

# TAC5412-Q1 Automotive Low Power Stereo Audio Codec with integrated programmable boost, micbias and diagnostics

## 1 Features

- AEC-Q100 qualified for automotive applications
  - Temperature grade 1:  $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$
- ADC Channel
  - Performance:
    - Line differential input dynamic range: 108dB
    - Mic differential input dynamic range: 108dB
    - THD+N:  $-95\text{dB}$
    - Channel summing mode supports high SNR
  - Input voltage:
    - Differential,  $10\text{-}V_{\text{RMS}}$  full-scale inputs
    - Single-ended,  $5\text{-}V_{\text{RMS}}$  full-scale inputs
  - Sample rate ( $f_s$ ) = 8kHz to 768kHz
  - Programmable microphone bias (5V to 10V):
    - With an integrated efficient boost converter, or
    - With external high voltage HVDD supply
  - Programmable microphone input fault diagnostics:
    - Open inputs or shorted inputs
    - Short to ground, MICBIAS or VBAT
    - Microphone bias over current protection
- DAC Channel
  - DAC performance:
    - DAC to Line Out Dynamic Range: 119dB
    - DAC to HP Out Dynamic Range: 115dB
    - THD+N:  $-95\text{dB}$
  - Head Phone/Line Out output voltage:
    - Differential,  $2\text{-}V_{\text{RMS}}$  full-scale
    - Single-ended,  $1\text{-}V_{\text{RMS}}$  full-scale
  - DAC sample Rates ( $f_s$ ) = 8KHz to 768KHz
- Common Features
  - Low Latency Filter Selection
  - Programmable HPF and Biquad Filters
  - I<sup>2</sup>C Control Interface
  - Audio Serial Interface
    - Format: TDM, I<sup>2</sup>S or Left Justified
    - Word Length: 16,20,24 or 32 Bits
  - Programmable PLL for Flexible Clocking
  - Single Supply Operation: 3.3V
  - I/O Supply Operation: 1.2V, 1.8V or 3.3V

- [Telematics Control Unit](#)
- [Automotive active noise cancellation](#)
- [Automotive head units](#)

## 3 Description

The TAC5412-Q1 is a high performance Stereo Codec with  $10V_{\text{RMS}}$  differential Input, 108dB Stereo ADC and  $2V_{\text{RMS}}$  Stereo DAC Channels. The TAC5412-Q1 supports both differential and Single Ended input and output. Device supports both Microphone and Line In input on ADC Channel. DAC Output can be configured for either Line Out or Head Phone Load. TAC5412-Q1 can drive up to 62.5mW into a Headphone Load. The device also offers an integrated high-voltage, programmable microphone bias, and input diagnostic circuitry that allows direct connection to microphone-based automotive systems with full fault diagnostic capability for direct-coupled inputs. The TAC5412-Q1 integrates an efficient boost converter to generate a high voltage microphone bias using an external, low-voltage, 3.3V supply, The device can also directly use an external high-voltage supply (HVDD), which is a readily available supply in the system to generate the high-voltage, programmable microphone bias. The TAC5412-Q1 integrates programable channel gain, digital volume control, a low-jitter phase-locked loop (PLL), a programmable high-pass filter (HPF), programmable EQ and biquad filters, low-latency filter modes. It allows for sample rates up to 768kHz. The TAC5412-Q1 supports time-division multiplexing (TDM), I<sup>2</sup>S, or left-justified (LJ) audio formats, and can be controlled with I<sup>2</sup>C. These integrated high-performance features, along with a single, 3.3V supply operation, makes TAC5412-Q1 an excellent choice for space-constrained automotive systems.

### Device Information

PART NUMBER	PACKAGE <sup>(1)</sup>	PACKAGE SIZE <sup>(2)</sup>
TAC5412-Q1	WQFN (28)	4.0mm × 4.0mm
	WQFN (32)	5.0mm × 5.0mm

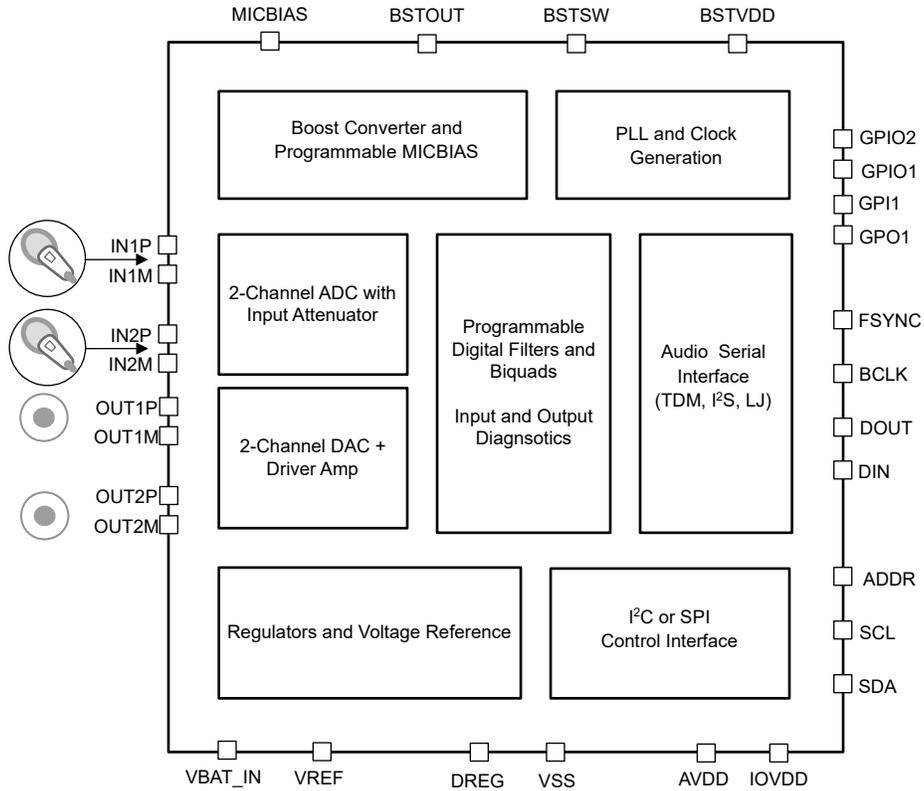
(1) For all available packages, see the orderable addendum at the end of the data sheet.

(2) The package size (length × width) is a nominal value and includes pins, where applicable.

## 2 Applications

- [Emergency Call- E-Call](#)





**Simplified Block Diagram**

ADVANCE INFORMATION

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## 4 Pin Configuration and Functions

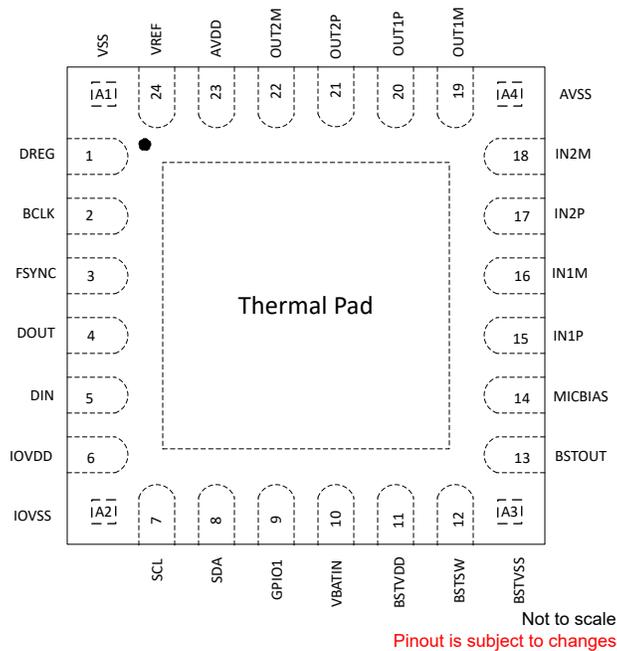


Figure 4-1. TAC5412-Q1 RGE Package, 28-Pin WQFN With Exposed Thermal Pad, Top View

Table 4-1. Pin Functions

PIN		TYPE <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
VSS	A1	Ground	Short directly to board Ground Plane.
DREG	1	Digital Supply	Digital on-chip regulator output voltage for digital supply (1.5V, nominal)
BCLK	2	Digital I/O	Audio serial data interface bus bit clock
FSYNC	3	Digital I/O	Audio serial data interface bus frame synchronization signal
DOUT	4	Digital Output	Audio serial data interface bus output
DIN	5	Digital Input	Audio serial data interface bus input
IOVDD	6	Digital Supply	Digital I/O power supply (1.8V or 3.3V, nominal)
IOVSS	A2	Ground	Short directly to board Ground Plane.
SCL	7	Digital Input	Clock for I <sup>2</sup> C Control Interface
SDA	8	Digital I/O	Data for I <sup>2</sup> C Control Interface
GPIO1	9	Digital I/O	General-purpose digital input/output 1 (multipurpose functions such as daisy-chain input, audio data output, PLL input clock source, interrupt, and so forth)
VBAT_IN	10	Analog	Analog VBAT input monitoring pin (used for input diagnostics)
BSTVDD	11	Analog Supply	Boost converter supply voltage (3.3V, nominal)
BSTSW	12	Analog Supply	Boost converter switching Pin
BSTVSS	A3	Ground	Short directly to board Ground Plane.

Table 4-1. Pin Functions (continued)

PIN		TYPE <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
BSTOUT	13	Analog Supply	Boost Convertor Output Voltage
MICBIAS	14	Analog	MICBIAS Output (Porgammable output upto 11V)
IN1P	15	Analog Input	Analog Input 1P Pin
IN1M	16	Analog Input	Analog Input 1M Pin
IN2P	17	Analog Input	Analog Input 2P Pin
IN2M	18	Analog Input	Analo Input 2M Pin
AVSS	A4	Ground	Short directly to board Ground Plane.
OUT1M	19	Analog Output	Analog Output 1M Pin
OUT1P	20	Analog Output	Analog Output 1P Pin
OUT2P	21	Analog Output	Analog Output 2P Pin
OUT2M	22	Analog Output	Analog Output 2M Pin
AVDD	23	Analog Supply	Analog power (3.3V, nominal)
VREF	24	Analog	Analog reference voltage filter output

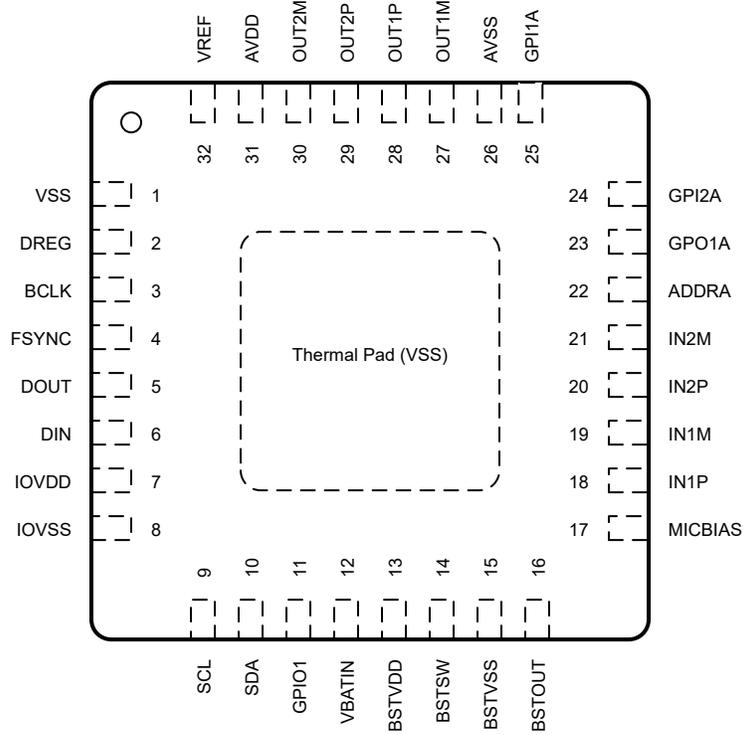


Figure 4-2. TAC5412-Q1 RTV Package, 32-Pin WQFN With Exposed Thermal Pad, Top View

**Table 4-2. Pin Functions**

PIN		TYPE <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
VSS	1	Ground	Short directly to board Ground Plane.
DREG	2	Digital Supply	Digital on-chip regulator output voltage for digital supply (1.5V, nominal)
BCLK	3	Digital I/O	Audio serial data interface bus bit clock
FSYNC	4	Digital I/O	Audio serial data interface bus frame synchronization signal
DOUT	5	Digital Output	Audio serial data interface bus output
DIN	6	Digital Input	Audio serial data interface bus input
IOVDD	7	Digital Supply	Digital I/O power supply (1.8V or 3.3V, nominal)
IOVSS	8	Ground	Short directly to board Ground Plane.
SCL	9	Digital Input	Clock for I <sup>2</sup> C Control Interface
SDA	10	Digital I/O	Data for I <sup>2</sup> C Control Interface
GPIO1	11	Digital I/O	General-purpose digital input/output 1 (multipurpose functions such as daisy-chain input, audio data output, PLL input clock source, interrupt, and so forth)
VBAT_IN	12	Analog	Analog VBAT input monitoring pin (used for input diagnostics)
BSTVDD	13	Analog Supply	Boost converter supply voltage (3.3V, nominal)
BSTSW	14	Analog Supply	Boost converter switching Pin
BSTVSS	15	Ground	Short directly to board Ground Plane.
BSTOUT	16	Analog Supply	Boost Converter Output Voltage
MICBIAS	17	Analog	MICBIAS Output (Programmable output upto 11V)
IN1P	18	Analog Input	Analog Input 1P Pin
IN1M	19	Analog Input	Analog Input 1M Pin
IN2P	20	Analog Input	Analog Input 2P Pin
IN2M	21	Analog Input	Analo Input 2M Pin
ADDRA	22	Digital Input	I2C Address Pin
GPO1A	23	Digital Output	General-purpose digital output 1 (multipurpose functions such as audio data output, interrupt, and so forth)
GPI2A	24	Digital Input	General-purpose digital input 2 (multipurpose functions such as daisy-chain input, PLL input clock source, and so forth)
GPI1A	25	Digital Input	General-purpose digital input 1 (multipurpose functions such as daisy-chain input, PLL input clock source, and so forth)
AVSS	26	Ground	Short directly to board Ground Plane.
OUT1M	27	Analog Output	Analog Output 1M Pin
OUT1P	28	Analog Output	Analog Output 1P Pin

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**Table 4-2. Pin Functions (continued)**

PIN		TYPE <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
OUT2P	29	Analog Output	Analog Output 2P Pin
OUT2M	30	Analog Output	Analog Output 2M Pin
AVDD	31	Analog Supply	Analog power (3.3V, nominal)
VREF	32	Analog	Analog reference voltage filter output

(1) I = Input, O = Output, I/O = Input or Output, G = Ground, P = Power.

## 5 Specifications

### 5.1 Absolute Maximum Ratings

over the operating ambient temperature range (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
Supply voltage	AVDD to AVSS	-0.3	3.9	V
Supply voltage	BSTVDD to VSS (thermal pad)	-0.3	3.9	V
Supply voltage	IOVDD to VSS (thermal pad)	-0.3	3.9	V
Supply voltage	BSTOUT(External HVDD Mode) to VSS (thermal pad)	-0.3	14	V
Ground voltage differences	AVSS to VSS (thermal pad)	-0.3	0.3	V
Battery voltage	VBAT_IN to AVSS	-0.3	18	V
Analog input voltage	Analog input pins voltage to AVSS	-0.3	18	V
Digital input voltage	Digital input pins voltage to VSS (thermal pad)	-0.3	IOVDD + 0.3	V
Temperature	Operating ambient, T <sub>A</sub>	-40	125	°C
	Junction, T <sub>J</sub>	-40	150	
	Storage, T <sub>stg</sub>	-65	150	

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

### 5.2 ESD Ratings

			VALUE	UNIT	
V <sub>(ESD)</sub>	Electrostatic discharge	Human-body model (HBM), per AEC Q100-002 <sup>(1)</sup>	±2000	V	
		Charged-device model (CDM), per AEC Q100-011	Corner package pins		±750
			All other non-corner package pins		±500

- (1) AEC Q100-002 indicates that HBM stressing shall be in accordance with the ANSI/ESDA/JEDEC JS-001 specification.

### 5.3 Recommended Operating Conditions

		MIN	NOM	MAX	UNIT
<b>POWER</b>					
AVDD <sup>(1)</sup>	Analog supply voltage to AVSS AVDD-3.3V Operation	3.0	3.3	3.6	V
BSTVDD	Boost converter supply voltage to VSS (thermal pad)	3.0	3.3	3.6	V
IOVDD	IO supply voltage to VSS (thermal pad) - IOVDD 3.3-V operation	3.0	3.3	3.6	V
	IO supply voltage to VSS (thermal pad) - IOVDD 1.8-V operation	1.65	1.8	1.95	
IOVDD	IO supply voltage to VSS (thermal pad) - IOVDD 1.2-V operation	1.08	1.2	1.32	V
BSTOUT	BSTOUT supply voltage to VSS in external HVDD Mode (thermal pad)	5.6	9	12	V
<b>INPUTS</b>					
VBAT_IN	VBAT_IN input pin voltage to AVSS	0	12.6	18	V
INxx	Analog input pins voltage to AVSS for line-in recording	0		14.2	V
	Analog input pins voltage to AVSS for microphone recording	0.1		MICBIAS - 0.1	V
	Analog input pins voltage to AVSS during short to VBAT_IN			VBAT_IN	V
	Digital input pins(except ADDRA, GPO1A, GPI1A, GPI2A) voltage to VSS (thermal pad)	0		IOVDD	V
	Digital input pins(ADDRA, GPO1A, GPI1A, GPI2A ) w.r.t AVSS	0		AVDD	V
<b>TEMPERATURE</b>					
T <sub>A</sub>	Operating ambient temperature	-40		125	°C

		MIN	NOM	MAX	UNIT
<b>OTHERS</b>					
	GPIO1 (used as CCLK input) clock frequency			36.864 <sup>(2)</sup>	MHz
C <sub>b</sub>	SCL and SDA bus capacitance for I <sup>2</sup> C interface supports standard-mode and fast-mode			400	pF
	SCL and SDA bus capacitance for I <sup>2</sup> C interface supports fast-mode plus			550	
C <sub>L</sub>	Digital output load capacitance		20	50	pF
	Boost converter inductor for TBD clocking mode		TBD		μH

- (1) AVSS and VSS (thermal pad); all ground pins must be tied together and must not differ in voltage by more than 0.2 V.  
 (2) MCLK input rise time (V<sub>IL</sub> to V<sub>IH</sub>) and fall time (V<sub>IH</sub> to V<sub>IL</sub>) must be less than 5 ns. For better audio noise performance, MCLK input must be used with low jitter.

## 5.4 Thermal Information

THERMAL METRIC <sup>(1)</sup>		TAC5412-Q1	UNIT
		RGE (VQFN)	
		24 PINS	
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	38.4	°C/W
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	26.3	°C/W
R <sub>θJB</sub>	Junction-to-board thermal resistance	15.9	°C/W
ψ <sub>JT</sub>	Junction-to-top characterization parameter	0.5	°C/W
ψ <sub>JB</sub>	Junction-to-board characterization parameter	15.8	°C/W
R <sub>θJC(bot)</sub>	Junction-to-case (bottom) thermal resistance	13.8	°C/W

- (1) For more information about traditional and new thermal metrics, see the [spra953](#) application report.

## 5.5 Thermal Information

THERMAL METRIC <sup>(1)</sup>		TAC5412-Q1	UNIT
		RTV (WQFN)	
		32 PINS	
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	39.7	°C/W
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	18.4	°C/W
R <sub>θJB</sub>	Junction-to-board thermal resistance	19.5	°C/W
ψ <sub>JT</sub>	Junction-to-top characterization parameter	0.2	°C/W
ψ <sub>JB</sub>	Junction-to-board characterization parameter	19.5	°C/W
R <sub>θJC(bot)</sub>	Junction-to-case (bottom) thermal resistance	11.5	°C/W

- (1) For more information about traditional and new thermal metrics, see the [spra953](#) application report.

## 5.6 Electrical Characteristics

at T<sub>A</sub> = 25°C, AVDD = 3.3 V, IOVDD = 3.3 V, BSTVDD = 3.3 V, HVDD = 11 V (for external HVDD case), f<sub>IN</sub> = 1-kHz sinusoidal signal, f<sub>S</sub> = 48 kHz, 32-bit audio data, BCLK = 256 x f<sub>S</sub>, TDM slave mode and PLL on (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	NOM	MAX	UNIT
<b>ADC PERFORMANCE FOR LINE INPUT RECORDING</b>					
Differential input full-scale DC signal voltage	AC-coupled input, input fault diagnostic not supported		10		V <sub>RMS</sub>
	DC-coupled input, DC common-mode voltage INxP = INxM = 7.1 V, input fault diagnostic supported				

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 at  $T_A = 25^\circ\text{C}$ ,  $AVDD = 3.3\text{ V}$ ,  $IOVDD = 3.3\text{ V}$ ,  $BSTVDD = 3.3\text{ V}$ ,  $HVDD = 11\text{ V}$  (for external HVDD case),  $f_{IN} = 1\text{-kHz}$  sinusoidal signal,  $f_S = 48\text{ kHz}$ , 32-bit audio data,  $BCLK = 256 \times f_S$ , TDM slave mode and PLL on (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	NOM	MAX	UNIT
	Single-ended input full-scale DC signal voltage	AC-coupled input, input fault diagnostic not supported		5		$V_{RMS}$
		DC-coupled input, DC common-mode voltage $INxP = INxM = 7.1\text{ V}$ , input fault diagnostic supported				
SNR	Signal-to-noise ratio, A-weighted <sup>(1) (2)</sup>	IN1 differential AC-coupled input selected and AC signal shorted to ground, 0-dB channel gain		108		dB
		IN1 differential DC-coupled input selected and AC signal shorted to ground, 0-dB channel gain		108		
DR	Dynamic range, A-weighted <sup>(2)</sup>	IN1 differential AC-coupled input selected and –60-dB full-scale AC signal input, 0-dB channel gain		108		dB
		IN1 differential DC-coupled input selected and –60-dB full-scale AC signal input, 0-dB channel gain		108		
THD+N	Total harmonic distortion <sup>(2)</sup>	IN1 differential AC-coupled input selected and –1-dB full-scale AC signal input, 0-dB channel gain		–95	TBD	dB
		IN1 differential DC-coupled input selected and –1-dB full-scale AC signal input, 0-dB channel gain		–95		

**ADC PERFORMANCE FOR MICROPHONE INPUT RECORDING**
**ADC OTHER PARAMETERS**

	Input impedance	Differential input, between $INxP$ and $INxM$		66.6		k $\Omega$
		Single-ended input, between $INxP$ and $INxM$		33.3		
	Offset	Shorted Input.		TBD		mV
	Digital volume control range	Programmable 0.5-dB steps	–120		42	dB
	Input Signal Bandwidth	Upto 192KSPS FS Rate		0.46		FS
		>192KSPS		90		kHz
	Output data sample rate	Programmable	3.675		768	kHz
	Output data sample word length	Programmable	16		32	Bits
	Digital high-pass filter cutoff frequency	First-order IIR filter with programmable coefficients, –3-dB point (default setting)		2		Hz
	Interchannel isolation	–1-dB full-scale AC signal line-in input to non measurement channel		–134		dB
	Interchannel gain mismatch	–6-dB full-scale AC signal line-in input, 0-dB channel gain		0.1		dB
	Interchannel phase mismatch	1-kHz sinusoidal signal		0.01		Degrees
PSRR	Power-supply rejection ratio	100-mV <sub>PP</sub> , 1-kHz sinusoidal signal on AVDD, differential input selected, 0-dB channel gain		92		dB
CMRR	Common-mode rejection ratio	Differential microphone input selected, 0-dB channel gain, 1- $V_{RMS}$ AC input, 1-kHz signal on both pins and measure level at output, CHx_CFG0 D3-2 register bits set to 2b'10 to configure device in high CMRR performance mode		80		dB

**MICROPHONE BIAS**

	MICBIAS noise	BW = 20 Hz to 20 kHz, A-weighted, 1- $\mu\text{F}$ capacitor between MICBIAS and AVSS		20		$\mu\text{V}_{RMS}$
	MICBIAS voltage	Programmable 0.5-V steps	3		10	V

at  $T_A = 25^\circ\text{C}$ ,  $AVDD = 3.3\text{ V}$ ,  $IOVDD = 3.3\text{ V}$ ,  $BSTVDD = 3.3\text{ V}$ ,  $HVDD = 11\text{ V}$  (for external HVDD case),  $f_{IN} = 1\text{-kHz}$  sinusoidal signal,  $f_S = 48\text{ kHz}$ , 32-bit audio data,  $BCLK = 256 \times f_S$ , TDM slave mode and PLL on (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	NOM	MAX	UNIT
MICBIAS current drive	MICBIAS voltage 10 V			30	mA
MICBIAS load regulation	MICBIAS voltage 10 V, measured up to maximum load	0		1	%
MICBIAS over current protection threshold	MICBIAS voltage 10 V	35			mA
<b>INPUT DIAGNOSTICS</b>					
Fault monitoring repetition rate	Programmable, DC-coupled input	1	4	8	ms
Fault response time	Fault monitoring repetition rate 4-ms, DC-coupled input		16		ms
Threshold voltage for (INxx – AVSS) input shorted to ground	Programmable 60-mV steps, DC-coupled input	0		900	mV
Threshold voltage for (INxP – INxM) input shorted together	Programmable 30-mV steps, DC-coupled input	0		450	mV
Threshold voltage for (MICBIAS – INxx) input shorted to MICBIAS	Programmable 30-mV steps, DC-coupled input	0		450	mV
Threshold voltage for (VBAT – INxx) input shorted to VBAT_IN	Programmable 30-mV steps, DC-coupled input	0		450	mV
<b>DAC Performance for Line Output/Head Phone Playback</b>					
Full Scale Output Voltage	Differential output between OUTxP and OUTxM, AVDD=3.3V		2		$V_{RMS}$
	Single-ended Output, AVDD=3.3V		1		
	Pseudo Differential Output between OUTxP and OUTxM, AVDD=3.3V		1		
SNR	Differential Output, 0dBFS Signal, AVDD=3.3V		119		dB
	Single Ended Output, 0dBFS Signal, AVDD=3.3V		110		
	Pseudo Differential Output, 0dBFS Signal, AVDD=3.3V		110		
	Differential Output, 0dBFS Signal, AVDD=3.3V, 0dBFS Signal, Power Tune Mode		114		
	Single Ended Output, 0dBFS Signal, AVDD=3.3V, Power Tune Mode		105		
	Pseudo Differential Output, 0dBFS Signal, AVDD=3.3V, Power Tune Mode		104		
DR	Differential Output, -60dBFS Signal, AVDD=3.3V		119		dB
	Single Ended Output, -60dBFS Signal, AVDD=3.3V		110		
	Pseudo Differential Output, -60dBFS Signal, AVDD=3.3V		110		
	Differential Output, -60dBFS Signal, AVDD=3.3V, 0dBFS Signal, Power Tune Mode		114		
	Single Ended Output, -60dBFS Signal, AVDD=3.3V, Power Tune Mode		105		
	Pseudo Differential Output, -60dBFS Signal, AVDD=3.3V, Power Tune Mode		104		
THD+N	Total harmonic distortion <sup>(2)</sup>		-95		dB

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 at  $T_A = 25^\circ\text{C}$ ,  $AVDD = 3.3\text{ V}$ ,  $IOVDD = 3.3\text{ V}$ ,  $BSTVDD = 3.3\text{ V}$ ,  $HVDD = 11\text{ V}$  (for external HVDD case),  $f_{IN} = 1\text{-kHz}$  sinusoidal signal,  $f_S = 48\text{ kHz}$ , 32-bit audio data,  $BCLK = 256 \times f_S$ , TDM slave mode and PLL on (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	NOM	MAX	UNIT
	Head Phone Load Range				16		$\Omega$
	Line Out Load Range			600			$\Omega$
	Channel gain control range	Programmable 1-dB steps		-6		12	dB
<b>DAC Channel OTHER PARAMETERS</b>							
	Output Offset	0 Input			0.5		mV
	Output Common Mode	Common Mode Level for OUTxP and OUTxM AVDD=3.3V (Register Configurable)	Common Mode Level for OUTxP and OUTxM AVDD=3.3V		1.625		V
	Common Mode Error	DC Error in Common Mode Voltage			$\pm 20$		mV
	Digital volume control range	Programmable 0.5-dB steps		-120		42	dB
	Output Signal Bandwidth	Upto 192KSPS FS Rate			0.46		FS
		>192KSPS			90		kHz
	Input data sample rate	Programmable		7.35		768	kHz
	Input data sample word length	Programmable		16		32	Bits
	Digital high-pass filter cutoff frequency	First-order IIR filter with programmable coefficients, -3-dB point (default setting)			2		Hz
	Interchannel isolation				-134		dB
	Interchannel gain mismatch				0.1		dB
	Interchannel phase mismatch	1-kHz sinusoidal signal			0.01		Degrees
PSRR	Power-supply rejection ratio	100-mV <sub>PP</sub> , 1-kHz sinusoidal signal on AVDD, differential input selected, 0-dB channel gain			92		dB
	Mute Attenuation				-130		dB
P <sub>out</sub>	Output Power Delivery	Single ended/Pseudo Differential R <sub>L</sub> =16 Ohms, THD+N<1%			62.5		mW
<b>DIGITAL I/O</b>							
V <sub>IL</sub>	Low-level digital input logic voltage threshold	All digital pins except GPI1A, GPI2A, ADDRA, SDA and SCL, IOVDD 1.8-V operation		-0.3		0.35 x IOVDD	V
		All digital pins except GPI1A, GPI2A, ADDRA, SDA and SCL, IOVDD 3.3-V operation		-0.3		0.8	
V <sub>IH</sub>	High-level digital input logic voltage threshold	All digital pins except GPI1A, GPI2A, ADDRA, SDA and SCL, IOVDD 1.8-V operation		0.65 x IOVDD		IOVDD + 0.3	V
		All digital pins except GPI1A, GPI2A, ADDRA, SDA and SCL, IOVDD 3.3-V operation		2		IOVDD + 0.3	
V <sub>OL</sub>	Low-level digital output voltage	All digital pins except GPO1A, SDA and SCL, I <sub>OL</sub> = -2 mA, IOVDD 1.8-V operation				0.45	V
		All digital pins except GPO1A, SDA and SCL, I <sub>OL</sub> = -2 mA, IOVDD 3.3-V operation				0.4	
V <sub>OH</sub>	High-level digital output voltage	All digital pins except GPO1A, SDA and SCL, I <sub>OH</sub> = 2 mA, IOVDD 1.8-V operation		IOVDD - 0.45			V
		All digital pins except GPO1A, SDA and SCL, I <sub>OH</sub> = 2 mA, IOVDD 3.3-V operation		2.4			
V <sub>IL(AVDD)</sub>	Low-level digital input logic voltage threshold	For Pins GPI1A, GPI2A, ADDRA		-0.3		0.35 x AVDD	V

at  $T_A = 25^\circ\text{C}$ ,  $AVDD = 3.3\text{ V}$ ,  $IOVDD = 3.3\text{ V}$ ,  $BSTVDD = 3.3\text{ V}$ ,  $HVDD = 11\text{ V}$  (for external HVDD case),  $f_{IN} = 1\text{-kHz}$  sinusoidal signal,  $f_S = 48\text{ kHz}$ , 32-bit audio data,  $BCLK = 256 \times f_S$ , TDM slave mode and PLL on (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	NOM	MAX	UNIT
$V_{IH(AVDD)}$	High-level digital input logic voltage threshold	For Pins GPI1A, GPI2A, ADDR A	$0.65 \times AVDD$		$AVDD + 0.3$	V
$V_{OL(AVDD)}$	Low-level digital output voltage	For GPO1A Pin			0.45	V
$V_{OH(AVDD)}$	High-level digital output voltage	For GPO1A Pin	$AVDD - 0.45$			V
$V_{IL(I2C)}$	Low-level digital input logic voltage threshold	SDA and SCL	-0.5		$0.3 \times IOVDD$	V
$V_{IH(I2C)}$	High-level digital input logic voltage threshold	SDA and SCL	$0.7 \times IOVDD$		$IOVDD + 0.5$	V
$V_{OL1(I2C)}$	Low-level digital output voltage	SDA, $I_{OL(I2C)} = -3\text{ mA}$ , $IOVDD > 2\text{ V}$			0.4	V
$V_{OL2(I2C)}$	Low-level digital output voltage	SDA, $I_{OL(I2C)} = -2\text{ mA}$ , $IOVDD$ [char_not_recognized] $2\text{ V}$			$0.2 \times IOVDD$	V
$I_{OL(I2C)}$	Low-level digital output current	SDA, $V_{OL(I2C)} = 0.4\text{ V}$ , standard-mode or fast-mode	3			mA
		SDA, $V_{OL(I2C)} = 0.4\text{ V}$ , fast-mode plus	20			
$I_{IL}$	Input logic-low leakage for digital inputs	All digital pins, input = $0\text{ V}$	-5	0.1	5	$\mu\text{A}$
$I_{IH}$	Input logic-high leakage for digital inputs	All digital pins, input = $IOVDD$	-5	0.1	5	$\mu\text{A}$
$C_{IN}$	Input capacitance for digital inputs	All digital pins		5		pF
$R_{PD}$	Pulldown resistance for digital I/O pins when asserted on			20		k $\Omega$

**TYPICAL SUPPLY CURRENT CONSUMPTION**

$I_{AVDD}$	Current consumption in hardware shutdown mode	SHDNZ = 0, all device external clocks stopped		0.5	$\mu\text{A}$
$I_{BSTVDD}$ , or $I_{HVDD}$				0.1	
$I_{IOVDD}$				0.1	
$I_{AVDD}$	Current consumption in sleep mode (software shutdown mode)	All device external clocks stopped		TBD	$\mu\text{A}$
$I_{BSTVDD}$ , or $I_{HVDD}$				0.1	
$I_{IOVDD}$				0.1	
$I_{AVDD}$	Current consumption when MICBIAS ON, MICBIAS voltage $10\text{ V}$ , $30\text{ mA}$ load, ADC off	$f_S = 48\text{ kHz}$ , $BCLK = 256$ [char_not_recognized] $f_S$		TBD	mA
$I_{BSTVDD}$				TBD	
$I_{HVDD}$				TBD	
$I_{IOVDD}$				0.01	
$I_{AVDD}$	Current consumption with ADC 2-channel operation at $f_S$ 16-kHz, MICBIAS off, PLL on, $BCLK = 512$ [char_not_recognized] $f_S$			TBD	mA
$I_{BSTVDD}$ , or $I_{HVDD}$				0	
$I_{IOVDD}$				0.1	
$I_{AVDD}$	Current consumption with ADC 2-channel operation at $f_S$ 48-kHz, MICBIAS on, PLL off, $BCLK = 512$ [char_not_recognized] $f_S$			TBD	mA
$I_{BSTVDD}$ , or $I_{HVDD}$				0	
$I_{IOVDD}$				0.1	

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 at  $T_A = 25^\circ\text{C}$ ,  $AVDD = 3.3\text{ V}$ ,  $IOVDD = 3.3\text{ V}$ ,  $BSTVDD = 3.3\text{ V}$ ,  $HVDD = 11\text{ V}$  (for external HVDD case),  $f_{IN} = 1\text{-kHz}$  sinusoidal signal,  $f_S = 48\text{ kHz}$ , 32-bit audio data,  $BCLK = 256 \times f_S$ , TDM slave mode and PLL on (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	NOM	MAX	UNIT
$I_{AVDD}$	Current consumption with DAC to HP 2-channel operation at $f_S$ 16-kHz, MICBIAS off, PLL on, BCLK = 512 [char_not_recognized] $f_S$		TBD			mA
$I_{BSTVDD}$ , or $I_{HVDD}$			0			
$I_{IOVDD}$			0.2			
$I_{AVDD}$	Current consumption with DAC to HP 2-channel operation at $f_S$ 48-kHz, MICBIAS off, PLL off, BCLK = 512 [char_not_recognized] $f_S$		TBD			mA
$I_{BSTVDD}$ , or $I_{HVDD}$			0			
$I_{IOVDD}$			TBD			

- (1) Ratio of output level with 1-kHz full-scale sine-wave input, to the output level with the AC signal input shorted to ground, measured A-weighted over a 20-Hz to 20-kHz bandwidth using an audio analyzer.
- (2) All performance measurements done with 20-kHz low-pass filter and, where noted, A-weighted filter. Failure to use such a filter can result in higher THD and lower SNR and dynamic range readings than shown in the Electrical Characteristics. The low-pass filter removes out-of-band noise, which, although not audible, can affect dynamic specification values.

**ADVANCE INFORMATION**

## 5.7 Timing Requirements: I<sup>2</sup>C Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V (unless otherwise noted); see TBD for timing diagram

		MIN	NOM	MAX	UNIT
<b>STANDARD-MODE</b>					
f <sub>SCL</sub>	SCL clock frequency	0		100	kHz
t <sub>HD,STA</sub>	Hold time (repeated) START condition. After this period, the first clock pulse is generated.	4			µs
t <sub>LOW</sub>	Low period of the SCL clock	4.7			µs
t <sub>HIGH</sub>	High period of the SCL clock	4			µs
t <sub>SU,STA</sub>	Setup time for a repeated START condition	4.7			µs
t <sub>HD,DAT</sub>	Data hold time	0		3.45	µs
t <sub>SU,DAT</sub>	Data setup time	250			ns
t <sub>r</sub>	SDA and SCL rise time			1000	ns
t <sub>f</sub>	SDA and SCL fall time			300	ns
t <sub>SU,STO</sub>	Setup time for STOP condition	4			µs
t <sub>BUF</sub>	Bus free time between a STOP and START condition	4.7			µs
<b>FAST-MODE</b>					
f <sub>SCL</sub>	SCL clock frequency	0		400	kHz
t <sub>HD,STA</sub>	Hold time (repeated) START condition. After this period, the first clock pulse is generated.	0.6			µs
t <sub>LOW</sub>	Low period of the SCL clock	1.3			µs
t <sub>HIGH</sub>	High period of the SCL clock	0.6			µs
t <sub>SU,STA</sub>	Setup time for a repeated START condition	0.6			µs
t <sub>HD,DAT</sub>	Data hold time	0		0.9	µs
t <sub>SU,DAT</sub>	Data setup time	100			ns
t <sub>r</sub>	SDA and SCL rise time	20		300	ns
t <sub>f</sub>	SDA and SCL fall time		20 × (IOVDD / 5.5 V)	300	ns
t <sub>SU,STO</sub>	Setup time for STOP condition	0.6			µs
t <sub>BUF</sub>	Bus free time between a STOP and START condition	1.3			µs
<b>FAST-MODE PLUS</b>					
f <sub>SCL</sub>	SCL clock frequency	0		1000	kHz
t <sub>HD,STA</sub>	Hold time (repeated) START condition. After this period, the first clock pulse is generated.	0.26			µs
t <sub>LOW</sub>	Low period of the SCL clock	0.5			µs
t <sub>HIGH</sub>	High period of the SCL clock	0.26			µs
t <sub>SU,STA</sub>	Setup time for a repeated START condition	0.26			µs
t <sub>HD,DAT</sub>	Data hold time	0			µs
t <sub>SU,DAT</sub>	Data setup time	50			ns
t <sub>r</sub>	SDA and SCL Rise Time			120	ns
t <sub>f</sub>	SDA and SCL Fall Time		20 × (IOVDD / 5.5 V)	120	ns
t <sub>SU,STO</sub>	Setup time for STOP condition	0.26			µs
t <sub>BUF</sub>	Bus free time between a STOP and START condition	0.5			µs

## 5.8 Switching Characteristics: I<sup>2</sup>C Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V (unless otherwise noted); see TBD for timing diagram

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>d</sub> (SDA)	SCL to SDA delay	Standard-mode	200		1250	ns
		Fast-mode	200		850	ns
		Fast-mode plus			400	ns

## 5.9 Timing Requirements: SPI Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V and 20-pF load on all outputs (unless otherwise noted); see TBD for timing diagram

PARAMETER		TEST CONDITIONS	MIN	NOM	MAX	UNIT
t <sub>i</sub> (SCLK)	SCLK period		40			ns
t <sub>H</sub> (SCLK)	SCLK high pulse duration		18			ns
t <sub>L</sub> (SCLK)	SCLK low pulse duration		18			ns
t <sub>LEAD</sub>	Enable lead time		16			ns
t <sub>TRAIL</sub>	Enable trail time		16			ns
t <sub>DSEQ</sub>	Sequential transfer delay		20			ns
t <sub>SU</sub> (MOSI)	MOSI data setup time		8			ns
t <sub>HLD</sub> (MOSI)	MOSI data hold time		8			ns
t <sub>r</sub> (SCLK)	SCLK rise time	10% - 90% rise time			6	ns
t <sub>f</sub> (SCLK)	SCLK fall time	90% - 10% fall time			6	ns

## 5.10 Switching Characteristics: SPI Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V and 20-pF load on all outputs (unless otherwise noted); see for timing diagram

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>a</sub> (MISO)	MISO access time	IOVDD = 1.8 V			18	ns
		IOVDD = 3.3 V			14	
t <sub>d</sub> (MISO)	SCLK to MISO delay	50% of SCLK to 50% of MISO, IOVDD = 1.8 V			19	ns
		50% of SCLK to 50% of MISO, IOVDD = 3.3 V			15	
t <sub>dis</sub> (MISO)	MISO disable time	IOVDD = 1.8 V			18	ns
		IOVDD = 3.3 V			14	

## 5.11 Timing Requirements: TDM, I<sup>2</sup>S or LJ Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V and 20-pF load on all outputs (unless otherwise noted); see for timing diagram

PARAMETER		TEST CONDITIONS	MIN	NOM	MAX	UNIT
t <sub>i</sub> (BCLK)	BCLK period		40			ns
t <sub>H</sub> (BCLK)	BCLK high pulse duration <sup>(1)</sup>		18			ns
t <sub>L</sub> (BCLK)	BCLK low pulse duration <sup>(1)</sup>		18			ns
t <sub>SU</sub> (FSYNC)	FSYNC setup time		8			ns
t <sub>HLD</sub> (FSYNC)	FSYNC hold time		8			ns
t <sub>r</sub> (BCLK)	BCLK rise time	10% - 90% rise time			10	ns
t <sub>f</sub> (BCLK)	BCLK fall time	90% - 10% fall time			10	ns

- (1) The BCLK minimum high or low pulse duration must be higher than 25 ns (to meet the timing specifications), if the SDO<sub>UT</sub> data line is latched on the opposite BCLK edge polarity than the edge used by the device to transmit SDO<sub>UT</sub> data.

### 5.12 Switching Characteristics: TDM, I<sup>2</sup>S or LJ Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V and 20-pF load on all outputs (unless otherwise noted); see TBD for timing diagram

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>d</sub> (SDOUT-BCLK)	BCLK to SDOUT delay	50% of BCLK to 50% of SDOUT, IOVDD = 1.8 V		18	ns
		50% of BCLK to 50% of SDOUT, IOVDD = 3.3 V		14	
t <sub>d</sub> (SDOUT-FSYNC)	FSYNC to SDOUT delay in TDM or LJ mode (for MSB data with TX_OFFSET = 0)	50% of FSYNC to 50% of SDOUT, IOVDD = 1.8 V		18	ns
		50% of FSYNC to 50% of SDOUT, IOVDD = 3.3 V		14	
f <sub>(BCLK)</sub>	BCLK output clock frequency; master mode (1)			24.576	MHz
t <sub>H</sub> (BCLK)	BCLK high pulse duration; master mode	IOVDD = 1.8 V		14	ns
		IOVDD = 3.3 V		14	
t <sub>L</sub> (BCLK)	BCLK low pulse duration; master mode	IOVDD = 1.8 V		14	ns
		IOVDD = 3.3 V		14	
t <sub>d</sub> (FSYNC)	BCLK to FSYNC delay; master mode	50% of BCLK to 50% of FSYNC, IOVDD = 1.8 V		18	ns
		50% of BCLK to 50% of FSYNC, IOVDD = 3.3 V		14	
t <sub>r</sub> (BCLK)	BCLK rise time; master mode	10% - 90% rise time, IOVDD = 1.8 V		10	ns
		10% - 90% rise time, IOVDD = 3.3 V		10	
t <sub>f</sub> (BCLK)	BCLK fall time; master mode	90% - 10% fall time, IOVDD = 1.8 V		8	ns
		90% - 10% fall time, IOVDD = 3.3 V		8	

(1) The BCLK output clock frequency must be lower than 18.5 MHz (to meet the timing specifications), if the SDOUT data line is latched on the opposite BCLK edge polarity than the edge used by the device to transmit SDOUT data.

### 5.13 Timing Requirements: PDM Digital Microphone Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V and 20-pF load on all outputs (unless otherwise noted); see TBD for timing diagram

PARAMETER	TEST CONDITIONS	MIN	NOM	MAX	UNIT
t <sub>SU</sub> (PDMINx)	PDMINx setup time	30			ns
t <sub>HLD</sub> (PDMINx)	PDMINx hold time	TBD			ns

### 5.14 Switching Characteristics: PDM Digital Microphone Interface

at T<sub>A</sub> = 25°C, IOVDD = 3.3 V or 1.8 V and 20-pF load on all outputs (unless otherwise noted); see TBD for timing diagram

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
f <sub>(PDMCLK)</sub>	PDMCLK clock frequency	0.768		6.144	MHz
t <sub>H</sub> (PDMCLK)	PDMCLK high pulse duration	72			ns
t <sub>L</sub> (PDMCLK)	PDMCLK low pulse duration	72			ns
t <sub>r</sub> (PDMCLK)	PDMCLK rise time	10% - 90% rise time		8	ns
t <sub>f</sub> (PDMCLK)	PDMCLK fall time	90% - 10% fall time		8	ns

## 6 Detailed Description

### 6.1 Overview

The TAC5412-Q1 is from a scalable TAC5x1x-Q1 family of devices. As with the extended family of devices, the TAC5412-Q1 consists of a high-performance, low-power, flexible, mono/stereo, audio analog-to-digital converter (ADC) and audio digital-to-analog converter (DAC) with extensive feature integration. This device is intended for automotive applications such as telematics control unit, hands-free in-vehicle communication, emergency call, and multimedia applications. The high dynamic range of this device enables far-field audio recording with high fidelity. This device integrates a host of features that reduce cost, board space, and power consumption in space-constrained automotive sub-system designs. Package, performance, and device-compatible configuration registers make this device well suited for scalable system designs.

The TAC5412-Q1 consists of the following blocks:

- 2-channel, multibit, high-performance delta-sigma ( $\Delta\Sigma$ ) ADCs
- Configurable single-ended or differential audio inputs with high voltage signal swing
- High-voltage, Low-noise programmable microphone bias output
- Highly flexible, comprehensive input fault diagnostic
- 2-channel, multibit, high-performance delta-sigma ( $\Delta\Sigma$ ) DACs
- Configurable single-ended, differential or pseudo-differential audio outputs
- Over Current Diagnostics and Protection for MICBIAS and analog outputs
- Automatic gain controller (AGC)
- Advanced Thermal foldback and protection
- Advanced Battery guard and distortion limiter
- Programmable decimation filters with linear-phase or low-latency filter
- Programmable channel gain, volume control, and biquad filters for each channel
- Programmable phase and gain calibration with fine resolution for each channel
- Programmable high-pass filter (HPF) and digital channel mixer
- Pulse density modulation (PDM) digital microphone interface(only available in 5x5mm Package) with high-performance decimation filter
- Integrated low-jitter, phase-locked loop (PLL) supporting a wide range of system clocks
- Integrated digital and analog voltage regulators to support single-supply operation

Communication to the TAC5412-Q1 for configuring the control registers is supported using an I<sup>2</sup>C interface. The device supports a highly flexible audio serial interface [time-division multiplexing (TDM), I<sup>2</sup>S, or left-justified (LJ)] to transmit audio data seamlessly in the system across devices.

### 6.2 Functional Block Diagram

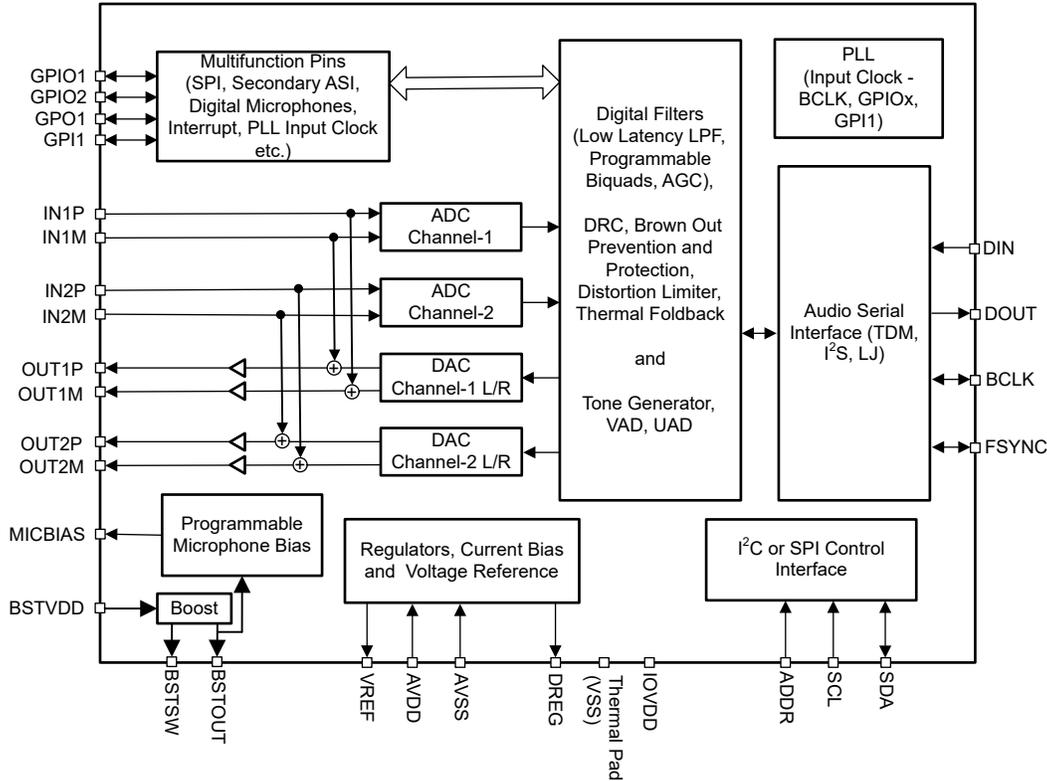


Figure 6-1. Functional Block Diagram

## 6.3 Feature Description

### 6.3.1 Serial Interfaces

This device has two serial interfaces: control and audio data. The control serial interface is used for device configuration. The audio data serial interface is used for transmitting audio data to the host device.

#### 6.3.1.1 Control Serial Interfaces

The device contains configuration registers and programmable coefficients that can be set to the desired values for a specific system and application use. All these registers can be accessed using either I<sup>2</sup>C or SPI communication to the device. For more information, see the [Section 7](#) section.

#### 6.3.1.2 Audio Serial Interfaces

Digital audio data flows between the host processor and the TAC5412-Q1 on the digital audio serial interface (ASI), or audio bus. This highly flexible ASI bus includes a TDM mode for multichannel operation, support for I<sup>2</sup>S or left-justified protocols format, programmable data length options, very flexible controller-target configurability for bus clock lines, and the ability to communicate with multiple devices within a system directly.

The TAC5412-Q1 supports up to two ASI Interfaces. Secondary ASI Clock and Data Pins can be configured by setting GPIO's. Frame Sync of two ASI's must be synchronous.

The bus protocol TDM, I<sup>2</sup>S, or left-justified (LJ) format can be selected for primary ASI by using the PASI\_FORMAT[1:0], P0\_R26\_D[7:6] register bits. As shown in [Table 6-1](#) and [Table 6-2](#), these modes are all most significant byte (MSB)-first, pulse code modulation (PCM) data format, with the output channel data word-length programmable as 16, 20, 24, or 32 bits by configuring the PASI\_WLEN[1:0], P0\_R26\_D[5:4] register bits.

**Table 6-1. Primary Audio Serial Interface Format**

P0_R26_D[7:6] : PASI_FORMAT[1:0]	PRIMARY AUDIO SERIAL INTERFACE FORMAT
00 (default)	Time division multiplexing (TDM) mode
01	Inter IC sound (I <sup>2</sup> S) mode
10	Left-justified (LJ) mode
11	Reserved (do not use this setting)

**Table 6-2. Primary Audio Serial Interface Data Word-Length**

P0_R7_D[5:4] : PASI_WLEN[1:0]	PRIMARY AUDIO OUTPUT CHANNEL DATA WORD-LENGTH
00	Data word-length set to 16 bits
01	Data word-length set to 20 bits
10	Data word-length set to 24 bits
11 (default)	Data word-length set to 32 bits

The frame sync pin, FSYNC, is used in this audio bus protocol to define the beginning of a frame and has the same frequency as the output data sample rates. The bit clock pin, BCLK, is used to clock out the digital audio data across the serial bus. The number of bit-clock cycles in a frame must accommodate multiple device active output channels with the programmed data word length.

A frame consists of multiple time-division channel slots (up to 32) to allow all input/output channel audio data transmissions to be completed on the audio bus by a device or multiple devices sharing the same audio bus. The device supports up to eight input channels and eight output channels that can be configured on the primary ASI bus to place their audio data on bus slot 0 to slot 31. [Table 6-3](#) lists the output channel-1 slot configuration settings. In I<sup>2</sup>S and LJ mode, the slots are divided into two sets, left-channel slots, and right-channel slots, as described in the [Section 6.3.1.2.2](#) and [Section 6.3.1.2.3](#) sections.

**Table 6-3. Output Channel-1 Slot Assignment Settings**

P0_R30_D[4:0] : PASI_TX_CH1_SLOT[4:0]	OUTPUT CHANNEL 1 SLOT ASSIGNMENT
0 0000 = 0d (default)	Slot 0 for TDM or left slot 0 for I <sup>2</sup> S, LJ.
0 0001 = 1d	Slot 1 for TDM or left slot 1 for LJ.
...	...
0 1111 = 15d	Slot 15 for TDM or left slot 15 for LJ.
1 0000 = 32d	Slot 16 for TDM or right slot 0 for I <sup>2</sup> S, LJ.
...	...
1 1110 = 30d	Slot 30 for TDM or right slot 14 for LJ.
1 1111 = 31d	Slot 31 for TDM or right slot 15 for LJ.

Similarly, the slot assignment setting for output channel 2 to channel 8 can be done using the PASI\_TX\_CH2\_SLOT (P0\_R31) to PASI\_TX\_CH8\_SLOT (P0\_R37) registers and for input channel 1 to channel 8 by using the PASI\_RX\_CH1\_SLOT (P0\_R40) to PAS\_RX\_CH8\_SLOT (P0\_R47), respectively.

The slot word length is the same as the primary ASI channel word length set for the device. The output channel data word length must be set to the same value for all TAC5412-Q1 devices if all devices share the same ASI bus in a system. The maximum number of slots possible for the ASI bus in a system is limited by the available bus bandwidth, which depends upon the BCLK frequency, output data sample rate used, and the channel data word length configured.

The device also includes a feature that offsets the start of the slot data transfer concerning the frame sync by up to 31 cycles of the bit clock. Offset can be configured independently for input and output data paths. [Table 6-4](#) and [Table 6-5](#) lists the programmable offset configuration settings for transmission and receive paths respectively.

**Table 6-4. Programmable Offset Settings for the ASI Slot Start for transmission**

P0_R28_D[4:0] : PASI_TX_OFFSET[4:0]	PROGRAMMABLE OFFSET SETTING FOR SLOT DATA TRANSMISSION START
0 0000 = 0d (default)	The device follows the standard protocol timing without any offset.
0 0001 = 1d	Slot start is offset by one BCLK cycle, as compared to standard protocol timing. For I <sup>2</sup> S or LJ, the left and right slot start is offset by one BCLK cycle, as compared to standard protocol timing.
.....	.....
1 1110 = 30d	Slot start is offset by 30 BCLK cycles, as compared to standard protocol timing. For I <sup>2</sup> S or LJ, the left and right slot start is offset by 30 BCLK cycles, as compared to standard protocol timing.
1 1111 = 31d	Slot start is offset by 31 BCLK cycles, as compared to standard protocol timing. For I <sup>2</sup> S or LJ, the left and right slot start is offset by 31 BCLK cycles, as compared to standard protocol timing.

**Table 6-5. Programmable Offset Settings for the ASI Slot Start for Receive**

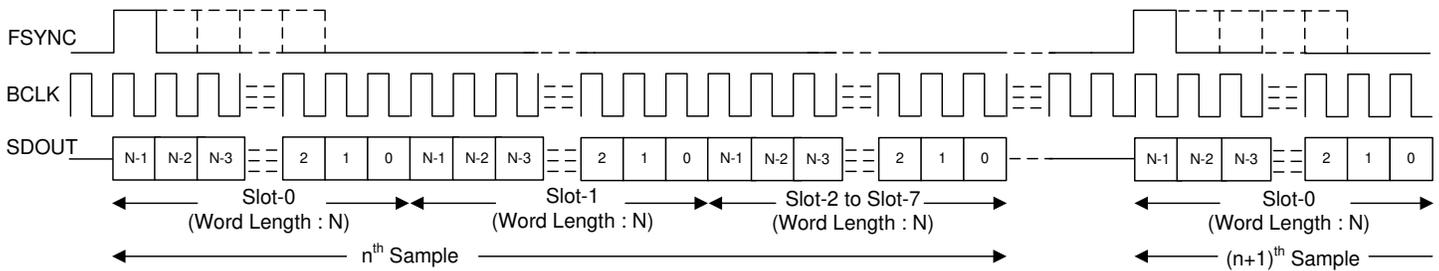
P0_R38_D[4:0] : PASI_RX_OFFSET[4:0]	PROGRAMMABLE OFFSET SETTING FOR SLOT DATA RECEIVE START
0 0000 = 0d (default)	The device follows the standard protocol timing without any offset.
0 0001 = 1d	Slot start is offset by one BCLK cycle, as compared to standard protocol timing. For I <sup>2</sup> S or LJ, the left and right slot start is offset by one BCLK cycle, as compared to standard protocol timing.
.....	.....
1 1110 = 30d	Slot start is offset by 30 BCLK cycles, as compared to standard protocol timing. For I <sup>2</sup> S or LJ, the left and right slot start is offset by 30 BCLK cycles, as compared to standard protocol timing.
1 1111 = 31d	Slot start is offset by 31 BCLK cycles, as compared to standard protocol timing. For I <sup>2</sup> S or LJ, the left and right slot start is offset by 31 BCLK cycles, as compared to standard protocol timing.

The device also features the ability to invert the polarity of the frame sync pin, FSYNC, used to transfer the audio data as compared to the default FSYNC polarity used in standard protocol timing. This feature can be set using the PASI\_FSYNC\_POL, P0\_R26\_D3 register bit. Similarly, the device can invert the polarity of the bit clock pin, BCLK, which can be set using the PASI\_BCLK\_POL, P0\_R26\_D2 register bit.

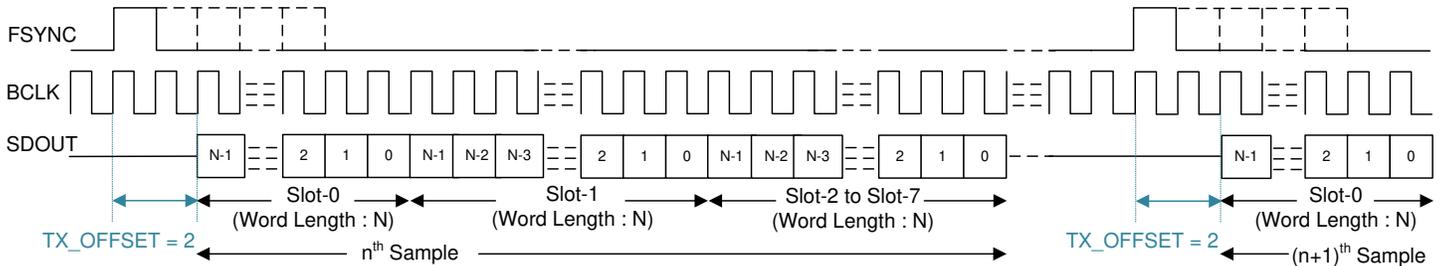
In addition, the word clock and bit clock can be independently configured in either Controller or Target mode, for flexible connectivity to a wide variety of processors. The word clock is used to define the beginning of a frame and may be programmed as either a pulse or a square-wave signal. The frequency of this clock corresponds to the maximum of the selected ADC sampling frequencies.

#### 6.3.1.2.1 Time Division Multiplexed Audio (TDM) Interface

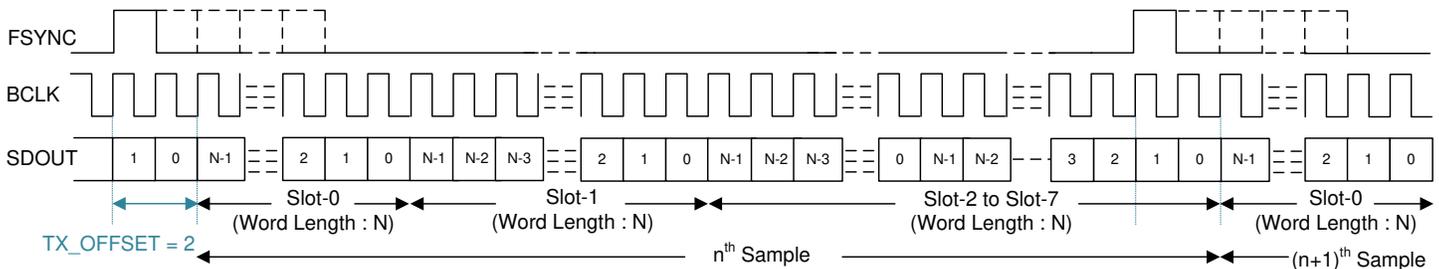
In TDM mode, also known as DSP mode, the rising edge of FSYNC starts the data transfer with the slot 0 data first. Immediately after the slot 0 data transmission, the remaining slot data are transmitted in order. FSYNC and each data bit (except the MSB of slot 0 when TX\_OFFSET equals 0) is transmitted on the rising edge of BCLK. [Figure 6-2](#) to [Figure 6-5](#) illustrate the protocol timing for TDM operation with various configurations.



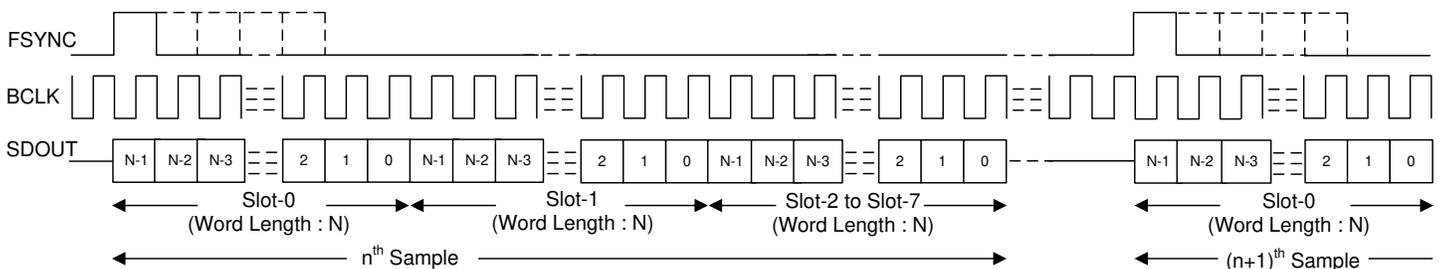
**Figure 6-2. TDM Mode Standard Protocol Timing (PASI\_TX\_OFFSET = 0)**



**Figure 6-3. TDM Mode Protocol Timing (PASI\_TX\_OFFSET = 2)**



**Figure 6-4. TDM Mode Protocol Timing (No Idle BCLK Cycles, PASI\_TX\_OFFSET = 2)**



**Figure 6-5. TDM Mode Protocol Timing (PASI\_TX\_OFFSET = 0 and PASI\_BCLK\_POL = 1)**

ADVANCE INFORMATION

For proper operation of the audio bus in TDM mode, the number of bit clocks per frame must be greater than or equal to the number of active output channels times the programmed word length of the output channel data. The device supports FSYNC as a pulse with a 1-cycle-wide bit clock, but also supports multiples as well. For a higher BCLK frequency operation, using TDM mode with a PASI\_TX\_OFFSET value higher than 0 is recommended.

### 6.3.1.2.2 Inter IC Sound (I<sup>2</sup>S) Interface

The standard I<sup>2</sup>S protocol is defined for only two channels: left and right. The device extends the same protocol timing for multichannel operation. In I<sup>2</sup>S mode, the MSB of the left slot 0 is transmitted on the falling edge of BCLK in the second cycle after the falling edge of FSYNC. Immediately after the left slot 0 data transmission, the remaining left slot data are transmitted in order. The MSB of the right slot 0 is transmitted on the falling edge of

BCLK in the second cycle after the *rising* edge of FSYNC. Immediately after the right slot 0 data transmission, the remaining right slot data are transmitted in order. FSYNC and each data bit is transmitted on the falling edge of BCLK. Figure 6-6 to Figure 6-9 illustrate the protocol timing for I<sup>2</sup>S operation with various configurations.

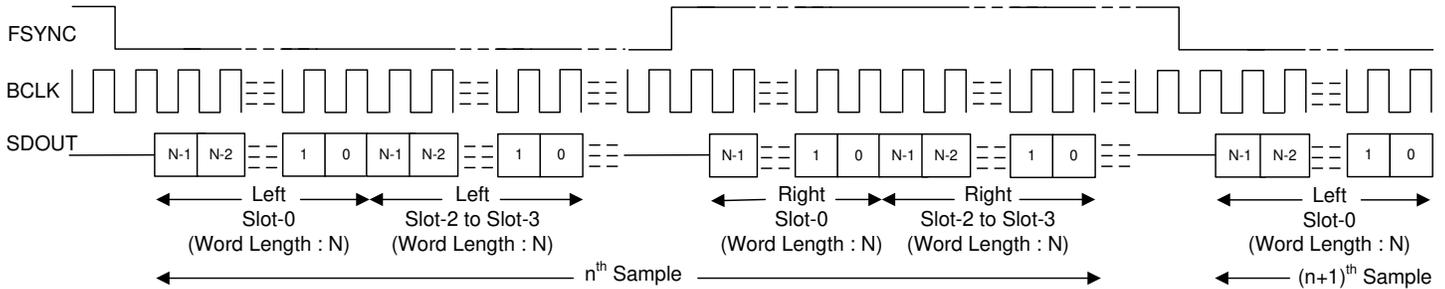


Figure 6-6. I<sup>2</sup>S Mode Standard Protocol Timing (PASI\_TX\_OFFSET = 0)

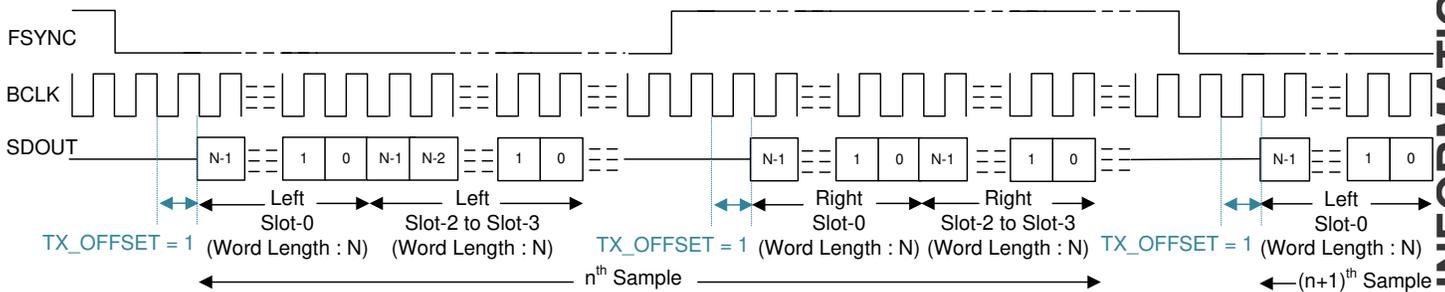


Figure 6-7. I<sup>2</sup>S Protocol Timing (PASI\_TX\_OFFSET = 1)

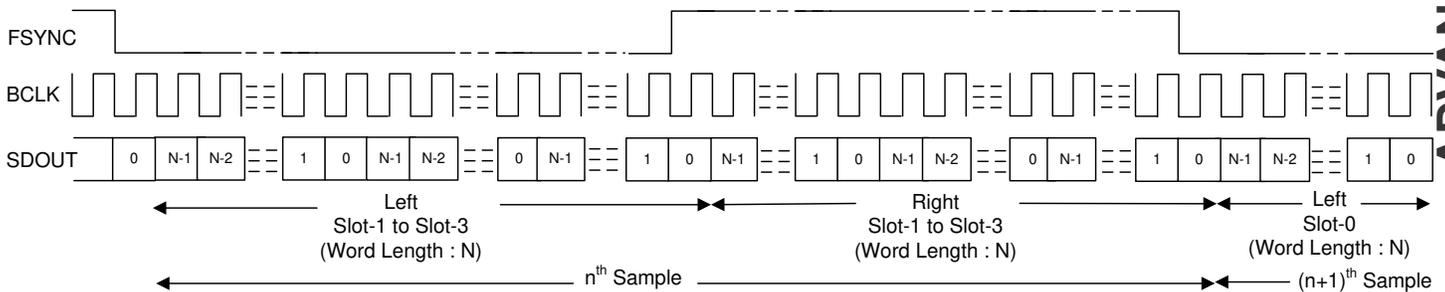


Figure 6-8. I<sup>2</sup>S Protocol Timing (No Idle BCLK Cycles, PASI\_TX\_OFFSET = 0)

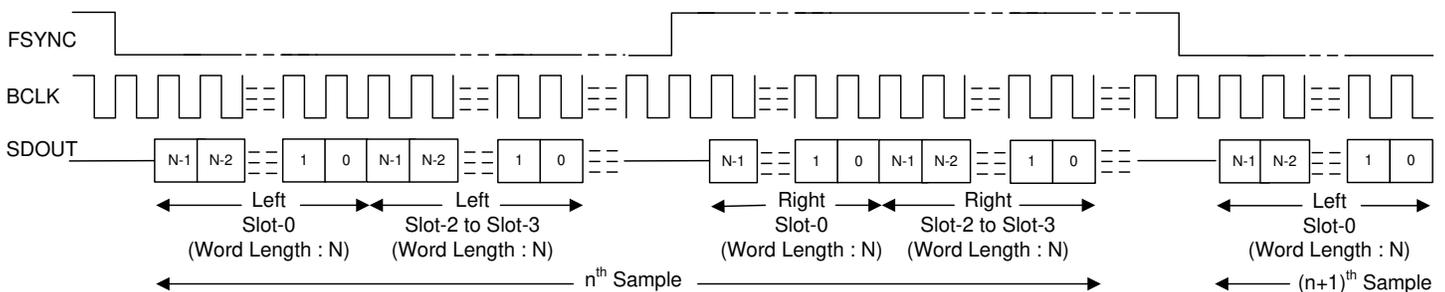


Figure 6-9. I<sup>2</sup>S Protocol Timing (PASI\_TX\_OFFSET = 0 and PASI\_BCLK\_POL = 1)

For proper operation of the audio bus in I<sup>2</sup>S mode, the number of bit clocks per frame must be greater than or equal to the number of active output channels (including left and right slots) times the programmed word length of the output channel data. The device FSYNC low pulse must be a number of BCLK cycles wide that is greater than or equal to the number of active left slots times the data word length configured. Similarly, the FSYNC high

pulse must be a number of BCLK cycles wide that is greater than or equal to the number of active right slots times the data word length configured.

### 6.3.1.2.3 Left-Justified (LJ) Interface

The standard LJ protocol is defined for only two channels: left and right. The device extends the same protocol timing for multichannel operation. In LJ mode, the MSB of the left slot 0 is transmitted in the same BCLK cycle after the *rising* edge of FSYNC. Each subsequent data bit is transmitted on the falling edge of BCLK. Immediately after the left slot 0 data transmission, the remaining left slot data are transmitted in order. The MSB of the right slot 0 is transmitted in the same BCLK cycle after the *falling* edge of FSYNC. Each subsequent data bit is transmitted on the falling edge of BCLK. Immediately after the right slot 0 data transmission, the remaining right slot data are transmitted in order. FSYNC is transmitted on the falling edge of BCLK. Figure 6-10 to Figure 6-13 illustrate the protocol timing for LJ operation with various configurations.

ADVANCE INFORMATION

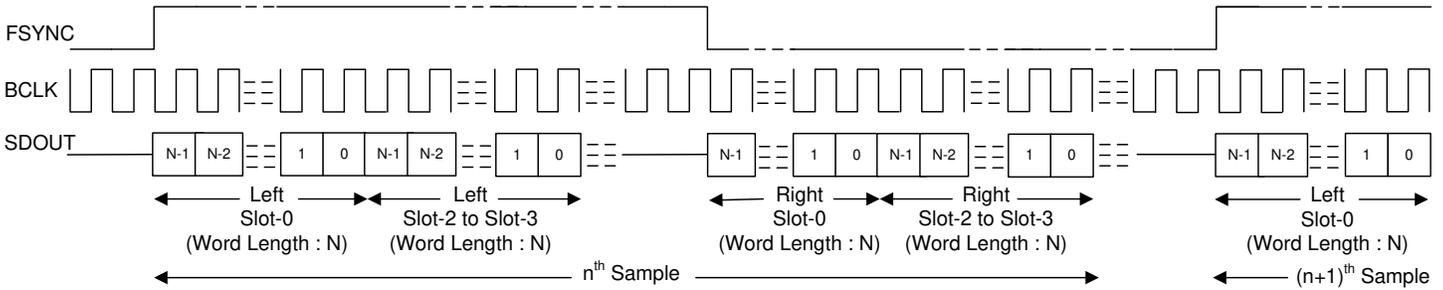


Figure 6-10. LJ Mode Standard Protocol Timing (TX\_OFFSET = 0)

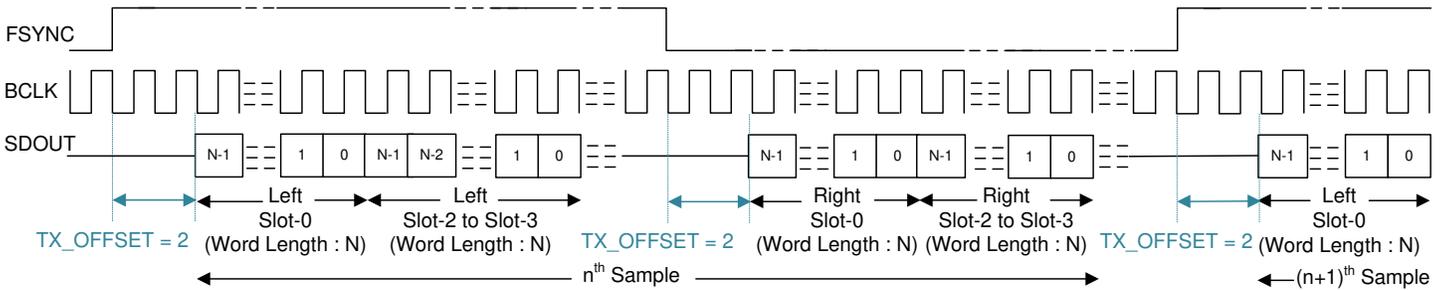


Figure 6-11. LJ Protocol Timing (TX\_OFFSET = 2)

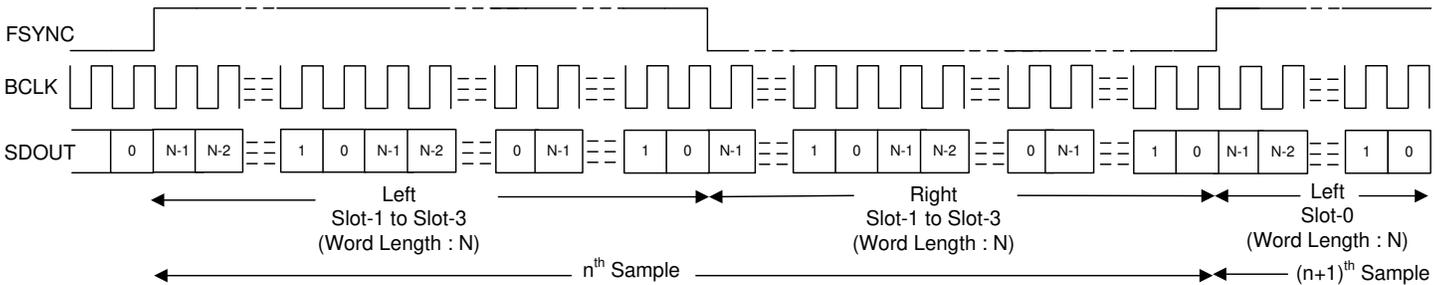


Figure 6-12. LJ Protocol Timing (No Idle BCLK Cycles, TX\_OFFSET = 0)

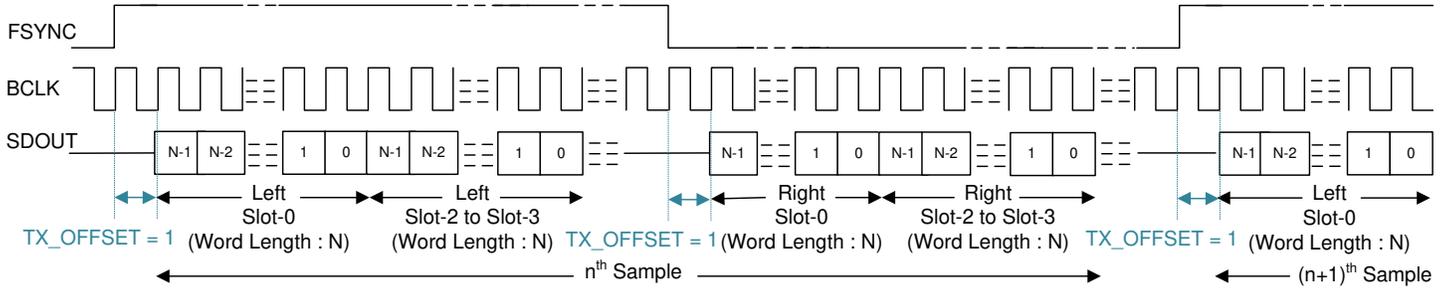


Figure 6-13. LJ Protocol Timing (TX\_OFFSET = 1 and BCLK\_POL = 1)

For proper operation of the audio bus in LJ mode, the number of bit clocks per frame must be greater than or equal to the number of active output channels (including left and right slots) times the programmed word length of the output channel data. The device FSYNC high pulse must be a number of BCLK cycles wide that is greater than or equal to the number of active left slots times the data word length configured. Similarly, the FSYNC low pulse must be number of BCLK cycles wide that is greater than or equal to the number of active right slots times the data word length configured. For a higher BCLK frequency operation, using LJ mode with a TX\_OFFSET value higher than 0 is recommended.

### 6.3.2 Using Multiple Devices With Shared Buses

The device has many supported features and flexible options that can be used in the system to seamlessly connect multiple TAC5412-Q1 devices by sharing a single common I<sup>2</sup>C or SPI control bus and an audio serial interface bus. This architecture enables multiple applications to be applied to a system that require a microphone or speaker array for beam-forming operation, audio conferencing, noise cancellation, and so forth. Figure 6-14 shows a diagram of multiple TAC5412-Q1 devices in a configuration where the control and audio data buses are shared.

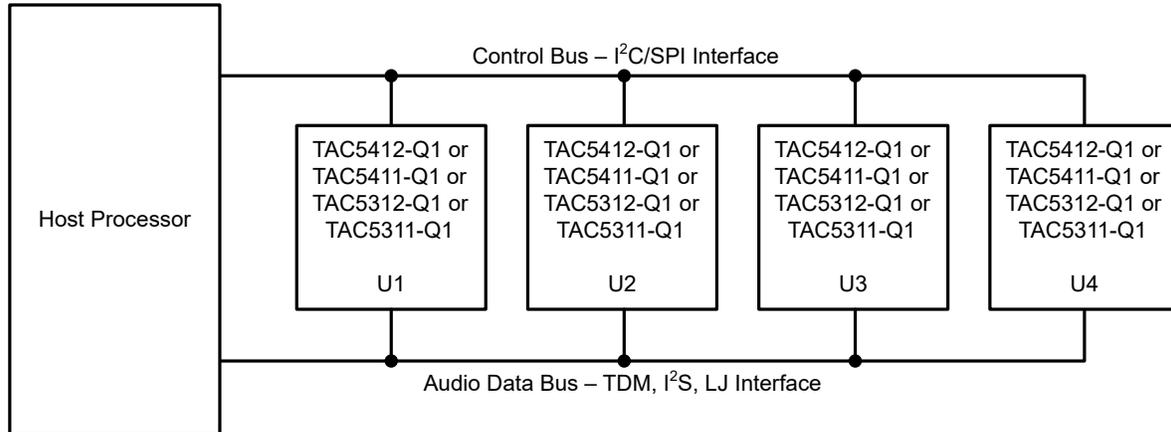


Figure 6-14. Multiple TAC5412-Q1 Devices With Shared Control and Audio Data Buses

The TAC5412-Q1 consists of the following features to enable seamless connection and interaction of multiple devices using a shared bus:

- Supports up to four pin-programmable I<sup>2</sup>C target addresses
- I<sup>2</sup>C broadcast simultaneously writes to (or triggers) all TAC5412-Q1 devices
- Supports up to 32 configuration input/output channel slots for the audio serial interface
- Tri-state feature (with enable and disable) for the unused audio data slots of the device
- Supports a bus-holder feature (with enable and disable) to keep the last driven value on the audio bus
- The GPIOx, GPI1 or GPO1 pin can be configured as a secondary input/output data lane or as a secondary audio serial interface
- The GPIOx, GPI1 or GPO1 pin can be used in a daisy-chain configuration of multiple TAC5412-Q1 devices

- Supports one BCLK cycle data latching timing to relax the timing requirement for the high-speed interface
- Programmable controller and target options for both primary and secondary audio serial interface
- Ability to synchronize the multiple devices for the simultaneous sampling requirement across devices

See the [Multiple TAC5x1x Devices With a Shared TDM and I<sup>2</sup>C/SPI Bus application report](#) for further details.

### 6.3.3 Phase-Locked Loop (PLL) and Clock Generation

The device has a smart auto-configuration block to generate all necessary internal clocks required for the ADC modulator and the digital filter engine used for signal processing. This configuration is done by monitoring the frequency of the FSYNC and BCLK signal on the audio buses.

The device supports the various data sample rates (of the FSYNC signal frequency) and the BCLK to FSYNC ratio to configure all clock dividers, including the PLL configuration, internally without host programming. [Table 6-6](#) and [Table 6-7](#) list the supported FSYNC and BCLK frequencies.

**Table 6-6. Supported FSYNC (Multiples or Submultiples of 48kHz) and BCLK Frequencies**

BCLK TO FSYNC RATIO	BCLK (MHz)								
	FSYNC (8 kHz)	FSYNC (16 kHz)	FSYNC (24 kHz)	FSYNC (32 kHz)	FSYNC (48 kHz)	FSYNC (96 kHz)	FSYNC (192 kHz)	FSYNC (384 kHz)	FSYNC (768 kHz)
16	Reserved	0.256	0.384	0.512	0.768	1.536	3.072	6.144	12.288
24	Reserved	0.384	0.576	0.768	1.152	2.304	4.608	9.216	18.432
32	0.256	0.512	0.768	1.024	1.536	3.072	6.144	12.288	24.576
48	0.384	0.768	1.152	1.536	2.304	4.608	9.216	18.432	Reserved
64	0.512	1.024	1.536	2.048	3.072	6.144	12.288	24.576	Reserved
96	0.768	1.536	2.304	3.072	4.608	9.216	18.432	Reserved	Reserved
128	1.024	2.048	3.072	4.096	6.144	12.288	24.576	Reserved	Reserved
192	1.536	3.072	4.608	6.144	9.216	18.432	Reserved	Reserved	Reserved
256	2.048	4.096	6.144	8.192	12.288	24.576	Reserved	Reserved	Reserved
384	3.072	6.144	9.216	12.288	18.432	Reserved	Reserved	Reserved	Reserved
512	4.096	8.192	12.288	16.384	24.576	Reserved	Reserved	Reserved	Reserved
1024	8.192	16.384	24.576	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
2048	16.384	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

**Table 6-7. Supported FSYNC (Multiples or Submultiples of 44.1kHz) and BCLK Frequencies**

BCLK TO FSYNC RATIO	BCLK (MHz)								
	FSYNC (7.35 kHz)	FSYNC (14.7 kHz)	FSYNC (22.05 kHz)	FSYNC (29.4 kHz)	FSYNC (44.1 kHz)	FSYNC (88.2 kHz)	FSYNC (176.4 kHz)	FSYNC (352.8 kHz)	FSYNC (705.6 kHz)
16	Reserved	Reserved	0.3528	0.4704	0.7056	1.4112	2.8224	5.6448	11.2896
24	Reserved	0.3528	0.5292	0.7056	1.0584	2.1168	4.2336	8.4672	16.9344
32	Reserved	0.4704	0.7056	0.9408	1.4112	2.8224	5.6448	11.2896	22.5792
48	0.3528	0.7056	1.0584	1.4112	2.1168	4.2336	8.4672	16.9344	Reserved
64	0.4704	0.9408	1.4112	1.8816	2.8224	5.6448	11.2896	22.5792	Reserved
96	0.7056	1.4112	2.1168	2.8224	4.2336	8.4672	16.9344	Reserved	Reserved
128	0.9408	1.8816	2.8224	3.7632	5.6448	11.2896	22.5792	Reserved	Reserved
192	1.4112	2.8224	4.2336	5.6448	8.4672	16.9344	Reserved	Reserved	Reserved
256	1.8816	3.7632	5.6448	7.5264	11.2896	22.5792	Reserved	Reserved	Reserved
384	2.8224	5.6448	8.4672	11.2896	16.9344	Reserved	Reserved	Reserved	Reserved
512	3.7632	7.5264	11.2896	15.0528	22.5792	Reserved	Reserved	Reserved	Reserved
1024	7.5264	15.0528	22.5792	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
2048	15.0528	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

The TAC5412-Q1 also supports non-Audio sample rates beyond those listed in prior tables. Refer to [Configuring Non-Audio Sample Rates for TAC5x1x devices](#) for more details.

The TAC5412-Q1 sample rate can be configured using registers CLK\_DET0 (P0\_R62) and CLK\_DET1 (P0\_R63) for primary and secondary ASI respectively. These registers also capture the device auto detect result for the FSYNC frequency in auto detection mode. The registers CLK\_DET2 (P0\_R64) and CLK\_DET3 (P0\_R65) capture the BCLK to FSYNC ratio detected by the device. If the device finds any unsupported combinations of FSYNC frequency and BCLK to FSYNC ratios, the device generates an ASI clock-error interrupt and mutes all the channels accordingly.

The TAC5412-Q1 also supports enabling channels while some ADC channels are already in operation. This requires a pre-configuration before power to describe the maximum number of channels that can be enabled while in operation to ensure proper clock generation and use. This can be configured by using register DYN\_PUPD\_CFG (P0\_R119). ADC\_DYN\_PUPD\_EN bit can be used to enable ADC channel's dynamic power up. The number of channels can be configured using ADC\_DYN\_MAXCH\_SEL bit.

The device uses an integrated, low-jitter, phase-locked loop (PLL) to generate internal clocks required for the modulators and digital filter engine, as well as other control blocks. The device also supports an option to use BCLK, GPIOx, or the GPI1 pin (as CCLK) as the audio clock source without using the PLL to reduce power consumption. However, the ADC performance may degrade based on jitter from the external clock source, and some processing features may not be supported if the external audio clock source frequency is not high enough. Therefore, TI recommends using the PLL for high-performance applications. More details and information on how to configure and use the device in low-power mode without using the PLL are discussed in the [TAC5x1x Power Consumption Matrix Across Various Usage Scenarios application report](#).

The device also supports an audio bus controller mode operation using the GPIOx or GPI1 pin (as CCLK) as the reference input clock source and supports various flexible options and a wide variety of system clocks. More details and information on controller mode configuration and operation are discussed in the [Configuring and Operating TAC5x1x as an Audio Bus Controller application report](#).

The audio bus clock error detection and auto-detect feature automatically generates all internal clocks, but can be disabled using the IGNORE\_CLK\_ERR (P0\_R4\_D6) and CUSTOM\_CLK\_CFG (P0\_R50\_D0) register bits, respectively. In the system, this disable feature can be used to support custom clock frequencies that are not covered by the auto detect scheme. For such application use cases, care must be taken to ensure that the multiple clock dividers are all configured appropriately. Therefore, TI recommends using the PPC3 GUI for device configuration settings; for more details see the [TAC5212EVM-PDK Evaluation module user's guide](#) and the [PurePath™ console graphical development suite](#).

### 6.3.4 Input Channel Configuration

The TAC5412-Q1 consists of two pairs of analog input pins (INxP and INxM) that can be configured as either differential or single-ended inputs for the recording channel. The device supports simultaneous recording of up to two channels using the multichannel ADC. The input source for the analog pins can be either analog microphones or line, aux inputs from the system board. [Table 6-8](#) describes how to set the input configuration for the record channel.

**Table 6-8. Input Source Selection for the Record Channel**

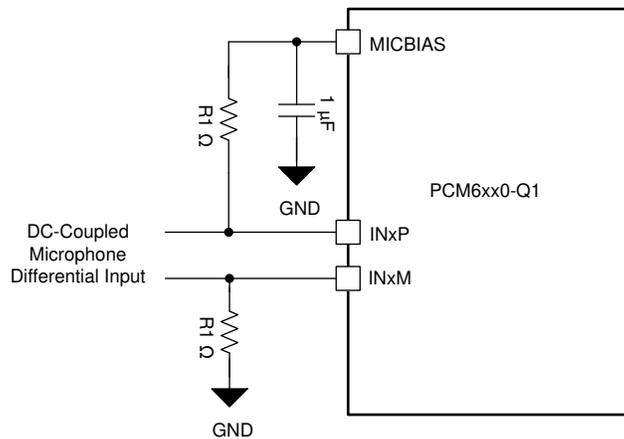
P0_R80_D[7:6] : ADC_CH1_INSRC[1:0]	INPUT CHANNEL 1 RECORD SOURCE SELECTION
00 (default)	Analog differential input for channel 1
01	Analog single-ended input for channel 1
10 or 11	Reserved (do not use this setting)

Similarly, the input source selection setting for input channel 2 can be configured using the ADC\_CH2\_INSRC[1:0] (P0\_R85\_D[7:6]) register bits.

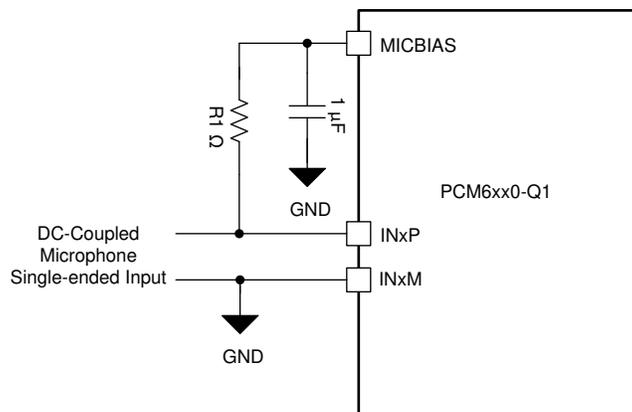
The device supports the input DC fault diagnostic feature for microphone recording with the DC-coupled inputs configuration; however, the device also supports an option for AC-coupled inputs if the DC diagnostic is not required for the specific input pins.

For the DC-coupled line input configuration, the DC common-mode difference ( $INxP - INxM$ ) for the analog input pins must be 0V to support the  $10V_{RMS}$  full-scale differential input. For the DC-coupled microphone input configuration, the DC common-mode difference ( $INxP - INxM$ ) for the analog input pins must be within 3.4V to 6.0V to support the  $2V_{RMS}$  full-scale differential input in the default mode of operation. The DC differential common-mode voltage is later filtered out by the digital high-pass filter and the digital output full-scale corresponds to the  $10V_{RMS}$  AC signal in this case.

Figure 6-15 and Figure 6-16 show how to connect a DC-coupled microphone for a differential and single-ended input, respectively. The value of the external bias resistor, R1, must be appropriately chosen based upon the microphone impedance. For a differential input, the value of the external bias resistor is recommended to be used for half of the microphone impedance, whereas for a single-ended input, the external bias resistor is recommended to be the same as the microphone impedance.



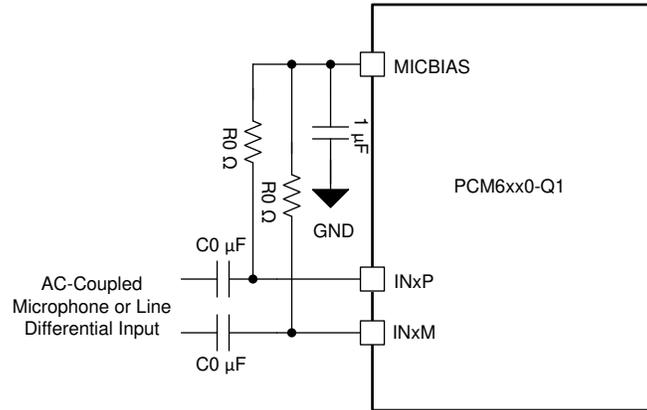
**Figure 6-15. DC-Coupled Microphone Differential Input Connection**



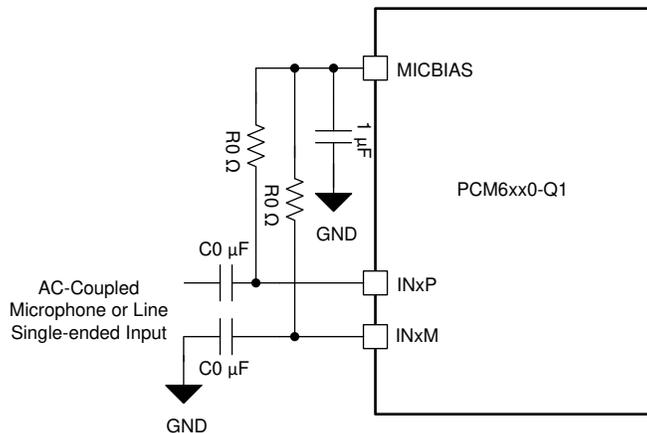
**Figure 6-16. DC-Coupled Microphone Single-Ended Input Connection**

In AC-coupled mode, the value of the coupling capacitor must be so chosen that the high-pass filter formed by the coupling capacitor and the input impedance do not affect the signal content. At power-up, before proper recording can begin, this coupling capacitor must be charged up to the common-mode voltage. For single-ended input configuration, the  $INxM$  pin must be grounded after the AC coupling capacitor in AC-coupled mode.

Figure 6-17 and Figure 6-18 show how to connect an AC-coupled microphone or line source for a differential and single-ended input, respectively. In AC-coupled mode, the device input pins INxP and INxM, must be biased appropriately for the DC common-mode value either using the on-chip MICBIAS output voltage along with external bias resistor, R0, or using an external bias generator circuit. The maximum value for resistor R0 depends upon the signal swing and the MICBIAS value programmed. See the [TAC5xxx-Q1 AC Coupled External Resistor Calculator](#) to calculate the R0 value for the desired system configuration.



**Figure 6-17. AC-Coupled Microphone or Line Differential Input Connection**



**Figure 6-18. AC-Coupled Microphone or Line Single-Ended Input Connection**

### 6.3.5 Reference Voltage

All audio data converters require a DC reference voltage. The TAC5412-Q1 achieves its low-noise performance by internally generating a low-noise reference voltage. This reference voltage is generated using a band-gap circuit with good PSRR performance. This audio converter reference voltage must be filtered externally using a minimum 1µF capacitor connected from the VREF pin to the analog ground (VSS).

To achieve low power consumption, this audio reference block is powered down in sleep mode or software shutdown. When exiting sleep mode, the audio reference block should be powered up by setting SLEEP\_EXIT\_VREF\_EN(P0\_R2\_D3) to 1'b1. An internal fast-charge scheme helps the VREF pin to settle to its steady-state voltage faster (a function of the decoupling capacitor on the VREF pin). This time is approximately equal to 3.5ms when using a 1µF decoupling capacitor. If a higher value of the decoupling capacitor is used on the VREF pin, the fast-charge setting must be reconfigured using the VREF\_QCHG, P0\_R2\_D[5:4] register bits, which support options of 3.5ms (default), 10ms, 50ms, or 100ms.

### 6.3.6 Microphone Bias

The device integrates a built-in, low-noise, programmable, high-voltage, microphone bias pin (MICBIAS) that can be used in the system for biasing the analog microphone. The integrated bias amplifier supports up to 30mA of load current, which can be used for multiple microphones and is designed to provide a combination of high PSRR, low noise, and programmable bias voltages to allow the biasing to be fine tuned for specific microphone combinations. The TAC5412-Q1 has an integrated efficient boost converter to generate the high voltage supply for the programmable microphone bias using an external, low-voltage, 3.3-V BSTVDD supply.

When using the MICBIAS pin for biasing multiple microphones, TI recommends avoiding common impedance on the board layout for the MICBIAS connection to minimize coupling across microphones. [Table 6-9](#) shows the available microphone bias programmable options.

**Table 6-9. MICBIAS Programmable Settings**

P1_R115_D[7:4] : MBIAS_VAL[3:0]	MICBIAS OUTPUT VOLTAGE
0000	Bypass to BSTOUT
0001	Set to 3.0 V
0010	Set to 3.5 V
0011-1000	Set to 4.0 V- 6.5 V
1001	Set to 7.0 V
1010	Set to 7.5 V(default)
1011	Set to 8.0 V
1100	Set to 8.5 V
1101	Set to 9.0 V
1110	Set to 9.5 V
1111	Set to 10.0 V

The microphone bias output can be powered on or powered off (default) by configuring the MICBIAS\_PDZ, P0\_R120\_D5 register bit. Additionally, the device provides an option to configure the GPIOx pins to directly control the microphone bias output power on or power off. This feature is useful in some systems to control the microphone directly without engaging the host for I<sup>2</sup>C or SPI communication. The MICBIAS\_PDZ, P0\_R120\_D5 register bit value is ignored if the GPIOx pins are configured to control the microphone bias power on or power off.

### 6.3.7 Input DC Fault Diagnostics

Each input of the TAC5412-Q1 features highly comprehensive DC fault diagnostics that can be configured to detect fault conditions in the DC-coupled input configuration and trigger an interrupt request to a host processor. Diagnostics are enabled for each channel by configuring DIAG\_CFG0, P1\_R70. For channels with diagnostics enabled, the input pins are scanned automatically by an integrated SAR ADC with a programmable repetition rate. The repetition rate can be configured using the REP\_RATE, P1\_R74\_D[7:6] register bits. For fastest fault response time and also to get better signal integrity and signal chain performance for the record channel, REP\_RATE must be configured to 0 (non-default setting). The diagnostic processor averages eight consecutive samples per test to improve noise performance. The DC fault diagnostics is not supported in the AC-coupled input configuration.

The device features various programmable threshold registers, P1\_R71 to P1\_R72, which can be configured by the host processor to define the fault region for a different category of fault condition detection. Additionally, there is also a debounce feature, configured with FAULT\_DBNCE\_SEL, P1\_R74\_D[3:2]. This feature sets the number of consecutive scan counts where the fault condition occurs before the latched status register is tripped, thus reducing false triggers by transient events. The device also has a moving average feature, P1\_R75, which continuously averages out the newly measured data with old measured data and thus reduces the false triggers by any short-duration transient events.

### 6.3.7.1 Fault Conditions

#### 6.3.7.1.1 Input Pin Short to Ground

A short to ground fault occurs when the voltage of the input pin is measured below the threshold voltage with respect to ground (AVSS). The threshold can be set by configuring DIAG\_SHT\_GND, P1\_R72\_D[7:4].

#### 6.3.7.1.2 Input Pin Short to MICBIAS

A short to MICBIAS fault occurs when the difference between the voltage measured for the MICBIAS pin and the input pin (MICBIAS – INxx) is less than the threshold. The threshold can be set by configuring DIAG\_SHT\_MICBIAS, P1\_R72\_D[3:0].

#### 6.3.7.1.3 Open Inputs

In the event that a microphone becomes disconnected from the inputs, the microphone bias resistors pull INxP to MICBIAS and INxM to ground. The combination of INxP shorted to MICBIAS and INxM shorted to ground for the same channel in a diagnostic sweep results in an open input fault condition.

#### 6.3.7.1.4 Short Between INxP and INxM

An input terminal shorted fault occurs when the difference between the voltage measured for the input pin INxP and the input pin INxM of the same channel is less than the threshold. The threshold can be set by configuring DIAG\_SHT\_TERM, P1\_R71\_D[7:4].

#### 6.3.7.1.5 Input Pin Overvoltage

An input terminal overvoltage fault occurs when the voltage measured for the input pin is above the voltage measured for the MICBIAS pin.

#### 6.3.7.1.6 Input Pin Short to VBAT\_IN

A short to VBAT\_IN fault occurs when the difference between the voltage measured for the VBAT\_IN pin and the input pin, ABS(VBAT\_IN – INxx), is less than the threshold or both the VBAT\_IN and INxx pin measured voltages are above 11.7V. The threshold can be set by configuring DIAG\_SHT\_VBAT\_IN, P1\_R71\_D[3:0].

When VBAT\_IN is less than MICBIAS, false fault detections can exist based on the signal level of the INxx pin. To minimize false detections there is also a separate debounce count for this condition set by configuring VSHORT\_DBNCE, P1\_R74\_D1.

### 6.3.7.2 Fault Reporting

Faults are reported in live and latched status registers. The live registers, P1\_R45 to P1\_R55, are updated continuously with each new scan and report the most recent measurements reported by the diagnostics processor. The latched status of each diagnostic fault is reported by the channel in P1\_R60 to P1\_R67, and a latched summary by the channel is reported in P1\_R52 to P1\_R59. If the LTCH\_CLR\_ON\_READ, P1\_R66\_D0, bit is set to '0', then the latched registers clear upon reading, and are latched if the associated bit in the live fault registers transitions from a '0' to a '1'. A transition of any bit in the latched register from a '0' to '1' triggers an interrupt request.

For detecting a persistent fault, an additional mode is available for the latched registers. In this mode, the latched registers are only cleared upon reading if the status bit in the associated live status register is '0' at the time of reading. This mode is enabled (default setting) by configuring LTCH\_CLR\_ON\_READ, P0\_R66\_D0 to a '1'.

#### 6.3.7.2.1 Overcurrent and Overtemperature Protection

The device has an overcurrent protection circuit that limits the current drawn out of the MICBIAS output to the maximum supported level when an external undesired short event occurs on the MICBIAS pin. The device sets the status flag, P1\_R59\_D2 bit, on an overcurrent detection. Additionally, the device has an overtemperature detection circuit that is enabled by default and sets the status flag, P1\_R52\_D5 bit, whenever the die junction temperature goes higher than the supported level.

Additionally, the P1\_R80 and P0\_R66\_D[4:3] register can be configured to shutdown MICBIAS along with the on-chip boost on an overtemperature detection. TI recommends configuring PD\_ON\_FLT\_CFG, P0\_R66\_D4-3

to '10' so that on an overtemperature detection, the device powers-down MICBIAS, the on-chip boost, and all ADC channels.

More details and information on fault diagnostics are discussed in the [TAC5xxx-Q1 Fault Diagnostics, Interrupts, and Protection Features](#) application report.

**ADVANCE INFORMATION**

### 6.3.8 Signal-Chain Processing

The TAC5412-Q1 signal chain is comprised of very-low-noise, high-performance, and low-power analog blocks and highly flexible and programmable digital processing blocks. The high performance and flexibility combined with a compact package makes the TAC5412-Q1 optimized for a variety of end-equipments and applications that require multichannel audio capture and playback. [Section 6.3.8.1](#) describe key components in ADC signal chain further.

### 6.3.8.1 ADC Signal-Chain

Figure 6-19 shows the key components of the record path signal chain.

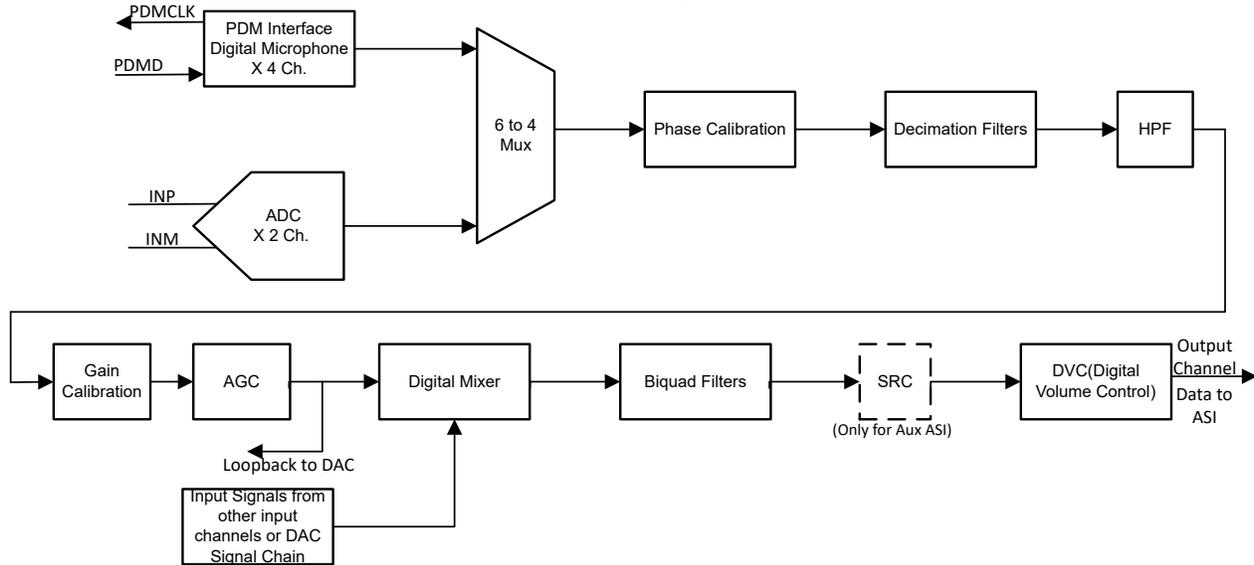


Figure 6-19. ADC Signal-Chain Processing Flowchart

The front-end ADC is very low noise, with a 115dB dynamic range performance. This low-noise and low-distortion, multibit, delta-sigma ADC enables the TAC5412-Q1 to record a far-field audio signal with very high fidelity, both in quiet and loud environments. Moreover, the ADC architecture has inherent antialias filtering with a high rejection of out-of-band frequency noise around multiple modulator frequency components. Therefore, the device prevents noise from aliasing into the audio band during ADC sampling. Further on in the signal chain, an integrated, high-performance multistage digital decimation filter sharply cuts off any out-of-band frequency noise with high stop-band attenuation.

The device also has an integrated programmable biquad filter that allows for custom low-pass, high-pass, or any other desired frequency shaping. Thus, the overall signal chain architecture removes the requirement to add external components for antialiasing low-pass filtering and thus saves drastically on the external system component cost and board space. See the [TAC5212 Integrated Analog Antialiasing Filter and Flexible Digital Filter application report](#) for further details.

The signal chain also consists of various highly programmable digital processing blocks such as phase calibration, gain calibration, high-pass filter, digital summer or mixer, biquad filters, synchronous sample rate converter, and volume control. The details of these processing blocks are discussed further in this section. The device also supports up to four digital PDM microphone recording channels when the analog recording channels are not used.

The desired input channels for recording can be enabled or disabled by using the CH\_EN (P0\_R118) register, and the output channels for the audio serial interface can be enabled or disabled by using the ASI\_TX\_CHx\_CFG register. In general, the device supports simultaneous power-up and power-down of all active channels for simultaneous recording. However, based on the application's needs, if some channels must be powered up or powered down dynamically when the other channel recording is on, then that use case is supported by setting the DYN\_PUPD\_CFG register.

The device supports an input signal bandwidth up to 100kHz, which allows the high-frequency non-audio signal to be recorded by using a 216kHz (or higher) sample rate. Wide bandwidth mode can be enabled or disabled by setting ADC\_CHx\_BW\_MODE bit.

For sample rates of 48kHz or lower, the device supports all features and various programmable processing blocks. However, for sample rates higher than 48kHz, there are limitations in the number of simultaneous

channel recordings and playback supported and the number of biquad filters and such. See the [TAC5212 Sampling Rates and Programmable Processing Blocks Supported application report](#) for further details.

### 6.3.8.1.1 Programmable Channel Gain and Digital Volume Control

The device has an independent programmable channel gain setting for each input channel that can be set to the appropriate value based on the maximum input signal expected in the system and the ADC VREF setting used (see the [Section 6.3.5](#) section), which determines the ADC full-scale signal level.

The device has a programmable digital volume control with a range from –80dB to 47dB in steps of 0.5dB with the option to mute the channel recording. The digital volume control value can be changed dynamically while the ADC channel is powered-up and recording. During volume control changes, the soft ramp-up or ramp-down volume feature is used internally to avoid any audible artifacts. Soft-stepping can be entirely disabled using the ADC\_DSP\_DISABLE\_SOFT\_STEP (P0\_R114\_D1) register bit.

The digital volume control setting is independently available for each output channel, including the digital microphone record channel. However, the device also supports an option to gang-up the volume control setting for all channels together using the channel 1 digital volume control setting, regardless if channel 1 is powered up or powered down. This gang-up can be enabled using the ADC\_DSP\_DVOL\_GANG (P0\_R114\_D0) register bit.

[Table 6-10](#) shows the programmable options available for the digital volume control.

**Table 6-10. Digital Volume Control (DVC) Programmable Settings**

P0_R82_D[7:0] : ADC_CH1_DVOL[7:0]	DVC SETTING FOR OUTPUT CHANNEL 1
0000 0000 = 0d	Output channel 1 DVC is set to mute
0000 0001 = 1d	Output channel 1 DVC is set to –80dB
0000 0010 = 2d	Output channel 1 DVC is set to –79.5dB
0000 0011 = 3d	Output channel 1 DVC is set to –79dB
...	...
1010 0000 = 160d	Output channel 1 DVC is set to –0.5dB
1010 0001 = 161d (default)	Output channel 1 DVC is set to 0dB
1010 0010 = 162d	Output channel 1 DVC is set to 0.5dB
...	...
1111 1101 = 253d	Output channel 1 DVC is set to 46dB
1111 1110 = 254d	Output channel 1 DVC is set to 46.5dB
1111 1111 = 255d	Output channel 1 DVC is set to 47dB

Similarly, the digital volume control setting for output channel 2 to channel 4 can be configured using the CH2\_DVOL (P0\_R87) to CH4\_DVOL (P0\_R95) register bits, respectively.

The internal digital processing engine soft ramps up the volume from a muted level to the programmed volume level when the channel is powered up, and the internal digital processing engine soft ramps down the volume from a programmed volume to mute when the channel is powered down. This soft-stepping of volume is done to prevent abruptly powering up and powering down the record channel. This feature can also be entirely disabled using the ADC\_DSP\_DISABLE\_SOFT\_STEP (P0\_R114\_D1) register bit.

### 6.3.8.1.2 Programmable Channel Gain Calibration

Along with the digital volume control, this device also provides programmable channel gain calibration. The gain of each channel can be finely calibrated or adjusted in steps of 0.1dB for a range of –0.8dB to 0.7dB gain error. This adjustment is useful when trying to match the gain across channels resulting from external components and microphone sensitivity. This feature, in combination with the regular digital volume control, allows the gains across all channels to be matched for a wide gain error range with a resolution of 0.1dB. [Table 6-11](#) shows the programmable options available for the channel gain calibration.

**Table 6-11. Channel Gain Calibration Programmable Settings**

P0_R83_D[7:4] : ADC_CH1_FGAIN[3:0]	CHANNEL GAIN CALIBRATION SETTING FOR INPUT CHANNEL 1
0000 = 0d	Input channel 1 gain calibration is set to -0.8dB
0001 = 1d	Input channel 1 gain calibration is set to -0.7dB
...	...
1000 = 8d (default)	Input channel 1 gain calibration is set to 0dB
...	...
1110 = 14d	Input channel 1 gain calibration is set to 0.6dB
1111 = 15d	Input channel 1 gain calibration is set to 0.7dB

Similarly, the channel gain calibration setting for input channel 2 to channel 4 can be configured using the ADC\_CH2\_CFG3 (P0\_R88) to ADC\_CH4\_CFG3 (P0\_R96) register bits, respectively.

### 6.3.8.1.3 Programmable Channel Phase Calibration

In addition to the gain calibration, the phase delay in each channel can be finely calibrated or adjusted in steps of one modulator clock cycle for a cycle range of 0 to 255 for the phase error. The modulator clock, the same clock used for ADC\_MOD\_CLK, is 6.144MHz (the output data sample rate is multiples or submultiples of 48kHz) or 5.6448MHz (the output data sample rate is multiples or submultiples of 44.1kHz) irrespective of the analog microphone or digital microphone use case. This feature is very useful for many applications that must match the phase with fine resolution between each channel, including any phase mismatch across channels resulting from external components or microphones. [Table 6-12](#) shows the available programmable options for channel phase calibration.

**Table 6-12. Channel Phase Calibration Programmable Settings**

P0_R64_D[7:0] : CH1_PCAL[7:0]	CHANNEL PHASE CALIBRATION SETTING FOR INPUT CHANNEL 1
0000 0000 = 0d (default)	Input channel 1 phase calibration with no delay
0000 0001 = 1d	Input channel 1 phase calibration delay is set to one cycle of the modulator clock
0000 0010 = 2d	Input channel 1 phase calibration delay is set to two cycles of the modulator clock
...	...
1111 1110 = 254d	Input channel 1 phase calibration delay is set to 254 cycles of the modulator clock
1111 1111 = 255d	Input channel 1 phase calibration delay is set to 255 cycles of the modulator clock

Similarly, the channel phase calibration setting for input channel 2 to channel 8 can be configured using the CH2\_PCAL (P0\_R69) to CH8\_PCAL (P0\_R99) register bits, respectively.

The phase calibration feature must not be used when the analog input and PDM input are used together for simultaneous conversion.

### 6.3.8.1.4 Programmable Digital High-Pass Filter

To remove the DC offset component and attenuate the undesired low-frequency noise content in the record data, the device supports a programmable high-pass filter (HPF). The HPF is not a channel-independent filter setting but is globally applicable for all ADC channels. This HPF is constructed using the first-order infinite impulse response (IIR) filter, and is efficient enough to filter out possible DC components of the signal. [Table 6-13](#) shows the predefined -3-dB cutoff frequencies available that can be set by using the ADC\_DSP\_HPF\_SEL[1:0] register bits of P0\_R114. Additionally, to achieve a custom -3-dB cutoff frequency for a specific application, the device also allows the first-order IIR filter coefficients to be programmed when the HPF\_SEL[1:0] register bits are set to 2'b00. [Figure 6-20](#) illustrates a frequency response plot for the HPF filter.

**Table 6-13. HPF Programmable Settings**

P0_R107_D[1:0] : HPF_SEL[1:0]	-3dB CUTOFF FREQUENCY SETTING	-3dB CUTOFF FREQUENCY AT 16-kHz SAMPLE RATE	-3dB CUTOFF FREQUENCY AT 48-kHz SAMPLE RATE
00	Programmable 1st-order IIR filter	Programmable 1st-order IIR filter	Programmable 1st-order IIR filter
01 (default)	$0.00002 \times f_s$	0.25Hz	1Hz

Table 6-13. HPF Programmable Settings (continued)

P0_R107_D[1:0] : HPF_SEL[1:0]	-3dB CUTOFF FREQUENCY SETTING	-3dB CUTOFF FREQUENCY AT 16-kHz SAMPLE RATE	-3dB CUTOFF FREQUENCY AT 48-kHz SAMPLE RATE
10	$0.00025 \times f_s$	4Hz	12Hz
11	$0.002 \times f_s$	32Hz	96Hz

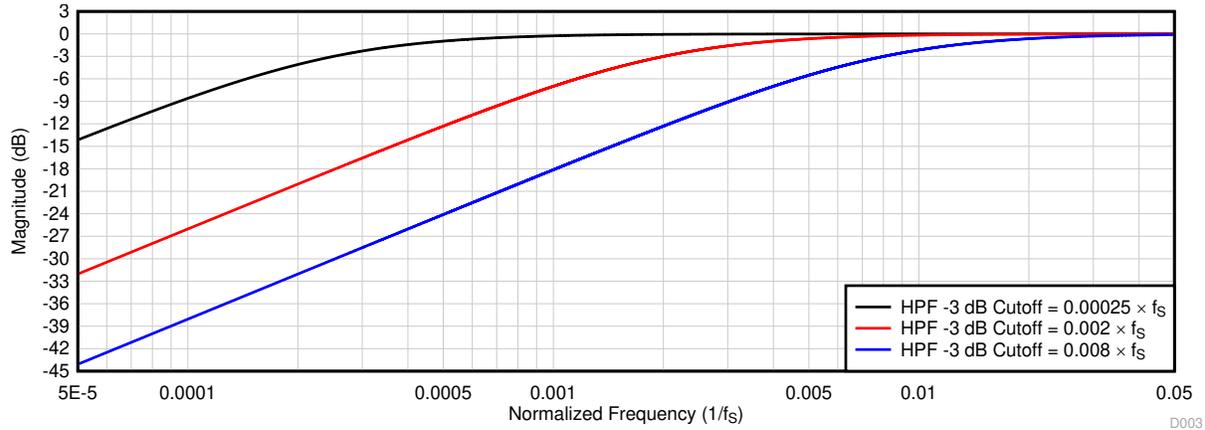


Figure 6-20. HPF Filter Frequency Response Plot

Equation 1 gives the transfer function for the first-order programmable IIR filter:

$$H(z) = \frac{N_0 + N_1 z^{-1}}{2^{31} - D_1 z^{-1}} \quad (1)$$

The frequency response for this first-order programmable IIR filter with default coefficients is flat at a gain of 0dB (all-pass filter). The host device can override the frequency response by programming the IIR coefficients in Table 6-14 to achieve the desired frequency response for high-pass filtering or any other desired filtering. If HPF\_SEL[1:0] is set to 2'b00, the host device must write these coefficient values for the desired frequency response before powering-up any ADC channel for recording. Table 6-14 shows the filter coefficients for the first-order IIR filter.

Table 6-14. 1st-Order IIR Filter Coefficients

FILTER	FILTER COEFFICIENT	DEFAULT COEFFICIENT VALUE	COEFFICIENT REGISTER MAPPING
Programmable 1st-order IIR filter (can be allocated to HPF or any other desired filter)	$N_0$	0x7FFFFFFF	P4_R72-R75
	$N_1$	0x00000000	P4_R76-R79
	$D_1$	0x00000000	P4_R80-R83

### 6.3.8.1.5 Programmable Digital Biquad Filters

The device supports up to 12 programmable digital biquad filters available for ADC signal chain limited to 3/channel. These highly efficient filters achieve the desired frequency response. The TAC5412-Q1 also supports on the fly programmable Biquad filters for two channel record use case. In digital signal processing, a digital biquad filter is a second-order, recursive linear filter with two poles and two zeros. Equation 2 gives the transfer function of each biquad filter:

$$H(z) = \frac{N_0 + 2N_1z^{-1} + N_2z^{-2}}{2^{31} - 2D_1z^{-1} - D_2z^{-2}} \quad (2)$$

The frequency response for the biquad filter section with default coefficients is flat at a gain of 0 dB (all-pass filter). The host device can override the frequency response by programming the biquad coefficients to achieve the desired frequency response for a low-pass, high-pass, or any other desired frequency shaping. If biquad filtering is required, then the host device must write these coefficients values before powering up any ADC channels for recording. In two channel use case, the TAC5412-Q1 also supports on the fly programmable filters. In this case, Device uses two banks of filters for one channel with a switch bit to perform the switch from one filter bank to the other. As described in [Table 6-15](#), these biquad filters can be allocated for each output channel based on the ADC\_DSP\_BQ\_CFG[1:0] register setting of P0\_R114. By setting BIQUAD\_CFG[1:0] to 2'b00, the biquad filtering for all record channels is disabled and the host device can choose this setting if no additional filtering is required for the system application.

**Table 6-15. Biquad Filter Allocation to the Record Output Channel**

PROGRAMMABLE BIQUAD FILTER	RECORD OUTPUT CHANNEL ALLOCATION USING P0_R114_D[3:2] REGISTER SETTING		
	ADC_DSP_BQ_CFG[1:0] = 2'b01 (1 Biquad per Channel)	ADC_DSP_BQ_CFG[1:0] = 2'b10 (Default) (2 Biquads per Channel)	ADC_DSP_BQ_CFG[1:0] = 2'b11 (3 Biquads per Channel)
Biquad filter 1	Allocated to output channel 1	Allocated to output channel 1	Allocated to output channel 1
Biquad filter 2	Allocated to output channel 2	Allocated to output channel 2	Allocated to output channel 2
Biquad filter 3	Allocated to output channel 3	Allocated to output channel 3	Allocated to output channel 3
Biquad filter 4	Allocated to output channel 4	Allocated to output channel 4	Allocated to output channel 4
Biquad filter 5	Not used	Allocated to output channel 1	Allocated to output channel 1
Biquad filter 6	Not used	Allocated to output channel 2	Allocated to output channel 2
Biquad filter 7	Not used	Allocated to output channel 3	Allocated to output channel 3
Biquad filter 8	Not used	Allocated to output channel 4	Allocated to output channel 4
Biquad filter 9	Not used	Not used	Allocated to output channel 1
Biquad filter 10	Not used	Not used	Allocated to output channel 2
Biquad filter 11	Not used	Not used	Allocated to output channel 3
Biquad filter 12	Not used	Not used	Allocated to output channel 4

[Table 6-16](#) shows the biquad filter coefficients mapping to the register space.

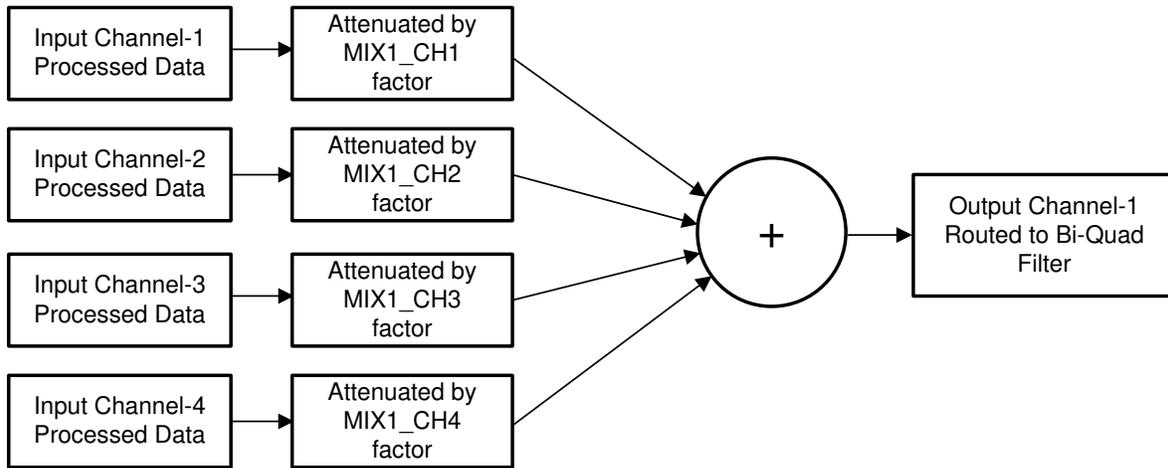
**Table 6-16. Biquad Filter Coefficients Register Mapping**

PROGRAMMABLE BIQUAD FILTER	BIQUAD FILTER COEFFICIENTS REGISTER MAPPING	PROGRAMMABLE BIQUAD FILTER	BIQUAD FILTER COEFFICIENTS REGISTER MAPPING
Biquad filter 1	P8_R8-R27	Biquad filter 7	P9_R8-R27
Biquad filter 2	P8_R28-R47	Biquad filter 8	P9_R28-R47
Biquad filter 3	P8_R48-R67	Biquad filter 9	P9_R48-R67
Biquad filter 4	P8_R68-R87	Biquad filter 10	P9_R68-R87
Biquad filter 5	P8_R88-R107	Biquad filter 11	P9_R88-R107
Biquad filter 6	P8_R108-R127	Biquad filter 12	P9_R108-R127

### 6.3.8.1.6 Programmable Channel Summer and Digital Mixer

For applications that require an even higher SNR than that supported for each channel, the device digital summing mode can be used. In this mode, the digital record data are summed up across the channel with an equal weightage factor, which helps in reducing the effective record noise.

The device supports a fully programmable mixer feature that can mix the various input channels with their custom programmable scale factor to generate the final output channels. [Figure 6-21](#) shows a block diagram that describes the mixer 1 operation to generate output channel 1.



**Figure 6-21. Programmable Digital Mixer Block Diagram**

A similar mixer operation is performed by mixer 2, mixer 3, and mixer 4 to generate output channel 2, channel 3, and channel 4, respectively.

### 6.3.8.1.7 Configurable Digital Decimation Filters

The device record channel includes a high dynamic range and a built-in digital decimation filter to process the oversampled data from the multibit delta-sigma ( $\Delta\Sigma$ ) modulator to generate digital data at the same Nyquist sampling rate as the FSYNC rate. As illustrated in [Figure 6-19](#), this decimation filter can also be used for processing the oversampled PDM stream from the digital microphone. The decimation filter can be chosen from four different types, depending on the required frequency response, group delay, power consumption, and phase linearity requirements for the target application. The selection of the decimation filter option can be done by configuring the ADC\_DSP\_DECI\_FILT, P0\_R114\_D[7:6] register bits. Low power filter can be configured by setting ADC\_LOW\_PWR\_FILT, P0\_R78\_D2 bit. [Table 6-17](#) shows the configuration register setting for the decimation filter mode selection for the record channel.

**Table 6-17. Decimation Filter Mode Selection for the Record Channel**

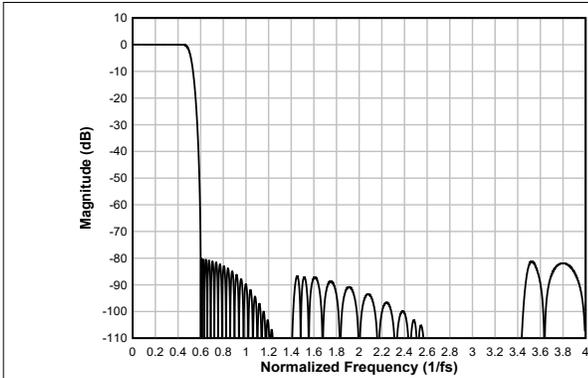
P0_R78_D2 : ADC_LOW_PWR_FILT	P0_R114_D[7:6] : ADC_DSP_DECI_FILT[1:0]	DECIMATION FILTER MODE SELECTION
0	00 (default)	Linear phase filters are used for the decimation
0	01	Low latency filters are used for the decimation
0	10	Ultra-low latency filters are used for the decimation
0	11	Reserved (do not use this setting)
1	x	Low power filters are used for the decimation

#### 6.3.8.1.7.1 Linear Phase Filters

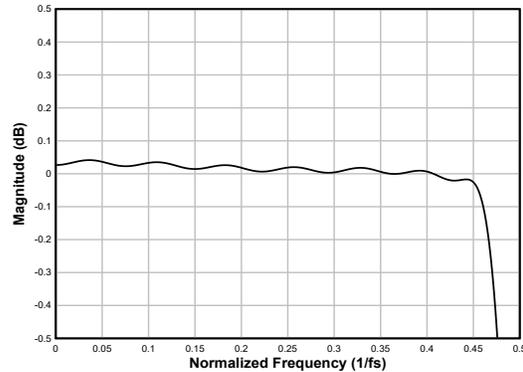
The linear phase decimation filters are the default filters set by the device and can be used for all applications that require a perfect linear phase with zero-phase deviation within the pass-band specification of the filter. The filter performance specifications and various plots for all supported output sampling rates are listed in this section.

**6.3.8.1.7.1.1 Sampling Rate: 16kHz or 14.7kHz**

Figure 6-22 and Figure 6-23 respectively show the magnitude response and the pass-band ripple for a decimation filter with a sampling rate of 16kHz or 14.7kHz. Table 6-18 lists the specifications for a decimation filter with a 16kHz or 14.7kHz sampling rate.



**Figure 6-22. Linear Phase Decimation Filter Magnitude Response**



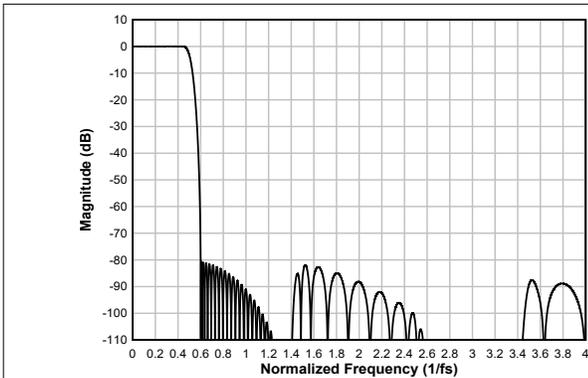
**Figure 6-23. Linear Phase Decimation Filter Pass-Band Ripple**

**Table 6-18. Linear Phase Decimation Filter Specifications**

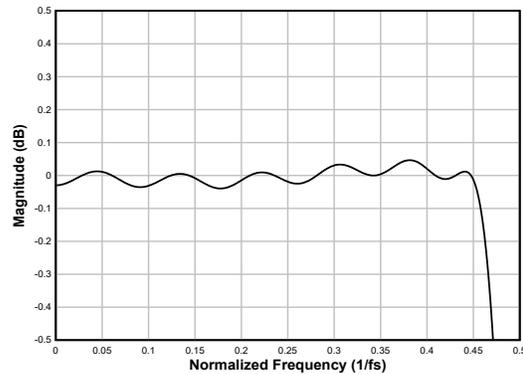
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_s$	-0.05		0.05	dB
Stop-band attenuation	Frequency range is $0.6 \times f_s$ to $4 \times f_s$	80.2			dB
	Frequency range is $4 \times f_s$ onwards	84.7			
Group delay or latency	Frequency range is 0 to $0.454 \times f_s$		16.1		$1/f_s$

**6.3.8.1.7.1.2 Sampling Rate: 24kHz or 22.05kHz**

Figure 6-24 and Figure 6-25 respectively show the magnitude response and the pass-band ripple for a decimation filter with a sampling rate of 24kHz or 22.05kHz. Table 6-19 lists the specifications for a decimation filter with a 24kHz or 22.05kHz sampling rate.



**Figure 6-24. Linear Phase Decimation Filter Magnitude Response**



**Figure 6-25. Linear Phase Decimation Filter Pass-Band Ripple**

**Table 6-19. Linear Phase Decimation Filter Specifications**

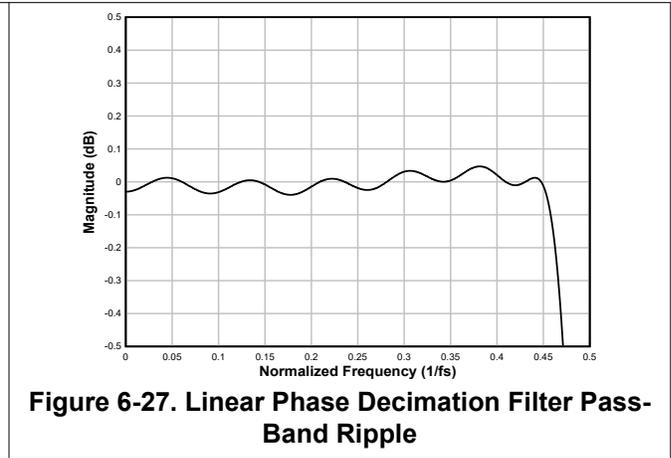
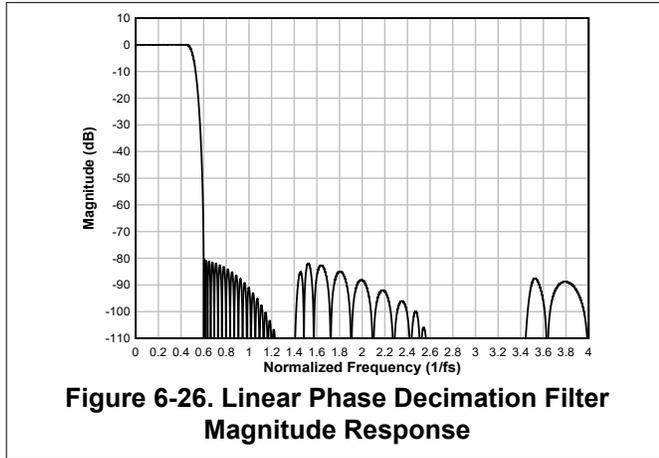
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_s$	-0.05		0.05	dB
Stop-band attenuation	Frequency range is $0.6 \times f_s$ to $4 \times f_s$	80.6			dB
	Frequency range is $4 \times f_s$ onwards	92.9			

**Table 6-19. Linear Phase Decimation Filter Specifications (continued)**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		14.7		$1/f_S$

**6.3.8.1.7.1.3 Sampling Rate: 32kHz or 29.4kHz**

Figure 6-26 and Figure 6-27 respectively show the magnitude response and the pass-band ripple for a decimation filter with a sampling rate of 32kHz or 29.4kHz. Table 6-20 lists the specifications for a decimation filter with a 32kHz or 29.4kHz sampling rate.

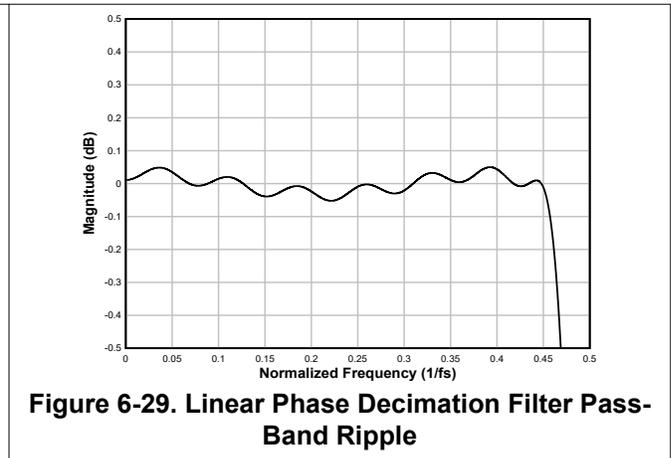
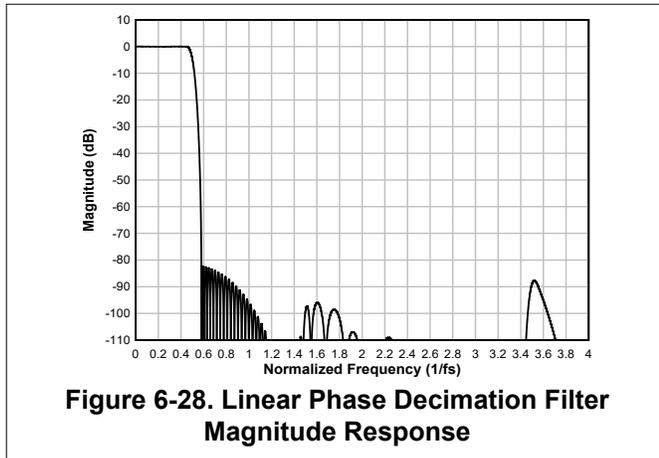


**Table 6-20. Linear Phase Decimation Filter Specifications**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_S$	-0.05		0.05	dB
Stop-band attenuation	Frequency range is $0.6 \times f_S$ to $4 \times f_S$	80.6			dB
	Frequency range is $4 \times f_S$ onwards	92.9			
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		14.7		$1/f_S$

**6.3.8.1.7.1.4 Sampling Rate: 48kHz or 44.1kHz**

Figure 6-28 and Figure 6-29 respectively show the magnitude response and the pass-band ripple for a decimation filter with a sampling rate of 48kHz or 44.1kHz. Table 6-21 lists the specifications for a decimation filter with a 48kHz or 44.1kHz sampling rate.

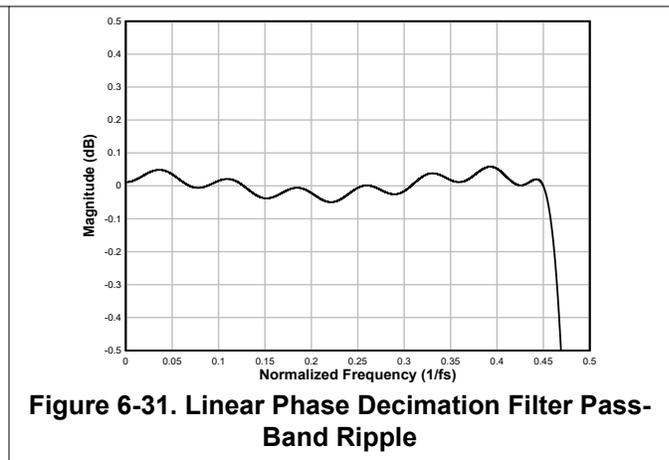
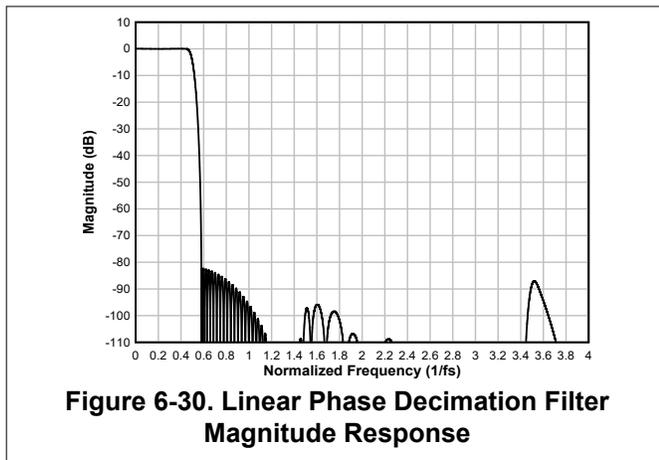


**Table 6-21. Linear Phase Decimation Filter Specifications**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_S$	-0.052		0.05	dB
Stop-band attenuation	Frequency range is $0.58 \times f_S$ to $4 \times f_S$	82.2			dB
	Frequency range is $4 \times f_S$ onwards	97.9			
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		17.0		$1/f_S$

**6.3.8.1.7.1.5 Sampling Rate: 96kHz or 88.2kHz**

Figure 6-30 and Figure 6-31 respectively show the magnitude response and the pass-band ripple for a decimation filter with a sampling rate of 96kHz or 88.2kHz. Table 6-22 lists the specifications for a decimation filter with a 96kHz or 88.2kHz sampling rate.

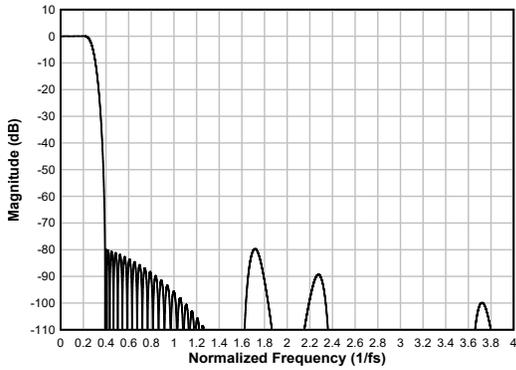


**Table 6-22. Linear Phase Decimation Filter Specifications**

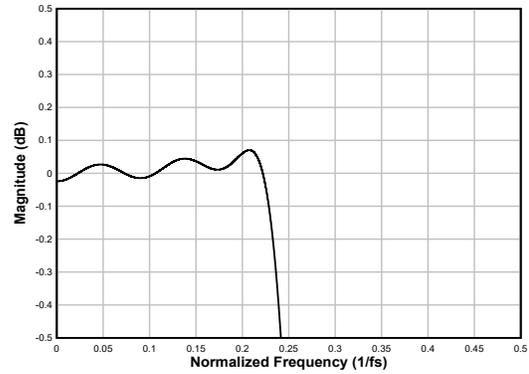
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_S$	-0.05		0.058	dB
Stop-band attenuation	Frequency range is $0.58 \times f_S$ to $4 \times f_S$	82.2			dB
	Frequency range is $4 \times f_S$ onwards	96.9			
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		16.9		$1/f_S$

**6.3.8.1.7.1.6 Sampling Rate: 384kHz or 352.8kHz**

Figure 6-32 and Figure 6-33 respectively show the magnitude response and the pass-band ripple for a decimation filter with a sampling rate of 384kHz or 352.8kHz. Table 6-23 lists the specifications for a decimation filter with an 384kHz or 352.8kHz sampling rate.



**Figure 6-32. Linear Phase Decimation Filter Magnitude Response**



**Figure 6-33. Linear Phase Decimation Filter Pass-Band Ripple**

**Table 6-23. Linear Phase Decimation Filter Specifications**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.227 \times f_S$	-0.07		0.07	dB
Stop-band attenuation	Frequency range is $0.391 \times f_S$ to $2 \times f_S$	79.7			dB
	Frequency range is $2 \times f_S$ onwards	89.3			
Group delay or latency	Frequency range is 0 to $0.212 \times f_S$		11.45		$1/f_S$

### 6.3.9 DAC Signal-Chain

Figure 6-34 shows the key components of the playback signal chain.

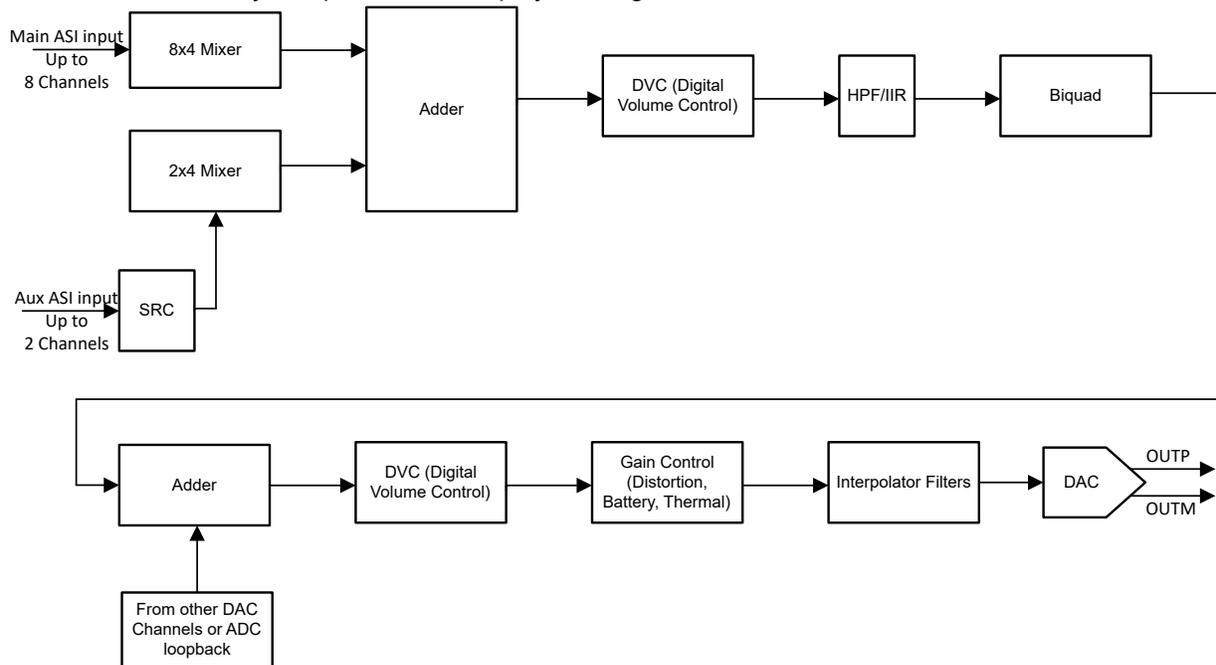


Figure 6-34. DAC Signal-Chain Processing Flowchart

The DAC signal chain offers a highly flexible low noise playback path for low noise and high-fidelity audio applications. This low-noise and low-distortion, multibit, delta-sigma DAC enables the TAC5412-Q1 to achieve 120dB dynamic range in a very low power. Moreover, the DAC architecture has inherent antialias filtering with a high rejection of out-of-band frequency noise around multiple modulator frequency components. Therefore, the device prevents noise from aliasing into the audio band. Further on in the signal chain, an integrated, high-performance multistage digital interpolation filter sharply cuts off any out-of-band frequency noise with high stop-band attenuation.

The signal chain also consists of various highly programmable digital processing blocks such as biquad filters, phase calibration, gain calibration, high-pass filter, digital summer or mixer, synchronous sample rate converter, distortion limiter, thermal foldback, brownout prevention, and volume control. The details of these processing blocks are discussed further in this section. The device also supports up to four channel single-ended output modes and an analog bypass option from ADC input to DAC output.

The output channels for playback can be enabled or disabled by using the CH\_EN (P0\_R118) register, and the input channels for the audio serial interface can be enabled or disabled by using the PASI\_RX\_CHx\_CFG or SASI\_RX\_CHx\_CFG bits. The device supports simultaneous power-up and power-down of all active channels for simultaneous playback. However, based on the application needs, if some channels must be powered-up or powered-down dynamically when the other channel playback is on, then that use case is supported by setting the DYN\_PUPD\_CFG register.

The device supports multiple data mixing options where up to 8 Input Channels from Main ASI, 2 Input Channels from Aux ASI, ADC loopback data, and tone generator can be mixed with flexible gain options for each path before playback on DAC output. By default, these mixers are disabled and channels are configured for only one channel data. Mixers can be configured by setting ASI\_DIN\_Mixers on Page 17.

The device supports an output signal bandwidth up to 100kHz, which allows the high-frequency non-audio signal to be played by using a 216kHz (or higher) sample rate. Wide band mode can be enabled or disabled by using the DAC\_CHx\_BW\_Mode bit.

For sample rates of 48kHz or lower, the device supports all features and various programmable processing blocks. However, for sample rates higher than 48kHz, there are limitations in the number of simultaneous channel recording and playback supported and the number of biquad filters and such. See the [TAC5212 Sampling Rates and Programmable Processing Blocks Supported application report](#) for further details.

### 6.3.9.1 Programmable Channel Gain and Digital Volume Control

The device has an independent programmable channel gain setting for each output channel that can be set to the appropriate value based on the maximum input signal expected in the system, This can be done by configuring OUT1x\_LVL\_CTRL and OUT2x\_LVL\_CTRL bits. Coarse gain configuration from -6dB to +24dB is available with these controls in steps of 6dB. .

The device has a programmable digital volume control with a range from -100dB to 27dB in steps of 0.5dB with the option to mute the channel recording. The digital volume control value can be changed dynamically while the DAC channel is powered-up and playing. During volume control changes, the soft ramp-up or ramp-down volume feature is used internally to avoid any audible artifacts. Soft-stepping can be entirely disabled using the DAC\_DSP\_DISABLE\_SOFT\_STEP (P0\_R115\_D1) register bit.

The digital volume control setting is independently available for each of the 4 single ended output channels. In the case of 2 Channel Differential DAC, Only settings for DAC\_CH1A and DAC\_CH2A are applicable. The device also supports an option to gang-up the volume control setting for all channels together using the channel 1A digital volume control setting, regardless if channel 1A is powered up or powered down. This gang-up can be enabled using the DAC\_DSP\_DVOL\_GANG (P0\_R115\_D0) register bit.

Table 6-24 shows the programmable options available for the digital volume control.

**Table 6-24. Digital Volume Control (DVC) Programmable Settings**

P0_R103_D[7:0] : DAC_CH1A_DVOL[7:0]	DVC SETTING FOR OUTPUT CHANNEL 1A
0000 0000 = 0d	Output channel 1 DVC is set to mute
0000 0001 = 1d	Output channel 1 DVC is set to -100dB
0000 0010 = 2d	Output channel 1 DVC is set to -99.5dB
0000 0011 = 3d	Output channel 1 DVC is set to -99dB
...	...
1100 1000 = 200d	Output channel 1 DVC is set to -0.5dB
1100 1001 = 201d (default)	Output channel 1 DVC is set to 0dB
1100 1010 = 202d	Output channel 1 DVC is set to 0.5dB
...	...
1111 1101 = 253d	Output channel 1 DVC is set to 26dB
1111 1110 = 254d	Output channel 1 DVC is set to 26.5dB
1111 1111 = 255d	Output channel 1 DVC is set to 27dB

Similarly, the digital volume control setting for output channel 1B,2A and 2B can be configured using the CH1B\_DVOL (P0\_R103) to CH2B\_DVOL (P0\_R112) register bits, respectively.

The internal digital processing engine soft ramps up the volume from a muted level to the programmed volume level when the channel is powered up, and the internal digital processing engine soft ramps down the volume from a programmed volume to mute when the channel is powered down. This soft-stepping of volume is done to prevent abruptly powering up and powering down the playback channel which can cause audible artifacts. This feature can also be entirely disabled using the DAC\_DSP\_DISABLE\_SOFT\_STEP (P0\_R115\_D1) register bit.

### 6.3.9.2 Programmable Channel Gain Calibration

Along with the digital volume control, this device also provides programmable channel gain calibration. The gain of each channel can be finely calibrated or adjusted in steps of 0.1dB for a range of -0.8dB to 0.7dB gain error. This adjustment is useful when trying to match the gain across channels resulting from transducer sensitivity and load impedance mismatch. This feature, in combination with the regular digital volume control, allows the gains

across all channels to be matched for a wide gain error range with a resolution of 0.1dB. [Table 6-25](#) shows the programmable options available for the channel gain calibration.

**Table 6-25. DAC Channel Gain Calibration Programmable Settings**

P0_R104_D[7:4] : DAC_CH1A_FGAIN[3:0]	CHANNEL GAIN CALIBRATION SETTING FOR INPUT CHANNEL 1A
0000 = 0d	Input channel 1 gain calibration is set to -0.8dB
0001 = 1d	Input channel 1 gain calibration is set to -0.7dB
...	...
1000 = 8d (default)	Input channel 1 gain calibration is set to 0dB
...	...
1110 = 14d	Input channel 1 gain calibration is set to 0.6dB
1111 = 15d	Input channel 1 gain calibration is set to 0.7dB

Similarly, the channel gain calibration setting for input channels 1B,2A and 2B can be configured using the DAC\_CH1B\_CFG1 (P0\_R106), DAC\_CH2A\_CFG1 (P0\_R111), and DAC\_CH2B\_CFG1 (P0\_R113) register bits, respectively.

### 6.3.9.3 Programmable Digital High-Pass Filter

To remove the DC offset component and attenuate the undesired low-frequency noise content in the record data, the device supports a programmable high-pass filter (HPF). The HPF is not a channel-independent filter setting but is globally applicable for all DAC channels. This HPF is constructed using the first-order infinite impulse response (IIR) filter, and is efficient enough to filter out possible DC components of the signal. [Table 6-26](#) shows the predefined -3dB cutoff frequencies available that can be set by using the DAC\_DSP\_HPF\_SEL[1:0] register bits of P0\_R115. Additionally, to achieve a custom -3dB cutoff frequency for a specific application, the device also allows the first-order IIR filter coefficients to be programmed when the DAC\_DSP\_HPF\_SEL[1:0] register bits are set to 2'b00. [Figure 6-35](#) illustrates a frequency response plot for the HPF filter.

**Table 6-26. HPF Programmable Settings**

P0_R115_D[5:4] : DAC_DSP_HPF_SEL[1:0]	-3-dB CUTOFF FREQUENCY SETTING	-3-dB CUTOFF FREQUENCY AT 16-kHz SAMPLE RATE	-3-dB CUTOFF FREQUENCY AT 48-kHz SAMPLE RATE
00	Programmable 1st-order IIR filter	Programmable 1st-order IIR filter	Programmable 1st-order IIR filter
01 (default)	$0.00002 \times f_s$	0.25Hz	1Hz
10	$0.00025 \times f_s$	4Hz	12Hz
11	$0.002 \times f_s$	32Hz	96Hz

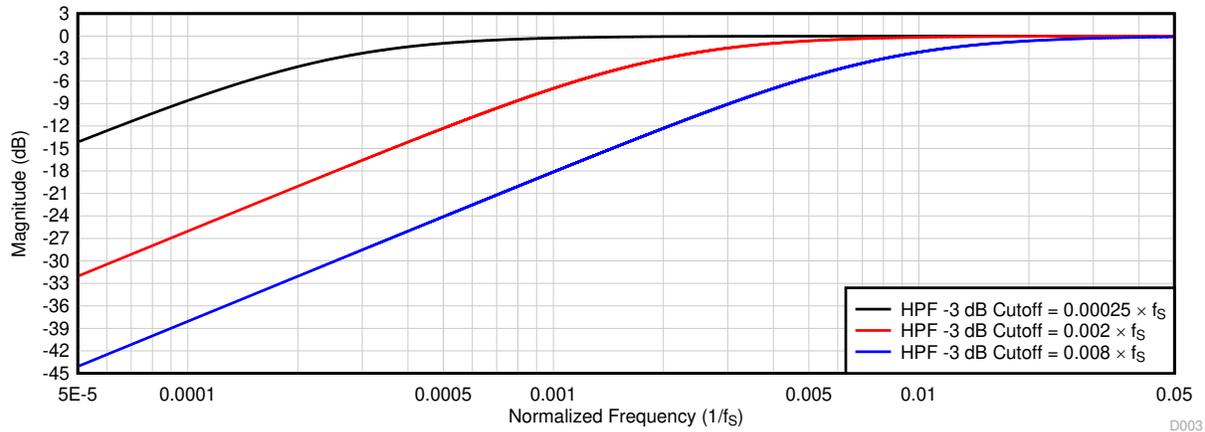


Figure 6-35. HPF Filter Frequency Response Plot

D003

Equation 3 gives the transfer function for the first-order programmable IIR filter:

$$H(z) = \frac{N_0 + N_1 z^{-1}}{2^{31} - D_1 z^{-1}} \quad (3)$$

The frequency response for this first-order programmable IIR filter with default coefficients is flat at a gain of 0 dB (all-pass filter). The host device can override the frequency response by programming the IIR coefficients in Table 6-27 to achieve the desired frequency response for high-pass filtering or any other desired filtering. If DAC\_DSP\_HPF\_SEL[1:0] is set to 2'b00, the host device must write these coefficients values for the desired frequency response before powering-up any DAC channel for playback. Table 6-27 shows the filter coefficients for the first-order IIR filter.

Table 6-27. 1st-Order IIR Filter Coefficients

FILTER	FILTER COEFFICIENT	DEFAULT COEFFICIENT VALUE	COEFFICIENT REGISTER MAPPING
Programmable 1st-order IIR filter (can be allocated to HPF or any other desired filter)	N <sub>0</sub>	0x7FFFFFFF	P17_R120-R124
	N <sub>1</sub>	0x00000000	P17_R125-R128
	D <sub>1</sub>	0x00000000	P18_R8-R11

### 6.3.9.4 Programmable Digital Biquad Filters

The device supports up to 12 programmable digital biquad filters available for DAC signal chain limited to 3/channel. These highly efficient filters achieve the desired frequency response. The TAC5412-Q1 also supports on the fly programmable Biquad filters for two channel playback use case. In digital signal processing, a digital biquad filter is a second-order, recursive linear filter with two poles and two zeros. Equation 4 gives the transfer function of each biquad filter:

$$H(z) = \frac{N_0 + 2N_1 z^{-1} + N_2 z^{-2}}{2^{31} - 2D_1 z^{-1} - D_2 z^{-2}} \quad (4)$$

The frequency response for the biquad filter section with default coefficients is flat at a gain of 0 dB (all-pass filter). The host device can override the frequency response by programming the biquad coefficients to achieve the desired frequency response for a low-pass, high-pass, or any other desired frequency shaping. If biquad filtering is required, then the host device must write these coefficients values before powering up any ADC channels for recording. In two channel use case, the TAC5412-Q1 also supports on the fly programmable filters. In this case, Device uses two banks of filters for one channel with a switch bit to perform the switch from one filter bank to the other. As described in Table 6-28, these biquad filters can be allocated for each output channel

based on the DAC\_DSP\_BQ\_CFG[1:0] register setting of P0\_R115. By setting DAC\_DSP\_BQ\_CFG[1:0] to 2'b00, the biquad filtering for all playback channels are disabled and the host device can choose this setting if no additional filtering is required for the system application. See the [TAC5212 Programmable Biquad Filter Configuration and Applications application report](#) for further details.

**Table 6-28. Biquad Filter Allocation to the Record Output Channel**

PROGRAMMABLE BIQUAD FILTER	RECORD OUTPUT CHANNEL ALLOCATION USING P0_R115_D[3:2] REGISTER SETTING		
	DAC_DSP_BQ_CFG[1:0] = 2'b01 (1 Biquad per Channel)	DAC_DSP_BQ_CFG[1:0] = 2'b10 (Default) (2 Biquads per Channel)	DAC_DSP_BQ_CFG[1:0] = 2'b11 (3 Biquads per Channel)
Biquad filter 1	Allocated to output channel 1	Allocated to output channel 1	Allocated to output channel 1
Biquad filter 2	Allocated to output channel 2	Allocated to output channel 2	Allocated to output channel 2
Biquad filter 3	Allocated to output channel 3	Allocated to output channel 3	Allocated to output channel 3
Biquad filter 4	Allocated to output channel 4	Allocated to output channel 4	Allocated to output channel 4
Biquad filter 5	Not used	Allocated to output channel 1	Allocated to output channel 1
Biquad filter 6	Not used	Allocated to output channel 2	Allocated to output channel 2
Biquad filter 7	Not used	Allocated to output channel 3	Allocated to output channel 3
Biquad filter 8	Not used	Allocated to output channel 4	Allocated to output channel 4
Biquad filter 9	Not used	Not used	Allocated to output channel 1
Biquad filter 10	Not used	Not used	Allocated to output channel 2
Biquad filter 11	Not used	Not used	Allocated to output channel 3
Biquad filter 12	Not used	Not used	Allocated to output channel 4

Table 6-29 shows the biquad filter coefficients mapping to the register space.

**Table 6-29. Biquad Filter Coefficients Register Mapping**

PROGRAMMABLE BIQUAD FILTER	BIQUAD FILTER COEFFICIENTS REGISTER MAPPING	PROGRAMMABLE BIQUAD FILTER	BIQUAD FILTER COEFFICIENTS REGISTER MAPPING
Biquad filter 1	P16_R8-R27	Biquad filter 7	P17_R8-R27
Biquad filter 2	P16_R28-R47	Biquad filter 8	P17_R28-R47
Biquad filter 3	P16_R48-R67	Biquad filter 9	P17_R48-R67
Biquad filter 4	P16_R68-R87	Biquad filter 10	P17_R68-R87
Biquad filter 5	P16_R88-R107	Biquad filter 11	P17_R88-R107
Biquad filter 6	P16_R108-R127	Biquad filter 12	P17_R108-R127

### 6.3.9.5 Programmable Digital Mixer

The device supports a fully programmable mixer feature that can mix the various input channels with their custom programmable scale factor to generate the final output channels.

### 6.3.9.6 Configurable Digital Interpolation Filters

The device playback channel includes a high dynamic range, built-in digital interpolation filter to process the input data stream to generate digital data stream for multibit delta-sigma ( $\Delta\Sigma$ ) modulator. The interpolation filter can be chosen from four different types, depending on the required frequency response, group delay, power consumption, and phase linearity requirements for the target application. The selection of the interpolation filter option can be done by configuring the DAC\_DSP\_INTX\_FILT, P0\_R115\_D[7:6] register bits. Low power filter can be configured by setting DAC\_LOW\_PWR\_FILT, P0\_R79\_D2 bit. [Table 6-30](#) shows the configuration register setting for the decimation filter mode selection for the record channel.

**Table 6-30. Interpolation Filter Mode Selection for the Playback Channel**

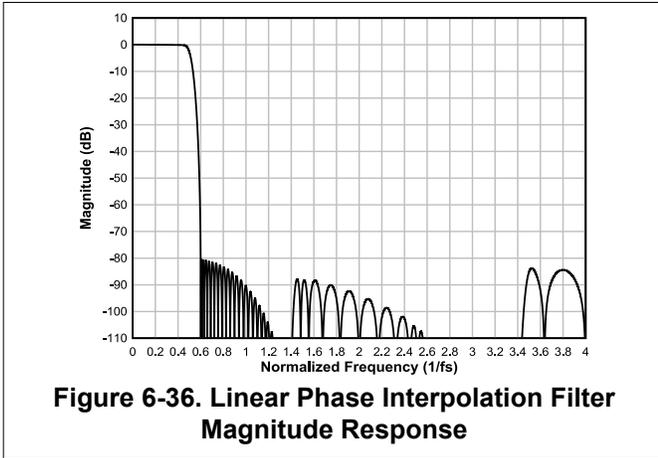
P0_R79_D2 : DAC_LOW_PWR_FILT	P0_R115_D[7:6] : DAC_DSP_INTX_FILT[1:0]	INTERPOLATION FILTER MODE SELECTION
0	00 (default)	Linear phase filters are used for the interpolation
0	01	Low latency filters are used for the interpolation
0	10	Ultra-low latency filters are used for the interpolation
0	11	Reserved (do not use this setting)
1	x	Low power filters are used for the interpolation

#### 6.3.9.6.1 Linear Phase Filters

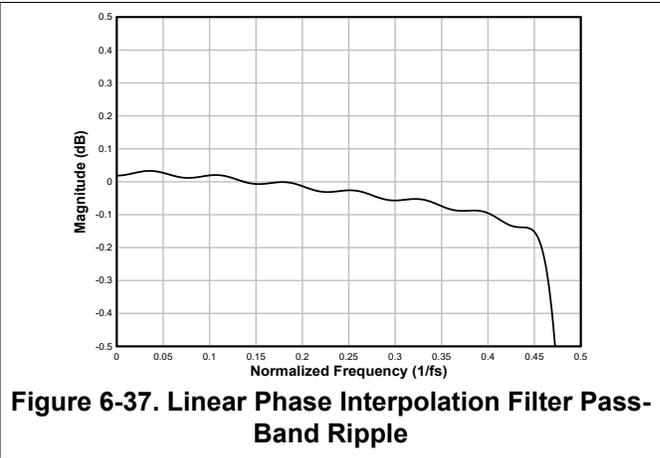
The linear phase interpolation filters are the default filters set by the device and can be used for all applications that require a perfect linear phase with zero-phase deviation within the pass-band specification of the filter. The filter performance specifications and various plots for all supported output sampling rates are listed in this section.

**6.3.9.6.1.1 Sampling Rate: 16kHz or 14.7kHz**

Figure 6-36 and Figure 6-37 respectively show the magnitude response and the pass-band ripple for an interpolation filter with a sampling rate of 16kHz or 14.7kHz. Table 6-31 lists the specifications for an interpolation filter with a 16kHz or 14.7-kHz sampling rate.



**Figure 6-36. Linear Phase Interpolation Filter Magnitude Response**



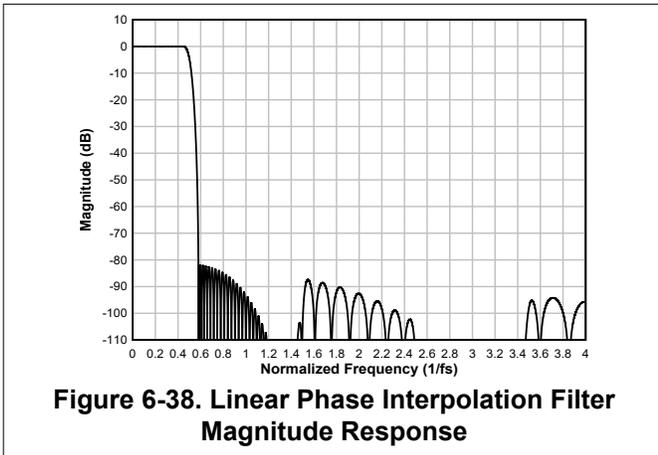
**Figure 6-37. Linear Phase Interpolation Filter Pass-Band Ripple**

**Table 6-31. Linear Phase Interpolation Filter Specifications**

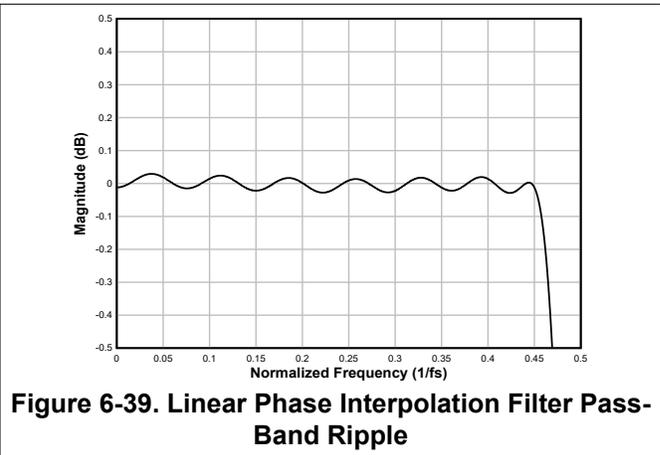
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_s$	-0.17		0.03	dB
Stop-band attenuation	Frequency range is $0.6 \times f_s$ to $4 \times f_s$	80.4			
	Frequency range is $4 \times f_s$ to $7.43 \times f_s$	86.9			dB
Group delay or latency	Frequency range is 0 to $0.454 \times f_s$		16.0		

**6.3.9.6.1.2 Sampling Rate: 24kHz or 22.05kHz**

Figure 6-38 and Figure 6-39 respectively show the magnitude response and the pass-band ripple for an interpolation filter with a sampling rate of 24kHz or 22.05kHz. Table 6-32 lists the specifications for an interpolation filter with a 24kHz or 22.05kHz sampling rate.



**Figure 6-38. Linear Phase Interpolation Filter Magnitude Response**



**Figure 6-39. Linear Phase Interpolation Filter Pass-Band Ripple**

**Table 6-32. Linear Phase Interpolation Filter Specifications**

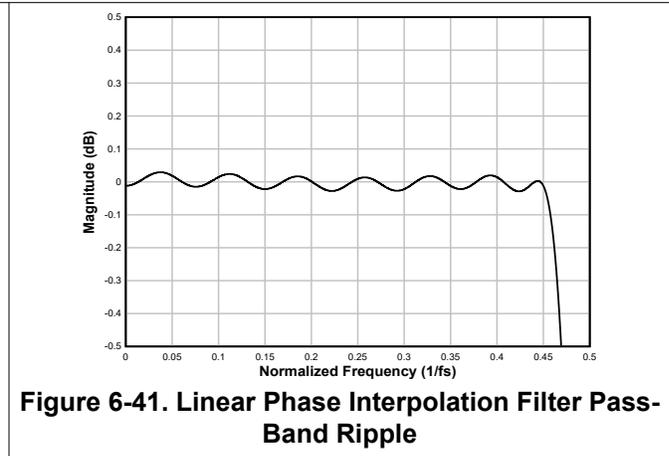
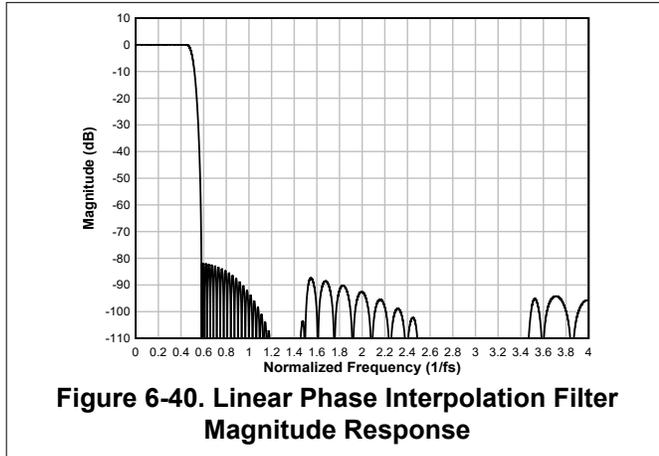
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_s$	-0.05		0.03	dB
Stop-band attenuation	Frequency range is $0.58 \times f_s$ to $4 \times f_s$	81.9			
	Frequency range is $4 \times f_s$ to $15.42 \times f_s$	87.6			dB

**Table 6-32. Linear Phase Interpolation Filter Specifications (continued)**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		17.6		$1/f_S$

**6.3.9.6.1.3 Sampling Rate: 32kHz or 29.4kHz**

Figure 6-40 and Figure 6-41 respectively show the magnitude response and the pass-band ripple for an interpolation filter with a sampling rate of 32kHz or 29.4kHz. Table 6-33 lists the specifications for an interpolation filter with a 32kHz or 29.4kHz sampling rate.

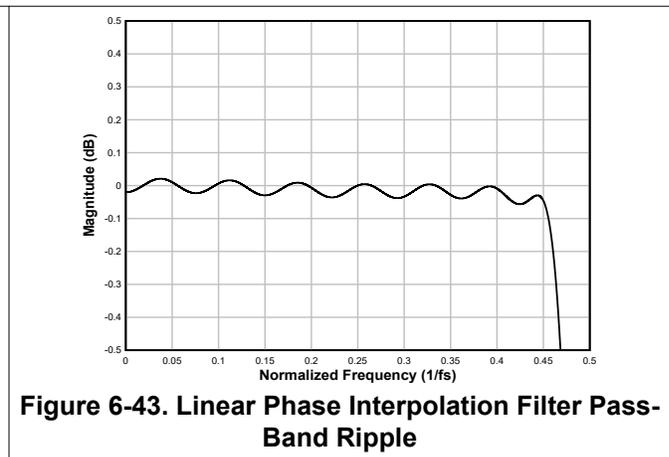
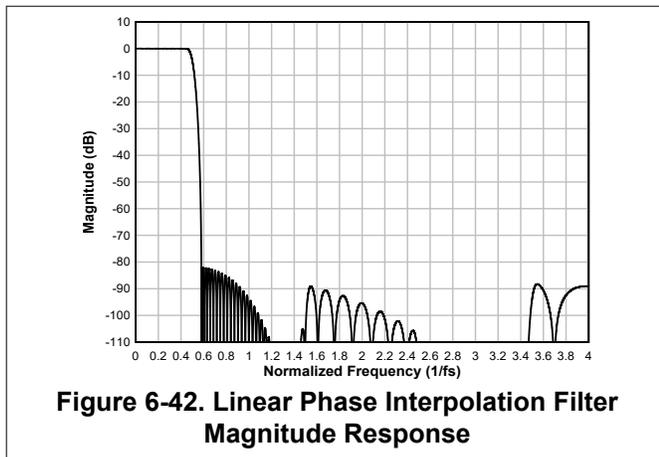


**Table 6-33. Linear Phase Interpolation Filter Specifications**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_S$	-0.05		0.03	dB
Stop-band attenuation	Frequency range is $0.586 \times f_S$ to $4 \times f_S$	81.9			dB
	Frequency range is $4 \times f_S$ to $15.42 \times f_S$	87.6			
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		17.6		$1/f_S$

**6.3.9.6.1.4 Sampling Rate: 48kHz or 44.1kHz**

Figure 6-42 and Figure 6-43 respectively show the magnitude response and the pass-band ripple for an interpolation filter with a sampling rate of 48kHz or 44.1kHz. Table 6-34 lists the specifications for an interpolation filter with a 48kHz or 44.1kHz sampling rate.

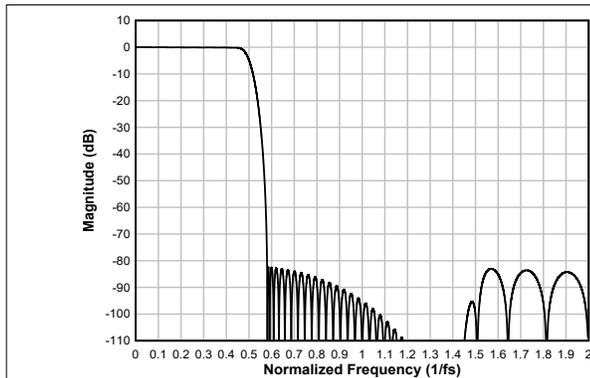


**Table 6-34. Linear Phase Interpolation Filter Specifications**

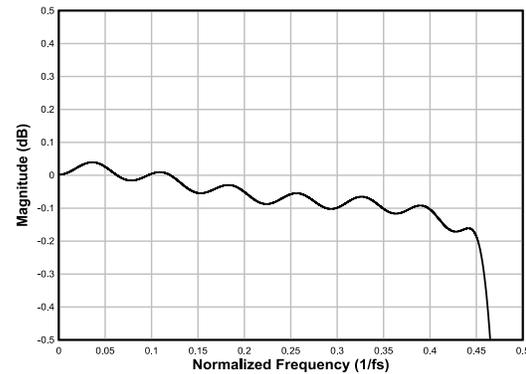
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.454 \times f_S$	-0.08		0.02	dB
Stop-band attenuation	Frequency range is $0.585 \times f_S$ to $4 \times f_S$	82.0			dB
	Frequency range is $4 \times f_S$ to $7.42 \times f_S$ onwards	89.0			
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		17.3		$1/f_S$

**6.3.9.6.1.5 Sampling Rate: 96kHz or 88.2kHz**

Figure 6-44 and Figure 6-45 respectively show the magnitude response and the pass-band ripple for an interpolation filter with a sampling rate of 96kHz or 88.2kHz. Table 6-35 lists the specifications for an interpolation filter with a 96kHz or 88.2kHz sampling rate.



**Figure 6-44. Linear Phase Interpolation Filter Magnitude Response**



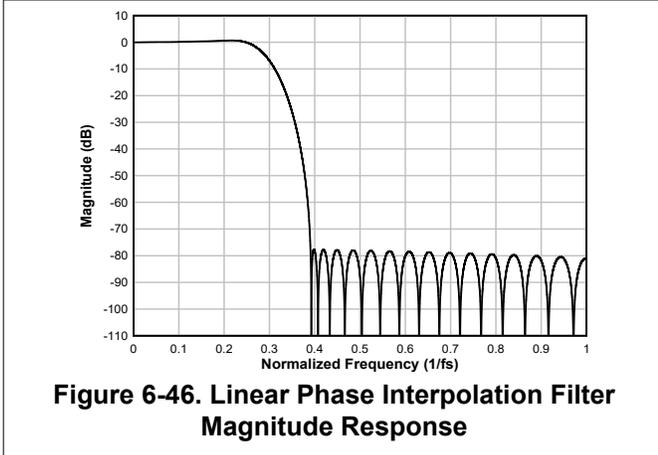
**Figure 6-45. Linear Phase Interpolation Filter Pass-Band Ripple**

**Table 6-35. Linear Phase Interpolation Filter Specifications**

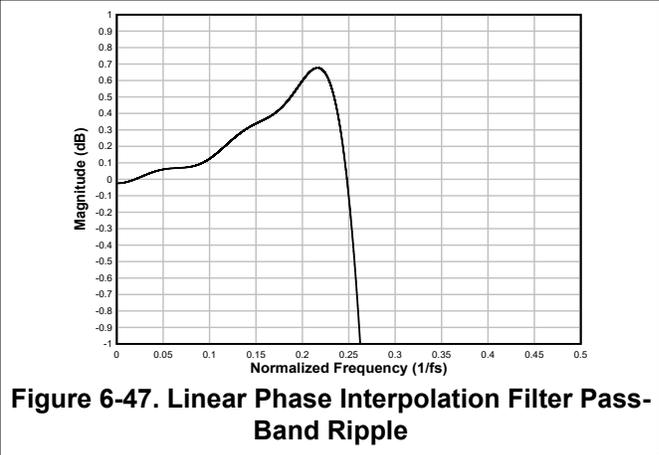
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.452 \times f_S$	-0.2		0.04	dB
Stop-band attenuation	Frequency range is $0.58 \times f_S$ to $3.42 \times f_S$	82.4			dB
Group delay or latency	Frequency range is 0 to $0.454 \times f_S$		16.7		$1/f_S$

**6.3.9.6.1.6 Sampling Rate: 384kHz or 352.8kHz**

Figure 6-46 and Figure 6-47 respectively show the magnitude response and the pass-band ripple for an interpolation filter with a sampling rate of 384kHz or 352.8kHz. Table 6-36 lists the specifications for an interpolation filter with a 384kHz or 352.8kHz sampling rate.



**Figure 6-46. Linear Phase Interpolation Filter Magnitude Response**



**Figure 6-47. Linear Phase Interpolation Filter Pass-Band Ripple**

**Table 6-36. Linear Phase Interpolation Filter Specifications**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Pass-band ripple	Frequency range is 0 to $0.245 \times f_s$	-0.03		0.67	dB
Stop-band attenuation	Frequency range is $0.391 \times f_s$ to $1.61 \times f_s$	77.6			dB
Group delay or latency	Frequency range is 0 to $0.212 \times f_s$		10.7		$1/f_s$

### 6.3.10 Interrupts, Status, and Digital I/O Pin Multiplexing

Certain events in the device may require host processor intervention and can be used to trigger interrupts to the host processor. One such event is an audio serial interface (ASI) bus error. The device powers down the record channels if any faults are detected with the ASI bus error clocks, such as:

- Invalid FSYNC frequency
- Invalid SBCLK to FSYNC ratio
- Long pauses of the SBCLK or FSYNC clocks

When an ASI bus clock error is detected, the device shuts down all the record and playback channels as quickly as possible. After all ASI bus clock errors are resolved, the device volume ramps back to its previous state to recover the audio. During an ASI bus clock error, the internal interrupt request (IRQ) interrupt signal asserts low if the clock error interrupt mask register bit INT\_MASK0[7] (P1\_R47\_D7) is set low. The clock fault is also available for readback in the latched fault status register bit INT\_LTCH0 (P1\_R52), which is a read-only register. Reading the latched fault status register, INT\_LTCH0, clears all latched fault status. The device can be additionally configured to route the internal IRQ interrupt signal on the GPIOx or GPO1 pins and also can be configured as open-drain outputs so that these pins can be wire-ANDed to the open-drain interrupt outputs of other devices.

The IRQ interrupt signal can either be configured as active low or active high polarity by setting the INT\_POL (P0\_R66\_D7) register bit. This signal can also be configured as a single pulse or a series of pulses by programming the INT\_EVENT[1:0] (P0\_R66\_D[6:5]) register bits. If the interrupts are configured as a series of pulses, the events trigger the start of pulses that stop when the latched fault status register is read to determine the cause of the interrupt.

The device also supports read-only live-status registers to determine if the channels are powered up or down and if the device is in sleep mode or not. These status registers are located in the DEV\_STS0 (P0\_R121) and DEV\_STS1 (P0\_R122) register bits.

The device has a multifunctional GPIO1 pin that can be configured for a desired specific function. [Table 6-37](#) lists all possible allocations of these multifunctional pins for the various features.

**Table 6-37. Multifunction Pin Assignments**

ROW	PIN FUNCTION	GPIO1	GPIO2	GPO1	GPI1
—	—	GPIO1_CFG	GPO2_CFG	GPO1_CFG	GPI1_CFG
—	—	P0_R10[7:4]	P0_R11[7:4]	P0_R12[7:4]	P0_R13[1]
A	Pin disabled	S <sup>(1)</sup>	S (default)	S (default)	S (default)
B	General-purpose output (GPO)	S	S	S	NS
C	Interrupt output (IRQ)	S (default)	S	S	NS
D	Power down for all ADC channels	S	S	NS	S
E	PDM clock output (PDMCLK)	S	S	S	NS
F	MiCBIAS on/off input (BIASEN)	S	S	NS	S
G	General-purpose input (GPI)	S	S	NS	S
H	Controller clock input (CCLK)	S	S	S	S
I	ASI daisy-chain input	S	S	NS	S
J	PDM data input 1 (PDMIN1)	S	S	NS	S
K	PDM data input 2 (PDMIN2)	S	S	NS	S
L	ASI DOUT	S	S	S	NS
M	ASI BCLK	S	S	S	S
N	ASI FSYNC	S	S	S	S
O	General Purpose Clock Out	S	S	S	NS
P	Incremental ADC Conversion Start	S	S	NS	S

(1) S means the feature mentioned in this row is *supported* for the respective GPIO1, GPOx, or GPIx pin mentioned in this column.

Each GPOx or GPIOx pin can be independently set for the desired drive configurations setting using the GPIOx\_DRV[2:0] or GPO1\_DRV[2:0] register bits. [Table 6-38](#) lists the drive configuration settings.

**Table 6-38. GPIO or GPOx Pins Drive Configuration Settings**

P0_R10_D[2:0] : GPIO1_DRV[2:0]	GPIO OUTPUT DRIVE CONFIGURATION SETTINGS FOR GPIO1
000	The GPIO1 pin is set to high impedance (floated)
001	The GPIO1 pin is set to be driven active low or active high
010 (default)	The GPIO1 pin is set to be driven active low or weak high (on-chip pullup)
011	The GPIO1 pin is set to be driven active low or Hi-Z (floated)
100	The GPIO1 pin is set to be driven weak low (on-chip pulldown) or active high
101	The GPIO1 pin is set to be driven Hi-Z (floated) or active high
110 and 111	Reserved (do not use these settings)

Similarly, the GPO1 pin can be configured using the GPO1\_DRV(P0\_R12) register bits.

When configured as a general-purpose output (GPO), the GPIOx or GPO1 pin values can be driven by writing the GPO\_GPI\_VAL (P0\_R14) registers. The GPIO\_MON bits (P0\_R14\_D[3:1]) can be used to readback the status of the GPIOx or GPI1 pin when configured as a general-purpose input (GPI).

## 7 Register Maps

This section describes the control registers for the device in detail. All these registers are eight bits in width and allocated to device configuration and programmable coefficients settings. These registers are mapped internally using a page scheme that can be controlled using either I<sup>2</sup>C or SPI communication to the device. Each page contains 128 bytes of registers. All device configuration registers are stored in page 0, page 1 and page 3. Page 0 is the default page setting at power up (and after a software reset). The device current page can be switch to a new desired page by using the PAGE[7:0] bits located in register 0 of every page.

Do not read from or write to reserved pages or reserved registers. Write only default values for the reserved bits in the valid registers.

The procedure for register access across pages is:

- Select page N (write data *N* to register 0 regardless of the current page number)
- Read or write data from or to valid registers in page N
- Select the new page M (write data *M* to register 0 regardless of the current page number)
- Read or write data from or to valid registers in page M
- Repeat as needed

## 7.1 Page 0 Registers

Table 7-1 lists the memory-mapped registers for the Page 0 registers. All register offset addresses not listed in Table 7-1 should be considered as reserved locations and the register contents should not be modified.

**Table 7-1. PAGE 0 Registers**

Address	Acronym	Register Name	Reset Value	Section
0x0	PAGE_CFG	Device page register	0x00	<a href="#">Section 7.1.1</a>
0x1	SW_RESET	Software reset register	0x00	<a href="#">Section 7.1.2</a>
0x2	VREF_CFG		0x00	<a href="#">Section 7.1.3</a>
0x3	AVDD_IOVDD_STS		0x00	<a href="#">Section 7.1.4</a>
0x4	MISC_CFG		0x00	<a href="#">Section 7.1.5</a>
0x5	MISC_CFG1		0x15	<a href="#">Section 7.1.6</a>
0x6	DAC_CFG_A0	DAC DEPOP configuration register	0x55	<a href="#">Section 7.1.7</a>
0x7	MISC_CFG0	Misc. configuration register	0x00	<a href="#">Section 7.1.8</a>
0xA	GPIO1_CFG0	GPIO1 configuration register 0	0x32	<a href="#">Section 7.1.9</a>
0xC	GPO1A_CFG0	GPO1A configuration register 0	0x00	<a href="#">Section 7.1.10</a>
0xD	GPI_CFG	GPI1 configuration register 0	0x00	<a href="#">Section 7.1.11</a>
0xE	GPO_GPI_VAL	GPIO, GPO output value register	0x00	<a href="#">Section 7.1.12</a>
0xF	INTF_CFG0	Interface configuration register 0	0x00	<a href="#">Section 7.1.13</a>
0x10	INTF_CFG1	Interface configuration register 1	0x52	<a href="#">Section 7.1.14</a>
0x11	INTF_CFG2	Interface configuration register 2	0x80	<a href="#">Section 7.1.15</a>
0x12	INTF_CFG3	Interface configuration register 3	0x00	<a href="#">Section 7.1.16</a>
0x13	INTF_CFG4	Interface configuration register 3	0x00	<a href="#">Section 7.1.17</a>
0x14	INTF_CFG5	Interface configuration register 4	0x00	<a href="#">Section 7.1.18</a>
0x15	INTF_CFG6	Interface configuration register 5	0x00	<a href="#">Section 7.1.19</a>
0x18	ASI_CFG0	ASI configuration register 0	0x40	<a href="#">Section 7.1.20</a>
0x19	ASI_CFG1	ASI configuration register 1	0x00	<a href="#">Section 7.1.21</a>
0x1A	PASI_CFG0	Primary ASI configuration register 0	0x30	<a href="#">Section 7.1.22</a>
0x1B	PASI_TX_CFG0	PASI TX configuration register 0	0x00	<a href="#">Section 7.1.23</a>
0x1C	PASI_TX_CFG1	PASI TX configuration register 1	0x00	<a href="#">Section 7.1.24</a>
0x1D	PASI_TX_CFG2	PASI TX configuration register 2	0x00	<a href="#">Section 7.1.25</a>
0x1E	PASI_TX_CH1_CFG	PASI TX Channel 1 configuration register	0x20	<a href="#">Section 7.1.26</a>
0x1F	PASI_TX_CH2_CFG	PASI TX Channel 2 configuration register	0x21	<a href="#">Section 7.1.27</a>
0x20	PASI_TX_CH3_CFG	PASI TX Channel 3 configuration register	0x02	<a href="#">Section 7.1.28</a>
0x21	PASI_TX_CH4_CFG	PASI TX Channel 4 configuration register	0x03	<a href="#">Section 7.1.29</a>
0x22	PASI_TX_CH5_CFG	PASI TX Channel 5 configuration register	0x04	<a href="#">Section 7.1.30</a>
0x23	PASI_TX_CH6_CFG	PASI TX Channel 6 configuration register	0x05	<a href="#">Section 7.1.31</a>
0x24	PASI_TX_CH7_CFG	PASI TX Channel 7 configuration register	0x06	<a href="#">Section 7.1.32</a>
0x25	PASI_TX_CH8_CFG	PASI TX Channel 8 configuration register	0x07	<a href="#">Section 7.1.33</a>
0x26	PASI_RX_CFG0	PASI RX configuration register 0	0x00	<a href="#">Section 7.1.34</a>
0x27	PASI_RX_CFG1	PASI RX configuration register 1	0x00	<a href="#">Section 7.1.35</a>
0x28	PASI_RX_CH1_CFG	PASI RX Channel 1 configuration register	0x20	<a href="#">Section 7.1.36</a>
0x29	PASI_RX_CH2_CFG	PASI RX Channel 2 configuration register	0x21	<a href="#">Section 7.1.37</a>
0x2A	PASI_RX_CH3_CFG	PASI RX Channel 3 configuration register	0x02	<a href="#">Section 7.1.38</a>
0x2B	PASI_RX_CH4_CFG	PASI RX Channel 4 configuration register	0x03	<a href="#">Section 7.1.39</a>
0x2C	PASI_RX_CH5_CFG	PASI RX Channel 5 configuration register	0x04	<a href="#">Section 7.1.40</a>
0x2D	PASI_RX_CH6_CFG	PASI RX Channel 6 configuration register	0x05	<a href="#">Section 7.1.41</a>

**Table 7-1. PAGE 0 Registers (continued)**

Address	Acronym	Register Name	Reset Value	Section
0x2E	PASI_RX_CH7_CFG	PASI RX Channel 7 configuration register	0x06	<a href="#">Section 7.1.42</a>
0x2F	PASI_RX_CH8_CFG	PASI RX Channel 8 configuration register	0x07	<a href="#">Section 7.1.43</a>
0x32	CLK_CFG0	Clock configuration register 0	0x00	<a href="#">Section 7.1.44</a>
0x33	CLK_CFG1	Clock configuration register 1	0x00	<a href="#">Section 7.1.45</a>
0x34	CLK_CFG2	Clock configuration register 2	0x40	<a href="#">Section 7.1.46</a>
0x35	CNT_CLK_CFG0	controller mode clock configuration register 0	0x00	<a href="#">Section 7.1.47</a>
0x36	CNT_CLK_CFG1	controller mode clock configuration register 1	0x00	<a href="#">Section 7.1.48</a>
0x37	CNT_CLK_CFG2	controller mode clock configuration register 2	0x20	<a href="#">Section 7.1.49</a>
0x38	CNT_CLK_CFG3	controller mode clock configuration register 3	0x00	<a href="#">Section 7.1.50</a>
0x39	CNT_CLK_CFG4	controller mode clock configuration register 4	0x00	<a href="#">Section 7.1.51</a>
0x3A	CNT_CLK_CFG5	controller mode clock configuration register 5	0x00	<a href="#">Section 7.1.52</a>
0x3B	CNT_CLK_CFG6	controller mode clock configuration register 6	0x00	<a href="#">Section 7.1.53</a>
0x3C	CLK_ERR_STS0	Clock error and status register 0	0x00	<a href="#">Section 7.1.54</a>
0x3D	CLK_ERR_STS1	Clock error and status register 1	0x00	<a href="#">Section 7.1.55</a>
0x3E	CLK_DET_STS0	Clock ratio detection register 0	0x00	<a href="#">Section 7.1.56</a>
0x3F	CLK_DET_STS1	Clock ratio detection register 1	0x00	<a href="#">Section 7.1.57</a>
0x40	CLK_DET_STS2	Clock ratio detection register 2	0x00	<a href="#">Section 7.1.58</a>
0x41	CLK_DET_STS3	Clock ratio detection register 3	0x00	<a href="#">Section 7.1.59</a>
0x42	INT_CFG	Interrupt configuration register	0x00	<a href="#">Section 7.1.60</a>
0x43	DAC_FLT_CFG	Interrupt configuration register	0x50	<a href="#">Section 7.1.61</a>
0x4B	ADC_DAC_MISC_CFG	ADC overload Response configuration register	0x00	<a href="#">Section 7.1.62</a>
0x4D	VREF_CFG	Power tune configuration register 0	0x00	<a href="#">Section 7.1.3</a>
0x4E	PWR_TUNE_CFG0	Power tune configuration register 0	0x00	<a href="#">Section 7.1.63</a>
0x4F	PWR_TUNE_CFG1	Power tune configuration register 1	0x00	<a href="#">Section 7.1.64</a>
0x50	ADC_CH1_CFG0	ADC Channel 1 configuration register 0	0x00	<a href="#">Section 7.1.65</a>
0x52	ADC_CH1_CFG2	ADC Channel 1 configuration register 2	0xA1	<a href="#">Section 7.1.66</a>
0x53	ADC_CH1_CFG3	ADC Channel 1 configuration register 3	0x80	<a href="#">Section 7.1.67</a>
0x54	ADC_CH1_CFG4	ADC Channel 1 configuration register 4	0x00	<a href="#">Section 7.1.68</a>
0x55	ADC_CH2_CFG0	ADC Channel 2 configuration register 0	0x00	<a href="#">Section 7.1.69</a>
0x57	ADC_CH2_CFG2	Channel 2 configuration register 2	0xA1	<a href="#">Section 7.1.70</a>
0x58	ADC_CH2_CFG3	ADC Channel 2 configuration register 3	0x80	<a href="#">Section 7.1.71</a>
0x59	ADC_CH2_CFG4	ADC Channel 2 configuration register 4	0x00	<a href="#">Section 7.1.72</a>
0x5A	ADC_CH3_CFG0	ADC Channel 3 configuration register 0	0x00	<a href="#">Section 7.1.73</a>
0x5B	ADC_CH3_CFG2	ADC Channel 3 configuration register 2	0xA1	<a href="#">Section 7.1.74</a>
0x5C	ADC_CH3_CFG3	ADC Channel 3 configuration register 3	0x80	<a href="#">Section 7.1.75</a>
0x5D	ADC_CH3_CFG4	ADC Channel 3 configuration register 4	0x00	<a href="#">Section 7.1.76</a>
0x5E	ADC_CH4_CFG0	ADC Channel 4 configuration register 0	0x00	<a href="#">Section 7.1.77</a>
0x5F	ADC_CH4_CFG2	Channel 4 configuration register 2	0xA1	<a href="#">Section 7.1.78</a>
0x60	ADC_CH4_CFG3	ADC Channel 4 configuration register 3	0x80	<a href="#">Section 7.1.79</a>
0x61	ADC_CH4_CFG4	ADC Channel 4 configuration register 4	0x00	<a href="#">Section 7.1.80</a>
0x64	OUT1x_CFG0	Channel OUT1x configuration register 0	0x20	<a href="#">Section 7.1.81</a>
0x65	OUT1x_CFG1	Channel OUT1x configuration register 1	0x20	<a href="#">Section 7.1.82</a>
0x66	OUT1x_CFG2	Channel OUT2x configuration register 2	0x20	<a href="#">Section 7.1.83</a>
0x67	DAC_CH1A_CFG0	DAC Channel 1A configuration register 0	0xC9	<a href="#">Section 7.1.84</a>
0x68	DAC_CH1A_CFG1	DAC Channel 1A configuration register 1	0x80	<a href="#">Section 7.1.85</a>

**Table 7-1. PAGE 0 Registers (continued)**

Address	Acronym	Register Name	Reset Value	Section
0x69	DAC_CH1B_CFG0	DAC Channel 1B configuration register 0	0xC9	<a href="#">Section 7.1.86</a>
0x6A	DAC_CH1B_CFG1	DAC Channel 1B configuration register 1	0x80	<a href="#">Section 7.1.87</a>
0x6B	OUT2x_CFG0	Channel OUT2x configuration register 0	0x20	<a href="#">Section 7.1.88</a>
0x6C	OUT2x_CFG1	Channel OUT2x configuration register 1	0x20	<a href="#">Section 7.1.89</a>
0x6D	OUT2x_CFG2	Channel OUT2x configuration register 2	0x20	<a href="#">Section 7.1.90</a>
0x6E	DAC_CH2A_CFG0	DAC Channel 2A configuration register 0	0xC9	<a href="#">Section 7.1.91</a>
0x6F	DAC_CH2A_CFG1	DAC Channel 2A configuration register 1	0x80	<a href="#">Section 7.1.92</a>
0x70	DAC_CH2B_CFG0	DAC Channel 2B configuration register 0	0xC9	<a href="#">Section 7.1.93</a>
0x71	DAC_CH2B_CFG1	DAC Channel 2B configuration register 1	0x80	<a href="#">Section 7.1.94</a>
0x72	DSP_CFG0	DSP configuration register 0	0x18	<a href="#">Section 7.1.95</a>
0x73	DSP_CFG1	DSP configuration register 0	0x18	<a href="#">Section 7.1.96</a>
0x76	CH_EN	Channel enable configuration register	0xCC	<a href="#">Section 7.1.97</a>
0x77	DYN_PUPD_CFG	Power up configuration register	0x00	<a href="#">Section 7.1.98</a>
0x78	PWR_CFG	Power up configuration register	0x00	<a href="#">Section 7.1.99</a>
0x79	DEV_STS0	Device status value register 0	0x00	<a href="#">Section 7.1.100</a>
0x7A	DEV_STS1	Device status value register 1	0x80	<a href="#">Section 7.1.101</a>
0x7E	I2C_CKSUM	I <sup>2</sup> C checksum register	0x00	<a href="#">Section 7.1.102</a>

### 7.1.1 PAGE\_CFG Register (Address = 0x0) [Reset = 0x00]

PAGE\_CFG is shown in [Figure 7-1](#) and described in [Table 7-2](#).

Return to the [Summary Table](#).

The device memory map is divided into pages. This register sets the page.

**Figure 7-1. PAGE\_CFG Register**

7	6	5	4	3	2	1	0
PAGE[7:0]							
R/W-00000000b							

**Table 7-2. PAGE\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PAGE[7:0]	R/W	0x0	These bits set the device page. 0d = Page 0 1d = Page 1 2d to 254d = Page 2 to page 254 respectively 255d = Page 255

### 7.1.2 SW\_RESET Register (Address = 0x1) [Reset = 0x00]

SW\_RESET is shown in [Figure 7-2](#) and described in [Table 7-3](#).

Return to the [Summary Table](#).

This register is the software reset register. Asserting a software reset places all register values in their default power-on-reset (POR) state.

**Figure 7-2. SW\_RESET Register**

7	6	5	4	3	2	1	0
RESERVED							SW_RESET

**Figure 7-2. SW\_RESET Register (continued)**

R-0000000b

R/W-0b

**Table 7-3. SW\_RESET Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-1	RESERVED	R	0x0	Reserved bits; Write only reset value
0	SW_RESET	R/W	0x0	Software reset. This bit is self clearing. 0d = Do not reset 1d = Reset all registers to their reset values

### 7.1.3 VREF\_CFG Register (Address = 0x2) [Reset = 0x00]

VREF\_CFG is shown in [Figure 7-3](#) and described in [Table 7-4](#).

Return to the [Summary Table](#).

**Figure 7-3. VREF\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		VREF_QCHG[1:0]		SLEEP_EXIT_V REF_EN	AVDD_MODE	IOVDD_IO_MO DE	SLEEP_ENZ
R-00b		R/W-00b		R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-4. VREF\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5-4	VREF_QCHG[1:0]	R/W	0x0	The duration of the quick-charge for the VREF external capacitor is set using an internal series impedance of 200 Ω. 0d = VREF quick-charge duration of 3.5 ms (typical) 1d = VREF quick-charge duration of 10 ms (typical) 2d = VREF quick-charge duration of 50 ms (typical) 3d = VREF quick-charge duration of 100 ms (typical)
3	SLEEP_EXIT_VREF_EN	R/W	0x0	Sleep mode exit configuration 0d = Only DREG Enabled 1d = DREG and VREF enabled
2	AVDD_MODE	R/W	0x0	AVDD mode configuration. 0d = Internal AREG regulator is used (Should be used for AVDD > 2V) 1d = AVDD 1.8V used directly for AREG (Strictly use this setting for AVDD 1.7V-1.9V)
1	IOVDD_IO_MODE	R/W	0x0	IOVDD mode configuration. 0d = IOVDD at 3.3V / 1.8V / 1.2V (speed limitation applicable for 1.8V and 1.2V) 1d = IOVDD at 1.8V / 1.2V only (no speed limitation - Strictly don't use this setting for IOVDD > 2V).
0	SLEEP_ENZ	R/W	0x0	Sleep mode setting. 0d = Device is in sleep mode 1d = Device is not in sleep mode

### 7.1.4 AVDD\_IOVDD\_STS Register (Address = 0x3) [Reset = 0x00]

AVDD\_IOVDD\_STS is shown in [Figure 7-4](#) and described in [Table 7-5](#).

Return to the [Summary Table](#).

**Figure 7-4. AVDD\_IOVDD\_STS Register**

7	6	5	4	3	2	1	0
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**Figure 7-4. AVDD\_IOVDD\_STS Register (continued)**

AVDD_MODE_STS	IOVDD_IO_MODE_STS	RESERVED	BRWNOUT_SHDN_STS	BRWNOUT_SHDN_EXIT_SLEEP
R-0b	R-0b	R-0000b	R-0b	R/W-0b

**Table 7-5. AVDD\_IOVDD\_STS Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	AVDD_MODE_STS	R	0x0	AVDD mode status flag register. 0d = AVDD_MODE as per configured 1d = AVDD > 2V (AVDD_MODE forced to 0d)
6	IOVDD_IO_MODE_STS	R	0x0	IOVDD mode status flag register. 0d = IOVDD_MODE as per configured 1d = IOVDD > 2V (IOVDD_IO_MODE forced to 0d)
5-2	RESERVED	R	0x0	Reserved bits; Write only reset values
1	BRWNOUT_SHDN_STS	R	0x0	Brwnout shutdown status 0d = No brwnout shutdown 1d = Brwnout shutdown
0	BRWNOUT_SHDN_EXIT_SLEEP	R/W	0x0	Brwnout shutdown sleep exit config 0d = Stay in sleep mode 1d = Exit sleep mode

### 7.1.5 MISC\_CFG Register (Address = 0x4) [Reset = 0x00]

MISC\_CFG is shown in [Figure 7-5](#) and described in [Table 7-6](#).

Return to the [Summary Table](#).

**Figure 7-5. MISC\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	I2C_BRDCAST_EN	RESERVED
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R/W-0b	R-0b

**Table 7-6. MISC\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6	RESERVED	R	0x0	Reserved bit; Write only reset value
5	RESERVED	R	0x0	Reserved bit; Write only reset value
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3	RESERVED	R	0x0	Reserved bit; Write only reset value
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	I2C_BRDCAST_EN	R/W	0x0	I <sup>2</sup> C broadcast addressing setting. 0d = I <sup>2</sup> C broadcast mode disabled 1d = I <sup>2</sup> C broadcast mode enabled; the I <sup>2</sup> C target address is fixed with pin-controlled LSB bits as '0'
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.1.6 MISC\_CFG1 Register (Address = 0x5) [Reset = 0x15]

MISC\_CFG1 is shown in [Figure 7-6](#) and described in [Table 7-7](#).

Return to the [Summary Table](#).

**Figure 7-6. MISC\_CFG1 Register**

7	6	5	4	3	2	1	0
INCAP_QCHG[1:0]		SHDN_CFG[1:0]		DREG_KA_TIME[1:0]		RESERVED	
R/W-00b		R/W-01b		R/W-01b		R-00b	

**Table 7-7. MISC\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	INCAP_QCHG[1:0]	R/W	0x0	The duration of the quick-charge for the external AC-coupling capacitor is set using an internal series impedance of 800 Ω. 0d = INxP, INxM quick-charge duration of 2.5 ms (typical) 1d = INxP, INxM quick-charge duration of 12.5 ms (typical) 2d = INxP, INxM quick-charge duration of 25 ms (typical) 3d = INxP, INxM quick-charge duration of 50 ms (typical)
5-4	SHDN_CFG[1:0]	R/W	0x1	Shutdown configuration. 0d = DREG is powered down immediately after IOVDD is deasserted 1d = DREG remains active to enable a clean shut down until a time-out(DREG_KA_TIME) is reached; after the time-out period, DREG is forced to power off 2d = DREG remains active until the device cleanly shuts down 3d = Reserved; Don't use
3-2	DREG_KA_TIME[1:0]	R/W	0x1	These bits set how long DREG remains active after IOVDD is deasserted. 0d = DREG remains active for 30 ms (typical) 1d = DREG remains active for 25 ms (typical) 2d = DREG remains active for 10 ms (typical) 3d = DREG remains active for 5 ms (typical)
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

**7.1.7 DAC\_CFG\_A0 Register (Address = 0x6) [Reset = 0x55]**

DAC\_CFG\_A0 is shown in [Figure 7-7](#) and described in [Table 7-8](#).

Return to the [Summary Table](#).

This register configures the device DAC DEPOP

**Figure 7-7. DAC\_CFG\_A0 Register**

7	6	5	4	3	2	1	0
RSERIES_DE_POP[3:0]				PWR_UP_TIME_DE_POP[3:0]			
R/W-0101b				R/W-0101b			

**Table 7-8. DAC\_CFG\_A0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	RSERIES_DE_POP[3:0]	R/W	0x5	HP Amp series resistor select config. 0d = Open 1d = 1K 2d = 2.5K 3d = 0.715k 4d = 10K 5d = 0.91k 6d = 2K 7d = 0.667k 8d = 20K Dont use Dont use Dont use Dont use Dont use Dont use Dont use

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**Table 7-8. DAC\_CFG\_A0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3-0	PWR_UP_TIME_DE_PO P[3:0]	R/W	0x5	HP Amp external cap charging time config. 0d = 2ms 1d = 4ms 2d = 8ms 3d = 16ms 4d = 50ms 5d = 100ms 6d = 250ms 7d = 500ms 8d = 1s 9d = 5s 10d-15d = Reserved

### 7.1.8 MISC\_CFG0 Register (Address = 0x7) [Reset = 0x00]

MISC\_CFG0 is shown in [Figure 7-8](#) and described in [Table 7-9](#).

Return to the [Summary Table](#).

This register configures the device Misc.

**Figure 7-8. MISC\_CFG0 Register**

7	6	5	4	3	2	1	0
DAC_ST_W_C AP_DIS	DAC_DLYD_P WRUP	DAC_DLYD_P WRUP_TIME	HW_RESET_O N_CLK_STOP_EN	RESERVED			
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R-0000b			

**Table 7-9. MISC\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	DAC_ST_W_CAP_DIS	R/W	0x0	DAC start with dc blocking capacitor discharge sequence. 0d = disable 1d = enable
6	DAC_DLYD_PWRUP	R/W	0x0	DAC power up delayed config. 0d = disable 1d = enable (Delay power-up by based on DAC_DLYD_PWRUP_TIME config)
5	DAC_DLYD_PWRUP_TIME	R/W	0x0	DAC power up delayed time config. 0d = 64-128ms 1d = 256-512ms
4	HW_RESET_ON_CLK_STOP_EN	R/W	0x0	Assertion of Hard Reset when clock selected by CLK_SRC_SEL is not available for 2ms config 0d = disable 1d = enable
3-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.1.9 GPIO1\_CFG0 Register (Address = 0xA) [Reset = 0x32]

GPIO1\_CFG0 is shown in [Figure 7-9](#) and described in [Table 7-10](#).

Return to the [Summary Table](#).

This register is the GPIO1 configuration register 0.

**Figure 7-9. GPIO1\_CFG0 Register**

7	6	5	4	3	2	1	0
GPIO1_CFG[3:0]				RESERVED	GPIO1_DRV[2:0]		



**Table 7-11. GPO1A\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	GPO1A_CFG[3:0]	R/W	0x0	GPO1A configuration.(Max frequency is limited to 6MHz. For SPI mode, this pin act as POCI and the below configuration settings are not applicable) (Buskeeper en is not supported when used as DOUT) 0d = GPO1A is disabled 1d = GPO1A is configured as a general-purpose input (GPI) or any other input function 2d = GPO1A is configured as a general-purpose output (GPO) 3d = GPO1A is configured as a chip interrupt output (IRQ) 4d = GPO1A is configured as a PDM clock output (PDMCLK) 5d = GPO1A is configured as primary ASI DOUT 6d = GPO1A is configured as primary ASI DOUT2 7d = GPO1A is configured as secondary ASI DOUT 8d = GPO1A is configured as secondary ASI DOUT2 9d = GPO1A is configured as secondary ASI BCLK output 10d = GPO1A is configured as secondary ASI FSYNC output 11d = GPO1A is configured as general purpose CLKOUT 12d = GPO1A is configured as PASI DOUT and SASI DOUT muxed 13d = GPO1A is configured as DAISY_OUT for DIN Daisy 14d to 15d = Reserved
3	SPI_POCI_CFG	R/W	0x0	SPI POCI configuration. 0d = GPO1A pin act as SPI POCI output (max frequency limited to 6MHz) and GPO1A_CFG and GPO1A_DRV settings are ignored. 0d = GPIO1A pin act as SPI POCI output for high speed use case and GPIO1A_CFG and GPIO1A_DRV settings are ignored.
2-0	GPO1A_DRV[2:0]	R/W	0x0	GPO1A output drive configuration. (Not valid if GPO1A_CFG configured as I <sup>2</sup> S out) (This is GPO1A in Auto-device but max frequency is limited to 6MHz. For SPI mode, this pin act as SSZ and the below configuration settings are not applicable) 0d = Hi-Z output 1d = Drive active low and active high 2d = Drive active low and weak high 3d = Drive active low and Hi-Z 4d = Drive weak low and active high 5d = Drive Hi-Z and active high 6d to 7d = Reserved; Don't use

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**7.1.11 GPI\_CFG Register (Address = 0xD) [Reset = 0x00]**

GPI\_CFG is shown in [Figure 7-11](#) and described in [Table 7-12](#).

Return to the [Summary Table](#).

This register is the GPI1 configuration register 0.

**Figure 7-11. GPI\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED						GPI1A_CFG	GPI1A_CFG
R-000000b						R/W-0b	R/W-0b

**Table 7-12. GPI\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	RESERVED	R	0x0	Reserved bits; Write only reset values
1	GPI1A_CFG	R/W	0x0	GPI1A configuration. 0d = GPI1A is disabled 1d = GPI1A is configured as a general-purpose input (GPI) or any other input function

**Table 7-12. GPIO\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
0	GPIO2A_CFG	R/W	0x0	GPIO2A configuration. 0d = GPIO2A is disabled 1d = GPIO2A is configured as a general-purpose input (GPI) or any other input function

### 7.1.12 GPO\_GPI\_VAL Register (Address = 0xE) [Reset = 0x00]

GPO\_GPI\_VAL is shown in [Figure 7-12](#) and described in [Table 7-13](#).

Return to the [Summary Table](#).

This register is the GPIO and GPO output value register.

**Figure 7-12. GPO\_GPI\_VAL Register**

7	6	5	4	3	2	1	0
GPIO1_VAL	RESERVED	GPO1A_VAL	RESERVED	GPIO1_MON	GPIO2A_MON	GPI1A_MON	RESERVED
R/W-0b	R-0b	R/W-0b	R-0b	R-0b	R-0b	R-0b	R-0b

**Table 7-13. GPO\_GPI\_VAL Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	GPIO1_VAL	R/W	0x0	GPIO1 output value when configured as a GPO. 0d = Drive the output with a value of 0 1d = Drive the output with a value of 1
6	RESERVED	R	0x0	Reserved bit; Write only reset value
5	GPO1A_VAL	R/W	0x0	GPO1A output value when configured as a GPO. 0d = Drive the output with a value of 0 1d = Drive the output with a value of 1
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3	GPIO1_MON	R	0x0	GPIO1 monitor value when configured as a GPI. 0d = Input monitor value 0 1d = Input monitor value 1
2	GPIO2A_MON	R	0x0	GPIO2A monitor value when configured as a GPI. 0d = Input monitor value 0 1d = Input monitor value 1
1	GPI1A_MON	R	0x0	GPI1A monitor value when configured as a GPI. 0d = Input monitor value 0 1d = Input monitor value 1
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.1.13 INTF\_CFG0 Register (Address = 0xF) [Reset = 0x00]

INTF\_CFG0 is shown in [Figure 7-13](#) and described in [Table 7-14](#).

Return to the [Summary Table](#).

This register is the interface configuration register 0.

**Figure 7-13. INTF\_CFG0 Register**

7	6	5	4	3	2	1	0
RESERVED	CCLK_SEL[1:0]		PASI_DIN2_SEL[2:0]		PASI_BCLK_SEL	PASI_FSYNC_SEL	
R-0b	R/W-00b		R/W-000b		R/W-0b	R/W-0b	

**Table 7-14. INTF\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	CCLK_SEL[1:0]	R/W	0x0	CCLK select configuration. 0d = cclk is disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A
4-2	PASI_DIN2_SEL[2:0]	R/W	0x0	Primary ASI DIN2 select configuration. 0d = Primary ASI DIN2 is disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A 4d = DOUT 5d = Primary ASI DIN 6d to 7d = Reserved
1	PASI_BCLK_SEL	R/W	0x0	Primary ASI BCLK select configuration. 0d = Primary ASI BCLK is BCLK 1d = Primary ASI BCLK is Secondary ASI BCLK
0	PASI_FSYNC_SEL	R/W	0x0	Primary ASI FSYNC select configuration. 0d = Primary ASI FSYNC is FSYNC 1d = Primary ASI FSYNC is Secondary ASI FSYNC

**7.1.14 INTF\_CFG1 Register (Address = 0x10) [Reset = 0x52]**

INTF\_CFG1 is shown in [Figure 7-14](#) and described in [Table 7-15](#).

Return to the [Summary Table](#).

This register is the interface configuration register 1.

**Figure 7-14. INTF\_CFG1 Register**

7	6	5	4	3	2	1	0
DOUT_SEL[3:0]			DOUT_VAL		DOUT_DRV[2:0]		
R/W-0101b			R/W-0b		R/W-010b		

**Table 7-15. INTF\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DOUT_SEL[3:0]	R/W	0x5	DOUT select configuration. 0d = DOUT is disabled 1d = DOUT is configured as input 2d = DOUT is configured as a general-purpose output (GPO) 3d = DOUT is configured as a chip interrupt output (IRQ) 4d = DOUT is configured as a PDM clock output (PDMCLK) 5d = DOUT is configured as primary ASI DOUT 6d = DOUT is configured as primary ASI DOUT2 7d = DOUT is configured as secondary ASI DOUT 8d = DOUT is configured as secondary ASI DOUT2 9d = DOUT is configured as secondary ASI BCLK output 10d = DOUT is configured as secondary ASI FSYNC output 11d = DOUT is configured as general purpose CLKOUT 12d = DOUT is configured as PASI DOUT and SASI DOUT muxed 13d = DOUT is configured as DAISY_OUT for DIN Daisy 14d = DOUT is configured as DIN(LOOPBACK) 15d = Reserved
3	DOUT_VAL	R/W	0x0	DOUT output value when configured as a GPO. 0d = Drive the output with a value of 0 1d = Drive the output with a value of 1

**Table 7-15. INTF\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
2-0	DOUT_DRV[2:0]	R/W	0x2	DOUT output drive configuration. 0d = Hi-Z output 1d = Drive active low and active high 2d = Drive active low and weak high 3d = Drive active low and Hi-Z 4d = Drive weak low and active high 5d = Drive Hi-Z and active high 6d to 7d = Reserved; Don't use

### 7.1.15 INTF\_CFG2 Register (Address = 0x11) [Reset = 0x80]

INTF\_CFG2 is shown in [Figure 7-15](#) and described in [Table 7-16](#).

Return to the [Summary Table](#).

This register is the interface configuration register 2.

**Figure 7-15. INTF\_CFG2 Register**

7	6	5	4	3	2	1	0
PASI_DIN_EN	SASI_FSYNC_SEL[2:0]			SASI_BCLK_SEL[2:0]			RESERVED
R/W-1b	R/W-000b			R/W-000b			R-0b

**Table 7-16. INTF\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_DIN_EN	R/W	0x1	Primary ASI DIN enable configuration. 0d = Primary ASI DIN is disabled 1d = Primary ASI DIN is enabled
6-4	SASI_FSYNC_SEL[2:0]	R/W	0x0	Secondary ASI FSYNC select configuration. 0d = Secondary ASI disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A 4d = Reserved 5d = Primary ASI FSYNC 6d to 7d = Reserved
3-1	SASI_BCLK_SEL[2:0]	R/W	0x0	Secondary ASI BCLK select configuration. 0d = Secondary ASI disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A 4d = Reserved 5d = Primary ASI BCLK 6d to 7d = Reserved
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.1.16 INTF\_CFG3 Register (Address = 0x12) [Reset = 0x00]

INTF\_CFG3 is shown in [Figure 7-16](#) and described in [Table 7-17](#).

Return to the [Summary Table](#).

This register is the interface configuration register 3.

**Figure 7-16. INTF\_CFG3 Register**

7	6	5	4	3	2	1	0
SASI_DIN_SEL[2:0]			SASI_DIN2_SEL[2:0]			RESERVED	
R/W-000b			R/W-000b			R-00b	

Figure 7-16. INTF\_CFG3 Register (continued)

Table 7-17. INTF\_CFG3 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-5	SASI_DIN_SEL[2:0]	R/W	0x0	Secondary ASI DIN select configuration. 0d = Secondary ASI DIN is disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A 4d = DOUT 5d = Primary ASI DIN 6d to 7d = Reserved
4-2	SASI_DIN2_SEL[2:0]	R/W	0x0	Secondary ASI DIN2 select configuration. 0d = Secondary ASI DIN2 is disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A 4d = DOUT 5d = Primary ASI DIN 6d to 7d = Reserved
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.1.17 INTF\_CFG4 Register (Address = 0x13) [Reset = 0x00]

INTF\_CFG4 is shown in Figure 7-17 and described in Table 7-18.

Return to the Summary Table.

This register is the interface configuration register 3.

Figure 7-17. INTF\_CFG4 Register

7	6	5	4	3	2	1	0
PDM_CH1_SEL	PDM_CH2_SEL	PDMDIN1_EDGE	PDMDIN2_EDGE	PDM_DIN1_SEL[1:0]		PDM_DIN2_SEL[1:0]	
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-00b		R/W-00b	

Table 7-18. INTF\_CFG4 Register Field Descriptions

Bit	Field	Type	Reset	Description
7	PDM_CH1_SEL	R/W	0x0	PDM select configuration for channel 1 of record path. 0d = Channel 1 is analog (ADC) type on the record path 1d = Channel 1 is digital (PDM) type on the record path
6	PDM_CH2_SEL	R/W	0x0	PDM select configuration for channel 2 of record path. 0d = Channel 2 is analog (ADC) type on the record path 1d = Channel 2 is digital (PDM) type on the record path
5	PDMDIN1_EDGE	R/W	0x0	PDMCLK latching edge used for channel 1 and channel 2 data. 0d = Channel 1 data are latched on the negative edge, channel 2 data are latched on the positive edge 1d = Channel 1 data are latched on the positive edge, channel 2 data are latched on the negative edge
4	PDMDIN2_EDGE	R/W	0x0	PDMCLK latching edge used for channel 3 and channel 4 data. 0d = Channel 3 data are latched on the negative edge, channel 4 data are latched on the positive edge 1d = Channel 3 data are latched on the positive edge, channel 4 data are latched on the negative edge
3-2	PDM_DIN1_SEL[1:0]	R/W	0x0	PDM data channels 1 and 2 select configuration. 0d = PDM data channels 1 and 2 are disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A

**Table 7-18. INTF\_CFG4 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
1-0	PDM_DIN2_SEL[1:0]	R/W	0x0	PDM data channels 3 and 4 select configuration. 0d = PDM data channels 3 and 4 are disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A

### 7.1.18 INTF\_CFG5 Register (Address = 0x14) [Reset = 0x00]

INTF\_CFG5 is shown in [Figure 7-18](#) and described in [Table 7-19](#).

Return to the [Summary Table](#).

This register is the interface configuration register 4.

**Figure 7-18. INTF\_CFG5 Register**

7	6	5	4	3	2	1	0
PDM_DIN_SEL_OVRD	DOUT_WITH_DIN	PD_ADC_GPIO[1:0]		PD_DAC_GPIO[1:0]		PLIM_GPIO	GPA_GPIO
R/W-0b	R/W-0b	R/W-00b		R/W-00b		R/W-0b	R/W-0b

**Table 7-19. INTF\_CFG5 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PDM_DIN_SEL_OVRD	R/W	0x0	PDM data channels (1 and 2)/(3 and 4) select configuration override. 0d = No Override 1d = PDM_DIN1/2_SEL if configured as GPI1 will be overridden as DIN
6	DOUT_WITH_DIN	R/W	0x0	DOUT used as both ASI OUT and ASI IN 0d = DOUT based on DOUT_SEL 1d = DOUT used as both ASI OUT and ASI DIN
5-4	PD_ADC_GPIO[1:0]	R/W	0x0	Power down ADC using GPIO select configuration.(ADC powered down if any one of the PD_ADC_GPIO/ADC_PDZ is configured power down) 0d = Power down ADC using GPIO is disabled 1d = Power down ADC using GPIO1 2d = Power down ADC using GPI2A 3d = Power down ADC using GPI1A
3-2	PD_DAC_GPIO[1:0]	R/W	0x0	Power down DAC using GPIO select configuration.(DAC powered down if any one of the PD_DAC_GPIO/DAC_PDZ is configured power down) 0d = Power down DAC using GPIO is disabled 1d = Power down DAC using GPIO1 2d = Power down DAC using GPI2A 3d = Power down DAC using GPI1A
1	PLIM_GPIO	R/W	0x0	PLIM using GPIO1 configuration. 0d = PLIM using GPIO1 is disabled 1d = PLIM using GPIO1
0	GPA_GPIO	R/W	0x0	GPA using GPIO1 configuration. 0d = GPA using GPIO1 is disabled 1d = GPA using GPIO1

### 7.1.19 INTF\_CFG6 Register (Address = 0x15) [Reset = 0x00]

INTF\_CFG6 is shown in [Figure 7-19](#) and described in [Table 7-20](#).

Return to the [Summary Table](#).

This register is the interface configuration register 5.

**Figure 7-19. INTF\_CFG6 Register**

7	6	5	4	3	2	1	0
EN_MBIAS_GPIO[1:0]		IADC_CONVST_GPIO[1:0]		RESERVED			
R/W-00b		R/W-00b		R-0000b			

**Table 7-20. INTF\_CFG6 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	EN_MBIAS_GPIO[1:0]	R/W	0x0	Enable MICBIAS using GPIO select configuration. 0d = Enable MICBIAS using GPIO is disabled 1d = Enable MICBIAS using GPIO1 2d = Enable MICBIAS using GPI2A 3d = Enable MICBIAS using GPI1A
5-4	IADC_CONVST_GPIO[1:0]	R/W	0x0	IADC conversion start using GPIO select configuration. 0d = Enable IADC using GPIO is disabled 1d = Enable IADC using GPIO1 2d = Enable IADC using GPI2A 3d = Enable IADC using GPI1A
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.1.20 ASI\_CFG0 Register (Address = 0x18) [Reset = 0x40]

ASI\_CFG0 is shown in [Figure 7-20](#) and described in [Table 7-21](#).

Return to the [Summary Table](#).

This register is the ASI configuration register 0.

**Figure 7-20. ASI\_CFG0 Register**

7	6	5	4	3	2	1	0
PASI_DIS	SASI_DIS	SASI_CFG_GANG	DAISY_EN[1:0]		DAISY_IN_SEL[2:0]		
R/W-0b	R/W-1b	R/W-0b	R/W-00b		R/W-000b		

**Table 7-21. ASI\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_DIS	R/W	0x0	Disable or enable primary ASI (PASI). 0d = Primary ASI enabled 1d = Primary ASI disabled
6	SASI_DIS	R/W	0x1	Disable or enable secondary ASI (SASI). 0d = Secondary ASI enabled 1d = Secondary ASI disabled
5	SASI_CFG_GANG	R/W	0x0	All configurations of secondary ASI ganged with primary ASI. 0d = Secondary ASI has independent configurations 1d = Secondary ASI configurations same as primary ASI
4-3	DAISY_EN[1:0]	R/W	0x0	Daisy chain feature enable (Daisy buffer length is 64, only 1 ASI with 1 DOUT AND DIN available) 0d = Daisy chain disabled 1d = PASI daisy chain enabled (Secondary ASI not available) 2d = SASI daisy chain enabled (Primary ASI not available) 3d = Reserved; Don't use
2-0	DAISY_IN_SEL[2:0]	R/W	0x0	Daisy input select configuration. 0d = Daisy input disabled 1d = GPIO1 2d = GPI2A 3d = GPI1A 4d = Reserved 5d = DIN 6d to 7d = Reserved

### 7.1.21 ASI\_CFG1 Register (Address = 0x19) [Reset = 0x00]

ASI\_CFG1 is shown in [Figure 7-21](#) and described in [Table 7-22](#).

Return to the [Summary Table](#).

This register is the ASI configuration register 1.

**Figure 7-21. ASI\_CFG1 Register**

7	6	5	4	3	2	1	0
ASI_DOUT_CFG1[1:0]		ASI_DIN_CFG1[1:0]		DAISY_DIR	RESERVED	RESERVED	RESERVED
R/W-00b		R/W-00b		R/W-0b	R-0b	R-0b	R-0b

**Table 7-22. ASI\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	ASI_DOUT_CFG1[1:0]	R/W	0x0	ASI data output configuration. 0d = 1 data output for Primary ASI and 1 data output for Secondary ASI 1d = 2 data outputs for Primary ASI 2d = 2 data outputs for Secondary ASI 3d = Reserved; Don't use
5-4	ASI_DIN_CFG1[1:0]	R/W	0x0	ASI data input configuration. 0d = 1 data input for Primary ASI and 1 data input for Secondary ASI 1d = 2 data inputs for Primary ASI 2d = 2 data inputs for Secondary ASI 3d = Reserved; Don't use
3	DAISY_DIR	R/W	0x0	Daisy direction configuration. 0d = ASI DOUT daisy 1d = ASI DIN daisy
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.1.22 PASI\_CFG0 Register (Address = 0x1A) [Reset = 0x30]

PASI\_CFG0 is shown in [Figure 7-22](#) and described in [Table 7-23](#).

Return to the [Summary Table](#).

This register is the ASI configuration register 0.

**Figure 7-22. PASI\_CFG0 Register**

7	6	5	4	3	2	1	0
PASI_FORMAT[1:0]		PASI_WLEN[1:0]		PASI_FSYNC_POL	PASI_BCLK_POL	PASI_BUS_ER_R	PASI_BUS_ER_R_COV
R/W-00b		R/W-11b		R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-23. PASI\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	PASI_FORMAT[1:0]	R/W	0x0	Primary ASI protocol format. 0d = TDM mode 1d = I <sup>2</sup> S mode 2d = LJ (left-justified) mode 3d = Reserved; Don't use

**Table 7-23. PASI\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5-4	PASI_WLEN[1:0]	R/W	0x3	Primary ASI word or slot length. 0d = 16 bits (Recommended this setting to be used with 10-kΩ input impedance configuration) 1d = 20 bits 2d = 24 bits 3d = 32 bits
3	PASI_FSYNC_POL	R/W	0x0	ASI FSYNC polarity (for PASI protocol only). 0d = Default polarity as per standard protocol 1d = Inverted polarity with respect to standard protocol
2	PASI_BCLK_POL	R/W	0x0	ASI BCLK polarity (for PASI protocol only). 0d = Default polarity as per standard protocol 1d = Inverted polarity with respect to standard protocol
1	PASI_BUS_ERR	R/W	0x0	ASI bus error detection. 0d = Enable bus error detection 1d = Disable bus error detection
0	PASI_BUS_ERR_RCOV	R/W	0x0	ASI bus error auto resume. 0d = Enable auto resume after bus error recovery 1d = Disable auto resume after bus error recovery and remain powered down until host configures the device

**7.1.23 PASI\_TX\_CFG0 Register (Address = 0x1B) [Reset = 0x00]**

PASI\_TX\_CFG0 is shown in [Figure 7-23](#) and described in [Table 7-24](#).

Return to the [Summary Table](#).

This register is the PASI TX configuration register 0.

**Figure 7-23. PASI\_TX\_CFG0 Register**

7	6	5	4	3	2	1	0
PASI_TX_EDGE	PASI_TX_FILL	PASI_TX_LSB	PASI_TX_KEEPER[1:0]		PASI_TX_USE_INT_FSYNC	PASI_TX_USE_INT_BCLK	PASI_TDM_PULSE_WIDTH
R/W-0b	R/W-0b	R/W-0b	R/W-00b		R/W-0b	R/W-0b	R/W-0b

**Table 7-24. PASI\_TX\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_TX_EDGE	R/W	0x0	Primary ASI data output (on the primary and secondary data pin) transmit edge. 0d = Default edge as per the protocol configuration setting in PASI_BCLK_POL 1d = Inverted following edge (half cycle delay) with respect to the default edge setting
6	PASI_TX_FILL	R/W	0x0	Primary ASI data output (on the primary and secondary data pin) for any unused cycles 0d = Always transmit 0 for unused cycles 1d = Always use Hi-Z for unused cycles
5	PASI_TX_LSB	R/W	0x0	Primary ASI data output (on the primary and secondary data pin) for LSB transmissions. 0d = Transmit the LSB for a full cycle 1d = Transmit the LSB for the first half cycle and Hi-Z for the second half cycle

**Table 7-24. PASI\_TX\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-3	PASI_TX_KEEPER[1:0]	R/W	0x0	Primary ASI data output (on the primary and secondary data pin) bus keeper. 0d = Bus keeper is always disabled 1d = Bus keeper is always enabled 2d = Bus keeper is enabled during LSB transmissions only for one cycle 3d = Bus keeper is enabled during LSB transmissions only for one and half cycles
2	PASI_TX_USE_INT_FSYNC	R/W	0x0	Primary ASI uses internal FSYNC for output data generation in Controller mode configuration as applicable. 0d = Use external FSYNC for ASI protocol data generation 1d = Use internal FSYNC for ASI protocol data generation
1	PASI_TX_USE_INT_BCLK	R/W	0x0	Primary ASI uses internal BCLK for output data generation in Controller mode configuration. 0d = Use external BCLK for ASI protocol data generation 1d = Use internal BCLK for ASI protocol data generation
0	PASI_TDM_PULSE_WIDTH	R/W	0x0	Primary ASI fsync pulse width in TDM format. (Valid for Controller mode) 0d = Fsync pulse is 1 bclk period wide 1d = Fsync pulse is 2 bclk period wide

**7.1.24 PASI\_TX\_CFG1 Register (Address = 0x1C) [Reset = 0x00]**

PASI\_TX\_CFG1 is shown in [Figure 7-24](#) and described in [Table 7-25](#).

Return to the [Summary Table](#).

This register is the PASI TX configuration register 1.

**Figure 7-24. PASI\_TX\_CFG1 Register**

7	6	5	4	3	2	1	0
RESERVED			PASI_TX_OFFSET[4:0]				
R-000b			R/W-00000b				

**Table 7-25. PASI\_TX\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-5	RESERVED	R	0x0	Reserved bits; Write only reset values
4-0	PASI_TX_OFFSET[4:0]	R/W	0x0	Primary ASI output data MSB slot 0 offset (on the primary and secondary data pin). 0d = ASI data MSB location has no offset and is as per standard protocol 1d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of one BCLK cycle with respect to standard protocol 2d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of two BCLK cycles with respect to standard protocol 3d to 30d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset assigned as per configuration 31d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of 31 BCLK cycles with respect to standard protocol

**7.1.25 PASI\_TX\_CFG2 Register (Address = 0x1D) [Reset = 0x00]**

PASI\_TX\_CFG2 is shown in [Figure 7-25](#) and described in [Table 7-26](#).

Return to the [Summary Table](#).

This register is the PASI TX configuration register 2.

**Figure 7-25. PASI\_TX\_CFG2 Register**

7	6	5	4	3	2	1	0
PASI_TX_CH8_SEL	PASI_TX_CH7_SEL	PASI_TX_CH6_SEL	PASI_TX_CH5_SEL	PASI_TX_CH4_SEL	PASI_TX_CH3_SEL	PASI_TX_CH2_SEL	PASI_TX_CH1_SEL
R/W-0b							

**Table 7-26. PASI\_TX\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_TX_CH8_SEL	R/W	0x0	Primary ASI output channel 8 select. 0d = Primary ASI channel 8 output is on DOUT 1d = Primary ASI channel 8 output is on DOUT2
6	PASI_TX_CH7_SEL	R/W	0x0	Primary ASI output channel 7 select. 0d = Primary ASI channel 7 output is on DOUT 1d = Primary ASI channel 7 output is on DOUT2
5	PASI_TX_CH6_SEL	R/W	0x0	Primary ASI output channel 6 select. 0d = Primary ASI channel 6 output is on DOUT 1d = Primary ASI channel 6 output is on DOUT2
4	PASI_TX_CH5_SEL	R/W	0x0	Primary ASI output channel 5 select. 0d = Primary ASI channel 5 output is on DOUT 1d = Primary ASI channel 5 output is on DOUT2
3	PASI_TX_CH4_SEL	R/W	0x0	Primary ASI output channel 4 select. 0d = Primary ASI channel 4 output is on DOUT 1d = Primary ASI channel 4 output is on DOUT2
2	PASI_TX_CH3_SEL	R/W	0x0	Primary ASI output channel 3 select. 0d = Primary ASI channel 3 output is on DOUT 1d = Primary ASI channel 3 output is on DOUT2
1	PASI_TX_CH2_SEL	R/W	0x0	Primary ASI output channel 2 select. 0d = Primary ASI channel 2 output is on DOUT 1d = Primary ASI channel 2 output is on DOUT2
0	PASI_TX_CH1_SEL	R/W	0x0	Primary ASI output channel 1 select. 0d = Primary ASI channel 1 output is on DOUT 1d = Primary ASI channel 1 output is on DOUT2

**ADVANCE INFORMATION**

**7.1.26 PASI\_TX\_CH1\_CFG Register (Address = 0x1E) [Reset = 0x20]**

PASI\_TX\_CH1\_CFG is shown in [Figure 7-26](#) and described in [Table 7-27](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 1 configuration register.

**Figure 7-26. PASI\_TX\_CH1\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		PASI_TX_CH1_CFG	PASI_TX_CH1_SLOT_NUM[4:0]				
R-00b		R/W-1b	R/W-00000b				

**Table 7-27. PASI\_TX\_CH1\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values

**Table 7-27. PASI\_TX\_CH1\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5	PASI_TX_CH1_CFG	R/W	0x1	Primary ASI output channel 1 configuration. 0d = Primary ASI channel 1 output is in a tri-state condition 1d = Primary ASI channel 1 output corresponds to ADC/PDM Channel 1 data
4-0	PASI_TX_CH1_SLOT_NUM[4:0]	R/W	0x0	Primary ASI output channel 1 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.27 PASI\_TX\_CH2\_CFG Register (Address = 0x1F) [Reset = 0x21]

PASI\_TX\_CH2\_CFG is shown in [Figure 7-27](#) and described in [Table 7-28](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 2 configuration register.

**Figure 7-27. PASI\_TX\_CH2\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		PASI_TX_CH2_CFG	PASI_TX_CH2_SLOT_NUM[4:0]				
R-00b		R/W-1b	R/W-00001b				

**Table 7-28. PASI\_TX\_CH2\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5	PASI_TX_CH2_CFG	R/W	0x1	Primary ASI output channel 2 configuration. 0d = Primary ASI channel 2 output is in a tri-state condition 1d = Primary ASI channel 2 output corresponds to ADC/PDM Channel 2 data
4-0	PASI_TX_CH2_SLOT_NUM[4:0]	R/W	0x1	Primary ASI output channel 2 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.28 PASI\_TX\_CH3\_CFG Register (Address = 0x20) [Reset = 0x02]

PASI\_TX\_CH3\_CFG is shown in [Figure 7-28](#) and described in [Table 7-29](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 3 configuration register.

**Figure 7-28. PASI\_TX\_CH3\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_TX_CH3_CFG[1:0]		PASI_TX_CH3_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00010b				

**Figure 7-28. PASI\_TX\_CH3\_CFG Register (continued)**

**Table 7-29. PASI\_TX\_CH3\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_TX_CH3_CFG[1:0]	R/W	0x0	Primary ASI output channel 3 configuration. 0d = Primary ASI channel 3 output is in a tri-state condition 1d = Primary ASI channel 3 output corresponds to PDM Channel 3 data 2d = Primary ASI channel 3 output corresponds to VBAT data 3d = Reserved
4-0	PASI_TX_CH3_SLOT_NUM[4:0]	R/W	0x2	Primary ASI output channel 3 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.29 PASI\_TX\_CH4\_CFG Register (Address = 0x21) [Reset = 0x03]

PASI\_TX\_CH4\_CFG is shown in [Figure 7-29](#) and described in [Table 7-30](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 4 configuration register.

**Figure 7-29. PASI\_TX\_CH4\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_TX_CH4_CFG[1:0]		PASI_TX_CH4_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00011b				

**Table 7-30. PASI\_TX\_CH4\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_TX_CH4_CFG[1:0]	R/W	0x0	Primary ASI output channel 4 configuration. 0d = Primary ASI channel 4 output is in a tri-state condition 1d = Primary ASI channel 4 output corresponds to PDM Channel 4 data 2d = Primary ASI channel 4 output corresponds to TEMP data 3d = Reserved
4-0	PASI_TX_CH4_SLOT_NUM[4:0]	R/W	0x3	Primary ASI output channel 4 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.30 PASI\_TX\_CH5\_CFG Register (Address = 0x22) [Reset = 0x04]

PASI\_TX\_CH5\_CFG is shown in [Figure 7-30](#) and described in [Table 7-31](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 5 configuration register.

**Figure 7-30. PASI\_TX\_CH5\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_TX_CH5_CFG[1:0]		PASI_TX_CH5_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00100b				

**Table 7-31. PASI\_TX\_CH5\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_TX_CH5_CFG[1:0]	R/W	0x0	Primary ASI output channel 5 configuration. 0d = Primary ASI channel 5 output is in a tri-state condition 1d = Primary ASI channel 5 output corresponds to ASI Input Channel 1 loopback data 2d = Primary ASI channel 5 output corresponds to echo reference Channel 1 data 3d = Reserved
4-0	PASI_TX_CH5_SLOT_NUM[4:0]	R/W	0x4	Primary ASI output channel 5 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.31 PASI\_TX\_CH6\_CFG Register (Address = 0x23) [Reset = 0x05]

PASI\_TX\_CH6\_CFG is shown in [Figure 7-31](#) and described in [Table 7-32](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 6 configuration register.

**Figure 7-31. PASI\_TX\_CH6\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_TX_CH6_CFG[1:0]		PASI_TX_CH6_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00101b				

**Table 7-32. PASI\_TX\_CH6\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_TX_CH6_CFG[1:0]	R/W	0x0	Primary ASI output channel 6 configuration. 0d = Primary ASI channel 6 output is in a tri-state condition 1d = Primary ASI channel 6 output corresponds to ASI Input Channel 2 loopback data 2d = Primary ASI channel 6 output corresponds to echo reference Channel 2 data 3d = Reserved

**Table 7-32. PASI\_TX\_CH6\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-0	PASI_TX_CH6_SLOT_NUM[4:0]	R/W	0x5	Primary ASI output channel 6 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.32 PASI\_TX\_CH7\_CFG Register (Address = 0x24) [Reset = 0x06]

PASI\_TX\_CH7\_CFG is shown in [Figure 7-32](#) and described in [Table 7-33](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 7 configuration register.

**Figure 7-32. PASI\_TX\_CH7\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_TX_CH7_CFG[1:0]		PASI_TX_CH7_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00110b				

**Table 7-33. PASI\_TX\_CH7\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_TX_CH7_CFG[1:0]	R/W	0x0	Primary ASI output channel 7 configuration. 0d = Primary ASI channel 7 output is in a tri-state condition 1d = Primary ASI channel 7 output corresponds to {VBAT_WLby2, TEMP_WLby2} 2d = Primary ASI channel 7 output corresponds to {echo_ref_ch1, echo_ref_ch2} 3d = Reserved
4-0	PASI_TX_CH7_SLOT_NUM[4:0]	R/W	0x6	Primary ASI output channel 7 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.33 PASI\_TX\_CH8\_CFG Register (Address = 0x25) [Reset = 0x07]

PASI\_TX\_CH8\_CFG is shown in [Figure 7-33](#) and described in [Table 7-34](#).

Return to the [Summary Table](#).

This register is the PASI TX Channel 8 configuration register.

**Figure 7-33. PASI\_TX\_CH8\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_TX_CH8_CFG	PASI_TX_CH8_SLOT_NUM[4:0]					
R-00b	R/W-0b	R/W-00111b					

**Table 7-34. PASI\_TX\_CH8\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5	PASI_TX_CH8_CFG	R/W	0x0	Primary ASI output channel 8 configuration. 0d = Primary ASI channel 8 output is in a tri-state condition 1d = Primary ASI channel 8 output corresponds to ICLA data
4-0	PASI_TX_CH8_SLOT_NUM[4:0]	R/W	0x7	Primary ASI output channel 8 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.1.34 PASI\_RX\_CFG0 Register (Address = 0x26) [Reset = 0x00]

PASI\_RX\_CFG0 is shown in [Figure 7-34](#) and described in [Table 7-35](#).

Return to the [Summary Table](#).

This register is the PASI RX configuration register 0.

**Figure 7-34. PASI\_RX\_CFG0 Register**

7	6	5	4	3	2	1	0
PASI_RX_EDGE	PASI_RX_USE_INT_FSYNC	PASI_RX_USE_INT_BCLK	PASI_RX_OFFSET[4:0]				
R/W-0b	R/W-0b	R/W-0b	R/W-00000b				

**Table 7-35. PASI\_RX\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_RX_EDGE	R/W	0x0	Primary ASI data input (on the primary and secondary data pin) receive edge. 0d = Default edge as per the protocol configuration setting in PASI_BCLK_POL 1d = Inverted following edge (half cycle delay) with respect to the default edge setting
6	PASI_RX_USE_INT_FSYNC	R/W	0x0	Primary ASI uses internal FSYNC for input data latching in Controller mode configuration as applicable. 0d = Use external FSYNC for ASI protocol data latching 1d = Use internal FSYNC for ASI protocol data latching
5	PASI_RX_USE_INT_BCLK	R/W	0x0	Primary ASI uses internal BCLK for input data latching in Controller mode configuration. 0d = Use external BCLK for ASI protocol data latching 1d = Use internal BCLK for ASI protocol data latching

**Table 7-35. PASI\_RX\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-0	PASI_RX_OFFSET[4:0]	R/W	0x0	Primary ASI data input MSB slot 0 offset (on the primary and secondary data pin). 0d = ASI data MSB location has no offset and is as per standard protocol 1d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of one BCLK cycle with respect to standard protocol 2d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of two BCLK cycles with respect to standard protocol 3d to 30d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset assigned as per configuration 31d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of 31 BCLK cycles with respect to standard protocol

### 7.1.35 PASI\_RX\_CFG1 Register (Address = 0x27) [Reset = 0x00]

PASI\_RX\_CFG1 is shown in [Figure 7-35](#) and described in [Table 7-36](#).

Return to the [Summary Table](#).

This register is the PASI RX configuration register 1.

**Figure 7-35. PASI\_RX\_CFG1 Register**

7	6	5	4	3	2	1	0
PASI_RX_CH8_SEL	PASI_RX_CH7_SEL	PASI_RX_CH6_SEL	PASI_RX_CH5_SEL	PASI_RX_CH4_SEL	PASI_RX_CH3_SEL	PASI_RX_CH2_SEL	PASI_RX_CH1_SEL
R/W-0b							

**Table 7-36. PASI\_RX\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_RX_CH8_SEL	R/W	0x0	Primary ASI input channel 8 select. 0d = Primary ASI channel 8 input is on DIN 1d = Primary ASI channel 8 input is on DIN2
6	PASI_RX_CH7_SEL	R/W	0x0	Primary ASI input channel 7 select. 0d = Primary ASI channel 7 input is on DIN 1d = Primary ASI channel 7 input is on DIN2
5	PASI_RX_CH6_SEL	R/W	0x0	Primary ASI input channel 6 select. 0d = Primary ASI channel 6 input is on DIN 1d = Primary ASI channel 6 input is on DIN2
4	PASI_RX_CH5_SEL	R/W	0x0	Primary ASI input channel 5 select. 0d = Primary ASI channel 5 input is on DIN 1d = Primary ASI channel 5 input is on DIN2
3	PASI_RX_CH4_SEL	R/W	0x0	Primary ASI input channel 4 select. 0d = Primary ASI channel 4 input is on DIN 1d = Primary ASI channel 4 input is on DIN2
2	PASI_RX_CH3_SEL	R/W	0x0	Primary ASI input channel 3 select. 0d = Primary ASI channel 3 input is on DIN 1d = Primary ASI channel 3 input is on DIN2
1	PASI_RX_CH2_SEL	R/W	0x0	Primary ASI input channel 2 select. 0d = Primary ASI channel 2 input is on DIN 1d = Primary ASI channel 2 input is on DIN2
0	PASI_RX_CH1_SEL	R/W	0x0	Primary ASI input channel 1 select. 0d = Primary ASI channel 1 input is on DIN 1d = Primary ASI channel 1 input is on DIN2

**7.1.36 PASI\_RX\_CH1\_CFG Register (Address = 0x28) [Reset = 0x20]**

 PASI\_RX\_CH1\_CFG is shown in [Figure 7-36](#) and described in [Table 7-37](#).

 Return to the [Summary Table](#).

This register is the PASI RX Channel 1 configuration register.

**Figure 7-36. PASI\_RX\_CH1\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		PASI_RX_CH1_CFG	PASI_RX_CH1_SLOT_NUM[4:0]				
R-00b		R/W-1b	R/W-00000b				

**Table 7-37. PASI\_RX\_CH1\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5	PASI_RX_CH1_CFG	R/W	0x1	Primary ASI input channel 1 configuration. 0d = Primary ASI channel 1 input is disabled 1d = Primary ASI channel 1 input corresponds to DAC Channel 1 data
4-0	PASI_RX_CH1_SLOT_NUM[4:0]	R/W	0x0	Primary ASI input channel 1 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.37 PASI\_RX\_CH2\_CFG Register (Address = 0x29) [Reset = 0x21]**

 PASI\_RX\_CH2\_CFG is shown in [Figure 7-37](#) and described in [Table 7-38](#).

 Return to the [Summary Table](#).

This register is the PASI RX Channel 2 configuration register.

**Figure 7-37. PASI\_RX\_CH2\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		PASI_RX_CH2_CFG	PASI_RX_CH2_SLOT_NUM[4:0]				
R-00b		R/W-1b	R/W-00001b				

**Table 7-38. PASI\_RX\_CH2\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5	PASI_RX_CH2_CFG	R/W	0x1	Primary ASI input channel 2 configuration. 0d = Primary ASI channel 2 input is disabled 1d = Primary ASI channel 2 input corresponds to DAC Channel 2 data

**Table 7-38. PASI\_RX\_CH2\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-0	PASI_RX_CH2_SLOT_NUM[4:0]	R/W	0x1	Primary ASI input channel 2 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.38 PASI\_RX\_CH3\_CFG Register (Address = 0x2A) [Reset = 0x02]**

PASI\_RX\_CH3\_CFG is shown in [Figure 7-38](#) and described in [Table 7-39](#).

Return to the [Summary Table](#).

This register is the PASI RX Channel 3 configuration register.

**Figure 7-38. PASI\_RX\_CH3\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		PASI_RX_CH3_CFG	PASI_RX_CH3_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00010b				

**Table 7-39. PASI\_RX\_CH3\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5	PASI_RX_CH3_CFG	R/W	0x0	Primary ASI input channel 3 configuration. 0d = Primary ASI channel 3 input is disabled 1d = Primary ASI channel 3 input corresponds to DAC Channel 3 data
4-0	PASI_RX_CH3_SLOT_NUM[4:0]	R/W	0x2	Primary ASI input channel 3 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.39 PASI\_RX\_CH4\_CFG Register (Address = 0x2B) [Reset = 0x03]**

PASI\_RX\_CH4\_CFG is shown in [Figure 7-39](#) and described in [Table 7-40](#).

Return to the [Summary Table](#).

This register is the PASI RX Channel 4 configuration register.

**Figure 7-39. PASI\_RX\_CH4\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		PASI_RX_CH4_CFG	PASI_RX_CH4_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00011b				

**Table 7-40. PASI\_RX\_CH4\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5	PASI_RX_CH4_CFG	R/W	0x0	Primary ASI input channel 4 configuration. 0d = Primary ASI channel 4 input is disabled 1d = Primary ASI channel 4 input corresponds to DAC Channel 4 data
4-0	PASI_RX_CH4_SLOT_NUM[4:0]	R/W	0x3	Primary ASI input channel 4 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.40 PASI\_RX\_CH5\_CFG Register (Address = 0x2C) [Reset = 0x04]**

PASI\_RX\_CH5\_CFG is shown in [Figure 7-40](#) and described in [Table 7-41](#).

Return to the [Summary Table](#).

This register is the PASI RX Channel 5 configuration register.

**Figure 7-40. PASI\_RX\_CH5\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_RX_CH5_CFG[1:0]		PASI_RX_CH5_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00100b				

**Table 7-41. PASI\_RX\_CH5\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_RX_CH5_CFG[1:0]	R/W	0x0	Primary ASI input channel 5 configuration. 0d = Primary ASI channel 5 input is disabled 1d = Primary ASI channel 5 input corresponds to DAC Channel 5 data 2d = Primary ASI channel 5 input corresponds to ADC Channel 1 output loopback 3d = Reserved
4-0	PASI_RX_CH5_SLOT_NUM[4:0]	R/W	0x4	Primary ASI input channel 5 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.41 PASI\_RX\_CH6\_CFG Register (Address = 0x2D) [Reset = 0x05]**

PASI\_RX\_CH6\_CFG is shown in [Figure 7-41](#) and described in [Table 7-42](#).

Return to the [Summary Table](#).

This register is the PASI RX Channel 6 configuration register.

**Figure 7-41. PASI\_RX\_CH6\_CFG Register**

7	6	5	4	3	2	1	0
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**Figure 7-41. PASI\_RX\_CH6\_CFG Register (continued)**

RESERVED	PASI_RX_CH6_CFG[1:0]	PASI_RX_CH6_SLOT_NUM[4:0]
R-0b	R/W-00b	R/W-00101b

**Table 7-42. PASI\_RX\_CH6\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_RX_CH6_CFG[1:0]	R/W	0x0	Primary ASI input channel 6 configuration. 0d = Primary ASI channel 6 input is disabled 1d = Primary ASI channel 6 input corresponds to DAC Channel 6 data 2d = Primary ASI channel 6 input corresponds to ADC Channel 2 output loopback 3d = Primary ASI channel 6 input corresponds to ICLA device 1 data
4-0	PASI_RX_CH6_SLOT_NUM[4:0]	R/W	0x5	Primary ASI input channel 6 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.42 PASI\_RX\_CH7\_CFG Register (Address = 0x2E) [Reset = 0x06]**

PASI\_RX\_CH7\_CFG is shown in [Figure 7-42](#) and described in [Table 7-43](#).

Return to the [Summary Table](#).

This register is the PASI RX Channel 7 configuration register.

**Figure 7-42. PASI\_RX\_CH7\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_RX_CH7_CFG[1:0]	PASI_RX_CH7_SLOT_NUM[4:0]					
R-0b	R/W-00b	R/W-00110b					

**Table 7-43. PASI\_RX\_CH7\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_RX_CH7_CFG[1:0]	R/W	0x0	Primary ASI input channel 7 configuration. 0d = Primary ASI channel 7 input is disabled 1d = Primary ASI channel 7 input corresponds to DAC Channel 7 data 2d = Primary ASI channel 7 input corresponds to ADC Channel 3 output loopback 3d = Primary ASI channel 7 input corresponds to ICLA device 2 data
4-0	PASI_RX_CH7_SLOT_NUM[4:0]	R/W	0x6	Primary ASI input channel 7 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.43 PASI\_RX\_CH8\_CFG Register (Address = 0x2F) [Reset = 0x07]**

 PASI\_RX\_CH8\_CFG is shown in [Figure 7-43](#) and described in [Table 7-44](#).

 Return to the [Summary Table](#).

This register is the PASI RX Channel 8 configuration register.

**Figure 7-43. PASI\_RX\_CH8\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	PASI_RX_CH8_CFG[1:0]		PASI_RX_CH8_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00111b				

**Table 7-44. PASI\_RX\_CH8\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	PASI_RX_CH8_CFG[1:0]	R/W	0x0	Primary ASI input channel 8 configuration. 0d = Primary ASI channel 8 input is disabled 1d = Primary ASI channel 8 input corresponds to DAC Channel 8 data 2d = Primary ASI channel 8 input corresponds to ADC Channel 4 output loopback 3d = Primary ASI channel 8 input corresponds to ICLA device 3 data
4-0	PASI_RX_CH8_SLOT_NUM[4:0]	R/W	0x7	Primary ASI input channel 8 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

**7.1.44 CLK\_CFG0 Register (Address = 0x32) [Reset = 0x00]**

 CLK\_CFG0 is shown in [Figure 7-44](#) and described in [Table 7-45](#).

 Return to the [Summary Table](#).

This register is the clock configuration register 0.

**Figure 7-44. CLK\_CFG0 Register**

7	6	5	4	3	2	1	0
PASI_SAMP_RATE[5:0]						PASI_FS_RATE_NO_LIM	CUSTOM_CLK_CFG
R/W-000000b						R/W-0b	R/W-0b

**Table 7-45. CLK\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	PASI_SAMP_RATE[5:0]	R/W	0x0	Primary ASI sample rate configuration. -Typical (Allowed Range) 0d = Primary ASI sampling rate auto detected in the device 1d = 768000 (670320-791040) 2d = 614400 (536256-632832) 3d = 512000 (446880-527360) 4d = 438857 (383040-452022) 5d = 384000 (335160-395520) 6d = 341333 (297920-351573) 7d = 307200 (268128-316416) 8d = 256000 (223440-263680) 9d = 219429 (191520-226011) 10d = 192000 (167580-197760) 11d = 170667 (148960-175786) 12d = 153600 (134064-158208) 13d = 128000 (111720-131840) 14d = 109714 (95760-113005) 15d = 96000 (83790-98880) 16d = 85333 (74480-87893) 17d = 76800 (67032-79104) 18d = 64000 (55860-65920) 19d = 54857 (47880-56502) 20d = 48000 (41895-49440) 21d = 42667 (37240-43946) 22d = 38400 (33516-39552) 23d = 32000 (27930-32960) 24d = 27429 (23940-28251) 25d = 24000 (20947-24720) 26d = 21333 (18620-21973) 27d = 19200 (16758-19776) 28d = 16000 (13965-16480) 29d = 13714 (11970-14125) 30d = 12000 (10473-12360) 31d = 10667 (9310-10986) 32d = 9600 (8379-9888) 33d = 8000 (6982-8240) 34d = 6857 (5985-7062) 35d = 6000 (5236-6180) 36d = 5333 (4655-5493) 37d = 4800 (4189-4944) 38d = 4000 (3491-4120) 39d = 3429 (2992-3531) 40d = 3000 (2618-3090) 41d-63d = Reserved
1	PASI_FS_RATE_NO_LIM	R/W	0x0	Limit sampling rate to standard audio sample rates only. 0d = Standard audio rates with 1% tolerance supported using auto mode 1d = Standard audio rates with 5% tolerance supported using auto mode
0	CUSTOM_CLK_CFG	R/W	0x0	Custom clock configuration enable, all dividers and mux selects need to be manually configured. 0d = Auto clock configuration 1d = Custom clock configuration

ADVANCE INFORMATION

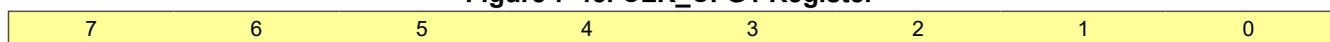
**7.1.45 CLK\_CFG1 Register (Address = 0x33) [Reset = 0x00]**

CLK\_CFG1 is shown in [Figure 7-45](#) and described in [Table 7-46](#).

Return to the [Summary Table](#).

This register is the clock configuration register 1.

**Figure 7-45. CLK\_CFG1 Register**



**Figure 7-45. CLK\_CFG1 Register (continued)**

SASI_SAMP_RATE[5:0]	SASI_FS_RATE_NO_LIM	RESERVED
R/W-000000b	R/W-0b	R-0b

**Table 7-46. CLK\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	SASI_SAMP_RATE[5:0]	R/W	0x0	Secondary ASI sample rate configuration. -Typical (Range) 0d = Secondary ASI sampling rate auto detected in the device 1d = 768000 (670320-791040) 2d = 614400 (536256-632832) 3d = 512000 (446880-527360) 4d = 438857 (383040-452022) 5d = 384000 (335160-395520) 6d = 341333 (297920-351573) 7d = 307200 (268128-316416) 8d = 256000 (223440-263680) 9d = 219429 (191520-226011) 10d = 192000 (167580-197760) 11d = 170667 (148960-175786) 12d = 153600 (134064-158208) 13d = 128000 (111720-131840) 14d = 109714 (95760-113005) 15d = 96000 (83790-98880) 16d = 85333 (74480-87893) 17d = 76800 (67032-79104) 18d = 64000 (55860-65920) 19d = 54857 (47880-56502) 20d = 48000 (41895-49440) 21d = 42667 (37240-43946) 22d = 38400 (33516-39552) 23d = 32000 (27930-32960) 24d = 27429 (23940-28251) 25d = 24000 (20947-24720) 26d = 21333 (18620-21973) 27d = 19200 (16758-19776) 28d = 16000 (13965-16480) 29d = 13714 (11970-14125) 30d = 12000 (10473-12360) 31d = 10667 (9310-10986) 32d = 9600 (8379-9888) 33d = 8000 (6982-8240) 34d = 6857 (5985-7062) 35d = 6000 (5236-6180) 36d = 5333 (4655-5493) 37d = 4800 (4189-4944) 38d = 4000 (3491-4120) 39d = 3429 (2992-3531) 40d = 3000 (2618-3090) 41d-63d = Reserved
1	SASI_FS_RATE_NO_LIM	R/W	0x0	Limit sampling rate to standard audio sample rates only. 0d = Standard audio rates with 1% tolerance supported using auto mode 1d = Standard audio rates with 5% tolerance supported using auto mode
0	RESERVED	R	0x0	Reserved bit; Write only reset value

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**7.1.46 CLK\_CFG2 Register (Address = 0x34) [Reset = 0x40]**

CLK\_CFG2 is shown in [Figure 7-46](#) and described in [Table 7-47](#).

Return to the [Summary Table](#).

This register is the clock configuration register 2.

**Figure 7-46. CLK\_CFG2 Register**

7	6	5	4	3	2	1	0
PLL_DIS	AUTO_PLL_FR_ALLOW	RESERVED	RESERVED	CLK_SRC_SEL[2:0]		RATIO_CLK_EDGE	
R/W-0b	R/W-1b	R-0b	R-0b	R/W-000b		R/W-0b	

**Table 7-47. CLK\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PLL_DIS	R/W	0x0	Custom/Auto clock mode PLL setting. 0d = PLL is always enabled in custom clk mode/PLL is enabled based on DSP MIPS requirement in auto clock mode 1d = PLL is disabled
6	AUTO_PLL_FR_ALLOW	R/W	0x1	Allow the PLL to operate in fractional mode of operation. 0d = PLL fractional mode disabled 1d = PLL fractional mode allowed
5	RESERVED	R	0x0	Reserved bit; Write only reset value
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3-1	CLK_SRC_SEL[2:0]	R/W	0x0	Input clock source select. 0d = Primary ASI BCLK is the input clock source 1d = cclk synchronized with Primary ASI FSYNC is the input clock source 2d = Secondary ASI BCLK is the input clock source 3d = cclk synchronized with Secondary ASI FSYNC is the input clock source 4d = Fixed cclk frequency (used only in controller mode configuration) 5d = Internal oscillator clock is the input clock source 6d to 7d = Reserved
0	RATIO_CLK_EDGE	R/W	0x0	Edge selection for clock source ratio detection. 0d = Use rising edge of clock source to check ratio with primary or secondary FSYNC 1d = Use falling edge of clock source to check ratio with primary or secondary FSYNC

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**7.1.47 CNT\_CLK\_CFG0 Register (Address = 0x35) [Reset = 0x00]**

CNT\_CLK\_CFG0 is shown in [Figure 7-47](#) and described in [Table 7-48](#).

Return to the [Summary Table](#).

This register is the controller mode clock configuration register 0.

**Figure 7-47. CNT\_CLK\_CFG0 Register**

7	6	5	4	3	2	1	0
PDM_CLK_CFG[1:0]		CCLK_FS_RATIO_MSB[5:0]					
R/W-00b		R/W-000000b					

**Table 7-48. CNT\_CLK\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	PDM_CLK_CFG[1:0]	R/W	0x0	PDM_CLK configurattion. 0d = PDM_CLK is 2.8224 MHz or 3.072 MHz 1d = PDM_CLK is 1.4112 MHz or 1.536 MHz 2d = PDM_CLK is 705.6 kHz or 768 kHz 3d = PDM_CLK is 5.6448 MHz or 6.144 MHz

**Table 7-48. CNT\_CLK\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5-0	CCLK_FS_RATIO_MSB[5:0]	R/W	0x0	Most significant bits for selecting the ratio between cclk and primary/secondary ASI FSYNC with which cclk is synchronized. 0d = Auto detect the ratio (assumption is cclk is synchronized with primary/secondary FSYNC) 1d to 16383d = Ratio as per configuration

#### 7.1.48 CNT\_CLK\_CFG1 Register (Address = 0x36) [Reset = 0x00]

CNT\_CLK\_CFG1 is shown in [Figure 7-48](#) and described in [Table 7-49](#).

Return to the [Summary Table](#).

This register is the controller mode clock configuration register 1.

**Figure 7-48. CNT\_CLK\_CFG1 Register**

7	6	5	4	3	2	1	0
CCLK_FS_RATIO_LSB[7:0]							
R/W-00000000b							

**Table 7-49. CNT\_CLK\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	CCLK_FS_RATIO_LSB[7:0]	R/W	0x0	Select the ratio between cclk and primary/secondary ASI FSYNC with which cclk is synchronized. 0d = Auto detect the ratio (assumption is cclk is synchronized with primary/secondary FSYNC) 1d to 16383d = Ratio as per configuration

#### 7.1.49 CNT\_CLK\_CFG2 Register (Address = 0x37) [Reset = 0x20]

CNT\_CLK\_CFG2 is shown in [Figure 7-49](#) and described in [Table 7-50](#).

Return to the [Summary Table](#).

This register is the controller mode clock configuration register 2.

**Figure 7-49. CNT\_CLK\_CFG2 Register**

7	6	5	4	3	2	1	0
CCLK_FREQ_SEL[2:0]			PASI_CNT_CFG	SASI_CNT_CFG	RESERVED	RESERVED	FS_MODE
R/W-001b			R/W-0b	R/W-0b	R-0b	R-0b	R/W-0b

**Table 7-50. CNT\_CLK\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-5	CCLK_FREQ_SEL[2:0]	R/W	0x1	These bits select the CCLK input frequency (used only in controller mode configuration). 0d = 12 MHz 1d = 12.288 MHz 2d = 13 MHz 3d = 16 MHz 4d = 19.2 MHz 5d = 19.68 MHz 6d = 24 MHz 7d = 24.576 MHz
4	PASI_CNT_CFG	R/W	0x0	Primary ASI controller or target configuration 0d = Primary ASI in target configuration 1d = Primary ASI in controller configuration

**Table 7-50. CNT\_CLK\_CFG2 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3	SASI_CNT_CFG	R/W	0x0	Secondary ASI controller or target configuration 0d = Secondary ASI in target configuration 1d = Secondary ASI in controller configuration
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	FS_MODE	R/W	0x0	Sample rate setting (valid when the device is in controller mode). This is applicable for both PASI and SASI. 0d = sampling rate is a multiple (or submultiple) of 48 kHz 1d = sampling rate is a multiple (or submultiple) of 44.1 kHz

**7.1.50 CNT\_CLK\_CFG3 Register (Address = 0x38) [Reset = 0x00]**

CNT\_CLK\_CFG3 is shown in [Figure 7-50](#) and described in [Table 7-51](#).

Return to the [Summary Table](#).

This register is the controller mode clock configuration register 3.

**Figure 7-50. CNT\_CLK\_CFG3 Register**

7	6	5	4	3	2	1	0
PASI_USE_INT_BCLK_FOR_FSYNC	PASI_INV_BCLK_FOR_FSYN C	PASI_BCLK_FS_RATIO_MSB[5:0]					
R/W-0b	R/W-0b	R/W-000000b					

**Table 7-51. CNT\_CLK\_CFG3 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_USE_INT_BCLK_F OR_FSYN C	R/W	0x0	Use internal BCLK for FSYN C generation in PASI during controller mode configuration. 0d = Use external BCLK for FSYN C generation 1d = Use internal BCLK for FSYN C generation
6	PASI_INV_BCLK_FOR_F SYN C	R/W	0x0	Invert PASI BCLK polarity only for PASI FSYN C generation in controller mode configuration. 0d = Do not invert PASI BCLK polarity for PASI FSYN C generation 1d = Invert PASI BCLK polarity for PASI FSYN C generation
5-0	PASI_BCLK_FS_RATIO_ MSB[5:0]	R/W	0x0	MSB bits for primary ASI BCLK to FSYN C ratio in controller mode.

**7.1.51 CNT\_CLK\_CFG4 Register (Address = 0x39) [Reset = 0x00]**

CNT\_CLK\_CFG4 is shown in [Figure 7-51](#) and described in [Table 7-52](#).

Return to the [Summary Table](#).

This register is the controller mode clock configuration register 4.

**Figure 7-51. CNT\_CLK\_CFG4 Register**

7	6	5	4	3	2	1	0
PASI_BCLK_FS_RATIO_LSB[7:0]							
R/W-00000000b							

**Table 7-52. CNT\_CLK\_CFG4 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PASI_BCLK_FS_RATIO_LSB[7:0]	R/W	0x0	LSB byte for primary ASI BCLK to FSYNC ratio in controller mode.

### 7.1.52 CNT\_CLK\_CFG5 Register (Address = 0x3A) [Reset = 0x00]

CNT\_CLK\_CFG5 is shown in [Figure 7-52](#) and described in [Table 7-53](#).

Return to the [Summary Table](#).

This register is the controller mode clock configuration register 5.

**Figure 7-52. CNT\_CLK\_CFG5 Register**

7	6	5	4	3	2	1	0
SASI_USE_INT_BCLK_FOR_FSYNC	SASI_INV_BCLK_FOR_FSYNC	SASI_BCLK_FS_RATIO_MSB[5:0]					
R/W-0b	R/W-0b	R/W-000000b					

**Table 7-53. CNT\_CLK\_CFG5 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	SASI_USE_INT_BCLK_FOR_FSYNC	R/W	0x0	Use internal BCLK for FSYNC generation in SASI during controller mode configuration. 0d = Use external BCLK for FSYNC generation 1d = Use internal BCLK for FSYNC generation
6	SASI_INV_BCLK_FOR_FSYNC	R/W	0x0	Invert SASI BCLK polarity only for SASI FSYNC generation in controller mode configuration. 0d = Do not invert SASI BCLK polarity for SASI FSYNC generation 1d = Invert SASI BCLK polarity for SASI FSYNC generation
5-0	SASI_BCLK_FS_RATIO_MSB[5:0]	R/W	0x0	MSB bits for secondary ASI BCLK to FSYNC ratio in controller mode.

### 7.1.53 CNT\_CLK\_CFG6 Register (Address = 0x3B) [Reset = 0x00]

CNT\_CLK\_CFG6 is shown in [Figure 7-53](#) and described in [Table 7-54](#).

Return to the [Summary Table](#).

This register is the controller mode clock configuration register 6.

**Figure 7-53. CNT\_CLK\_CFG6 Register**

7	6	5	4	3	2	1	0
SASI_BCLK_FS_RATIO_LSB[7:0]							
R/W-00000000b							

**Table 7-54. CNT\_CLK\_CFG6 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	SASI_BCLK_FS_RATIO_LSB[7:0]	R/W	0x0	LSB byte for secondary ASI BCLK to FSYNC ratio in controller mode.

### 7.1.54 CLK\_ERR\_STS0 Register (Address = 0x3C) [Reset = 0x00]

CLK\_ERR\_STS0 is shown in [Figure 7-54](#) and described in [Table 7-55](#).

Return to the [Summary Table](#).

This register is the clock error and status register 0.

**Figure 7-54. CLK\_ERR\_STS0 Register**

7	6	5	4	3	2	1	0
DSP_CLK_ERR	RESERVED	RESERVED	SRC_RATIO_ERR	DEM_RATE_ERR	PDM_CLK_ERR	RESET_ON_CLK_STOP_DET_STS	RESERVED
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b

**Table 7-55. CLK\_ERR\_STS0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	DSP_CLK_ERR	R	0x0	Flag indicating ratio error between FSYNC and selected clock source. 0d = No ratio error 1d = Ratio error between primary or secondary ASI FSYNC and selected clock source
6	RESERVED	R	0x0	Reserved bit; Write only reset value
5	RESERVED	R	0x0	Reserved bit; Write only reset value
4	SRC_RATIO_ERR	R	0x0	Flag indicating that SRC m:n ratio is unsupported. (not valid for custom m/n ratio config). 0d = m:n ratio supported 1d = Unsupported m:n ratio error
3	DEM_RATE_ERR	R	0x0	Flag indicating that clock configuration does not allow valid DEM rate. 0d = No DEM clock rate error 1d = DEM clock rate error in selected clock configuration
2	PDM_CLK_ERR	R	0x0	Flag indicating that clock configuration does not allow valid PDM clock generation. 0d = No PDM clock generation error 1d = PDM clock generation error in selected clock configuration
1	RESET_ON_CLK_STOP_DET_STS	R	0x0	Flag indicating that audio clock source stopped for atleast 1ms. 0d = No audio clock source error 1d = Audio clock source stopped for atleast 1ms
0	RESERVED	R	0x0	Reserved bit; Write only reset value

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### 7.1.55 CLK\_ERR\_STS1 Register (Address = 0x3D) [Reset = 0x00]

CLK\_ERR\_STS1 is shown in [Figure 7-55](#) and described in [Table 7-56](#).

Return to the [Summary Table](#).

This register is the clock error and status register 1.

**Figure 7-55. CLK\_ERR\_STS1 Register**

7	6	5	4	3	2	1	0
PASI_BCLK_FS_RATIO_ERR	SASI_BCLK_FS_RATIO_ERR	CCLK_FS_RATIO_ERR	PASI_FS_ERR	SASI_FS_ERR	RESERVED		
R-0b	R-0b	R-0b	R-0b	R-0b	R-000b		

**Table 7-56. CLK\_ERR\_STS1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PASI_BCLK_FS_RATIO_ERR	R	0x0	Flag indicating PASI bclk fsync ratio error. 0d = No PASI bclk fsync ratio error 1d = PASI bclk fsync ratio error in selected clock configuration
6	SASI_BCLK_FS_RATIO_ERR	R	0x0	Flag indicating SASI bclk fsync ratio error. 0d = No SASI bclk fsync ratio error 1d = SASI bclk fsync ratio error in selected clock configuration

**Table 7-56. CLK\_ERR\_STS1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5	CCLK_FS_RATIO_ERR	R	0x0	Flag indicating CCLK fsync ratio error. 0d = No CCLK fsync ratio error 1d = CCLK fsync ratio error
4	PASI_FS_ERR	R	0x0	Flag indicating PASI FS rate change or halt error. 0d = No PASI FS error 1d = PASI FS rate change or halt detected
3	SASI_FS_ERR	R	0x0	Flag indicating SASI FS rate change or halt error. 0d = No SASI FS error 1d = SASI FS rate change or halt detected
2-0	RESERVED	R	0x0	Reserved bits; Write only reset values

**7.1.56 CLK\_DET\_STS0 Register (Address = 0x3E) [Reset = 0x00]**

CLK\_DET\_STS0 is shown in [Figure 7-56](#) and described in [Table 7-57](#).

Return to the [Summary Table](#).

This register is the clock ratio detection register 0.

**Figure 7-56. CLK\_DET\_STS0 Register**

7	6	5	4	3	2	1	0
PASI_SAMP_RATE_STS[5:0]						PLL_MODE_STS[1:0]	
R-000000b						R-00b	

**Table 7-57. CLK\_DET\_STS0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	PASI_SAMP_RATE_STS[5:0]	R	0x0	Primary ASI Sample rate detected status. 0d = Reserved 1d = 768000 (670320-791040) 2d = 614400 (536256-632832) 3d = 512000 (446880-527360) 4d = 438857 (383040-452022) 5d = 384000 (335160-395520) 6d = 341333 (297920-351573) 7d = 307200 (268128-316416) 8d = 256000 (223440-263680) 9d = 219429 (191520-226011) 10d = 192000 (167580-197760) 11d = 170667 (148960-175786) 12d = 153600 (134064-158208) 13d = 128000 (111720-131840) 14d = 109714 (95760-113005) 15d = 96000 (83790-98880) 16d = 85333 (74480-87893) 17d = 76800 (67032-79104) 18d = 64000 (55860-65920) 19d = 54857 (47880-56502) 20d = 48000 (41895-49440) 21d = 42667 (37240-43946) 22d = 38400 (33516-39552) 23d = 32000 (27930-32960) 24d = 27429 (23940-28251) 25d = 24000 (20947-24720) 26d = 21333 (18620-21973) 27d = 19200 (16758-19776) 28d = 16000 (13965-16480) 29d = 13714 (11970-14125) 30d = 12000 (10473-12360) 31d = 10667 (9310-10986) 32d = 9600 (8379-9888) 33d = 8000 (6982-8240) 34d = 6857 (5985-7062) 35d = 6000 (5236-6180) 36d = 5333 (4655-5493) 37d = 4800 (4189-4944) 38d = 4000 (3491-4120) 39d = 3429 (2992-3531) 40d = 3000 (2618-3090) 41d-63d = Reserved
1-0	PLL_MODE_STS[1:0]	R	0x0	PLL usage status. 0d = PLL used in integer mode 1d = PLL used in fractional mode 2d = PLL not used 3d = Reserved

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**7.1.57 CLK\_DET\_STS1 Register (Address = 0x3F) [Reset = 0x00]**

CLK\_DET\_STS1 is shown in [Figure 7-57](#) and described in [Table 7-58](#).

Return to the [Summary Table](#).

This register is the clock ratio detection register 1.

**Figure 7-57. CLK\_DET\_STS1 Register**

7	6	5	4	3	2	1	0
SASI_SAMP_RATE_STS[5:0]						RESERVED	
R-000000b						R-00b	

**Table 7-58. CLK\_DET\_STS1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	SASI_SAMP_RATE_STS[5:0]	R	0x0	Secondary ASI Sample rate detected status. 0d = Reserved 1d = 768000 (670320-791040) 2d = 614400 (536256-632832) 3d = 512000 (446880-527360) 4d = 438857 (383040-452022) 5d = 384000 (335160-395520) 6d = 341333 (297920-351573) 7d = 307200 (268128-316416) 8d = 256000 (223440-263680) 9d = 219429 (191520-226011) 10d = 192000 (167580-197760) 11d = 170667 (148960-175786) 12d = 153600 (134064-158208) 13d = 128000 (111720-131840) 14d = 109714 (95760-113005) 15d = 96000 (83790-98880) 16d = 85333 (74480-87893) 17d = 76800 (67032-79104) 18d = 64000 (55860-65920) 19d = 54857 (47880-56502) 20d = 48000 (41895-49440) 21d = 42667 (37240-43946) 22d = 38400 (33516-39552) 23d = 32000 (27930-32960) 24d = 27429 (23940-28251) 25d = 24000 (20947-24720) 26d = 21333 (18620-21973) 27d = 19200 (16758-19776) 28d = 16000 (13965-16480) 29d = 13714 (11970-14125) 30d = 12000 (10473-12360) 31d = 10667 (9310-10986) 32d = 9600 (8379-9888) 33d = 8000 (6982-8240) 34d = 6857 (5985-7062) 35d = 6000 (5236-6180) 36d = 5333 (4655-5493) 37d = 4800 (4189-4944) 38d = 4000 (3491-4120) 39d = 3429 (2992-3531) 40d = 3000 (2618-3090) 41d-63d = Reserved
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

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**7.1.58 CLK\_DET\_STS2 Register (Address = 0x40) [Reset = 0x00]**

CLK\_DET\_STS2 is shown in [Figure 7-58](#) and described in [Table 7-59](#).

Return to the [Summary Table](#).

This register is the clock ratio detection register 2.

**Figure 7-58. CLK\_DET\_STS2 Register**

7	6	5	4	3	2	1	0
RESERVED			FS_CLKSRC_RATIO_DET_MSB_STS[5:0]				
R-00b			R-000000b				

**Table 7-59. CLK\_DET\_STS2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values

**Table 7-59. CLK\_DET\_STS2 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5-0	FS_CLKSRC_RATIO_DE T_MSB_STS[5:0]	R	0x0	MSB bits for primary ASI or secondary ASI FSYNC to clock source ratio detected.

### 7.1.59 CLK\_DET\_STS3 Register (Address = 0x41) [Reset = 0x00]

CLK\_DET\_STS3 is shown in [Figure 7-59](#) and described in [Table 7-60](#).

Return to the [Summary Table](#).

This register is the clock ratio detection register 3.

**Figure 7-59. CLK\_DET\_STS3 Register**

7	6	5	4	3	2	1	0
FS_CLKSRC_RATIO_DET_LSB_STS[7:0]							
R-00000000b							

**Table 7-60. CLK\_DET\_STS3 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	FS_CLKSRC_RATIO_DE T_LSB_STS[7:0]	R	0x0	LSB byte for primary ASI or secondary ASI FSYNC to clock source ratio detected.

### 7.1.60 INT\_CFG Register (Address = 0x42) [Reset = 0x00]

INT\_CFG is shown in [Figure 7-60](#) and described in [Table 7-61](#).

Return to the [Summary Table](#).

This register is the interrupt configuration register.

**Figure 7-60. INT\_CFG Register**

7	6	5	4	3	2	1	0
INT_POL	INT_EVENT[1:0]	PD_ON_FLT_CFG[1:0]	LTCH_READ_CFG	PD_ON_FLT_R CV_CFG	LTCH_CLR_ON_READ		
R/W-0b	R/W-00b	R/W-00b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-61. INT\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_POL	R/W	0x0	Interrupt polarity. 0b = Active low (IRQZ) 1b = Active high (IRQ)
6-5	INT_EVENT[1:0]	R/W	0x0	Interrupt event configuration. 0d = INT asserts on any unmasked latched interrupts event 1d = INT asserts on any unmasked live interrupts event 2d = INT asserts for 2 ms (typical) for every 4-ms (typical) duration on any unmasked latched interrupts event 3d = INT asserts for 2 ms (typical) one time on each pulse for any unmasked interrupts event
4-3	PD_ON_FLT_CFG[1:0]	R/W	0x0	Powerdown configuration during fault for chx and micbias. 0d = Faults are not considered for power down 1d = Only unmasked faults are considered for power down 2d = All faults are considered for powerdown 3d = Reserved
2	LTCH_READ_CFG	R/W	0x0	Interrupt latch registers readback configuration. 0b = All interrupts can be read through the LTCH registers 1b = Only unmasked interrupts can be read through the LTCH registers

**Table 7-61. INT\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
1	PD_ON_FLT_RCV_CFG	R/W	0x0	Configuration for Powerdown ADC channels on fault 0b = Auto recovery, ADC channels are re-powered up when fault goes away 1b = Manual recovery, ADC channels are not re-powered up when fault goes away
0	LTCH_CLR_ON_READ	R/W	0x0	Cfgn for clearing LTCH register bits 0 = LTCH reg bits are cleared on reg read only if live status is zero 1 = LTCH reg bits are cleared on reg read irrespective of live status

**7.1.61 DAC\_FLT\_CFG Register (Address = 0x43) [Reset = 0x50]**

DAC\_FLT\_CFG is shown in [Figure 7-61](#) and described in [Table 7-62](#).

Return to the [Summary Table](#).

This register is the interrupt configuration register.

**Figure 7-61. DAC\_FLT\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	DAC_PD_ON_FLT_CFG[1:0]		DAC_PD_ON_FLT_RCV_CFG	OUT_CHx_PD_FLT_STS	DAC_DIS_PD_W_PU	DAC_FLT_DET_DIS	AREG_SC_FLAG_DET_DIS
R-0b	R/W-10b		R/W-1b	R-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-62. DAC\_FLT\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	DAC_PD_ON_FLT_CFG[1:0]	R/W	0x2	Powerdown configuration during fault for DAC . 0d = Faults are not considered for power down 1d = Only unmasked faults are considered for power down 2d = All faults are considered for powerdown 3d = Reserved
4	DAC_PD_ON_FLT_RCV_CFG	R/W	0x1	Configuration for Powerdown DAC channels on fault 0b = Auto recovery, DAC channels are re-powered up when fault goes away 1b = Manual recovery, DAC channels are not re-powered up when fault goes away
3	OUT_CHx_PD_FLT_STS	R	0x0	Status for PD on OUTxx faults 0d = No DAC Channel is Powered Down due to fault/s 1d = Some DAC Channel is Powered Down due to fault/s
2	DAC_DIS_PD_W_PU	R/W	0x0	Disable power down on DRVR VG fault while powering up DAC 0b = Power down DAC on DRVR VG fault while power up 1b = Disable power down DAC on DRVR VG fault while power up
1	DAC_FLT_DET_DIS	R/W	0x0	DAC vg_fault/sc_fault detect config 0b = enable 1b = disable
0	AREG_SC_FLAG_DET_DIS	R/W	0x0	AREG short circuit detect config 0b = enable 1b = disable

**7.1.62 ADC\_DAC\_MISC\_CFG Register (Address = 0x4B) [Reset = 0x00]**

ADC\_DAC\_MISC\_CFG is shown in [Figure 7-62](#) and described in [Table 7-63](#).

Return to the [Summary Table](#).

Option to Mute ADC Channel in Overload Recovery Phase

**Figure 7-62. ADC\_DAC\_MISC\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	RESERVED	RESERVED	ADC_CH1_MUTE_ON_OVERLOAD	ADC_CH2_MUTE_ON_OVERLOAD	RESERVED		
R-0b	R-0b	R-0b	R/W-0b	R/W-0b	R-000b		

**Table 7-63. ADC\_DAC\_MISC\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6	RESERVED	R	0x0	Reserved bit; Write only reset value
5	RESERVED	R	0x0	Reserved bit; Write only reset value
4	ADC_CH1_MUTE_ON_OVERLOAD	R/W	0x0	Mute ADC channel 1 while ADC1 is in Overload Recovery Phase 0b = Disable 1b = Enable
3	ADC_CH2_MUTE_ON_OVERLOAD	R/W	0x0	Mute ADC channel 2 while ADC2 is in Overload Recovery Phase 0b = Disable 1b = Enable
2-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.1.63 PWR\_TUNE\_CFG0 Register (Address = 0x4E) [Reset = 0x00]

PWR\_TUNE\_CFG0 is shown in [Figure 7-63](#) and described in [Table 7-64](#).

Return to the [Summary Table](#).

This register is configuration register for power tune configuration.

**Figure 7-63. PWR\_TUNE\_CFG0 Register**

7	6	5	4	3	2	1	0
ADC_CLK_BY2_MODE	ADC_CIC_ORDER	ADC_FIR_BYPASS	RESERVED		ADC_LOW_POWER_FILTER	RESERVED	
R/W-0b	R/W-0b	R/W-0b	R-00b		R/W-0b	R-00b	

**Table 7-64. PWR\_TUNE\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	ADC_CLK_BY2_MODE	R/W	0x0	ADC MOD CLK select configuration. 0d = MOD CLK 3MHz 1d = MOD CLK 1.5MHz
6	ADC_CIC_ORDER	R/W	0x0	ADC CIC order configuration. 0d = 5th order CIC 1d = 4th order CIC
5	ADC_FIR_BYPASS	R/W	0x0	ADC FIR bypass configuration. 0d = Bypass disable 1d = Bypass enable
4-3	RESERVED	R	0x0	Reserved bits; Write only reset values
2	ADC_LOW_POWER_FILTER	R/W	0x0	Low Power filter configuration for ADC 0d = Disable 1d = Enable
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.1.64 PWR\_TUNE\_CFG1 Register (Address = 0x4F) [Reset = 0x00]

PWR\_TUNE\_CFG1 is shown in [Figure 7-64](#) and described in [Table 7-65](#).

Return to the [Summary Table](#).

This register is configuration register for power tune configuration.

**Figure 7-64. PWR\_TUNE\_CFG1 Register**

7	6	5	4	3	2	1	0
DAC_CLK_BY2_MODE	RESERVED	DAC_FIR_SEG_BYPASS	RESERVED		DAC_LOW_PWR_FILTER	DAC_POWER_SCAL	RESERVED
R/W-0b	R-0b	R/W-0b	R-00b		R/W-0b	R/W-0b	R-0b

**Table 7-65. PWR\_TUNE\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	DAC_CLK_BY2_MODE	R/W	0x0	DAC MOD CLK select configuration. 0d = MOD CLK 3MHz 1d = MOD CLK 1.5MHz
6	RESERVED	R	0x0	Reserved bit; Write only reset value
5	DAC_FIR_SEG_BYPASS	R/W	0x0	DAC FIR and segmenter bypass configuration. 0d = Bypass disable 1d = Bypass enable
4-3	RESERVED	R	0x0	Reserved bits; Write only reset values
2	DAC_LOW_PWR_FILTER	R/W	0x0	Low Power Filter configuration for DAC 0d = Disable 1d = Enable
1	DAC_POWER_SCAL	R/W	0x0	DAC IREF select configuration. 0d = Vref/R 1d = Vref/2R
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.1.65 ADC\_CH1\_CFG0 Register (Address = 0x50) [Reset = 0x00]

ADC\_CH1\_CFG0 is shown in [Figure 7-65](#) and described in [Table 7-66](#).

Return to the [Summary Table](#).

This register is configuration register 0 for ADC channel 1.

**Figure 7-65. ADC\_CH1\_CFG0 Register**

7	6	5	4	3	2	1	0
ADC_CH1_INSRC[1:0]		RESERVED		RESERVED		ADC_CH1_FULLSCALE_VAL	ADC_CH1_BW_MODE
R/W-00b		R-00b		R-00b		R/W-0b	R/W-0b

**Table 7-66. ADC\_CH1\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	ADC_CH1_INSRC[1:0]	R/W	0x0	ADC Channel 1 input configuration. 0d = Analog differential input 1d = Analog single-ended input Dont use Dont use
5-4	RESERVED	R	0x0	Reserved bits; Write only reset values
3-2	RESERVED	R	0x0	Reserved bits; Write only reset values
1	ADC_CH1_FULLSCALE_VAL	R/W	0x0	ADC Channel 1 Fullscale value for VREF=2.75 V (applicable for the analog input). 0d = 10 Vrms differential 1d = 5 Vrms differential

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**Table 7-66. ADC\_CH1\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
0	ADC_CH1_BW_MODE	R/W	0x0	ADC Channel 1 band-width selection. coupling (applicable for the analog input). 0d = audio band-width (24 kHz mode) 1d = wide band-width (96 kHz mode)

### 7.1.66 ADC\_CH1\_CFG2 Register (Address = 0x52) [Reset = 0xA1]

ADC\_CH1\_CFG2 is shown in [Figure 7-66](#) and described in [Table 7-67](#).

Return to the [Summary Table](#).

This register is configuration register 2 for ADC channel 1.

**Figure 7-66. ADC\_CH1\_CFG2 Register**

7	6	5	4	3	2	1	0
ADC_CH1_DVOL[7:0]							
R/W-10100001b							

**Table 7-67. ADC\_CH1\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	ADC_CH1_DVOL[7:0]	R/W	0xA1	Channel 1 digital volume control. 0d = Digital volume is muted 1d = Digital volume control is set to -80 dB 2d = Digital volume control is set to -79.5 dB 3d to 160d = Digital volume control is set as per configuration 161d = Digital volume control is set to 0 dB 162d = Digital volume control is set to 0.5 dB 163d to 253d = Digital volume control is set as per configuration 254d = Digital volume control is set to 46.5 dB 255d = Digital volume control is set to 47 dB

### 7.1.67 ADC\_CH1\_CFG3 Register (Address = 0x53) [Reset = 0x80]

ADC\_CH1\_CFG3 is shown in [Figure 7-67](#) and described in [Table 7-68](#).

Return to the [Summary Table](#).

This register is configuration register 3 for ADC channel 1.

**Figure 7-67. ADC\_CH1\_CFG3 Register**

7	6	5	4	3	2	1	0
ADC_CH1_FGAIN[3:0]				RESERVED			
R/W-1000b				R-0000b			

**Table 7-68. ADC\_CH1\_CFG3 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	ADC_CH1_FGAIN[3:0]	R/W	0x8	ADC channel 1 fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB

**Table 7-68. ADC\_CH1\_CFG3 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

**7.1.68 ADC\_CH1\_CFG4 Register (Address = 0x54) [Reset = 0x00]**

 ADC\_CH1\_CFG4 is shown in [Figure 7-68](#) and described in [Table 7-69](#).

 Return to the [Summary Table](#).

This register is configuration register 4 for ADC channel 1.

**Figure 7-68. ADC\_CH1\_CFG4 Register**

7	6	5	4	3	2	1	0
ADC_CH1_PCAL[5:0]						PCAL_ANA_DIG_SEL[1:0]	
R/W-000000b						R/W-00b	

**Table 7-69. ADC\_CH1\_CFG4 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	ADC_CH1_PCAL[5:0]	R/W	0x0	ADC channel 1 phase calibration with modulator clock resolution. 0d = No phase calibration 1d = Phase calibration delay is set to one cycle of the modulator clock 2d = Phase calibration delay is set to two cycles of the modulator clock 3d to 62d = Phase calibration delay as per configuration 63d = Phase calibration delay is set to 63 cycles of the modulator clock
1-0	PCAL_ANA_DIG_SEL[1:0]	R/W	0x0	PCAL support configuration. 0d = Pcal for both Ana-Dig supported 1d = Pcal for only Ana 2d = Pcal for only Dig 3d = Reserved

**7.1.69 ADC\_CH2\_CFG0 Register (Address = 0x55) [Reset = 0x00]**

 ADC\_CH2\_CFG0 is shown in [Figure 7-69](#) and described in [Table 7-70](#).

 Return to the [Summary Table](#).

This register is configuration register 0 for ADC channel 2.

**Figure 7-69. ADC\_CH2\_CFG0 Register**

7	6	5	4	3	2	1	0
ADC_CH2_INSRC[1:0]		RESERVED		ADC_CH2_CM_TOL[1:0]		ADC_CH2_FUL LSCALE_VAL	ADC_CH2_BW _MODE
R/W-00b		R-00b		R/W-00b		R/W-0b	R/W-0b

**Table 7-70. ADC\_CH2\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	ADC_CH2_INSRC[1:0]	R/W	0x0	ADC Channel 2 input configuration. 0d = Analog differential input 1d = Analog single-ended input Dont use Dont use
5-4	RESERVED	R	0x0	Reserved bits; Write only reset values

**Table 7-70. ADC\_CH2\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3-2	ADC_CH2_CM_TOL[1:0]	R/W	0x0	ADC Channel 2 input coupling (applicable for the analog input). 0d = AC-coupled input with common mode variance tolerance supported 50 mVpp for single ended and 100 mVpp for differential configuration 1d = AC-coupled / DC-coupled input with common mode variance tolerance supported 500 mVpp for single ended and 1 Vpp for differential configuration (Expected SNR degradation of 1-2 dB) 2d = AC-coupled / DC-coupled input with common mode variance tolerance supported rail to rail (supply to ground) (Expected SNR degradation of 3-4 dB , High CMRR supported only in this case) 3d = Reserved
1	ADC_CH2_FULLSCALE_VAL	R/W	0x0	ADC Channel 2 Fullscale value for VREF=2.75 V (applicable for the analog input). 0d = 10 Vrms differential 1d = 5 Vrms differential
0	ADC_CH2_BW_MODE	R/W	0x0	ADC Channel 2 band-width selection. coupling (applicable for the analog input). 0d = audio band-width (24 kHz mode) 1d = wide band-width (96 kHz mode) (Supported only for 40-kΩ input impedance case)

**7.1.70 ADC\_CH2\_CFG2 Register (Address = 0x57) [Reset = 0xA1]**

ADC\_CH2\_CFG2 is shown in [Figure 7-70](#) and described in [Table 7-71](#).

Return to the [Summary Table](#).

This register is configuration register 2 for channel 2.

**Figure 7-70. ADC\_CH2\_CFG2 Register**

7	6	5	4	3	2	1	0
ADC_CH2_DVOL[7:0]							
R/W-10100001b							

**Table 7-71. ADC\_CH2\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	ADC_CH2_DVOL[7:0]	R/W	0xA1	Channel 1 digital volume control. 0d = Digital volume is muted 1d = Digital volume control is set to -80 dB 2d = Digital volume control is set to -79.5 dB 3d to 160d = Digital volume control is set as per configuration 161d = Digital volume control is set to 0 dB 162d = Digital volume control is set to 0.5 dB 163d to 253d = Digital volume control is set as per configuration 254d = Digital volume control is set to 46.5 dB 255d = Digital volume control is set to 47 dB

**7.1.71 ADC\_CH2\_CFG3 Register (Address = 0x58) [Reset = 0x80]**

ADC\_CH2\_CFG3 is shown in [Figure 7-71](#) and described in [Table 7-72](#).

Return to the [Summary Table](#).

This register is configuration register 3 for ADC Channel 2.

**Figure 7-71. ADC\_CH2\_CFG3 Register**

7	6	5	4	3	2	1	0
ADC_CH2_FGAIN[3:0]				RESERVED			

**Figure 7-71. ADC\_CH2\_CFG3 Register (continued)**  
R/W-1000b R-0000b

**Table 7-72. ADC\_CH2\_CFG3 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	ADC_CH2_FGAIN[3:0]	R/W	0x8	ADC Channel 2 fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.1.72 ADC\_CH2\_CFG4 Register (Address = 0x59) [Reset = 0x00]

ADC\_CH2\_CFG4 is shown in [Figure 7-72](#) and described in [Table 7-73](#).

Return to the [Summary Table](#).

This register is configuration register 4 for ADC Channel 2.

**Figure 7-72. ADC\_CH2\_CFG4 Register**

7	6	5	4	3	2	1	0
ADC_CH2_PCAL[5:0]						RESERVED	
R/W-000000b						R-00b	

**Table 7-73. ADC\_CH2\_CFG4 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	ADC_CH2_PCAL[5:0]	R/W	0x0	ADC Channel 2 phase calibration with modulator clock resolution. 0d = No phase calibration 1d = Phase calibration delay is set to one cycle of the modulator clock 2d = Phase calibration delay is set to two cycles of the modulator clock 3d to 62d = Phase calibration delay as per configuration 63d = Phase calibration delay is set to 63 cycles of the modulator clock
1-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.1.73 ADC\_CH3\_CFG0 Register (Address = 0x5A) [Reset = 0x00]

ADC\_CH3\_CFG0 is shown in [Figure 7-73](#) and described in [Table 7-74](#).

Return to the [Summary Table](#).

This register is configuration register 0 for ADC channel 3.

**Figure 7-73. ADC\_CH3\_CFG0 Register**

7	6	5	4	3	2	1	0
ADC_CH3_CL ONE	RESERVED						
R/W-0b	R-0000000b						

**Table 7-74. ADC\_CH3\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	ADC_CH3_CLONE	R/W	0x0	ADC Channel 3 input configuration. 0d = clone disabled 1d = Channel 3 Digital Filter Input is generated same as Channel 1 Digital Filter Input (Cloned Input)
6-0	RESERVED	R	0x0	Reserved bits; Write only reset value

#### 7.1.74 ADC\_CH3\_CFG2 Register (Address = 0x5B) [Reset = 0xA1]

ADC\_CH3\_CFG2 is shown in [Figure 7-74](#) and described in [Table 7-75](#).

Return to the [Summary Table](#).

This register is configuration register 2 for ADC channel 3.

**Figure 7-74. ADC\_CH3\_CFG2 Register**

7	6	5	4	3	2	1	0
ADC_CH3_DVOL[7:0]							
R/W-10100001b							

**Table 7-75. ADC\_CH3\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	ADC_CH3_DVOL[7:0]	R/W	0xA1	Channel 3 digital volume control. 0d = Digital volume is muted 1d = Digital volume control is set to -80 dB 2d = Digital volume control is set to -79.5 dB 3d to 160d = Digital volume control is set as per configuration 161d = Digital volume control is set to 0 dB 162d = Digital volume control is set to 0.5 dB 163d to 253d = Digital volume control is set as per configuration 254d = Digital volume control is set to 46.5 dB 255d = Digital volume control is set to 47 dB

#### 7.1.75 ADC\_CH3\_CFG3 Register (Address = 0x5C) [Reset = 0x80]

ADC\_CH3\_CFG3 is shown in [Figure 7-75](#) and described in [Table 7-76](#).

Return to the [Summary Table](#).

This register is configuration register 3 for ADC channel 3.

**Figure 7-75. ADC\_CH3\_CFG3 Register**

7	6	5	4	3	2	1	0
ADC_CH3_FGAIN[3:0]				RESERVED			
R/W-1000b				R-0000b			

**Table 7-76. ADC\_CH3\_CFG3 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	ADC_CH3_FGAIN[3:0]	R/W	0x8	ADC channel 3 fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB

**Table 7-76. ADC\_CH3\_CFG3 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

**7.1.76 ADC\_CH3\_CFG4 Register (Address = 0x5D) [Reset = 0x00]**

 ADC\_CH3\_CFG4 is shown in [Figure 7-76](#) and described in [Table 7-77](#).

 Return to the [Summary Table](#).

This register is configuration register 4 for ADC channel 3.

**Figure 7-76. ADC\_CH3\_CFG4 Register**

7	6	5	4	3	2	1	0
ADC_CH3_PCAL[5:0]						RESERVED	
R/W-000000b						R-00b	

**Table 7-77. ADC\_CH3\_CFG4 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	ADC_CH3_PCAL[5:0]	R/W	0x0	ADC channel 3 phase calibration with modulator clock resolution. 0d = No phase calibration 1d = Phase calibration delay is set to one cycle of the modulator clock 2d = Phase calibration delay is set to two cycles of the modulator clock 3d to 62d = Phase calibration delay as per configuration 63d = Phase calibration delay is set to 63 cycles of the modulator clock
1-0	RESERVED	R	0x0	Reserved bits; Write only reset value

**7.1.77 ADC\_CH4\_CFG0 Register (Address = 0x5E) [Reset = 0x00]**

 ADC\_CH4\_CFG0 is shown in [Figure 7-77](#) and described in [Table 7-78](#).

 Return to the [Summary Table](#).

This register is configuration register 0 for ADC Channel 4.

**Figure 7-77. ADC\_CH4\_CFG0 Register**

7	6	5	4	3	2	1	0
ADC_CH4_CLONE	RESERVED						
R/W-0b	R-0000000b						

**Table 7-78. ADC\_CH4\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	ADC_CH4_CLONE	R/W	0x0	ADC Channel 4 input configuration. 0d = clone disabled 1d = Channel 4 Digital Filter Input is generated same as Channel 2 Digital Filter Input (Cloned Input)
6-0	RESERVED	R	0x0	Reserved bits; Write only reset value

**7.1.78 ADC\_CH4\_CFG2 Register (Address = 0x5F) [Reset = 0xA1]**

 ADC\_CH4\_CFG2 is shown in [Figure 7-78](#) and described in [Table 7-79](#).

Return to the [Summary Table](#).

This register is configuration register 2 for channel 4.

**Figure 7-78. ADC\_CH4\_CFG2 Register**

7	6	5	4	3	2	1	0
ADC_CH4_DVOL[7:0]							
R/W-10100001b							

**Table 7-79. ADC\_CH4\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	ADC_CH4_DVOL[7:0]	R/W	0xA1	Channel 4 digital volume control. 0d = Digital volume is muted 1d = Digital volume control is set to -80 dB 2d = Digital volume control is set to -79.5 dB 3d to 160d = Digital volume control is set as per configuration 161d = Digital volume control is set to 0 dB 162d = Digital volume control is set to 0.5 dB 163d to 253d = Digital volume control is set as per configuration 254d = Digital volume control is set to 46.5 dB 255d = Digital volume control is set to 47 dB

#### 7.1.79 ADC\_CH4\_CFG3 Register (Address = 0x60) [Reset = 0x80]

ADC\_CH4\_CFG3 is shown in [Figure 7-79](#) and described in [Table 7-80](#).

Return to the [Summary Table](#).

This register is configuration register 3 for ADC Channel 4.

**Figure 7-79. ADC\_CH4\_CFG3 Register**

7	6	5	4	3	2	1	0
ADC_CH4_FGAIN[3:0]				RESERVED			
R/W-1000b				R-0000b			

**Table 7-80. ADC\_CH4\_CFG3 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	ADC_CH4_FGAIN[3:0]	R/W	0x8	ADC Channel 4 fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

#### 7.1.80 ADC\_CH4\_CFG4 Register (Address = 0x61) [Reset = 0x00]

ADC\_CH4\_CFG4 is shown in [Figure 7-80](#) and described in [Table 7-81](#).

Return to the [Summary Table](#).

This register is configuration register 4 for ADC Channel 4.

**Figure 7-80. ADC\_CH4\_CFG4 Register**

7	6	5	4	3	2	1	0
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**Figure 7-80. ADC\_CH4\_CFG4 Register (continued)**

ADC_CH4_PCAL[5:0]	RESERVED
R/W-000000b	R-00b

**Table 7-81. ADC\_CH4\_CFG4 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	ADC_CH4_PCAL[5:0]	R/W	0x0	ADC Channel 4 phase calibration with modulator clock resolution. 0d = No phase calibration 1d = Phase calibration delay is set to one cycle of the modulator clock 2d = Phase calibration delay is set to two cycles of the modulator clock 3d to 62d = Phase calibration delay as per configuration 63d = Phase calibration delay is set to 63 cycles of the modulator clock
1-0	RESERVED	R	0x0	Reserved bits; Write only reset value

**7.1.81 OUT1x\_CFG0 Register (Address = 0x64) [Reset = 0x20]**

OUT1x\_CFG0 is shown in [Figure 7-81](#) and described in [Table 7-82](#).

Return to the [Summary Table](#).

This register is configuration register 0 for Channel OUT1x.

**Figure 7-81. OUT1x\_CFG0 Register**

7	6	5	4	3	2	1	0
OUT1x_SRC[2:0]			OUT1x_CFG[2:0]			OUT1x_VCOM	OUT1x_LP_MODE
R/W-001b			R/W-000b			R/W-0b	R/W-0b

**Table 7-82. OUT1x\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-5	OUT1x_SRC[2:0]	R/W	0x1	OUT1x Source Configuration. 0d = Output driver disabled 1d = Input from DAC signal chain 2d = Input from Analog bypass path 3d = Input from both DAC signal chain and Analog bypass path 4d = Independent input from both DAC signal chain and Analog bypass path (DAC -> OUT1P, IN1P -> OUT1M) 5d = Independent input from both DAC signal chain and Analog bypass path (IN1M -> OUT1P, DAC -> OUT1M) 6d-7d = Reserved; Don't use
4-2	OUT1x_CFG[2:0]	R/W	0x0	OUT1x DAC / Analog Bypass Routing Configuration. (Don't use if OUT1x_SRC configured 4d or 5d) 0d = Differential (DAC1AP + DAC1BP / IN1M -> OUT1P; DAC1AM + DAC1BM / IN1P -> OUT1M) 1d = Stereo single-ended (DAC1A / IN1M -> OUT1P; DAC1B / IN1P -> OUT1M) 2d = Mono single-ended with output at OUT1P only (DAC1A + DAC1B / IN1M -> OUT1P) 3d = Mono single-ended with output at OUT1M only (DAC1A + DAC1B / IN1P -> OUT1M) 4d = Pseudo differential with OUT1M as VCOM (DAC1A, DAC1B / IN1M -> OUT1P, VCOM -> OUT1M) 5d = Pseudo differential with OUT1M as VCOM and OUT2M for external sensing (DAC1A, DAC1B / IN1M -> OUT1P, VCOM -> OUT1M) 6d = Pseudo differential with OUT1P as VCOM (IN1P -> OUT1M, VCOM -> OUT1P) 7d = Reserved; Don't use

**Table 7-82. OUT1x\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
1	OUT1x_VCOM	R/W	0x0	Channel OUT1x VCOM configuration. 0d = $0.6 * V_{ref}$ (for 1.375V VREF mode alone as $0.654 * V_{ref}$ ) 1d = AVDD by 2
0	OUT1x_LP_MODE	R/W	0x0	Low power mode of OUT1x channel. (only valid for OUT1x_SRC configured as DAC signal chain) (not valid for OUT1x_CFG configured as Stereo SE) 0d = Low power mode is disabled (3 dB higher perf) 1d = Low power mode is enabled

### 7.1.82 OUT1x\_CFG1 Register (Address = 0x65) [Reset = 0x20]

OUT1x\_CFG1 is shown in [Figure 7-82](#) and described in [Table 7-83](#).

Return to the [Summary Table](#).

This register is configuration register 1 for Channel OUT1x.

**Figure 7-82. OUT1x\_CFG1 Register**

7	6	5	4	3	2	1	0
OUT1P_DRIVE[1:0]		OUT1P_LVL_CTRL[2:0]			RESERVED	RESERVED	DAC_CH1_BW_MODE
R/W-00b		R/W-100b			R-0b	R-0b	R/W-0b

**Table 7-83. OUT1x\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	OUT1P_DRIVE[1:0]	R/W	0x0	Channel OUT1P drive configuration. 0d = Line out driver with minimum 300 Ω impedance 1d = Headphone driver with minimum 4 Ω impedance 2d = 4 Ω 3d = FD Receiver/Debug
5-3	OUT1P_LVL_CTRL[2:0]	R/W	0x4	Channel OUT1P level control configuration Dont use Dont use Dont use Dont use 4d = -8 dB 5d = -14 dB 6d = -20 dB 7d = -26 dB
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	DAC_CH1_BW_MODE	R/W	0x0	DAC Channel 1 band-width selection. 0d = audio band-width (24 kHz mode) 1d = wide band-width (96 kHz mode)

### 7.1.83 OUT1x\_CFG2 Register (Address = 0x66) [Reset = 0x20]

OUT1x\_CFG2 is shown in [Figure 7-83](#) and described in [Table 7-84](#).

Return to the [Summary Table](#).

This register is configuration register 2 for Channel OUT2x.

**Figure 7-83. OUT1x\_CFG2 Register**

7	6	5	4	3	2	1	0
OUT1M_DRIVE[1:0]		OUT1M_LVL_CTRL[2:0]			RESERVED	DAC_CH1_FUL_LSCALE_VAL	DAC_CH1_CM_TOL

**Figure 7-83. OUT1x\_CFG2 Register (continued)**

R/W-00b	R/W-100b	R-0b	R/W-0b	R/W-0b
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**Table 7-84. OUT1x\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	OUT1M_DRIVE[1:0]	R/W	0x0	Channel OUT1M drive configuration. 0d = Line out driver with minimum 300 Ω impedance 1d = Headphone driver with minimum 4 Ω impedance 2d = 4 Ω 3d = FD Receiver/Debug
5-3	OUT1M_LVL_CTRL[2:0]	R/W	0x4	Channel OUT1M level control configuration. Dont use Dont use Dont use Dont use 4d = -8 dB 5d = -14 dB 6d = -20 dB 7d = -26 dB
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	DAC_CH1_FULLSCALE_VAL	R/W	0x0	DAC Channel 1 Fullscale value for VREF=2.75 V 0d = 10 Vrms differential 1d = 5 Vrms differential
0	DAC_CH1_CM_TOL	R/W	0x0	DAC Channel 1 input coupling (applicable for the analog input). 0d = AC-coupled input with common mode variance tolerance supported 50 mVpp for single ended and 100 mVpp for differential configuration 1d = AC-coupled / DC-coupled input with common mode variance tolerance supported rail to rail (supply to ground) (Expected SNR degradation of 3-4 dB , High CMRR supported only in this case)

ADVANCE INFORMATION

**7.1.84 DAC\_CH1A\_CFG0 Register (Address = 0x67) [Reset = 0xC9]**

DAC\_CH1A\_CFG0 is shown in [Figure 7-84](#) and described in [Table 7-85](#).

Return to the [Summary Table](#).

This register is configuration register 0 for DAC channel 1A.

**Figure 7-84. DAC\_CH1A\_CFG0 Register**

7	6	5	4	3	2	1	0
DAC_CH1A_DVOL[7:0]							
R/W-11001001b							

**Table 7-85. DAC\_CH1A\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DAC_CH1A_DVOL[7:0]	R/W	0xC9	Channel 1A digital volume control. 0d = Digital Volume is muted 1d = Digital Volume Control set to -100 dB 2d = Digital Volume Control set to -99.5 dB 3d to 200d = Digital Volume Control set to as per configuration 201d = Digital Volume Control set to 0 dB 202d = Digital Volume Control set to +0.5 dB 203d to 253d = Digital Volume Control set to as per configuration 254d = Digital Volume Control set to +26.5 dB 255d = Digital Volume Control set to +27 dB

### 7.1.85 DAC\_CH1A\_CFG1 Register (Address = 0x68) [Reset = 0x80]

DAC\_CH1A\_CFG1 is shown in [Figure 7-85](#) and described in [Table 7-86](#).

Return to the [Summary Table](#).

This register is configuration register 1 for DAC channel 1A.

**Figure 7-85. DAC\_CH1A\_CFG1 Register**

7	6	5	4	3	2	1	0
DAC_CH1A_FGAIN[3:0]				RESERVED			
R/W-1000b				R-0000b			

**Table 7-86. DAC\_CH1A\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DAC_CH1A_FGAIN[3:0]	R/W	0x8	DAC channel 1A fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.1.86 DAC\_CH1B\_CFG0 Register (Address = 0x69) [Reset = 0xC9]

DAC\_CH1B\_CFG0 is shown in [Figure 7-86](#) and described in [Table 7-87](#).

Return to the [Summary Table](#).

This register is configuration register 0 for DAC channel 1B.

**Figure 7-86. DAC\_CH1B\_CFG0 Register**

7	6	5	4	3	2	1	0
DAC_CH1B_DVOL[7:0]							
R/W-11001001b							

**Table 7-87. DAC\_CH1B\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DAC_CH1B_DVOL[7:0]	R/W	0xC9	Channel 1B digital volume control. 0d = Digital Volume is muted 1d = Digital Volume Control set to -100 dB 2d = Digital Volume Control set to -99.5 dB 3d to 200d = Digital Volume Control set to as per configuration 201d = Digital Volume Control set to 0 dB 202d = Digital Volume Control set to +0.5 dB 203d to 253d = Digital Volume Control set to as per configuration 254d = Digital Volume Control set to +26.5 dB 255d = Digital Volume Control set to +27 dB

### 7.1.87 DAC\_CH1B\_CFG1 Register (Address = 0x6A) [Reset = 0x80]

DAC\_CH1B\_CFG1 is shown in [Figure 7-87](#) and described in [Table 7-88](#).

Return to the [Summary Table](#).

This register is configuration register 1 for DAC channel 1B.

**Figure 7-87. DAC\_CH1B\_CFG1 Register**

7	6	5	4	3	2	1	0
DAC_CH1B_FGAIN[3:0]				RESERVED			
R/W-1000b				R-0000b			

**Table 7-88. DAC\_CH1B\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DAC_CH1B_FGAIN[3:0]	R/W	0x8	DAC channel 1B fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.1.88 OUT2x\_CFG0 Register (Address = 0x6B) [Reset = 0x20]

OUT2x\_CFG0 is shown in [Figure 7-88](#) and described in [Table 7-89](#).

Return to the [Summary Table](#).

This register is configuration register 0 for Channel OUT2x.

**Figure 7-88. OUT2x\_CFG0 Register**

7	6	5	4	3	2	1	0
OUT2x_SRC[2:0]			OUT2x_CFG[2:0]			OUT2x_VCOM	OUT2x_LP_MODE
R/W-001b			R/W-000b			R/W-0b	R/W-0b

**Table 7-89. OUT2x\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-5	OUT2x_SRC[2:0]	R/W	0x1	OUT2x Source Configuration. 0d = Output driver disabled 1d = Input from DAC signal chain 2d = Input from Analog bypass path 3d = Input from both DAC signal chain and Analog bypass path 4d = Independent input from both DAC signal chain and Analog bypass path (DAC -> OUT2P , IN2P -> OUT2M) 5d = Independent input from both DAC signal chain and Analog bypass path (IN2M -> OUT2P, DAC -> OUT2M) 6d-7d = Reserved; Don't use

**Table 7-89. OUT2x\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-2	OUT2x_CFG[2:0]	R/W	0x0	OUT2x DAC / Analog Bypass Routing Configuration. (Don't use if OUT1x_SRC configured 4d or 5d) 0d = Differential (DAC2AP + DAC2BP / IN2M -> OUT2P ; DAC2AM + DAC2BM / IN2P -> OUT2M) 1d = Stereo single-ended (DAC2A / IN2M -> OUT2P ; DAC2B / IN2P -> OUT2M) 2d = Mono single-ended with output at OUT2P only (DAC2A + DAC2B / IN2M-> OUT2P) 3d = Mono single-ended with output at OUT2M only (DAC2A + DAC2B / IN2P -> OUT2M) 4d = Pseudo differential with OUT2M as VCOM (DAC2A, DAC2B / IN2M -> OUT2P, VCOM -> OUT2M) 5d =Reserved; Don't use 6d = Pseudo differential with OUT2P as VCOM (IN2P -> OUT2M, VCOM -> OUT2P) 7d = Reserved; Don't use
1	OUT2x_VCOM	R/W	0x0	Channel OUT2x VCOM configuration. 0d = 0.6 * Vref (for 1.375V VREF mode alone as 0.654*Vref) 2d = AVDD by 2
0	OUT2x_LP_MODE	R/W	0x0	Low power mode of OUT2x channel. (only valid for OUT2x_SRC configured as DAC signal chain) (not valid for OUT2x_CFG configured as Stereo SE) 0d = Low power mode is disabled (3 dB higher perf) 1d = Low power mode is enabled

**7.1.89 OUT2x\_CFG1 Register (Address = 0x6C) [Reset = 0x20]**

OUT2x\_CFG1 is shown in [Figure 7-89](#) and described in [Table 7-90](#).

Return to the [Summary Table](#).

This register is configuration register 1 for Channel OUT2x.

**Figure 7-89. OUT2x\_CFG1 Register**

7	6	5	4	3	2	1	0
OUT2P_DRIVE[1:0]	OUT2P_LVL_CTRL[2:0]		RESERVED		RESERVED	DAC_CH2_BW_MODE	
R/W-00b	R/W-100b		R-0b		R-0b	R/W-0b	

**Table 7-90. OUT2x\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	OUT2P_DRIVE[1:0]	R/W	0x0	Channel OUT2P drive configuration. 0d = Line out driver with minimum 300 Ω impedance 1d = Headphone driver with minimum 4 Ω impedance 2d = 4 Ω 3d = FD Receiver/Debug
5-3	OUT2P_LVL_CTRL[2:0]	R/W	0x4	Channel OUT2P level control configuration. Dont use Dont use Dont use Dont use 4d = -8 dB 5d = -14 dB 6d = -20 dB 7d = -26 dB
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value

**Table 7-90. OUT2x\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
0	DAC_CH2_BW_MODE	R/W	0x0	DAC Channel 2 band-width selection. 0d = audio band-width (24 kHz mode) 1d = wide band-width (96 kHz mode)

### 7.1.90 OUT2x\_CFG2 Register (Address = 0x6D) [Reset = 0x20]

OUT2x\_CFG2 is shown in [Figure 7-90](#) and described in [Table 7-91](#).

Return to the [Summary Table](#).

This register is configuration register 2 for Channel OUT2x.

**Figure 7-90. OUT2x\_CFG2 Register**

7	6	5	4	3	2	1	0
OUT2M_DRIVE[1:0]		OUT2M_LVL_CTRL[2:0]			RESERVED	DAC_CH2_FUL LSCALE_VAL	DAC_CH2_CM _TOL
R/W-00b		R/W-100b			R-0b	R/W-0b	R/W-0b

**Table 7-91. OUT2x\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	OUT2M_DRIVE[1:0]	R/W	0x0	Channel OUT2M drive configuration. 0d = Line out driver with minimum 300 Ω impedance 1d = Headphone driver with minimum 4 Ω impedance 2d = 4 Ω 3d = FD Receiver/Debug
5-3	OUT2M_LVL_CTRL[2:0]	R/W	0x4	Channel OUT2M level control configuration. Dont use Dont use Dont use Dont use 4d = -8 dB 5d = -14 dB 6d = -20 dB 7d = -26 dB
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	DAC_CH2_FULLSCALE_VAL	R/W	0x0	DAC Channel 2 Fullscale value for VREF=2.75 V 0d = 10 Vrms differential 1d = 5 Vrms differential
0	DAC_CH2_CM_TOL	R/W	0x0	DAC Channel 2 input coupling (applicable for the analog input). 0d = AC-coupled input with common mode variance tolerance supported 50 mVpp for single ended and 100 mVpp for differential configuration 1d = AC-coupled / DC-coupled input with common mode variance tolerance supported rail to rail (supply to ground) (Expected SNR degradation of 3-4 dB , High CMRR supported only in this case)

### 7.1.91 DAC\_CH2A\_CFG0 Register (Address = 0x6E) [Reset = 0xC9]

DAC\_CH2A\_CFG0 is shown in [Figure 7-91](#) and described in [Table 7-92](#).

Return to the [Summary Table](#).

This register is configuration register 0 for DAC channel 2A.

**Figure 7-91. DAC\_CH2A\_CFG0 Register**

7	6	5	4	3	2	1	0
DAC_CH2A_DVOL[7:0]							

Figure 7-91. DAC\_CH2A\_CFG0 Register (continued)

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Table 7-92. DAC\_CH2A\_CFG0 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-0	DAC_CH2A_DVOL[7:0]	R/W	0xC9	Channel 2A digital volume control. 0d = Digital Volume is muted 1d = Digital Volume Control set to -100 dB 2d = Digital Volume Control set to -99.5 dB 3d to 200d = Digital Volume Control set to as per configuration 201d = Digital Volume Control set to 0 dB 202d = Digital Volume Control set to +0.5 dB 203d to 253d = Digital Volume Control set to as per configuration 254d = Digital Volume Control set to +26.5 dB 255d = Digital Volume Control set to +27 dB

### 7.1.92 DAC\_CH2A\_CFG1 Register (Address = 0x6F) [Reset = 0x80]

DAC\_CH2A\_CFG1 is shown in Figure 7-92 and described in Table 7-93.

Return to the [Summary Table](#).

This register is configuration register 1 for DAC channel 2A.

Figure 7-92. DAC\_CH2A\_CFG1 Register

7	6	5	4	3	2	1	0
DAC_CH2A_FGAIN[3:0]				RESERVED			
R/W-1000b				R-0000b			

Table 7-93. DAC\_CH2A\_CFG1 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-4	DAC_CH2A_FGAIN[3:0]	R/W	0x8	DAC channel 2A fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.1.93 DAC\_CH2B\_CFG0 Register (Address = 0x70) [Reset = 0xC9]

DAC\_CH2B\_CFG0 is shown in Figure 7-93 and described in Table 7-94.

Return to the [Summary Table](#).

This register is configuration register 0 for DAC channel 2B.

Figure 7-93. DAC\_CH2B\_CFG0 Register

7	6	5	4	3	2	1	0
DAC_CH2B_DVOL[7:0]							
R/W-11001001b							

**Table 7-94. DAC\_CH2B\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DAC_CH2B_DVOL[7:0]	R/W	0xC9	Channel 2B digital volume control. 0d = Digital Volume is muted 1d = Digital Volume Control set to -100 dB 2d = Digital Volume Control set to -99.5 dB 3d to 200d = Digital Volume Control set to as per configuration 201d = Digital Volume Control set to 0 dB 202d = Digital Volume Control set to +0.5 dB 203d to 253d = Digital Volume Control set to as per configuration 254d = Digital Volume Control set to +26.5 dB 255d = Digital Volume Control set to +27 dB

### 7.1.94 DAC\_CH2B\_CFG1 Register (Address = 0x71) [Reset = 0x80]

DAC\_CH2B\_CFG1 is shown in [Figure 7-94](#) and described in [Table 7-95](#).

Return to the [Summary Table](#).

This register is configuration register 1 for DAC channel 2B.

**Figure 7-94. DAC\_CH2B\_CFG1 Register**

7	6	5	4	3	2	1	0
DAC_CH2B_FGAIN[3:0]				RESERVED			
R/W-1000b				R-0000b			

**Table 7-95. DAC\_CH2B\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DAC_CH2B_FGAIN[3:0]	R/W	0x8	DAC channel 2B fine gain calibration. 0d = Fine gain is set to -0.8 dB 1d = Fine gain is set to -0.7 dB 2d = Fine gain is set to -0.6 dB 3d to 7d = Fine gain is set as per configuration 8d = Fine gain is set to 0 dB 9d = Fine gain is set to 0.1 dB 10d to 13d = Fine gain is set as per configuration 14d = Fine gain is set to 0.6 dB 15d = Fine gain is set to 0.7 dB
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.1.95 DSP\_CFG0 Register (Address = 0x72) [Reset = 0x18]

DSP\_CFG0 is shown in [Figure 7-95](#) and described in [Table 7-96](#).

Return to the [Summary Table](#).

This register is the digital signal processor (DSP) configuration register 0.

**Figure 7-95. DSP\_CFG0 Register**

7	6	5	4	3	2	1	0
ADC_DSP_DECI_FILT[1:0]		ADC_DSP_HPF_SEL[1:0]		ADC_DSP_BQ_CFG[1:0]		ADC_DSP_DIS ABLE_SOFT_S TEP	ADC_DSP_DV OL_GANG
R/W-00b		R/W-01b		R/W-10b		R/W-0b	R/W-0b

**Table 7-96. DSP\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	ADC_DSP_DECI_FILT[1:0] ]	R/W	0x0	ADC channel decimation filter response. 0d = Linear phase 1d = Low latency 2d = Ultra-low latency 3d = Reserved; Don't use
5-4	ADC_DSP_HPF_SEL[1:0]	R/W	0x1	ADC channel high-pass filter (HPF) selection. 0d = Programmable first-order IIR filter for a custom HPF with default coefficient values in P10_R120-127 and P11_R8-11 set as the all-pass filter 1d = HPF with a cutoff of $0.00002 \times f_s$ (1 Hz at $f_s = 48$ kHz) is selected 2d = HPF with a cutoff of $0.00025 \times f_s$ (12 Hz at $f_s = 48$ kHz) is selected 3d = HPF with a cutoff of $0.002 \times f_s$ (96 Hz at $f_s = 48$ kHz) is selected
3-2	ADC_DSP_BQ_CFG[1:0]	R/W	0x2	Number of biquads per ADC channel configuration. 0d = No biquads per channel; biquads are all disabled 1d = 1 biquad per channel 2d = 2 biquads per channel 3d = 3 biquads per channel
1	ADC_DSP_DISABLE_SOFT_STEP	R/W	0x0	ADC Soft-stepping disable during DVOL change, mute, and unmute. 0d = Soft-stepping enabled 1d = Soft-stepping disabled
0	ADC_DSP_DVOL_GANG	R/W	0x0	DVOL control ganged across ADC channels. 0d = Each channel has its own DVOL CTRL settings as programmed in the ADC_CHx_DVOL bits 1d = All active channels must use the channel 1 DVOL setting (ADC_CH1_DVOL) irrespective of whether channel 1 is turned on or not

**7.1.96 DSP\_CFG1 Register (Address = 0x73) [Reset = 0x18]**

DSP\_CFG1 is shown in [Figure 7-96](#) and described in [Table 7-97](#).

Return to the [Summary Table](#).

This register is the digital signal processor (DSP) configuration register 0.

**Figure 7-96. DSP\_CFG1 Register**

7	6	5	4	3	2	1	0
DAC_DSP_INTX_FILT[1:0]		DAC_DSP_HPF_SEL[1:0]		DAC_DSP_BQ_CFG[1:0]		DAC_DSP_DISABLE_SOFT_STEP	DAC_DSP_DVOL_GANG
R/W-00b		R/W-01b		R/W-10b		R/W-0b	R/W-0b

**Table 7-97. DSP\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	DAC_DSP_INTX_FILT[1:0] ]	R/W	0x0	DAC channel decimation filter response. 0d = Linear phase 1d = Low latency 2d = Ultra-low latency 3d = Reserved; Don't use

**Table 7-97. DSP\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5-4	DAC_DSP_HPF_SEL[1:0]	R/W	0x1	DAC channel high-pass filter (HPF) selection. 0d = Programmable first-order IIR filter for a custom HPF with default coefficient values in P17_R120-127 and P18_R8-11 set as the all-pass filter 1d = HPF with a cutoff of $0.00002 \times f_S$ (1 Hz at $f_S = 48$ kHz) is selected 2d = HPF with a cutoff of $0.00025 \times f_S$ (12 Hz at $f_S = 48$ kHz) is selected 3d = HPF with a cutoff of $0.002 \times f_S$ (96 Hz at $f_S = 48$ kHz) is selected
3-2	DAC_DSP_BQ_CFG[1:0]	R/W	0x2	Number of biquads per DAC channel configuration. 0d = No biquads per channel; biquads are all disabled 1d = 1 biquad per channel 2d = 2 biquads per channel 3d = 3 biquads per channel
1	DAC_DSP_DISABLE_SOFT_STEP	R/W	0x0	DAC Soft-stepping disable during DVOL change, mute, and unmute. 0d = Soft-stepping enabled 1d = Soft-stepping disabled
0	DAC_DSP_DVOL_GANG	R/W	0x0	DVOL control ganged across DAC channels. 0d = Each DAC channel has its own DVOL CTRL settings as programmed in the DAC_CHx_DVOL bits 1d = All active channels must use the channel 1 DVOL setting (DAC_CH1_DVOL) irrespective of whether channel 1 is turned on or not

**7.1.97 CH\_EN Register (Address = 0x76) [Reset = 0xCC]**

CH\_EN is shown in [Figure 7-97](#) and described in [Table 7-98](#).

Return to the [Summary Table](#).

This register is the channel enable configuration register.

**Figure 7-97. CH\_EN Register**

7	6	5	4	3	2	1	0
IN_CH1_EN	IN_CH2_EN	IN_CH3_EN	IN_CH4_EN	OUT_CH1_EN	OUT_CH2_EN	OUT_CH3_EN	OUT_CH4_EN
R/W-1b	R/W-1b	R/W-0b	R/W-0b	R/W-1b	R/W-1b	R/W-0b	R/W-0b

**Table 7-98. CH\_EN Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	IN_CH1_EN	R/W	0x1	Input channel 1 enable setting. 0d = Input channel 1 is disabled 1d = Input channel 1 is enabled
6	IN_CH2_EN	R/W	0x1	Input channel 2 enable setting. 0d = Input channel 2 is disabled 1d = Input channel 2 is enabled
5	IN_CH3_EN	R/W	0x0	Input channel 3 enable setting. 0d = Input channel 3 is disabled 1d = Input channel 3 is enabled
4	IN_CH4_EN	R/W	0x0	Input channel 4 enable setting. 0d = Input channel 4 is disabled 1d = Input channel 4 is enabled
3	OUT_CH1_EN	R/W	0x1	Output channel 1 enable setting. 0d = Output channel 1 is disabled 1d = Output channel 1 is enabled
2	OUT_CH2_EN	R/W	0x1	Output channel 2 enable setting. 0d = Output channel 2 is disabled 1d = Output channel 2 is enabled

**Table 7-98. CH\_EN Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
1	OUT_CH3_EN	R/W	0x0	Output channel 3 enable setting. 0d = Output channel 3 is disabled 1d = Output channel 3 is enabled
0	OUT_CH4_EN	R/W	0x0	Output channel 4 enable setting. 0d = Output channel 4 is disabled 1d = Output channel 4 is enabled

**7.1.98 DYN\_PUPD\_CFG Register (Address = 0x77) [Reset = 0x00]**

DYN\_PUPD\_CFG is shown in [Figure 7-98](#) and described in [Table 7-99](#).

Return to the [Summary Table](#).

This register is the power-up configuration register.

**Figure 7-98. DYN\_PUPD\_CFG Register**

7	6	5	4	3	2	1	0
ADC_DYN_PU PD_EN	ADC_DYN_MA XCH_SEL	DAC_DYN_PU PD_EN	DAC_DYN_MA XCH_SEL	DYN_PUPD_A DC_PDM_DIFF _CLK	RESERVED		
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R-000b		

**Table 7-99. DYN\_PUPD\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	ADC_DYN_PUPD_EN	R/W	0x0	Dynamic channel power-up, power-down enable for record path. 0d = Channel power-up, power-down is not supported if any channel recording is on 1d = Channel can be powered up or down individually, even if channel recording is on
6	ADC_DYN_MAXCH_SEL	R/W	0x0	Dynamic mode maximum channel select configuration for record path. 0d = Channel 1 and channel 2 are used with dynamic channel power-up, power-down feature enabled 1d = Channel 1 to channel 4 are used with dynamic channel power-up, power-down feature enabled
5	DAC_DYN_PUPD_EN	R/W	0x0	Dynamic channel power-up, power-down enable for playback path. 0d = Channel power-up, power-down is not supported if any channel playback is on 1d = Channel can be powered up or down individually, even if channel playback is on
4	DAC_DYN_MAXCH_SEL	R/W	0x0	Dynamic mode maximum channel select configuration for playback path. 0d = Channel 1 and channel 2 are used with dynamic channel power-up, power-down feature enabled 1d = Channel 1 to channel 4 are used with dynamic channel power-up, power-down feature enabled
3	DYN_PUPD_ADC_PDM_ DIFF_CLK	R/W	0x0	Dynamic power-up power-down with different adc mod clock and pdm clock configuration. 0d = Same ADC MOD CLK and PDM CLK in dynamic pupd 1d = Different ADC MOD CLK and PDM CLK in dynamic pupd
2-0	RESERVED	R	0x0	Reserved bits; Write only reset value

**7.1.99 PWR\_CFG Register (Address = 0x78) [Reset = 0x00]**

PWR\_CFG is shown in [Figure 7-99](#) and described in [Table 7-100](#).

Return to the [Summary Table](#).

This register is the power-up configuration register.

**Figure 7-99. PWR\_CFG Register**

7	6	5	4	3	2	1	0
ADC_PDZ	DAC_PDZ	MICBIAS_PDZ	RESERVED	UAD_EN	VAD_EN	UAG_EN	RESERVED
R/W-0b	R/W-0b	R/W-0b	R-0b	R/W-0b	R/W-0b	R/W-0b	R-0b

**Table 7-100. PWR\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	ADC_PDZ	R/W	0x0	Power control for ADC and PDM channels. 0d = Power down all ADC and PDM channels 1d = Power up all enabled ADC and PDM channels
6	DAC_PDZ	R/W	0x0	Power control for DAC channels. 0d = Power down all DAC channels 1d = Power up all enabled DAC channels
5	MICBIAS_PDZ	R/W	0x0	Power control for MICBIAS. 0d = Power down MICBIAS 1d = Power up MICBIAS
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3	UAD_EN	R/W	0x0	Enable ultrasound activity detection (UAD) algorithm. 0d = UAD is disabled 1d = UAD is enabled
2	VAD_EN	R/W	0x0	Enable voice activity detection (VAD) algorithm. 0d = VAD is disabled 1d = VAD is enabled
1	UAG_EN	R/W	0x0	Enable ultrasound activity detection (UAG) algorithm. 0d = UAG is disabled 1d = UAG is enabled
0	RESERVED	R	0x0	Reserved bit; Write only reset value

ADVANCE INFORMATION

**7.1.100 DEV\_STS0 Register (Address = 0x79) [Reset = 0x00]**

DEV\_STS0 is shown in [Figure 7-100](#) and described in [Table 7-101](#).

Return to the [Summary Table](#).

This register is the device status value register 0.

**Figure 7-100. DEV\_STS0 Register**

7	6	5	4	3	2	1	0
IN_CH1_STATU S	IN_CH2_STATU S	IN_CH3_STATU S	IN_CH4_STATU S	OUT_CH1_STA TUS	OUT_CH2_STA TUS	OUT_CH3_STA TUS	OUT_CH4_STA TUS
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b

**Table 7-101. DEV\_STS0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	IN_CH1_STATUS	R	0x0	ADC or PDM channel 1 power status. 0d = ADC or PDM channel is powered down 1d = ADC or PDM channel is powered up
6	IN_CH2_STATUS	R	0x0	ADC or PDM channel 2 power status. 0d = ADC or PDM channel is powered down 1d = ADC or PDM channel is powered up
5	IN_CH3_STATUS	R	0x0	ADC or PDM channel 1 power status. 0d = ADC or PDM channel is powered down 1d = ADC or PDM channel is powered up

**Table 7-101. DEV\_STS0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4	IN_CH4_STATUS	R	0x0	ADC or PDM channel 2 power status. 0d = ADC or PDM channel is powered down 1d = ADC or PDM channel is powered up
3	OUT_CH1_STATUS	R	0x0	DAC channel 1 power status. 0d = DAC channel is powered down 1d = DAC channel is powered up
2	OUT_CH2_STATUS	R	0x0	DAC channel 2 power status. 0d = DAC channel is powered down 1d = DAC channel is powered up
1	OUT_CH3_STATUS	R	0x0	DAC channel 3 power status. 0d = DAC channel is powered down 1d = DAC channel is powered up
0	OUT_CH4_STATUS	R	0x0	DAC channel 4 power status. 0d = DAC channel is powered down 1d = DAC channel is powered up

**7.1.101 DEV\_STS1 Register (Address = 0x7A) [Reset = 0x80]**

DEV\_STS1 is shown in [Figure 7-101](#) and described in [Table 7-102](#).

Return to the [Summary Table](#).

This register is the device status value register 1.

**Figure 7-101. DEV\_STS1 Register**

7	6	5	4	3	2	1	0
MODE_STS[2:0]			PLL_STS	MICBIAS_STS	BOOST_STS	CHx_PD_FLT_STS	ALL_CHx_PD_FLT_STS
R-100b			R-0b	R-0b	R-0b	R-0b	R-0b

**Table 7-102. DEV\_STS1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-5	MODE_STS[2:0]	R	0x4	Device mode status. 0-3d = Reserved 4d = Device is in sleep mode or software shutdown mode 5d = Reserved 6d = Device is in active mode with all record and playback channels turned off 7d = Device is in active mode with at least one record or playback channel turned on
4	PLL_STS	R	0x0	PLL status. 0d = PLL is not enabled 1d = PLL is enabled
3	MICBIAS_STS	R	0x0	MICBIAS status. 0d = MICBIAS is disabled 1d = MICBIAS is enabled
2	BOOST_STS	R	0x0	Boost status. 0d = Boost is disabled 1d = Boost is enabled
1	CHx_PD_FLT_STS	R	0x0	Status for PD on INxx Analog inputs faults 0d = No ADC Channel is Powered Down due to fault/s on Analog inputs INxx 1d = Some ADC Channel is Powered Down due to fault/s on Analog inputs INxx

**Table 7-102. DEV\_STS1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
0	ALL_CHx_PD_FLT_STS	R	0x0	Status for PD on Micbias faults 0d = No ADC Channel is Powered Down due to fault/s related to Micbias 1d = All ADC Channels are Powered Down due to fault/s related to Micbias

**7.1.102 I2C\_CKSUM Register (Address = 0x7E) [Reset = 0x00]**

I2C\_CKSUM is shown in [Figure 7-102](#) and described in [Table 7-103](#).

Return to the [Summary Table](#).

This register returns the I<sup>2</sup>C transactions checksum value.

**Figure 7-102. I2C\_CKSUM Register**

7	6	5	4	3	2	1	0
I2C_CKSUM[7:0]							
R/W-00000000b							

**Table 7-103. I2C\_CKSUM Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	I2C_CKSUM[7:0]	R/W	0x0	These bits return the I <sup>2</sup> C transactions checksum value. Writing to this register resets the checksum to the written value. This register is updated on writes to other registers on all pages.

## 7.2 Page 1 Registers

Table 7-104 lists the memory-mapped registers for the Page 1 registers. All register offset addresses not listed in Table 7-104 should be considered as reserved locations and the register contents should not be modified.

**Table 7-104. PAGE 1 Registers**

Address	Acronym	Register Name	Reset Value	Section
0x0	PAGE_CFG	Device page register	0x00	<a href="#">Section 7.2.1</a>
0x3	DSP_CFG0		0x00	<a href="#">Section 7.2.2</a>
0xD	CLK_CFG0		0x00	<a href="#">Section 7.2.3</a>
0xE	CHANNEL_CFG1		0x00	<a href="#">Section 7.2.4</a>
0xF	CHANNEL_CFG2		0x00	<a href="#">Section 7.2.5</a>
0x17	SRC_CFG0	SRC configuration register 1	0x00	<a href="#">Section 7.2.6</a>
0x18	SRC_CFG1	SRC configuration register 2	0x00	<a href="#">Section 7.2.7</a>
0x19	JACK_DET_CFG0	JACK DET configuration register 0	0x00	<a href="#">Section 7.2.8</a>
0x1A	JACK_DET_CFG1	JACK DET configuration register 1	0x00	<a href="#">Section 7.2.9</a>
0x1B	JACK_DET_CFG2	JACK DET configuration register 2	0x00	<a href="#">Section 7.2.10</a>
0x1C	JACK_DET_CFG3	JACK DET configuration register 3	0x00	<a href="#">Section 7.2.11</a>
0x1E	LPAD_CFG1	LPAD	0x20	<a href="#">Section 7.2.12</a>
0x1F	LPSG_CFG1	LPSG	0x80	<a href="#">Section 7.2.13</a>
0x20	LPAD_LPSG_CFG1	LPAD and LPSG common configuration register 1	0x00	<a href="#">Section 7.2.14</a>
0x23	LIMITER_CFG	Limiter configuration register 2	0x00	<a href="#">Section 7.2.15</a>
0x24	AGC_DRC_CFG	AGC_DRC configuration register 2	0x00	<a href="#">Section 7.2.16</a>
0x2B	PLIM_CFG0	PLIM configuration register 0	0x00	<a href="#">Section 7.2.17</a>
0x2C	MIXER_CFG0	MISC configuration register 0	0x00	<a href="#">Section 7.2.18</a>
0x2D	MISC_CFG0	MISC configuration register 0	0x00	<a href="#">Section 7.2.19</a>
0x2E	BRWNOUT		0xBF	<a href="#">Section 7.2.20</a>
0x2F	INT_MASK0	Interrupt Mask Register-0	0xFF	<a href="#">Section 7.2.21</a>
0x30	INT_MASK1	Interrupt Mask Register-1	0x0F	<a href="#">Section 7.2.22</a>
0x31	INT_MASK2	Interrupt Mask Register-2	0x00	<a href="#">Section 7.2.23</a>
0x32	INT_MASK4	Interrupt Mask Register-3	0x00	<a href="#">Section 7.2.24</a>
0x33	INT_MASK5	Interrupt Mask Register-3	0x30	<a href="#">Section 7.2.25</a>
0x34	INT_LTCH0	Latched Interrupt Readback Register-0	0x00	<a href="#">Section 7.2.26</a>
0x35	CHx_LTCH	Summary of Diagnostics	0x00	<a href="#">Section 7.2.27</a>
0x36	IN_CH1_LTCH		0x00	<a href="#">Section 7.2.28</a>
0x37	IN_CH2_LTCH		0x00	<a href="#">Section 7.2.29</a>
0x38	OUT_CH1_LTCH		0x00	<a href="#">Section 7.2.30</a>
0x39	OUT_CH2_LTCH		0x00	<a href="#">Section 7.2.31</a>
0x3A	INT_LTCH1	Latched Interrupt Readback Register-0	0x00	<a href="#">Section 7.2.32</a>
0x3B	INT_LTCH2	Latched Interrupt Readback Register-3	0x00	<a href="#">Section 7.2.33</a>
0x3C	INT_LIVE0	Live Interrupt Readback Register-0	0x00	<a href="#">Section 7.2.34</a>
0x3D	CHx_LIVE	Summary of Diagnostics	0x00	<a href="#">Section 7.2.35</a>
0x3E	IN_CH1_LIVE		0x00	<a href="#">Section 7.2.36</a>
0x3F	IN_CH2_LIVE		0x00	<a href="#">Section 7.2.37</a>
0x40	OUT_CH1_LIVE		0x00	<a href="#">Section 7.2.38</a>
0x41	OUT_CH2_LIVE		0x00	<a href="#">Section 7.2.39</a>
0x42	INT_LIVE1	Latched Interrupt Readback Register-0	0x00	<a href="#">Section 7.2.40</a>
0x43	INT_LIVE2	Latched Interrupt Readback Register-3	0x00	<a href="#">Section 7.2.41</a>

Table 7-104. PAGE 1 Registers (continued)

Address	Acronym	Register Name	Reset Value	Section
0x46	DIAG_CFG0		0x00	<a href="#">Section 7.2.42</a>
0x47	DIAG_CFG1		0x37	<a href="#">Section 7.2.43</a>
0x48	DIAG_CFG2		0x87	<a href="#">Section 7.2.44</a>
0x4A	DIAG_CFG4		0xB8	<a href="#">Section 7.2.45</a>
0x4B	DIAG_CFG5		0x00	<a href="#">Section 7.2.46</a>
0x4C	DIAG_CFG6		0xA2	<a href="#">Section 7.2.47</a>
0x4D	DIAG_CFG7		0x48	<a href="#">Section 7.2.48</a>
0x4E	DIAG_CFG8		0xBA	<a href="#">Section 7.2.49</a>
0x4F	DIAG_CFG9		0x4B	<a href="#">Section 7.2.50</a>
0x50	DIAG_CFG10		0x88	<a href="#">Section 7.2.51</a>
0x51	DIAG_CFG11		0x40	<a href="#">Section 7.2.52</a>
0x52	DIAG_CFG12		0x44	<a href="#">Section 7.2.53</a>
0x53	DIAG_CFG13		0x00	<a href="#">Section 7.2.54</a>
0x54	DIAG_CFG14		0x48	<a href="#">Section 7.2.55</a>
0x56	DIAG_MON_MSB_VBAT		0x00	<a href="#">Section 7.2.56</a>
0x57	DIAG_MON_LSB_VBAT		0x00	<a href="#">Section 7.2.57</a>
0x58	DIAG_MON_MSB_MBIAS		0x00	<a href="#">Section 7.2.58</a>
0x59	DIAG_MON_LSB_MBIAS		0x01	<a href="#">Section 7.2.59</a>
0x5A	DIAG_MON_MSB_IN1P		0x00	<a href="#">Section 7.2.60</a>
0x5B	DIAG_MON_LSB_IN1P		0x02	<a href="#">Section 7.2.61</a>
0x5C	DIAG_MON_MSB_IN1M		0x00	<a href="#">Section 7.2.62</a>
0x5D	DIAG_MON_LSB_IN1M		0x03	<a href="#">Section 7.2.63</a>
0x5E	DIAG_MON_MSB_IN2P		0x00	<a href="#">Section 7.2.64</a>
0x5F	DIAG_MON_LSB_IN2P		0x04	<a href="#">Section 7.2.65</a>
0x60	DIAG_MON_MSB_IN2M		0x00	<a href="#">Section 7.2.66</a>
0x61	DIAG_MON_LSB_IN2M		0x05	<a href="#">Section 7.2.67</a>
0x62	DIAG_MON_MSB_OUT1P		0x00	<a href="#">Section 7.2.68</a>
0x63	DIAG_MON_LSB_OUT1P		0x06	<a href="#">Section 7.2.69</a>
0x64	DIAG_MON_MSB_OUT1M		0x00	<a href="#">Section 7.2.70</a>
0x65	DIAG_MON_LSB_OUT1M		0x07	<a href="#">Section 7.2.71</a>
0x66	DIAG_MON_MSB_OUT2P		0x00	<a href="#">Section 7.2.72</a>
0x67	DIAG_MON_LSB_OUT2P		0x08	<a href="#">Section 7.2.73</a>
0x68	DIAG_MON_MSB_OUT2M		0x00	<a href="#">Section 7.2.74</a>
0x69	DIAG_MON_LSB_OUT2M		0x09	<a href="#">Section 7.2.75</a>
0x6A	DIAG_MON_MSB_TEMP		0x00	<a href="#">Section 7.2.76</a>
0x6B	DIAG_MON_LSB_TEMP		0x0A	<a href="#">Section 7.2.77</a>
0x6C	DIAG_MON_MSB_MBIAS_LOAD		0x00	<a href="#">Section 7.2.78</a>
0x6D	DIAG_MON_LSB_MBIAS_LOAD		0x0B	<a href="#">Section 7.2.79</a>
0x6E	DIAG_MON_MSB_AVDD		0x00	<a href="#">Section 7.2.80</a>
0x6F	DIAG_MON_LSB_AVDD		0x0C	<a href="#">Section 7.2.81</a>
0x70	DIAG_MON_MSB_GPA		0x00	<a href="#">Section 7.2.82</a>
0x71	DIAG_MON_LSB_GPA		0x0D	<a href="#">Section 7.2.83</a>
0x72	BOOST_CFG		0x00	<a href="#">Section 7.2.84</a>

**Table 7-104. PAGE 1 Registers (continued)**

Address	Acronym	Register Name	Reset Value	Section
0x73	MICBIAS_CFG		0xA0	<a href="#">Section 7.2.85</a>

### 7.2.1 PAGE\_CFG Register (Address = 0x0) [Reset = 0x00]

PAGE\_CFG is shown in [Figure 7-103](#) and described in [Table 7-105](#).

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The device memory map is divided into pages. This register sets the page.

**Figure 7-103. PAGE\_CFG Register**

7	6	5	4	3	2	1	0
PAGE[7:0]							
R/W-00000000b							

**Table 7-105. PAGE\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PAGE[7:0]	R/W	0x0	These bits set the device page. 0d = Page 0 1d = Page 1 2d to 254d = Page 2 to page 254 respectively 255d = Page 255

### 7.2.2 DSP\_CFG0 Register (Address = 0x3) [Reset = 0x00]

DSP\_CFG0 is shown in [Figure 7-104](#) and described in [Table 7-106](#).

Return to the [Summary Table](#).

**Figure 7-104. DSP\_CFG0 Register**

7	6	5	4	3	2	1	0
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	DIS_DVOL_OTF_CHG	EN_BQ_OTF_CHG
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R/W-0b	R/W-0b

**Table 7-106. DSP\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6	RESERVED	R	0x0	Reserved bit; Write only reset value
5	RESERVED	R	0x0	Reserved bit; Write only reset value
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3	RESERVED	R	0x0	Reserved bit; Write only reset value
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	DIS_DVOL_OTF_CHG	R/W	0x0	Disable run-time changes to DVOL settings. 0d = Digital volume control changes supported while ADC is powered-on 1d = Digital volume control changes not supported while ADC is powered-on. This is useful for 384 kHz and higher sample rate if more than one channel processing is required.
0	EN_BQ_OTF_CHG	R/W	0x0	Enable run-time changes to Biquad settings. 0d = Disable on the fly biquad changes 1d = Enable on the fly biquad changes

### 7.2.3 CLK\_CFG0 Register (Address = 0xD) [Reset = 0x00]

CLK\_CFG0 is shown in [Figure 7-105](#) and described in [Table 7-107](#).

Return to the [Summary Table](#).

**Figure 7-105. CLK\_CFG0 Register**

7		6		5		4		3		2		1		0	
CNT_TGT_CFG_OVR_PASI		CNT_TGT_CFG_OVR_SASI		RESERVED		RESERVED		PASI_USE_INT_FSYNC		SASI_USE_INT_FSYNC		RESERVED			
R/W-0b		R/W-0b		R-0b		R-00b		R/W-0b		R/W-0b		R-0b			

**Table 7-107. CLK\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	CNT_TGT_CFG_OVR_PASI	R/W	0x0	ASI controller target Config Override Register 0d = controller-target Config as per PASI_CNT_CFG bit. 1d = Override the standard behavior of the PASI_CNT_CFG. In this case the clock auto detect feature is not available. PASI_CNT_CFG = 0 : BCLK is input but FSYNC is output. PASI_CNT_CFG = 1 : BCLK is output but FSYNC in input.
6	CNT_TGT_CFG_OVR_SASI	R/W	0x0	ASI controller target Config Override Register 0d = controller-target Config as per SASI_CNT_CFG bit. 1d = Override the standard behavior of the SASI_CNT_CFG. In this case the clock auto detect feature is not available. SASI_CNT_CFG = 0 : BCLK is input but FSYNC is output. SASI_CNT_CFG = 1 : BCLK is output but FSYNC in input.
5	RESERVED	R	0x0	Reserved bit; Write only reset value
4-3	RESERVED	R	0x0	Reserved bits; Write only reset values
2	PASI_USE_INT_FSYNC	R/W	0x0	For Primary use internal FSYNC in controller mode configuration. 0d = Use external FSYNC 1d = Use internal FSYNC
1	SASI_USE_INT_FSYNC	R/W	0x0	For Secondary use internal FSYNC in controller mode configuration. 0d = Use external FSYNC 1d = Use internal FSYNC
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.4 CHANNEL\_CFG1 Register (Address = 0xE) [Reset = 0x00]

CHANNEL\_CFG1 is shown in [Figure 7-106](#) and described in [Table 7-108](#).

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**Figure 7-106. CHANNEL\_CFG1 Register**

7		6		5		4		3		2		1		0	
FORCE_DYN_MODE_CUST_MAX_CH				DYN_MODE_CUST_MAX_CH[3:0]								RESERVED			
R/W-0b				R/W-0000b								R-000b			

**Table 7-108. CHANNEL\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	FORCE_DYN_MODE_CUST_MAX_CH	R/W	0x0	ADC Force dynamic mode custom max channel 0d = In Dynamic, Max channel is based on ADC_DYN_MAXCH_SEL 1d = In Dynamic mode, max channel is custom as DYN_MODE_CUST_MAX_CH

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**Table 7-108. CHANNEL\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
6-3	DYN_MODE_CUST_MAX_CH[3:0]	R/W	0x0	ADC Dynamic mode custom max channel configuration [3]->CH4_EN [2]->CH3_EN [1]->CH2_EN [0]->CH1_EN
2-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.5 CHANNEL\_CFG2 Register (Address = 0xF) [Reset = 0x00]

CHANNEL\_CFG2 is shown in [Figure 7-107](#) and described in [Table 7-109](#).

Return to the [Summary Table](#).

**Figure 7-107. CHANNEL\_CFG2 Register**

7	6	5	4	3	2	1	0
DAC_FORCE_DYN_MODE_CUST_MAX_CH	DAC_DYN_MODE_CUST_MAX_CH[3:0]				RESERVED		
R/W-0b	R/W-0000b				R-000b		

**Table 7-109. CHANNEL\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	DAC_FORCE_DYN_MODE_CUST_MAX_CH	R/W	0x0	DAC Force dynamic mode custom max channel 0d = In Dynamic, Max channel is based on DAC_DYN_MAXCH_SEL 1d = In Dynamic mode, max channel is custom as per DAC_DYN_MODE_CUST_MAX_CH
6-3	DAC_DYN_MODE_CUST_MAX_CH[3:0]	R/W	0x0	DAC Dynamic mode custom max channel configuration ([3]->CH4_EN, [2]->CH3_EN, [1]->CH2_EN, [0]->CH1_EN) [3]->CH4_EN [2]->CH3_EN [1]->CH2_EN [0]->CH1_EN
2-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.6 SRC\_CFG0 Register (Address = 0x17) [Reset = 0x00]

SRC\_CFG0 is shown in [Figure 7-108](#) and described in [Table 7-110](#).

Return to the [Summary Table](#).

This register is configuration register 1 for SRC.

**Figure 7-108. SRC\_CFG0 Register**

7	6	5	4	3	2	1	0
SRC_EN	DIS_AUTO_SRC_DET	RESERVED					
R/W-0b	R/W-0b	R-000000b					

**Table 7-110. SRC\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	SRC_EN	R/W	0x0	SRC enable config 0b = SRC disable 1b = SRC enable

**Table 7-110. SRC\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
6	DIS_AUTO_SRC_DET	R/W	0x0	SRC auto detect config 0b = SRC auto detect enabled 1b = SRC auto detect disabled
5-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.2.7 SRC\_CFG1 Register (Address = 0x18) [Reset = 0x00]

SRC\_CFG1 is shown in [Figure 7-109](#) and described in [Table 7-111](#).

Return to the [Summary Table](#).

This register is configuration register 2 for SRC.

**Figure 7-109. SRC\_CFG1 Register**

7	6	5	4	3	2	1	0
MAIN_FS_CUS TOM_CFG	MAIN_FS_SEL ECT_CFG	MAIN_AUX_RATIO_M_CUSTOM_CFG[2:0]		MAIN_AUX_RATIO_N_CUSTOM_CFG[2:0]			
R/W-0b	R/W-0b	R/W-000b		R/W-000b			

**Table 7-111. SRC\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	MAIN_FS_CUSTOM_CFG	R/W	0x0	Main Fs custom config 0b = Main Fs is auto inferred 1b = Main Fs need to be selected from MAIN_FS_SELECT_CFG
6	MAIN_FS_SELECT_CFG	R/W	0x0	Main Fs select config 0b = PASI Fs shall be used as Main Fs 1b = SASI Fs shall be used as Main Fs
5-3	MAIN_AUX_RATIO_M_C USTOM_CFG[2:0]	R/W	0x0	Main and Aux Fs Ratio m:n config 0d = m is auto inferred 1d = 1 2d = 2 3d = 3 4d = 4 5d = Reserved 6d = 6 7d = Reserved
2-0	MAIN_AUX_RATIO_N_C USTOM_CFG[2:0]	R/W	0x0	Main and Aux Fs Ratio m:n config 0d = n is auto inferred 1d = 1 2d = 2 3d = 3 4d = 4 5d = Reserved 6d = 6 7d = Reserved

### 7.2.8 JACK\_DET\_CFG0 Register (Address = 0x19) [Reset = 0x00]

JACK\_DET\_CFG0 is shown in [Figure 7-110](#) and described in [Table 7-112](#).

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This register is the JACK DET configuration register 0.

**Figure 7-110. JACK\_DET\_CFG0 Register**

7	6	5	4	3	2	1	0
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**Figure 7-110. JACK\_DET\_CFG0 Register (continued)**

JACK_DET_MONITOR_FREQ[1:0]	JACK_DET_PULSE_WIDTH	RESERVED	RESERVED	HPDET_CLOCK_SEL[1:0]	RESERVED
R/W-00b	R/W-0b	R-0b	R-0b	R/W-00b	R-0b

**Table 7-112. JACK\_DET\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	JACK_DET_MONITOR_FREQ[1:0]	R/W	0x0	Headset Detection Pulse Frequency 0d = 0.5 Hz 1d = 1 Hz 2d = 7.5 Hz 3d = 15 Hz
5	JACK_DET_PULSE_WIDTH	R/W	0x0	Detector Pulse High Width 0d = 4ms (MICBIAS PIN Cap = 1 uF) 1d = 32ms (MICBIAS PIN Cap = 10 uF)
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3	RESERVED	R	0x0	Reserved bit; Write only reset value
2-1	HPDET_CLOCK_SEL[1:0]	R/W	0x0	Headphone Detection Clock Timeperiod Select 0d = 1ms 1d = 2ms 2d = 4ms 3d = Reserved
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.9 JACK\_DET\_CFG1 Register (Address = 0x1A) [Reset = 0x00]

JACK\_DET\_CFG1 is shown in [Figure 7-111](#) and described in [Table 7-113](#).

Return to the [Summary Table](#).

This register is the JACK DET configuration register 1.

**Figure 7-111. JACK\_DET\_CFG1 Register**

7	6	5	4	3	2	1	0
RESERVED	JACK_DET_COMP_CTRL2	JACK_DET_COMP_CTRL3[1:0]	HPDET_COUPLE	HPDET_USE_2x_CURR	JACK_DET_EN	RESERVED	
R-0b	R/W-0b	R/W-00b	R/W-0b	R/W-0b	R/W-0b	R-0b	

**Table 7-113. JACK\_DET\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6	JACK_DET_COMP_CTRL2	R/W	0x0	Hook Press Threshold Control in Fixed External Resistance case, controls the choice of Lowest Microphone impedance to be supported or Highest Hook button Impedance to be supported 0d = Minimum Microphone resistance supported, R_Mic = 800 Ωs and Max Hook button impedance supported, R_Hook = 320 Ωs for AC coupled Headphones R26<3> = 0 (else, when R26<3> = 1, R_hook = 150 Ωs) 1d = Max Hook button impedance supported, R_hook = 680 Ωs and Minimum Microphone resistance supported, R_Mic = 1350 Ωs for AC coupled Headphones R26<3> = 0 (else, when R26<3> = 1, R_Mic = 1750 Ωs)

**Table 7-113. JACK\_DET\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5-4	JACK_DET_COMP_CTRL 3[1:0]	R/W	0x0	Hook Pressed Jack Insertion support, valid only for External Resistor Type P0_R25_D4 = 0 else Don't care. 0d = supports minimum Hook button impedance of 150 Ωs for Hook Pressed Jack Insertion detection 1d = supports minimum Hook button impedance of 100 Ωs for Hook Pressed Jack Insertion detection 2d = supports minimum Hook button impedance of 50 Ωs for Hook Pressed Jack Insertion detection 3d = Reserved
3	HPDET_COUPLING	R/W	0x0	Headphone detect coupling 0d = AC coupled 1d = DC coupled
2	HPDET_USE_2x_CURR	R/W	0x0	Headset detect current sel config 0d = 2x current for headphone detection disabled 1d = 2x current for headphone detection enabled
1	JACK_DET_EN	R/W	0x0	Headset Detection Enable 0d = Headset Detection Disabled 1d = Headset Detection Enabled
0	RESERVED	R	0x0	Reserved bit; Write only reset value

**7.2.10 JACK\_DET\_CFG2 Register (Address = 0x1B) [Reset = 0x00]**

JACK\_DET\_CFG2 is shown in [Figure 7-112](#) and described in [Table 7-114](#).

Return to the [Summary Table](#).

This register is the JACK DET configuration register 2.

**Figure 7-112. JACK\_DET\_CFG2 Register**

7	6	5	4	3	2	1	0
RESERVED	HPDET_DEB	JACK_DET_DEB_INSERT[2:0]		JACK_DET_DEB_REMOVAL	JACK_DET_DEB_HOOK_PRES S[1:0]		
R-0b	R/W-0b	R/W-000b		R/W-0b	R/W-00b		

**Table 7-114. JACK\_DET\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6	HPDET_DEB	R/W	0x0	Headphone Detection Debounce Programmability 0d = No Debounce 1d = Debounce of 3 detections
5-3	JACK_DET_DEB_INSERT T[2:0]	R/W	0x0	Headset Insert Detection Debounce Programmability 0d = Debounce Time = 16ms 1d = Debounce Time = 32ms 2d = Debounce Time = 64ms 3d = Debounce Time = 128ms 4d = Debounce Time = 256ms 5d = Debounce Time = 512ms 6d = Reserved. Don not use 7d = No Debounce
2	JACK_DET_DEB_REMOVAL	R/W	0x0	Headset Removal Detection Debounce Programmability 0d = Debounce of 5 detections 1d = Debounce of 3 detections
1-0	JACK_DET_DEB_HOOK_PRES S[1:0]	R/W	0x0	Hook Press Debounce config 0d = No Debounce 1d = No Debounce 2d = Debounce of 2 detections 3d = Debounce of 3 detections

### 7.2.11 JACK\_DET\_CFG3 Register (Address = 0x1C) [Reset = 0x00]

JACK\_DET\_CFG3 is shown in [Figure 7-113](#) and described in [Table 7-115](#).

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This register is the JACK DET configuration register 3.

**Figure 7-113. JACK\_DET\_CFG3 Register**

7	6	5	4	3	2	1	0
JACK_TYPE_FLAG[1:0]		HEADSET_TYPE_DET[1:0]		RESERVED			
R-00b		R-00b		R-0000b			

**Table 7-115. JACK\_DET\_CFG3 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	JACK_TYPE_FLAG[1:0]	R	0x0	Headset Jack type flag 0d = Jack is not inserted 1d = Jack is inserted without Microphone 2d = Reserved. Do not use 3d = Jack is inserted with Microphone
5-4	HEADSET_TYPE_DET[1:0]	R	0x0	Headset type 0d = Headset is not inserted 1d = Jack is inserted with mono-HS (RIGHT) 2d = Jack is inserted with mono-HS (LEFT) 3d = Jack is inserted with stereo-HS
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.2.12 LPAD\_CFG1 Register (Address = 0x1E) [Reset = 0x20]

LPAD\_CFG1 is shown in [Figure 7-114](#) and described in [Table 7-116](#).

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Low Power Activity Detection. Voice activity detection or Ultrasonic Activity detection configuration register 1

**Figure 7-114. LPAD\_CFG1 Register**

7	6	5	4	3	2	1	0
LPAD_MODE[1:0]		LPAD_CH_SEL[1:0]		LPAD_SDOUT_INT_CFG	RESERVED	LPAD_PD_DET_EN	RESERVED
R/W-00b		R/W-10b		R/W-0b	R-0b	R/W-0b	R-0b

**Table 7-116. LPAD\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	LPAD_MODE[1:0]	R/W	0x0	Auto ADC power up / power down configuration selection. 0d = User initiated ADC power-up and ADC power-down 1d = VAD/UAD interrupt based ADC power up and ADC power down 2d = VAD/UAD interrupt based ADC power up but user initiated ADC power down Dont use
5-4	LPAD_CH_SEL[1:0]	R/W	0x2	VAD channel select. 0d = Channel 1 is monitored for VAD/UAD activity 1d = Channel 2 is monitored for VAD/UAD activity 2d = Channel 3 is monitored for VAD/UAD activity 3d = Channel 4 is monitored for VAD/UAD activity
3	LPAD_SDOUT_INT_CFG	R/W	0x0	SDOUT interrupt configuration. 0d = SDOUT pin is not enabled for interrupt function 1d = SDOUT pin is enabled to support interrupt output when channel data in not being recorded
2	RESERVED	R	0x0	Reserved bit; Write only reset value

**Table 7-116. LPAD\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
1	LPAD_PD_DET_EN	R/W	0x0	Enable ASI output data during VAD/UAD activity. 0d = VAD/UAD processing is not enabled during ADC recording 1d = VAD/UAD processing is enabled during ADC recording and VAD interrupts are generated as configured
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.13 LPSG\_CFG1 Register (Address = 0x1F) [Reset = 0x80]

LPSG\_CFG1 is shown in [Figure 7-115](#) and described in [Table 7-117](#).

Return to the [Summary Table](#).

Low Power Signal Generation configuration register 1

**Figure 7-115. LPSG\_CFG1 Register**

7	6	5	4	3	2	1	0
LPSG_CH_SEL[1:0]		RESERVED	RESERVED				
R/W-10b		R-0b	R-00000b				

**Table 7-117. LPSG\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	LPSG_CH_SEL[1:0]	R/W	0x2	LPSG channel select.- UAG 0d = UAG activity is generated on channel 1 1d = UAG activity is generated on channel 2 2d = UAG activity is generated on channel 3 3d = UAG activity is generated on channel 4
5	RESERVED	R	0x0	Reserved bit; Write only reset value
4-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.14 LPAD\_LPSG\_CFG1 Register (Address = 0x20) [Reset = 0x00]

LPAD\_LPSG\_CFG1 is shown in [Figure 7-116](#) and described in [Table 7-118](#).

Return to the [Summary Table](#).

This register is configuration register 1 for VAD/UAD/UAG.

**Figure 7-116. LPAD\_LPSG\_CFG1 Register**

7	6	5	4	3	2	1	0
LPAD_LPSG_CLK_CFG[1:0]		LPAD_LPSG_EXT_CLK_CFG[1:0]		RESERVED	LPAD_PH1_EN	RESERVED	
R/W-00b		R/W-00b		R-0b	R/W-0b	R-00b	

**Table 7-118. LPAD\_LPSG\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	LPAD_LPSG_CLK_CFG[1:0]	R/W	0x0	Clock select for VAD/UAD/UAG 0d = VAD/UAD/UAG processing using internal oscillator clock 1d = VAD/UAD/UAG processing using external clock on BCLK input 2d = VAD/UAD/UAG processing using external clock on CCLK input 3d = Custom clock configuration based on CNT_CFG, CLK_SRC and CLKGEN_CFG registers in page 0

**Table 7-118. LPAD\_LPSG\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5-4	LPAD_LPSG_EXT_CLK_CFG[1:0]	R/W	0x0	Clock configuration using external clock for VAD/UAD/UAG 0d = External clock is 24.576 MHz 1d = External clock is 6.144 MHz 2d = External clock is 12.288 MHz 3d = External clock is 18.432 MHz
3	RESERVED	R	0x0	Reserved bit; Write only reset value
2	LPAD_PH1_EN	R/W	0x0	Enable LPAD Phase 1 detection through Jack Detection comparator. 0d = LPAD phase 1 disabled 1d = LPAD phase 1 enabled
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.15 LIMITER\_CFG Register (Address = 0x23) [Reset = 0x00]

LIMITER\_CFG is shown in [Figure 7-117](#) and described in [Table 7-119](#).

Return to the [Summary Table](#).

This register is configuration register 2 for Limiter.

**Figure 7-117. LIMITER\_CFG Register**

7	6	5	4	3	2	1	0
LIMITER_INP_SEL[1:0]		LIMITER_OUT_SEL[1:0]		RESERVED			
R/W-00b		R/W-00b		R-0000b			

**Table 7-119. LIMITER\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	LIMITER_INP_SEL[1:0]	R/W	0x0	Limiter input select config 0d = max(dacin_ch0, dacin_ch1) 1d = dacin_ch1 2d = dacin_ch0 3d = avg(dacin_ch0, dacin_ch1)
5-4	LIMITER_OUT_SEL[1:0]	R/W	0x0	Limiter output select config 0d = applied on both 1d = dacin_ch1 2d = dacin_ch0 3d = applied none
3-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.16 AGC\_DRC\_CFG Register (Address = 0x24) [Reset = 0x00]

AGC\_DRC\_CFG is shown in [Figure 7-118](#) and described in [Table 7-120](#).

Return to the [Summary Table](#).

This register is configuration register 2 for AGC\_DRC.

**Figure 7-118. AGC\_DRC\_CFG Register**

7	6	5	4	3	2	1	0
AGC_CH1_EN	AGC_CH2_EN	AGC_CH3_EN	AGC_CH4_EN	DRC_CH1_EN	DRC_CH2_EN	DRC_CH3_EN	DRC_CH4_EN
R/W-0b							

**Table 7-120. AGC\_DRC\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	AGC_CH1_EN	R/W	0x0	AGC Channel 1 enable config 0d = disable 1d = enable
6	AGC_CH2_EN	R/W	0x0	AGC Channel 2 enable config 0d = disable 1d = enable
5	AGC_CH3_EN	R/W	0x0	AGC Channel 3 enable config 0d = disable 1d = enable
4	AGC_CH4_EN	R/W	0x0	AGC Channel 4 enable config 0d = disable 1d = enable
3	DRC_CH1_EN	R/W	0x0	DRC Channel 1 enable config 0d = disable 1d = enable
2	DRC_CH2_EN	R/W	0x0	DRC Channel 2 enable config 0d = disable 1d = enable
1	DRC_CH3_EN	R/W	0x0	DRC Channel 3 enable config 0d = disable 1d = enable
0	DRC_CH4_EN	R/W	0x0	DRC Channel 4 enable config 0d = disable 1d = enable

**7.2.17 PLIM\_CFG0 Register (Address = 0x2B) [Reset = 0x00]**

PLIM\_CFG0 is shown in [Figure 7-119](#) and described in [Table 7-121](#).

Return to the [Summary Table](#).

This register is configuration register 0 for PLIM.

**Figure 7-119. PLIM\_CFG0 Register**

7	6	5	4	3	2	1	0
EN_PLIM	PLIM_ATT_N_VAL[2:0]			PLIM_BY_SAR_GPA	PLIM_RECOVER_Y	RESERVED	
R/W-0b	R/W-000b			R/W-0b	R/W-0b	R-00b	

**Table 7-121. PLIM\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	EN_PLIM	R/W	0x0	Enable PLIM 0d = Disable 1d = Enable
6-4	PLIM_ATT_N_VAL[2:0]	R/W	0x0	PLIM attenuation factor 0d = 0dB 1d = -6dB 2d = -12dB 3d = -18dB 4d = -24dB 5d = -30dB 6d = -36dB 7d = -42dB
3	PLIM_BY_SAR_GPA	R/W	0x0	PLIM attenuation value source 0d = Plimit attenuation based on GPIO and reg_plimi_attn_val 1d = Plimit attenuation based on GPA Analog voltage. LUT will map SAR ADC data to Attenuation factor

**Table 7-121. PLIM\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
2	PLIM_RECOVERY	R/W	0x0	PLIM attenuation recovery 0d = Plimit func doesn't recover. It stays at same attenuation level or can apply more attenuation if required 1d = Plimit func recovers (reduces the attenuation) if "gpio_val=0" or "sar_adc_gpa" data suggest that Battery Voltage has recovered then we can reduce the attenuation being applied
1-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.2.18 MIXER\_CFG0 Register (Address = 0x2C) [Reset = 0x00]

MIXER\_CFG0 is shown in [Figure 7-120](#) and described in [Table 7-122](#).

Return to the [Summary Table](#).

This register is the MISC configuration register 0.

**Figure 7-120. MIXER\_CFG0 Register**

7	6	5	4	3	2	1	0
EN_DAC_ASI_MIXER	EN_SIDE_CHAIN_MIXER	EN_ADC_CHANNEL_MIXER	EN_LOOPBACK_MIXER	RESERVED			
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R-0000b			

**Table 7-122. MIXER\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	EN_DAC_ASI_MIXER	R/W	0x0	Enable DAC ASI Mixer 0b = Disabled 1b = Enabled
6	EN_SIDE_CHAIN_MIXER	R/W	0x0	Enable Side Chain Mixer 0b = Disabled 1b = Enabled
5	EN_ADC_CHANNEL_MIXER	R/W	0x0	Enable ADC Channel Mixer 0b = Disabled 1b = Enabled
4	EN_LOOPBACK_MIXER	R/W	0x0	Enable Loopback Mixer 0b = Disabled 1b = Enabled
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.2.19 MISC\_CFG0 Register (Address = 0x2D) [Reset = 0x00]

MISC\_CFG0 is shown in [Figure 7-121](#) and described in [Table 7-123](#).

Return to the [Summary Table](#).

This register is the MISC configuration register 0.

**Figure 7-121. MISC\_CFG0 Register**

7	6	5	4	3	2	1	0
EN_DISTORTION	EN_BOP	EN_THERMAL_FOLDBACK	EN_DRC	DAC_SIGNAL_GENERATOR_1_ENABLE	DAC_SIGNAL_GENERATOR_2_ENABLE	DSP_VBAT_AV_DD_SEL	BRWNOUT_EN
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-123. MISC\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	EN_DISTORTION	R/W	0x0	Distortion Limiter enable config 0b = Distortion Limiter disable 1b = Distortion Limiter enable
6	EN_BOP	R/W	0x0	BOP enable config 0b = BOP disable 1b = BOP enable
5	EN_THERMAL_FOLDBACK	R/W	0x0	Thermal Foldback enable config 0b = Thermal Foldback disable 1b = Thermal Foldback enable
4	EN_DRC	R/W	0x0	DRC enable config 0b = DRC disable 1b = DRC enable
3	DAC_SIGNAL_GENERATOR_1_ENABLE	R/W	0x0	DAC signal generator 1 enable config 0b = Signal generator disabled 1b = Signal generator enabled
2	DAC_SIGNAL_GENERATOR_2_ENABLE	R/W	0x0	DAC signal generator 2 enable config 0b = Signal generator disabled 1b = Signal generator enabled
1	DSP_VBAT_AVDD_SEL	R/W	0x0	SAR data source select for DSP Limiter, BOP, DRC 0b = SAR VBAT data to DSP 1b = SAR AVDD data to DSP
0	BRWNOUT_EN	R/W	0x0	Brownout enable config 0b = Brownout disable 1b = Brownout enable

**7.2.20 BRWNOUT Register (Address = 0x2E) [Reset = 0xBF]**

BRWNOUT is shown in [Figure 7-122](#) and described in [Table 7-124](#).

Return to the [Summary Table](#).

**Figure 7-122. BRWNOUT Register**

7	6	5	4	3	2	1	0
BRWNOUT_THRS[7:0]							
R/W-10111111b							

**Table 7-124. BRWNOUT Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	BRWNOUT_THRS[7:0]	R/W	0xBF	Threshold for brownout shutdown (IF P1_R45_D1->DSP_VBAT_AVDD_SEL=1) Default = 7.8V (~2.7V) $N_d = ((0.9 \times (N \times 16)) / 4095) - 0.211764 \times 17$ (V) $((0.9 \times (N \times 16)) / 4095) - 0.225 \times 6$ (V)

**7.2.21 INT\_MASK0 Register (Address = 0x2F) [Reset = 0xFF]**

INT\_MASK0 is shown in [Figure 7-123](#) and described in [Table 7-125](#).

Return to the [Summary Table](#).

Interrupt masks.

**Figure 7-123. INT\_MASK0 Register**

7	6	5	4	3	2	1	0
INT_MASK0	INT_MASK0	INT_MASK0	INT_MASK0	INT_MASK0	RESERVED	RESERVED	RESERVED

**Figure 7-123. INT\_MASK0 Register (continued)**

R/W-1b	R/W-1b	R/W-1b	R/W-1b	R/W-1b	R-0b	R-0b	R-0b
--------	--------	--------	--------	--------	------	------	------

**Table 7-125. INT\_MASK0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_MASK0	R/W	0x1	Clock error interrupt mask. 0b = Don't Mask 1b = Mask
6	INT_MASK0	R/W	0x1	PLL Lock interrupt mask. 0b = Don't Mask 1b = Mask
5	INT_MASK0	R/W	0x1	Boost Over Temperature interrupt mask. 0b = Don't Mask 1b = Mask
4	INT_MASK0	R/W	0x1	Boost Over Current interrupt mask. 0b = Don't Mask 1b = Mask
3	INT_MASK0	R/W	0x1	Boost MO interrupt mask. 0b = Don't Mask 1b = Mask
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.22 INT\_MASK1 Register (Address = 0x30) [Reset = 0x0F]

INT\_MASK1 is shown in [Figure 7-124](#) and described in [Table 7-126](#).

Return to the [Summary Table](#).

Interrupt masks.

**Figure 7-124. INT\_MASK1 Register**

7	6	5	4	3	2	1	0
INT_MASK1	INT_MASK1	INT_MASK1	INT_MASK1	INT_MASK1	RESERVED	RESERVED	RESERVED
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-1b	R-0b	R-0b	R-0b

**Table 7-126. INT\_MASK1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_MASK1	R/W	0x0	Channel-1 Input DC Faults Diagnostic Interrupt Mask. 0b = Don't Mask 1b = Mask
6	INT_MASK1	R/W	0x0	Channel-2 Input DC Faults Diagnostic Interrupt Mask. 0b = Don't Mask 1b = Mask
5	INT_MASK1	R/W	0x0	Channel-1 Output DC Faults Diagnostic Interrupt Mask. 0b = Don't Mask 1b = Mask
4	INT_MASK1	R/W	0x0	Channel-2 Output DC Faults Diagnostic Interrupt Mask. 0b = Don't Mask 1b = Mask
3	INT_MASK1	R/W	0x1	Input Faults Diagnostic Interrupt Mask for "Short to VBAT_IN" detect when VBAT_IN Voltage is less than MICBIAS Voltage. 0b = Don't Mask 1b = Mask
2	RESERVED	R	0x0	Reserved bit; Write only reset value

**Table 7-126. INT\_MASK1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.23 INT\_MASK2 Register (Address = 0x31) [Reset = 0x00]

INT\_MASK2 is shown in [Figure 7-125](#) and described in [Table 7-127](#).

Return to the [Summary Table](#).

Interrupt masks.

**Figure 7-125. INT\_MASK2 Register**

7	6	5	4	3	2	1	0
INT_MASK2							
R/W-0b							

**Table 7-127. INT\_MASK2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_MASK2	R/W	0x0	Input Diagnostics - Open Inputs Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
6	INT_MASK2	R/W	0x0	Input Diagnostics - Inputs Shorted Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
5	INT_MASK2	R/W	0x0	Input Diagnostics - INP Shorted to GND Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
4	INT_MASK2	R/W	0x0	Input Diagnostics - INM Shorted to GND Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
3	INT_MASK2	R/W	0x0	Input Diagnostics - INP Shorted to MICBIAS Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
2	INT_MASK2	R/W	0x0	Input Diagnostics - INM Shorted to MICBIAS Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
1	INT_MASK2	R/W	0x0	Input Diagnostics - INP Shorted to VBAT_IN Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
0	INT_MASK2	R/W	0x0	Input Diagnostics - INM Shorted to VBAT_IN Fault Interrupt Mask. 0b = Don't Mask 1b = Mask

### 7.2.24 INT\_MASK4 Register (Address = 0x32) [Reset = 0x00]

INT\_MASK4 is shown in [Figure 7-126](#) and described in [Table 7-128](#).

Return to the [Summary Table](#).

Interrupt masks.

**Figure 7-126. INT\_MASK4 Register**

7	6	5	4	3	2	1	0
INT_MASK4	RESERVED						
R/W-0b	R-0b						

**Figure 7-126. INT\_MASK4 Register (continued)**

**Table 7-128. INT\_MASK4 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_MASK4	R/W	0x0	INP overvoltage fault mask. 0b = Don't Mask 1b = Mask
6	INT_MASK4	R/W	0x0	INM overvoltage fault mask. 0b = Don't Mask 1b = Mask
5	INT_MASK4	R/W	0x0	OUT Short Circuit Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
4	INT_MASK4	R/W	0x0	DRVR Virtual Ground Fault Interrupt Mask. 0b = Don't Mask 1b = Mask
3	INT_MASK4	R/W	0x0	Headset insert detection interrupt mask. 0b = Don't Mask 1b = Mask
2	INT_MASK4	R/W	0x0	Headset remove detection interrupt mask. 0b = Don't Mask 1b = Mask
1	INT_MASK4	R/W	0x0	Headset detection hook(button) interrupt mask. 0b = Don't Mask 1b = Mask
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.25 INT\_MASK5 Register (Address = 0x33) [Reset = 0x30]

INT\_MASK5 is shown in [Figure 7-127](#) and described in [Table 7-129](#).

Return to the [Summary Table](#).

Interrupt masks.

**Figure 7-127. INT\_MASK5 Register**

7	6	5	4	3	2	1	0
INT_MASK5							
R/W-0b	R/W-0b	R/W-1b	R/W-1b	R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-129. INT\_MASK5 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_MASK5	R/W	0x0	GPA up threshold fault mask. 0b = Don't Mask 1b = Mask
6	INT_MASK5	R/W	0x0	GPA low threshold fault mask. 0b = Don't Mask 1b = Mask
5	INT_MASK5	R/W	0x1	VAD power up detect interrupt mask. 0b = Don't Mask 1b = Mask
4	INT_MASK5	R/W	0x1	VAD power down detect interrupt mask. 0b = Don't Mask 1b = Mask
3	INT_MASK5	R/W	0x0	Micbias short circuit fault mask. 0b = Don't Mask 1b = Mask

**Table 7-129. INT\_MASK5 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
2	INT_MASK5	R/W	0x0	Micbias High current fault mask. 0b = Don't Mask 1b = Mask
1	INT_MASK5	R/W	0x0	Micbias Low current fault mask. 0b = Don't Mask 1b = Mask
0	INT_MASK5	R/W	0x0	Micbias Over voltage fault mask. 0b = Don't Mask 1b = Mask

### 7.2.26 INT\_LTCH0 Register (Address = 0x34) [Reset = 0x00]

INT\_LTCH0 is shown in [Figure 7-128](#) and described in [Table 7-130](#).

Return to the [Summary Table](#).

Latched interrupt readback.

**Figure 7-128. INT\_LTCH0 Register**

7	6	5	4	3	2	1	0
INT_LTCH0	INT_LTCH0	INT_LTCH0	INT_LTCH0	INT_LTCH0	RESERVED	RESERVED	RESERVED
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b

**Table 7-130. INT\_LTCH0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_LTCH0	R	0x0	Interrupt due to clock error (self clearing bit). 0b = No interrupt 1b = Interrupt
6	INT_LTCH0	R	0x0	Interrupt due to PLL Lock (self clearing bit) 0b = No interrupt 1b = Interrupt
5	INT_LTCH0	R	0x0	Interrupt due to Boost Over Temperature (self clearing bit). 0b = No interrupt 1b = Interrupt
4	INT_LTCH0	R	0x0	Interrupt due to Boost Over Current.(self clearing bit). 0b = No interrupt 1b = Interrupt
3	INT_LTCH0	R	0x0	Interrupt due to Boost MO. (self clearing bit). 0b = No interrupt 1b = Interrupt
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.27 CHx\_LTCH Register (Address = 0x35) [Reset = 0x00]

CHx\_LTCH is shown in [Figure 7-129](#) and described in [Table 7-131](#).

Return to the [Summary Table](#).

Channel level Diagnostics Latched Status

**Figure 7-129. CHx\_LTCH Register**

7	6	5	4	3	2	1	0
---	---	---	---	---	---	---	---

**Figure 7-129. CHx\_LTCH Register (continued)**

STS_CHx_LTC H	STS_CHx_LTC H	STS_CHx_LTC H	STS_CHx_LTC H	STS_CHx_LTC H	RESERVED	RESERVED	RESERVED
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b

**Table 7-131. CHx\_LTCH Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	STS_CHx_LTCH	R	0x0	Status of Input CH1_LTCH. 0b = No faults occurred in input channel 1 1b = Fault or Faults have occurred in input channel 1
6	STS_CHx_LTCH	R	0x0	Status of Input CH2_LTCH. 0b = No faults occurred in input channel 2 1b = Fault or Faults have occurred in input channel 2
5	STS_CHx_LTCH	R	0x0	Status of Output CH1_LTCH. 0b = No faults occurred in output channel 1 1b = Fault or Faults have occurred in output channel 1
4	STS_CHx_LTCH	R	0x0	Status of Output CH2_LTCH. 0b = No faults occurred in output channel 2 1b = Fault or Faults have occurred in output channel 2
3	STS_CHx_LTCH	R	0x0	Status on fault due "Short to VBAT_IN fault detected when VBAT_IN is less than MICBIAS" 0b = Short to VBAT_IN fault when VBAT_IN is less than MICBIAS did NOT occur in any channel 1b = Short to VBAT_IN fault when VBAT_IN is less than MICBIAS has occurred in atleast one channel
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	RESERVED	R	0x0	Reserved bit; Write only reset value

**7.2.28 IN\_CH1\_LTCH Register (Address = 0x36) [Reset = 0x00]**

IN\_CH1\_LTCH is shown in [Figure 7-130](#) and described in [Table 7-132](#).

Return to the [Summary Table](#).

**Figure 7-130. IN\_CH1\_LTCH Register**

7	6	5	4	3	2	1	0
IN_CH1_LTCH							
R-0b							

**Table 7-132. IN\_CH1\_LTCH Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	IN_CH1_LTCH	R	0x0	Input Channel-1 Open Inputs (self clearing bit). 0b = No Open Inputs 1b = Open Inputs
6	IN_CH1_LTCH	R	0x0	Input Channel-1 Inputs Shorted (self clearing bit). 0b = No Input Shorted 1b = Input Shorted each Other
5	IN_CH1_LTCH	R	0x0	Input Channel-1 INP Shorted to GND (self clearing bit). 0b = INP not shorted to GND 1b = INP shorted to GND
4	IN_CH1_LTCH	R	0x0	Input Channel-1 INM Shorted to GND (self clearing bit). 0b = INM not shorted to GND 1b = INM shorted to GND
3	IN_CH1_LTCH	R	0x0	Input Channel-1 INP Shorted to MICBIAS (self clearing bit). 0b = INP not shorted to MICBIAS 1b = INP shorted to MICBIAS

**Table 7-132. IN\_CH1\_LTCH Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
2	IN_CH1_LTCH	R	0x0	Input Channel-1 INM Shorted to MICBIAS (self clearing bit). 0b = INM not shorted to MICBIAS 1b = INM shorted to MICBIAS
1	IN_CH1_LTCH	R	0x0	Input Channel-1 INP Shorted to VBAT_IN (self clearing bit). 0b = INP not shorted to VBAT_IN 1b = INP shorted to VBAT_IN
0	IN_CH1_LTCH	R	0x0	Input Channel-1 INM Shorted to VBAT_IN (self clearing bit). 0b = INM not shorted to VBAT_IN 1b = INM shorted to VBAT_IN

**7.2.29 IN\_CH2\_LTCH Register (Address = 0x37) [Reset = 0x00]**

IN\_CH2\_LTCH is shown in [Figure 7-131](#) and described in [Table 7-133](#).

Return to the [Summary Table](#).

**Figure 7-131. IN\_CH2\_LTCH Register**

7	6	5	4	3	2	1	0
IN_CH2_LTCH							
R-0b							

**Table 7-133. IN\_CH2\_LTCH Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	IN_CH2_LTCH	R	0x0	Input Channel-2 Open Inputs (self clearing bit). 0b = No Open Inputs 1b = Open Inputs
6	IN_CH2_LTCH	R	0x0	Input Channel-2 Inputs Shorted (self clearing bit). 0b = No Input Shorted 1b = Input Shorted each Other
5	IN_CH2_LTCH	R	0x0	Input Channel-2 INP Shorted to GND (self clearing bit). 0b = INP not shorted to GND 1b = INP shorted to GND
4	IN_CH2_LTCH	R	0x0	Input Channel-2 INM Shorted to GND (self clearing bit). 0b = INM not shorted to GND 1b = INM shorted to GND
3	IN_CH2_LTCH	R	0x0	Input Channel-2 INP Shorted to MICBIAS (self clearing bit). 0b = INP not shorted to MICBIAS 1b = INP shorted to MICBIAS
2	IN_CH2_LTCH	R	0x0	Input Channel-2 INM Shorted to MICBIAS (self clearing bit). 0b = INM not shorted to MICBIAS 1b = INM shorted to MICBIAS
1	IN_CH2_LTCH	R	0x0	Input Channel-2 INP Shorted to VBAT_IN (self clearing bit). 0b = INP not shorted to VBAT_IN 1b = INP shorted to VBAT_IN
0	IN_CH2_LTCH	R	0x0	Input Channel-2 INM Shorted to VBAT_IN (self clearing bit). 0b = INM not shorted to VBAT_IN 1b = INM shorted to VBAT_IN

**7.2.30 OUT\_CH1\_LTCH Register (Address = 0x38) [Reset = 0x00]**

OUT\_CH1\_LTCH is shown in [Figure 7-132](#) and described in [Table 7-134](#).

Return to the [Summary Table](#).

**Figure 7-132. OUT\_CH1\_LTCH Register**

7	6	5	4	3	2	1	0
OUT_CH1_LTC H	OUT_CH1_LTC H	OUT_CH1_LTC H	OUT_CH1_LTC H	MASK_ADC_C H1_OVRLD_FL AG	MASK_ADC_C H2_OVRLD_FL AG	RESERVED	
R-0b	R-0b	R-0b	R-0b	R/W-0b	R/W-0b	R-00b	

**Table 7-134. OUT\_CH1\_LTCH Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	OUT_CH1_LTCH	R	0x0	OUT1P Short Circuit Fault (self clearing bit). 0b = No short circuit fault 1b = Short circuit fault
6	OUT_CH1_LTCH	R	0x0	OUT1M Short Circuit Fault (self clearing bit). 0b = No short circuit fault 1b = Short circuit fault
5	OUT_CH1_LTCH	R	0x0	Channel 1 DRVRP Virtual Ground Fault (self clearing bit). 0b = No virtual ground fault 1b = Virtual ground fault
4	OUT_CH1_LTCH	R	0x0	Channel 1 DRVRM Virtual Ground Fault (self clearing bit). 0b = No virtual ground fault 1b = Virtual ground fault
3	MASK_ADC_CH1_OVRL D_FLAG	R/W	0x0	ADC CH1 OVRLD fault mask. 0b = Don't Mask 1b = Mask
2	MASK_ADC_CH2_OVRL D_FLAG	R/W	0x0	ADC CH2 OVRLD fault mask. 0b = Don't Mask 1b = Mask
1-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.2.31 OUT\_CH2\_LTCH Register (Address = 0x39) [Reset = 0x00]

OUT\_CH2\_LTCH is shown in [Figure 7-133](#) and described in [Table 7-135](#).

Return to the [Summary Table](#).

**Figure 7-133. OUT\_CH2\_LTCH Register**

7	6	5	4	3	2	1	0
OUT_CH2_LTC H	OUT_CH2_LTC H	OUT_CH2_LTC H	OUT_CH2_LTC H	RESERVED		MASK_AREG_ SC_FLAG	AREG_SC_FL G_LTCH
R-0b	R-0b	R-0b	R-0b	R-00b		R/W-0b	R-0b

**Table 7-135. OUT\_CH2\_LTCH Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	OUT_CH2_LTCH	R	0x0	OUT2P Short Circuit Fault (self clearing bit). 0b = No short circuit fault 1b = Short circuit fault
6	OUT_CH2_LTCH	R	0x0	OUT2M Short Circuit Fault (self clearing bit). 0b = No short circuit fault 1b = Short circuit fault
5	OUT_CH2_LTCH	R	0x0	Channel 2 DRVRP Virtual Ground Fault (self clearing bit). 0b = No virtual ground fault 1b = Virtual ground fault
4	OUT_CH2_LTCH	R	0x0	Channel 2 DRVRM Virtual Ground Fault (self clearing bit). 0b = No virtual ground fault 1b = Virtual ground fault
3-2	RESERVED	R	0x0	Reserved bits; Write only reset value

**Table 7-135. OUT\_CH2\_LTCH Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
1	MASK_AREG_SC_FLAG	R/W	0x0	AREG SC fault mask. 0b = Don't Mask 1b = Mask
0	AREG_SC_FLAG_LTCH	R	0x0	AREG SC fault (self clearing bit). 0b = No AREG short circuit fault 1b = AREG short circuit fault

### 7.2.32 INT\_LTCH1 Register (Address = 0x3A) [Reset = 0x00]

INT\_LTCH1 is shown in [Figure 7-134](#) and described in [Table 7-136](#).

Return to the [Summary Table](#).

Latched interrupt readback.

**Figure 7-134. INT\_LTCH1 Register**

7	6	5	4	3	2	1	0
INT_LTCH1							
R-0b							

**Table 7-136. INT\_LTCH1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_LTCH1	R	0x0	Channel-1 INP Over Voltage (self clearing bit). 0b = No INP Over Voltage fault 1b = INP Over Voltage fault has occurred
6	INT_LTCH1	R	0x0	Channel-1 INM Over Voltage (self clearing bit). 0b = No INM Over Voltage fault 1b = INM Over Voltage fault has occurred
5	INT_LTCH1	R	0x0	Channel-2 INP Over Voltage (self clearing bit). 0b = No INP Over Voltage fault 1b = INP Over Voltage fault has occurred
4	INT_LTCH1	R	0x0	Channel-2 INM Over Voltage (self clearing bit). 0b = No INM Over Voltage fault 1b = INM Over Voltage fault has occurred
3	INT_LTCH1	R	0x0	Interrupt due to Headset Insert Detection (self clearing bit). 0b = No interrupt 1b = Interrupt
2	INT_LTCH1	R	0x0	Interrupt due to Headset Remove Detection (self clearing bit). 0b = No interrupt 1b = Interrupt
1	INT_LTCH1	R	0x0	Interrupt due to Headset hook(button) (self clearing bit). 0b = No interrupt 1b = Interrupt
0	INT_LTCH1	R	0x0	Interrupt due to MIPS overload (self clearing bit) 0b = No interrupt 1b = Interrupt

### 7.2.33 INT\_LTCH2 Register (Address = 0x3B) [Reset = 0x00]

INT\_LTCH2 is shown in [Figure 7-135](#) and described in [Table 7-137](#).

Return to the [Summary Table](#).

Latched interrupt readback.

Figure 7-135. INT\_LTCH2 Register

7	6	5	4	3	2	1	0
INT_LTCH2							
R-0b							

Table 7-137. INT\_LTCH2 Register Field Descriptions

Bit	Field	Type	Reset	Description
7	INT_LTCH2	R	0x0	Interrupt due to GPA up threshold fault (self clearing bit). 0b = No interrupt 1b = Interrupt
6	INT_LTCH2	R	0x0	Interrupt due to GPA low threshold fault (self clearing bit) 0b = No interrupt 1b = Interrupt
5	INT_LTCH2	R	0x0	Interrupt due to VAD power up detect (self clearing bit). 0b = No interrupt 1b = Interrupt
4	INT_LTCH2	R	0x0	Interrupt due to VAD power down detect (self clearing bit). 0b = No interrupt 1b = Interrupt
3	INT_LTCH2	R	0x0	Interrupt due to Micbias short circuit condition (self clearing bit) 0b = No interrupt 1b = Interrupt
2	INT_LTCH2	R	0x0	Interrupt due to Micbias High current fault (self clearing bit). 0b = No interrupt 1b = Interrupt
1	INT_LTCH2	R	0x0	Interrupt due to Micbias Low current fault (self clearing bit) 0b = No interrupt 1b = Interrupt
0	INT_LTCH2	R	0x0	Interrupt due to Micbias Over voltage fault (self clearing bit). 0b = No interrupt 1b = Interrupt

7.2.34 INT\_LIVE0 Register (Address = 0x3C) [Reset = 0x00]

INT\_LIVE0 is shown in Figure 7-136 and described in Table 7-138.

Return to the Summary Table.

Latched interrupt readback.

Figure 7-136. INT\_LIVE0 Register

7	6	5	4	3	2	1	0
INT_LIVE0	INT_LIVE0	INT_LIVE0	INT_LIVE0	INT_LIVE0	RESERVED	RESERVED	RESERVED
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b

Table 7-138. INT\_LIVE0 Register Field Descriptions

Bit	Field	Type	Reset	Description
7	INT_LIVE0	R	0x0	Interrupt due to clock error . 0b = No interrupt 1b = Interrupt
6	INT_LIVE0	R	0x0	Interrupt due to PLL Lock 0b = No interrupt 1b = Interrupt
5	INT_LIVE0	R	0x0	Interrupt due to Boost Over Temperature . 0b = No interrupt 1b = Interrupt

**Table 7-138. INT\_LIVE0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4	INT_LIVE0	R	0x0	Interrupt due to Boost Over Current.. 0b = No interrupt 1b = Interrupt
3	INT_LIVE0	R	0x0	Interrupt due to Boost MO. . 0b = No interrupt 1b = Interrupt
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.35 CHx\_LIVE Register (Address = 0x3D) [Reset = 0x00]

CHx\_LIVE is shown in [Figure 7-137](#) and described in [Table 7-139](#).

Return to the [Summary Table](#).

Channel level Diagnostics Live Status

**Figure 7-137. CHx\_LIVE Register**

7	6	5	4	3	2	1	0
STS_CHx_LIVE	STS_CHx_LIVE	STS_CHx_LIVE	STS_CHx_LIVE	STS_CHx_LIVE	RESERVED	RESERVED	RESERVED
R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b	R-0b

**Table 7-139. CHx\_LIVE Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	STS_CHx_LIVE	R	0x0	Status of Input CH1_LIVE. 0b = No faults occurred in input channel 1 1b = Fault or Faults have occurred in input channel 1
6	STS_CHx_LIVE	R	0x0	Status of Input CH2_LIVE. 0b = No faults occurred in input channel 2 1b = Fault or Faults have occurred in input channel 2
5	STS_CHx_LIVE	R	0x0	Status of Output CH1_LIVE. 0b = No faults occurred in output channel 1 1b = Fault or Faults have occurred in output channel 1
4	STS_CHx_LIVE	R	0x0	Status of Output CH2_LIVE. 0b = No faults occurred in output channel 2 1b = Fault or Faults have occurred in output channel 2
3	STS_CHx_LIVE	R	0x0	Status on fault due "Short to VBAT_IN fault detected when VBAT_IN is less than MICBIAS" 0b = Short to VBAT_IN fault when VBAT_IN is less than MICBIAS did NOT occur in any channel 1b = Short to VBAT_IN fault when VBAT_IN is less than MICBIAS has occurred in atleast one channel
2	RESERVED	R	0x0	Reserved bit; Write only reset value
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.2.36 IN\_CH1\_LIVE Register (Address = 0x3E) [Reset = 0x00]

IN\_CH1\_LIVE is shown in [Figure 7-138](#) and described in [Table 7-140](#).

Return to the [Summary Table](#).

**Figure 7-138. IN\_CH1\_LIVE Register**

7	6	5	4	3	2	1	0
IN_CH1_LIVE							
R-0b							

**Table 7-140. IN\_CH1\_LIVE Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	IN_CH1_LIVE	R	0x0	Input Channel-1 Open Inputs . 0b = No Open Inputs 1b = Open Inputs
6	IN_CH1_LIVE	R	0x0	Input Channel-1 Inputs Shorted . 0b = No Input Shorted 1b = Input Shorted each Other
5	IN_CH1_LIVE	R	0x0	Input Channel-1 INP Shorted to GND . 0b = INP not shorted to GND 1b = INP shorted to GND
4	IN_CH1_LIVE	R	0x0	Input Channel-1 INM Shorted to GND . 0b = INM not shorted to GND 1b = INM shorted to GND
3	IN_CH1_LIVE	R	0x0	Input Channel-1 INP Shorted to MICBIAS . 0b = INP not shorted to MICBIAS 1b = INP shorted to MICBIAS
2	IN_CH1_LIVE	R	0x0	Input Channel-1 INM Shorted to MICBIAS . 0b = INM not shorted to MICBIAS 1b = INM shorted to MICBIAS
1	IN_CH1_LIVE	R	0x0	Input Channel-1 INP Shorted to VBAT_IN . 0b = INP not shorted to VBAT_IN 1b = INP shorted to VBAT_IN
0	IN_CH1_LIVE	R	0x0	Input Channel-1 INM Shorted to VBAT_IN . 0b = INM not shorted to VBAT_IN 1b = INM shorted to VBAT_IN

**7.2.37 IN\_CH2\_LIVE Register (Address = 0x3F) [Reset = 0x00]**

IN\_CH2\_LIVE is shown in [Figure 7-139](#) and described in [Table 7-141](#).

Return to the [Summary Table](#).

**Figure 7-139. IN\_CH2\_LIVE Register**

7	6	5	4	3	2	1	0
IN_CH2_LIVE							
R-0b							

**Table 7-141. IN\_CH2\_LIVE Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	IN_CH2_LIVE	R	0x0	Input Channel-2 Open Inputs . 0b = No Open Inputs 1b = Open Inputs
6	IN_CH2_LIVE	R	0x0	Input Channel-2 Inputs Shorted . 0b = No Input Shorted 1b = Input Shorted each Other
5	IN_CH2_LIVE	R	0x0	Input Channel-2 INP Shorted to GND . 0b = INP not shorted to GND 1b = INP shorted to GND
4	IN_CH2_LIVE	R	0x0	Input Channel-2 INM Shorted to GND . 0b = INM not shorted to GND 1b = INM shorted to GND

**Table 7-141. IN\_CH2\_LIVE Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3	IN_CH2_LIVE	R	0x0	Input Channel-2 INP Shorted to MICBIAS . 0b = INP not shorted to MICBIAS 1b = INP shorted to MICBIAS
2	IN_CH2_LIVE	R	0x0	Input Channel-2 INM Shorted to MICBIAS . 0b = INM not shorted to MICBIAS 1b = INM shorted to MICBIAS
1	IN_CH2_LIVE	R	0x0	Input Channel-2 INP Shorted to VBAT_IN . 0b = INP not shorted to VBAT_IN 1b = INP shorted to VBAT_IN
0	IN_CH2_LIVE	R	0x0	Input Channel-2 INM Shorted to VBAT_IN . 0b = INM not shorted to VBAT_IN 1b = INM shorted to VBAT_IN

**7.2.38 OUT\_CH1\_LIVE Register (Address = 0x40) [Reset = 0x00]**

OUT\_CH1\_LIVE is shown in [Figure 7-140](#) and described in [Table 7-142](#).

Return to the [Summary Table](#).

**Figure 7-140. OUT\_CH1\_LIVE Register**

7	6	5	4	3	2	1	0
OUT_CH1_LIV E	OUT_CH1_LIV E	OUT_CH1_LIV E	OUT_CH1_LIV E	RESERVED			
R-0b	R-0b	R-0b	R-0b	R-0000b			

**Table 7-142. OUT\_CH1\_LIVE Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	OUT_CH1_LIVE	R	0x0	OUT1P Short Circuit Fault . 0b = No short circuit fault 1b = Short circuit fault
6	OUT_CH1_LIVE	R	0x0	OUT1M Short Circuit Fault . 0b = No short circuit fault 1b = Short circuit fault
5	OUT_CH1_LIVE	R	0x0	Channel 1 DRVRP Virtual Ground Fault . 0b = No virtual ground fault 1b = Virtual ground fault
4	OUT_CH1_LIVE	R	0x0	Channel 1 DRVRM Virtual Ground Fault . 0b = No virtual ground fault 1b = Virtual ground fault
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

**7.2.39 OUT\_CH2\_LIVE Register (Address = 0x41) [Reset = 0x00]**

OUT\_CH2\_LIVE is shown in [Figure 7-141](#) and described in [Table 7-143](#).

Return to the [Summary Table](#).

**Figure 7-141. OUT\_CH2\_LIVE Register**

7	6	5	4	3	2	1	0
OUT_CH2_LIV E	OUT_CH2_LIV E	OUT_CH2_LIV E	OUT_CH2_LIV E	RESERVED			AREG_SC_FL A_G_LIVE
R-0b	R-0b	R-0b	R-0b	R-000b			R-0b

**Table 7-143. OUT\_CH2\_LIVE Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	OUT_CH2_LIVE	R	0x0	OUT2P Short Circuit Fault . 0b = No short circuit fault 1b = Short circuit fault
6	OUT_CH2_LIVE	R	0x0	OUT2M Short Circuit Fault . 0b = No short circuit fault 1b = Short circuit fault
5	OUT_CH2_LIVE	R	0x0	Channel 2 DRVRP Virtual Ground Fault . 0b = No virtual ground fault 1b = Virtual ground fault
4	OUT_CH2_LIVE	R	0x0	Channel 2 DRVRM Virtual Ground Fault . 0b = No virtual ground fault 1b = Virtual ground fault
3-1	RESERVED	R	0x0	Reserved bits; Write only reset value
0	AREG_SC_FLAG_LIVE	R	0x0	AREG SC fault . 0b = No AREG short circuit fault 1b = AREG short circuit fault

**7.2.40 INT\_LIVE1 Register (Address = 0x42) [Reset = 0x00]**

INT\_LIVE1 is shown in [Figure 7-142](#) and described in [Table 7-144](#).

Return to the [Summary Table](#).

Live interrupt readback.

**Figure 7-142. INT\_LIVE1 Register**

7	6	5	4	3	2	1	0
INT_LIVE1	RESERVED						
R-0b	R-0b						

**Table 7-144. INT\_LIVE1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_LIVE1	R	0x0	Channel-1 INP Over Voltage . 0b = No INP Over Voltage fault 1b = INP Over Voltage fault has occurred
6	INT_LIVE1	R	0x0	Channel-1 INM Over Voltage . 0b = No INM Over Voltage fault 1b = INM Over Voltage fault has occurred
5	INT_LIVE1	R	0x0	Channel-2 INP Over Voltage . 0b = No INP Over Voltage fault 1b = INP Over Voltage fault has occurred
4	INT_LIVE1	R	0x0	Channel-2 INM Over Voltage . 0b = No INM Over Voltage fault 1b = INM Over Voltage fault has occurred
3	INT_LIVE1	R	0x0	Interrupt due to Headset Insert Detection . 0b = No interrupt 1b = Interrupt
2	INT_LIVE1	R	0x0	Interrupt due to Headset Remove Detection . 0b = No interrupt 1b = Interrupt
2	INT_LIVE1	R	0x0	Interrupt due to Headset hook(button) . 0b = No interrupt 1b = Interrupt
1	INT_LIVE1	R	0x0	Interrupt due to MIPS overload 0b = No interrupt 1b = Interrupt

**Table 7-144. INT\_LIVE1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
0	RESERVED	R	0x0	

**7.2.41 INT\_LIVE2 Register (Address = 0x43) [Reset = 0x00]**

INT\_LIVE2 is shown in [Figure 7-143](#) and described in [Table 7-145](#).

Return to the [Summary Table](#).

Live interrupt readback.

**Figure 7-143. INT\_LIVE2 Register**

7	6	5	4	3	2	1	0
INT_LIVE2							
R-0b							

**Table 7-145. INT\_LIVE2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	INT_LIVE2	R	0x0	Interrupt due to GPA up threshold fault . 0b = No interrupt 1b = Interrupt
6	INT_LIVE2	R	0x0	Interrupt due to GPA low threshold fault 0b = No interrupt 1b = Interrupt
5	INT_LIVE2	R	0x0	Interrupt due to VAD power up detect . 0b = No interrupt 1b = Interrupt
4	INT_LIVE2	R	0x0	Interrupt due to VAD power down detect . 0b = No interrupt 1b = Interrupt
3	INT_LIVE2	R	0x0	Interrupt due to Micbias short circuit condition 0b = No interrupt 1b = Interrupt
2	INT_LIVE2	R	0x0	Interrupt due to Micbias High current fault . 0b = No interrupt 1b = Interrupt
1	INT_LIVE2	R	0x0	Interrupt due to Micbias Low current fault 0b = No interrupt 1b = Interrupt
0	INT_LIVE2	R	0x0	Interrupt due to Micbias Over voltage fault . 0b = No interrupt 1b = Interrupt

**7.2.42 DIAG\_CFG0 Register (Address = 0x46) [Reset = 0x00]**

DIAG\_CFG0 is shown in [Figure 7-144](#) and described in [Table 7-146](#).

Return to the [Summary Table](#).

**Figure 7-144. DIAG\_CFG0 Register**

7	6	5	4	3	2	1	0
IN_CH1_DIAG_EN	IN_CH2_DIAG_EN	INCL_SE_INM	INCL_AC_COUP	OUT1P_DIAG_EN	OUT1M_DIAG_EN	OUT2P_DIAG_EN	OUT2M_DIAG_EN
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-146. DIAG\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	IN_CH1_DIAG_EN	R/W	0x0	Channel-1 Input (IN1P and IN1M) Scan for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled
6	IN_CH2_DIAG_EN	R/W	0x0	Channel-2 Input (IN2P and IN2M) Scan for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled
5	INCL_SE_INM	R/W	0x0	INxM pin Diagnostics Scan Selection for Single Ended Configuration 0b = INxM pins of single ended channels are excluded for diagnosis 1b = INxM pins of single ended channels are included for diagnosis
4	INCL_AC_COUP	R/W	0x0	AC coupled channels pins Scan Selection for Diagnostics 0b = INxP and INxM pins of AC coupled channels are excluded for diagnosis 1b = INxP and INxM pins of AC coupled channels are included for diagnosis
3	OUT1P_DIAG_EN	R/W	0x0	Channel-1 Output OUT1P Scan for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled
2	OUT1M_DIAG_EN	R/W	0x0	Channel-1 Output OUT1M Scan for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled
1	OUT2P_DIAG_EN	R/W	0x0	Channel-2 Output OUT2P Scan for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled
0	OUT2M_DIAG_EN	R/W	0x0	Channel-2 Output OUT2M Scan for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled

**7.2.43 DIAG\_CFG1 Register (Address = 0x47) [Reset = 0x37]**

DIAG\_CFG1 is shown in [Figure 7-145](#) and described in [Table 7-147](#).

Return to the [Summary Table](#).

**Figure 7-145. DIAG\_CFG1 Register**

7	6	5	4	3	2	1	0
DIAG_SHT_TERM[3:0]				DIAG_SHT_VBAT_IN[3:0]			
R/W-0011b				R/W-0111b			

**Table 7-147. DIAG\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_SHT_TERM[3:0]	R/W	0x3	INxP and INxM Terminal Short Detect Threshold 0d = INxP and INxM Terminal Short Detect Threshold Value is 0 mV 1d = INxP and INxM Terminal Short Detect Threshold Value is 30 mV 2d = INxP and INxM Terminal Short Detect Threshold Value is 60 mV 10d to 13d = INxP and INxM Terminal Short Detect Threshold Value is as per configuration 14d = INxP and INxM Terminal Short Detect Threshold Value is 420 mV 15d = INxP and INxM Terminal Short Detect Threshold Value is 450 mV

**Table 7-147. DIAG\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3-0	DIAG_SHT_VBAT_IN[3:0]	R/W	0x7	Short to VBAT_IN Detect Threshold 0d = Short to VBAT_IN Detect Threshold Value is 0 mV 1d = Short to VBAT_IN Detect Threshold Value is 30 mV 2d = Short to VBAT_IN Detect Threshold Value is 60 mV 10d to 13d = Short to VBAT_IN Detect Threshold Value is as per configuration 14d = Short to VBAT_IN Detect Threshold Value is 420 mV 15d = Short to VBAT_IN Detect Threshold Value is 450 mV

#### 7.2.44 DIAG\_CFG2 Register (Address = 0x48) [Reset = 0x87]

DIAG\_CFG2 is shown in [Figure 7-146](#) and described in [Table 7-148](#).

Return to the [Summary Table](#).

**Figure 7-146. DIAG\_CFG2 Register**

7	6	5	4	3	2	1	0
DIAG_SHT_GND[3:0]				DIAG_SHT_MICBIAS[3:0]			
R/W-1000b				R/W-0111b			

**Table 7-148. DIAG\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_SHT_GND[3:0]	R/W	0x8	Short to GND Detect Threshold 0d = Short to GND Detect Threshold Value is 0 mV 1d = Short to GND Detect Threshold Value is 60 mV 2d = Short to GND Detect Threshold Value is 120 mV 10d to 13d = Short to GND Detect Threshold Value is as per configuration 14d = Short to GND Detect Threshold Value is 840 mV 15d = Short to GND Detect Threshold Value is 900 mV
3-0	DIAG_SHT_MICBIAS[3:0]	R/W	0x7	Short to MICBIAS Detect Threshold 0d = Short to MICBIAS Detect Threshold Value is 0 mV 1d = Short to MICBIAS Detect Threshold Value is 30 mV 2d = Short to MICBIAS Detect Threshold Value is 60 mV 10d to 13d = Short to MICBIAS Detect Threshold Value is as per configuration 14d = Short to MICBIAS Detect Threshold Value is 420 mV 15d = Short to MICBIAS Detect Threshold Value is 450 mV

#### 7.2.45 DIAG\_CFG4 Register (Address = 0x4A) [Reset = 0xB8]

DIAG\_CFG4 is shown in [Figure 7-147](#) and described in [Table 7-149](#).

Return to the [Summary Table](#).

**Figure 7-147. DIAG\_CFG4 Register**

7	6	5	4	3	2	1	0
RESERVED		RESERVED		FAULT_DBNCE_SEL[1:0]		VSHORT_DBNCE	DIAG_2X_THRES
R-00b		R-00b		R/W-10b		R/W-0b	R/W-0b

**Table 7-149. DIAG\_CFG4 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values
5-4	RESERVED	R	0x0	Reserved bits; Write only reset values

**Table 7-149. DIAG\_CFG4 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3-2	FAULT_DBNCE_SEL[1:0]	R/W	0x2	Debounce conut for all the faults (except VBAT_IN short when VBAT_IN < MicBias) 0b = 16 counts for debounce to filter-out false faults detection 1b = 8 counts for debounce to filter-out false faults detection 2b = 4 counts for debounce to filter-out false faults detection 3b = No debounce count
1	VSHORT_DBNCE	R/W	0x0	VBAT_IN short debounce count 0b = 16 counts for debounce to filter-out false faults detection 1b = 8 counts for debounce to filter-out false faults detection
0	DIAG_2X_THRES	R/W	0x0	Diagostic thresholds range scale 0d = Thresholds same as configured 1d = All the configuration thresholds gets scale by 2 times

**7.2.46 DIAG\_CFG5 Register (Address = 0x4B) [Reset = 0x00]**

DIAG\_CFG5 is shown in [Figure 7-148](#) and described in [Table 7-150](#).

Return to the [Summary Table](#).

**Figure 7-148. DIAG\_CFG5 Register**

7	6	5	4	3	2	1	0
DIAG_MOV_AVG_CFG[1:0]		MOV_AVG_DIS_MBIAS_LOAD	MOV_AVG_DIS_TEMP_SENS	MOV_AVG_DIS_GPA	RESERVED		
R/W-00b		R/W-0b	R/W-0b	R/W-0b	R-000b		

**Table 7-150. DIAG\_CFG5 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	DIAG_MOV_AVG_CFG[1:0]	R/W	0x0	Moving average configuration 0d = Moving average disabled 1d = Moving average enabled with 0.5 weightage for new and old data 2d = Moving average enabled with 0.75 weightage for old data and 0.25 weightage for new data 3d = Reserved
5	MOV_AVG_DIS_MBIAS_LOAD	R/W	0x0	Moving average configuration for MicBias Load channel 0b = Moving average is enabled for Micbias Load channel 1b = Moving average is disabled for Micbias Load channel
4	MOV_AVG_DIS_TEMP_SENS	R/W	0x0	Moving average configuration for Temp sense channel 0b = Moving average is enabled for Temp sense channel 1b = Moving average is disabled for Temp sense channel
3	MOV_AVG_DIS_GPA	R/W	0x0	Moving average configuration for GPA channel 0b = Moving average is enabled for GPA channel 1b = Moving average is disabled for GPA channel
2-0	RESERVED	R	0x0	Reserved bits; Write only reset values

**7.2.47 DIAG\_CFG6 Register (Address = 0x4C) [Reset = 0xA2]**

DIAG\_CFG6 is shown in [Figure 7-149](#) and described in [Table 7-151](#).

Return to the [Summary Table](#).

**Figure 7-149. DIAG\_CFG6 Register**

7	6	5	4	3	2	1	0
MBIAS_HIGH_CURR_THRS[7:0]							
R/W-10100010b							

Figure 7-149. DIAG\_CFG6 Register (continued)

Table 7-151. DIAG\_CFG6 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-0	MBIAS_HIGH_CURR_TH RS[7:0]	R/W	0xA2	Threshold for Micbias High current fault diagnostics Default = ~ 27mA $Nd = ((0.9 \times (N \times 16)) / 4095) - 0.2 \times 72.83237$ (mA)

#### 7.2.48 DIAG\_CFG7 Register (Address = 0x4D) [Reset = 0x48]

DIAG\_CFG7 is shown in [Figure 7-150](#) and described in [Table 7-152](#).

Return to the [Summary Table](#).

Figure 7-150. DIAG\_CFG7 Register

7	6	5	4	3	2	1	0
MBIAS_LOW_CURR_THRS[7:0]							
R/W-01001000b							

Table 7-152. DIAG\_CFG7 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-0	MBIAS_LOW_CURR_TH RS[7:0]	R/W	0x48	Threshold for Micbias Low current fault diagnostics Default = ~ 4mA $Nd = ((0.9 \times (N \times 16)) / 4095) - 0.2 \times 72.83237$ (mA)

#### 7.2.49 DIAG\_CFG8 Register (Address = 0x4E) [Reset = 0xBA]

DIAG\_CFG8 is shown in [Figure 7-151](#) and described in [Table 7-153](#).

Return to the [Summary Table](#).

Figure 7-151. DIAG\_CFG8 Register

7	6	5	4	3	2	1	0
GPA_UP_THRS_FLT_THRES[7:0]							
R/W-10111010b							

Table 7-153. DIAG\_CFG8 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-0	GPA_UP_THRS_FLT_TH RES[7:0]	R/W	0xBA	General Purpose Analog High Threshold Default = ~ 2.6V $nd = ((0.9 \times (N \times 16)) / 4095) - 0.225 \times 6$ (V)

#### 7.2.50 DIAG\_CFG9 Register (Address = 0x4F) [Reset = 0x4B]

DIAG\_CFG9 is shown in [Figure 7-152](#) and described in [Table 7-154](#).

Return to the [Summary Table](#).

Figure 7-152. DIAG\_CFG9 Register

7	6	5	4	3	2	1	0
GPA_LOW_THRS_FLT_THRES[7:0]							
R/W-01001011b							

**Table 7-154. DIAG\_CFG9 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	GPA_LOW_THRS_FLT_T HRES[7:0]	R/W	0x4B	General Purpose Analog Low Threshold Default = ~ 0.2V $nd = ((0.9 \times (N \times 16) / 4095) - 0.225) \times 6$ (V)

**7.2.51 DIAG\_CFG10 Register (Address = 0x50) [Reset = 0x88]**

DIAG\_CFG10 is shown in [Figure 7-153](#) and described in [Table 7-155](#).

Return to the [Summary Table](#).

**Figure 7-153. DIAG\_CFG10 Register**

7	6	5	4	3	2	1	0
PD_MBIAS_SHRT_CKT_FLT	PD_MBIAS_HIGH_CURR_FLT	PD_MBIAS_LOW_CURR_FLT	PD_MBIAS_OV_FLT	PD_MBIAS_OT_FLT	MAN_RCV_PD_FLT_CHK	MBIAS_FLT_AUTO_REC_EN	MICBIAS_SHRT_CKT_DET_DIS
R/W-1b	R/W-0b	R/W-0b	R/W-0b	R/W-1b	R/W-0b	R/W-0b	R/W-0b

**Table 7-155. DIAG\_CFG10 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PD_MBIAS_SHRT_CKT_FLT	R/W	0x1	Powerdown configuration of Micbias during Short Circuit fault 0b = No change when fault occurs 1b = Micbias is disabled when fault occurs
6	PD_MBIAS_HIGH_CURR_FLT	R/W	0x0	Powerdown configuration of Micbias during High current fault 0b = No change when fault occurs 1b = Micbias is disabled when fault occurs
5	PD_MBIAS_LOW_CURR_FLT	R/W	0x0	Powerdown configuration of Micbias during Low current fault 0b = No change when fault occurs 1b = Micbias is disabled when fault occurs
4	PD_MBIAS_OV_FLT	R/W	0x0	Powerdown configuration of Micbias during high voltage fault 0b = No change when fault occurs 1b = Micbias is disabled when fault occurs
3	PD_MBIAS_OT_FLT	R/W	0x1	Powerdown configuration of Micbias during over temperature fault 0b = No change when fault occurs 1b = Micbias is disabled when fault occurs
2	MAN_RCV_PD_FLT_CHK	R/W	0x0	Manual Recovery (self clear bit) 0b = No effect 1b = Recheck fault status and re-powerup channels if they do not have any faults
1	MBIAS_FLT_AUTO_REC_EN	R/W	0x0	Micbias PD on faults Auto-Recovery Enable 0d = Auto recovery from Micbias faults disabled 1d = Auto recovery enabled
0	MICBIAS_SHRT_CKT_DET_DIS	R/W	0x0	Micbias Short Circuit fault detect config 0b = enable 1b = disable

**7.2.52 DIAG\_CFG11 Register (Address = 0x51) [Reset = 0x40]**

DIAG\_CFG11 is shown in [Figure 7-154](#) and described in [Table 7-156](#).

Return to the [Summary Table](#).

**Figure 7-154. DIAG\_CFG11 Register**

7	6	5	4	3	2	1	0
SAFE BAND_MBIAS_OV_FLT[2:0]			RESERVED				
R/W-010b			R-00000b				

Figure 7-154. DIAG\_CFG11 Register (continued)

Table 7-156. DIAG\_CFG11 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-5	SAFE BAND_MBIAS_OV_FLT[2:0]	R/W	0x2	Safeband cfgn for Mbias over voltage fault's lower boundary 0 = No safeband 1 = 30mV safeband (1LSb at 9b lvl) 2 = 60mV safeband (2LSb at 9b lvl) 3-7 = N*30mV
4-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.53 DIAG\_CFG12 Register (Address = 0x52) [Reset = 0x44]

DIAG\_CFG12 is shown in Figure 7-155 and described in Table 7-157.

Return to the [Summary Table](#).

Figure 7-155. DIAG\_CFG12 Register

7	6	5	4	3	2	1	0
SAFE BAND_INx_MBIAS_FLT[2:0]			SAFE BAND_INx_OV_FLT[2:0]			RESERVED	
R/W-010b			R/W-001b			R-00b	

Table 7-157. DIAG\_CFG12 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-5	SAFE BAND_INx_MBIAS_FLT[2:0]	R/W	0x2	Safeband cfgn for INx Short to Mbias fault's upper boundary 0 = No safeband 1 = 30mV safeband (1LSb at 9b lvl) 2 = 60mV safeband (2LSb at 9b lvl) 3-7 = N*30mV
4-2	SAFE BAND_INx_OV_FLT[2:0]	R/W	0x1	Safeband cfgn for INx Overvoltage fault's lower boundary 0 = No safeband 1 = 30mV safeband (1LSb at 9b lvl) 2-7 = N*30mV Dont use
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.54 DIAG\_CFG13 Register (Address = 0x53) [Reset = 0x00]

DIAG\_CFG13 is shown in Figure 7-156 and described in Table 7-158.

Return to the [Summary Table](#).

Figure 7-156. DIAG\_CFG13 Register

7	6	5	4	3	2	1	0
DIAG_FORCE_EN	DIAG_EN_MIC_BIAS_LOAD	DIAG_EN_MIC_BIAS	DIAG_EN_VBAT	DIAG_EN_TEMP_SENSE	DIAG_EN_AVD	DIAG_EN_GPA	RESERVED
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R-0b

Table 7-158. DIAG\_CFG13 Register Field Descriptions

Bit	Field	Type	Reset	Description
7	DIAG_FORCE_EN	R/W	0x0	Configuration for auto/manual enable for diag vbat, micbias, micbias load, temp 0b = Auto enabled (auto enabled if atleast one of the input channel diagnostics is enabled in DIAG_CFG0) 1b = Manual en/disable based on DIAG_CFG13 Register

**Table 7-158. DIAG\_CFG13 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
6	DIAG_EN_MICBIAS_LOAD	R/W	0x0	Micbias current/load channel enable for Diagnostics, valid if DIAG_FORCE_EN = 1 0b = Diagnostic Disabled 1b = Diagnostic Enabled
5	DIAG_EN_MICBIAS	R/W	0x0	Micbias channel enable for Diagnostics, valid if DIAG_FORCE_EN = 1 0b = Diagnostic Disabled 1b = Diagnostic Enabled
4	DIAG_EN_VBAT	R/W	0x0	VBAT channel enable for Diagnostics, valid if DIAG_FORCE_EN = 1 0b = Diagnostic Disabled 1b = Diagnostic Enabled
3	DIAG_EN_TEMP_SENSE	R/W	0x0	Temp sense channel enable for Diagnostics, valid if DIAG_FORCE_EN = 1 0b = Diagnostic Disabled 1b = Diagnostic Enabled
2	DIAG_EN_AVDD	R/W	0x0	AVDD channel enable for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled
1	DIAG_EN_GPA	R/W	0x0	GPA channel enable for Diagnostics 0b = Diagnostic Disabled 1b = Diagnostic Enabled
0	RESERVED	R	0x0	Reserved bit; Write only reset value

**7.2.55 DIAG\_CFG14 Register (Address = 0x54) [Reset = 0x48]**

DIAG\_CFG14 is shown in [Figure 7-157](#) and described in [Table 7-159](#).

Return to the [Summary Table](#).

**Figure 7-157. DIAG\_CFG14 Register**

7	6	5	4	3	2	1	0
RESERVED	AVDD_FILT_SEL[1:0]	RESERVED	VBAT_FILT_SEL[1:0]	RESERVED	VBAT_SHRT_FLT		
R-0b	R/W-10b	R-0b	R/W-10b	R-0b	R/W-0b		

**Table 7-159. DIAG\_CFG14 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	AVDD_FILT_SEL[1:0]	R/W	0x2	AVDD filter select 0d = 3.5MHz 1d = 200kHz 2d = 100kHz 3d = No filter
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3-2	VBAT_FILT_SEL[1:0]	R/W	0x2	VBAT filter select 0d = 3.5MHz 1d = 200kHz 2d = 100kHz 3d = No filter
1	RESERVED	R	0x0	Reserved bit; Write only reset value
0	VBAT_SHRT_FLT	R/W	0x0	Cfgn on INx short to VBAT 0 = INx Overvoltage and INx short to VBAT are separate 1 = INx Overvoltage and INx short to VBAT are Ord together as VBAT short fault

**7.2.56 DIAG\_MON\_MSB\_VBAT Register (Address = 0x56) [Reset = 0x00]**

 DIAG\_MON\_MSB\_VBAT is shown in [Figure 7-158](#) and described in [Table 7-160](#).

 Return to the [Summary Table](#).

**Figure 7-158. DIAG\_MON\_MSB\_VBAT Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_VBAT[7:0]							
R-00000000b							

**Table 7-160. DIAG\_MON\_MSB\_VBAT Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_VBAT[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

**7.2.57 DIAG\_MON\_LSB\_VBAT Register (Address = 0x57) [Reset = 0x00]**

 DIAG\_MON\_LSB\_VBAT is shown in [Figure 7-159](#) and described in [Table 7-161](#).

 Return to the [Summary Table](#).

**Figure 7-159. DIAG\_MON\_LSB\_VBAT Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_VBAT[3:0]				Channel[3:0]			
R-0000b				R-0000b			

**Table 7-161. DIAG\_MON\_LSB\_VBAT Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_VBAT[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x0	Channel ID

**7.2.58 DIAG\_MON\_MSB\_MBIAS Register (Address = 0x58) [Reset = 0x00]**

 DIAG\_MON\_MSB\_MBIAS is shown in [Figure 7-160](#) and described in [Table 7-162](#).

 Return to the [Summary Table](#).

**Figure 7-160. DIAG\_MON\_MSB\_MBIAS Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_MBIAS[7:0]							
R-00000000b							

**Table 7-162. DIAG\_MON\_MSB\_MBIAS Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_MBIAS[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

**7.2.59 DIAG\_MON\_LSB\_MBIAS Register (Address = 0x59) [Reset = 0x01]**

 DIAG\_MON\_LSB\_MBIAS is shown in [Figure 7-161](#) and described in [Table 7-163](#).

 Return to the [Summary Table](#).

**Figure 7-161. DIAG\_MON\_LSB\_MBIAS Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_MBIAS[3:0]				Channel[3:0]			
R-0000b				R-0001b			

**Table 7-163. DIAG\_MON\_LSB\_MBIAS Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_MBIAS[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x1	Channel ID

### 7.2.60 DIAG\_MON\_MSB\_IN1P Register (Address = 0x5A) [Reset = 0x00]

DIAG\_MON\_MSB\_IN1P is shown in [Figure 7-162](#) and described in [Table 7-164](#).

Return to the [Summary Table](#).

**Figure 7-162. DIAG\_MON\_MSB\_IN1P Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_IN_CH1P[7:0]							
R-00000000b							

**Table 7-164. DIAG\_MON\_MSB\_IN1P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_IN_CH1P[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.61 DIAG\_MON\_LSB\_IN1P Register (Address = 0x5B) [Reset = 0x02]

DIAG\_MON\_LSB\_IN1P is shown in [Figure 7-163](#) and described in [Table 7-165](#).

Return to the [Summary Table](#).

**Figure 7-163. DIAG\_MON\_LSB\_IN1P Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_IN_CH1P[3:0]				Channel[3:0]			
R-0000b				R-0010b			

**Table 7-165. DIAG\_MON\_LSB\_IN1P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_IN_CH1P[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x2	Channel ID

### 7.2.62 DIAG\_MON\_MSB\_IN1M Register (Address = 0x5C) [Reset = 0x00]

DIAG\_MON\_MSB\_IN1M is shown in [Figure 7-164](#) and described in [Table 7-166](#).

Return to the [Summary Table](#).

**Figure 7-164. DIAG\_MON\_MSB\_IN1M Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_IN_CH1M[7:0]							

**Figure 7-164. DIAG\_MON\_MSB\_IN1M Register (continued)**

R-0000000b

**Table 7-166. DIAG\_MON\_MSB\_IN1M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_IN_CH1N[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.63 DIAG\_MON\_LSB\_IN1M Register (Address = 0x5D) [Reset = 0x03]

DIAG\_MON\_LSB\_IN1M is shown in [Figure 7-165](#) and described in [Table 7-167](#).

Return to the [Summary Table](#).

**Figure 7-165. DIAG\_MON\_LSB\_IN1M Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_IN_CH1N[3:0]				Channel[3:0]			
R-0000b				R-0011b			

**Table 7-167. DIAG\_MON\_LSB\_IN1M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_IN_CH1N[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x3	Channel ID

### 7.2.64 DIAG\_MON\_MSB\_IN2P Register (Address = 0x5E) [Reset = 0x00]

DIAG\_MON\_MSB\_IN2P is shown in [Figure 7-166](#) and described in [Table 7-168](#).

Return to the [Summary Table](#).

**Figure 7-166. DIAG\_MON\_MSB\_IN2P Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_IN_CH2P[7:0]							
R-0000000b							

**Table 7-168. DIAG\_MON\_MSB\_IN2P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_IN_CH2P[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.65 DIAG\_MON\_LSB\_IN2P Register (Address = 0x5F) [Reset = 0x04]

DIAG\_MON\_LSB\_IN2P is shown in [Figure 7-167](#) and described in [Table 7-169](#).

Return to the [Summary Table](#).

**Figure 7-167. DIAG\_MON\_LSB\_IN2P Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_IN_CH2P[3:0]				Channel[3:0]			
R-0000b				R-0100b			

**Table 7-169. DIAG\_MON\_LSB\_IN2P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_IN_CH2P[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x4	Channel ID

### 7.2.66 DIAG\_MON\_MSB\_IN2M Register (Address = 0x60) [Reset = 0x00]

DIAG\_MON\_MSB\_IN2M is shown in [Figure 7-168](#) and described in [Table 7-170](#).

Return to the [Summary Table](#).

**Figure 7-168. DIAG\_MON\_MSB\_IN2M Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_IN_CH2N[7:0]							
R-00000000b							

**Table 7-170. DIAG\_MON\_MSB\_IN2M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_IN_CH2N[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.67 DIAG\_MON\_LSB\_IN2M Register (Address = 0x61) [Reset = 0x05]

DIAG\_MON\_LSB\_IN2M is shown in [Figure 7-169](#) and described in [Table 7-171](#).

Return to the [Summary Table](#).

**Figure 7-169. DIAG\_MON\_LSB\_IN2M Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_IN_CH2N[3:0]				Channel[3:0]			
R-0000b				R-0101b			

**Table 7-171. DIAG\_MON\_LSB\_IN2M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_IN_CH2N[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x5	Channel ID

### 7.2.68 DIAG\_MON\_MSB\_OUT1P Register (Address = 0x62) [Reset = 0x00]

DIAG\_MON\_MSB\_OUT1P is shown in [Figure 7-170](#) and described in [Table 7-172](#).

Return to the [Summary Table](#).

**Figure 7-170. DIAG\_MON\_MSB\_OUT1P Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_OUT_CH1P[7:0]							
R-00000000b							

**Table 7-172. DIAG\_MON\_MSB\_OUT1P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_OUT_CH1P[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.69 DIAG\_MON\_LSB\_OUT1P Register (Address = 0x63) [Reset = 0x06]

DIAG\_MON\_LSB\_OUT1P is shown in [Figure 7-171](#) and described in [Table 7-173](#).

Return to the [Summary Table](#).

**Figure 7-171. DIAG\_MON\_LSB\_OUT1P Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_OUT_CH1P[3:0]				Channel[3:0]			
R-0000b				R-0110b			

**Table 7-173. DIAG\_MON\_LSB\_OUT1P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_OUT_C H1P[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x6	Channel ID

### 7.2.70 DIAG\_MON\_MSB\_OUT1M Register (Address = 0x64) [Reset = 0x00]

DIAG\_MON\_MSB\_OUT1M is shown in [Figure 7-172](#) and described in [Table 7-174](#).

Return to the [Summary Table](#).

**Figure 7-172. DIAG\_MON\_MSB\_OUT1M Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_OUT_CH1N[7:0]							
R-00000000b							

**Table 7-174. DIAG\_MON\_MSB\_OUT1M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_OUT_CH1N[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.71 DIAG\_MON\_LSB\_OUT1M Register (Address = 0x65) [Reset = 0x07]

DIAG\_MON\_LSB\_OUT1M is shown in [Figure 7-173](#) and described in [Table 7-175](#).

Return to the [Summary Table](#).

**Figure 7-173. DIAG\_MON\_LSB\_OUT1M Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_OUT_CH1N[3:0]				Channel[3:0]			
R-0000b				R-0111b			

**Table 7-175. DIAG\_MON\_LSB\_OUT1M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_OUT_C H1N[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble

**Table 7-175. DIAG\_MON\_LSB\_OUT1M Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3-0	Channel[3:0]	R	0x7	Channel ID

### 7.2.72 DIAG\_MON\_MSB\_OUT2P Register (Address = 0x66) [Reset = 0x00]

DIAG\_MON\_MSB\_OUT2P is shown in [Figure 7-174](#) and described in [Table 7-176](#).

Return to the [Summary Table](#).

**Figure 7-174. DIAG\_MON\_MSB\_OUT2P Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_OUT_CH2P[7:0]							
R-0000000b							

**Table 7-176. DIAG\_MON\_MSB\_OUT2P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_OUT_CH2P[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.73 DIAG\_MON\_LSB\_OUT2P Register (Address = 0x67) [Reset = 0x08]

DIAG\_MON\_LSB\_OUT2P is shown in [Figure 7-175](#) and described in [Table 7-177](#).

Return to the [Summary Table](#).

**Figure 7-175. DIAG\_MON\_LSB\_OUT2P Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_OUT_CH2P[3:0]				Channel[3:0]			
R-0000b				R-1000b			

**Table 7-177. DIAG\_MON\_LSB\_OUT2P Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_OUT_C_H2P[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x8	Channel ID

### 7.2.74 DIAG\_MON\_MSB\_OUT2M Register (Address = 0x68) [Reset = 0x00]

DIAG\_MON\_MSB\_OUT2M is shown in [Figure 7-176](#) and described in [Table 7-178](#).

Return to the [Summary Table](#).

**Figure 7-176. DIAG\_MON\_MSB\_OUT2M Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_OUT_CH2N[7:0]							
R-0000000b							

**Table 7-178. DIAG\_MON\_MSB\_OUT2M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_OUT_CH2N[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

**7.2.75 DIAG\_MON\_LSB\_OUT2M Register (Address = 0x69) [Reset = 0x09]**

 DIAG\_MON\_LSB\_OUT2M is shown in [Figure 7-177](#) and described in [Table 7-179](#).

 Return to the [Summary Table](#).

**Figure 7-177. DIAG\_MON\_LSB\_OUT2M Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_OUT_CH2N[3:0]				Channel[3:0]			
R-0000b				R-1001b			

**Table 7-179. DIAG\_MON\_LSB\_OUT2M Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_OUT_C H2N[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0x9	Channel ID

**7.2.76 DIAG\_MON\_MSB\_TEMP Register (Address = 0x6A) [Reset = 0x00]**

 DIAG\_MON\_MSB\_TEMP is shown in [Figure 7-178](#) and described in [Table 7-180](#).

 Return to the [Summary Table](#).

**Figure 7-178. DIAG\_MON\_MSB\_TEMP Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_TEMP[7:0]							
R-00000000b							

**Table 7-180. DIAG\_MON\_MSB\_TEMP Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_TEMP[ 7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

**7.2.77 DIAG\_MON\_LSB\_TEMP Register (Address = 0x6B) [Reset = 0x0A]**

 DIAG\_MON\_LSB\_TEMP is shown in [Figure 7-179](#) and described in [Table 7-181](#).

 Return to the [Summary Table](#).

**Figure 7-179. DIAG\_MON\_LSB\_TEMP Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_TEMP[3:0]				Channel[3:0]			
R-0000b				R-1010b			

**Table 7-181. DIAG\_MON\_LSB\_TEMP Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_TEMP[ 3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0xA	Channel ID

**7.2.78 DIAG\_MON\_MSB\_MBIAS\_LOAD Register (Address = 0x6C) [Reset = 0x00]**

 DIAG\_MON\_MSB\_MBIAS\_LOAD is shown in [Figure 7-180](#) and described in [Table 7-182](#).

Return to the [Summary Table](#).

**Figure 7-180. DIAG\_MON\_MSB\_MBIAS\_LOAD Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_MBIAS_LOAD[7:0]							
R-0000000b							

**Table 7-182. DIAG\_MON\_MSB\_MBIAS\_LOAD Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_MBIAS_LOAD[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.79 DIAG\_MON\_LSB\_MBIAS\_LOAD Register (Address = 0x6D) [Reset = 0x0B]

DIAG\_MON\_LSB\_MBIAS\_LOAD is shown in [Figure 7-181](#) and described in [Table 7-183](#).

Return to the [Summary Table](#).

**Figure 7-181. DIAG\_MON\_LSB\_MBIAS\_LOAD Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_MBIAS_LOAD[3:0]				Channel[3:0]			
R-0000b				R-1011b			

**Table 7-183. DIAG\_MON\_LSB\_MBIAS\_LOAD Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_MBIAS_LOAD[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0xB	Channel ID

### 7.2.80 DIAG\_MON\_MSB\_AVDD Register (Address = 0x6E) [Reset = 0x00]

DIAG\_MON\_MSB\_AVDD is shown in [Figure 7-182](#) and described in [Table 7-184](#).

Return to the [Summary Table](#).

**Figure 7-182. DIAG\_MON\_MSB\_AVDD Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_AVDD[7:0]							
R-0000000b							

**Table 7-184. DIAG\_MON\_MSB\_AVDD Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_AVDD[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.81 DIAG\_MON\_LSB\_AVDD Register (Address = 0x6F) [Reset = 0x0C]

DIAG\_MON\_LSB\_AVDD is shown in [Figure 7-183](#) and described in [Table 7-185](#).

Return to the [Summary Table](#).

**Figure 7-183. DIAG\_MON\_LSB\_AVDD Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_AVDD[3:0]				Channel[3:0]			

**Figure 7-183. DIAG\_MON\_LSB\_AVDD Register (continued)**

R-0000b R-1100b

**Table 7-185. DIAG\_MON\_LSB\_AVDD Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_AVDD[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0xC	Channel ID

### 7.2.82 DIAG\_MON\_MSB\_GPA Register (Address = 0x70) [Reset = 0x00]

DIAG\_MON\_MSB\_GPA is shown in [Figure 7-184](#) and described in [Table 7-186](#).

Return to the [Summary Table](#).

**Figure 7-184. DIAG\_MON\_MSB\_GPA Register**

7	6	5	4	3	2	1	0
DIAG_MON_MSB_GPA[7:0]							
R-00000000b							

**Table 7-186. DIAG\_MON\_MSB\_GPA Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	DIAG_MON_MSB_GPA[7:0]	R	0x0	Diagnostic SAR Monitor Data MSB Byte

### 7.2.83 DIAG\_MON\_LSB\_GPA Register (Address = 0x71) [Reset = 0x0D]

DIAG\_MON\_LSB\_GPA is shown in [Figure 7-185](#) and described in [Table 7-187](#).

Return to the [Summary Table](#).

**Figure 7-185. DIAG\_MON\_LSB\_GPA Register**

7	6	5	4	3	2	1	0
DIAG_MON_LSB_GPA[3:0]				Channel[3:0]			
R-0000b				R-1101b			

**Table 7-187. DIAG\_MON\_LSB\_GPA Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	DIAG_MON_LSB_GPA[3:0]	R	0x0	Diagnostic SAR Monitor Data LSB Nibble
3-0	Channel[3:0]	R	0xD	Channel ID

### 7.2.84 BOOST\_CFG Register (Address = 0x72) [Reset = 0x00]

BOOST\_CFG is shown in [Figure 7-186](#) and described in [Table 7-188](#).

Return to the [Summary Table](#).

**Figure 7-186. BOOST\_CFG Register**

7	6	5	4	3	2	1	0
BOOST_DIS	BOOST_OCPE N	BOOST_PDz_F LT	RESERVED	RESERVED	RESERVED		
R/W-0b	R/W-0b	R/W-0b	R-0b	R-0b	R-000b		

**Table 7-188. BOOST\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	BOOST_DIS	R/W	0x0	Boost Enable/Disable 0d = Internal Boost enable 1d = Internal Boost disable/bypass
6	BOOST_OCPEN	R/W	0x0	Boost Over Current Protection Enable/Disable 0d = Boost OCP is enable 1d = Boost OCP is disable
5	BOOST_PDz_FLT	R/W	0x0	Boost PD cfn 0d = Boost is powered down if Micbias is powered down due to faults 1d = Boost is NOT powered down if Micbias is powered down due to faults
4	RESERVED	R	0x0	Reserved bit; Write only reset value
3	RESERVED	R	0x0	Reserved bit; Write only reset value
2-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.2.85 MICBIAS\_CFG Register (Address = 0x73) [Reset = 0xA0]

MICBIAS\_CFG is shown in [Figure 7-187](#) and described in [Table 7-189](#).

Return to the [Summary Table](#).

**Figure 7-187. MICBIAS\_CFG Register**

7	6	5	4	3	2	1	0
MBIAS_VAL[3:0]				RESERVED			
R/W-1010b				R-0000b			

**Table 7-189. MICBIAS\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-4	MBIAS_VAL[3:0]	R/W	0xA	MicBias Value 0d = Microphone Bias output is bypassed to BSTOUT/HVDD 1d = Microphone Bias is set to 3.0 V 2d = Microphone Bias is set to 3.5 V 3d = Microphone Bias is set to 4.0 V 4d = Microphone Bias is set to 4.5 V 5d = Microphone Bias is set to 5 V 6d = Microphone Bias is set to 5.5 V 7d = Microphone Bias is set to 6 V 8d = Microphone Bias is set to 6.5 V 9d = Microphone Bias is set to 7 V 10d = Microphone Bias is set to 7.5 V 11d = Microphone Bias is set to 8 V 12d = Microphone Bias is set to 8.5 V 13d = Microphone Bias is set to 9 V 14d = Microphone Bias is set to 9.5 V 15d = Microphone Bias is set to 10 V
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.3 Page\_3 Registers

Table 7-190 lists the memory-mapped registers for the Page\_3 registers. All register offset addresses not listed in Table 7-190 should be considered as reserved locations and the register contents should not be modified.

**Table 7-190. PAGE\_3 Registers**

Address	Acronym	Register Name	Reset Value	Section
0x0	PAGE_CFG	Device page register	0x00	<a href="#">Section 7.3.1</a>
0x1A	SASI_CFG0	Secondary ASI configuration register 0	0x30	<a href="#">Section 7.3.2</a>
0x1B	SASI_TX_CFG0	SASI TX configuration register 0	0x00	<a href="#">Section 7.3.3</a>
0x1C	SASI_TX_CFG1	SASI TX configuration register 1	0x00	<a href="#">Section 7.3.4</a>
0x1D	SASI_TX_CFG2	SASI TX configuration register 2	0x00	<a href="#">Section 7.3.5</a>
0x1E	SASI_TX_CH1_CFG	SASI TX Channel 1 configuration register	0x00	<a href="#">Section 7.3.6</a>
0x1F	SASI_TX_CH2_CFG	SASI TX Channel 2 configuration register	0x01	<a href="#">Section 7.3.7</a>
0x20	SASI_TX_CH3_CFG	SASI TX Channel 3 configuration register	0x02	<a href="#">Section 7.3.8</a>
0x21	SASI_TX_CH4_CFG	SASI TX Channel 4 configuration register	0x03	<a href="#">Section 7.3.9</a>
0x22	SASI_TX_CH5_CFG	SASI TX Channel 5 configuration register	0x04	<a href="#">Section 7.3.10</a>
0x23	SASI_TX_CH6_CFG	SASI TX Channel 6 configuration register	0x05	<a href="#">Section 7.3.11</a>
0x24	SASI_TX_CH7_CFG	SASI TX Channel 7 configuration register	0x06	<a href="#">Section 7.3.12</a>
0x25	SASI_TX_CH8_CFG	SASI TX Channel 8 configuration register	0x07	<a href="#">Section 7.3.13</a>
0x26	SASI_RX_CFG0	SASI RX configuration register 0	0x00	<a href="#">Section 7.3.14</a>
0x27	SASI_RX_CFG1	SASI RX configuration register 1	0x00	<a href="#">Section 7.3.15</a>
0x28	SASI_RX_CH1_CFG	SASI RX Channel 1 configuration register	0x00	<a href="#">Section 7.3.16</a>
0x29	SASI_RX_CH2_CFG	SASI RX Channel 2 configuration register	0x01	<a href="#">Section 7.3.17</a>
0x2A	SASI_RX_CH3_CFG	SASI RX Channel 3 configuration register	0x02	<a href="#">Section 7.3.18</a>
0x2B	SASI_RX_CH4_CFG	SASI RX Channel 4 configuration register	0x03	<a href="#">Section 7.3.19</a>
0x2C	SASI_RX_CH5_CFG	SASI RX Channel 5 configuration register	0x04	<a href="#">Section 7.3.20</a>
0x2D	SASI_RX_CH6_CFG	SASI RX Channel 6 configuration register	0x05	<a href="#">Section 7.3.21</a>
0x2E	SASI_RX_CH7_CFG	SASI RX Channel 7 configuration register	0x06	<a href="#">Section 7.3.22</a>
0x2F	SASI_RX_CH8_CFG	SASI RX Channel 8 configuration register	0x07	<a href="#">Section 7.3.23</a>
0x32	CLK_CFG12	Clock configuration register 12	0x00	<a href="#">Section 7.3.24</a>
0x33	CLK_CFG13	Clock configuration register 13	0x00	<a href="#">Section 7.3.25</a>
0x34	CLK_CFG14	Clock configuration register 14	0x10	<a href="#">Section 7.3.26</a>
0x35	CLK_CFG15	Clock configuration register 15	0x01	<a href="#">Section 7.3.27</a>
0x36	CLK_CFG16	Clock configuration register 16	0x00	<a href="#">Section 7.3.28</a>
0x37	CLK_CFG17	Clock configuration register 17	0x00	<a href="#">Section 7.3.29</a>
0x38	CLK_CFG18	Clock configuration register 18	0x08	<a href="#">Section 7.3.30</a>
0x39	CLK_CFG19	Clock configuration register 19	0x20	<a href="#">Section 7.3.31</a>
0x3A	CLK_CFG20	Clock configuration register 20	0x04	<a href="#">Section 7.3.32</a>
0x3B	CLK_CFG21	Clock configuration register 21	0x00	<a href="#">Section 7.3.33</a>
0x3C	CLK_CFG22	Clock configuration register 18	0x01	<a href="#">Section 7.3.34</a>
0x3D	CLK_CFG23	Clock configuration register 18	0x01	<a href="#">Section 7.3.35</a>
0x3E	CLK_CFG24	Clock configuration register 21	0x01	<a href="#">Section 7.3.36</a>
0x44	CLK_CFG30	Clock configuration register 30	0x00	<a href="#">Section 7.3.37</a>
0x45	CLK_CFG31	Clock configuration register 31	0x00	<a href="#">Section 7.3.38</a>
0x46	CLKOUT_CFG1	CLKOUT configuration register 1	0x00	<a href="#">Section 7.3.39</a>
0x47	CLKOUT_CFG2	CLKOUT configuration register 2	0x01	<a href="#">Section 7.3.40</a>
0x48	BSTCLK_CFG1	Boost clock configuration register 1	0x00	<a href="#">Section 7.3.41</a>

**Table 7-190. PAGE\_3 Registers (continued)**

Address	Acronym	Register Name	Reset Value	Section
0x49	SARCLK_CFG1	SAR clock configuration register 1	0x00	<a href="#">Section 7.3.42</a>
0x5B	ADC_OVRD_FLAG		0x00	<a href="#">Section 7.3.43</a>

### 7.3.1 PAGE\_CFG Register (Address = 0x0) [Reset = 0x00]

PAGE\_CFG is shown in [Figure 7-188](#) and described in [Table 7-191](#).

Return to the [Summary Table](#).

The device memory map is divided into pages. This register sets the page.

**Figure 7-188. PAGE\_CFG Register**

7	6	5	4	3	2	1	0
PAGE[7:0]							
R/W-00000000b							

**Table 7-191. PAGE\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PAGE[7:0]	R/W	0x0	These bits set the device page. 0d = Page 0 1d = Page 1 2d to 254d = Page 2 to page 254 respectively 255d = Page 255

### 7.3.2 SASI\_CFG0 Register (Address = 0x1A) [Reset = 0x30]

SASI\_CFG0 is shown in [Figure 7-189](#) and described in [Table 7-192](#).

Return to the [Summary Table](#).

This register is the ASI configuration register 0.

**Figure 7-189. SASI\_CFG0 Register**

7	6	5	4	3	2	1	0
SASI_FORMAT[1:0]		SASI_WLEN[1:0]		SASI_FSYNC_POL	SASI_BCLK_P OL	SASI_BUS_ER R	SASI_BUS_ER R_RCOV
R/W-00b		R/W-11b		R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-192. SASI\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	SASI_FORMAT[1:0]	R/W	0x0	Secondary ASI protocol format. 0d = TDM mode 1d = I <sup>2</sup> S mode 2d = LJ (left-justified) mode 3d = Reserved; Don't use
5-4	SASI_WLEN[1:0]	R/W	0x3	Secondary ASI word or slot length. 0d = 16 bits (Recommended this setting to be used with 10-kΩ input impedance configuration) 1d = 20 bits 2d = 24 bits 3d = 32 bits
3	SASI_FSYNC_POL	R/W	0x0	ASI FSYNC polarity (for SASI protocol only). 0d = Default polarity as per standard protocol 1d = Inverted polarity with respect to standard protocol

**Table 7-192. SASI\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
2	SASI_BCLK_POL	R/W	0x0	ASI BCLK polarity (for SASI protocol only). 0d = Default polarity as per standard protocol 1d = Inverted polarity with respect to standard protocol
1	SASI_BUS_ERR	R/W	0x0	ASI bus error detection. 0d = Enable bus error detection 1d = Disable bus error detection
0	SASI_BUS_ERR_RCOV	R/W	0x0	ASI bus error auto resume. 0d = Enable auto resume after bus error recovery 1d = Disable auto resume after bus error recovery and remain powered down until host configures the device

### 7.3.3 SASI\_TX\_CFG0 Register (Address = 0x1B) [Reset = 0x00]

SASI\_TX\_CFG0 is shown in [Figure 7-190](#) and described in [Table 7-193](#).

Return to the [Summary Table](#).

This register is the SASI TX configuration register 0.

**Figure 7-190. SASI\_TX\_CFG0 Register**

7	6	5	4	3	2	1	0
SASI_TX_EDGE	SASI_TX_FILL	SASI_TX_LSB	SASI_TX_KEEPER[1:0]		SASI_TX_USE_INT_FSYNC	SASI_TX_USE_INT_BCLK	SASI_TDM_PULSE_WIDTH
R/W-0b	R/W-0b	R/W-0b	R/W-00b		R/W-0b	R/W-0b	R/W-0b

**Table 7-193. SASI\_TX\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	SASI_TX_EDGE	R/W	0x0	Secondary ASI data output (on the primary and secondary data pin) transmit edge. 0d = Default edge as per the protocol configuration setting in SASI_BCLK_POL 1d = Inverted following edge (half cycle delay) with respect to the default edge setting
6	SASI_TX_FILL	R/W	0x0	Secondary ASI data output (on the primary and secondary data pin) for any unused cycles 0d = Always transmit 0 for unused cycles 1d = Always use Hi-Z for unused cycles
5	SASI_TX_LSB	R/W	0x0	Secondary ASI data output (on the primary and secondary data pin) for LSB transmissions. 0d = Transmit the LSB for a full cycle 1d = Transmit the LSB for the first half cycle and Hi-Z for the second half cycle
4-3	SASI_TX_KEEPER[1:0]	R/W	0x0	Secondary ASI data output (on the primary and secondary data pin) bus keeper. 0d = Bus keeper is always disabled 1d = Bus keeper is always enabled 2d = Bus keeper is enabled during LSB transmissions only for one cycle 3d = Bus keeper is enabled during LSB transmissions only for one and half cycles
2	SASI_TX_USE_INT_FSYNC	R/W	0x0	Secondary ASI uses internal FSYNC for output data generation in controller mode configuration as applicable. 0d = Use external FSYNC for ASI protocol data generation 1d = Use internal FSYNC for ASI protocol data generation
1	SASI_TX_USE_INT_BCLK	R/W	0x0	Secondary ASI uses internal BCLK for output data generation in controller mode configuration. 0d = Use external BCLK for ASI protocol data generation 1d = Use internal BCLK for ASI protocol data generation

**Table 7-193. SASI\_TX\_CFG0 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
0	SASI_TDM_PULSE_WIDTH	R/W	0x0	Secondary ASI fsync pulse width in TDM format. 0d = Fsync pulse is 1 bclk period wide 1d = Fsync pulse is 2 bclk period wide

### 7.3.4 SASI\_TX\_CFG1 Register (Address = 0x1C) [Reset = 0x00]

SASI\_TX\_CFG1 is shown in [Figure 7-191](#) and described in [Table 7-194](#).

Return to the [Summary Table](#).

This register is the SASI TX configuration register 1.

**Figure 7-191. SASI\_TX\_CFG1 Register**

7	6	5	4	3	2	1	0
RESERVED			SASI_TX_OFFSET[4:0]				
R-000b			R/W-00000b				

**Table 7-194. SASI\_TX\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-5	RESERVED	R	0x0	Reserved bits; Write only reset value
4-0	SASI_TX_OFFSET[4:0]	R/W	0x0	Secondary ASI output data MSB slot 0 offset (on the primary and secondary data pin). 0d = ASI data MSB location has no offset and is as per standard protocol 1d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of one BCLK cycle with respect to standard protocol 2d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of two BCLK cycles with respect to standard protocol 3d to 30d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset assigned as per configuration 31d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of 31 BCLK cycles with respect to standard protocol

### 7.3.5 SASI\_TX\_CFG2 Register (Address = 0x1D) [Reset = 0x00]

SASI\_TX\_CFG2 is shown in [Figure 7-192](#) and described in [Table 7-195](#).

Return to the [Summary Table](#).

This register is the SASI TX configuration register 2.

**Figure 7-192. SASI\_TX\_CFG2 Register**

7	6	5	4	3	2	1	0
SASI_TX_CH8_SEL	SASI_TX_CH7_SEL	SASI_TX_CH6_SEL	SASI_TX_CH5_SEL	SASI_TX_CH4_SEL	SASI_TX_CH3_SEL	SASI_TX_CH2_SEL	SASI_TX_CH1_SEL
R/W-0b							

**Table 7-195. SASI\_TX\_CFG2 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	SASI_TX_CH8_SEL	R/W	0x0	Secondary ASI output channel 8 select. 0d = Secondary ASI channel 8 output is on DOUT 1d = Secondary ASI channel 8 output is on DOUT2

**Table 7-195. SASI\_TX\_CFG2 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
6	SASI_TX_CH7_SEL	R/W	0x0	Secondary ASI output channel 7 select. 0d = Secondary ASI channel 7 output is on DOUT 1d = Secondary ASI channel 7 output is on DOUT2
5	SASI_TX_CH6_SEL	R/W	0x0	Secondary ASI output channel 6 select. 0d = Secondary ASI channel 6 output is on DOUT 1d = Secondary ASI channel 6 output is on DOUT2
4	SASI_TX_CH5_SEL	R/W	0x0	Secondary ASI output channel 5 select. 0d = Secondary ASI channel 5 output is on DOUT 1d = Secondary ASI channel 5 output is on DOUT2
3	SASI_TX_CH4_SEL	R/W	0x0	Secondary ASI output channel 4 select. 0d = Secondary ASI channel 4 output is on DOUT 1d = Secondary ASI channel 4 output is on DOUT2
2	SASI_TX_CH3_SEL	R/W	0x0	Secondary ASI output channel 3 select. 0d = Secondary ASI channel 3 output is on DOUT 1d = Secondary ASI channel 3 output is on DOUT2
1	SASI_TX_CH2_SEL	R/W	0x0	Secondary ASI output channel 2 select. 0d = Secondary ASI channel 2 output is on DOUT 1d = Secondary ASI channel 2 output is on DOUT2
0	SASI_TX_CH1_SEL	R/W	0x0	Secondary ASI output channel 1 select. 0d = Secondary ASI channel 1 output is on DOUT 1d = Secondary ASI channel 1 output is on DOUT2

**7.3.6 SASI\_TX\_CH1\_CFG Register (Address = 0x1E) [Reset = 0x00]**

SASI\_TX\_CH1\_CFG is shown in [Figure 7-193](#) and described in [Table 7-196](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 1 configuration register.

**Figure 7-193. SASI\_TX\_CH1\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		SASI_TX_CH1_CFG	SASI_TX_CH1_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00000b				

**Table 7-196. SASI\_TX\_CH1\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5	SASI_TX_CH1_CFG	R/W	0x0	Secondary ASI output channel 1 configuration. 0d = Secondary ASI channel 1 output is in a tri-state condition 1d = Secondary ASI channel 1 output corresponds to ADC Channel 1 data
4-0	SASI_TX_CH1_SLOT_NUM[4:0]	R/W	0x0	Secondary ASI output channel 1 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.7 SASI\_TX\_CH2\_CFG Register (Address = 0x1F) [Reset = 0x01]

SASI\_TX\_CH2\_CFG is shown in [Figure 7-194](#) and described in [Table 7-197](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 2 configuration register.

**Figure 7-194. SASI\_TX\_CH2\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		SASI_TX_CH2_CFG	SASI_TX_CH2_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00001b				

**Table 7-197. SASI\_TX\_CH2\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5	SASI_TX_CH2_CFG	R/W	0x0	Secondary ASI output channel 2 configuration. 0d = Secondary ASI channel 2 output is in a tri-state condition 1d = Secondary ASI channel 2 output corresponds to ADC Channel 2 data
4-0	SASI_TX_CH2_SLOT_NUM[4:0]	R/W	0x1	Secondary ASI output channel 2 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.8 SASI\_TX\_CH3\_CFG Register (Address = 0x20) [Reset = 0x02]

SASI\_TX\_CH3\_CFG is shown in [Figure 7-195](#) and described in [Table 7-198](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 3 configuration register.

**Figure 7-195. SASI\_TX\_CH3\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_TX_CH3_CFG[1:0]		SASI_TX_CH3_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00010b				

**Table 7-198. SASI\_TX\_CH3\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_TX_CH3_CFG[1:0]	R/W	0x0	Secondary ASI output channel 3 configuration. 0d = Secondary ASI channel 3 output is in a tri-state condition 1d = Secondary ASI channel 3 output corresponds to ADC Channel 3 data 2d = Secondary ASI channel 3 output corresponds to VBAT data 3d = Reserved

**Table 7-198. SASI\_TX\_CH3\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-0	SASI_TX_CH3_SLOT_NUM[4:0]	R/W	0x2	Secondary ASI output channel 3 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.9 SASI\_TX\_CH4\_CFG Register (Address = 0x21) [Reset = 0x03]

SASI\_TX\_CH4\_CFG is shown in [Figure 7-196](#) and described in [Table 7-199](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 4 configuration register.

**Figure 7-196. SASI\_TX\_CH4\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_TX_CH4_CFG[1:0]		SASI_TX_CH4_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00011b				

**Table 7-199. SASI\_TX\_CH4\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_TX_CH4_CFG[1:0]	R/W	0x0	Secondary ASI output channel 4 configuration. 0d = Secondary ASI channel 4 output is in a tri-state condition 1d = Secondary ASI channel 4 output corresponds to ADC Channel 4 data 2d = Secondary ASI channel 4 output corresponds to TEMP data 3d = Reserved
4-0	SASI_TX_CH4_SLOT_NUM[4:0]	R/W	0x3	Secondary ASI output channel 4 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.10 SASI\_TX\_CH5\_CFG Register (Address = 0x22) [Reset = 0x04]

SASI\_TX\_CH5\_CFG is shown in [Figure 7-197](#) and described in [Table 7-200](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 5 configuration register.

**Figure 7-197. SASI\_TX\_CH5\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_TX_CH5_CFG[1:0]		SASI_TX_CH5_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00100b				

**Table 7-200. SASI\_TX\_CH5\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_TX_CH5_CFG[1:0]	R/W	0x0	Secondary ASI output channel 5 configuration. 0d = Secondary ASI channel 5 output is in a tri-state condition 1d = Secondary ASI channel 5 output corresponds to ASI Input Channel 1 loopback data 2d = Secondary ASI channel 5 output corresponds to echo reference channel 1 data 3d = Reserved
4-0	SASI_TX_CH5_SLOT_NUM[4:0]	R/W	0x4	Secondary ASI output channel 5 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.11 SASI\_TX\_CH6\_CFG Register (Address = 0x23) [Reset = 0x05]

SASI\_TX\_CH6\_CFG is shown in [Figure 7-198](#) and described in [Table 7-201](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 6 configuration register.

**Figure 7-198. SASI\_TX\_CH6\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_TX_CH6_CFG[1:0]		SASI_TX_CH6_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00101b				

**Table 7-201. SASI\_TX\_CH6\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_TX_CH6_CFG[1:0]	R/W	0x0	Secondary ASI output channel 6 configuration. 0d = Secondary ASI channel 6 output is in a tri-state condition 1d = Secondary ASI channel 6 output corresponds to ASI Input Channel 2 loopback data 2d = Secondary ASI channel 6 output corresponds to echo reference channel 2 data 3d = Reserved
4-0	SASI_TX_CH6_SLOT_NUM[4:0]	R/W	0x5	Secondary ASI output channel 6 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.12 SASI\_TX\_CH7\_CFG Register (Address = 0x24) [Reset = 0x06]

SASI\_TX\_CH7\_CFG is shown in [Figure 7-199](#) and described in [Table 7-202](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 7 configuration register.

**Figure 7-199. SASI\_TX\_CH7\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_TX_CH7_CFG[1:0]		SASI_TX_CH7_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00110b				

**Table 7-202. SASI\_TX\_CH7\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_TX_CH7_CFG[1:0]	R/W	0x0	Secondary ASI output channel 7 configuration. 0d = Secondary ASI channel 7 output is in a tri-state condition 1d = Secondary ASI channel 7 output corresponds to {VBAT_WLby2, TEMP_WLby2} 2d = Secondary ASI channel 7 output corresponds to {echo_ref_ch1_wlby2, echo_ref_ch2_wlby2} 3d = Reserved
4-0	SASI_TX_CH7_SLOT_NUM[4:0]	R/W	0x6	Secondary ASI output channel 7 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.13 SASI\_TX\_CH8\_CFG Register (Address = 0x25) [Reset = 0x07]

SASI\_TX\_CH8\_CFG is shown in [Figure 7-200](#) and described in [Table 7-203](#).

Return to the [Summary Table](#).

This register is the SASI TX Channel 8 configuration register.

**Figure 7-200. SASI\_TX\_CH8\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		SASI_TX_CH8_CFG	SASI_TX_CH8_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00111b				

**Table 7-203. SASI\_TX\_CH8\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5	SASI_TX_CH8_CFG	R/W	0x0	Secondary ASI output channel 8 configuration. 0d = Secondary ASI channel 8 output is in a tri-state condition 1d = Secondary ASI channel 8 output corresponds to ICLA data
4-0	SASI_TX_CH8_SLOT_NUM[4:0]	R/W	0x7	Secondary ASI output channel 8 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.14 SASI\_RX\_CFG0 Register (Address = 0x26) [Reset = 0x00]

SASI\_RX\_CFG0 is shown in [Figure 7-201](#) and described in [Table 7-204](#).

Return to the [Summary Table](#).

This register is the SASI RX configuration register 0.

**Figure 7-201. SASI\_RX\_CFG0 Register**

7	6	5	4	3	2	1	0
SASI_RX_EDGE	SASI_RX_USE_INT_FSYNC	SASI_RX_USE_INT_BCLK	SASI_RX_OFFSET[4:0]				
R/W-0b	R/W-0b	R/W-0b	R/W-00000b				

**Table 7-204. SASI\_RX\_CFG0 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	SASI_RX_EDGE	R/W	0x0	Secondary ASI data input (on the primary and secondary data pin) receive edge. 0d = Default edge as per the protocol configuration setting in bit 2 (BCLK_POL) 1d = Inverted following edge (half cycle delay) with respect to the default edge setting
6	SASI_RX_USE_INT_FSYNC	R/W	0x0	Secondary ASI uses internal FSYNC for input data latching in controller mode configuration as applicable. 0d = Use external FSYNC for ASI protocol data latching 1d = Use internal FSYNC for ASI protocol data latching
5	SASI_RX_USE_INT_BCLK	R/W	0x0	Secondary ASI uses internal BCLK for input data latching in controller mode configuration. 0d = Use external BCLK for ASI protocol data latching 1d = Use internal BCLK for ASI protocol data latching
4-0	SASI_RX_OFFSET[4:0]	R/W	0x0	Secondary ASI data input MSB slot 0 offset (on the primary and secondary data pin). 0d = ASI data MSB location has no offset and is as per standard protocol 1d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of one BCLK cycle with respect to standard protocol 2d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of two BCLK cycles with respect to standard protocol 3d to 30d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset assigned as per configuration 31d = ASI data MSB location (TDM mode is slot 0 or I <sup>2</sup> S, LJ mode is the left and right slot 0) offset of 31 BCLK cycles with respect to standard protocol

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### 7.3.15 SASI\_RX\_CFG1 Register (Address = 0x27) [Reset = 0x00]

SASI\_RX\_CFG1 is shown in [Figure 7-202](#) and described in [Table 7-205](#).

Return to the [Summary Table](#).

This register is the SASI RX configuration register 1.

**Figure 7-202. SASI\_RX\_CFG1 Register**

7	6	5	4	3	2	1	0
SASI_RX_CH8_SEL	SASI_RX_CH7_SEL	SASI_RX_CH6_SEL	SASI_RX_CH5_SEL	SASI_RX_CH4_SEL	SASI_RX_CH3_SEL	SASI_RX_CH2_SEL	SASI_RX_CH1_SEL
R/W-0b							

**Table 7-205. SASI\_RX\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	SASI_RX_CH8_SEL	R/W	0x0	Secondary ASI input channel 8 select. 0d = Secondary ASI channel 8 input is on DIN 1d = Secondary ASI channel 8 input is on DIN2
6	SASI_RX_CH7_SEL	R/W	0x0	Secondary ASI input channel 7 select. 0d = Secondary ASI channel 7 input is on DIN 1d = Secondary ASI channel 7 input is on DIN2
5	SASI_RX_CH6_SEL	R/W	0x0	Secondary ASI input channel 6 select. 0d = Secondary ASI channel 6 input is on DIN 1d = Secondary ASI channel 6 input is on DIN2
4	SASI_RX_CH5_SEL	R/W	0x0	Secondary ASI input channel 5 select. 0d = Secondary ASI channel 5 input is on DIN 1d = Secondary ASI channel 5 input is on DIN2
3	SASI_RX_CH4_SEL	R/W	0x0	Secondary ASI input channel 4 select. 0d = Secondary ASI channel 4 input is on DIN 1d = Secondary ASI channel 4 input is on DIN2
2	SASI_RX_CH3_SEL	R/W	0x0	Secondary ASI input channel 3 select. 0d = Secondary ASI channel 3 input is on DIN 1d = Secondary ASI channel 3 input is on DIN2
1	SASI_RX_CH2_SEL	R/W	0x0	Secondary ASI input channel 2 select. 0d = Secondary ASI channel 2 input is on DIN 1d = Secondary ASI channel 2 input is on DIN2
0	SASI_RX_CH1_SEL	R/W	0x0	Secondary ASI input channel 1 select. 0d = Secondary ASI channel 1 input is on DIN 1d = Secondary ASI channel 1 input is on DIN2

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**7.3.16 SASI\_RX\_CH1\_CFG Register (Address = 0x28) [Reset = 0x00]**

SASI\_RX\_CH1\_CFG is shown in [Figure 7-203](#) and described in [Table 7-206](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 1 configuration register.

**Figure 7-203. SASI\_RX\_CH1\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		SASI_RX_CH1_CFG	SASI_RX_CH1_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00000b				

**Table 7-206. SASI\_RX\_CH1\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5	SASI_RX_CH1_CFG	R/W	0x0	Secondary ASI input channel 1 configuration. 0d = Secondary ASI channel 1 input is disabled 1d = Secondary ASI channel 1 input corresponds to DAC Channel 1 data
4-0	SASI_RX_CH1_SLOT_NUM[4:0]	R/W	0x0	Secondary ASI input channel 1 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.17 SASI\_RX\_CH2\_CFG Register (Address = 0x29) [Reset = 0x01]

SASI\_RX\_CH2\_CFG is shown in [Figure 7-204](#) and described in [Table 7-207](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 2 configuration register.

**Figure 7-204. SASI\_RX\_CH2\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		SASI_RX_CH2_CFG	SASI_RX_CH2_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00001b				

**Table 7-207. SASI\_RX\_CH2\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5	SASI_RX_CH2_CFG	R/W	0x0	Secondary ASI input channel 2 configuration. 0d = Secondary ASI channel 2 input is disabled 1d = Secondary ASI channel 2 input corresponds to DAC Channel 2 data
4-0	SASI_RX_CH2_SLOT_NUM[4:0]	R/W	0x1	Secondary ASI input channel 2 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.18 SASI\_RX\_CH3\_CFG Register (Address = 0x2A) [Reset = 0x02]

SASI\_RX\_CH3\_CFG is shown in [Figure 7-205](#) and described in [Table 7-208](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 3 configuration register.

**Figure 7-205. SASI\_RX\_CH3\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		SASI_RX_CH3_CFG	SASI_RX_CH3_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00010b				

**Table 7-208. SASI\_RX\_CH3\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5	SASI_RX_CH3_CFG	R/W	0x0	Secondary ASI input channel 3 configuration. 0d = Secondary ASI channel 3 input is disabled 1d = Secondary ASI channel 3 input corresponds to DAC Channel 3 data

**Table 7-208. SASI\_RX\_CH3\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-0	SASI_RX_CH3_SLOT_NUM[4:0]	R/W	0x2	Secondary ASI input channel 3 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.19 SASI\_RX\_CH4\_CFG Register (Address = 0x2B) [Reset = 0x03]

SASI\_RX\_CH4\_CFG is shown in [Figure 7-206](#) and described in [Table 7-209](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 4 configuration register.

**Figure 7-206. SASI\_RX\_CH4\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED		SASI_RX_CH4_CFG	SASI_RX_CH4_SLOT_NUM[4:0]				
R-00b		R/W-0b	R/W-00011b				

**Table 7-209. SASI\_RX\_CH4\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5	SASI_RX_CH4_CFG	R/W	0x0	Secondary ASI input channel 4 configuration. 0d = Secondary ASI channel 4 input is disabled 1d = Secondary ASI channel 4 input corresponds to DAC Channel 4 data
4-0	SASI_RX_CH4_SLOT_NUM[4:0]	R/W	0x3	Secondary ASI input channel 4 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.20 SASI\_RX\_CH5\_CFG Register (Address = 0x2C) [Reset = 0x04]

SASI\_RX\_CH5\_CFG is shown in [Figure 7-207](#) and described in [Table 7-210](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 5 configuration register.

**Figure 7-207. SASI\_RX\_CH5\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_RX_CH5_CFG[1:0]	SASI_RX_CH5_SLOT_NUM[4:0]					
R-0b	R/W-00b	R/W-00100b					

**Table 7-210. SASI\_RX\_CH5\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_RX_CH5_CFG[1:0]	R/W	0x0	Secondary ASI input channel 5 configuration. 0d = Secondary ASI channel 5 input is disabled 1d = Secondary ASI channel 5 input corresponds to DAC Channel 5 data 2d = Secondary ASI channel 5 input corresponds to ADC Channel 1 output loopback 3d = Reserved
4-0	SASI_RX_CH5_SLOT_NUM[4:0]	R/W	0x4	Secondary ASI input channel 5 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.21 SASI\_RX\_CH6\_CFG Register (Address = 0x2D) [Reset = 0x05]

SASI\_RX\_CH6\_CFG is shown in [Figure 7-208](#) and described in [Table 7-211](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 6 configuration register.

**Figure 7-208. SASI\_RX\_CH6\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_RX_CH6_CFG[1:0]		SASI_RX_CH6_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00101b				

**Table 7-211. SASI\_RX\_CH6\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_RX_CH6_CFG[1:0]	R/W	0x0	Secondary ASI input channel 6 configuration. 0d = Secondary ASI channel 6 input is disabled 1d = Secondary ASI channel 6 input corresponds to DAC Channel 6 data 2d = Secondary ASI channel 6 input corresponds to ADC Channel 2 output loopback 3d = Secondary ASI channel 6 input corresponds to ICLA device 1 data
4-0	SASI_RX_CH6_SLOT_NUM[4:0]	R/W	0x5	Secondary ASI input channel 6 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.22 SASI\_RX\_CH7\_CFG Register (Address = 0x2E) [Reset = 0x06]

SASI\_RX\_CH7\_CFG is shown in [Figure 7-209](#) and described in [Table 7-212](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 7 configuration register.

**Figure 7-209. SASI\_RX\_CH7\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_RX_CH7_CFG[1:0]		SASI_RX_CH7_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00110b				

**Table 7-212. SASI\_RX\_CH7\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_RX_CH7_CFG[1:0]	R/W	0x0	Secondary ASI input channel 7 configuration. 0d = Secondary ASI channel 7 input is disabled 1d = Secondary ASI channel 7 input corresponds to DAC Channel 7 data 2d = Secondary ASI channel 7 input corresponds to ADC Channel 3 output loopback 3d = Secondary ASI channel 7 input corresponds to ICLA device 2 data
4-0	SASI_RX_CH7_SLOT_NUM[4:0]	R/W	0x6	Secondary ASI input channel 7 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.23 SASI\_RX\_CH8\_CFG Register (Address = 0x2F) [Reset = 0x07]

SASI\_RX\_CH8\_CFG is shown in [Figure 7-210](#) and described in [Table 7-213](#).

Return to the [Summary Table](#).

This register is the SASI RX Channel 8 configuration register.

**Figure 7-210. SASI\_RX\_CH8\_CFG Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_RX_CH8_CFG[1:0]		SASI_RX_CH8_SLOT_NUM[4:0]				
R-0b	R/W-00b		R/W-00111b				

**Table 7-213. SASI\_RX\_CH8\_CFG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value
6-5	SASI_RX_CH8_CFG[1:0]	R/W	0x0	Secondary ASI input channel 8 configuration. 0d = Secondary ASI channel 8 input is disabled 1d = Secondary ASI channel 8 input corresponds to DAC Channel 8 data 2d = Secondary ASI channel 8 input corresponds to ADC Channel 4 output loopback 3d = Secondary ASI channel 8 input corresponds to ICLA device 3 data

**Table 7-213. SASI\_RX\_CH8\_CFG Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-0	SASI_RX_CH8_SLOT_NUM[4:0]	R/W	0x7	Secondary ASI input channel 8 slot assignment. 0d = TDM is slot 0 or I <sup>2</sup> S, LJ is left slot 0 1d = TDM is slot 1 or I <sup>2</sup> S, LJ is left slot 1 2d to 14d = Slot assigned as per configuration 15d = TDM is slot 15 or I <sup>2</sup> S, LJ is left slot 15 16d = TDM is slot 16 or I <sup>2</sup> S, LJ is right slot 0 17d = TDM is slot 17 or I <sup>2</sup> S, LJ is right slot 1 18d to 30d = Slot assigned as per configuration 31d = TDM is slot 31 or I <sup>2</sup> S, LJ is right slot 15

### 7.3.24 CLK\_CFG12 Register (Address = 0x32) [Reset = 0x00]

CLK\_CFG12 is shown in [Figure 7-211](#) and described in [Table 7-214](#).

Return to the [Summary Table](#).

This register is the clock configuration register 12.

**Figure 7-211. CLK\_CFG12 Register**

7	6	5	4	3	2	1	0
PDIV_CLKSRC_SEL[1:0]		PASI_BCLK_DIV_CLK_SEL[2:0]			RESERVED		
R/W-00b		R/W-000b			R-000b		

**Table 7-214. CLK\_CFG12 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	PDIV_CLKSRC_SEL[1:0]	R/W	0x0	Source clock selection for PLL PDIV Divider. 0d = PLL_PDIV_IN_CLK is Primary ASI BCLK 1d = PLL_PDIV_IN_CLK is Secondary ASI BCLK 2d = PLL_PDIV_IN_CLK is CCLK 3d = PLL_PDIV_IN_CLK is internal Oscillator Clock
5-3	PASI_BCLK_DIV_CLK_SEL[2:0]	R/W	0x0	Primary ASI BCLK divider clock source selection. 0d = Primary ASI BCLK divider clock source is PLL output 1d = Reserved 2d = Primary ASI BCLK divider clock source is secondary ASI BCLK 3d = Primary ASI BCLK divider clock source is CCLK 4d = Primary ASI BCLK divider clock source is internal oscillator clock 5d = Primary ASI BCLK divider clock source is DSP clock 6d to 7d = Reserved
2-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.3.25 CLK\_CFG13 Register (Address = 0x33) [Reset = 0x00]

CLK\_CFG13 is shown in [Figure 7-212](#) and described in [Table 7-215](#).

Return to the [Summary Table](#).

**Figure 7-212. CLK\_CFG13 Register**

7	6	5	4	3	2	1	0
RESERVED	SASI_BCLK_DIV_CLK_SEL[2:0]			RESERVED			
R-0b	R/W-000b			R-0000b			

**Table 7-215. CLK\_CFG13 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value

**Table 7-215. CLK\_CFG13 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
6-4	SASI_BCLK_DIV_CLK_SEL[2:0]	R/W	0x0	Secondary ASI BCLK divider clock source selection. 0d = Secondary ASI BCLK divider clock source is PLL output 1d = Secondary ASI BCLK divider clock source is primary ASI BCLK 2d = Reserved 3d = Secondary ASI BCLK divider clock source is CCLK 4d = Secondary ASI BCLK divider clock source is internal oscillator clock 5d = Secondary ASI BCLK divider clock source is DSP clock 6d to 7d = Reserved
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

### 7.3.26 CLK\_CFG14 Register (Address = 0x34) [Reset = 0x10]

CLK\_CFG14 is shown in [Figure 7-213](#) and described in [Table 7-216](#).

Return to the [Summary Table](#).

This register is the clock configuration register 14.

**Figure 7-213. CLK\_CFG14 Register**

7	6	5	4	3	2	1	0
DIG_NM_DIV_CLK_SRC_SEL[1:0]		ANA_NM_DIV_CLK_SRC_SEL[1:0]		RESERVED		RESERVED	
R/W-00b		R/W-01b		R-00b		R-00b	

**Table 7-216. CLK\_CFG14 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	DIG_NM_DIV_CLK_SRC_SEL[1:0]	R/W	0x0	Source clock selection for DIG NMDIV CLK clock. 0d = DIG NM divider input clock is Primary ASI BCLK 1d = DIG NM divider input clock is Secondary ASI BCLK 2d = DIG NM divider input clock is CCLK 3d = DIG NM divider input clock is internal oscillator clock
5-4	ANA_NM_DIV_CLK_SRC_SEL[1:0]	R/W	0x1	Source clock selection for NMDIV CLK clock. 0d = NM divider input clock is PLL Output 1d = NM divider input clock is PLL Output 2d = NM divider input clock is DIG NM Divider Clock Source 3d = NM divider input clock is Primary ASI BCLK (Low Jitter Path)
3-2	RESERVED	R	0x0	Reserved bits; Write only reset values
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.3.27 CLK\_CFG15 Register (Address = 0x35) [Reset = 0x01]

CLK\_CFG15 is shown in [Figure 7-214](#) and described in [Table 7-217](#).

Return to the [Summary Table](#).

This register is the clock configuration register 15.

**Figure 7-214. CLK\_CFG15 Register**

7	6	5	4	3	2	1	0
PLL_PDIV[7:0]							
R/W-0000001b							

**Table 7-217. CLK\_CFG15 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PLL_PDIV[7:0]	R/W	0x1	PLL pre-scaler P-divider value (Don't care when auto detection is enabled) 0d = PLL PDIV value is 256 1d = PLL PDIV value is 1 2d = PLL PDIV value is 2 3d to 254d = PLL PDIV value is as per configuration 255d = PLL PDIV value is 255

**7.3.28 CLK\_CFG16 Register (Address = 0x36) [Reset = 0x00]**

CLK\_CFG16 is shown in [Figure 7-215](#) and described in [Table 7-218](#).

Return to the [Summary Table](#).

This register is the clock configuration register 16.

**Figure 7-215. CLK\_CFG16 Register**

7	6	5	4	3	2	1	0
PLL_JMUL_MSB B	PLL_DIV_CLK_ DIG_BY_2	PLL_DMUL_MSB[5:0]					
R/W-0b	R/W-0b	R/W-000000b					

**Table 7-218. CLK\_CFG16 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	PLL_JMUL_MSB	R/W	0x0	PLL integer portion J-multiplier value MSB bit. (Don't care when auto detection is enabled)
6	PLL_DIV_CLK_DIG_BY_2	R/W	0x0	PLL DIV clock divide by 2 configuration 0d = No divide/2 inside PLL 1d = PLL does a divide/2
5-0	PLL_DMUL_MSB[5:0]	R/W	0x0	PLL fractional portion D-multiplier value MSB bits. (Don't care when auto detection is enabled)

**7.3.29 CLK\_CFG17 Register (Address = 0x37) [Reset = 0x00]**

CLK\_CFG17 is shown in [Figure 7-216](#) and described in [Table 7-219](#).

Return to the [Summary Table](#).

This register is the clock configuration register 17.

**Figure 7-216. CLK\_CFG17 Register**

7	6	5	4	3	2	1	0
PLL_DMUL_LSB[7:0]							
R/W-00000000b							

**Table 7-219. CLK\_CFG17 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PLL_DMUL_LSB[7:0]	R/W	0x0	PLL fractional portion D-multiplier value LSB byte. Above D-multiplier value MSB bits (PLL_DMUL_MSB) along with this LSB byte (PLL_DMUL_LSB) is concatenated to determine final D-multiplier value. (Don't care when auto detection is enabled) 0d = PLL DMUL value is 0 1d = PLL DMUL value is 1 2d = PLL DMUL value is 2 3d to 9998d = PLL JMUL value is as per configuration 9999d = PLL JMUL value is 9999 10000d to 16383d = Reserved; Don't use

### 7.3.30 CLK\_CFG18 Register (Address = 0x38) [Reset = 0x08]

CLK\_CFG18 is shown in [Figure 7-217](#) and described in [Table 7-220](#).

Return to the [Summary Table](#).

This register is the clock configuration register 18.

**Figure 7-217. CLK\_CFG18 Register**

7	6	5	4	3	2	1	0
PLL_JMUL_LSB[7:0]							
R/W-00001000b							

**Table 7-220. CLK\_CFG18 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PLL_JMUL_LSB[7:0]	R/W	0x8	PLL integer portion J-multiplier value LSB byte. Above J-multiplier value MSB bit (PLL_JMUL_MSB) along with this LSB byte (PLL_JMUL_LSB) is concatenated to determine final J-multiplier value. (Don't care when auto detection is enabled) 0d = Reserved; Don't use 1d = PLL JMUL value is 1 2d = PLL JMUL value is 2 3d to 510d = PLL JMUL value is as per configuration 511d = PLL JMUL value is 511

### 7.3.31 CLK\_CFG19 Register (Address = 0x39) [Reset = 0x20]

CLK\_CFG19 is shown in [Figure 7-218](#) and described in [Table 7-221](#).

Return to the [Summary Table](#).

This register is the clock configuration register 19.

**Figure 7-218. CLK\_CFG19 Register**

7	6	5	4	3	2	1	0
NDIV[2:0]			PDM_DIV[2:0]			RESERVED	
R/W-001b			R/W-000b			R-00b	

**Table 7-221. CLK\_CFG19 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-5	NDIV[2:0]	R/W	0x1	NDIV divider value. (Don't care when auto detection is enabled) 0d = NDIV value is 8 1d = NDIV value is 1 2d = NDIV value is 2 3d to 6d = NDIV value is as per configuration 7d = NDIV value is 7

**Table 7-221. CLK\_CFG19 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
4-2	PDM_DIV[2:0]	R/W	0x0	PDM divider value. (Don't care when auto detection is enabled) 0d = PDM_DIV value is 1 1d = PDM_DIV value is 2 2d = PDM_DIV value is 4 3d = PDM_DIV value is 8 4d = PDM_DIV value is 16 5d-7d Reserved
1-0	RESERVED	R	0x0	Reserved bits; Write only reset values

### 7.3.32 CLK\_CFG20 Register (Address = 0x3A) [Reset = 0x04]

CLK\_CFG20 is shown in [Figure 7-219](#) and described in [Table 7-222](#).

Return to the [Summary Table](#).

This register is the clock configuration register 20.

**Figure 7-219. CLK\_CFG20 Register**

7	6	5	4	3	2	1	0
MDIV[5:0]						DIG_ADC_MODCLK_DIV[1:0]	
R/W-000001b						R/W-00b	

**Table 7-222. CLK\_CFG20 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-2	MDIV[5:0]	R/W	0x1	MDIV divider value. (Don't care when auto detection is enabled) 0d = MDIV value is 64 1d = MDIV value is 1 2d = MDIV value is 2 3d to 62d = MDIV value is as per configuration 63d = MDIV value is 63
1-0	DIG_ADC_MODCLK_DIV[1:0]	R/W	0x0	ADC modulator clock divider value. (Don't care when auto detection is enabled) 0d = DIG_ADC_MODCLK_DIV value is 1 1d = DIG_ADC_MODCLK_DIV value is 2 2d = DIG_ADC_MODCLK_DIV value is 4 3d = Reserved

### 7.3.33 CLK\_CFG21 Register (Address = 0x3B) [Reset = 0x00]

CLK\_CFG21 is shown in [Figure 7-220](#) and described in [Table 7-223](#).

Return to the [Summary Table](#).

This register is the clock configuration register 21.

**Figure 7-220. CLK\_CFG21 Register**

7	6	5	4	3	2	1	0
RESERVED	DIG_DAC_MODCLK_DIV[1:0]		RESERVED	PASI_BDIV_MS B	SASI_BDIV_MS B	RESERVED	
R-00b	R/W-00b		R-0b	R/W-0b	R/W-0b	R-0b	

**Table 7-223. CLK\_CFG21 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset values

**Table 7-223. CLK\_CFG21 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
5-4	DIG_DAC_MODCLK_DIV[1:0]	R/W	0x0	DAC modulator clock divider value. (Don't care when auto detection is enabled) 0d = DIG_DAC_MODCLK_DIV value is 1 1d = DIG_DAC_MODCLK_DIV value is 2 2d = DIG_DAC_MODCLK_DIV value is 4 3d = Reserved
3	RESERVED	R	0x0	Reserved bit; Write only reset value
2	PASI_BDIV_MSB	R/W	0x0	Primary ASI BCLK divider value MSB bit. (Don't care when auto detection is enabled)
1	SASI_BDIV_MSB	R/W	0x0	Secondary ASI BCLK divider value MSB bit. (Don't care when auto detection is enabled)
0	RESERVED	R	0x0	Reserved bit; Write only reset value

### 7.3.34 CLK\_CFG22 Register (Address = 0x3C) [Reset = 0x01]

CLK\_CFG22 is shown in [Figure 7-221](#) and described in [Table 7-224](#).

Return to the [Summary Table](#).

This register is the clock configuration register 18.

**Figure 7-221. CLK\_CFG22 Register**

7	6	5	4	3	2	1	0
PASI_BDIV_LSB[7:0]							
R/W-00000001b							

**Table 7-224. CLK\_CFG22 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	PASI_BDIV_LSB[7:0]	R/W	0x1	Secondary ASI BCLK divider value. (Don't care when auto detection is enabled) 0d = SASI BCLK divider value is 512 1d = SASI BCLK divider value is 1 2d = SASI BCLK divider value is 2 3d to 62d = SASI BCLK divider value is as per configuration 63d = SASI BCLK divider value is 511

### 7.3.35 CLK\_CFG23 Register (Address = 0x3D) [Reset = 0x01]

CLK\_CFG23 is shown in [Figure 7-222](#) and described in [Table 7-225](#).

Return to the [Summary Table](#).

This register is the clock configuration register 18.

**Figure 7-222. CLK\_CFG23 Register**

7	6	5	4	3	2	1	0
SASI_BDIV_LSB[7:0]							
R/W-00000001b							

**Table 7-225. CLK\_CFG23 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-0	SASI_BDIV_LSB[7:0]	R/W	0x1	Secondary ASI BCLK divider value. (Don't care when auto detection is enabled) 0d = SASI BCLK divider value is 512 1d = SASI BCLK divider value is 1 2d = SASI BCLK divider value is 2 3d to 62d = SASI BCLK divider value is as per configuration 63d = SASI BCLK divider value is 511

**7.3.36 CLK\_CFG24 Register (Address = 0x3E) [Reset = 0x01]**

CLK\_CFG24 is shown in [Figure 7-223](#) and described in [Table 7-226](#).

Return to the [Summary Table](#).

This register is the clock configuration register 21.

**Figure 7-223. CLK\_CFG24 Register**

7	6	5	4	3	2	1	0
RESERVED			ANA_NM_DIV[5:0]				
R-00b			R/W-000001b				

**Table 7-226. CLK\_CFG24 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	RESERVED	R	0x0	Reserved bits; Write only reset value
5-0	ANA_NM_DIV[5:0]	R/W	0x1	Analog N-M DIV divider value. (Don't care when auto detection is enabled) 0d = ANA_NM_DIV value is 64 1d = ANA_NM_DIV value is 1 2d = ANA_NM_DIV value is 2 3d to 62d = ANA_NM_DIV value is as per configuration 63d = NDIV value is 63

**7.3.37 CLK\_CFG30 Register (Address = 0x44) [Reset = 0x00]**

CLK\_CFG30 is shown in [Figure 7-224](#) and described in [Table 7-227](#).

Return to the [Summary Table](#).

**Figure 7-224. CLK\_CFG30 Register**

7	6	5	4	3	2	1	0
RESERVED					NDIV_EN	MDIV_EN	PDM_DIV_EN
R-00000b					R/W-0b	R/W-0b	R/W-0b

**Table 7-227. CLK\_CFG30 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-3	RESERVED	R	0x0	Reserved bits; Write only reset value
2	NDIV_EN	R/W	0x0	NDIV divider enable 0d = divider disabled 1d = divider enabled
1	MDIV_EN	R/W	0x0	MDIV divider enable 0d = divider disabled 1d = divider enabled

**Table 7-227. CLK\_CFG30 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
0	PDM_DIV_EN	R/W	0x0	PDM divider enable 0d = divider disabled 1d = divider enabled

### 7.3.38 CLK\_CFG31 Register (Address = 0x45) [Reset = 0x00]

CLK\_CFG31 is shown in [Figure 7-225](#) and described in [Table 7-228](#).

Return to the [Summary Table](#).

**Figure 7-225. CLK\_CFG31 Register**

7	6	5	4	3	2	1	0
DIG_ADC_DEM_DIV_EN	DIG_ADC_MODCLK_DIV_EN	DIG_DAC_DEM_DIV_EN	DIG_DAC_MODCLK_DIV_EN	PASI_BDIV_EN	SASI_BDIV_EN	PASI_FSYNC_DIV_EN	SASI_FSYNC_DIV_EN
R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b

**Table 7-228. CLK\_CFG31 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	DIG_ADC_DEM_DIV_EN	R/W	0x0	ADC DEM divider enable 0d = divider disabled 1d = divider enabled
6	DIG_ADC_MODCLK_DIV_EN	R/W	0x0	ADC MODCLK divider enable 0d = divider disabled 1d = divider enabled
5	DIG_DAC_DEM_DIV_EN	R/W	0x0	DAC DEM divider enable 0d = divider disabled 1d = divider enabled
4	DIG_DAC_MODCLK_DIV_EN	R/W	0x0	DAC MODCLK divider enable 0d = divider disabled 1d = divider enabled
3	PASI_BDIV_EN	R/W	0x0	PASI BDIV divider enable 0d = divider disabled 1d = divider enabled
2	SASI_BDIV_EN	R/W	0x0	SASI BDIV divider enable 0d = divider disabled 1d = divider enabled
1	PASI_FSYNC_DIV_EN	R/W	0x0	PASI FSYNC DIV divider enable 0d = divider disabled 1d = divider enabled
0	SASI_FSYNC_DIV_EN	R/W	0x0	SASI FSYNC DIV divider enable 0d = divider disabled 1d = divider enabled

### 7.3.39 CLKOUT\_CFG1 Register (Address = 0x46) [Reset = 0x00]

CLKOUT\_CFG1 is shown in [Figure 7-226](#) and described in [Table 7-229](#).

Return to the [Summary Table](#).

This register is the CLKOUT configuration register 1.

**Figure 7-226. CLKOUT\_CFG1 Register**

7	6	5	4	3	2	1	0
RESERVED					CLKOUT_CLK_SEL[2:0]		
R-00000b					R/W-000b		

Figure 7-226. CLKOUT\_CFG1 Register (continued)

Table 7-229. CLKOUT\_CFG1 Register Field Descriptions

Bit	Field	Type	Reset	Description
7-3	RESERVED	R	0x0	Reserved bits; Write only reset value
2-0	CLKOUT_CLK_SEL[2:0]	R/W	0x0	General Purpose CLKOUT divider clock source selection. 0d = Source clock is PLL output 1d = Source clock is primary ASI BCLK 2d = Source clock is secondary ASI BCLK 3d = Source clock is CCLK 4d = Source clock is internal oscillator clock 5d = Source clock is DSP clock 6d to 7d = Reserved

### 7.3.40 CLKOUT\_CFG2 Register (Address = 0x47) [Reset = 0x01]

CLKOUT\_CFG2 is shown in Figure 7-227 and described in Table 7-230.

Return to the [Summary Table](#).

This register is the CLKOUT configuration register 2.

Figure 7-227. CLKOUT\_CFG2 Register

7	6	5	4	3	2	1	0
CLKOUT_DIV_EN	CLKOUT_DIV[6:0]						
R/W-0b	R/W-000001b						

Table 7-230. CLKOUT\_CFG2 Register Field Descriptions

Bit	Field	Type	Reset	Description
7	CLKOUT_DIV_EN	R/W	0x0	CLKOUT divider enable. 0d = CLKOUT divider disabled 1d = CLKOUT divider enabled
6-0	CLKOUT_DIV[6:0]	R/W	0x1	CLKOUT DIV divider value. 0d = CLKOUT_DIV value is 128 1d = CLKOUT_DIV value is 1 2d = CLKOUT_DIV value is 2 3d to 126d = CLKOUT_DIV value is as per configuration 127d = CLKOUT_DIV value is 127

### 7.3.41 BSTCLK\_CFG1 Register (Address = 0x48) [Reset = 0x00]

BSTCLK\_CFG1 is shown in Figure 7-228 and described in Table 7-231.

Return to the [Summary Table](#).

This register is the Boost clock configuration register 1

Figure 7-228. BSTCLK\_CFG1 Register

7	6	5	4	3	2	1	0
RESERVED	BST_CLK_FRE_Q_SEL	BST_CLK_SRC_AUTO_DIS	BST_CLK_SRC_MANUAL_SEL	BST_CLK_EN_AUTO_DIS	BST_CLK_MANUAL_EN	BST_CLK_MANUAL_DIV[1:0]	
R-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-00b	

Table 7-231. BSTCLK\_CFG1 Register Field Descriptions

Bit	Field	Type	Reset	Description
7	RESERVED	R	0x0	Reserved bit; Write only reset value

**Table 7-231. BSTCLK\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
6	BST_CLK_FREQ_SEL	R/W	0x0	Boost clock frequency mode 0d = Boost clock frequency is ~6MHz 1d = Boost clock frequency is ~3MHz
5	BST_CLK_SRC_AUTO_DISABLE	R/W	0x0	Boost divider source clock auto selection disable 0d = Boost divider source clock auto-selection based on clock detection scheme 1d = Boost divider source clock auto-selection disabled and selected based on BST_CLK_SRC_SEL
4	BST_CLK_SRC_MANUAL_SEL	R/W	0x0	Boost clock source manual selection (don't care in auto mode) 0d = Boost clock generated based on Audio clock available for ADC/DAC 1d = Boost clock generated based on internal oscillator clock
3	BST_CLK_EN_AUTO_DISABLE	R/W	0x0	Boost divider source clock auto selection disable 0d = Boost divider auto-enabled 1d = Boost divider enabled/disabled based on manual control using BST_CLK_MANUAL_EN
2	BST_CLK_MANUAL_EN	R/W	0x0	Boost divider manual enable (don't care in auto mode) 0d = Boost divider disabled 1d = Boost divider enabled
1-0	BST_CLK_MANUAL_DIV[1:0]	R/W	0x0	Boost divider value (don't care in auto mode) 0d = Boost divider value is 1 1d = Boost divider value is 2 2d = Boost divider value is 4 3d = Boost divider value is 8

**7.3.42 SARCLK\_CFG1 Register (Address = 0x49) [Reset = 0x00]**

SARCLK\_CFG1 is shown in [Figure 7-229](#) and described in [Table 7-232](#).

Return to the [Summary Table](#).

This register is the SAR clock configuration register 1

**Figure 7-229. SARCLK\_CFG1 Register**

7	6	5	4	3	2	1	0
SAR_CLK_FREQ_SEL[1:0]	SAR_CLK_SRC_AUTO_DISABLE	SAR_CLK_SRC_MANUAL_SEL	SAR_CLK_EN_AUTO_DISABLE	SAR_CLK_MANUAL_EN	SAR_CLK_MANUAL_DIV[1:0]		
R/W-00b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-0b	R/W-00b	

**Table 7-232. SARCLK\_CFG1 Register Field Descriptions**

Bit	Field	Type	Reset	Description
7-6	SAR_CLK_FREQ_SEL[1:0]	R/W	0x0	SAR clock frequency mode 0d = SAR clock frequency is ~6MHz 1d = SAR clock frequency is ~3MHz 2d = SAR clock frequency is ~1.5MHz 3d = SAR clock frequency is ~12MHz (valid only when SAR clock is generated directly using internal oscillator clock)
5	SAR_CLK_SRC_AUTO_DISABLE	R/W	0x0	SAR divider source clock auto selection disable 0d = SAR divider source clock auto-selection based on clock detection scheme 1d = SAR divider source clock auto-selection disabled and selected based on BST_CLK_SRC_SEL
4	SAR_CLK_SRC_MANUAL_SEL	R/W	0x0	SAR clock source manual selection (don't care in auto mode) 0d = SAR clock generated based on Audio clock available for ADC/DAC 1d = SAR clock generated based on internal oscillator clock

**Table 7-232. SARCLK\_CFG1 Register Field Descriptions (continued)**

Bit	Field	Type	Reset	Description
3	SAR_CLK_EN_AUTO_DISABLE	R/W	0x0	SAR divider source clock auto selection disable 0d = SAR divider auto-enabled 1d = SAR divider enabled/disabled based on manual control using BST_CLK_EN
2	SAR_CLK_MANUAL_EN	R/W	0x0	SAR divider manual enable (don't care in auto mode) 0d = SAR divider disabled 1d = SAR divider enabled
1-0	SAR_CLK_MANUAL_DIV[1:0]	R/W	0x0	SAR divider value (don't care in auto mode) 0d = SAR divider value is 1 1d = SAR divider value is 2 2d = SAR divider value is 4 3d = SAR divider value is 8

### 7.3.43 ADC\_OVRD\_FLAG Register (Address = 0x5B) [Reset = 0x00]

ADC\_OVRD\_FLAG is shown in [Figure 7-230](#) and described in [Table 7-233](#).

Return to the [Summary Table](#).

**Figure 7-230. ADC\_OVRD\_FLAG Register**

7	6	5	4	3	2	1	0
ADC_CH1_OVRD_LTCH	ADC_CH2_OVRD_LTCH	ADC_CH1_OVRD_LIVE	ADC_CH2_OVRD_LIVE	RESERVED			
R-0b	R-0b	R-0b	R-0b	R-0000b			

**Table 7-233. ADC\_OVRD\_FLAG Register Field Descriptions**

Bit	Field	Type	Reset	Description
7	ADC_CH1_OVRD_LTCH	R	0x0	ADC CH1 OVRD fault (self clearing bit). 0b = No ADC CH1 OVRD fault 1b = ADC CH1 OVRD fault
6	ADC_CH2_OVRD_LTCH	R	0x0	ADC CH2 OVRD fault (self clearing bit). 0b = No ADC CH2 OVRD fault 1b = ADC CH2 OVRD fault
5	ADC_CH1_OVRD_LIVE	R	0x0	ADC CH1 OVRD fault (self clearing bit). 0b = No ADC CH1 OVRD fault 1b = ADC CH1 OVRD fault
4	ADC_CH2_OVRD_LIVE	R	0x0	ADC CH2 OVRD fault (self clearing bit). 0b = No ADC CH2 OVRD fault 1b = ADC CH2 OVRD fault
3-0	RESERVED	R	0x0	Reserved bits; Write only reset value

## 8 Application and Implementation

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### Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

---

### 8.1 Application Information

The TAC5412-Q1 is a stereo, high-performance audio codec that supports sample rates of up to 768 kHz. The device supports up to a total of 4 microphones for simultaneous recording which can be selected from up to 2 analog microphones or 4 digital pulse density modulation (PDM) microphones. The device also supports up to 4 channel simultaneous playback which can be configured as a 2 channel differential or psuedo differential output or up to 4 channel single-ended output with options for headphone and lineout drive capabilities.

Communication to the TAC5412-Q1 for configuration of the control registers is supported using an I<sup>2</sup>C or SPI interface. The device supports a highly flexible, audio serial interface (TDM, I<sup>2</sup>S, and LJ) to transmit audio data seamlessly in the system across devices.

### 8.2 Typical Application

#### 8.2.1 Application

Figure 8-1 shows a typical configuration of the TAC5412-Q1 for an application using two analog ECM microphones for simultaneous recording and two channel lineout operation with an I<sup>2</sup>C control interface and a time-division multiplexing (TDM) audio data target interface. For best distortion performance, use input AC-coupling capacitors with a low-voltage coefficient.

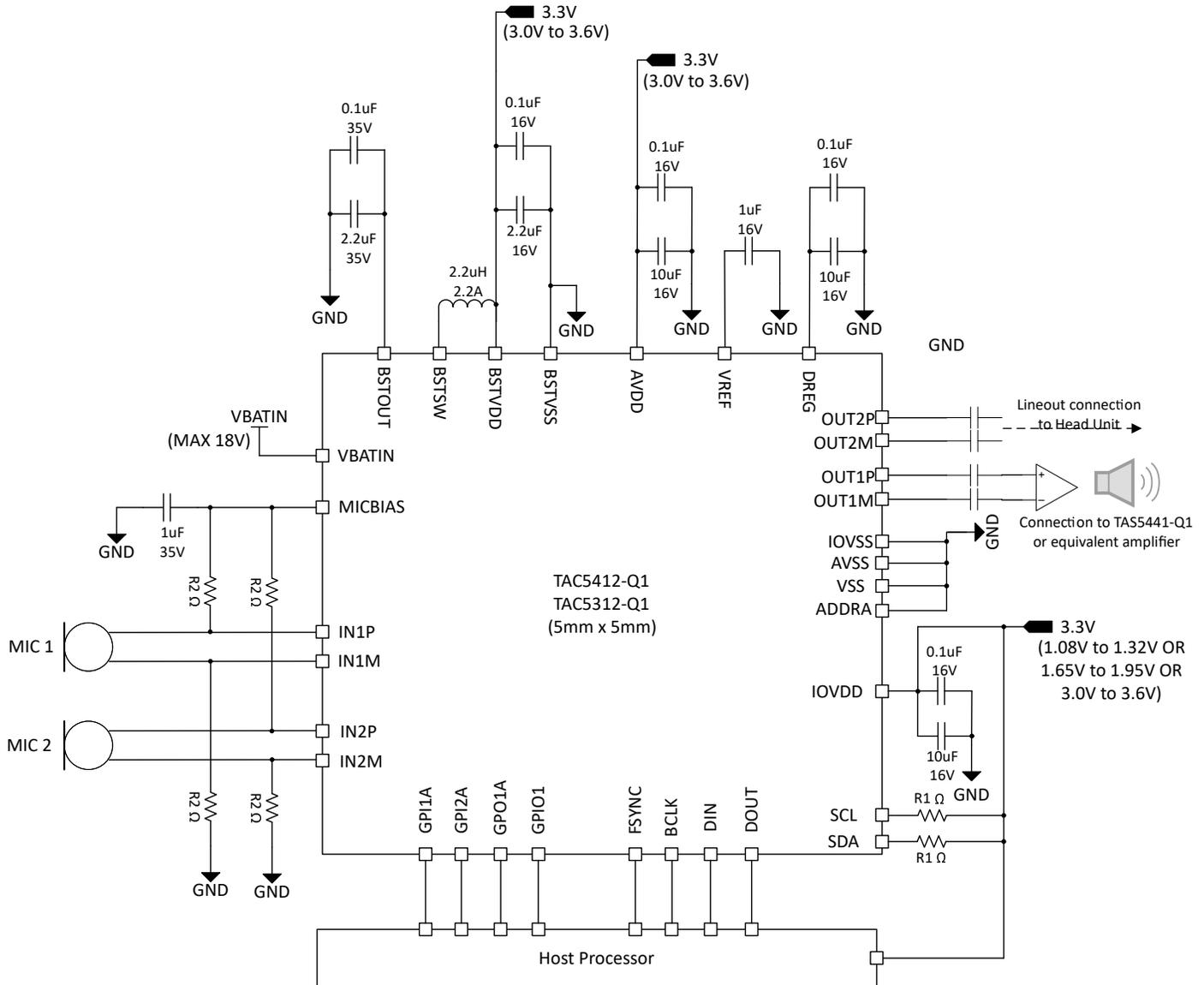


Figure 8-1. Stereo Microphone with Stereo Lineout Block Diagram

### 8.2.2 Design Requirements

Table 8-1 lists the design parameters for this application.

Table 8-1. Design Parameters

PARAMETER	VALUE
AVDD	3.3V
BSTVDD	3.3V
IOVDD	1.2V or 1.8V or 3.3V
AVDD supply current consumption	TBD
BSTVDD supply current consumption	TBD
IOVDD supply current consumption	TBD
Maximum MICBIAS current	30mA
Load on OUT1M, OUT1P, OUT2M, OUT2P	>600 ohms

ADVANCE INFORMATION

### 8.2.3 Detailed Design Procedure

This section describes the necessary steps to configure the TAC5412-Q1 for this specific application. The following steps provide a sequence of items that must be executed in the time between powering the device up and reading data from the device or transitioning from one mode to another mode of operation.

1. Apply power to the device:
  - a. Power up the IOVDD, BSTVDD and AVDD power supplies
  - b. Wait for at least 1ms to allow the device to initialize the internal registers.
  - c. The device now goes into sleep mode (low-power mode < 10  $\mu$ A)
2. Transition from sleep mode to active mode whenever required for the operation:
  - a. Wake up the device by writing to P0\_R2 to disable sleep mode
  - b. Wait for at least 1 ms to allow the device to complete the internal wake-up sequence
  - c. Override the default configuration registers or programmable coefficients value as required (this step is optional)
  - d. Enable all desired input channels by writing to P0\_R118
  - e. Enable all desired audio serial interface input/output channels by writing to P0\_R40 to P0\_R47 for DAC and P0\_R30 to P0\_R37 for ADC
  - f. Power-up the ADC, DAC and MICBIAS by writing to P0\_R120
  - g. Apply FSYNC and BCLK with the desired output sample rates and the BCLK to FSYNC ratio

This specific step can be done at any point in the sequence after step a.

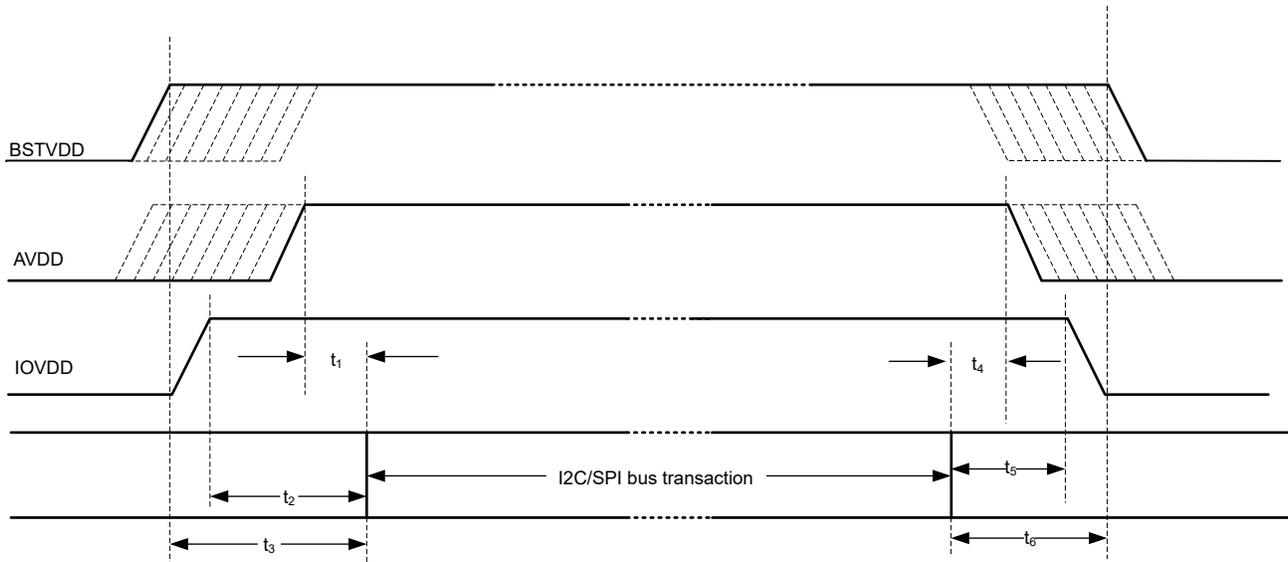
See the [Section 6.3.3](#) section for supported sample rates and the BCLK to FSYNC ratio.

- h. The device recording data is now sent to the host processor using the TDM audio serial data bus and playback data from TDM is now played on the lineout
3. Transition from active mode to sleep mode (again) as required in the system for low-power operation:
  - a. Enter sleep mode by writing to P0\_R2 to enable sleep mode
  - b. Wait at least 6 ms (when FSYNC = 48 kHz) for the volume to ramp down and for all blocks to power down
  - c. Read P0\_R122 to check the device shutdown and sleep mode status
  - d. If the device P0\_R122\_D[7:5] status bit is 3'b100 then stop FSYNC and BCLK in the system
  - e. The device now goes into sleep mode (low-power mode < 10  $\mu$ A) and retains all register values
4. Transition from sleep mode to active mode (again) as required for the recording operation:
  - a. Wake up the device by writing to P0\_R2 to disable sleep mode
  - b. Wait at least 1 ms to allow the device to complete the internal wake-up sequence
  - c. Apply FSYNC and BCLK with the desired output sample rates and the BCLK to FSYNC ratio
  - d. The device recording data is now sent to the host processor using the TDM audio serial data bus and playback data from TDM is now played on the lineout
5. Repeat step 4 and step 5 as required for mode transitions

## 9 Power Supply Recommendations

The power-supply sequence between the IOVDD, BSTVDD and AVDD rails can be applied in any order. However, after all supplies are stable, then only initiate the I<sup>2</sup>C or SPI transactions to initialize the device.

For the supply power-up requirement,  $t_1$ ,  $t_2$  and  $t_3$  must be at least 2 ms to allow the device to initialize the internal registers. For the supply power-down requirement,  $t_4$ ,  $t_5$  and  $t_6$  must be at least 10 ms. This timing (as shown in Figure 9-1) allows the device to ramp down the volume on the record data, power down the analog and digital blocks, and put the device into shutdown mode. The device can also be immediately put into shutdown mode by ramping down power supplies, but doing so causes an abrupt shutdown.



**Figure 9-1. Power-Supply Sequencing Requirement Timing Diagram**

Make sure that the supply ramp rate is slower than  $0.1V/\mu s$  and that the wait time between a power-down and a power-up event is at least 100 ms. For supply ramp rate slower than  $0.1 V/ms$ , host device must apply a software reset as first transaction before doing any device configuration. Make sure all digital input pins are at valid input levels and not toggling during supply sequencing.

The TAC5412-Q1 supports a single AVDD supply operation by integrating an on-chip digital regulator, DREG, and an analog regulator, AREG.

## 10 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

### 10.1 Documentation Support

#### 10.1.1 Related Documentation

### 10.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](http://ti.com). Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 10.3 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

### 10.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.  
All trademarks are the property of their respective owners.

### 10.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 10.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

## 11 Revision History

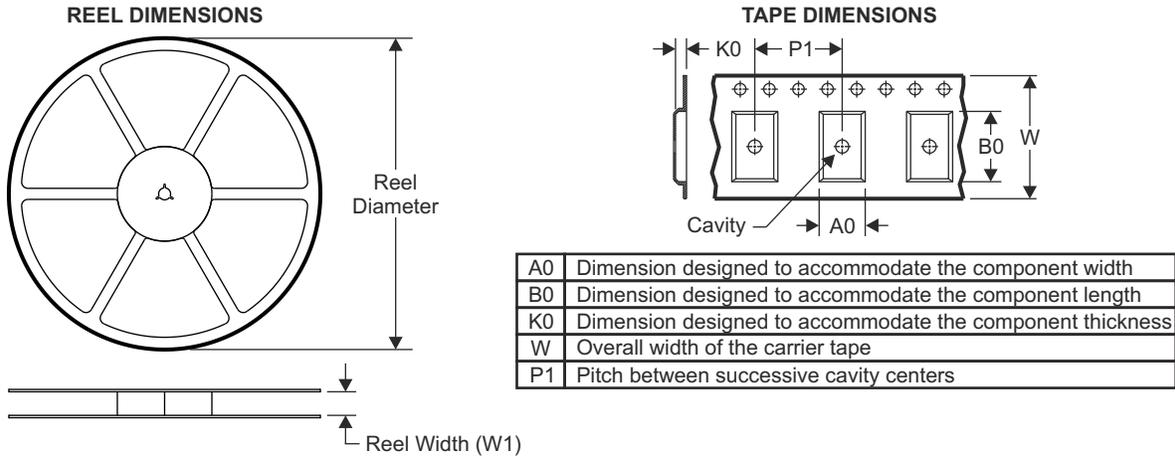
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
January 2024	*	Initial Release

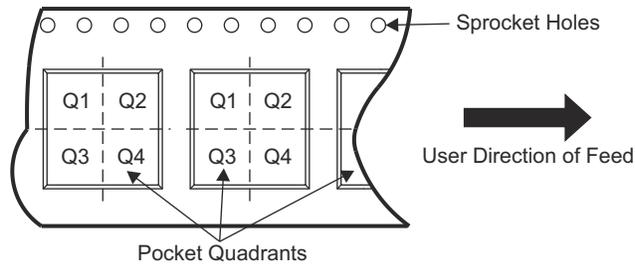
## 12 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

### 12.1 Tape and Reel Information



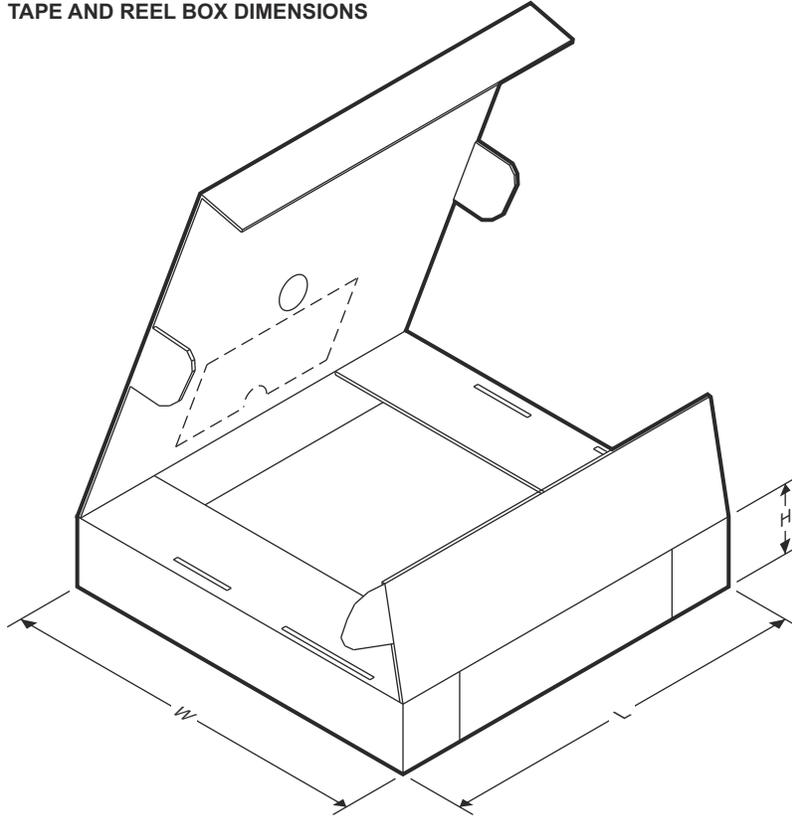
#### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
XC5412WQRTVRQ1	WQFN	RTV	32	3000	330.0	12.4	5.3	5.3	1.1	8.0	12.0	Q1

**ADVANCE INFORMATION**

**TAPE AND REEL BOX DIMENSIONS**



**ADVANCE INFORMATION**

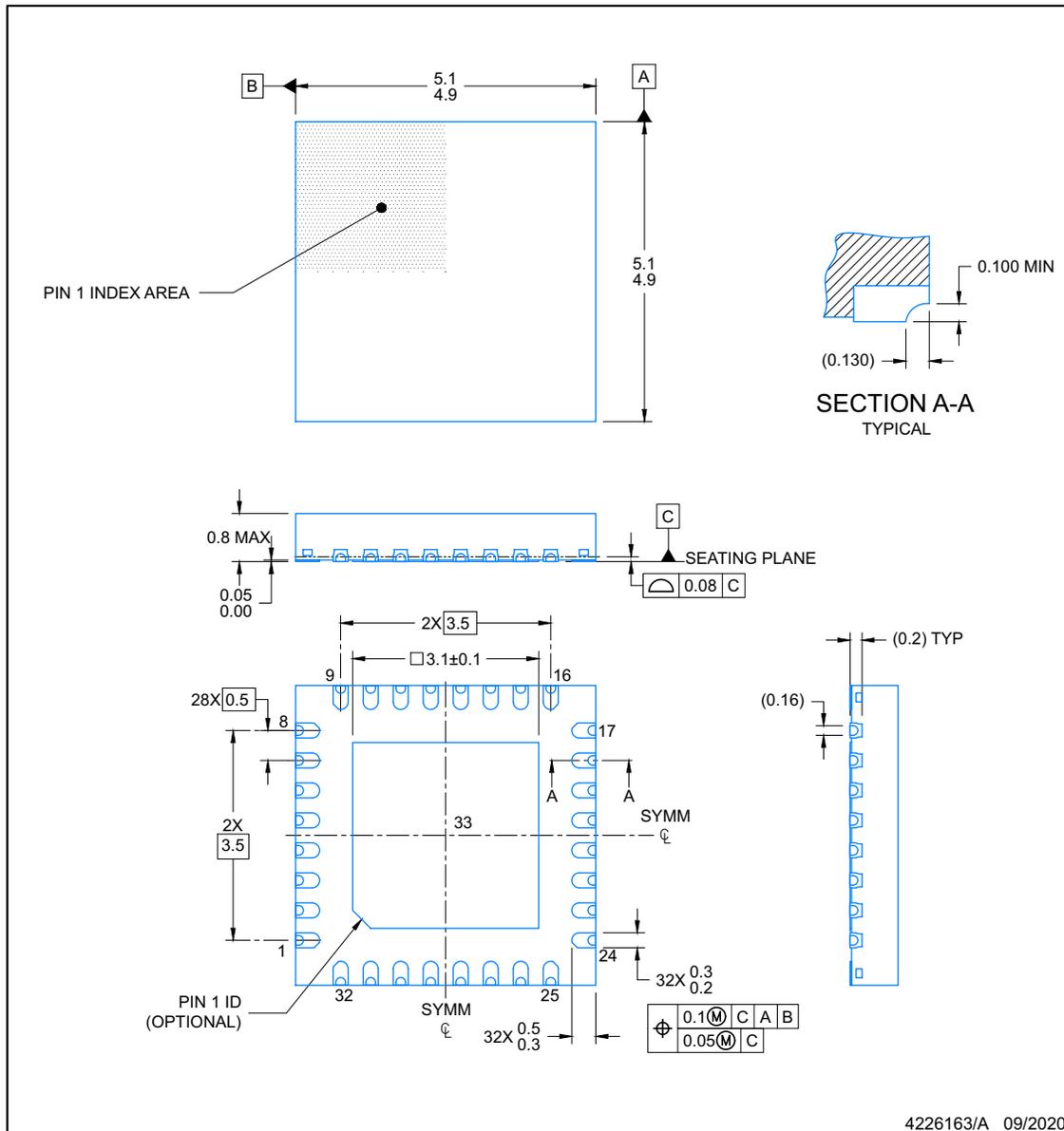
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
XC5412WQRTVRQ1	WQFN	RTV	32	3000	367.0	367.0	35.0

**PACKAGE OUTLINE**

**RTV0032U**

**WQFN - 0.8 mm max height**

PLASTIC QUAD FLATPACK-NO LEAD



**NOTES:**

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for optimal thermal and mechanical performance.

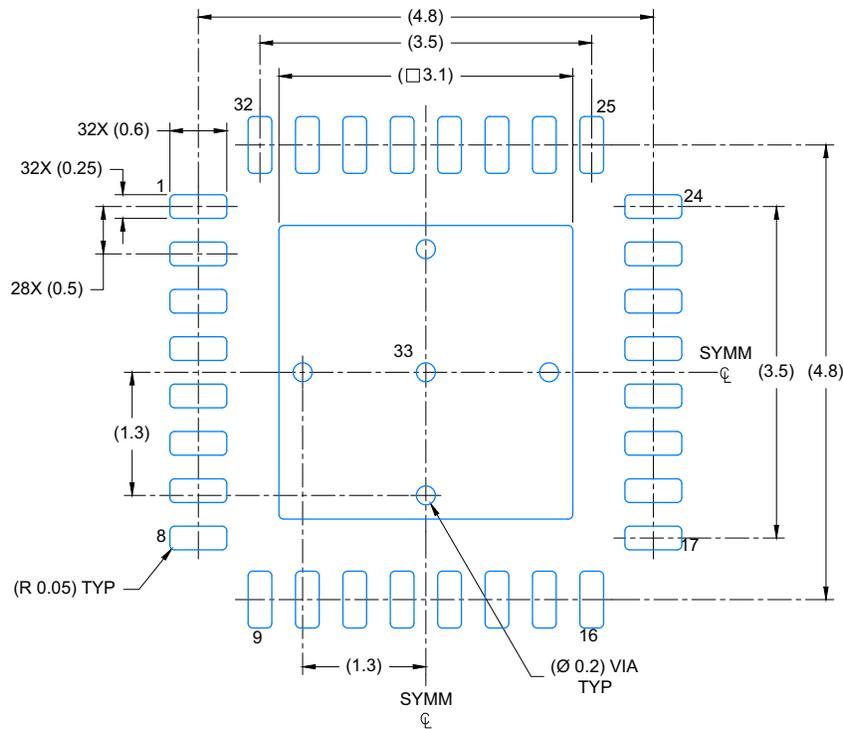
**ADVANCE INFORMATION**

## EXAMPLE BOARD LAYOUT

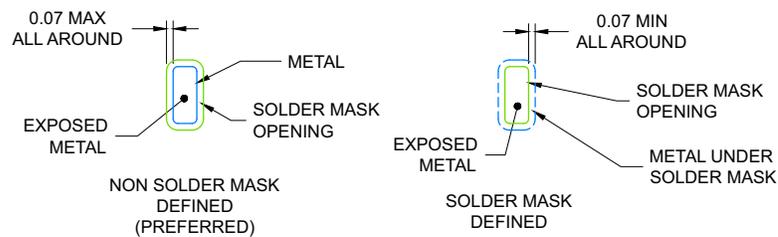
**RTV0032U**

**WQFN - 0.8 mm max height**

PLASTIC QUAD FLATPACK-NO LEAD



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 15X



SOLDER MASK DETAILS

4226163/A 09/2020

NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

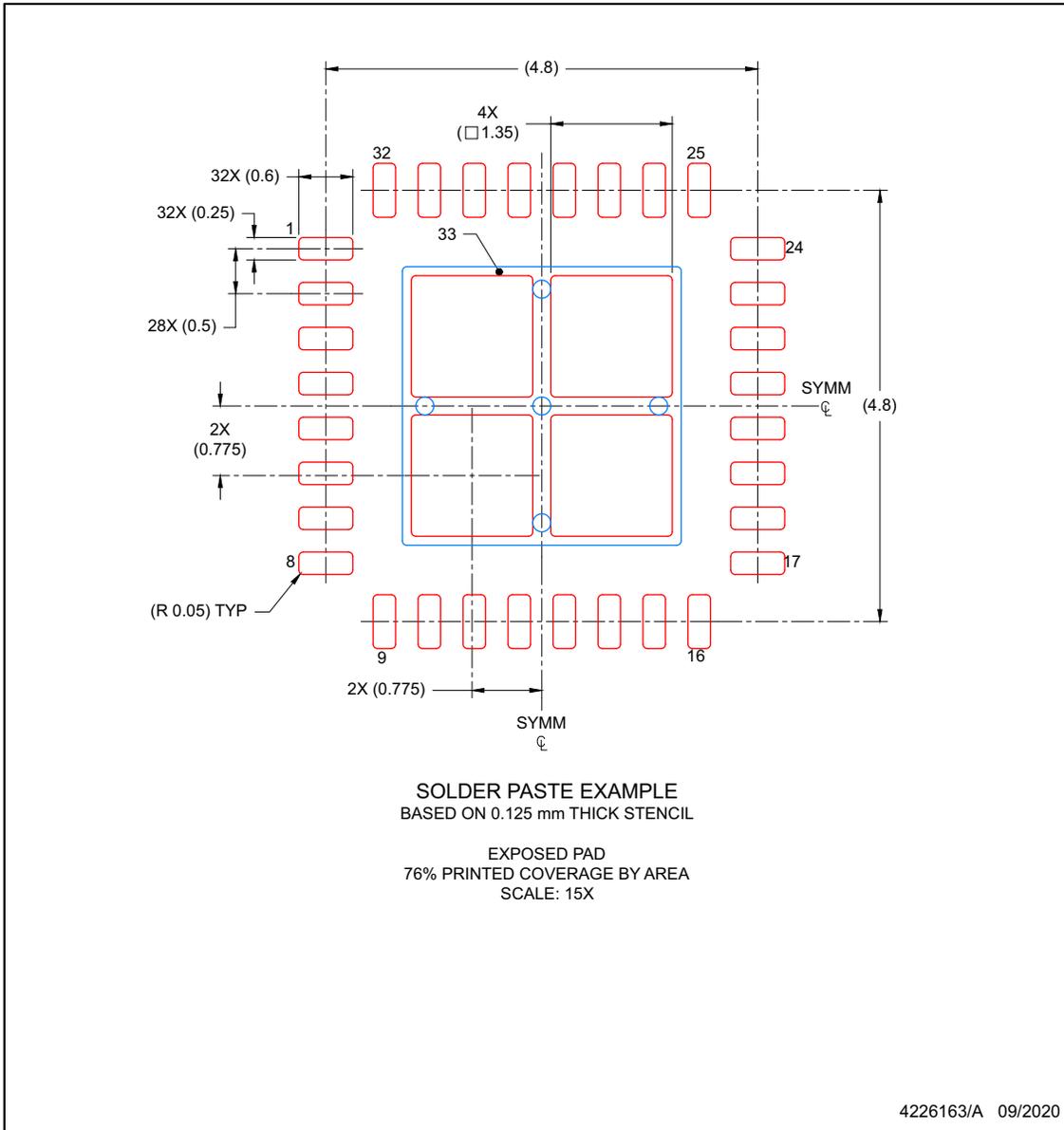
ADVANCE INFORMATION

**EXAMPLE STENCIL DESIGN**

**RTV0032U**

**WQFN - 0.8 mm max height**

PLASTIC QUAD FLATPACK-NO LEAD



NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

**ADVANCE INFORMATION**

**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
XC5412WQRTVRQ1	ACTIVE	WQFN	RTV	32	3000	TBD	Call TI	Call TI	-40 to 125		Samples

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSELETE:** TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

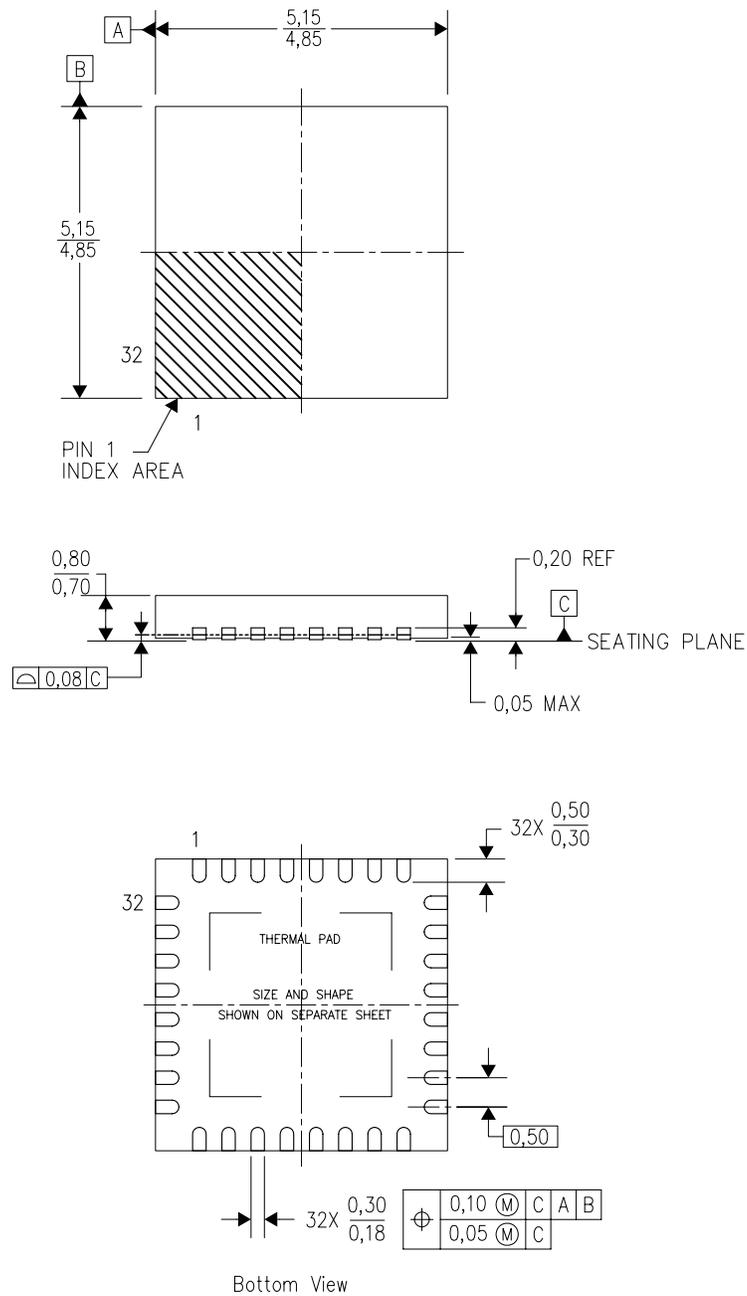
(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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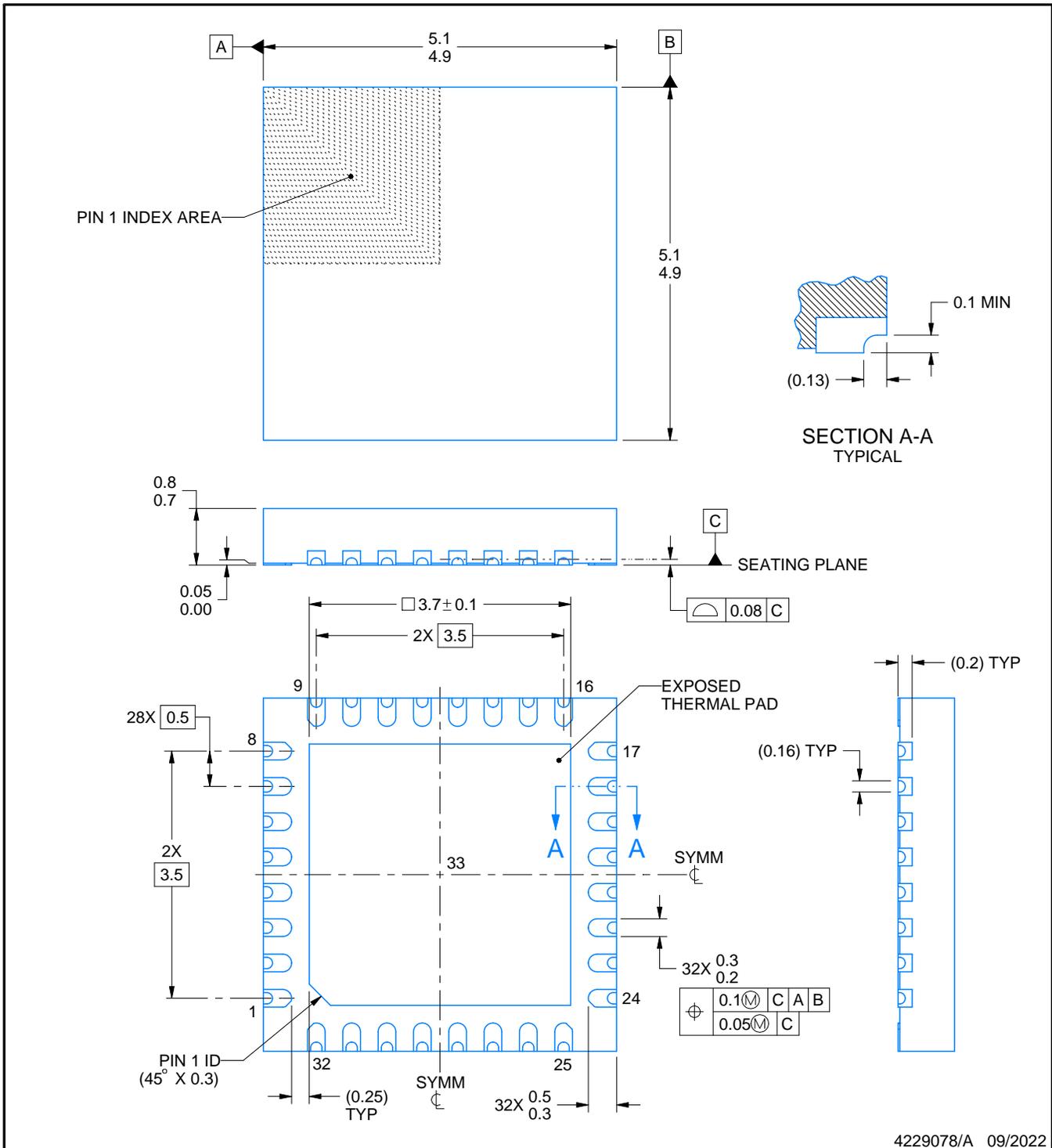
RTV (S-PWQFN-N32)

PLASTIC QUAD FLATPACK NO-LEAD



4206245/C 10/11

- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5-1994.
  - B. This drawing is subject to change without notice.
  - C. Quad Flatpack, No-Leads (QFN) package configuration.
  - D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
  - E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
  - F. Falls within JEDEC MO-220.



4229078/A 09/2022

NOTES:

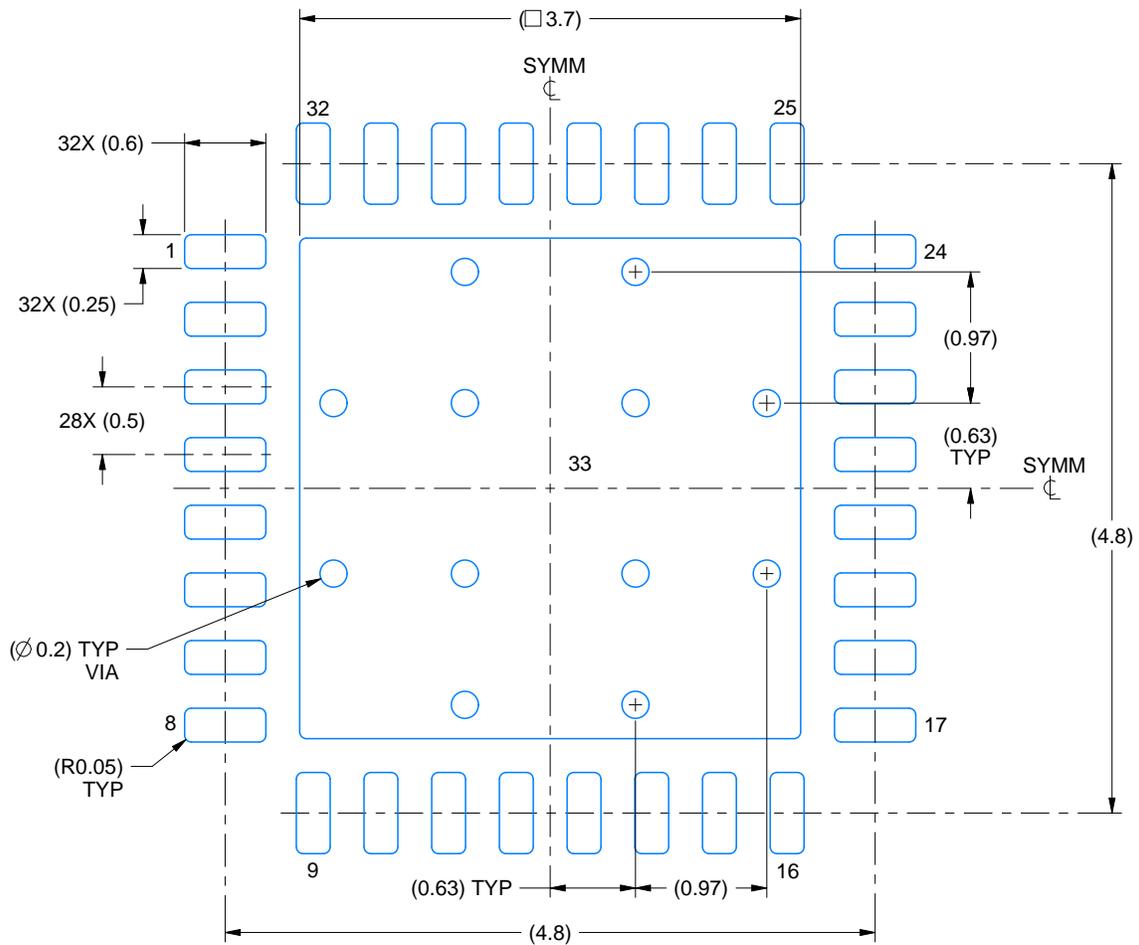
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

# EXAMPLE BOARD LAYOUT

RTV0032L

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:18X



SOLDER MASK DETAILS

4229078/A 09/2022

NOTES: (continued)

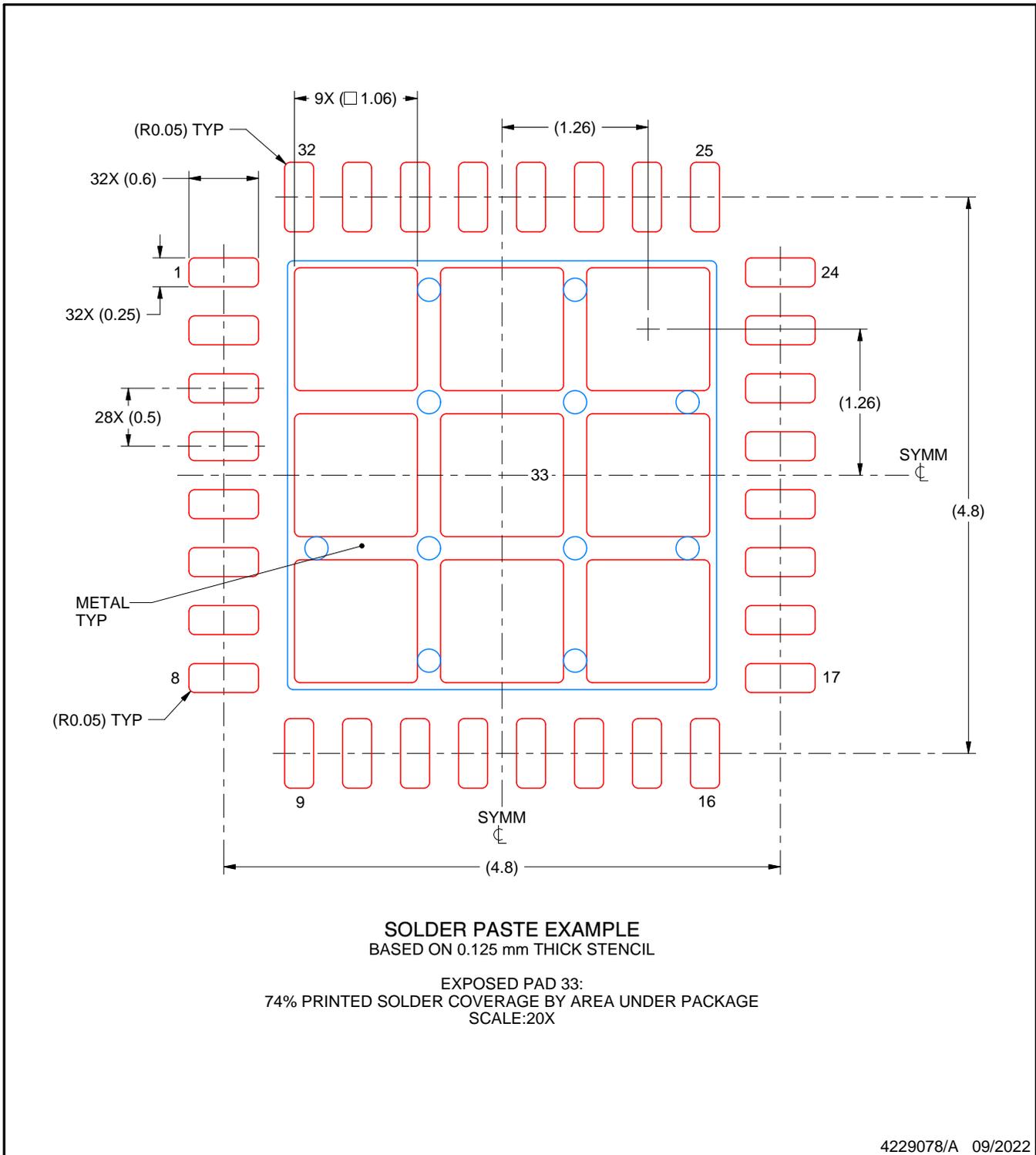
- This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
- Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

# EXAMPLE STENCIL DESIGN

RTV0032L

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

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