Technical Description

The Equipment Under Test (EUT) is a 2.4GHz Bluetooth 2.1 + EDR transceiver speaker. The EUT is power by an AC Adapter (Model: K15S140100U; Input 100-240V, 50/60Hz, 0.5A; Output: 14.0V, 1.0A) or 8x 1.5VDC AA size Alkaline Battery. The Bluetooth module in the EUT is operating in the frequency range from 2402MHz to 2480MHz (79 channels with 1MHz channel spacing). After pairing, the audio signal can be fed to the speaker. Also there is an Aux port for audio input only

2.4GHz Bluetooth Module:
Modulation Type: GFSK
Antenna Type: Integral, Internal
Frequency Range for 2.1: 2402MHz - 2480MHz, 1MHz channel spacing, 79 channels
Nominal field strength is 92.9dBμV/m @ 3m
Production Tolerance of field strength is 95.9 dBμV/m
Antenna gain is 0dBi

The functions of main ICs are mentioned below.
1. Part 1: MCU_SOC Contains RF Preamplifier, mixing, IF amplifier, Demodulation
1)M1 acts as the 2.4GHz radio core of Bluetooth module
2)Crystal (16MHz) to provide system clock for M1

2. Part 2: Line Input, Bluetooth Input, Switch Function and Volume Control
1)U6 acts as XZD4558 SOP-8 Dual operational amplifier
2)U2 acts as SPDT Analog Switch CRT
3) U5 acts as Volume Control IC

3. Part 3: AUDIO AMPLIFIER IC
1) U4 acts as 15WClass-D Audio Power Amplifier with Power Limit IC AMP PAM8006A QFN5*5-32L

4. Part 4: DC BATTERY INPUT POWER SUPPLY AMP_VDD U1,3 Manostat 5.0V_3.3V
1) U3 acts as 15WClass-D Audio Power Amplifier with Power Limit IC AMP PAM8006A QFN5*5-32L
2) U1 acts as a Voltage Regulator IC
3) Q4 acts as MOSFET XSZ2107

5. Part 5: LED1 KEY OPERATING And Working instructions LED

Electronics GLEAD 佳利电子

ZYM-BT55_V1.0

Bluetooth Module

Datasheet

Document History

Revision	Date	Change Reason
V1.0	2011-12-10	First release

TABLE OF CONTENTS

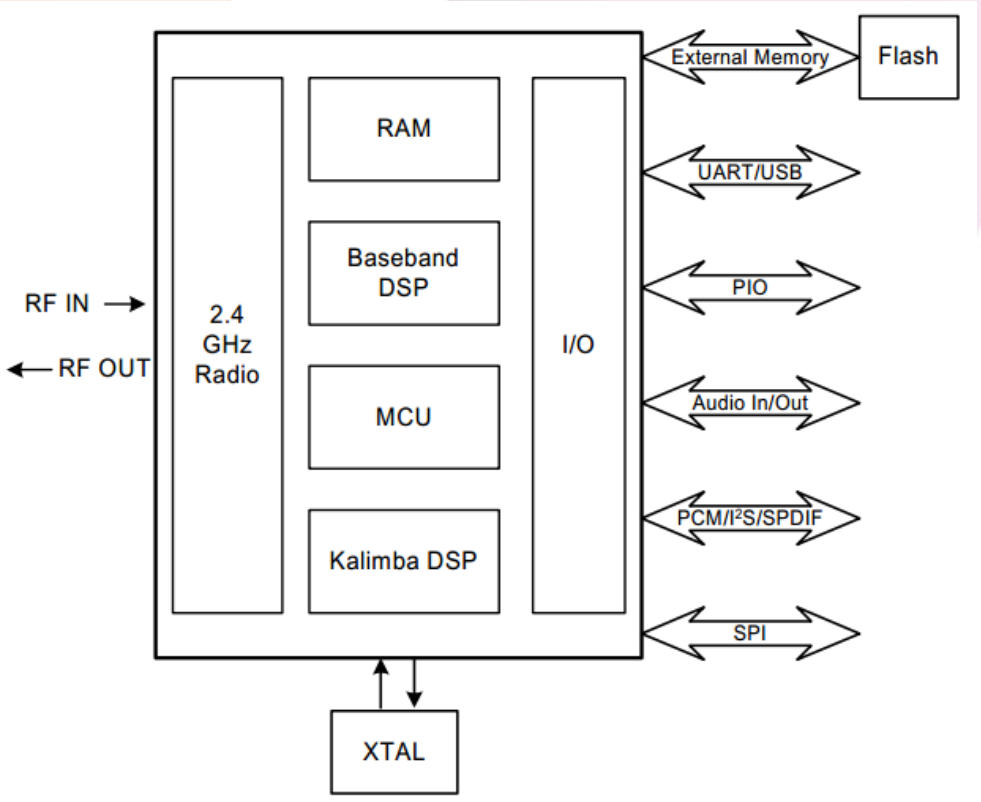
1 Introduction and Block Diagram

1.1 General Introduction

The ZYM-BT55 module from GLEAD is a complete Bluetooth® solution.It is built on CSR BC05 MultiMedia External Core and 8Mbit/16Mbit/32Mbit Flash memory.It's a short range,compact and cost effective module. Be able to be embedded into your any electronics devices which need Bluetooth® connection,such as PND, Car Audio, Home Audio, Car kit, Handsfree applications…

The ZYM-BT55 module is a power class2 Bluetooth® device, and is in compliance with version 2.1 of the Bluetooth® specification. It includes CSR BC05 MultiMedia Core and 8Mbit/16Mbit/32Mbit Flash memory, a radio front-end, antenna interface, supporting circuitry, together with some higher-level software protocols and applications such as L2CAP, SDP, GAP, HSP, HFP, A2DP, AVRCP, OPP and PBAP resided in the flash memory.

1.2 Block Diagram



2 Key Features and Application Area

2.1 Key Features

- A small and cost effective Bluetooth® System
- Bluetooth® specification v2.1 compliant
- Class 2, up to 10-meter range
- Complete 2.4GHz Bluetooth® System
- Power management: low power 1.8V operation for Bluetooth® core
- Bluetooth® Profile Supported: HSP, HFP, A2DP ,AVRCP,OPP,PBAP
- Built in 16-bit Stereo Codec- 92dB SNR for DAC
- External antenna
- On-board flash memory (8Mbits/16Mbits/32Mbits)
- Optional echo cancellation software library
- Support multiple connections
- Support for 802.11 Co-existence
- Surface mount module for embedded applications
- Several firmware options
- Rewritable flash memory for easy upgrade route
- Custom firmware production available

2.2 Application Area

- Stereo Bluetooth® headset/headphone
- Automotive car kit applications
- Personal Navigation Device
- PDAs and other portable terminals
- MP3 headset
- High-end noise cancellation mono headset

3 Technical Specifications

3.1 General Specification

No.	Items	Description
1	Bluetooth Version	v2.1 + EDR
2	Chipset	CSR BC57E687C
3	Dimension	21mm x 13.5mm x 2.2mm
4	Voltage	3.3V~4.2V DC
5	Frequency Range	2402～2480MHz
6	Maximum RF Transmit Power	4dBm (Class 1, Class 2 and Class 3 support)
7	Receive Sensitivity	-92dBm (typ) π/4 DQPSK receiver sensitivity and -84dBm (typ) 8DPSK receiver sensitivity

3.2 Electrical Characteristics

3.2.1 Absolute Maximum Rating

Parameter		Min	Max	Unit
Storage temperature		-40	+105	℃
Supply voltage	VBAT	3.2	4.4	℃
	LED[1:0]		4.4	V
	VDD_CHG		6.5	V

3.2.2 Recommended Operating Conditions

Parameter	Minimum	Typ	Maximum	Unit
Operating temperature	-40	20	+85	℃
VCHG	4.75	5.00	5.75	V
VBAT	3.2	4.0	4.4	V
POWER	3.2	4.0	4.4	V
1V8	1.7	1.8	1.9	V

3.2.3 Stereo Codec: Analogue to Digital Converter

Analogue to Digital Converter					
Parameter	**Conditions**	**Min**	**Typ**	**Max**	**Unit**

Resolution	-		-	-	16	Bits
Input Sample Rate, F_{sample}	-		8	-	44.1	kHz
Signal to Noise Ratio, SNR(a)	f_{in}= 1kHz B/W = 20Hz→20kHz A-Weighted THD+N < 1% 150mV_{pk-pk} input	**F_{sample}**				
		8kHz	-	79	-	dB
		11.025kHz	-	77	-	dB
		16kHz	-	76	-	dB
		22.050kHz	-	76	-	dB
		32kHz	-	75	-	dB
		44.1kHz	-	75	-	dB
Digital Gain	Digital Gain Resolution = 1/32dB		-24	-	21.5	dB
Analogue Gain	Analogue Gain Resolution = 3dB		-	-	42	dB
Input full scale at maximum gain (differential)			-	4	-	mV rms
Input full scale at minimum gain (differential)			-	800	-	mV rms
3dB Bandwidth			-	20	-	kHz
Microphone mode input impedance			-	6.0	-	Ω
THD+N (microphone input) @ 30mV rms input			-	0.04	-	%

3.2.4 Stereo Codec: Digital to Analogue Converter

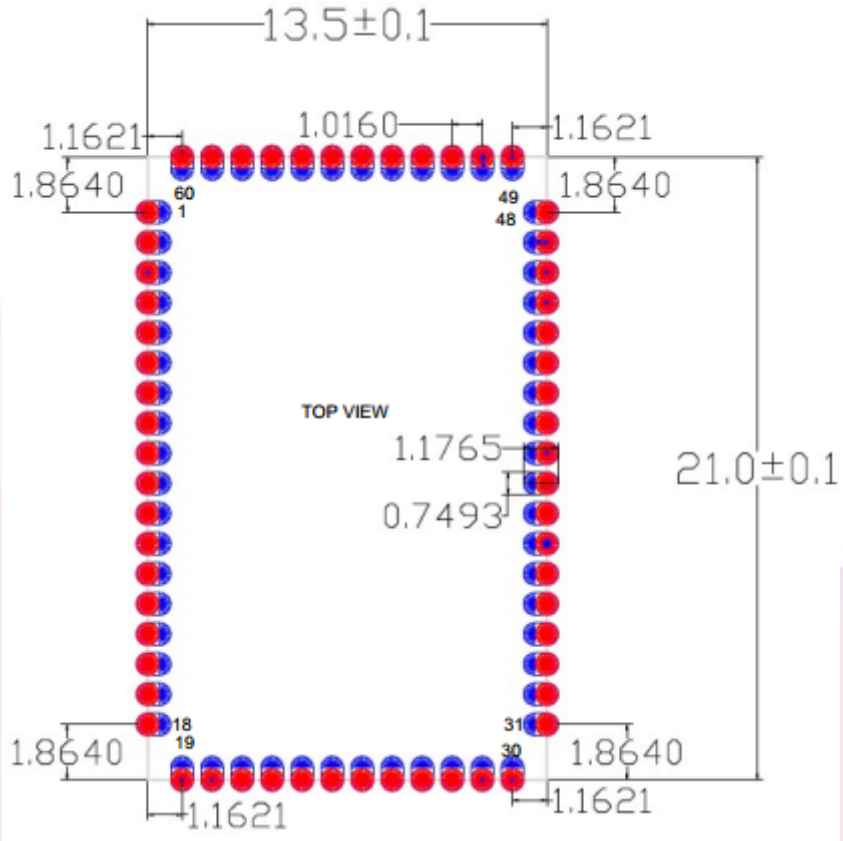
Digital to Analogue Converter						
Parameter	**Conditions**		**Min**	**Typ**	**Max**	**Unit**
Resolution	-		-	-	16	Bits
Output Sample Rate, Fsample	-		8	-	96	kHz
Signal to Noise Ratio, SNR	f_{in}= 1kHz B/W = 20Hz→20kHz A-Weighted THD+N < 0.01% 0dBFS signal Load = 100kΩ	**F_{sample}**				
		8kHz	-	95	-	dB
		11.025kHz	-	95	-	dB
		16kHz	-	95	-	dB
		22.050kHz		95		dB
		32kHz	-	95	-	dB
		44.1kHz	-	95	-	dB
		48kHz	-	95	-	dB
Digital gain	Digital gain Resolution = 1/32		-24	-	21.5	dB
Analogue gain	Analogue Gain Resolution = 3dB		0	-	-21	dB

Output voltage full-scale swing (differential)[a]		-	750	-	mV rms
Allowed Load	Resistive	16(8)		O.C	Ω
	Capacitive			500	pF
THD+N 100kΩ load				0.01	%
THD+N 16Ω load		-	-	0.1	%
SNR (Load = 16Ω, 0dBFS input relative to digital silence)		-	-95	-	dB

4 Mechanical Dimensions and Pin Assignment

4.1 Mechanical Dimensions

Unit(mm)

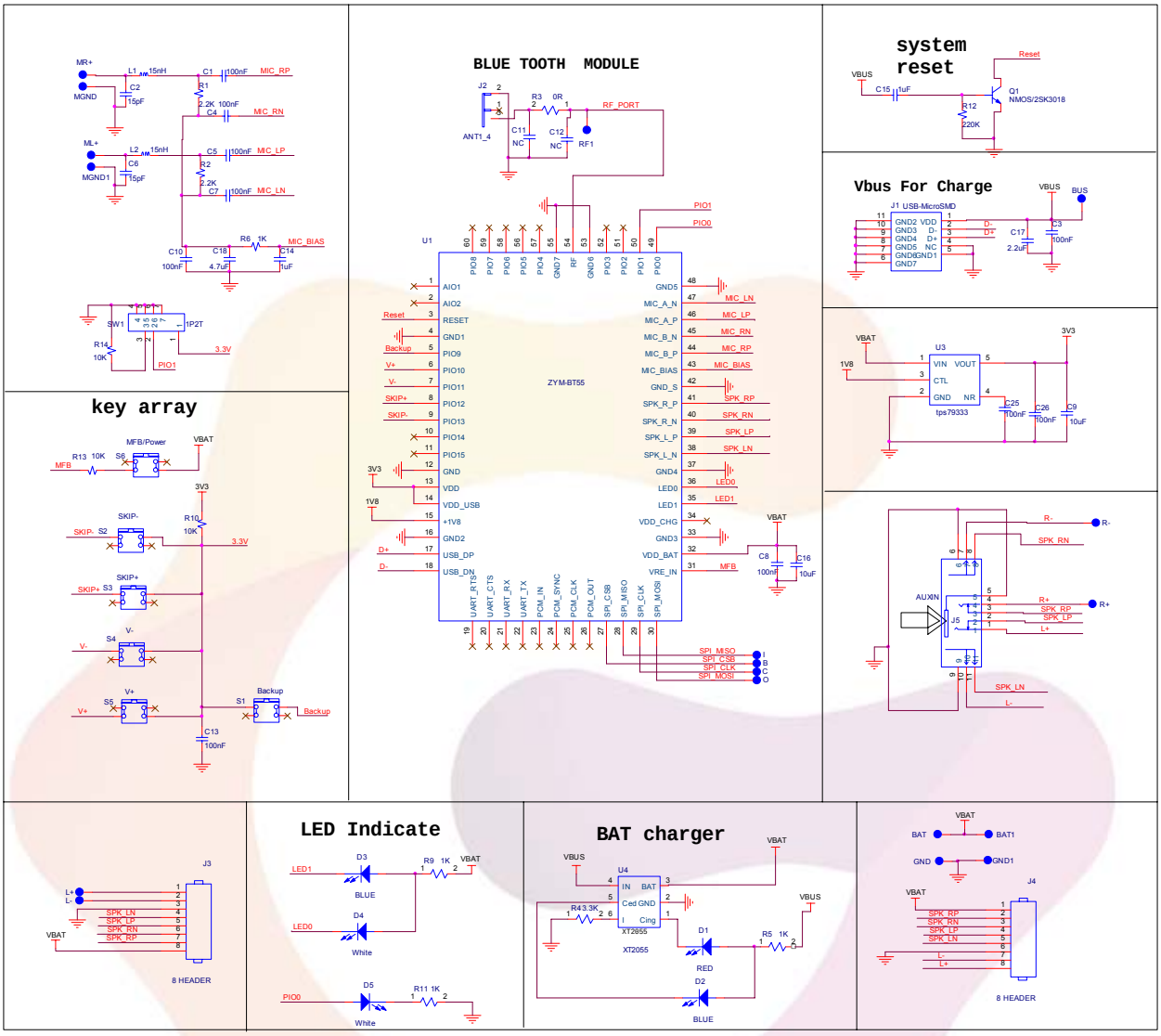


4.2 Pin Assignment

Pin No.	Name	Pad Type	Description
1	AIO1	Bi-directional	Analogue programmable input/output line
2	AIO0	Bi-directional	Analogue programmable input/output line
3	RESET	CMOS input with weak internal pull-up	Reset if low. Input debounced so must be low for >5ms to cause a reset
4	GND	VSS	Ground connection
5	PIO9	Bi-directional with programmable strength internal pullup/down	Programmable input/output line
6	PIO10		
7	PIO11		
8	PIO12		
9	PIO13		
10	PIO14		
11	PIO15		
12	GND	VSS	Ground connection
13	VDD	Power	3.3V power supply
14	VDD_USB		Positive supply for UART/USB ports
15	1V8		1.8V power supply
16	GND	VSS	Ground connection
17	USB_DP	Bi-directional	USB data plus with selectable internal 1.5kΩ pull-up resistor
18	USB_DN	Bi-directional	USB data minus
19	UART_RTS	Bi-directional CMOS output, tri-state, withweak internal pull-up	UART request to send active low
20	UART_CTS	CMOS input with weak internal pulldown	UART clear to send active low
21	UART_RX	CMOS input with weak internal pulldown	UART data input
22	UART_TX	Bi-directional CMOS output, tri-state, with weak internal pull-up	UART data output
23	PCM_IN	CMOS input, with weak internal pulldown	Synchronous data input
24	PCM_SYNC	Bi-directional with weak internal pulldown	Synchronous data sync
25	PCM_CLK	Bi-directional with weak internal pulldown	Synchronous data clock
26	PCM_OUT	CMOS output, tristate, with weak internal pull-down	Synchronous data output

27	SPI_CSB	Input with weak internal pull-up	Chip select for SPI, active low
28	SPI_MISO	CMOS output, tristate, with weak internal pull-down	SPI data output
29	SPI_CLK	Input with weak internal pull-down	SPI clock
30	SPI_MOSI	CMOS input, with weak internal pulldown	SPI data input
31	VRE_IN	Analogue	Enable,active high
32	VDD_BAT	Power	Lithium ion/polymer battery positive terminal. Battery charger output and input to switch-mode regulator
33	GND	VSS	Ground connection
34	VDD_CHG	Charger input	Lithium ion/polymer battery charger input
35	LED1	Open drain output	LED driver
36	LED0	Open drain output	LED driver
37	GND	VSS	Ground connection
38	SPK_L_N	Analogue	Speaker output negative, left
39	SPK_L_P	Analogue	Speaker output positive, left
40	SPK_R_N	Analogue	Speaker output negative, right
41	SPK_R_P	Analogue	Speaker output positive, right
42	GND	VSS	Ground connection
43	MIC_BIAS	Analogue	Microphone bias
44	MIC_B_P	Analogue	Microphone input positive, right
45	MIC_B_N	Analogue	Microphone input negative, right
46	MIC_A_P	Analogue	Microphone input positive, left
47	MIC_A_N	Analogue	Microphone input negative, left
48	GND	VSS	Ground connection
49	PIO0	Bi-directional with programmable strength internal pullup/down	Programmable input/output line (external RXEN)
50	PIO1		Programmable input/output line (external TXEN)
51	PIO2		Programmable input/output line
52	PIO3		Programmable input/output line
53	GND	VSS	Ground connection
54	RF	Bi-directional	RF input/output
55	GND	VSS	Ground connection
56	PIO4	Bi-directional with programmable strength internal pullup/down	Programmable input/output line
57	PIO5		
58	PIO6		
59	PIO7		
60	PIO8		

5 Example Application Schematic



6 NOTICE!

This chapter contains important information for the safe and reliable use of the ZYM-BT55 BT Module. Please read this chapter carefully before starting to use the ZYM-BT55 BT Module.

6.1 General information

Bluetooth technology is in fact a kind of short distance wireless communication technology, which can effectively simplify the palmtop computer, notebook computer and mobile phone, and other mobile phones for communication between terminal equipment, can also be successful. These simplify the equipment and Internet communication between the Internets, so that these moderns communication equipment and data transmissions between the Internets' become more quickly and efficiently, to widen the road for wireless communications.

6.2 Electro Static Discharge (ESD)

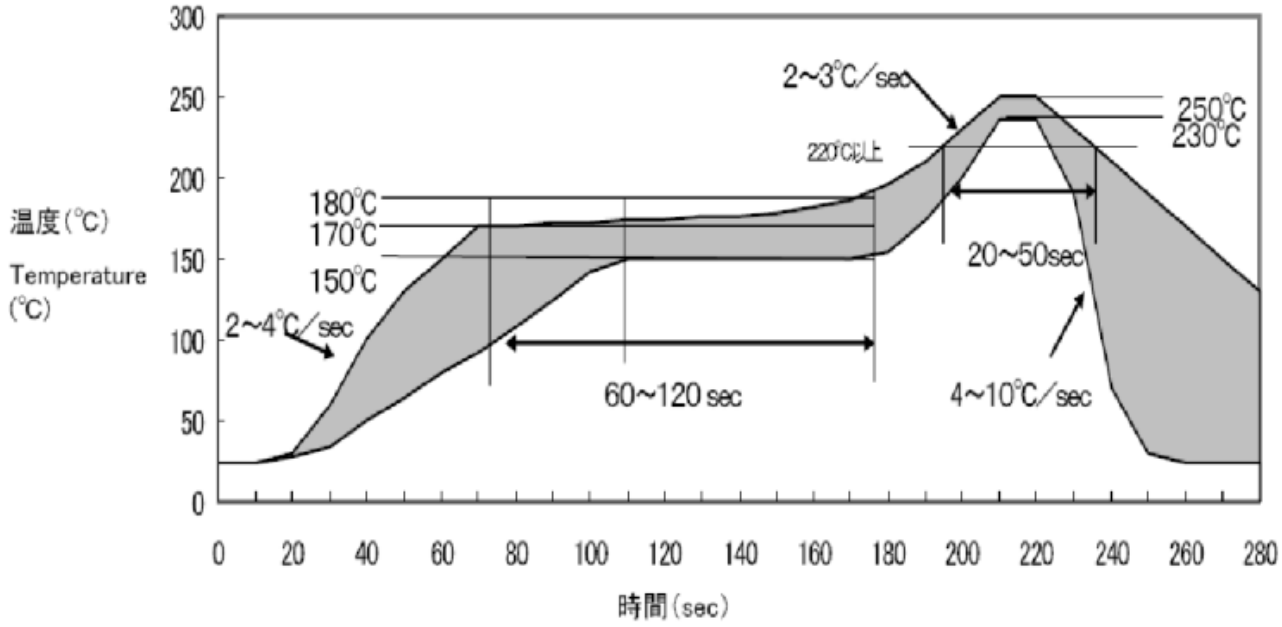
The following Electro Static Discharge (ESD) precautions are recommended:

- Protective outer garments
- Handle device in ESD safeguarded work area
- Transport device in ESD shielded containers
- Monitor and test all ESD protection equipment
- Treat the ZYM-BT55 BT Module as Extremely sensitive to ESD

7 Recommended Reflow Temperature Profile

The module must go through 120°C baking for at least 4 hours before reflow process.

推荐回流温度条件(Typical reflow condition)



8 Order information

8.1 Order information

Device	Package			Order Number
	Type	Size(mm)	Shipment Method	
ZYM-BT55 BT Module based on CSR BC57E687C chip	PCB PAD	21x 13.5 x 2.2	Carrier Tape	ZYM-BT55

8.2 Contacts

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