QuickBlue™

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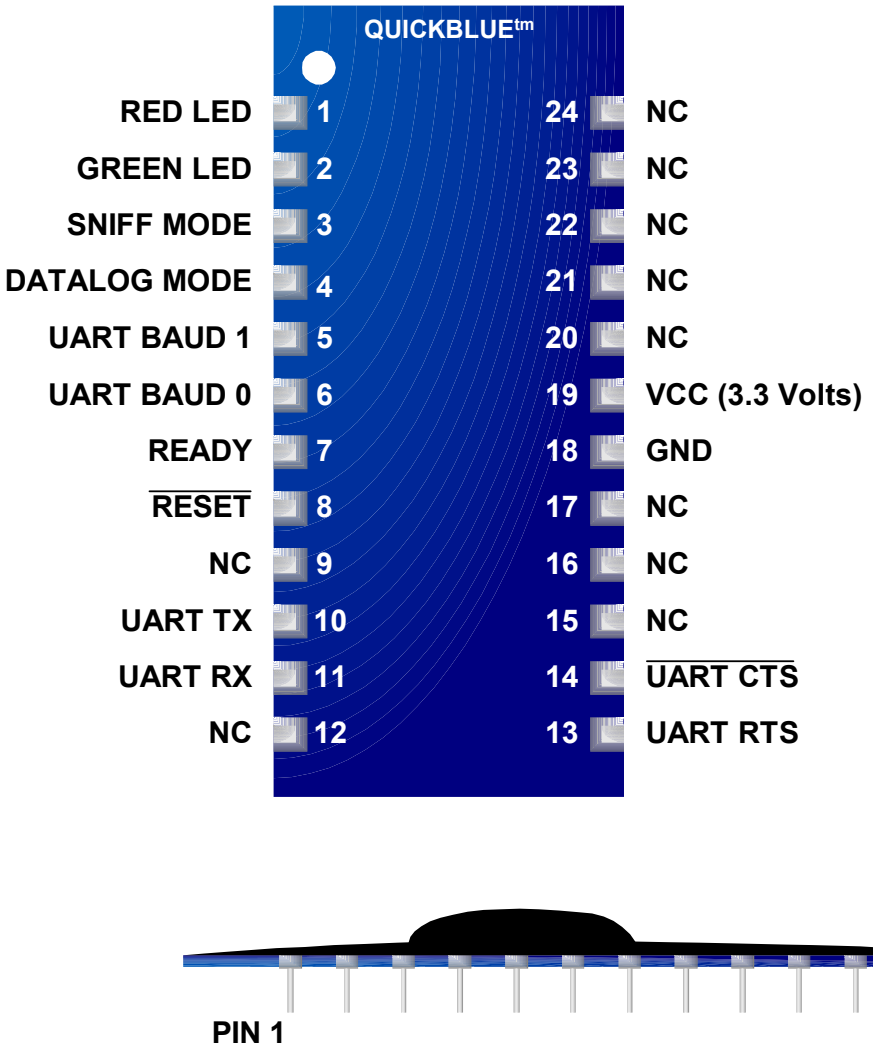
QuickBluetm Link

QuickBlue Link operates as a Bluetoothtm Slave and offers a “no hassle” wireless serial interface. QuickBluetm Link is intended for speedy development of Bluetoothtm applications without the need to be familiar with the, sometimes tricky, Bluetoothtm protocol.

The layout of the QuickBluetm Link module is shown below: -



Pins 1 and **2** are for connecting 2 optional LEDs, one **Red** and one **Green**. When the QuickBluetm Link is in discovery mode, both LEDs will blink alternatively, once a connection has been established, the **Green** LED will remain illuminated, while the **Red** LED blinks. Both pins have internal current limiting resistors, allowing direct connection of the LEDs.

Pin 3 Enables or Disables SNIFF mode, see Host Controller Interface Document Part E of the Bluetoothtm Specifications Ver 1.2 [Vol 2], section 7.2.2, for details of Sniff mode.

Unconnected, or Low disables Sniff mode, High Enables Sniff mode.

The Sniff Enable or Disable will only be operated upon by either a reset or a power cycle of the module.

The parameter for Sniff mode are preset to: -

Sniff_Max_Interval = 0x0100
Sniff_Min_Interval = 0x0010
Sniff_Attempts = 0x000A
Sniff_Timeout = 0x0005

Pin 4 Enables or Disables a small application running within the QuickBlue™ Link, that scans the I/O of the module and transmit them as a comma delimited text string to the host.

Unconnected, or Low disables Datalog mode, High Enables Datalog mode.

The Datalog Enable or Disable will only be operated upon by either a reset or a power cycle of the module.

Pins 5 and **6** choose the baud rate for the user interface. The table below shows there pattern and the corresponding baud rate chosen: -

UART BAUD 0	UART BAUD 0	BAUDRATE
Low (unconnected)	Low (unconnected)	115200
High	Low (unconnected)	57600
Low (unconnected)	High	19200
High	High	9600

The baud rate will only be operated upon by either a reset or a power cycle of the module.

Pin 7 will be set high when the module has completed its start-up sequence and the module is in slave discovery mode.

Pin 8 will reset the module when brought to ground for a period of a few 10s of milliseconds then released. This pin has an internal 5KΩ pull-up resistor.

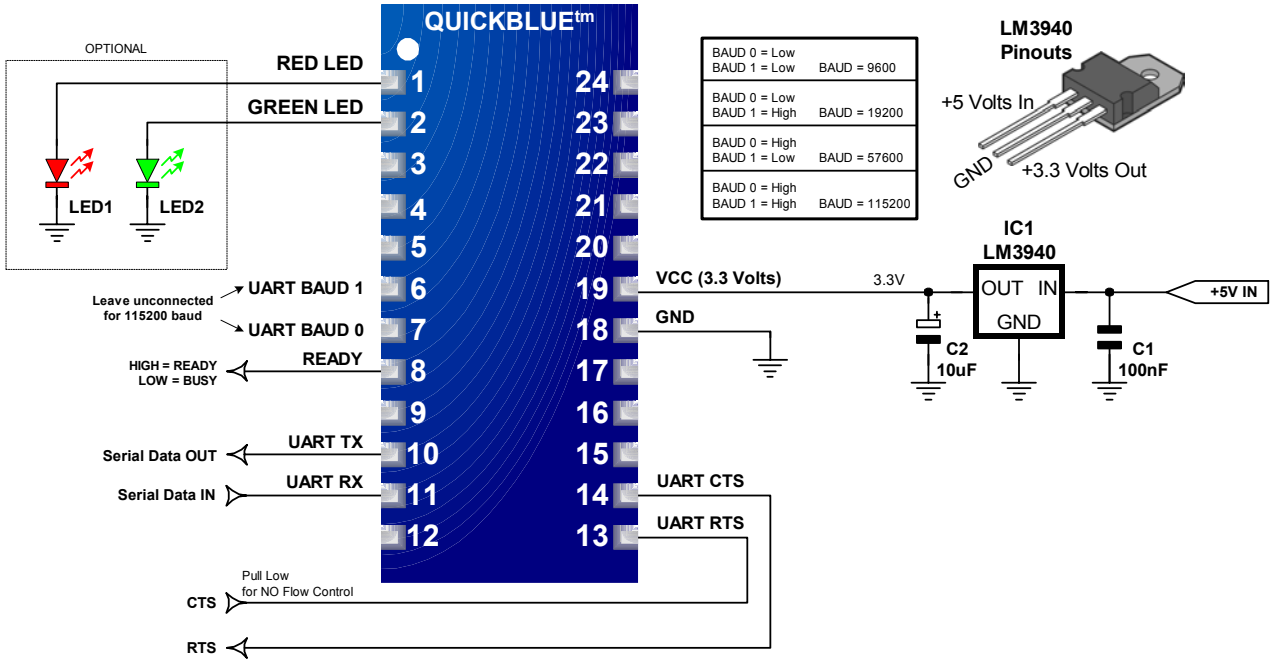
Pins 10 and **11**, together with pins **13** and **14** form the serial interface to and from the module. This is in the form of standard RS232 1 start bit, 8 data bits, and 1 stop bit, No parity (8N1).

TX is serial output from the module.
RX is serial in to the module.
CTS is the Clear To Send pin to the module. (If not required, connect to Ground)
RTS is the Ready To Send pin from the module.

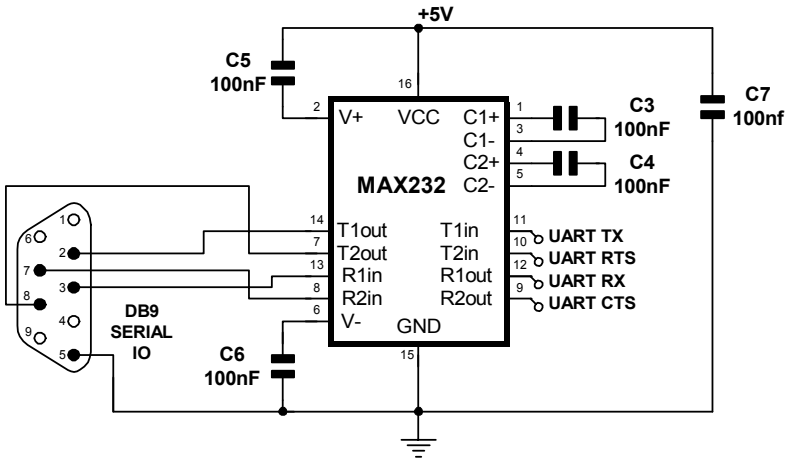
Pins 18 and **19** are the Voltage supply to the module. This may be from 3.0 Volts to 3.6 Volts. With the optimum voltage being 3.3 Volts. See below: -

Parameter	Condition	Min	Typ	Max	Unit	Remark
Operating Voltage	Vcc	3.0	3.3	3.6	V	-
Peak Current	Discovery Mode	75	80	85	mA	-
Peak Current	Connected (Sniff Off)	35	40	50	mA	-
Peak Current	Connected (Sniff On)	10	20	25	mA	-
Input High Voltage	UART-CTS, UART-RX, UART-BAUD0, UART-BAUD1, RESET, SNIFF	-	Vcc	Vcc + 0.3	V	-
Output High Voltage	UART-RTS, UART-TX, READY	-	Vcc	-	V	Io = 25mA
Output High Voltage	Red LED, Green LED	-	Vcc	-	V	Io = 4mA

The connections to the QuickBlue™ Link couldn't be simpler, especially if being interfaced to a microcontroller. The circuit below shows the connections required: -



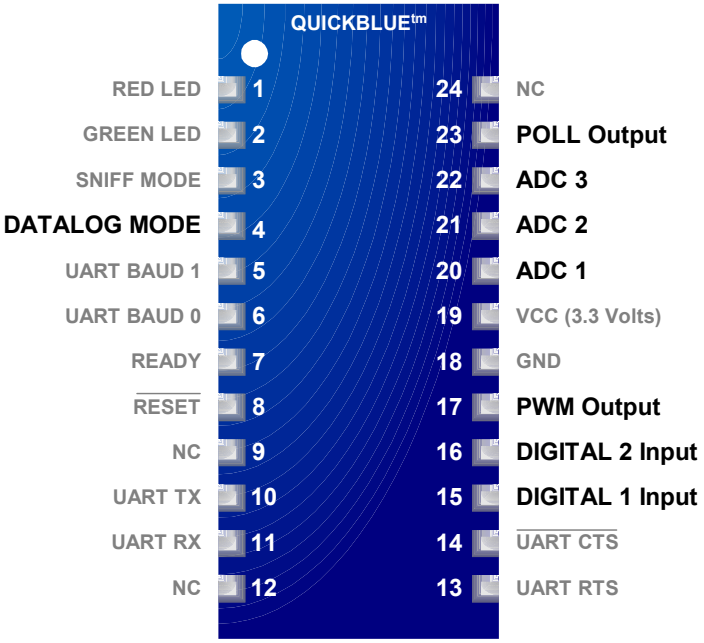
If interfacing to a PC, then a level converter is required that also inverts the mark and space. For this, our old friend the MAX232 can be used, as shown below: -



DataLog Mode

Connecting **Pin 4** (DATALOG MODE) of QuickBlue™ to Vcc Enables a small application running within the QuickBlue™ Link, that scans the I/O of the module and transmits the values to the host as a comma delimited text string, whenever it receives a byte serially from the host.

The I/Os when in DataLog mode are shown below: -



POLL is an output that strobes Low-High-Low for 1ms before scanning the ports and outputting the comma delimited string.

ADC 1, **ADC 2**, and **ADC 3** are separate 10-bit Analogue to Digital Converter inputs referenced to Vcc.

PWM is an Output for a PWM (Pulse Width Modulated) signal with an 8-bit resolution, operating at 84KHz. The byte sent to trigger the datalog comma de-limited string is the duty cycle of the PWM signal, and a value from 0 to 255 is valid, with 0 being the lowest duty cycle and 255 being the highest.

DIGITAL 1 and **DIGITAL 2** are Digital Inputs.

The comma delimited string is wrapped in square braces and has a format of: -

```
[ADC1,ADC2,ADC3,DIGITAL 1,DIGITAL 2]
```

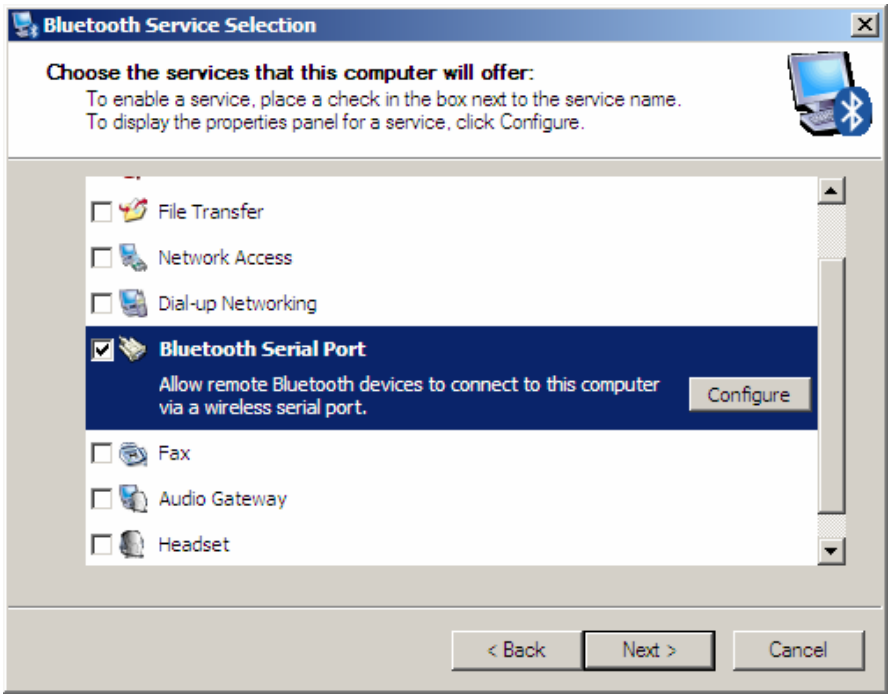
Values ADC1,2,3 are padded to 4 characters, so 25 will be 0025.

Getting Started

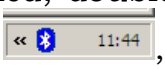
In order to test the QuickBlue™ Link module, we'll use the PC to talk to it via HyperTerminal ™.

First you will need a Bluetooth™ dongle of some description plugged into the PC and its drivers installed. We'll take a look at that process now using an industry standard Belkin Bluetooth™ USB adapter.

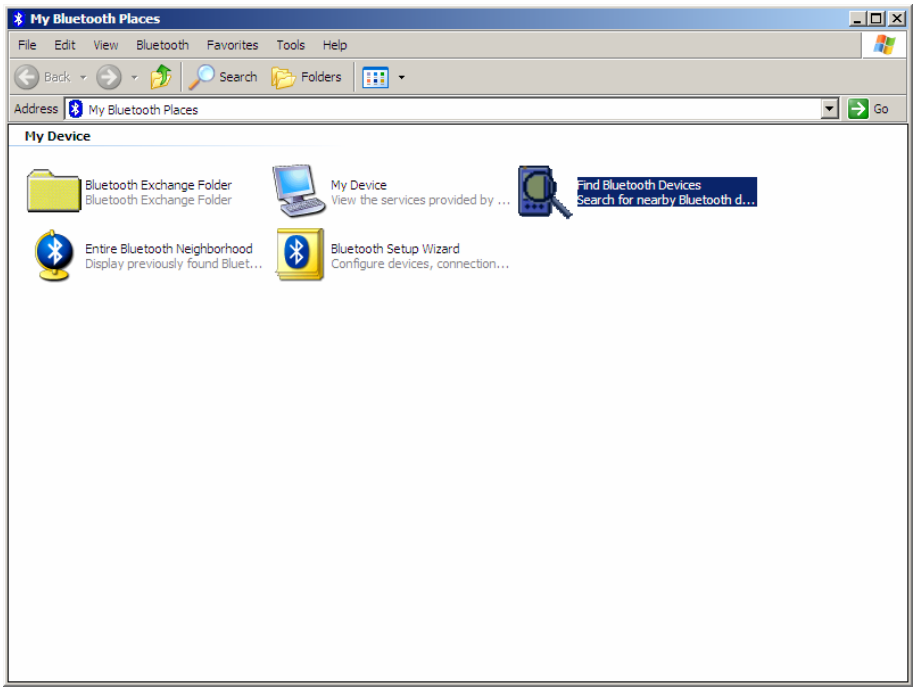
After inserting the CDROM that came with the USB adapter and navigating past the mandatory copyright notices etc, the screen below was displayed.



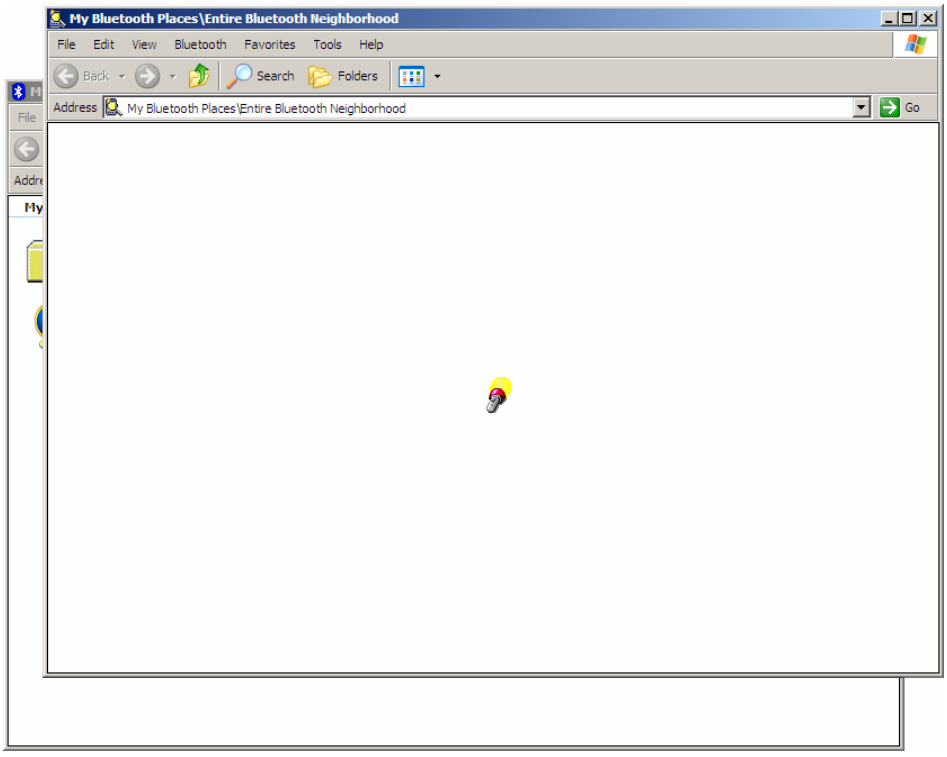
The above screen shot shows that only the Bluetooth™ Serial port driver has been chosen, which is all we need for QuickBlue™ Link.

After the drivers have been installed, double click on the Bluetooth™ icon located to the right of the taskbar 

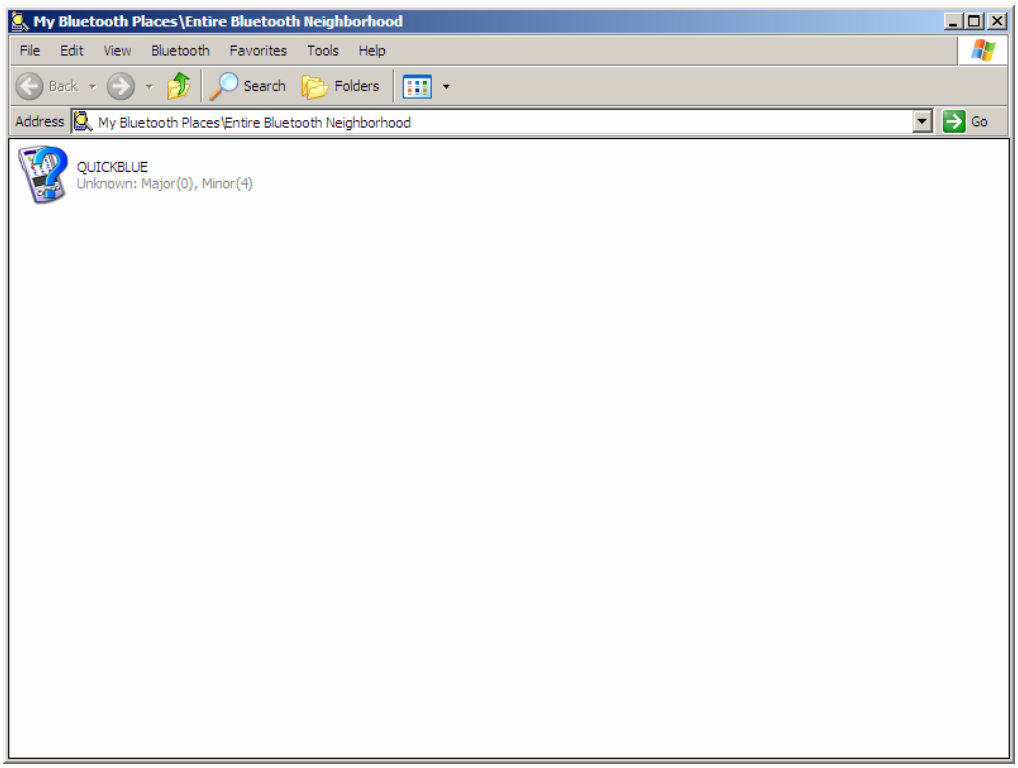
, and open the Bluetooth™ places window.



Click on the “Find Bluetooth Devices” icon, and another window will appear with a search light. The QuickBlue™ Link module is now being located.

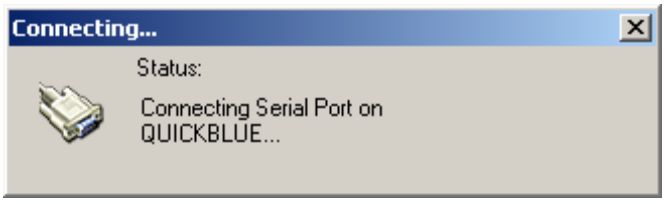


Once the QuickBlue™ Link module has been located, it will show up in the window.

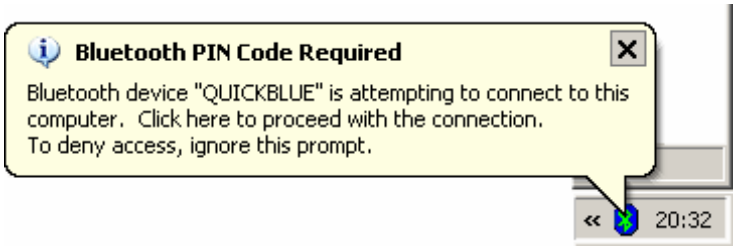


The blue question mark covering the name indicates that it is not yet connected so right click on the QuickBlue™ icon, and a small menu will appear.

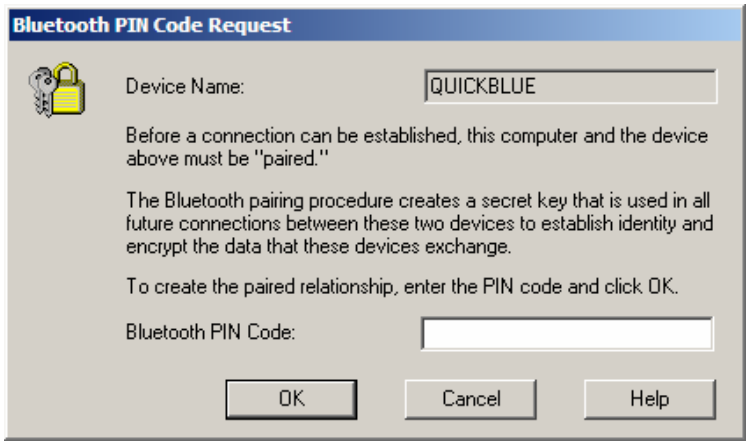
Choose Connect Serial Port and a small window will appear signalling that a connection is being attempted.



A short while into connecting, a balloon will appear from the taskbar Bluetooth icon, indicating that a PIN code (Personal Identification Number) is required.



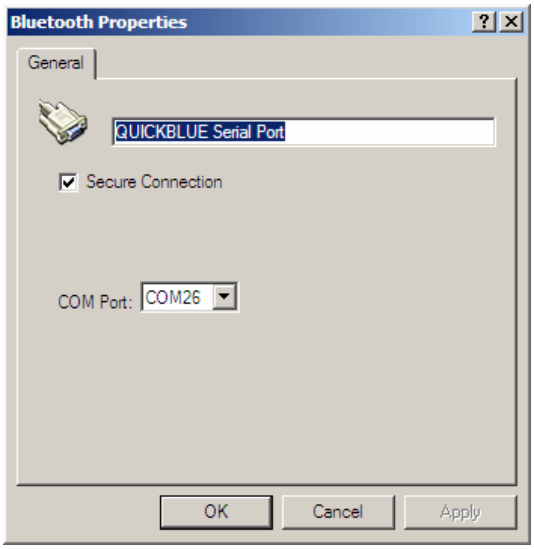
Click on the balloon and a window will open.



Enter the PIN code, which is **1234**, and click OK.

If the PIN was accepted, the QuickBlue™ Link is now paired with the PC, and as long as this PIN is not changed, it should not be required to enter this again.

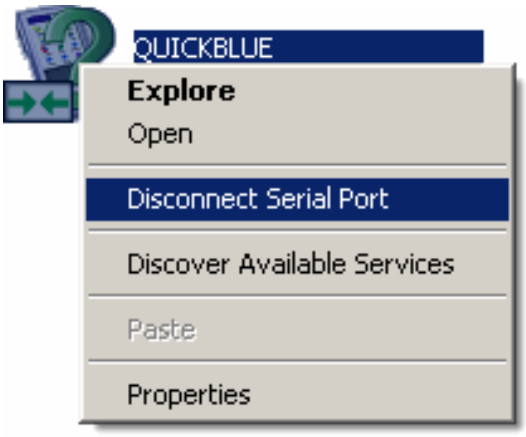
You should now e greeted with a small window informing you as to which COM port the QuickBlue is attached.



Please note that the COM port chosen will differ from PC to PC.

Now that the QuickBlue™ Link module is paired and connected, the icon in the BlueTooth™ Neighbourhood window will become green.

We don't want to be connected right now, so right click on the QUICKBLUE icon and choose Disconnect Serial Port.



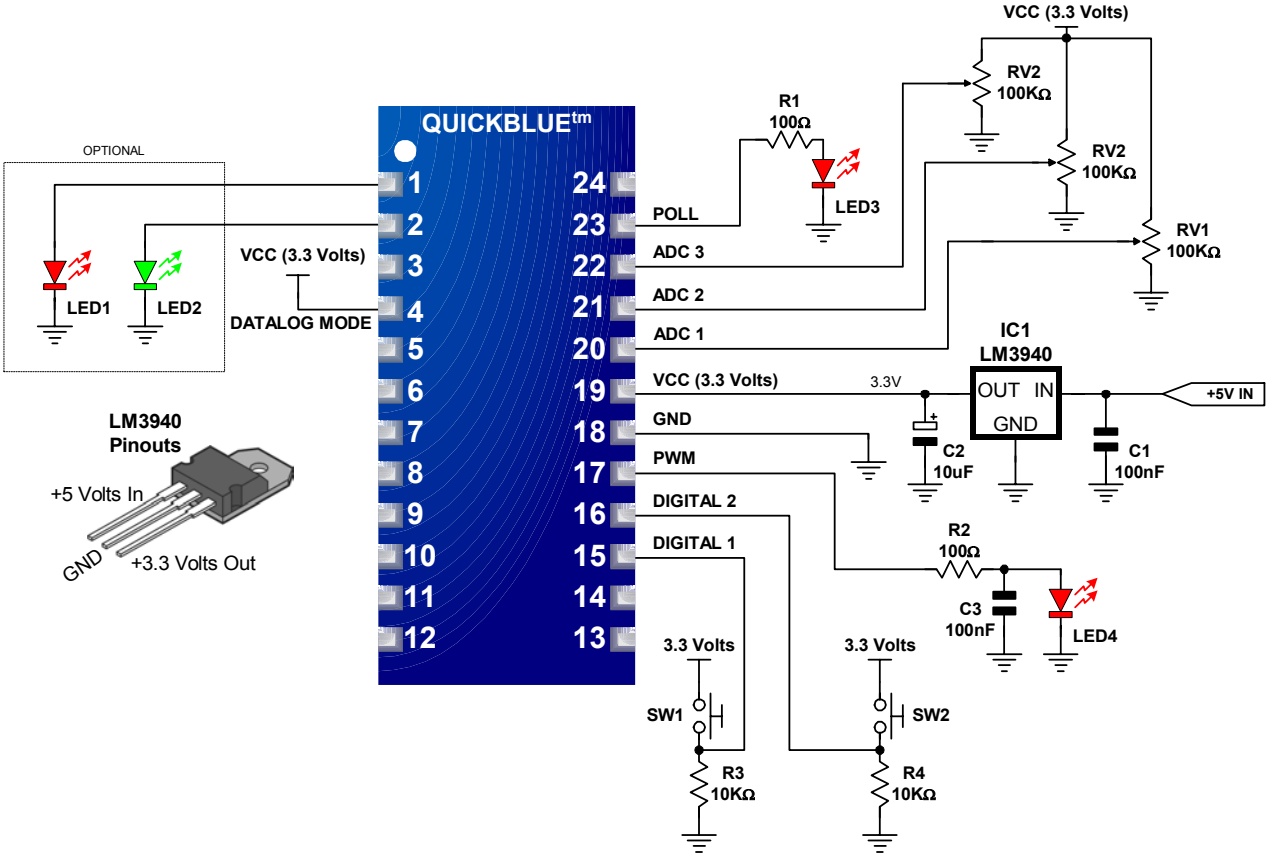
The QUICKBLUE icon will now become blue with a red tick beside it meaning that it is paired but not connected.

The QuickBlue™ Link module is now setup and ready to use.

Please remember that this process will not be exactly the same with a different USB BlueTooth™ dongle, but the principles of pairing and connecting are the same.

Testing QuickBlue[tm] Link.

In order to test the QuickBlue[tm] Link module, it can be placed into datalog mode using the circuit shown below: -



The QuickBlue[tm] Link module is placed into Datalog mode by connecting pin 4 to VCC.

Variable resistors VR1, VR2, and VR3 are connected to all three ADC channels, and will produce a variable voltage from 0 to 3.3 Volts.

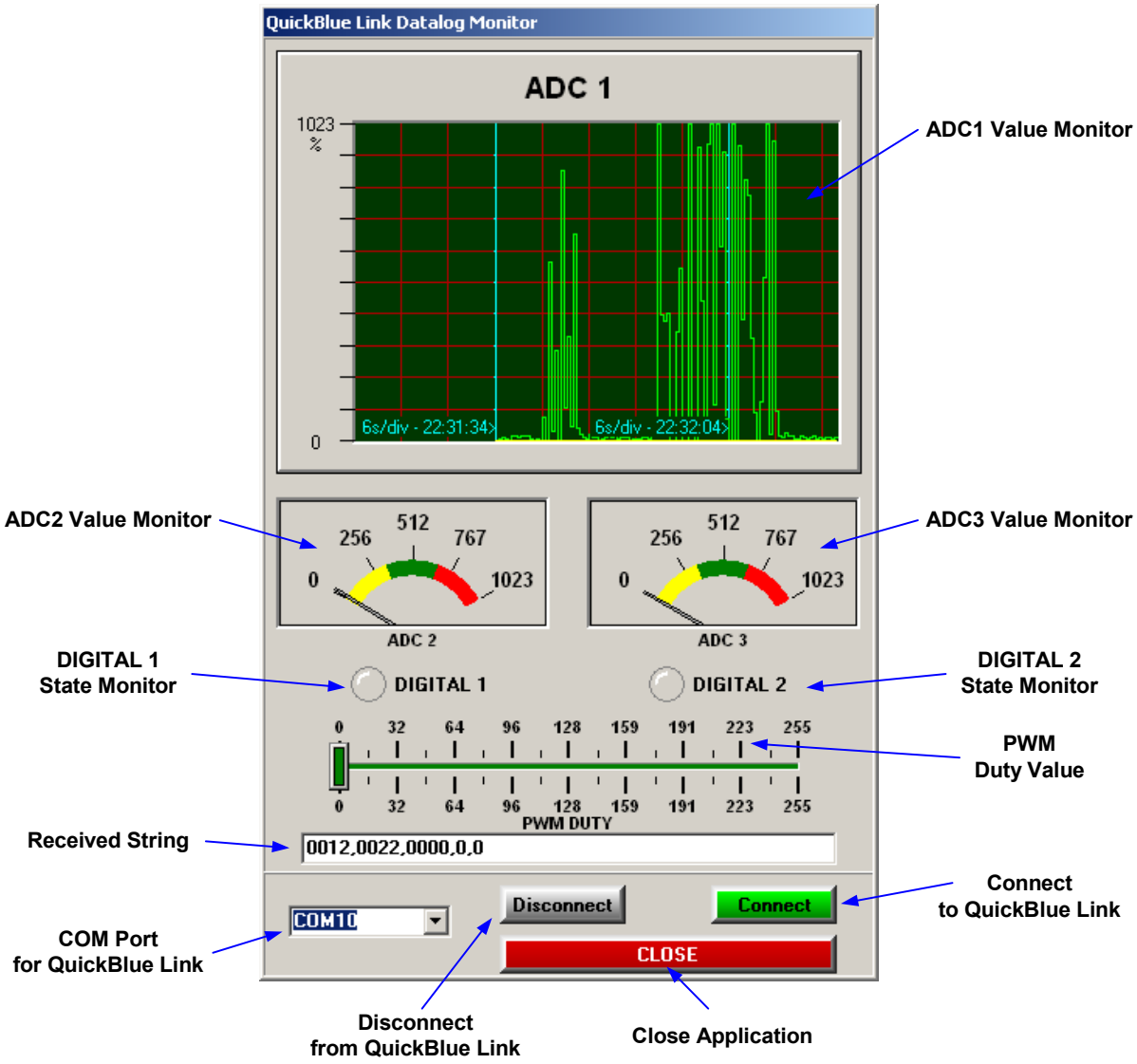
Buttons SW1 and SW2 are connected to both DIGITAL channels and will produce a high when either button is pressed.

LEDs 1 and 2 are optional and indicate which mode the QuickBlue[tm] Link module is currently in. i.e. Connected or not connected.

LED3 will flash whenever the QuickBlue[tm] Link module receives a serial value.

LED4 will increase or decrease in brightness depending on the duty cycle of the PWM signal.

A demo Windows application has been produced in order to interact with the datalog. The program is named **DATALOG_MONITOR.EXE**. Upon running the program, you will be greeted with the window shown below: -



The program displays graphically the status of the ADC and DIGITAL inputs, and outputs the PWM duty on every transmission request.

It's use is very simple, build the circuit shown earlier, power up the Quick-Blue™ Link module, making sure that it has been previously paired, choose the COM port for the QuickBlue™ Link and click the Connect Button.

The trend chart will show the ADC1 channel value, while the two meters will show the ADC2 and ADC3 values. The two LEDs will indicate the condition of the two DIGITAL channels, while moving the slider will alter the PWM duty.

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