

R70
Ethernet to CAN interface
Software reference manual (1.3 EN)

General information

R70 Ethernet to CAN interface
Software reference manual

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1. R70 Ethernet to CAN interface

1.1. Advanced functionality

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.

Due to the multiple functionality of the R70 it is not possible to describe every conceivable application in this manual. If there are any questions beyond the provided information, please contact d&b support at software.support@dbaudio.com.

1.2. LAN Parameters Advanced

Advanced page

The screenshot shows the 'LAN Parameters' page in 'Advanced' mode. At the top, there are tabs for 'Device Info', 'LAN Parameters', and 'CAN Parameters', with 'LAN Parameters' selected. The version 'R70 X 0.3.0' is shown in the top right. Below the tabs, there are 'Standard' and 'Advanced' buttons, with 'Advanced' selected. A warning message reads: 'This page is only for users with advanced experience. Wrong adjustments can lead to malfunction!'. The settings are organized into two main sections: 'Device Settings' and 'Connection settings for Socket 1' and 'Connection settings for Socket 2'. 'Device Settings' includes fields for Host Name (db-r70), IP Address (192.168.1.70), Subnet Mask (255.255.255.0), Gateway Address (0.0.0.0), Obtain an IP address automatically (checkbox), DNS1 (1.1.1.1), DNS2 (0.0.0.0), and Block Time (x10ms) (0). 'Connection settings for Socket 1' includes Socket Mode (server), TCP (radio button), UDP (radio button), Port Number (30000), Remote IP Address, and Remote Port Number (30000). 'Connection settings for Socket 2' includes Socket Mode (server) and TCP (radio button). A note at the bottom of the Device Settings section states: 'Values will be set after confirming with save and a device restart.'

1.2.1. Device Settings

The settings Host Name, IP Address, Subnet Mask and Obtain a IP Address are set in the Standard page of the LAN Parameters.

Note: It is possible to access R70 with R1 using a WAN (Internet). In this case the automatic device detection does not work and manual adjustments have to be made. For further information, please contact d&b support at software.support@dbaudio.com.

Gateway Address: IP address of the LAN gateway for connection to different LANs or to the WAN.

DNS1 / DNS2: IP address of Dynamic Name Servers.

Block Time: The time between two Ethernet messages can be set to reduce LAN traffic. If the data buffer is full prior to the set time the message is transmitted.

1.2.2. Connection settings for Socket [1-4]

The R70 offers four Sockets to be connected by four clients (e.g. R1, R10...) which can be set individually. The following parameters can be set for each Socket.

Socket Mode

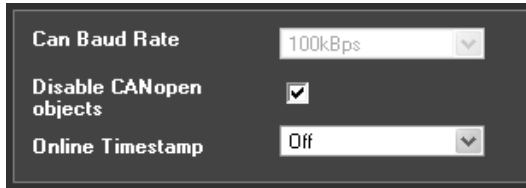
- server:** waits for clients.
- client** connecting to the defined server after boot up.
- (auto connect):** ("Remote IP Address","Remote Port Number")
- disabled:** socket is disabled
- TCP / UDP:** set the desired transport protocol:
 - Port Number** of the socket.
 - Remote IP Address** of the server to which the client is connected (in client mode).
 - Remote Port Number** to which the client is connected (in client mode).
 - Connection inactive timer (s):** Time after which the socket is closed if no TCP message is received (0 = timer off).

1.2.3. Possible Communication Modes

PC with R1/R10	R70	R70	Remark	Application
TCP	TCP server	---	Reliable Ethernet communication	Standard use together with R1/R10 on a LAN or WLAN.
UDP_SERVER	UDP client	UDP client	Non-reliable Ethernet communication to broadcast with one or more R70s or between two or more R70s.	Special cases with more than one master (R1 and a media control or PLC on the CAN bus).
---	TCP client	TCP server	Reliable Ethernet communication between two R70s.	Special case to bridge two CAN networks.

1.3. CAN Parameters Advanced

1.3.1. General

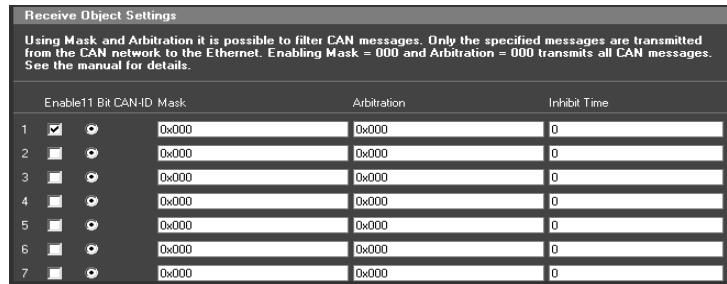


- CAN Baud Rate:** The Baud Rate of the dbCAN network is 100 kBps and can not be changed.
- Disable:** Disabled by default as this is for service purposes only.
- Online Timestamp:** To determine the actual time of a received CAN message, even if more than one CAN message is combined to form one Ethernet message, a time stamp can be added to each CAN message.

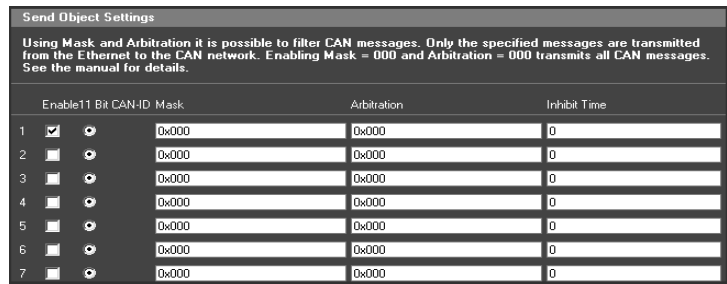
1.3.2. Object settings - Enable 11-Bit CAN-ID Mask

The Mask and Arbitration register values (hexadecimal) allow for specific filtering of CAN messages. The following setting can be specified:

- which CAN messages are transmitted from the CAN-Bus to the Ethernet ⇒ **Receive Object Settings**



- which CAN messages are transmitted from the Ethernet to the CAN-Bus ⇒ **Send Object Settings**



Note: For both the Receive and the Send Objects, the Mask and Arbitration values are set to 0x000 by default. As a result, all incoming CAN messages are transmitted to the Ethernet or all CAN messages transmitted via the Ethernet are passed on to the CAN-Bus.

The "dbCAN-ID Structure and Object-Classes" are detailed in the following section 1.3.3.

How the filtering works

Example:

Only CAN messages from an amplifier (Process data from device) should be sent from the R70 via Ethernet to a computer.

The Mask and Arbitration values have to be set.

Determine the relevant bits from the 11 Bit CAN ID (refer to the extract of the dbCAN protocol as detailed in section 1.3.3 on page 9).

Mask value

Bit	10	9	8	7	6	5	4	3	2	1	0	Hex
Logic state	1	1	0	0	0	0	0	0	0	0	0	0x600

The relevant bits are Bit10 and 9 and can be found in the so-called Object-Class (2) as shown below (extract from section 1.3.3).

Object class	Bit		Description
	10	9	
2	1	0	Process data from device (Process data)

Arbitration value

Bit	10	9	8	7	6	5	4	3	2	1	0	Hex
logic state	1	0	0	0	0	0	0	0	0	0	0	0x400

Logic operation

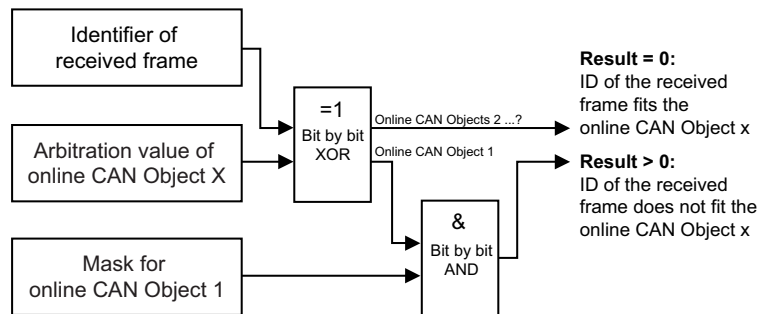


Fig. 1: Logical function of the filtering

Received Frame 1:

Primary master telegram to device with dbCAN-ID 0.01

Bit	10	9	8	7	6	5	4	3	2	1	0	Hex
Received Frame1 (Identifier of received frame)	0	0	0	0	0	0	0	0	0	0	1	0x001
Arbitration value of online CAN Object X	1	0	0	0	0	0	0	0	0	0	0	0x400
XOR	1	0	0	0	0	0	0	0	0	0	1	0x601
Mask for online CAN Object 1	1	1	0	0	0	0	0	0	0	0	0	0x600
AND	1	0	0	0	0	0	0	0	0	0	0	0x400

Result > 0 ⇒ Telegram blocked**Received Frame1:**

Telegram from device with dbCAN-ID 0.01

Bit	10	9	8	7	6	5	4	3	2	1	0	Hex
Received Frame1 (Identifier of received frame)	1	0	0	0	0	0	0	0	0	0	1	0x401
Arbitration value of online CAN Object X	1	0	0	0	0	0	0	0	0	0	0	0x400
XOR	0	0	0	0	0	0	0	0	0	0	1	0x001
Mask for online CAN Object 1	1	1	0	0	0	0	0	0	0	0	0	0x600
AND	0	0	0	0	0	0	0	0	0	0	0	0x000

Result = 0 ⇒ Telegram passed

1.3.3. dbCAN protocol extract

dbCAN is based on CAN Layer 2 with 11 bit CAN-Identifier.

Structure of the 11 Bit CAN-Identifier for dbCAN

Bit 10-9	Object class	2 bit ⇒ 4 Object-Classes
Bit 8-6	Subnet	3 bit ⇒ 8 Subnets (0 to 7)
Bit 5-0	Device-Id	6 bit ⇒ 63 Devices "Device-Id 0 is for broadcast"

The priority of the Object-Class is higher than the Device-Id.

Object classes

Object class	Bit		Description
	10	9	
0	0	0	Primary Master (Process data)
1	0	1	Secondary Master (Process data)
2	1	0	Process data from device (Process data)
3	1	1	Stream objects

Subnet-Id

Subnet	Bits			Description
	8	7	6	
0	0	0	0	Subnet 0
to	:	:	:	
7	1	1	1	Subnet 7

Device-Id

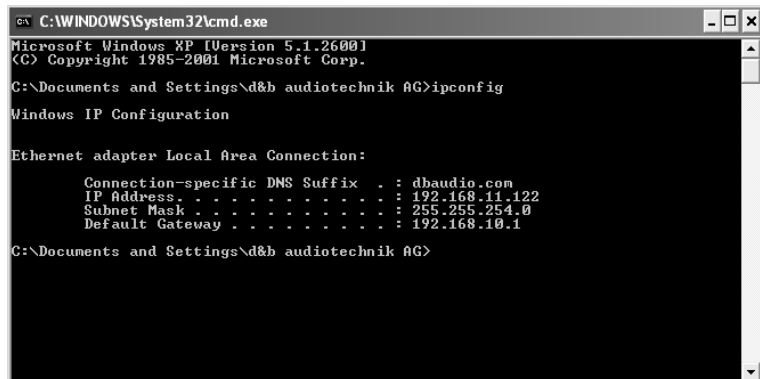
Device-Id	Bits						Description
	5	4	3	2	1	0	
0	0	0	0	0	0	0	Broadcast into the Subnet
1	0	0	0	0	0	1	Lowest Device-Id
to	:	:	:	:	:	:	
63	1	1	1	1	1	1	Highest Device-Id

2. Ethernet tools

2.1. ipconfig (Windows)/ifconfig (MAC OS X)

In Windows, the command line tool "ipconfig" can be used to display all current TCP/IP network configuration values of the computer. This tool also refreshes the DHCP and DNS settings.

Open the DOS prompt and type in "ipconfig".



```
C:\WINDOWS\System32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\d&b audiotechnik AG>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

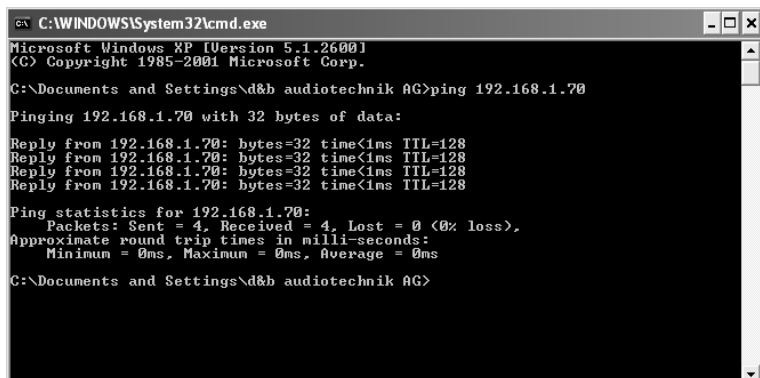
    Connection-specific DNS Suffix  . : dbaudio.com
    IP Address . . . . . : 192.168.11.122
    Subnet Mask . . . . . : 255.255.254.0
    Default Gateway . . . . . : 192.168.10.1

C:\Documents and Settings\d&b audiotechnik AG>
```

For MAC OS X, the tool "ifconfig" can be used.

2.2. Ping

"ping" is a computer network tool used to test whether a particular host can be accessed across an IP network.



```
C:\WINDOWS\System32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\d&b audiotechnik AG>ping 192.168.1.70

Pinging 192.168.1.70 with 32 bytes of data:

Reply from 192.168.1.70: bytes=32 time<1ms TTL=128
Reply from 192.168.1.70: bytes=32 time<1ms TTL=128
Reply from 192.168.1.70: bytes=32 time<1ms TTL=128
Reply from 192.168.1.70: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.70:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\d&b audiotechnik AG>
```