100M Wireless RS232 Serial Adapter

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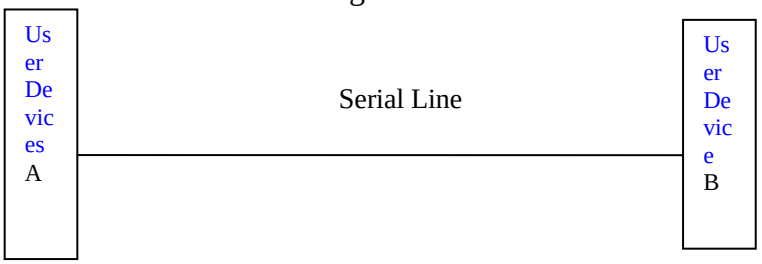
1. Brief Introduction

100M Wireless RS232 Serial Adapter was design and applied to different of electronic industrial equipment, such as rail range finder, four-wheel position indicator, air compresso r, surveying and mapping total station and variety of flow detectors. As a cable replacement program, it can connect the single-chip processor or processor directly via using PnP mode to achieve the wireless data transmission among equipments transparently. 100M Wireless RS232 Serial Adapter can be divided into Master device and Slave device which can be matched as one set. When the circuit of the100m RS232 Bluetooth Serial Adapter hardware is connected correctly and powered up, the master and slave device will establish a connection automatically and identify & memory each other. Then, the user's device can use the 100M Wireless RS232 Serial Adapter as the same as using a serial cable.100M Wireless RS232 Serial Adapter can be used independently as well, excluding using by match. When user’s equipment equipped with a Slave100m RS232 Bluetooth Serial Adapter, other Bluetooth devices, such as Bluetooth PDA can search out this 100M Wireless RS232 Serial Adapter and find out the services provided, and then establish connection and communicate with it through these services. For the communication of the users ’equipments, 100M Wireless RS232 Serial Adapter can still be used as serial line. 100M Wireless RS232 Serial Adapter provides a safety identification function. When users use safety identification, the equipments’ connects must be authenticated, and only the authenticated equipment can realize communication. However, this process could be finished automatically if it is a pair of 100M Wireless RS232 Serial Adapter. (Default Password: 1234) Figure 1 shows that in the application of user devices A and B is a serial cable. Figure 2 shows that in the application of the user devices A and B are 100M Wireless RS232 Serial Adapter, and between the two devices, it is the same to users devices and regarded as a serial line. Figure 3 shows the connection of 100M Wireless RS232 Serial Adapter and other Bluetooth devices (here is the connection situation of the Bluetooth PDA). Under this situation, for the user device, it is the same as the figure 1 and figure 2.

Figure1



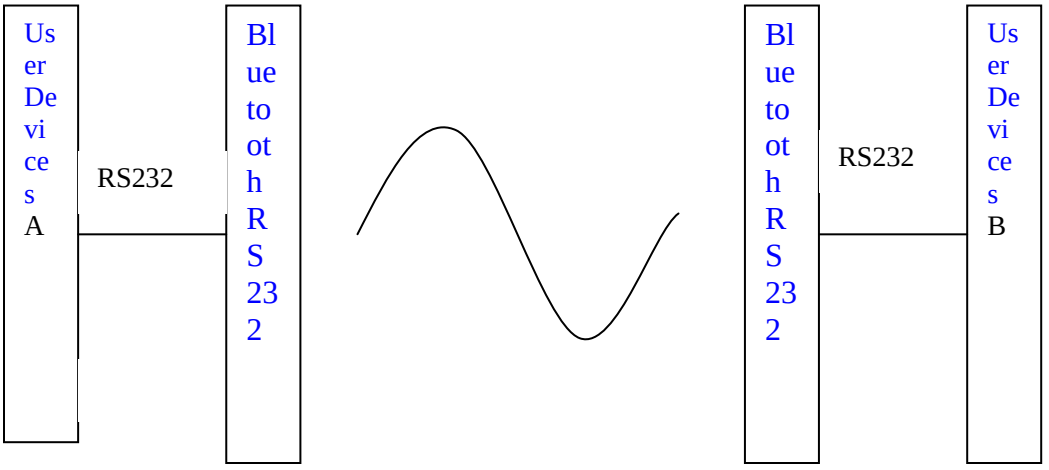


Figure 2

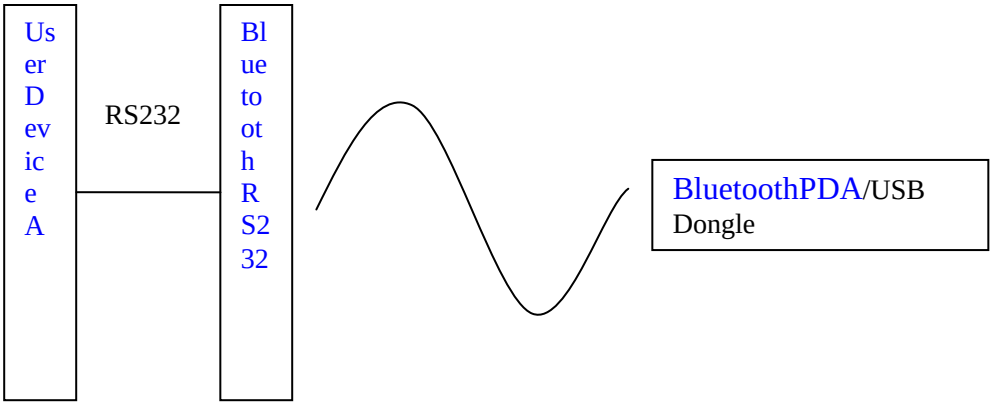


Figure 3

2. Technical Specifications

Standard and Model No.	Bluetooth Serial Adapter	
	Standard	Class 1 (male)
	Model No.	BTS4504C1H
Specification	Compatible Bluetooth 3.0 Specification	
RF output power	CLASS 1 Standard	
Operating Frequency	ISM Frequency 2.400～2.483GHz	
Spectrum extensions	FHSS	
Antenna	External antenna	
Sensitivity	<-88dBm at < 0.1% BER	
Protocol	LM, LC, L2cap , SDP , RFCOMM	
Support services	Bluetooth Serial Port Profile (SPP)	
Maximum connection number	As master devices, it can connect 7 slave devices at the same time at most.	
Rating	Plug power supply and DB9 seat power supply, 6V DC 350mA 2.1W	
Communication Interface	Standard RS232 five-wire serial mode(RxD, TxD, RTS, CTS, GND)	
Connector	DB9 socket(male)	
Signal pin	RxD, TxD, RTS, CTS, GND	
energy-saving	Automatic power saving mode, support low-power operating mode / high-speed operating mode	
Security	Security certification, data encryption	
Baud rate	1.2K～1382.4Kbps	
LED indicator	Power indicating, connection status, operating mode	
Applied range	PC, MCU, PDA, mobile phone and so on	
Maximum connection distance	100 meters in open air	

Work Environment	Working Temperature	-20℃ ～ +70℃
	Storage Temperature	-40℃ ～ +85℃
	Humidity	5％～90％ no condensation
Size	99(L)×34(W)×17(H) mm, without antenna	

3. Power Consumption

Mode	Test Condition (Slave Device)	Maximum mA	Typical Value mA	Minimum mA
Working	Sniff Open(No data transmission)	24.2	15.5	15.3
	Sniff close or data transmission	42.4	33.0	29.4
No connection	Connect (Inquiry) interval=2048 Connect (Inquiry) continue=18	27.0	15.4	15.3

Notes:
Under regular mode, all parameter is default.
Between the devices it is 10 meters apart. It continuously sends data at the same time with 9600 baud rate.

4. Description of indicator and press-button

There are three LED light on the 100M Wireless RS232 Serial Adapter used to indicate the power state, connect status and master/slave mode of 100m RS232 Bluetooth Serial Adapter. Using mode switchover press-button to change the working mode of adapter.(data mode or command mode)

Indicator light:
The indicator light of adapter is red/green LED light, power state (red light), master/slave mode indicator (red light), connect condition indicator (green light).
When the 100M Wireless RS232 Serial Adapter is powered, the power state indicator light (red light) is always bright.

If the master/slave mode instructor (red light) blinks every few seconds, it means the serial port adapter operates smoothly. We can judge this device is master device or slave device by looking the interval time of lights blinking. If blinking once every 3 seconds, it is slave device. If blinking once every 6 seconds, it is master device.
If the connect state indicator (green light) extinguishes, that means it has established

connection with other Bluetooth devices. If blinking, it means not establish connection. When not connecting, we can judge whether it memorize the address (that is whether matches other Bluetooth device of not) or not through the green light's blinking speed. If blinking quickly (twice every second), it means it has remembered the address; if blinking slowly (once every second), it does not remember. For master device, it blinks once every 3 seconds when query. When matching, it blinks quickly four times every second; when connecting, blink once every second; after connecting, the indicator light extinguishes.
When RS232 is working under the parameter setting condition, the master/slave indicator light and connecting state indicator light extinguish.

Mode switch button: In data model state, press Cmd button, the two working condition indicator light of the 100M Wireless RS232 Serial Adapter extinguish. At this time 100M Wireless RS232 Serial Adapter works under the parameter setting condition and returns "+ OPEN: 0" from serial port. In parameter setting condition, 100M Wireless RS232 Serial Adapter stops working, and can only set the parameter 100M Wireless RS232 Serial Adapter. In parameter settings state, press the Cmd button and RS232 adapter exit parameter condition, and begin to work.(searching, matching, connecting, sending data etc.); but cannot set 100M Wireless RS232 Serial Adapter parameters. After powering, it enters data mode state default.

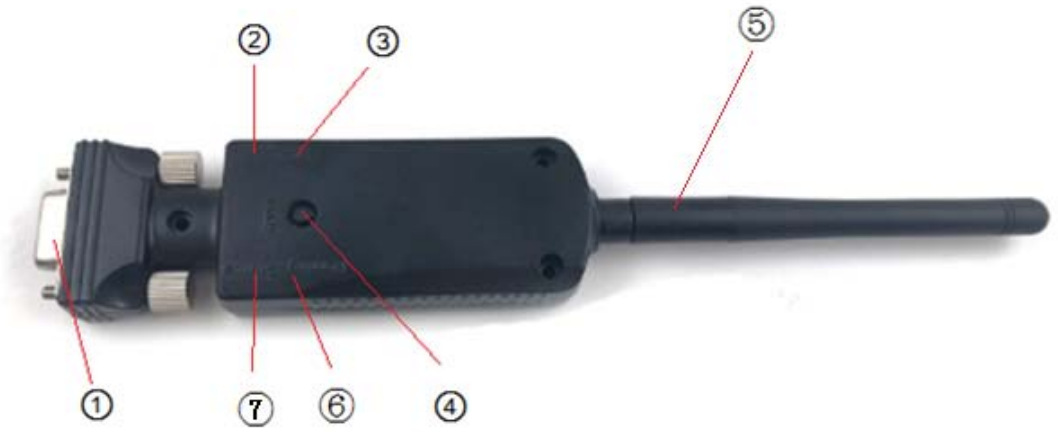
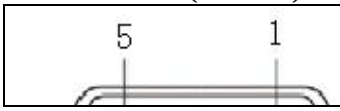


Figure 4 Outside View

1. RS232 Connector
2. DC Power Connector
3. Power Indicator Light (red)
4. Mode Switch Button (CMD button)
5. External Antenna
6. Master/Slave Mode Indicator Light (red)
7. Connection Mode Indicator Light (green)

5. Definition of DB9 Socket Pin

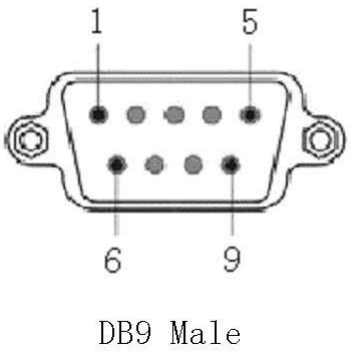
Hole Pattern (Female) DB9



Pin No	Signal
1	VCC
2	TXD

	3	RXD
	4	Nc
	5	GND
	6	Nc
	7	CTS
	8	RTS
	9	VCC

Needle Pattern (Male) DB9



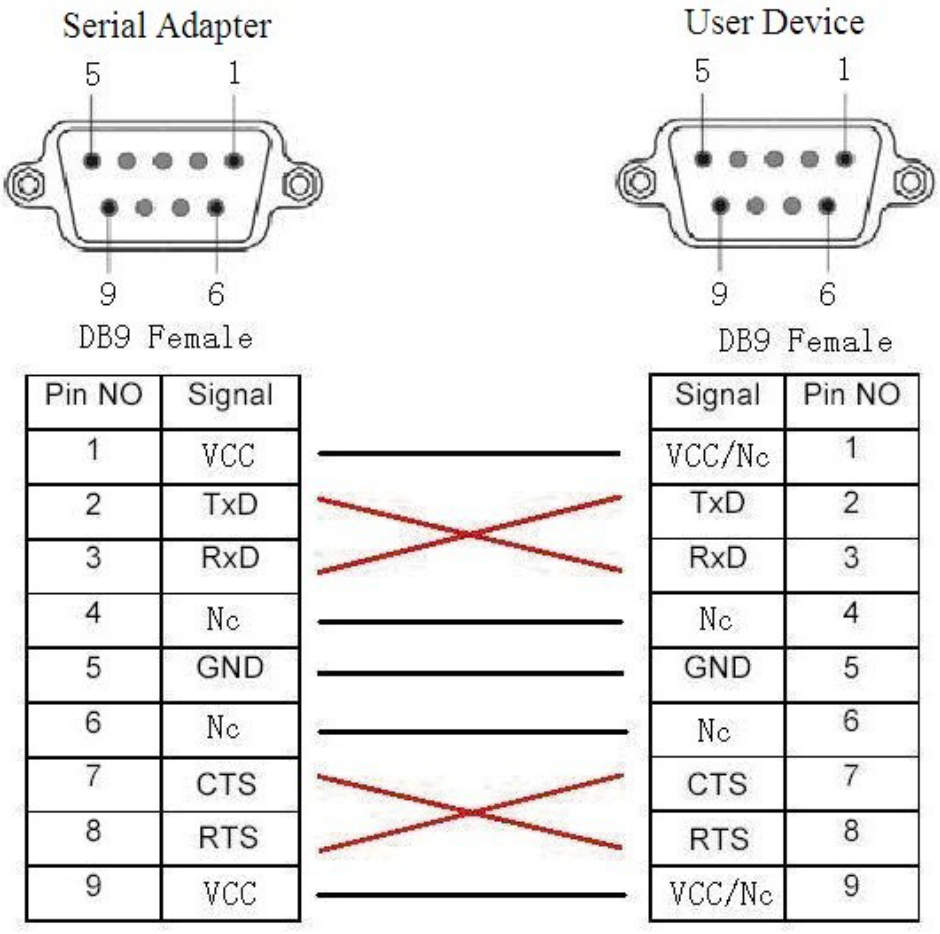
Pin No	Signal
1	VCC
2	RXD
3	TXD
4	Nc
5	GND
6	Nc
7	RTS
8	CTS
9	VCC

6. Description of Power Supply Condition

There are two ways of power supply. One way is power socket of adapter. The power adapter specification of 100M Wireless RS232 Serial Adapter is 6V DC, 350mA rated current.

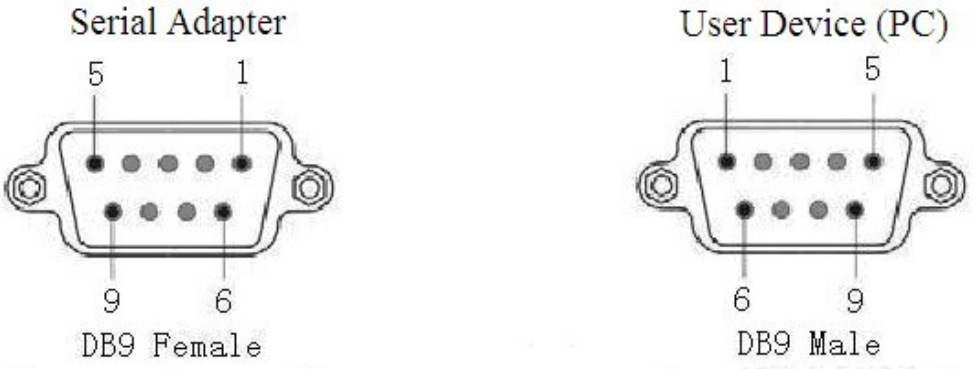
The second way is using DB9 seat to supply. It can be used on the device which developed by user. It can provide power only by plug in serial port.

7. Description of Serial Interconnection



Pin NO	Signal
1	VCC
2	TxD
3	RxD
4	Nc
5	GND
6	Nc
7	CTS
8	RTS
9	VCC

Signal	Pin NO
VCC/Nc	1
TxD	2
RxD	3
Nc	4
GND	5
Nc	6
CTS	7
RTS	8
VCC/Nc	9



Pin NO	Signal		Signal	Pin NO
1	VCC	———	VCC/Nc	1
2	TxD	———	RxD	2
3	RxD	———	TxD	3
4	Nc	———	Nc	4
5	GND	———	GND	5
6	Nc	———	Nc	6
7	CTS	———	RTS	7
8	RTS	———	CTS	8
9	VCC	———	VCC/Nc	9

Notes: VCC/Nc says when use power sockets power-up, 1 and 9 pin is Nc. Using DB9 power-up, 1 and 9 pin connect VCC power supply.

8. Instructions

After powering on, the power indicator light of the device should bright immediately and the other indicator light is blinking separately.

After the factory, the default settings for the device are generally 9600bps, 8-N-1 communication mode and with flow control. It is a slave device and matching code is 1234.

If there is need to modify parameter, please press the switch button to make 100M Wireless RS232 Serial Adapter enter into parameter setting mode. Then the two blinked state indicator light extinguished. Setting related parameter through AT command or parameter setting tools, such as by the following parameter: master/slave device, baud rate, authentication, and bind address.

If communicate between two 100M Wireless RS232 Serial Adapters, you must set one adapter as a master device and the other as a slave device. And you can identify the status according to the blinking state of the master/slave indicator.

Connecting several device need to enter command mode setting and the max memorized slave device number M (AT+ROLE= M\r\n). After returning data mode, it will automatically find and connect slave device around.

Notes: The parameter is saving in Bluetooth. Therefore, even blackout, the parameter will keep the same number as the last time and will not lose.

After modifying the parameter, please press the switch button again to make 100M Wireless RS232 Serial Adapter enter into data model.

Starting under the data state, if the master device does not memorize address, it will firstly search the nearby Bluetooth device. If querying the Bluetooth device, the master device will enter matched state. If authentication passes, the master device will memorize (save) the address of this device and establish connection with this device. If memorized the address already, the master device connect the memorized device directly and will not query or match. The memorized address can be cleared by AT command and parameter setting tools.

The slave device wait for the other device's query and connect.

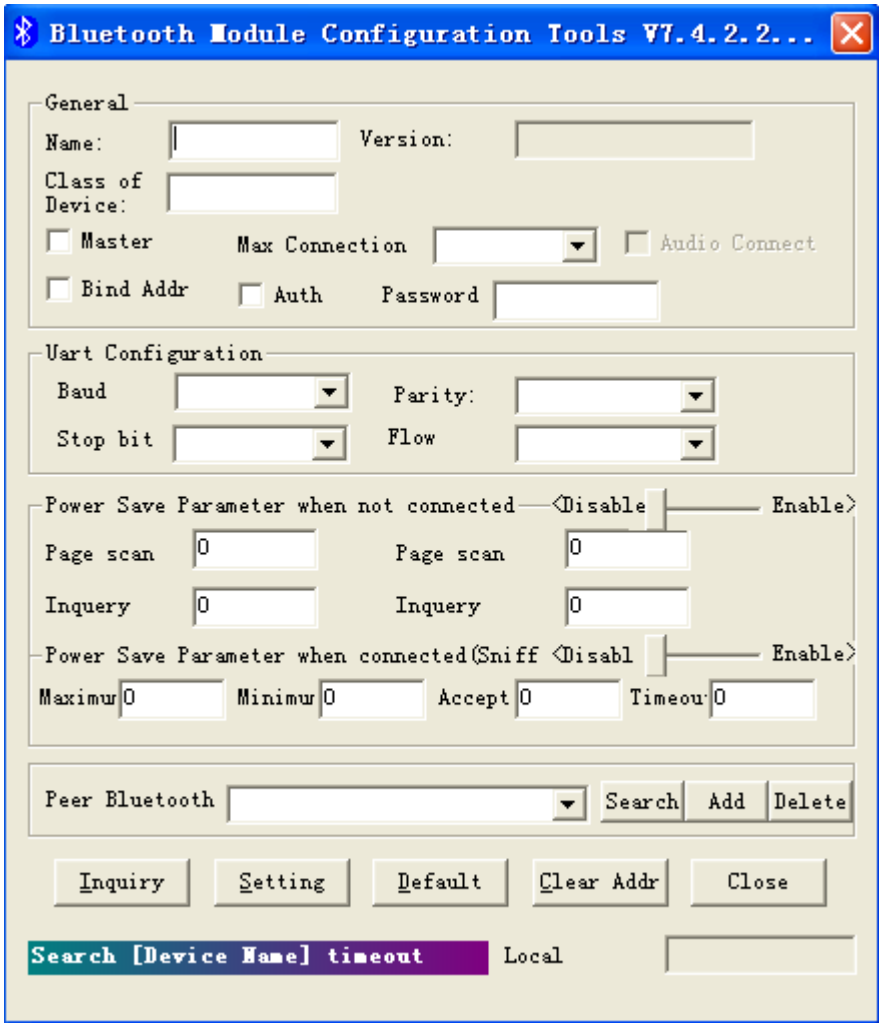
If two Bluetooth devices connect successfully, connection indicator light (green light) extinguishes, and the master/slave mode instructions (red light) keep blinking. At this time, data can mutual communicate. For user device, it is like connecting with serial line and can receive data directly. Of course, for the mode of point to multi-point, the user need to structure data stream format by themselves to distinguish between some slave device.

What should be paid special attention is that the serial flow control pin (CTS, RTS) is default effective. If not cancel flow control and the flow control pin is not disposed by the user program, the data cannot be transmitted or can only transmit one-way after connecting.

Once the device is connected, unless the signal is very bad to opposite side's Bluetooth disconnect automatically, our serial adapter will not disconnect automatically and the connection will always remain.

Notes: The FAQ section gives an important supplement to use equipment and the answers of the common problems that the customers may have. Please read carefully before using this section.

9. Configuration Tools

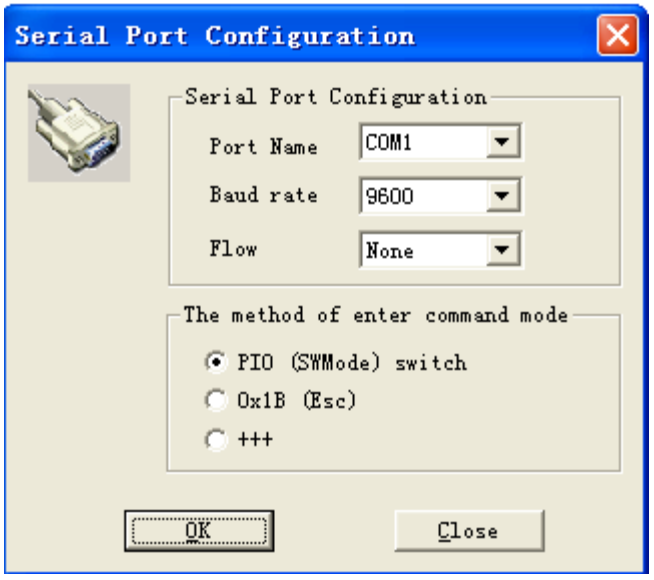


Notes: When using configuration tools, firstly please press Cmd button to make serial adapter enter into parameter setting mode, make sure the baseboard connect on PC port correctly and make sure the port not be occupied by other software. After setting the parameter, please press Cmd button again to make100M Wireless RS232 Serial Adapter enter into data mode and make the modified parameter effective.

Make the V4.25 version of the "Configuration Tools" as an example.

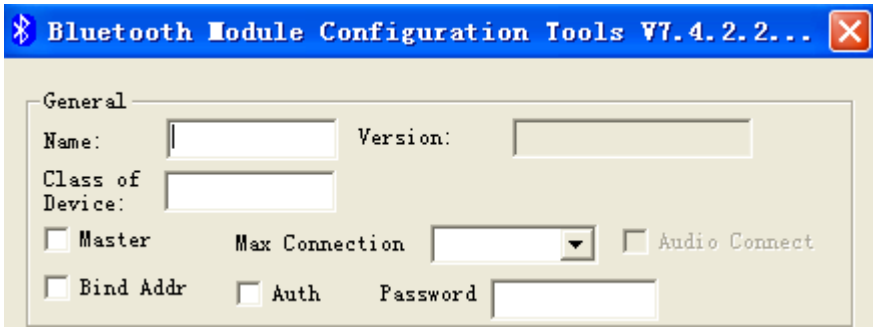
"Configuration Tools" includes start-up screen and the main interface. The main interface is shown as above.

9.1 Boot screen



Open SetParam_en.exe file, enter the start screen, and set the communication parameters of the serial adapter and the computer serial port
Port name
Select a port name of the computer and the serial adapter, such as COM1, COM2
Data flow control
Select flow control way

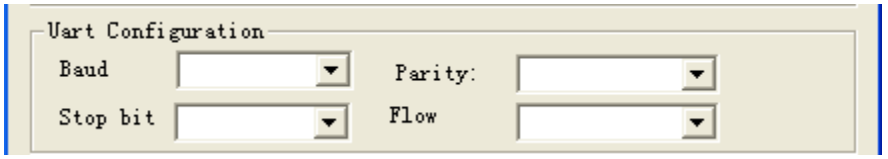
9.2 Basic Settings



Device name
Set the serial adapter's name, and it only supports English name (not exceed 16 characters).
Firmware version
The current version of the serial adapter
Class of Device
The Class of the master and slave devices must be the same, or the master device should use 0x000000 and the slave device can use arbitrary. Details are in the appendix. (Class of Device must be 6 characters)
The master device
Setting the serial adapter as a master device, if not checked, was from the device. When both sides are using the serial adapter, you must call the shots is a device made

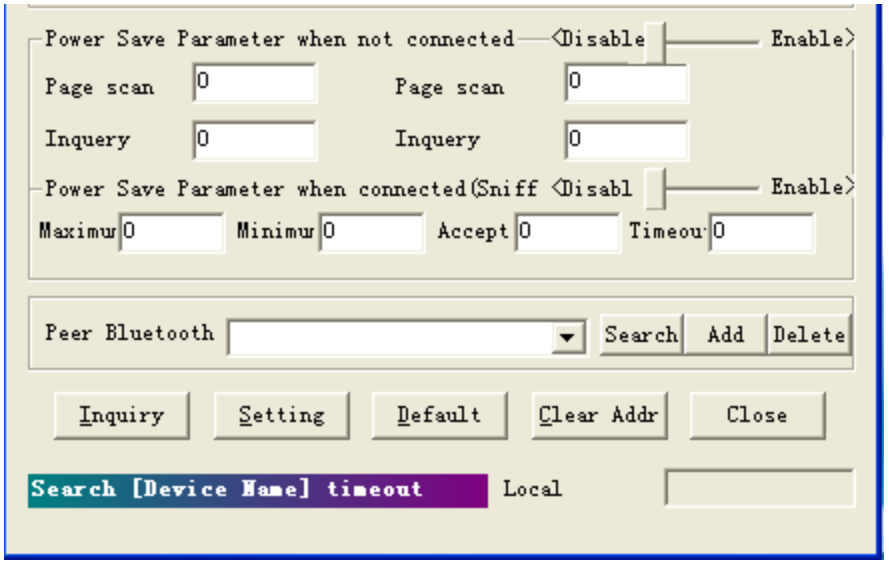
from a device, which can be used as an alternative to RS232 cable.
Bind address
Whether you have bound the address of the other or not. Ticking means that it cannot connect with other devices after this matching & connection, but only limit the connection of this device. On the contrary, it is allowed to connect and match with any other devices.
Whether to use authentication and encryption
If selected, the other device must enter a password before connecting to authentication, and data transmission will be encrypted.
Password
Password used to authenticate. (No more than 6 characters)

9.3 Serial parameters



- Baud rate
  Setting data communication baud rates of the module and equipment. This baud rate is the baud rate of the module.
- Parity
  Support for no parity, odd parity, even parity
- Stop bit
  Supports 1 stop bit, 2 stop bits

9.4 Energy-saving parameters and commands



- Connection interval
  The interval of each time you connect and scan, that is how often to allow the connection. Interval time = setting value × 625us

- Connection lasts
  The duration of each time you connect and scan, that is the time you remain the connection state. Duration = setting value × 625us
- Note: The duration of connection cannot be longer than the interval.
- Inquiry Interval
  The interval of each time you inquire and scan, that is how often to allow queries. Interval time = setting value × 625us
- Inquiry lasts
  The duration of each time you Inquire and scan, that is the time you maintain the Inquiring & scanning state. Duration = setting value × 625us
  Note: The duration of Inquiring cannot exceed the interval of Inquiring.
- Sniff energy parameters
  Sniff has four parameters: maximum, minimum, try, timeout. Parameter value = set value × 625us. When all the four parameters are 0, the sniff energy saving is forbidden, serial adapter run at full speed, the maximum data transmission speed is the highest, but power is high, and it is recommended to use when data is large. If allow to sniff energy, the serial adapter's power consumption will be reduced, and it is recommended to allow to sniff energy when the data is small, and it can reduce power consumption. Such as: Maximum = 800, minimum = 80, try = 8, timeout = 8.
- Binding Bluetooth address
  Inquiry the Bluetooth device address which matches with the Bluetooth module
- Inquiry
  Inquiry the current settings of the serial adapter.
- Set
  Set parameters to the serial adapter. However, it must be effective after the next start.
- Default
  Revert the serial adapter to the default setting. However, it must be effective after the next start.
- Clear the address
  Clear the address of the other Bluetooth device saved in the serial adapter. Once the serial adapter establishes connection with a Bluetooth device, it will save its address. At next communication, the Bluetooth module can only communicate with this Bluetooth device and will not accept others' addresses. You can clear the Bluetooth address by this tool, so that you can communicate with other devices.

9.5 Set

After everything is ready, select the appropriate parameters from the connection setting dialog, such as communication port and flow control mode, and click the Connect button to establish a connection with the serial adapter.

When the connection is successful, the system will display the Inquired current setting parameters of the serial adapter on the screen.
If users need to modify some of these parameters such as baud rate, you can select the appropriate parameters, and after entering the appropriate values, click the Settings button to set. After setting, you can execute the Inquire command to check if the parameter settings are correct.
After setting parameters, you must press the toggle button to enter data mode, and then the

Serial adapter can be used regularly.
Note: Do not set the parameters often, or it will damage the chip.
Description: This can be customized according to user requirements

10. AT command

Do not use "Configuration Tools" and the parameters of the 100m RS232 Bluetooth Serial Adapter can also be inquired / changed when send the AT command with serial port directly.
Note: being the same as using Configuration Tools, it can be allowed to perform parameter setting command only when the serial adapter working under the "parameter setting state" (that is press Cmd button to enter). When Parameters are modified, you should make the serial adapter return to the data model, and then parameter settings take effect.
Each command must make the two bytes (\r\n)carriage return and line feed ((ASCII codes are 0x0D, 0x0A) as the end sign, or command cannot be identified
The brackets "<>"outside of the parameter is added for convenient reading and the actual command is without the “<>"

1. Test command

command	response	parameter
AT\r\n	\r\nOK\r\n	None

2. Set / Inquire the baud rate

command	response	parameter
AT+BAUD=<rate>\r\n	\r\nOK\r\n	rate: Baud Rate (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600, 1382400) Default: 9600
AT+BAUD?\r\n	\r\nOK\r\n \r\n＋BAUD: <rate>\r\n	

Note: This parameter is only valid for the Bluetooth data communication. The baud rate used to set the parameters is always 9600bps and does not change. The high the baud rate is the more power consumption the system uses up.

3. Set / Inquire the serial communication mode

command	response	parameter
AT+UARTMODE=<stopbit>, <paritybit>\r\n	\r\nOK\r\n	<stopbit>: Stop bit 0: 1 stop bit 1: 2 stop bits <paritybit>paritybit 0: No parity 1: Odd parity 2: Even Parity Default: 0, 0

4. Set / Inquire authentication password

Command	Response	Parameter
AT+PASSWORD=<password>\r\n	\r\n OK\r\n	password: Default: 1234 (No more than 6 bytes)
AT+PASSWORD?\r\n	\r\n OK\r\n \r\n+PASSWORD: <password>\r\n	

5. Set/Inquire Name

Command	Response	Parameter
AT+NAME=<name>\r\n	\r\n OK\r\n	name: setting name Default: definition according to the specification of products (when modifying, no more than 16 bytes.)
AT+NAME?\r\n	\r\n OK\r\n \r\n＋NAME: <name>\r\n	

6. Set / Inquire Sniff power-saving mode

Command	Response	Parameter
AT+SNIFF=<max>, <min>, <attemp>, <timeout>\r\n	\r\n OK\r\n	max: max time min: min time attemp: attemp time timeout: timeout time Default: 200, 32, 1, 8(Decimalism)
AT+SNIFF?\r\n	\r\n OK\r\n \r\n ＋ SNIFF: <max>, <min>, <attemp>, <timeout>\r\n	

Notes: This parameter will affect the power consumption of system.

7. Set / Inquire the parameters of inquiring scan and connecting scan

Command	Response	Parameter
AT+SCANTIME=<pageint>, <pagewin>, <inqint>, <inqwin>\r\n	\r\n OK\r\n	pageint: Connection interval pagewin: Duration of connection inqint: Inquire interval inqwin: Inquire duration Default: 2048, 18, 2048, 18(Decimal)
AT+SCANTIME?\r\n	\r\n OK\r\n \r\n+SCANTIME: <pageint>, <pagewin>, <inqint>, <inqwin>\r\n	

<pageint>: Connect scan interval(Range: 18～4096)

<pagewin>: Connect scan duration(Range: 17～4096)

<inqint>: Inquiry scan interval(Range: 18～4096)

<inqwin>: Inquiry scan duration(Range: 17～4096)

<pageint>must longer than<pagewin>； <inqint> must longer than <inqwin>

This parameter will affect the system power consumption

8. Set / Inquire whether authenticate

command	response	parameter
AT+AUTH=<enable>\r\n	\r\n OK\r\n	enable: 0 doesn't need authentication, or needs authentication
AT+AUTH?\r\n	\r\n OK\r\n \r\n＋AUTH: <enable>\r\n	

Authentication: the security authentication is provided by the module. Only the authenticated users can communicate with it. If it is a pair of modules, these processes are done automatically. (Default password: 1234)

9. Set / Inquire device type

Command	Response	Parameter
AT+CLASS=<cod>\r\n	\r\n OK\r\n	cod: device type (The length must be 6 bytes.) Default: 000000
AT+CLASS?\r\n	\r\n OK\r\n \r\n＋CLASS: <cod>\r\n	

10. Set / Inquire device role

Command	Response	Parameter
AT+ROLE=<master>\r\n	\r\n OK\r\n	master: (0~7) 0 stands for slave device. Others: the device number of automatically connection Default: slave device
AT+ROLE?\r\n	\r\n OK\r\n \r\n＋ROLE: <master>\r\n	

11. Set / Inquire the data processing mode when not connected

command	response	parameter
AT+DATAMODE=<mode>\r\n	\r\n OK\r\n	<mode>: 0: The data is stored in the buffer until the connection is established and sent to the other Bluetooth device 1: When not connected, the data received will lost directly Default: 0
AT+DATAMODE?\r\n	\r\n OK\r\n \r\n ＋ DATAMODE: <mode>\r\n	

12. Set / Inquire flow control mode

Command	Response	Parameter
AT+FLOWCONTROL=<type>\r\n	\r\n OK\r\n	<type>: 0: no flow control 1: adapt hardware flow control Default: 1
AT+FLOWCONTROL?\r\n	\r\n OK\r\n \r\n＋FLOWCONTROL: <type>\r\n	

13. Set / Inquire the type of data device

Command	Response	Parameter
AT+DEVTYPE=<type>\r\n	\r\n OK\r\n	<type>: 0: NONE 1: DCE 2: DTE Default: 0
AT+DEVTYPE?\r\n	\r\n OK\r\n \r\n＋DEVTYPE: <type>\r\n	

14. Set / Inquire whether it is bind

command	response	parameter
AT+BIND=<enable>\r\n	\r\n OK\r\n	enable: 0 doesn't bind the address or the address has been bound. Default: not bind the address
AT+BIND?\r\n	\r\n OK\r\n \r\n＋BIND: <enable>\r\n	

When binding the address: For the slave device, if it has memorized the address, it is not allowed to be queried and matched and can be connected only by its memory devices; for the master device, if it has memorized the address, then it is trying to connect to the memorized device. When binding the address, once the device memorizes the address, the connection can only be established between the memorized device and itself, and not to establish a connection with other devices. Therefore, when binding the address, if you want to establish a connection with other devices, you must clear the memorized address.
When not binding the address: the slave device can be queried and matched; the master device will clear the memorized addressed automatically and re-Inquire and match new equipment after failing to connect with the memorized device that up to a certain number.
So, if you want to connect the permanent equipment, you'd better bind the address.

15. Set/Inquire the memorized remoted Bluetooth device

Command	Response	Parameter
AT+RADDR=<addr>\r\n	\r\n OK\r\n	addr: the remote Bluetooth address
AT+RADDR?\r\n	\r\n OK\r\n \r\n+RADDR:<addr>, \r\n	

When using this command to set the Bluetooth address of other side, the Bluetooth module as master device will keep trying to connect the address till succeed unless by press button or clear address command to clear the address. If the Bluetooth module as slave device, do not bind the address, it still can be connected by other master devices. If binding the address, it can set the binding address by this command.

16. Clear the memorized address

Command	Response	Parameter
AT+CLEARADDR\r\n	\r\n OK\r\n	None

Memorized address: After two serial adapter match successfully, they will memorize the other side's Bluetooth address.

17. Inquire local Bluetooth address

Command	Response	Parameter
AT+LADDR?\r\n	\r\n OK\r\n \r\n＋LADDR: <addr>\r\n	addr: the local Bluetooth address

Notes: When using address setting command, the format must be the same as the inquired local or remote Bluetooth address.

18. Inquire software version

Command	Response	Parameter
AT+VERSION?\r\n	\r\n OK\r\n \r\n＋VERSION: <Para1>\r\n	Para1: software version

19. Software reset

Command	Response	Parameter
AT+RESTART\r\n	\r\n OK\r\n	

After sending this command, the serial adapter's program will reset and no need to re-power.

20. Inquire remoted Bluetooth devices

command	response	parameter
AT+INQ\r\n	\r\n OK\r\n \r\n+INQRESU: <addr>, <class>, <name>\r\n Inquire Results \r\n+INQCOMP\r\n Inquire complete	<addr>: Bluetooth address <name>: Device name

21. Cancel inquire remoted Bluetooth devices

Command	Response	Parameter
AT+CANCEL\r\n	\r\n OK\r\n	

22. Restore default settings

Command	Response	Parameter
AT+RESET\r\n	\r\n OK\r\n	No

23. Inquire all commands

Command	Response	Parameter
ATZ?\r\n	\r\n OK\r\n Show all commands	List all the commands

11. FAQ:

1 After powering the module, the indicator of the Module doesn’t blink.

Check whether the power supply is correct. The correct power is positive inside and negative outside, from 6V. If the power is supplied by DB9, the user needs to connect 1 or 9 pin to VCC and 5 pin to GND.

2 When there are multiple Bluetooth devices around, how to connect to the specified Bluetooth device?

Send AT+INQ command, and get the information of the Bluetooth device around
Find the specified Bluetooth address according to the device name of INQRESU
Send AT+RADDR=addr and memorized the information of the device
Send AT+BIND=1command, and bind this device
Send AT+ROLE=1, and set it as a single-point master device；
Sending AT+EXIT pushing command setting mode, the serial adapter will connect appointed Bluetooth device initiatively.

3 How to operate if want to connect with multiply devices at the same time?

The steps are about the same of the previous question, however:
Memorize multiply device information through the “AT+RADDR=addr”command;
Send AT+ROLE command to set the needed connected device number.
Send AT+EXIT pushing command setting mode, the serial adapter will connect appointed Bluetooth device initiatively.

4 How the multipoint connections send and receive data? And what are the differences between the sending & receiving of multipoint and point-to -point connections?

The point to point sending and receiving data has no distinction of master device and slave device. But the multipoint connection has the distinction of master device and slave device. Each slave device can receive the data from a master device, but when send data from a slave device, only the master devices can receive it and other slave devices cannot receive this data. If multiply slave devices send data to the master device at the same time, the data sending from the serial port of the master device is intertwined and cannot distinguish which device it was sent from.

5 Can not set the parameters, or use the Configuration Tools displaying "connection timeout" when connects to the PC

First, make sure if the indicator of the module in the data mode is blinking, and blinking means that the module works properly;
Make the module enter into the parameter setting mode. At this time, all of the indicators extinguish except for the power indicator;
Whether the serial port number of the setting tool (the Configuration Tools which JS&T provides) is the serial port you are using;
If use the serial line to connect with the PC, make sure whether the connection line is correct. Check the connection instruction of the serial port to learn about the connection method.

6 How to send AT command by your hand?

For most AT commands are not given in the Configuration Tools, it can only send through entering commands by hand when necessary. The steps are as follows:

Select a serial communication software (such as HyperTerminal or serial debugging assistant) to open the linked serial port. The serial port parameters under the parameter setting state are always configured to 9600bps and 8-N-1, and they have nothing to do with the serial parameters of the data communication which the AT command set.
Press the toggle key to make the device enter into the parameter setting state. The blinking indicator extinguishes and the serial port should receive "+ OPEN: x\r\n ", and “x” as the current number of the memorized devices. Then you can send commands. What need to be noted is that all commands are end with CRLF ""\r\n ". All the commands will return "\r\nOK\r\n " to response after sending and receiving correctly. If returns "\r\nERROR\r\n " , please check whether the sending is correct. For example: sending a test command AT\r\n should send the 4 bytes ‘A’‘T’‘\r’‘\n’. The Bluetooth returns “\r\nOK\r\n” after receiving properly.

7 Two serial adapter can not connect with each other

Use Configuration Tools to inquiry and confirm whether one of the 2 modules is a Master device, the other one is a Slave device; whether the passwords and Category Codes of the two modules are the same, and if they are not, you should use the Configuration Tools to modify them into a same value.
Whether the master device has memorized other module’s address. If it is, please remove it. Besides, please check whether there are other Bluetooth setting or not. If there are, please close it.
Whether the module has set the Bind Address option and connected with other devices. If it is, please remove the Match Setting addresses first. Because, for the Slave device, it is not allowed to be inquired and matched and only can be connected with its memorized devices if it has memorized the address; for the Master device, it will try to connect with its memorized devices all the time if it has memorized the addresses.

8 Why PC, USB Dongle cannot find the serial adapter?

Firstly, ensure whether the serial adapter be set as a Slave device. For the serial adapter, the master device cannot be found by other devices.
Whether the adapter has set the Bind Address option and connected with other devices. If it is, please remove the Match Setting addresses first. Because, for the Slave device, it is not allowed to be inquired and matched and only can be connected with its memorized devices if it has memorized the address.

9 Why PC USB Dongle and serial adapter cannot realize data communication or only communicate by one-way data communication?

First, make sure whether the two devices establish a connection, judging by looking at whether the Link indicator of the Bluetooth extinguish;
Check whether the serial cable connection is correct

Whether the serial port of the using serial adapter's application program of the using the serial port is the same of the serial port parameter of the adapter's configuration. If the serial adapter has set the flow control, PC-side application should be selected for hardware flow control or CTS / RTS flow control; if connect to MCU, MCU should also process CTS and RTS pin in accordance with the RS232 protocol.
If determines not to use flow control, use " AT+FLOWCONTROL\r\n " command to cancel it.
If communicates large amounts of data with high-speed, it is strongly recommended to use flow control function, or it may cause data loss or a adapter reset.
.

10 How to communicate with PDA?

Firstly you need to set parameter of PDA and adapter and to make sure it must be the mode of one master and one slave. What need to be paid attention is the port setting of PDA. Taking WIN CE as an example, Bluetooth serial port settings are divided into the two serial ports: push and pop, if the module connects with the mobile phone as a master device initiatively, use the push port; If the module is connected by the mobile phone as a slave device initiatively, then use the pop port.

11 How to communicate with Bluetooth mobile phone?

The general Bluetooth mobile phone cannot connect the serial service of other Bluetooth devices initiatively because they do not have serial service menu which can connect serial port. If the user want to realize serial port connect between Bluetooth mobile phone and adapter, they can set adapter as master device and connect Bluetooth mobile phone initiatively. But if need data communicate with adapter module, the user need to write by themselves generally or ask for serial communication software, which can be used on mobile phone, from mobile phone producer.

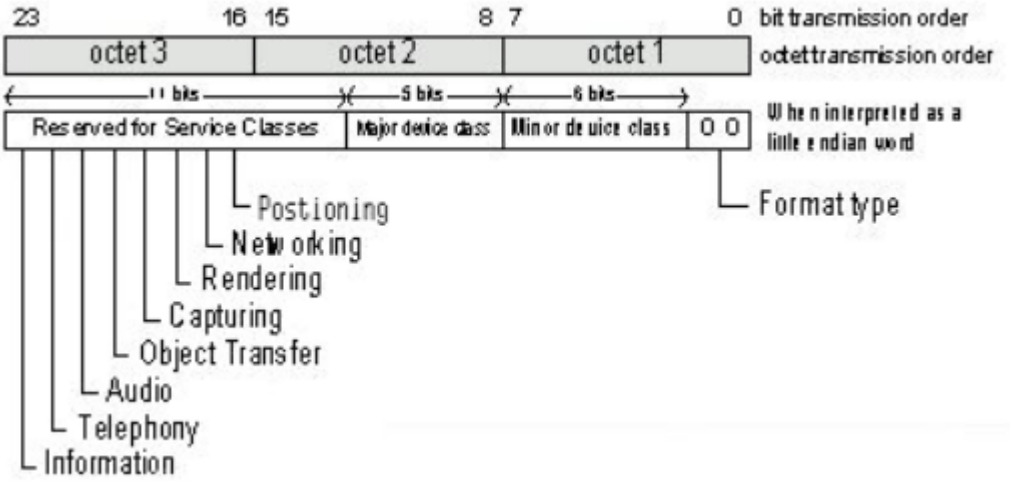
12. Appendix

12.1 Equipment Type Number

The Class of Device/Service (CoD) field has a variable format. The format is indicated using the 'Format Type field' within the CoD. The length of the Format Type field is variable and ends with two bits different from '11'. The version field starts at the least significant bit of the CoD and may extend upwards.

In the 'format #1' of the CoD (Format Type field = 00), 11 bits are assigned as a bit-mask (multiple bits can be set) each bit corresponding to a high level generic category of service class. Currently 7 categories are defined. These are primarily of a 'public service' nature. The remaining 11 bits are used to indicate device type category and other device-specific characteristics.

Any reserved but otherwise unassigned bits, such as in the Major Service Class field, should be set to 0.



Any reserved but otherwise unassigned bits, such as in the Major Service Class field, should be set to 0.

Figure 1.2: The Class of Device/Service field (first format type). Please note the order in which the octets are sent on the air and stored in memory. Bit number 0 is sent first on the air.

12.2 MAJOR SERVICE CLASSES

Bit no	Major Service Class
13	Limited Discoverable Mode [Ref #1]
14	(reserved)
15	(reserved)
16	Positioning (Location identification)
17	Networking (LAN, Ad hoc, ...)
18	Rendering (Printing, Speaker, ...)
19	Capturing (Scanner, Microphone, ...)
20	Object Transfer (v-Inbox, v-Folder, ...)
21	Audio (Speaker, Microphone, Headset service, ...)
22	Telephony (Cordless telephony, Modem, Headset service, ...)
23	Information (WEB-server, WAP-server, ...)

TABLE 1.2: MAJOR SERVICE CLASSES

[Ref #1 As defined in See Generic Access Profile, Bluetooth SIG]

12.3 MAJOR DEVICE CLASSES

The Major Class segment is the highest level of granularity for defining a Bluetooth Device. The main function of a device is used to determine the major class grouping. There are 32 different possible major classes. The assignment of this Major Class field is defined in Table 1.3.

12	11	10	9	8	Major Device Class
0	0	0	0	0	Miscellaneous [Ref #2]
0	0	0	0	1	Computer (desktop, notebook, PDA, organizers ...)
0	0	0	1	0	Phone (cellular, cordless, payphone, modem, ...)
0	0	0	1	1	LAN /Network Access point
0	0	1	0	0	Audio/Video (headset, speaker, stereo, video display, vcr.....
0	0	1	0	1	Peripheral (mouse, joystick, keyboards ...)
0	0	1	1	0	Imaging (printing, scanner, camera, display, ...)
1	1	1	1	1	Uncategorized, specific device code not specified
X	X	X	X	X	All other values reserved

TABLE 1.3: MAJOR DEVICE CLASSES

[Ref #2: Used where a more specific Major Device Class code is not suited (but only as specified in this document). Devices that do not have a major class code assigned can use the all-1 code until 'classified']

12.4 THE MINOR DEVICE CLASS FIELD

The 'Minor Device Class field' (bits 7 to 2 in the CoD), are to be interpreted only in the context of the Major Device Class (but independent of the Service Class field). Thus the meaning of the bits may change, depending on the value of the 'Major Device Class field'. When the Minor Device Class field indicates a device class, then the primary device class should be reported, e.g. a cellular phone that can also work as a cordless handset should use 'Cellular' in the minor device class field.

12.5 MINOR DEVICE CLASS FIELD - COMPUTER MAJOR CLASS

7	6	5	4	3	2	Minor Device Class bit no of CoD
0	0	0	0	0	0	Uncategorized, code for device not assigned
0	0	0	0	0	1	Desktop workstation
0	0	0	0	1	0	Server-class computer
0	0	0	1	0	0	Handheld PC/PDA (clam shell)
0	0	0	1	0	1	Palm sized PC/PDA
0	0	0	1	1	0	Wearable computer (Watch sized)
X	X	X	X	X	X	All other values reserved

TABLE 1.4: SUB DEVICE CLASS FIELD FOR THE 'COMPUTER' MAJOR CLASS

12.6 MINOR DEVICE CLASS FIELD - PHONE MAJOR CLASS

7	6	5	4	3	2	Minor Device Class bit no of CoD
0	0	0	0	0	0	Uncategorized, code for device not assigned
0	0	0	0	0	1	Cellular
0	0	0	0	1	0	Cordless
0	0	0	0	1	1	Smart phone
0	0	0	1	0	0	Wired modem or voice gateway
0	0	0	1	0	1	Common ISDN Access
0	0	0	1	1	0	Sim Card Reader
X	X	X	X	X	X	All other values reserved

TABLE 1.5: SUB DEVICE CLASSES FOR THE 'PHONE' MAJOR CLASS

12.7 MINOR DEVICE CLASS FIELD - LAN/NETWORK ACCESS POINT MAJOR CLASS

7	6	5	Minor Device Class bit no of CoD
0	0	0	Fully available
0	0	1	1 - 17% utilized
0	1	0	17 - 33% utilized
0	1	1	33 - 50% utilized

1	0	0	50 - 67% utilized
1	0	1	67 - 83% utilized
1	1	0	83 - 99% utilized
1	1	1	No service available [REF #3]
X	X	X	All other values reserved

TABLE 1.6: THE LAN/NETWORK ACCESS POINT LOAD FACTOR FIELD

[Ref #3: "Device is fully utilized and cannot accept additional connections at this time, please retry later"]

The exact loading formula is not standardized. It is up to each LAN/Network Access Point implementation to determine what internal conditions to report as a utilization percentage. The only requirement is that the number reflects an ever-increasing utilization of communication resources within the box. As a recommendation, a client that locates multiple LAN/Network Access Points should attempt to connect to the one reporting the lowest load.

			Minor Device Class
4	3	2	bit no of CoD
0	0	0	Uncategorized (use this value if no other apply)
X	X	X	All other values reserved

TABLE 1.7: RESERVED SUB-FIELD FOR THE LAN/NETWORK ACCESS POINT

12.8 MINOR DEVICE CLASS FIELD - AUDIO/VIDEO MAJOR CLASS

						Minor Device Class
7	6	5	4	3	2	bit no of CoD
0	0	0	0	0	0	Uncategorized, code not assigned
0	0	0	0	0	1	Device conforms to the Headset profile
0	0	0	0	1	0	Hands-free
0	0	0	0	1	1	(Reserved)
0	0	0	1	0	0	Microphone
0	0	0	1	0	1	Loudspeaker
0	0	0	1	1	0	Headphones
0	0	0	1	1	1	Portable Audio
0	0	1	0	0	0	Car audio
0	0	1	0	0	1	Set-top box
0	0	1	0	1	0	HiFi Audio Device
0	0	1	0	1	1	VCR
0	0	1	1	0	0	Video Camera
0	0	1	1	0	1	Camcorder
0	0	1	1	1	0	Video Monitor
0	0	1	1	1	1	Video Display and Loudspeaker
0	1	0	0	0	0	Video Conferencing
0	1	0	0	0	1	(Reserved)
0	1	0	0	1	0	Gaming/Toy [Ref #4]
X	X	X	X	X	X	All other values reserved

[Ref #4: Only to be used with a Gaming/Toy device that makes audio/video capabilities available via Bluetooth]

TABLE 1.8: SUB DEVICE CLASSES FOR THE 'AUDIO/VIDEO' MAJOR CLASS

12.9 MINOR DEVICE CLASS FIELD - PERIPHERAL MAJOR CLASS

7	6	Minor Device Class bit no of CoD
0	1	Keyboard
1	0	Pointing device
1	1	Combo keyboard/pointing device
X	X	All other values reserved

TABLE 1.9: THE PERIPHERAL MAJOR CLASS KEYBOARD/POINTING DEVICE FIELD

Bits 6 and 7 independently specify mouse, keyboard or combo mouse/keyboard devices. These may be combined with the lower bits in a multifunctional device.

5	4	3	2	Minor Device Class bit no of CoD
0	0	0	0	Uncategorized device
0	0	0	1	Joystick
0	0	1	0	Gamepad
0	0	1	1	Remote control
0	1	0	0	Sensing device
0	1	0	1	Digitizer tablet
X	X	X	X	All other values reserved

TABLE 1.10: RESERVED SUB-FIELD FOR THE DEVICE TYPE

12.10 MINOR DEVICE CLASS FIELD - IMAGING MAJOR CLASS

7	6	5	4	Minor Device Class bit no of CoD
X	X	X	1	Display
X	X	1	X	Camera
X	1	X	X	Scanner
1	X	X	X	Printer
X	X	X	X	All other values reserved

TABLE 1.11: THE IMAGING MAJOR CLASS BITS 4 TO 7

Bits 4 to 7 independently specify display, camera, scanner or printer. These may be combined in a multifunctional device.

3	2	Minor Device Class bit no of CoD
0	0	Uncategorized, default
X	X	All other values reserved

TABLE 1.12: THE IMAGING MAJOR CLASS BITS 2 AND 3

Bits 2 and 3 are reserved

Example:

PC: 0x120104

NOTEBOOK: 0x12010C

Headphones: 0x200404

*RF warning for Mobile device:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

§ 15.19 Labeling requirements.

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.

§ 15.21 Information to user.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.105 Information to the user.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.

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