BT-23, BT-234
Bluetooth Module
Hardware & Software Specification

2006/06/28
Ver.0.1

Revision History

Date	Version	Description
06/28/2006	0.1	Create initial version

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1. Introduction

BT-23 project depends on BC04 components. The Bluetooth component integrates the Bluetooth functions, providing the Bluetooth enabled device the **SPP dev B**.

There are two units in this solution, Bluetooth unit and host unit. The Host unit will transfer the user data to the Bluetooth unit through UART interface. Bluetooth unit used to transfer the received user data to the remote device.

Because of this high-level of integration, the communication method between host unit and controller unit is a UART port. All command and response between the host unit and controller unit were defined into specified AT command format.

This solution is used for Bluetooth industry control equipments.

2. Product function

- Support Bluetooth Class 2 SPP profile，and use RS232 transfer information.

- Support AT command to read or change system parameter

- Communication with TSC product can through Bluetooth and use SPP

  profile print data.

- Module size should match TSC BT module BOX.

3. Hardware Specification

3.1. Electrical Characteristics

3.1.1. General Specification

Item	Description
Bluetooth Specification	Version 2.0+EDR
Frequency	2402~2480MHz
Modulation	FHSS/GFSK
Antenna Impedance	50Ω

3.1.2. I/O Specification (Operation Temp.= 20°C)

Description	Min.	Typ.	Max.	Unit
VIL input low voltage	-0.4	-	0.8	Volts
VIH input high voltage	0.7VDD	-	VDD+0.4	Volts
VOL Output logic level low voltage (IO=4.0mA),	-	-	0.2	Volts
VOH Output high voltage (IO =-4.0mA),	VDD-0.2	-	-	Volts

3.1.3. Current Consumption (Operation Temp.= 20°C)

Typical Average Current consumption	Average	Unit
Standby mode (connected to host)	60	uA
ACL data transfer (115.2kbps UART) (Master)	11.3	mA

3.1.4. Receiver specification (Operation Temp.= 20°C)

Description	Frequency （GHz）	Min.	Typ.	Max.	Unit
Sensitivity at 0.1% BER for all packet types	2.402	-	-85.0	-	dBm
	2.441	-	-85.0	-	dBm
	2.480	-	-87.0	-	dBm
Maximum received signal at 0.1% BER		-20	10	-	dBm

3.1.5. Transmitter Specification (Operation Temp.= 20°C)

Description	Min.	Typ.	Max.	Unit
Maximum RF transmit power	-	1	-	dBm
RF power variation over temperature range with compensation disabled	-	2	-	dBm
RF power control range	25	35	-	dB

3.2. Recommended Operating conditions

Description	Min.	Typ	Max.	Unit
Operating temperature	-20		+70	°C
Supply voltage:		3.3		Volts

4. Software Specification

4.1. AT Command Format

4.1.1. Command format
```
<at-command-object>::={
    <at-command-header><SPACE>
    <at-command-body><SPACE>
    [<at-command-parameter>[COMMA]]*
    <CR>
}
```

<at-command-header>::=AT+BT
<at-command-body>::='character set, upper case, length = 4
<at-command-parameter>::=' number set and character set, be separated by comma, the last parameter need not comma-tailed'

4.1.2. Response format
```
<at-response-object>::={
    <at-response-header><SPACE>
    <at-response-body><SPACE>
    [<at-response-parameter><COMMA>]*
    <CR>
}
```

<at-response-header>::=AT-BT
<at-response-body>::='character set, upper case, length = 4'
<at-response-parameter>::='number set and character set, be separated by comma, the last parameter need not comma-tailed'

4.1.3. Indication format

```
<at-indication-object>::={
    <at-indication-header><SPACE>
    <at-indication-body><SPACE>
    [<at-indication-parameter><COMMA>]*
    <CR>
}
```

<at-indication-header>::=AT-BT
<at-indication-body>::='character set, upper case, length = 4'
<at-indication-parameter>::=' number set and character set, be seperated by comma, the last parameter need not comma-tailed'

4.1.4. Note

Chapter after 3 details the each of the Bluetooth component AT commands, response and indication, including a brief description of behavior, syntax of the command, context of the command, and types of responses.

Some responses will not be "immediate". Where applicable, these will be noted and will include an approximate delay before response.

For commands with optional parameters, all possible forms will be listed under the syntax subsection.

Note that a full piece of AT command, AT response or AT indication must be tailed with "\r" (0x0d).

4.2. Generic AT Command Definition

This chapter details the generic AT commands, response and indication, including a brief description of behavior, syntax of the command, context of the command, and types of responses. These commands are profile independent.

4.2.1. GLDN

The GLDN command is used to get the local device name.

Syntax

AT+BT GLDN

Response

If the command succeeded, the response is:

AT-BT GLDN 1,[name]

If the command failed, the response is:

AT-BT GLDN 0,0

4.2.2. SLDN

The SLDN command is used to set the local device name.

Syntax

AT+BT SLDN [name]

Response

If the command succeeded, the response is:

AT-BT SLDN 1

If the command failed, the response is:

AT-BT SLDN 0

Note:

Maximum device name length is 16.

4.2.3. GLBD

The GLBD command is used to get the local Bluetooth device address.

Syntax

AT+BT GLBD

Response

If the command succeeded, the response is:

AT-BT GLBD 1,[bd]

If the command failed, the response is:

AT-BT GLBD 0,0

4.2.4. GPIN

The GPN command is used to get the local fixed PIN code.

Syntax

AT+BT GPIN

Response

If the command succeeded, the response is:

AT-BT GPIN 1,[pin]

If the command failed, the response is:

AT-BT GPIN 0,0

4.2.5. SPIN

The SPIN command is used to set the fixed PIN code.

Syntax

AT+BT SPIN [pin]

Response

If the command succeeded, the response is:

AT-BT SPIN 1

If the command failed, the response is:

AT-BT SPIN 0

Note

If the bd is 0, then used to response to the current pin code indication.

4.2.6. SECU

The SECU command is used to set the security mode and encryption mode.

Syntax

AT+BT SECU [par1],[par2]

par1:

security mode 1, 2, 3

par2:

0, Encrypt off.

1, Encrypt point to point traffic.

2, Encrypt point to point and broadcast traffic

Response

If the command succeeded, the response is:

AT-BT SECU 1

If the command failed, the response is:

AT-BT SECU 0

Note

It is recommended that the security mode be changed only when the system is not in the process of creating or accepting connections.

4.2.7. GSEC

The GSEC command is used to get the security mode and encryption mode.

Syntax

AT+BT GECU

Response

If the command succeeded, the response is:

AT-BT SECU 1, [secu],[encr]

If the command failed, the response is:

AT-BT SECU 0,0,0

Note

secu:

security mode 1, 2, 3

encr:

0, Encrypt off.

1, Encrypt point to point traffic.

2, Encrypt point to point and broadcast traffic

4.2.8. DATA

The command is used to change from the command status to the data status.

Syntax

AT+BT DATA

Response

If the command succeeded, the response is:

AT-BT DATA 1

If the command failed, the response is:

AT-BT DATA 0

4.2.9. CMND

The command is used to change from data status to command status.

Syntax

AT+BT CMND

Response

If the command succeeded, the response is:

AT-BT CMND 1

If the command failed, the response is:

AT-BT CMND 0

4.3. Miscellaneous

4.3.1. Factory setting

The default local device name is "BT23".

The default pin code is "0000"

The default security mode is security 1, no encryption.

The default device class is printer.

The default UART setting is 115200, 8, N, 1, hardware flow control enable.

4.4.   Operation

4.4.1.   Inquiring and Connected Mode

Inquiring Mode: The mode is the BT-23 can be inquired by remote bluetooth device.

Connected Mode: While the BT-23 is already connected by remote bluetooth device, the BT-23 cannot be inquired by others bluetooth device.

4.4.2.   AT Command at Inquiring and Connected Mode

Inquiring Mode: BT-23 can accept Read/Write AT Command. The mode is also Inquire Mode after AT Command.

Connected Mode: BT-23 can accept Read/Write AT Command. The mode is also connected Mode after AT Command.
   The data will be lost from remote connected bluetooth device after CMND AT Command. It shall change to DATA after CMND AT command.

4.4.3.   Link Key

BT-23 can reserve 5 Link Key.

5. Caution

This equipment complies with FCC radiation exposure limits. However, in order to avoid the possibility of exceeding the FCC exposure limits, this device and its antenna should not be co-located or operating in conjunction with any other antenna or transmitter."

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

For OEM integrators, the manual for the OEM integrators must include some instructions to be followed by the end users in the user manual.   For example:

The OEM integrators must be instructed to ensure that the end user has no manual instructions to remove or install the device.
The OEM integrators must be instructed about the end product labeling ("Contains TX FCC ID:UES2006001")

This device is intended only for OEM integrators under the following conditions:
1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as the 2 conditions above are met, further transmitter test will not be required.   However, the OEM integrator is still responsible for testing their end product for any other additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.)

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product.   In these circumstances, the OEM integrator will be responsible for re-evaluate the end product (including the

transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and end users (for example, access points, router, wireless ADSL modems, and similar equipment).   The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: UES2006001".

Notice for OEM integrator

Following RF exposure info shall be supplied in end-users manual depends on the application.

For mobile configuration of RF Exposure Information:

IMPORTANT NOTE:

To comply with FCC RF exposure compliance requirements, this grant is applicable to only Mobile Configurations.   The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.