

Docklight Application Note: Bluetooth Serial Port

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1 Bluetooth Serial Ports and Docklight

“Serial Port Profile (SPP)” is one of several services that can be provided by a Bluetooth wireless device. Other known service categories are for example “Audio Headset” or “Bluetooth Printer”. A Bluetooth Serial Port can be accessed as a COM port in Windows (e.g. COM3 or COM7), much in the same way as any RS232 port available on your PC, or any virtual COM port.

Before accessing a Bluetooth Serial Port, it needs to be installed and set up. This includes the following steps:

- Installing/Enabling Bluetooth support on your Windows operating system.
- Discovering the Bluetooth Device and pairing it with your computer.
- Selecting the Bluetooth Serial Port service for this device and choose a COM port for it (e.g. COM3).

For detailed information on these topics, please refer to the Online Help of the Bluetooth management software installed on your PC. Several different Bluetooth Configuration Managers / Bluetooth stacks are available. The most common are

- Broadcom / WIDCOMM Bluetooth Software for Windows [4]
- Microsoft Bluetooth Manager [3]
- Toshiba PC Bluetooth Stack [5]

Using Docklight to connect to a Bluetooth Serial Port should be possible with any of the above mentioned Bluetooth stacks. But during the Docklight history several problems have been observed by our customers for certain combinations of Bluetooth chipsets, devices, driver versions and Bluetooth stacks. Such problems can be a simple error message when opening the COM port, but also include a bluescreen / reboot crash.

Sometimes the problem only appears with Docklight, but other COM port applications (or even other Docklight versions) work fine. This is not because there is anything wrong with the way Docklight accesses a serial COM port, but it simply accesses the serial port driver with much higher frequency than other plain vanilla applications like Hyperterminal. A bluescreen / reboot crash always originates from the Windows device driver layer, so there is little Docklight can do about it.

2 Reference Configuration

The following setup describes a reference configuration that has been successfully tested with Docklight:

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- ASUS EeePC 1000H netbook (1.6 GHz Intel Atom processor, 2 GB Ram)
- Built-in bluetooth module Azurewave / Broadcom AW-BT253
- *Windows XP Professional* Version 2002 Service Pack 3
- Broadcom / WIDCOMM Bluetooth Software V 5.5.0.3900
- Bluetooth serial adapter Roving Networks Firefly RN-240M-RNW (FireFly-D8DE, Ver 4.22 05/09/07)

The above hardware and software configuration has been tested in Docklight Send/Receive or Receive Only applications, including long-term monitoring. No instability has been observed.

In addition, we used Docklight for Bluetooth modem access on the following cellular phones

- Sony Ericsson K530i
- Sony Ericsson W810i
- Motorola Razr V3x

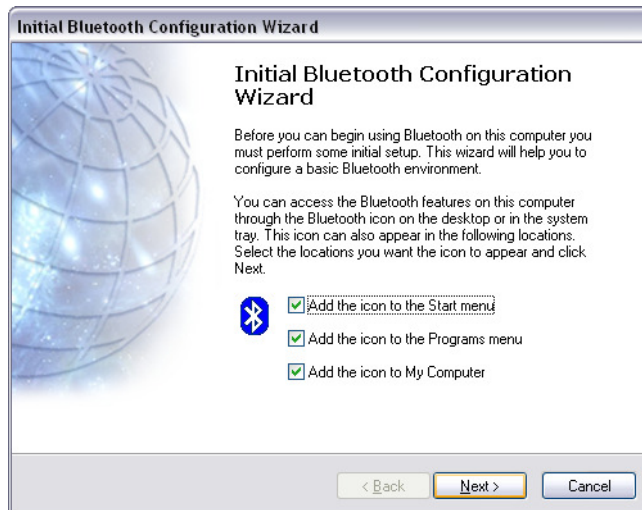
NOTE: We have decided to test and document one basic PC configuration widely available at a low price point. But we would very much welcome feedback on other Bluetooth module / driver / stack / device combinations. Both positive (“works for me”) or negative (“crashes / does not work as intended”) comments would be extremely helpful to us.


3 Configuration Example: Firefly Bluetooth Serial Adapter

This section describes how to set up Bluetooth and Docklight for the reference configuration listed above. It includes both the initial configuration of the Bluetooth services on your computer and the setup for a new Bluetooth wireless device in range.

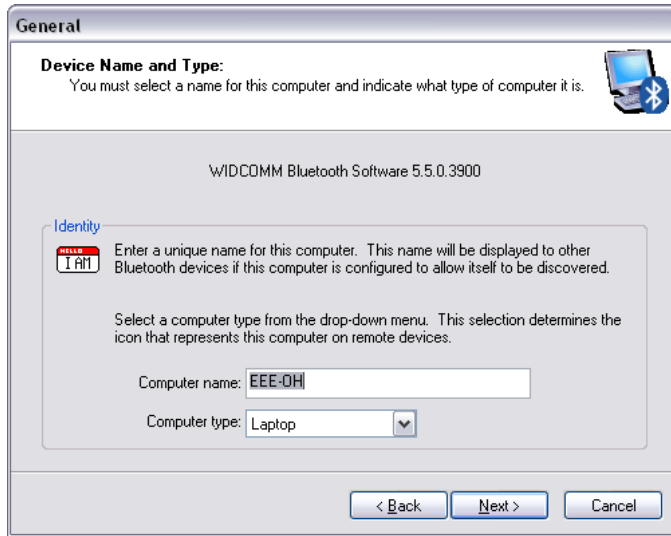
NOTE: Depending on your PC hardware, Bluetooth Devices, stacks and driver versions, these steps can look different on your computer.

1. If your PC does not include a pre-installed Bluetooth manager: install the Bluetooth Software, e.g. from your computer’s driver CD.
2. Make sure Bluetooth is enabled on your computer. On the Asus EeePC, Bluetooth is enabled/disabled using the **Fn + F2** key combination.
3. Start the **Bluetooth Configuration Wizard** from the **Control Panel** or the Bluetooth desktop icon.



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4. Enter the basic Bluetooth information about your computer.




5. You can now configure the services that your computer will offer to other Bluetooth devices. This is not necessary for our application and you can keep the default settings.



6. Now start the configuration wizard for setting up the Bluetooth connection to your serial port device



7. Make sure your Bluetooth device is ready to operate and discoverable, then find and select the device in the Bluetooth configuration manager.


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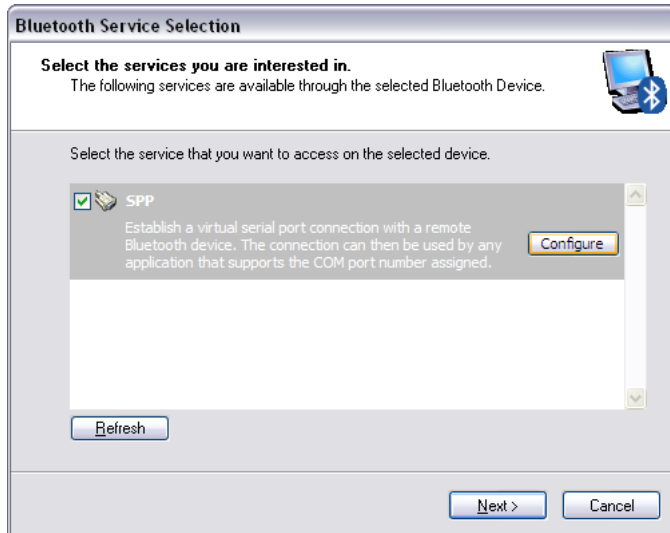


8. Perform **Bluetooth Pairing**. Please refer to your Bluetooth device's install guide [6] for details like the passkey required.

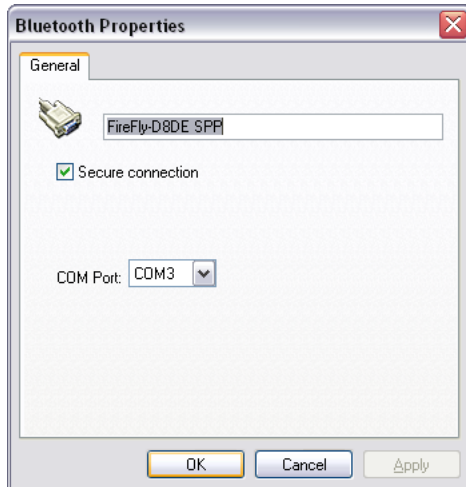


9. Choose the **SPP (Serial Port Profile)** service and press **Configure**.

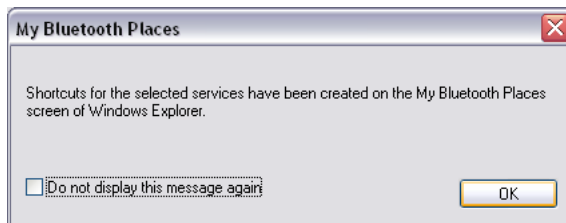
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10. Now choose a COM port number (e.g. COM3, COM7) and confirm with **OK**.



11. The serial port has now been added to your Bluetooth Places. Confirm with **OK**.

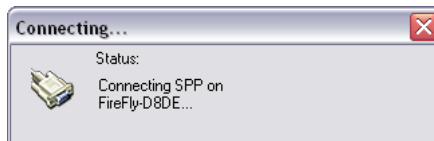
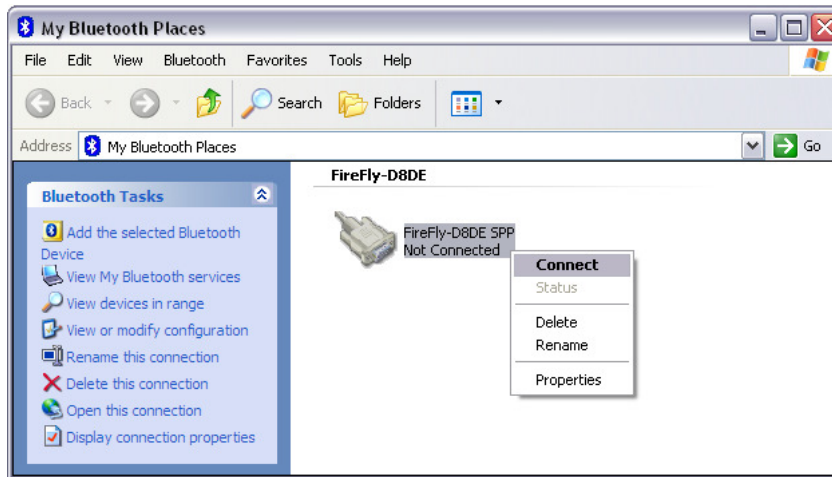



12. Exit the Bluetooth Configuration Wizard by pressing **Cancel**.

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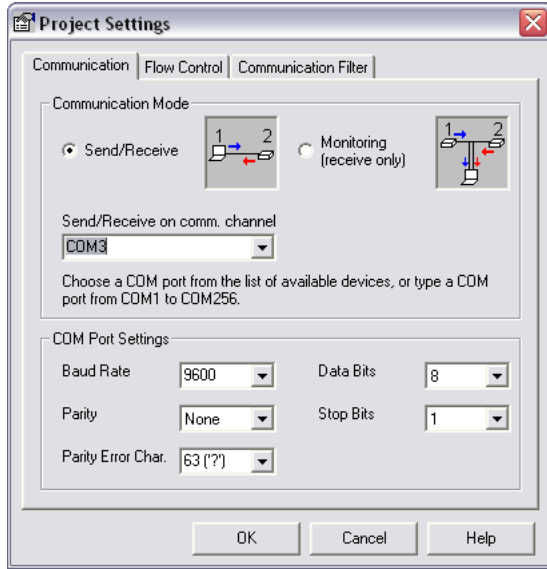


- Go to **My Bluetooth Places**, locate the Bluetooth device and choose **Connect** from the context menu (right mouse button).



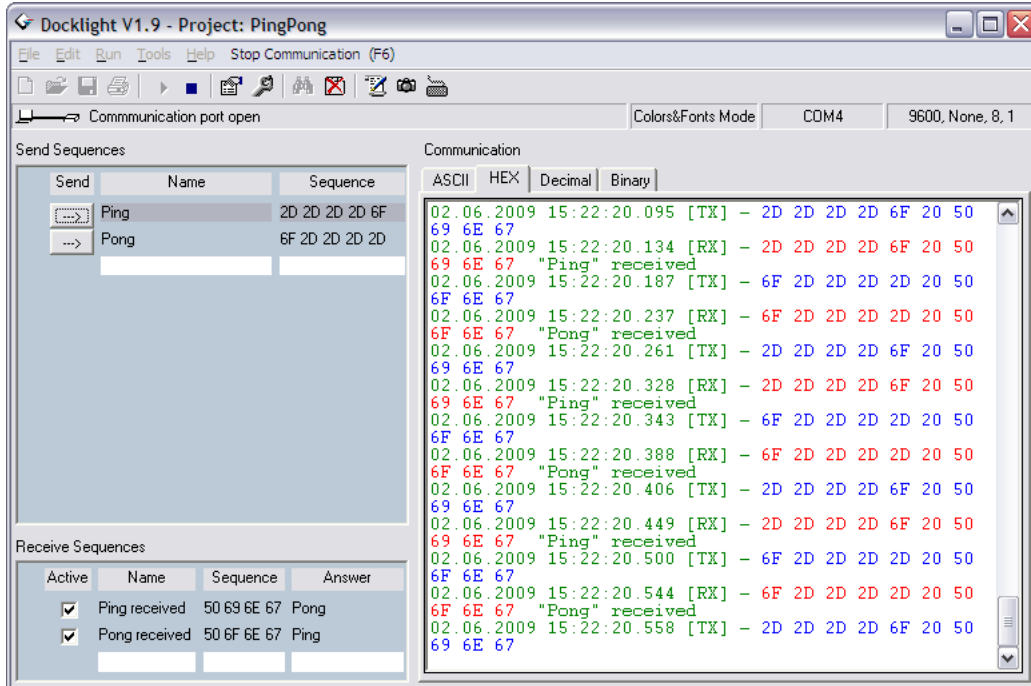
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14. Start Docklight and choose the newly created COM port (in our example: COM3) in the **Project Settings** dialog.



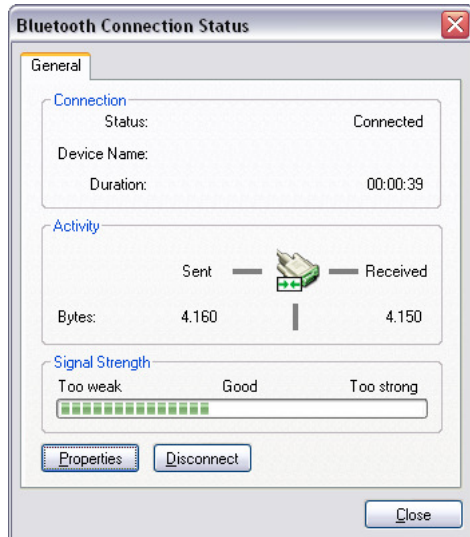
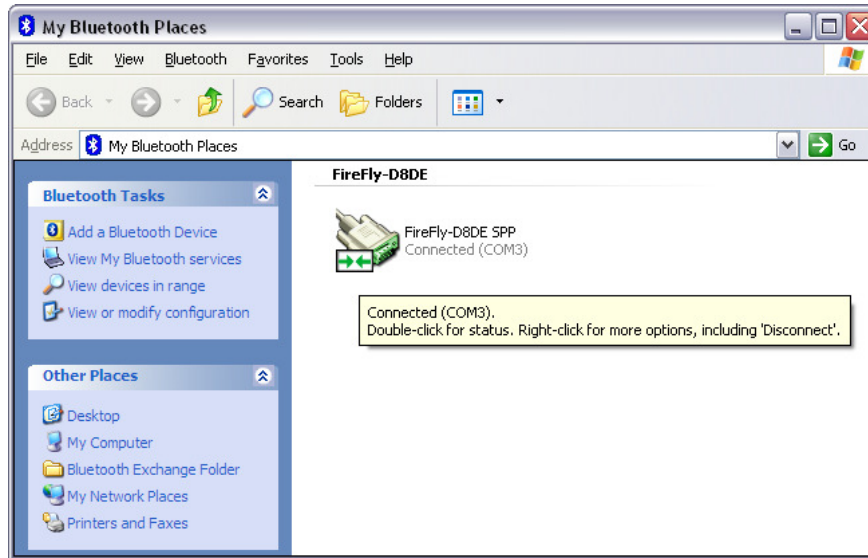
Docklight should now be able to open/close the COM port and send/receive serial data via the Bluetooth Wireless Device. When you start or stop communications in Docklight, the **Bluetooth Connection Status** should change between “Connected” and “Disconnected” accordingly.

NOTE: In our example, we connected the FireFly serial port to a simple loopback (echo) plug, so all transmitted data is received back immediately.




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The Broadcom / WIDCOMM Bluetooth manager displays the Bluetooth connection status in the item **My Bluetooth Places** in the Windows Control Panel.



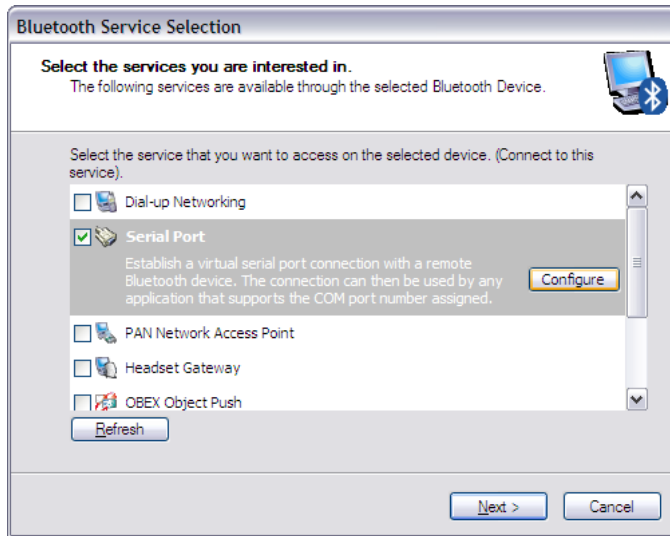
NOTE: For other Bluetooth managers (Toshiba, Microsoft), please see the accompanying documentation.

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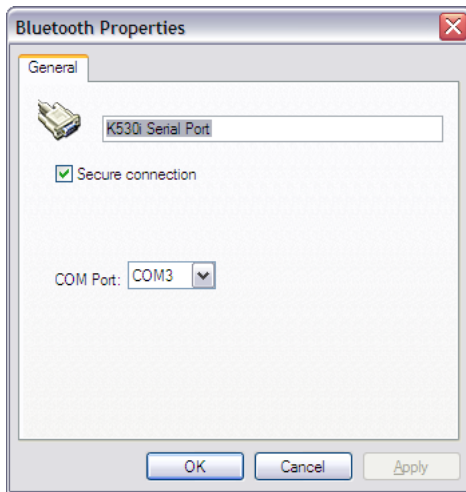
4 Configuration Example: Cellular phone Bluetooth modem

Cellular phones with Bluetooth support can usually be accessed as a modem through a designated COM port. The section below describes how to connect to the modem COM port and perform a basic modem test using Docklight Scripting.


1. Detect and pair your cellular phone with the PC, as described in the previous section
2. Check if your cellular phone provides a **Serial Port (SPP)** service. This is for example the case for Sony Ericsson K530i.

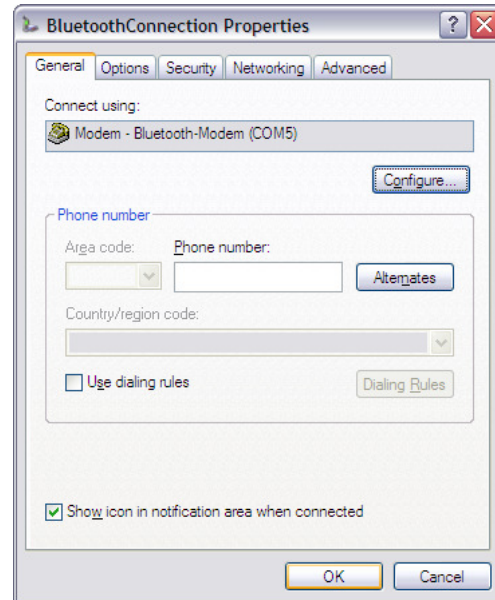
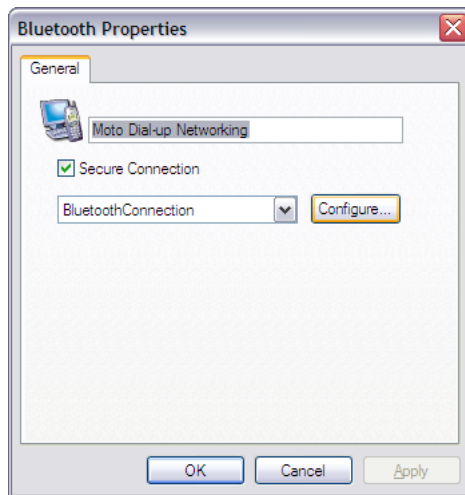
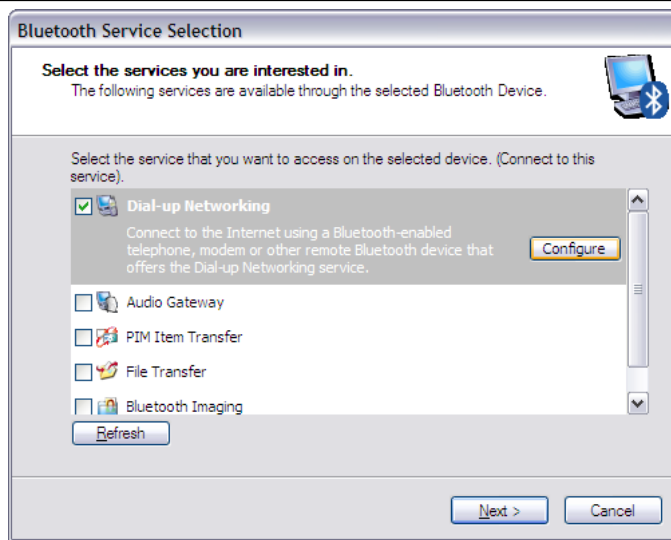


3. Press **Configure** to find out which COM port to use in Docklight for accessing the modem. In our example, this is **COM3**.



4. If no Serial Port service is offered by your cellular phone (e.g. for Motorola Razr V3x), check if there is a **Dial-Up Networking** service and press **Configure**. In the **Connection Properties** dialog, you can see the COM port that is assigned for the Bluetooth modem - In this example: **COM5**.

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5. Start **Docklight Scripting** and open the examples **ModemATCommands.ptp** / **ModemScript.pts** (for details see the Docklight User Manual at <http://docklight.de/manual/checkingatmodemcommandset.htm>).

NOTE: If you use **Docklight** (standard, non-scripting) you can do a manual test instead, using the example project **ModemDiagnostics.ptp** (see the Docklight User Manual at <http://docklight.de/manual/sampleprojectmodemdiagnosti.htm>).

6. Open the **Project Settings** dialog and choose the COM port that is assigned to the Bluetooth Modem (e.g. **COM3** or **COM5**).
7. Start the script using **Run Script (Shift + F5)**.

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You should now be able to retrieve basic identification and information about the cellular phone's modem. For a Sony Ericsson K530i, the Docklight communication window output could look like this:

```

Waiting for modem ...

03.06.2009 10:56:52.544 [TX] - ATQ0V1E0<CR><LF>

03.06.2009 10:56:52.590 [RX] - ATQ0V1E0<CR>
<CR><LF>
OK<CR><LF>

    Checking AT command set...

03.06.2009 10:56:52.720 [TX] - ATIO<CR><LF>

03.06.2009 10:56:52.814 [RX] - <CR><LF>
Sony Ericsson K530<CR><LF>
<CR><LF>
OK<CR><LF>

03.06.2009 10:56:52.939 [TX] - ATII<CR><LF>


03.06.2009 10:56:53.010 [RX] - <CR><LF>
CXC1250912<CR><LF>
<CR><LF>
OK<CR><LF>

03.06.2009 10:56:53.165 [TX] - ATII2<CR><LF>

03.06.2009 10:56:53.240 [RX] - <CR><LF>
OK<CR><LF>

03.06.2009 10:56:53.392 [TX] - ATII3<CR><LF>

03.06.2009 10:56:53.484 [RX] - <CR><LF>
Sony Ericsson Bluetooth Modem 079<CR><LF>
<CR><LF>
OK<CR><LF>
    
```

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```

03.06.2009 10:56:53.610 [TX] - ATI4<CR><LF>

03.06.2009 10:56:53.697 [RX] - <CR><LF>
OK<CR><LF>

03.06.2009 10:56:53.829 [TX] - ATI5<CR><LF>

03.06.2009 10:56:53.924 [RX] - <CR><LF>
Configuration Settings on Channel 0<CR><LF>
&C: 1<CR><LF>
&D: 0<CR><LF>
*EIAC: 1,1,"Internet 3G"<CR><LF>
*EIAC: 2,1,"3G Portal"<CR><LF>
*EIAC: 1,3,"PanNapDefaultAccount"<CR><LF>
*ELIN: 1<CR><LF>
+CBST: 0,0,1<CR><LF>
+CDIP: 0,0<CR><LF>
+CGACT: 1,0<CR><LF>
+CGACT: 2,0<CR><LF>
+CGATT: 0<CR><LF>
+CGCLASS: "CC"<CR><LF>
+CGDCONT: 1,"IP","uinternet","0.0.0.0",0,0<CR><LF>

...
    
```

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6 References

- [1] Docklight V1.9 User Manual, from edition 04/2009,
http://www.docklight.de/pdf/docklight_manual.pdf
- [2] Bluetooth SIG: Bluetooth Serial Port Profile (SPP) (Bluetooth → Get Technical → How it Works → Profiles Overview → SPP)
<http://www.bluetooth.com/Bluetooth/Technology/Works/SPP.htm>
- [3] Microsoft Help And Support: How to install and configure Bluetooth devices in Windows XP Service Pack 2. Article ID: 883259
<http://support.microsoft.com/kb/883259>
- [4] Broadcom Bluetooth Support / WIDCOMM Bluetooth Software for Windows:
<http://www.broadcom.com/support/bluetooth/>
- [5] Toshiba EMEA Bluetooth Information Center
<http://aps2.toshiba-tro.de/bluetooth/>
- [6] Roving Networks FireFly Install Guide, firefly-ref-guide.pdf
<http://www.rovingnetworks.com/>

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