

TAS5036REF

**Reference Design for the TAS5036 Digital Audio
PWM Processor**

User's Guide

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Dallas, Texas 75265

Read This First

About This Manual

This manual describes the operation of the TAS5036REF evaluation module from Texas Instruments.

How to Use This Manual

This document contains the following chapters:

- Chapter 1 – Introduction
- Chapter 2 – System Interfaces
- Chapter 3 – Schematic, Parts List, PCB Specification, and PCB Layout

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This book may contain cautions and warnings.

This is an example of a caution statement.

A caution statement describes a situation that could potentially damage your software or equipment.

This is an example of a warning statement.

A warning statement describes a situation that could potentially cause harm to you.

The information in a caution or a warning is provided for your protection. Please read each caution and warning carefully.

Related Documentation From Texas Instruments

The following is a list of data manual that have detailed descriptions of the integrated circuits used in the design of the TAS5036REF evaluation module. The data manuals can be obtained at the URL <http://www.ti.com>.

Part Number	Literature Number
TAS5036APFB	SLES061
SN74LVC2G08DCTR	SCES198
SN74LVC08APWR	SCAS283
SN74LVC126APWR	SCAS339
TPA112DGN	SLOS212

Trademarks

Equibit is a trademark of Texas Instruments.

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Introduction

The true digital audio amplifiers (TDAA) system consists of a PCM-PWM modulator device and a PWM power output device. The PCM-PWM processor accepts a serial PCM digital audio stream and converts it to a 3.3-V PWM audio stream. The TDAA output stage provides a large-signal PWM output. The digital PWM signal is then demodulated, providing power output for driving loudspeakers. This patented technology provides low cost, high quality, highly efficient digital audio applicable to many audio systems developed for the digital age.

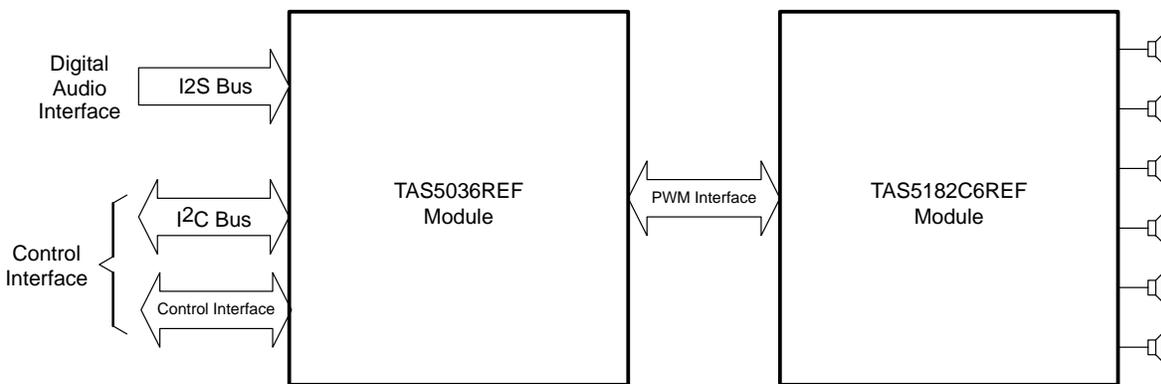
The TAS5036REF reference design demonstrates the integrated circuit TAS5036A from Texas Instruments (TI). The TAS5036A is a 24-bit multichannel digital pulse width modulator based on Equibit™ technology. The TAS5036A is designed to drive up to six digital power devices to provide six channels of digital audio amplification. The digital power devices can be conventional monolithic power stages or discrete differential power stages using gate drivers (like TAS5182) and MOSFETs.

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1.3 Jumper Settings	1-3

The TAS5036A has six independent volume controls with soft volume and mute. The TAS5036A supports bridged output configurations. The device operates in BD mode (three-level modulation). This all-digital audio system contains only two analog components in the signal chain – an LC low-pass filter at each speaker terminal. The TAS5036A provides up to 100-dB SNR at the speaker terminals, dependent on design and optimization. The TAS5036A has a wide variety of serial input options including right justified (16, 20, or 24 bit), I2S (16, 20, or 24 bit), left justified, or DSP (16 bit) data formats. It is fully compatible with AES standard sampling rates of 44.1 kHz, 48 kHz, 88.2 kHz, and 96 kHz including de-emphasis for 44.1-kHz and 48-kHz sample rates, and supports 32-kHz, 172.4-kHz, and 192-kHz sample frequencies. The TAS5036A plus TAS51xx power stage device combination can be used in a wide range of applications such as microcomponent systems, home theater in a box (HTIB), DVD receivers, or A/V receivers.

Together with the TAS5182C6REF module, the TAS5036REF module is a complete true digital audio amplifier system, which includes digital volume control, headphone amplifier, and a subwoofer output.

Figure 1–1. TDAA System With TAS5036REF and TAS5182C6REF Reference Designs



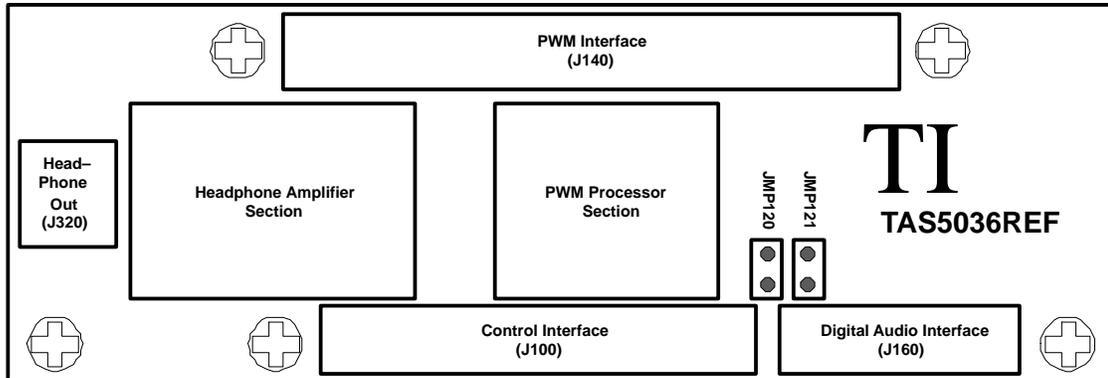
1.1 TAS5036REF Features

- Six channel TDAA reference design (double-sided plated-through PCB layout)
- Supports noiseless self-contained protection system (short circuit and thermal) for the TAS5110 and the TAS5182 output stages. The autorecovery loop is closed when JMP120 and JMP121 are shorted.
- Onboard headphone amplifier

1.2 PCB Key Map

The physical structure for the TAS5036REF is illustrated in Figure 1–2.

Figure 1–2. Physical Structure for the TAS5036REF (Rough Outline)



1.3 Jumper Settings

Together with the TAS5100/TAS5110/TAS5182 PWM output stages from Texas Instruments, the TAS5036REF module can be configured in auto-recovery mode (closed loop). The $\overline{\text{SHUTDOWN}}$ signal(s) from the output stage is connected to error recovery at the PWM processor when JMP120 and JMP121 are shorted.

The autorecovery loop has to be disabled when the modulator board is connected to an output stage module with autorecovery on-chip (e.g. the TAS5111 and the TAS5112 reference modules). Autorecovery is disabled when JMP120 and JMP 121 are removed.



System Interfaces

This chapter describes the TAS5036REF system interfaces.

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2.1 Digital Audio Interface (J160)

The digital audio interface contains digital audio signal data (I2S), clocks, etc. See the TAS5036A data manual, SLES061, for signal timing and details not explained in this document.

Table 2–1. Digital Audio Interface Pin Connections

Pin No.	Net Name	Description
01	GND	Ground
02	MCLK-IN	Not used
03	GND	Ground
04	SDIN1	I2S data 1, channel 1 and 2 (left and right front speakers)
05	SDIN2	I2S data 2, channel 3 and 4 (left and right rear speakers)
06	SDIN3	I2S data 3, channel 5 and 6 (center speaker subwoofer)
07	GND	Ground
08	GND	Ground
09	GND	Ground
10	GND	Ground
11	SCLK	I2S bit clock (64xFs) used to shift in serial data from SIN1, SDIN2, and SDIN3. SDATA is sampled with the rising edge of the SCLK. The I2S format can be changed in the I ² C registers.
12	GND	Ground
13	LRCLK	Left/right clock (Fs) used to indicate left/right data being transmitted in SDATA. The left channel is transmitted when LRCLK is low and the right channel is transmitted when LRCLK is high.
14	GND	Ground
15	Not used	For future use
16	GND	Ground

Table 2–2. Clock Rates

	Sample Frequency	LRCLK (Fs)	SCLK (64 × Fs)	MCLK
Normal Speed MCLK = 256 × Fs	32 kHz	32 kHz	2.048 MHz	8.192 MHz
	44.1 kHz	44.1 kHz	2.8224 MHz	11.2896 MHz
	48 kHz	48 kHz	3.072 MHz	12.288 MHz
Double Speed MCLK = 256 × Fs	64 kHz	64 kHz	4.096 MHz	16.384 MHz
	88.2 kHz	88.2 kHz	5.6448 MHz	22.5792 MHz
	96 kHz	96 kHz	6.144 MHz	24.576 MHz
Quad Speed MCLK = 128 × Fs	176.4 kHz	176.4 kHz	11.2896 MHz	22.579 MHz
	192 kHz	192 kHz	12.288 MHz	24.576 MHz

2.2 Control Interface (J100)

The control interface connects the TAS5036A board to the microcontroller section.

Table 2–3. Control Interface Pin Connections

Pin No.	Net Name	Description															
01	GND	Ground															
02	V-HBRIDGE-CONTROL	Not used															
03	GND	Ground															
04	$\overline{\text{RESET}}$	System reset (bidirectional). The TAS5036A enters a 4-ms initiation sequence before PWM signals are present at the output. If a quit reset is desired, $\overline{\text{MUTE}}$ should be asserted low before applying $\overline{\text{RESET}}$.															
05	$\overline{\text{SOFT-RESET}}$	TAS5036A error recovery (active low). Enables the user to enter a reset state click and pop free without resetting the I ² C (volume) register settings. Both soft and hard resets stop the output stage from switching and brings it into a low-low state, meaning the low-side MOSFET in both half bridges is ON.															
06	$\overline{\text{MUTE}}$	$\overline{\text{MUTE}}$ (active low) ramps the volume from any setting to noiseless soft mute. Alternatively, the mute mode can also be initiated through the serial control interface (I ² C).															
07	$\overline{\text{POWER-DOWN}}$	$\overline{\text{POWER-DOWN}}$ (active low) places the TAS5036A in power-down mode. During power down, all I ² C and data bus operations are ignored. If a quit power down is desired, $\overline{\text{MUTE}}$ should be asserted low before applying $\overline{\text{RESET}}$.															
08	Not used																
09	Not used																
10	SDA	I ² C data clock															
11	GND	Ground															
12	SCL	I ² C bit clock															
13	Not used																
14	I ² C-ADDRESS-SELECT	TAS5036 I ² C address select: <table border="0" style="margin-left: 20px;"> <tr> <td></td> <td>Pin Level</td> <td>I²C Address</td> </tr> <tr> <td></td> <td>Low</td> <td>1Ah</td> </tr> <tr> <td></td> <td>High</td> <td>1Bh</td> </tr> </table>		Pin Level	I ² C Address		Low	1Ah		High	1Bh						
	Pin Level	I ² C Address															
	Low	1Ah															
	High	1Bh															
15	DOUBLE-SPEED	DOUBLE-SPEED (active high) is used to support sampling rates of 88.2 kHz and 96 kHz. Alternatively, the double-speed mode can also be initiated through the serial control interface (I ² C).															
16	$\overline{\text{CLIP}}$	Digital clipping indicator (active low)															
17	GND	Ground															
18	DEM-SEL2	De-emphasis filter select bit 1 <table border="0" style="margin-left: 20px;"> <tr> <td>DEM-SEL2</td> <td>DEM-SEL1</td> <td>MODE</td> </tr> <tr> <td>0</td> <td>0</td> <td>De-emphasis disabled</td> </tr> <tr> <td>0</td> <td>1</td> <td>De-emphasis enabled for Fs = 32 kHz</td> </tr> <tr> <td>1</td> <td>0</td> <td>De-emphasis enabled for Fs = 44.1 kHz</td> </tr> <tr> <td>1</td> <td>1</td> <td>De-emphasis enabled for Fs = 48 kHz</td> </tr> </table>	DEM-SEL2	DEM-SEL1	MODE	0	0	De-emphasis disabled	0	1	De-emphasis enabled for Fs = 32 kHz	1	0	De-emphasis enabled for Fs = 44.1 kHz	1	1	De-emphasis enabled for Fs = 48 kHz
DEM-SEL2	DEM-SEL1	MODE															
0	0	De-emphasis disabled															
0	1	De-emphasis enabled for Fs = 32 kHz															
1	0	De-emphasis enabled for Fs = 44.1 kHz															
1	1	De-emphasis enabled for Fs = 48 kHz															

Table 2–4. J100 Pin Description (Continued)

Pin No.	Net Name	Description
19	DEM-SEL1	De-emphasis filter select bit 1
20	$\overline{\text{SD-E1}}$	Shutdown error reporting group 1. The TAS51XX digital output stages (channel 1, 2, and 5) assert this signal low when an internal error occurs. This can be due to either an overtemperature protection or an overcurrent event.
21	$\overline{\text{SD-E2}}$	Shutdown error reporting group 2. The TAS51XX digital output stages (channel 3, 4, and 6) assert this signal low when an internal error occurs. This can be due to either an overtemperature protection or an overcurrent event.
22	$\overline{\text{ERROR0}}$	Error reporting 0 (ERR0 from the TAS51XX output stages)
23	$\overline{\text{ERROR1}}$	Error reporting 1 (ERR1 from the TAS51XX output stages)
24	$\overline{\text{HEADPHONE-DISABLE}}$	<p>Headphone control</p> <p>Headphone enable sequence</p> <ol style="list-style-type: none"> 1. Mute all channels (register address 03h) 2. $\overline{\text{HEADPHONE-DISABLE}}$ is asserted high. 3. Individual channel mute of channels 3–6 (register address 19h). 4. Unmute all channels (register address 03h). <p>Headphone disable sequence</p> <ol style="list-style-type: none"> 1. Mute all channels (register address 03h) 2. $\overline{\text{HEADPHONE-DISABLE}}$ is asserted low. 3. Unmute of channels 3–6 (register address 19h). 4. Unmute all channels (register address 03h). <p>Headphone disable mode</p> <ol style="list-style-type: none"> 0 Headphone output disabled. 1 Output stage channel 1 and 2 is muted. Channel 3, 4, 5, and 6 should be muted through the I²C interface.
25	GND	Ground
26	GND	Ground
27	Not used	For future use
28	Not used	For future use
29	Not used	For future use
30	Not used	For future use
31	GND	Ground
32	GND	Ground
33	+5V	Power supply (out)
34	+5V	Power supply (out)

2.3 PWM Interface (J140)

This interface connects the TAS5036REF board to the output stage module.

Figure 2–1. Pin Numbers at PWM Interface (J140)

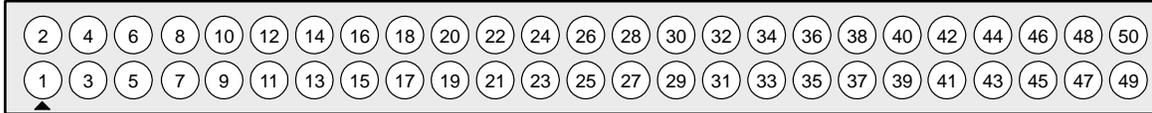


Table 2–4. J140 Pin Description

Pin No.	Net Name	Description
01	V-HBRIDGE-CONTROL	For future use
02	GND	Ground
03	PWM-AP-1	Channel 1 PWM input (differential +) – positive H-bridge side
04	PWM-AM-1	Channel 1 PWM input (differential –) – positive H-bridge side
05	$\overline{\text{VALID}}-1$	Valid channel 1
06	PWM-BM-1	Channel 1 PWM input (differential –) – negative H-bridge side
07	PWM-BP-1	Channel 1 PWM input (differential +) – negative H-bridge side
08	GND	Ground
09	PWM-AP-2	Channel 2 PWM input (differential +) – positive H-bridge side
10	PWM-AM-2	Channel 2 PWM input (differential –) – positive H-bridge side
11	$\overline{\text{VALID}}-2$	Valid channel 2
12	PWM-BM-2	Channel 2 PWM input (differential –) – negative H-bridge side
13	PWM-BP-2	Channel 2 PWM input (differential +) – negative H-bridge side
14	GND	Ground
15	PWM-AP-3	Channel 3 PWM input (differential +) – positive H-bridge side
16	PWM-AM-3	Channel 3 PWM input (differential –) – positive H-bridge side
17	$\overline{\text{VALID}}-3$	Valid channel 3
18	PWM-BM-3	Channel 3 PWM input (differential –) – negative H-bridge side
19	PWM-BP-3	Channel 3 PWM input (differential +) – negative H-bridge side
20	GND	Ground
21	PWM-AP-4	Channel 4 PWM input (differential +) – positive H-bridge side
22	PWM-AM-4	Channel 4 PWM input (differential –) – positive H-bridge side
23	$\overline{\text{VALID}}-4$	Valid channel 4
24	PWM-BM-4	Channel 4 PWM input (differential –) – negative H-bridge side
25	PWM-BP-4	Channel 4 PWM input (differential +) – negative H-bridge side
26	GND	Ground
27	PWM-AP-5	Channel 5 PWM input (differential +) – positive H-bridge side

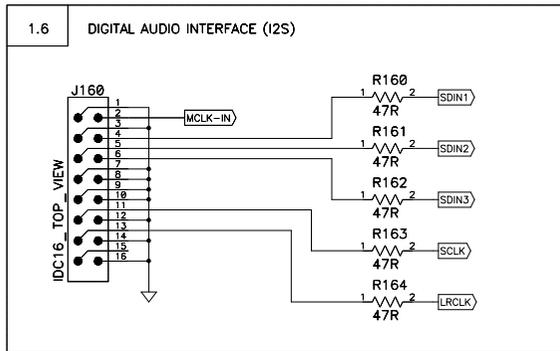
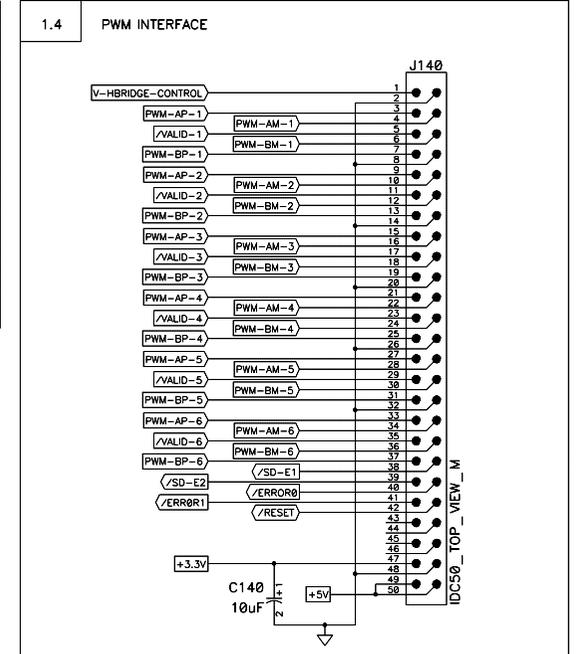
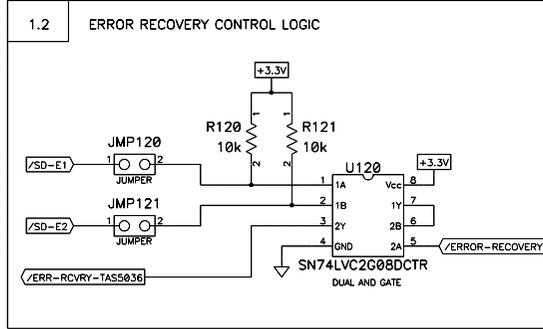
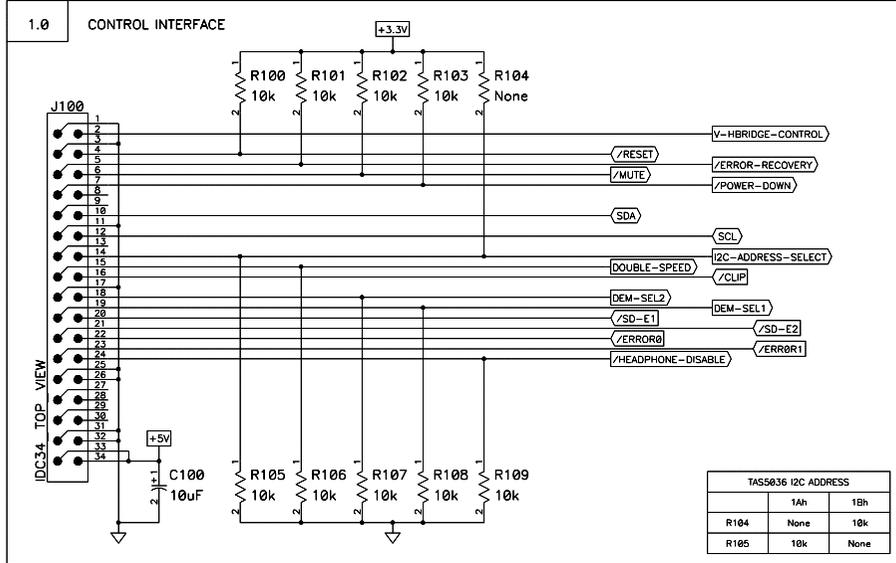
Table 2–4. J100 Pin Description (Continued)

Pin No.	Net Name	Description
28	PWM-AM-5	Channel 5 PWM input (differential –) – positive H-bridge side
29	$\overline{\text{VALID}}\text{-5}$	Valid channel 5
30	PWM-BM-5	Channel 5 PWM input (differential –) – negative H-bridge side
31	PWM-BP-5	Channel 5 PWM input (differential +) – negative H-bridge side
32	GND	Ground
33	PWM-AP-6	Channel 6 PWM input (differential +) – positive H-bridge side
34	PWM-AM-6	Channel 6 PWM input (differential –) – positive H-bridge side
35	$\overline{\text{VALID}}\text{-6}$	Valid channel 6
36	PWM-BM-6	Channel 6 PWM input (differential –) – negative H-bridge side
37	PWM-BP-6	Channel 6 PWM input (differential +) – negative H-bridge side
38	$\overline{\text{SD}}\text{-E1}$	Shutdown group 1 (center + left and right front speakers)
39	$\overline{\text{SD}}\text{-E2}$	Shutdown group 2 (subwoofer + left and right rear speakers)
40	$\overline{\text{ERROR}}\text{0}$	Error signal ERR0 from TAS5182
41	$\overline{\text{ERROR}}\text{1}$	Error signal ERR1 from TAS5182
42	$\overline{\text{RESET}}$	System reset (bidirectional)
43	PSU-COMP-2	For future use
44	PSU-COMP-1	For future use
45	Not Used	For future use
46	Not Used	For future use
47	+3.3V	3.3-V supply voltage for the modulator module (e.g., the TAS5026REF)
48	GND	Ground
49	+5V	5-V supply voltage
50	+5V	5-V supply voltage

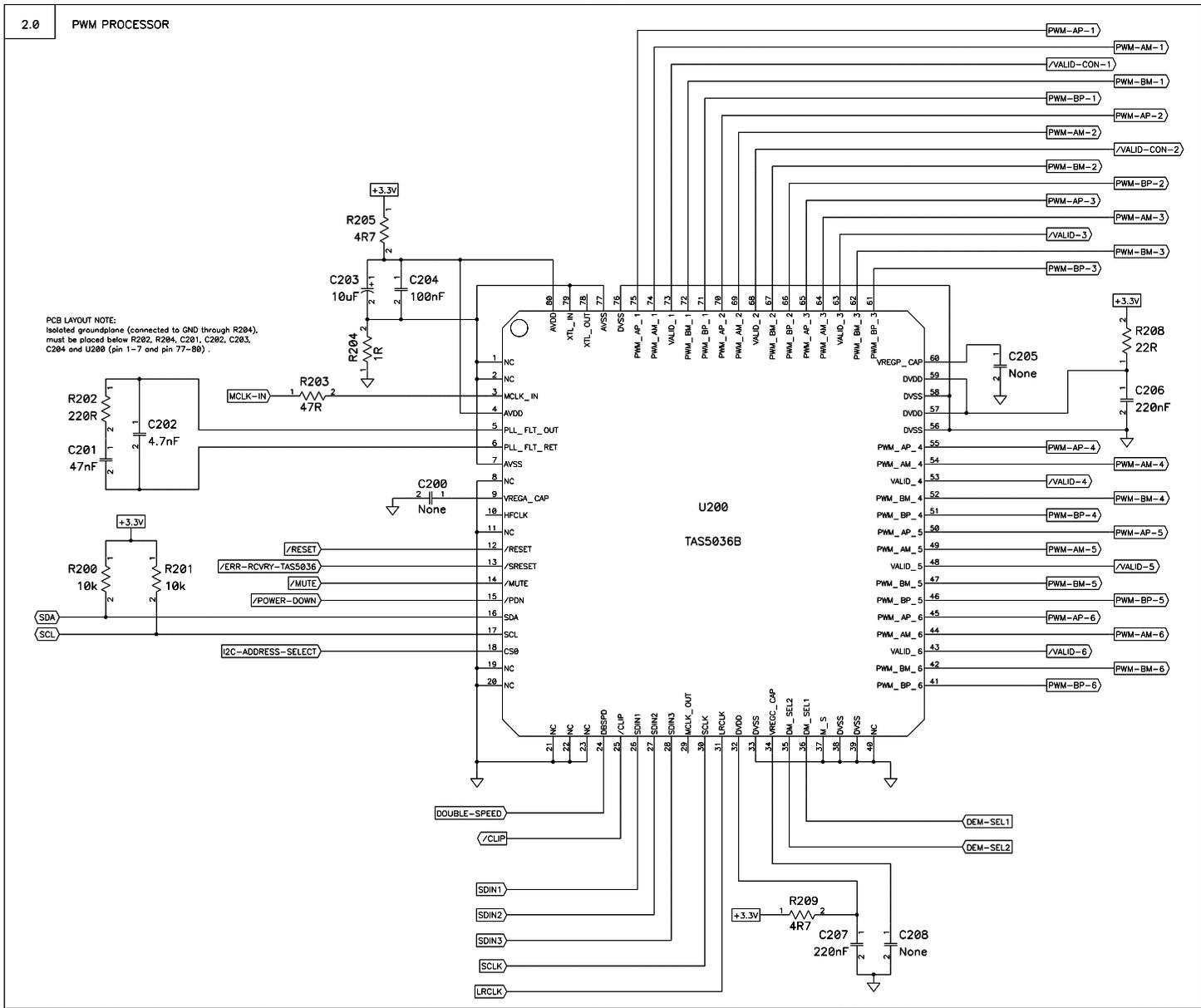
Schematic, Parts List, PCB Specification, and PCB Layout

The chapter contains the schematic, parts list, PCB specification, and PCB layout for the TAS5036REF.

Input & Output Section



TAS5036 Section



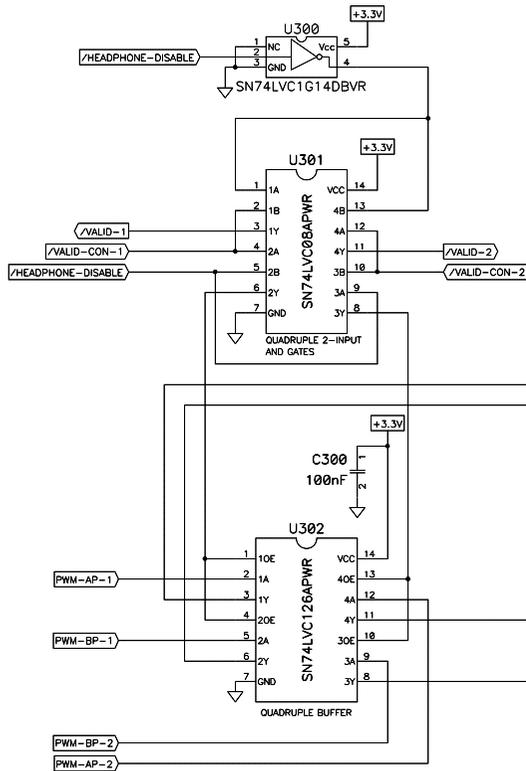
2.0 PWM PROCESSOR

PCB LAYOUT NOTE:
Isolated groundplane (connected to GND through R204),
must be placed below R202, R204, C201, C202, C203,
C204 and U200 (pin 1-7 and pin 77-80).

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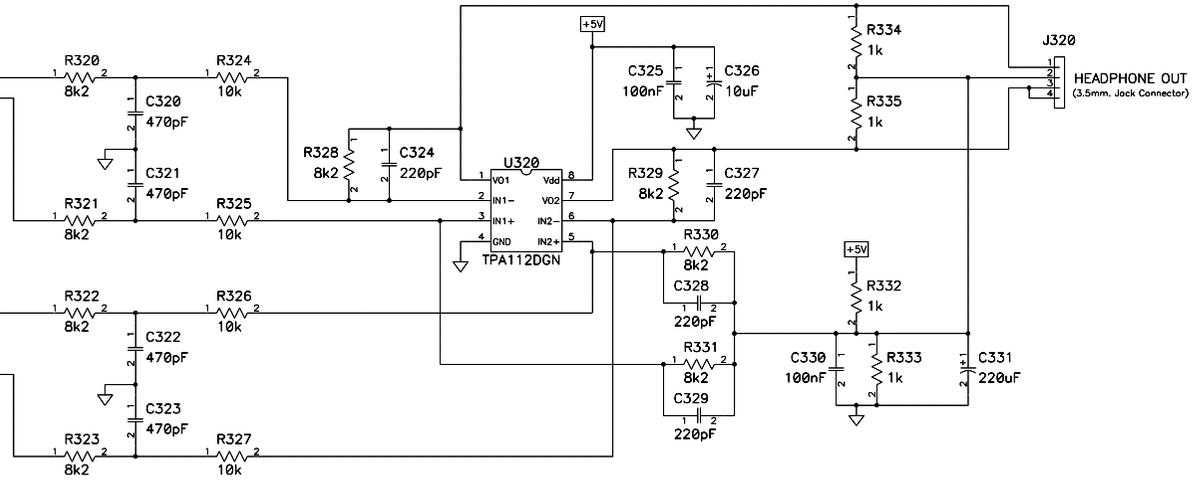
Headphone Amplifier Section

3.0 INPUT BUFFER & CONTROL LOGIC



3.2 LOWPASS FILTER & OUTPUT AMPLIFIER

Gain = -7dB (0.45X)
 -0.5dB@20kHz
 -3.0dB@54kHz
 -25dB@350kHz



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Ref Des	Part Number	Description	Housing	Manufacturer	Manufacturer Part Number
C100	200041060	10uF 16V 20% LYT	LY4x5SMD	Panasonic	ECE V 1C A 100 SR
C140	200041060	10uF 16V 20% LYT	LY4x5SMD	Panasonic	ECE V 1C A 100 SR
C200	Not used	Not used			
C201	200054730	47nF 16V 20% X7R	0603	KEMET	C0603C473M2RAC
C202	200054720	4.7nF 50V 20% X7R	0603	KEMET	C0603C473M5RAC
C203	200041060	10uF 16V 20% LYT	LY4x5SMD	Panasonic	ECE V 1C A 100 SR
C204	200051040	100nF 16V 20% X7R	0603	KEMET	C0603C104M4RAC
C205	Not used	Not used			
C206	200052240	220nF 10V 10% X7R	0603	Phycomp	223824615654
C207	200052240	220nF 10V 10% X7R	0603	Phycomp	223824615654
C208	Not used	Not used			
C300	200051040	100nF 16V 20% X7R	0603	KEMET	C0603C104M4RAC
C320	200064710	470pF 10% 50V NPO	0603	KEMET	C0603C471K5GAC
C321	200064710	470pF 10% 50V NPO	0603	KEMET	C0603C471K5GAC
C322	200064710	470pF 10% 50V NPO	0603	KEMET	C0603C471K5GAC
C323	200064710	470pF 10% 50V NPO	0603	KEMET	C0603C471K5GAC
C324	200062210	220pF 10% 50V NPO	0603	KEMET	C0603C221K5GAC
C325	200051040	100nF 16V 20% X7R	0603	KEMET	C0603C104M4RAC
C326	200041060	10uF 16V 20% LYT	LY4x5SMD	Panasonic	ECE V 1C A 100 SR
C327	200062210	220pF 10% 50V NPO	0603	KEMET	C0603C221K5GAC
C328	200062210	220pF 10% 50V NPO	0603	KEMET	C0603C221K5GAC
C329	200062210	220pF 10% 50V NPO	0603	KEMET	C0603C221K5GAC
C330	200051040	100nF 16V 20% X7R	0603	KEMET	C0603C104M4RAC
C331	200042270	220uF 6.3V 20% LYT	LY8x9SMD	Panasonic	EEV F C0 J 221 P
C332	Deleted	Deleted			
C333	Deleted	Deleted			
J100	700820340	Box Header straight 34 pin 2.54mm	IDC34	Multicomp	MC9A12-3434
J140	700820500	Box Header straight 50 pin 2.54mm	IDC50	Multicomp	MC9A12-5034
J160	700820160	Box Header straight 16 pin 2.54mm	IDC16	Multicomp	MC9A12-1634
J320	700353520	Stereo 3.5mm JACK socket		Schurter	4832.2320
JMP120	700100020	2 pin 2.54mm Pitch Header	MX2SI	Molex	90120-0122
JMP121	700100020	2 pin 2.54mm Pitch Header	MX2SI	Molex	90120-0122
PCB	900116511	P165-PCB-001(2.00)		Printline	P165-PCB-001(2.00)
R100	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R101	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R102	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R103	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R104	Not used	Not used			

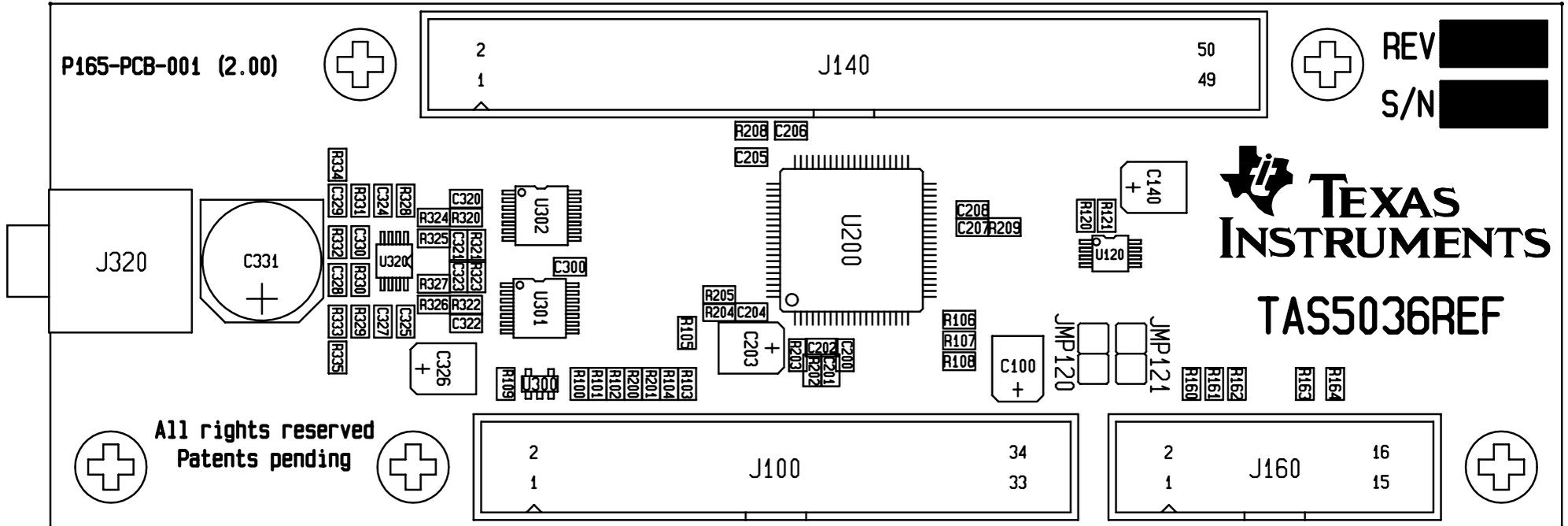
Ref Des	Part Number	Description	Housing	Manufacturer	Manufacturer Part Number
R105	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R106	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R107	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R108	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R109	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R120	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R121	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R160	100247090	47R0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 47R0
R161	100247090	47R0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 47R0
R162	100247090	47R0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 47R0
R163	100247090	47R0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 47R0
R164	100247090	47R0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 47R0
R200	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R201	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R202	100222000	220R 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 220R
R203	100247090	47R0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 47R0
R204	100210080	1R0 5% 300ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 1R0
R205	100247080	4R70 5% 300ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 4R70
R206	Deleted	Deleted			
R207	Deleted	Deleted			
R208	100222090	22R 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 22R
R209	100247080	4R70 5% 300ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 4R70
R320	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R321	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R322	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R323	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R324	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R325	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R326	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R327	100210020	10k0 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 10k0
R328	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R329	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R330	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R331	100282010	8k20 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 -00 5% PA 8k20
R332	100210010	1k00 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 1k00
R333	100210010	1k00 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 1k00
R334	100210010	1k00 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 1k00
R335	100210010	1k00 5% 200ppm 100mW metalfilm	0603	BC Components	DCT 0603 - 00 5% PA 1k00

Ref Des	Part Number	Description	Housing	Manufacturer	Manufacturer Part Number
SHUNT120	700110210	Black 2.54mm Shunt		Molex	15-29-1024
SHUNT121	700110210	Black 2.54mm Shunt		Molex	15-29-1024
U120	520140083	Dual AND gate, LVC	MSOP8	Texas Instruments	SN74LVC2G08DCTR
U200	500050362	6 ch PWM processor (BD, VOL, 192kHz)	TQFP80	Texas Instruments	TAS5036BPFB
U300	520140140	Single Schmitt-Trigger Inverter, LVC	SOT23-5	Texas Instruments	SN74LVC1G14DBVR
U301	520140081	Quad AND gate, LVC	TSSOP14	Texas Instruments	SN74LVC08APWR
U302	520141262	Quad Buffer with output enable, LVC	TSSOP14	Texas Instruments	SN74LVC126APWR
U320	510101121	150mW Stereo Power Amplifier	MSOP8	Texas Instruments	TPA112DGN

TAS5036REF PCB SPECIFICATION

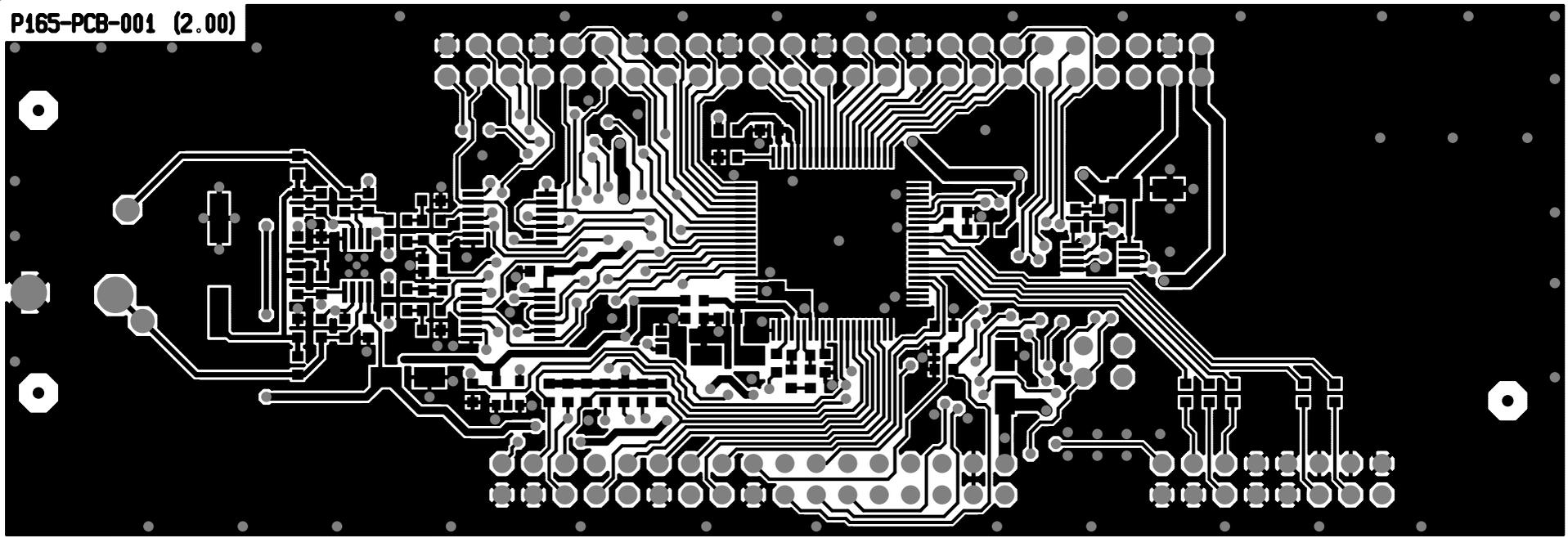
BOARD IDENTIFICATION:	P165-PCB-001 (2.00)
BOARD TYPE:	DOUBLE-SIDED PLATED-THROUGH BOARD
LAMINATE TYPE:	FR4
LAMINATE THICKNESS:	1.6 mm
COPPER THICKNESS:	35 μ m (INCL. PLATING EXTERIOR LAYER)
COPPER PLATING OF HOLES:	>25 μ m
MINIMUM HOLE DIAMETER	0.3 mm
SILKSCREEN COMPONENT SIDE:	WHITE - REMOVE SILKSCREEN FROM SOLDER AREA & PRE-TINNED AREAS
SILKSCREEN SOLDER SIDE:	None
SOLDER MASK COMPONENT SIDE:	GREEN
SOLDER MASK SOLDER SIDE:	GREEN
PROTECTIVE COATING:	SOLDER COATING AND CHEMICAL SILVER ON FREE COPPER
ELECTRICAL TEST:	PCB MUST BE ELECTRICAL TESTED
MANUFACTURED TO:	PERFAG 2E (www.perfag.dk)
APERTURE TABLE:	PERFAG 10A (www.perfag.dk)
BOARD SIZE:	127 x 44 mm

COMP. LAYOUT COMP	DpS 4804 021008
TI Copenhagen P165-PCB-001	(2.00)

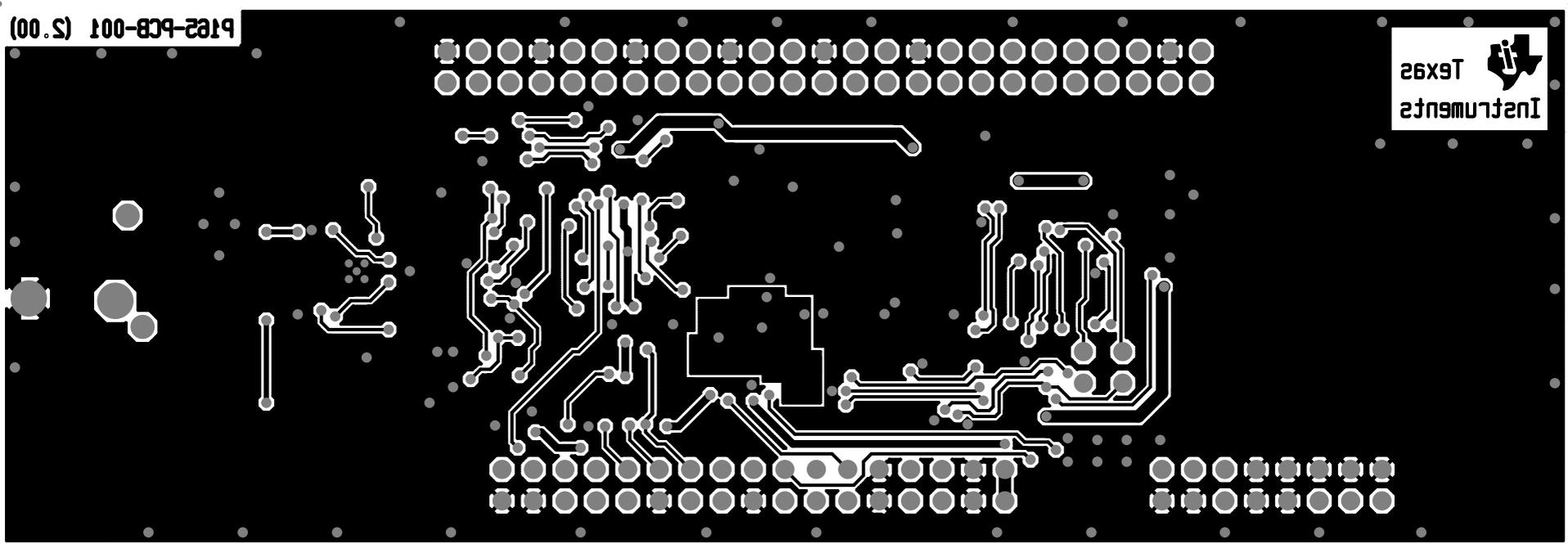


COMPONENT SIDE	DpS 4804 021008
TI Copenhagen P165-PCB-001 (2.00)	

P165-PCB-001 (2.00)

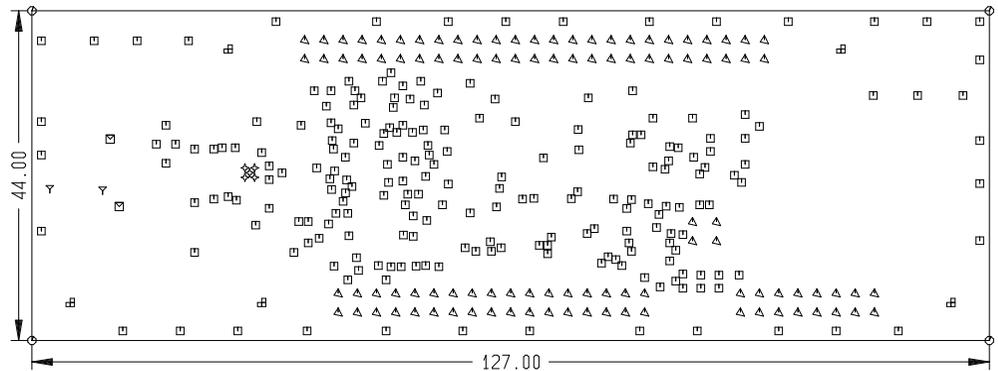


800150 4084 2q0	20LDER 2IDE
(00.S) 100-8CB-001	TI C0b0rnu0g0u P102-PCB-001



DRILL INFORMATION	dps 4804 021008
TI Copenhagen P165-PCB-001 (2.00)	

✦ T1 VH DIA = 0.3 QTY = 5
 ◻ T2 VH DIA = 0.5 QTY = 218
 ▲ T3 PTH DIA = 1 QTY = 104
 ◻ T4 PTH DIA = 1.5 QTY = 2
 ▼ T5 PTH DIA = 2.1 QTY = 2
 ▣ T6 PTH DIA = 3.3 QTY = 5
 ○ T7 NP DIA = 0.05 QTY = 4



DRILL CODE