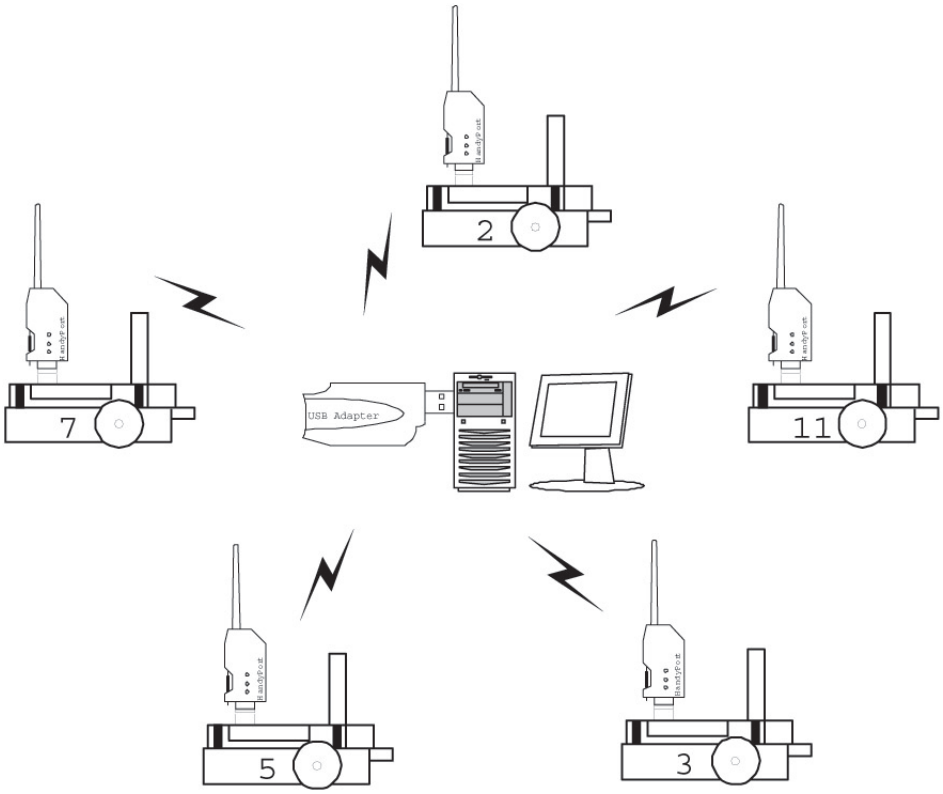
EyeNet

Wireless Network for Mobile Robots
using Bluetooth Technology



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1 Introduction

This manual introduces you to the wireless network solution for mobile robots using Bluetooth technology. The EyeNet gives you the opportunity for communication between mobile robots as well as the remote controll of any robot connected to the network. The next pages will show how to setup, configure and run the small Bluetooth network and its devices.
Make sure you will have the following items:

- Bluetooth Wireless Serial Multi-Port
  (Handywave MSPP)
- Bluetooth Wireless RS-232 Transceiver
  (Handywave HPS-120)
- IVT BlueSoil MSPP 1.2.0 Software (or higher)
- RemoteUI Software
- EyeCon with RoBios 6.2 (or higher)

2 Quick User Guide

This section gives you a quick step-by-step guide how to run the EyeNet. This guide assumes, that the multi serial port (MSPP) and the IVT BlueSoleil software is installed. Refer to the MSPP manual to see how to install it.

1. Connect the multi serial port to the USB port of your PC.
2. Connect the HandyPort with a Null-Modem adapter to the EyeBot.
3. Switch on the EyeBot and configure the HandyPort as described in section 3.
4. Run the IVT BlueSoleil software.
5. Double click on the red sun. The available Bluetooth devices will appear.
6. Double click on a HandyPort symbol. The MSPP checks the available services for this device. After a short while the serial cable symbol should turn purple.
7. Double click the purple serial cable symbol. A connection to the highlighted HandyPort should be established. A pop-up window shows you the appropriate COM port.
8. Run the RemoteUI program.
9. Tick the COM port boxes to which the HandyPort(s) is(are) connected.
10. Press the ‘Start/Refresh’ button.
11. The EyeBots should authenticate by transmitting their IDs, which are displayed next to the COM tick box.
12. Run your EyeBot program that might use the RADIO functions or use the remote functions.
13. On authentication an ‘EyeConsole’ symbol appears. Click on the symbol to show the EyeConsole.

3 Configuration

To configure the HandyWave Bluetooth HandyPort modules you can either use a Terminal emulator like Hyperterm or Minicom, or you can use the configuration menu on the EyeBot.

3.1 EyeBot Config Menu

Connect the HandyPort HPU-120 with a Null-Modem cable to the serial port 1 of the EyeBot. Switch on the EyeBot and the red operation (OPR) LED should light. Go to the configuration menu for the HandyPort, which can be found under
Demo $\Rightarrow$ Network $\Rightarrow$ BLT.
Take a peaked thing, i.e. a pen, and press the reset button (RST) at the HandyPort. The green link (LNK) LED should flash now. Wait 5 seconds after the LED is flashing and then press ETR. You will now see the setup menu. It contains only the items which are relevant to the mobile robot network system.
These items are:

- **Speed:**
  The baud rate of the serial port of the HandyPort can be changed here. Possible speeds are: 9600bps, 19200bps, 38400bps, 57600bps, 115200bps
- **Handshake:**
  The Handshake can either be set to ‘NONE’ or ‘RTS/CTS’.
- **Mode:**
  There are three modes available:
  1. **1:1:**
     This establishes a 1-to-1 connection between the HandyPort and another Bluetooth device with the remote address specified under ‘RemAdr’. As soon as the remote device is available, the HandyPort will connect to it.

2. **WAIT:**
   In this mode the HandyPort will wait until another device tries establish a connection. The remote address will not be evaluated.
3. **REG_CON:**
   The ‘Register & Connect’ mode is used with the BlueSoil software. Within this mode the HandyPort will automatically connect to the remote device and the Multi-Port will take the COM port, which was specified within the BlueSoil software. This way the HandyPort will be connected to the same COM port every time.

- **RemAdr:** Specify the hardware address of the remote device. Use the ’+’ button to increase the hexadecimal number. Use the ‘→’ to jump to the next number.

To confirm the displayed values press ‘END’ and wait until the green link (LNK) LED stops flashing and the red operation (OPR) LED switchs on. The HandyPort is configured now. Figure 1 shows the screenshots of the setup menu.

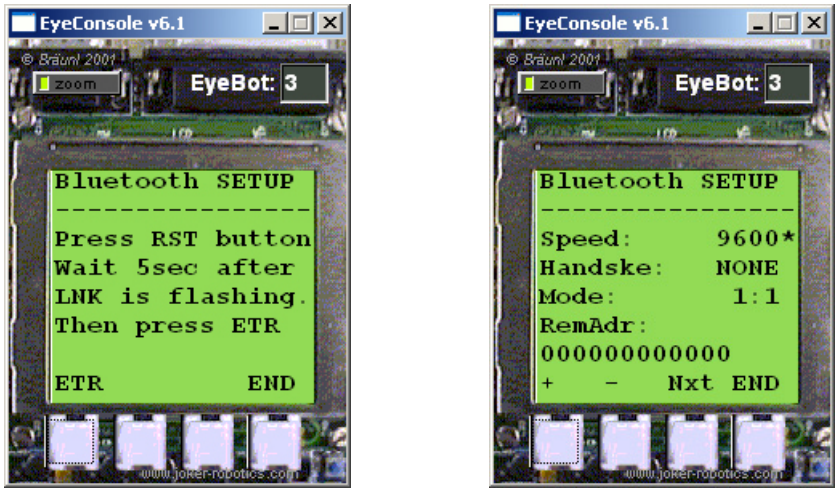

Figure 1: Bluetooth setup menu

3.2 Terminal Program

To get access to the whole configuration menu of the HandyPort use a terminal program such as ‘Hyperterm’ or ‘Minicom’. Connect the HandyPort HPU-120 with a Null-Modem cable to the serial port of your PC and apply power supply through a USB cable. The following instructions will show how to access the HandyPort menu by using Hyperterm.

1. Run Hypertrm

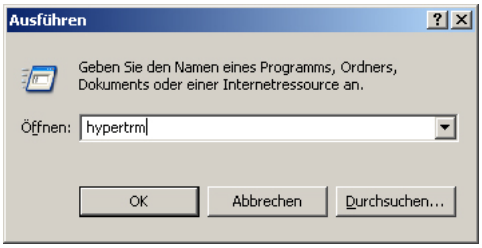

Figure 2: Run Hyperterm

2. Go to File ⇒ Properties Select the appropriate COM port under ‘Connect using’ and click ‘Configure’.

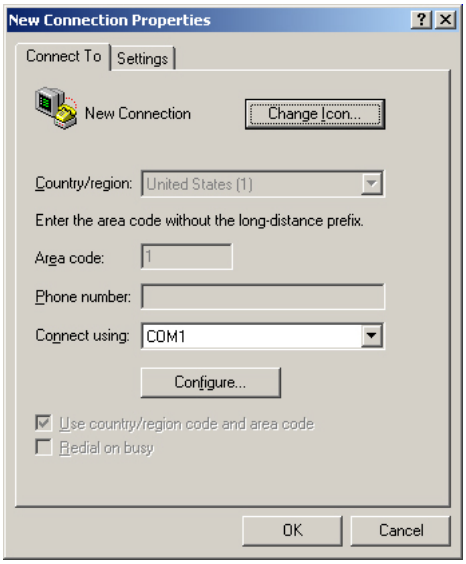

Figure 3: Properties

3. Change the settings to the values that are shown in Figure 4.

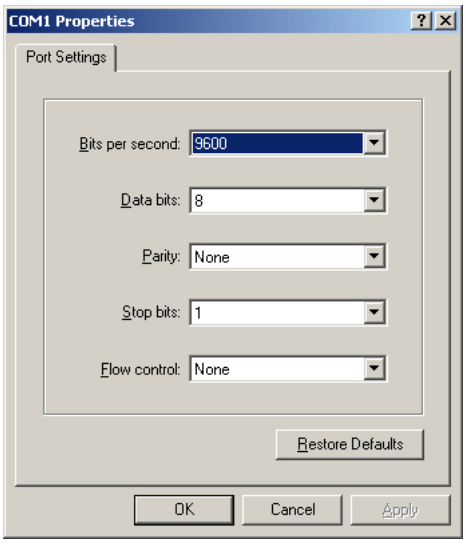

Figure 4: Port settings

4. Press the reset (RST) button on the HandyPort and wait 5 seconds after the green LED is flashing. Then press 'Enter' and the menu should appear.

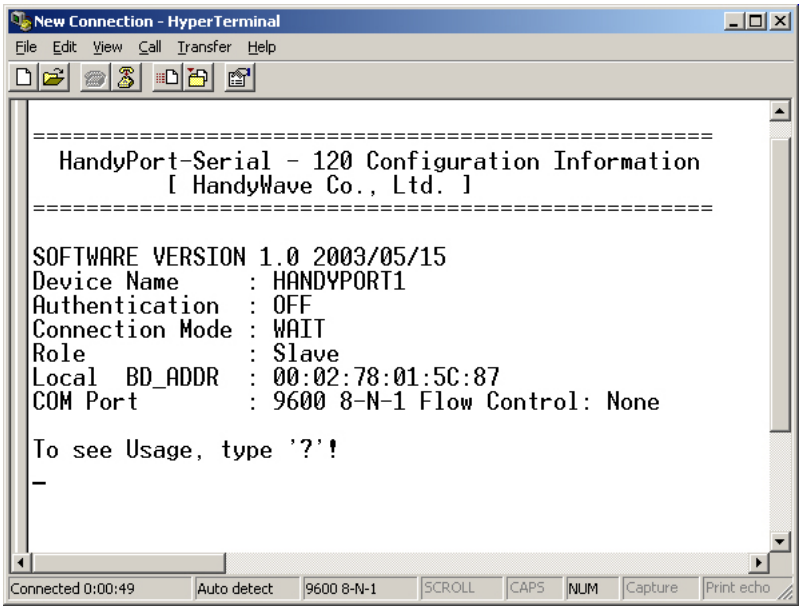

Figure 5: HanyPort Menu

Further details on the HandyPort and its configuration can be found in the HandyPort manual.

3.3 Settings

Make sure that the speed and the flow control settings are always the same on the EyeBot and the HandyPort to prevent errors. The default values for the RADIO functions on the EyeBot are:

- Speed: 115200bps
- Handshake: NONE

4 BlueSoleil Software

Please refer to the MSPP manual to install the IVT BlueSoleil MSPP software.
After the installation, plug in the multi-serial port to an USB port and run the software. Figure 6 shows the graphical user interface.

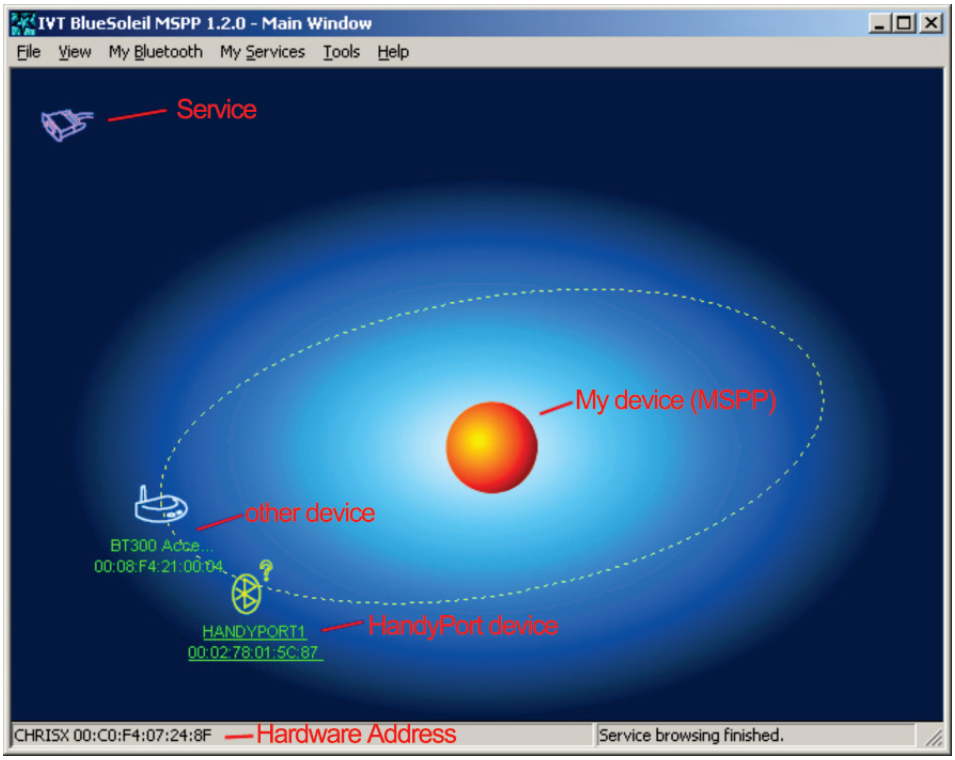

Figure 6: BlueSoleil GUI

- On startup the software searchs for available Bluetooth devices. It will show your available HandyPorts and might show other devices in range.
- The sun represents the MSPP and its hardware address is shown in the lower left corner.
- The serial cable symbol represents the available service of the highlighted Bluetooth device. Double click on a device to update these services.

- Double click on the service symbol, i.e. the serial cable, to establish a connection.
- Depending on the mode settings of the HandyPort and the MSPP, the devices will connect automatically (see Chapter 2).
- Either a small pop-up window in the lower right corner of your screen or the properties window will tell you to which COM port a device is connected to your computer.
- On right click on one of the devices a menu will open with all relevant items.
- The MSPP is able to connect up to seven Bluetooth devices simultaneously.

5 RemoteUI

This section deals with the RemoteUI software. This software is the center part of the network and is responsible for the operation of the network. Figure 7 shows the graphical user interface of the program.

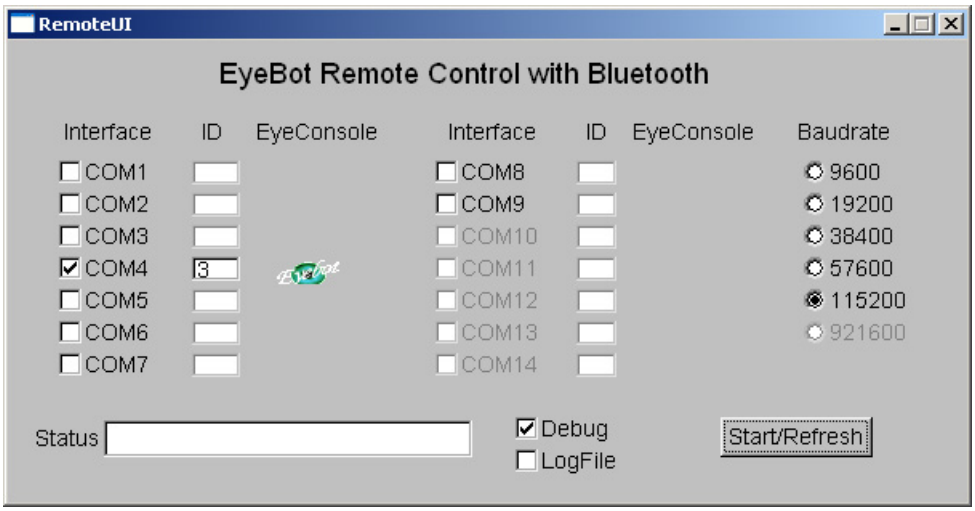

Figure 7: RemoteUI GUI

- After the HandyPorts are connected to the MSPP, tick the right COM port boxes.
- Press the ‘Start/Refresh’ button.
- You can now either run your program on the EyeBot, that uses the RADIO functions, or enable the remote function.
- The EyeBot will authenticate and its ID will appear beside the COM port tick box.
- A small EyeConsole icon will also appear in the same row. Use this icon to view the EyeConsole. The EyeConsole, shown in Figure 8, shows you the current display of the real EyeBot. Through the buttons of the EyeConsole you have full controll of your EyeBots.

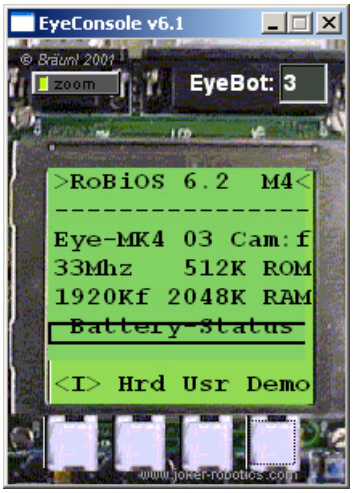

Figure 8: EyeConsole

- To view the traffic through the MSPP, tick the ‘Debug’ tick box. All incoming messages will be displayed in a console window (NOTE: only the first 10 bytes of the whole message are displayed).
- Choose the ‘Logfile’ box to create a file called ‘logfile.txt’. All incoming messages will be listed there (NOTE: every byte will be written to the file)

6 Troubleshooting

This section shows you how to handle problems and error messages.

Problems and Error Messages

Problem/Message	Reason	Solution
The devices are connected, but no transmission is done.	The HandyPort and the serial port do not have the same settings.	Change settings of the HandyPort to the same of the EyeBot's serial port.
	The HandyPort and the chosen baud rate of the RemoteUI program do not match.	Change the baud rate either on the EyeBot+HandyPort or in the RemoteUI program.
	The chosen COM port in the RemoteUI and the COM port to which the HandyPort is connected, do not match.	Get the COM port by a right click on the device in the BlueSoleil software and tick the appropriate COM tick box in the RemoteUI software.
The MSPP and the HandyPort cannot connect.	The HandyPort is in configuration mode. (flashing green LED)	Press the RST button to leave configuration mode.
'Error while initializing COM'	The chosen COM port is not registered with the operation system.	Make sure that the COM port is available under the operation system.