External Conexant 56K Data/Fax   Bluetooth   Modem

Specification Model Name:	**BT-56SA-SCD**
Modem specification	
Chip Set	**Conexant SC56D**
Line Connection	**PSTN,2 wires**
Data Transmission	**BELL 103 and 212A** **ITU-T V.21 (300 bps)** **ITU-T V.22 (1200 bps)** **ITU-T V.23 (1200/75 bps)** **ITU-T V.22 bis (2400 bps)** **ITU-T V.32 (9600/4800 bps)** **ITU-T V.32 bis (14400/7200/1200 bps)** **ITU-T V.34 bis (33600/28800 bps)** **ITU-T V.90 and K56 flex** **ITU-T V.92**
ITU-T V.92	**Quick connect Theory of Operation** **Modem on-hold** **PCM Upstream**
Fax Transmission	**Send/Receive G3 Fax** **ITU-T V.27ter (2400 bps)** **ITU-T V.29 (9600 bps)** **ITU-T V.17 (14400 bps)**
Error Correction	**MNP 2-4/V.42 LAPM**
Data Compression	**MNP 5/V.42 bis/V.44**
Command Set	**EIA/TIA 578 Class 1 & T.31 Class 1.0**
Transmit Level	**Country depend**
Flow Control	**XON/XOFF , RTS/CTS(default)**
Escape code	**TIES**
Dialing Mode	**Tone /pulse**
Noted Features	**Speed Buffering** **Auto Format/Speed sensing** **Auto Retrain**
DATA Interface	**UART**
Telephone Interface	**PSTN Line through RJ-11**
Signal light	**PWR;BT;CD;TX;RX**
Radio Specification	
Chip set	**CSR**
Standards	**Bluetooth Specification V1.1**
Carrier Frequency	**2.4GHZ to 2.4835GHZ**

DATA Rate	**Asymmetric: 723.2kbps max/57.6kbps** **Symmetric:433.9kbps**
Receiving sensitivity	**-80dBm**
Output Power	**+3dBm to –20dBm (class 2)**
Modulation Method	**GFSK**
Support Profile	**Dial-Up Networking;FAX;**
OS	**WIN 98 SE/ME/2000/XP**
Antenna	**External**
EMI/Safety/Certification	
PTT	**FCC Part68 Class B** **CTR21**
Safety	**FCC Part15 Class B** **CE;LVD EN60950**
Bluetooth Qualification	**BQB**

GLOBAL
SUN TECH

Bluetooth Module Design Application

Product Name	GST class 2 Bluetooth module
Product ID	GL2BMU02
Hardware Version	Rev.01
Firmware Version	14.8

OVERVIEW

GL2BMU02 is a highly integrated Bluetooth module include Radio, Baseband, Link Manager, and Host Control Interface. Due to its sufficient pin definitions, high receiving sensitivity, low power consumption, and low cost, GL2BMU02 is suitable for numerous electronic devices, such as Notebook PC, PDA, Modem, Router, Joystick, USB/UART adapter....

FEATURE

- Comply with Bluetooth Specification V1.1
- Support up to 7 ACL connection and 3 SCO connection
- Up to 12 PIO/ 2 AIO pin definitions is ideally suited for rapid embedded development any kind of products.
- 13 bit PCM interface
- UART interface with programmable baud rate
- Compact size (25x14.5x2.2mm) can be fit any type of product
- RF output power –20dBm -- +3 dBm (class 2).
- High receiving sensitivity (-80 dBm 0.1%BER).
- Pin to pin compatible with GL24BM14-C21 class 1 module
- Output interface over USB/UART/PCM/SPI.
- Alternative built-in 4M or 8M flash memory.

APPLICATIONS:

Notebook PC, PDA, Access Point, USB dongle, Headset, UART adapter, router, modem, Mouse, Keyboard, PC peripherals, embedded products....

1

GENERAL SPECIFICATION

ITEMS	SPECIFICATION
Supply Voltage	VDD: 3.3V+/-0.3V Regulated supply voltage
Carrier Frequency	2400MHz to 2483.5MHz(USA,Spain,France)
Modulation Method	GFSK,1Mbps,0.5BT Gaussian
Maximum Data Rate	Asynchronous:723.2kbps/57.6kbps Synchronous:433.9kbps/433.9kbps
Transmission Power	+3dBm to –20dBm; Power control 4 stage
Hopping	1600hops/sec, 1MHz channel space
Receiving Signal Range	-80dBm to -20 dBm
Receiver IF Frequency	1.5MHz center frequency
Baseband Crystal OSC	16MHz
Output Interface	USB,PCM,SPI,UART
Operation Temperature	-40 to +85 degree
Absolute Max Supply Voltage	3.6V for VDD,other VDD +0.3V
Storage Temperature	-40to +85 degree
Bluetooth Specification	Ver1.1
USB Specification	Ver 1.1

ELECTRICAL CHARACTERISTICS

1) Transmitter Section

ITMES		Min	Typ	Max	Unit	Condition
Transmission power ETC1		-6	TBD	+4	dBm	Longest supported packet
Initial Frequency Accuracy		-75		75	KHz	Hopping ON/OFF Continuous TX
In-band spurious ETC1						Max hold and 100kHz
M +/- 500 kHz				-20	dBc	
|M-N|=2				-20	dBm	
|M-N|≧3				-40	dBm	
Exception NOTE5				-20	dBm	
Out of band spurious ETC1 (Operation mode)						100kHz RBW
30MHz to 1GHz				-36	dBm	
1GHz to 12.75GHz				-30	dBm	
1.8GHz to 1.9GHz				-47	dBm	
5.1GHz to 5.3GHz				-47	dBm	
Adjacent Channel Power						
+/- 2MHz				-20	dB	
>+/- 3MHz				-40	dB	
Modulation Characteristics NTC	F1AVG	140		175	KHz	00001111,Hopping off DH1
	F2MIN	115			KHz	01010101,Hopping off DH1
	F2AVG/F1AVG	0.8				
Frequency Drift				±25	KHz	DH1
				±40	KHz	DH3
				±40	KHz	DH5
						Max Drift rate:400Hz/10us
Operation current ETC1			80		mA	Peak Current during bust

2)Receiver Section

ITMES	Min	Typ	Max	Unit	Condition
Sensitivity Single slot packet Multi slot packet	 -82 -82	 -80 -80	 -76 -76	 dBm dBm	BER 10E-3,hopping off/1600K returned payload bit Multi slot packets uses DH5
Maximum received signal NTC	 -20	 -5		 dBm	BER 10E-3,hopping off 1600K returned payload bit ,multi slot packet,DH1
Out-band blocking NTC 30MHz to 2000MHz 2000MHz to 2399MHz 2498MHz to 3000MHz 3000MHz to 12.75GHz (idle mode) 30MHz to 1GHz 1GHz to 12.75GHz 1.8GHz to 1.9GHz 5.15GHz to 5.3GHz	 -10 -27 -27 -10 		 -57 -47 -47 -47	 dBm dBm dBm dBm dBm dBm dBm dBm	Hopping off,BER 10E-3
Intermodulation N=5	-39			dBm	Hopping off,BER 10E-3
Interference Performance Co-channel Adjacent(1MHz) to In-band image			 14 -16	 dB dB	NTC,BER 10E-3 Measured at hopping off.

3) Power Consumption

Mode	Avg.	Peak	Unit
SCO connection HV3 (1st interval sniff mode) -Slave	32		mA
SCO connection HV3 (1st interval sniff mode) -Master	33		mA
SCO connection HV1 –Slave	67		mA
SCO connection HV1 –Master	67		mA
ACL Data transfer, 115.2kbps UART (Master to Slave) – Slave	60		mA
ACL Data transfer, 115.2kbps UART (Slave to Master) – Slave	56		mA
ACL Data transfer, 115.2kbps UART (Master to slave) – Master	63		mA
ACL Data transfer, 115.2kbps UART (Slave to Master) – Master	20		mA
Deep Sleep Mode, Initial	1.5		uA
ACL connection, Sniff Mode 40ms interval 57.6kbps UART	4		MA
ACL connection, Sniff Mode 1.28S interval 38.4kbps UART	1		mA
PARK Mode	0.6		mA
Peak current during burst		80	mA

4) PIN DEFINITION

| PIN Name	No	I/O	Description
GND	1		Ground
GND	2		Ground
GND	3		Ground
GND	4		Ground
AIO0	5	I/O	Programmable Input/Output line
AIO1	6	I/O	Programmable Input/Output line
RESET	7		Reset if high
SPI_MISO	8	O	Synchronous Serial Interface Data Input
SPI_CSB	9	I	Chip select for Synchronous Serial Interface
SPI_CLK	10	I	Synchronous Serial Interface Clock
SPI_MOSI	11	I	Synchronous Serial Interface Data Input
UART_CTS	12	I	UART clear to send
UART_TX	13	O	Asynchronous Serial Data Output
UART_RTS	14	O	UART ready to send
UART_RX	15	I	Asynchronous Serial Data
1V8	16		For BlueCore2 CORE
GND	17		Ground
VSUP	18	I	3V3 for RF circuit
PCM_OUT	19	O	Synchronous Data Output
PCM_SYNC	20	I/O	Synchronous Data Strobe
PCM_IN	21	I	Synchronous 8kss data out
PCM_CLK	22	I/O	Synchronous Data Clock
USB_DP	23	I/O	USB Data+
USB_DN	24	I/O	USB Data-
PIO11	25	I/O	Programmable Input/Output Line
PIO10	26	I/O	Programmable Input/Output Line
PIO9	27	I/O	Programmable Input/Output Line
PIO8	28	I/O	Programmable Input/Output Line
PIO7/RAM_CSB	29	I/O	Programmable Input/Output Line
PIO6/CLK_REQ	30	I/O	PIO line or clock request for external clock line
PIO5/USB_DETACH	31	I/O	PIO line or chip detaches from USB when this input
PIO4/USB_ON	32	I/O	Programmable I/O lines/Interrupt request 1
PIO3/USB_Wake_Up	33	I/O	PIO or Output goes high to wake up PC when in
PIO2/USB_Pull_Up	34	I/O	PIO or USB pull-up
GND	35		Ground
ANT	36	I/O	Transmitter out and receiver input
PIO1/TXEN	37	I/O	Control output for external PA class 1 only
PIO0/RXEN	38	I/O	Control output for external LNA(if fitted)

GL2BMU02 Block Diagram
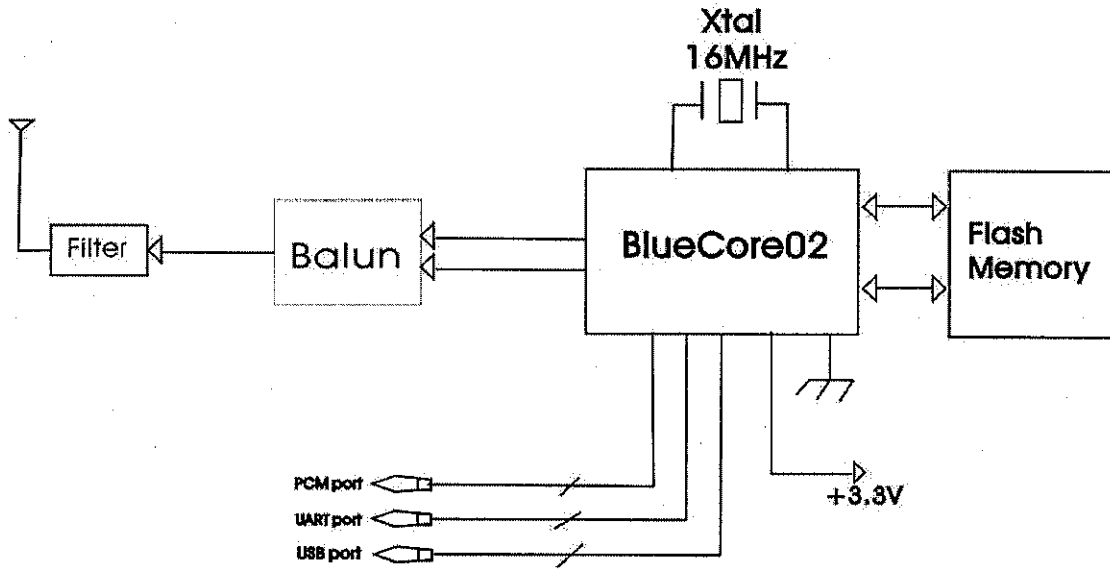
GL2BMU02 PIO Placement
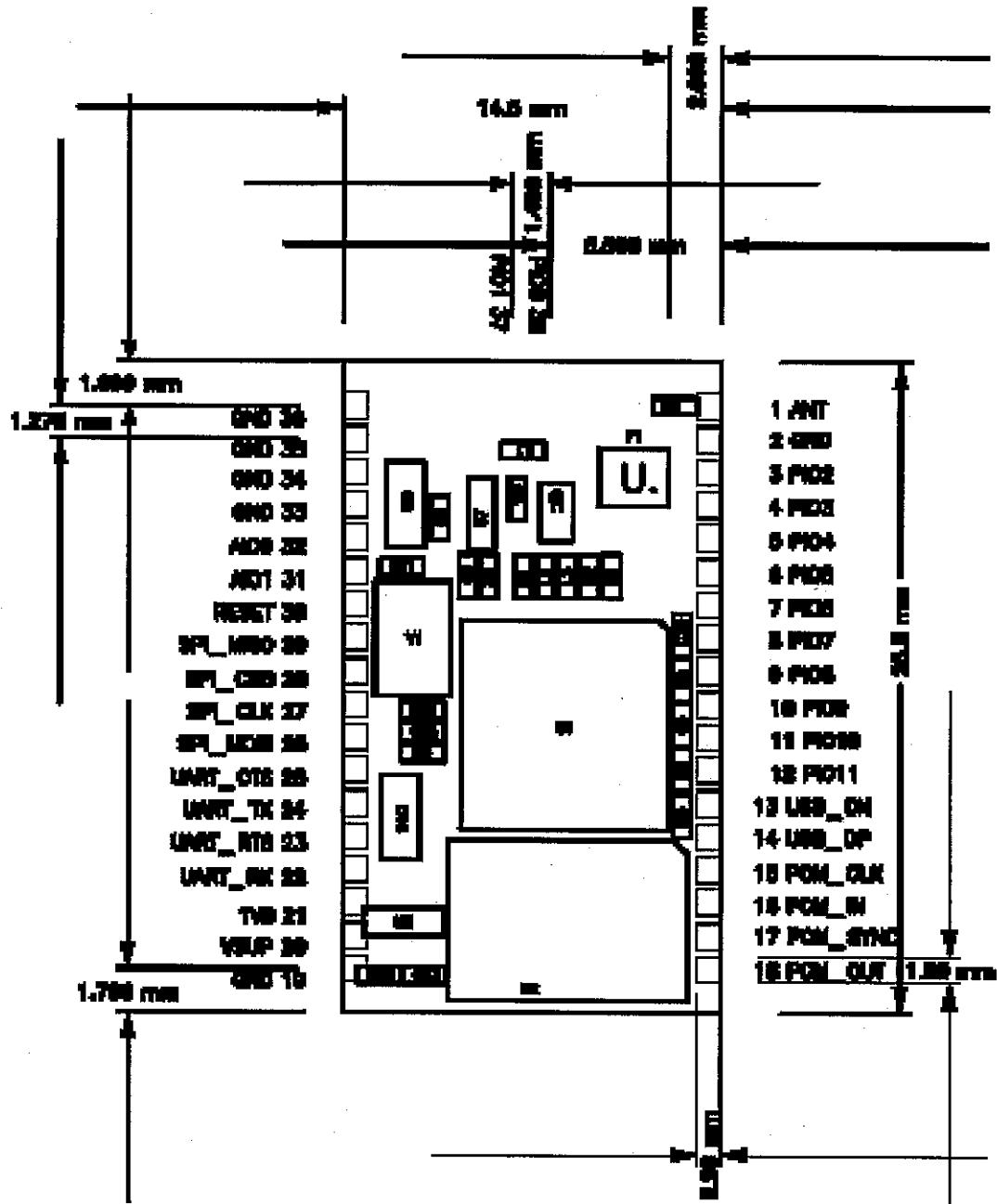
Operation description

Modem

1. **Purpose:** The purpose of this document is to describe key component operations on Bluetooth of BT-56SA-SCD.

2. **Key components**:Modem Single Chip Conexant CX06827-11,Flash Memory,DAA circuit.

3. **Operation Principle:**The Coneant SC56D Single Chip ACF Modem supports analog data up to 56 kbps,analog fax to 14.4kbps,telephone answering machine(TAM)/telephony extensions,and parallel/serial host interface operation depending on model.The modem operates with PSTN telephone lines worldwide. The CX06827 ACF device integrates modem controller(MCU),modem pump(MDP),bootloader ROM,and analog line interface codec functions into a single 144-pin TQFP.The modem operates by executing firmware from external ROM/flash ROM and RAM.Customized modem firmware and added/modified country profiles can also be executed from external memory,either from ROM/flash ROM or from serial EEPROM/flash ROM and RAM.

   +3.3v operation with +5V tolerant digital inputs

   Operation clock is provided by 26.224MHz.

   Typical power use SCFACF: 274mW(Normal Mode);27.7mW(Sleep Mode)

   VC: 5mW(Normal Mode)

Key Features
Data Modem

-ITU-T V.90/K56flex (SC56D models)/V.34(SC56),V.32bis,V.32,V.22bis,V.22,V.23,and V.21;Bell 212A and Bell 103.

-V.42 LAPM and MNP 2-4 error correction.

-V.42 bis and MNP 5 data compression.

-MNP 10EC enhanced cellular performance.

-V.250 and V.251 commands.

V.22 bis fast connect

Fax modem send and receive rates up to 14.4kbps

-V.17,V.29,V.27 ter,and V.21 channel 2.

-EIA/TIA 578 Class 1 and T.31 Class 1.0,and EIA/TIA 578 Class 2 Commands.

V.80 synchronous access mode supports host-controlled communication protocols with H.324 interface support

Interfaces to external ROM/flash ROM,RAM,and optional serial EEPROM.

Downloadable Architecture

-Downloadable MCU firmware from the host/DTE to flash ROM.

-Downloadable MDP code modules from the MCU transparent to the host.

Data/FAX call discrimination

Hardware-based modem controller and digital signal processor (DSP).

Worldwide operation

-Complies to TBR21 and other country requirements.

-Caller ID detection,

-Call progress,blacklisting.

-External ROM/flash ROM includes default values for 29 countries.

Caller ID and distinctive ring detect

Telephony/TAM

-V.253 commands

-2-bit and 4-bit Conexant ADPCM,8-bit linear PCM,and 4-bit IMA coding

-8 kHz sample rate.

-Concurrent DTMF,ring,and Caller ID detection.

Built-in host/DTE interface with speeds up to 230.4kbps.

-Parallel 16550A UART-compatible interface

-Serial ITU-T V.24(EIA/TIA-232-E)logical interface.

Direct mode(serial DTE interface)

Flow control and speed buffering

Automatic format/speed buffering.

Serial async/sync data;parallel async data.

Bluetooth

1. **Purpose:** The purpose of this document is to describe key component operations on Bluetooth of   BT-56SA-SCD..

2. **Key components:** CSR BlueCore 02 External BC212015B, Bluetooth Single Chip AMD AM29LV400B, Flash Memory, XC6204B32MR, High Speed LDO Regulators

3. **Operation Principle:** CSR BlueCore 02 External BC212015B, Bluetooth Single Chip BlueCore2-External is a single chip radio and baseband IC for Bluetooth 2.4GHz systems. It is implemented in 0.18μm CMOS technology. When used with external flash containing the CSR Bluetooth software stack, it provides a fully compliant Bluetooth system for data and voice communications.

   Operation at 2.7 ~ 3.3V supply.

   Operation clock is provided by 16MHz oscillator.

Key Features

Radio

-Operation with common TX/RX terminals simplifies external matching circuitry and eliminates external antenna switch

-Extensive built-in self-test minimizes production test time

-No external trimming is required in production

-Full RF reference designs are available

Transmitter

-Up to +6dBm RF transmit power with level control from the on-chip 6-bit DAC over a dynamic range greater than 30dB

-Supports Class 2 and Class 3 radios without the need for an external power amplifier or TX/RX switch

-Support Class 1 radio with an external power amplifier provided by a power control terminal controlled by an internal 8-bit voltage DAC and an external RF TX/RX switch

Receiver

-Integrated channel filters

-Digital demodulator for improved sensitivity and co-channel rejection

-Digitized RSSI available in real time over the HCI interface

-Fast AGC for enhanced dynamic range

Synthesizer

-Fully integrated synthesizer, no external VCO varactor diode or resonator

-Compatible with crystals between 8 and 32MHz (in multiples of 250KHz) or an external clock

Auxiliary Features

-Crystal oscillator with built-in digital trimming

-Power management includes digital shut down and wake up commands and an integrated low power oscillator for ultra-low Park/Sniff/Hold mode power consumption

-Devices can be used with an external Master oscillator and provides a clock request signal. To control external clock source.

-Uncommitted 8-bit ADC and 8-bit DAC are available to application programs

Baseband and software

-External 8Mbit flash for complete system solution and application flexibility

-32kbyte on-chip RAM allows full speed Bluetooth data transfer, mixed voice and data, plus full 7 slaves Pico net operation

-Dedicated logic for forward error correction, header error control, access code correlation, demodulation, cyclic redundancy check, encryption bit-stream generation, whitening and transmit pulse shaping

-Transponders for A-law, μ-law and linear voice rom host and A-law, μ-law and CVSD voice over air

Physical Interfaces

-Synchronous serial interface up to 4MBaud

-UART interface with programmable Baud rate up to 1.5MBaud

-Full speed USB interface supports OHCI and UHCI host interfaces. Compliant with USB v1.1

-Synchronous bi-directional serial programmable audio interface

-Operational l-CTM Compatible interface

Bluetooth Stack Running on an Internal Micro-controller

CSR.s Bluetooth Protocol Stack runs on-chip in a variety of configurations:

-Standard HCI (UART or USB)

-Fully embedded to RFCOMM, thus reducing host CPU load

AMD AM29LV400B, Flash Memory

The Am29LV400B is a 4 Mbit, 3.0 volt-only Flash memory organized as 524,288 bytes or 262,144 words. The devices are offered in 48-ball FBGA. The word-wide data (x16) appears on DQ15-DQ0; the byte-wide (x8) data appears on DQ7-DQ0. This device is designed to be programmed in-system using only a single 3.0 volt VCC supply. No Vpp is required for write or erase operations. The device can also be programmed in standard EEPROM programmers.

XC6204B32MR, High Speed LDO Regulators

The XC6204 series are highly precise, low noise, positive voltage LDO regulators **Maximum Output Current**: 150mA manufactured using CMOS processes. The series achieves high ripple rejection **Dropout Voltage**: 200mV (IOUT = 100mA) and low dropout and consists of a standard voltage source, an error correction, **Maximum Operation Voltage**: 10V current limiter and a phase compensation circuit plus a driver transistor. **Output Voltage Range**: 1.8V - 6.0V in 50mV increments Output voltage is selectable in 50mV increments within a range of 1.8V ~ 6.0V. **Highly Accurate**: ±2% the series is also compatible with low ESR ceramic capacitors which give added **Low Power Consumption**: TYP 70µA output stability. This stability can be maintained even during load fluctuations due **Standby Current**: less than 0.1µA to the excellent transient response of the series. **High ripple Rejection**: 70dB (10kHz) The Current limiter's feedback circuit also operates as a short protect for the output **Low Output Noise**: 30µVrms current limiter and the output pin. **Operating Temperature Range**: -40 ~ +85 The CE function enables the output to be turned off, resulting in greatly reduced **Low ESR Capacitor Compatible**: Ceramic capacitor power consumption.