# R70
# Ethernet to CAN interface
## Manual (1.4 EN)

d&b audiotechnik

**General information**

R70 Ethernet to CAN interface
Manual

Version 1.4 EN, 04/2009, D2402.EN .01



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# Contents

# 1. R70 Ethernet to CAN interface

This manual describes the facilities and functions of the hardware and the basic operation of the R70 Ethernet to CAN interface.

Basic knowledge of Ethernet network technology is assumed.

A detailed description of the advanced functionality of the R70 is given in the 'Software reference manual' which is available on the attached CD-ROM in English language.

## 1.1. General safety instructions

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.

## 1.2. Intended use

The R70 Ethernet to CAN interface provides two RJ 45 CAN connectors with a built-in switchable terminator as well as a LAN connector. The R70 contains a web interface for configuration using a standard web browser. Up to five R70 interfaces in TCP/IP mode may be connected to a PC and simultaneously operated by the R1 software.

The R70 is designed to connect the d&b Remote network (CAN-Bus) to a PC via Ethernet (TCP/IP or UDP/IP).

The R70 must only be used within a d&b sound reinforcement system.

The device can be used within applications according to the standard EN 60849 (IEC 60849) 'Sound Systems for Emergency Purposes' (voice evacuation systems).

The device is not intended for direct connection to telecommunication networks.

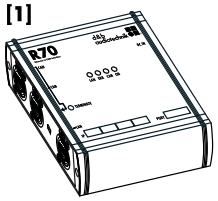
A detailed description of the d&b Remote network (CAN-Bus) is given in the technical information TI 312 which is provided with the CD-ROM or can be downloaded from our website at www.dbaudio.com. We recommend to regularly check the d&b website for the latest version of the documentation (R70 manual and TI 312).

## 1.3. Scope of supply

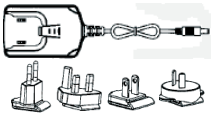
Before installation and start up please verify the shipment for completeness and carry out a visual inspection of the packaging and the individual items listed below for obvious damage during shipment.

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

[1]



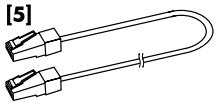
[2]



[3]

[4]

[5]



| Qty. | d&b Code | Description |
|---|---|---|
| 1 | Z6124 | R70 Ethernet to CAN interface **[1]** |
| 1 | | Power supply **[2]** including 4 x AC input plugs specific to the following territorial regions:<br>Europe, UK, USA, and Australia |
| 2 | Z6116 | RJ 45 M Terminator **[3]** |
| 1 | | CD-ROM **[4]** containing the R70 manuals and additional documentation (TI 312).<br>Additionally, the AcrobatReader® in its current version is provided to allow the documents to be displayed and printed. |
| 1 | | Ethernet cable 2 m/6.5 ft (CAT6, 4 Pair STP) **[5]** |
| 1 | | Additional cable clip to be used as cord grip for the power supply. |

## 1.4. Technical specification

**Power supply**
Supply voltage.....10 V to 30 V DC / 330 mA, or PoE (Power over Ethernet)
DC IN (barrel connector).....to accept coaxial plug 2.1 x5.5 x 9.5 mm
.....Center Positive Standard

**Operating conditions**
Temperature range.....– 40° C to + 50° C (– 40° F - + 122° F)

**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, CAN, ERROR, LAN, TERMINATE

**Connectors**
LAN (Ethernet).....1 x RJ 45 connector
CAN.....2 x RJ 45 connectors, wired in parallel

**Hardware**
Controller.....16 Bit
Program Flash.....256 kB
Data Flash.....8 MB
SRAM Size.....256 kB
EEPROM Size.....8 kB
Additional features.....CAN galvanically isolated

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

**Ethernet Specification**
Ethernet.....10/100 M Base-F, IEEE 802.3u
Power over Ethernet (PoE).....IEEE 802.3af

**Housing/Dimensions/Weight**
Housing.....Extruded aluminium
Dimensions (height x width x depth).....115x110x35 mm [4.5" x 4.3" x 1.4"]
Weight.....230 g (0.5 lb)

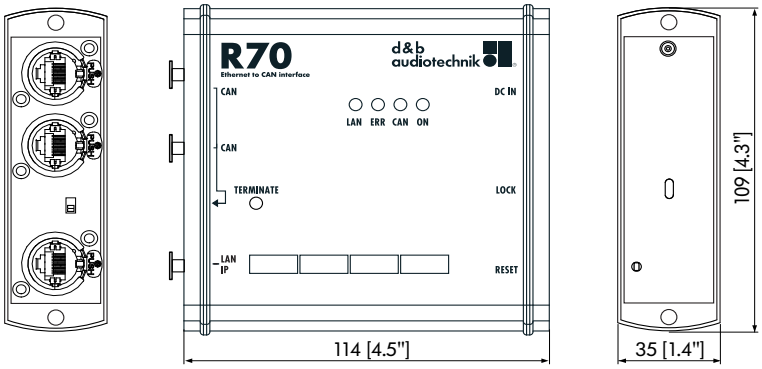
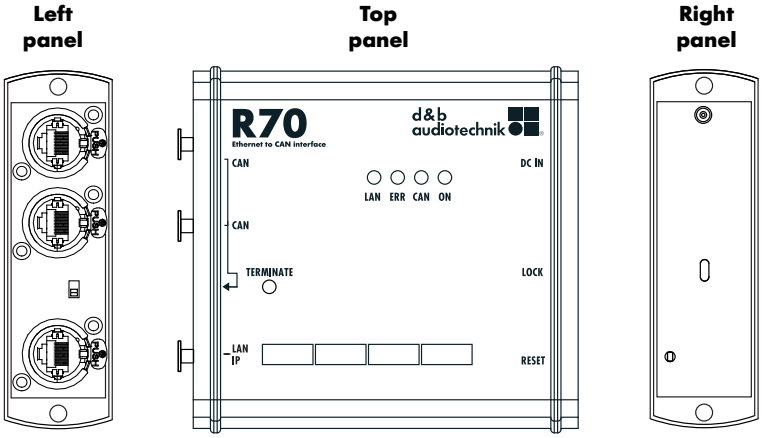



**Fig. 1: Dimensions in mm [inch]**

**Additional accessories**
Z6123 Bopla mounting clamp upright.....wall mounting
.....top hat rail mounting (TS 35)

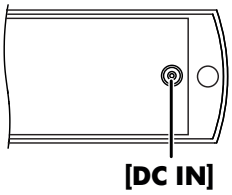
# 2. R70 Hardware

The hardware of the R70 Ethernet to CAN interface is housed in a rugged aluminium enclosure including connectors, controls, and indicators.




## 2.1. Connectors

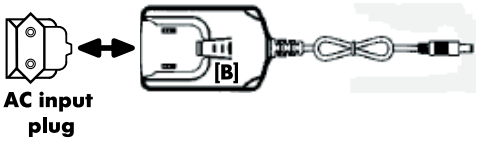
### 2.1.1. Power supply [DC IN]




The device can be powered by Ethernet (PoE, IEEE 802.3af) or by an external power supply according to the specifications.

The connector for the external power supply is located on the right hand side panel of the device (DC IN/Center Positive Standard ⊕⊃–⊖).

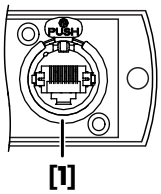
The power supply is equipped with changeable AC input plugs to allow for connection to the following mains sockets: Europe, UK, USA, and Australia.




**Fitting/Exchanging the AC input plug**
To fit or exchange the AC input plug, proceed as follows:

1. Slide in the respective AC input plug until it snaps into place.
2. To exchange the plug, press the button [B] and slide out the plug.

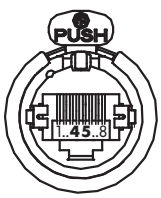
### 2.1.2. LAN connector [1]




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

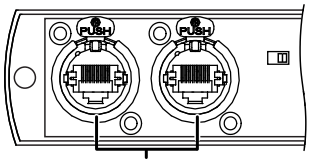
**Note:** Crossover Detection and Auto Correction are supported.

**LAN [1]**




| Pin | Signal | PoE |
|---|---|---|
| 1 | TxD + | Mode A+ |
| 2 | TxD - | Mode A+ |
| 3 | RxD + | Mode A- |
| 4 | connected to Pin 5 | Mode B + |
| 5 | connected to Pin 4 | Mode B + |
| 6 | RxD - | Mode A - |
| 7 | connected to Pin 8 | Mode B - |
| 8 | connected to Pin 7 | Mode B - |
| Shell | Enclosure | Shield |

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



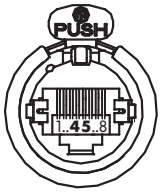

**[2]**

### 2.1.3. CAN-Bus connectors [2]

Two RJ 45 connectors are located on the left hand side panel of the device. Both connectors are wired in parallel to allow different wiring setups of the CAN-Bus

**NOTICE:** Shielded cables and shielded RJ 45 connectors must be used to connect the devices of the d&b Remote network (CAN-Bus). The cable shielding must be connected to both sides of the RJ 45 connector as the "CAN Ground" is routed via the cable shielding.

**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**

## 2.2. Controls and indicators

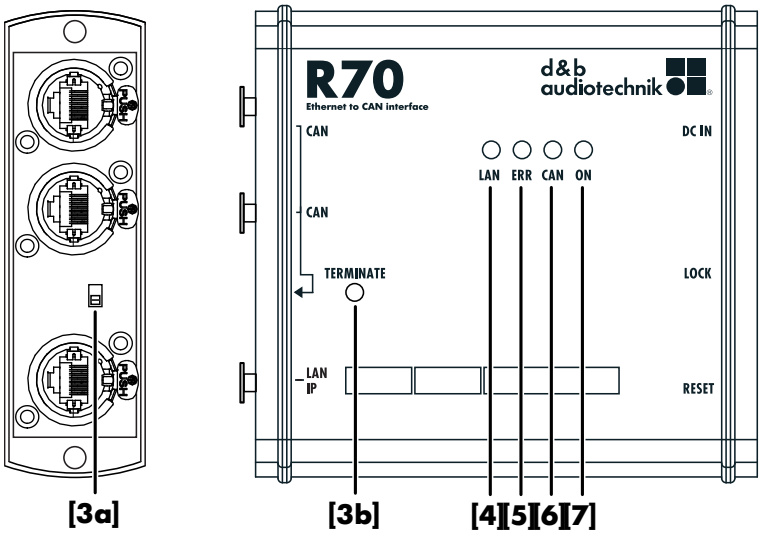



**Fig. 2: Controls and indicators**

### 2.2.1. 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 R70 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).

To terminate the interface:

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

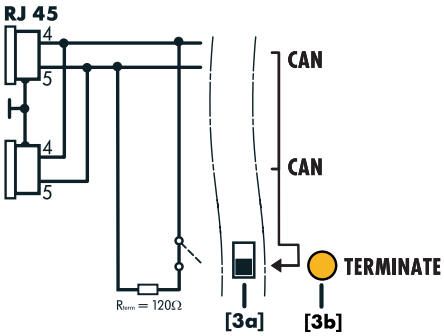



**Fig. 3: Termination switch and corresponding indicator LED**

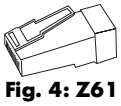


**Fig. 4: Z6118 RJ 45 M Terminator**

**Note:** The two RJ 45 M terminators supplied with the R70 interface must not be used to terminate the interface if the termination switch is set to TERMINATE. They are used to terminate the last device of a CAN-Bus segment (refer to the following section).

## CAN-Bus termination

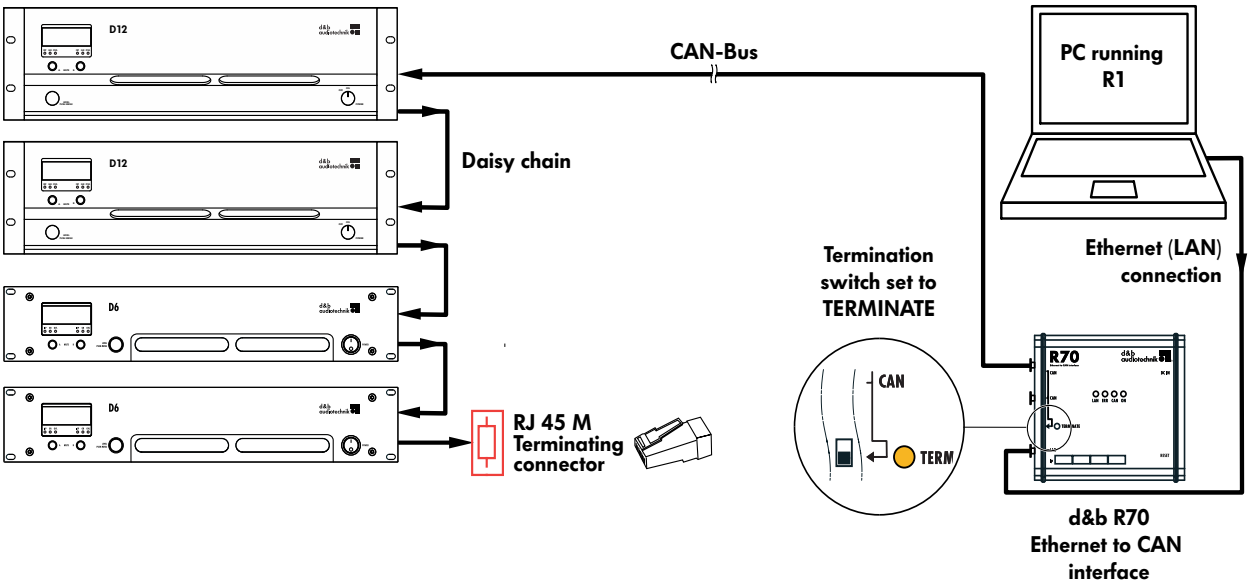



**Fig. 5: d&b Remote network (CAN-Bus), wiring example 1 with terminated R70 interface at the "beginning" of the CAN-Bus segment.**

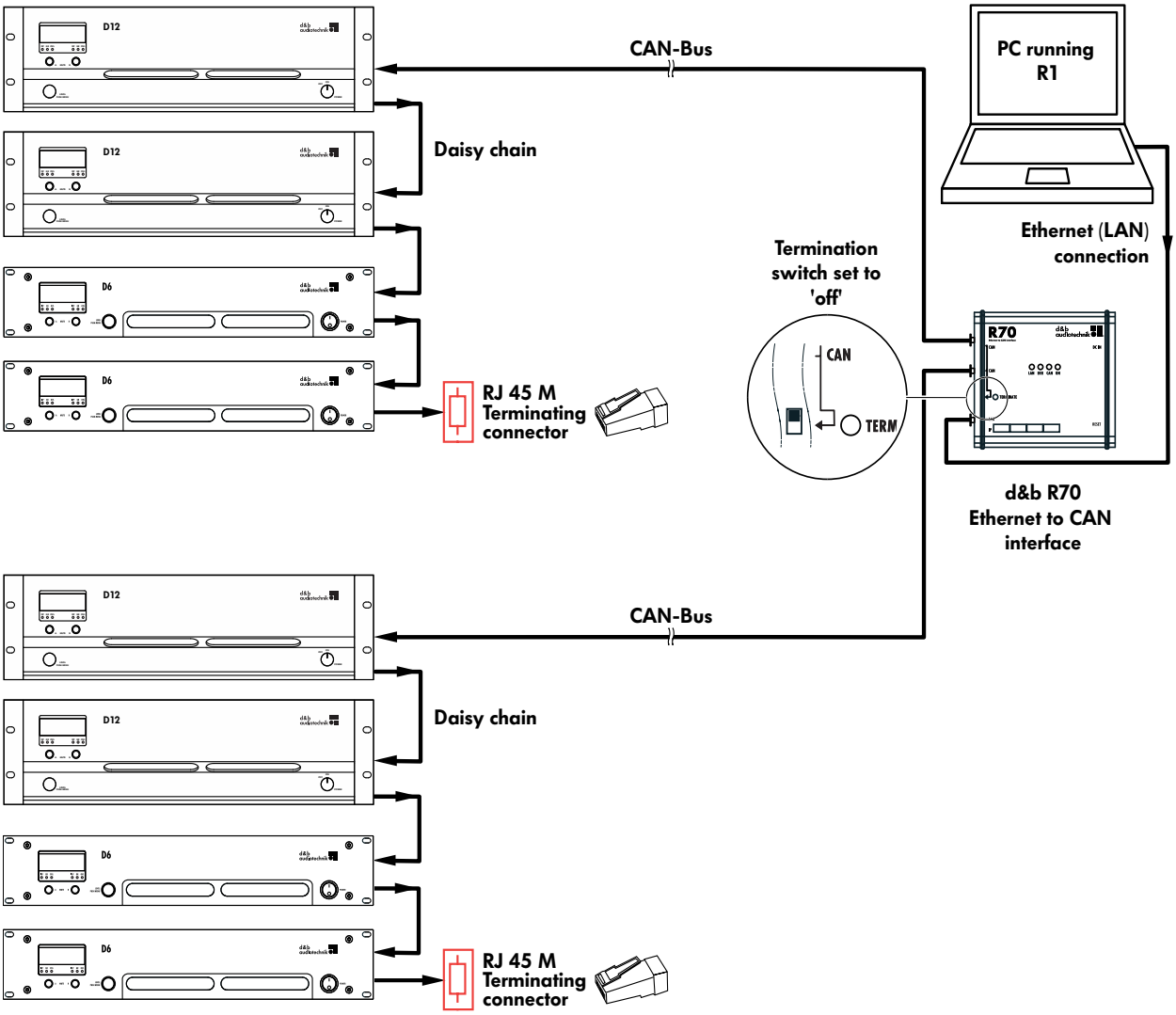
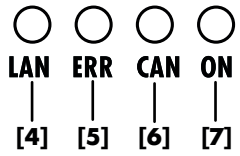



**Fig. 6: d&b Remote network (CAN-Bus), wiring example 2 with non-terminated R70 interface within the CAN-Bus segment.**

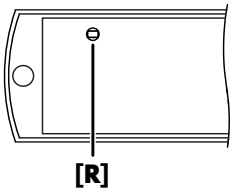
### 2.2.2. Indicators (Status LEDs)




The R70 interface is equipped with four LEDs for visual status control of the device. The function of each LED is described in the table below:

| **LED** (Col. [Pos.]) | **Status:** | **Description** |
|---|---|---|
| **LAN** (Green [4]) | **Off:** | No active Ethernet connection |
| | **Rapid flashing:** | Active Ethernet connection |
| **ERR** (Red [5]) | **Off:** | No error |
| | **On:** | Device is in Bus off mode |
| | **Flashing:** | CAN error |
| **CAN** (Green [6]) | **Off:** | No CAN data transfer |
| | **On:** | Operational state |
| | **Slow flashing:** | Stopped state |
| | **Flashing:** | CAN message received (through an active Ethernet connection) |
| **ON** (Green [7]) | **Off:** | Device is shut off |
| | **On:** | Status OK |
| | **Flashing:** | Initializing |

### 2.2.3. RESET [R]

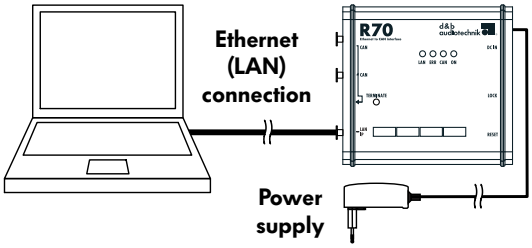



The RESET switch (push button) is located on the right hand side panel of the device and allows for a reset of the device to factory default. To reset the device, proceed as follows:

1. Disconnect the power from the device.
2. Press and hold the reset switch while reconnecting the power and continue pressing down the reset switch for approx 3 s. During this time the reset is executed while the ERR-LED is flashing and the CAN-LED lights up. After successful reset all status LEDs light up.
3. Release the reset switch.

# 3. R70 operation and configuration

## 3.1. Physical setup




**Note:** When Power over Ethernet (PoE) is available, the external power supply is not required.

## 3.2. IP address

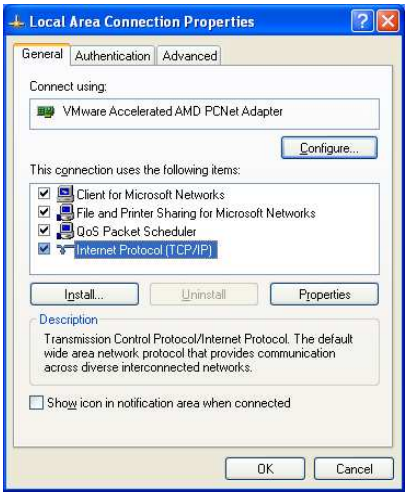
In order to access the d&b Remote network, the R70 interface must have the same IP network settings as your network. Depending on the network topology, the IP address can either be assigned manually or automatically (DHCP).

When the R70 is connected to a network with a DHCP server present, a matching IP address is assigned to the interface automatically.

In all other cases the R70 must be adapted manually.

The R70 IP address is set to **192.168.1.70** by factory default (see also the label sticker on the rear panel of the R70).

## 3.3. Direct connection




To access the R70, manually assign an IP address to the PC on your network with the same subnet as the R70. Proceed as follows:

1. From the "Start-Settings" menu select the "Network Connection" associated with your network adapter.

2. Select "Internet Protocol (TCP/IP)" and click on "Properties".

3. Enter a static IP address in the same subnet as the R70 by selecting "Use the following IP address":

   **IP address:** 192.168.1.71

   **Subnet mask:** 255.255.255.0

4. Apply the changes by clicking OK and close the network properties dialog.

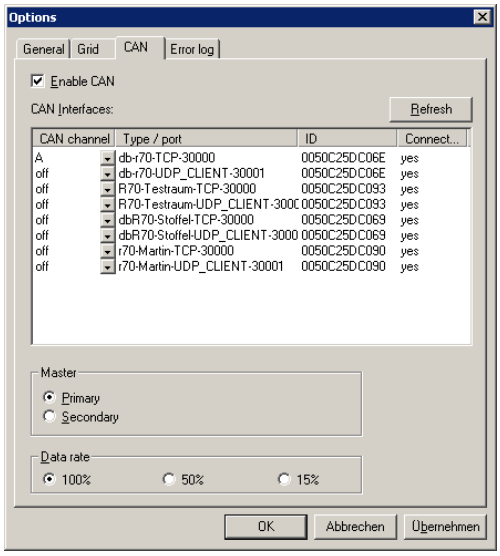
To display the web interface of the R70, enter the IP address of the R70 in the address bar of your web browser.

## 3.4. LAN network with DHCP server

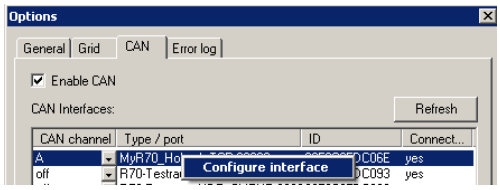
**Note:** If a firewall is active, allow access to the UDP Port 33333 (fix) and the TCP Port 30000 (adjustable).

The "Obtain an IP address automatically" function is enabled by default.

1. Connect the R70 to your network and an IP address is assigned by the DHCP server.
2. Start the respective d&b software (e.g. R1 - Edit mode) and select "CAN" from the "Extras-Options" menu.
   The program scans for connected interfaces and all devices found are listed. This may take several seconds.




3. Right click on an R70 entry in the list and select "Configure Interface" to access the R70 web interface.

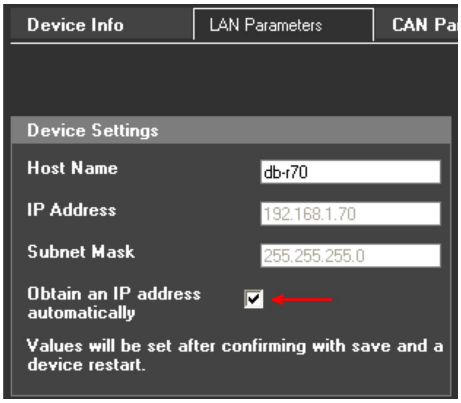


## 3.5. LAN network without DHCP server

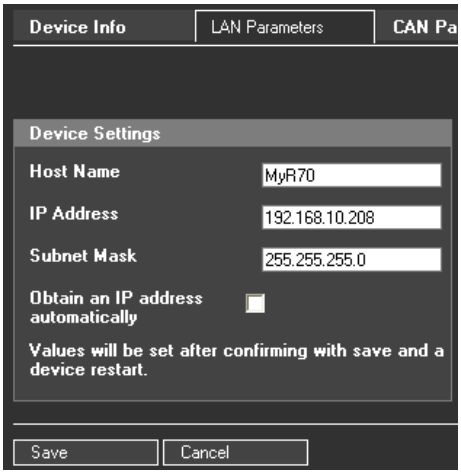
When the R70 is connected to a network without DHCP server, the R70 must be adapted to the local network.

To do so, first proceed as described in the previous section (Direct connection) to gain access to the R70.

1. Select the "LAN Parameters" tab from the R70 web interface and disable "Obtain an IP address automatically".



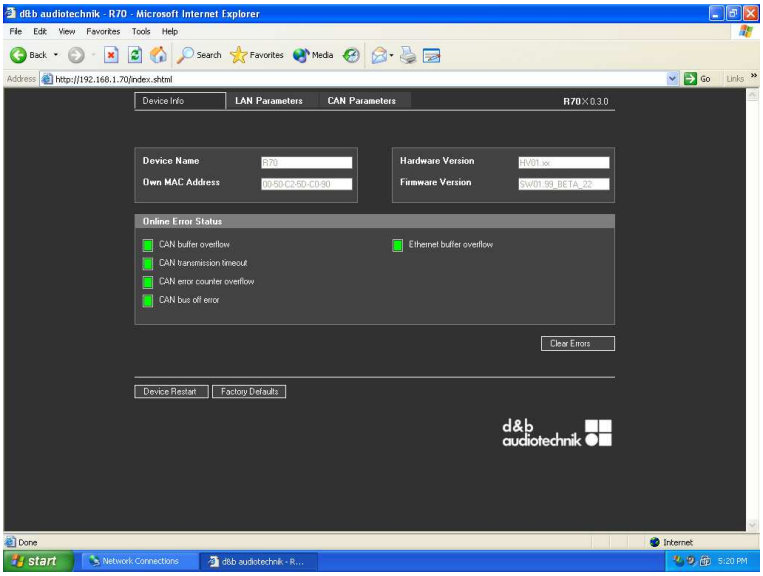

2. Enter the desired Host name, the respective IP address and Subnet mask.




3. Click Save to confirm and execute a Device Restart.

## 3.6. R70 Web interface

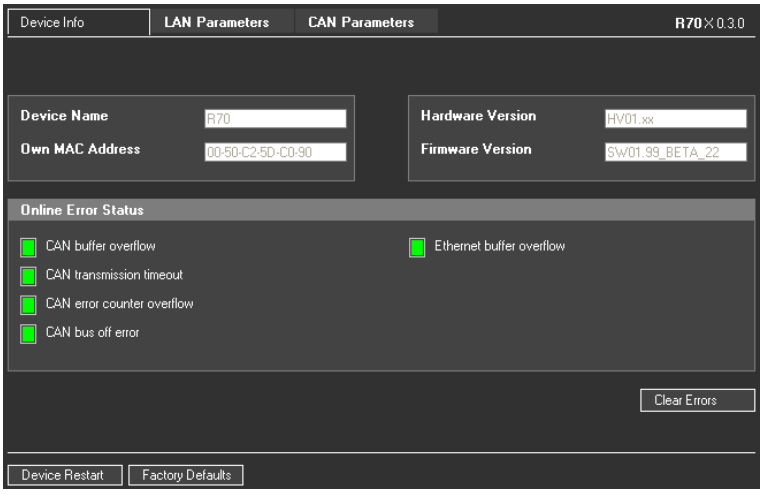
The R70 does not require its own drivers for use with a computer. All configurations can be set using a standard web browser with JavaScript enabled.




**Recommended web browsers:**

| | |
|---|---|
| **Windows** | Microsoft Internet Explorer 6.0 or higher<br>Mozilla Firefox 2.0 or higher |
| **Mac OS** | Safari 1 or higher |

### 3.6.1. Device Info




**Clear Errors**
The respective error message is reset after the related fault is solved.

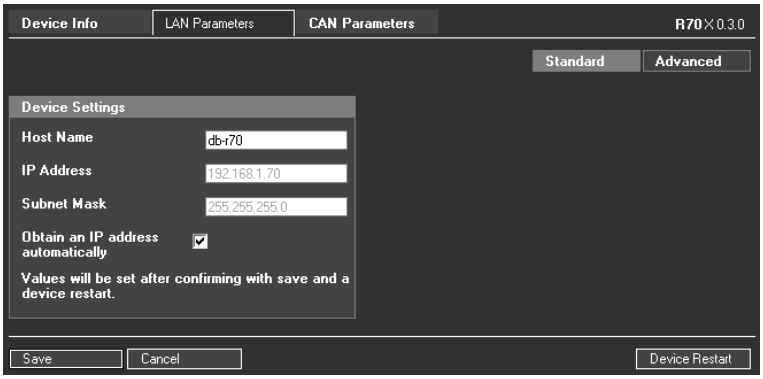
**Device Restart**
The device is rebooted and the current session is disconnected.

**Factory Default**
The device is set to the default IP address and DHCP is enabled. The R70 IP address is set to 192.168.1.70 by factory default - see also the label sticker on the rear panel of the R70.

### 3.6.2. LAN and CAN Parameters

**NOTICE:** The "Advanced" pages for the LAN and CAN parameters are only intended for users with advanced experience and knowledge. Wrong adjustments or settings can lead to malfunction.

## LAN Parameters



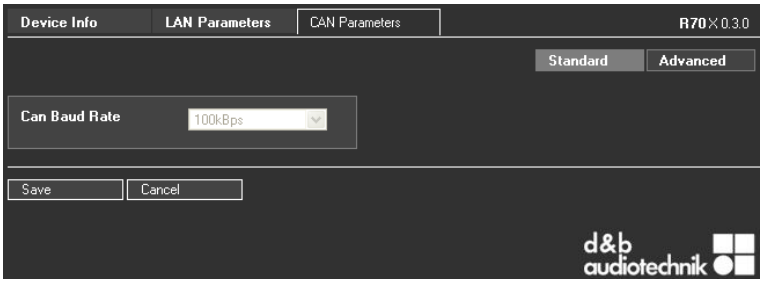

In the "LAN Parameters" tab, the settings of the R70 can be modified to the on site conditions of the local area network.

When more than one R70 is used, each one must have a unique IP address and host name.

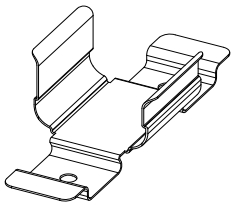
The settings below can be assigned automatically if the on site network supports this capability. Otherwise please consult the responsible network administrator for the appropriate IP settings.

| | |
|---|---|
| **Host Name** | Name to identify the R70 within a network. This name must be unique. |
| **IP Address** | Unique IP address according to "IP v4 Standard". |
| **Subnet Mask** | Corresponding subnet mask |
| **Obtain an IP address automatically** | Enable / Disable |

## CAN Parameters



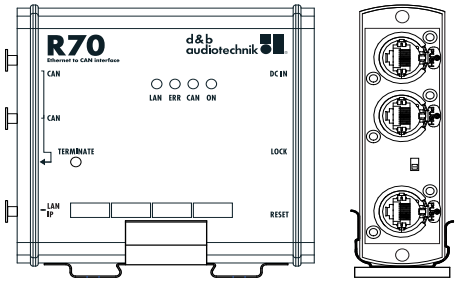
# 4. R70 accessories and anti-theft protection (LOCK)



## 4.1. Mounting clamp

The additional Z6123 Bopla mounting clamp allows the R70 interface to be mounted to:

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

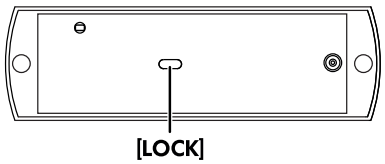



### 4.1.1. Attaching the mounting clamp

The two clamp halves have different lengths. For this reason, we recommend you to align the clamp or the R70 in such a way that the short clamp half is located on the top panel of the device (see graphic opposite).

## 4.2. Anti-theft protection – LOCK

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



## 4.3. Dimension drawings

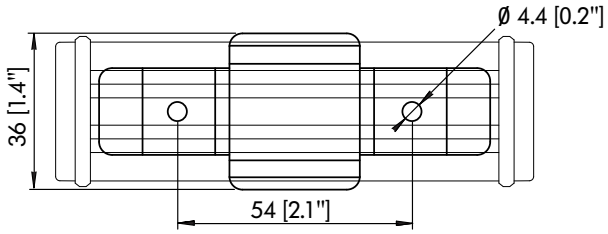



**Fig. 7: Z6123 Bopla mounting clamp upright, dimensions in mm [inch]**

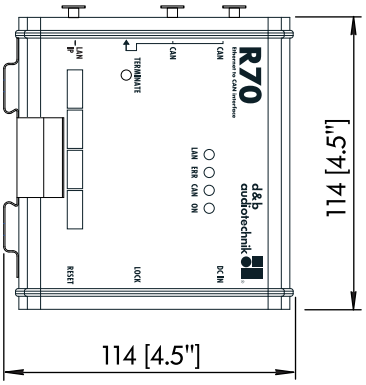



**Fig. 8: Wall mounting with dimensions in mm [inch]**

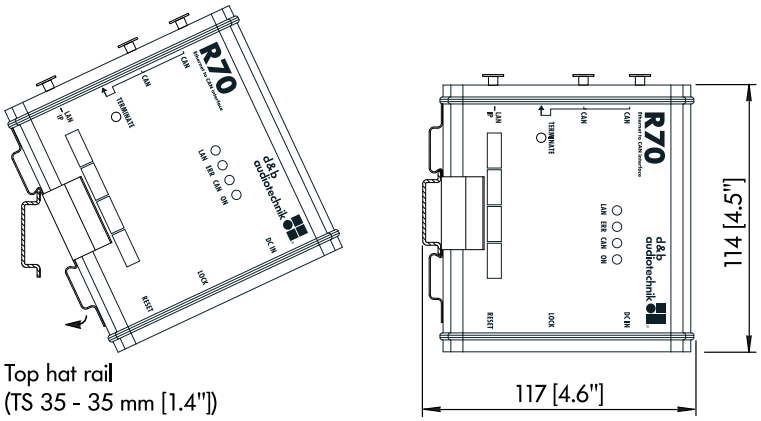



**Fig. 9: Top hat rail mounting with dimensions in mm [inch]**

# 5. Manufacturer's declarations

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

This declaration applies to the:

**R70 Ethernet to CAN interface, Z6124.000**

manufactured by d&b audiotechnik GmbH.

All products of this type starting from variant Z6124.000 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.

## 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.

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