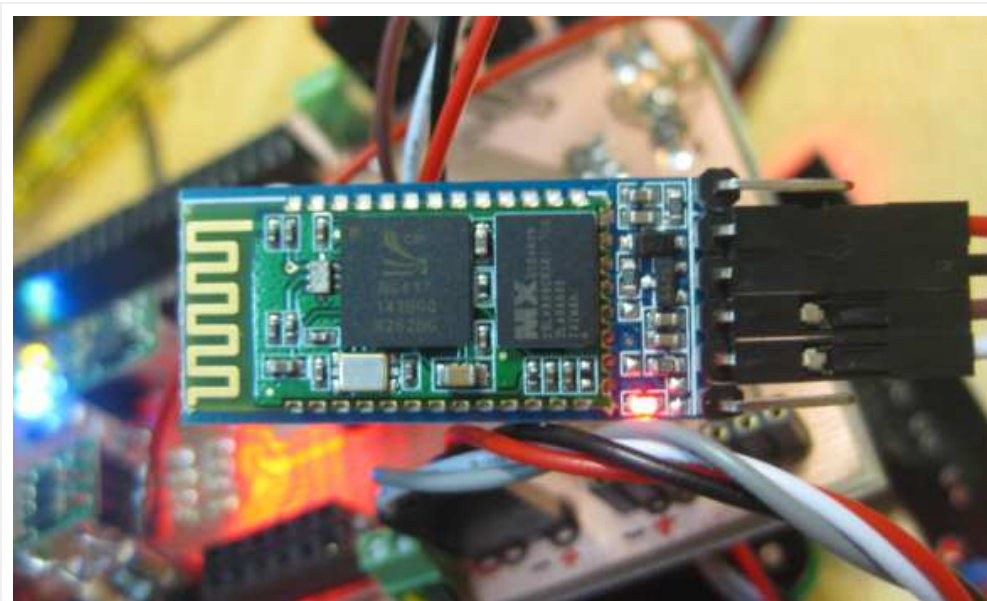


# Using the HC-06 Bluetooth Module

Posted on **June 19, 2013**

9 Votes

After [my first post using a Bluetooth module](#), things have evolved a bit. The challenge with these Bluetooth modules is: they look the same, but having different firmware. I did not fully realize that until I have ordered another bluetooth module from [dx.com](#):

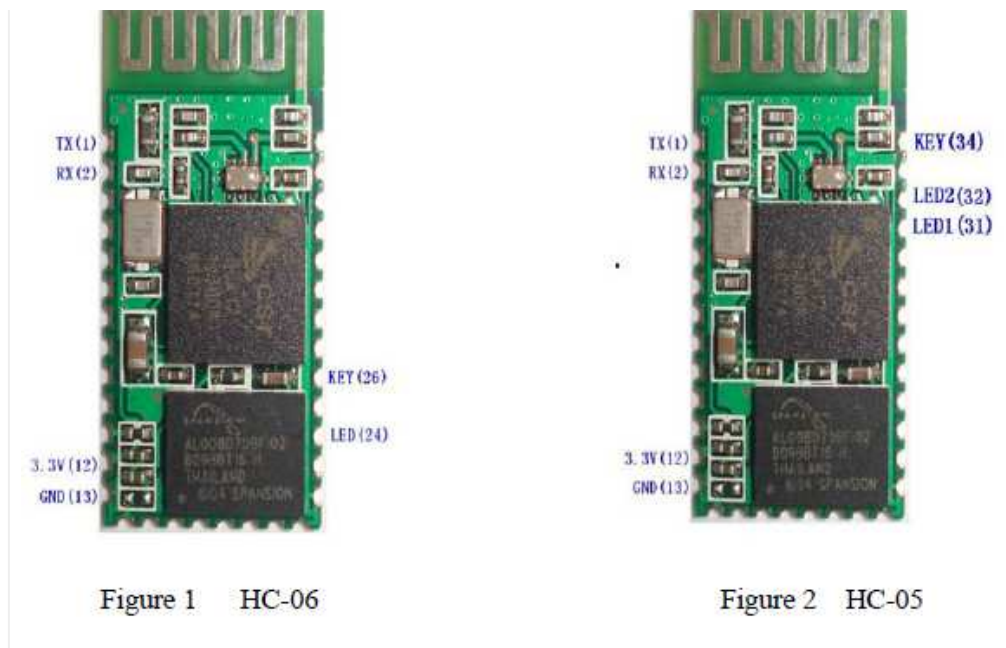


— DX.com Bluetooth Module (HC-06)

That module comes already on a carrier, so I assumed I can use the same driver as for my other module. I was wrong .

## HC-05 or HC-06

My earlier module which I received from another source (without an adapter, [see this post](#)) has a different firmware on it, known as HC-05, while my DX.com module has a HC-06 firmware. To be clear: the modules are the same, but the software/firmware on it is different, and the firmware uses the pins differently too



— HC-06 and HC-05 (Source Wavesen Data Sheet)

*Check out this post which explains how to re-program the firmware of the device with firmware programming adapter:*

<http://byron76.blogspot.ch/2011/09/hc05-firmware.html>

The HC-05 has the 'full' firmware on it: many AT commands, and can be both master and slave module. The HC-06 firmware on the other hand only can be a slave device, with very limited AT commands.

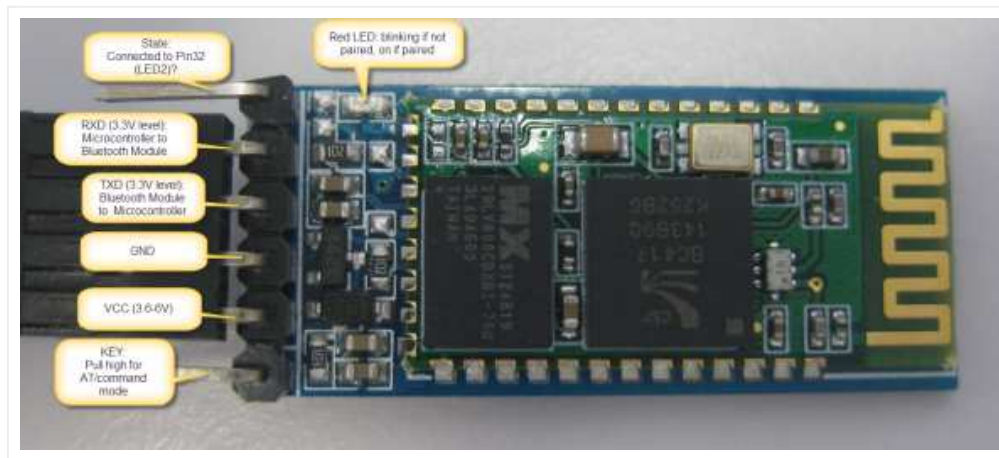
Or in other words:

- The **HC-05** module can build a connection to other modules. E.g. a Robot being a master and connecting to slave bluetooth module. Or in slave mode to make a wireless bridge to a notebook.
- The **HC-06** module only can be a slave. This makes it only useful for say connecting a notebook as a master to a robot with a slave module e.g. for a wireless serial bridge.

For most use cases the HC-06 is enough, as typically I want to have a wireless UART connection to my devices from my notebook.

### JY-MCU V1.5 Module

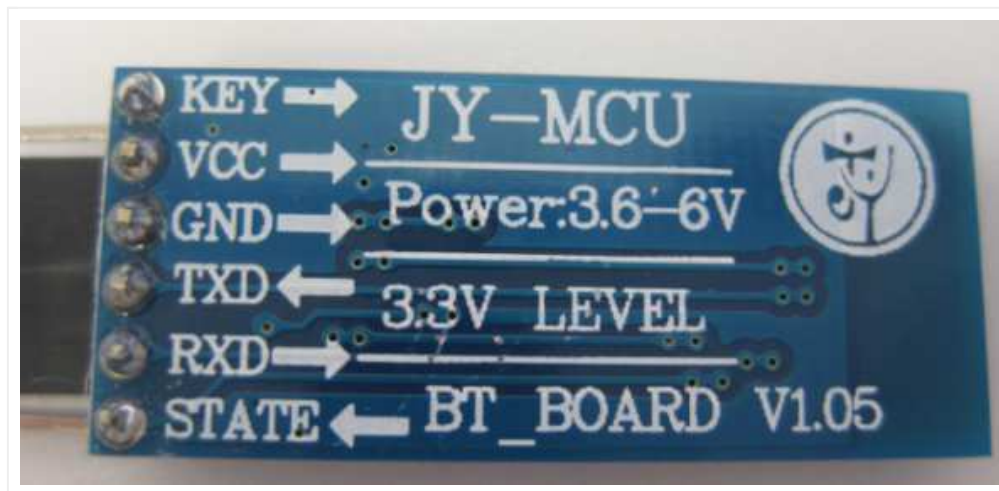
Below is an image of the JY-MCU HC-06 (JY-MCU V1.5) module. The module came with a 4-pin header, and I have added the pins for STATE and KEY, and removed the plastic around the module to get access to the pins:



— HC-06 Top Side

## Pins

On the bottom side there are labels for the signal direction and voltage levels:



— JY-MCU BT\_BOARD V1.05 Bottom Side

- **KEY:** according to the data sheet, I need to pull-up this pin while power-on-reset of the module to enforce AT mode. I have not been able to verify this yet. I have been told that some modules have this pin not connected at all?
- **VCC** is indicated in the range of 3.6V-6V. The module worked for me both with 3.3V and 5V.

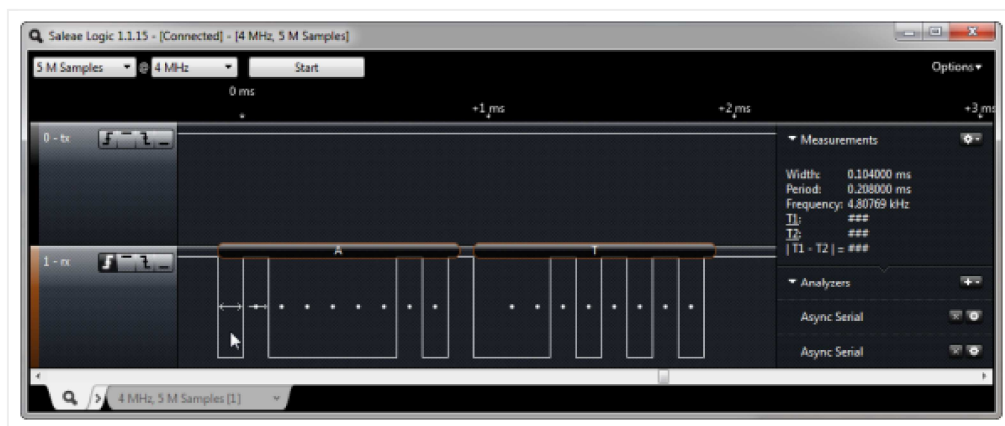
- **GND:** Ground
- **TXD:** serial *output* of the module, to be connected to RX of the microcontroller.  
Note that this signal is using 3.3V logic level
- **RXD:** serial *input* of the module, to be connected to the TX of the microcontroller.  
Note that this signal is using 3.3V logic levels.
- **STATE:** connected to LED2 (Pin32) of the module, but no meaning? At least on my module the pin was always low, regardless if paired or not.

### Different AT commands

On the HC-05 module, I send “AT\r\n” to the device, and then it responds with “OK\r\n”.

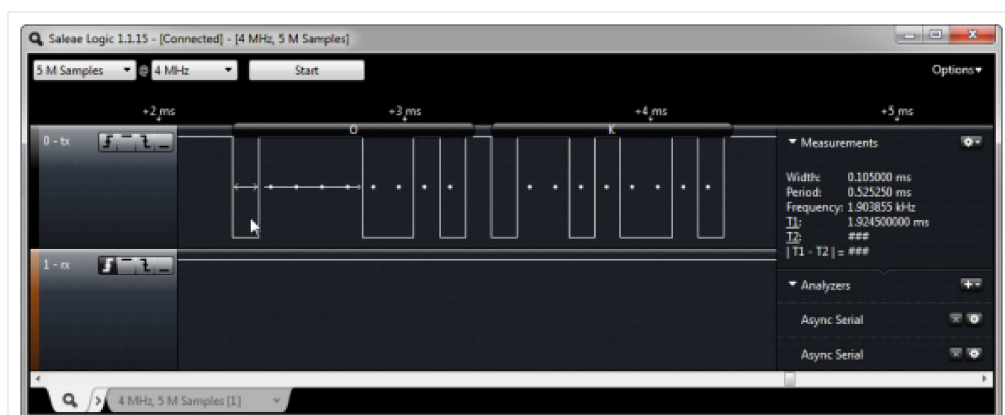
But on the HC-06, the protocol is different I need to send “AT” (without the new-line characters), and I receive “OK” (without the new-line characters).

The logic analyzer shows this behaviour too: AT command sent to the device:



— AT Command sent to Device

OK response from the device with no “\r\n” at the end:



---

— OK Response from the Device

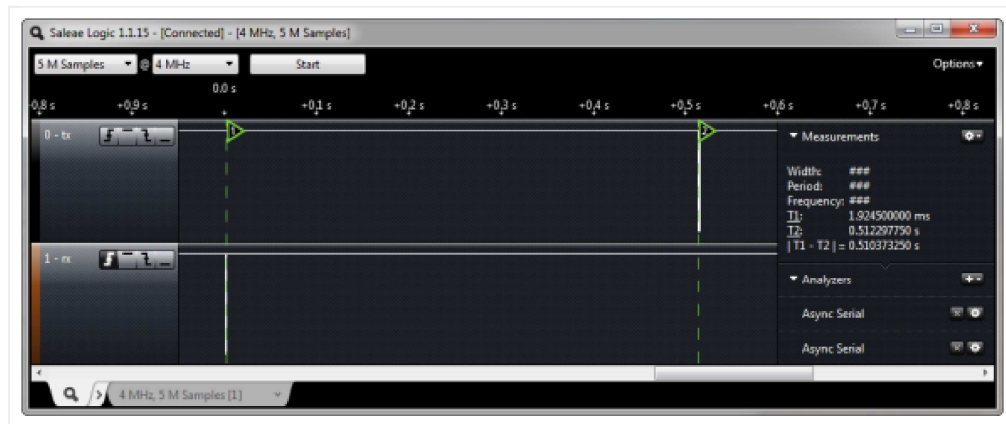
The missing “\r\n” is present for all commands of the HC-06 firmware. As as this is not enough, there are very few command possible. The table below shows all the HC-06 firmware commands with the response:

COMMAND	RESPONSE	COMMENT
AT	OK	Used to verify communication
AT+VERSION	OKlinvorV1.8	The firmware version (version might depend on firmware)
AT+NAMExyz	OKsetname	Sets the module name to “xyz”
AT+PIN1234	OKsetPIN	Sets the module PIN to 1234
AT+BAUD1	OK1200	Sets the baud rate to 1200
AT+BAUD2	OK2400	Sets the baud rate to 2400
AT+BAUD3	OK4800	Sets the baud rate to 4800
AT+BAUD4	OK9600	Sets the baud rate to 9600
AT+BAUD5	OK19200	Sets the baud rate to 19200
AT+BAUD6	OK38400	Sets the baud rate to 38400
AT+BAUD7	OK57600	Sets the baud rate to 57600
AT+BAUD8	OK115200	Sets the baud rate to 115200
AT+BAUD9	OK230400	Sets the baud rate to 230400
AT+BAUDA	OK460800	Sets the baud rate to 460800
AT+BAUDB	OK921600	Sets the baud rate to 921600
AT+BAUDC	OK1382400	Sets the baud rate to 1382400

That’s it.

### Firmware Timing

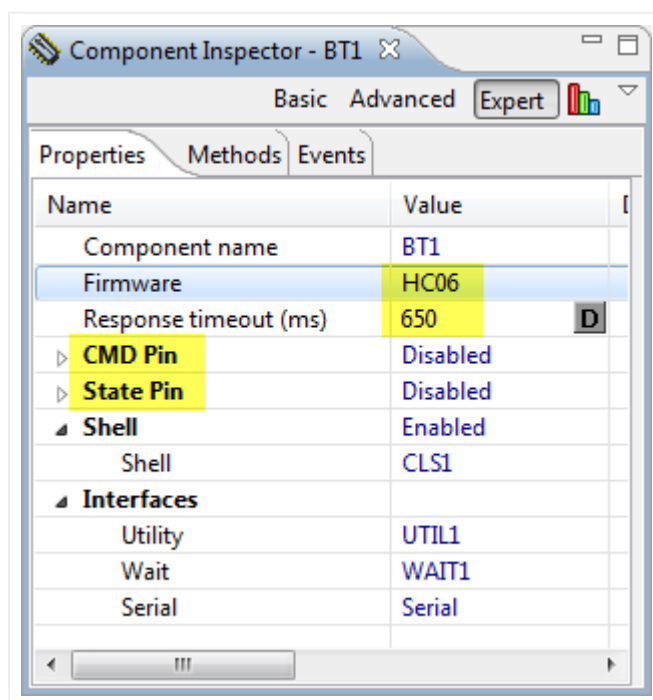
As this is not enough, my driver did not work even with the new commands implemented. The HC-05 firmware as sending a response back in less than 300 ms, while the HC-06 firmware needs more than 500 ms until there is a response:



So for this I had to introduce a user configurable delay in the component.

### Processor Expert Component

With this knowledge, the Processor Expert Bluetooth component has been updated to support both the HC-05 and HC-06 firmware:

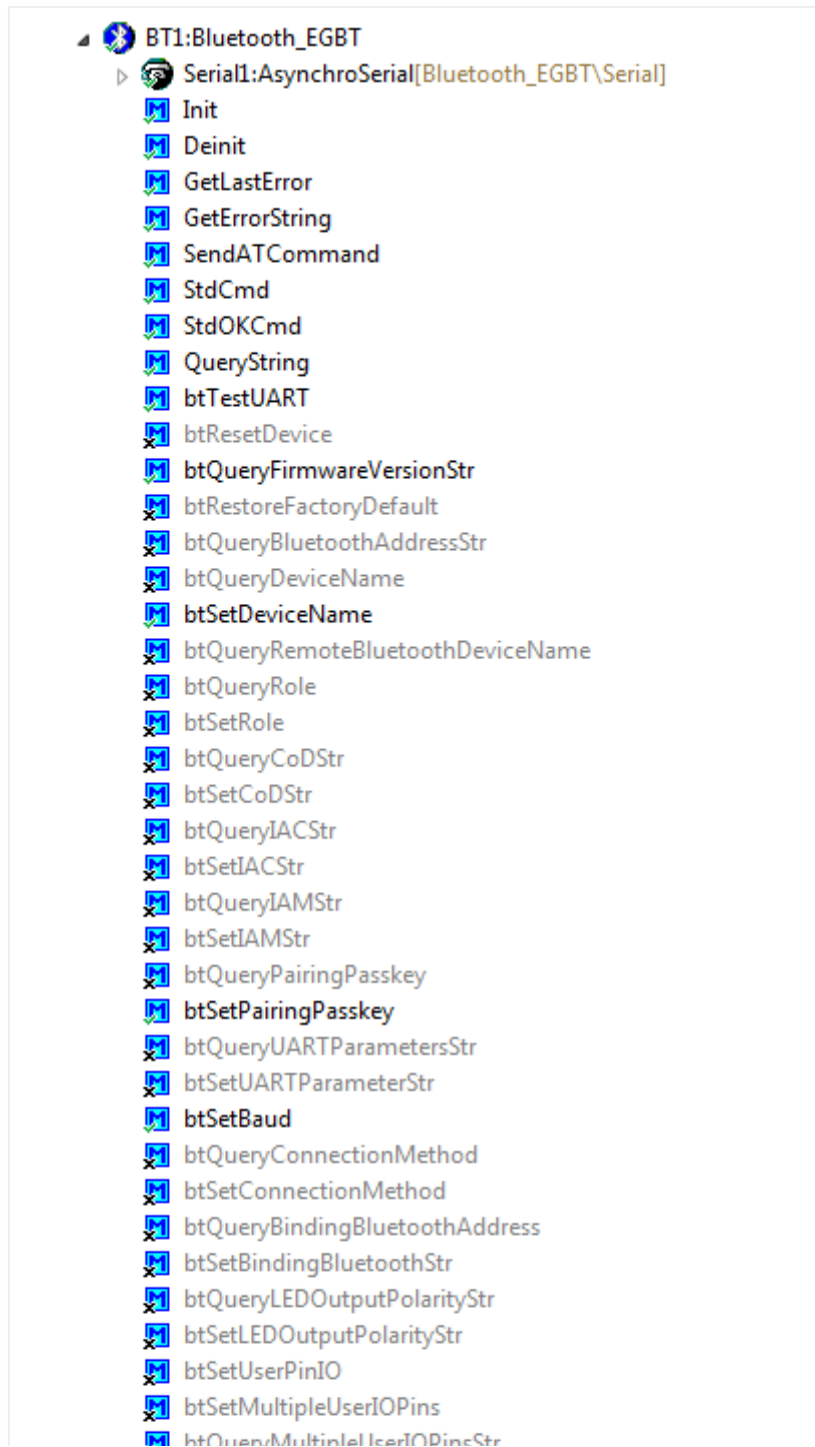


— Bluetooth Component Supporting HC-05 and HC-06



- **Firmware** to select between HC-05 and HC-06
- Configurable **Response Time** if the module needs longer for commands
- Optional **State** and **CMD** pins

If the HC-05 firmware is selected, then the component automatically disables the functionality methods not present/supported in the firmware (grayed out methods):



```

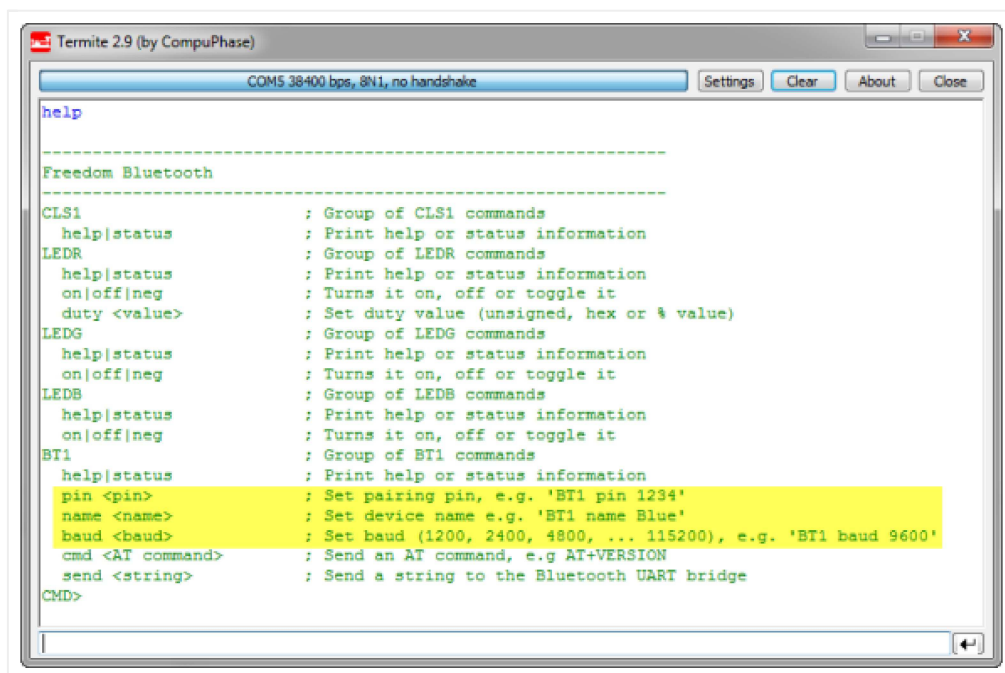
x btQueryMultipleUserIO Pins
x btQueryMultipleUserIOPins
x btQueryScanningParametersStr
x btSetScanningParameterStr
x btQuerySNIFFParametersStr
x btSetSNIFFParameterStr
x btQuerySecurityEncryptionModesStr
x btSetSecurityEncryptionModesStr
x btDeleteAuthenticatedDeviceFromListStr
x btFindDeviceFromAuthenticatedDeviceListStr
x btQueryTotalNumberOfDeviceFromAuthenticationListStr
x btQueryTotalNumberOfDeviceFromAuthenticationList
x btQueryMostRecentlyUsedAuthenticatedDevice
x btQueryCurrentStateOfDeviceStr
x ParseCommand
x RecvChar
x SendChar
x GetCharsInRxBuf
x StdIOKeyPressed
x StdIOReadChar
x StdIOSendChar

```

— Bluetooth Module Methods

## Command Line Interface

The Processor Expert component features an optional command line interface:



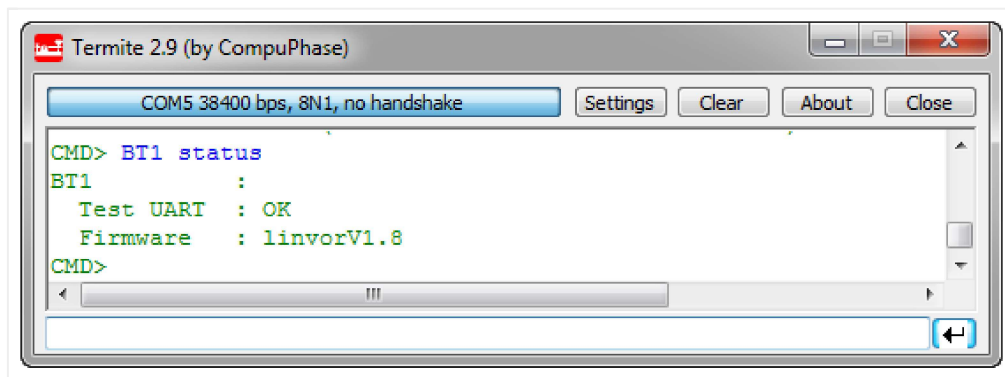
— HC-06 Shell Commands



With this, I can change the pairing pin, device name or baud, beside of sending AT commands or sending a string over the wireless bridge.

*Changing the pairing/name/baud will be effective after resetting the device. Keep in mind if you change the baud, this will change the baud as well between the module and the microcontroller.*

The 'status' command issues an AT command to the device to see if it responds, plus shows the firmware version:



— BT1 Status with Module Firmware

*Status and AT commands can only be used if the device is not paired yet (means: while the red LED is blinking).*

### Connecting to the Bluetooth Module

The Bluetooth module runs the SPP (Serial Protocol over Bluetooth) protocol. So any device supporting SPP can connect to it. On a PC this looks like a virtual COM port. I show here the steps for Windows (running Windows 7).

*It seems that Apple (iPhone, iPad, etc) does \*not\* support SPP, so connecting with an iPhone is not possible. Android (which I did not try) should work, or any PC machine with Bluetooth.*

Before connecting, make sure the module is powered and ready to pair. The red LED on the module indicates the status:

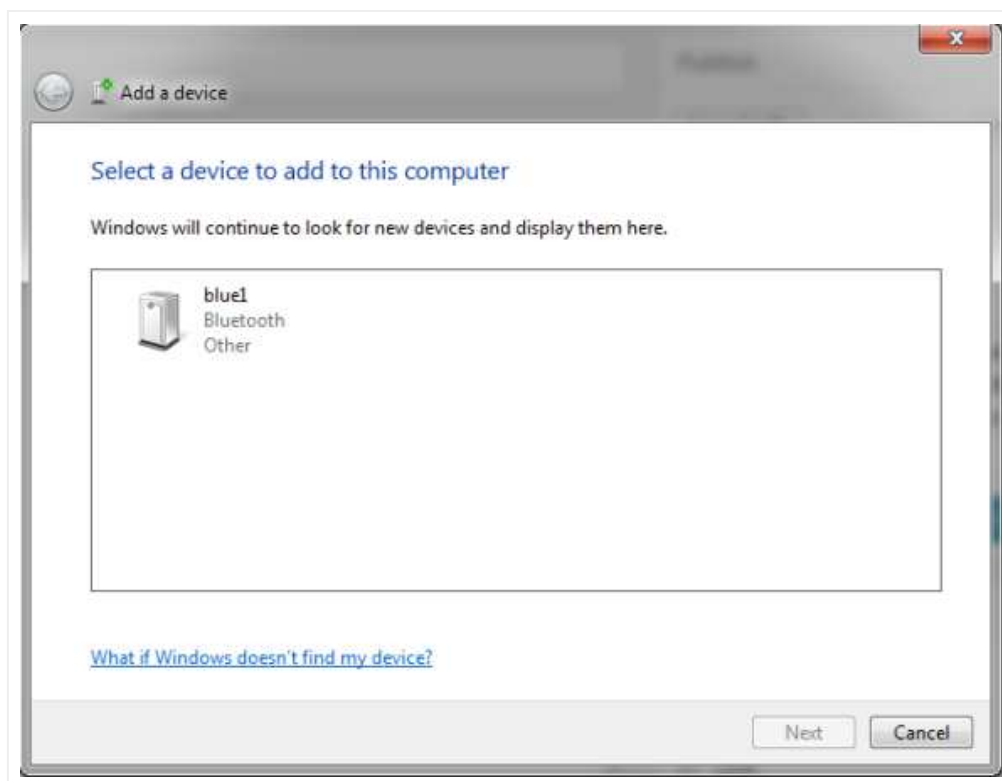
- blinking: ready to pair
- steady on: paired

From the Device Manager, select 'Add a Device':



- Device Manager with Add a Device

Then the new device should show up:

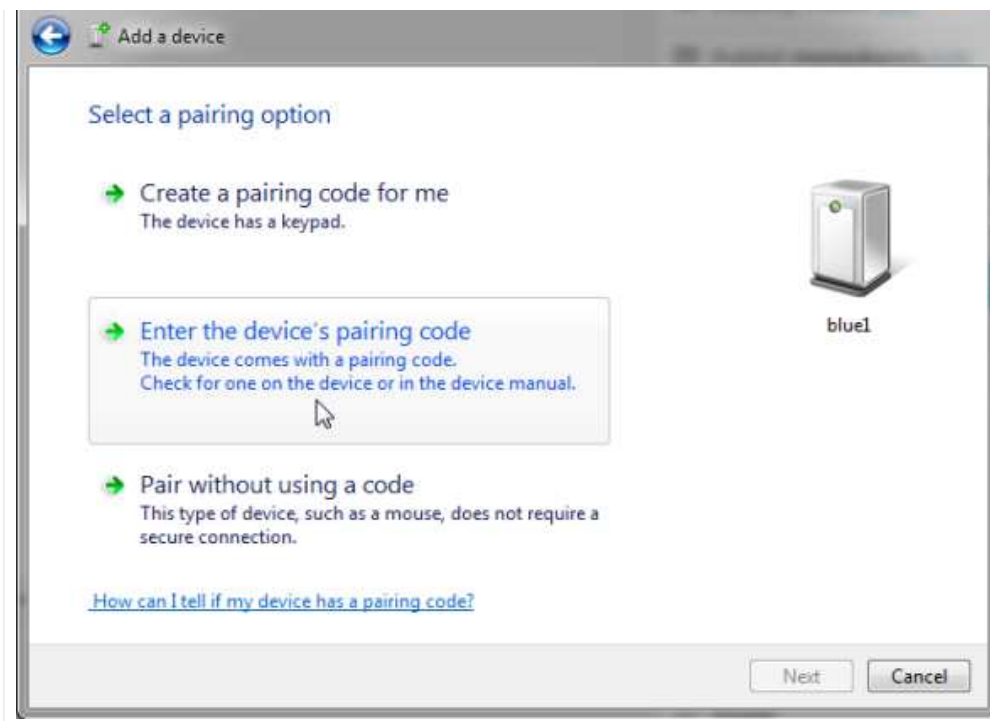


- Add a device Dialog

*the name of the device shows here for me 'blue1', as I have named it as such. But it might show up for you as 'linvor' (default) or 'other'.*

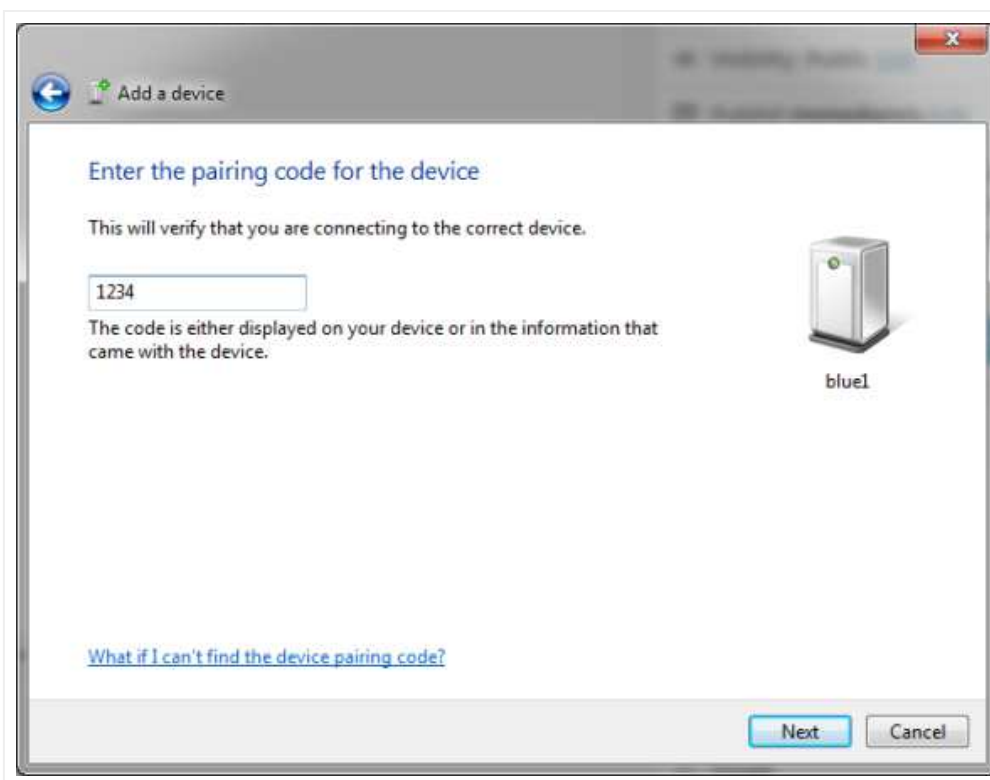
Select the device and press 'Next'. In the next dialog select 'Enter the device's pairing code':





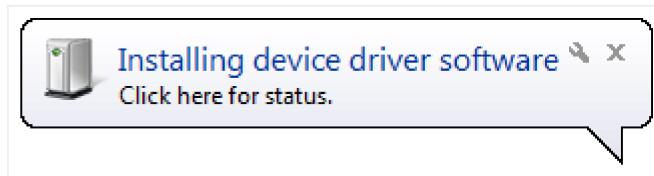
- Enter the device's pairing code

The default pairing code is 1234:



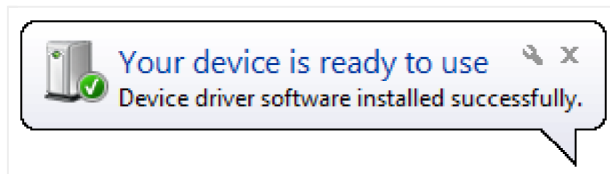
- Enter the pairing code for the device

Pressing next, and device drivers will be installed:



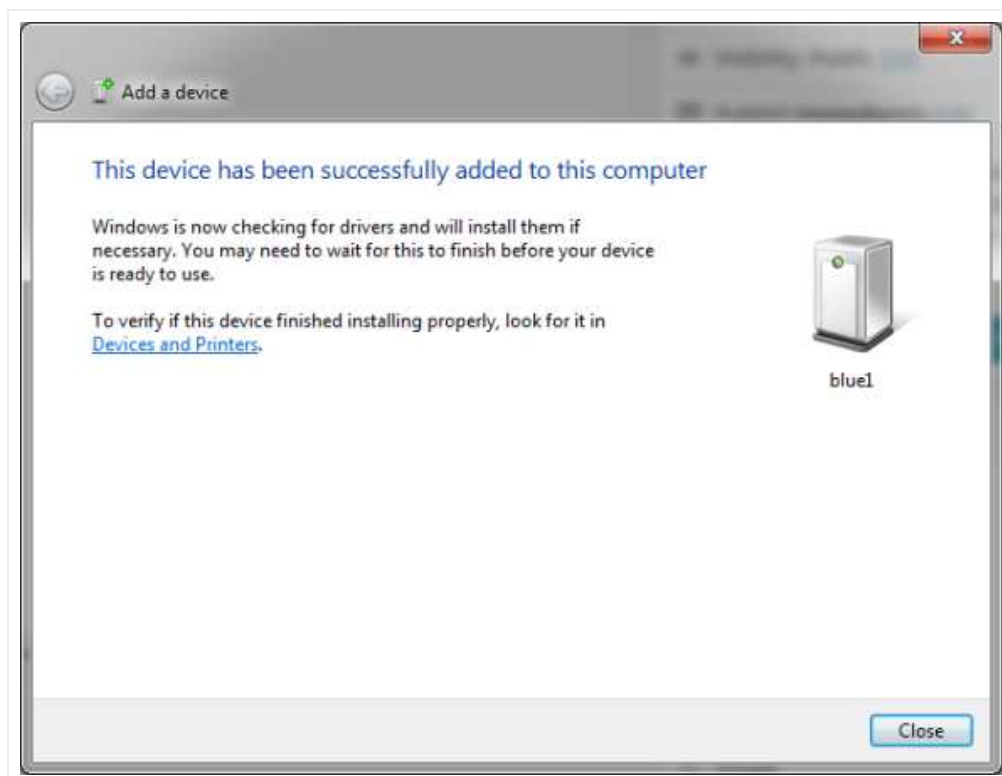
- Installing device drivers

Then the device is ready to use:



- Your Device is ready to use

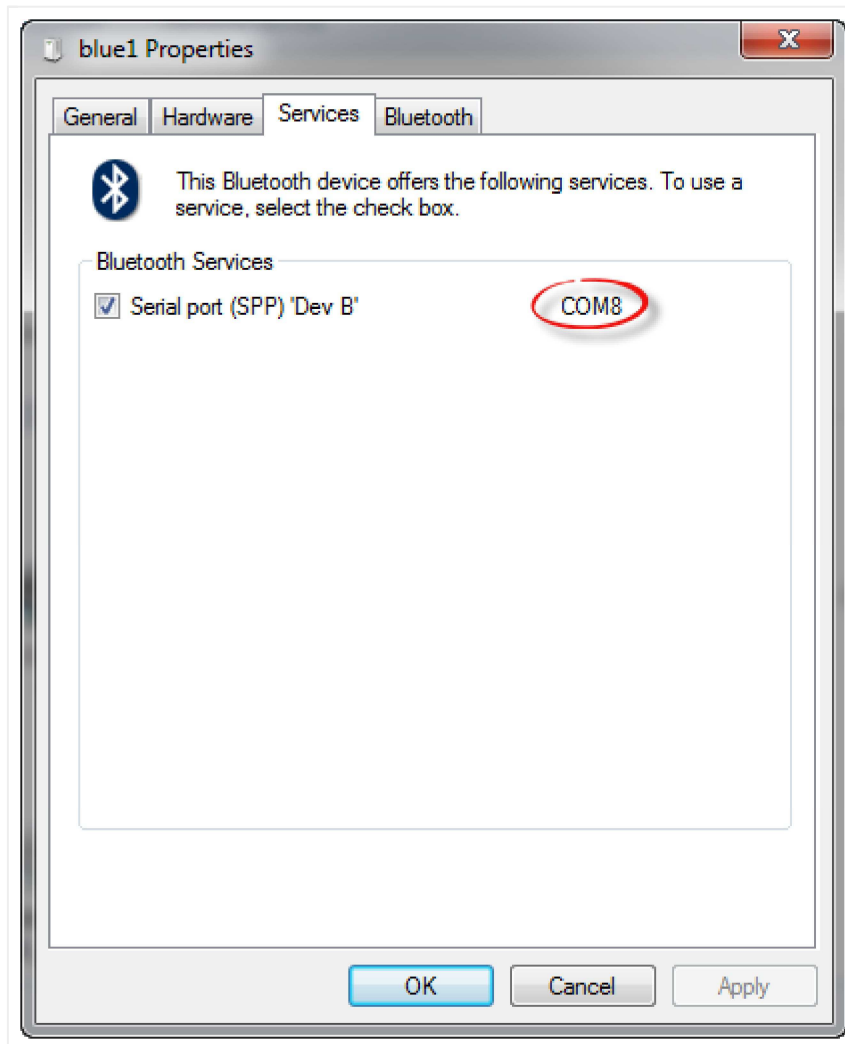
And the confirmation dialog shows up:



- This device has been successfully added to this computer

### COM Port used by Device

Checking the properties on the newly added device shows that it supports SPP. And it shows the virtual COM port used:

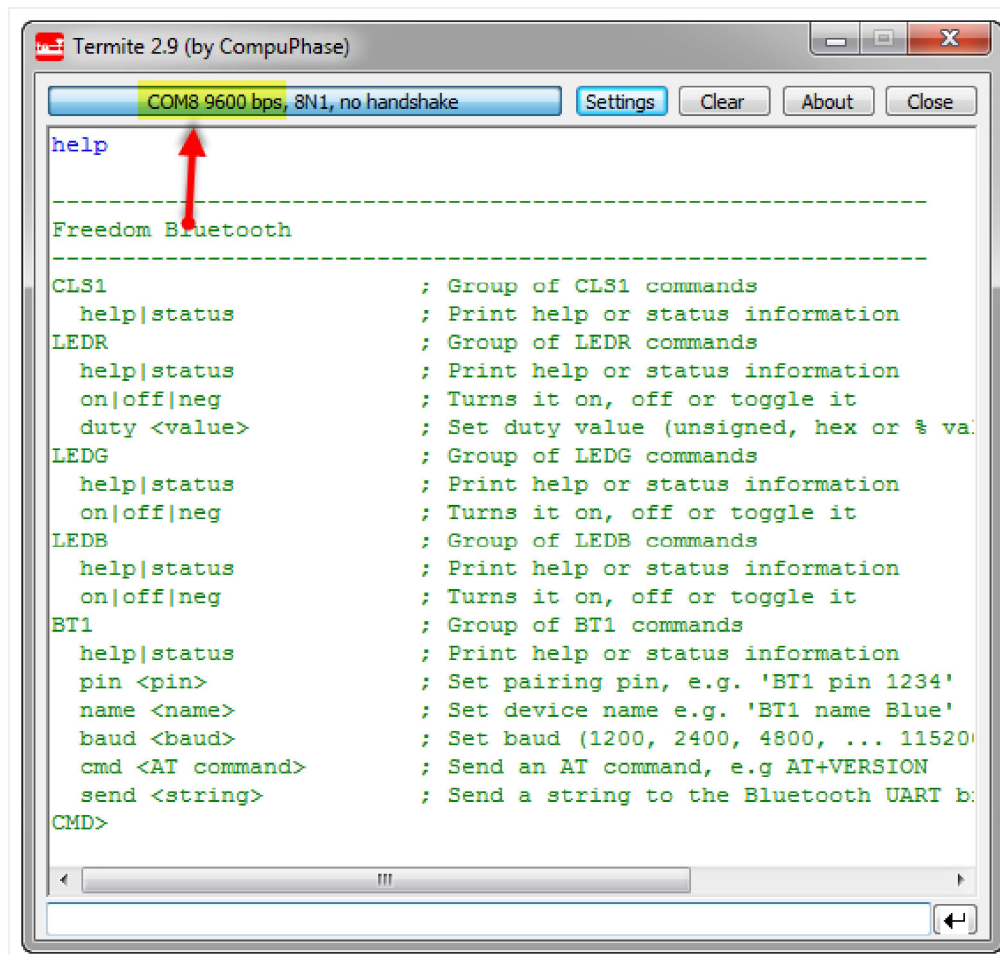


- Device Services

*Note that if I check the COM ports in the device manager, then I see that actually two COM ports have been added. Only the one shown above with the SPP protocol will work. It is unclear to me why there is a second port?*

### Connecting to the Wireless Bluetooth Bridge

Using that COM port shown for the SPP service, I can connect with a terminal program on the host PC to my board. Basically this gives me a wireless bridge over Bluetooth to my board. So from my PC I can open a terminal window and type in some commands, which are parsed by the Shell on the FRDM board, and it responds back to the terminal on the PC:

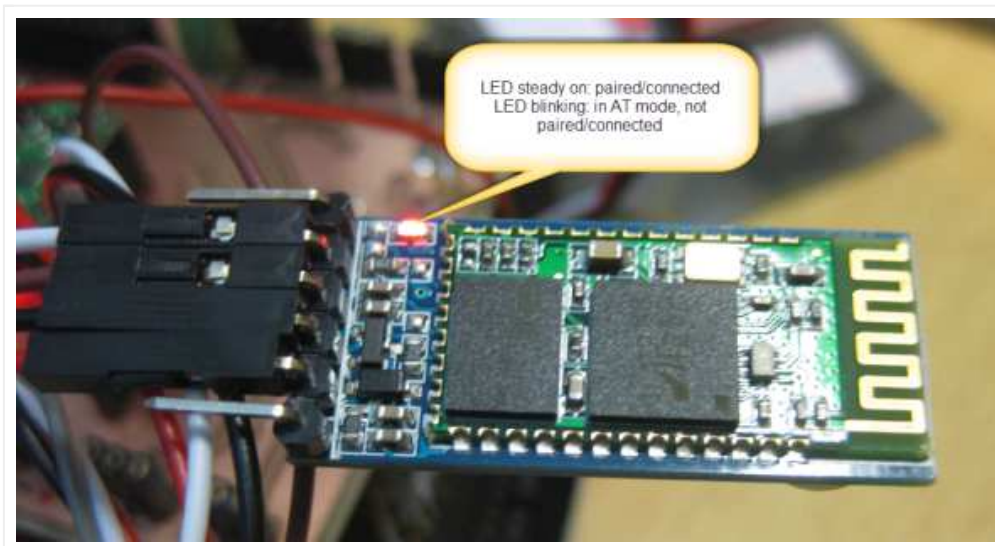


— Wireless Bluetooth Bridge Connection

*Make sure you use the COM port used for the SPP service, and that it matches the baud settings of the communication between the microcontroller and the Bluetooth module. I'm using above the default of 9600 baud. It is possible to change/increase the baud as explained above, as 9600 is not very fast. Only be sure that you not exceed the baud to a value which cannot be handled by your PC. It should work ok up to a baud of 115200.*

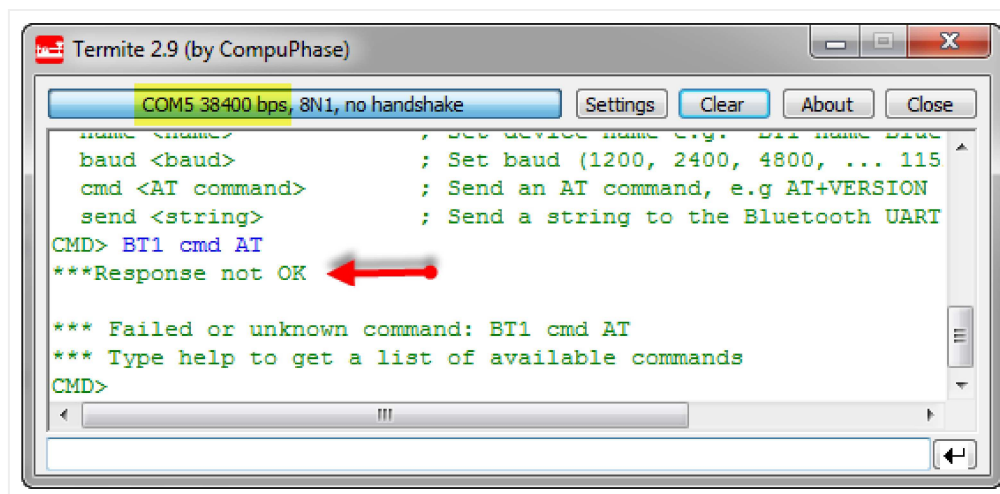
Once connected, the red LED on the Bluetooth module is always on.





— Pairing LED

While connected, the module is in 'transparent' mode, and does not accept AT commands. Below is an example where I try to send an AT command from the microcontroller while the Bluetooth module is connected to the host PC:



— Trying to send AT commands from the microcontroller while connected to PC

Instead, what I send to the UART ends up transparently on the host PC:





— Bluetooth Module in Transparent Mode

## Wireless Bridge

Everything I send to the virtual COM port ends up on the Bluetooth module, which then sends the commands to the microcontroller using the RX and TX connection between the microcontroller and the module. With this, it is very easy to send/receive commands using the Processor Expert Shell component, and the implementation are just a few lines:

```

1  /**
2   * \file
3   * \brief This is the implementation module for the shell
4   * \author Erich Styger
5   *
6   * This interface file is used for a console and terminal.
7   * That way we can interact with the target and change settings u
8   */
9
10 #include "Shell.h"
11 #include "CLS1.h"
12 #include "LEDR.h"
13 #include "LEDG.h"
14 #include "LEDB.h"
15 #include "BT1.h"
16
17 static const CLS1_ParseCommandCallback CmdParserTable[] =
18 {
19     CLS1_ParseCommand,
20 #if LEDR_PARSE_COMMAND_ENABLED
21     LEDR_ParseCommand,
22 #endif
23 #if LEDG_PARSE_COMMAND_ENABLED
24     LEDG_ParseCommand,
25 #endif
26 #if LEDB_PARSE_COMMAND_ENABLED
27     LEDB_ParseCommand,
28 #endif
29 #if BT1_PARSE_COMMAND_ENABLED
30     BT1_ParseCommand,
31 #endif
32     NULL /* sentinel */
33 };
34
35 /* Bluetooth stdio */
36 static CLS1_ConstStdIOType BT_stdio = {
37     (CLS1_StdIO_In_FctType)BT1_StdIOReadChar, /* stdin */
38     (CLS1_StdIO_OutErr_FctType)BT1_StdIOSendChar, /* stdout */
39     (CLS1_StdIO_OutErr_FctType)BT1_StdIOSendChar, /* stderr */
40     BT1_StdIOKeyPressed /* if input is not empty */
41 };

```

```

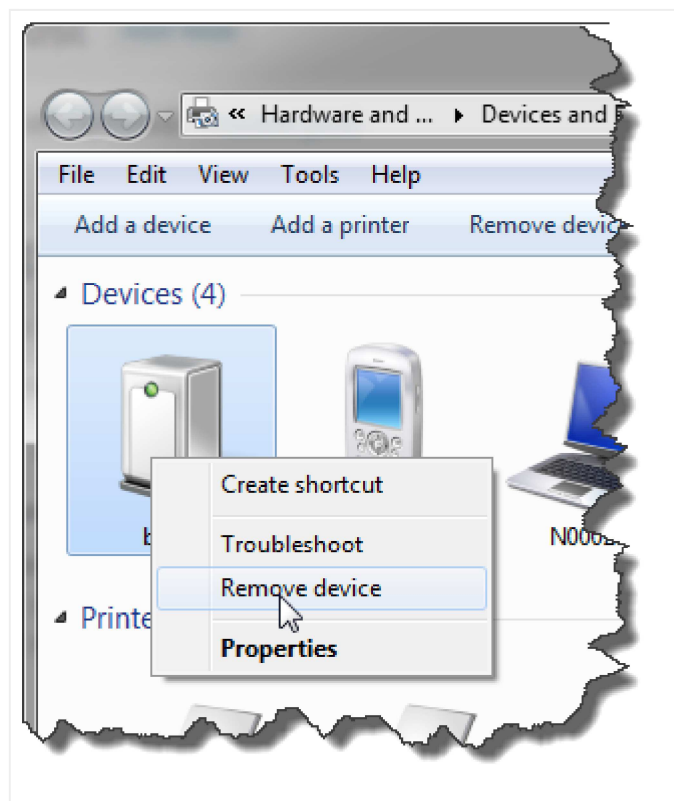
42
43 void SHELL_Run(void) {
44     unsigned char buf[32];
45     unsigned char bTbuf[32];
46
47     buf[0]='\0';
48     bTbuf[0]='\0';
49     CLS1_ParseWithCommandTable((unsigned char*)CLS1_CMD_HELP, CLS1_
50     for(;;) {
51         (void)CLS1_ReadAndParseWithCommandTable(buf, sizeof(buf), CLS
52         (void)CLS1_ReadAndParseWithCommandTable(bTbuf, sizeof(bTbuf),
53     }
54 }

```

## Unbinding and Trouble Shooting

In case there are issues with connecting to the module, it is necessary to unbind and re-bind (connect) to the module. It happened to me sometimes I'm able to connect once, but then not any more. In that case the following steps help:

1. Close any terminal program potentially connected to the Bluetooth virtual COM port.
2. Unpower the Bluetooth module so it is not visible any more to the PC.
3. Right click on the device in the Windows Device manager (or Devices and Printer group) and select 'Remove Device':



— Unbinding Bluetooth Device

4. Re-power the module: the red LED shall be blinking as not connected.
5. Search for the device in the device manager (as above), and connect again to the device with a pairing pin.
6. Connect to the module using the COM port specified for the SPP service.

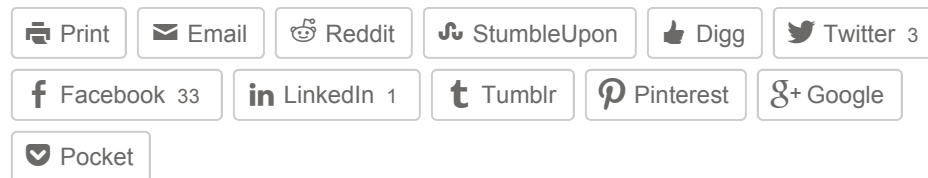
That way I was always able to recover connection to my module. See as well [this post](#) which helped me to solve my problem.

## Sources

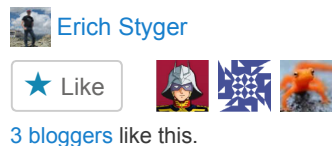
All the component sources discussed are available on [GitHub](#). Additionally, the [FRDM-KL25Z Bluetooth example project](#) has been updated to support both the HC-05 and HC-06 modules.

Happy Bluetoothing

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## RELATED

[Getting Bluetooth Working with JY-MCU BT\\_BOARD V1.06](#)  
In "Embedded"

[Bluetooth with the Freedom Board](#)  
In "Boards"

[Yet another Bluetooth Firmware: BC04](#)  
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This entry was posted in [Boards](#), [Debugging](#), [Eclipse](#), [Embedded](#), [Embedded Components](#), [KL25Z Freedom Board](#), [Processor Expert](#), [Tips & Tricks](#) and tagged [CodeWarrior](#), [codewarrior project](#), [Eclipse](#), [Embedded Component](#), [freedom board](#), [KL25Z Freedom Board](#), [open source projects](#), [Processor Expert](#), [software](#),

[software project](#), [Tips&Tricks](#) by [Erich Styger](#). Bookmark the [permalink](#) [<http://mcuoneclipse.com/2013/06/19/using-the-hc-06-bluetooth-module/>] .

80 THOUGHTS ON "USING THE HC-06 BLUETOOTH MODULE"



Alex Vecchio

on [June 19, 2013 at 21:39](#) said:

Hi Erich,

Maybe you can talk about 24L01+ and Ethernet communications? Do you have this Beans?

Thanks,  
Alex Vecchio  
Brasil



Erich Styger

on [June 19, 2013 at 21:48](#) said:

Hi Alex,  
do you mean the 24L01 from Nordic Semiconductor?  
No, I do not have beans for this one. I do have an Ethernet Shield, but had not much time to work on it. It will be one of the next things for sure.



Alex Vecchio

on [June 19, 2013 at 21:58](#) said:

Ouch... Fastest answer i've ever seen!

Yes. I am talking about the Nordic Semiconductor 24L01. Maybe this can be a really cheap solution to control a freedom board from another freedom board wirelessly.

Other thing is to control a freedom board through the intranet.

I am waiting for your new posts. Thanks for this excellent job you are doing.



**Erich Styger**

on **June 19, 2013 at 22:38** said:

Sometimes I never sleep  
yes, that Nordic module is really interesting,  
although I do not have one (yet). The HC-06  
Bluetooth one (or the HC05) are really cheap:  
less then \$10, and at least the HC-05 one can be  
used to control another FRDM board.



Alex Vecchio

on **June 20, 2013 at 06:32** said:

Hi Erich,  
I think we can control a lot of Freedom boards  
simultaneously with the 24L01+ but we cannot  
do this with bluetooth devices. Right?



**Erich Styger**

on **June 20, 2013 at 08:03** said:

Yes, doing this with the HC-05 probably is not  
easily possible. For the use case you describe  
I'm using an IEEE802.15.4 module which can  
build up star or mesh networks.



Tom





on **June 20, 2013 at 22:57** said:

Hi Erich,

These modules are really cheap at  
([http://yourduino.com/sunshop2/index.php?l=product\\_detail&p=188](http://yourduino.com/sunshop2/index.php?l=product_detail&p=188)).

I have bought from them and the parts were very reasonable and shipping was good too!

Cheers,

Tom



**Erich Styger**

on **June 21, 2013 at 07:37** said:

Hi Tom,

they are \*incredibly\* cheap, thanks for the link. I guess will order a few to try it out. Once concern I have: the drivers I have seen are all GPL2 which is a concern. Have you seen (or using) LGPL or BSD style drivers or stacks? Otherwise it looks I need to develop everything from ground up which is not ideal.



Tom

on **June 21, 2013 at 14:37** said:

Erich,

Erich,

No I haven't seen LGPL or BSD stacks but I haven't been looking that hard. There is a library at (<http://arduino-info.wikispaces.com/nRF24L01->

[RF24-Examples](#)) which may be something you can leverage.



**Erich Styger**

on **June 21, 2013 at 14:42** said:

Hi Tom,  
yes, I already found that library, but it is GPL2 as well, so not very usable for anything than true hobby projects.

Anyway, I have ordered a handful of modules, and whenever I find time, I'll start writing a BSD style driver. Contributions are always welcome

Erich



Alex Vecchio

on **June 22, 2013 at 04:23** said:

Maybe you can use this for anything.

<https://code.google.com/p/nrf24l01/>

I start to dig any reference for 24L01 and BSD.



**Erich Styger**

on **June 22, 2013 at 08:51** said:

Hi Alex,  
thanks for the link. Good information.





Alex Vecchio

on **June 23, 2013 at 02:51** said:

I think this can be useful too.

<http://nrqm.ca/nrf24l01/>



Erich Styger

on **June 23, 2013 at 06:10** said:

Hi Alex,

yes, this one is about what I was looking for,  
thanks!



Dusty

on **June 20, 2013 at 01:53** said:

Hi Erich

I got some experience with one of these modules on a project. I think they are all more or less the same, but for the firmware (as you point out). The circuit is a CSR reference design. The CSR chip is based around a core architecture developed at Cambridge university. You can get the development tools from their web site (easy to find), and develop your own firmware for the module. I never got so far as to download all that, not sure about what the cost is etc. I would guess there is a reference design for the firmware as well, which is what all of these different firmware versions would be based upon.



Erich Styger

on **June 20, 2013 at 05:52** said:

Hi Dusty,

yes, I have found the article from Byron

(<http://byron76.blogspot.ch/2011/09/hc05-firmware.html>)

which points to the CSR site. I have registered and downloaded the tools, but not done much with it. I did not know that this has been developed at Cambridge, which is interesting.



**Surdeanu Mihai**

on **July 3, 2013 at 10:26** said:

Hi, Erich!

You have done a very good job by creating a component like this.

Two weeks ago, I have bought a BC04 bluetooth module from ElectroDragon (which is a little bit different from HC05 or HC06 as firmware) and this thing involved, for me, some changes into your component source code.

After implementing all changes, I would like to add a new BC04 firmware to

“Bluetooth\_EBGT” component project. The problem with that is caused by the fact that I cannot import very well your project, because when I try to edit the source code of a method I get the following error : “Source Code missing in default driver. It could be present in a prg.”.

Any help would be greatly appreciated.

Thank you.



**Erich Styger**

on **July 3, 2013 at 10:40** said:

Hi Surdeanu,

I don't think I have seen that error myself, so not sure what is causing this? Maybe you could email me your changes/source code and I'm happy to have it incorporated into the Processor Expert component.

Send it to the email I have listed at the end of the 'About' page of this blog.

Thanks for contributing to that project!

**Surdeanu Mihai**on **July 3, 2013 at 10:49** said:

Ok. Then, I think that I will send it tomorrow,  
because today I want to do some other tests.  
Have a nice day.

Pingback: [Yet another Bluetooth Firmware: BC04 | MCU on Eclipse](#)

Pingback: [Tutorial: Ultra Low Cost 2.4 GHz Wireless Transceiver with the FRDM Board | MCU on Eclipse](#)

Pingback: [Mini Sumo Robot Competition running with FRDM-KL25Z | MCU on Eclipse](#)

**jame jon**on **September 9, 2013 at 00:12** said:

hi can u please give me a help on a Eclipse code to control  
Bluetooth module

**Erich Styger**on **September 9, 2013 at 06:07** said:

have a look at the example here:

[https://github.com/ErichStyger/mcuoneclipse/tree/master/Examples/FRDM-KL25Z/Freedom\\_Blue](https://github.com/ErichStyger/mcuoneclipse/tree/master/Examples/FRDM-KL25Z/Freedom_Blue)

Pingback: [Zumo Robot Chassis PCB arrived! | MCU on Eclipse](#)





tom

on **October 2, 2013 at 10:32** said:

Hi Erich,

thx a lot for showing the differences between HC-05 and HC-06 module !

I happened to get my HC-06 work with a Trust USB-BT dongle and WinXP32.

Just shortcut the Tx/Rx on the module and used Comport Toolkit as a terminal to see the looped back chars.

If longer blocks of data are sent the delay decreases to somewhat 90msecs. But that's all for the good news.

The HC-06 does not establish working mode (steady LED) when I use my lenovo T500 with win7-64. I can connect the device, send pairing pin and two successive COMxy ports are shown in device manager. But the first where the SPP is assigned to can not be accessed by my terminal programs and the LED on the HC-06 keeps flashing indicating AT mode . Same situation with my Galaxy-S2 GT-i9100, it finds it, pairing pin input but HC-06 stays in AT mode.

Has anyone an idea or solution about that ???

All the best, Tom.

**Erich Styger**on **October 2, 2013 at 10:36** said:

Hi Tom,

I had some problems with another notebook, where I was not able to establish connection: here it helped to re-install the drivers on the notebook as explained in the article.

On another notebook I used a cheap bluetooth dongle (under Windows7 64bit). I never got it working to connect to the bluetooth module, while it worked on another machine with XP.

So I just make the guess that there might be a similar problem in your case, but with the internal bluetooth



module? It might be worthwhile to try an external bluetooth module?



Tom

on **October 7, 2013 at 10:31** said:

Hi Erich,

Thanks for your comments.

With Android I've got it work. After inputting the pairing sequence on the phone the HC06 stays in AT mode but if my app runs it connects and switches to SPP mode .

I'll try to reinstall the win7 BT drivers and see what will happen...

Good luck, Tom.



**Erich Styger**

on **October 7, 2013 at 20:17** said:

Hmm, yes, this is true on Windows too: only if I connect to the COM port with my terminal, it changes from AT to transparent mode. I thought I had mentioned this, but probably not bold enough.....

So here again: the connection only happens if actually connected on the host to the virtual COM Port



tom

on **October 8, 2013 at 12:42** said:

yepp,

But with my win7-64 I see both virtual COM ports created by the BT in the device manager but can

not access the lower numbered one with any terminal program...  
This works with XP-32.



**Erich Styger**

on **October 8, 2013 at 12:51** said:

Yes, I have the same: one of the ports is 'dead', not sure why. But works on the other one.

Pingback: [Zumo Robot assembled | MCU on Eclipse](#)



**tharindu lakshantha**

on **October 31, 2013 at 16:22** said:

hey can you tell me can we pair 2 hc-06 module at the same time .???...



**Erich Styger**

on **October 31, 2013 at 17:01** said:

you mean to have a connection from the host PC to two modules the same time? yes.

To pair two HC-06 modules to each other: no.



**DIEGO EDUARDO LOPEZ RUBIO**

on **December 4, 2013 at 22:58** said:

I have a problem when I compile the file bth1.h gives me an error on line 331: byte BT1\_ParseCommand (const unsigned char \* cmd, bool \* handled, CLS1\_StdIOType const \* io);

**Erich Styger**

on **December 5, 2013 at 18:34** said:

Hi Diego,  
what kind of error message do you get? I tried again my example on GitHub and it works fine for me. Have you loaded the latest Processor Expert components from GitHub too? It looks like it is an issue with the shell, and maybe you are using an older version of the code/components?

Erich

**DIEGO EDUARDO LOPEZ RUBIO**

on **December 8, 2013 at 06:21** said:

fix the error, I wanted to ask you for help with the command line interface, as you do to get the settings? because it recognizes the port but when writing AT commands nothing happens. If you could help me or pass me your mail. Thanks in advance.

**Erich Styger**

on **December 8, 2013 at 16:12** said:

If nothing happens if you write AT commands, this typically means that the Bluetooth module already has been connected to the PC host. If the module is connected, then the LED is on (compared to be in blinking mode if not paired, where it accepts AT commands). Another reason for the AT commands not working is a wrong

UART baud configuration. By default the modules operate with 9600 baud. Please verify with a logic analyzer if that baud is used. I hope this helps?



nikhil gupta

on **December 12, 2013 at 09:21** said:

Hi

i am presently working on a project that requires microcontroller to microcontroller wireless communication. i was wondering if we could do this using 2 BLUETOOTH hc06 or hc05, by simply interfacing 1 of the modules with the transmitting microcontroller and interfacing the second with the receiving microcontroller. i have been able to pair my HC06 module with laptop and mobile. when i use a laptop on 1 end i simply have an option to enter the pairing code into my laptop but while working with 2 bluetooth modules the problem i am facing is how do i enter the pairing code.



Erich Styger

on **December 12, 2013 at 18:13** said:

Hi,

the HC-06 only can be slave, so you cannot connect two HC-06 with each other. It should be possible to connect a HC-06 with a HC-05 in master mode, but I have not tried this yet.



Paulius

on **December 12, 2013 at 11:11** said:

Hello,

I have HC-06, and I need to change data bits 8 to 7 (required for my application). I cant find any info about setting data bits. Maybe you know something about that.. is it possible?



**Erich Styger**

on **December 12, 2013 at 18:15** said:

Yes, some microcontrollers can configure the UART to different than 8bits (e.g. to 7 bits).

To my knowledge this is not possible with Kinetis. But I have not checked deeply on this.



**DIEGO EDUARDO LOPEZ RUBIO**

on **December 15, 2013 at 03:16** said:

hello, hey when I run the program the terminal gives me this

---

My Project Name

---

CLS1; Group of CLS1 commands

help | status; Print status information or help

CMD>

AT write the codes and nothing happens



**Erich Styger**

on **December 15, 2013 at 09:54** said:

Hi Diego,

are you using my example from GitHub? From the shell output it looks like you have not added the command line interface to the Bluetooth module, as it does not show up with help. Be aware that if the HC-06 LED is

not blinking, the module already connected to a host, and it does not accept any AT commands (the AT commands are sent to the host).



logicchild

on **January 13, 2014 at 11:16** said:

Hi,

That was great, but I have a question, Can my PC connect to more than one module.

I want to create an app in the PC that monitor many bluetooth modules at the same time.

Is that possible?

Thanks



Erich Styger

on **January 13, 2014 at 11:22** said:

Hi,

yes, you can connect to many modules with your PC. They will show up with different COM ports.



Waste king garbage disposal warranty

on **January 18, 2014 at 04:03** said:

I'll immediately snatch your rss feed as I can not to find your e-mail

subscription hyperlink or e-newsletter service. Do you've any? Kindly let me recognize in order that I could subscribe.

Thanks.





**Erich Styger**

on **January 18, 2014 at 07:54** said:

It is the 'Follow' button below the RSS feed link on the right side of the page.



Jami

on **February 2, 2014 at 16:14** said:

Hi Erich,

Thanks for sharing the result with such great detail.

I'm planning to use this bluetooth module with Arduino Pro Mini 3.3V model – in this case, the logic level would be needless, right?

Best reagards,  
Jami



**Erich Styger**

on **February 2, 2014 at 18:46** said:

Hi Jami,

yes, the module operates with 3.3V logic levels. You just need to be careful about the supply voltage. My modules say 3.6V-6V, but I was able to use them with 3.3V without problems. That might depend on the module.

Erich



Jami

on **February 3, 2014 at 00:20** said:

Hi Erich,

Thanks for the reply.

I still haven't got HC-06 but quickly tested an HC-05 (also marked with 3.6V-6V) with the Arduino. They both are well integrated.

Jami



**Alan**

on **February 7, 2014 at 23:05** said:

Excellent site, thanks, lots of good info,

I wonder if you can assist with my little challenge?

My project is to provide a wireless connection between a racing yacht's Nav computer (a B&G Hercules Performance Unit) and my Android phone using my HT-06 (Ver 1.06).

To build up some expertise, I'm practicing at home by trying to get the connection going by connecting the HT-06 to my Garmin GPS72 handheld GPS receiver. I'm bluetoothing to the HT-06 with my laptop and a cheap USB dongle using a good terminal emulator (Reflection).

When connecting the GPS72 to the laptop with a cable, it comes in on USB at COM04 and my terminal emulator happily talks to it at 4800 8/None.

However, when trying to get the laptop to talk to the GPS72 with the HT-05, I get the connection up and running (solid led) and I'm receiving data from the GPS72, but on the terminal see the pulses of data, but instead of getting interpretable data, there are strings of, like "~f~~"

I know it's because I have an incompatibility in comms protocols and have tweaked the terminal through speeds and parity with no joy.

I suspect I have to configure the HT-06 to use 4800 8/N, but not having the connectors to connect the laptop to the HT-05 I'm not able to tweak the coms speeds from the laptop, so I'm

wondering if it is at all possible to send AT commands from the laptop to the HT-06 over BT?



**Erich Styger**

on **February 8, 2014 at 10:12** said:

Hi Alan,

thanks for your kind words .

As for your question: you cannot send AT commands over the air to the Bluetooth module: if it is connected, it is in transparent mode and will send the incoming data to the other side (so you cannot reach the Bluetooth controller with AT commands).

As for the protocol errors: can you hook up a logic analyzer on the serial signals to see what is going on? That would give a clue if the baud is somewhat wrong or outside the spec, if parity/etc is used.



**Alan**

on **February 9, 2014 at 01:33** said:

And thanks for your prompt reply. It's as I feared. Odd, eh, that they design a slave module – presumably to connect to a dumb device, that can't be configured by the master.

One more question, if I may. When I do get to set the comms protocol with an AT command, say AT+BAUD3, does that setting persist over a power reset? i.e. can I set it in the lab, and then rely on it in the field?



**Erich Styger**

on **February 9, 2014 at 07:42** said:

Yes, the settings persist in the device.

**Alan**on **February 14, 2014 at 04:30** said:

Hi Erich,

Back again, sorry.

I suspect I have a faulty device (HC-06 Ver 1.06), and being a software guy, a class world-renowned for unfairly blaming the hardware, I have tried to be thorough in my testing.

The final clincher for me is that when I send AT commands over the serial port I get no response at all.

I have a breakout board on the serial line and can see the RX line flash its led.

The HC-06 is flashing.

I am using 232Analyzer to send data 9600 8 N 1 and am sending AT.

I have read the HC Serial Bluetooth Products User Instructional Manual, <http://www.exp-tech.de/service/datasheet/HC-Serial-Bluetooth-Products.pdf> which seems quite straightforward if a little confusing.

And I'm still receiving corrupt data over the bluetooth connection when sending ASCII at 9600 8 N 1.

Before I send off for a replacement, is there anything else that you know that I can try to talk to my baby?

Cheers, and thanks for your patience.

**Erich Styger**on **February 14, 2014 at 05:46** said:

If the HC06 is flashing, then it is not connected to the PC. You really would need a logic analyzer like the Salae one so you can inspect the bits and bytes on the line. Maybe something is wrongly configured on your side (baud?), and only with flashing LEDs you will not see it. I'm a software guy too, but developing software for hardware means a scope and a logic analyzer is key. Without it, it is like programming without a PC monitor



**Lyman Alan Connor**

on **February 19, 2014 at 00:38** said:

I'm a novice with these boards as well but it appears that you're trying to send AT commands and the chip is not in that mode. My board had a pin labeled "KEY". Tie that pin to the VCC source, Now disrupt and re-establish the power to the HC-06 leaving the "Key" tied to power. The unit will reboot in AT mode. To reset to Normal mode remove KEY from Vcc and disrupt and re-establish power. I was also able to easily pair with this device using "1234" as the code. Once that was done I opened up TeraTerm Pro and selected the comm port configured for my BT. I was talking to a Mini Pro quite quickly...Hope this helps...



**Remi Wielandts**

on **March 12, 2014 at 08:32** said:

Hello Erich,

I am using an HC-05 board (found on eBay

[http://www.ebay.com/itm/150843209961?ssPageName=STRK:MEWNX:IT&\\_trksid=p3984.m1497.l2649](http://www.ebay.com/itm/150843209961?ssPageName=STRK:MEWNX:IT&_trksid=p3984.m1497.l2649)).

I am trying to configure it using the AT commands. This can only be done using the physical serial connection to the PC, is that correct? I believe I managed to get the board into configuration mode using the KEY pin, since the LED now blinks differently. However, when I use TeraTerm to send AT commands (simply with AT\r\n), the board responses with things such as: x, then xÅ\r\n, then Ap\ûpÿ, etc every time I resend the AT command. I guess it could be some problem with the coding of the

commands such as wrong font... But still I don't understand why it responds differently to a unique command.

Can you help? Thank you in advance!

Remi



**Erich Styger**

on **March 12, 2014 at 10:50** said:

Hi Remi,  
this does not sound like a font problem. Can you hook up a logic analyzer to see what the module really responds? It very well could be that this module is not a HC-05 one, but a different one with different firmware?

Erich



**Alan**

on **March 12, 2014 at 11:34** said:

I have concluded that the HC-06 device does not conform to RS232 standards.

I have spent 6 weeks messing with it ( well, 2 separately purchased boards) connected to my PC (XP and W7) using some pretty clever terminal emulators (realTerm, Commfront 232Analyser, Reflection ) and I have concluded that it doesn't generate the 10 bit per character (start, 8 bit data, stop) syntax defined by RS232. I was unable to get it to respond to an AT command, nor could I get it to transmit text at its default speed of 9600, N 8,1 or any other combination.

All the folks successfully using it are using Arduino. I haven't found anyone using it successfully in conventional RS232 PC mode. I have thrown them away and spent \$125 on an older but functional RS232 to Bluetooth adapter.

It's pretty clunky, requiring a PC Utility to configure it, but it works!



Remi Wielandts  
on **March 17, 2014 at 15:48** said:

Hi Erich,

Thanks for the reply. I don't have a logic analyzer. I have tested somewhat further and I have noticed that using Termite, when I change the baud rate to a lower value, I get a response identical to what I send to the device. If I put a higher baud rate, I start getting all this nonsense... Also, I should mention that I don't have a serial connection on my computer, so I make use of a RS232 to USB converter from Logilink. So the baud rate which I change is probably the baud between the PC and the converter.



**Erich Styger**  
on **March 18, 2014 at 14:51** said:

Hi Remi,  
yes, the baud is only applied to the physical serial line, not for the USB communication. for a USB-CDC connection the baud is pretty much useless.



Remi Wielandts  
on **March 17, 2014 at 16:16** said:

Just read Allan and Tom's comments. If I understand it, I should have a RS232 to TTL converter between my USB to RS232 converter and the HC-05 module because the HC-05 "talks" in TTL and not RS232?



**Erich Styger**

on **March 18, 2014 at 14:54** said:

Hi Remi,  
The HC-05 module does not use TTL (0-5V) levels, but 0-3.3V. RS-232 uses completely different voltage levels (3 to 15V and -3 to -15V, see <http://en.wikipedia.org/wiki/RS-232>), so they are not compatible. Your PC or RS-232-USB converter expects that different voltage, so if you want to connect the bluetooth module to your PC, then you need to use a level shifter like a Maxim 3232 or similar. The logic levels of 0-3.3V of the module are only to be used with something which has the same voltage levels, e.g. a microcontroller.



**Remi Wielandts**

on **March 18, 2014 at 15:18** said:

Hi Erich, thanks for the answers. The daughter board which I bought with the HC-05 module mounted on it has such a MAX3232 level shifter (see ebay link above).

I know that I was able to switch the board into AT mode, at least from the different blinking of the LED. I tried using different baud rates for the serial communication to the bluetooth module, no success. I made sure the TX and RX are correct,



used different voltage levels (5.0 and 3.3 volts) for both the Vcc and the Key. I tried to reset the device using AT+RESET in case the transmission to the device was functioning correctly but not the reception from it. I have bought 3 of these devices and tested all, they give the same results.

I am running out of ideas...

Btw, what is the tiny push button on the daughter boards for?



**Erich Styger**

on **March 18, 2014 at 18:10** said:

I have not used these modules. But it sounds you have nothing than the modules? No user manual, schematics or something you absolutely need to understand this module. I checked that ebay page, but there was no more information than the pictures. You even cannot be sure what kind of firmware is on the module without this information. And without the right tools (aka logic analyzer) it is like fishing in the dark



**Erich Styger**

on **March 18, 2014 at 18:14** said:

Oh, I see, there *\*is\** indeed a data sheet .  
What the 'Key' does depends on the firmware on the module. Many firmware are using it to get back into the 'command' mode. But not clear to me which firmware really is on this module.

**Erich Styger**on **March 18, 2014 at 18:15** said:

And I have found in the description what 'key' is supposed to do. Key connects 3.3.V to PIO11:  
3. PIO11, control the module working mode,  
High=AT commands receiving mode(Commands response mode), Low  
or NC= Bluetooth module normally working.

**Alan**on **March 27, 2014 at 00:48** said:

Hi Remi,

I can confirm that a Maxim 3232 works like a charm with the HC-06 to provide an interface between a PC serial COM port and the HC-06, notwithstanding the discrepancy between the TTL and MCU voltages, as it handles the voltage range of 3.3 to 5V.

I have just taken delivery of my Maxim board and am happily bluetoothing between my PC and my Android phone.

I have also connected my Garmin GPS72, configured to report using NMEA at 4800 to my Android phone with this configuration.

You don't need a logic analyser.

You do have to cross the TXD and RXD lines between the HC-06 and the Maxim.

It's taken me almost eight weeks to work this out, but success comes to the diligent!

**tom**



on **March 12, 2014 at 14:46** said:

Alan,

Sorry, but you are missing basic electrical skills and you did not rtfm.

The HC-05/6 as well as all the other BT-modules from other suppliers provide a 3,3V digital logic interface. The guys using an arduino wire the 3,3V TxD/RxD signals of the arduino UART to the corresponding pins on the HC-05 module, the arduino provides a virtual COMport via USB to the connected PC/Laptop so there is no RS232 within that signal way to be used.

Your PC (COM1:) has a standard RS232 interface what is electrically on a total different planet (use wikipedia and READ please) as the 3,3V or 5V digital logic interface. Or you use an USB->RS232 converter cable but that's the same... That's why you could not make a working connection... It is an electrical problem !

[http://www.ebay.de/itm/RS232-Serial-Port-to-TTL-Digital-Converter-Module-SP3232EEN-5V-3-3V-Jump-Kables-/400676853830?pt=Wissenschaftliche\\_Ger%C3%A4te&hash=item5d4a339846](http://www.ebay.de/itm/RS232-Serial-Port-to-TTL-Digital-Converter-Module-SP3232EEN-5V-3-3V-Jump-Kables-/400676853830?pt=Wissenschaftliche_Ger%C3%A4te&hash=item5d4a339846)

Use something like that and everything should be fine ;o).

Good luck, tom.



**Alan**

on **March 12, 2014 at 23:14** said:

AHA!, at last some light in the wilderness.

Silly me...When I did R TFM (extensively), the doco consistently (if slightly incoherently) referred to the HC-05 as a serial BT adapter, and from my software background, serial MEANS RS232!

Nowhere did they say that the headers on the card talk TTL not RS232. I have discusses my problem extensively on forums and emails, I knew I was making

a simple mistake, but no-one was smart enough to spot my confusion.

The traps for young players trying to reach across technologies! Thanks Tom, so much for your clarification.



dida

on **March 29, 2014 at 13:30** said:

hi..my project is to send the data using bluetooth module.is that possible if i want to connect hc-05 from PIC1 as a transmitter and hc-06 as a receiver at PIC2 ?



**Erich Styger**

on **March 29, 2014 at 21:00** said:

The HC-06 Bluetooth module only can be a slave, but the HC-05 is able to be a master too. So with the HC-05 as master, you should be able to connect from teh HC-06 module. What microcontroller (PIC, TI, Freescale, STM) does not matter



Harvey Hutama

on **March 30, 2014 at 16:20** said:

Hi erich

I have a module (DAQ Module) to get data from strain gage in rotating sensor. The module use USB cable communication to my computer (It has Ft232 serial to Usb IC in its daughterboard).

Now, I want to get the data via Bluetooth, and I already bought HC 05. Unfortunately, Because of the module architecture, I can't get its rx tx to my HC 05.

In the HC 05 datasheet, I see the USB Dp and Dm port, and they said it can transfer data via usb protocol (v 1.1). After that, I connect my module's USB port (USB type B) to the Dp and the Dm port, and I connect the Vcc and Gnd to my power bank. The HC 05 is connected to my comp, but it is connected to my Serial Com over the Bluetooth, not as the module it self. And i cant connect the module to my Labview (because the module is used to connect via USB cable)

I want to ask several questions:

- Can I connect HC 05 via USB Protocol, instead of UART Serial Communication?
- What should I do if I want to connect via USB protocol? Install another driver (in windows device manager)for my HC 05, or else?

I'm sorry for my long post and my english. Hope to get your response soon

Thank you



**Erich Styger**

on **March 30, 2014 at 17:21** said:

Hi Harvey,

To my knowledge, only the SPI port

(<http://byron76.blogspot.ch/2011/09/upgrade-your-bluetooth-module.html>) is active for the HC-05 module. I don't think it is able to talk the USB protocol unless you have a different firmware on it. And if your module would indeed have the firmware for USB on it: which device class would it implement? Moreover, to connect it to USB, it would need the proper protection/etc which I do not see implemented on the module? So my thinking is that you cannot connect the module directly to USB: to connect it to USB you need to have a SCI-to-USB converter. Like that FT232 or simply use the FRDM-KL25Z board with an USB firmware to implement a USB-CDC bridge (<http://mcuoneclipse.com/2012/10/07/tutorial-usb-cdc-with-the-kl25z-freedom-board/>).

I hope this helps?

Pingback: [Getting Bluetooth Working with JY-MCU BT\\_BOARD V1.06 | MCU on Eclipse](#)



akselsmandel

on **March 30, 2014 at 18:22** said:

Hi Erich

Thank you for your kindness to answer me.

I'm sorry, maybe my explanation about my module is not good enough yet

My module is Emant 300. It is used to be connected to computer physically with usb cable, but actually communicate with the computer using UART. So that's why there is converter of USB-TTL (FT232) in my module.

You can see it in this link <http://www.emant.com/251004.page>

I have tried to connect my module via usb cable, and it was detected (until now, it is, as long as i connect it via usb cable). In Windows Device Manager, its name is USB serial port (to proof it physically connect via usb cable, but talking with serial communication). It connected to my Labview, detected as emant 300 DAQ module.

But now, I want to change usb cable with bluetooth HC 05. So i cut the usb cable, pin Dp and Dm to HC 05, and power it with power bank. But why the bluetooth can't connect as USB Protocol?

About SCI to USB converter, I will try to learn that. Maybe it will provide me another alternatives. Thank you, Erich



**Erich Styger**

on **March 30, 2014 at 19:03** said:

Are you saying that you connected Dp and Dm to the HC05 Rx/Tx pins? This for sure does not work: USB is

using a completely different protocol than RS-232/SCI.  
Not only this, it is using different voltage levels too.



akselsmandel

on **March 30, 2014 at 19:31** said:

No, I am not. I connected Dp and dm to the HC 05 Dp and Dm pins, since it have those pins. I want to communicate usb protocol via bluetooth but it doesn't work

Maybe the manufacturer must delete its spec about 'can use usb protocol v. 1,1' . They does not have the explanation about that (and make me confused). HC 05 Users in internet don't talk about this too, so it's hard to find any clue about usb protocol over bluetooth on it.

Maybe i'll try to convert the usb protocol to serial protocol, as you say, and after that connect that serial to the Rx/Tx pin at HC 05

Thank you very much, Erich