Technical Description

The Equipment Under Test (EUT) is a Clock Radio. The EUT has Bluetooth Audio portion which is operating between 2402MHz and 2480MHz (79 channels with 1MHz channel spacing). When the EUT is switched ON in Bluetooth mode, the display will show “BT” and a LED flashing. The Bluetooth enabled device would be searched and connected the EUT before playing audio. After pairing, the “BT” LED will stay lit. The audio signal will be amplified and fed to internal stereo loudspeaker. The EUT also have AM/FM radio and alarm clock function. A LED display acts as the visual interface. The EUT is powered by 5V DC from an AC/DC adaptor. The AC/DC adaptor can accept 100-240VAC. Two optional size AA batteries (3VDC) are for real-time-clock memory back-up. A USB port (5VDC) is for charging purpose only.

2.4GHz Bluetooth Module:
Modulation Type: GFSK
Antenna Type: Integral, Internal
Frequency Range: 2402MHz - 2480MHz, 1MHz channel spacing, 79 channels

Nominal field strength is 98.4dBµV/m @ 3m
Production Tolerance of field strength is +/- 3dB
Antenna gain is 0dBi

The functions of main ICs are mentioned below.

1. BlueTooth module CMD2022B (BT101):
1) IC3 (CW6638M) acts as the 2.4GHz radio core of Bluetooth module
2) IC2 (AX2225) is MCU integrating with audio DSP and CODEC.
3) IC4 (24C08) is 8k serial EEPROM for parameter storage.
4) Y2 (26MHz) crystal provides system clock for IC3.
5) X302 (32.768kHz) crystal provides system clock for IC2.

2. AM/FM Radio Portion:
1) IC301 (BK1088E) acts as digital AM/FM radio demodulator.
2) L301 acts as AM antenna.

3. MCU module:
1) IC1 (HC180230A) acts as MCU core for the product.
2) X1 (32.768kHz) acts as clock for the MCU core (IC1).
3) LED1-LED36 are the LED display. SW1-SW11 are Keypad.

4. Audio portion:
1) IC302, IC303 (MS4890) are 1W power amplifiers driving loudspeaker.

5. Power Supply portion:
1) IC304 (ME6206A33) is 3.3V voltage regulator.

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				

CMD2022B

CW6638M

Bluetooth Module

Rev 1.0

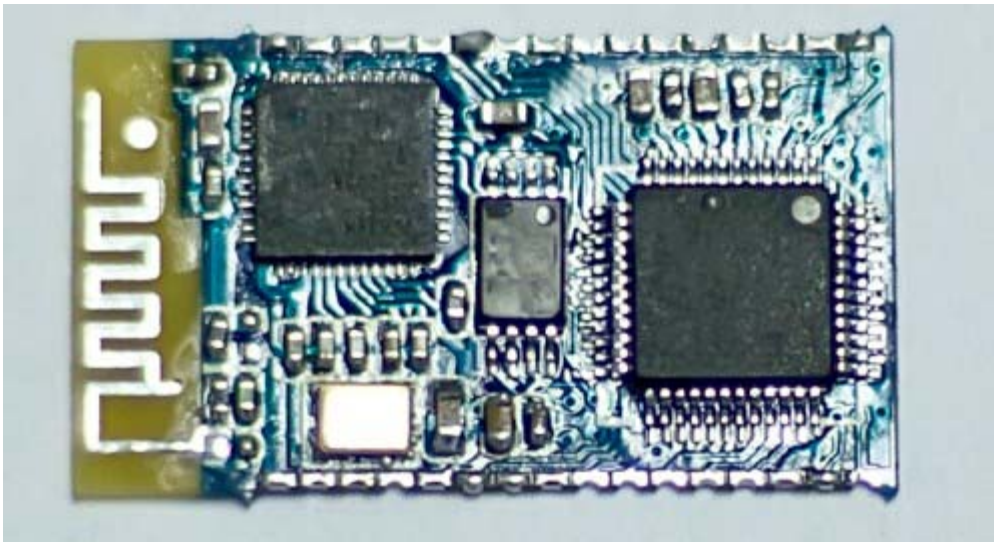
Mar 2013

Table of Contents

Module Description

CW6638+AX2225A is robust Bluetooth Audio Module which has rich functions targeted to small size portable Audio Boombox market. Incorporated with Appotech MP3 decode IC, CW6638+AX2225A is a highly competitive solution. CW6638M is Bluetooth 2.1 + EDR and also Bluetooth 3.0 compatible.

CMD2022B CW6638+AX2225A Module Photograph



CM**D2022B** CW6638 Module

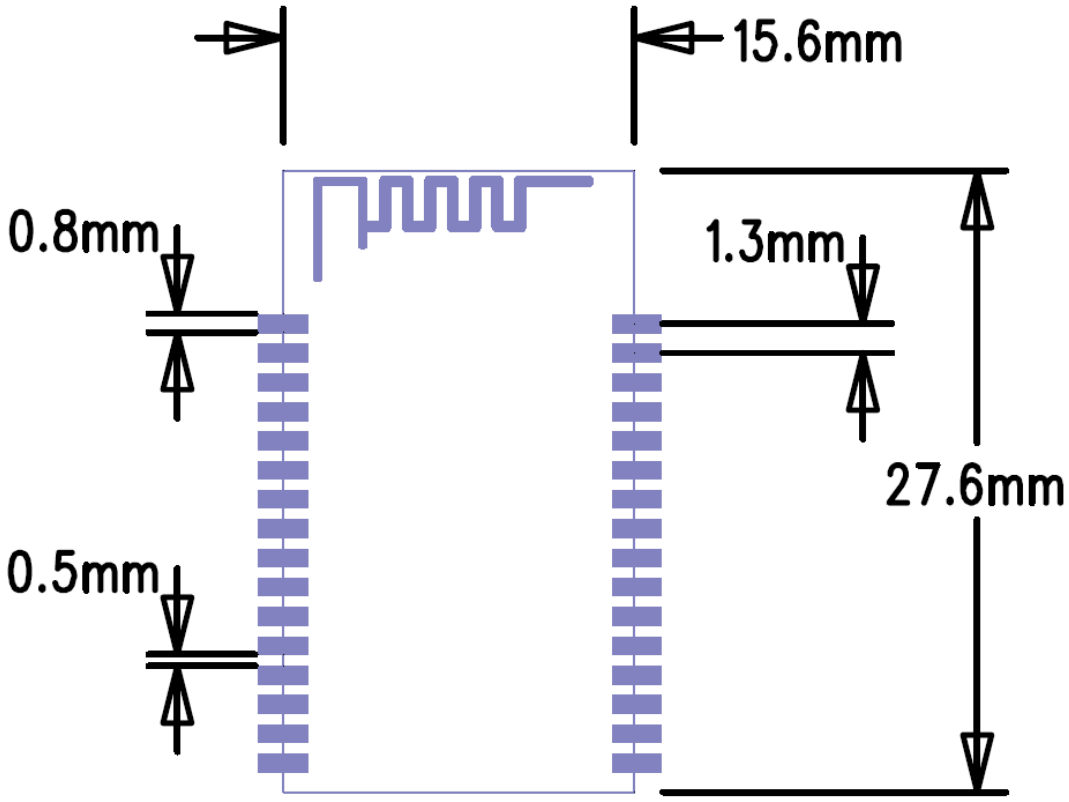
CMD2022 B-CW6638+AX2225A Module Characteristics

- Support USB, SD/TF card;
- Aux in with Volume Control；(three AUX_IN Channels)
- Support external FM radio chip;
- Support IR remote function；
- Support buzz tone；
- Support USB card reader function, access SD, TF audio files;
- Support power ON/OFF function；

- Support AUDIO EQUALIZATION;
- Support USB Host;
- Support L2CAP/A2DP(AVCTP/AVDTP/AVRCP)
  Audio files
- Support MCU, UART;

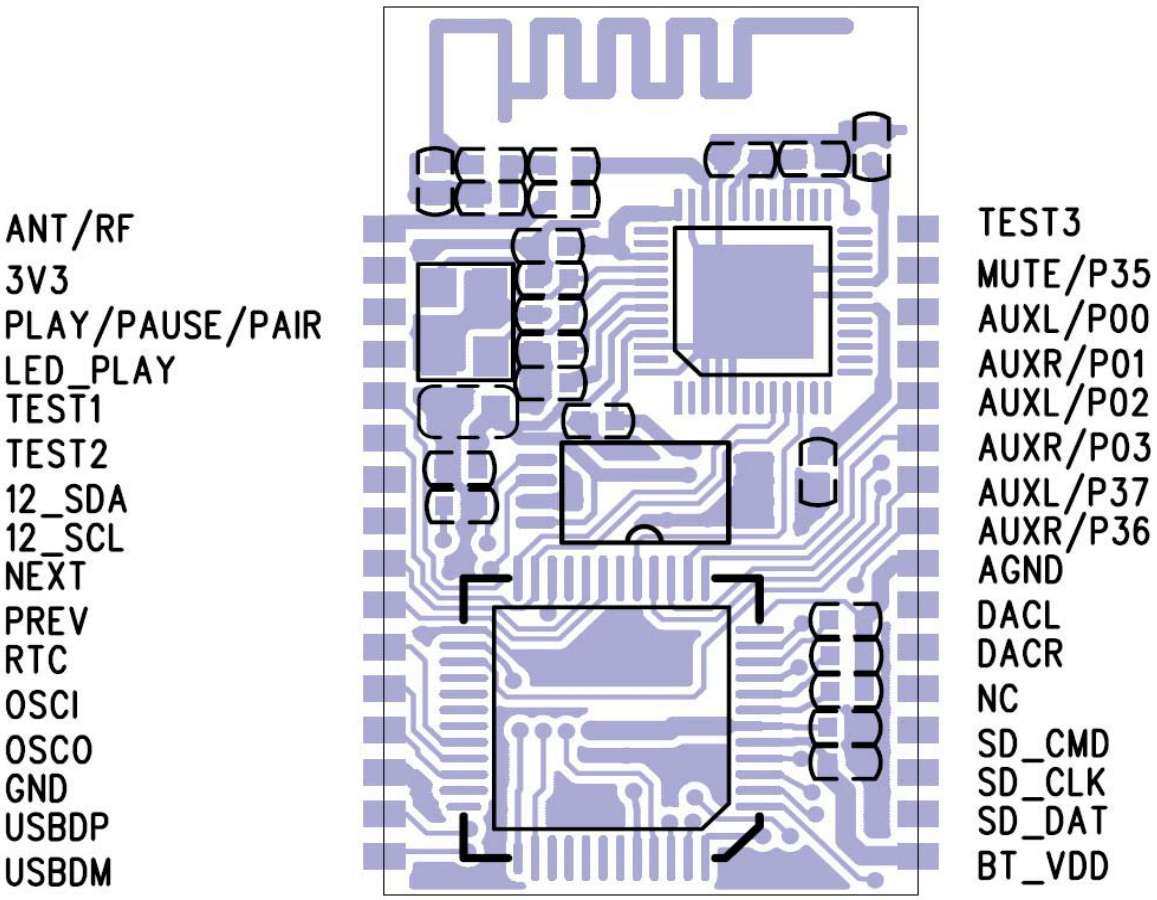
Module Deminsion

Module	Demainsion
CMD2022B CW6638	L×W×H=27.6mm × 15.6mm × 2mm



Pin Assignment

CMD2022B- CW6638 Pin Assignment



Pin	Name	Function	Description
1	RF_ANT	RF_ANT	External Antenna Port, NC if internal PCB antenna is used;
2	3.3V	POWER	3.3V output
3	PLAY/PAUSE	Digital Input	PLAY/PAUSE
4	BT_LED	Digital Input	Power On Indicator (Active High)
5	TEST1	Digital I/O	NC
6	TEST2	Digital I/O	NC
7	IIC_SDA	Digital I/O	IIC_SDA
8	IIC_SCL	Digital I/O	IIC_SCL
9	NEXT	Digital I/O	Next Track
10	PREV	Digital I/O	Previous Track

11	RTC	POWER	Real Time Clock;(POWER)
12	32KIN	Digital Input	32.768kH clock;
13	32KOUT	Digital out	32.768kHz clock output
14	GND	POWER	Power Ground;
15	USBDP	Digital I/O	USB DP
16	USBDM	Digital I/O	USB DM
17	BT_VDD	POWER	Module Power Input
18	SD_DAT	Digital I/O	SD/TF data;
19	SD_CLK	Digital I/O	SD/TF Clock;
20	SD_CMD	Digital I/O	SD/TF CMD;
21	NC	Digital I/O	NC
22	DACR	Digital OUT	DAC Audio out R;
23	DACL	Digital OUT	DAC Audio out L;
24	AGND	POWER	Analog Ground;
25	AUXR/P37	Digital Input	AUX1 R_input; or MCU UART (programmable);
26	AUXL/P36	Digital Input	AUX1 L_input; or MCU UART (programmable);
27	AUXR/P03	Digital Input	AUX2 R_input; or IO (programmable);
28	AUXL/P02	Digital Input	AUX2 L_input; or IO (programmable);
29	AUXR/P01	Digital Input	AUX3 R_input; or IO (programmable);
30	AUXL/P00	Digital Input	AUX3 L_input; or IO (programmable);
31	MUTE/P35	Digital OUT	MUTE or IO (programmable)
32	TESR3	Digital I/O	test port

Note: Module IO is for 3.3V system，Don't exceed 3.3V in application to avoid damage.

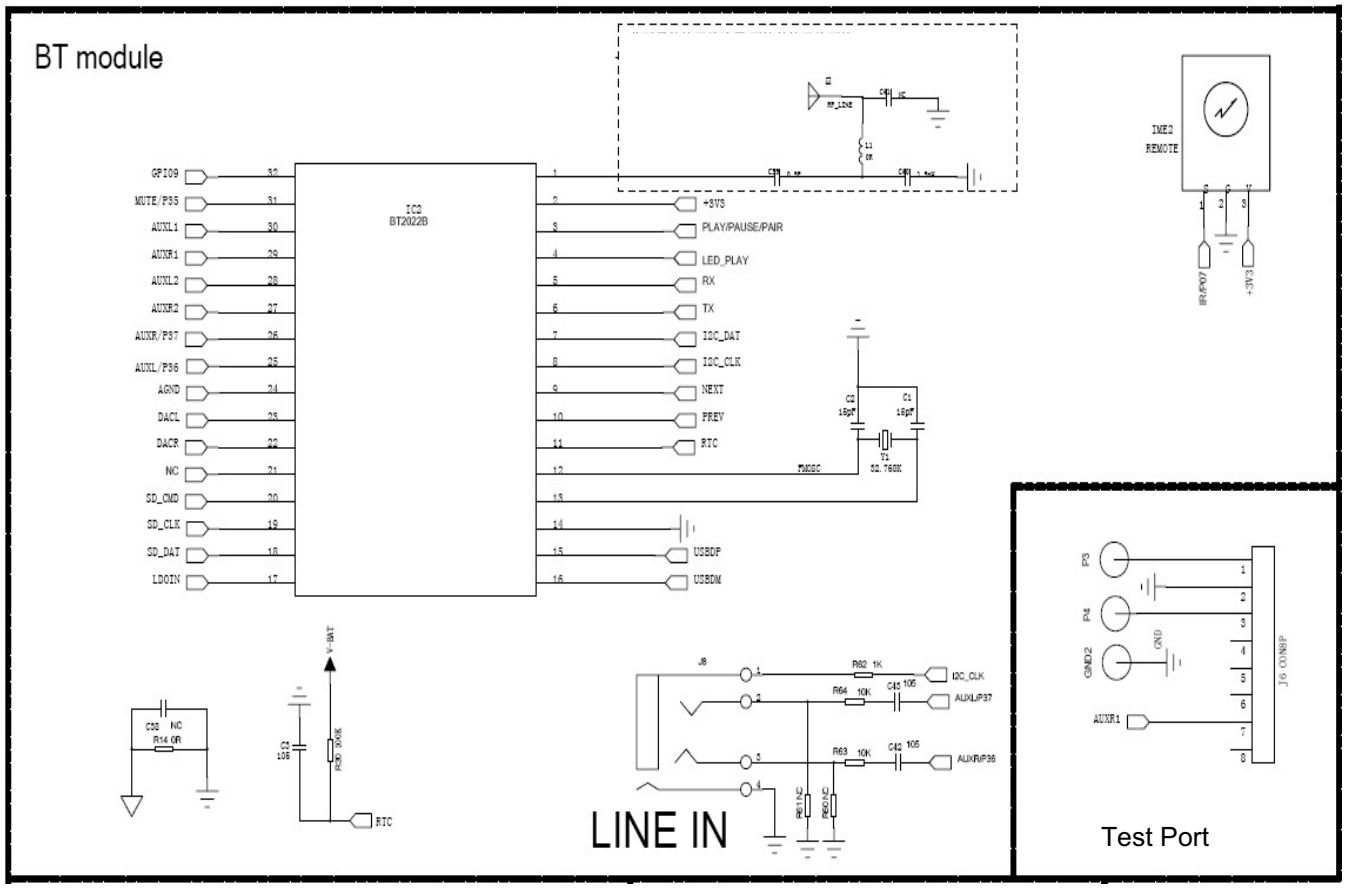
Application

- Portable luetooth Audio
- Bluetooth MP3 Boombox
- Bluetooth Speaker
- Bluetooth Home Audio
- Hi-Fi Bluetooth Stereo

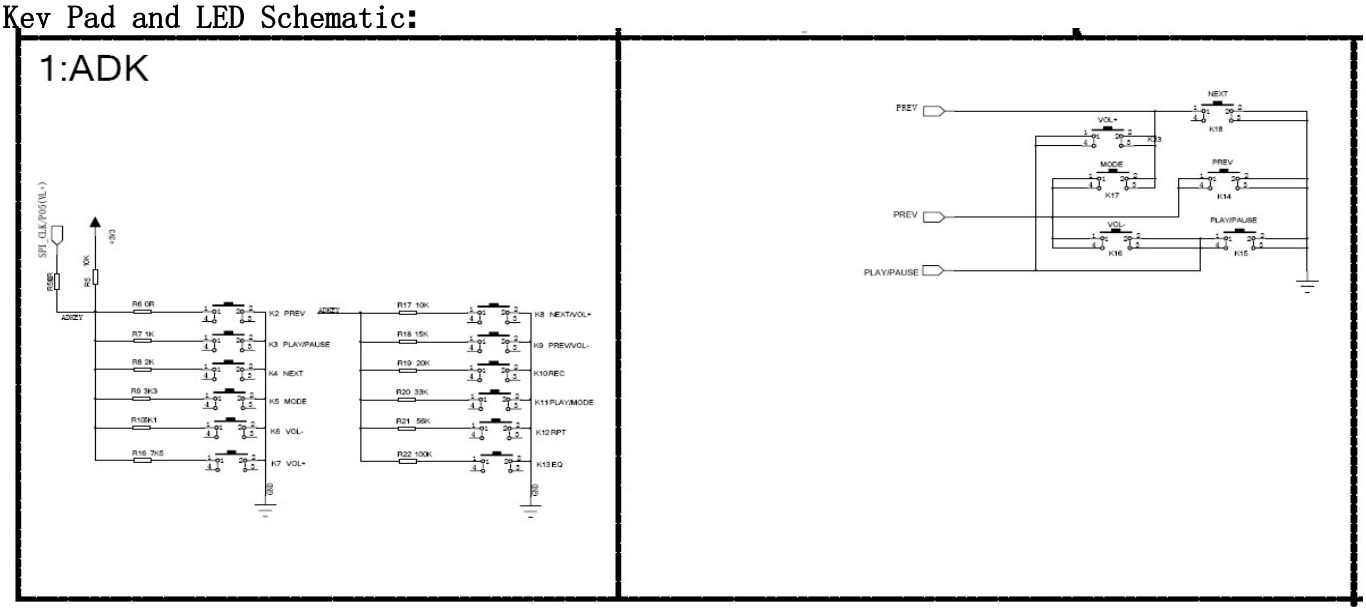
- Bluetooth Car Audio

CMD2022B CW6638 Application Schematic

MCU Schematic:



Kev Pad and LED Schematic:



(一): CMD2022B CW6638 Application Schematic

Bluetooth 3.0 Single Chip for A2DP/AVRCP Solution

General Description

The CONWISE CW6638M is a monolithic, single-chip, stand-alone baseband process with an integrated 2.4GHz transceiver including EDR to 3Mbits/s for Bluetooth v2.1+EDR and v3.0 applications. The CW6638M is also completely backward-compatible with Bluetooth 1.1/1.2/2.0 specification. It eliminates the need for external flash memories and active components into the device. Thus minimizing the footprint and system cost of implementing a Bluetooth system.

The CW6638M has been designed in CMOS RF technology, the most cost-performance effective silicon process today. This use of the advanced process enables the CW6638M to achieve the lowest cost total solution and maintain the possible lower current consumption in all modes of operation.

The CW6638M is the optimal solution for A2DP/AVRCP applications that requires the audio bitstream payload and remote control commands/ events via UART interface.

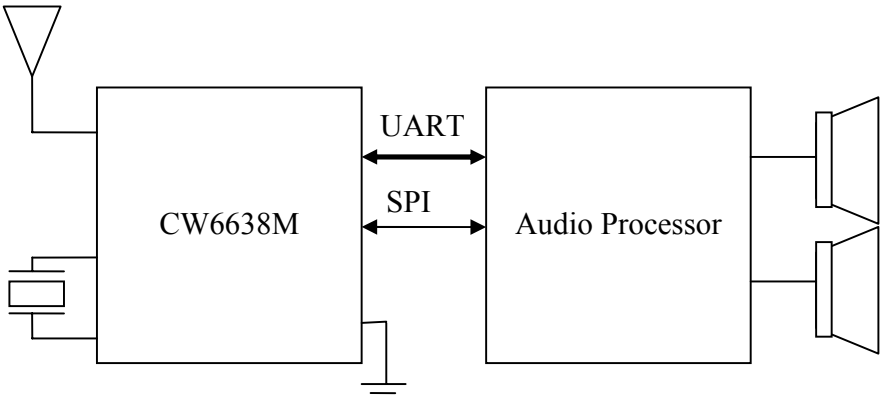
Features

- **Bluetooth specification version 3.0 compatible.**
- **Support ACL multi-slot packets for Data/Audio stream application.**
- **Support SCO/eSCO link with external PCM digital audio interface.**
- **Support high-speed UART baud rate of up to 3Mbps and USB2.0 full-speed compliant for HCI transport**
- **Support AFH for WiFi coexistence.**
- **Optimal 2-wire coexistence with WLAN.**
- **On-chip ROM eliminates dedicated flash memory chip, significantly lowering system BOM.**
- **Integrated 8-bit 8051 microprocessor core instead of ARM/MIPS such high cost processors.**
- **External Clock/Crystal 16, 26MHz system clocks are available to apply for system requirements.**
- **Optional external 32.768KHz crystal/clock for deep-low power mode using.**
- **Wide operation voltage: 2.2V~5.5V.**
- **Package types available**

  CW6638M: 48pin QFN package (6mm x 6mm)

Applications

- **Bluetooth speaker utilizing A2DP/AVRCP**
- **Audio system require audio source via Bluetooth from cellphone, PC**



Revision History

Revision	*Date*	*Originator*	*Change Description*
V1.0	2012/06/28	Jamic	Draft version initial released

1. Overview

The CW6638M is Bluetooth Core Specification version 3.0 compliant and designed for used for Bluetooth Audio application. The combination of the Radio Transceiver, BBC and the 8051-based microcontroller-BLM, BIM with on-chip ROM provide a complete lower layer Bluetooth protocol stock including the link controller (LC), link manger (LM), A2DP sink and AVRCP . The major features of CW6638M are listed in section 1.1 and the usage models- Bluetooth Audio is described in following section 1.2.

1.1. Features

Major features of the CW6638M include:

- Fully supports Bluetooth 3.0 features
- Adaptive Frequency Hopping (AFH)
- Scatter Mode
- QoS
- eSCO
- Fast Connect
- LMP improvements
- Synchronization
- Built-in regulators
- Built-in TR switch
- Maximum UART baud rates of 3 Mbps
- Support maximum Bluetooth data rates over UART interfaces
- HCI USB transport support with USB version 2.0 full-speed compliant interface
- High speed HCI UART transport support
- Channel quality driven data rate and package type selection
- Extended radio and production test mode features
- Full support for power saving modes
- Built-in LPO clock using external 32.768KHz crystal/clock

1.2. Bluetooth Audio Usage Model

The CW6638M is designed to provide direct interface to provide audio processor with audio bitstream transported via Bluetooth as show in figure 1. The CW6638M has very flexible PCM and UART interface enabling it to transparently connect with existing circuits. In addition, the low-cost crystal and external LPO (Low Power Oscillator) inputs allows to further minimizing the size, power and cost of the integration.

The CW6638M incorporates a number of unique features to accommodate the integration into audio playback platforms.

- The PCM interface provides multiple modes of operation to support both master and slave as well as interfacing to single external codec devices.
- The UART interface supports hardware flow control with tight integration to power control side band signalling to support the lowest power operation.

- The XTAL oscillation circuit provides a dedicated 26MHz to accommodate the typical reference frequency used by mobile phone.
- A programmable XTAL power-up or power-down signal allows the device to indicate when the clock supplied to the CW6638M may be disabled for added power saving during sleep mode.
- Both the XTAL and external LPO inputs are high impedance inputs that have minimal loading on the driving source.
- The highly linear design of the radio transceiver ensures that the device has the lowest output spurious emissions regardless of the stat of operation and has been fully characterized in the global cellular bands.
- The transceiver design has excellent blocking (eliminating desensitization of the Bluetooth receiver) and inter-modulation performance (distortion of the transmitted signal caused by the mixing of the cellular and Bluetooth transmissions) in the presence of a any cellular transmission (GSM, GPRS, CDMA, WCDMA or TD-SCDMA). Minimal external filtering is required for integration inside the handset.
- Minimal external components are required for integration and very compact packaging is available.

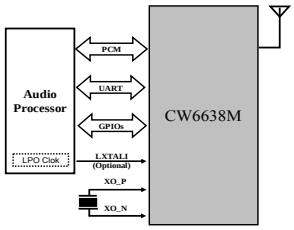


Figure 1 Bluetooth Audio Model

2. Pin Assignments

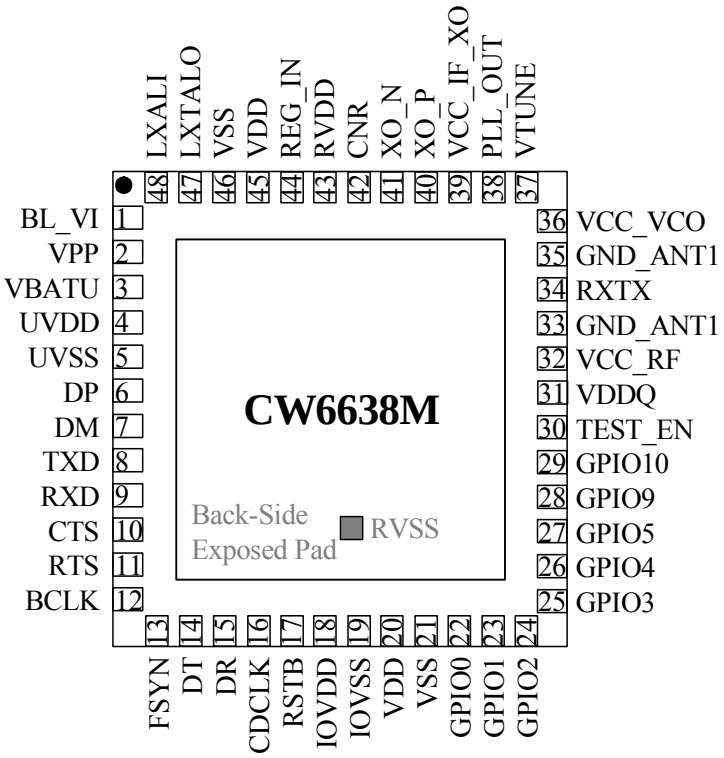


Figure 2 CW6638M 48-pin QFN6x6 Pin Diagram(Top-View)

Table 1: Pin Description

Pin Number	*Pin Name*	*I/O*	*Power Domain*	*Description*
Clock/Crystal Interface and Reset				
40	XO_P	I	RVDD	Crystal or frequency reference input
41	XO_N	O	RVDD	Crystal Oscillator output. Connect with XO_P if the reference clock is supplied

48	LXTALI	I	IOVDD	Low clock rate crystal driver input pin for *32.768KHz* crystal or external clock input. Connect to IOVSS if no low clock is applied.
47	LXTALO	O	IOVDD	Low clock rate crystal driver output pin for *32.768KHz* crystal driving. Leave unconnected if low clock is supplied.
17	RSTB	I	IOVDD	Active low system reset. This pin contains a weak pull-up.
Digital I/O and Core Power Supplies				
18	IOVDD	I	NA	Power supply for GPIOs.
19	IOGND	-	NA	Ground connection of GPIOs
44	REG_IN	I	NA	This pin serves as an input of the on-chip VDD and RVDD LDO regulators.
20, 45	VDD	-	NA	On-chip 1.8V LDO output for digital core, this pin output typical voltage is 1.8V.
21, 46	VSS	-	NA	Ground connection of on-chip 1.8 VDD LDO
2	VPP	-	VDD	Internal OTP ROM power supply. This pin should be left unconnected in field application.
RF Power Supplies				
43	RVDD	-	NA	On-chip 1.8V RVDD LDO output to supply internal RF circuits, this pin output typical voltage is 1.8V.
Exposed Pad	RVSS	-	NA	Ground connection of on-chip 1.8V RVDD LDO
31	VDDQ	I	RVDD	Digital block of RF circuit power supply. This pin must connect to RVDD.
32	VCC_RF	I	RVDD	RF circuit power supply. This pin must connect to RVDD.
36	VCC_VCO	I	RVDD	VCO circuit power supply. This pin must connect to RVDD.
39	VCC_IF_XO	I	RVDD	IF and internal Crystal Oscillator circuit power supply. This pin must connect to RVDD
42	CNR	O	RVDD	On-Chip RVDD LDO external decoupling capacitor pin.
USB Power Supplies				
3	VBATU	-	NA	This pin serves as an input of the on-chip UVDD LOD regulators. Connect to UVSS if the USB interface is not used.
4	UVDD	-	NA	On-chip 3.3V UVDD LDO output to supply USB transceiver.
5	UVSS	-	NA	Ground connection of on-chip 3.3V UVDD LDO
USB Interface				
6	DP	I/O	UVDD	USB data plus pin for the HCI USB interface. This pin should be connected to UVSS if USB is not used.
7	DM	I/O	UVDD	USB data minus pin for the HCI USB interface. This pin should be connected to UVSS if USB is not used.
UART Interface				
8	TXD	O	IOVDD	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 the GPIO Pin 14.
9	RXD	I	IOVDD	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 the GPIO Pin 15
10	CTS	I	IOVDD	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.

11	RTS	O	IOVDD	UART Request 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.
Audio PCM Interface				
12	BCLK	I/O	IOVDD	PCM serial data clock pin. In master mode, this is the clock output into the external HOST/CODEC. In clock slave mode, this is an input pin.
13	FSYN	O	IOVDD	PCM serial data synchronization pin. In master mode, this is an 8Khz sync signal to synchronize the input and output serial data streams.
14	DT	O	IOVDD	PCM serial data output pin. This data is clocked with BLCK, and first serial bit is synchronized by FSYN
15	DR	I	IOVDD	PCM serial data input pin. This data is clocked with BLCK, and first serial bit is synchronized by FSYN
16	CDCLK	O	IOVDD	External CODEC system clock. It can enable/disable to output the system clock to drive an external CODEC.
GPIO				
22, 23, 24, 25, 26, 27, 28, 29	GPIO0~GPIO 10	I/O	IOVDD	3.3V tolerant GPIO pin with programmable pull-up.
Radio				
33, 35	GND_ANT1	-	RVDD	Ground connection of RF I/O antenna. These pins must connect to RVSS.
34	RXTX	-	RVDD	RF I/O antenna pin.
37	VTUNE	I	RVDD	VCO tune input pin.
38	PLL_OUT	O	RVDD	Charge Pump output
Battery-Low Detector				
1	BL_VI	I	VDD	The input detection pin of Battery-Low Detector
Reserved Pins				
30	TEST_EN	I	IOVDD	The test mode enable pin. This pin should be left unconnected for field application.

3. Electrical Characteristics

3.1. Absolute Maximum Ratings

Table 2: Maximum Electrical Rating

Rating	*Minimum*	*Maximum*	*Unit*
Storage temperature	-40	+150	°C
Supply voltage of REG_IN	-0.4	5.5	V
Supply voltage of VBATU	-0.4	5.5	V
Supply voltage of UVDD	-0.4	4.0	V
Supply voltage of IOVDD	-0.4	4.0	V
Supply voltage of input/output Pin	IOVSS-0.4	IOVDD+0.4	V
Supply voltage of VDD	-0.4	3.0	V
Supply voltage of RVDD, VCC_RF, VCC_IF_VCO, VCC_XO	-0.4	3.0	V

3.2. Recommended Operating Conditions

Table 3: Recommended Operating Conditions

Rating	*Minimum*	*Typical*	*Maximum*
Operation temperature	0 °C	+25°C	+70 °C
Supply voltage of REG_IN	2.2V	3.3V	5.5V
Supply voltage of VBATU	3.7V	5.0V	5.5V
Supply voltage of UVDD	2.8V	3.3V	3.6V
Supply voltage of IOVDD	1.7V	3.3V	3.6V
Supply voltage of VDD	1.7V	1.8V	2.0V
Supply voltage of RVDD, VCC_RF, VCC_IF_VCO, VCC_XO	1.7V	1.8V	2.0V

3.3. Clocks

Table 4: Signal Specification of XO_P/XO_N Pin

Crystal Oscillator	*Minimum*	*Typical*	*Maximum*
Crystal frequency	-	26MHz	-
Crystal load capacitance	8pF	10pF	12pF
Frequency tolerance			±20ppm
Digital trim range	0pF	-	3.1pF
Digital trim step	-	100fF	-
External clock of XO_P[1]	***Minimum***	***Typical***	***Maximum***
Input frequency	-	26MHz	-
Clock input level	0.8Vp-p	-	RVDD
XO_P input impedance	100KΩ	-	-
XO_P input impedance	-	-	4pF

1. Connect XO_N and XO_P together when use external reference clock instead of crystal.

Table 5: Signal Specification of LXTALI/LXTALO Pin

Crystal Oscillator	*Minimum*	*Typical*	*Maximum*

Crystal frequency	-	32.768KHz	-
Crystal load capacitance	-	20pF	-
Frequency tolerance			±200ppm
External clock of LXTALI[1]	***Minimum***	***Typical***	***Maximum***
Input frequency	-	32.768KHz	-
Clock input level	0.8 x VDD	-	-
LXTALI input impedance	100KΩ	-	-

1. Leave LXTALO unconnected when use external reference clock instead of crystal.

3.4. Linear Regulator

Table 6: UVDD LDO

UVDD Liner Regulator	***Minimum***	***Typical***	***Maximum***
Input voltage	3.7V	-	5.5V
Dropout voltage (I_{load}=70mA)	-	-	0.2V
Output voltage (I_{load}=70mA)	-	3.3V	-
Temperature coefficient	-	-	-
Output noise	-	-	-
Load regulation (I_{load}<70mA)	-	-	200mV/A
Maximum output current	-	-	70mA
Quiescent current	-	7uA	-

Table 7: VDD LDO

VDD Liner Regulator	***Minimum***	***Typical***	***Maximum***
Input voltage	2.2V	-	5.5V
Dropout voltage (I_{load}=70mA)	-	-	0.2V
Output voltage (I_{load}=70mA)	-	1.8V	-
Temperature coefficient	-	-	-
Output noise	-	-	-
Load regulation (I_{load}<70mA)	-	-	200mV/A
Maximum output current	-	-	70mA
Quiescent current	-	7uA	-

Table 8: RVDD LDO

RVDD Liner Regulator	***Minimum***	***Typical***	***Maximum***
Input voltage	2.2V	-	5.5V
Dropout voltage (I_{load}=70mA)	-	-	0.2V
Output voltage (I_{load}=70mA)	-	1.8V	-
Temperature coefficient	-	-	-
Output noise	-	-	-
Load regulation (I_{load}<70mA)	-	-	200mV/A
Maximum output current	-	-	80mA
Quiescent current	-	20uA	-

3.5. Power Consumption

Table 9 shows the current consumption for (IOVDD/REG_IN=2.8V, RVDD=1.8V, VDD=1.8V) (T_A=25°C) (XO_P=26MHz, LXTALI=GND) (UART HCI=921.6Kbps)

Table 9: Typical Current Consumption

Operational Mode	*Minimum*	*Typical*	*Maximum*
Page scan, time internal 1.28s	-	1mA	-
Inquiry	-	55mA	-
Page scan and Inquiry	-	1.6mA	-
ACL no traffic	-	26mA	-
ACL with file transfer	-	47mA	-
SCO HV3	-	52mA	-
Sleep	-	80uA	-

3.6. RF Specifications

Table 10: Receiver RF specifications

Parameter		*Minimum*	*Typical*[2]	*Maximum*
Receiver Selection				
Frequency range		2402MHz	-	2480MHz
Rx sensitivity[1]	GFSK, 0.1% BER	-88dBm	-86dBm	-84dBm
	π/4-DQPSK, 0.01% BER	-	-86dBm	-
	8-DPSK, 0.01% BER	-	-78dBm	-
Input IP3		-21dBm	-	-
Maximum input	GFSK, 0.1% BER	-	0dBm	-
	π/4-DQPSK, 0.1% BER	-	0dBm	-
	8-DPSK, 0.1% BER	-	-10dBm	-
Interference Performance				
C/I co-channel (GFSK, 0.1%BER)		11dB	10dB	-
C/I 1 MHz adjacent channel (GFSK, 0.1% BER)		-	-1dB	0dB
C/I 2 MHz adjacent channel (GFSK, 0.1% BER)		-	-36dB	-30dB
C/I >=3 MHz adjacent channel (GFSK, 0.1% BER)		-	-43dB	-40dB
C/I Image channel (GFSK, 0.1% BER)		-	-15dB	-9dB
C/I co-channel (π/4-DQPSK, 0.1% BER)		-	12dB	13dB
C/I 1 MHz adjacent channel (π/4-DQPSK, 0.1% BER)		-	-7dB	0dB
C/I 2 MHz adjacent channel (π/4-DQPSK, 0.1% BER)		-	-32dB	-30dB
C/I >=3 MHz adjacent channel (π/4-DQPSK, 0.1% BER)		-	-43dB	-40dB
C/I Image channel (π/4-DQPSK, 0.1%BER)		-	-19dB	-7dB
C/I co-channel (8-DPSK, 0.1%BER)		-	20dB	21dB
C/I 1 MHz adjacent channel (8-DPSK, 0.1% BER)		-	0dB	5dB
C/I 2 MHz adjacent channel (8-DPSK, 0.1% BER)		-	-27dB	-25dB
C/I >=3 MHz adjacent channel (8-DPSK, 0.1% BER)		-	-35dB	-33dB
C/I Image channel (8-DPSK, 0.1%BER)		-	-13dB	0dB
Intermodulation Performance				
Frequency range +3MHz~+6MHz offset (0.1% BER)		-39dBm	-	-
Out-of-Band Blocking Performance (CW)				

30 MHz - 2000 MHz, 0.1% BER	-10dBm	-3dBm	-
2000 MHz – 2399 MHz, 01% BER	-27dBm	-13dBm	-
2498 MHz – 3000 MHz, 0.1% BER	-27dBm	-14dBm	-
3000 MHz – 12.75GMz, 0.1% BER	-10dBm	-6dBm	-
Spurious Emissions			
30 MHz – 1 GHz	-	-	-
1 GHz -12.75 GHz	-	-	-

1. The receiver sensitivity is measured on the device interface.
2. Typical operating conditions are RVDD=1.8V operation voltage and 25°C ambient temperature.
3. The maximum value represents the actual Bluetooth specification required for Bluetooth qualification as defined in the version 3.0 specification.

Table 11: Transmitter RF specifications

Parameter	*Minimum*	*Typical*[1]	*Maximum*
Transmitter Selection			
Frequency range	2402MHz	-	2480MHz
Output power	-3dBm	+1dBm	+4dBm
Output power level control	2dB	4dB	8dB
20dB bandwidth output spectrum	-	780KHz	1000KHz
Frequency drift			
DH1 packet	-	13KHz	±25KHz
DH3 packet	-	15KHz	±40KHz
DH5 packet	-	15KHz	±40KHz
Modulation Index	0.28	0.32	0.35
Out-Band Spurious Emission			
30 MHz – 1 GHz idle mode	-	-	-57dBm
1 GHz -12.75 GHz idle mode	-	-	-47dBm
1.8 GHz - 1.9 GHz	-	-	-57dBm
5.15 GHz -5.3 GHz	-	-	-47dBm

1. Typical operating conditions are RVDD=1.8V operation voltage and 25°C ambient temperature.
2. The maximum value represents the actual Bluetooth specification required for Bluetooth qualification as defined in the version 3.0 specification.
3. the RF characteristics are measured at the chip interface.

4. Application Circuits

4.1. Usage Model through UART

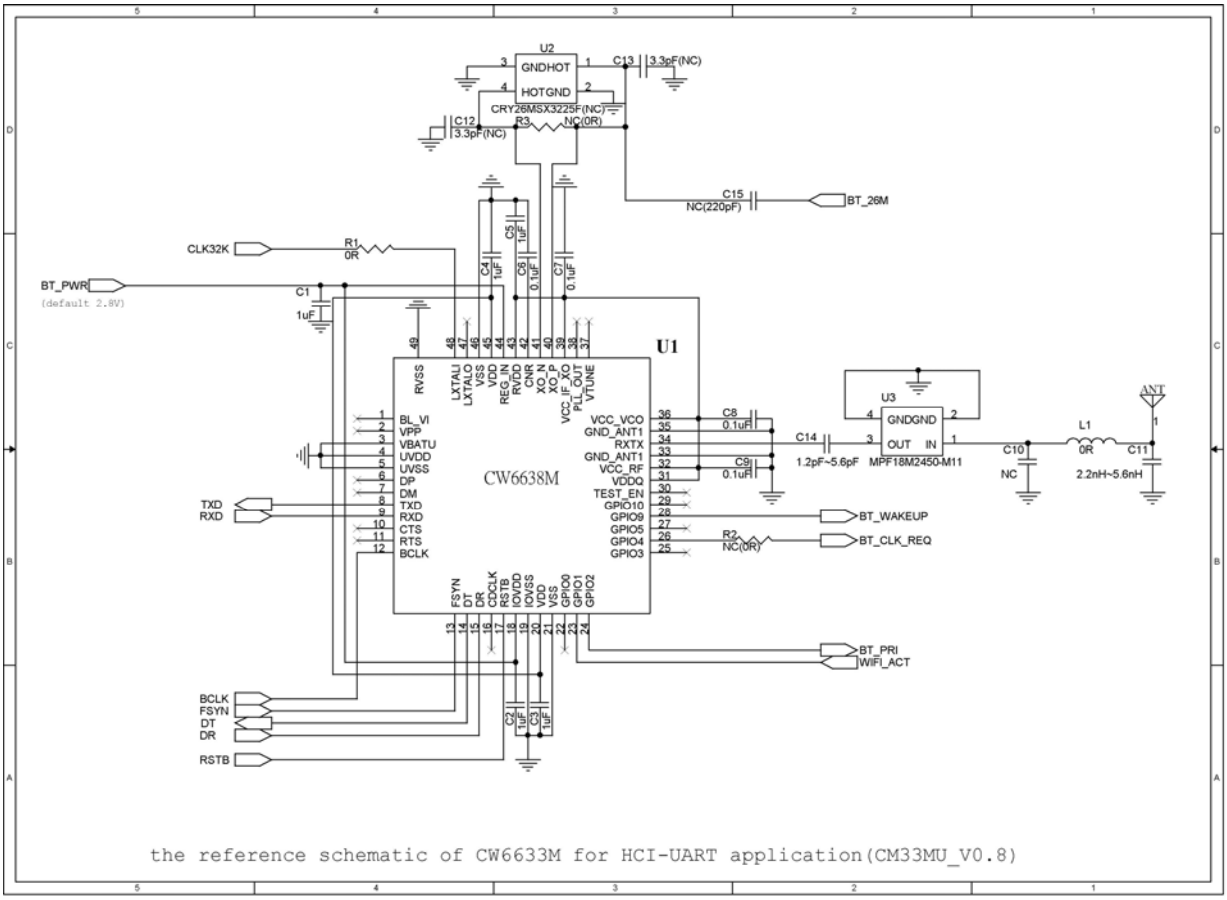
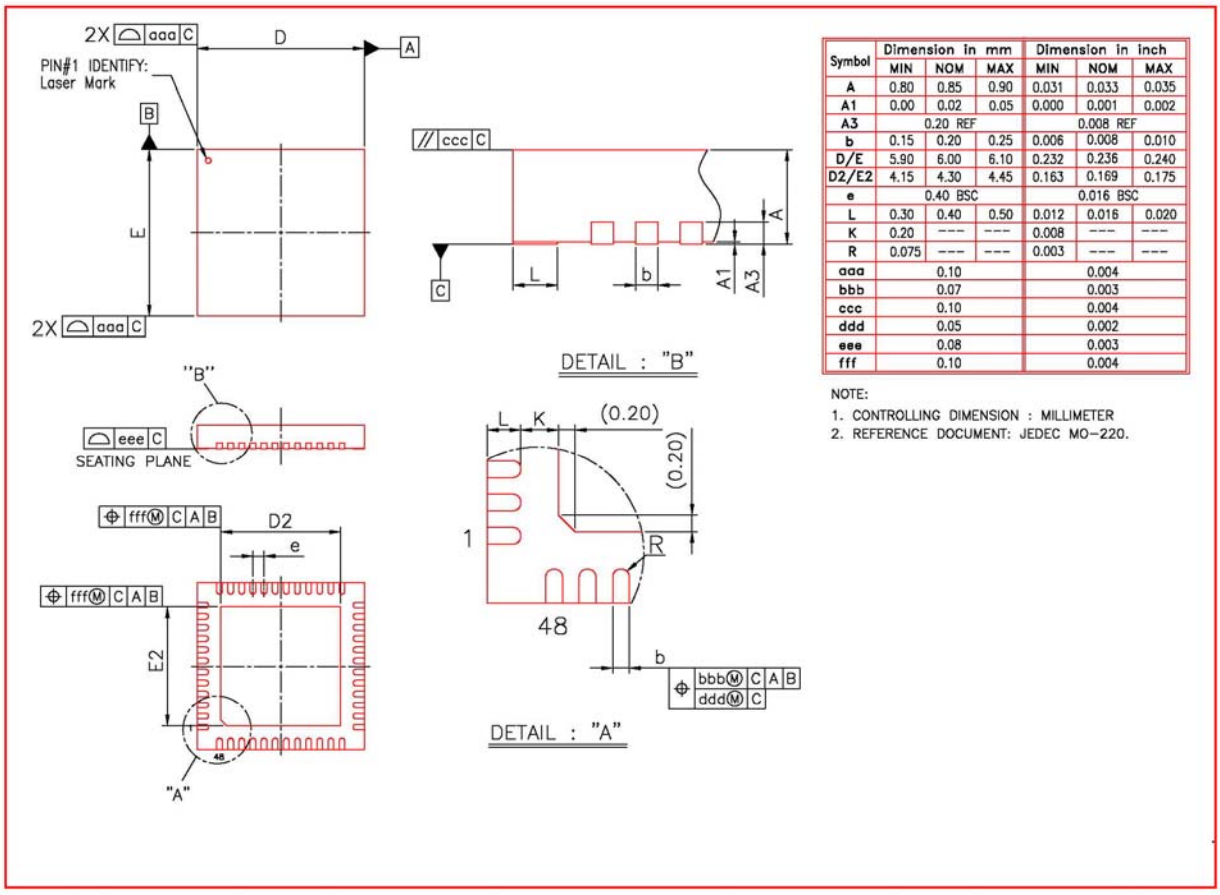


Figure 3 The Application Circuit for Usage Model-UART

5. Mechanical Information

5.1. QFN6x6 48-pin Package Information



Symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.85	0.90	0.031	0.033	0.035
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	0.20 REF			0.008 REF		
b	0.15	0.20	0.25	0.006	0.008	0.010
D/E	5.90	6.00	6.10	0.232	0.236	0.240
D2/E2	4.15	4.30	4.45	0.163	0.169	0.175
e	0.40 BSC			0.016 BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020
K	0.20	---	---	0.008	---	---
R	0.075	---	---	0.003	---	---
aaa	0.10			0.004		
bbb	0.07			0.003		
ccc	0.10			0.004		
ddd	0.05			0.002		
eee	0.08			0.003		
fff	0.10			0.004		

Figure 4 CW6638M 48-pin, 6 x 6 x 0.85mm, 0.4mm-pitch QFN Package Dimension

Figure 5 CW6638M Product Marking

6. Ordering Information

Package			Order Number
Type	**Size**	Shipment Method	
48-Pin QFN (Pb free)	**6 x 6 x 0.85mm**	Tape&Reel	CW6638M

Minimum Order Quantity

Tape & Reel: 3Kpcs/reel

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