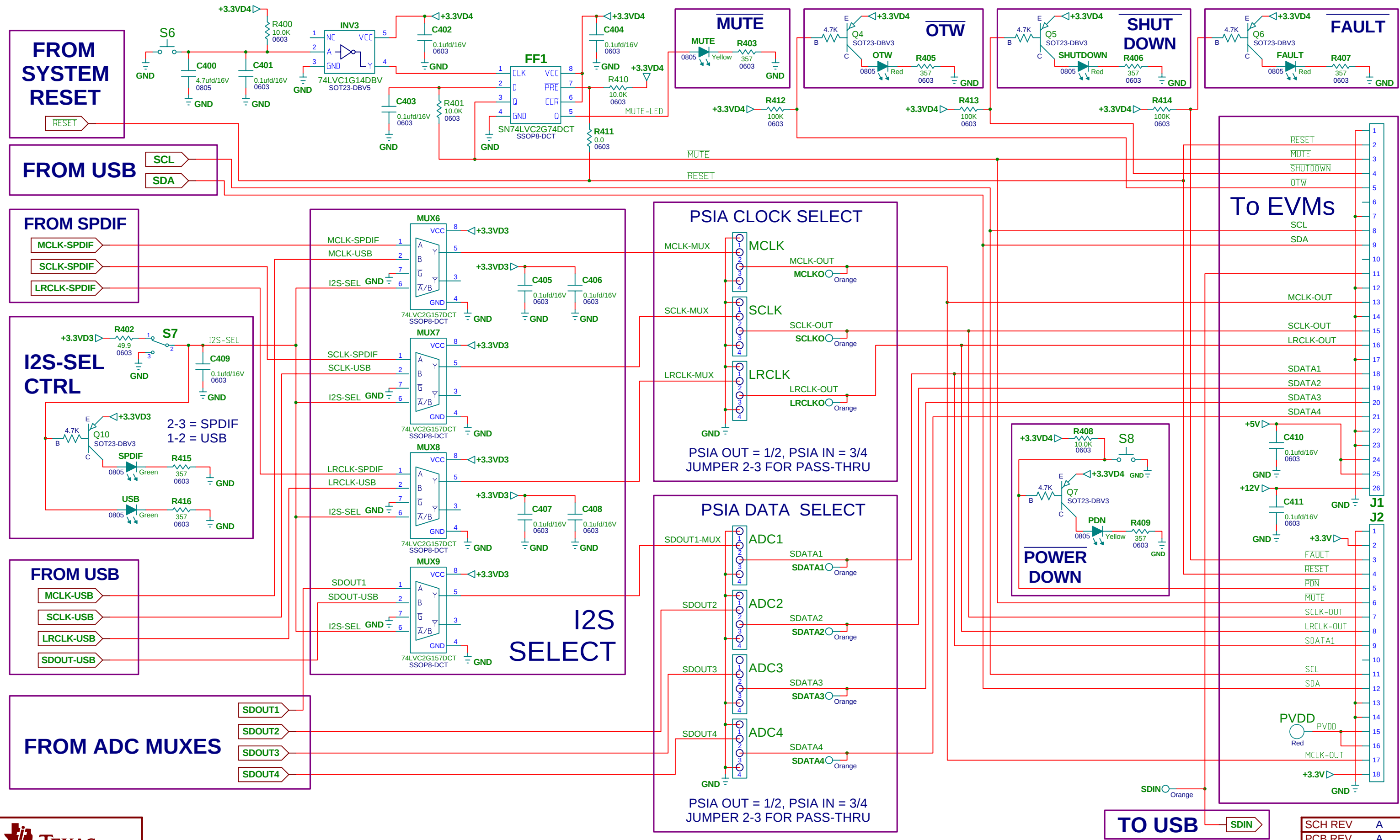
INPUT-USB BOARD #3



INPUT-USB BOARD #3

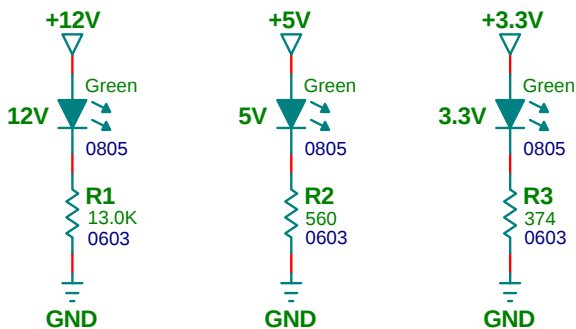
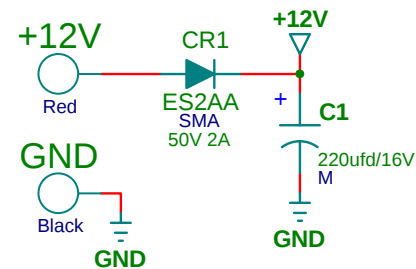


INPUT-USB BOARD #3

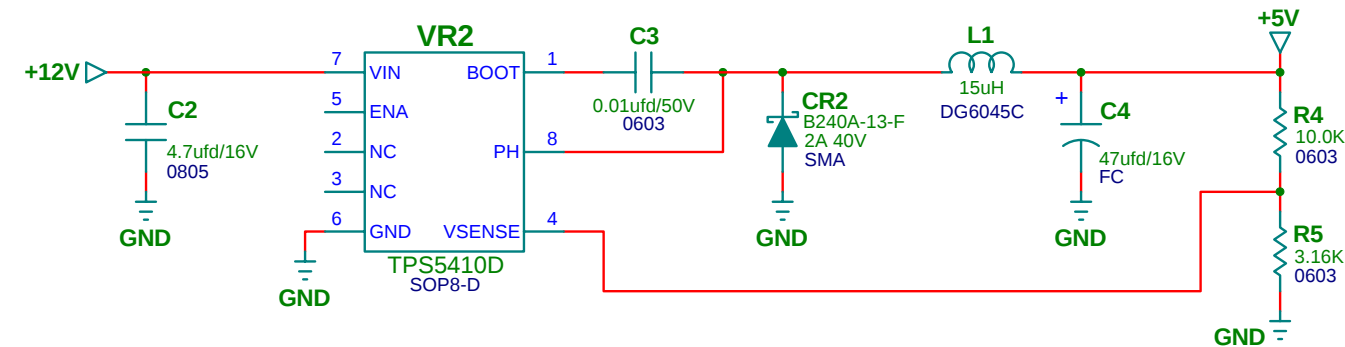


INPUT-USB BOARD #3

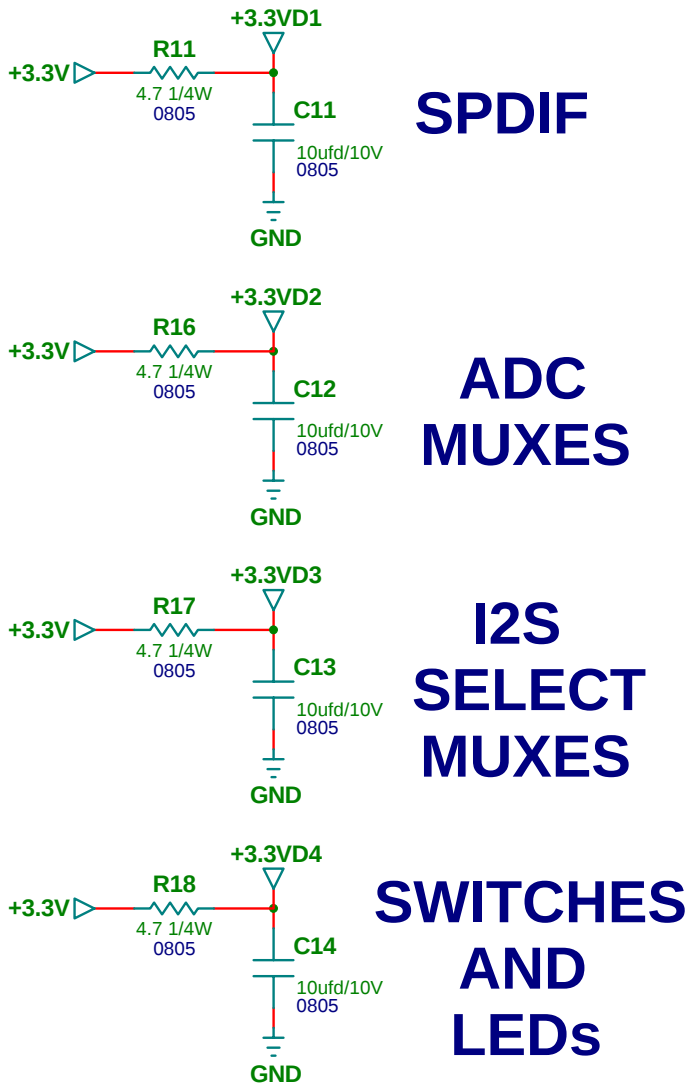
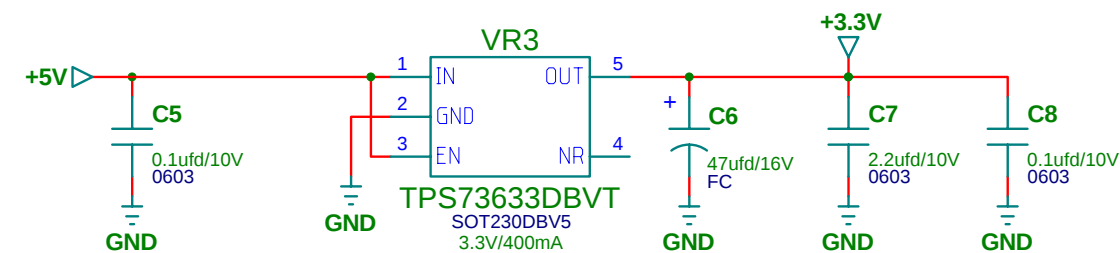
MAIN POWER IN



PVDD TO 5V SWITCHER

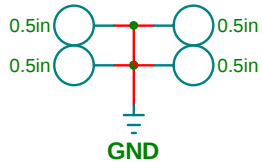


5V TO 3.3V DC-DC CONVERTER



BOM ONLY

STANDOFFS



INPUT-USB BOARD #3

REVISION HISTORY

REVISION	DESCRIPTION	DATE	APPROVAL
A	INITIAL RELEASE	JULY 12, 2011	TL

TEXAS INSTRUMENTS DISCLAIMER

The information and materials ("Materials") provided here are provided by Texas Instruments Incorporated ("TI") as a service to its customers and/or suppliers, and may be used for informational purposes only, and only subject to the following terms. By downloading or viewing these Materials, you are signifying your assent to these terms.

1.) These preliminary evaluation schematics are intended for use for PRELIMINARY ENGINEERING DEVELOPMENT AND EVALUATION PURPOSES ONLY and are not considered by Texas Instruments to be fit as a basis for establishing production products or systems. This information may be incomplete in several respects, including but not limited to information relating to required design, marketing, and/or manufacturing-related protective considerations and product safety measures typically found in the end-product incorporating the goods.

2.) Accordingly, neither TI nor its suppliers warrant the accuracy or completeness of the information, text, graphics, links or other items contained within the Materials. TI may make changes to the Materials, or to the products described therein, at any time without notice. TI makes no commitment to update the Materials.

3.) TI assumes no liability for applications assistance, customer product design, software performance, or services that may be described or referenced in the Materials. The user assumes all responsibility and liability for proper and safe design and handling of goods. Accordingly, the user indemnifies TI from all claims arising from its use of the Materials.

4.) TI currently deals with various customers for products, and therefore our arrangement with the user will not be exclusive. TI makes no representations regarding the commercial availability of non-TI components that may be referenced in the Materials.

5.) No license is granted under any patent right or other intellectual property right of TI covering or relating to any combination, machine, or process in which such TI products or services might be or are used. Except as expressly provided herein, TI and its suppliers do not grant any express or implied right to you under any patents, copyrights, trademarks, or trade secret information.

6.) Performance tests and ratings, to the extent referenced in the Materials, are measured using specific computer systems and/or components and reflect the approximate performance of TI products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing.

7.) Resale of TI's products or services with statements different from or beyond the parameters stated by TI for that product or service in official TI data books or data sheets voids all express and any implied warranties for the associated TI product or service, and is an unfair and deceptive business practice, and TI is not responsible for any such use.

8.) The Materials are copyrighted and any unauthorized use may violate copyright, trademark, and other laws. You may only download one copy for your internal use only, unless you are specifically licensed to do otherwise by TI in writing. This is a license, not a transfer of title, and is subject to the following restrictions: You may not:

- (a) modify the Materials (including any associated warranties, conditions, limitations or notices) or use them for any commercial purpose, or any public display, performance, sale or rental;
- (b) decompile, reverse engineer, or disassemble software Materials except and only to the extent permitted by applicable law;
- (c) remove any copyright or other proprietary notices from the Materials;
- (d) transfer the Materials to another person. You agree to prevent any unauthorized copying of the Materials. TI may terminate this license at any time if you are in breach of the terms of this Agreement. Upon termination, you will immediately destroy the Materials.

9.) THE MATERIALS ARE PROVIDED "AS IS" WITHOUT ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND INCLUDING WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT OF INTELLECTUAL PROPERTY, OR FITNESS FOR ANY PARTICULAR PURPOSE. IN NO EVENT SHALL TI OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, LOSS OF INFORMATION) ARISING OUT OF THE USE OF OR INABILITY TO USE THE MATERIALS, EVEN IF TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

EVALUATION BOARD/KIT/MODULE (EVM) ADDITIONAL TERMS

Texas Instruments (TI) provides the enclosed Evaluation Board/Kit/Module (EVM) under the following conditions:

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods.

Should this evaluation board/kit not meet the specifications indicated in the User's Guide, the board/kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING LIMITED WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Please read the User's Guide and, specifically, the Warnings and Restrictions notice in the User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For additional information on TI's environmental and/or safety programs, please visit www.ti.com/esh or contact TI.

No license is granted under any patent right or other intellectual property right of TI covering or relating to any machine, process, or combination in which such TI products or services might be or are used. TI currently deals with a variety of customers for products, and therefore our arrangement with the user is not exclusive. TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein.

REGULATORY COMPLIANCE INFORMATION

As noted in the EVM User's Guide and/or EVM itself, this EVM and/or accompanying hardware may or may not be subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules.

For EVMs **not** subject to the above rules, this evaluation board/kit/module is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION OR EVALUATION PURPOSES ONLY and is not considered by TI to be a finished end product fit for general consumer use. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC or ICES-003 rules, which are designed to provide reasonable protection against radio frequency interference. Operation of the equipment 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.

General Statement for EVMs including a radio

User Power/Frequency Use Obligations: This radio is intended for development/professional use only in legally allocated frequency and power limits. Any use of radio frequencies and/or power availability of this EVM and its development application(s) must comply with local laws governing radio spectrum allocation and power limits for this evaluation module. It is the user's sole responsibility to only operate this radio in legally acceptable frequency space and within legally mandated power limitations. Any exceptions to this are strictly prohibited and unauthorized by Texas Instruments unless user has obtained appropriate experimental/development licenses from local regulatory authorities, which is responsibility of user including its acceptable authorization.

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

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

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.

For EVMs annotated as IC – INDUSTRY CANADA Compliant

This Class A or B digital apparatus complies with Canadian ICES-003.

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

Concerning EVMs including radio transmitters

This device complies with Industry Canada licence-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.

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.

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

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.

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.

【Important Notice for Users of this Product in Japan】

This development kit is NOT certified as Confirming to Technical Regulations of Radio Law of Japan

If you use this product in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product:

1. Use this product 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 this product only after you obtained the license of Test Radio Station as provided in Radio Law of Japan with respect to this product, or
3. Use of this product only after you obtained the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to this product. Also, please do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

Texas Instruments Japan Limited
(address) 24-1, Nishi-Shinjuku 6 chome, Shinjuku-ku, Tokyo, Japan

<http://www.tij.co.jp>

【ご使用にあたっての注】

本開発キットは技術基準適合証明を受けておりません。

本製品のご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

上記を遵守頂けない場合は、電波法の罰則が適用される可能性があることをご留意ください。

日本テキサス・インスツルメンツ株式会社

東京都新宿区西新宿 6 丁目 2 4 番 1 号

西新宿三井ビル

<http://www.tij.co.jp>

EVALUATION BOARD/KIT/MODULE (EVM) WARNINGS, RESTRICTIONS AND DISCLAIMERS

For Feasibility Evaluation Only, in Laboratory/Development Environments. Unless otherwise indicated, this EVM is not a finished electrical equipment and not intended for consumer use. It is intended solely for use for preliminary feasibility evaluation in laboratory/development environments by technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems and subsystems. It should not be used as all or part of a finished end product.

Your Sole Responsibility and Risk. You acknowledge, represent and agree that:

1. You have unique knowledge concerning Federal, State and local regulatory requirements (including but not limited to Food and Drug Administration regulations, if applicable) which relate to your products and which relate to your use (and/or that of your employees, affiliates, contractors or designees) of the EVM for evaluation, testing and other purposes.
2. You have full and exclusive responsibility to assure the safety and compliance of your products with all such laws and other applicable regulatory requirements, and also to assure the safety of any activities to be conducted by you and/or your employees, affiliates, contractors or designees, using the EVM. Further, you are responsible to assure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard.
3. You will employ reasonable safeguards to ensure that your use of the EVM will not result in any property damage, injury or death, even if the EVM should fail to perform as described or expected.
4. You will take care of proper disposal and recycling of the EVM's electronic components and packing materials.

Certain Instructions. It is important to operate this EVM within TI's recommended specifications and environmental considerations per the user guidelines. Exceeding the specified EVM ratings (including but not limited to input and output voltage, current, power, and environmental ranges) may cause property damage, personal injury or death. If there are questions concerning these ratings please contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. 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 as long as the input and output are maintained at a normal ambient operating temperature. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors which can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during normal operation, please be aware that these devices may be very warm to the touch. As with all electronic evaluation tools, only qualified personnel knowledgeable in electronic measurement and diagnostics normally found in development environments should use these EVMs.

Agreement to Defend, Indemnify and Hold Harmless. You agree to defend, indemnify and hold TI, its licensors and their representatives harmless from and against any and all claims, damages, losses, expenses, costs and liabilities (collectively, "Claims") arising out of or in connection with any use of the EVM that is not in accordance with the terms of the agreement. This obligation shall apply whether Claims arise under law of tort or contract or any other legal theory, and even if the EVM fails to perform as described or expected.

Safety-Critical or Life-Critical Applications. If you intend to evaluate the components for possible use in safety critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, such as devices which are classified as FDA Class III or similar classification, then you must specifically notify TI of such intent and enter into a separate Assurance and Indemnity Agreement.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2012, Texas Instruments Incorporated

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Mobile Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community Home Page

e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2012, Texas Instruments Incorporated