

# Infolight manual

Version 1.4



***Informative Visible Feedback***

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### About Factorycode

Factorycode bridges the gap between new software development methods and small embedded systems with innovative products based on our personal interest and research into both fields. Factorycode is located at the Ideon Research Park, in Lund, Sweden, Europe.

## Introduction

The Infolight has three lights, red, yellow and green, that can be controlled over a USB connection from a computer.

*What to show? - Information hidden in a computer!*

It's all up to you - software build results, stock market indicators, weather reports...

## Specification

Light bulbs	3 x 6 Volt 300mA with Ba9s socket
USB	Type B connector. Virtual Serial Port driver. Configurable COM port number, 115200 bps, 8N1.
CPU	Philips LPC2103 ARM7 60 MHz
Size	~54 x 13,5 x 9,5 cm
Power	USB bus powered ~350mA (no external power required)

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## Commands

Commands to the Infolight are one single character. The received character will be echoed back to the sender as an indication that it was received. *Turning on one light will turn off the others to prevent overloading of the USB power source.*

Command character	Description
G	Turn on green light, turn off all other
Y	Turn on yellow light, turn off all other
R	Turn on red light, turn off all other
g	Turn off green light
y	Turn off yellow light
r	Turn of red light
c	Turn off blinking of yellow light
C	Turn on blinking of yellow light, turn off all other
V	Shows software version information
?	<i>Enter software update mode. Remove and reconnect USB cable from device if entered by mistake. Do not use!</i>
<Other character>	Invalid command, will blink yellow light, turn off all other

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# Windows USB setup

## 1 - Downloading the USB virtual com-port driver

The Infolight contains a CP2102 USB to serial circuit from Silabs. Microsoft approved and verified drivers can be download from their website. As of this writing the link to their download page is:

[http://www.silabs.com/tgwWebApp/public/web\\_content/products/Microcontrollers/USB/en/mcu\\_vcp.htm](http://www.silabs.com/tgwWebApp/public/web_content/products/Microcontrollers/USB/en/mcu_vcp.htm)

Download and execute the self extracting executable file. Remember the location of the unpacked files, the default location is "C:\SiLabs\MCU\CP210x\Win2K\_XP".

## 2 - Attach the Infolight to a USB port.

We recommend that you connect it to either an empty port directly on a computer or to a self-powered USB hub since the Infolight draws about 350mA of current from the USB cable.\*

Once attached to the USB bus, the Infolight will start to blink yellow indicating that it is connected to power but has not yet received a valid command character.

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\* Self powered USB hubs - <https://www.microsoft.com/whdc/system/bus/USB/hubs.aspx>

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**Figure 1** USB cable connected to the back of the Infolight

### **3 – Install the driver**

Once Windows recognizes the new USB device, a wizard will ask you to search for the driver. Select the NO-option, and then point the wizard towards the newly downloaded drivers, see step 1.

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## 4 – Finding the new virtual COM-port number

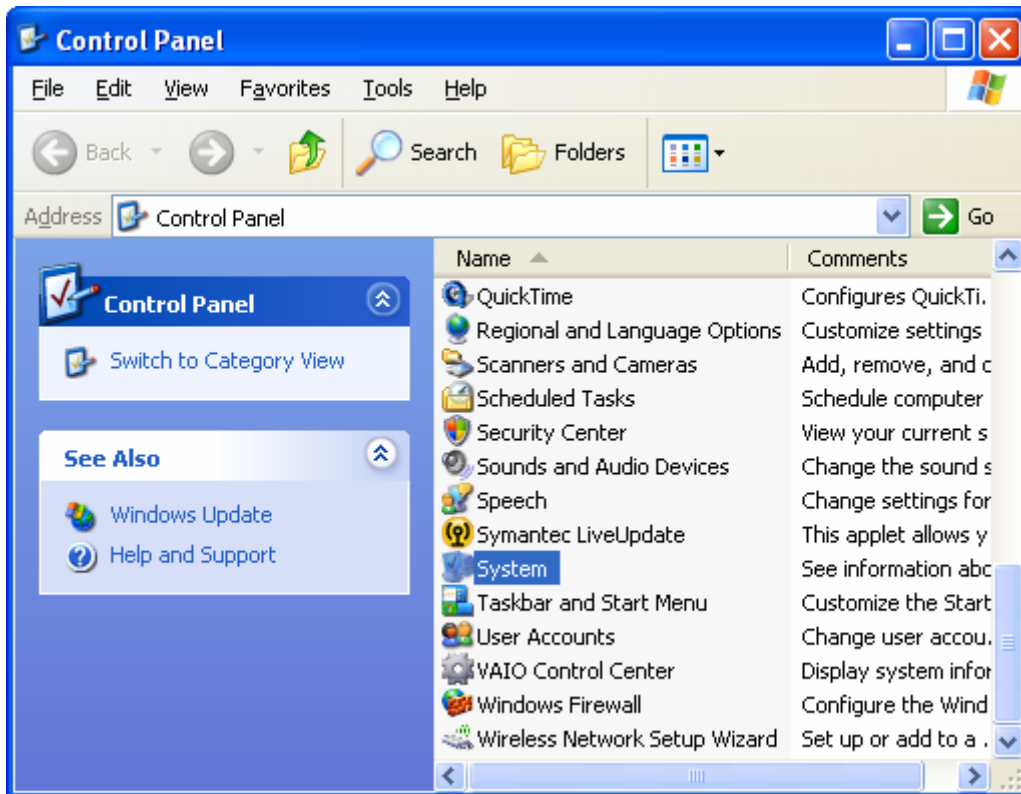


Figure 2 Open the Control Panel and click on System.

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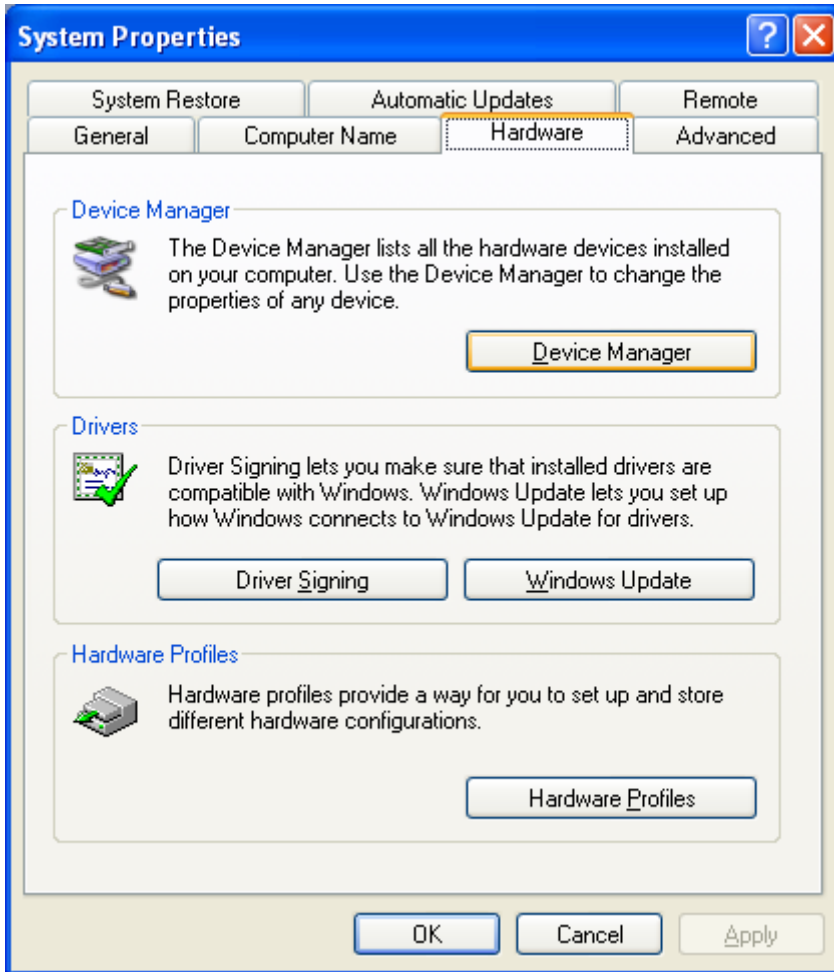


Figure 3 Choose the Hardware tab and then Device Manager

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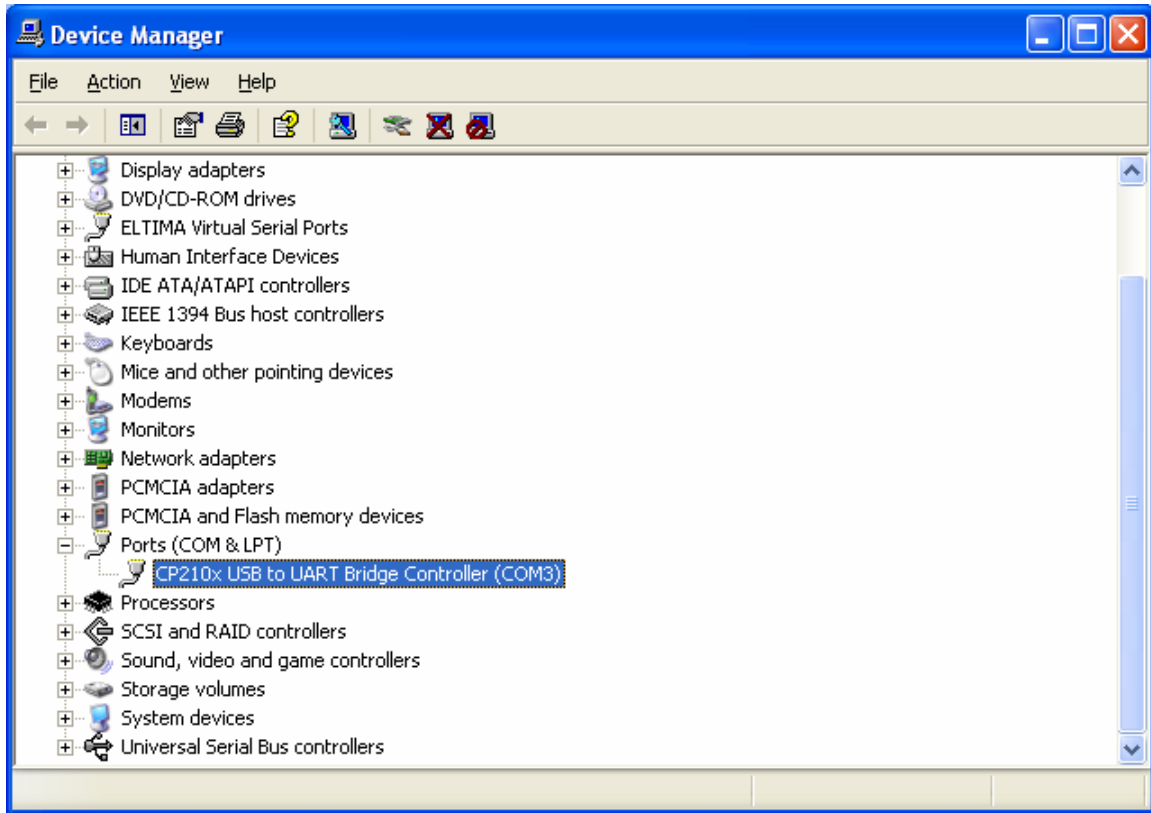


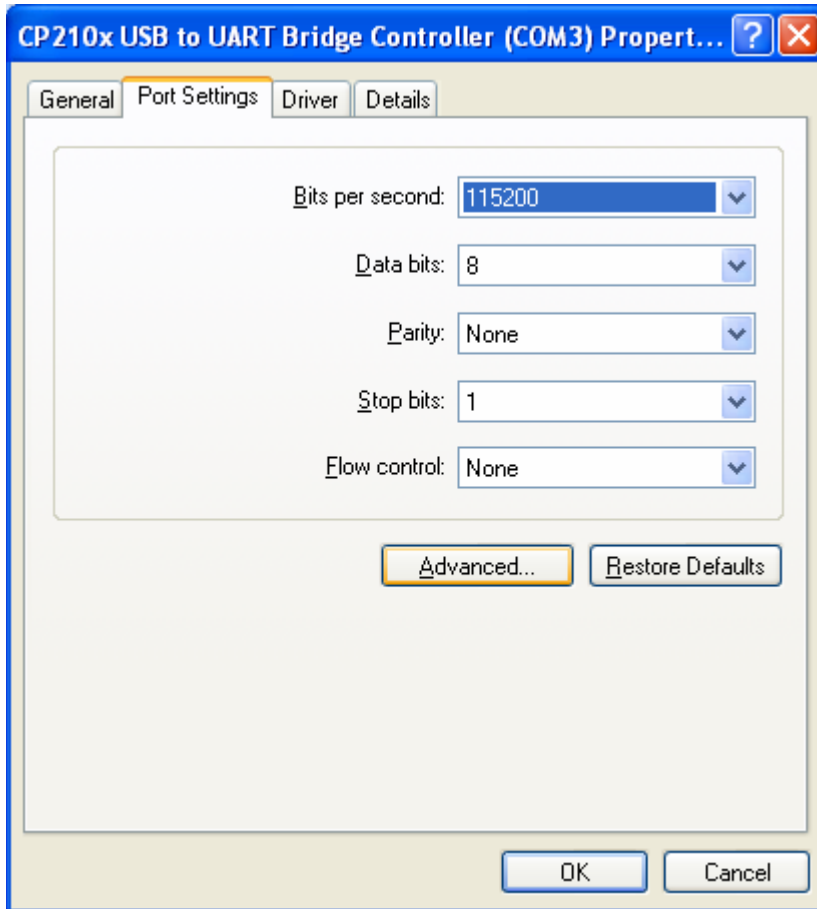
Figure 4 Open the Ports (COM & LPT) remember the COMx setting. (COM3 in this example)

## 5 – Advanced users – changing COM port number

For the advanced user, there is the possibility to change the COM port number. This might be needed if you are running old programs that can only handle COM ports with number 1, 2, 3 or 4. Find and double click on the new COM port.

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**Figure 5** Choose the Port Settings Tab and click on Advanced

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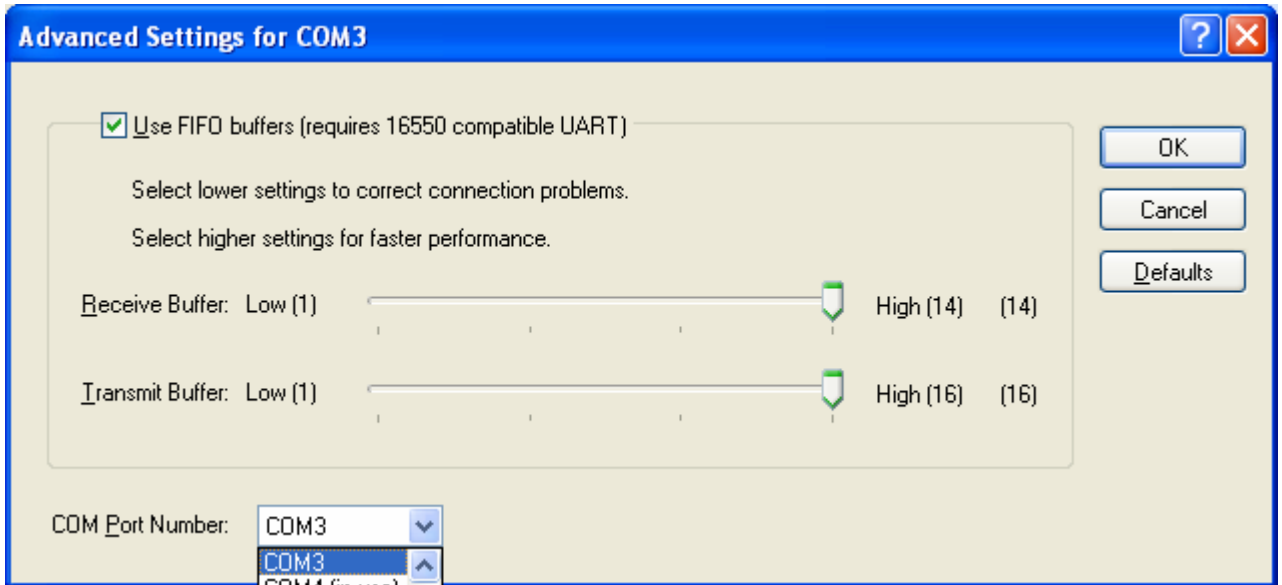


Figure 6 Choose the wanted COM-port number & click OK.

## Linux setup (experimental)

Support for the USB-to-serial chip CP2102 from Silabs that is used inside the Infolight is shipped with the most recent distributions. Ubuntu Linux has been reported to work out of the box with the Infolight.

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## Testing the Inflight

Open HyperTerminal (Start->All Programs->Accessories->Communications->HyperTerminal) and enter a new name for the connection. Press Ok.



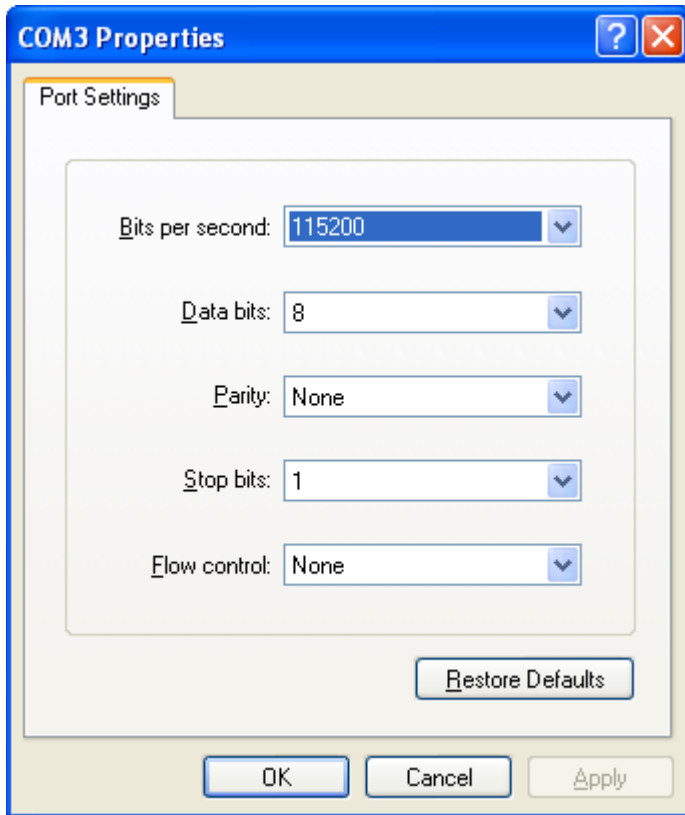
Select the new COM port. In our example it is COM3 as we noted when we checked the USB serial port number. Press OK.



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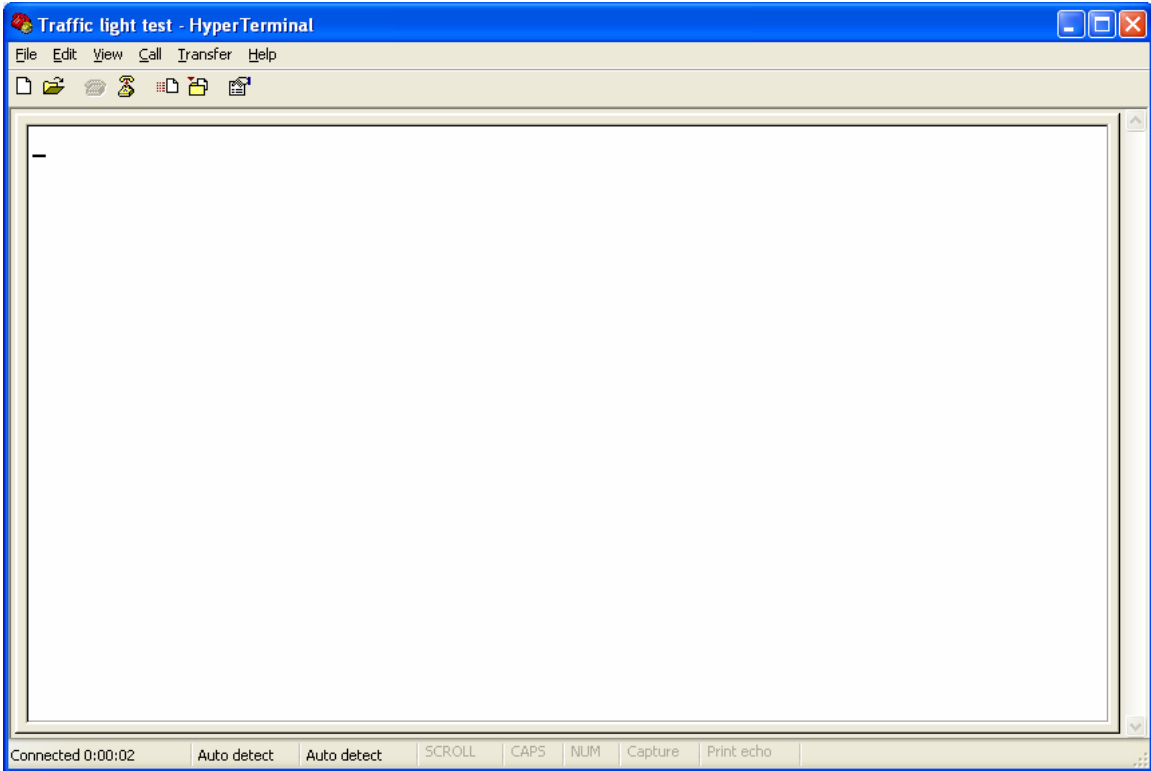
Choose 115200 Bits per Second, 8 Data bits, None as parity, 1 stopbit and None as flow control. Press OK.



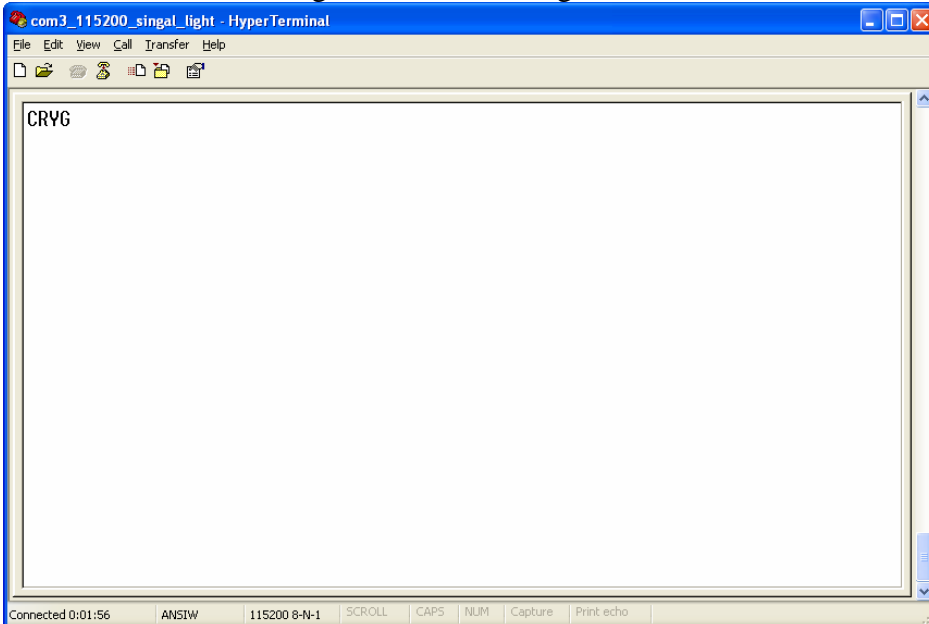
The HyperTerminal window should appear as below, after a few seconds it should say “Connected” on the bottom status line.

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Press the shift + 'C' key to turn off the blinking. Press shift+'r', i.e. the character 'R' will be sent. Press shift + 'y' to send the 'Y' character. Press shift+'g' to send the 'G' character. Now all the lights in the traffic light should have been lit once.



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**Figure 7 The green light is lit after sending the G character**

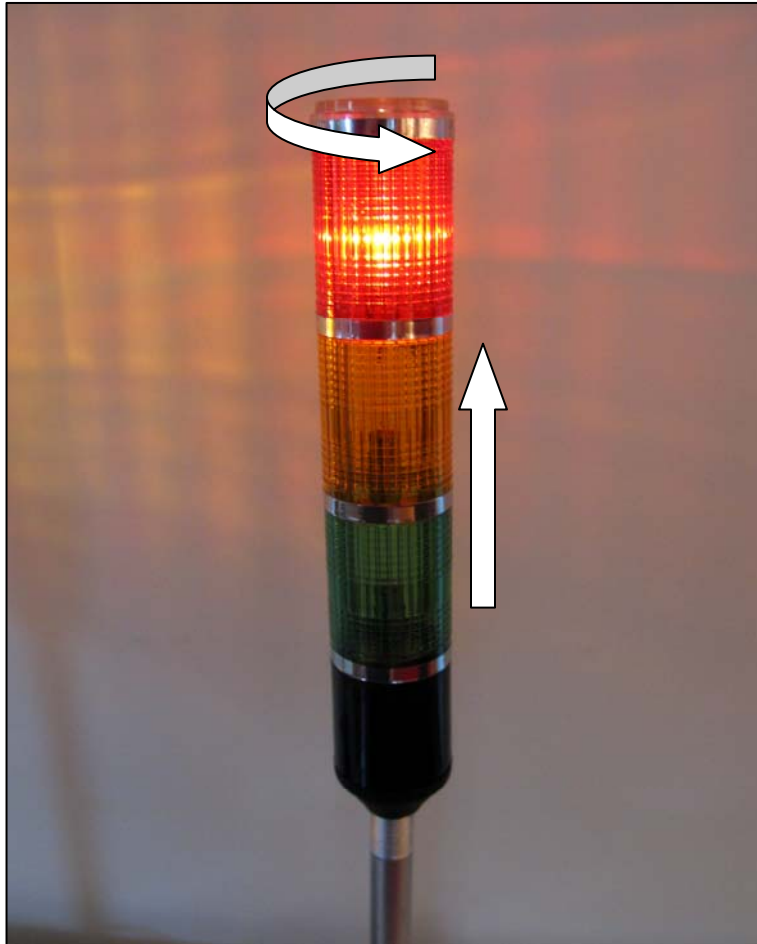
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## Changing light bulbs

Unplug the USB cable. Turn the plastic top counter-clockwise until it can be removed. Slide the colored plastic lenses upwards and remove them.



*Hold the Infolight in an upright position so you do not lose the spring and copper pin under the light bulb as you remove the light-bulb. Insert a new light bulb. (6 volts, 300mA, Ba9s) Slide down the colored plastic lenses and turn them lightly until they fit the spline which will prevent further rotation. Attach the top plastic and turn it clockwise until fastened.*

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## Known issues

### ***Computer loses the USB device – low power USB ports***

The Infolight has probably been connected to a low powered USB connection, such as bus powered USB hubs which should not supply more than 100mA of current. On laptops some of the ports might not be able to deliver enough power and after a while they shut down as an automatic resettable fuse heat up and cause a voltage drop that makes the Infolight hardware malfunction.

Workaround – change the physical USB port the Infolight is connected to a port that can supply more power. Read the computer manual on USB ports (especially on laptops where all USB ports are not equal)

### ***Lost response from Infolight – long USB cable***

There is a huge difference between USB cables on how much current they can deliver. The current consumption (350ma) of the Infolight might be too high for a long and cheap USB cable. That results in a voltage too low for the microcontroller to work correctly, unpredictable behavior might result. Most likely you will get garbage back from the virtual serial port and the Infolight can not be controlled.

Workaround - change USB cables to another brand.

Workaround – Use shorter USB cables. If you still need to place the Infolight a long way from the computer, try connecting the long cable to a self-powered USB-hub (i.e it has an external power supply) and connected the Infolight with a short USB cable.

### ***Light bulbs not lit***

If the light bulb is broken – replace it. See previous chapter.

*During transportation mechanical parts might come loose.*

If the light bulb is not broken, the bayonet holder might not connect power correctly. Attach the USB cable, tell the Infolight to light the malfunctioning light (send it a R, Y or G character). Remove the plastic lenses (see chapter on changing light bulbs). Move, twist and turn the light bulb until it lights up.

Check that the metal bars inside the lamp are tight. If not turn them tight by hand.

The light bulbs turn hot while lit, so be careful.

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### ***Infolight resets when light turns on***

Light bulbs are in fact very complex devices. While the light bulbs draw the rated current once lit, they can act as short circuits until they are warm. A light bulb that consumes 300mA once lit might need several amperes for the first 50 ms; this will overload the internal power supplies. Our experience is that the resistance in a cold light bulb can change considerable between light bulbs from the same production batch.

The Infolight is equipped with a preventive algorithm, but this might not help with extreme light bulbs, therefore:

Workaround – change light bulbs.

### ***Two or more Infolights to one computer is not recommended***

All the Infolights share the same unique USB ID, which means that the computer can not distinguish between them. COM ports numbers might change between Infolights every time the computer is reset and the USB enumeration is done in a different order.

Workaround – Use two computers to display two information messages.

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