The Coprocessor for Xear Audio Technology Authentication
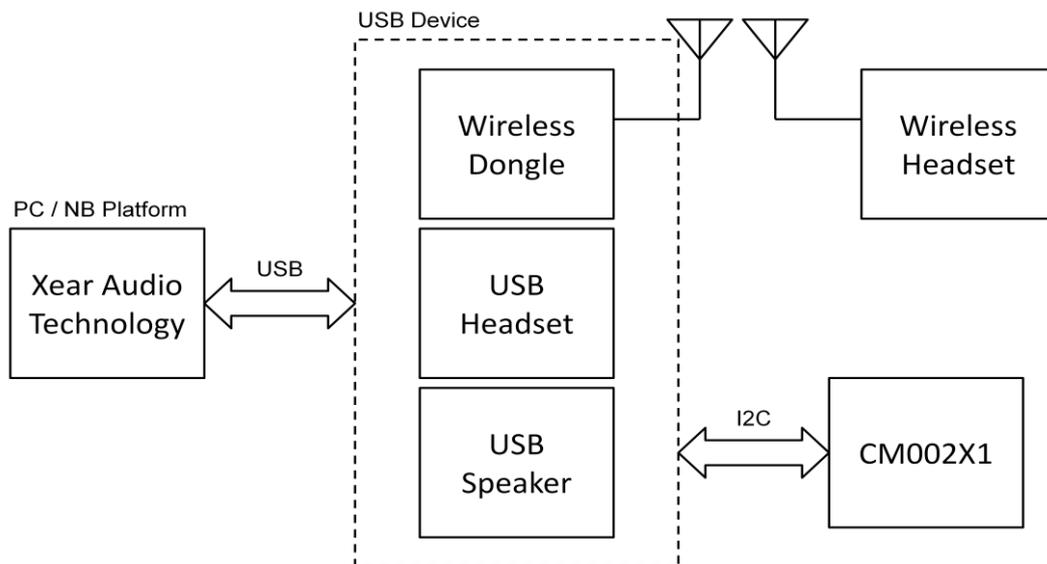
DESCRIPTION

The CM002X1 is a coprocessor to enable Xear Audio Technology. The CM002X1 is only accessed via I2C interface which is in salve mode, and it is the highly integrated circuit with crystal-less design and small package size of SOT-23 1.5mm x 2.9mm.

The application can be used for USB headset, USB speaker, USB microphone, wireless dongle with wireless headset and so on.

FEATURES

- Provide individual security authentication for Xear audio technology
- Support I2C slave interface
- Crystal-less design
- Low power consumption
- SOT-23 1.5mm x 2.9mm package size

Application Scenario

CM002X1 Application Scenario

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Release Notes

Revision	Date	Description
1.0	2023/06/30	First release

1   Description and Overview

The CM002X1 is a coprocessor to enable Xear Audio Technology. The CM002X1 is only accessed via I2C interface which is in salve mode, and it is the highly integrated circuit with crystal-less design and small package size of SOT-23 1.5mm x 2.9mm. The application can be used for USB headset, USB speaker, USB microphone, wireless dongle with wireless headset and so on.

2   Ordering Information

| Model No.	Package	Storage Ambient Temperature	Supply Range
CM002X1	6-pin SOT-23, 1.5mm × 2.9mm	-40°C to +120°C	V_{CC} = 3.0V ~ 3.6V

3   Features

- Provide individual security authentication for Xear audio technology
- Support I2C slave interface
- Crystal-less design
- Low power consumption
- Operating voltage from 3.0V to 3.6V
- 6-pin SOT-23 1.5mm x 2.9mm package size

4 Pin Descriptions

4.1 Pin Assignment

Pin #	Signal Name	Description
1	NC	Not Connected
2	GND	Ground
3	SCL	I2C Serial Clock Input
4	SDA	I2C Serial Data Input / Output
5	NC	Not Connected
6	VCC	3.3V Digital Supply Voltage

4.2 Pin-Out Diagram (Top View)

NC 1   6 VCC

GND 2   5 NC

SCL 3   4 SDA

YYWW
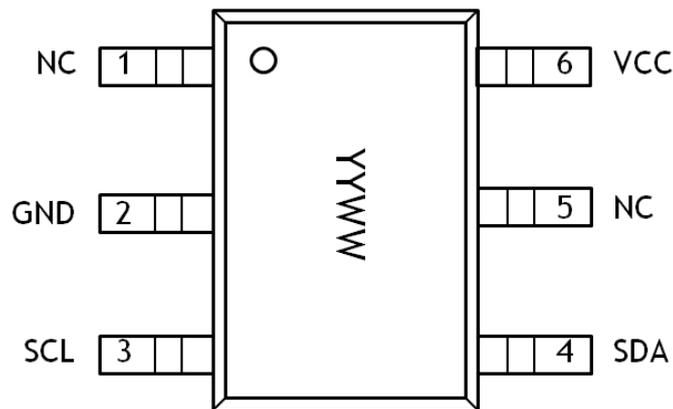
Package Type : SOT-23-6L
Package Size : 1.5mm x 2.9mm
YY : Production Year
WW : Production Week

5 I2C Interface (Two Wire Interface)

The I2C Interface is ideally suited for typical microcontroller applications. The I2C protocol allows the systems designer to interconnect up to 128 different devices using only two bus lines, one for clock (SCL) and one for data (SDA). The only external hardware has to implement the bus is a single pull-up resistor for each of the TWI (Two-Wire Interface) bus lines. All devices connect to the bus have individual addresses. CM002X1 operates as a slave device on the I2C bus. I2C interface on CM002X1 is compatible with Phillips Format, supporting up to 400 Kbps. For the specified address and write data can be referred CM002X1 programming guide.

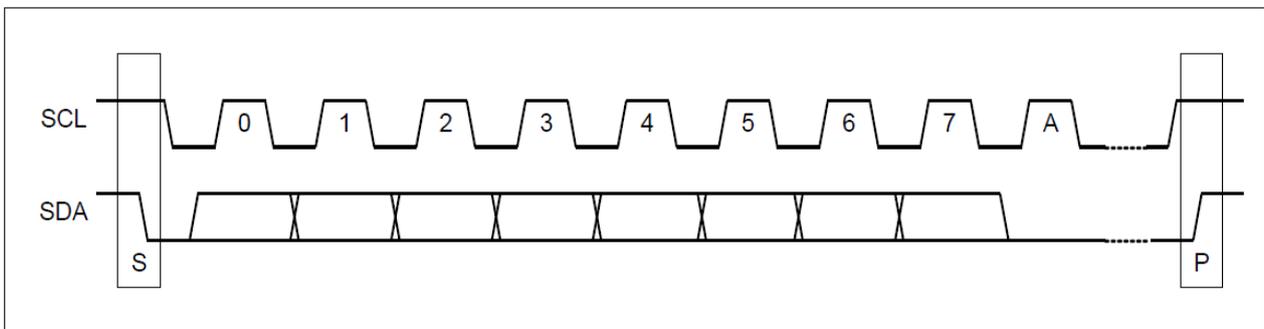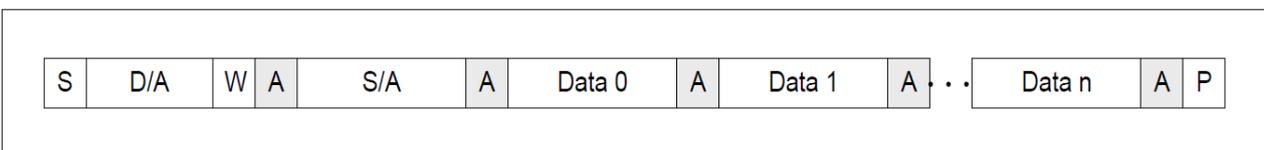Figure 5-1. I2C Interface

5.1 Write Packet Structure

Figure 5-2. Write Packet Structure

S: Start

D/A: Device Address (Slave Address) 7 bit

W: Device Address Write bit (0)

A: Acknowledge

S/A: Sub Address

Data 0 ~ n: Write Data

P: Stop

5.2 Read Packet Structure

S	D/A	W	A	S/A	A	Sr	D/A	R	A	Data 0	A	· · ·

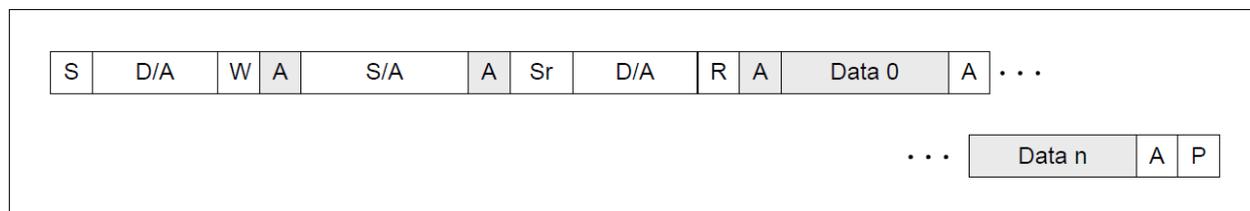| · · ·	Data n	A	P

Figure 5-3. Read Packet Structure

S: Start

D/A: Device Address (Slave Address) 7 bit

W: Device Address Write bit (0)

A: Acknowledge

S/A: Sub Address

Sr : Repeated Start (Non-Stop)

R: Device Address Read bit (1)

Data 0 ~ n: Read Data

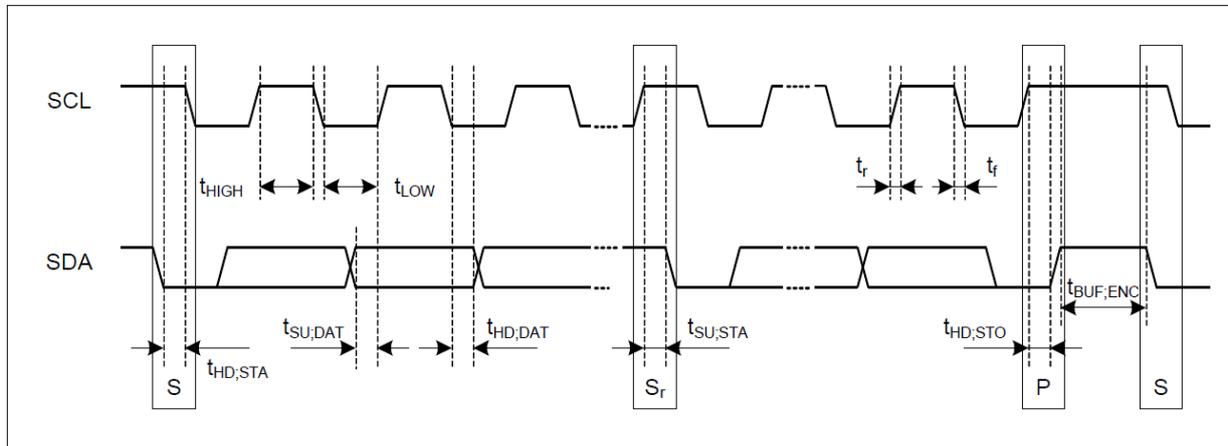P: Stop

5.3 Definition of Timing

Figure 5-4. I2C Interface Timing Requirements

Parameter	Symbol	Standard-Mode		Fast-Mode		Unit
		MIN	MAX	MIN	MAX	
SCL clock frequency	f_{SCL}	0	100	0	400	KHz
Hold time (repeated) START condition.	$t_{HD;STA}$	4.0	–	0.6	–	us
LOW period of the SCL clock	t_{LOW}	4.7	–	1.3	–	us
HIGH period of the SCL clock	t_{HIGH}	4.0	–	0.6	–	us
Setup time for repeated START condition	$t_{SU;STA}$	4.7	–	0.6	–	us
Data hold time	$t_{HD;DAT}$	5.0	–	–	–	us
Data setup time	$t_{SU;DAT}$	250	–	100	–	ns
Rising time of both SDA and SCL signals	t_r	–	1000	20	300	ns
Falling time of both SDA and SCL signals	t_f	–	300	20	300	ns
Setup time of STOP condition	$t_{SU;STO}$	4.0	–	0.6	–	us
Bus free time between STOP and START condition	$t_{BUF;ENC}$[1]	1	–	1	–	ms

Table 5-1. I2C Timing Parameters
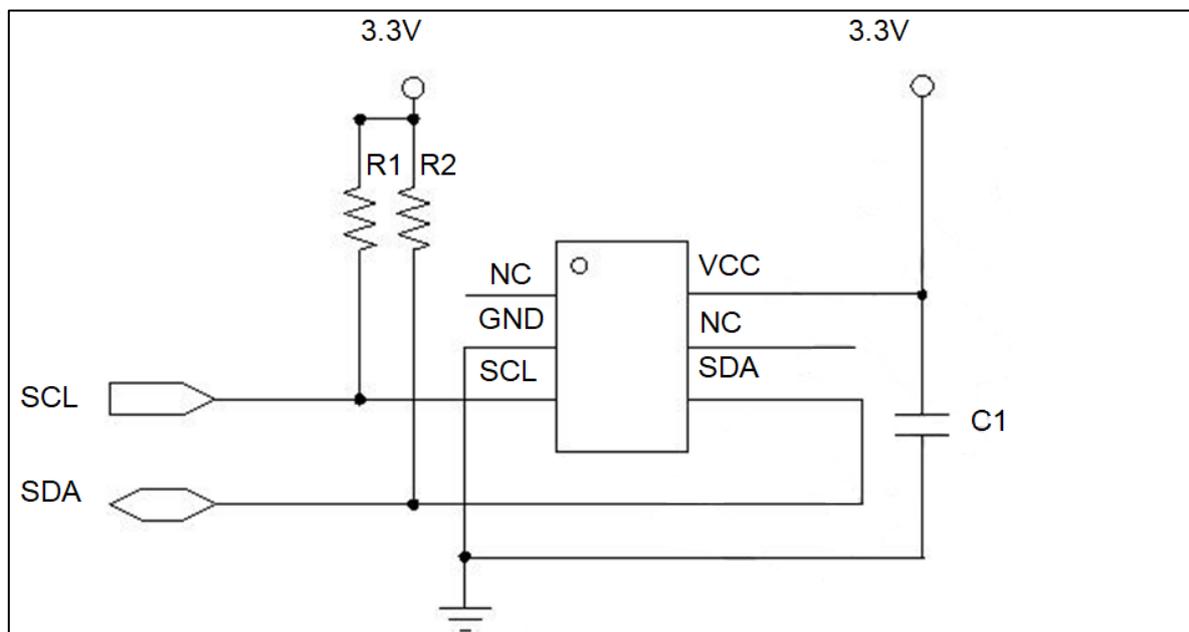
6 Typical Application Circuit

Figure 6-1. CM002X1 Application Circuit

R1, R2 : 2K ~ 10K ohm (TYP. 4.7K ohm)

C1 : 0.1uF

7 Electrical Characteristics

7.1 Absolute Maximum Rating

Description	Min	Typ	Max	Unit
Supply Voltage	2.7		6.0	V
Storage Temperature	-40		120	˚C
DC Current VCC and GND			3	mA

Table 7-1. Absolute Maximum Rating

7.2 Recommended Operation Conditions

Parameter	Min	Typ	Max	Unit
Operating Temperature	-40		85	˚C
Operating Voltage	3.0		3.6	V

Table 7-2. Recommended Operation Conditions

7.3 DC Characteristics

Symbol	Parameter	Condition	Min	Typ	Max
V_{IL}	Input Low Voltage				0.8V
V_{IH}	Input High Voltage		2.0V		
I_I	Input Leakage Current	VCC = MIN V_{IN} = GND or 3.6V			1uA
V_{OL}	Output Low Voltage	I_{OL} = 2mA			0.4V
V_{OH}	Output High Voltage	I_{OH} = 2mA	2.4V		3.6V
I_{VCC}	VCC Supply Current	Active 16MHz, VCC=3.3V		200uA	
		Sleep mode		55uA	
V_t	Threshold Voltage (*POR)		1.1V	1.2V	1.3V
t_{RINIT}	Register Initial time (*POR)				160us

DC Characteristics (3.3V I/O)

Table 7-3. DC Characteristics

*It is recommended to operate at 3.3V

*POR is Power On Reset

8   Package Information

COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	MAX
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.600
G	0°	8°

NOTE :

ALL DIMENSIONS REFER TO JEDEC STANDARD
MO-178 AB.
DO NOT INCLUDE MOLD FLASH OR
PROTRUSIONS.
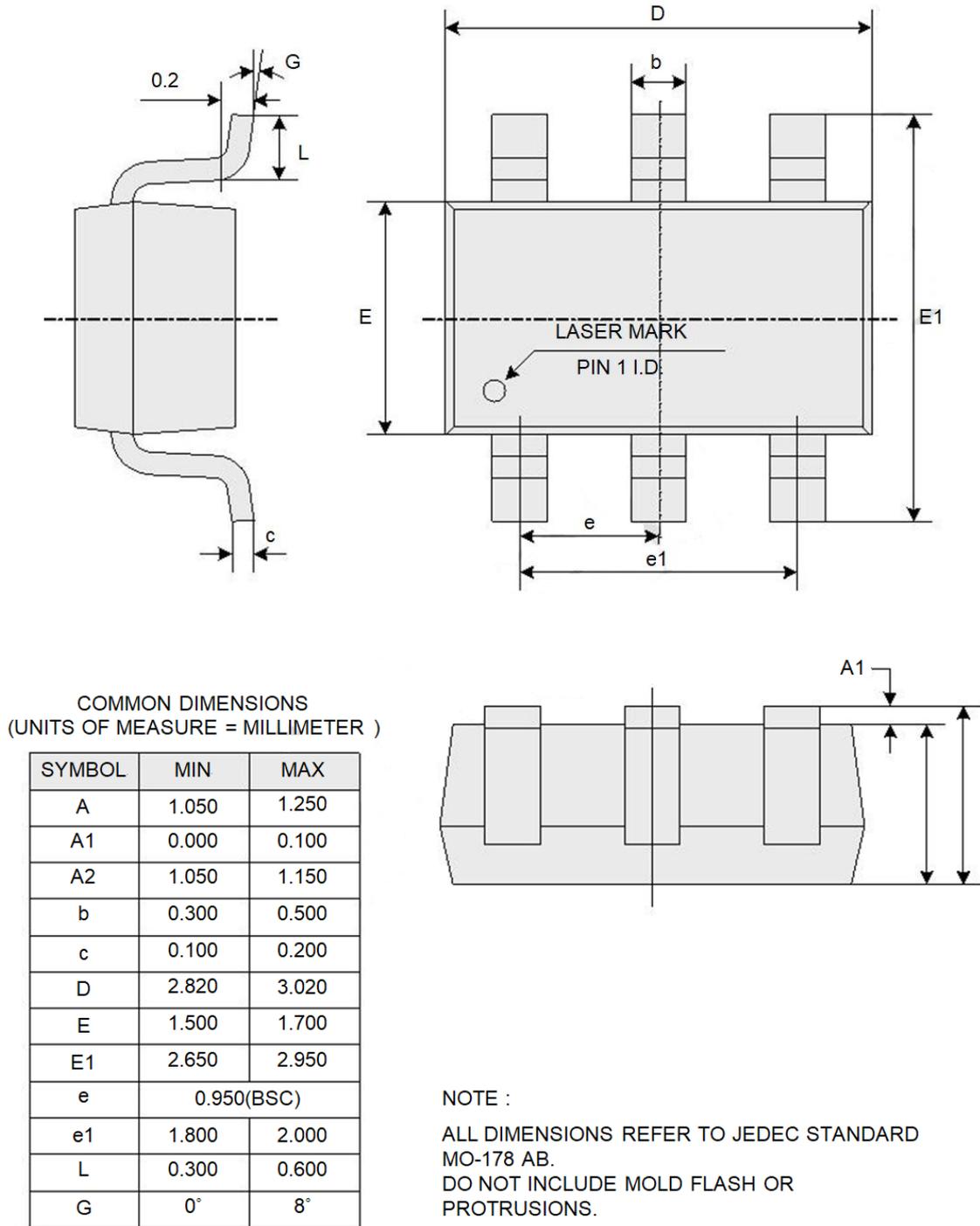
Note: Outline Dimensions are shown in millimeters

Figure 8-1. 6-pin SOT-23 Package Outline Dimension

—End of Datasheet—

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