# User's Guide TPA6404-Q1 Evaluation Module

### TEXAS INSTRUMENTS

#### ABSTRACT

This manual describes the operations of the TPA6404Q1AEVM. The TPA6404Q1AEVM is a stand-alone EVM. The PurePath<sup>™</sup> Control Console 3 GUI (PPC3) is used to initialize and operate the EVM. The main topics of this document are:

- Hardware implementation and descriptions
- Software implementation and descriptions
- TPA6404 EVM operations (hardware and software)

Required equipment and accessories:

- 1. TPA6404 EVM
- 2. USB A male to micro B male cable
- 3. Power Supply Unit (PSU) up to 18 V, 6-A capable
- 4. 1-4 resistive loads or speaker loads
- 5. 8 pairs of wires stripped both ends
- 6. 2-mm slotted screwdriver
- 7. Desktop or laptop PC with Microsoft® Windows® 7 OS
- 8. Access to the internet for downloading software

#### **Table of Contents**

1 Trademarks	1
2 Hardware Overview	2
2.1 TPA6404Q1 Evaluation Module Description	2
3 Software Overview	4
3.1 PurePath <sup>™</sup> Console 3 (PPC3) Access and Description	4
3.2 PurePath <sup>™</sup> Console 3 – TPA6404 EVM Home Window	6
3.3 PurePath <sup>™</sup> Console 3 – TPA6404 EVM Register Map Window	7
3.4 PurePath <sup>™</sup> Console 3 – TPA6404 EVM Monitor & Control Window	8
4 TPA6404 EVM Start Up	9
4.1 TPA6404 EVM Setup	9
4.2 TPA6404 Settings on Device Monitor & Control Window	9
4.3 TPA6404 Settings on Register Map Window	13
4.4 I2C Window	14
5 Board Layouts, Bill of Materials, and Schematic	16
5.1 TPA6404 EVM Layouts	
5.2 TPA6404E1 EVM Schematic	18
6 Revision History	22
-	

#### 1 Trademarks

PurePath<sup>™</sup> are trademarks of Texas Instruments. Microsoft<sup>®</sup> and Windows<sup>®</sup> are registered trademarks of Microsoft Corporation. All trademarks are the property of their respective owners.

1

#### 2 Hardware Overview

#### 2.1 TPA6404Q1 Evaluation Module Description

The TPA6404Q1 EVM can operate as a stand-alone EVM. USB adapter is provided for a more thorough evaluation of the device. Figure 2-1 shows the EVM board.



Figure 2-1. TPA6404Q1 EVM



#### Figure 2-2 shows the TPA6404E1 EVM signal flow:



Figure 2-2. EVM Block Diagram



### 3 Software Overview 3.1 PurePath<sup>™</sup> Console 3 (PPC3) Access and Description

PPC3 is a server-based tool. Request access at http://www.ti.com/tool/PUREPATHCONSOLE.

Once approval is given, download the software from www.ti.com/mysecuresoftware.

S NEG	0dm44Amps-EvmPr 🕨 Suggested	Sites 💌 🧃 httpssps02.itg	giti.com-sit 🚸 INT- Aud	lio Amplifiers - TL. 🔒	WebHome HPA-AIP-HA	C SambaServer HPA-AIF	P-H 🔯 Automotive Sector - Home		
<b>i</b> (	Texas Instrument	Everything ·	~ Search			Q,	Hello, Tuan   Logout		
Products	Applications & designs	Tools & software	Support & training	Order Now A	bout TI	🕙 My History	📜 Cart   English 🗇 myTl		
ne > myT	l account> mySecure Software						La		
iySe	cure Software								
proved re	equests for secure software fro	m Ti							
This cod	le is intended for your use only.								
User acc	tess is granted on a per-person	basis.	ct TI						
il some	nie wisnes to request access p	lease have chern contai	ce n.						
irch OPN	Search Name, Software Pro	duct and Description				<b>Q</b>			
oftware I	Search Name, Software Pro	duct and Description				٩			
oftware I	Search Name, Software Pro	duct and Description	Last Undated by	Last Accord	Initial Account	Access Explosion			
rch OPN oftware I tion •	Search Name, Software Pro Products Reset Display Name	duct and Description Software Product	Last Updated by _	Last Access Date	Initial Access Date	Access Expiration Date	Description		
rch OPN oftware I tion -	Search Name, Software Pro Products Reset Display  Name	Software Product  TPA6404-SW	Last Updated by TI 16 Mar 2017	Last Access Date	Initial Access Date	Access Expiration Date 13 Aug 2020	Description		
oftware I ction • Access	Search Name, Software Pro Products Reset Display Name • TPA6404 Software Product	duct and Description Software Product  TPA6404-SW	Last Updated by TI 16 Mar 2017	Last Access Date	Initial Access Date	Access Expiration Date 13 Aug 2020	Description		
arch OPN oftware I ction - Access ew Access pdated	Search Name. Software Pro Products Reset Display Name   TPA6404 Software Product TAS6422 Software Files	duct and Description Software Product  TPA6404-SW TAS6422SW	Last Updated by TI 16 Mar 2017 21 Aug 2017	Last Access Date	<ul> <li>Initial Access Date</li> <li>14 Aug 2017</li> </ul>	Access Expiration Date 13 Aug 2020 13 Aug 2020	Description		
rch OPN oftware I ction • kccess www. kccess odated kccess	Search Name. Software Pro Products Reset Display Name  TPA6404 Software Product TAS6422 Software Files PurePath Console Graphical	duct and Description Software Product  TPA6404-SW TAS6422SW PUREPATHCONSOLE	Last Updated by TI 16 Mar 2017 21 Aug 2017 03 Jan 2016	Last Access Date	<ul> <li>Initial Access</li> <li>Date</li> <li>14 Aug 2017</li> <li>06 Jul 2015</li> </ul>	Access Expiration Date 13 Aug 2020 13 Aug 2020 30 Mar 2018	Description     PurePath Console Graphical		
rch OPN oftware I stion - kccess sw kccess sdated kccess	Search Name. Software Pro Products Reset Display  Name      TPA6404 Software Product  TAS6422 Software Files  PurePath Console Graphical Development Suite View EULA	duct and Description Software Product  TPA6404-SW TAS6422SW PUREPATHCONSOLE	Last Updated by 16 Mar 2017 21 Aug 2017 03 Jan 2016	Last Access Date 14 Aug 2017 14 Aug 2017	<ul> <li>Initial Access •</li> <li>Date</li> <li>14 Aug 2017</li> <li>06 Jul 2015</li> </ul>	Access Expiration Date 13 Aug 2020 13 Aug 2020 30 Mar 2018	Description      PrePath Console Graphical      Development Suite		
rch OPN oftware I ttion - kccess ww kccess adated kccess	Search Name. Software Pro Products Reset Display  Name      TPA6404 Software Product  TAS6422 Software Product  TAS6422 Software Files  PurePath Console Graphical  Development Suite  View EULA  TAS6424 Software Product	Software Product  TPA6404-SW TAS6422SW PUREPATHCONSOLE TAS6424SW	Last Updated by . TI 16 Mar 2017 21 Aug 2017 03 Jan 2016 05 Aug 2015	Last Access Date 14 Aug 2017 14 Aug 2017 14 Aug 2017	Date 14 Aug 2017 06 Jul 2015 26 Jul 2016	Access Expiration Date 13 Aug 2020 13 Aug 2020 30 Mar 2018 28 Sep 2018	Description     Description     PurePath Console Graphical     Development Suite     TA662A Software Product		
rch OPN oftware I ttion - kccess ww kccess sdated kccess	Search Name, Software Pro Products Reset Display Name  TPA6404 Software Product TAS6422 Software Files PurePath Console Gurgehida View EULA TAS6425 Software Product View EULA	duct and Description Software Product  TPA6404-SW TAS6424SW TAS6424SW TAS6424SW	Last Updated by . TI 16 Mar 2017 21 Aug 2017 03 Jan 2016 05 Aug 2015	Last Access Date 14 Aug 2017 14 Aug 2017 14 Aug 2017	Initial Access         •           Date         •           14 Aug 2017         •           06 jul 2015         •           26 jul 2016         •	Access Expiration           Date           13 Aug 2020           13 Aug 2020           30 Mar 2018           28 Sep 2018	Description     Description     Development Suite     TA66424 Software Product		

Figure 3-1. PPC3 Download Window

Run the installation program. Also download the PPC3 User Manual (slou408) for further instructions.



Figure 3-2 shows the window displayed when first running PPC3.



Figure 3-2. PPC3 Window

When the window in Figure 3-2 is displayed, click on "sign in" to see TPA6404 EVM application. All of the Apps in Figure 3-3 may not be displayed for you.



Figure 3-3. Available Apps Window

Click the TPA6404 App box to download the TPA6404 application. An *Installation* window pops up, next click **Install**.



The TPA6404 EVM box appears in the *Installed EVM Apps* section, see Figure 3-3. Click on the TPA6404 box to launch the TPA6404 App. There are three windows available with the TPA6404 EVM PPC3: *Home Window*, *Register Map Window*, and *Device Monitor & Control Window*.

#### 3.2 PurePath<sup>™</sup> Console 3 – TPA6404 EVM Home Window

When the TPA6404 EVM PPC3 is launched, the *Home Window* displays (see Figure 3-4). If the EVM is powered on and the USB is connected to the PC, the *Home Window* displays the *Connect* box in the bottom right hand corner. If the EVM is not powered on or the USB is not connected, only *TPA6404 EVM – Offline* is displayed.



Figure 3-4. TPA6404 EVM Home Window

#### 3.3 PurePath<sup>™</sup> Console 3 – TPA6404 EVM Register Map Window

When clicking on the *Register Map Box* on the *Home Window*, the *Register Map Window* is displayed. The *Register Map* indicates the current setting of all the registers in the TPA6404 device.

egister Map								R	ead All R	egisters	Fields
Jerrister Name 14		Value				E	lits				
rogister mane er		- and -	7	6	5	4	3	2	1	0	Description
Block										1094Y	
Mode Control	0×00	0×00	0	0	0	0	0	0	0	0	
Misc Control 1	0×01	0x32	0	0	1	1	0	0	1	0	
Misc Control 2	0×02	0×62	0	1	1	0	0	0	1	0	
SAP Control	0×03	0×04	0	0	0	0	0	1	0	0	
State Control	0×04	0×55	0	1	0	1	0	1	0	-1	
DC LDG Control 1	0×09	0×00	0	0	0	0	0	0	0	0	
DC LDG Control 2	0×0A	0×11	0	0	0	1	0	0	0	4	
DC LDG Control 3	0×0B	0×11	0	0	0	1	0	0	0	1	N.
DC LDG Report 12	0×0C	0×00	0	0	0	0	0	0	0	0	
DC LDG Report 34	0×0D	0×00	0	0	0	0	0	0	0	0	
DC LDG Report LO	0×0E	0×00	0	0	0	0	0	0	0	0	
State Report	0×0F	0x55	0	1	0	1	0	1	0	1	
Channel Fault	0×10	0x00	0	0	0	0	0	0	0	0	
Global Fault 1	0×11	0×00	0	0	0	0	0	0	0	0	
Global Fault 2	0×12	0x00	0	0	0	0	0	0	0	0	

Figure 3-5. TPA6404 EVM Register Map Window

7



#### 3.4 PurePath<sup>™</sup> Console 3 – TPA6404 EVM Monitor & Control Window

When clicking on *Device Monitor & Control* box in the *Home Window*, the *Device Monitor & Control* window is displayed. The *Register Map* indicates the current setting of all the registers in TPA6404.

■ PurePath <sup>™</sup> Console -TPA6404 EVM						;
🕎 App Center 👌 🍘: TPA6404 EVM Hom	e ⇒ ;;; Device Monitor & Cont	trol 🛛		Hi-z Mute Play M	ode Slave Mode	Master Mode
Channel 1 🔌 Hi-z	Channel 2	🔌 Hi-z 🗸 🗸	Channel 3	🔌 Hi-z	Channel 4	💫 Hi-z 🗸 🗸
Mode Line Output Speaker	Mode Line Output	Speaker	Mode Line Outp	ut Speaker	Mode Line Output	Speaker
Miscellaneous Controls			Faults / Warning	gs 🗸	OTW Unmask 🗹 Clip	Unmask Clear Read
Output CH12     Output CH34       BTL     BTL       OTW     Frequency       120 C···     2.1 MHz       45 deg	OC LVL1 LVL2 Gain V High: 22 dB	Clip Detect Disable Enable Clip Level 2% THD ~	OC CH1 ✓ CH2 ✓ CH3 ✓ CH4 ✓	DC         OTSD         OTW         CLP           ✓         ✓         ✓         ✓         ✓           ✓         ✓         ✓         ✓         ✓           ✓         ✓         ✓         ✓         ✓           ✓         ✓         ✓         ✓         ✓           ✓         ✓         ✓         ✓         ✓           ✓         ✓         ✓         ✓         ✓	W V No Fault/Warm	ing X Fault Warning Clock Fault V Global OTSD V Global OTW V
AC Load Diagnostics		ଚ	DC Load Diagn	ostics		କ
Gain     Test Current       ♥     CH1     1     10mA       ♥     CH2     1     ↓     L(uH)     3.3       ♥     CH3     1     ∨     C(uF)     1       ♥     CH4     1     ∨	Setting         Impedance F           GAIN=4, I=20mA         06           GAIN=4, I=20mA         12           GAIN=4, I=20mA         12           GAIN=1, I=20mA         24           GAIN=1, I=20mA         24           GAIN=1, I=20mA         48           ChenneT 1 gain is spanged with cha           Chennel 3 gain is ganged with cha	Resolution         0.031203           0.002407         0.124814           0.249627         0.249627           nnel 2 gain.	SL Thr           CH1         1.0           CH2         1.0           CH3         1.0           CH4         1.0	eshold	Retry Abort LD	Start ≯
TPA6404 EVM Disconnect		24	C			🜵 Texas Instruments

Figure 3-6. TPA6404 EVM Device Monitor & Control Window



#### 4 TPA6404 EVM Start Up

This section describes the TPA6404 start up procedure. Have all the equipment and accessories listed on the first page of this document available.

#### 4.1 TPA6404 EVM Setup



Figure 4-1. TPA6404 EVM Connections

Hardware and software connections:

- Desktop or laptop PC running Windows 7. Open PPC3 GUI.
- Connect 14.4-VDC PSU to the TPA6404 EVM
- Connect speakers or resistive loads to the TPA6404 EVM
- Connect USB micro cable from the PC to the EVM
- Set the switches (STANDBY, MUTE) to down positions
- Turn on the PSU
- Connect the audio source this can be a 3-mm stereo connector connected from the PC to the EVM as shown in Figure 4-1.
- At this point, 3.3V LED, and USB-LOCK LED are on.
- On the PPC3 window, launch the TPA6404 EVM application
- Click Connect at the bottom left corner of the window
- Click Device Monitor & Control
- Click on *Play* at the top left corner of the window
- On the PC make sure the volume level is set as desired. The maximum level is quite loud.
- On the EVM, first switch up the STANDBY switch and then the MUTE switch
- The audio can now be streamed to the speakers

#### 4.2 TPA6404 Settings on Device Monitor & Control Window

Most of the register settings are done on the *Device Monitor & Control* window. The TPA6404 *Register Map* window is for reference.

Click the *CONNECT* button on the bottom left corner of the TPA6404 EVM application window, see Figure 3-5. The LED next to the TPA6404 EVM changes from gray to green and the *CONNECT* button changes to a *DISCONNECT* button.

Click on the TPA6404 Device Monitor & Control box, the Device Monitor & Control window displays.

E PurePath <sup>™</sup> Console -TPA6404 EVM			- 🗆 🖌
፵ App Center ⇒ 👜 TPA6404 EVM Home	e 🗦 🤠 Device Monitor & Control 🕐	Hi-z Mute Play M	ode Slave Mode Master Mode
Channel 1 🙀 Hi-z	🗸 Channel 2 🙀 Hi-z 🗸	Channel 3 🙀 Hi-z	✓ Channel 4 🔌 Hi-z ✓
Mode	Mode	Mode	Mode
Line Output Speaker	Line Output Speaker	Line Output Speaker	Line Output Speaker
Miscellaneous Controls		Faults / Warnings 🖌	OTW Unmask 🗹 Clip Unmask Clear Read
Output CH12 Output CH34	OC Clip Detect	OC DC OTSD OTW CLP	₩ 🗸 No Fault/Warning 🗙 Fault 🧜 Warning
OTW Frequency Phase	LVL1 LVL2 Disable Enable	сн1 🗸 🗸 🗸 🗸	PVDD OV 🖌 Clock Fault 🗸
120 C 2.1 MHz 45 deg	High: 22 dB     2% THD	CH2 V V V V	PVDD UV 🗸 Global OTSD 🗸
			VBAT OV 🗸 Global OTW 🗸 VBAT UV 🖌
AC Load Diagnostics	ę	DC Load Diagnostics	ę
Gain Test Current	Setting         Impedance Range (Ω)         Resolution	SL Threshold	
✓ CH1 1 ✓ 10mA ✓	GAIN=4, I=20mA 06 0.031203 GAIN=4, I=10mA 12 0.062407	CH1 1.0 ~	Retry
CH2 1 V L (uH) 3.3	GAIN=1, I=20mA 24 0.124814 GAIN=1, I=10mA 48 0.249627	CH2 1.0 ~	
✓ CH3 1 ✓ C (uF) 1	Channel 1 gain is ganged with channel 2 gain. Channel 3 gain is ganged with channel 4 gain.	CH3 1.0 ~	
✓ CH4 1 ✓	Start >	CH4 1.0 ~	Start >
TPA6404 EVM - offline     Connect		<sup>2</sup> C	🐺 Texas Instruments

Figure 4-2. Device Monitor & Control Window

This window has 7 major sections: the global control section, channel control section, miscellaneous control section, faults and warnings section, AC load diagnostics section, and DC load diagnostics section.

#### 4.2.1 Global Control Section

The *Hi-z*, *Mute* and *Unmute* buttons with the gray background control all 4 channels at the same time. When Hi-z is selected, all 4 channels are put in Hi-z. The display for each channel in the channel control section reflects these button selections.



Figure 4-3. Global Control Section

The *Reset* button is a software reset. This puts the device back in default settings.

#### 4.2.2 Channel Control Section

Each channel has the same setting selections: *Hi-z*, *Mute*, and *Play* mode.

Channel 1	◀》Play Mode 🗸 🗸	Channel 2	∢) Play Mode ~
Channel 3	∢) Play Mode 🗸 ✓	Channel 4	◀) Play Mode 🗸

#### Figure 4-4. Channel Control Section

#### 4.2.3 Miscellaneous Control Section

There are miscellaneous settings that are available on the GUI for easy access (see Figure 4-5).

Miscellaneous Controls										
Output CH12	Output CH34		ос		Clip Detect					
BTL	BTL		LVL1	LVL2	Disable	Enable				
OTW Frequency	Phase		Gain		Clip Level					
120 C 🗸 2.1 MHz 💉	<ul> <li>45 deg</li> </ul>	~	High: 22 dB	~	2% THD	~				

#### Figure 4-5. Miscellaneous Control Section

The overcurrent has two levels. The lower level is 1, the default is level 2. When running 6- or 8- $\Omega$  speakers, the OC level can be set to 1.

Overtemperature warning can be programmable, use the pull-down menu to choose the OTW temperature. The default setting is 120°C.

The output switching frequency (FSW) or Pulse Width Modulation (PWM) frequency is set at 2.1 MHz. The pull-down menu on the *PWM FRQ* box is used to choose a lower FSW.

The PWM output (at the pin) offset phase for each channel is set at 45 degrees. This helps lower the ripple current on the power supply as not all the channels switch at the same time. To choose a different phase offset, use the pull-down menu on the *Phase* box. TI recommends using the default value. If other settings are used, thorough testing is strongly recommended.

There are four gain settings in the TPA6404: low, medium, high and max. The default setting is standard gain for driving speakers at 14.4 VDC. The gain setting is selectable via the drop-down menu in the *Gain* box.



#### 4.2.4 Faults / Warnings Section

The top right buttons on the Faults / Warnings box serve as controlling and monitoring faults.

Clip enable route the clip detection bit to the warning pin. This is displayed as a yellow LED on the EVM.

Thermal enable route the overtemperature warning bit to the warning pin. This is displayed as the same yellow LED on the EVM. The **Clear** button clears all the faults and warnings. The **Read** button manually read the faults and warnings.

Faults /	Warnin	gs				Clip Unmask Thermal Unmask Clear Read
	ос	DC	OTSD	отw	CLPW	Vo Fault/Warning 🗙 Fault 🚦 Warning
CH1	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
CH2	$\checkmark$	$\checkmark$	×	$\checkmark$	<b>~</b>	PVDD OV V Clock Fault V PVDD UV V Global OTSD V
снз	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	VBAT OV 🗸 Global OTW 🗸
CH4	✓	✓	✓	✓	✓	VBAT UV 🖌

Figure 4-6. Faults / Warnings Section

#### 4.2.5 AC Load Diagnostics Section

The AC load diagnostics report speaker impedance and phase. Diagnostics are performed with one or all four channels.

AC Load I	AC Load Diagnostics												
	Gain	Test Current	Setting	Impedance Range (Ω)	Resolution								
			GAIN=4, I=20mA	06	0.031203								
CH1	1 🗸	10mA 🗸	GAIN=4, I=10mA	12	0.062407								
		1. (11)	GAIN=1, I=20mA	24	0.124814								
CHZ	· ·	L (UH) 3.3	GAIN=1, I=10mA	48	0.249627								
🖌 СНЗ	1 🛩	C (uF) 1	Channel 1 gain is Channel 3 gain is	ganged with channel 2 gain. ganged with channel 4 gain.									
🖌 СН4	1 🛩												
					Start >								

Figure 4-7. AC Load Diagnostics Section

Select the correct output impedance and click the *Start* > button. Follow the pop up instructions to run the load diagnostics.

Click on the icon located on the top right of the AC load diagnostics box to see the results.



#### 4.2.6 DC Load Diagnostics Section

The DC load diagnostics report if a channel is short to power, short to ground, short to load, or open.

DC Loa	d Diagnostics	Ş
	SL Threshold	
CH1	1.0 🗸	Retry
CH2	1.0 🗸	Abort LD
СНЗ	1.0 🗸	
CH4	1.0 🗸	
		Start >

Figure 4-8. DC Load Diagnostics Section

Select the impedance of the load from 0.5 to 5  $\Omega$ . Click *Start* > and then click the icon on the top right of the box to view results.

If a channel is selected as a line-out, click on "LO ENA LD" to enable line-out load diagnostics. Use the *Retry* box when DC load diagnostics are run more than one time. Exit DC load diagnostics by clicking the *Abort LD* box.

#### 4.3 TPA6404 Settings on Register Map Window

Select a particular register then double click on any bit, the bit will change state. This state is executed at the end of the click.

■ PurePath <sup>™</sup> Console - TPA6404 EV	'M											×
興 App Center 🔌 👜 TPA6404 EVM H	ome 🗲 🧰 Register Map	0										
Register Map								R	ead All R	egisters	Fields	
Register Name ↓↑ (	Q. Address ↓↑ Q.	Value	7	E	5	E	Bits	2	1	0	Misc Control 1	
▼ Block			,	0	5	4	5	2			Field	Value
Mode Control	0x00	0x00	0	0	0	0	0	0	0	0	PLEN	0
Misc Control 1	0x01	flx32	n	n	1	1	n	n	1	0	OTW Ctrl [1:0]	0x01
Mice Centrel 2	001	0		4			0	0			OC Ctrl	1
MISC CONTOU 2	0402	0462	0			0	0	0		° 📘	RESERVED	0x00
State Control	0×04	0x55	0	1	0	1	0	1	0	1	Gain [1:0]	0×02
DC LDG Control 1	0x09	0x00	0	0	0	0	0	0	0	0		
DC LDG Control 2	0x0A	0x11	0	0	0	1	0	0	0	1	Description	
DC LDG Control 3	0x0B	0x11	0	0	0	1	0	0	0	1	PLEN	
DC LDG Report 12	0x0C	0x00	0	0	0	0	0	0	0	0	Over-Temperature Warning (	Control
DC LDG Report 34	0×0D	0x00	n	0	0	n	n	0	0		Over-Current Control	
DC LDG Report LO	0×05	0×00		0			0				RESERVED Output Gain Control	
DC EDO Nepon EO	0.0E	0.00									oupur oun control	
State Report	UXUF	0x55	U	1	U	1	U	1	U	1		
Channel Fault	0x10	0x00	0	0	0	0	0	0	0	0		
Global Fault 1	0x11	0x00	0	0	0	0	0	0	0	0		
Olobal Fault 2	0x12	0x00	0	0	0	0	0	0	0	0		
Warning	0x13	0x00	0	0	0	0	0	0	0	0		
										_		
TPA6404 EVM Disconnect					I <sup>2</sup> C						🖑 Тех	as Instruments

Figure 4-9. Register Map Window



#### 4.4 I2C Window

The PPC3 has an I2C monitor and also configuration program options (see Figure 4-10).

■ PurePath <sup>™</sup> Console -TPA6404	1 EVM											×
🕎 App Center 🗲 📋 TPA6404 EV	M Home 🗲 🔟 Register M	ap <b>Ø</b>										
Register Map		I2C Monito	ir						Reg	isters	Fields	
Register Name ↓↑	Q, Address ↓↑ 0	Slave Q					目前	1/0	Log	0	Misc Control 1	
▼ Block		1									Field	Value
Mode Control	0x00									0	PLEN	0
Misc Control 1	0x01									0	OTW Ctrl [1:0]	0x01
Misc Control 2	0x0.2									0	OC Ctrl	1
Pinto Control	0×04										RESERVED	0x00
State Control	0.04										Gain [1:0]	0x02
DC LDG Control 1	0809									°	Description	
DC LDG Control 2	0x0A									1		
DC LDG Control 3	0x0B									1	PI EN	a Control
DC LDG Report 12	0x0C									0	Over-Current Control	g control
DC LDG Report 34	0x0D									0	RESERVED	
DC LDG Report LO	0×0E									0	Output Gain Control	
State Report	0x0F									1		
Channel Fault	0x10									0		
Global Fault 1	0x11	0x00	0	0	0	0	0	0	0	0		
Global Fault 2	0x12	0x00	0	0	0	0	0	0	0	0		
Warning	0x1 3	0x00	0	0	0	0	0	0	0	0		
											Second Street and second	
					120							
TPA6404 EVM Disconnect					1 <sup>2</sup> C	2					40	EXAS INSTRUMENTS

Figure 4-10. I2C Window – I2C Logging

When this window is first open, the round button is green. To record I2C commands, click on this button and it will turn red. The recording can be saved for later use by clicking the save icon.

The I2C commands can also be copied to the clip board by clicking the  $\blacksquare$  icon next to trash bin icon.

E PurePath <sup>™</sup> Console -TPA6404 E	EVM											×
🕎 App Center 👌 👩 TPA6404 EVM	Home 🔾 🧰 Register Map	0										
Register Map	I2C Monitor Registers								legisters	Fields		
Register Name ∔↑	Q. Address ↓↑ Q.							VO H	Log		Misc Control 1	
= Disate		1								U	Field	Value
▼ BIUCK Mode Control	0x00									0	PI EN	0
Misc Control 1	0x01									0	OTW Ctrl [1:0]	0x01
Misc Control 2	0v0.2									0	OC Ctrl	1
Misc Control 2	0.02										RESERVED	0x00
State Control	0X04										Gain [1:0]	0x02
DC LDG Control 1	0x09									0	Description	
DC LDG Control 2	0x0A									1	Description	
DC LDG Control 3	0x0B									1	PLEN	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.
DC LDG Report 12	0x0C									0	Over-Temperature Warnin	ng Control
DC LDG Report 34	0x0D									0	RESERVED	
DC LDG Report LO	0x0E	Execute								0	Output Gain Control	
State Report	0x0F	-						(	Dutput	1		
Channel Fault	0x10								-	0		
Global Equit 1	0x11	0,00	0	0	0	0	0	0				
Giubar Fault I	UXTT	UXUU	0		0	0	0	0	0			
Global Fault 2	0x12	UxUU	ÿ	U	U	U	U	U	U	0		
Warning	0x13	0x00	0	0	0	0	0	0	0	0		
TPA6404 EVM     Disconned     V     TEXas Instruments										EXAS INSTRUMENTS		

Figure 4-11. I2C Window – Sending I2C Commands

A set of I2C commands can be loaded and executed from this window. On the top right corner, click on the *I/O* button to display the window in Figure 4-11. Write I2C commands here, or open an existing \*.cfg file then click



the *Execute* button on the bottom left corner. The I2C commands are sent to the device when the "Execute" button is pressed.

## 5 Board Layouts, Bill of Materials, and Schematic 5.1 TPA6404 EVM Layouts

Figure 5-1 and Figure 5-2 illustrate the EVM board layouts.



Figure 5-1. TPA6404Q1 EVM Top





Figure 5-2. TPA6404Q1 EVM Bottom

#### 5.2 TPA6404E1 EVM Schematic

Figure 5-3 and Figure 5-4 illustrate the EVM schematics.





















#### **6 Revision History**

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

С	hanges from Revision * (October 2017) to Revision A (February 2018)	Page
•	Updated Section 2.1 with TPA6404Q1 information and images	2
•	Updated PPC3 Download Window image	4
•	Updated TPA6404 EVM Connections image	9
•	Updated Miscellaneous Control Section section	11
•	Updated TPA6404Q1 EVM Top and TPA6404Q1 EVM Bottom images	16
•	Changed Figure 5-3 through Figure 5-6	18

#### IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to TI's Terms of Sale or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265 Copyright © 2022, Texas Instruments Incorporated