

TAS1020AEVM

Evaluation Module for the TAS1020A

User's Guide

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the specified input and output ranges described in the EVM User's Guide.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 60°C. The EVM is designed to operate properly with certain components above 60°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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Read This First

About This Manual

This manual describes the operation of the TAS1020A evaluation module from Texas Instruments.

How to Use This Manual

This document contains the following chapters:

- ☐ Chapter 1—Introduction
- ☐ Chapter 2—EVM Operation Overview

Information About Cautions and Warnings

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.

FCC Warning

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

Related Documentation From Texas Instruments

The following is a list of data manuals that have detailed descriptions of the integrated circuits used in the design of the TAS1020A EVM. These data manuals can be obtained at the URL <http://www.ti.com>

Part Number	Literature Number
☐ TAS1020A	SLES003
☐ TLV320AIC27	SLAS253
☐ SN74LVTH244A	SCAS586
☐ SN74LV4737A	SLLS178
☐ SN74CBT3245A	SCDS002
☐ SN75HC540	SCLS007
☐ TPS7233	SLVS102
☐ TLV2362	SLOS195

TAS1020A EVM Kit Contents

TAS1020A EVM is shipped with the following:

- 1) TAS1020AEVM Evaluation Module
- 2) TAS1020AEVM CD. The CD contains the following:
 - a) TAS1020A Data Manual
 - b) TAS1020AEVM User's Guide
 - c) TAS1020AEVM Schematic
 - d) TAS1020AEVM Bill of Materials
 - e) TAS1020AEVM PCB
 - f) TAS1020AEVM Gerber Files
 - g) DFU Software
- 3) TAS1020A Data Manual
- 4) TAS1020AEVM User's Guide
- 5) Cover Letter
- 6) Contact List

Emulator and Compiler Information

The emulator hardware should consist of a PC card, an interface cable, and an emulator pod. These components may or may not be sold independently depending on the vendor. The emulator software should include everything required to run the hardware. For emulator from Nohau, visit web-site <http://www.nohau.com>. For emulator software from Phytion, visit web-site <http://www.phytion.com>. Emulator operation must be 3.3 V.

TI example code is provided in the EEPROM on-board. See the cover letter for instructions on getting the source code. All TI example code is written in C++. An 8051 C++ to assembly code compiler is a very useful tool. It is recommended to check the compiler and the emulator for compatibility before making a selection. For more information on the Keil C compiler, please visit web-site <http://www.keil.com/c51>.

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- Gerber—Bottom Silkscreen
- Gerber—Fab Notes
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- Gerber—Copper Layer 3
- Gerber—Copper Layer 4
- Gerber—Copper Layer 5
- Gerber—Copper Layer 6
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Introduction

The TAS1020A evaluation module (EVM) is based on the TI TAS1020A integrated circuit (IC). The TAS1020A IC is a universal serial bus (USB) peripheral interface device designed specifically for applications that require isochronous data streaming, e.g., streaming of digital audio data between the host PC and the speaker system via the USB connection. The TAS1020A fully complies with the USB specification version 1.1 and the USB audio class specification.

The TAS1020A uses a standard 8052 microcontroller unit (MCU) core with on-chip memory to handle all data transfer. A full explanation of how to configure the TAS1020A to control the streaming data and set up the interface ports and registers is specified in the TAS1020A data manual. The Preface tells how to obtain the data manual.

The TAS1020A EVM is designed to allow development and evaluation of the TAS1020A for controlling streams of data. The TAS1020A accepts USB data streams and generates audio streams using common audio protocols at the codec port. This programmable port allows the audio data to be output as AC-Link, IIS, AIC, or a general-purpose mode.

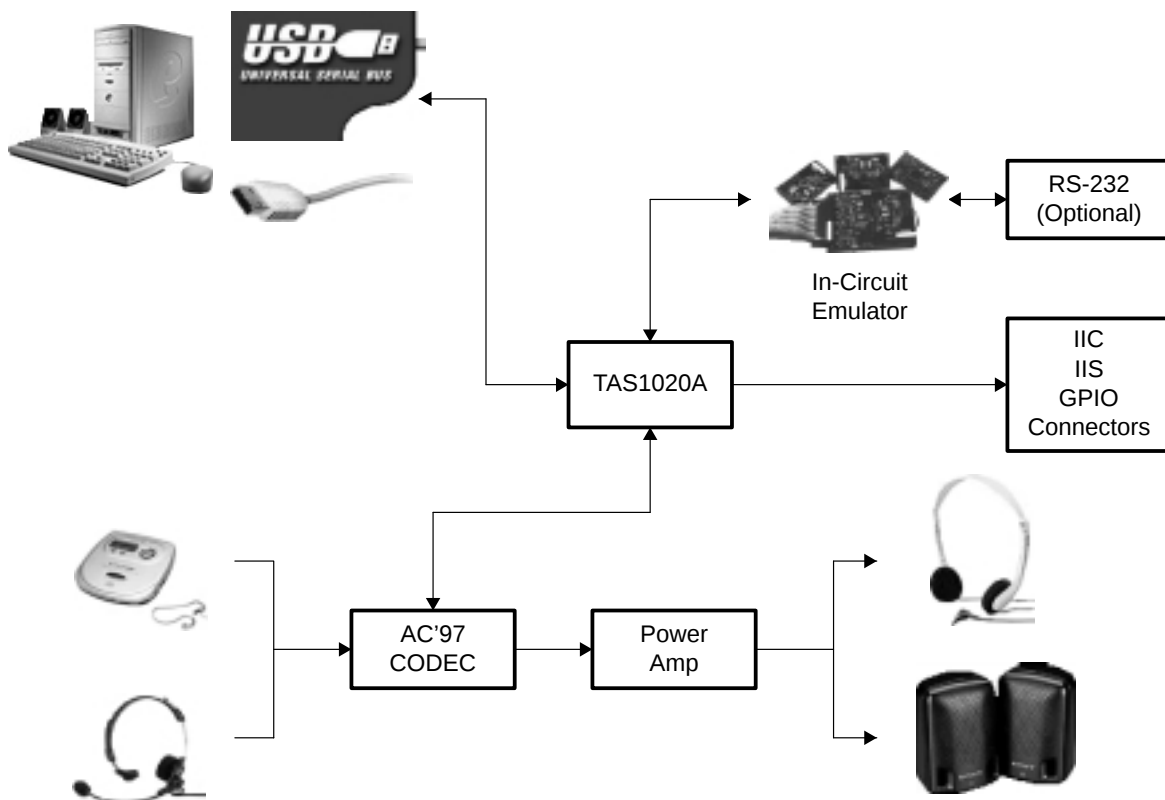
Additional features on the TAS1020A EVM board are:

- ☐ *Microphone input* can be used with external microphone.
- ☐ *Line input* for CD or any other analog input, musical device.
- ☐ *Audio amplifier* can be used with any PC speakers.
- ☐ *In-circuit emulator* circuit is primarily used for firmware development and debugging.
- ☐ The TAS1020A EVM also includes connectors that enable the use of alternative audio codecs. The firmware included with the EVM does not support codecs other than the AC'97 codec provided.
- ☐ *Rear channels*. The EVM is capable of playing four channels with the appropriate firmware. The firmware included with the EVM does not support four-channel output.

- ❑ *RS-232 circuit.* This circuit is optional. There are customers who use this circuit to communicate with the EVM. The firmware included with the EVM does not support this circuit.

Digital audio sources such as those from a PC CD player, Windows™ Media Player or other PC audio applications on the host stream data to the TAS1020A USB interface via USB. The TAS1020A converts this data to AC'97 format and transfers the data to the AC'97 codec. The AC'97 codec takes the digital data and converts it to analog. The analog data is then amplified and output to the mini-stereo 3,5 mm jack. The voice data from the microphone can be recorded and stored in the host PC. See Figure 1–1 for top level description of the TAS1020A functions.

Figure 1–1. TAS1020A EVM Block Diagram



EVM Board Operation

This chapter describes an overview of the TAS1020A EVM board operation.

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2.1 Photographs of TAS1020A EVM

Figure 2–1. TAS1020A EVM Top View



Figure 2–2. TAS1020A EVM Bottom View



2.2 Jumper Settings

There are four jumpers on the EVM.

- ☐ JP1 is used to set power input to the EVM. If JP1 is shunted pin 1 to pin 2, the EVM is powered through the USB bus. If JP1 is shunted pin 2 to pin 3, a +9 Vdc power supply is needed to power the EVM.
- ☐ JP2 is used to enable signals going to the AC'97 codec. During normal operation, JP2 is in. This allows the signals to go to the AC'97 codec. When using signals from connectors JB1 and JB2, it is recommended to remove JP2. Operation for JB1 and JB2 connectors will be discussed in the subsequent section.
- ☐ JP3 is used to put the TAS1020A either in internal mode or in external mode. In internal mode, the application code is downloaded from the EPROM. In external mode, the TAS1020A MCU is disabled and logic in the TAS1020A allows the external/MCU to read/write the registers to control the TAS1020A. If JP3 is shunted pin 1 to pin 2, the TAS1020A is in external mode. If JP3 is shunted pin 2 to pin 3, the TAS1020A is in internal mode.
- ☐ JP4 is used to generate external interrupt. When JP4 is in, an external interrupt is generated. In the external interrupt mode, the XINT pin is pulled low. External interrupt can also be used as a remote wake-up signal.

Choose one of the following jumper configurations before applying power to the EVM:

Table 2–1. Jumper Configurations

Normal/internal, external power	JP1 pin 2–3	JP2 IN	JP3 pin 2–3	JP4 OUT
Normal/internal, bus power	JP1 pin 1–2	JP2 IN	JP3 pin 2–3	JP4 OUT
Emulator/external, external power	JP1 pin 2–3	JP2 IN	JP3 pin 1–2	JP4 OUT
Emulator/external, bus power	JP1 pin 1–2	JP2 IN	JP3 pin 1–2	JP4 OUT

2.3 Power the TAS1020A EVM

The TAS1020A EVM can be powered from USB bus power or from an external power supply.

2.3.1 External Power

Ensure JP1 is shunted pin 2 to pin 3. Set the power supply to +9 Vdc and set the current limit to 1 A. Make sure the power supply is off before connecting it to PJ1 of the EVM. Turn the power supply on and LED 9 and LED 11 will light.

2.3.2 Bus Power

Ensure JP1 is shunted pin 1 to pin 2. Connect the USB cable from the PC to the EVM. Only LED 11 will light.

2.4 Miscellaneous Connections

2.4.1 Microphone

A microphone can be connected to the 3,5 mm stereo jack, J8 (bottom side), to record voice.

2.4.2 LINE IN Connector

This connector can take an analog stereo input. This analog input will be digitized and will be ready for record or playback.

2.4.3 Headphones and Speakers

Connect headphones or speakers to the 3,5-mm stereo jack, J6 (top side), to listen to playback audio streams. Be sure to adjust to a safe volume before streaming audio. Volume adjustment can be done by using the buttons on the TAS1020A EVM board, labeled S1–S3 (see Section 2.6.2 Reset Momentary Switch for more details) or by double clicking the speaker icon located on the right corner of the Windows taskbar and adjusting the main playback volume slider.

Note:

Four-channel output is not supported in the included firmware. Audio cannot be streamed to the REAR channel, 3,5-mm stereo jack (J5). The REAR channel jack is there to aid customers in developing a 4 channel AC'97 application.

2.4.4 JB1 and JB2 Connectors

Connectors JB1 and JB2 route clocks, power, IIC, IIS, and GPIO signals from the TAS1020A. These signals can be used to interface the TAS1020A to other codecs circuit boards for further evaluation or development of the functions of the TAS1020A. It is recommended to remove JP2 when using JB1 and JB2 connectors to prevent the AC'97 codec from interfering with these signals. It is also recommended to add buffers between the AC'97 codec and the target signals to provide signal integrity.

2.5 Host Enumeration

A standard USB cable is required to connect the EVM platform to a downstream USB port. The EVM uses a standard Type-B connector.

2.5.1 Internal Mode

The EVM shipped is set in internal mode (EPROM Installed). The firmware will enable the host to recognize the device and will perform applications pertaining to the AC'97 codec. When connecting the host PC to the EVM via the USB bus, the PC will enumerate and display a speaker icon on the right corner of the taskbar. The device is ready to stream audio data.

2.5.2 External (Emulator) Mode

See Table 2–1 for the correct jumper settings in this mode. Bring up the application code as per the emulator manufacturer's instructions. See Appendix A for further details on emulator manufacturers. When the application is running, the EVM can be connected to the host PC to stream audio data.

2.6 TAS1020A EVM Features (Detailed Description)

2.6.1 External Clock

External clock may be used as a clock source for MCLKI. SMA connector, J1 is used for this function.

2.6.2 Reset Momentary Switch

The RESET switch resets the TAS1020A to the default state. This action will reset all registers, counters, and clocks. This action is different than the suspend/resume mode. See Section 2.6.6, Suspend/Resume Mode for details on the suspend/resume operation.

2.6.3 Port 1 Light Emitting Diodes

A group of LEDs is included on the TAS1020A EVM for quick and easy GPIO evaluation. The LEDs are connected to port 1 bit 0 through 7 of both the in-circuit emulator socket and the TAS1020A. When the EVM is in the internal (EPROM installed) mode, the LEDs reflect port 1 from the TAS1020A. When the EVM is in the external (Emulator) mode, the LEDs reflect port 1 from the Emulator.

2.6.4 Human Interface Device (HID) Switches

The S1–S3 switches are general-purpose momentary buttons that may be used to develop HID control functions using the TAS1020A EVM. These switches are active in either internal or external mode (JP3 setting). The firmware shipped with the EVM has HID control. The following are the functions of these switches:

- ☐ S–1: Volume increase
- ☐ S–2: Volume decrease
- ☐ S–3: Volume mute

2.6.5 TIA/EIA-232-F (RS-232)

A subminiature D–9 connector uses RS232 protocols and is provided for possible real time monitoring applications. The port may be used in both the internal and the external mode. The circuit is wired for the external mode, for use with the Emulator. To use this circuit in internal mode, use a 48-pin socket and solder two jumper wires (pin 11 to pin 22, and pin 10 to pin 21) on this socket. Place this socket on J4. Receive Data (Rx) and Transmit Data (Tx) are

the only two signals used for the serial interface. Electrical signal levels are RS-232 compliant but no handshaking communication is present. In order to use this circuit, code must be written to control the functions. The components for this circuit are not populated on the board. See Table 2–2 for the components that are needed for this circuit.

Table 2–2. RS-232 Components

Reference Designator	Description	Manufacturer	Part Number
U8	RS-232 Transceiver	Texas Instruments	SN75LV4737ABDR
C100, C101, C102, C103, C7	Capacitor, 0.1 μ F/35 V	Digi-Key	PCC104BTR–ND
R77, R78	Resistor, 100 Ω	Digi-Key	P100HTR–ND
J2	9-pin connector	Digi-Key	409F–ND

2.6.6 Suspend/Resume Mode

The TAS1020A IC supports suspend/resume for USB bus-powered applications. When the host goes into sleep mode, the TAS1020A IC suspends all clocks and functions. When the host wakes up, the TAS1020A IC resumes its normal functions. The TAS1020A IC can also wake up the host from an external interrupt signal (remote wake-up).

Note:

The TAS1020A EVM board is not designed to support suspend/resume. Therefore, USB specification on suspend/resume does not apply to the TAS1020A EVM board. The TAS1020A IC supports suspend/resume and thus, will function as described above.

2.6.7 Device Firmware Upgrade (DFU)

Caution

When executing a DFU, the current code in the EPROM will be written over. If the code needs to be protected, use another EPROM.

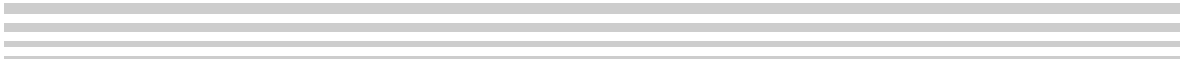
The TAS1020A IC supports DFU. For more information on the DFU class specification see:

<http://www.usb.org/developers/data/devclass/usbd/fu10.pdf>

The specific implementation in the TAS1020A is also described in detail in the data manual. When the EVM is set in the internal mode without an EPROM or, when there is a new firmware stored in the host PC, the firmware can be downloaded or upgraded from the host. A utility software that supports this function on the host is included in the EVM package. Follow the procedures listed below to use the DFU utility.

- 1) Be sure to connect the EVM to the host PC and have everything running.
- 2) Make a shortcut for DFU.EXE file on the desktop.
- 3) Double click on the DFU.EXE icon, a DFU utility window will be displayed.
- 4) Click on RESET button. There should be no error message.
- 5) Click on ... button located to the right of the DOWNLOAD box. A file select window will appear.
- 6) Select a file with the correct header and application code in binary format to download.
- 7) Click on the box next to DOWNLOAD WHOLE FILE.
- 8) Click on DOWNLOAD button.
- 9) Click on GET STATUS button. Valid status will be displayed on the DFU utility window.
- 10) The EVM will automatically execute the firmware.

TAS1020AEVM Bill of Materials



This appendix contains the Bill of Materials for the TAS1020AEVM.

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A.1 TAS1020AEVM Bill of Materials

Capacitor										
ITEM NO.	TYPE/ SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR	ALT. PART NUMBER	MFG/VENDOR
1	C0603	Capacitor, ceramic 27 pF 50 V 0603 SMD	C1, C2, C10, C11	4	Panasonic	ECU-V1H270JCV	PCC270ACVTR-ND	Digi-Key		
2		Capacitor, ceramic 47 pF 50 V 0603 SMD	C12, C14, C30, C32	4	Panasonic	ECU-Y1H470JC7	PCC470ACVTR-ND	Digi-Key		
3		Capacitor, ceramic 100 pF 50 V 0603 SMD	C5, C9, C40	3	Panasonic	ECU-V1H101JCV	PCC101ACVTR-ND	Digi-Key		
4		Capacitor, ceramic 220 pF 50 V 0603 SMD	C38, C41, C44, C45	4	Panasonic	ECJ-1VC1H221J	PCC221ACVTR-ND	Digi-Key		
5		Capacitor 1000 pF 50 V ceramic X7R 0603	C6	1	Panasonic	ECJ-1VB1H102K	PCC1772TR-ND	Digi-Key		
6		Capacitor 3300 pF 50 V ceramic X7R 0603	C8	1	Panasonic	ECJ-1VB1H332K	PCC1778TR-ND	Digi-Key		
7		Capacitor 0.1 μ F 16 V ceramic X7R 0603	C19, C21, C24, C43, C53, C55, C56, C61, C62, C64, C66, C68, C70, C71, C73, C74, C75, C77, C78, C80, C81, C82, C89, C90, C91, C92	26	Panasonic	ECJ-1VB1C104K	PCC1762TR-ND	Digi-Key		
8	C0805	Capacitor 47 pF 50 V ceramic chip 0805 SMD	C3, C4	2	Panasonic	ECU-V1H470JCG	PCC470CGTR-ND	Digi-Key		
9		Capacitor 47000 pF 16 V ceramic X7R 0805	C20	1	Panasonic	ECJ-2VB1C473K	PCC1808TR-ND	Digi-Key		
10		Capacitor 0.1 μ F 16 V ceramic X7R 0805	C47, C49, C51	3	Panasonic	ECJ-2VB1C104K	PCC1812TR-ND	Digi-Key		
11		Capacitor 0.47 μ F 16 V ceramic X7R 0805	C39	1	Panasonic	ECJ-2YB1C474K	PCC1818TR-ND	Digi-Key		
12		Capacitor 1 μ F 16 V ceramic Y5V 0805	C36	1	Panasonic	ECJ-2VF1C105Z	PCC1849TR-ND	Digi-Key		

Capacitor (continued)										
ITEM NO.	TYPE/ SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR	ALT. PART NUMBER	MFG/VENDOR
13	C1206	Capacitor 0.33 μ F 16 V ceramic X7R 1206	C13, C15, C29, C33, C37	5	Panasonic	ECJ-3VB1C334K	PCC1876TR-ND	Digi-Key		
14		Capacitor 1 μ F 16 V ceramic X7R 1206	C26, C27	2	Panasonic	ECJ-3YB1C105K	PCC1882TR-ND	Digi-Key		
16	VSA4.7/25	Capacitor 1 μ F 50 V VS ELECT SMD	C23	1	Panasonic	ECE-V1HS010SR	PCE3083TR-ND	Digi-Key		
17	VS10/16	Capacitor 10 μ F 16V VS ELECT SMD	C22, C25, C60, C72, C76, C79, C83, C88, C93, C94, C95	11	Panasonic	ECE-V1CA100SR	PCE3062TR-ND	Digi-Key	ECJ-3VB1C474K	PCC1878TR-ND
18	VS22/16	Capacitor 22 μ F 16 V ELECT VS SMD	C42, C52, C54, C63, C67, C69	6	Panasonic	ECE-V1CA220WR	PCE3179TR-ND	Digi-Key		
19	KA100-16	100 UF 16 V MINI ALUM ELECT (KA)	C17, C18, C31, C34	4	Panasonic	ECE-A1CKA101	P833-ND	Digi-Key		
20	KGA15-16	15 UF 16 V RAD ALUM ELEC capacitor (KG)	C16, C35	2	Panasonic	ECE-A1CKG150	P911-ND	Digi-Key		
21	KGD68-25	Capacitor 68 μ F 25 V ELECT KG radial	C46, C48, C65	3	Panasonic	ECE-A1EKG680	P946-ND	Digi-Key		
22	KGD100-16	Capacitor 100 μ F 16 V ELECT KG radial	C50	1	Panasonic	ECE-A1CKG101	P944-ND	Digi-Key		

Resistors										
ITEM NO.	TYPE / SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR	ALT. PART NUMBER	MFG/VENDOR
23	R0603	Resistor 100 Ω 1/16W 1% 0603 SMD	R2, R20	2	Panasonic	ERK-3EKF1000V	P100HTR-ND	Digi-Key		
24		Resistor 221 Ω 1/16W 1% 0603 SMD	R40	1	Panasonic	ERJ-3EKF2210V	P221HTR-ND	Digi-Key		
25		Resistor 332 Ω 1/16W 1% 0603 SMD	R10, R25, R35, R36	4	Panasonic	ERJ-3EKF3320V	P332HTR-ND	Digi-Key		
26		Resistor 1 k Ω 1/16W 1% 0603 SMD	R47, R71	2	Panasonic	ERJ-3EKF1001V	P1.00KHTR-ND	Digi-Key		
27		Resistor 2.55 k Ω 1/16W 1% 0603 SMD	R39	1	Panasonic	ERJ-3EKF2551V	P2.55KHTR-ND	Digi-Key		
28		Resistor 3.09 k Ω 1/16W 1% 0603 SMD	R9	1	Panasonic	ERJ-3EKF3091V	P3.09KHTR-ND	Digi-Key		
29		Resistor 4.99 k Ω 1/16W 1% 0603 SMD	R1, R5, R6, R14, R15, R16, R17, R18, R19, R26, R27, R28, R29, R30, R37	15	Panasonic	ERJ-3EKF4991V	P4.99KHTR-ND	Digi-Key		
30		Resistor 10 k Ω 1/16W 1% 0603 SMD	R41	1	Panasonic	ERJ-3EKF1002V	P10.0KHTR-ND	Digi-Key		
31		Resistor 47.5 k Ω 1/16W 1% 0603 SMD	R22, R24, R32, R34, R42	5	Panasonic	ERJ-3EKF4752V	P47.5KHTR-ND	Digi-Key		
32		Resistor 100 k Ω 1/16W 1% 0603 SMD	R21, R23, R31, R33, R43	5	Panasonic	ERJ-3EKF1003V	P100KHTR-ND	Digi-Key		
33		Resistor 249 k Ω 1/16W 1% 0603 SMD	R60	1	Panasonic	ERJ-3EKF2493V	P249KHTR-ND	Digi-Key		
34	R0805	Resistor 27.4 Ω 1/10W 1% 0805 SMD	R4, R7	2	Panasonic	ERJ-6ENF27R4V	P27.4CTR-ND	Digi-Key		
35		Resistor 332 Ω 1/10W 1% 0805 SMD	R46	1	Panasonic	ERJ-6ENF3320V	P332CTR-ND	Digi-Key		
36		Resistor 1 k Ω 1/10W 1% 0805 SMD	R48	1	Panasonic	ERJ-6GEYJ102V	P1.0KCTR-ND	Digi-Key		
37		Resistor 1.5 k Ω 1/10W 1% 0805 SMD	R3	1	Panasonic	ERJ-6ENF1501V	P1.50KCTR-ND	Digi-Key		
38	R1206	Resistor 0 Ω 1/8W 5% 1206 SMD	R76	1	Panasonic	ERJ-8GEY0R00V	P0.0ECT-ND	Digi-Key		
39		Resistor 1 Ω 1/8W 5% 1206	R50, R61, R62, R63, R69	5	Panasonic	ERJ-8GEYJ1R0V	P1.0ECT-ND	Digi-Key		

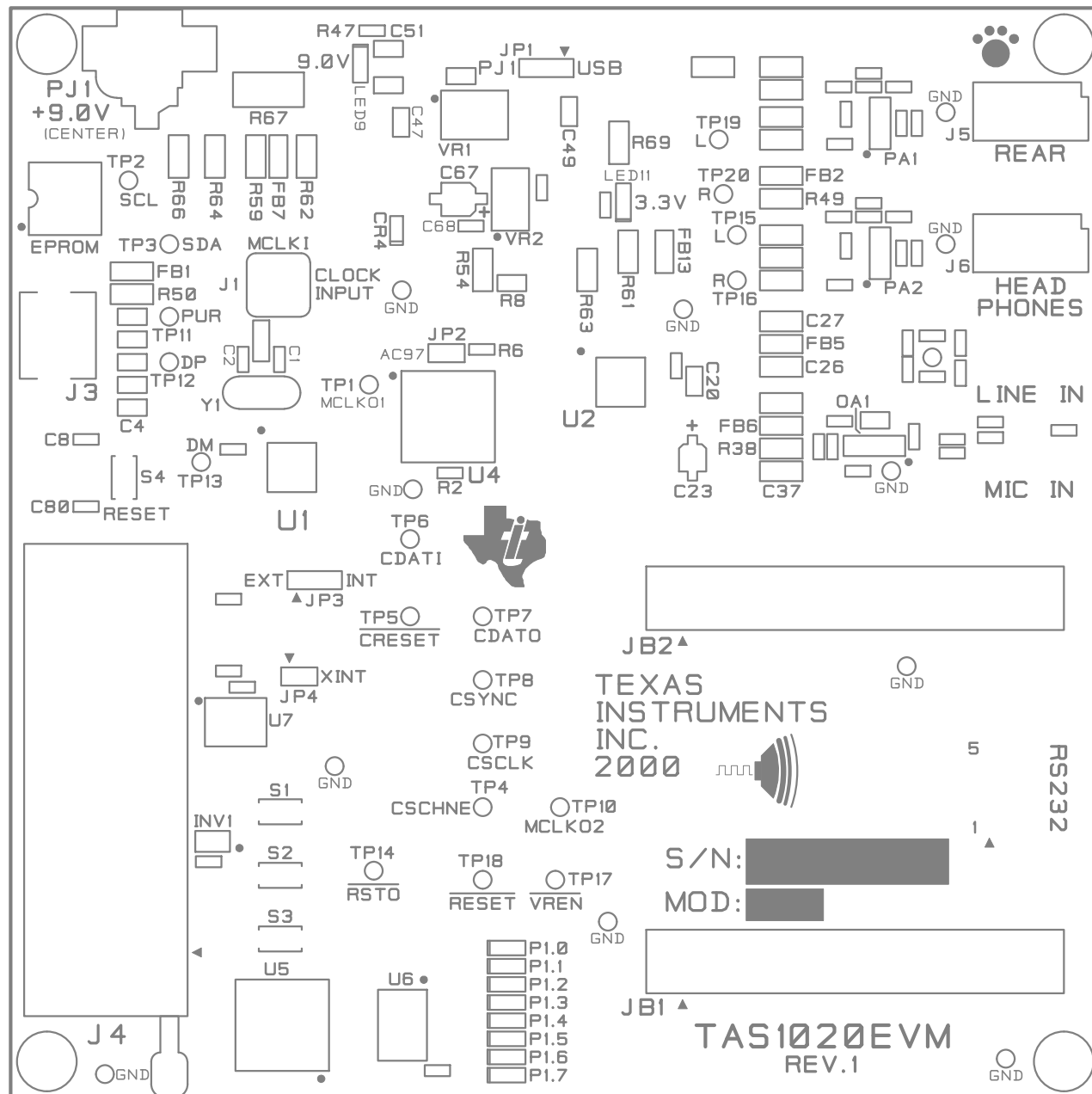
Resistors (continued)										
ITEM NO.	TYPE / SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR	ALT. PART NUMBER	MFG/VENDOR
40		Resistor 2.7 Ω 1/8W 5% 1206	R45, R49, R53, R54, R59, R64	6	Panasonic	ERJ-8GEYJ2R7V	P2.7ECT-ND	Digi-Key		
41		Resistor 10 Ω 1/8W 1% 1206 SMD	R66	1	Panasonic	ERJ-8ENF10R0V	P10.0FCT-ND	Digi-Key		
42		Resistor 49.9 Ω 1/8W 1% 1206 SMD	R11, R12, R13, R74, R75	5	Panasonic	ERJ-8ENF49R9V	P49.9FCT-ND	Digi-Key		
43		Resistor 100 k Ω 1/8W 1% 1206 SMD	R38	1	Panasonic	ERJ-8ENF1003V	P100KFCT-ND	Digi-Key		
44	R2512	Resistor 1 Ω 1 W 5% 2512	R67	1	Panasonic	ERJ-1WYJ1R0U	P1.0XTR-ND	Digi-Key		
45	RDIP16-SM	Resistor-NET 330 Ω 16-pin 8 resistor SMD	RDIP1	1	CTS	766163331G	766-163-R330-ND	Digi-Key	767-163-R330-ND	Digi-Key

Ferrite Beads										
ITEM NO.	TYPE / SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR	ALT. PART NUMBER	MFG/VENDOR
46	FB0805	Ferrite bead core 39 Ω 4 A 0805 SMD	FB12	1	Panasonic	EXC-ML20A390U	P10191TR-ND	Digi-Key		
47	FB1206	Ferrite SMT 1206 1.5 A 31 Ω	FB1, FB2, FB3, FB4, FB5, FB6, FB7, FB8, FB10, FB13, FB14, FB15	12	Steward	MI1206K310R-00	240-1036-1-ND	Digi-Key		

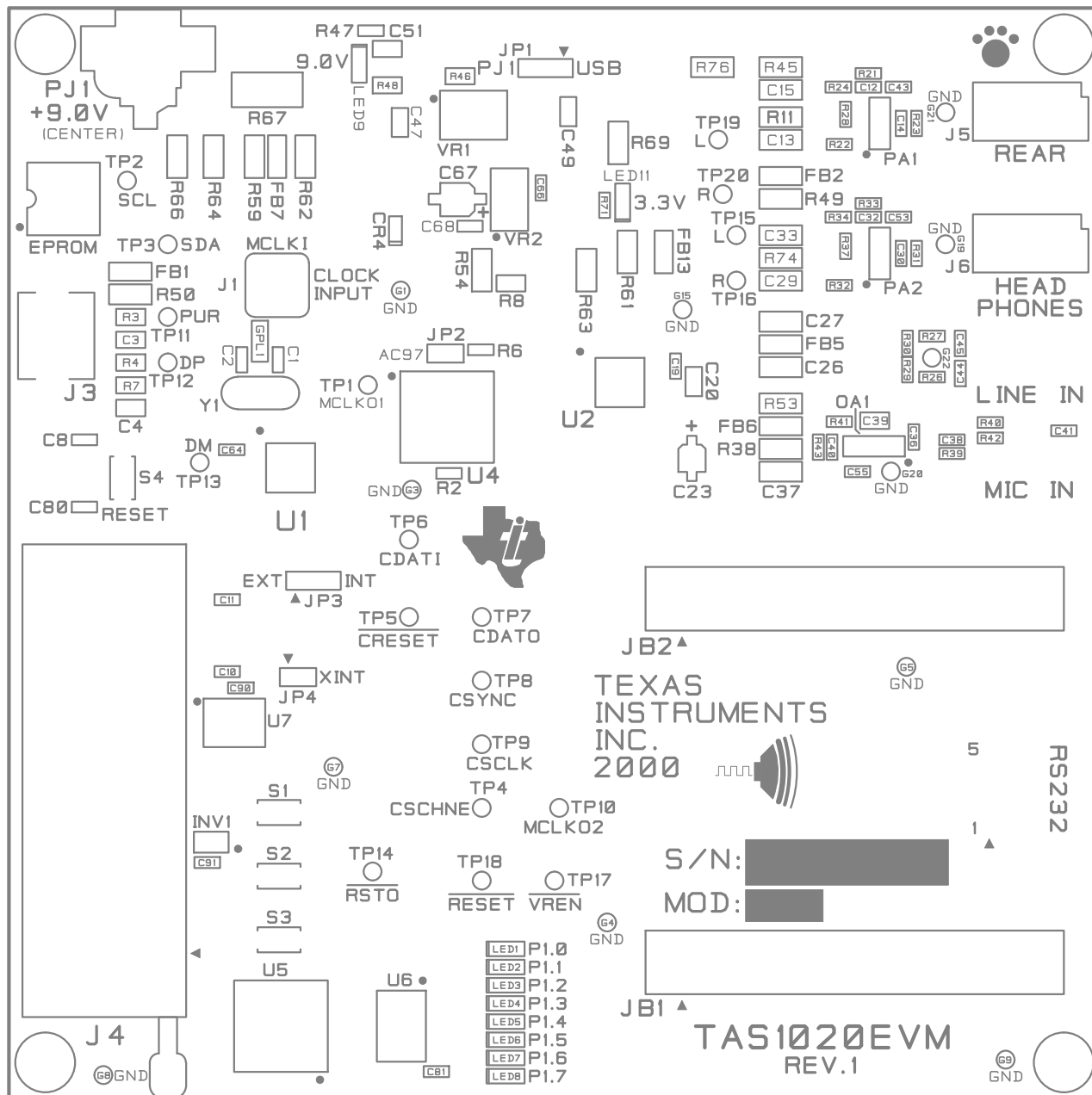
Semiconductors										
ITEM NO.	TYPE / SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR	ALT. PART NUMBER	MFG/VENDOR
48	1N4004, DO-41	1AMP 400 PIV silicon rectifier	CR1, CR2	2	Diodes, Inc.	1N4004	1N4004DICT-ND	Digi-Key		
49	1N4148, DO-35	Diode 100 V 500 MW fast switching	CR4	1	Diodes, Inc.	1N4148	1N4148DICT-ND	Digi-Key		
50	1N5404, DO201AD	1N5404, Diode 3 A 400-V glass P D0201AD	CR3	1	Diodes, Inc.	1N5404	1N5404GCT-ND	Digi-Key		
51	24LC04, DIP8	24LC64, IC serial EEPROM 8KX8 2.5 V 8 DIP	EPROM	1	Microchip Technology	24LC64-I/P	24LC64-I/P-ND	Digi-Key		
52	LED, CMD15-21	LED yellow DIFF 1206 SMD	LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8	8	Chicago Miniature	CMD15-21VYD/TR8	L62307TR-ND	Digi-Key		
53	LED, CMD15-21	LED H.E. red DIFF 1206 SMD	LED9, LED11	2	Chicago Miniature	CMD15-21VRD/TR8	L62301TR-ND	Digi-Key		
54	LM4881MM	LM4881MM	PA1, PA2	2	National Semiconductor	LM4881MM		Pioneer	TPA6110A2D6N	Texas Instruments
55	DS1233A-3.3V	DS1233A-3.3 V	U3	1	Dallas Semiconductor	DS1233AZ-10		Newark	DS1233A-10	Newark
56	LM317, SOT223	LM317, IC positive ADJ 1A VREG SOT223	VR1	1	National Semiconductor	LM317EMP	LM317EMPCT-ND	Digi-Key		
57	CRYSTAL, HC49-US	6 MHz	Y1	1	ECS	ECS-60-32-4	X413-ND	Digi-Key		
58	CRYSTAL, HC49-US	12 MHz	Y2	1	ECS	ECS-120-32-4	X172-ND	Digi-Key		
59	74AHC1G14	74AHC1G14	INV1	1	TI	SN74AHC1G14DBV	296-1092-1-ND	Digi-Key		
60	TLV2362PWR	TLV2362PWR	OA1	1	TI	TLV2362PWR		TI		
61	TAS1020A PFB	TAS1020A PFB	U1	1	TI	TAS1020 PFB		TI		
62	TLV320AIC27	TLV320AIC27, IC 18-bit stereo codec 48 TQFP	U2	1	TI	TLV320AIC27C PFB		TI	296-2216-ND	Digi-Key
63	SN74CBT3245A	SN74CBT3245ADW	U4, U5	2	TI	SN74CBT3245ADW		TI		
64	74AHC540DB	74AHC540DB	U6	1	TI	SN74AHC540DBR		TI		
65	SN74LVTH244A	SN74LVTH244A	U7	1	TI	SN74LVTH244APWR		TI		
67	TPS7233QD	TPS7233QD, IC 3.3V LDO regulator 8 SOP	VR2	1	TI	TPS7233QD	296-1966-5-ND	Digi-Key		

Connectors										
ITEM NO.	TYPE / SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR	ALT. PART NUMBER	MFG/VENDOR
68	SMA	CONN SMA receptacle straight PCB	J1(clock input)	1	Amphenol	901-144-8-RFX	ARFX1231-ND	Digi-Key		
69	DB9F, right angle	9-Pin female, right angle	J2	1	Norcomp	177-009-210-071	409F-ND	Digi-Key		
70	USB_TYPEB-RA	CONN USB right angle male Type B PCB	J3	1	Assmann Electronics	AU-Y1007	AE1085-ND	Digi-Key		
71	DIP40, 0.600 spacing	40-Pin ZIF socket, gold	J4	1	Aries Electronics	40-6554-11	A307-ND	Digi-Key		
72	Mini stereo jack, 3,5 mm	Rear	J5(rear), J6(head phone), J7(LINE IN), J8(MIC IN)	4	CUI Stack	SJ-3535N	CP-3535N-ND	Digi-Key	96F9609	Newark
73	IDC40M	Shrouded header 40 POS straight	JB1, JB2	2	3M	2540-6002UB	MHB40K-ND	Digi-Key		
74	2-Pin header	ST single M header gold 02 POS	JP5, JP1	2	Sullins Electronics	PZC02SAAN	S1011-02-ND	Digi-Key		
75	3-Pin header	ST single M header gold 03 POS	JP3, JP4	2	Sullins Electronics	PZC03SAAN	S1011-03-ND	Digi-Key		
76	Power jack	CONN 2,5-mm power jack hybrid SMD	PJ1(+9V IN)	1	Switchcraft	RASH712	SC1154-ND	Digi-Key		
77	Switch, momentary, surface mount	Switch, light touch 240GF SMD	S1, S2, S3, S4	4	Panasonic	EVQ-PPDA25	P8087STR-ND	Digi-Key		
78	Test point	PC test point mini red	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20	20	Keystone Electronics	5000	5000K-ND	Digi-Key		
79	Test point	PC test point mini black	G1, G2, G3, G4, G5, G6, G7, G8, G9, G15, G19, G20, G21, G22	14	Keystone Electronics	5001	5001K-ND	Digi-Key		
80		IC socket 8 pin 0.300 gold	EPROM	1	MILL-MAX	110-13-308-41-001	ED56083-ND	Digi-Key		

Hardware								
ITEM NO.	TYPE / SIZE	DESCRIPTION	REFERENCE DESIGNATORS	QTY	MFG	MFG PART NUMBER	VENDOR PART NUMBER	VENDOR
81		Hex ALUM M/F 4-40 thread 0.500"		4	Keystone Electronics	8401K	8401K-ND	Digi-Key
82		4-40 Hex nut		6	Building Fasteners	HNZ440	H216-ND	Digi-Key
83		#4 Lockwasher, internal tooth		6	Building Fasteners	INT LWZ 004	H236-ND	Digi-Key
84		4-40 X 3/8 machine screw PH		6	Building Fasteners	PMS 440 0038 PH	H781-ND	Digi-Key
85		#4 Recessed bumper		4	Keystone Electronics	720	720K-ND	Digi-Key



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 TAS1020 Customer Evaluation Board
 TOP SILKSCREEN: TAS1020EVMR1.SS1



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ASSEMBLY NOTES: TAS1020EVMR1.ASY

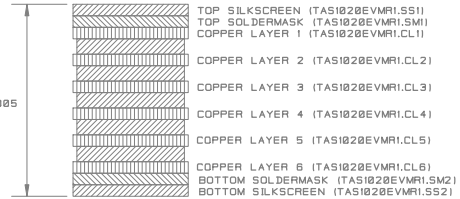


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BOTTOM SILKSCREEN: TAS1020EVMR1.SS2

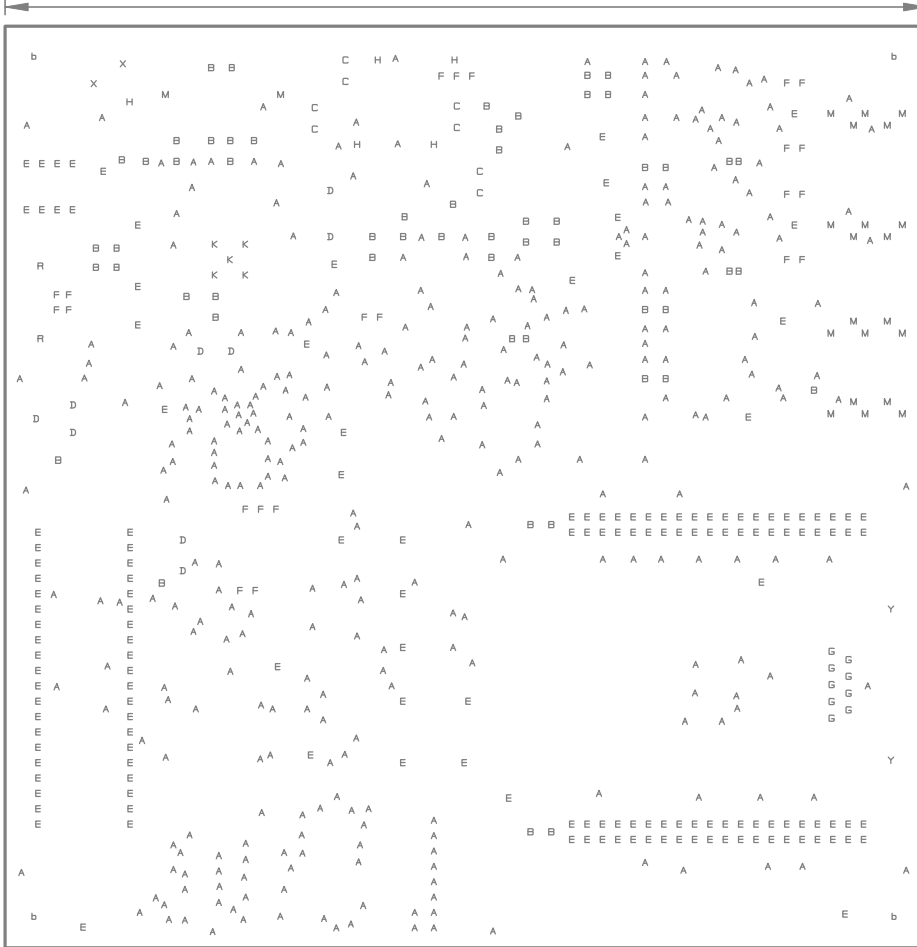
GENERAL NOTES:

1. ALL PLATED THROUGH HOLES TO BE CHEMICALLY CLEANED BEFORE PLATING.
2. END ITEM TO MEET OR EXCEED IPC-A-600.
3. MATERIAL: FR4.
4. FINISHED THICKNESS = .080 +/- .005
5. ALL COPPER WEIGHT = 1 OZ.
6. POSITION ACCURACY = +/- .0015
7. APPLY BLUE ENTHONE SOLDERMASK TO BOTH SIDES OF BOARD.
8. SEPARATE ARTWORK FOR TOP AND BOTTOM OF BOARD.
9. APPLY WHITE SILKSCREEN TO BOTH SIDES OF BOARD USING SEPARATE ARTWORK FOR EACH SIDE OF BOARD.
10. WARPAGE = +/- .005 PER LINEAR INCH MAX.
11. SMOBC.
12. HOT AIR LEVELING.
13. ALL HOLES ARE PLATED.

.080 +/- .005



6.000"



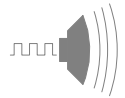
Other Files Included:

- 1) TAS1020EVMR1.PLT - PLATED THRU-HOLE FILE.
- 2) TAS1020EVMR1.REP - REPORT FILE.
- 3) TAS1020EVMR1.FAB - THIS FILE.

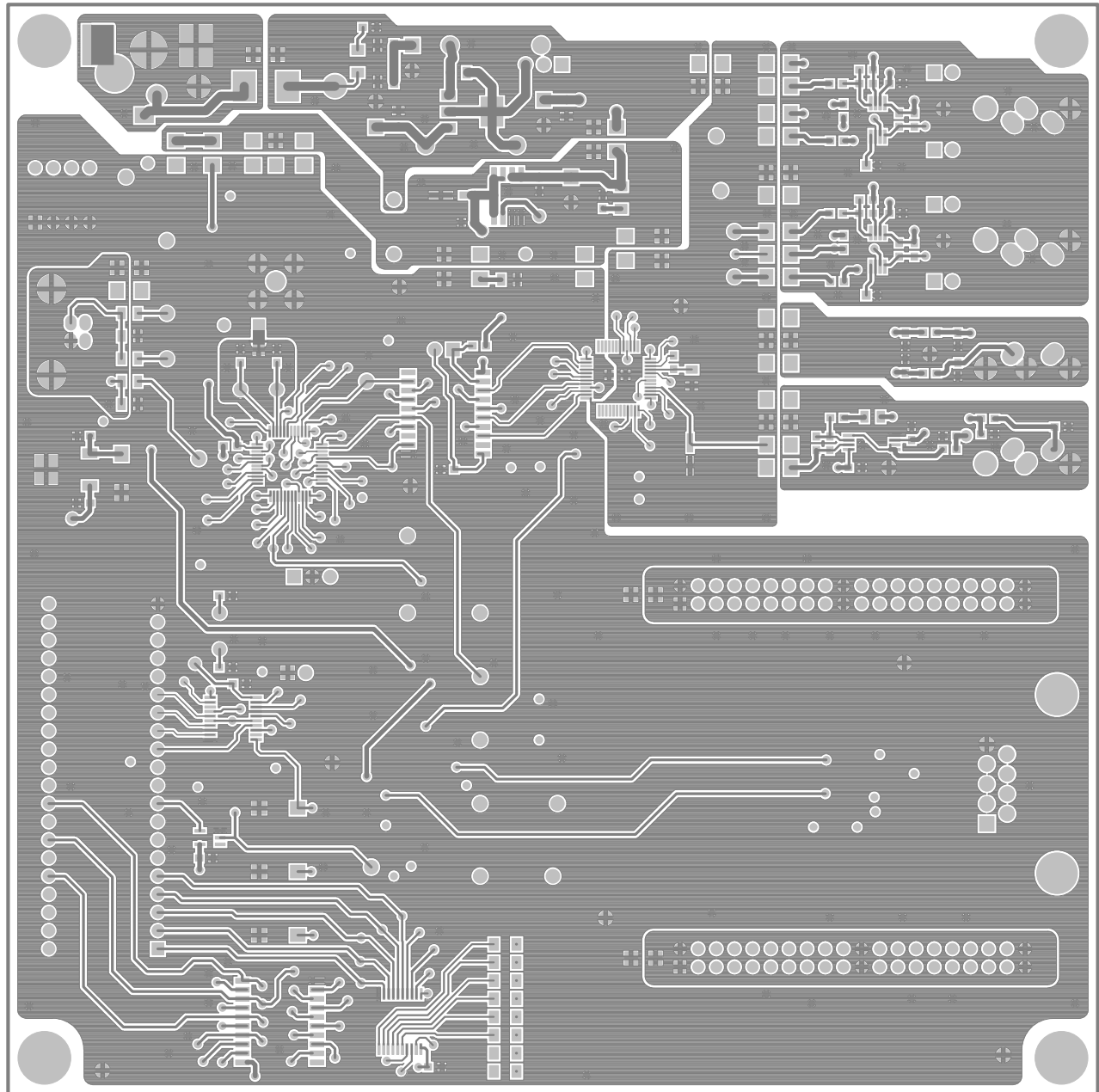
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES	
TOLERANCES:	
CORNERS	+ .075 R MAX
ANGLES	+/- 5 DEGREES
HOLE DIAMETERS:	
≤ .080	+/- .003
> .080	+/- .004
DIMENSIONAL LIMITS APPLY AFTER PLATING AND COATING	

Hole Schedule		
Symbol	Quan.	Size
A	334	14
B	56	20
C	100	25
D	160	30
E	22	35
F	22	40
G	22	45
H	22	50
K	22	60
M	22	70
R	22	85
X	4	120
Y	4	125
Z	4	140

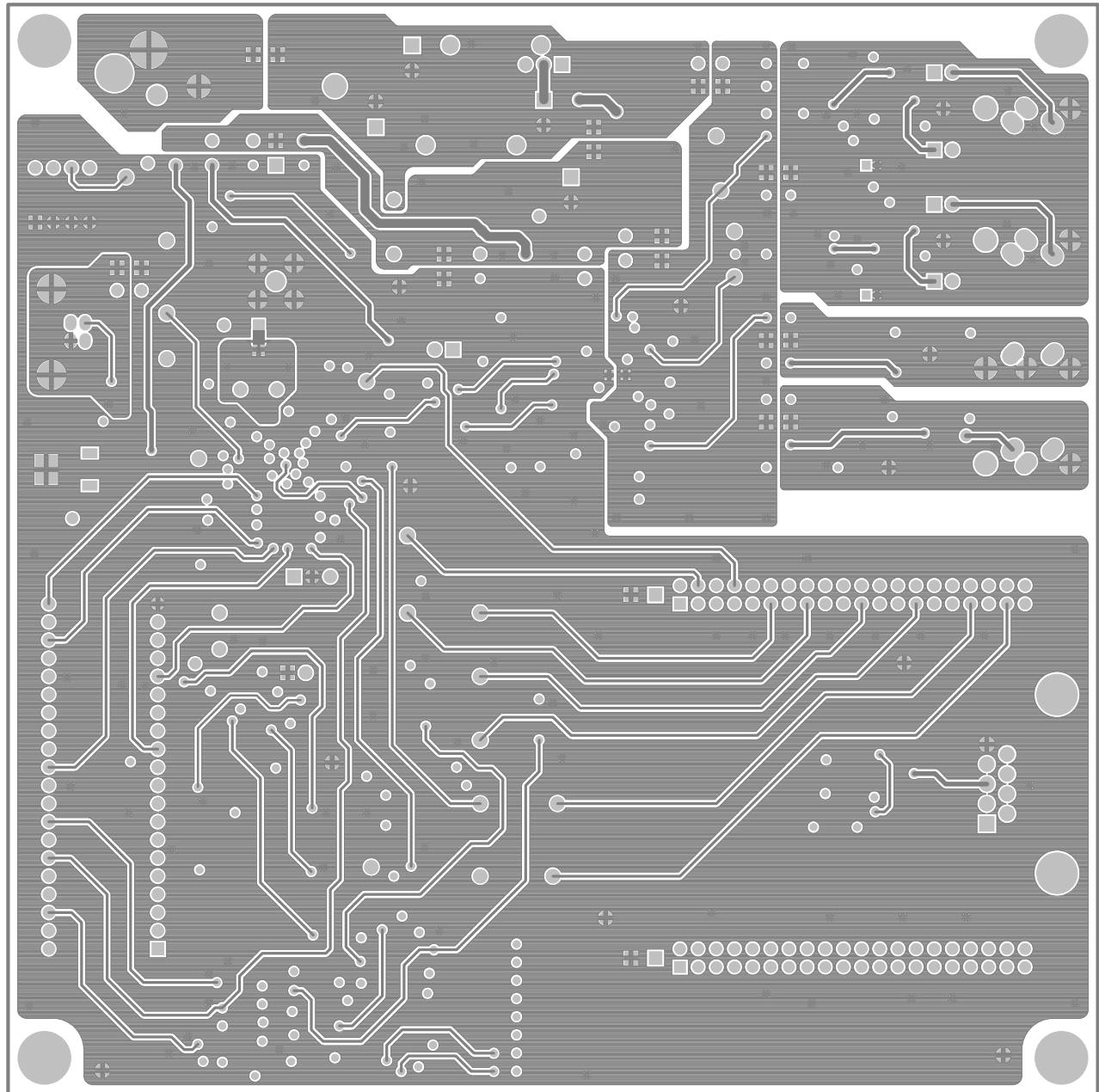
6.000"



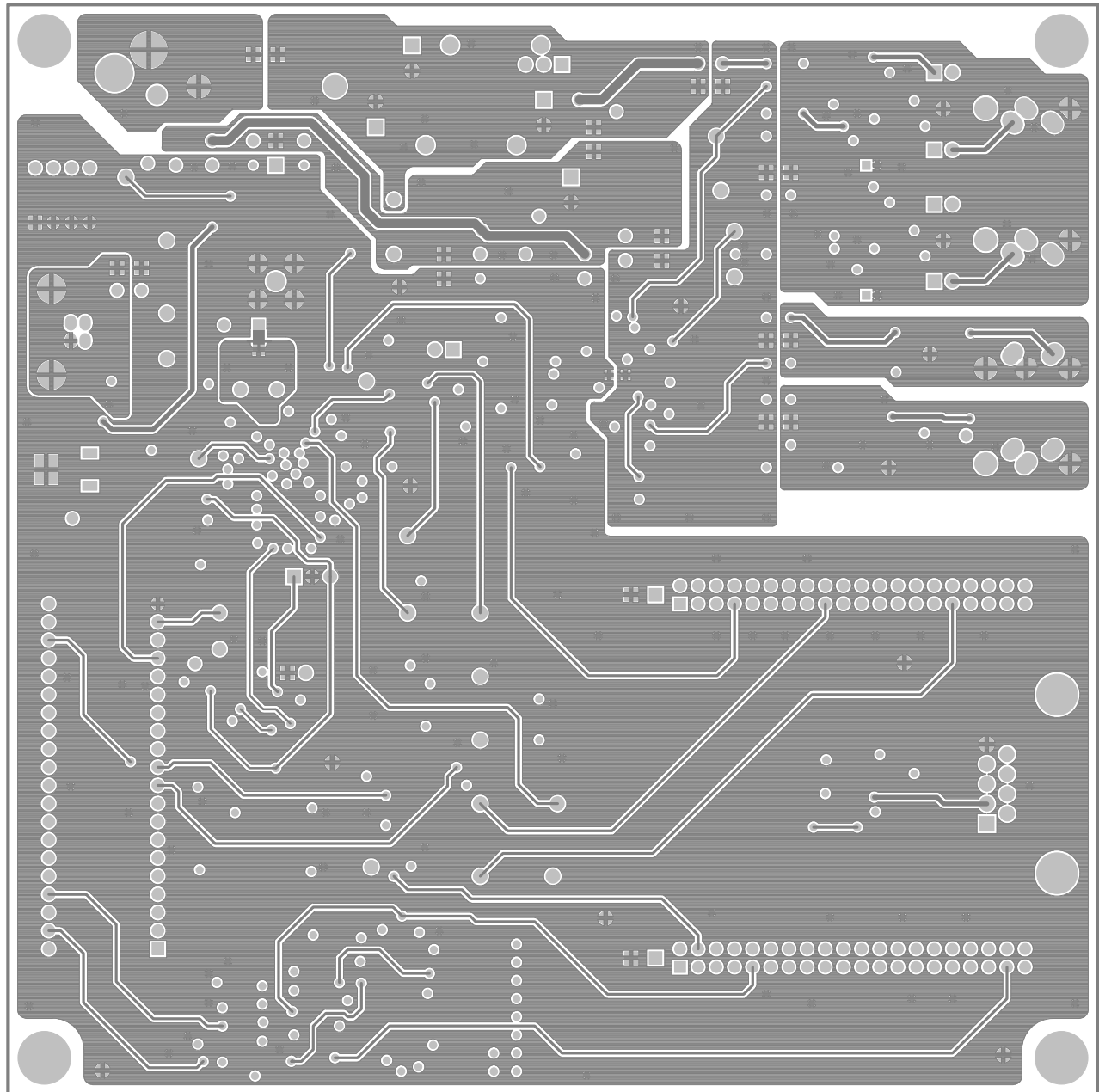
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FAB NOTES: TAS1020EVMR1.FAB



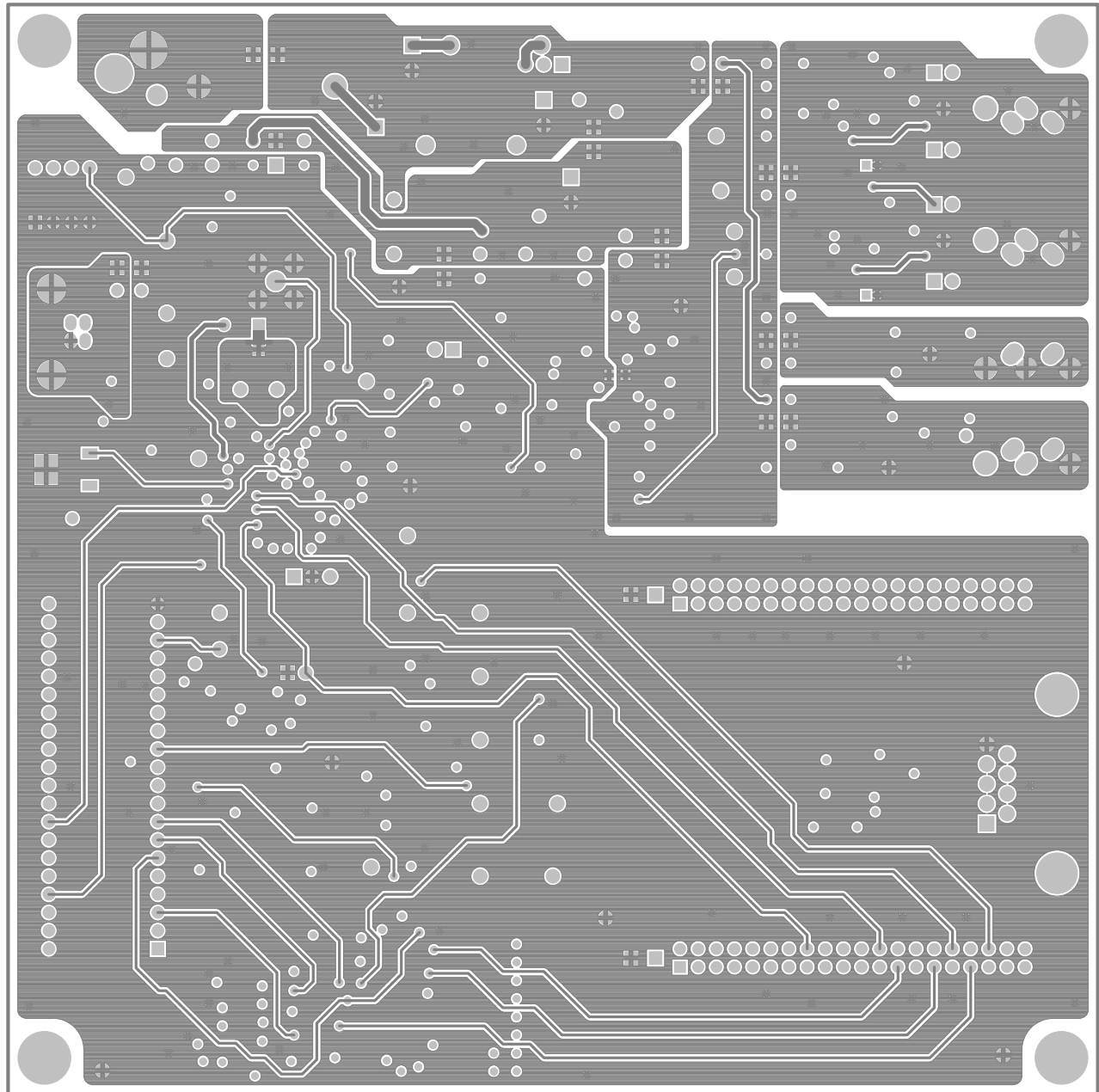
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TAS1020 Customer Evaluation Board
COPPER LAYER 1: TAS1020EVMR1.CL1



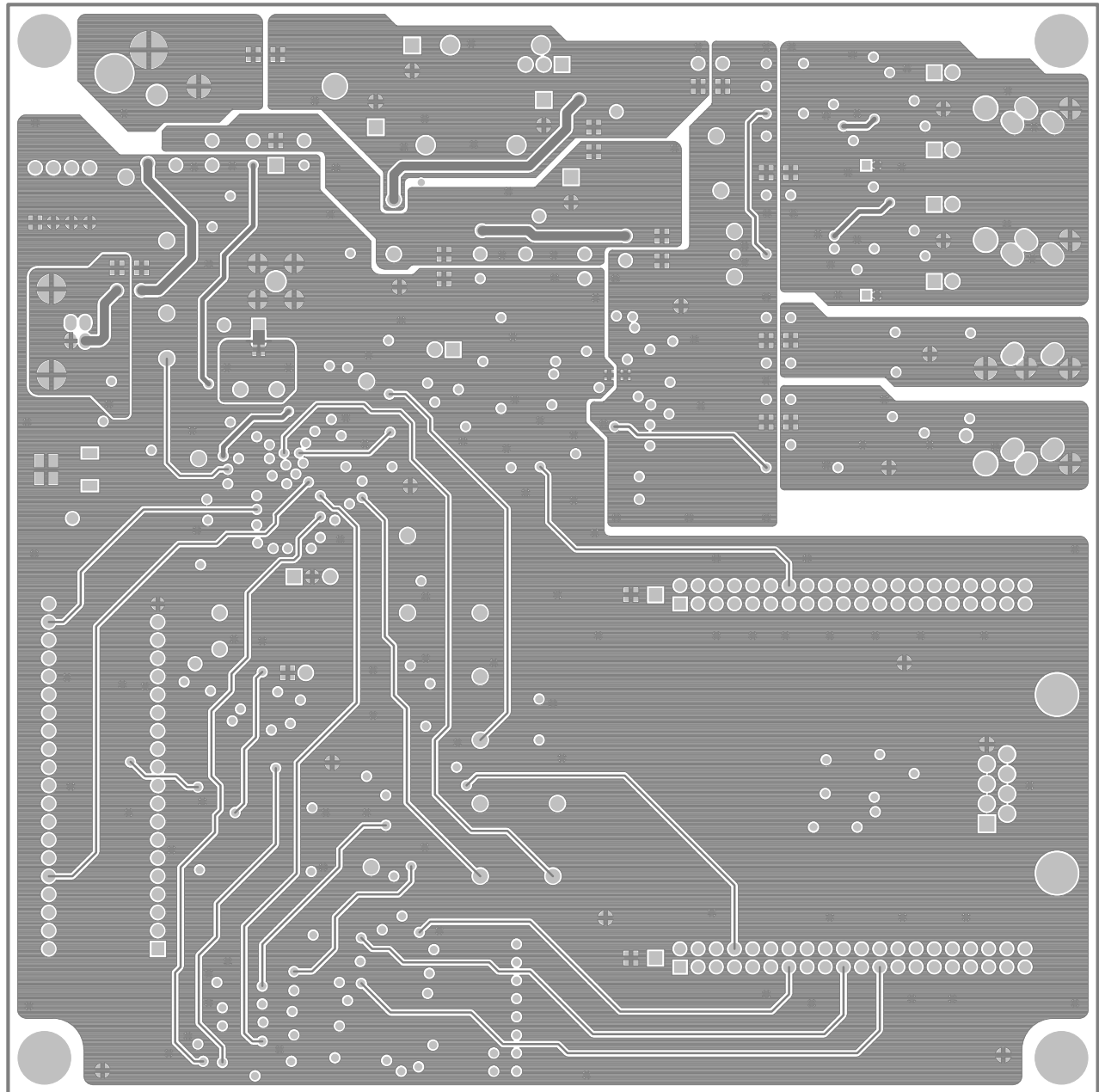
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COPPER LAYER 2: TAS1020EVMR1.CL2



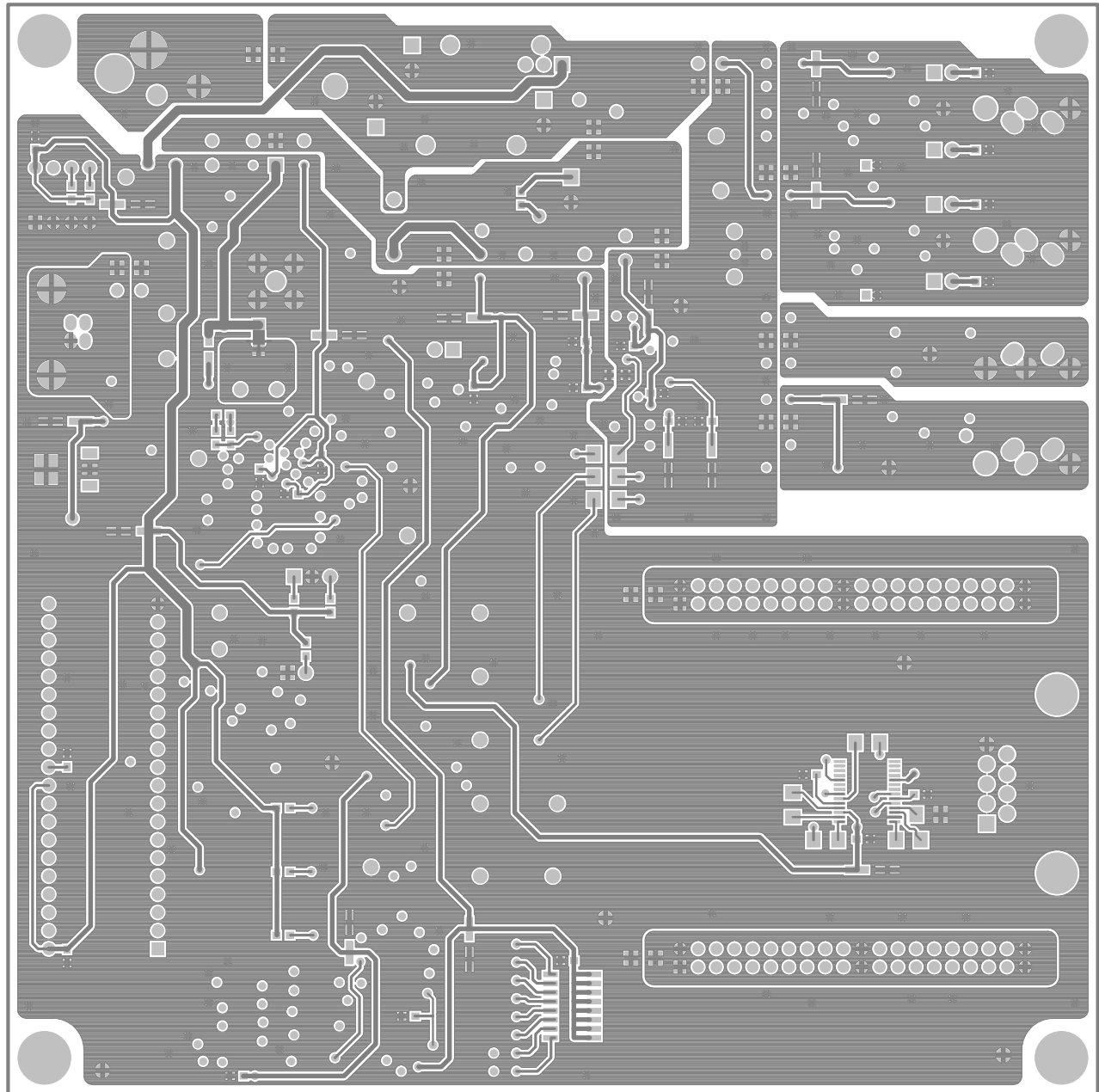
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COPPER LAYER 3: TAS1020EVMR1.CL3



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COPPER LAYER 4: TAS1020EVMR1.CL4



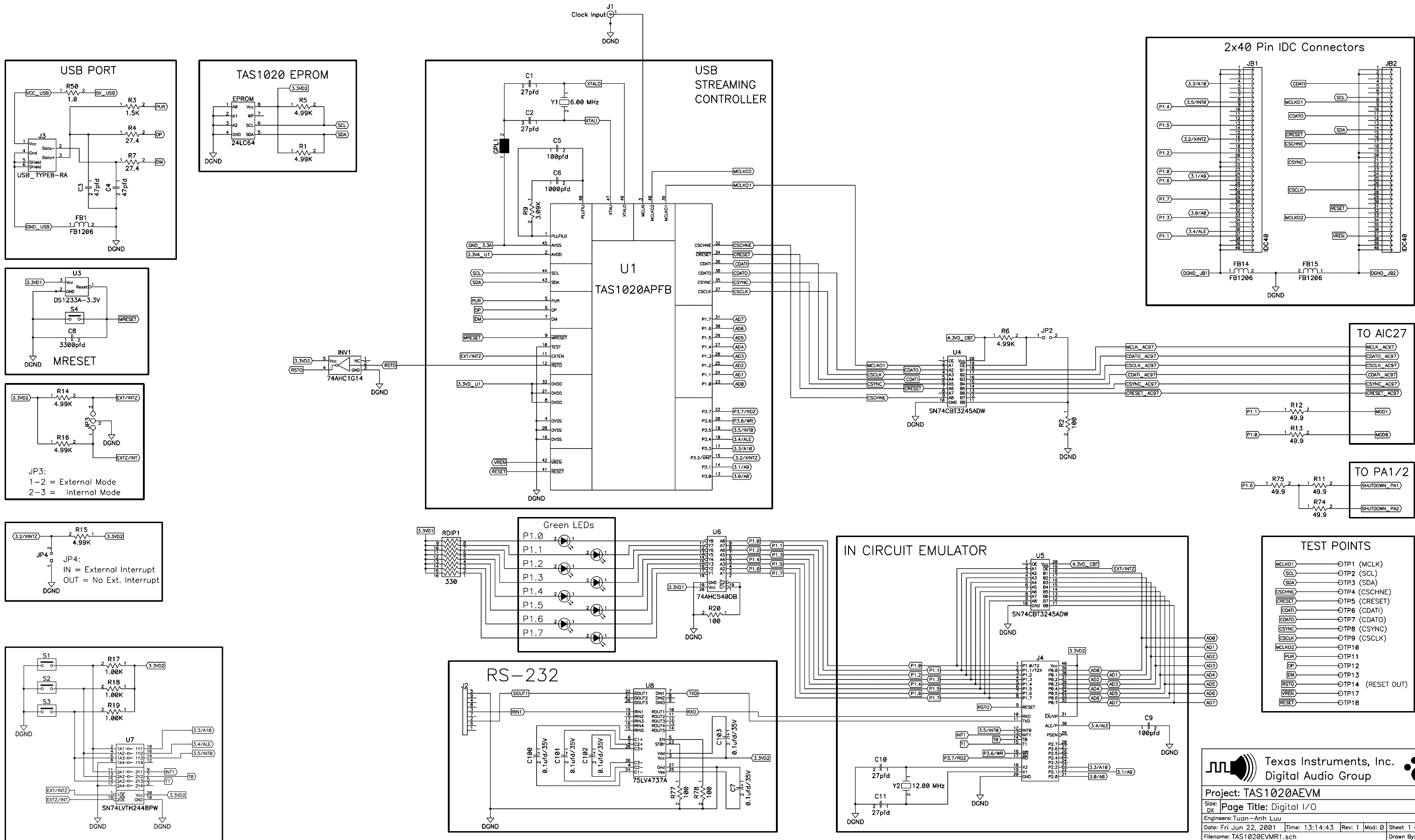
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COPPER LAYER 5: TAS1020EVMR1.CL5



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COPPER LAYER 6: TAS1020EVMR1.CL6

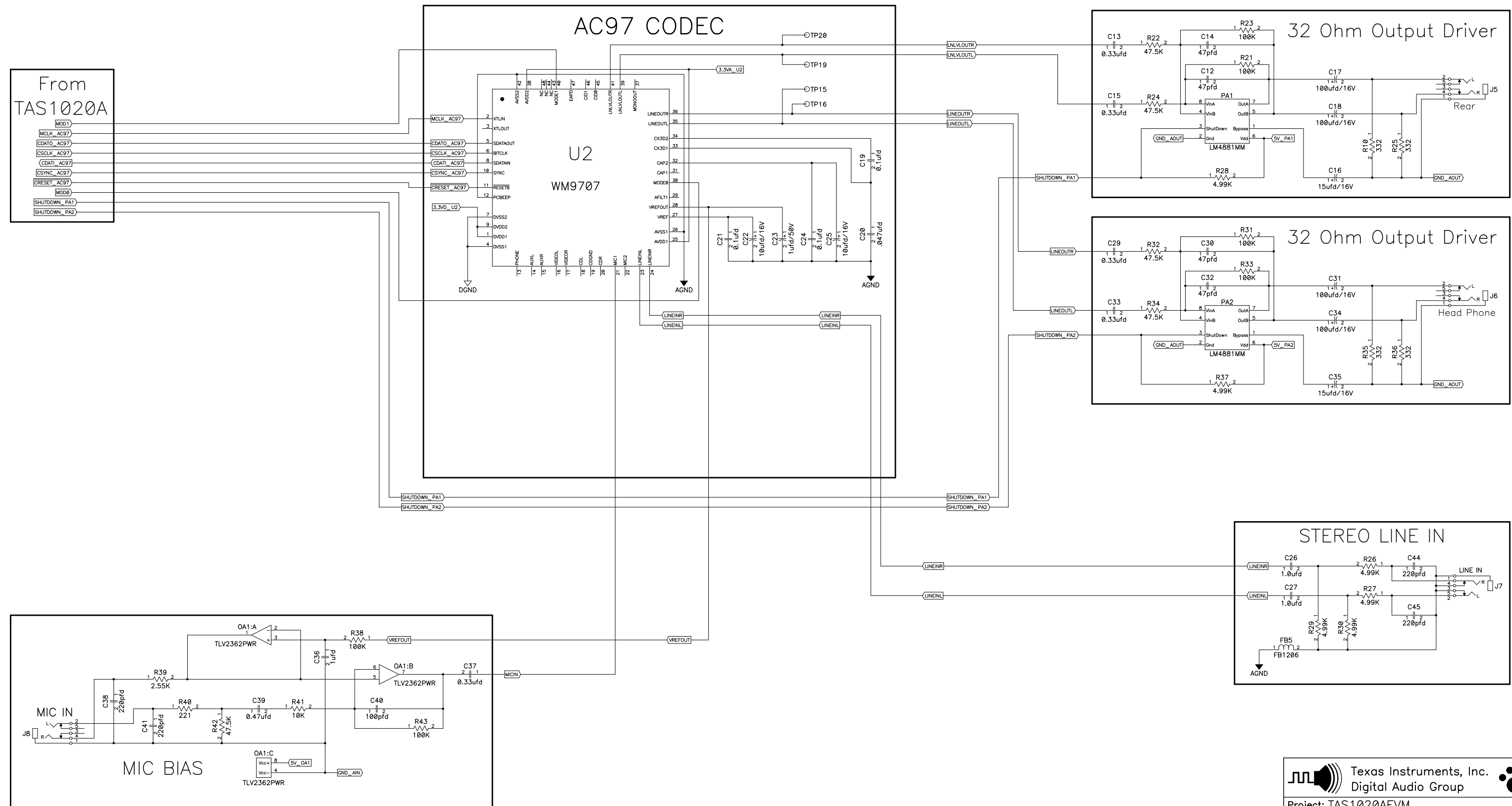
TAS1020A Evaluation Module

Revision 1



TAS1020A Evaluation Module

Revision 1



TAS1020A Evaluation Module

Revision 1

