

Technical Description

The Equipment Under Test (EUT) is a Home Theatre Sound Bar. It can accept analog input sources (RCA aux-in and 3.5mm phone jack line-in), SPDIF digital audio input (optical TOSLINK) and wireless Bluetooth device. The Bluetooth module in the EUT is operating in the frequency range from 2402MHz to 2480MHz (79 channels with 1MHz channel spacing). The audio signal is amplified and fed to the built-in passive loudspeakers. The EUT is powered by an AC/DC adaptor. (Input: 120VAC 50/60Hz ; Output: 13VDC 1.8ADC).

2.4GHz Bluetooth Module:

Modulation Type: GFSK

Antenna Type: Integral, Internal (PCB Trace)

Frequency Range: 2402MHz - 2480MHz, 1MHz channel spacing, 79 channels

Nominal field strength is 97.2dB μ V/m @ 3m

Production Tolerance of field strength is +/- 3dB

Antenna gain is 0dBi

The functions of main ICs are mentioned below.

1. BlueTooth module CMD2028 (BT101):

- 1) CW6682E (U1) acts as the 2.4GHz radio core of Bluetooth module CMD2028 (BT101) which is integrating with audio CODEC.
- 2) The 26MHz crystal (Y1) provides system clock for CW6682E (U1).
- 3) 25X40 (U4) is 4kbit serial flash EEPROM for parameter storage.
- 4) IC101 (3M1608) is data converting circuit for driving LED indicators.

2. Optical Input Portion:

- 1) IC602 (SI2100) acts as SPDIF digital audio input receiver.
- 2) JK101 is TOSLINK optical input receiver.
- 3) IC601 (ES7134LV) is stereo 24-bit 192kHz Digital-to-analog converter.
- 4) REM101 is IR-remote control receiver.

3. Regulator portion:

- 1) IC501 (LM1117) acts as 5V DC regulator.

4. Audio portion:

- 1) AU2 (SC2314) is volume/selector switch.
- 2) AU1 (2110) is stereo 10W audio amplifier driving internal loudspeakers.

Channel Frequency Table of Bluetooth Module

CH. NO.	FRE.	Hex Value		CH. NO.	FRE.	Hex Value		CH. NO	FRE.	Hex Value		CH. NO	FRE.	Hex Value
CH0	2402MHz	0		CH26	2428MHz	1A		CH52	2454MHz	34		CH78	2480MHz	4E
CH1	2403MHz	1		CH27	2429MHz	1B		CH53	2455MHz	35				
CH2	2404MHz	2		CH28	2430MHz	1C		CH54	2456MHz	36				
CH3	2405MHz	3		CH29	2431MHz	1D		CH55	2457MHz	37				
CH4	2406MHz	4		CH30	2432MHz	1E		CH56	2458MHz	38				
CH5	2407MHz	5		CH31	2433MHz	1F		CH57	2459MHz	39				
CH6	2408MHz	6		CH32	2434MHz	20		CH58	2460MHz	3A				
CH7	2409MHz	7		CH33	2435MHz	21		CH59	2461MHz	3B				
CH8	2410MHz	8		CH34	2436MHz	22		CH60	2462MHz	3C				
CH9	2411MHz	9		CH35	2437MHz	23		CH61	2463MHz	3D				
CH10	2412MHz	A		CH36	2438MHz	24		CH62	2464MHz	3E				
CH11	2413MHz	B		CH37	2439MHz	25		CH63	2465MHz	3F				
CH12	2414MHz	C		CH38	2440MHz	26		CH64	2466MHz	40				
CH13	2415MHz	D		CH39	2441MHz	27		CH65	2467MHz	41				
CH14	2416MHz	E		CH40	2442MHz	28		CH66	2468MHz	42				
CH15	2417MHz	F		CH41	2443MHz	29		CH67	2469MHz	43				
CH16	2418MHz	10		CH42	2444MHz	2A		CH68	2470MHz	44				
CH17	2419MHz	11		CH43	2445MHz	2B		CH69	2471MHz	45				
CH18	2420MHz	12		CH44	2446MHz	2C		CH70	2472MHz	46				
CH19	2421MHz	13		CH45	2447MHz	2D		CH71	2473MHz	47				
CH20	2422MHz	14		CH46	2448MHz	2E		CH72	2474MHz	48				
CH21	2423MHz	15		CH47	2449MHz	2F		CH73	2475MHz	49				
CH22	2424MHz	16		CH48	2450MHz	30		CH74	2476MHz	4A				
CH23	2425MHz	17		CH49	2451MHz	31		CH75	2477MHz	4B				
CH24	2426MHz	18		CH50	2452MHz	32		CH76	2478MHz	4C				
CH25	2427MHz	19		CH51	2453MHz	33		CH77	2479MHz	4D				

CMD2028

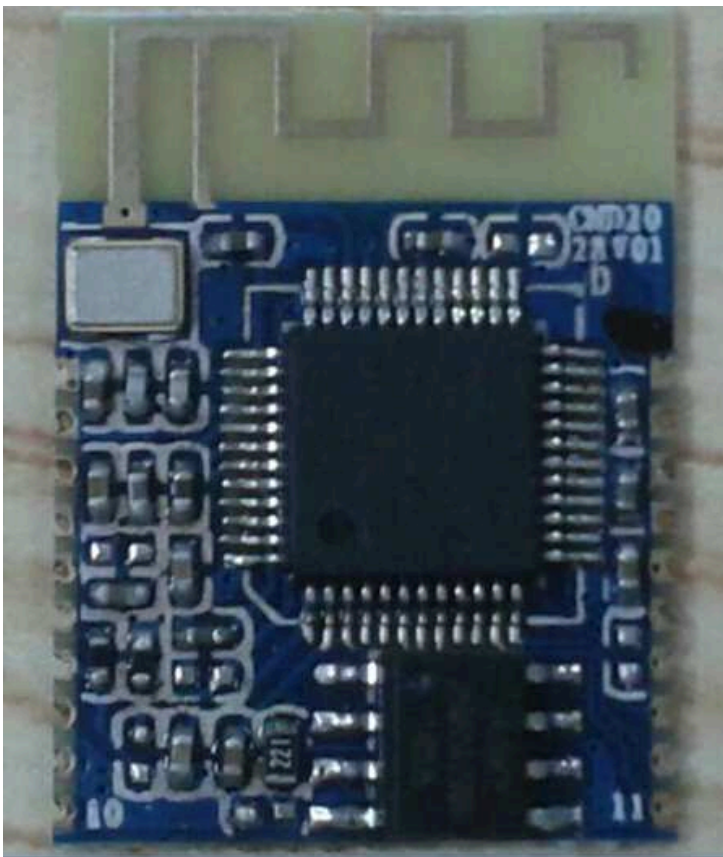
CW6682E

Rev1.0
Mar 2014

模块综述

Operation Of Description CMD2028 is a fully functional and high-performance Bluetooth module designed for Bluetooth hands-free calls. It is the perfect combination of the Buildwin Bluetooth IC and audio decoder IC to perform the Bluetooth audio player features and Bluetooth speakerphone function. The module is based on CLASS 2 power level, using the Bluetooth 2.1 + EDR specification, and compatible with Bluetooth 3.0 and below. It supports 16-bit DAC audio output with low output noise. In addition, it also has echo cancellation function to make a perfect call quality. Using a standard Bluetooth radio system in the 2.4GHz ISM band, based on the RF chipset CW6682E which is derived by crystal 26MHz and controlled by the SPI Flash. Highly integrated single-chip IC with radio transceiver and baseband Processor, which is compliant with Bluetooth 2.1+EDR specification.

CMD2028 (CW6682E) dirgram:



CMD2028 (CW6682E) features

- Use Bluetooth 2.1 + EDR specifications, compatible with Bluetooth 3.0 and below
- Support L2CAP/A2DP (AVCTP / AVDTP / AVCRP) to receive stereo audio signal and control the Prev/Next operation of the audio transmitter by agreement
- Support SPI flash to store firmware and support to configure parameters and modify the applications as demands and request
- 10-bit ADC mono MIC input
- Support UART interface communication
- SBC decode for Bluetooth audio streaming
- Support Piconet
- Low power sniff mode, stop mode;
- Small footprint
- 16bit DAC high audio quality output driving 40mW@32 Ω headphone;

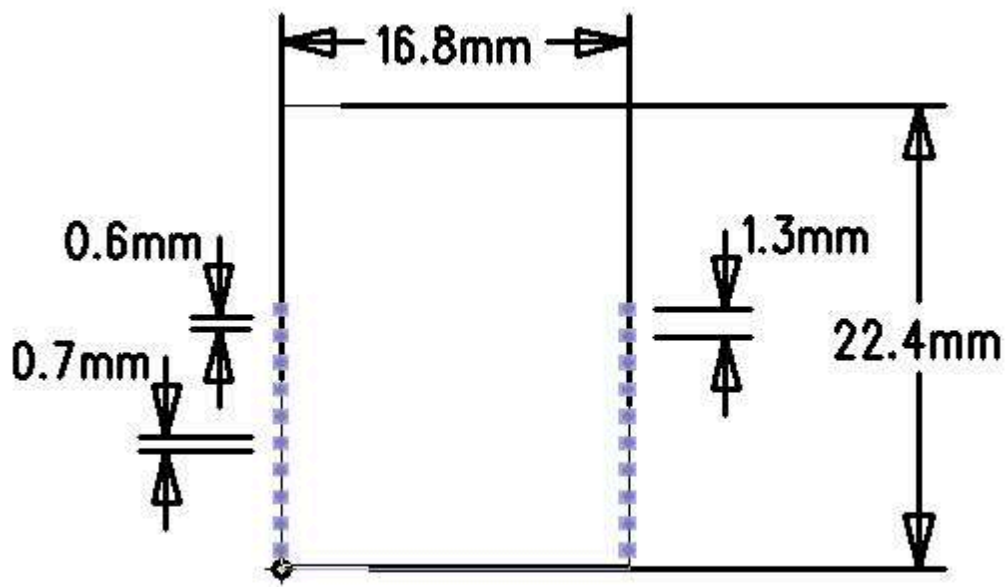
Specifications

Information on the equipment

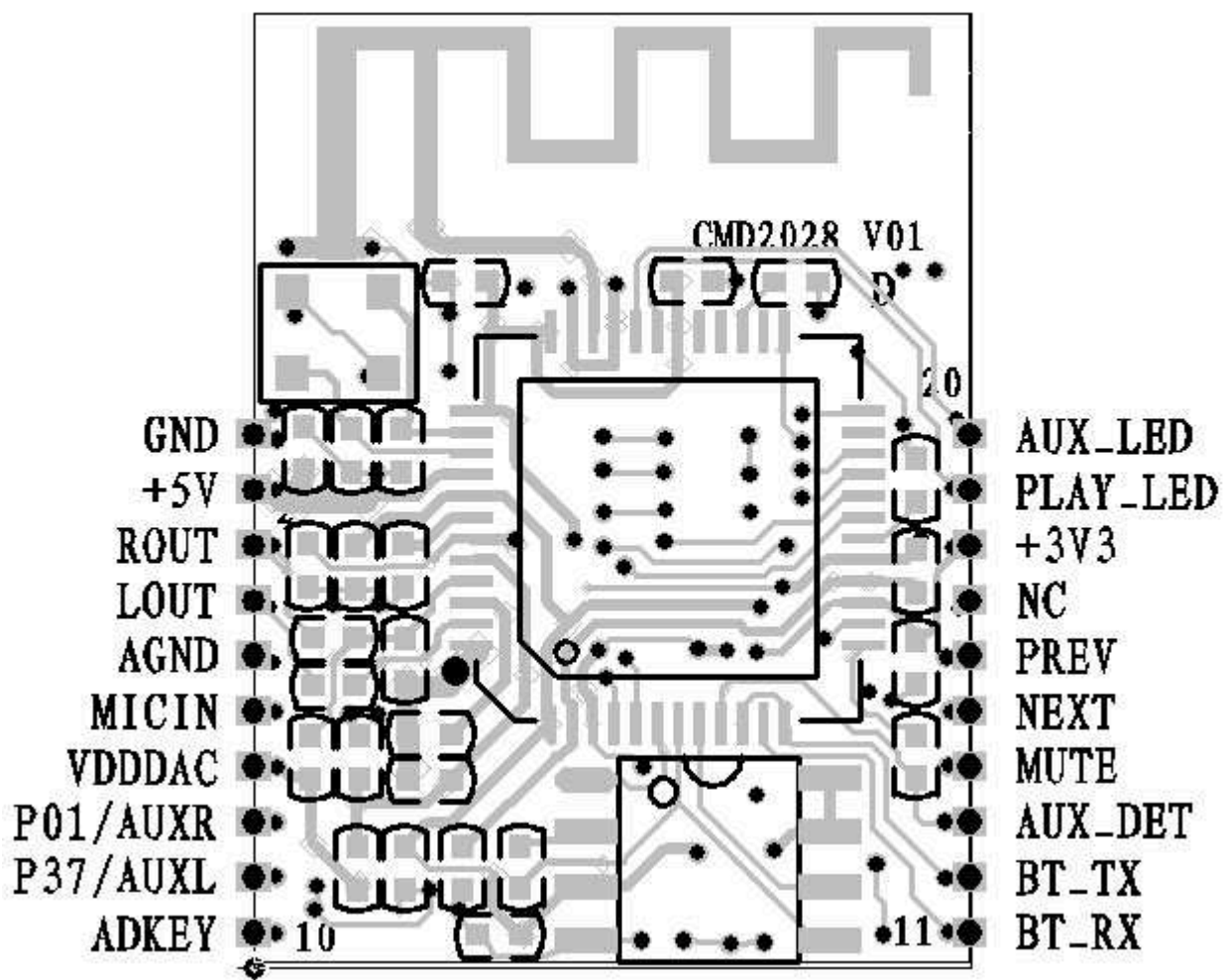
Device name	Bluetooth Module
Brand	N/A
Model No.	CMD2028
Manufacturer	N/A
Equipment type	<input type="checkbox"/> Transmitter <input type="checkbox"/> Receiver <input checked="" type="checkbox"/> Transceiver
Frequency of operation	2402MHz-2480MHz
Type of modulation	GFSK
Channel spacing	1MHz
Channel number	79
Peak output power	+4dBm (max)
Mode of operation	<input type="checkbox"/> Simplex <input checked="" type="checkbox"/> Duplex
Antenna gain	0dBi
Antenna type	PCB Trace
Antenna connector	integrated
Operating voltage	3.3V-5V

Dimension

模块类型	尺寸
CMD2028 (CW6682E)	22.4mm × 16.8mm × 2mm



CMD2028 (CW6682E) pin assignment



脚号	名称	电气特性	说明
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1	GND	POWER	电源地线脚;
2	BT_VDD	POWER	电源输入;
3	DACR	Digital OUT	右声道输出;
4	DACL	Digital OUT	左声道输出;
5	AGND	POWER	模拟地脚;
6	MIC/P03	Digital Input	Mic 输入接口;
7	VDDDAC	Digital Input	VDDDAC 电源输出用于MIC电路供电;
8	AUXR/P01	Digital I/O	外部音源AUXR_input;如无AUX功能,可做IO按键如:PREV;
9	AUXL/P37	Digital Input	外部音源AUXL_input;如无AUX功能,可做IO按键如:NEXT;
10	AKKEY (P13)	Digital I/O	PLAY/PAUSE ,在线升级时,这个脚按键必须接出来;可以做 ADK 按键口,或做配对键;
11	BT-RX	Digital I/O	蓝牙测试口,只做认证用;
12	BT-TX	Digital I/O	蓝牙测试口,只做认证用;
13	AUX_DET (P07)	Digital Input	AUX功能检测脚
14	MUTE/P12	Digital OUT	MUTE输出脚;(默认为高).
15	SD_DAT (P32)	Digital I/O	SD/TF卡的通信口;可以做普通IO口.如IO按键:NEXT;
16	SD_CLK (P30)	Digital I/O	SD/TF卡的通信口;可以做普通IO口.如IO按键:PREV;
17	SD_CMD/BT_RST	Digital I/O	蓝牙复合IO口,不可以做其它IO口.

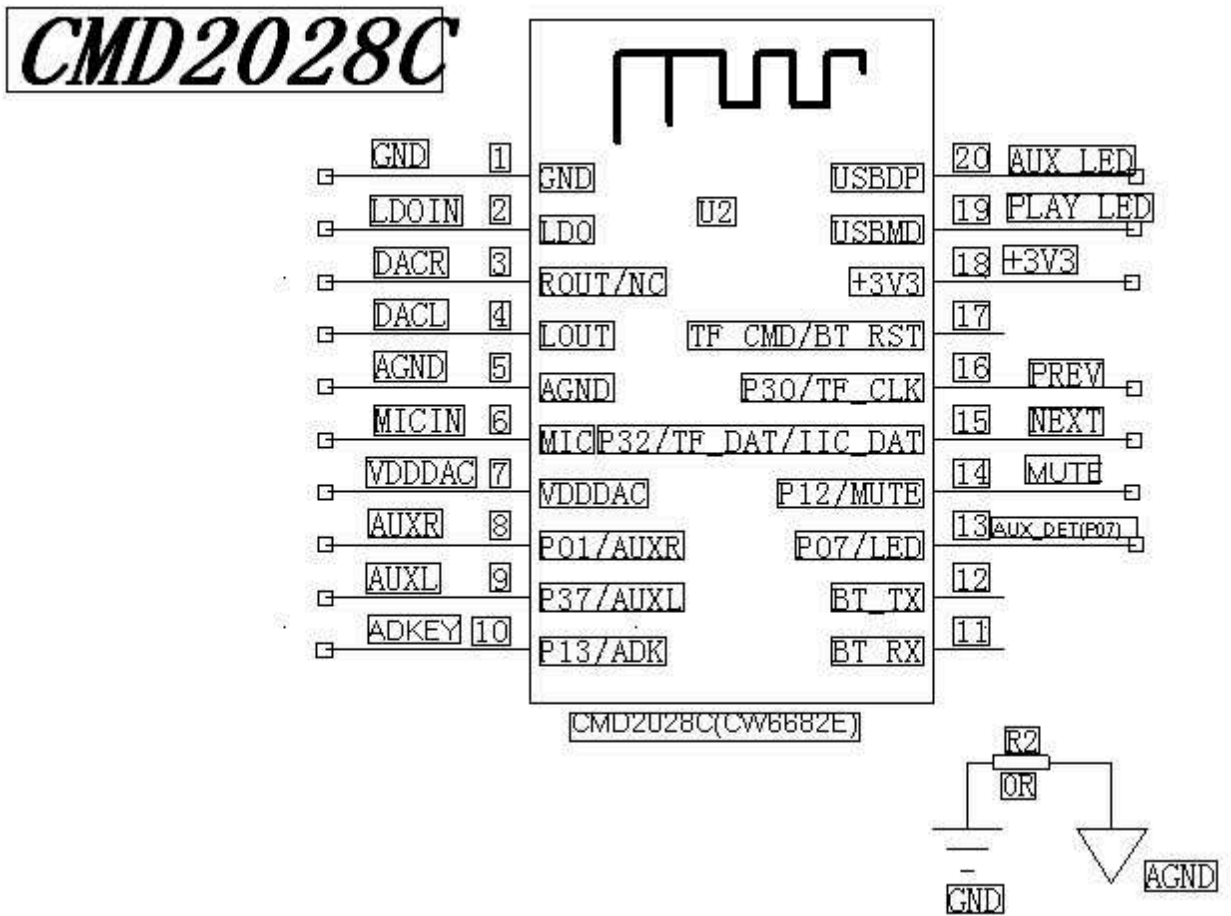
18	3.3V	POWER	3.3V输出脚
19	USBDM	Digital I/O	USB输入; 在线升级DM数据口, 只可以做输出I/O口, 如: PLAY指示灯
20	USBDP	Digital I/O	USB输入; 在线升级DP数据口, 只可以做输出I/O口, 如: AUX指示灯

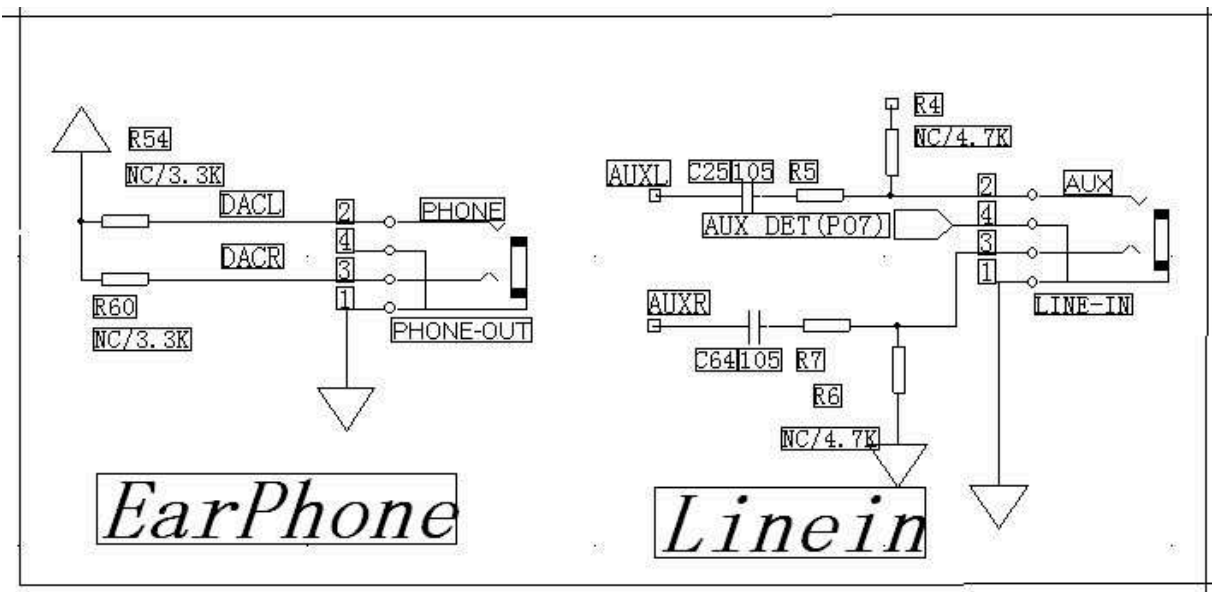
All I/O are 3.3V level

Application

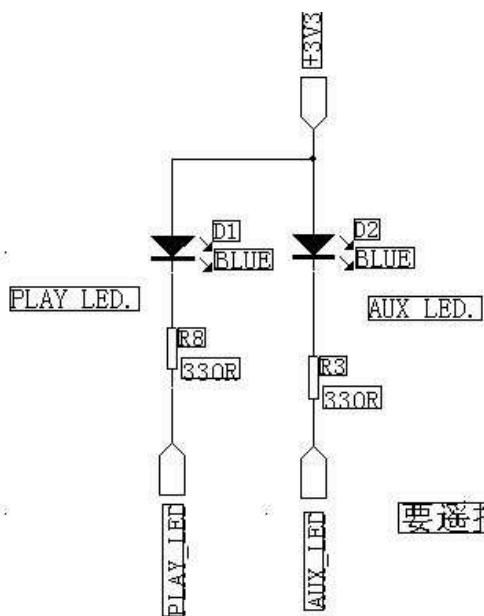
- Bluetooth Tiny Speaker 蓝牙小音箱
- Bluetooth MP3 Boombox 蓝牙MP3 Boombox
- Bluetooth Active Speaker 蓝牙扬声器
- Bluetooth Home Audio 家用蓝牙音响
- Bluetooth HiFi Audio 高品质音响
- Bluetooth Cigarette Lighter 蓝牙点烟器.....

CMD2028 CW6682E

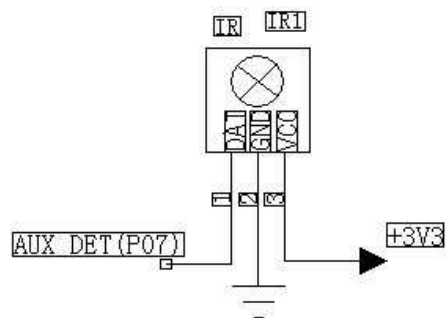




遥控及LED的应用:



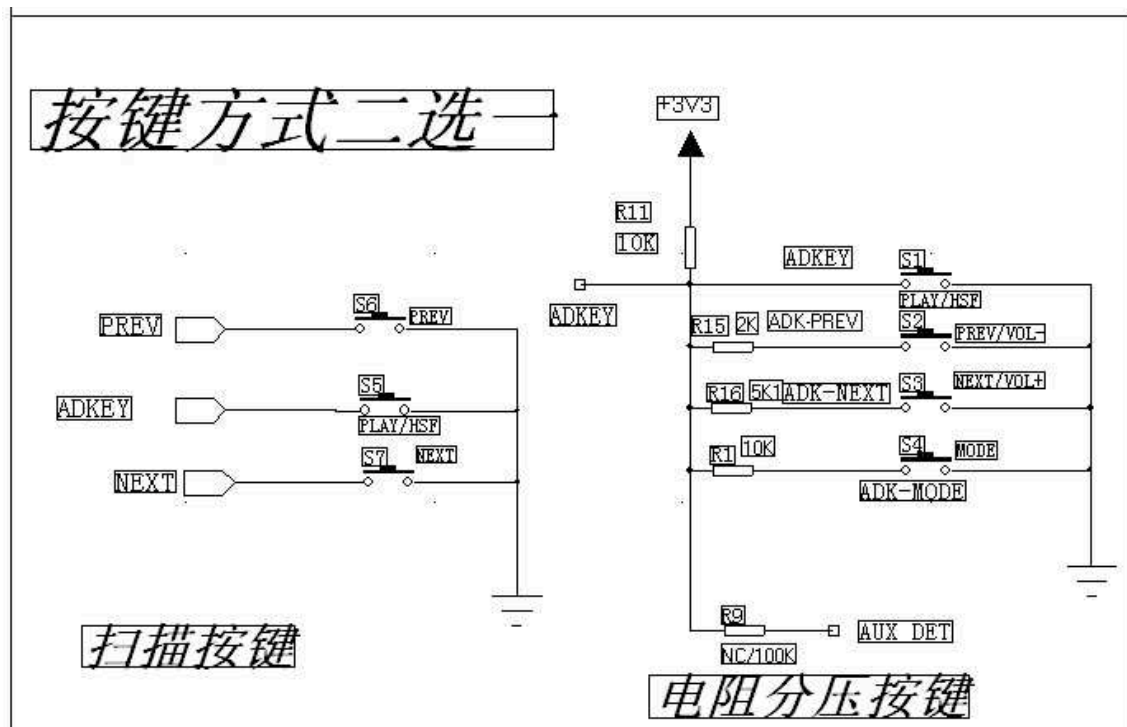
LED



IR

要遥控功能时, 不可以做AUX检测脚, 应用电路二选一.

Application:



CMD2028 (CW6682E) Application



AppoTech
卓荣集成

CW6680E/CW6681E/ CW6682E

Bluetooth Audio Player Microcontroller

User Manual

[CW6680E/CW6681E/CW6682E-UM-110-EN]

Versions: 1.1.0

Release Date: 2014-10-11

1 Product Overview

1.1 Outline

CW6680E/CW6681E/CW6682E is an MCS-51™ Compatible high performance mixed signal microcontroller. It integrates advanced digital and analog peripherals to suit for Bluetooth Audio Player applications.

1.2 Features

- Compatible with MCS-51™ instruction set;
- Maximum 48MHz operating frequency;
- Supports MP3 decoder;
- Supports WMA decoder;
- Supports WAV decoder;
- Supports MP3 encoder;
- Keypad tone mixer;
- Two multi-function 8-bit timers, support Capture and PWM mode;
- Two multi-function 16-bit timers, support Capture and PWM mode;
- Watchdog Timer with on-chip RC oscillator;
- one full-duplex UART;
- Two SPI;
- CW6680E support Full-speed USB 2.0 Device controller;
- CW6681E support Full-speed USB 2.0 Device/Host controller;
- Independent powered RTCC;
- 48MHz PLL-based clock generator;
- Six Channels 10-bit SARADC;
- Power on Reset;
- Support Bluetooth phone.

2 Pin Definitions

2.1 CW6680E/CW6681E

2.1.1 Package

LQFP48

2.1.2 Pin Assignment

Figure 2-1 shows the pin assignments of LQFP48 package

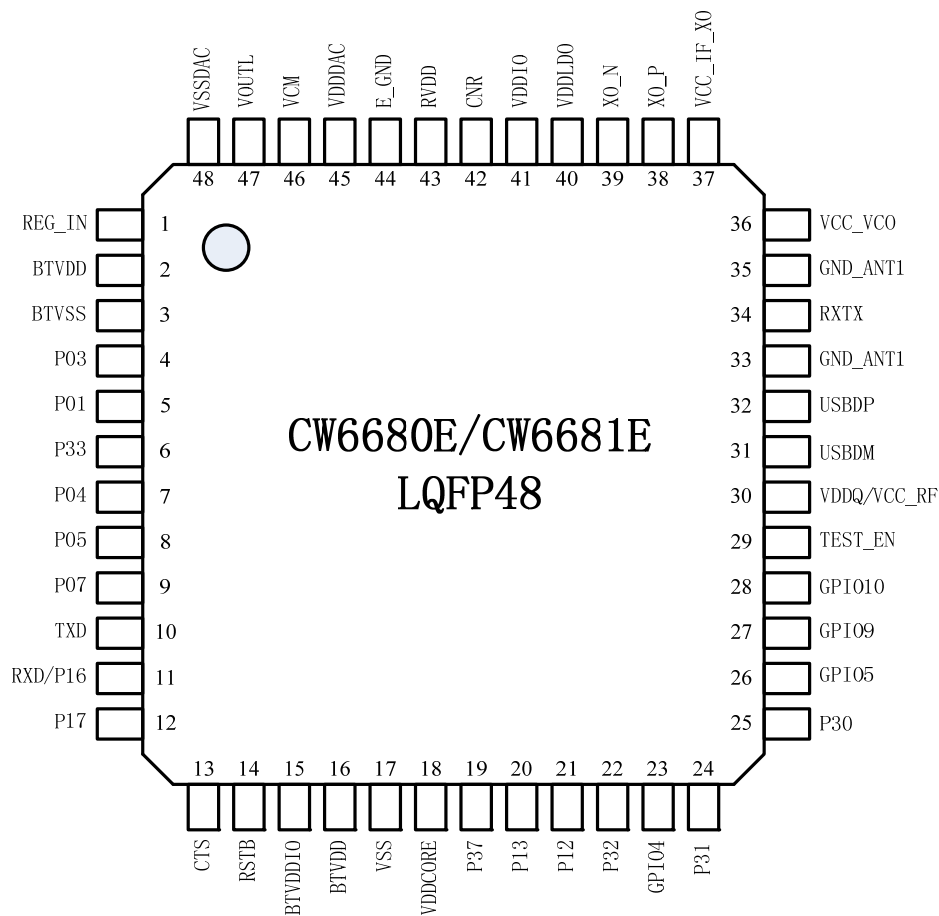


Figure 2-1 Pin Assignment for LQFP48

2.1.3 Pin Description

Table 2-1 shows the pin descriptions of LQFP48 package.

Table 2-1 LQFP48 pin description

Pin No.	Name	Type	Function
1	REG_IN	I	This pin serves as an input of the on-chip VDD and RVDD LDO regulators
2	BTVDD	PWR	Bluetooth VDD
3	BTVSS	GND	Bluetooth ground
4	P03	AI	MICIN1 VCMBUF AUXL2
5	P01	I/O	AUXR0 SDDAT2 UART0TX1 GPIO
6	P33	I/O	ADC0 PWRWKUP LVDDDET CLKO GPIO
7	P04	I/O	ADC2 INT0 SPI1DO1 SPI1DODI1 PWM1 SPI0DODI1 SPI0DO1 GPIO
8	P05	I/O	ADC3 INT1 SPI1CLK1 CAP0 SPI0CLK1 GPIO
9	P07	I/O	INT3 CAP1 GPIO
10	TXD	O	UART Serial data output port for the HCI UART interface. This pin should be left unconnected if UART is not used or can be configured to GPIO
11	RXD	I	UART Serial data input port for the HCI UART interface. This pin should be left unconnected if UART is not used or can be configured to GPIO
	P16	I/O	ADC6

Pin No.	Name	Type	Function
			TMR2 PWM2 IISREFCLK AMIN CAP2 UART0TX0 GPIO
12	P17	I/O	TMR2 IISWS GPIO
13	CTS	I	UART Clear to Send-active low for HCI UART interface when the hardware flow control feature enable. This pin is used to set the system clock rate if the flow control feature is disabled
14	RSTB	I	Active low system reset. This pin contains a weak pull-up
15	BTVDDIO	I	Power supply for GPIOs
16	BTVDD	PWR	Bluetooth VDD
17	VSS	GND	Ground
18	VDDCORE	PWR	Digital 1.2V Power
19	P37	I/O	AUXL1 GPIO
20	P13	I/O	ADC5 GPIO
21	P12	I/O	GPIO
22	P32	I/O	SPI1DO0 SPI1DODI0 SDDAT01 GPIO
23	GPIO4	I/O	3.3V tolerant GPIO pin with programmable pull-up
24	P31	I/O	SPI1DI0 SDCMD1 GPIO
25	P30	I/O	ADC4 SPI1CLK0 SDCLK1 GPIO
26	GPIO5	I/O	3.3V tolerant GPIO pin with programmable pull-up
27	GPIO9	I/O	3.3V tolerant GPIO pin with

Pin No.	Name	Type	Function
			programmable pull-up
28	GPIO10	I/O	3.3V tolerant GPIO pin with programmable pull-up
29	TEST_EN	I	The test mode enable pin. This pin should be left unconnected for field application.
30	VDDQ	I	Digital block of RF circuit power supply. This pin must connect to RVDD
	VCC_RF	I	RF circuit power supply. This pin must connect to RVDD
31	USBDM	I/O	USB Negative Input/output
32	USBDP	I/O	USB Positive Input/output
33	GND_ANT1	-	Ground connection of RF I/O antenna. These pins must connect to RVSS
34	RXTX	-	RF I/O antenna pin
35	GND_ANT1	-	Ground connection of RF I/O antenna. These pins must connect to RVSS
36	VCC_VCO	I	VCO circuit power supply. This pin must connect to RVDD
37	VCC_IF_XO	I	IF and internal Crystal Oscillator circuit power supply. This pin must connect to RVDD
38	XO_P	I	Crystal or frequency reference input
39	XO_N	O	Crystal Oscillator output. Connect with XO_P if the reference clock is supplied
40	VDDLDO	PWR	LDO 5V Power
41	VDDIO	PWR	IO 3.3V Power
42	CNR	O	On-Chip RVDD LDO external decoupling capacitor pin
43	RVDD	-	On-chip 1.8V RVDD LDO output to supply internal RF circuits, this pin output typical voltage is 1.8V
44	E-GND	GND	Ground
45	VDDDAC	PWR	DAC 3.3V Power HeadPhone 3.3V Power
46	VCM	AO	DAC Bandgap voltage reference
47	DACL	AO	DAC Left Channel
48	VSSDAC	GND	DAC Ground

I: input; **O**: output; **PWR**: power; **GND**: ground; **AO**: Analog Output; **AI**: Analog Input; **NC**: not connect

2.2 CW6682E

2.2.1 Package

LQFP48

2.2.2 Pin Assignment

Figure 2-2 shows the pin assignments of LQFP48 package

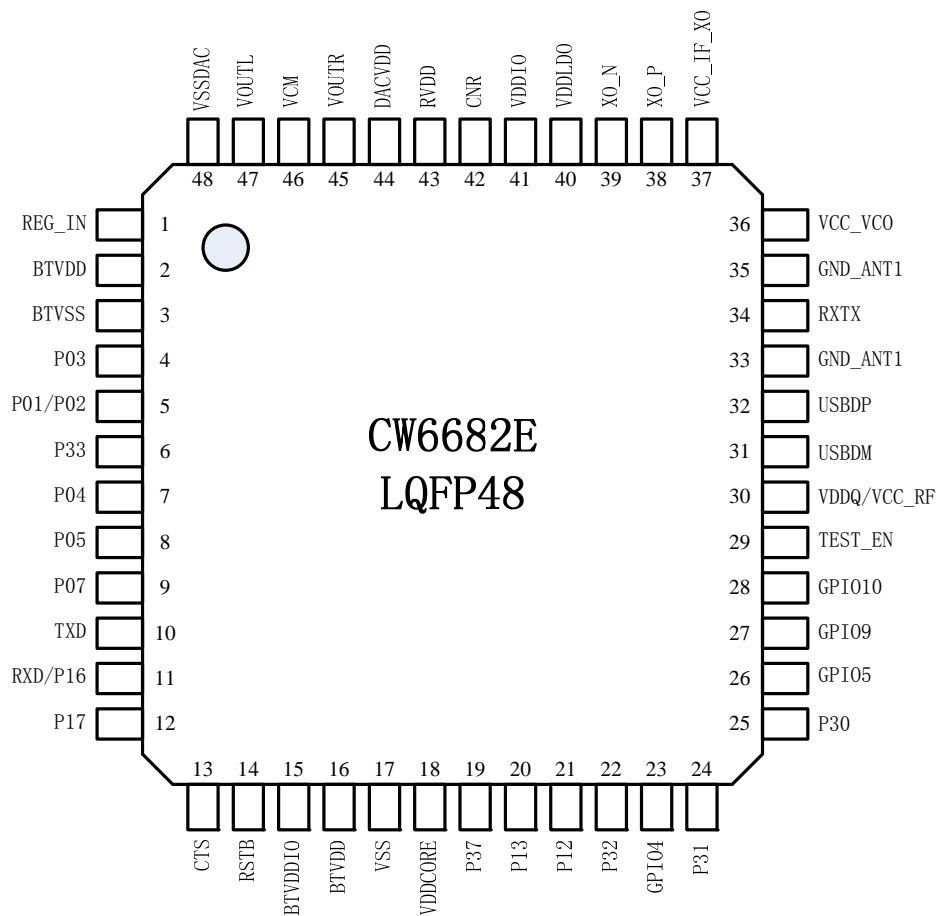


Figure 2-2 Pin Assignment for LQFP48

2.2.3 Pin Description

Table 2-2 shows the pin descriptions of LQFP48 package.

Table 2-2 LQFP48 pin description

Pin No.	Name	Type	Function
1	REG_IN	I	This pin serves as an input of the on-chip VDD and RVDD LDO regulators
2	BTVDD	PWR	Bluetooth VDD

Pin No.	Name	Type	Function
3	BTVSS	GND	Bluetooth ground
4	P03	AI	MICIN1 VCMBUF AUXL2
5	P01	I/O	AUXR0 SDDAT2 UART0TX1 GPIO
	P02	I/O	AUXR2 MICIN0 GPIO
6	P33	I/O	ADC0 PWRWKUP LVDDDET CLKO GPIO
7	P04	I/O	ADC2 INT0 SPI1DO1 SPI1DODI1 PWM1 SPI0DODI1 SPI0DO1 GPIO
8	P05	I/O	ADC3 INT1 SPI1CLK1 CAP0 SPI0CLK1 GPIO
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14	RSTB	I	Active low system reset. This pin contains a weak pull-up
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19	P37	I/O	AUXL1 GPIO
20	P13	I/O	ADC5 GPIO
21	P12	I/O	GPIO
22	P32	I/O	SPI1DO0 SPI1DODI0 SDDAT01 GPIO
23	GPIO4	I/O	3.3V tolerant GPIO pin with programmable pull-up
24	P31	I/O	SPI1DI0 SDCMD1 GPIO
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41	VDDIO	PWR	IO 3.3V Power
42	CNR	O	On-Chip RVDD LDO external decoupling capacitor pin
43	RVDD	-	On-chip 1.8V RVDD LDO output to supply internal RF circuits, this pin output typical voltage is 1.8V
44	DACVDD	PWR	DAC 3.3V Power HeadPhone 3.3V Power
45	VOUTR	AO	DAC Right Channel
46	VCM	AO	DAC Bandgap voltage reference
47	VOUTL	AO	DAC Left Channel
48	VSSDAC	GND	DAC Ground

I: input; O: output; PWR: power; GND: ground; AO: Analog Output; AI: Analog Input; NC: not connect