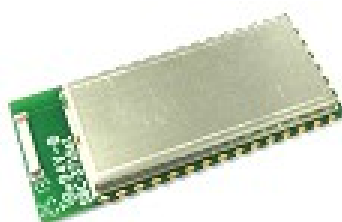


HIGH END AUDIO BLUETOOTH MODULE

BUILD-IN EXTREME HIGH QUALITY AUDIO CODEC

SBC3716



Preliminary Specification

Version 1.1

10-SEP.-2013

Revision	Description	Date	Remark
V0.1	SBC3716 preliminary released	JUNE 2013	
V1.0	SBC3716 specification renew LED reference design renew	JULY 2013	
V1.1	Modify the audio spec.	Sep. 2013	

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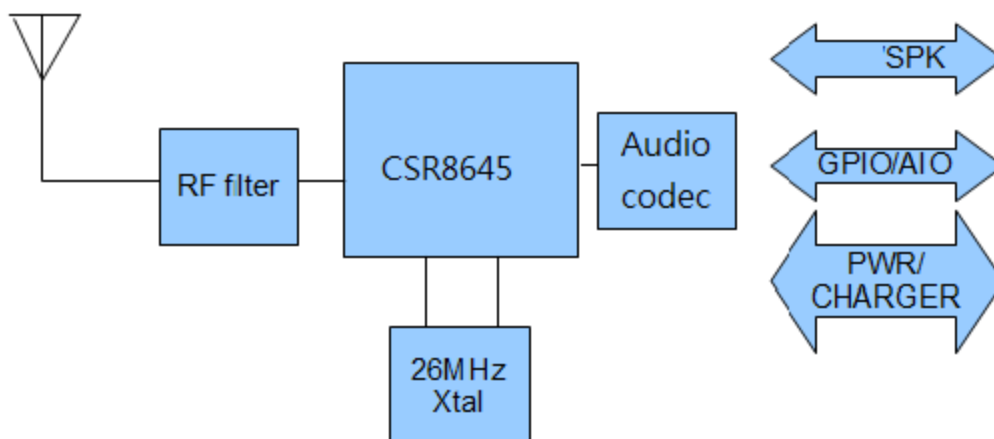
1. Description

SBC3716 audio Receiver is power by CSR BC8645 technology. That provides a complete 2.4GHz Bluetooth technology for stereo music transmission and also build in high quality of codec. The SBC3716 module is compliant with Bluetooth specification v4.0 and support A2DP, AVRCP

2. Features

1. CSR BlueCore8645 Chip.
2. Bluetooth v4.0
3. Class 1, Class 2 and Class 3 support without the need for an external power amplifier
4. build in ESS high end audio codec for extreme audio quality.
5. SBC decoder support.
6. Stereo widening (S3D)
7. Multipoint support for A2DP connection to 2 A2DP sources for music playback
8. Supported A2DP1.2, AVRCP 1.4
9. Build in high performance chip antenna.
10. Dimension: 37.0 X 16.0 X 3.1mm.

3. Block Diagram



SBC3716 Module Block Diagram

4. Radio Characteristics

	Frequency (GHz)	MIN	TYP	MAX	BT Spec	Unit
Sensitivity at 0.1%BER	2.402	≤-93	-85	-	≤ -70	dBm
	2.441	≤-93	-85	-		dBm
	2.480	≤-93	-85	-		dBm
RF Transmit Power	2.402	0	3	10	≤ 4	dBm
	2.441	0	3	10		dBm
	2.480	0	3	10		dBm
Initial Carrier Frequency Tolerance	2.402	-	5	75	75	kHz
	2.441	-	5	75		kHz
	2.480	-	5	75		kHz
20dB bandwidth for modulated carrier		-	900	1000	≤1000	kHz
Drift (Five slots packet)		-	15	-	40	kHz
Drift Rate		-	13	-	20	kHz
Δf1 avg "Maximum Modulation"	2.402	140	165	175	140 < Δf1 avg	kHz
	2.441	140	165	175		kHz
	2.480	140	165	175		kHz
Δf2 max "Minimum Modulation"	2.402	115	190	-	115	kHz
	2.441	115	190	-		kHz
	2.480	115	190	-		kHz

5. Analog Performance

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
PCM sampling rate	fs				200	kHz
Mute Delay	T _{DMUTE}		500	-		mS
Dynamic Performance						
DNR(A-weighted)		-60dBFS		112		dB-A
%THD+N		0dBFS		0.002	0.006	%
		-3dBFS			0.005	%
Interchannel Isolation				100		dB
DC Accuracy						
Absolute DC Offset				<4		mV
Load Resistance	R _L		5			kΩ
Digital Filter Performance						
Pass band		+/- 0.005dB			0.454	fs
		-3dB			0.49	fs
Stop band		< -115dB	0.546			dB
Group Delay		115		35/fs		S

6. Electrical Characteristics

Recommended Operating Conditions

Rating		Min	Typ	Max	Unit
Operating temperature range		0	20	70	°C
Supply Voltage					
Charger	VCHG	4.75 / 3.10	5.00	5.25	V
LEDs	LED[2:0]	1.10	3.70	4.25	V
Battery	VBAT_SENSE	0	3.7	4.2	V
	VREGENABLE	0	3.7	4.2	V
1.8V	VDD_AUDIO_DRV	1.7	1.8	1.95	V
	VDD_AUX_1V8	1.7	1.8	1.95	V
	VDD_PADS_1	1.7	1.8	3.6	V
	VDD_PADS_2	1.7	1.8	3.6	V
	VDD_AUX_1V8	1.25	1.8	1.95	V
1.35V	SMPS_1V35_SENSE	1.3	1.35	1.4	V
	VDD_AUDIO	1.3	1.35	1.4	V
	VREGIN_DIG	1.3	1.35 or 1.80	1.95	V

Power Consumption

DUT Role	Connection	Packet Type	Packet Size	Average Current	Unit
Slave	SCO	HV3	30	11	mA
Slave	eSCO	EV3	30	11.8	mA
Slave	eSCO	2EV3	60	9.2	mA
Slave	Stereo high quality SBC: ■ Joint stereo ■ Bit-Pool = 50, 16 blocks and 8 subbands ■ 48kHz sampling ■ No sniff ■ White noise			13.3	mA
Slave	Stereo low quality SBC: ■ Joint stereo ■ Bit-Pool = 20, 16 blocks and 8 subbands ■ 48kHz sampling ■ No sniff ■ White noise			11.8	mA
Slave	Stereo high quality MP3: ■ 192kbps ■ 48kHz sampling ■ No sniff ■ White noise			12.5	mA
Slave	Stereo low quality MP3: ■ 96kbps ■ 48kHz sampling ■ No sniff ■ White noise			11.8	mA

Voltage Input

	MIN	Typ.	MAX	Unit
Supply Voltage	3.1	3.3	3.5	V

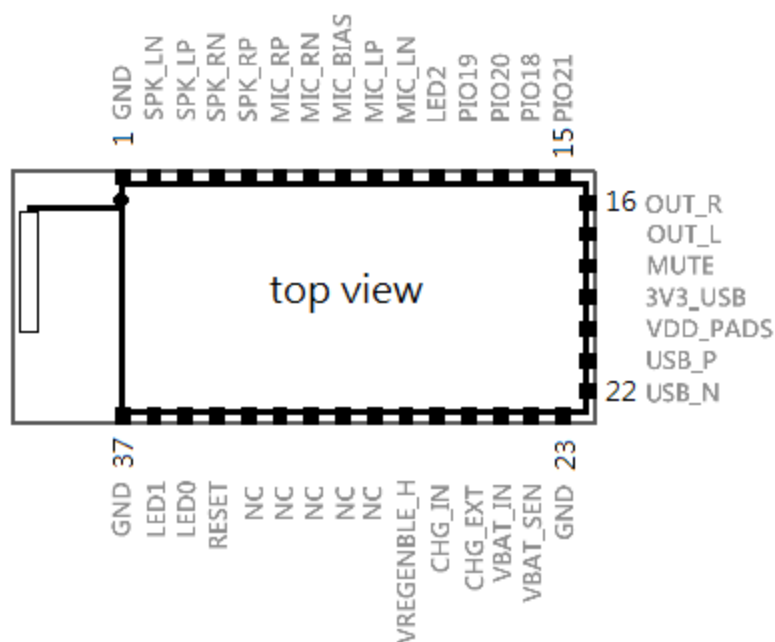
Operating Conditions

Voltage Range	3.3V±0.2V
Operating Temperature Range	0°C ~ 70°C
Storage Temperature Range	-40°C ~ 85°C
Relative Humidity (Operating)	≤90%
Relative Humidity (Storage)	≤90%

7. Software

- ³⁵/₁₇ SBC and Faststream decoder
- ³⁵/₁₇ Stereo widening (S3D)
- ³⁵/₁₇ Support for smartphone applications (apps)
- ³⁵/₁₇ A2DP Multipoint support enables the connection of two A2DP source devices to SBC3716 at the same time

8. Pin Definition



PIN	Name	Type	Description
1	GND	PWR	ground
2	SPK_LN	O	Reserved. (differential Speaker output Negative, left)
3	SPK_LP	O	Reserved. (differential Speaker output Positive, left)
4	SPK_RN	O	Reserved. (differential Speaker output Negative, right)
5	SPK_RP	O	Reserved. (differential Speaker output Positive, right)
6	MIC_RP	I	Reserved. (Microphone input positive, right)
7	MIC_RN	I	Reserved. (Microphone input negative, right)
8	MIC_BIAS	PWR	Reserved. (Microphone bias)
9	MIC_LP	I	Reserved. (Microphone input positive, left)
10	MIC_LN	I	Reserved. (Microphone input negative, left)
11	LED2	O	LED indicator
12	PIO19	I/O	Play/Pause
13	PIO20	I/O	Stop Play
14	PIO18	I/O	Forward
15	PIO21	I/O	Backward
16	OUT_R	O	Single end Right Analog audio Output
17	OUT_L	O	Single end Left Analog audio Output
18	MUTE	I	Active Low Mute Input
19	3V3_USB	I	VCC 3.3V input
20	VDD_PADS	PWR	1.7V to 3.6V positive supply input for input/output ports: REST,UART,PCM,SPI,PIO[all]
21	USB_P	I/O	USB data plus with selectable internal 1.5k pull-up resistor
22	USB_N	I/O	USB data minus
23	GND	PWR	ground
24	VBAT_SEN	PWR	Reserved.(Battery charger sense input)
25	VBAT_IN	I	3.3V input
26	CHG_EXT	PWR	Reserved.(External battery charger control)
27	CHG_IN	I	3.3V input
28	VREGENBLE_H	I	Regulator enable input
29-33	NC		
34	RESET	I	Reset if low. Input debounced so must be low for >5ms to cause a reset.
35	LED0	I/O	LED indicator
36	LED1	I/O	LED indicator
37	GND	PWR	ground

GND

Connect GND pins to the ground plane of the PCB.

VDD_BAT

Input for an internal 1.8 V switched mode regulator combined with output of the internal battery charger. When not powered from a battery, VCC3.3 and VDD_BAT can be combined to a single 3.3 V supply voltage.

REST

The RESET pin is an active low reset.

PIO

Programmable digital I/O lines. All PIO lines can be configured through software to have either weak or strong pull-ups or pull-downs. Configuration for each PIO line depends on the application. Please check Default configuration in Standard Setup Information.

USB_P

A bi-directional USB data line with a selectable internal 1.5 k Ω pull-up implemented as a current source. An external series resistor is required to match the connection to the characteristic impedance of the USB cable.

USB_N

bi-directional USB data line. An external series resistor is required to match the connection to the characteristic impedance of the USB cable.

SPKR_RP and SPKR_RN

Right channel audio output. The audio output lines should be routed differentially to either the speakers or to the output amplifier, depending on whether or not a single-ended signal is required. Use low impedance ground plane dedicated for the audio signals.

SPKR_LP and SPKR_LN

Left channel audio output. The same guidelines apply to this section as discussed previously.

MIC_BIAS

Bias voltage output for a microphone. Use the same layout guidelines as discussed previously with other audio signals.

MIC_RP and MIC_RN

Right channel audio inputs. This dual audio input can be configured to be either single ended or fully differential and programmed for either microphone or line input. Route differential pairs close to each other and use a solid dedicated audio ground plane for the audio signals.

MIC_LP and MIC_LN

Left channel audio input. The same guidelines apply to this section as discussed previously.

OUT_R

Single end analog audio out in right channel.

OUT_L

Single end analog audio out in left channel.

LED0

Power indicator. Lighting when power on. Flash with LED1 when stay in pairing mode.

LED1

Bluetooth indicator. Flash with LED0 when stay in pairing mode. Lighting when Bluetooth connected.

9. Mechanical Specification

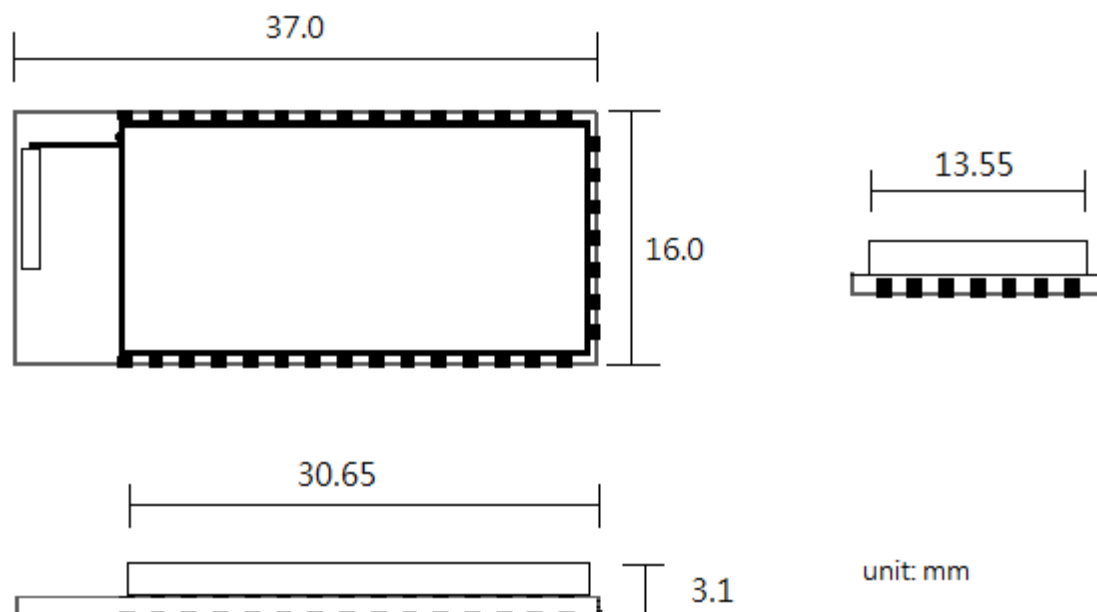
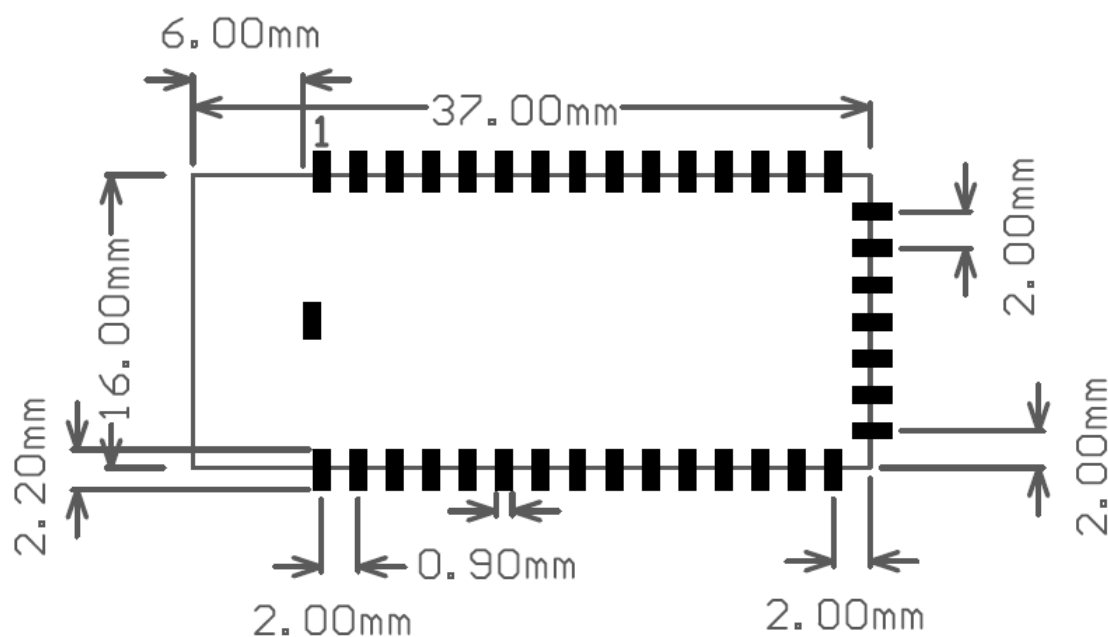
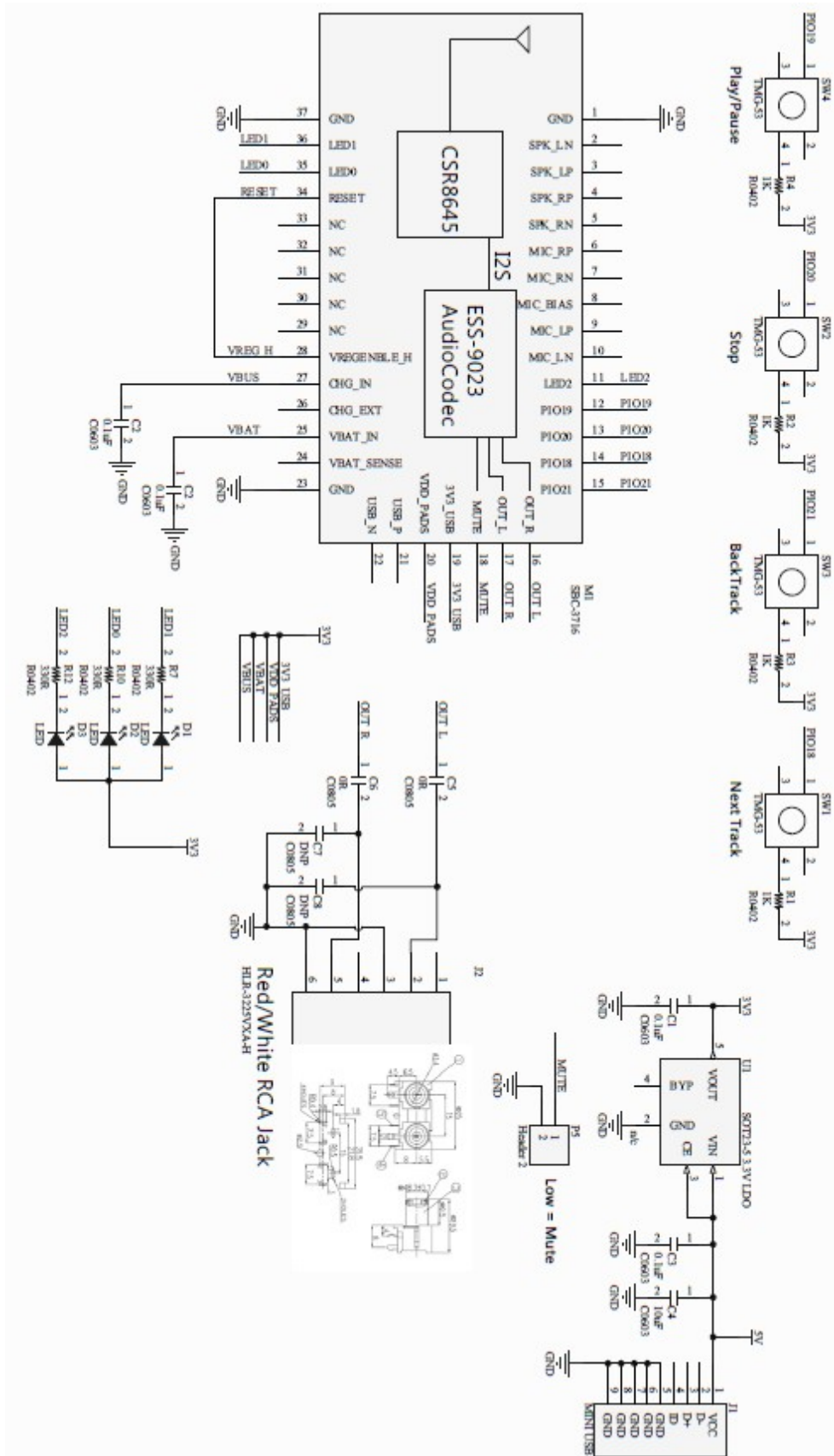


Fig. 1.2 SBC3716 Mechanical Specification

10. Layout reference



11. Reference Schematics



12. Reflow information

Reflow Profile Graphic, assuming:

1. Kester R905 Sn/4Ag/0.5Cu solder paste.
2. All solder ball alloys melt at 217°C.
3. Component joints do not exceed temperatures as per J-STD-02

