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# **Linkplay Far Field Voice Input Processing Module (ASR\_C02)**

**User Manual**

**Rev 0.2**

**NOV 18, 2016**

<b>Doc Title</b>	Far Field Voice Input Processing C02 Specification	<b>Number</b>	WMB20161118
		<b>Version</b>	0.2

## **HISTORY**

<b>Version</b>	<b>Date</b>	<b>Description</b>
0.1	18/11/2016	Initial specification draft
0.2	09/01/2017	Revision update

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## 1 . Overview

ASR\_C02 module is developed by Linkplay to support the applications of far field voice interaction. It enables high performance automatic speech recognition (ASR) and excellent voice clarity with two microphones through Conexant's voice input processing software that includes noise suppression and full-duplex Acoustic Echo Cancellation (AEC). It adds voice control, voice search and Voice over Internet Protocol (VoIP) functions to smart speaker, smart TV, Set-Top Box (STB), smart appliances, and automotive hands-free control and communication systems. It delivers a superior voice interactive experience in the most challenging room environments.

### Features

- Alexa compatible
- Low power Wake-up over Voice (WoV) mode - 70mW
- Embedded powerful, dual-core 32-bit DSP
- Dual for field, 24 bit,106dB dynamic range ADCs with microphone pre-amplification and independent Microphone Bias supply
- Support sample rate: 8 ~96kHz
- Programmable pre-amplifier with integrated analog and digital gains. The analog gain has 1dB steps and digital gain has 0.125dB steps
- Integrated Direct DC/DC converter
- 22 PIN, supports single side SMT solder

### Applications

- Connected speaker and sound bar
- Voice controlled smart TV/STB
- Voice interactive home appliance
- Internet of Things(IOT) devices
- Automotive hands-free control/communication

## 1.1. Parameters

	Item	Parameter
<b>Hardware</b>	Voltage	5V
	Work Current	49mA (161.7mW @ 3.3V)
	Standby Current	N/A
	Work temperature	-5°C~70°C
	Storage temperature	-40°C~125°C

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I2S RX port	I2S format: standard I2S Slave 44.1KHz 16bit stereo/Master 48KHz 24bit stereo
Control interface	I2C, could be used in firmware upgrade
Dimension	33.6mm x 21.6mm

Table 1-1 Parameters of ASR\_C02 module

## 2. Hardware Description

### 2.1. Description of hardware interface

ASR\_C02 module provides stamp hole in two side with 1.6mm space that could be easily soldered to main board with SMT. The detail of pin layout is as follows:

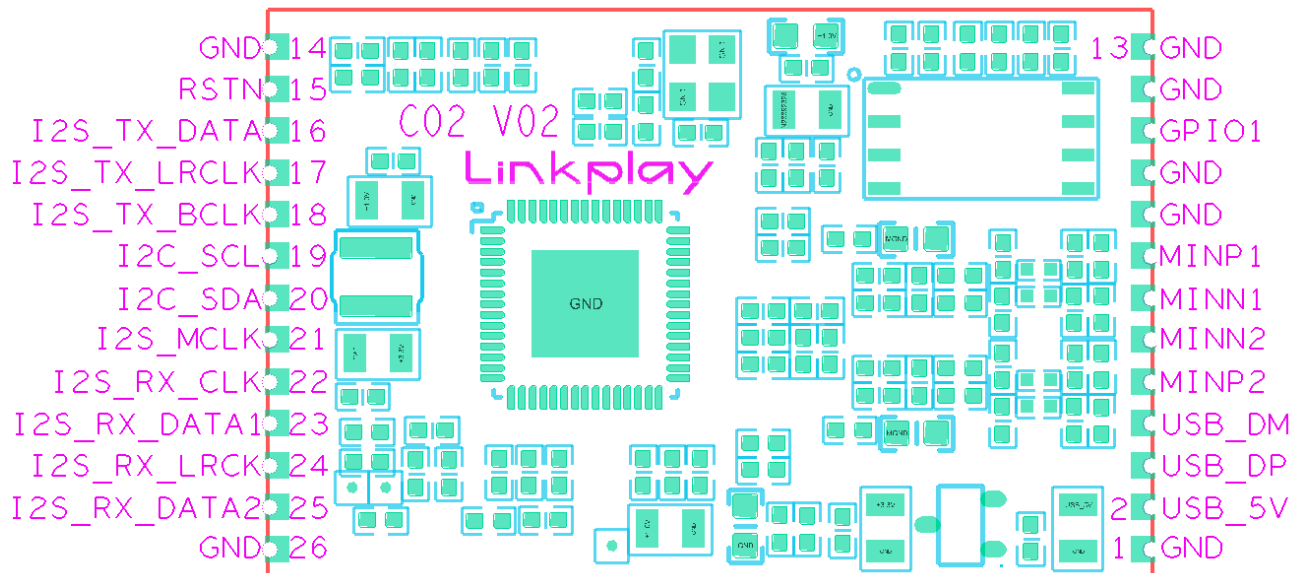


Figure 2-1 ASR\_C02 pin number and signal definition

#### ASR\_C02 pin description:

PIN	Pin Name	Type	Description
1, 9, 10, 12, 13, 14, 26	GND	Power	Digital ground
2	USB_5V	Power	Input > 100mA
3	USB_DP	I/O	Full speed USB 2.0
4	USB_DM	I/O	
5	MINP2	I	MIC2 in positive
6	MINN2	I	MIC2 in negative
7	MINN1	I	MIC1 in negative
8	MINP1	I	MIC1 in positive

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11	GPIO1	O	General Purpose Input Output, wake-up output
15	RSTN	I, IPU	Module reset, built-in RC reset, could be used for firmware upgrade
16	I2S_TX_DATA	O	I2S TX signal(reserved)
17	I2S_TX_LRCLK	I/O	
18	I2S_TX_BCLK	I/O	
19	I2C_SCL	I/O	I2C port, pull up with 1.8K resistor, used for firmware upgrade with RSTN
20	I2C_SDA	I/O	
21	I2S_MCLK	O	I2S master clock
22	I2S_RX_CLK	I/O	I2S RX input clock
23	I2S_RX_DATA1	I	AEC RX I2S input data reference for 2 channels
24	I2S_RX_LRCK	I/O	I2S RX input L/R clock
25	I2S_RX_DATA2	I	AEC I2S RX input data reference for 4 channels

Table 2-1 Linkplay ASR\_C02 module pin description

**Notes:**

1. I: Input
2. O: Output
3. P: Power
4. IPU: Internal Pull Up
5. IPD: Internal Pull Down

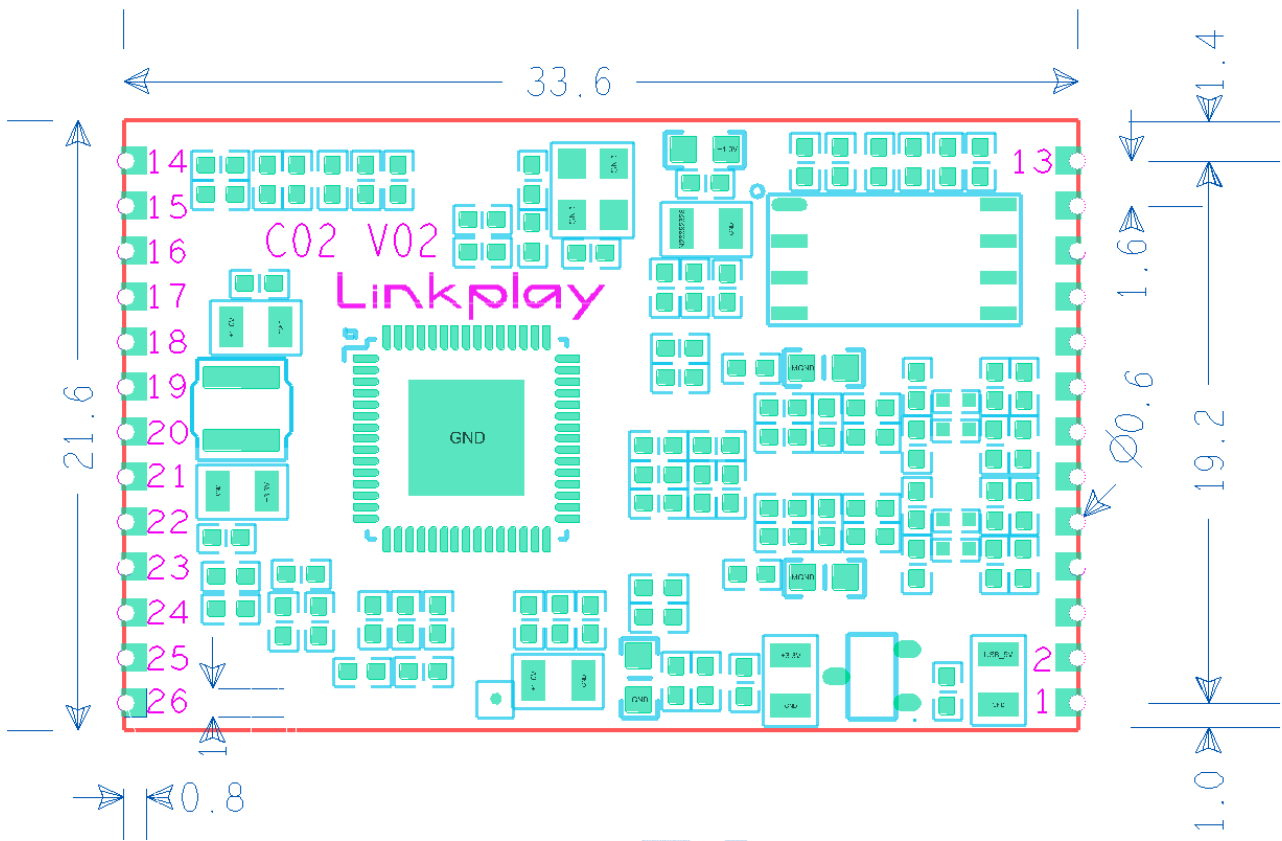
## 2.2. Mechanical Dimension

Linkplay ASR\_C02 module has the dimension of 33.6mm x 21.6mm. The detailed layout is as below.

Unit: mm

Front view

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Bottom view

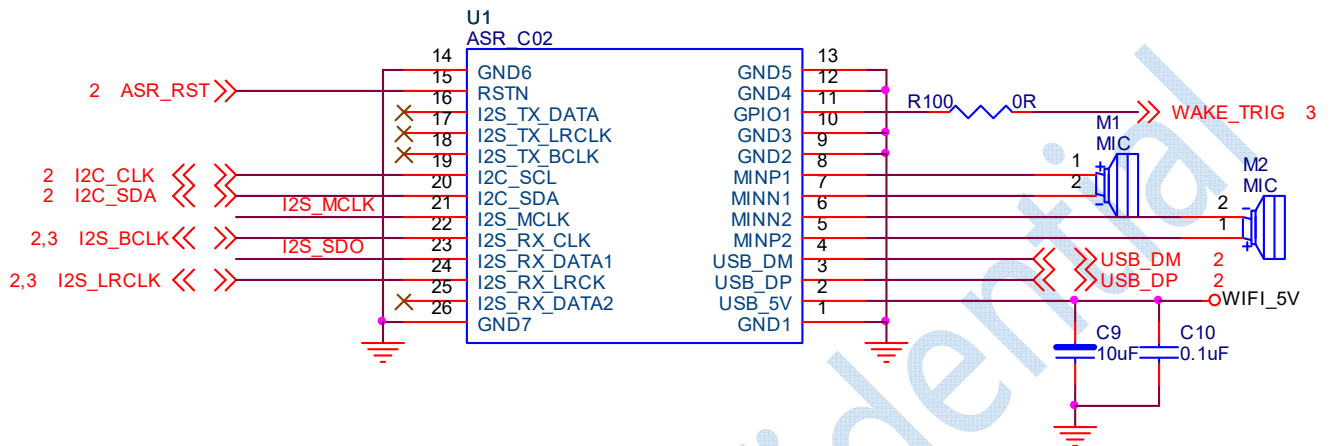


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Figure 2-2 Linkplay ASR\_C02 Physical dimension

## 2.3. Reference design

Typical reference design for ASR\_C02 module



Note:

- 1) Firmware update via Wi-Fi module by using I2C and ASR\_RST
- 2) GPIO1 signal could be connected to MCU to trigger the MCU to power on the LED and wake-up Wi-Fi module
- 3) I2S reference provided to ASR\_C02 module should be obtained after the EQ etc. sound effect

## 3. Module picture and package

1) ASR\_C02 module picture

TBD

Notes:

Linkplay: Linkplay logo

C02: module number

V02: MP version of C02 module

2) Delivery

TBD

Notes:

One tray = 30pcs

One box = 15 trays

1 box in total 15\*30 pcs= 450 pcs