BC04-B BLUETOOTH MODULE

AT COMMANDS

Users can through a serial interface and BC04-B chips for communication, serial interface use Tx, Rx two root signal lines, baud rate support 1200,2400,4800,9600,14400,19200,38400,57600,115200,230400,460800 and 921600 bps. The default of baud rate is 9600 bps.

BC04-B Bluetooth serial interface module (hereinafter referred to as the module) has two kinds of work modes: Master, Slave mode. Configure method is as follows:
PIO (4)---soft/hardware master-slave setting port: set low (or impending) for hardware settings master-slave mode, set 3.3 V high level for software setting master-slave mode; If choose hardware setting master-slave mode, can use the PIO (5) to set; If choose software settings master-slave mode, can use AT commands inquires and set (AT + ROLE).
PIO (5)---hardware master-slave setting port: 3.3 V high level setting Master mode, grounding (or impending) setting for Slave mode.

AT COMMANDS INSTRUCTIONS

BC04-B Bluetooth serial interface module has two kinds of commands: commands and indications. (Note this: AT commands all case, all with command carriage returns, line feeds character end: \ r \ n).

I. Commands

Command 1：Testing Connection Commands

Command	Answer	Parameter
AT	OK	None

Command 2：Inquires Program Version

Command	Answer	Parameter
AT+VERSION	+VERSION=< Para1>	<Para1>：**Firmware version, Bluetooth version number, local HCI version, HCI revision, LMP version number, son LMP version number**

Example：
AT+VERSION\r\n

+BOLUTEK Firmware V2.1, Bluetooth V2.1, HCI V2.1, HCI Rev37, LMP V4, LMP SubV37

Command 3：Inquires The Help Information

Command	Answer	Parameter
AT+HELP	Command Description --- AT Check if the command terminal work normally AT+RESET Software reboot …… ……	none

Command 4：Inquires/Set——Name

Command	Answer	Parameter
AT+NAME	+NAME=<Para1>	<Para1>：the name of device
AT+NAME< Para1>	1.+NAME=<Para1> OK——success 2.ERROR=<Error_Code>——failed*	default：BC04-B

*< Error_Code > for the error code, please see appendix 1

Command 5：Restore Default Settings

command	answer	parameter
AT+DEFAULT	OK	None

Command 6：Software Reset/Restart

Command	Answer	Parameter
AT+ RESET	OK	None

Command 7：Inquires/Set——PIN

Command	Answer	Parameter
AT+PIN	+PIN=<Para1>	<Para1>：pin code
AT+PIN< Para1>	1.+PIN=<Para1> OK——success 2.ERROR=<Error_Code>——failed	default：1234

Command 8：Inquires/Set——Baud Rate

Command	Answer	Parameter
AT+BAUD	+BAUD=<Para1>	<Para1>： baud rate
AT+BAUD< Para1>	1.+BAUD=<Para1> OK——success 2.ERROR=<Error_Code>——failed	1---1200 2---2400 3---4800 4---9600 5---19200 6---38400 7---57600 8---115200 9---230400 A---460800 B---921600 C---1382400 default：4---9600

Note: after changing the baud rate, not the default 9600, if set parameters or data communication in the later, need to use the setting baud rate.

Command 9：Inquires/Set——Equipment Type

Command	Answer	Parameter
AT+COD	+COD=<Para1>,<Para2>	< Para1 > :local equipment types (length must for six byte), it's effect in slave mode
AT+COD< Para1>,<Para2>	1.+COD=<Para1>,<Para2> OK——success 2.ERROR=<Error_Code>——failed	< Para2 > : filter equipment types, it's effect in master mode, used for filtering to equipment (if setting 000000, it's returning all search of equipments) The default: 001f00, 000000

In order to effectively around to many Bluetooth implementation filtering, and rapid inquiry or be inquires the custom Bluetooth device, the user can set the standard for the module Bluetooth device types, such as 001f00 (hex).

Command 10：Inquires/Set——Master/Slave Mode

Command	Answer	Parameter
AT+ROLE	+ROLE=<Para1>	<Para1>：

Command	Answer	Parameter
AT+ROLE< Para1>	1.+ROLE=<Para1> OK——success 2.ERROR=<Error_Code>—— failed	0---slave 1---master The default:0 slave

Note: in hardware Settings master-slave mode condition, can use AT + ROLE inquiry, set command can't change a master-slave mode. In the software installed master-slave mode condition, this command mode in the next set master-slave on effective when electricity.

Command 11：Inquires/Set——Inquires The Access Code

Command	Answer	Parameter
AT+IAC	+IAC=<Para1>	<Para1>：**Inquires the access**
AT+IAC< Para1>	1.+ IAC =<Para1> OK——success 2.ERROR=<Error_Code>—— failed	**code** The default：9e8b33 **Set specific see appendix 2:** **inquires introductions**

Access Code set to GIAC (General Inquire Access Code: 0x9e8b33) General inquires the Access Code, can be used to find or be found all around the Bluetooth device; In order to effectively in many Bluetooth devices around the rapid inquires custom or be inquires Bluetooth devices, users can access the module inquires into GIAC and LIAC code set outside of the numbers, such as e8b3f9.

Command 12：Inquires The Distal Bluetooth Device Name

Command	Answer	Parameter
AT+RNAME< Para1>	1.OK——success 2.ERROR=<Error_Code>—— failed	< Para1>：**Remote Bluetooth** **device address**

Example：
Bluetooth device address：00:11:22:33:44:55，Device name：BC04-B
AT+RNAME00,11,22,33,44,55\r\n
OK
+RNAME=BC04-B

Command 13：Inquires/Set——Inquires The Access Mode

Command	Answer	Parameter
AT+INQM	+INQM=<Para1>,<Para2>,<Para3>	<Para1>：inquiry mode 0：inquiry_mode_standard

		1：inquiry_mode_rssi
AT+INQM<Para1>,<Para2>,<Para3>	1.+INQM=<Para1>,<Para2>,<Para3> OK——success 2.ERROR=<Error_Code> —— failed	2：inquiry_mode_eir **Length: 1 byte** **<Para2> : most Bluetooth device response number** **length: 2 bytes** **<Para3> : the biggest inquires the overtime** **Overtime scope: 1-30 (converted into time: 1.28-61.44 seconds)** **Length: 2 bytes** **The default value: 1,9,30 (hex)**

RSSI access mode: according to receiving signal strength around a visit default access the strongest signal Bluetooth devices.

Example:
AT + INQM1, 5, 12-set inquires the access mode: according to the RSSI pattern search, more than five Bluetooth device response is terminated inquiry, set for overtime 48 * 1.28 = 61.44 seconds
+ INQM = 1,5,30
OK

Command 14：Inquires/set——Connection modes

command	answer	parameter
AT+CMODE	+CMODE=<Para1>	**< Para1 > : 0: designated Bluetooth address connection modes (designated by the BIND command Bluetooth address set) 1: any Bluetooth address connection modes (from BIND the constraints of the command set address)** **The default: 1**
AT+CMODE< Para1>	1.+CMODE=<Para1> OK——success 2.ERROR=<Error_Code>—— failed	

Binding address: for from equipment, if has the memory address, it can't be matched with inquires, can only be it memory device to connect; On the equipment, if has the memory address, is always try to connect it to the memory of the equipment; So when binding address, once a device memory address, the connection is only in it and it is established between the memory of the equipment, and will not establish a connection with other equipment. So, in the binding address, if hope to establish a connection with other equipment, it must be clear memory address.

Don't binding address: from the devices can be matched with inquires; The equipment will have been connected to the memory devices, until clear memory address, the main equipment began to search and matching new equipment.

Command 15：**Inquires/set——Binding Bluetooth address**

command	answer	parameter
AT+BIND	+BIND=<Para1>	<Para1>： Set bingding Bluetooth address：11,22,33,44,55,66
AT+BIND<Para1>	+BIND=<Para1> OK——success 2.ERROR=<Error_Code> ——failed	**Reply Bluetooth address format**：11:22:33:44:55:66 The Default：00:00:00:00:00:00

When using this command to set up each other's Bluetooth address, unless through the key or remove address command (AT + CLEAR) to remove address, as the main equipment Bluetooth module will have been trying to connect the address until success. As the Bluetooth module from equipment if not binding address, can be any other main equipment link; If need to bind the address, use the command set the binding of address.

Example：

In the designated Bluetooth address connection mode, binding Bluetooth device address: 15:51:35: ef: CD: ab

Command and response as follows：

AT+BIND11,22,33,44,55,66\r\n

+BIND=11:22:33:44:55:66

OK

Command 16：**Clear memory address**

command	answer	parameter
AT+CLEAR	OK	none

The module will remember the address of the other after paring success, this command can be used to clear the memory address (not binding mode) or the binding address(binding mode).

Command 17：**Inquires/set——Serial interface communication mode**

command	answer	parameter
AT+UARTMODE	+UARTMODE=<Para1>,<Para2>	**< Para1 > : stop bits** **0:1 stop bits**
AT+ UARTMODE<Para1>,<Para2>	1. +UARTMODE=<Para1>,<Para2> OK ——success 2.ERROR=<Error_Code> ——	**1:2 stop bits** **< Para2 > : parity** **0: no calibration** **1: strange calibration**

	failed	2: parity checking
		The default: 0, 0

Command 18：Inquires——Local Bluetooth address

command	answer	parameter
AT+LADDR	+LADDR=<Para1>	<Para1> ： local Bluetooth address Example：11:22:33:44:55:66

Command 19：Inquires——Bluetooth module working state

command	answer	parameter
AT+STATE	+STATE=<Para1>	<Para1>： **Bluetooth module working state** **Return values**： 0：INITIALIZING 1：READY 2：INQUIRING 3：PAIRABLE 4：CONNECTING 5：CONNECTED

Command 20：Search distal Bluetooth devices

command	answer	parameter
AT+INQ	OK	none

Note: after the beginning of inquires, equipment for the meeting for Bluetooth address. Specific format see instructions 8(INQS, INQ: Bluetooth address, equipment type, RSSI instructions, INQE), RSSI whether to return to the command ,can use AT + INQM to be set.

Example：
AT+IAC9e8b33\r\n   ——**Set any access code Bluetooth devices**
+ IAC=9e8b33
OK
AT+COD001f00\r\n   ——**Set Bluetooth device type**
+COD=001f00
OK
AT+INQM1,9,30\r\n   ——**Mode Settings：Take RSSI signal strength instructions, more than nine Bluetooth device response is terminated inquiry, set overtime for 61.44 seconds**
AT+INQ   ——search Bluetooth devices
OK
+INQS

+INQ：11:22:33:44:55:66,001f00,-90　　——**Return to search to Bluetooth address equipment information**

+INQ：aa:bb:cc:dd:ee:ff,001f00,-71　　——**Return to search to Bluetooth address equipment information**

+INQE

Command 21 ： **Inquires/set**——whether **Search distal Bluetooth devices automatically or not**

command	answer	parameter
AT+AUTOINQ	+AUTOINQ=<Para1>	<Para1>： 0：search automatically 1 ： can not search automatically
AT+ AUTOINQ<Para1>	+ AUTOINQ=<Para1> OK——success 2.ERROR=<Error_Code> —— failed	The Default：1

Example：
AT+AUTOINQ1\r\n　　——Set search the remote Bluetooth device automatically+AUTOINQ=1
OK
AT+INQ\r\n　　　　——search the remote Bluetooth device
+INQS
+INQ： 11:22:33:44:55:66,001f00,-90　　　　——**Return to search to Bluetooth address equipment information**

+INQ： aa:bb:cc:dd:ee:ff,001f00,-71　　　　——**Return to search to Bluetooth address equipment information**

......
+INQE
+INQS
+INQ：11:22:33:44:55:66,001f00,-90
+INQ：aa:bb:cc:dd:ee:ff,001f00,-71
......
+INQE

Command 22：Cancel query ——remote Bluetooth device

command	answer	parameter
AT+INQC	OK	none

Note：This order only works under the master mode query, stop the current query.

Command 23：Inquires/set——Whether connect the remote Bluetooth device or not

command	answer	parameter
AT+AUTOCONN	+AUTOCONN=\<Para1>	\<Para1>:
AT+ AUTOCONN\<Para1>	+ AUTOCONN=\<Para1> OK——success 2.ERROR=\<Error_Code> — — failed	0 ： Can not connect automatically 1：Connect automatically The Default：1

Command 24：Connect the remote Bluetooth device

command	answer	parameter
AT+CONNECT\<Para1>	1.OK——success 2. ERROR=\<Error_Code>——failed	\<Para1>: **Set remote Bluetooth address format**11,22,33,44,55,66 Reply Bluetooth address format： 11:22:33:44:55:66

Note：This order only works under "Ready"

Example ：
AT+CONNECT11,22,33,44,55,66 ——connect remote Bluetooth device OK
+CONNECTING>>11:22:33:44:55:66 — — in the process of connecting Bluetooth device automatically（master mode）
+CONNECTED

Command 25：Inquires/set — — Paging scanning、Query scanning parameters

command	answer	parameter
AT+IPSCAN	+IPSCAN=\<Para1>,\<Para2>,\<Para3>,\<Para4>	\<Para1>: query time interval \<Para2>：query duration
AT+IPSCAN\<Para1>,\<Para2>,\<Para3>,\<Para4>	1.+IPSCAN=\<Para1>,\<Para2>,\<Para3>,\<Para4> OK——success 2.ERROR=\<Error_Code>	\<Para3>: query time interval \<Para4>：query duration The above parameters are decimal number。

	——failed	The Default: 400,200,400,200

Command 26：Inquires/set——Safe、Encryption Mode

command	answer	parameter
AT+SENM	+SENM=<Para1>,<Para2>	<Para1>：safe mode，as value below(1byte)：
AT+SENM<Para1>,<Para2>	1.+SENM=<Para1>,<Para2> OK——success 2.ERROR=<Error_Code>——failed	0——sec_mode0_off 1——sec_mode1_non_secure 2——sec_mode2_service 3——sec_mode3_link 4——sec_mode4_ssp <Para2>：encryption mode，as value below(1byte)： 0——hci_enc_mode_off 1——hci_enc_mode_pt_to_pt 2——hci_enc_mode_pt_to_pt_and_bcast The Default：0,0

Command 27：Inquires/set——Low power consumption mode

command	answer	parameter
AT+LOWPOWER	+LOWPOWER=<Para1>	<Para1>: 0：do not support low power consumption 1：support low power consumption The Default：1
AT+ LOWPOWER<Para1>	1. +LOWPOWER=<Para1> OK——success 2.ERROR=<Error_Code>——failed	

Command 28：Inquires/set——Sniff energy-save mode

command	answer	parameter
AT+SNIFF	+SNIFF=<Para1>,<Para2>,<Para3>,<Para4>	<Para1>：maximum time <Para2>：minimum time
AT+SNIFF<Para1>,<Para2>,<Para3>,<Para4>	1.+SNIFF=<Para1>,<Para2>,<Para3>,<Para4> OK——success 2.ERROR=<Error_Code>——failed	<Para3>：trial time <Para4>：timeout Default：20,40,1,5

Command 29：Inquires/set——Indication up instruction

command	answer	parameter
AT+ENABLEIND	+ ENABLEIND=\<Para1\>	\<Para1\>：
AT+ENABLEIND\<Para1\>	1.+ENABLEIND=\<Para1\> OK——success 2.ERROR=\<Error_Code\>—— failed	0： turn off Indication up instruction 1： turn on Indication up instruction Default ： 1

Command 30：Inquires——Bluetooth paring list

command	answer	parameter
AT+LSP	LSP=\<Para1\>,\<Para2\>,\<Para3\> ...... LSP=E	\<Para1\> ： serial number （0-7） \<Para2\>：Bluetooth address code\<Para3\>：name Default feedback：LSP=E

The maximum record of Bluetooth device is 8 Bluetooth addresses which have paired before.And it will saved the record even power-off

Command 31：Delete all Bluetooth pairing list

command	answer	parameter
AT+RESETPDL	OK	none

Command 32：Delete appointed Bluetooth pairing record

command	answer	parameter
AT+REMOVEPDL\<Para1\>	OK	\<Para1\> ： serial number （0-7）

Command 33：Inquires/set——offline monitoring duration

command	answer	parameter
AT+SUPERVISION	+SUPERVISION=\<Para1\>	\<Para1\>：response time，unit

AT+SUPERVISION<Para1>	1.+SUPERVISION=<Para1> OK——success 2.ERROR=<Error_Code>—— failed	Second （Hexadecimal） Default ：5

After offline of the opposite Bluetooth ，Linkloss reports time 。During this time ，though the opposite get offline, still keep connecting.

II．Indications

Indication 1：Status of Ready

Indication	parameter
+READY	none

Indication 2：Status of query

Indication	parameter
+INQUIRING	none

Feature of the master mode is"query automatically"

Indication 3：Status of pairing

Indication	parameter
+PAIRABLE	none

Feature of the slave mode is "to be searched"

odIndication	parameter
+CONNECTING<Para1>	<Para1>：Bluetooth address code As the following format： >>aa:bb:cc:dd:ee:ff (master mode) <<aa:bb:cc:dd:ee:ff (slave mode)

Indication 5：Connected

Indication	parameter
+CONNECTED	none

Indication 6：Connection failure

Indication	parameter
+CONNECTION FAILED	none

Indication 7：Disconnect

Indication	parameter
+DISC:<Para1>	<Para1>：reason for disconnect SUCCESS：disconnect normally LINKLOSS：disconnect for linkloss NO_SLC：disconnect for NO SLC TIMEOUT：disconnect for timeout ERROR：disconnect for other reason

Indication 8：report the name of remote Bluetooth device

Indication	parameter
+RNAME=<Para1>	<Para1>：name of remote Bluetooth device example: BOLUTEK

Note：if it can find the device ，the module will report the name of remote Bluetooth device automatically

Indication 9：report the result of query

Indication	parameter
+INQS query beginning +INQ=<Para1>,<Para2>,<Para3> ······ Query of device information +INQE query accomplishment	<Para1>：Bluetooth address Format：11:22:33:44:55:66 <Para2>：type of device <Para3>：RSSI signal strength(decimal is normal，return when void 7fff)

Appendix 1：AT Description of fault code order

Return format of fault code ——ERROR=<Error_Code>

Error_code(Decimal)	Note
101	Device's name which is more than 40 bytes
102	Paring code which is more than 16 bytes
103	Baud rate which is more than 1 byte

104	Type of device(COD)which is more than 6 bytes
105	Error for obtaining address code of remote device
106	Master-slave mode length is more than 1 byte
107	Connection mode length is more than 1 byte
108	Error for bingding address strength
109	Length of IAC is more than 6 bytes
110	Error for setting length of INQM
111	Set query automatically longer than 1 bytes
112	Set the length of connect automatically longer than 1 byte
113	Error for setting the length of SENM
114	Error for setting the length of IPSCAN
115	Error for setting the length of SNIFF
116	Error for setting the length of LOWPOWER
117	Error for CONNECT order and length of address code
118	Error for setting the length of UARTMODE
119	Error for setting the length of ENABLEIND
121	Error for setting the length of REMOVEPDL
201	Baud rate parameter is out of range(1 - C)
202	Error for type of device(COD)input value
203	Error for obtaining the name of remote device and address code value
204	Error of Master-slave mode set value
205	Error of Connection mode set value
206	Error for obtaining the name of remote device and address code value
207	Error for setting bingding address value
208	Error for setting IAC value
209	Error for setting INQM value
210	Error for query automatically value
211	Error for connect automatically
212	Error for setting SENM value
213	Error for setting IPSCAN value
214	Error for setting SNIFF value
215	Error for setting LOWPOWER value
216	Error for CONNECT order and length of address code
217	Error for setting UARTMODE value
218	Error for setting ENABLEIND value
220	Error for setting SUPERVISION value
301	IAC value is not in the normal range(0x9e8b00 - 0x9e8b33)

302	This order only support master mode
303	Inquiry only works under the status of Ready
304	Inquiry canceling only works under the status of Inquiring
305	CONNECT order only works under the status of Ready

Appendix 2: inquires introductions

The General- and Device-Specific Inquiry Access Codes (DIACs)

The Inquiry Access Code is the first level of filtering when finding *Bluetooth* devices and services. The main purpose of defining multiple IACs is to limit the number of responses that are received when scanning devices within range.

#	LAP value	Usage
0	0x9E8B33	General/Unlimited Inquiry Access Code (GIAC)
1	0x9E8B00	Limited Dedicated Inquiry Access Code (LIAC)
2-63	0x9E8B01-0x9E8B32, 0x9E8B34-0x9E8B3F	RESERVED FOR FUTURE USE

Table 1: *The Inquiry Access Codes*

The Limited Inquiry Access Code (LIAC) is only intended to be used for limited time periods in scenarios where both sides have been explicitly caused to enter this state, usually by user action. For further explanation of the use of the LIAC, please refer to the Generic Access Profile.

In contrast it is allowed to be continuously scanning for the General Inquiry Access Code (GIAC) and respond whenever inquired.

The Class of Device/Service field

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.

Figure 1: *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.*

Major Service Classes

The Major and Minor classes are intended to define a general family of devices with which any particular implementation wishes to be associated. No assumptions should be made about specific functionality or characteristics of any application based solely on the assignment of the Major or Minor device class.

Bit no	Major Service Class
13	Limited Discoverable Mode
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 2: *Major Service Classes*

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, ...)
0	0	1	1	1	Wearable
0	1	0	0	0	Toy
0	1	0	0	1	Health
1	1	1	1	1	Uncategorized, specific device code not specified
X	X	X	X	X	All other values reserved

Table 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']

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.

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	0	1	1	Laptop
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 4: *Sub Device Class field for the 'Computer' Major Class*

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
X	X	X	X	X	X	All other values reserved

Table 5: *Sub Device Classes for the 'Phone' Major Class*

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
X	X	X	All other values reserved

Table 6: *The LAN/Network Access Point Load Factor field*

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.

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

Table 7: *Reserved sub-field for the LAN/Network Access Point*

Minor Device Class field - Audio/Video Major Class

7 6 5 4 3 2	Minor Device Class bit no of CoD
0 0 0 0 0 0	Uncategorized, code not assigned
0 0 0 0 0 1	Wearable Headset Device
0 0 0 0 1 0	Hands-free Device
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
X X X X X X	All other values reserved

Table 8: *Sub Device Classes for the 'Audio/Video' Major Class*

Minor Device Class field - Peripheral Major Class

7 6	Minor Device Class bit no of CoD
0 0	Not Keyboard / Not Pointing Device

Minor Device Class bit no of CoD	
0 1	Keyboard
1 0	Pointing device
1 1	Combo keyboard/pointing device

Table 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
0 1 1 0	Card Reader (e.g. SIM Card Reader)
0 1 1 1	Digital Pen
1 0 0 0	Handheld scanner for bar-codes, RFID, etc.
1 0 0 1	Handheld gestural input device (e.g., "wand" form factor)
X X X X	All other values reserved

Table 10: *Minor Class bits 2 to 5 for Peripheral Major Class*

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 11: *The Imaging Major Class bits 4 to 7*

Bits 4 to 7 independantly 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 12: *The Imaging Major Class bits 2 and 3*

Bits 2 and 3 are reserved

Minor Device Class field - Wearable Major Class

The Minor Class segment is the lowest level of granularity for defining a *Bluetooth* Device. There are 64 different possible minor classes.

7 6 5 4 3 2	Minor Device Class bit no of CoD
0 0 0 0 0 1	Wrist Watch
0 0 0 0 1 0	Pager
0 0 0 0 1 1	Jacket
0 0 0 1 0 0	Helmet
0 0 0 1 0 1	Glasses
X X X X X X	All other values reserved

Minor Device Class field - Toy Major Class

7 6 5 4 3 2	Minor Device Class bit no of CoD
0 0 0 0 0 1	Robot
0 0 0 0 1 0	Vehicle
0 0 0 0 1 1	Doll / Action Figure
0 0 0 1 0 0	Controller
0 0 0 1 0 1	Game
X X X X X X	All other values reserved

Minor Device Class field - Health

7 6 5 4 3 2	Minor Device Class bit no of CoD
0 0 0 0 0 0	Undefined
0 0 0 0 0 1	Blood Pressure Monitor
0 0 0 0 1 0	Thermometer
0 0 0 0 1 1	Weighing Scale
0 0 0 1 0 0	Glucose Meter
0 0 0 1 0 1	Pulse Oximeter
0 0 0 1 1 0	Heart/Pulse Rate Monitor
0 0 0 1 1 1	Health Data Display
0 0 1 0 0 0	Step Counter
0 0 1 0 0 1	Body Composition Analyzer
0 0 1 0 1 0	Peak Flow Monitor
0 0 1 0 1 1	Medication Monitor

0	0	1	1	0	0	Knee Prosthesis
0	0	1	1	0	1	Ankle Prosthesis
0	0	1	1	1	0	Generic Health Manager
X	X	X	X	X	X	All other values reserved