

FEATURES

- ARM application processor, Max Speed 96MHz
- Internal 16M bits SPI serial Flash
- DSP Code Max speed 170MHz
- Ultra-low-power consumption design 3.5mA @ power-down; 15.4mA @standby; 25mA @active playback
- Support USB 2.0 Full Speed with UAC 1.0
- Build in 24-bit DAC/ADC with 48K sampling rate
- Build in mono ADC, SNR 104dB, THD+N<-91dB
- Build in stereo DAC, SNR 114dB, THD+N<-101dB
- Build in stereo 22mW PA for headphone
- Fully configurable PEQ, up to 20 segments
- Support Serial Interface: UART, I2C
- Support 14 GPIO, 3 wake-up IO, 4 PWM for LED controller
- Operating voltage: I/O 1.8~3.3V, Core 1.1V
- Package QFN-44 (4mm*5mm, Pitch 0.35mm)

The CM6572 features an ARM core and DSP code, along with a comprehensive range of interfaces, including UART, PWM, I2C, and GPIO, to support diverse USB audio applications. Additionally, it incorporates Cmedia's Xear™ Sound Technology—Surround HP and hardware DSP-based AI noise cancellation and Acoustic Echo Cancellation—to deliver users an exceptional near-end auditory experience while transmitting clear voice quality to the far end by filtering out surrounding noise.

The diagram illustrates the HiFi DAC system architecture, centered around a **DSP** (Digital Signal Processor) and a **Codec** (Digital-to-Analog Converter).

System Components and Connections:

- USB Interface:** Connected to the **Control Bus**.
- Crystal 32MHz:** Provides a clock signal to the **Control Bus**.
- Control Bus:** A central vertical bus connecting the USB Interface, Crystal 32MHz, SPI 16Mb Nor Flash, ARM, and the DSP.
- SPI 16Mb Nor Flash:** Connected to the **Control Bus**.
- ARM:** Connected to the **Control Bus**.
- DSP (Digital Signal Processor):**
 - Receives **Mic_DSP_side_tone** and **Mic_side_tone** signals.
 - Contains a **10-Band PEQ** (Parametric Equalizer) and a **20-Band PEQ for L&R** (Left and Right channels).
 - Processes signals through **AI NR** (Artificial Noise Reduction) and **side_tone** processing blocks.
 - Outputs **side_tone** signals to the **Codec**.
- Codec (Digital-to-Analog Converter):**
 - Input:** Receives **Mic_side_tone** and **Mic_DSP_side_tone** signals, processed by an **ADC** (Analog-to-Digital Converter).
 - Output:** Outputs **DACL** (Left Channel) and **DACR** (Right Channel) signals to the **Headphone Out**.
- Headphone Out:** Receives the **DACL** and **DACR** signals.
- GPIO x 14 PWM LED X4 Uart, I2C:** A general-purpose I/O block connected to the **Control Bus**.

Release notes

Revision	Date	Description
1.00	2024/12/10	Formal release

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1 Description and overview

The CM6572 is a next generation, ultra-low-power single-chip USB audio solution with an integrated DSP, specifically designed for mobile USB gaming headsets and USB microphones that demand high performance and low power consumption.

The CM6572 features an ARM core and DSP code, along with a comprehensive range of interfaces, including UART, PWM, I2C, and GPIO, to support diverse USB audio applications. Additionally, it incorporates Cmedia's Xear™ Sound Technology—Surround HP and hardware DSP-based AI noise cancellation and Acoustic Echo Cancellation—to deliver users an exceptional near-end auditory experience while transmitting clear voice quality to the far end by filtering out surrounding noise.

2 Ordering information

Product	Package Marking	Package Type	Transport Media	Storage Temperature
CM6572	CM6572	QFN-44 (4mm x 5mm)	Tray	-55 to 150°C

3 Features

3.1 System

- ARM with Floating Point Unit (FPU) maximum speed 96MHz
- DSP code maximum speed 170MHz
- Internal 16Mbits QSPI serial Flash
- Support USB and UART for mass production and upgrade program

3.2 USB Compliance

- USB 2.0 Full Speed
- USB Audio Class 1.0
- Audio data supports up to 24-bits and 48k sampling rate

3.3 Audio Paths and Interface

- Build in mono channels 24-bit input sigma-delta ADC, SNR 102dB, THD+N<-90dB
- ADC supports sample rate 48KHz
- Build in stereo 24-bit input sigma-delta DAC, SNR 120dB, THD+N<-100dB, Noise<2uVrms
- Build in stereo 22mW PA for headphone
- DAC supports sample rate 48KHz

3.4 Audio Processing

- Fully configurable PEQ, up to 20 segments
- Xear™ Surround Sound Technology by Driver
- Xear™ AI noise cancellation H/W DSP
- Xear™ Acoustic Echo Cancellation H/W DSP

3.5 Physical Interface

- Support 14 GPIO, 3 wake-up IO
- Support 4 PWM for LED controller
- Serial Interface: I2C, UART
- Integrated 10bit SAR A/D converter

3.6 Power Management

- Operating voltage: I/O 1.8~3.3V, Core 1.1V
- Integrated 2*DC-DC buck converters

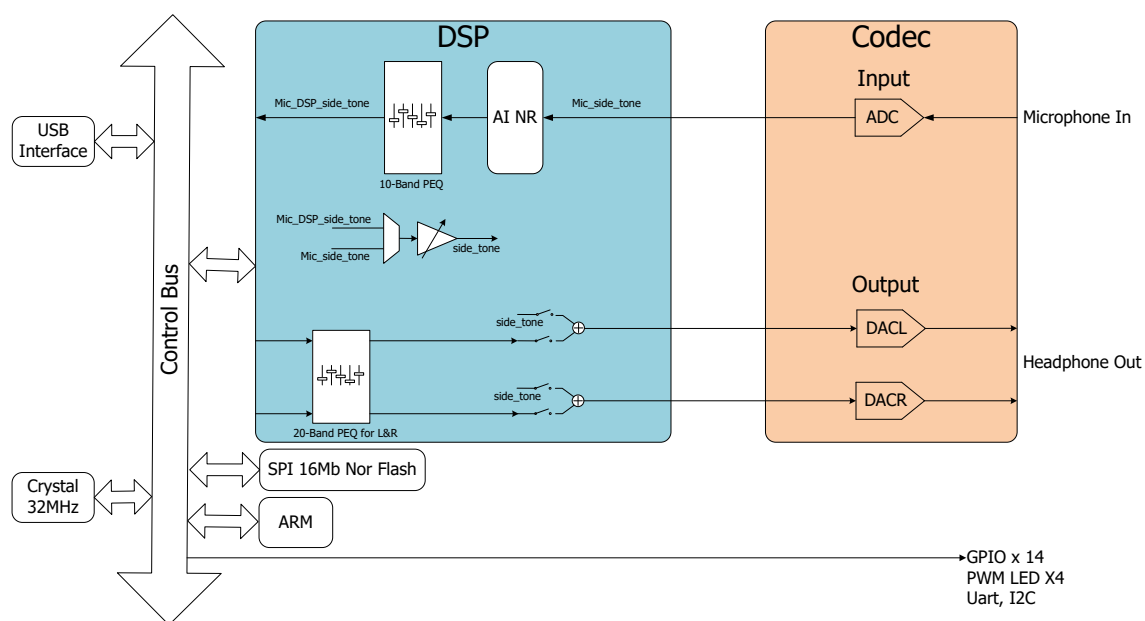
3.7 Others

- Package QFN-44 (4mm*5mm, Pitch 0.35mm)

4 Applications

- USB gaming headset
- USB type-C Headset
- USB type-C dongle
- USB docking
- USB microphone
- DSP standalone mode

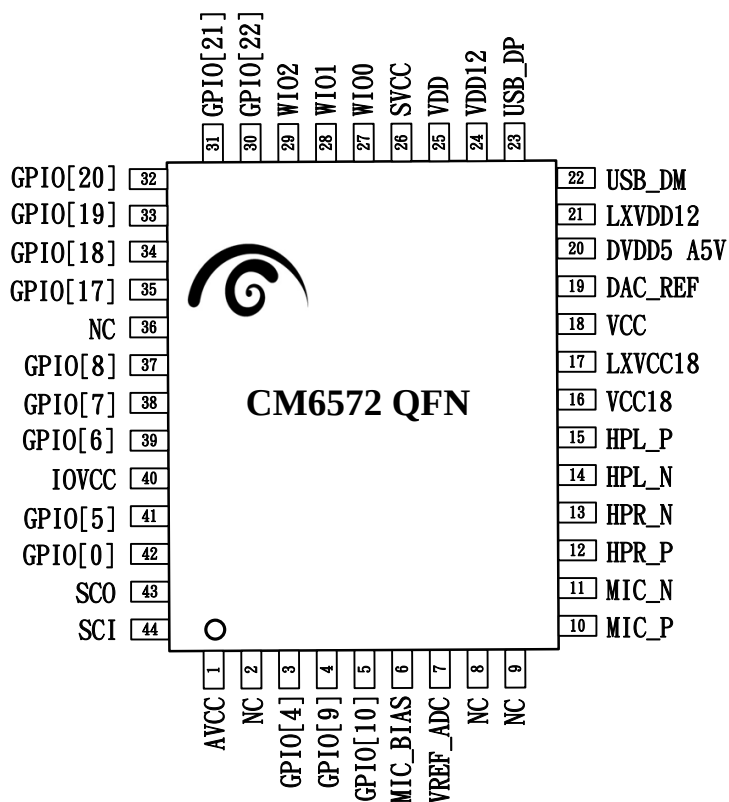
5 Block Diagram



CM6572 Functional Block Diagram

6 System Description

6.1 Pin-Out



6.2 Pin Description

Pin #	Symbol	I/O	Description
USB2.0 FS BUS Interface			
22	USB_DM	AIO	USB data negative (USB D- signal).
23	USB_DP	AIO	USB data positive (USB D+ signal).
Power/Ground			
1	AVCC	PWR	Analog power
6	MIC_BIAS	AO	Microphone Bias for ECM microphone
7	VREF_ADC	PWR	Voltage reference for ADC
16	VCC18	PWR	1.8V power
17	LXVCC18	PWR	VCC1.8V power
18	VCC	PWR	3.3V power
19	DAC_REF	PWR	Voltage reference for DAC
20	DVDD5 A5V	PWR	USB5V digital/analog single power
21	LXVDD12	PWR	VDD1.2V power
24	VDD12	PWR	1.2V power
25	VDD	PWR	1.1V power
26	SVCC	PWR	2.7V power

40	IOVCC	PWR	IO power 3.3V/1,8V
Audio Interface			
10	MIC_P	AI	Microphone Input
11	MIC_N	AI	Microphone Input
12	HPR_P	AO	Right channel of Headphone output
13	HPR_N	AO	Right channel of Headphone output
14	HPL_N	AO	Left channel of Headphone output
15	HPL_P	AO	Left channel of Headphone output
GPIO			
3	GPIO_4	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
4	GPIO_9	DIO	IOVCC I/O power, Digital I/O and I2C interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
5	GPIO_10	DIO	IOVCC I/O power, Digital I/O and I2C interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
30	GPIO_22	DIO	VCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default High level
31	GPIO_21	DIO	VCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default Low level
32	GPIO_20	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
33	GPIO_19	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
34	GPIO_18	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
35	GPIO_17	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
37	GPIO_8	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
38	GPIO_7	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
39	GPIO_6	DIO	IOVCC I/O power, Digital I/O and UART interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
41	GPIO_5	DIO	IOVCC I/O power, Digital I/O interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
42	GPIO_0	DIO	IOVCC I/O power, Digital I/O and UART interface bidirectional buffer with 2/4/6/10 mA driving current default high resistance
27	WIO0	DIO	SVCC I/O power, Wake up I/O interface default high resistance
28	WIO1	DIO	SVCC I/O power, Wake up I/O interface default high resistance
29	WIO2	DIO	SVCC I/O power, Wake up I/O interface default high resistance
OSC			
43	SCO	AO	32MHz clock output
44	SCI	AI	32MHz clock input
Miscellaneous			
2	NC	N	NC
8	NC	N	NC
9	NC	N	NC
36	NC	N	NC
45	EPAD	GND	Exposed pad as Digital ground

7 Electrical Characteristics

7.1 Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ	Max.	Unit
Supply Voltage	DC5V	4.3	5	5.5	V
Input Voltage	3.3V IO	2.8	3.3	3.4	V
	1.8V IO	1.62	1.8	1.98	V
Operating ambient temperature	T _A	-40		+85	°C
Storage temperature	T _S	-55		+150	°C
ESD Protection(Human Body Model)	HBM	3K			V

7.2 Recommended Operational Conditions

Supply Voltage	Min.	Typ	Max.	Units
DC5V	4.3	5	6	V
VCC	2.8	3.1	3.4	V
SVCC	2.6	2.8	3.0	V
AVCC	2.6	2.8	3.0	V
VCC18	1.62	1.8	1.98	V
VDD	0.81	1.1	1.21	V
VDD12	1.26	1.4	1.6	V
IOVCC	1.62	1.8/3.1	3.4	V
Operating ambient temperature	-	25	-	°C

7.3 DC Characteristics

Parameter	Symbol	Min.	Max.	Units	Units
Low-level input voltage	V _{IL}		0.6	V	3.1V GPIO pin IOVCC = 3.1V T _{amb} = -10 to 70 °C
High-level input voltage	V _{IH}	2.4		V	
Low-level output voltage	V _{OL}		0.6	V	
High-level output voltage	V _{OH}	2.4		V	
Low-level input voltage	V _{IL}		0.3	V	1.8V GPIO pin IOVCC = 1.8V T _{amb} = -10 to 70 °C
High-level input voltage	V _{IH}	1.5		V	
Low-level output voltage	V _{OL}		0.3	V	
High-level output voltage	V _{OH}	1.5		V	

7.4 Power Consumption

Test Conditions: DVDD50_A5V=USB 5V, DGND =0V, @ Active, Sample Rate=48kHz, 24Bits, 32ohm loading

Items	Test Conditions	Test Values			Unit
		Min.	Typ.	Max.	
Current consumption @ Power down	Jack unplugged power-down mode		3.5		mA
Current consumption @ Standby (Idle)	OSC clock=32MHz		15.4		mA
Current consumption @ Active	Play+Record		25		mA

7.5 ADC Performance

Pre-Amplifier					
Parameter	Condition	Min.	Typ	Max.	Unit
Full Scale Input Voltage	Single-ended input ADC gain = 0dB	-	-	577	mVrms
	Differential input ADC gain = 0dB			1.16	Vrms
Analogue gain	6dB step	-12	-	12	dB
Analog to Digital Converter					
Resolution	-	-	-	24	Bits
Input Sample Rate	-	8	-	48	kHz
SNR	Differential input ADC gain = 0dB fin = 1KHz@0dBFS B/W = 20Hz~20kHz Fs = 48KHz A-Weighting	-	104	-	dBA
	Single-ended input ADC gain = 0dB fin = 1KHz@0dBFS B/W = 20Hz~20kHz Fs = 48KHz A-Weighting	-	102	-	dBA
Dynamic Range	Differential input ADC gain = 0dB fin = 1KHz@0dBFS B/W = 20Hz~20kHz Fs = 48KHz A-Weighting	-	104	-	dBA
	Single-ended input ADC gain = 0dB fin = 1KHz@0dBFS	-	100	-	dBA

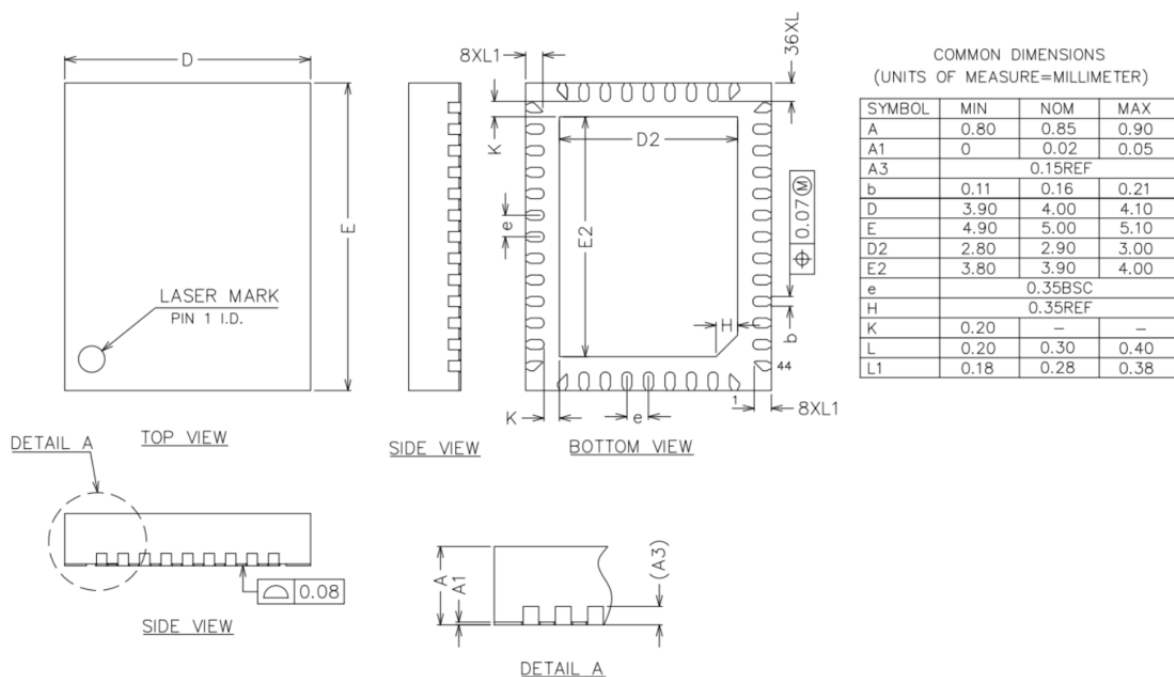
	B/W = 20Hz~20kHz Fs = 48KHz A-Weighting				
THD+N	Differential input ADC gain = 0dB fin = 1KHz@0dBFS B/W = 20Hz~20kHz Fs = 48KHz A-Weighting	-	-91	-	dB
	Single-ended input ADC gain = 0dB fin = 1KHz@0dBFS B/W = 20Hz~20kHz Fs = 48KHz A-Weighting	-	-88	-	dB
Digital gain	1dB step	0	-	49	dB

7.6 DAC Performance

Digital to Analog Converter					
Parameter	Condition	Min.	Typ	Max.	Unit
Resolution	-	-	-	24	Bits
Output Sample Rate	-	8	-	48	kHz
SNR	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 10KΩ Differential Output swing = 0.95Vrms	-	114	-	dBA
	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 32Ω Differential Output swing = 770mVrms		113		dBA
	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 16Ω Differential Output swing = 600mVrm		110		dBA
Dynamic Range	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 10KΩ Differential Output swing = 0.95Vrms		110		dBA
	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 32Ω Differential Output swing = 770mVrms		110		dBA
	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 16Ω Differential Output swing = 600mVrm		110		dBA

THD+N	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 10KΩ Differential Output swing = 0.95Vrms		-101		dB
	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 32Ω Differential Output swing = 770mVrms		-92		dB
	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 16Ω Differential Output swing = 600mVrm		-89		dB
Digital gain	0.375 dB/step (Can set to mute)	-98	-	24	dB
Stereo crosstalk	Fin = 1KHz@0dBFS input B/W = 20Hz~20KHz, A-Weighting Fs = 48KHz, Load = 10KΩ Differential Output swing = 0.95Vrms	-	-130	-	dB
Max Amplitude	fin = 1KHz@0dBFS input Fs = 48KHz, Load = 10KΩ	Differential Output swing	-	-	950 Vrms
		Single-ended Output swing	-	-	470 Vrms
Max Output Power	fin = 1KHz@0dBFS input Fs = 48KHz, Load = 16Ω Differential Output swing = 600mVrms		-	-	20 mW
	fin = 1KHz@0dBFS input Fs = 48KHz, Load=16Ω Single-ended Output swing = 470mVrms		-	-	14 mW
Noise Floor	Differential Output swing = 950mVrms A-Weighting		1.9		uVrms
	Single-ended Output swing = 470mVrms A-Weighting		3.9		uVrms

8 Package Information



— End of Datasheet —

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