

**R60**  
**USB to CAN interface**  
**Manual (1.4 EN)**

## **General information**

R60 USB to CAN interface  
Manual

Version 1.4 EN, 04/2009, DOC01586

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# 1. R60 USB to CAN interface

This manual describes the facilities and functions of the hardware and the installation of the necessary software (driver) of the R60 USB to CAN interface.

A detailed description of the d&b Remote network (CAN-Bus) is given in the technical information TI 312 which is provided with the CD-ROM or can be downloaded from our website at [www.dbaudio.com](http://www.dbaudio.com). We recommend to regularly check the d&b website for the latest version of the documentation (R60 manual and TI 312).

## 1.1. Intended use

The R60 USB to CAN interface is designed to connect the d&b Remote network (CAN-Bus) to a PC via USB (**U**niversal **S**erial **B**us) and must only be used within a d&b sound reinforcement system.

The R60 provides two RJ 45 CAN connectors with a built in switchable terminator and comes with drivers for Windows® operating systems. Up to five R60 interfaces may be connected to a PC and simultaneously operated by the R1 software.

## 1.2. General safety instructions

**WARNING!** The R60 USB to CAN interface must not be used in applications where there is a potential risk of personal injury caused by malfunction or complete drop out of the unit.

Installation and start up must only be carried out by qualified technicians.

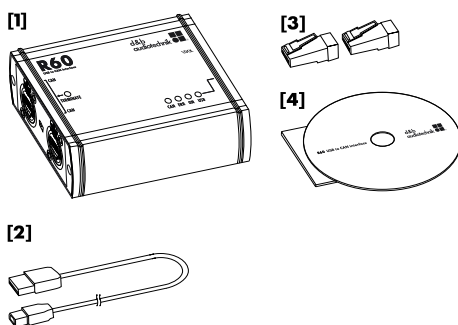
In case of a malfunction or doubts concerning the proper functioning of the device, please contact d&b audiotechnik for further information or advice.

As the device does not contain any components to be maintained or repaired by the user, the enclosure must not be opened. The device can only be repaired by d&b audiotechnik.

## 1.3. Scope of supply

Before installation and start up please verify the shipment for completeness and carry out a visual inspection of the packaging and the individual items listed below for obvious damage during shipment.

**NOTICE:** If there are any signs of obvious damage to the items, do not connect and operate the device.



Qty.	d&b Code	Description
1	Z6118	R60 USB to CAN interface [1]
1		Standard USB cable 0.5 m (1.6 ft) [2] (Connector type A to type B)
2	Z6116	RJ 45 M Terminator [3]
1		CD-ROM (containing the driver software, R60 manual and additional documentation – TI 312) [4]

**1.4. Technical specification**

**Power supply**

Supply voltage.....5 V, powered via USB Bus  
 Current drawn.....< 100 mA  
 Temperature range.....0 – 60 °C

**Controls and indicators**

Termination.....built in switchable terminator  
 .....Termination of CAN-Bus with internal resistor 120 Ω/ 1/4 W / ± 5%  
 .....with corresponding status LED  
 Indicators (Status LEDs).....ON, USB, CAN, ERROR, TERMINATE

**Connectors**

USB.....1 x USB Type B connectors  
 CAN.....2 x RJ 45 connectors, wired in parallel

**Hardware**

Controller.....8 Bit  
 Flash Memory Size.....32 k  
 SRAM Size.....128 kB  
 EEPROM Size.....2 kB  
 Additional features.....CAN galvanically isolated

**CAN Specification**

.....2.0 A/B  
 CAN-Bus coupling.....High Speed, according to ISO 11898  
 Max. CAN Baud Rate.....1 Mbit/s

**USB Specification**

USB Baud Interface.....USB 1.1  
 USB Buffer Memory.....256 messages

**PC Requirements**

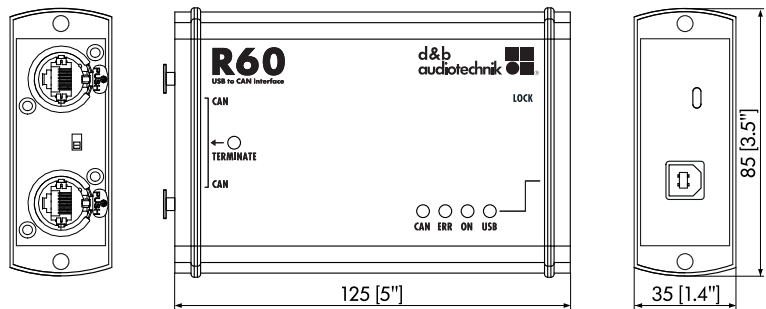
.....min. Pentium CPU, 32 MB RAM, 10 MB free disk space

**Supported Operating Systems**

.....Windows® 2000, XP  
 .....Mac OSX®

**Housing/Dimensions**

Housing.....Extruded aluminium  
 Dimensions (Height x width x depth).....125x85x35 mm [5" x 3.5" x 1.4"]  
 Weight.....200 g (0.45 lb)



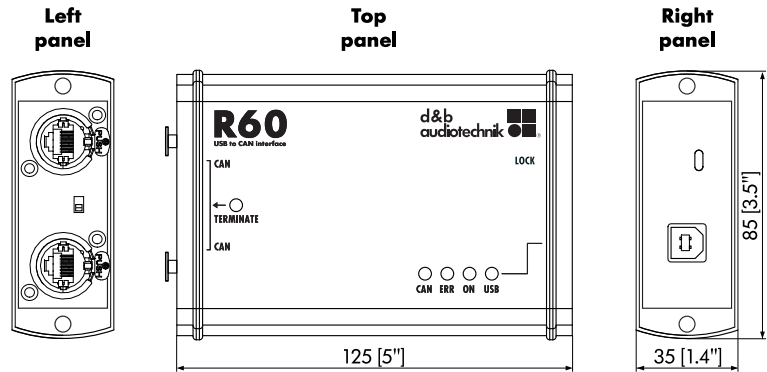
**Fig. 1: Dimensions in mm [inch]**

**Accessories**

Z6122/Z6123 Bopla mounting clamps.....wall mounting  
 .....top hat rail mounting (TS 35)

## 2. R60 Hardware

The hardware of the R60 USB to CAN interface is housed in a rugged aluminium enclosure including connectors, controls and indicators.



**Fig. 2: Top and side views**

### 2.1. Power supply

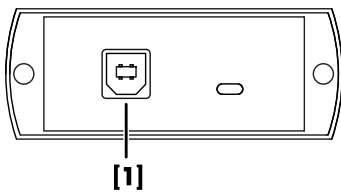
The device is powered by the USB port and is therefore not dependent on any external power supply.

It is recommended to power the device by the PC (USB Host) or by a self powered USB Hub.

**NOTICE:** With bus powered USB Hubs the voltage supply might not be sufficient to power up the R60 interface.

### 2.2. Connectors

#### 2.2.1. USB port [1]

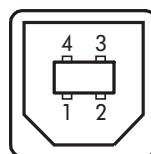


The USB connector type B is located on the right hand side panel of the device.

The USB-Port is used to interface the R60 with a PC. It provides a data transmission rate of up to 12 Mbit/s. To interface the device with a PC the supplied standard USB cable should be used.

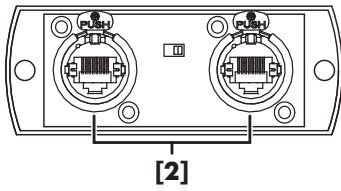
**NOTICE:** To match EMC requirements the length of the USB cable is limited to a maximum of 3 m (10 ft).

**USB [1]**



Pin	Signal	Remark
1	$V_{BUS}$	
2	D	
3	D +	
4	GND	
Shell	Enclosure	Shield

**Tab. 1: USB port pin assignment**



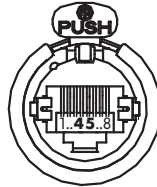
**2.2.2. CAN-Bus connectors [2]**

The RJ 45 connector type B (white colored coding ring) is located on the left hand side panel of the device.

**Note:** Crossover Detection and Auto Correction are supported.

Two RJ 45 connectors are located on the left side panel of the device. Both connectors are wired in parallel to allow different wiring setups of the CAN-Bus (see section 2.3.2. CAN-Bus termination on page 9).

**RJ 45 [2]**



Pin	Signal	Remark
1	-	
2	-	
3	-	
4	CAN_H	CAN high bus line (active high)
5	CAN_L	CAN low bus line (active low)
6		
7		
8		
Shell	GND	CAN ground

**Table 2: RJ 45 (CAN-Bus) pin assignment**

**NOTICE!** To connect the devices to the d&b Remote network (CAN-Bus) shielded cables and shielded RJ45 connectors must be used. The cable shielding must be connected to both sides of the RJ45 connector as the "CAN Ground" is routed via the cable shielding.

The signals on the CAN connection terminals CAN\_H and CAN\_L must match the signals on the CAN terminals of the connected devices.

### 2.3. Controls and indicators

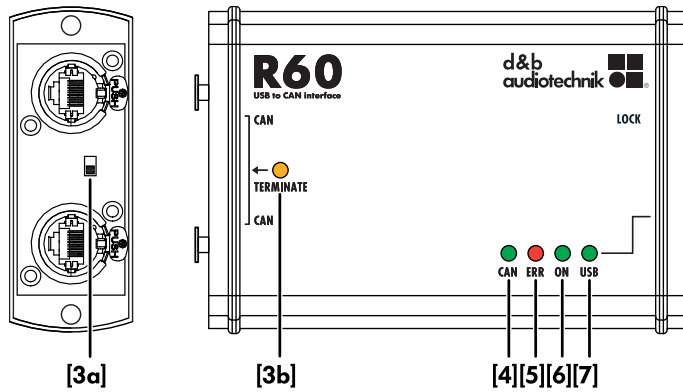


Fig. 3: Controls and indicators

#### 2.3.1. Termination switch [3a] and indicator [3b]

In general the CAN-Bus has to be terminated on both ends of a CAN-Bus segment. Please refer to the technical information TI 312 d&b Remote network for more detailed information.

The R60 interface has a built in switchable terminator which can be activated when only one of its CAN connectors is used (refer to the wiring examples given in the following section 2.3.2).

To terminate the interface:

- Set the termination switch [3a] to TERMINATE.
- The corresponding status LED [3b] illuminates.  
In this case both RJ 45 connectors are terminated as shown in the graphic opposite.

**Note:** The two RJ 45 M terminators supplied with the R60 interface must not be used to terminate the interface if the termination switch is set to TERMINATE. They are used to terminate the end of a CAN-Bus segment at its last device (refer to the following section 2.3.2).

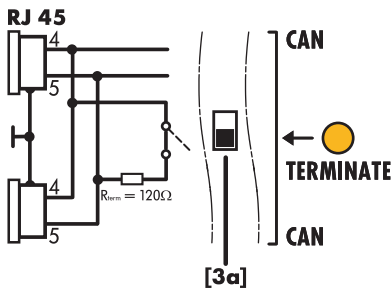


Fig. 4: Termination switch and corresponding indicator LED

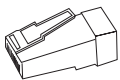


Fig. 5: Z6118 RJ 45 M Terminator

### 2.3.2. CAN-Bus termination

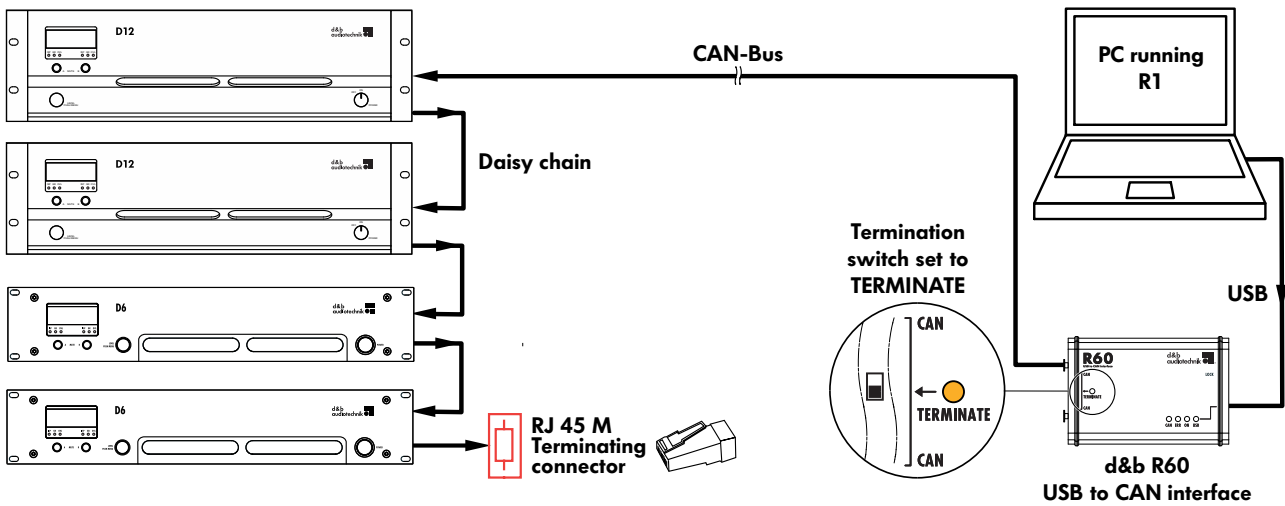


Fig. 6: d&b Remote network (CAN-Bus), wiring example 1 with terminated R60 interface at the "beginning" of the CAN-Bus segment.

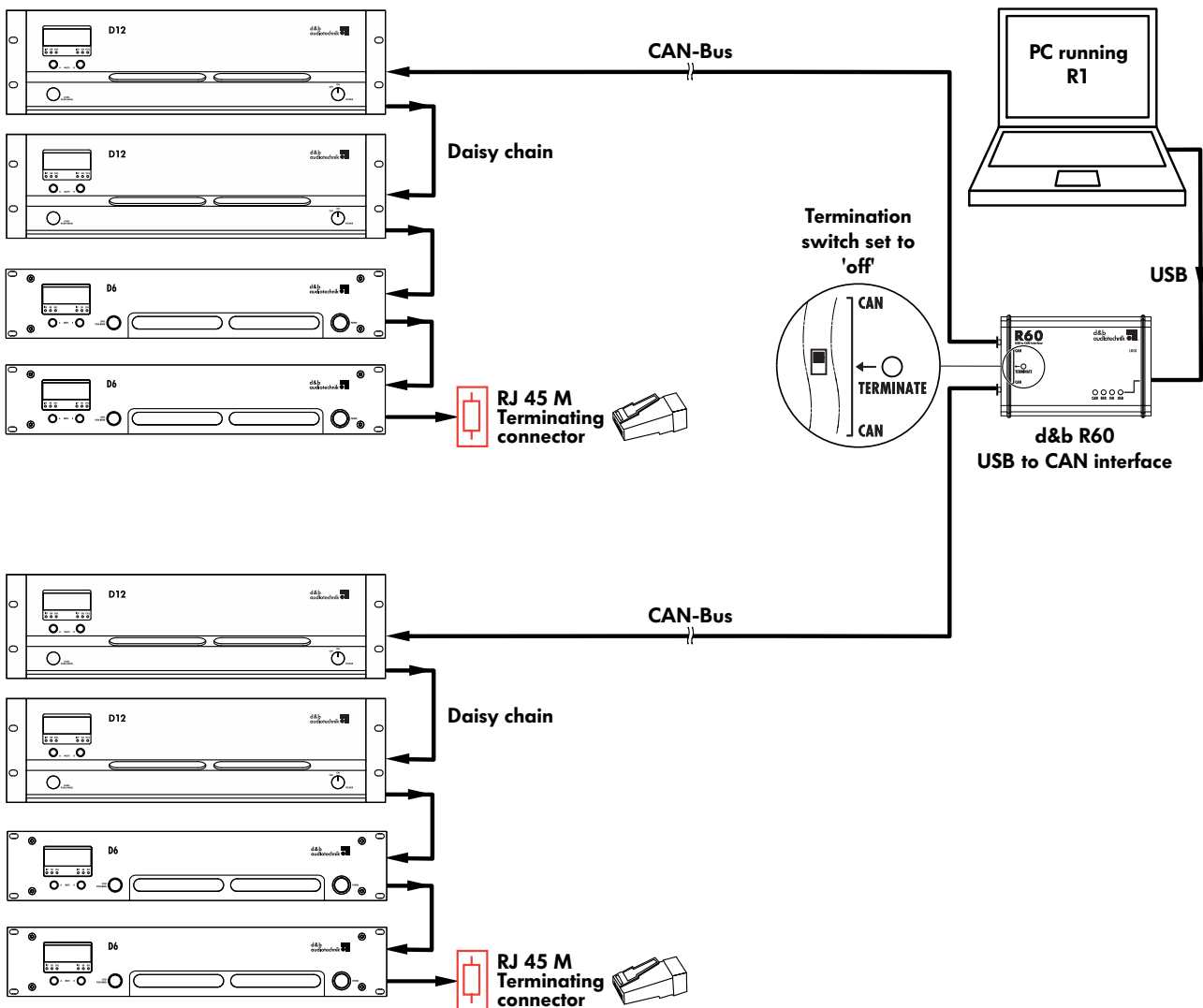
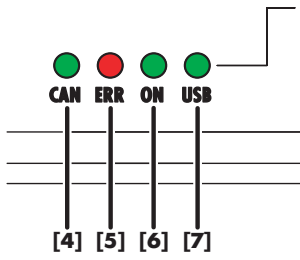


Fig. 7: d&b Remote network (CAN-Bus), wiring example 2 with non terminated R60 interface within the CAN-Bus segment.

### 2.3.3. Indicators (Status LEDs)

The R60 interface is equipped with four LEDs for visual status control of the device. The corresponding function of each LED is described in the table below:



LED (Col. [Pos.])	Status:	Description
<b>CAN</b> (Green [4])	<b>Off:</b>	No CAN data transfer
	<b>Flashing:</b>	CAN data transfer
	<b>Flashing with ERR:</b>	CAN error
<b>ERR</b> (Red [5])	<b>Off:</b>	No error
	<b>Flashing with CAN:</b>	CAN error
	<b>Flashing with USB:</b>	USB error
<b>ON</b> (Green [6])	<b>Off:</b>	No USB connected
	<b>On:</b>	Device ready for operation
<b>USB</b> (Green [7])	<b>Off:</b>	No USB data transfer
	<b>Flashing:</b>	USB data transfer
	<b>Flashing with ERR:</b>	USB error

## 3. R60 Software

- [-] R60
  - [+] AcrobatReader
  - [+] Documentation
  - [-] Driver
    - [+] Mac\_OSX\_PPC
    - [+] Win

### 3.1. R60 CD-ROM

The CD-ROM provided with the R60 USB to CAN interface contains the following software and documentation:

- R60 drivers for Windows® and MAC OSX®
- R60 USB to CAN interface manual and MAC OSX installation guide
- Technical information TI 312 d&b Remote network (CAN-Bus).

Additionally, the AcrobatReader® in its current version is provided to allow the documents to be displayed and printed.

**Note:** We recommend you to regularly check the d&b website [www.dbaudio.com](http://www.dbaudio.com) for the latest version of the R60 drivers and documentation (R60 manual, TI 312).

### 3.2. R60 USB driver installation

The R60 USB to CAN interface requires special drivers for use with a computer. For use with MAC OSX (PowerPC), the respective driver has to be used. In this case, the d&b Remote network software runs on an appropriate Windows emulation. For MAC OSX (Intel) the Windows driver can be used to run d&b Remote software in a virtualization. In the following the installation procedure for Windows® XP is described.

Up to five R60 interfaces may be operated and individually addressed by the d&b Remote network via virtual COM ports. The respective drivers have to be installed separately for each USB port to be used. We recommend to install the drivers for all available ports. The driver installation is started by connecting the R60 to the respective USB port and consists of the USB driver followed by a virtual COM port driver. It automatically assigns the USB port to a COM port number which can be accessed by the respective application software.

**Notes:** Due to the decision of d&b not to invest in the registration of the drivers with Microsoft® the installation in Windows® XP may lead to warning messages that the drivers are not certified by Microsoft®. These messages can be ignored. They don't impair the proper functioning of the drivers.

If you want to update existing drivers, first uninstall the previous version (refer to section 3.2.3. Uninstalling the drivers on page 17).

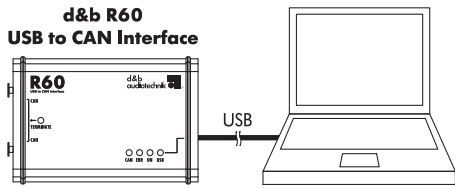


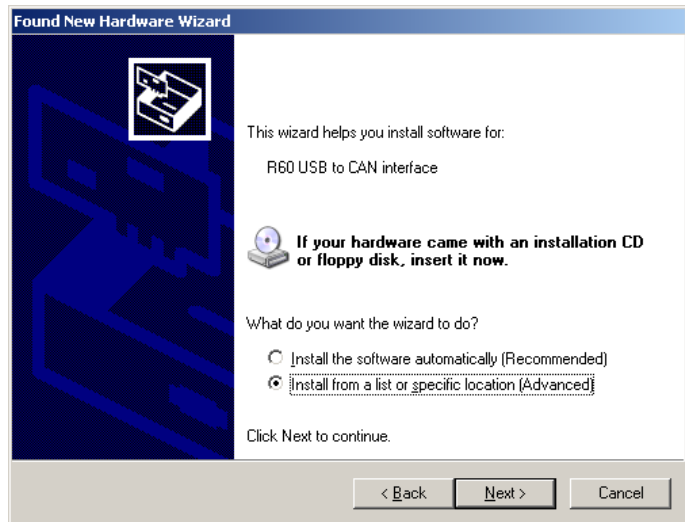
Fig. 8: Driver installation setup

### 3.2.1. Windows XP® driver installation

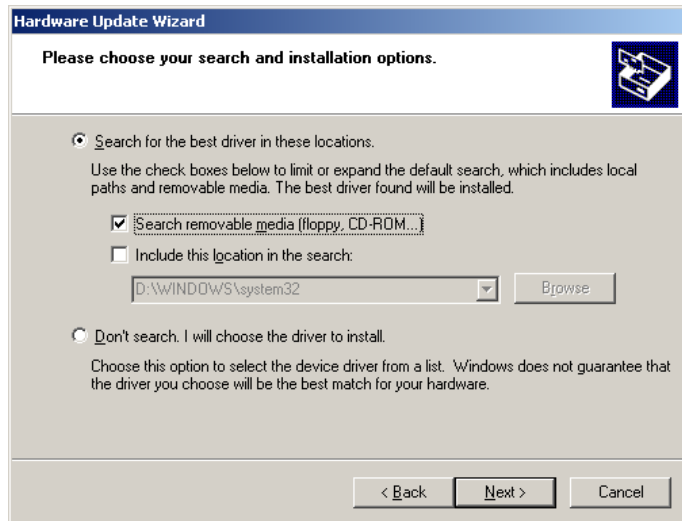
1. Provided that R1 (supporting R60 from version 2.0.7) has been installed on the PC beforehand, the required drivers are located at 'C:\programs\dbaudio\VCP\_Driver\_R60\_USB\_CAN\_Interface'. If not, insert the CD into the CD-ROM drive of your PC.
2. Connect the R60 USB to CAN interface to the desired USB port of your PC using the provided USB cable. The device will now be powered by the USB interface of the PC and the installation routine will start automatically.
3. Windows® will display the following dialog box:



4. Select 'Next' to continue the setup.
5. Choose the option as shown below and press 'Next' to continue.



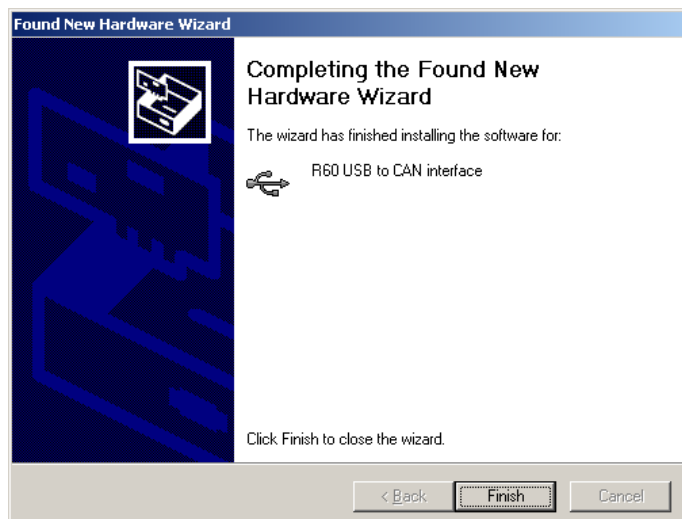
- Select the directory where the driver is located (e.g. 'C:\programs\dbaudio\VCP\_Driver\_R60\_USB\_CAN\_Interface'). If you install the device using the CD-ROM shipped with the R60 interface select 'Search removable media (floppy, CD-ROM...)' and press 'Next'.



- A warning message may appear indicating that the driver is not certified by Microsoft®. Select 'Continue Anyway'.



- The installation of the hardware driver has been successfully finished as soon as the following screen is displayed.



Press the 'Finish' button to complete the hardware driver setup.

9. After completing the hardware driver setup a further dialog will pop up indicating that the virtual COM port will be installed. The procedure is exactly the same as for the hardware driver setup. When this setup is completed, the R60 interface is ready for operation.

### 3.2.2. Changing the virtual COM port in Windows XP®

The virtual COM port driver automatically assigns the respective USB port to a certain COM port number (e.g. COM 4). If the dedicated application software does not support this COM port number, the virtual port used by the R60 interface can be changed as follows:

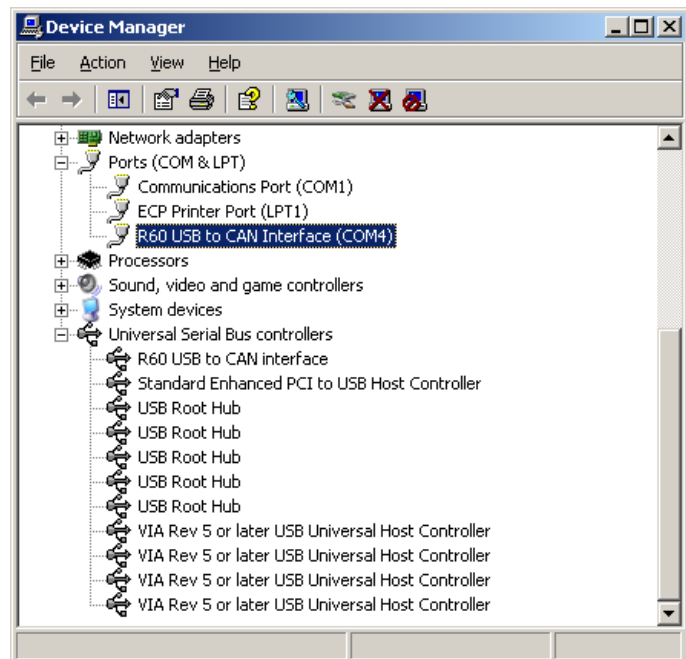
**Note:** When the COM port assignment has been changed, the computer must be rebooted.

When you change the port assignment, it is recommended that you close all applications that access the respective COM ports.

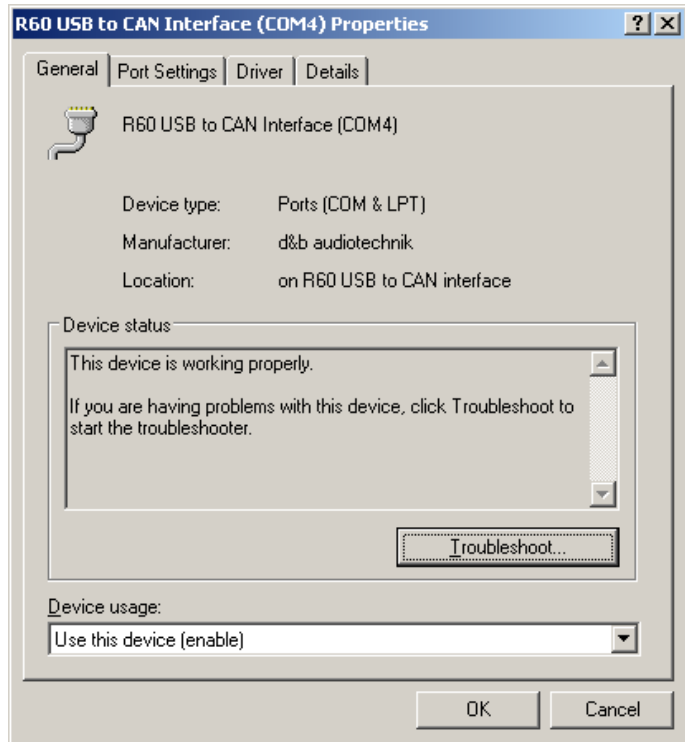
Do not select a COM port that is already used by other devices such as physically existing COM ports.

Open the Device Manager by executing the following steps: Open 'Control Panel – System Properties – Hardware – Device Manager'.

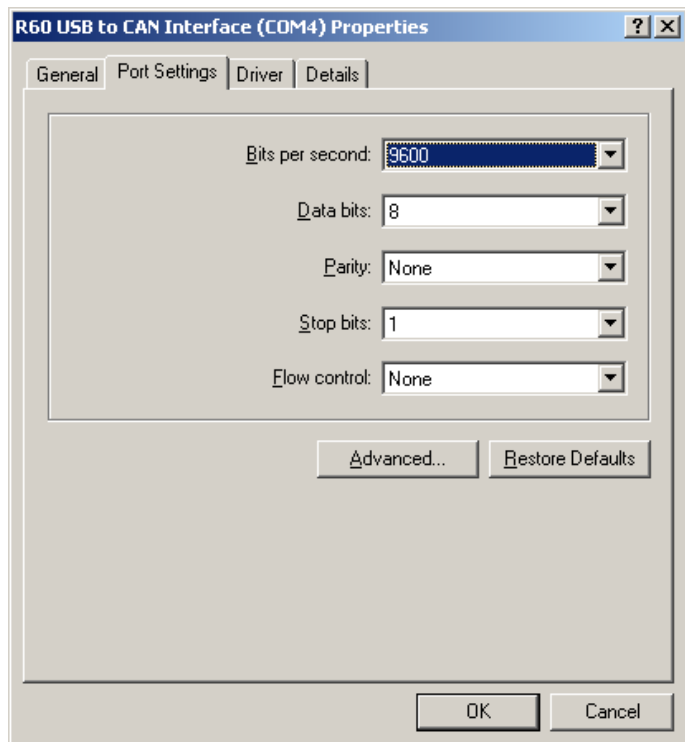
1. Open the 'Ports (COM & LPT)' branch to display the following list:



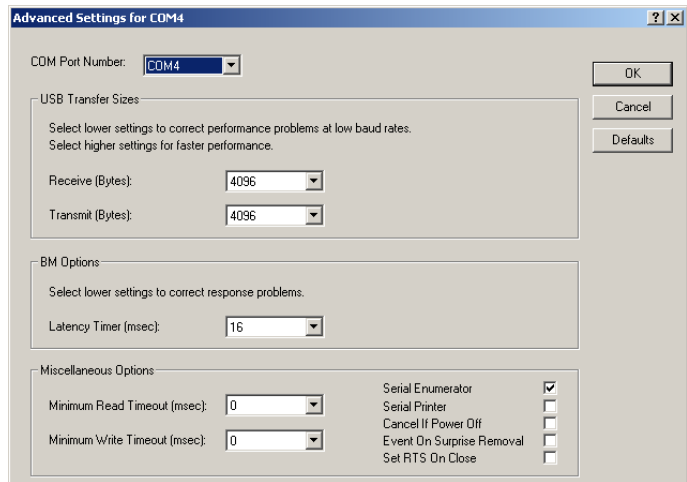
2. Double click the 'R60 USB to CAN interface' to open the following dialog:



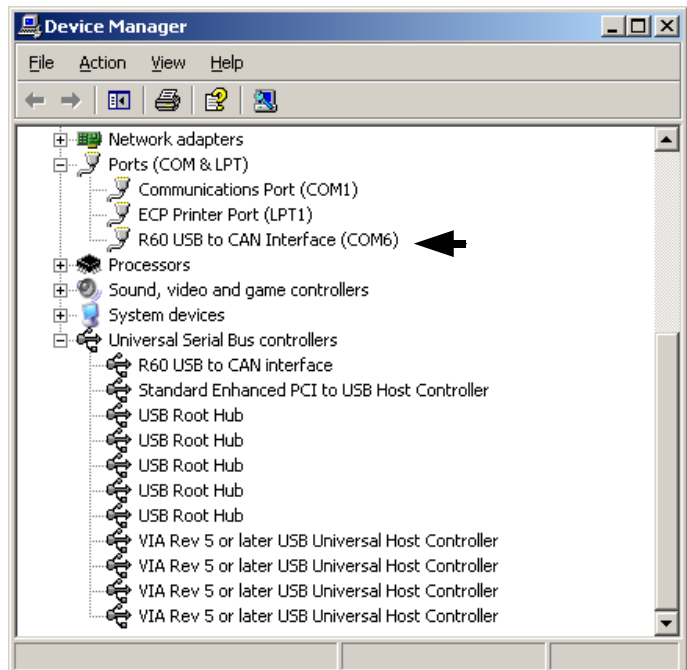
3. Select the 'Port Settings' tab to open the following dialog:



- 4. Select the 'Advanced' button and set the desired COM port number.



- 5. To verify the selected COM port, close all windows and return to the Device Manager. The new COM port will be shown in brackets after the 'R60 USB to CAN interface' label.



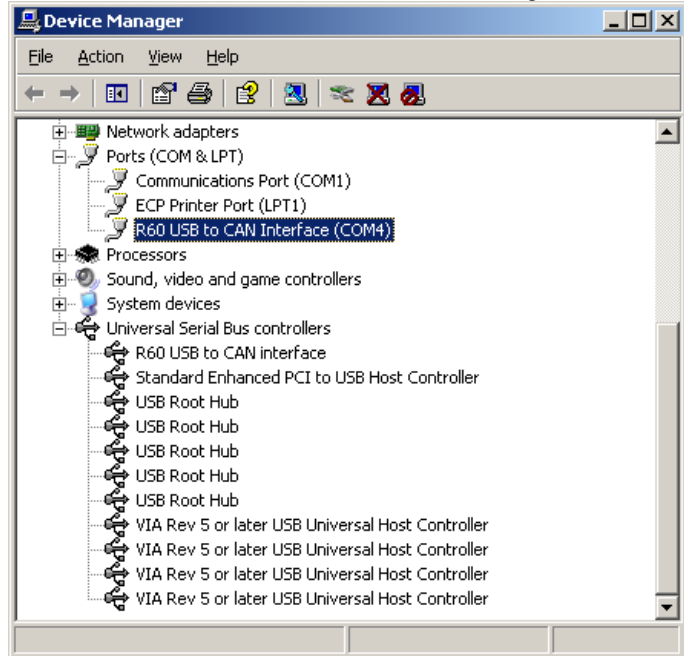
- 6. Reboot your computer.

### 3.2.3. Uninstalling the drivers

**Note:** Both the respective virtual COM-Port and the USB driver need to be uninstalled.

In order to uninstall the drivers for the R60 interface proceed as follows:

1. Open the Device Manager by executing the following steps:  
Open 'Control Panel – System'.  
Select the 'Hardware' tab and click 'Device Manager'.



2. From the View menu select 'Show Hidden Devices'.
3. Open the 'Ports (COM & LPT)' folder and double click the respective COM-Port.
4. Select the 'Driver' tab and then select 'Uninstall'.
5. To uninstall the USB driver, open the 'Universal Serial Bus controllers' folder and double click the respective USB device.
6. Select the 'Driver' tab and then select 'Uninstall'.

## 4. R60 accessories

### 4.1. Mounting clamps

The additional Z6122/6123 Bopla mounting clamps allow the R60 interface to be mounted to:

- Walls or inside racks.
- Top hat rails (TS 35 – 35 mm/1.4") inside an equipment cabinet.

#### Notes on Z6122:

If the Z6122 Mounting clamp is intended to be used in a rack for mobile applications it is recommended to use two clamps on the outer edges of the interface to prevent it from rattling as shown in the graphic below.

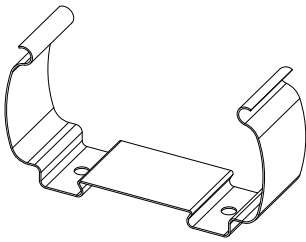


Fig. 9: Z6122 Bopla Mounting clamp

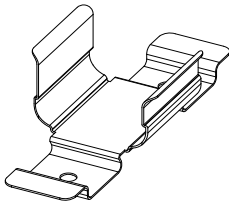
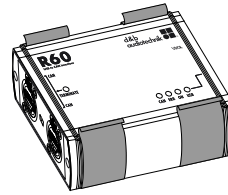
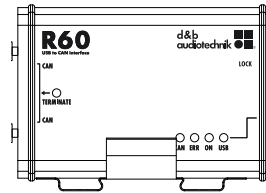


Fig. 10: Z6123 Bopla Mounting clamp upright

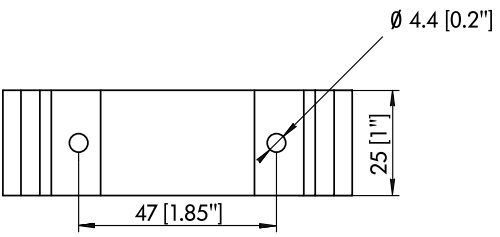
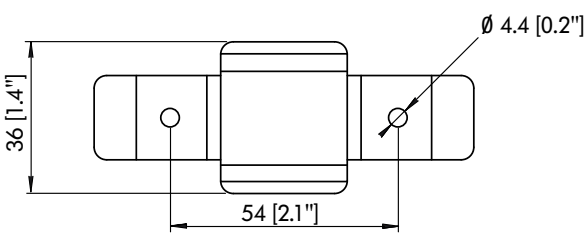
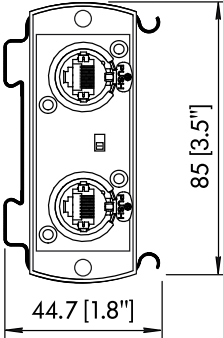
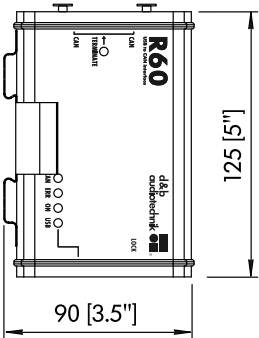
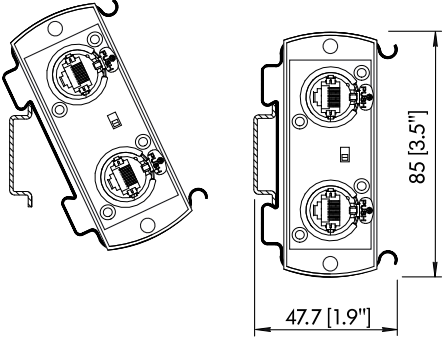
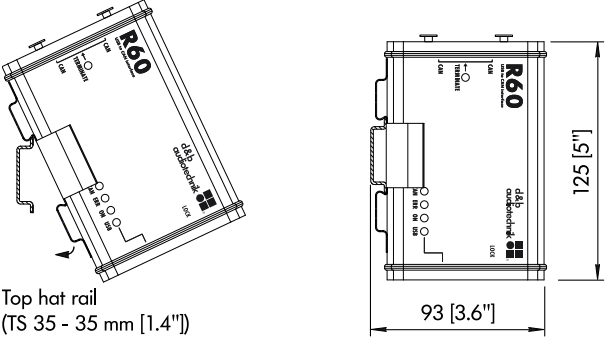


#### Notes on Z6123:

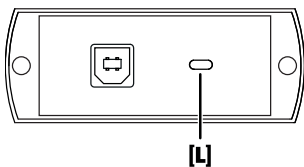
The two clamp halves have different lengths. For this reason, we recommend you to align the clamp or the R60 in such a way that the short clamp half is located on the top panel of the device as shown in the graphic below.



4.1.1. Dimension drawings

<p><b>Z6122 Bopla mounting clamp</b></p>  <p>Ø 4.4 [0.2"]</p> <p>25 [1"]</p> <p>47 [1.85"]</p> <p><b>Fig. 11: Dimensions in mm [inch]</b></p>	<p><b>Z6123 Bopla mounting clamp upright</b></p>  <p>Ø 4.4 [0.2"]</p> <p>36 [1.4"]</p> <p>54 [2.1"]</p> <p><b>Fig. 12: Dimensions in mm [inch]</b></p>
 <p>85 [3.5"]</p> <p>44.7 [1.8"]</p> <p><b>Fig. 13: Wall mounting with dimensions in mm [inch]</b></p>	 <p>125 [5"]</p> <p>90 [3.5"]</p> <p><b>Fig. 14: Wall mounting with dimensions in mm [inch]</b></p>
 <p>85 [3.5"]</p> <p>47.7 [1.9"]</p> <p><b>Fig. 15: Top hat rail mounting with dimensions in mm [inch]</b></p>	 <p>125 [5"]</p> <p>93 [3.6"]</p> <p>Top hat rail (TS 35 - 35 mm [1.4"])</p> <p><b>Fig. 16: Top hat rail mounting with dimensions in mm [inch]</b></p>

4.2. Anti-theft protection – LOCK



A slot (LOCK - [L]) is located on the right hand side panel of the device and allows for the attachment of a Kensington lock device.

## 5. Manufacturer's declarations

### 5.1. EU declaration of conformity (CE symbol)



This declaration applies to the R60 USB to CAN Interface manufactured by d&b audiotechnik GmbH:

#### **R60, USB to CAN Interface, Z6118.000**

All products of this type starting from variant Z6118.000 are included, provided they correspond to the original technical version and have not been subject to any later design or electromechanical modifications.

We herewith declare that said product is in conformity with the provisions of the following EC directives including all applicable amendments:

**2004/108/EC Electromagnetic Compatibility**

**2006/95/EC Low Voltage**

**IEC 60950 (DIN EN 60950): 2001**

A detailed declaration is available on request and can be ordered from d&b or downloaded from the d&b website at [www.dbaudio.com](http://www.dbaudio.com).

### 5.2. Disposal (WEEE symbol)



This symbol indicates that electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime.

When out of use the device must be disposed of in accordance with the national environmental regulations.