

## ***TPA3132D2EVM Audio Amplifier Evaluation Module***

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This evaluation module allows users to evaluate the TI's TPA3132D2 audio amplifier. This user's guide contains an operations description, schematic, printed-circuit board (PCB) layout, and the bill of materials.

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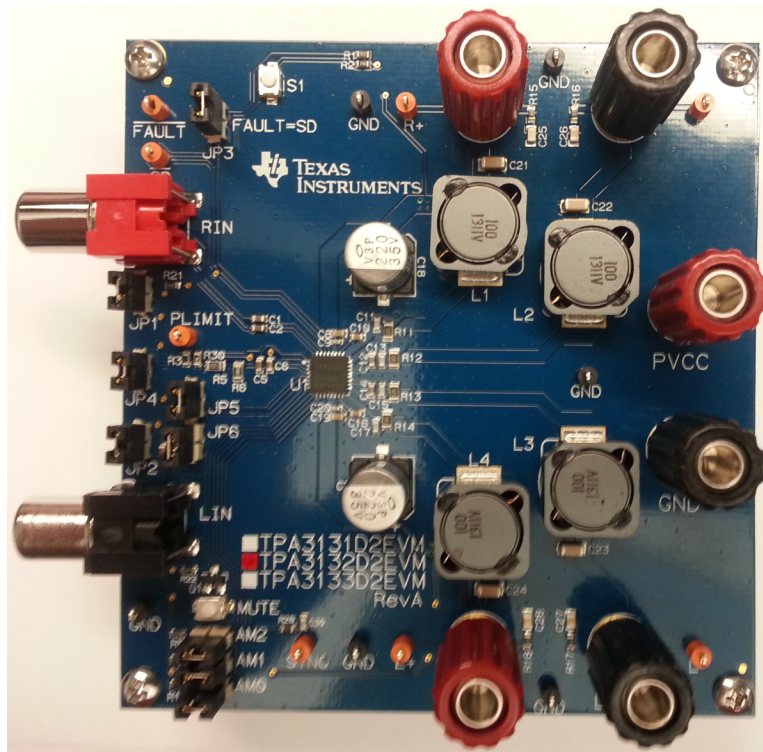
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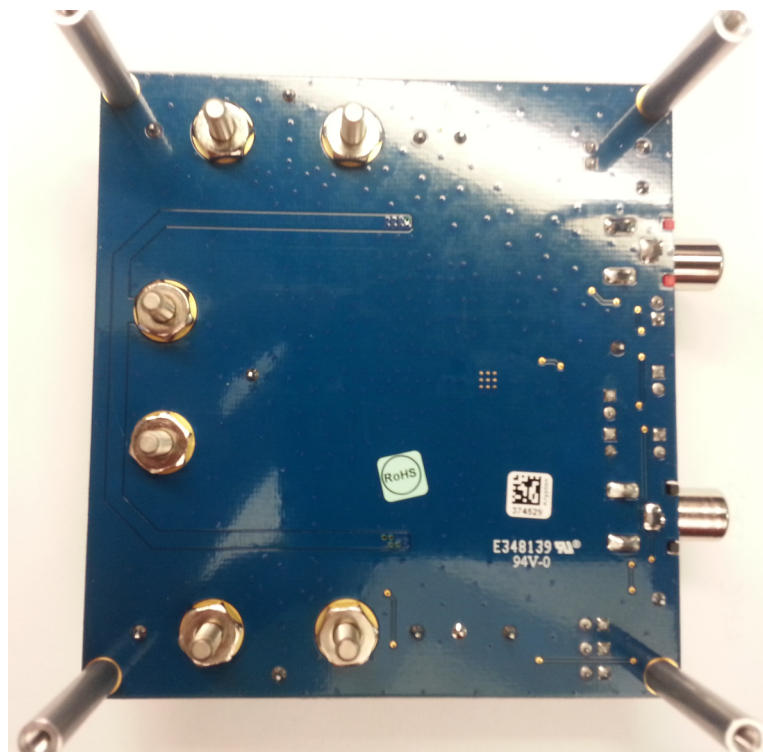
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## 1 Introduction

The TPA3132D2EVM (EVM) customer evaluation module, [Figure 1](#) and [Figure 2](#), demonstrates the TPA3132D2 integrated circuit (IC) from TI.



**Figure 1. TPA3132D2EVM Audio Power Amplifier – Top View**



**Figure 2. TPA3132D2EVM Audio Power Amplifier – Bottom View**

## 2 Operation

### 2.1 Quick-Start List for Stand-Alone Operation

Section 2.1.1 and Section 2.1.2 provide instructions for the TPA3132D2EVM in stand-alone operation or when connecting it into existing circuits or equipment. Connections to the EVM power supply and output connectors can be made by inserting stripped wire or using banana jacks. The input connectors are RCA phono jacks.

#### 2.1.1 Power Supply

A single power supply is required to power the EVM. Because most of the pins are PVCC compliant, the PVCC supply can also be used to power the analog supply (AVcc) and to pull up the logic pins for shutdown (SD) control, and gain (GAIN). PLIMIT can be powered by an external supply connected to the PLIMIT pin. Do not power the PLIMIT pin through the PLIMIT network when the PVCC supply is turned off. This can damage the IC.

**Table 1. Power Supply Requirements**

| Description | Voltage Range | Current Requirements | Wire Size |
|-------------|---------------|----------------------|-----------|
| PVCC        | 4.5 V to 26 V | 3 A                  | 24 AWG    |

1. Ensure that the external regulated power supply is turned OFF.
2. Connect the external regulated power supply, adjusted from 4.5 V to 26 V, to the PVCC and GND banana jacks on the EVM taking care to observe marked polarity.

#### 2.1.2 EVM Preparations

##### Inputs and Outputs

1. For a BTL configuration, remove jumpers from JP5 and JP6 and connect loads across the outputs (LEFT+ and LEFT-) and (RIGHT+ and RIGHT-). For PBTL configuration, insert jumpers on JP5 and JP6 and connect a single load from one of the left speaker jacks to one of the right speaker jacks
2. Connect audio inputs, either differential or single-ended, to the LIN and RIN RCA phono plugs for BTL operation. For PBTL operation, connect a single input, differential or single-ended, to the RIN RCA phono plug.

**Table 2. TPA3132D2EVM Jumpers**

| Jumper            | Function             | Options                                                                                                                                                                              | Notes                                                                                     |
|-------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| JP1               | RCA Gnd to board GND |                                                                                                                                                                                      |                                                                                           |
| JP2               | RCA Gnd to board GND |                                                                                                                                                                                      |                                                                                           |
| JP3               | Fault to SD short    | Auto SD = insert, No SD= open                                                                                                                                                        | When inserted, fault will pull down SD                                                    |
| JP4               | Gvdd to Plimit short | Insert to defeat, remove to enable                                                                                                                                                   | See datasheet ( <a href="#">SLOS841</a> )                                                 |
| JP5               | BTL or PBTL          | Insert for PBTL, remove for BTL                                                                                                                                                      | JP5 and JP6 should match                                                                  |
| JP6               | BTL or PBTL          | Insert for PBTL, remove for BTL                                                                                                                                                      | JP5 and JP6 should match                                                                  |
| AM0<br>AM1<br>AM2 | Oscillator frequency | AM2=0, AM1=0, AM0=0<br>AM2=0, AM1=0, AM0=1<br>AM2=0, AM1=1, AM0=0<br>AM2=0, AM1=1, AM0=1<br>AM2=1, AM1=0, AM0=0<br>AM2=1, AM1=0, AM0=1<br>AM2=1, AM1=1, AM0=0<br>AM2=1, AM1=1, AM0=1 | 400 kHz<br>500 kHz<br>600 kHz<br>1000 kHz<br>1200 kHz<br>Reserved<br>Reserved<br>Reserved |

##### Power Up

1. Verify correct power supply voltage and polarity, and turn the external power supply ON. The EVM begins to operate.
2. Adjust the audio source for the correct volume.

### 3 Schematic, Layout, and Bill of Materials

#### 3.1 TPA3132D2EVM Schematic

Figure 3 illustrates the schematic for this EVM.

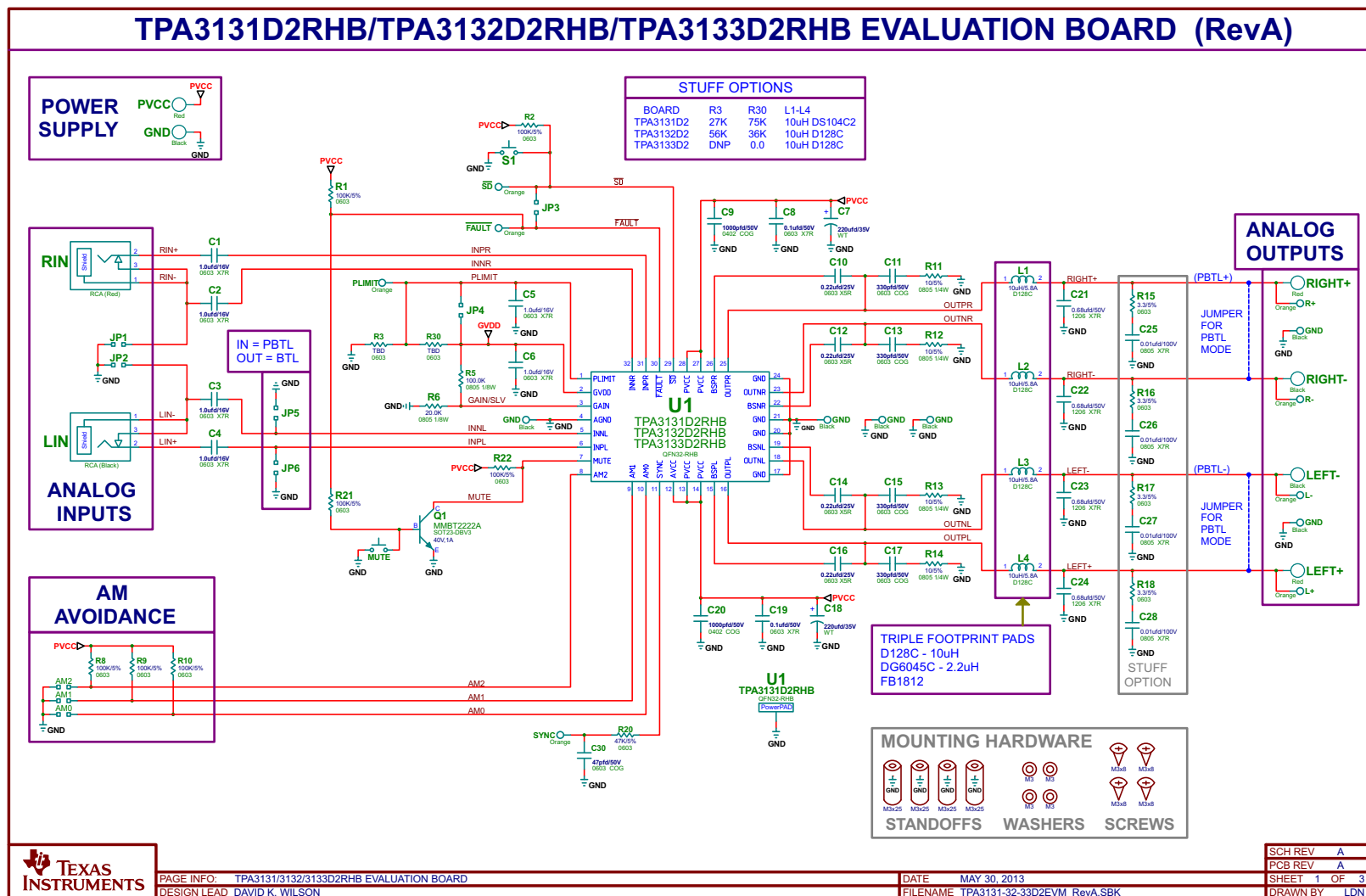


Figure 3. TPA3132D2EVM Schematic

### 3.2 TPA3132D2EVM Printed-Circuit Board Layers

Figure 4 and Figure 5 illustrate the top- and bottom-side PCB layouts for the EVM.

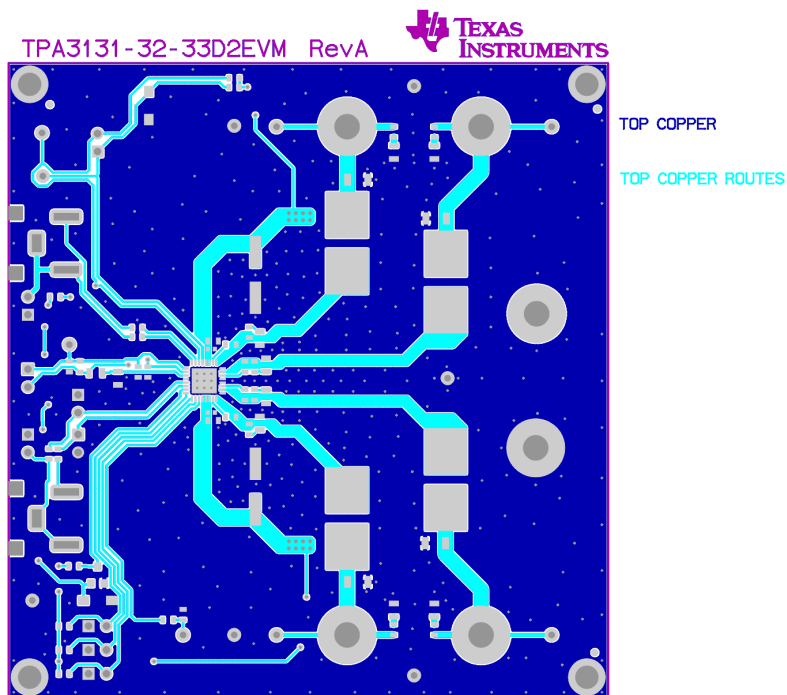


Figure 4. TPA3132D2EVM – Top-Side Layout

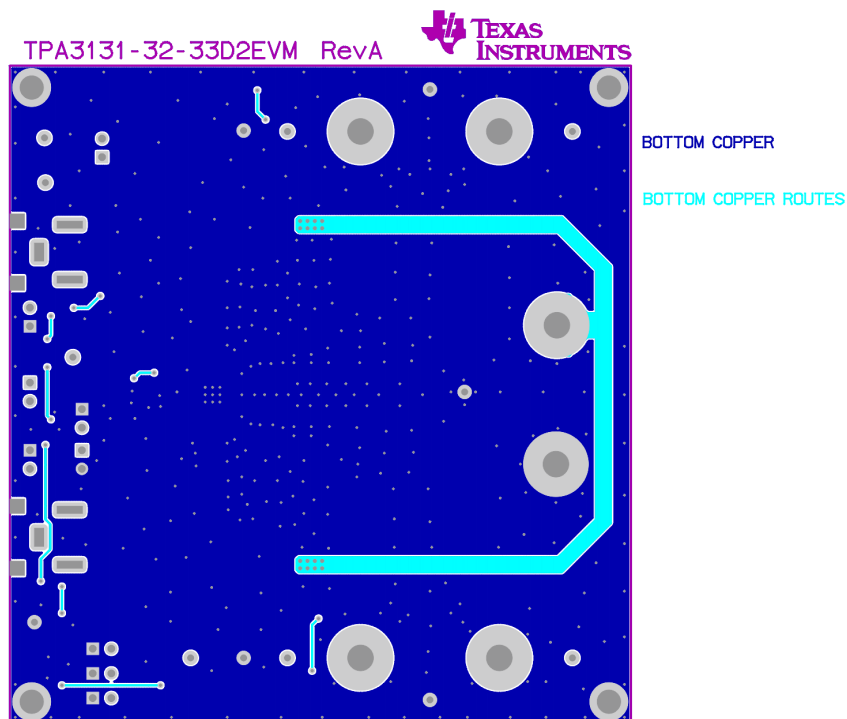


Figure 5. TPA3132D2EVM – Bottom-Side Layout

### 3.3 TPA3132D2EVM Bill of Materials

Table 3 is the TPA3132D2EVM BOM.

**Table 3. TPA3132D2EVM Bill of Materials**

| Item | MANU PART NUM      | MANU                  | Qty | REF Designators                             | Description                                                      |
|------|--------------------|-----------------------|-----|---------------------------------------------|------------------------------------------------------------------|
| 1    | TPA3132D2RHB       | TEXAS INSTRUMENTS     | 1   | U1                                          | 100 W FILTER-FREE CLASS D STEREO AMP AM AVOIDANCE QFN32-RHB ROHS |
| 2    | MMBT2222A-7-F      | DIODES INC.           | 1   | Q1                                          | TRANSISTOR NPN GENERAL PURPOSE 40V 1A SOT23 DBV3 ROHS            |
| 3    | C1608X7R1C105K     | TDK                   | 6   | C1, C2, C3, C4, C5, C6                      | CAP SMD0603 CERM 1.0UFD 16V 10% X7R ROHS                         |
| 4    | UWT1V221MNL1GS     | NICHICON              | 2   | C7, C18                                     | CAP SMD ELECT 220ufd 35V 20% WT ROHS                             |
| 5    | GRM188R71H104KA93D | MURATA                | 2   | C8, C19                                     | CAP SMD0603 CERM 0.1UFD 50V 10% X7R ROHS                         |
| 6    | GRM1555C1H102JA01D | MURATA                | 2   | C9, C20                                     | CAP SMD0402 CERM 1000pfd 5% 50V COG ROHS                         |
| 7    | 06033D224KAT2A     | AVX                   | 4   | C10, C12, C14, C16                          | CAP SMD0603 CERM 0.22UFD 25V 10% X5R ROHS                        |
| 8    | GRM1885C1H331JA01D | MURATA                | 4   | C11, C13, C15, C17                          | CAP SMD0603 CERM 330PFD 50V 5% COG ROHS                          |
| 9    | C1206C684K5RACTU   | KEMET                 | 4   | C21, C22, C23, C24                          | CAP SMD1206 CERM 0.68UFD 50V 10% X7R ROHS                        |
| 10   | GRM21BR72A103KA01L | MURATA                | 4   | C25, C26, C27, C28                          | CAP SMD0805 CERM 0.01UFD 100V 10% X7R ROHS                       |
| 11   | GRM1885C1H470JA01D | MURATA                | 1   | C30                                         | CAP SMD0603 CERM 47PFD 50V 5% COG ROHS                           |
| 12   | RMCF0603JT100K     | STACKPOLE ELECTRONICS | 7   | R1, R2, R8, R9, R10, R21, R22               | RESISTOR SMD0603 100K OHMS 5% 1/10W ROHS                         |
| 13   | ERJ-3EKF5602V      | PANASONIC             | 1   | R3                                          | RESISTOR SMD0603 56.0K OHM 1% THICK FILM 1/10W ROHS              |
| 14   | MCR10EZHF1003      | ROHM                  | 1   | R5                                          | RESISTOR SMD0805 100.0 KOHMS 1% 1/8W ROHS                        |
| 15   | MCR10EZHF2002      | ROHM                  | 1   | R6                                          | RESISTOR SMD0805 20.0 KOHMS 1% 1/8W ROHS                         |
| 16   | ESR10EZPJ100       | ROHM                  | 4   | R11, R12, R13, R14                          | RESISTOR SMD0805 10 OHM 5% 1/4W ROHS                             |
| 17   | ERJ-3GEYJ3R3V      | PANASONIC             | 4   | R15, R16, R17, R18                          | RESISTOR SMD0603 3.3 OHMS 5% 1/10W ROHS                          |
| 18   | ERJ-3GEYJ473V      | PANASONIC             | 1   | R20                                         | RESISTOR SMD0603 47K OHMS 5% 1/10W ROHS                          |
| 19   | RC0603FR-0736KL    | YAGEO                 | 1   | R30                                         | RESISTOR SMD0603 THICK FILM 36.0K OHMS 1% 1/10W ROHS             |
| 20   | 931BS-100M         | TOKO                  | 4   | L1, L2, L3, L4                              | INDUCTOR 10uH 5.8A TYPE D128C ROHS                               |
| 21   | PBC02SAAN          | SULLINS               | 9   | AM0, AM1, AM2, JP1, JP2, JP3, JP4, JP5, JP6 | HEADER THRU MALE 2 PIN 100LS GOLD ROHS                           |
| 22   | PJРАН1X1U013       | SWITCHCRAFT           | 1   | RIN                                         | JACK, RCA 3-PIN PCB-RA RED ROHS                                  |
| 23   | PJРАН1X1U01X       | SWITCHCRAFT           | 1   | LIN                                         | JACK, RCA 3-PIN PCB-RA BLACK ROHS                                |
| 24   | 5001               | KEYSTONE ELECTRONICS  | 6   | G1, G2, G3, G4, G5, G6                      | PC TESTPOINT, BLACK, ROHS                                        |
| 25   | 5003               | KEYSTONE ELECTRONICS  | 8   | L+, L-, R+, R-, SD, SYNC, FAULT, PLIMIT     | PC TESTPOINT, ORANGE, ROHS                                       |
| 26   | TL1015AF160QG      | E-SWITCH              | 2   | S1, MUTE                                    | SWITCH, MOM, 160G SMT 4X3MM ROHS                                 |
| 27   | 7006               | KEYSTONE ELECTRONICS  | 3   | PVCC, LEFT+, RIGHT+                         | BINDING POST, RED, 15A ECONO ROHS                                |
| 28   | 7007               | KEYSTONE ELECTRONICS  | 3   | GND, LEFT-, RIGHT-                          | BINDING POST, BLACK, 15A ECONO ROHS                              |

**Table 3. TPA3132D2EVM Bill of Materials (continued)**

| Item                                    | MANU PART NUM                                                                                                                                 | MANU          | Qty | REF Designators                             | Description                                                    |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----|---------------------------------------------|----------------------------------------------------------------|
| 29                                      | 95947A018                                                                                                                                     | MCMaster-CARR | 4   | STANDOFFS                                   | STANDOFF M3x25mm 4.5mm DIA HEX ALUM F-F ROHS                   |
| 30                                      | 92148A150                                                                                                                                     | MCMaster-CARR | 4   | STANDOFF WASHERS                            | WASHER SPLIT-LOCK M3 6.2mm OD 0.7mm THICK STAINLESS STEEL ROHS |
| 31                                      | 92000A118                                                                                                                                     | MCMaster-CARR | 4   | STANDOFF SCREWS                             | SCREW M3x8 PHILIPS PANHEAD STAINLESS STEEL ROHS                |
| 32                                      | 969102-0000-DA                                                                                                                                | 3M            | 9   | AM0, AM1, AM2, JP1, JP2, JP3, JP4, JP5, JP6 | SHUNT BLACK AU FLASH 0.100LS OPEN TOP ROHS                     |
|                                         |                                                                                                                                               | TOTAL         | 109 |                                             |                                                                |
| 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. |               |     |                                             |                                                                |

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