Kvaser BlackBird Getting Started Guide

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https://www.kvaser.com

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1 About this manual

This manual is intended for Kvaser BlackBird users. It contains a description of the setup programs and detailed instructions of how to connect the device to a wireless network. Basic knowledge about TCP/IP networks is assumed.

This manual applies to Kvaser BlackBird devices listed in Table 1.

Device	Product Number
Kvaser BlackBird SemiPro HS	73-30130-00441-2
Kvaser BlackBird SemiPro HS OBDII	73-30130-00629-4
Kvaser BlackBird SemiPro HS/HS	73-30130-00453-5
Kvaser BlackBird SemiPro 3xHS	73-30130-00446-7
Kvaser BlackBird v2	73-30130-00671-3
Kvaser BlackBird v2 OBDII	73-30130-00675-1
Kvaser BlackBird Pro v2	73-30130-00983-7

Table 1: Kvaser BlackBird devices and their EAN numbers

Throughout this document, we use the name Kvaser BlackBird to mean any one of the different Kvaser BlackBird products listed in Table 1, unless otherwise noted.

2 Installation summary

This chapter summarizes the installation and setup steps, connecting to the device in infrastructure mode. You will find detailed information about the different steps in the following chapters.

1. Install the driver package (Section 3.1, Installing the drivers, on Page 7)
2. Connect your Kvaser BlackBird to the computer via the USB cable.
3. Start the parameter setting program (Section 6.1, Starting the configuration program, on Page 16) and configure at a minimum:
   (a) The network name(Section 6.3, Selecting WLAN network, on Page 19)
   (b) The network passphrase (Section 6.4, Setting WLAN keys and security, on Page 21)
   (c) Decide whether to use DHCP or a static IP number (Section 6.5, Network setup and device name, on Page 24)
4. Save the configuration (Section 6.7, Save the configuration, on Page 27).
5. Verify that the WLAN connection works (Section 6.8, Verifying the WLAN connection, on Page 27).
6. Disconnect the USB cable and supply external power to the Kvaser BlackBird (Section 6.9, Supplying external power to the device, on Page 30).
7. Check the LED indicators (Section 10.1, Check the LEDs, on Page 42).
8. Start the Kvaser Network Device Selector program (Section 7.1, Starting the Kvaser Network Device Selector, on Page 31).
9. Connect to the device (Section 7.2, Selecting the device you want to use, on Page 31).
10. The new remote CAN device should now be visible in Kvaser Device Guide (Section 8, Using Kvaser BlackBird from your software, on Page 34).

3 Driver installation

Please visit www.kvaser.com/download to download the latest versions of drivers, software and documentation.

3.1 Installing the drivers

Install version 5.6 or later of the Kvaser CAN drivers by running `kvaser_drivers_setup.exe`.

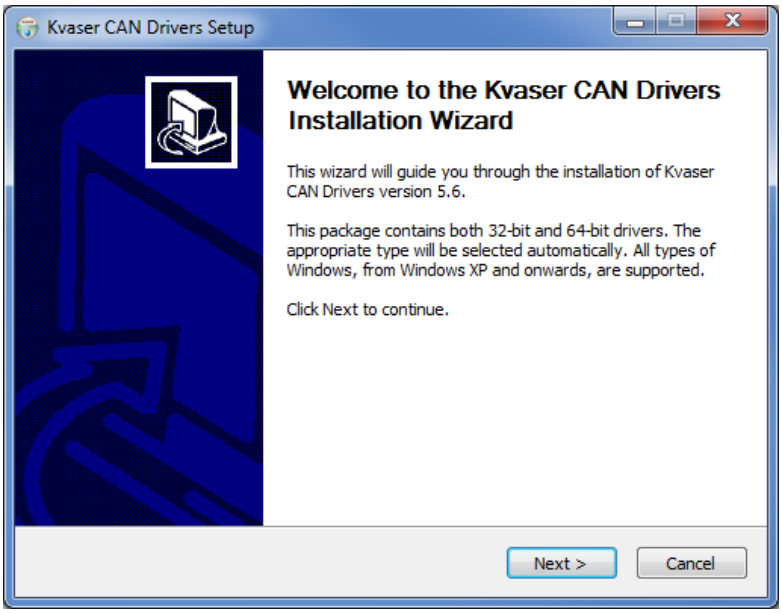

Figure 1: Kvaser CAN Drivers Installation Wizard.

After installing the drivers, plug in your Kvaser BlackBird into a free USB port on your computer.

The “Found New Hardware” wizard in Windows will now start. Complete it as usual.

3.2 Verifying driver installation

Check that the Kvaser BlackBird is connected via the USB cable to the computer.

Go to the Control Panel and start Kvaser Device Guide, which is located under “Hardware and Sound”, see Figure 2 on Page 8.

Your Kvaser BlackBird should be visible in the list of devices, see Figure 3 on Page 8.

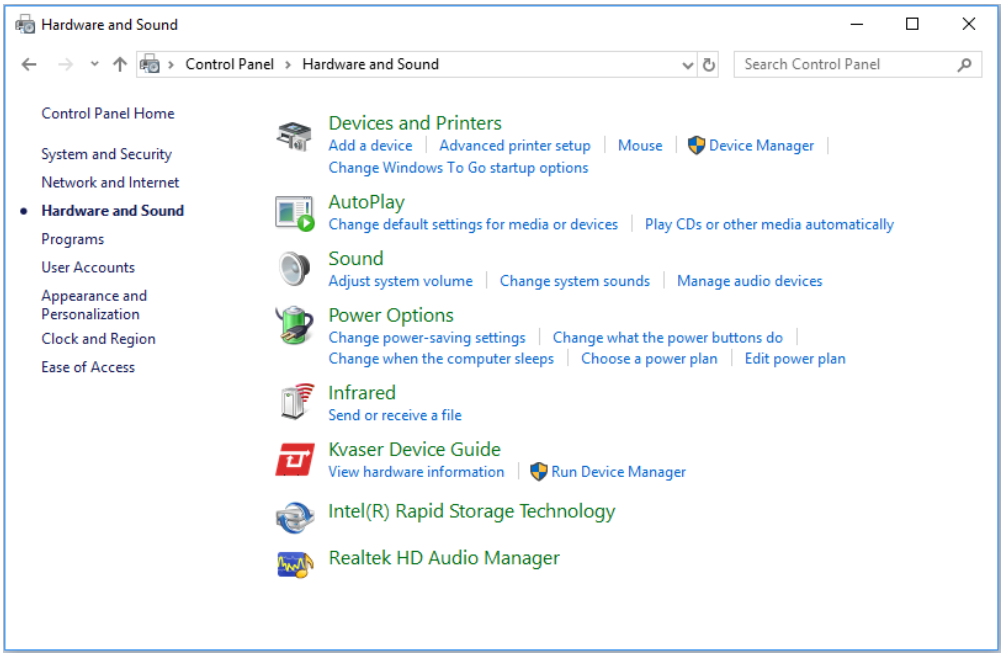

Figure 2: Starting Kvaser Device Guide from the Control Panel.

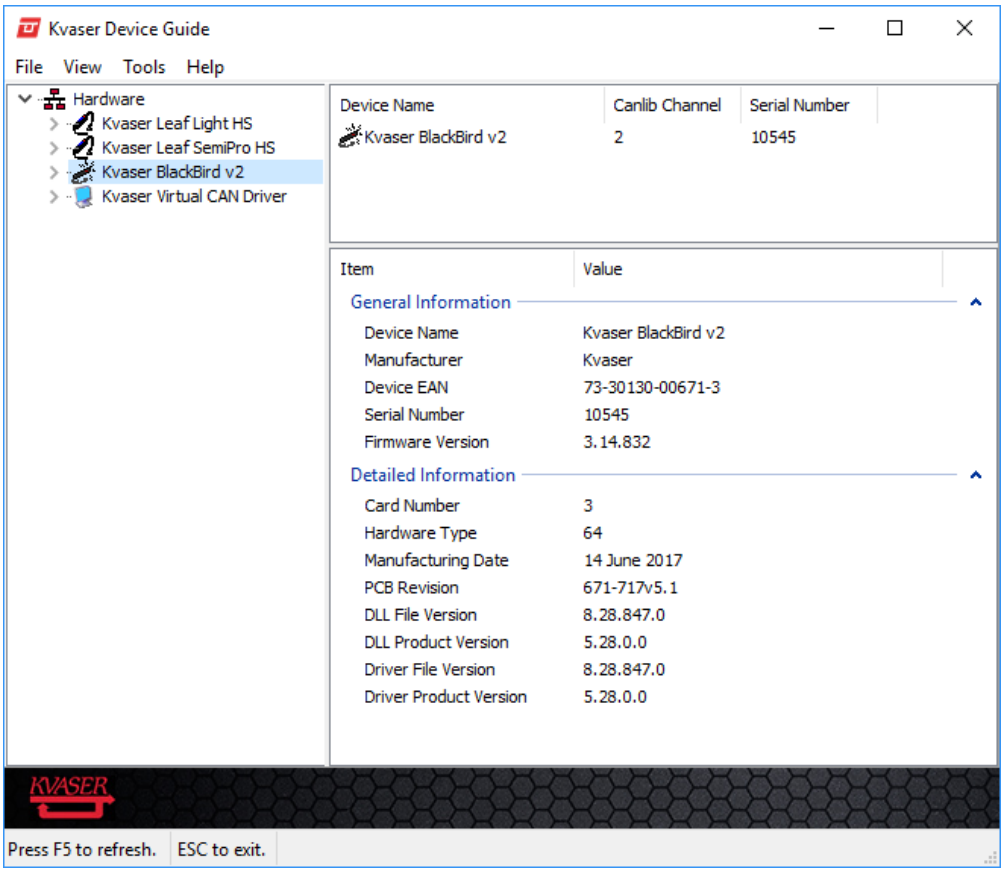

Figure 3: Kvaser Device Guide lists the connected devices.

4 Network operational modes

The Kvaser BlackBird is normally connected to a computer via an access point (AP), this is referred to as infrastructure mode. The Kvaser BlackBird may also be connected directly to a computer using either ad-hoc mode or the “Wireless Hosted Network” feature of the computer.

Windows 8 no longer support ad-hoc mode, instead use the replacement (introduced in Windows 7) called “Wireless Hosted Network”. In this mode, you configure the Kvaser BlackBird in the same way as for infrastructure mode.

4.1 Ad-hoc mode

Ad-hoc mode is not supported in Windows 8 and later. It’s successor, called “Wireless hosted network” or “virtualization”, is supported from windows 7. See Section 4.3, Wireless hosted network, on Page 11 for more information.

In ad-hoc mode, you are connecting the Kvaser BlackBird directly to a computer. Therefore, you must assign static IP addresses to the Kvaser BlackBird and to the computer.

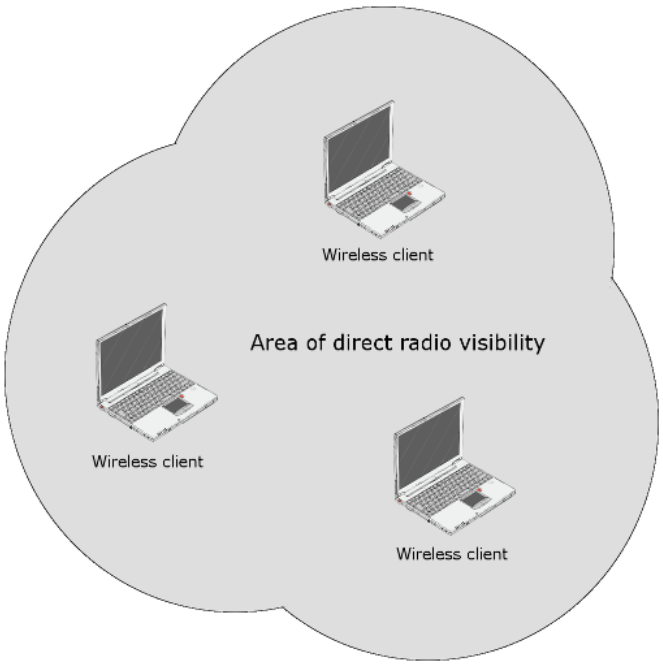

Figure 4: Ad-hoc mode.

If you are going to use ad-hoc mode, you should read Section 9, Configuring host computer, on Page 35 and configure your computer before continuing.

Ad-hoc mode is limited to a maximum speed of 11 Mbit/s (maximum speed required by the IEEE 802.11 standard for ad-hoc mode). Still, 11 Mbit/s is likely enough for most real-world one-way CAN traffic, as long as you are reasonably alone on the channel and there is not too much radio interference.

Note that most network cards only support WEP-64 and WEP-128 encryption in ad-hoc mode.

4.2 Infrastructure mode

If you are using an AP (Access Point), you should connect the Kvaser BlackBird in infrastructure mode.

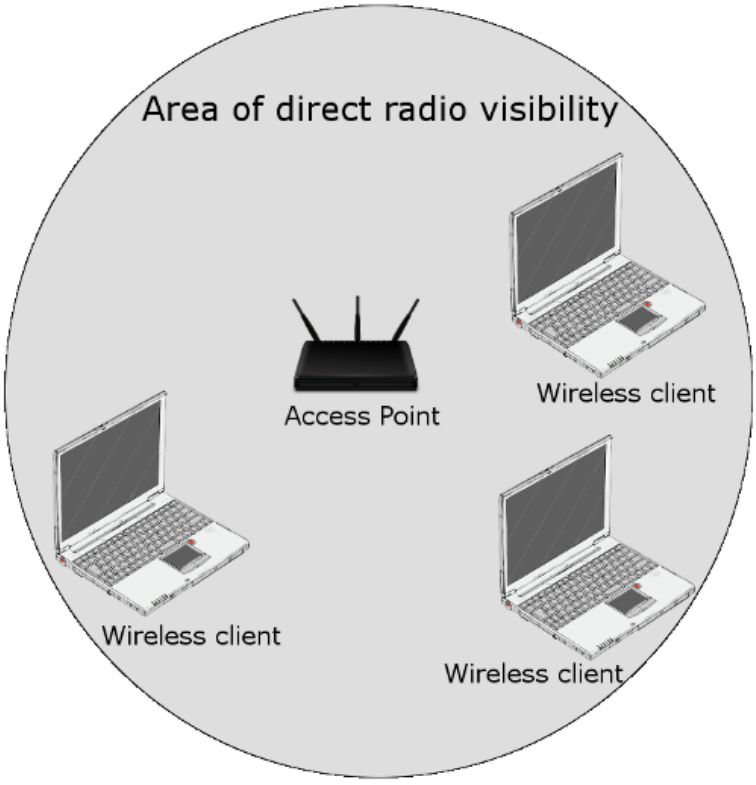

Figure 5: Infrastructure mode.

In this case, your network probably has a DHCP server running. If your network does not have a DHCP server, you will need to assign a static IP address to your Kvaser BlackBird. You should consult with your network manager to determine what IP address and Subnet mask should be used.

4.3 Wireless hosted network

When using Wireless hosted networks, your computer is simulating an Access Point so others can connect to it using Infrastructure mode even though you are connecting directly to the computer.

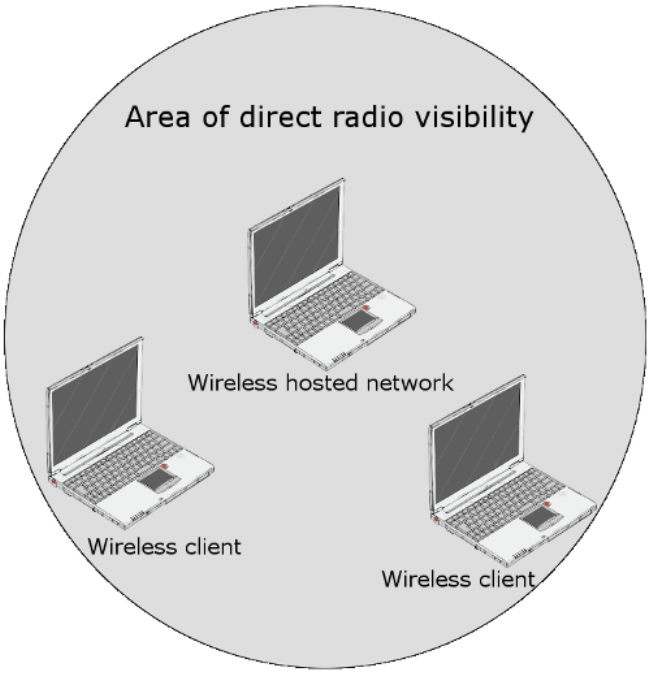

Figure 6: Direct connection using Wireless hosted network.

If you are using the “Wireless Hosted Network”, you should connect the Kvaser BlackBird in infrastructure mode.

In this case, your computer typically have a DHCP server running and you will not have to assign static IP addresses.

See Section 9.2, Setting up Wireless Hosted Network on your computer, on Page 36 for more information.

5 Quick start using Wi-Fi pairing tool

If you just would like to connect your Kvaser BlackBird directly to a single host computer which has support for Wi-Fi Direct, the recommended way is to use the Kvaser Wi-Fi Pairing Tool. This will set up Wireless hosted network on the host computer and configure the Kvaser BlackBird to connect to it.

5.1 Initial network setup

The easiest way to get started is to use the Kvaser Wi-Fi Pairing Tool to pair your Kvaser BlackBird with a host host computer that supports Wi-Fi Direct.

Connect the Kvaser BlackBird to a free USB port on your host computer or externally powered USB hub and start the Kvaser Device Guide, which was installed together with the drivers and can be found in the Windows Control Panel.

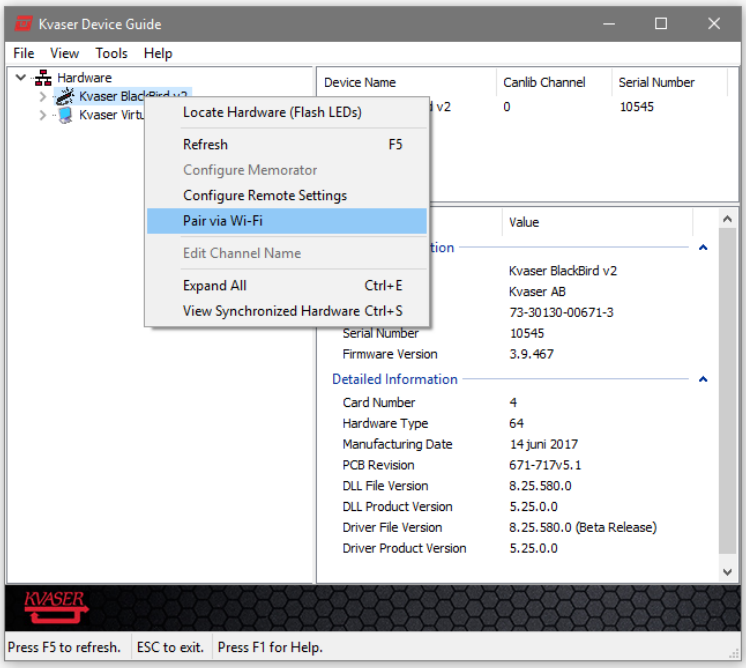

Figure 7: Right click on the Kvaser BlackBird in Kvaser Device Guide and select “Pair via Wi-Fi” to start Kvaser Wi-Fi Pairing Tool.

There are some basic configurations that you can change while configuring the Kvaser BlackBird, these are available on the configuration tab in the Kvaser Wi-Fi Pairing Tool (see Figure 8 on Page 13) and include setting the Geographical Region.

Start the pairing process by clicking the “Pair Device and PC” button under the Status tab in the Kvaser Wi-Fi Pairing Tool. The complete configuration process may take 40 seconds to complete, and during that time both the host host computer and Kvaser BlackBird will be configured, and the connection will also be tested.

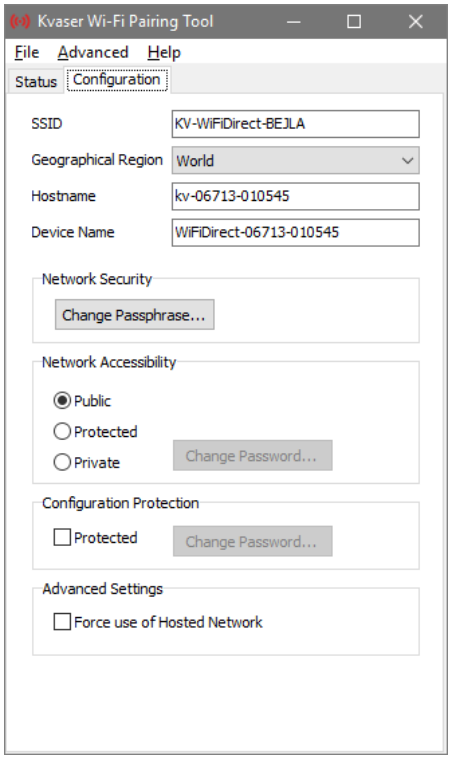

Figure 8: Some configurations are available under the Configuration tab in the Kvaser Wi-Fi Pairing Tool.

Note that some host computer firewalls may interfere with the automatic detection of the newly configured Kvaser BlackBird and needs to be turned off to complete the last step, “Waiting for device to respond via Wi-Fi”.

Now that the Kvaser BlackBird has been successfully paired with the host host computer, you should remove the Kvaser BlackBird from the USB port and apply power to the CAN connector instead. The device will now turn up as a “Remote” device inside the Kvaser Device Guide, see Figure 11 on Page 15.

For information about how to set up a WLAN connection to the Kvaser BlackBird, see the Kvaser BlackBird Getting Started Guide.

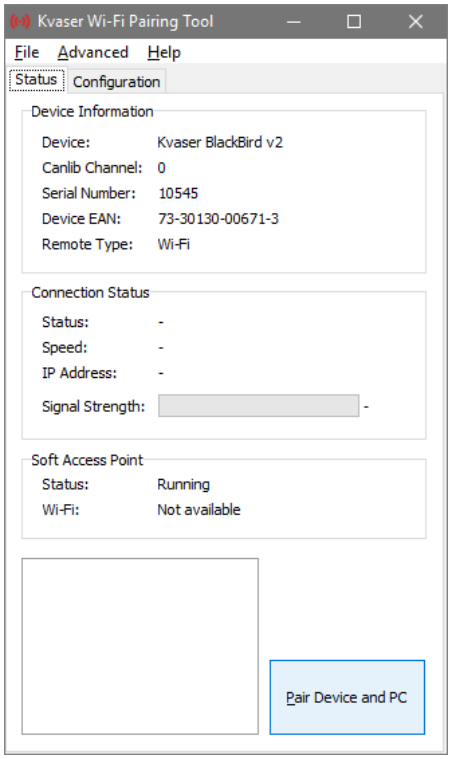

Figure 9: In the Kvaser Wi-Fi Pairing Tool, click “Pair Device and PC” to start the pairing sequence.

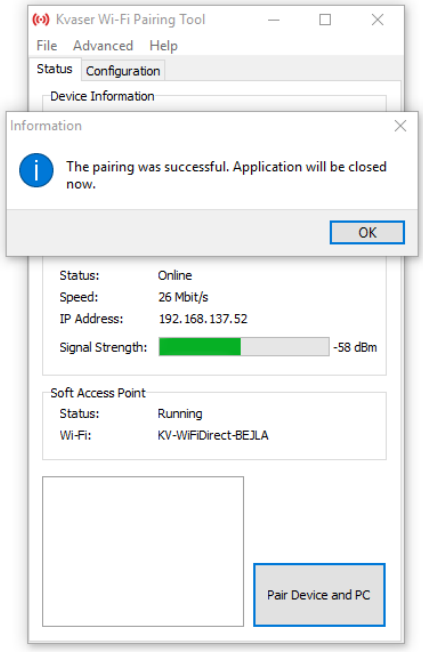

Figure 10: The Kvaser Wi-Fi Pairing Tool have successfully configured our Kvaser BlackBird.

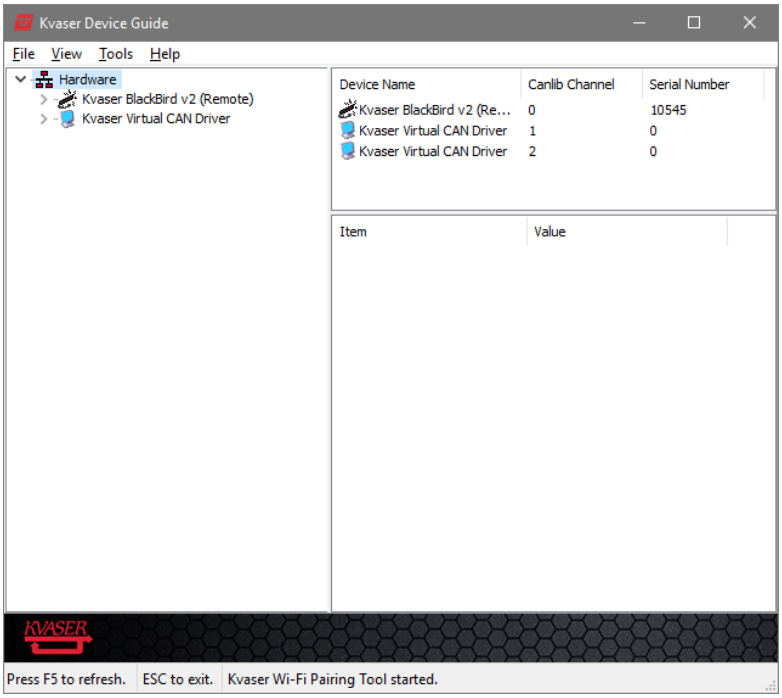

Figure 11: The Kvaser BlackBird is marked as (Remote) to denote that it is now connected via Wi-Fi.

6 Configuring the Kvaser BlackBird

Check that your Kvaser BlackBird is connected via the USB cable to your computer and start the configuration program.

6.1 Starting the configuration program

Start the Kvaser Device Guide and select “Remote Device Configuration” under the Tools menu. This will start the Kvaser Remote Device Configuration program used to configure the Kvaser BlackBird. All configuration changes will be saved in the device’s flash memory.

6.2 Identifying your Kvaser BlackBird

When you start Kvaser Remote Device Configuration, you will be presented with a list of found devices, see Figure 12.

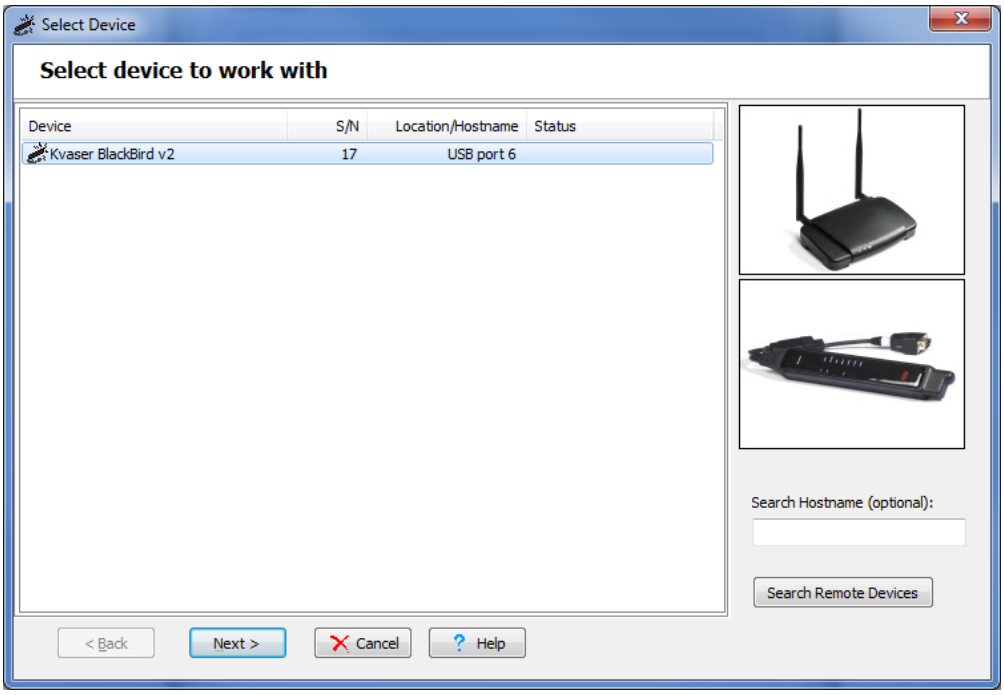

Figure 12: Kvaser Remote Device Configuration starting up.

Select your device in the list and click Next.

If you have more than one Kvaser BlackBird in the list, you can identify a specific unit by the serial number that is printed on the back of the unit. You can also identify a Kvaser BlackBird by right-clicking on it in the list and selecting “Locate Hardware (Flash LEDs)”. The LEDs on the selected device will now flash momentarily.

If your device does not show up in the list of devices, make sure you have connected the unit properly to your USB port. Check that you have installed the drivers and that the Kvaser BlackBird is recognised by the Kvaser Device Guide program as described in Section 3.2, Verifying driver installation, on Page 7.

The first time you connect to the device, the message shown in Figure 13.

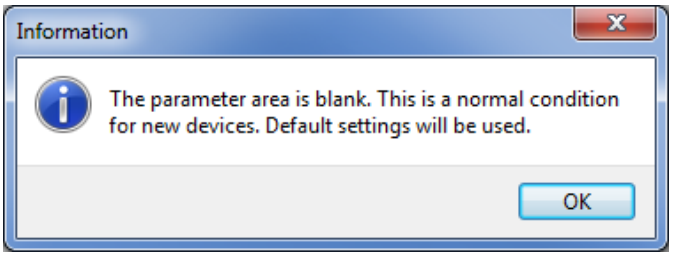

Figure 13: The device parameters are initially blank.

Your Kvaser BlackBird ships without any passwords set. (If you decide to set a password, you will be asked for it next time you connect to the device. In that case, enter the password and click Finish.) For more information about setting a device password, see Section 6.6, Setting device accessibility, on Page 26

Once you have connected the Kvaser BlackBird to the computer and started Kvaser Remote Device Configuration, you will be shown the Status tab, see Figure 14 on Page 18. If you have not configured a connection, the display will show Connection Status as Not Connected.

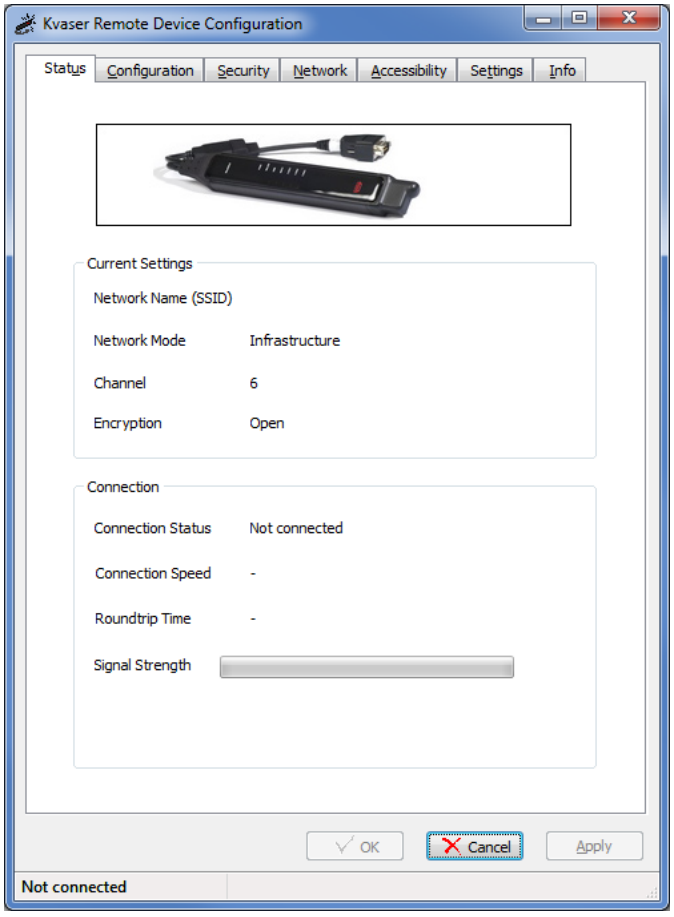

Figure 14: Status tab in Kvaser Remote Device Configuration.

6.3 Selecting WLAN network

You will now enter the name of the WLAN network you are connecting the Kvaser BlackBird to. Go to the Configuration tab, see Figure 15.

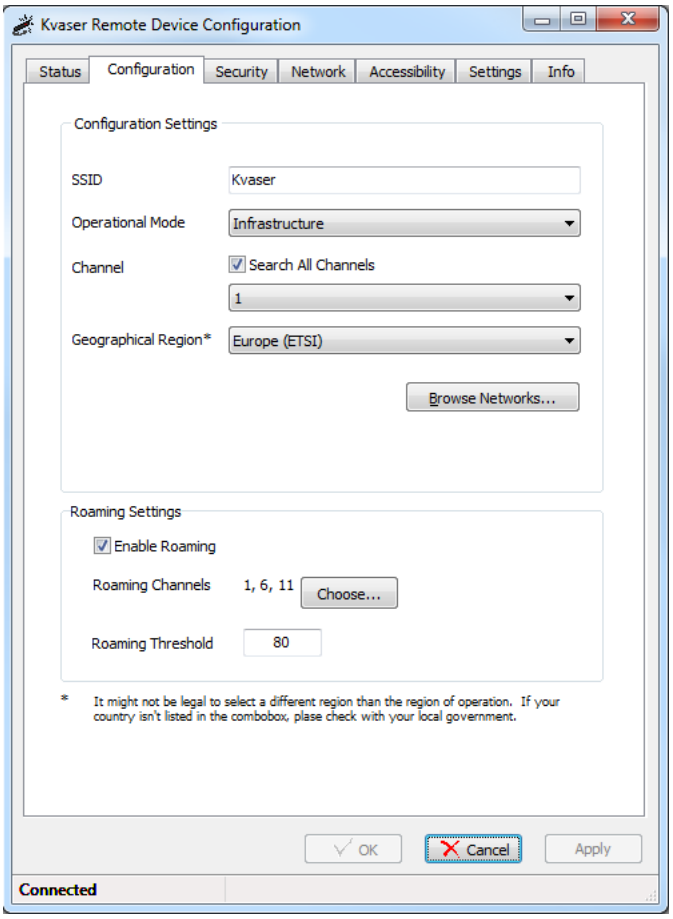

Figure 15: Configuration tab in Kvaser Remote Device Configuration.

Make sure that Geographical Region is set to the correct value. This field ensures that the antenna power and available channels are set according to the specified regulatory domain.

The built in Network Browser provides the easiest way to connect to a network. Note however that it should only be used when the unit is connected through USB. When using ad-hoc mode, make sure you have performed the setup steps described in Section 9, Configuring host computer, on Page 35. Press the Browse Networks button.

6.3.1 Currently available networks

This window accumulates all visible networks, see Figure 16 on Page 20. To clear the list of obsolete networks, you must close this window and then re-open it. Whenever a network is detected its signal strength is shown next to the network's

name. In order to get a stable connection, the signal strength should be better than −70 dBm (as a rule of thumb, −70 dBm is weak, −60 dBm is fair, −50 dBm is good, and −40 dBm is strong).

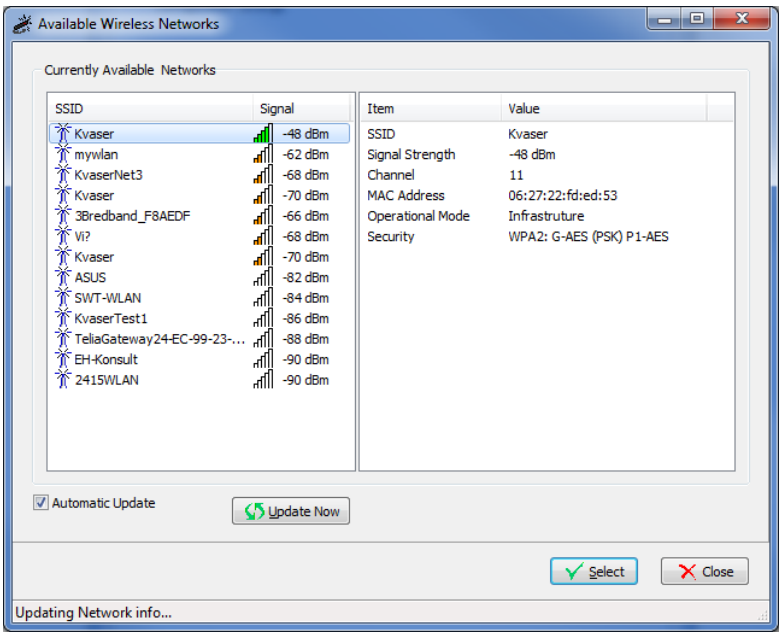

Figure 16: Availible networks in Kvaser Remote Device Configuration.

Wait for your network to show up among the Currently Available Networks. The scanning process can take a little while, so please be patient. When you select the network you would like to connect to, more detailed information about the network is shown in the right pane.

When using ad-hoc mode, make sure the computer is still connected (i.e. a time-out has not disconnected the computer from the network).

Once the desired network is selected, click “Select” and you will be informed that some network specific settings will be copied to your configuration setting. The copied settings include the SSID value, the Operational Mode, and the Encryption Mode. The “Search All Channels” will also be enabled. Click OK to allow the copying of these values.

6.3.2 Multiple APs in a network

You will notice that the same network is listed more than once if you have multiple APs within range. You can identify a specific AP on a network by selecting the network and noting the MAC Address shown in the right pane. Multiple APs within a single network may also use different channels. The current channel is also shown in the right pane.

Normally you will be connected to the AP with the strongest signal strength within a given network. You may override this by manually selecting which channel to use on the Configuration Tab.

6.3.3 Roaming settings

In situations where you know that device will need to roam to another access point, you may want to specify roaming settings. Kvaser BlackBird doesn't roam by default. However, you may turn roaming on by checking 'Enable Roaming' checkbox. In this case, you should also specify which channels the device can roam. If none channels are provided, device will attempt to use default channels, which are 1, 6 and 11 for Kvaser BlackBird. Another value that device needs to know is roaming threshold. It can takes values from 0 to 100 (0 to -100 dBm accordingly) and means the signal strength at which Kvaser BlackBird will consider roaming.

6.4 Setting WLAN keys and security

On the Configuration tab you now have a valid SSID, a correct Operational Mode and Channel setting. In order to connect, you also need to specify the Encryption key used by the network. This is done on the Security tab.

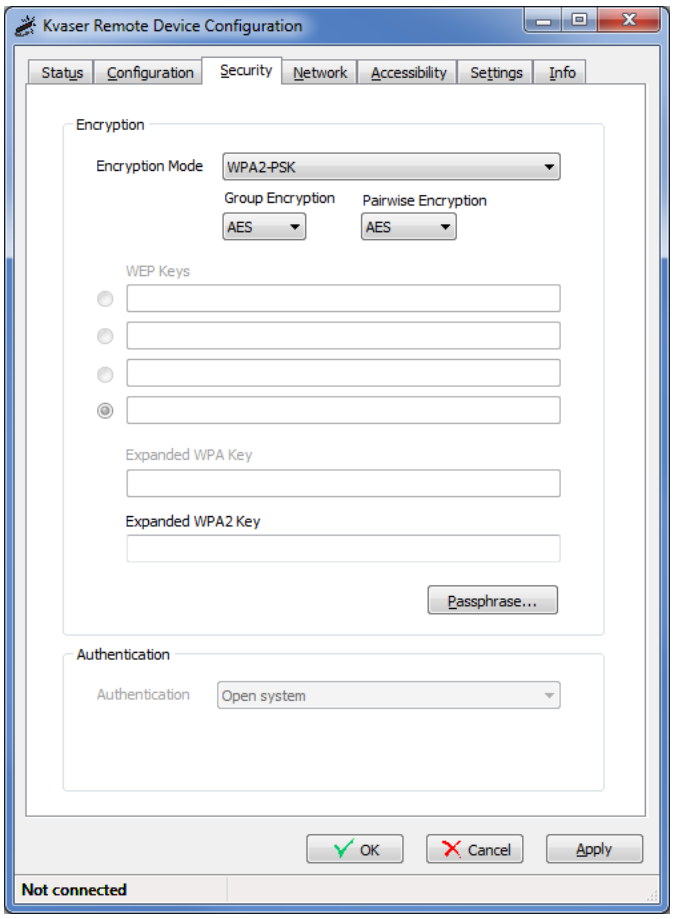

Figure 17: Security tab in Kvaser Remote Device Configuration.

The Encryption mode is already copied when you selected the network, but you

can here specify one of the following Encryption modes:

- Open, or "plain text"
- WEP (64-bit)
- WEP (128-bit)
- WPA with PSK (Pre-shared key) and TKIP encryption
- WPA2 with PSK (Pre-shared key) and AES encryption

If you choose an encryption mode other than Open, you should also use the “Passphrase...” button to generate the encryption keys used. When using WEP, you should also specify the Authentication algorithm used. If you don’t know what encryption mode to select, please read the following sections or ask your network manager.

You may also override the Group and Pairwise Encryptions used (TKIP or AES).

Encryption keys will, for security reasons, never be read from the device, so these fields will be empty whenever you connect to a device, regardless of if they are set or not.

6.4.1 Open, or "plain text"

This Encryption mode means that all data is transferred unencrypted. This is only recommended for initial setup or debugging connection issues.

6.4.2 WEP-64 or WEP-128

When using WEP-64, you must provide a 40-bit-key in hexadecimal format (i.e. 10 hexadecimal digits). For WEP-128 you need a 104-bit-key. There is room for up to 4 keys to be entered. You may also use a passphrase to generate the WEP keys, see Section 6.4.6, Using passphrase to generate keys, on Page 23. Use the radio buttons to the left of the keys to select the key that will be used.

6.4.3 About static WEP keys

Some rules for setting up WEP:

- The Kvaser BlackBird must have one of the WEP keys specified on the AP in order to decode data sent from the AP to the Kvaser BlackBird.
- The AP must have all of the Kvaser BlackBird’s keys so the AP can decode transmissions from the Kvaser BlackBird to the AP.
- The key must occupy the same slot on all nodes (AP and Kvaser BlackBirds). For example, if the AP defines abc123 as WEP key number 3, then the Kvaser BlackBirds must define that same string as WEP key 3.

6.4.4 Authentication algorithm

When using WEP encryption, you can choose the Authentication algorithm:

- Open system means any station may connect to the AP whether that client station has the correct WEP key or not. This algorithm is also used in WPA and WPA2 encryption modes.
- Shared key authentication requires the client station to have the correct WEP key in order to associate with the access point.

Even though a client station is allowed to associate with an access point, this does not ensure the client can exchange traffic with that access point. A station must have the correct WEP key in order to successfully access and decrypt data from an access point, and to transmit readable data to the access point.

6.4.5 WPA-PSK or WPA2-PSK

Both WPA and WPA2 use Pre-Shared Keys (PSK). WPA-PSK uses the Temporal Key Integrity Protocol (TKIP). WPA2-PSK uses Counter mode/CBC-MAC Protocol which uses the Advanced Encryption Algorithm (AES).

6.4.6 Using passphrase to generate keys

Instead of entering the security keys in hexadecimal format, you may use a Passphrase. Click on the Passphrase button and a Generate keys window will open, see Figure 18 on Page 24. This window will allow you to enter a pass phrase and select which types of keys you would like to generate.

For WPA-PSK and WPA2-PSK encryption modes, the key generation is based upon the network SSID, so make sure that the correct network name is entered in the SSID field.

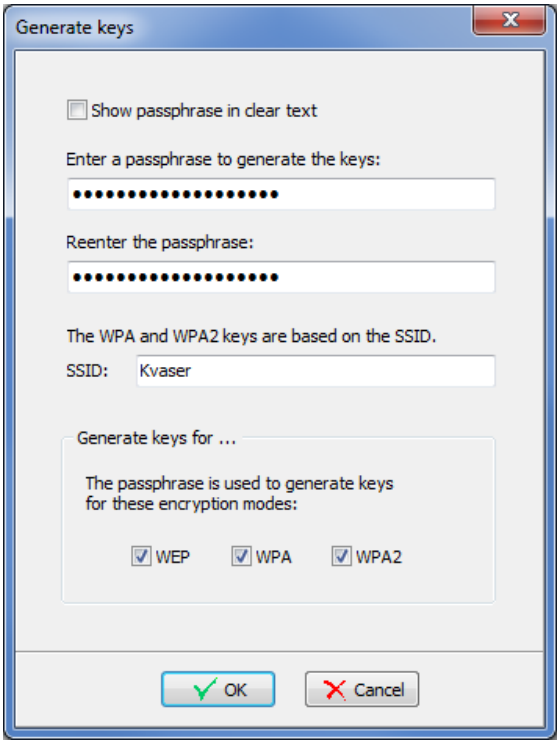

Figure 18: Generating network keys.

6.5 Network setup and device name

We should now configure an appropriate Device name and choose an address assignment method. This is done under the Network tab, see Figure 19 on Page 25.

If you are not sure about your network's configuration, check with your network manager. In infrastructure mode, the default selection of DHCP (automatic IP address assignment) will be the desired selection. If your network requires a static IP address, you will need to manually enter the IP address, network mask, and gateway IP address. When using static IP, see Section 9.1, Setting static IP on your computer, on Page 35 for details on how to set a static IP on your computer.

In the Device Name box, you can enter a descriptive name of the device. This name will be visible when you browse the network using the tool described in Section 7, Selecting the device from the network, on Page 31.

Clicking on the Apply or OK button will save the configuration to your Kvaser BlackBird and restart it. You may edit more than one tab before clicking Apply/OK.

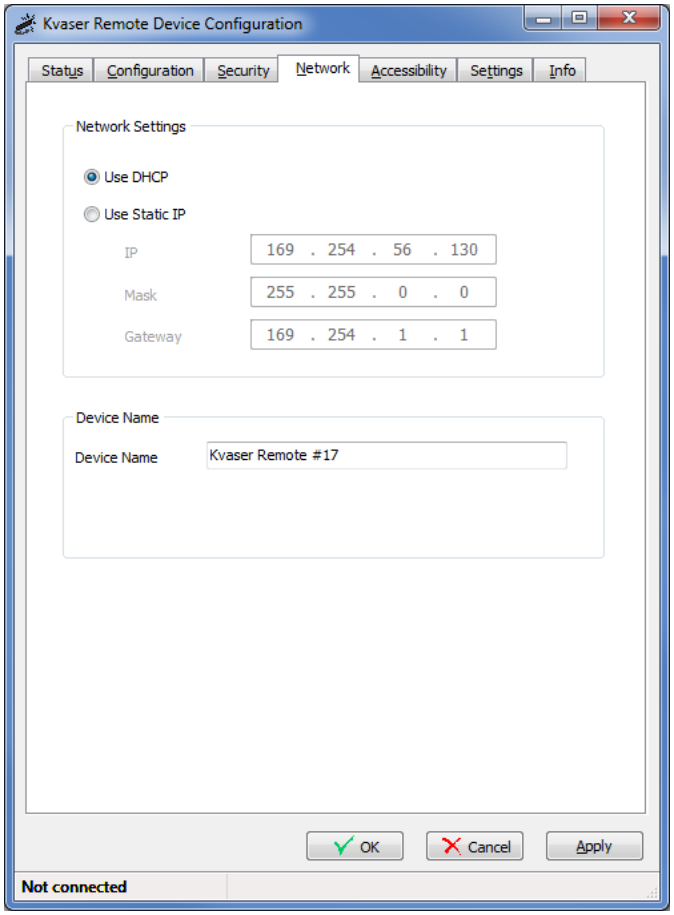

Figure 19: Network tab in Kvaser Remote Device Configuration.

6.6 Setting device accessibility

On the Accessibility tab (see Figure 20) you can optionally set two different passwords to protect your device.

1. A network connection password. When set, it is required each time a computer tries to connect to the Kvaser BlackBird. This password prevents unauthorized network access to your Kvaser BlackBird.
2. A flash parameter password. When set, it is required each time you or someone else wants to read or change the parameters in the flash memory of the Kvaser BlackBird.

If you forget your flash parameter password, you have the option to reset the password when you connect the Kvaser BlackBird. However, this reset will also erase all settings back to the factory default values.

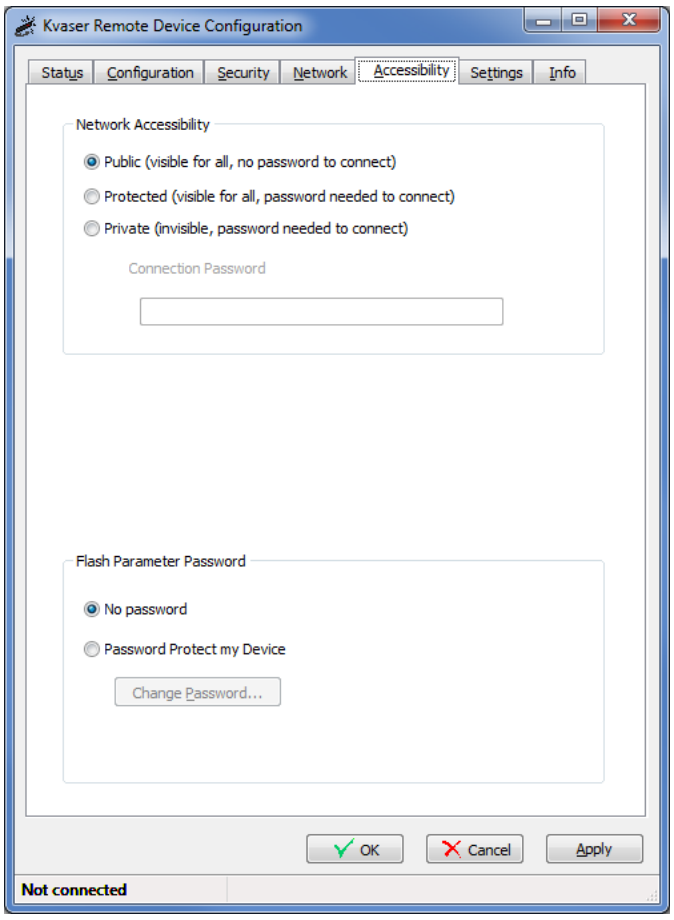

Figure 20: Accessibility tab in Kvaser Remote Device Configuration.

The network accessibility can be set to any one of the following three modes:

Public The device is visible to and usable by anyone on the network, and no password is required to connect.

Protected The device is visible in the network setup program, but it cannot be used from a computer without supplying the network connection password.

Private The device is not visible in the network setup program. Anyone who wants to use it must know its network address and must supply the network connection password.

6.7 Save the configuration

The device is now configured. Save the parameters to the device by clicking the Apply button. The device will restart. After about 5-10 s you should see the device trying to connect to the WLAN in the status bar.

6.8 Verifying the WLAN connection

When connecting to the computer in ad-hoc mode, make sure that the computer is still connected (i.e. a timeout has not caused the computer to disconnect from the network). Returning to the Status tab, see Figure 21 on Page 28:

1. The connection status should become Connected.
2. The connection speed should be between 1 and 54 Mbit/s (ad-hoc is supporting max 11 Mbit/s) depending on the received signal strength and data amount to be sent.
3. The signal strength should be better than −75 dBm.

You may want to check the Info tab as well, see Figure 22 on Page 29, and verify that the “Device IP Address” is a valid address on your network. The Info tab in the Kvaser Remote Device Configuration tool will also show general information about the device such as MAC address, and hostname.

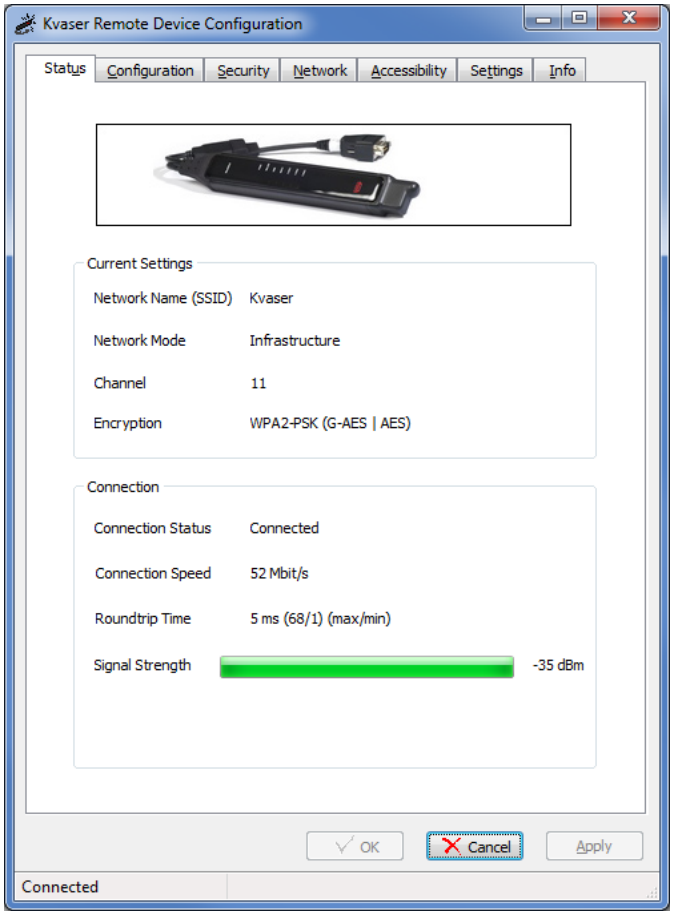

Figure 21: Network connected in Kvaser Remote Device Configuration.

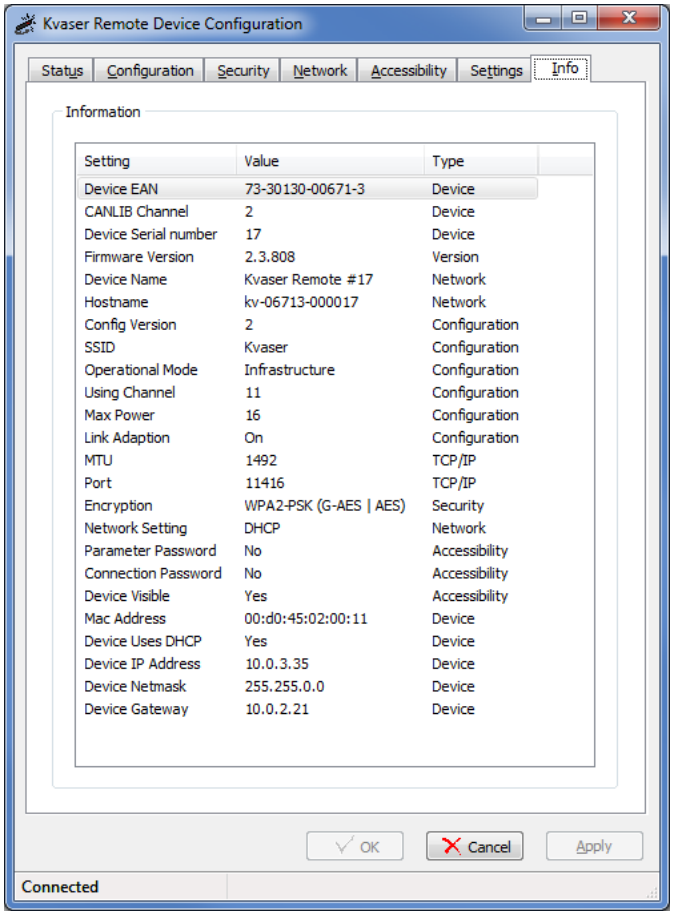

Figure 22: Info tab in Kvaser Remote Device Configuration.

6.9 Supplying external power to the device

Before you can start using your Kvaser BlackBird, you have to end the Kvaser Remote Device Configuration and remove the device from USB.

Don't forget to supply external power to the device. See your Kvaser BlackBird user's guide for more information.

7 Selecting the device from the network

7.1 Starting the Kvaser Network Device Selector

The next step is to see if the device can be spotted on the network. This is done through the Kvaser Device Guide using the Network Device Selector, which is located under the Tools menu.

7.2 Selecting the device you want to use

When Kvaser Network Device Selector is started, a list of discovered devices will be shown.

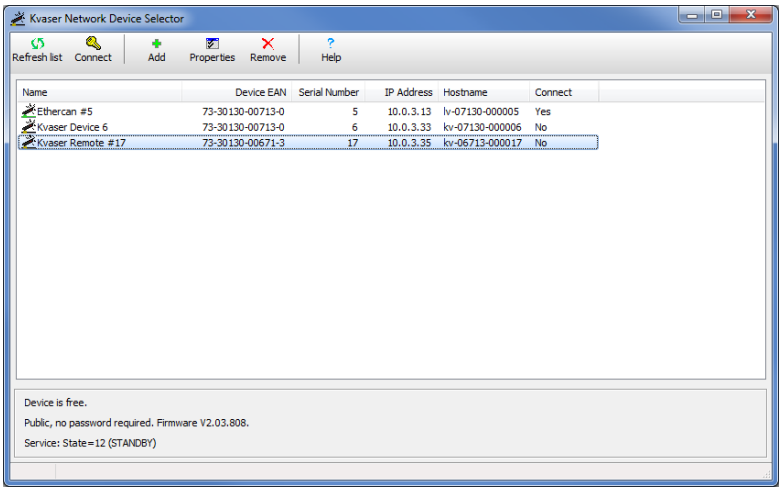

Figure 23: Detected remote devices in Kvaser Network Device Selector.

Your device should appear in the list of discovered devices, see Figure 23, select it and click the “Connect” button.

You may need to press the “Refresh list” button to update the list. The value in the Connect column should be “Yes” for your device.

When you select a device from the list in the Kvaser Network Device Selector window, status information about the connection will be displayed in the lower half of the window, see Figure 24 on Page 32

In Figure 24 on Page 32, we can see that the device is being configured via USB. This makes it unavailable for remote network useage. We can also see that the service isn’t running on the local machine. It must be started before a connection can be made.

If the connection status is “Device is being configured...”, close the Kvaser Remote Device Configuration program from the previous section (and unplug the device from the computer’s USB port).

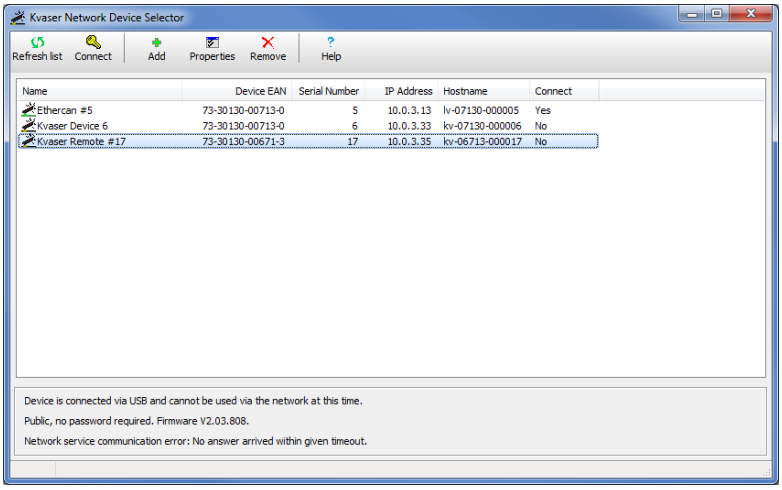

Figure 24: Verifying connection status in Kvaser Network Device Selector.

If the connection status is “Device is connected via USB...”, unplug the device from the computer’s USB port.

Don’t forget to supply external power to the device, see Section 6.9, Supplying external power to the device, on Page 30.

7.3 Finding new hardware

The Network Enumerator Service will now discover the device and the driver will be installed.

If the driver was not installed, make sure that the Network Enumerator Service is running by going to Control Panel -> Administrative Tools -> Services. Locate KvEnumSrv and check the status.

7.4 Verifying connection status

Figure 25 on Page 33 shows what it looks like when the connection is established. Our device, “Kvaser Remote #17”, is connected to the computer Gram.kvaser.se at network address 10.0.3.35. The device driver service says CONNECTION UP, which means that the driver is installed and the computer is connected.

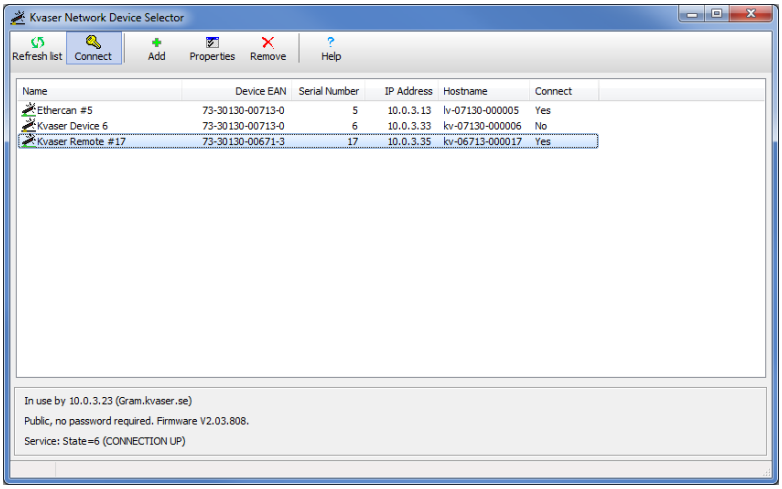

Figure 25: Connection with the device have been established.

8 Using Kvaser BlackBird from your software

You can use the Kvaser BlackBird from any program that uses the CANlib API. You can view the channel information in Kvaser Device Guide by selecting a channel under the Kvaser BlackBird (Remote), see Figure 26.

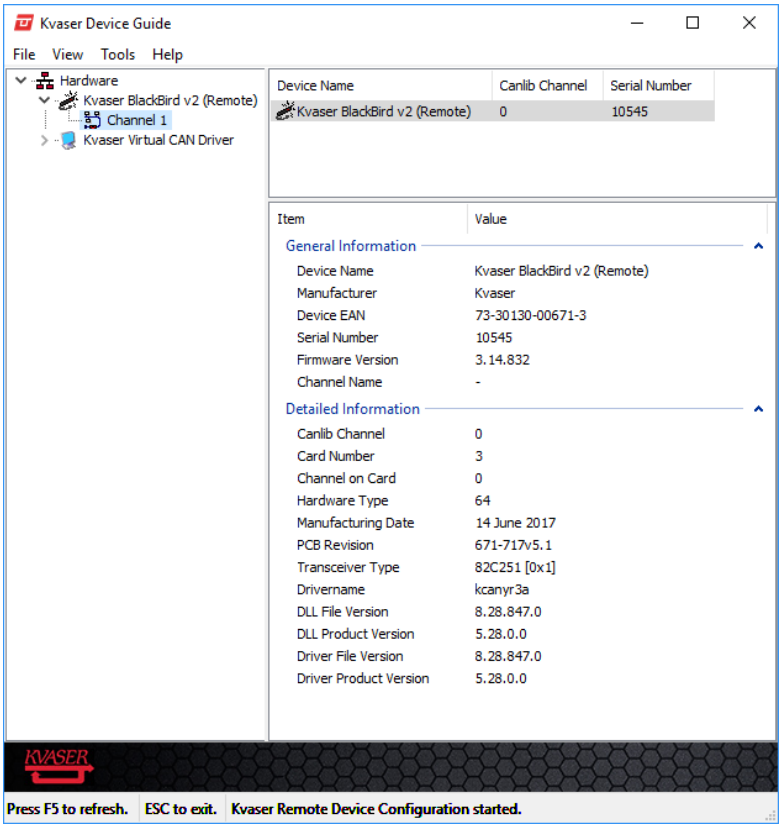

Figure 26: Channel information in Kvaser Hardware.

9 Configuring host computer

When connecting the Kvaser BlackBird directly to a computer, using either ad-hoc or Wireless Hosted Network, you must configure the computer. This configuration includes setting up a static IP (see Section 9.1 Setting static IP on your computer) and the wireless network (see Section 9.2, Setting up Wireless Hosted Network on your computer, on Page 36 or Section 9.3, Setting up an ad-hoc network on your computer, on Page 39).

If you are using infrastructure mode and DHCP, you can skip this chapter.

9.1 Setting static IP on your computer

To connect to the Kvaser BlackBird in ad-hoc mode or via a Wireless Hosted Network, you most likely need to set a static IP address and Subnet mask on your computer.

The IP address and net mask must be set so that the computer and Kvaser BlackBird can talk to each other. You can do this by using the following example:

	Kvaser BlackBird	Computer
IP address:	192.168.20.21	192.168.20.5
Subnet mask:	255.255.255.0	255.255.255.0
Default gateway:	192.168.20.5	192.168.20.5

Table 2: Example of Static IP settings

The example in Table 2 may or may not be usable on your network (check this with the person responsible for your network), but it is important to put the Kvaser BlackBird and the computer on the same subnet by:

1. Give them different IP addresses.
2. Give them the same Subnet mask.
3. Give them the same Default gateway, most likely you can use the IP address of the computer as gateway.

This is how you would configure the computer in Windows 7, see Figure 27 on Page 36:

1. Open up the Network Connections (Start->Control Panel->View network status and tasks->Change adapter settings)
2. Select the wireless network connection you want to use for the Kvaser BlackBird communication. Right click and select Properties.
3. In the Wireless Network Connection Properties, scroll down the list and select Internet Protocol Version 4 (TCP/IPv4). Click on the properties button.

4. In the Internet Protocol (TCP/IP) Properties you should select “Use the following IP address” and enter your static IP address and subnet mask. The Kvaser BlackBird is currently not accessing any DNS server, so you may leave these fields empty.
5. Click OK
6. Click Close to apply the new settings.

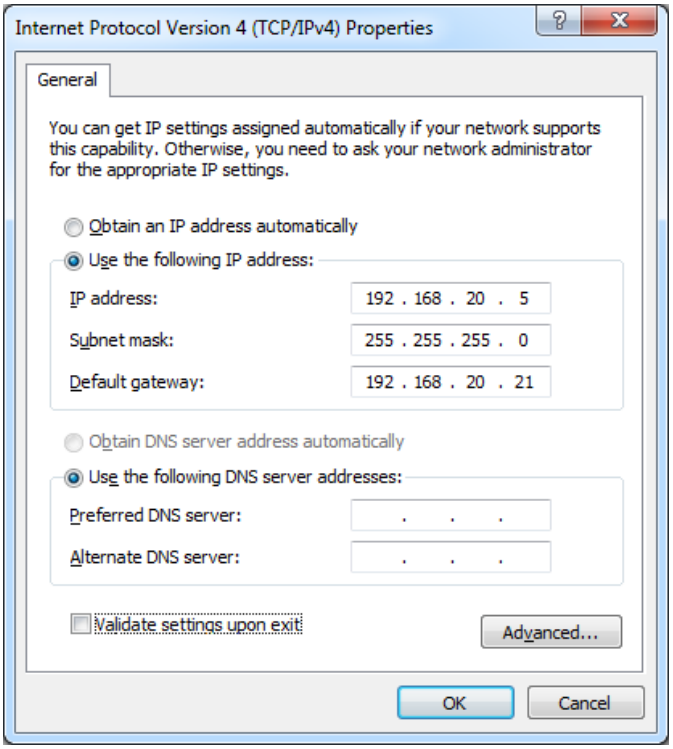

Figure 27: Setting static IP in Windows 7.

9.2 Setting up Wireless Hosted Network on your computer

Windows 7 introduced “Wireless Hosted Network” as a replacement for ad-hoc network and is configured from the command prompt.

Start by opening a command prompt as administrator. On Windows 7, type `cmd` into the Start Menu search box, right click `cmd.exe` and select “Run as administrator”, see Figure 28 on Page 37.

Now verify that your wi-fi network card is capable of running a hosted network by running:

```
C:\>netsh wlan show drivers
```

It should show “Hosted network supported: Yes”, see Figure 29 on Page 37.

To set up the hosted network type:

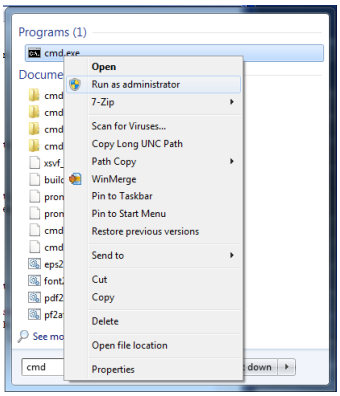

Figure 28: Starting command prompt as administrator.

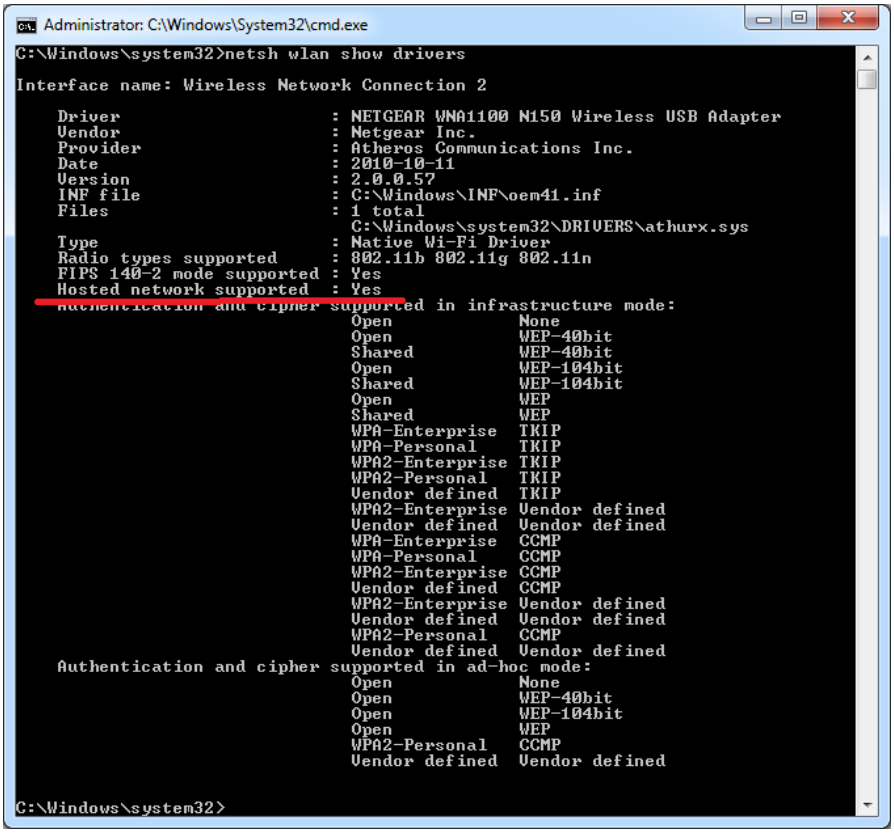

Figure 29: Wireless adapter supports hosted network.

```
C:\>netsh wlan set hostednetwork mode=allow ssid=mynet key="passphrase"
```

Hosted Networks automatically uses WPA2-PSK (AES) encryption and the key must be between 8 to 63 ASCII characters. In addition, wireless Hosted Networks do not automatically restart after the computer resumes from sleep, hibernate, or restarts. However, if used, a third-party utility might initiate a reconnection.

To start the hosted network, type:

```
C:\>netsh wlan start hostednetwork
```

To stop the hosted network, type:

```
C:\>netsh wlan stop hostednetwork
```

See Figure 30 for example output.

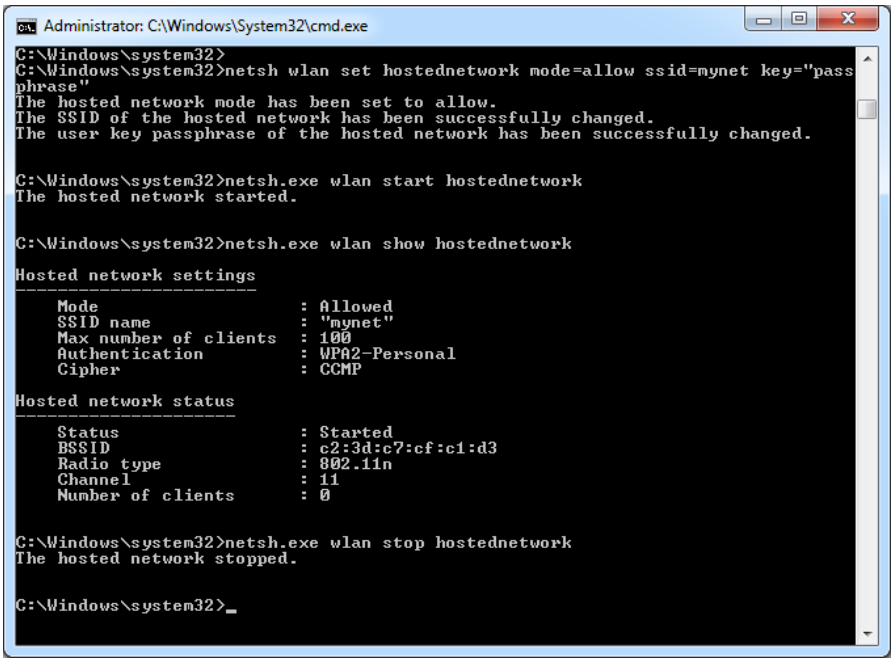

Figure 30: Example of setting up, starting and stopping a hosted network.

Windows will set the IP address of the Wireless Hosted Network to 192.168.173.1 (with netmask 255.255.255.0). This IP may be changed via the registry setting, see Table 3.

Hive	HKEY_LOCAL_MACHIME
Key	\SYSTEM\CurrentControlSet\services\SharedAccess\Parameters
Name	ScopeAddress
Name	ScopeAddressBackup
Name	StandaloneDHCPAddress

Table 3: Registry keys for setting IP of Wireless Hosted Network.

The Wireless Hosted Network typically starts a DHCP server, you can verify this by using 'ipconfig /all' and examine the entry for the Hosted network. If you still would like to set a static IP address to the Kvaser BlackBird, see Section 6.5, Network setup and device name, on Page 24.

9.3 Setting up an ad-hoc network on your computer

If you want to connect to your Kvaser BlackBird in ad-hoc mode, you need to configure your network card for connecting to an Ad-hoc network. Since the ad-hoc network lacks a DHCP server you also need to assign a static IP address first, see Section 9.1, Setting static IP on your computer, on Page 35.

Windows 8 no longer support ad-hoc mode, instead use the replacement (introduced in Windows 7) called "Wireless Hosted Network", see Section 9.2, Setting up Wireless Hosted Network on your computer, on Page 36.

This is how you would set up an ad-hoc network called MyAdHocNet:

1. Open up the Network and Sharing center (Start->Control Panel->Network and Sharing Center).
2. Click "Set up a new connection or network".
3. Scroll down and select "Set up a wireless ad-hoc (computer-to-computer) network" and click Next.
4. Set your network name and select Open or WEP as security type. If you selected WEP, also enter a Security key, see Figure 31 on Page 40.

   See Section 6.4, Setting WLAN keys and security, on Page 21 for the corresponding settings of the Kvaser BlackBird. The computer and Kvaser BlackBird must have identical settings. If you choose WEP as the encryption method, Windows will allocate the same key for all key indexes. (See Section 6.4.3, About static WEP keys, on Page 22 for more information about keys and key indexes.)

   We recommend trying Open network authentication without any data encryption to get the communication with the Kvaser BlackBird working. Later you can repeat this setup adding encryption.

A confirmation dialog will open up and the ad-hoc network is now ready for connection, see Figure 32 on Page 40.

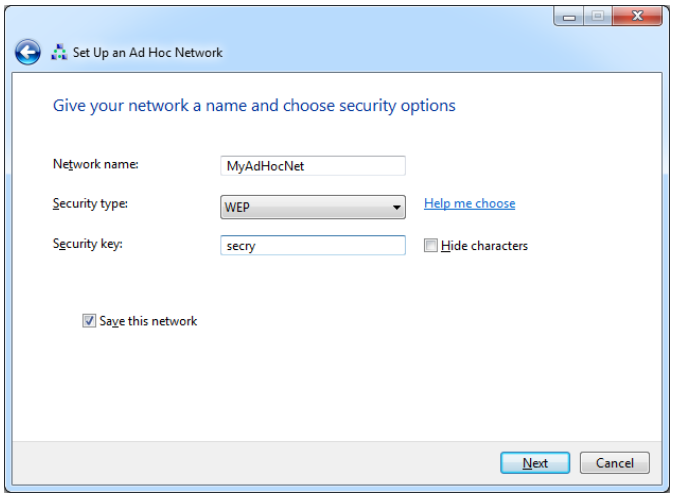

Figure 31: Setting up ad-hoc network in Windows 7.

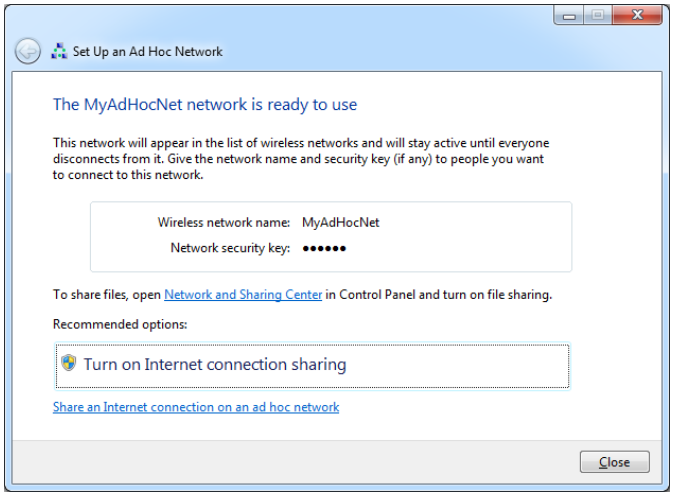

Figure 32: Setting up ad-hoc network in Windows 7.

9.4 Connecting your computer to the ad-hoc network

View available networks by selecting Start->Control Panel->Network and Internet->Connect to a network, see Figure 33.

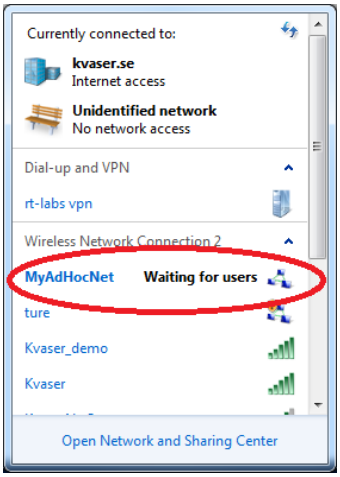

Figure 33: Selecting wireless network in Windows 7.

If it is not already connected, right click on the network and select “Connect”.

Since we haven’t configured the Kvaser BlackBird, the computer will not find any devices yet. You can safely leave this running and continue below.

You should now go back to Section 6, Configuring the Kvaser BlackBird, on Page 16.

10 Troubleshooting

This section describes what to check if the connection does not work as expected.

10.1 Check the LEDs

The PWR LED (green) should be illuminated.

The WLAN LED (blue):

- LED flashes about once per second (0.8 s period to be exact). Something went wrong during start up. Try disconnecting the CAN and USB connectors and then reconnecting.
- LED gives a steady blue light when connected to the Network Enumerator Service via a network with good signal strength.
- LED gives a slow steady blink (on for about 1.8 s, than off for about 1.8 s) when disconnected from the Network Enumerator Service, but connected to a network with good signal strength.

If the signal strength of the network is poor, the steady part of the WLAN LED signal described in the two cases above will start to blink. The frequency of the blinking will increase as the network connection gets worse. For example, if you have a connection to the Network Enumerator Service like above, but with poor signal quality, you will see a continuously pulsating LED. If you get disconnected from the Network Enumerator Service, the WLAN LED blinking will consist of fast blinking for 1.8 s and then off for 1.8 s.

10.2 Check connected status

The Kvaser Remote Device Configuration program should display “Connected”. If not, you may have an authorization problem. Check the WLAN passphrase, security keys, encryption, and authorization mode.

10.3 Check signal strength

The Kvaser Remote Device Configuration program should indicate a signal strength between (circa) −70 dBm and −30 dBm.

10.4 Check WLAN security settings

If the Connection status is something other than Connected in the parameter setter, check:

- WLAN encryption and/or authorization modes must agree with the settings in the WLAN access point. Most corporate networks are probably using WPA or WPA2.
- The key is pre-shared and must be the same in the access point and in the Kvaser BlackBird.
- Check that you have typed in the key or passphrase correctly. The pass phrase is case sensitive.

Check the WLAN encryption and authorization mode with your network administrator. You can also use the Browse networks button in the parameter setter, select the network in question from the list, and see some technical details for that network in the pane to the right.

Some networks may have firewall rules that prevent unknown devices from connecting to the network. Make sure you are allowed to connect.

10.5 Scan for networks

Use the Browse networks button in the parameter setter to check that the WLAN network you want to connect to is listed.

10.6 Check IP number and network mask

If you have opted to use DHCP, check in the Info tab of the parameter setter that a reasonable IP number has been assigned. If you have set a static IP, make sure both the IP number and Network mask are correct.

10.7 Check that your computer and Kvaser BlackBird recognize each other (ad-hoc mode)

View available networks by selecting Start->Control Panel->Network and Internet->Connect to a network, see Figure 34 on Page 44.

The status should say Connected.

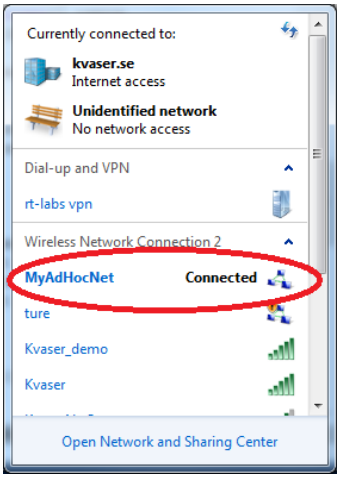

Figure 34: Selecting wireless network in Windows 7.

10.8 Check channel number when using ad-hoc mode

It is strongly recommended that you follow the steps described in this document to connect to your Kvaser BlackBird in ad-hoc mode. This means; first connect your computer to the ad-hoc network, and then connect the Kvaser BlackBird via the built in Network Browser. This ensures that the correct channel is set (the channel is not set to “Automatic”).

Some computer (most notable are computers with Intel 3945abg WLAN chip) only connect to ad-hoc networks on a fixed preset channel. So it can find the Kvaser BlackBird ad-hoc net, but tries to connect to it on its own predefined channel, regardless of which channel the Kvaser BlackBird is using.

If you don’t use the built in Network Browser, you must manually make sure that the channel settings of all devices on the ad-hoc network are set to use the same channel number.

10.9 Check the WLAN link with the ping command

If the Kvaser BlackBird shows up in the Kvaser Network Device Selector list, right-click on the device and select Ping (ICMP). If the Kvaser BlackBird is not listed, you can use windows built-in ping program to verify that the Kvaser BlackBird is connected to the network.

On Windows 7, type `cmd` into the Start Menu search box and press Enter. In the command window that appeared you now enter the ping command. If your Kvaser BlackBird’s IP address was set to 192.168.20.21, you should write "ping 192.168.20.21" and hit <Return>, see Figure 35 on Page 45.

If you get a reply, which looks something like the one in Figure 35 on Page 45, you can talk to your Kvaser BlackBird and the WLAN link is working.

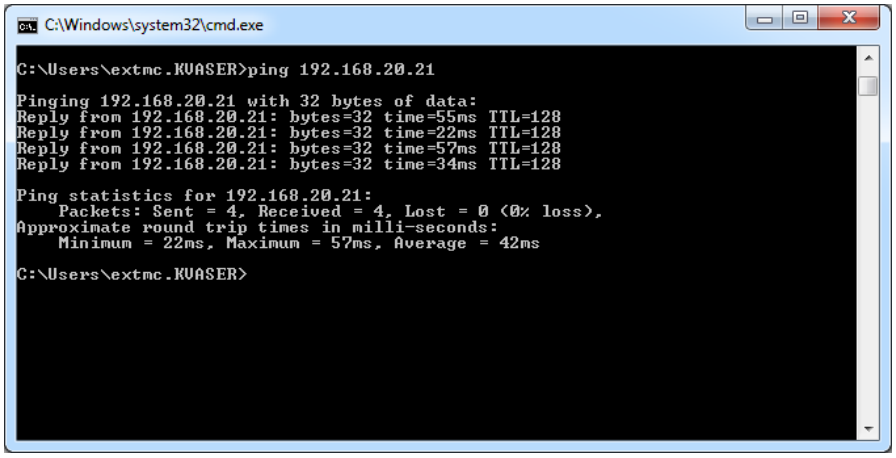

Figure 35: Checking the WLAN link with ping.

10.10 Connect to the built-in web server

The Kvaser BlackBird has a built-in web server that can be enabled on the Settings tab in the Kvaser Remote Device Configuration tool, see Figure 36 on Page 46.

If the Kvaser BlackBird is listed in the Kvaser Network Device Selector list, right-click on the device and select Connect to web server. Your web browser will open and display a page. This web page is not very interesting. However, if this does not work, you may have some type of firewall problem.

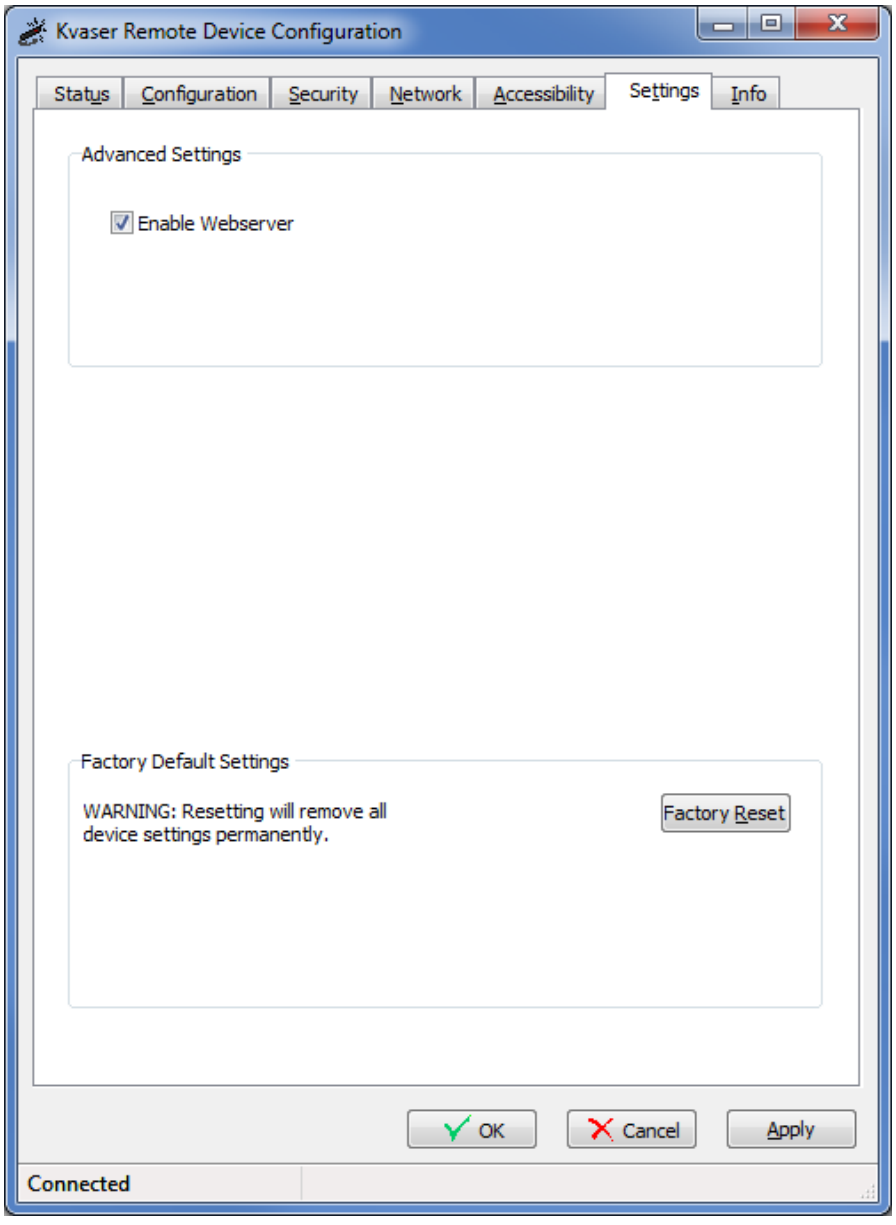

Figure 36: Enable webserver for debugging.

10.11 Scan for Kvaser BlackBirds

Using the Kvaser Network Device Selector tool, scan the network once again. Check the LEDs on the Kvaser BlackBird. The INFO LED should flash a few times when scanning is in progress.

10.12 Add the device manually

In the Kvaser Network Device Selector tool, press the “Add” button. The following dialog will appear:

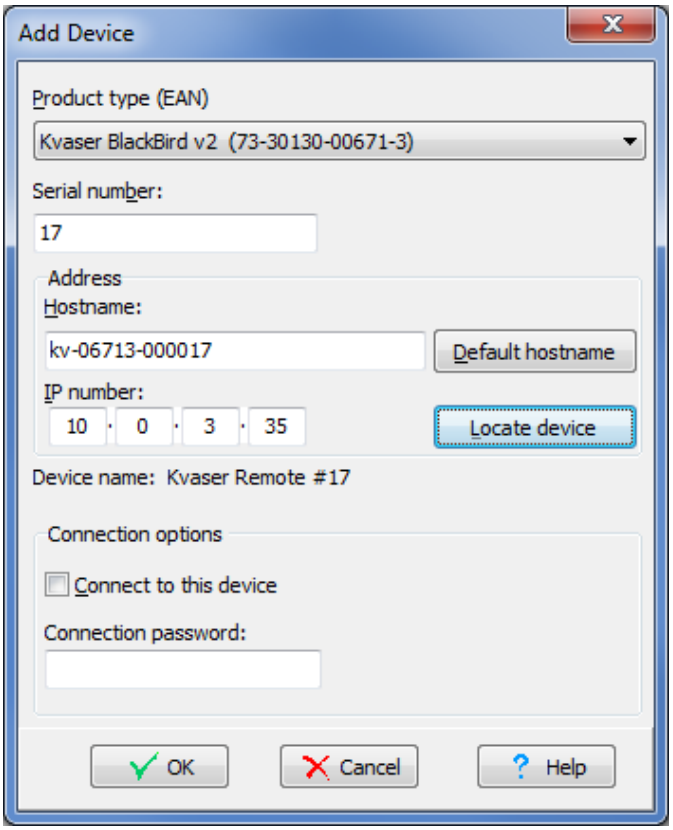

Figure 37: Adding device manually.

If the Kvaser BlackBird is absent from the scan list, you can manually enter the device data here.

- Enter IP number. If you don’t know the IP number you should enter the hostname. If you have not set an explicit hostname, you can select the EAN, enter the serial number and use the “Default hostname” button to generate and fill in the default hostname (based on EAN and serial number).
- You can use the “Locate device” button to check whether the device is reachable. (This will also update EAN, serial number and hostname if the device is found.)

- If a different IP number or hostname are found during locating device, there will be a prompt asking if you want to use that information instead.
- Check “Connect to this device” if you want the service to connect to the device whenever it becomes available.
- Enter the network connection password for the device, if needed.

Press OK to apply the settings.

If the device is reachable when you press the “Locate device” button, but it is missing from the scan list until you enter the unit manually, then you probably have a firewall in the computer that is blocking some of the traffic.

10.13 Service status indications

CONNECTION_UP means the service has established a connection to the device.

STANDBY means the device is in the list but the service isn’t trying to use it.

UNWILLING means some type of connection problem. Maybe the device is in use already, maybe it is being configured via USB, or maybe the connection password is wrong.

10.14 Disconnect USB cable

The service will not be able to connect to the Kvaser BlackBird under any one of the following conditions:

1. The USB cable is connected.
2. Someone is configuring the device.
3. Another service is already connected to the device.

10.15 Scanning will not detect devices on other IP networks

The scanning process will only detect Kvaser BlackBirds on the local network. If the Kvaser BlackBird you are trying to use is behind a router of any kind, you must add it manually to the list.

10.16 Restart the service

This should not normally be necessary, but as a troubleshooting measure you can stop the service and start it again. Use Control Panel -> Administrative Tools -> Services and locate KvEnumSrv.

10.17 Check your firewall

The default port number used by the Kvaser BlackBird is 11416. This port is used for both UDP and TCP and should be open for both incoming and outgoing traffic (both TCP and UDP) on your firewall. The Kvaser Network Device Selector tool might also need authorization from you. Consult your firewall software documentation for how to do this.

10.18 Check for other programs running

If the service indicates a status of CONNECTION_UP but you can't see the device in Kvaser Hardware, check if the parameter setter program, or any other program using the Kvaser BlackBird, is running (with the exception for the network setup program). If so, close them and try again.

11 Document Revision History

Version history for document IN_98027_blackbird_getting_started:

Revision	Date	Changes
1	2008-04	Initial version.
2	2008-05-05	Updated screenshots, layout changes, several paragraphs cleaned up.
3	2009-09-25	Minor editorial changes.
4	2011-01-17	Added more info about ad-hoc 11 Mbit/s limit. Added more chapters to the Troubleshooting section. Updated minimum CAN bus supply voltage. Minor editorial changes.
5	2014-01-27	Updated for Windows 7. Changed layout of references, figures.
6	2014-04-15	Renumbered pages.
7	2014-08-12	Updated screenshots and description texts.
8	2015-05-13	Added information about roaming settings.
9	2016-09-29	Most Wireless Hosted Networks has a dhcp server running.
10	2018-09-13	Added chapter about Wi-Fi pairing tool.
11	2019-06-17	“Kvaser Device Guide” has replaced “Kvaser Hardware”.
11.1	2019-08-09	Url protocol updated.
11.2	2020-03-24	Figure 3 now showing USB connected device.
11.3	2022-03-02	Minor textual changes.
11.4	2024-03-15	Updated Kvaser logo.