



XAir

User's Guide


Configuration

Copyright © 2002 BinTec Communications AG, all rights reserved.

Version 2.0

Document # 71000P

Mai 2002



Purpose This manual describes the configuration of **XAir**. For up-to-the-minute information and instructions concerning the latest software release, you should always read our release notes, especially when carrying out a software update to a later release level. The latest release notes can always be found at www.bintec.net.

Liability While every effort has been made to ensure the accuracy of all information in this manual, BinTec Communications AG cannot assume liability to any party for any loss or damage caused by errors or omissions or by statements of any kind in this document and is only liable within the scope of its terms of sale and delivery.

The information in this manual is subject to change without notice. Additional information, including changes and release notes for **XAir**, can be found at www.bintec.net.

Trademarks BinTec and the BinTec logo are registered trademarks of BinTec Communications AG.

Other product names and trademarks mentioned are usually the property of the respective companies and manufacturers.

Copyright All rights are reserved. No part of this publication may be reproduced or transmitted in any form or by any means – graphic, electronic, or mechanical – including photocopying, recording in any medium, taping, or storage in information retrieval systems, without the prior written permission of BinTec Communications AG. Adaptation and especially translation of the document is inadmissible without the prior consent of BinTec Communications AG.

Guidelines and standards **XAir** complies with the following guidelines and standards:

- R&TTE Directive 1999/5/EC
- CE marking for all EU countries

You will find detailed information in the declaration of conformity at www.bintec.net.



How to reach BinTec

BinTec Communications AG
Südwestpark 94
D-90449 Nürnberg
Germany
Telephone: +49 911 96 73 0
Fax: +49 911 688 07 25
Internet: www.bintec.net

BinTec Communications France
6/8 Avenue de la Grande Lande
F-33174 Gradignan
France
Telephone: +33 5 57 35 63 00
Fax: +33 5 56 89 14 05
Internet: www.bintec.fr





Table of Contents	5
1 Introduction	9
2 Previous Knowledge	11
3 Further Documentation	12
4 Typographical Conventions	13
5 Important Text Passages	14
6 General Safety Precautions	15
7 The Major Parameters	17
7.1 Changing Passwords for User Levels	18
7.2 Conventions for Interface Names	19
7.3 Configuring the Network Name	22
7.4 Selecting the Frequency	23
7.5 Configuring Other Ethernet Parameters	24
8 The BinTec XAir Manager	25
8.1 Defining a Multicast Interface	27
8.2 The User Interface of the BinTec XAir Manager	28
8.2.1 The Main Window	28
8.2.2 The Menu Bar	28
8.2.3 The Tool Bar	29
8.2.4 The Status Bar	29
8.3 Functions of BinTec XAir Manager	30
8.3.1 Finding Available XAirs	30
8.3.2 Manually Processing Entries	32
8.3.3 The Basic Configuration	33

8.3.4	Entering the Password	33
8.3.5	Starting a Telnet Connection	34
8.3.6	Starting a Web Connection	35
8.3.7	Upgrading the Firmware	35
8.3.8	Resetting XAir to Ex Works Settings	40
8.3.9	Rebooting XAir	40
8.3.10	Closing the BinTec XAir Manager	40
9	The Telnet User Interface	41
9.1	Starting the Telnet Connection and Logging In	42
9.2	Structure of the User Interface	44
9.3	STATUS Menu	46
9.3.1	STATUS Submenu SUMMARY	46
9.3.2	STATUS Submenu PORTS	49
9.3.3	STATUS Submenu ARPCACHE	57
9.3.4	STATUS Submenu BUFFERUTIL	57
9.3.5	STATUS Submenu SOFTWARE	58
9.4	CONFIG Menu	59
9.4.1	CONFIG Submenu SYSTEM	59
9.4.2	CONFIG Submenu PORTS	60
9.4.3	CONFIG Submenu INTERFACES	68
9.4.4	CONFIG Submenu FILTERING	72
9.4.5	CONFIG Submenu IPROUTES	86
9.5	CONTROL Menu	89
9.5.1	CONTROL Submenu DHCP_CLIENT	90
9.5.2	CONTROL Submenu SNMP	91
9.5.3	CONTROL Submenu SECURITY	95
9.5.4	CONTROL Submenu VIEWLOGS	100
9.5.5	CONTROL Submenu SYSTEMRESET	100
9.5.6	CONTROL Submenu RESETToFD	101

	9.6	Commands	102
10		The Web User Interface	103
	10.1	Starting the Web User Interface	104
	10.2	Structure of the Web User Interface	107
	10.3	Navigating the Web User Interface	108
	10.4	Menus and Parameters of the Web User Interface	109
11		XAir Bridge	111
	11.1	Using the XAir Bridge	112
	11.2	Requirements for a Link to an XAir Bridge	116
	11.3	XAir Bridge Set 11 Mbps	119
	11.3.1	Menus	119
	11.3.2	Configuration of an 11-Mbps XAir Bridge	128
	11.4	XAir Bridge Set 22 Mbps (Double Bridge)	148
	11.4.1	Special Configuration Features of Double Bridge	148
	11.4.2	Modified CONFIG Submenu PORTS	149
	11.4.3	Configuration of a 22-Mbps XAir Bridge (Double Bridge)	151
12		LEDs	157
	12.1	Assignment of LEDs to Ports	158
	12.2	LEDs for Ethernet Socket	160
	12.3	Boot Operation	161
	12.4	Error Display	164
		Index	165



1 Introduction

The **XAir** family of products from BinTec Communications AG offers an extensive infrastructure for wireless communication between various terminals and between whole networks. A powerful platform has been developed on the basis of wireless technology specifically to meet the requirements for professional applications.

This can be used to set up innovative networks and independent network connections for modern communication services in local areas to suit the user's needs.



Figure 1-1: **XAir**

Preliminary considerations

It is hard to imagine today's corporate communications without the capability of reaching a wide range of applications over an existing line-based Intranet. In conjunction with a wireless infrastructure like BinTec Communications AG has created with the **XAir** product family, this opens up new opportunities for a wide range of target groups.

New flexibility

Your decision to buy a wireless infrastructure based on BinTec's **XAir** is much more than just replacing a cable network. You will become considerably more flexible. In a BinTec wireless infrastructure, any terminal at any site can have access to the network and links can be set up to other networks.

New mobility Modern working methods and new forms of organization demand increasing mobility and independence for employees. Wireless communication with your **XAir** makes this possible and also enables your network to meet the new requirements. An unplanned meeting over **XAir**, a discussion with a colleague over **XAir** – your choice is unlimited with a wireless infrastructure.



Figure 1-2: Working with **XAir**

Aims You are ideally equipped with BinTec's **XAir** family. A modular concept and the versatility of the **XAir** family give you the freedom you expect from a professional wireless infrastructure.

It makes no difference whether your installation is complex or simple. BinTec offers coordinated solutions for both large concerns and small offices. The home user can also profit from innovation.

2 Previous Knowledge

This user's guide assumes you have the following basic knowledge:

- Basic knowledge of network structure
- Knowledge of basic network terminology, such as server, client and IP address
- Basic knowledge of using Microsoft Windows operating systems
- Knowledge of the document **XAir** - Los Geht's/Getting Started.

3 Further Documentation

You will find further information about the **XAir** in the following documentation:

- **XAir** - Los Geht's/Getting Started (German/English, printed, PDF)
- Important information for antenna installation (German, printed, PDF)

4 Typographical Conventions

The following typographical conventions and elements are used:

Typographical element	Meaning
▶	Here you are requested to do something.
■ —	Lists including two levels.
MENU ▶ SUBMENU Menu ▶ Submenu	<ul style="list-style-type: none"> ■ Indicates menus and submenus in the Telnet interface. ■ Indicates menus and submenus in the Windows interface.
Non-proportional (Courier), e.g. ping 192.168.1.254	<ul style="list-style-type: none"> ■ Indicates commands (e.g. in the Telnet interface) that you must enter as shown. ■ Display of Telnet interface.
<IP address>	Indicates inputs in which you enter a value for the term shown in the brackets. Do not enter the pointed brackets.
bold, e.g. Mode Windows Start menu	<ul style="list-style-type: none"> ■ Indicates fields in the Telnet interface. ■ Indicates keys, key combinations and Windows terms.
<i>italics, e.g.</i> <i>none</i>	Indicates values that you can enter or set in the Telnet interface.
Online: blue	Indicates links.

Table 4-1: Typographical elements

5 Important Text Passages

Important text passages are marked by symbols in the margin, which have the following meaning:




Symbol	Meaning
	Points out useful and relevant tips and tricks.
	Brings your attention to general and important points.
	Brings your attention to important safety precautions. Levels of danger are in accordance with ANSI: <ul style="list-style-type: none"> ■ Caution (indicates possible danger that, if unheeded, could cause material damage) ■ Warning (indicates possible danger that, if unheeded, could cause bodily harm) ■ Danger (indicates danger that, if unheeded, could lead to serious bodily harm or death)

Table 5-1: List of visual aids

6 General Safety Precautions

The following sections contain safety precautions you are strongly advised to heed when working with your equipment.

- Transport and storage**
- Only transport and store **XAir** in its original packaging or use other appropriate packaging to protect against knocking and shaking.
- Installation and operation**
- Read the information on the ambient conditions (see Technical Data) before installing and operating **XAir**.
 - Condensation may occur externally or internally if the equipment is moved from a colder room to a warmer room. When moving the equipment under such conditions, allow ample time for the equipment to reach room temperature and to dry out completely before operating. Observe the ambient conditions under Technical Data.
 - Make sure that the connection requirements for the power supply unit are observed.
 - Make sure the safety mains socket in the building is freely accessible. You must remove the mains plug to disconnect the equipment completely from the mains.
 - Arrange the cables so that they are not in the way and cannot be tripped over or damaged.
 - Do not connect, disconnect or touch the data lines during lightning storms.
- Operation according to the regulations**
- **XAir** meets the relevant safety standards for information technology equipment for use in offices.
 - Ambient temperature should not exceed 50 °C. Avoid exposure to direct sunlight.
 - Make sure no foreign objects (e.g. paper clips) or liquids get into the equipment (risk of electric shock, short-circuit). Make sure the equipment is sufficiently cooled.
 - In an emergency (e.g. damaged housing or operating element, entry of liquid or foreign bodies), immediately disconnect the power supply and notify customer service.

- Cleaning and repair**
- The equipment should only be opened by trained personnel. Only service centers authorized by BinTec should carry out any repairs to the equipment. Your dealer will tell you where the service centers are situated. Unauthorized opening and improper repairs can result in serious danger for the user (e.g. electric shock). Unauthorized opening of the equipment invalidates the terms of the guarantee and exempts BinTec Communications AG from any liability.
 - Never use water to clean this equipment. Water spillage can result in serious danger for the user (e.g. electric shock) and cause considerable damage to the equipment.
 - Never use scouring or abrasive alkaline cleaning agents on this equipment.

7 The Major Parameters

This chapter gives you an insight into the configuration options for **XAir**. The major **XAir** configuration parameters are introduced and briefly described. The basic configuration parameters, such as the IP address, are ignored here as they are explained in Los Geh't's/Getting Started.

7.1 Changing Passwords for User Levels



To prevent unauthorized access, you should change the passwords for the three user levels "Admin", "User" and "View" immediately.

You will find a detailed description of the user-specific rights for each user level in [chapter 9.1, page 42](#).

This chapter briefly explains how you can define the passwords for the user levels. A detailed version can be found in [chapter 9.5.3, page 95](#).

- Start the BinTec **XAir** Manager (see [chapter 8, page 25](#)) and select **Configuration** ➤ **Telnet** to set up a Telnet connection.
 - Log in as administrator by entering the password `admin` when asked to enter the password. This password is already set as default for user level "Admin" in the ex works configuration of **XAir**.
 - Select **CONTROL** ➤ **SECURITY** ➤ **USERLEVEL** ➤ **EDIT** in the Telnet interface.
 - In the list of available user levels on the right of the table, tag the user level for which you want to change the password ("Admin", "User" or "View") and press **Enter**.
 - Enter the "Admin" password again and press **Enter**.
 - Enter the new password and press **Enter**.
 - Enter the new password again and press **Enter**.
- The new password is then valid the next time you log in.



Caution!

The passwords are not reset to the ex works settings by **ResetToFD**. If you forget the "Admin" password, you must return your **XAir**.

- Remember the "Admin" password.

7.2 Conventions for Interface Names

This chapter explains the conventions used for assigning interface names for **XAIR**.

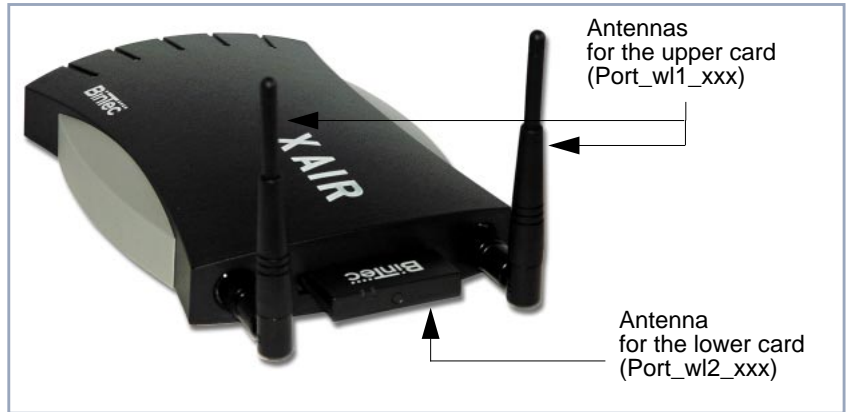


Figure 7-1: Example of **XAIR** cards for **XAIR** Professional with **XAIR** upgrade kit

The relationships between the LEDs and the **XAir** radio cards are shown in the following table:


Symbol	Function	Slot number of radio card	Position of radio card	User interface designation
— 1 —	((p))	1	Upper integrated card	Port_wl1_xxx
	[s]			
— 2 —	((p))	2	Lower integrated card or external card	Port_wl2_xxx
	[s]			
	Ethernet activity	—	—	Port_eth1

Table 7-1: LEDs and radio cards



If your **XAir** has an older housing, note that the port labeling is reversed.



If your **XAir** is only equipped with the lower card, this card is designated Port_wl1_xxx in the interface.

Name conventions for wireless ports

The names of wireless ports in the user interface of **XAir** comprise the following:

- *Port_wl*, where *wl* stands for wireless
- Number of physical port (1 or 2)
- *_ap*, where *ap* stands for access point port

- *_br*, where *br* stands for a bridge port

- *_brX*, where *brX* stands for a double bridge port

The name of the lower radio card is therefore:

- *Port_wl2_ap*

The designation "wireless port" is generally used in the descriptions below.

Name conventions for Ethernet port

The name of the Ethernet port (10/100 Base-T) in the user interface of **XAir** comprises the following:

- *Port_eth*, where *eth* stands for Ethernet

The name of the Ethernet port is:

- *Port_eth1*

The designation "Ethernet port" is generally used in the descriptions below.

Name conventions for interfaces

The names of the interfaces in the user interface of **XAir** comprise the following:

- *le0* for an Ethernet interface

- *wl* for a wireless port interface (*wl1* or *wl2*)

7.3 Configuring the Network Name

In contrast to a LAN set up over Ethernet, a wireless LAN does not have any cables for setting up a permanent connection between the server and clients. Access violations or faults may therefore occur with directly adjacent radio networks.

To prevent this, every radio network has a parameter that uniquely identifies the network and is comparable with a domain name. Only clients whose network configuration is the same as that of **XAir** can communicate in this Wireless LAN (WLAN). The same network name must be configured.



The network name (parameter **NetworkName**) is an important feature for the security of your **XAir**. The network name is called the SSID (Service Set Identifier), which prevents clients that do not know this SSID logging in to your access point. You should therefore select a safe network name and only pass this to persons who need the SSID for logging in to your **XAir**.

Important: Please also note the parameter **BcstSSID**, which is described in "[CONFIG ► PORTS ► <RADIOPORT>](#)", page 61.

The parameter for the network name of **XAir** is **NetworkName**. Carry out the following steps to set this for **XAir**:

- Start the BinTec **XAir** Manager and select **Configuration** ► **Telnet** to set up a Telnet connection.
- Log in as administrator.
- Select **CONFIG** ► **PORTS** ► **<WIRELESS PORT>** (e.g. *Port_wl1_ap*).
- Tag the **NetworkName** entry and press **Enter** or the right arrow key.
- Now enter the desired network name (**NetworkName**) and press **Enter**.
All clients set to this network name (**NetworkName**) can now access this WLAN.

7.4 Selecting the Frequency

Configuring the network name (**NetworkName**, see [chapter 7.3, page 22](#)) means that radio networks can be logically separated from each other, but they can still mutually interfere if they are operating on the same or closely adjacent radio channels.

So if you are operating two or more radio networks with small spacing between them, it is advisable to assign the networks to different channels. Each of these should be spaced four to five channels apart, as a network also partially occupies the adjacent channels. Faults can also occur due to other radio applications such as DECT telephones.

Proceed as follows to select the channel frequency:

- Start the BinTec **XAir** Manager and select **Configuration** ➤ **Telnet** to set up a Telnet connection.
- Log in as administrator.
- Select **CONFIG** ➤ **PORTS** ➤ **<WIRELESS PORT>** ➤ **BASIC** (e.g. *Port_wl1_ap*).
- Tag the **DSChannel** entry.
- Press **Enter** or the right arrow key.
A list of possible frequencies is now displayed on the right of the table. The ex works default setting is 2412 MHz, i.e. 2.412 GHz.
- Use the arrow keys to select the desired frequency and press **Enter**.

7.5 Configuring Other Ethernet Parameters

You have already configured the IP address, subnet mask and gateway for **XAir** in the basic configuration of the BinTec **XAir** Manager (see Los Geht's/Getting Started).

You will find other parameters for Ethernet port configuration in the **CONFIG** ► **PORTS** ► **<ETHERNET PORT>** menu (e.g. *Port_eth1*).

The following parameters are available:

- Interface
- AutoNegotiation
- Speed.

You will find a description of the individual parameters in [chapter 9.4.2, page 60](#).

8 The BinTec **XA**ir Manager

This chapter describes the extra configuration options provided by the BinTec **XA**ir Manager in addition to the basic configuration (see chapter "Basic Configuration" in Los Geht's/Getting Started).



Start the BinTec **XA**ir Manager by double clicking the xairm.exe file.

The basic configuration comprises the following settings:

- Enter access point name
- Enter IP address
- Enter net mask
- Enter standard gateway.

You can also make the following configurations with the BinTec **XA**ir Manager:

- Starting a Telnet connection
- Starting a web connection
- Upgrading the firmware
- Rebooting
- Resetting **XA**ir to ex works settings.



Your **XA**ir and the PC you want to use for configuring **XA**ir must be in the same LAN.



Instructions for working with the BinTec **XAir** Manager:

- The PC must have a working TCP/IP stack with a sensible configuration.
- All settings made over the BinTec **XAir** Manager can also be made over a router.
- The search function is restricted to the subnetwork of the PC on which the BinTec **XAir** Manager is located if the router does not forward multicasts.
- With more recent firmware versions, **XAir** can only be configured via a password. You should change the preset passwords as soon as possible for security reasons. Older firmware versions do not have this feature. You are recommended to update to the current firmware version. You will find the current version of the firmware at www.bintec.net.

If your PC has several network interfaces, you can configure a certain multicast interface (router or switch) in the BinTec **XAir** Manager (see [chapter 8.1, page 27](#)) over which **XAirs** are to be searched for.

8.1 Defining a Multicast Interface

If the PC on which the BinTec **XAir** Manager is installed has several network interfaces, one interface can be defined as a multicast interface. This interface is used for searching for **XAirs**.

Proceed as follows to manually define a multicast interface (router or switch):

- Select **Extras** ➤ **Options**.

The following dialog box opens:

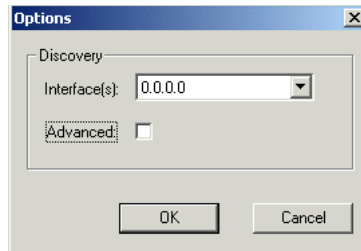


Figure 8-1: Entering the IP address for the multicast router (switch)

- Enter the IP address of the desired multicast interface (router or switch) and press **OK**.
Once the multicast interface 0.0.0.0 is defined, a search is made over all network interfaces of the PC.

8.2 The User Interface of the BinTec XAir Manager

The user interface of the BinTec **XAir** Manager comprises four components, which are described in detail below:

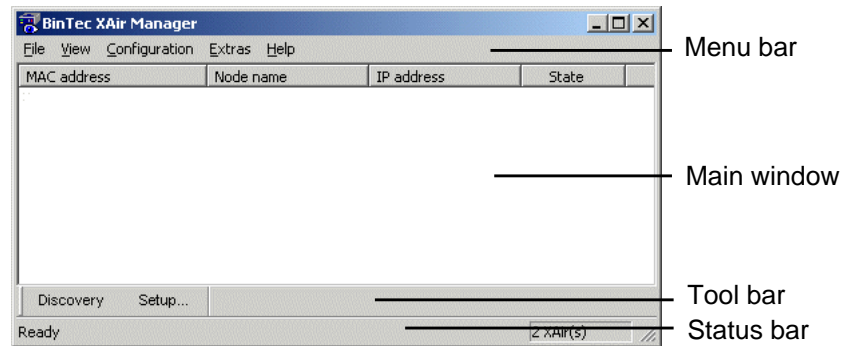


Figure 8-2: User interface of BinTec **XAir** Manager

8.2.1 The Main Window

The main window is initially blank when starting the BinTec **XAir** Manager via the BinTec xairm.exe file. The main window consists of tables arranged in columns for **MAC address**, **Node name**, **IP address** and **State**. As soon as **XAIRs** have been searched for and recognized in the network, these columns contain the relevant data for each device.

8.2.2 The Menu Bar

The menu is located at the top edge of the BinTec **XAir** Manager and contains the menu items **File**, **View**, **Configuration**, **Extras** and **Help** with the respective menu subitems.

8.2.3 The Tool Bar

The tool bar, which is located directly below the main window, provides fast access to the two most important functions of the **XAir** Manager, **Discovery** and **Setup**. These two functions, which can also be selected via the menu, are explained in more detail below (see [chapter 8.3.1, page 30](#) and [chapter 8.3.3, page 33](#)).

Proceed as follows to show or hide the tool bar:

- Select **View** ➤ **Tool Bar**.

8.2.4 The Status Bar

The status bar at the bottom edge of the window shows you the status of the **XAir** Manager. If the mouse pointer is over a menu item that activates a function (e.g. **Discovery**), the function of this menu item is also shown in the status bar.

Proceed as follows to show or hide the status bar:

- Select **View** ➤ **Status Bar**.

8.3 Functions of BinTec XAir Manager

This chapter describes the following:

- "Finding Available XAirs", page 30
- "Manually Processing Entries", page 32
- "The Basic Configuration", page 33
- "Entering the Password", page 33
- "Starting a Telnet Connection", page 34
- "Starting a Web Connection", page 35
- "Upgrading the Firmware", page 35
- "Resetting XAir to Ex Works Settings", page 40
- "Rebooting XAir", page 40
- "Closing the BinTec XAir Manager", page 40

8.3.1 Finding Available XAirs

The **Discovery** function can be activated via the menu item **File** ► **Discovery** or directly via the **Discovery** button on the tool bar.

The BinTec **XAir** Manager then recognizes **XAirs** installed in the network automatically and shows them in the main window with the associated network parameters (MAC address, Node name, IP address):

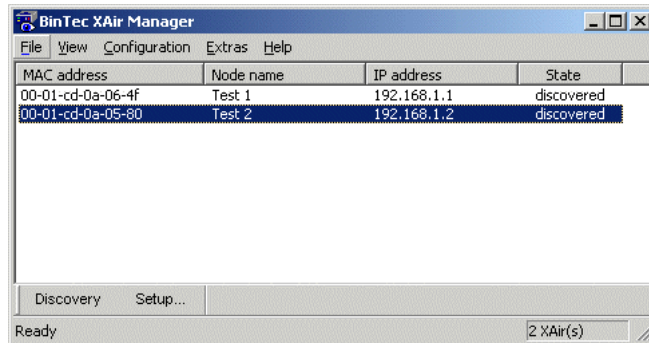


Figure 8-3: **XAirs** found

The entries in the **State** column mean:

- *discovered* = found by BinTec **XAir** Manager,
- *by user* = manual entry and
- *not found* = **XAir** is not found by a new search.

8.3.2 Manually Processing Entries

The **Add**, **Delete** and **Delete All** functions can be selected in the menu item **File ► Manual Entry**:

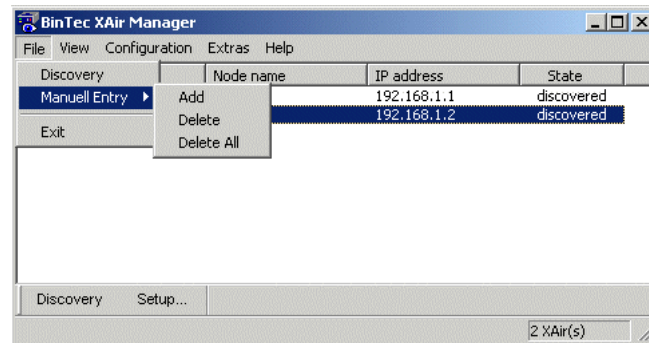


Figure 8-4: Submenu **Manual Entry ► Add**

Manually adding an XAir

- Select **File ► Manual Entry ► Add**.

A dialog box opens in which you can enter the IP address of the **XAir** to be added:

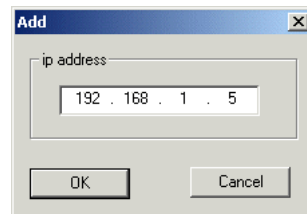


Figure 8-5: Entering the IP address of **XAir**

- Confirm your entry by clicking the **OK** button. The manually entered **XAir** is searched for and appears in the list in the main window when it is found.

Deleting an XAir manually entered or not found.

Proceed as follows to delete manually added **XAirs (State by user)** and **XAirs** tagged as *not found* from the list:

- Tag the MAC address of the entry to be deleted.
- Select **File ► Manual Entry ► Delete**.



Entries that have been created automatically with the **Discovery** function cannot be deleted in this way.

Deleting all XAirs not found

Proceed as follows to simultaneously delete all entries tagged as *not found* from the list in the main window:

- Select **File** ➤ **Manual Entry** ➤ **Delete All**.

8.3.3 The Basic Configuration

To configure an **XAir**, tag the relevant entry in the main window, enter the password (**Configuration** ➤ **Password**) and select either **Configuration** ➤ **Setup** or press the **Setup...** button in the tool bar.

You will find details on carrying out the basic configuration in chapter "The Basic Configuration" in Los Geht's/Getting Started.

8.3.4 Entering the Password

The password is necessary for using the following settings of the BinTec **XAir** Manager:

- Firmware Upgrade
- Reboot
- Reset
- Setup.

Proceed as follows to enter the password:

- Tag the **XAir** in the list and select **Configuration** ➤ **Password**.
- Enter the password for the user level "Admin" and press **OK**.
The ex works password set for the user level "Admin" is *admin*.
If the function field **Assign to all XAirs** is activated, the same password is also used for all other **XAirs**. If the BinTec **XAir** Manager is closed, the

password must be entered again when the BinTec **XAir** Manager is restarted.



If you have not already done so, you should change the passwords for the three user levels "Admin", "User" and "View" immediately to prevent unauthorized access.

You can change the passwords in the user interface of the **XAir** in the **CONTROL ► SECURITY ► USERLEVEL ► EDIT** menu (see [chapter 7.1, page 18](#)).

8.3.5 Starting a Telnet Connection

Proceed as follows to start a Telnet connection:

- Tag the **XAir** you wish to access over Telnet in the main window.
- Select **Configuration ► Telnet**.
A terminal is now emulated in a new dialog box.
- Select **Terminal ► Settings** in the new dialog box.

The following window opens:

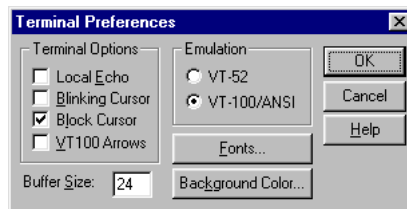


Figure 8-6: **Terminal Settings** window

- If you wish to use all the functions of the terminal, make sure
 - the option field *VT-100/ANSI* is activated in **Emulation** field,
 - the **Buffer Size** for an optimum display is set to at least 24.



If necessary, you can adapt the interface design of the terminal window to suit your needs via the **Fonts** and **Background Color** buttons.

You can obtain detailed information about the various configuration options via the **Help** button on the right of the window.

- Once you have completed all the settings, confirm them with **OK**.

8.3.6 Starting a Web Connection

Proceed as follows to start a web connection:

- Tag the **XAir** you wish to access over a web connection (web user interface) in the main window.
- Select **Configuration** ➤ **Web**.
XAir's web user interface is started.
- Click the graphic.
A dialog appears for entering the user name and password.



Important! Refer to the description of user names and passwords in [chapter 7.1, page 18](#).

- Enter the **user name** and **password**. The user name here corresponds to the user level you wish to access and the password to the corresponding password.
- Confirm your entries with **OK**.
The configuration menu of the web user interface opens.

You will find a detailed description of the web user interface and activating the web user interface from a browser in [chapter 10, page 103](#).

8.3.7 Upgrading the Firmware



You will find the current firmware for **XAir** in the download section for **XAir** on BinTec's website at www.bintec.net. The current version of the BinTec **XAir** Manager can also be found here.

Always use the latest version of the BinTec **XAir** Manager for upgrading the **XAir** firmware and observe the instructions in the relevant release notes.



Note that after upgrading the firmware, you may have to reset your **XAir** to the ex works settings. This means that you lose your current configuration and have to configure the device again after the upgrade.

The monitor, firmware and boot loader are always upgraded at the same time when you upgrade the firmware for **XAir**. The upgrade files have the file extension ".afw".



Caution!

When carrying out the upgrade on your **XAir**, you must not switch **XAir** off. The data connection must not be interrupted, as otherwise the **XAir** software is destroyed and you must return the device to the manufacturer.

- Never switch off **XAir** during the upgrade or interrupt the data connection.

Proceed as follows to upgrade the firmware:

- Before starting the upgrade, make sure that the new version of the firmware (file with extension *.afw) is available on the hard disk of your PC or another storage medium.
- Tag the **XAir** you want to upgrade in the main window of the BinTec **XAir** Manager.
- If not already done, enter the user name and password for the user level "Admin" under **Configuration** ➤ **Password**. This must be done before an upgrade is possible.
- Select **Configuration** ➤ **Firmware upgrade**.

The following window opens:

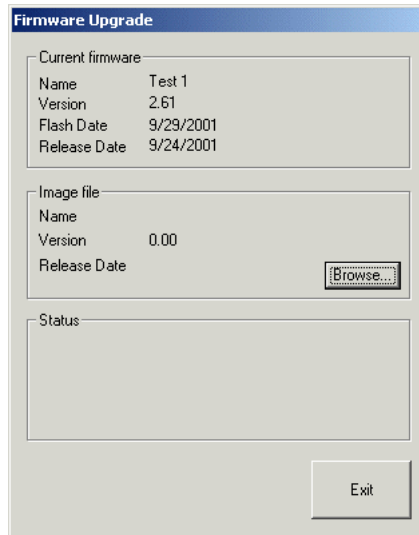


Figure 8-7: **Firmware Upgrade** window

➤ Press the **Browse...** button.

The following window opens:

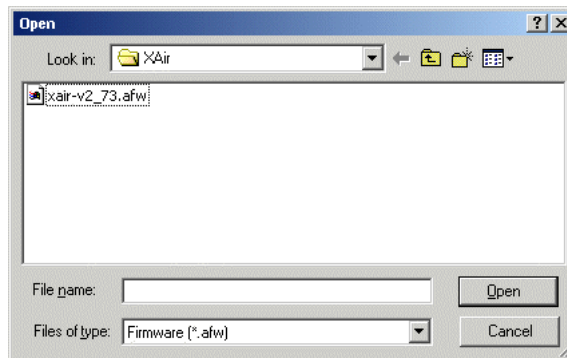


Figure 8-8: Selecting the firmware upgrade file

➤ Select the file containing the new firmware.
This is the file **xair-v2_73.afw** in our example.

- Click the **Open** button.

The path for the firmware is now updated automatically in the control window for the **Image file**. The BinTec **XAir** Manager also checks if an upgrade is possible and meaningful:

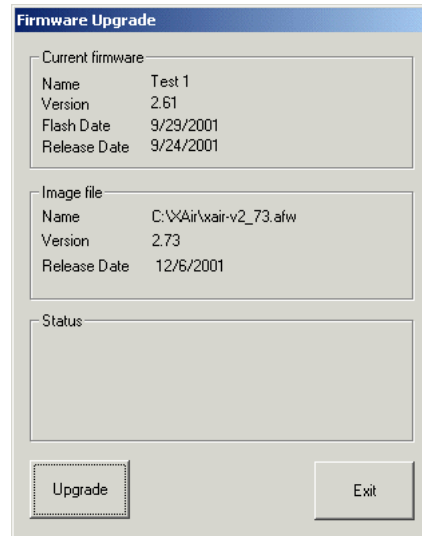


Figure 8-9: **Firmware Upgrade** window with selected firmware

- Click the **Upgrade** button.

The firmware upgrade is carried out.

The **Status** field shows a progress bar and the current process:

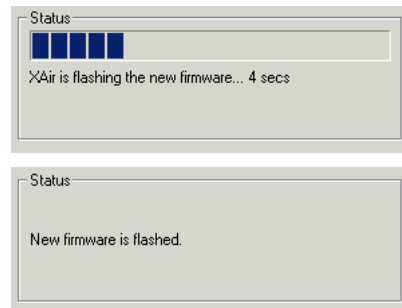


Figure 8-10: Status window for upgrade process

The following dialog box appears on successful completion of the firmware upgrade:

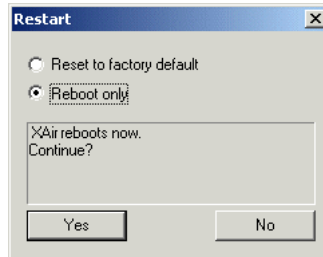


Figure 8-11: Reboot confirmation

The BinTec **XAir** Manager always suggests the necessary option in this dialog box: The **Reboot only** option field if the **XAir** is only to be rebooted or the **Reset to factory default** option field to reboot **XAir** and to reset it to the ex works settings at the same time.



If the BinTec **XAir** Manager has tagged the **Reset to factory default** option field here, you should not change the setting to **Reboot only**, as your configuration then no longer works. In this case, it is necessary to reconfigure the **XAir** after upgrading the firmware.

If the BinTec **XAir** Manager suggests the **Reboot only** option field here, you can also select the **Reset to factory default** if required.

- Confirm with **Yes** to restart **XAir** or to reset **XAir** to the ex works settings at the same time.



If the **Reboot only** option field is tagged, a reboot is also carried out by clicking the **No** button.

The reboot of **XAir** is not shown on the screen of your PC, but you can use the LEDs on **XAir** to check radio activity, radio status and Ethernet activity (see [chapter 12.3, page 161](#)).

- Finally check the operation of your **XAir**, for example, by searching for **XAirs** installed in the network using the BinTec **XAir** Manager.

8.3.8 Resetting XAir to Ex Works Settings

Proceed as follows to discard the configuration already made and reset **XAir** to the ex works settings:

- Select **Configuration** ➤ **Reset to factory default**.

XAir is reset to the ex works settings and a reboot is carried out automatically.



The following settings are not reset as part of resetting to the ex works settings:

- IP address
- Subnet mask
- Gateway
- Access point name
- Passwords
- ACL settings
- MAC list for AcLocal.

8.3.9 Rebooting XAir

Proceed as follows to reboot the **XAir**:

- Select **Configuration** ➤ **Reboot**.

XAir is rebooted.

8.3.10 Closing the BinTec XAir Manager

Proceed as follows to close the BinTec **XAir** Manager:

- Select **File** ➤ **Exit**.

The program is closed.

9 The Telnet User Interface

This chapter describes the structure and functions of the Telnet user interface, which you can use via Telnet. Examples of functions:

- Displaying various status parameters of **XAir**
- Configuring system, interface and filter settings
- Checking access permissions



To enable the **XAir** Manager to find **XAir** automatically, your PC must be located in the same network as the **XAir** to be configured. If the **XAir** to be configured is located in another network, you must create it as a manual entry in the **XAir** Manager.

All settings made over the **XAir** Manager can also be made over a router.

9.1 Starting the Telnet Connection and Logging In

Proceed as follows to emulate a terminal (see [chapter 8.3.5, page 34](#)):

- ▶ Start your Telnet connection in the BinTec **XAir** Manager via **XAir ▶ Telnet**.

The start screen of the terminal opens in a new window:

```
                Welcome to BinTec XAir!  
  
            BinTec Communications AG, Nuremberg, Germany  
            http://www.bintec.de  
  
                XAir Access Point  
  
Node Name: test2                                UpTime : 0:22:25  
  
password:
```

Figure 9-1: Start screen for Telnet connection

User levels You are requested to enter a password for logging in at one of the user levels.

There are basically three different user levels for BinTec **XAir**: "Admin", "User" and "View".

The user level "Admin" allows unrestricted access to all functions of the terminal. The ex works setting of the password for this user level is "admin".

If you log in as "User", you are not allowed access to certain system configuration options. In particular, a "User" cannot make any settings that would interfere with the operation of the **XAir**. The ex works password setting for this user level is "user".

The user level "View" gives you no options for configuration of **XAir**. You can only view a few status screens. The ex works password setting for this user level is "view".

- Enter the password for the desired user level and press **Enter**.
You can now access the main menu.



You should change the preset passwords as soon as possible for security reasons. The relevant steps for changing a password are explained in [chapter 9.5.3, page 95](#).

9.2 Structure of the User Interface

The structure of the user interface is explained below:

Title section	XAIR Access Point by BinTec Communications AG	
Path	XAIR Multi2 - V 2.73 test2	
Menu and command section	<pre> Menu ----- 1 - Status [->] 2 - Config [->] 3 - Control [->] 4 - Refresh [5] 5 - Help 6 - Exit </pre>	<pre> Main Submenu ----- Summary Ports [->] ArpCache [1] BufferUtil [41%] Software </pre>
Status section	Show status.	
Input section	<pre> User is authorized at 'admin' level. Enter a number or name. 0:23:53[admin]> </pre>	

Figure 9-2: Structure of user interface

The user interface is divided into five main sections:

- Title section
- Path indication
- Menu and command section
- Status section
- Input section (prompt)

Title section The title section of the window contains general information, such as the **XAIR** version used (in the example: V 2.73) and the name of the **XAIR** to be configured (in the example: test2)

Path The path indication (e.g. Main) helps to show you where you are currently located in the user interface.

Menu and command section The menu and command section is located in the middle of the window and displays the individual menus or commands in tabular form. The left side of the table shows you the menu in which you are currently located, the **MAIN** menu in the example. The right side of the table shows the submenu of the currently selected menu item, if available. In our example, the **STATUS** menu item has the options **SUMMARY**, **PORTS**, **ARPCACHE**, **BUFFERUTIL** and **SOFTWARE**.

Menu items (e.g. **CONFIG**) or commands (e.g. **EXIT**) are shown by a code, followed by a name and a value in square brackets, if applicable. An arrow symbol beside the name of the menu item instead of a value indicates that a submenu exists.

Telnet is keyboard-oriented and you must use the keyboard to navigate in the individual menus. Use the arrow up and arrow down keys to select menu items or commands. Use the right arrow to change to the submenu of the selected menu item. The left arrow is used to return to the last menu. You can also open a menu item or activate a command directly by entering its code (e.g. Status = 1) or name. You can call up a detailed list of all keys used with the command **HELP**.

Status section The status section of the terminal displays information about the currently selected menu item or command and the current status when executing certain actions.

Input section The input section of the terminal displays the keyboard inputs that are currently possible together with their effect and the active user level. The prompt that accepts the keyboard commands is also located here.

9.3 STATUS Menu

The **STATUS** menu combines all the information about **XAir**. This information is only available as a display for the user levels "User" and "View", but the user level "Admin" can reset values to zero. The statistics data under **Summary** are only available as a display for all user levels.

STATUS menu:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                                    test2

                                Main
                                Submenu
-----
1 - Status      [ -> ]      Summary
2 - Config      [ -> ]      Ports          [ -> ]
3 - Control     [ -> ]      ARPCache       [ 1 ]
4 - Refresh     [ 5 ]      BufferUtil      [ 41% ]
5 - Help
6 - Exit

                                Software

                                Show status.

User is authorized at 'admin' level.
Enter a number or name.
0:23:53[admin]>

```

Figure 9-3: **STATUS** menu

9.3.1 STATUS Submenu **SUMMARY**

Proceed as follows to display a summary screen with all the major network parameters:

➤ Select **STATUS** ➤ **SUMMARY**.

The following menu opens:

```

XAIR Multi2 - V2.73
XAir Access Point by BinTec Communications AG test2
State
-----
Primary If  IP Config      DHCP   Filter      SNMP   Up Time
-----
IP_Address  192.168.001.005  disabled Prot:fwrSome  on     0:26:51
Subnet_Mask 255.255.255.000      Mcst:forward
GateWay     000.000.000.000
Sessions
1

Port      MAC Address      Speed  Network Name  Mode  Client
-----
Port_eth1 00:01:CD:0A:00:4A  10    11@1-2412~BinTec  Half
Port_wll_ap 00:60:1D:22:E4:AC  11@1-2412~BinTec  AP      1

Enter [SPACE]refresh, [q]quit:
    
```

Figure 9-4: **STATUS** ► **SUMMARY** menu

The terms and parameters used are explained in the following table:

Parameters	Meaning
Primary If/IP Config	Shows the IP address, subnet mask and gateway of the primary interface.

Parameters	Meaning
DHCP	<p>Shows if the IP address has been requested by a DHCP server or a permanently configured IP address is used.</p> <ul style="list-style-type: none"> ■ <i>disabled</i> A permanently configured IP address is used. ■ <i>enabled</i> An IP address can be requested by a DHCP server. ■ <i>in use</i> An IP address has been requested by a DHCP server and this is being used. ■ <i>failure</i> A fault occurred when the DHCP server requested the IP address.
Filters	Shows the filter settings (see chapter 9.4.4, page 72).
SNMP	Shows if SNMP is active or not (<i>on/off</i>). See also chapter 9.5.2, page 91 .
Up Time	Shows the time interval since the last reset.
Session	Number of active user connections (currently only Telnet connections).
Port	Shows all active ports.
MAC Address	Shows the MAC address of the individual ports.
Speed	Shows the speed set for the individual ports in Mbps. The frequency is also shown for wireless ports.

Parameters	Meaning
Network Name (for wireless ports only)	Shows the defined network name of the wireless ports. A tilde "~" as prefix indicates that the parameter BcstSSID (see Table 9-10, page 65) is activated. The value is only shown in the user level "Admin". No value is shown in the user levels "User" and "View".
Mode	Shows the transmission mode for the Ethernet port and wireless port. The following modes are possible for the various ports: <ul style="list-style-type: none"> ■ Ethernet port <i>Full</i> stands for Full-Duplex Mode. <i>Half</i> stands for Half-Duplex Mode. ■ Wireless port <i>AP</i> stands for Access Point Mode.
Client	Number of associated radio clients.

Table 9-1: Fields of **STATUS** ► **SUMMARY** menu

9.3.2 STATUS Submenu **PORTS**

Opening the **PORTS** submenu displays the status screens, which display reports and data about the activities of the **XAir** ports.

Which of the ports are displayed here depend on the hardware configuration of **XAir**.



STATUS ► **PORTS** ►
<**ETHERNET PORT**>

This menu item shows the MAC address, the maximum speed and the status screen with the major parameters of an Ethernet port (e.g. port _eth1).

The following screen appears:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                     test2
                                Status Ports Port_eth1
                                Command
-----
1 - MAC           [ 00:01:CD:0A:00:4A ]
2 - MaxSpeed     [ 100 ]
3 - Statistics
-----

                                Show traffic statistics of this port.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:10:46[admin]>

```

Figure 9-5: **STATUS** ► **PORTS** ► **<ETHERNET PORT>** menu

The parameters are explained in the following table:

Parameters	Meaning
MAC	Shows the MAC address of the Ethernet port, but this cannot be changed at any user level.
MaxSpeed	The figure in brackets shows the maximum speed of the Ethernet port in Mbps. This entry cannot be changed.
Statistics	Select Statistics to display the statistics for received, transmitted and filtered frames at the Ethernet port.

Table 9-2: Fields of **STATUS** ► **PORTS** ► **<ETHERNET PORT>**

Statistics You can open the following screen via **STATUS** ► **PORTS** ► **<ETHERNET PORT>** ► **STATISTICS** :

```

                                XAir Access Point    by BinTec Communications AG
XAIR Multi2 - V2.73                                     test2
                                Status Ports Port_eth1
Parameters                                     Value
-----
Received frames since last reset                51
Transmitted frames since last reset             73
Filtered frames since last reset                0
MULTICAST received frames since last reset     51
MULTICAST transmitted frames since last reset  73
MULTICAST filtered frames since last reset     0
Filtered frames (on all ports) since last reset 0

Enter [SPACE]refresh, [r]reset, [q]quit:

```

Figure 9-6: **STATUS** ► **PORTS** ► **<ETHERNET PORT>** ► **STATISTICS** menu

The terms and parameters used are explained in the following table.

Parameters	Meaning
Received frames since last reset	Shows the number of frames received since the last reset.
Transmitted frames since last reset	Shows the number of frames transmitted since the last reset.
Filtered frames since last reset	Shows the number of frames filtered since the last reset.
MULTICAST received frames since last reset	Shows the number of multicast frames received since the last reset.
MULTICAST transmitted frames since last reset	Shows the number of multicast frames transmitted since the last reset.
MULTICAST filtered frames since last reset	Shows the number of multicast frames filtered since the last reset.

Parameters	Meaning
Filtered frames (on all ports) since last reset	Shows the number of frames filtered by all ports since the last reset.

Table 9-3: Fields of **STATUS** ► **PORTS** ► **<ETHERNET PORT>** ► **STATISTICS**

STATUS ► **PORTS** ► **<RADIOPORT>** This menu item shows the MAC address, the maximum speed and the status screen with the major parameters of a wireless port (e.g. port_wl1_ap).

The following screen appears:

```

XAIR Multi2 - V2.73
XAIR Access Point by BinTec Communications AG
test2

Status Ports Port_wl1_ap

Command
-----|-----
1 - MAC [ 00:60:1D:22:E4:AC ]
2 - MaxSpeed [ 11 ]
3 - Statistics
4 - CardFirmware [ 7.48 ]
5 - NodeTable

Show traffic statistics of this port.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:10:46[admin]>

```

Figure 9-7: **STATUS** ► **PORTS** ► **<RADIOPORT>** menu

The terms and parameters used are explained in the following table:

Parameters	Meaning
MAC	Shows the MAC address of the wireless port, but this cannot be changed at any user level.
MaxSpeed	The figure in brackets shows the maximum speed of the wireless port in Mbps. This entry cannot be changed.

Parameters	Meaning
Statistics	Select Statistics to display the statistics for received, transmitted and filtered frames at the wireless port.
CardFirmware	Shows the firmware version of the radio card installed in the XAir . This entry can be viewed at all levels, but cannot be changed.
NodeTable	The node table shows the list of associated clients at this port.

Table 9-4: Fields of **STATUS** ► **PORTS** ► **<RADIOPORT>**

Statistics You can open the following screen via **STATUS** ► **PORTS** ► **<RADIOPORT>** ► **STATISTICS** :

```

XAir Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73   test2
Status Ports Port_wll_ap
Parameters              Value
-----
Received frames since last reset      880
Transmitted frames since last reset   596
Filtered frames since last reset      0
MULTICAST received frames since last reset  77
MULTICAST transmitted frames since last reset 596
MULTICAST filtered frames since last reset  0
Filtered frames (on all ports) since last reset 0

Enter [SPACE]refresh, [r]reset, [q]quit:

```

Figure 9-8: **STATUS** ► **PORTS** ► **<RADIOPORT>** ► **STATISTICS** menu

The terms and parameters used are explained in the following table:

Parameters	Meaning
Received frames since last reset	Shows the number of frames received since the last reset.
Transmitted frames since last reset	Shows the number of frames transmitted since the last reset.
Filtered frames since last reset	Shows the number of frames filtered since the last reset.
MULTICAST received frames since last reset	Shows the number of multicast frames received since the last reset.
MULTICAST transmitted frames since last reset	Shows the number of multicast frames transmitted since the last reset.
MULTICAST filtered frames since last reset	Shows the number of multicast frames filtered since the last reset.
Filtered frames (on all ports) since last reset	Shows the number of frames filtered by all ports since the last reset.

Table 9-5: Fields of **STATUS** ► **PORTS** ► **<RADIOPORT>** ► **STATISTICS**

Node Table You can open the following screen via **STATUS** ► **PORTS** ► **<WIRELESS PORT>** ► **NODETABLE** :

```

                                XAir Access Point    by BinTec Communications AG
XAIR Multi2 - V2.73                                                    test2
                                Status Ports Port_wll_ap
                                Name      MAC Address      IP_Address      State  Type  Rate
-----
002.11  00:60:1D:22:96:64    192.168.001.011  Asso   Client  11
002.11  00:60:1D:1C:A9:EB       192.168.001.012  Asso   Client   5

Enter [SPACE]refresh, [q]quit:

```

Figure 9-9: **STATUS** ► **PORTS** ► **<RADIOPORT>** ► **NODETABLE** menu

The **NODE TABLE** shows the list of associated clients logged in to this port.

The terms and parameters used are explained in the following table:

Parameters	Meaning
Name	Shows the name of the radio node.
MAC Address	Shows the MAC address of the radio node.
IP_Address	Shows the IP address of the radio node.
State	Shows the state of the radio connection in which the radio node is currently located: <ul style="list-style-type: none"> ■ <i>asso.</i> (associated) ■ <i>auth.</i> (authenticated) ■ <i>learned</i> ■ <i>conn.</i> (connected)
Type	Shows the type of log-in at XAir (<i>client</i>).
Rate	Shows the current transmission rate to this client in Mbps.

Table 9-6: Fields of **STATUS** ▶ **PORTS** ▶ **<RADIOPORT>** ▶ **NODETABLE**

Node Statistics You can access statistics by tagging an individual client in the node table and pressing **Enter**. The statistical data of the individual associated client is displayed.

```

XAIR Multi2 - V2.73
XAir Access Point by BinTec Communications AG
test2
Status Ports Port_wll_ap
Rate Rx Packets Rx Bytes Tx Packets Tx Bytes
-----
1 0 0 0 0
2 0 0 0 0
5 10 540 14 4445
11 6149 1211672 6606 5319195

Enter [SPACE]refresh, [r]reset, [q]quit:

```

Figure 9-10: **STATUS** ► **PORTS** ► **<RADIOPORT>** ► **NODETABLE** menu, statistics of an individual client

The terms used are explained in the following table:

Parameters	Meaning
Rate	Shows the transmission rate of the client in Mbps.
Rx Packets	Shows the packets received by the client at the relevant transmission rate.
Rx Bytes	Shows the bytes received by the client at the relevant transmission rate.
Tx Packets	Shows the packets sent to the client at the relevant transmission rate.
Tx Bytes	Shows the bytes sent to the client at the relevant transmission rate.

Table 9-7: Terms for node statistics

9.3.3 STATUS Submenu *ARPCACHE*

Proceed as follows to view the ARP table of **XAir**. The figures in square brackets indicate the number of entries:

➤ Select **STATUS** ➤ **ARPCACHE**.

The content of **XAir**'s ARP table is shown.

All IP stations (e.g. routers and PCs) that have had direct contact with this **XAir** within the last 20 minutes are listed here (e.g. over Telnet, http or Ping). The counter restarts for each IP packet exchanged. If an IP station is inactive for 20 minutes, the relevant entry is deleted from the list:

```

XAIR Multi2 - V2.73
XAir Access Point      by BinTec Communications AG
                        test2
IP address             MAC address           Status
-----
192.168.001.011      00:60:1D:22:96:64    Reply
                        State                Timeout
192.168.001.011      00:60:1D:22:96:64    Reply    19:54

Enter [SPACE]refresh, [q]quit:

```

Figure 9-11: **STATUS** ➤ **ARPCACHE** menu

9.3.4 STATUS Submenu *BUFFERUTIL*

The value shown here is a relative value for the utilization of the buffer pool.

The buffer pool can be viewed at all three user levels, but cannot be changed.

9.3.5 STATUS Submenu SOFTWARE

STATUS ► **SOFTWARE** contains a table with information about the software in the FLASH memory of **XAir**:

```

XAir Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73   test2

      Status
Name      Version  Flash Data      Release
-----
Bootloader  2.02    Sep 25 16:17:06 2001    Apr 19 15:36:23 2001
VPD         3.04    Sep 25 16:17:04 2001    Sep 25 16:17:04 2001
Monitor    1.41    Sep 25 16:17:09 2001    Jul  3 17:22:53 2001
CM         2.61    <none>
Firmware   2.73    Jan  9 06:43:50 2002    Dec  6 16:39:51 2001

Enter [SPACE]refresh, [q]quit:

```

Figure 9-12: **STATUS** ► **SOFTWARE** menu

The terms used are explained in the following table:

Parameters	Meaning
Name	The Name column contains a list of the various parts of the firmware.
Version	Shows the version number of the relevant software part.
Flash Data	The Flash Data column shows the date and time of the last upgrade of the respective software. This information may not be shown if the relevant entry was generated by another part of the firmware.
Release	The Release column shows the release date of the respective software.

Table 9-8: **STATUS** ► **SOFTWARE** menu

9.4 CONFIG Menu

Many of **XAir**'s parameters can be configured in the **CONFIG** menu, depending on the user level at which you are logged in:

```

XAIR Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73                                         test2

      Main
Menu          Submenu
-----
1 - Status   [ -> ]      System      [ -> ]
2 - Config   [ -> ]      Ports        [ -> ]
3 - Control  [ -> ]      Interfaces   [ -> ]
4 - Refresh  [ 5 ]      Filtering    [ -> ]
5 - Help
6 - Exit
      IpRoutes   [ -> ]

Configuration Menu.

Enter a number or name.
0:24:59[admin]>

```

Figure 9-13: **CONFIG** menu

9.4.1 CONFIG Submenu **SYSTEM**

CONFIG ➤ **SYSTEM** ➤ **NODENAME** In **CONFIG** ➤ **SYSTEM** ➤ **NODENAME** you can view the name of **XAir** at the user level "User" or "View" and also change it at the user level "Admin". This can be done much more conveniently using the BinTec **XAir** Manager, as described in the chapter "Basic Configuration" in the document Los Geh't's/Getting Started.

9.4.2 CONFIG Submenu PORTS

CONFIG ► **PORTS** ► You can configure the individual active ports in the **CONFIG** ► **PORTS** menu:
PORT <ETHERNETPORT>

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                           test2

                                Config Ports Port_eth1

                                Command                Parameters
                                -----                -----
01 - Interface      [ 1e0 ]                        Interface_Name
02 - AutoNegMode    [ enabled ]
03 - CurrentValue  [ 10BaseT_HD ]

                                Interface assignment for this port.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:10:46[admin]>

```

Figure 9-14: **CONFIG** ► **PORTS** ► **PORT** <ETHERNETPORT> menu

The terms and options used are explained in the following table:

Option	Meaning
Interface	For assigning an interface.
AutoNegMode	This function is for switching the Auto Negotiation Mode on and off (<i>enabled/disabled</i>). This mode is normally enabled. If you would like to set the speed and operation mode of the port manually, you must set the AutoNegMode here to <i>disabled</i> .
CurrentValue	Shows the current speed and duplex mode of the port. The indicated value can only be changed if you have disabled the Auto Negotiation Mode.

Table 9-9: Fields of **CONFIG** ► **PORTS** ► **PORT** <ETHERNETPORT>

CONFIG ► PORTS ►
<RADIOPORT>

```

XAIR Multi2 - V2.73          XAIR Access Point   by BinTec Communications AG
                                                                    test2
Config Ports Port_wll_ap

Command                      Parameters
-----
1 - Interface                [ le0 ]          Interface_Name
2 - OperatingMode            [ AP ]
3 - NetworkName              [ BinTec ]
4 - Basic                    [ -> ]
5 - WEP                      [ -> ]
6 - Extended                 [ -> ]

Interface assignment for this port.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 9-15: CONFIG ► PORTS ► <RADIOPORT> menu



Security Functions

The submenu **BASIC** contains the parameter **BcstSSID**. If this parameter is disabled, clients who do not know the network name of **XAir** cannot log in to **XAir**. If **BcstSSID** is *disabled*, the network name of **XAir** is no longer broadcast, which means that clients with the network name entry *ANY* can no longer log in to **XAir** either. See [chapter 7.3, page 22](#).

Wireless Equivalent Privacy (WEP) in the **WEP** submenu is available for encryption.

BinTec Communications AG still offers IPsec encryption as a security function. You can find information about this in the IPsec product section on BinTec's web site at www.bintec.net.

The options used in the menu are explained in the following table:

Option	Meaning
Interface	Enables the administrator to assign an interface. This menu item is only a static display at the user levels "User" and "View".

Option	Meaning
OperatingMode	<p>You can use this menu item at user level "Admin" to select the desired port operation mode from a list or enter it manually in the prompt. The operation mode cannot be changed at user levels "User" and "View".</p> <p>Possible values:</p> <ul style="list-style-type: none"> ■ <i>AP</i> Mode for operating the port as access point so that clients can log in to this port. ■ <i>Bridge</i> Mode for a bridge. See "CONFIG ► PORTS ► PORT_WLX_BR", page 122. ■ <i>D-Bridge</i> Mode for a double bridge. See "CONFIG ► PORTS ► PORT_WLX_BR", page 122.
NetworkName	<p>This option is for defining the network name and is only displayed at the user level "Admin".</p>
Basic	<ul style="list-style-type: none"> ■ DSChannel Here you can set the frequency of the DS channel at the user level "Admin" or "User". ■ BcstSSID Disabling this option prevents radio clients logging in if they do not know XAir's network name. This entry exists only at the user level "Admin". Disabling BcstSSID means extra security for XAir. BinTec recommends that you configure the NetworkName on XAir and disable BcstSSID. This means the NetworkName is no longer broadcast by XAir.

Option	Meaning
Basic (continued)	<p>■ Repeating Enables direct communication between radio clients logged in to the same XAir. If Repeating is disabled, the radio clients logged in to this XAir cannot exchange data with each other.</p> <p>The setting Repeating can be changed at the "Admin" user level, only viewed at the "User" level and is not available at the "View" level.</p> <p>■ McastRate For setting the transmission rate for multicast frames. This subitem is shown at all user levels with the corresponding configuration, but can only be changed at the "User" and "Admin" levels.</p>
WEP	<p>WEP (Wireless Equivalent Privacy) is used for configuration of radio traffic encryption. These parameters exist only at the "Admin" level and can only be configured at this level. If you do not use VPN, BinTec recommends that you use the WEP function.</p> <p>■ State Activates (<i>enabled</i>) or deactivates (<i>disabled</i>) the encryption.</p> <p>■ TxKeyNumber Defines the key (1-4) for encrypting the data for transmission.</p>

Option	Meaning
WEK (continued)	<p>■ Key 1-4</p> <p>For entering the key that XAir is to know. XAir can decrypt a radio frame that has been encrypted with a key that it knows.</p> <p>It is important that the key of the corresponding entry is always used for decryption. This means that if the client encrypts with key 3, the same value must be entered in key 3 at XAir as at the client. This obviously applies in both directions.</p> <p>The key used depends on the length of the key you have entered (corresponds to bits). There are two types of cards, which support up to 128 bits or only up to 40 bits:</p> <p>If you enter a key with a length of 40 bits, 64-bit encryption is used (key + 24 bits).</p> <p>If you enter a key with 104 bits, 128-bit encryption is used.</p> <p>The key can be entered in ASCII (a-z, A-Z, 0-9) or hexadecimal form (0x followed by the relevant number of hex numbers).</p> <p>Examples:</p> <ul style="list-style-type: none"> - 64-bit encryption "ABCDE" (ASCII) = "0x4142434445" (hexadecimal) - 128-bit encryption "1234567890123" (ASCII) = "0x31323334353637383930313233" (hexadecimal) <p>Set keys are shown by the character "*".</p>

Option	Meaning
Extended	<p>Specific settings:</p> <ul style="list-style-type: none"> ■ Encapsulation Access to this function is only possible with appropriate configuration at the "Admin" level. This menu item has many submenus, which are explained in detail below.

Table 9-10: Fields of *CONFIG* ▶ *PORTS* ▶ *<RADIOPORT>*

- CONFIG* ▶ *PORTS* ▶
<RADIOPORT> ▶
EXTENDED ▶
ENCAPSULATION
- Only LLC frames are sent over a wireless port. All other frames must be provided with an LLC header. The menu item *ENCAPSULATION* is used to configure this operation and to determine how the encapsulation is to be reversed on receipt.



The *ENCAPSULATION* function should only be used by experienced administrators.

The *ENCAPSULATION* menu offers you the following options:

- The **Mode** option enables you to cancel all the previous settings concerning frame processing and restore the initial values.
- The **Modification** option enables you to define exactly how incoming and outgoing data packets are to be handled:
 - You can process outgoing packets in *CONFIG* ▶ *PORTS* ▶ *<RADIOPORT>* ▶ *EXTENDED* ▶ *ENCAPSULATION* ▶ *MODIFICATION* ▶ *TRANSMIT*.
 - You can define the configuration for incoming packets in *CONFIG* ▶ *PORTS* ▶ *<RADIOPORT>* ▶ *EXTENDED* ▶ *ENCAPSULATION* ▶ *MODIFICATION* ▶ *RECEIVE*.

CONFIG ➤ **PORTS** ➤ The options used in the menu and the resulting possible settings are explained in the following table:
 <RADIOPORT> ➤

EXTENDED ➤
ENCAPSULATION ➤
MODIFICATION ➤
TRANSMIT

Option	Meaning
Def.Encaps.	Select Default Encapsulation with this option, i.e. set the default that is to be used as the basis for transmission of frames without LLC headers. The defaults are the two standards <i>RFC_1042</i> and <i>IEEE_802.1H</i> , which you can either select from the list or enter directly in the prompt.
Exceptions	Here you can define any protocols to which Default Encapsulation is not to apply. The Show option enables you to display all the protocols excepted until now and the value in square brackets indicates the number of these protocols. Select Add to add more protocols to the exceptions list (max. 10). These can either be selected in the predefined list or entered in the prompt. You can also delete protocols from the exceptions list with Remove , i.e. Default Encapsulation now applies to these protocols again.

Table 9-11: Fields of **CONFIG** ➤ **PORTS** ➤ <RADIOPORT> ➤ **EXTENDED** ➤ **ENCAPSULATION** ➤ **MODIFICATION** ➤ **TRANSMIT**

CONFIG ➤ **PORTS** ➤ In this menu item, first select the standard for which you would like to define the action to be taken on receipt of a data packet. The *RFC_1042* and *IEEE_802.1H* specifications are predefined here as defaults.
 <RADIOPORT> ➤

EXTENDED ➤
ENCAPSULATION ➤
MODIFICATION ➤
RECEIVE

The submenus of the options in [Table 9-11, page 66](#) have an identical structure and are explained together in the following table:

Parameters	Meaning
DefaultAction	Here you can define whether the LLC header is to be removed as standard from incoming data packets. Select <i>remove</i> to remove the header or <i>unchanged</i> to leave the data packet unchanged.
Exceptions	<p>Here you can define any protocols to which Default Action is not to apply.</p> <p>The Show option enables you to display all the protocols excepted until now and the value in square brackets indicates the number of these protocols.</p> <p>Select Add to add more protocols to the list of exceptions (max. 10). These can either be selected in the predefined list or entered in the prompt.</p> <p>You can also delete protocols from the exceptions list with Remove, i.e. Default Action now applies to these protocols again.</p>

Table 9-12: Fields of **CONFIG** ► **PORTS** ► **<RADIOPORT>** ► **EXTENDED** ► **ENCAPSULATION** ► **MODIFICATION** ► **RECEIVE**

CONFIG ► **PORTS** ► **<BRIDGEPORT>** You will find descriptions of the menus for the bridge port in [chapter 11.3.1, page 119](#) and [chapter 11.4.2, page 149](#).

9.4.3 CONFIG Submenu INTERFACES

CONFIG ► **INTERFACES** is for configuring the interfaces in the network at the user level "Admin". Example based on interface le0:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                                    test2

                                Config Interfaces le0

                                Command                Parameters
-----|-----
1 - IP_Address                [ 192.168.001.005 ]      IP_Address
2 - Subnet_Mask                [ 255.255.255.000 ]      Subnet_Mask
3 - GateWay                    [ 000.000.000.000 ]      GateWay
4 - DHCP_StartUp              [ disabled ]
5 - DHCP_Fallback              [ 000.000.000.000 ]
6 - DHCP_Options               [ -> ]

                                IP address of this interface.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-16: **CONFIG** ► **INTERFACES** ► **LE0** menu

The terms and options used in the menu are explained in the following table:

Option	Meaning
IP_Address	IP address of interface. Only as display at the user levels "User" and "View".
Subnet_Mask	Network address of interface. Only as display at the user levels "User" and "View".
Gateway	Interface gateway. Only as display at the user levels "User" and "View".

Option	Meaning
DHCP_StartUp	<p>This option is for activating (<i>enabled</i>) and deactivating (<i>disabled</i>) the DHCP client for XAir.</p> <p>If the DHCP client is activated, a request is sent to the DHCP server automatically on starting XAir and a valid IP address (lease) is assigned if the request is successful.</p> <p>If the DHCP client is not active, XAir is started with the IP address defined in the BinTec XAir Manager.</p>
DHCP_Fallback	<p>Here you can enter a permanent IP address in case XAir cannot obtain an IP address from a DHCP server on starting. XAir will then be reachable over the IP address configured here.</p> <p>The facilities offered by this option do not comply with the DHCP rules. They have been introduced to ensure that connection to XAir is always possible.</p> <p>The ex works setting is the fallback IP address 0.0.0.0 (complies with DHCP rules).</p>
DHCP_Options	<p>This option is explained in detail in the following section.</p>

Table 9-13: Fields of **CONFIG** ► **INTERFACES** ► **LE0**

CONFIG ➤
INTERFACES ➤ **LE0** ➤
DHCP_OPTIONS

This menu item offers the following menu:

```

XAIR Multi2 - V2.73
XAir Access Point by BinTec Communications AG
test2
Config Interfaces le0 DHCP_Options
Command Parameters
-----
1 - Lease [ none ] Operation
2 - RequestedIP [ disabled ]
3 - ClientID [ default ]
4 - Server [ disabled ]
5 - VendorID [ disabled ]
6 - Duration [ disabled ]

Request, rebind or release a lease.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-17: **CONFIG** ➤ **INTERFACES** ➤ **LE0** ➤ **DHCP_OPTIONS** menu

The designations and parameters used in the menu are explained in the table below and the possible options offered by the respective menu items listed:

Option	Meaning
Lease	<p>Shows the status on requesting an IP address.</p> <ul style="list-style-type: none"> ■ <i>none</i> DHCP is not activated. ■ <i>in use</i> An IP address requested over a DHCP server is active. ■ <i>trying</i> DHCP request is being processed. ■ <i>failure</i> An error has occurred on requesting the IP address. <p>Possible actions:</p> <ul style="list-style-type: none"> ■ <i>request</i> Enables an IP address to be requested from the DHCP server if no address has been assigned yet. ■ <i>release</i> Releases the address again. This can be assigned by the DHCP server again. XAir then uses the address set in Fallback. ■ <i>rebind</i> Corresponds to a <i>release</i> followed by a <i>request</i>.
RequestedIP (Option 50)	For requesting a certain IP address (CurrentIP) from the DHCP server.

Option	Meaning
ClientID (Option 61)	Used for clearly identifying a client at the DHCP server. The MAC address (<i>default</i>) of the Ethernet port is used as default setting. You can also assign a client ID (ClientID).
Server (Option 54)	Used for selecting a certain DHCP server (IP address of DHCP server) in the network if several DHCP servers are available. The option is deactivated in the default setting (<i>disabled</i>), i.e. all DHCP servers in the directly connected network are addressed and, if relay agents exist at routers, also in external networks.
VendorID (Option 60)	Also class ID with some manufacturers. Allows devices to be grouped and different attributes to be assigned to these groups.
Duration (Option 51)	Defines the time duration (specific) for the use of an IP address assigned by the DHCP server (lease time). A DHCP server can accept such a request or overwrite with its settings.

Table 9-14: Fields of **CONFIG** ➤ **INTERFACES** ➤ **LE0** ➤ **DHCP_OPTIONS**

9.4.4 **CONFIG** Submenu **FILTERING**

The **FILTERING** menu is used for configuration of the various filters to enable effective data exchange.



The **FILTERING** function should only be used by experienced administrators.

CONFIG ► **FILTERING** menu:

```

XAIR Multi2 - V2.73
XAIR Access Point by BinTec Communications AG
test2

Config Filtering
-----
Command                                     Parameters
-----
1 - ARPProcessing [ ON ]
2 - Protocol      [ -> ]
3 - MAC_Multicast [ -> ]

Turn special ARP processing ON or OFF.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-18: **CONFIG** ► **FILTERING** menu

In principle, none of the packets used for direct communication with **XAir** (e.g. Telnet session on **XAir**) are (can be) filtered.

**Operation of filtering
(example)**

The method of operation of the filters is explained here using an example.

The following settings have been made:

- **ARPProcessing:** *ON*
- **Protocol:** *procMcstFlt* as default
- **Protocol:** IPX is to be dropped
- Multicast filter default rule:
 - Source = any;
 - Destination = any multicast;
 - Destination port = port_wl1_br

The incoming data traffic comprises:

- an IPX packet
- an ARP request to an associated client

■ a multicast frame

The individual packets are filtered as follows:

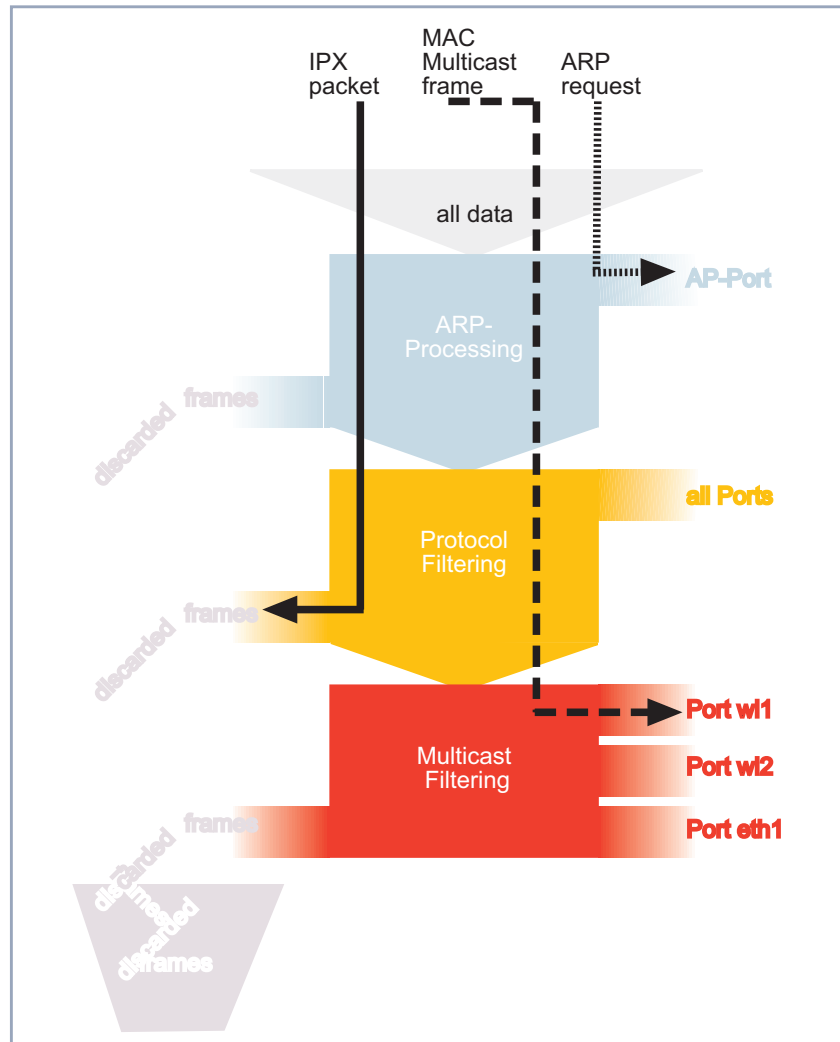


Figure 9-19: Example of filtering

CONFIG ► **FILTERING** ► **ARPPROCESSING** ARP Processing passes all ARP packets coming from or intended for associated clients to the corresponding ports without passing through the filters.

ARP requests for associated clients are converted from MAC multicast to MAC unicast. ARP requests not intended for associated clients are filtered at the same time.

An entry is accordingly created in the protocol list, which shows *ARP (0x806)* in the *procARP* state. This entry cannot be manipulated.

ARP Processing is configured for each **XAir** and concerns only access point ports.

CONFIG ► **FILTERING** ► **PROTOCOL** Rules for forwarding or filtering protocols can be defined, changed and deleted in the **PROTOCOL** menu.

CONFIG ► **FILTERING** ► **PROTOCOL** menu:

```

XAIR Multi2 - V2.73          XAir Access Point    by BinTec Communications AG
                                                                    test2
                               Config Filtering Protocol
                               Command              Parameters
-----|-----
1 - DefaultMode [ procMstFlt ] | Mode
2 - Show        [ 1 ]
3 - Add
4 - Remove

                               Processing rule for all those protocols, for which no
                               specific actions are defined.

Enter a number or name, "=" main menu, [ESC] previous menu.

```

Figure 9-20: **CONFIG** ► **FILTERING** ► **PROTOCOL** menu

The designations and parameters used in the menu are explained in the table below and the possible options offered by the respective menu items listed:

Option	Meaning
DefaultMode	<p>Shows the Default Mode, which applies to all protocols not included in the list.</p> <ul style="list-style-type: none"> <li data-bbox="719 454 1226 621">■ <i>forward</i> All packets of the protocols not included in the list are forwarded in line with the normal access point function and the multicast filters are ignored. <li data-bbox="719 642 1226 741">■ <i>discard</i> All packets of the protocols not included in the list are discarded. <li data-bbox="719 761 1226 929">■ <i>procMcstFlt</i> All packets of the protocols not included in the list are passed to the multicast filters. The multicast filters then decide to which port(s) the packets are passed. <li data-bbox="719 949 1226 1321">■ <i>procARP</i> (special case ARP Processing) All ARP packets sent by a wireless client are passed by XAir to the relevant port: to the other wireless port if the recipient is associated there, or to the Ethernet. All ARP packets intended for an associated wireless client are passed to the wireless port at which the client is associated. All other ARP packets, especially ARP requests, not intended for associated clients are discarded.

Option	Meaning
Show	<p data-bbox="801 286 1051 312">Shows the protocol list:</p> <ul style="list-style-type: none"><li data-bbox="801 338 1308 500">■ Protocol The protocol name, the name of the protocol suite or the protocol numbers in hex code are shown and can be selected or entered under Add.<li data-bbox="801 526 1308 772">■ Mode<ul style="list-style-type: none"><li data-bbox="843 565 972 590">– <i>forward</i><li data-bbox="843 599 1001 625">– <i>fwrd some</i><li data-bbox="843 633 972 659">– <i>discard</i><li data-bbox="843 667 1015 693">– <i>procMcstFlt</i><li data-bbox="843 701 1308 772">– <i>procARP</i> (special case if ARPProcessing ON)

Option	Meaning
Add	<p>Adds a protocol or a protocol suite to the list. An action is selected for each protocol. The protocol list can contain max. 32 entries.</p> <p>There are two possible ways of entering a protocol or a suite:</p> <ul style="list-style-type: none"> ■ Select a protocol or suite from the predefined list. Predefined protocol and protocol groups: <ol style="list-style-type: none"> 1 - AppleTalk (AppleTalk, ARP for AppleTalk) 2 - Vines (protocols from Banyan Vines) 3 - DEC (DEC Digital Equipment Corporation protocols) 4 - INET (IP, ARP) 5 - IPX (IPX protocol) 6 - SNAServices (IBM SNA Services on Ethernet protocol) 7 - IP 8 - ARP 9 - RARP <p>or</p> <ul style="list-style-type: none"> ■ Enter the protocol number as hex code in the prompt (e.g. 0x800 for IP, 0x806 for ARP).

Option	Meaning
Remove	<p>Removes all protocols with <i>all</i> or the selected protocol from the list.</p> <p>There are two possible ways of entering the protocol to be removed:</p> <ul style="list-style-type: none"> ■ Select the protocol from the list <p>or</p> <ul style="list-style-type: none"> ■ Enter the protocol number as hex code in the prompt (e.g. 0x800 for IP, 0x806 for ARP).

Table 9-15: Fields of **CONFIG** ► **FILTERING** ► **PROTOCOL**

CONFIG ► **FILTERING** ► **MAC_MULTICAST** Rules for forwarding or filtering multicast frames can be defined, changed and deleted in the **MAC_MULTICAST** menu.

► Select **CONFIG** ► **FILTERING** ► **MAC_MULTICAST**.

The following menu opens if more than one rule is defined:

```

XAIR Multi2 - V2.73          XAIR Access Point   by BinTec Communications AG
                                                                    test2
                          Config Filtering MAC_Multicast
                          Command                Parameters
-----
1 - DefaultRule [ forward ]          Default Rule
2 - ShowAll      [ 2 ]
3 - AddFrom
4 - Remove
5 - Edit         [ -> ]
6 - SortShow

Processing rule for all multicast frames not affected by
other rules.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-21: **CONFIG** ► **FILTERING** ► **MAC_MULTICAST** menu (with more than one rule)

This menu opens if only the default rule is active:

```

XAIR Multi2 - V2.73          XAir Access Point   by BinTec Communications AG
                                test2
                                Config Filtering MAC_Multicast
                                Command              Parameters
-----
1 - DefaultRule [ forward ]      |      Default Rule
1 - ShowAll      [ 2 ]
3 - AddFrom
4 - Edit         [ -> ]

                                Processing rule for all multicast frames not affected by
                                other rules.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-22: **CONFIG** ➤ **FILTERING** ➤ **MAC_MULTICAST** menu (only default rule)

The designations and parameters used in the menu are explained in the table below and the possible options offered by the respective menu items listed:

Option	Meaning
DefaultRule	<p>The default rule always exists and cannot be deactivated. The ex works settings define that all multicast frames are to be forwarded to all ports. The default value of DefaultRule is therefore <i>forward</i>.</p> <p>At the user levels "Admin" and "User", you can restrict the forwarding of multicast frames by adding filter conditions, i.e. change the default rule or add new rules.</p> <p>The value shown in the DefaultRule menu item can be <i>forward</i>, <i>forward some</i> or <i>discard</i>:</p> <ul style="list-style-type: none"> ■ <i>forward</i> All multicast frames are forwarded to all ports. ■ <i>forward some</i> Multicast frames are only forwarded via certain ports. (DestPort contains the list of those ports via which multicast frames are to be forwarded). ■ <i>discard</i> No multicast frames are forwarded. <p>How to change and limit rules is described in this table under Edit.</p>
ShowAll	<p>Select ShowAll to show a table of all the filter rules defined until now in unsorted order. The value in the square brackets indicates the number of rules.</p>

Option	Meaning
<p>AddFrom</p>	<p>This menu item exists only at the "Admin" and "User" levels.</p> <p>If you select the AddFrom option, you will first be requested to enter the code of an existing rule in the prompt. This rule is then copied automatically and added as a new rule, which you can then edit again.</p>
<p>Edit</p> <p>Editable entries for the default rule and other rules in the Edit submenu:</p>	<p>This entry exists only at the "Admin" and "User" levels. This option gives you various possibilities for editing existing rules.</p> <ul style="list-style-type: none"> ■ RuleNumber Enter the code of the rule to be changed. ■ DestPort In this menu you can determine to which ports the frames are to be forwarded in each case for the selected rule. <ul style="list-style-type: none"> – Show Shows a list of all ports to which the frames are forwarded according to the currently edited rule. – Add Further ports can be added to this list, which then also receive the forwarded frames. – Remove Certain ports are removed from the list and therefore excluded from forwarding.
	<ul style="list-style-type: none"> ■ ShowRule You can use this option to view the currently edited rule with its filter conditions.

Option	Meaning
<p>Edit (continued)</p> <p>Editable entries for the default rule and other rules in the Edit submenu:</p> <p>Additional editable entries for all rules except the default rule in the Edit submenu:</p>	<ul style="list-style-type: none"> <li data-bbox="801 286 1305 770"> <p>■ StatusIT</p> <p>Select Status IT to switch on the interdependency test. This performs a logical test of the following statuses every time a rule is activated:</p> <p>If the rule to be activated opposes rules already active, an error message is generated and the rule is not activated.</p> <p>If the rule can already be implemented by other active rules, a warning is generated but the rule is activated.</p> <p>If the two situations above do not apply, the rule is activated and a confirmation message displayed.</p> <li data-bbox="801 787 1305 958"> <p>■ Activity</p> <p>A rule is deactivated after the AddFrom function (<i>disabled</i>), i.e. the new rule is not yet applied. You can now adapt the rule to your needs and then activate it (<i>enabled</i>).</p> <li data-bbox="801 975 1305 1111"> <p>■ SourceMAC</p> <p>Defines the MAC address of the sender of those multicast frames to which the rule is to be applied.</p> <li data-bbox="801 1128 1305 1325"> <p>■ DestMcstMAC</p> <p>Defines the destination MAC address to which the rule is to apply. Predefined addresses: <i>AnyMcst</i> and <i>Broadcast</i>. Any desired multicast addresses can be used as destination addresses.</p>
<p>Remove</p>	<p>This field exists only if more than one filter rule exists.</p> <p>Enables a rule to be deleted. The default rule cannot be deleted.</p>

Option	Meaning
ShowSort	<p>This field exists only if more than one filter rule exists.</p> <p>If more than one rule is activated, the rules are processed in a certain order. If a rule has been applied to a frame, this frame is not checked further by the other rules.</p> <p>The EDIT ► SHOWSORT menu item shows the order of execution of all filter rules added.</p> <p>This order is shown in Table 9-17, page 84.</p>

Table 9-16: Fields of **CONFIG** ► **FILTERING** ► **MAC_MULTICAST**

Order of processing multicast rules

If more than one rule is activated, the rules are processed in a certain order.

If a frame has not satisfied the conditions of a processed rule, it is compared with the conditions of the next rule. Frames that do not match any of the rules added and activated by the user are processed by the default rule:

Source MAC	Destination Multicast MAC	Destination port	Order of processing
Specific	Specific	Specific	1
Specific	Specific	Any	2
Specific	Any	Specific	3
Specific	Any	Any	4
Any	Specific	Specific	5
Any	Specific	Any	6
Any	Any	Specific	7
Any	Any	Any	8

Table 9-17: Order of rules

Example of multicast filtering **XAir** with 2 wireless cards and 1 Ethernet port.

ShowAll command:

Rule number	Activity	Source MAC	Destination Mcast MAC	Destination port
0	enabled	ANY	ANY MCAST	Port_eth1
1	enabled	ANY	broadcast	Port_wl1_ap
2	dis-abled	00:01:02: 03:04:05 00:02:01: 03:04:05	ANY	Port_wl1_ap Port_wl2_ap

Table 9-18: Example of multicast filtering: **ShowAll**

ShowSort command:

Rule number	Activity	Source MAC	Destination Mcast MAC	Destination port
2	dis-abled	00:01:02: 03:04:05 00:02:01: 03:04:05	ANY	Port_wl1_ap Port_wl2_ap
1	enabled	ANY	broadcast	Port_wl1_ap
0	enabled	ANY	ANY MCAST	Port_eth1

Table 9-19: Example of multicast filtering: **ShowSort**

Order of execution First rule 1, then rule 0. Rule number 2 is not activated at the moment.

Effect:

- All broadcasts are only forwarded to *port_wl1_ap*.
- All other multicast frames are only forwarded to *port_eth1*.

In this example, the wireless network at *port_wl2_ap* (at *port_eth1* as well, but less important there because the speed is normally very high) is relieved of all broadcasts. The wireless client logged in at *port_wl2_ap* is then not reachable for ARP requests (and therefore not for data communication either).

9.4.5 CONFIG Submenu *IPROUTES*

In this menu you can configure the routing table at the user level "Admin". It is mainly intended for entering additional routes in networks that are reachable over other routers:

```
XAIR Multi2 - V2.73          XAir Access Point    by BinTec Communications AG
                                                                    test2
                          Config IpRoutes
                          Command
-----|-----
1 - Show [ 2 ]
2 - Add
3 - Remove

                          Shows the routing table

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>
```

Figure 9-23: CONFIG ➔ *IPROUTES* menu

The commands are described in detail in the following table:

Command	Description
Show	<p>Shows the routing table.</p> <p>Each routing entry comprises:</p> <ul style="list-style-type: none"> ■ Destination IP address of destination network. ■ Mask Netmask of destination network. ■ Gateway IP address of the router via which the data packets are routed to the destination network. ■ If Indicates the XAir interface. ■ Metric Indicates the number of routers between own network and destination network.
Add	<p>For adding routing entries to the routing table.</p> <p>Enter the following parameters for a routing entry:</p> <ul style="list-style-type: none"> ■ Destination IP address of destination network. ■ Mask Netmask of destination network. Shows the number of subnet bits, e.g. 32 corresponds to 255.255.255.255. ■ Gateway IP address of the router via which the data packets are routed to the destination network.

Command	Description
Remove	For removing routing entries from the routing table. The default route, the route to the local host and the route to your own network cannot be removed.

Table 9-20: Fields of *CONFIG* ➔ *IPROUTES*

9.5 CONTROL Menu

In the **CONTROL** menu you can change the passwords of the user levels, carry out a **System Reset** or reset the parameters to the ex works settings. Here you will also find the menus for **ACL** and **SNMP**. You can also show **XAir's** log files and make additional settings for DHCP communication:

```

XAIR Multi2 - V2.73
XAir Access Point by BinTec Communications AG
test2

Main
-----
Menu                               Submenu
-----
1 - Status [ -> ]                   DHCP_Client [ -> ]
2 - Config [ -> ]                   SNMP [ -> ]
3 - Control [ -> ]                   Security [ -> ]
4 - Refresh [ 5 ]                   ViewLogs
5 - Help                             SystemReset
6 - Exit                             ResetToFD

Control Menu.

Enter a number or name.
0:24:59[admin]>
```

Figure 9-24: **CONTROL** menu

9.5.1 CONTROL Submenu *DHCP_CLIENT*

If **XAir** is to request an IP address from a DHCP server on starting, you can configure the parameters for requesting an IP address in this submenu.

```

XAir Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73   test2

Control DHCP_Client

Command
-----|-----
1 - Leases           [ 0 ]
2 - Retransm.       [ 4 ]
3 - Retries         [ 2 ]

Show all used leases of all interfaces.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-25: **CONTROL** ➤ **DHCP_CLIENT** menu

The commands are described in detail in the following table:

Command	Description
Leases	Shows the number of interfaces with an active IP address or for which the request to the DHCP server is still being processed.
Retransm.	The time interval (in seconds) between possible retransmissions of the request to the DHCP server.
Retries	Maximum number of retransmissions of the request to the DHCP server.

Table 9-21: Fields of **CONTROL** ➤ **DHCP_CLIENT**

9.5.2 CONTROL Submenu SNMP

This menu and its submenus offer you the possibility of configuring SNMP settings. **XAir** supports SNMP v1, SNMP v2c and MIB II:

```

XAIR Multi2 - V2.73          XAir Access Point    by BinTec Communications AG
                                test2

                                Control SNMP

                                Command                Parameters
-----
1 - Status          [ enabled ]          Status
2 - Port_SNMP          [ 161 ]
3 - SysObjectID       [ 272 ]
4 - Contact            [ Contact string ]
5 - Location           [ Location string ]
6 - Read_Access       [ public ]
7 - Write_Access      [ private ]
8 - Send_Trap         [ trap_community ]
7 - Manager           [ -> ]



                                Current status of SNMP agent.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-26: **CONTROL** ➔ **SNMP** menu

The menu contains the following entries:

Command	Description
State	Switches SNMP on or off:  <i>enabled</i>  <i>disabled</i>
Port_SNMP	The IP port used by the SNMP agent. The default setting is <i>161</i> .
SysObjectID	This value designates the manufacturer and device. It cannot be changed.
Contact	The name of the contact person for the device.
Location	The location of the device.

Command	Description
Read_Access	The community for read only access. The password for access.
Write_Access	The community for read and write access. The password for access.
Send_Trap	The community used for automatic transmission of messages (traps). This password is used for access control at the receiver system, the SNMP Manager.
Manager	This submenu is used to administrate the list of authorized SNMP Managers.

Table 9-22: Fields of **CONTROL** ➤ **SNMP**

CONTROL ➤ **SNMP** ➤
MANAGER

This menu item offers the following menu:

```

XAIR Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73    test2

Control SNMP Manager

Command
-----|-----
1 - Show      [ 1 ]
2 - Add
3 - Remove
4 - Edit      [ -> ]

Show list of all entries of authorized SNMP managers.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-27: **CONTROL** ➤ **SNMP** ➤ **MANAGER** menu

The **CONTROL** ➤ **SNMP** ➤ **MANAGER** menu contains the following options:

Command	Description
Show	Shows the list of authorized SNMP Manager systems and their permissions.

Command	Description
Add	For adding an SNMP Manager to the list.
Remove	For removing an SNMP Manager from the list.
Edit	This submenu is for configuring the access options of an SNMP Manager.

Table 9-23: Fields of **CONTROL** ► **SNMP** ► **MANAGER**

CONTROL ► **SNMP** ► **MANAGER** ► **EDIT**
Edit offers the following menu:

```

XAIR Multi2 - V2.73
XAIR Access Point by BinTec Communications AG test2
Control SNMP Manager Edit
-----
Command                                     Parameters
-----
1 - ManagerName [ 192.168.001.109 ]         ElementNr
2 - IP_Address  [ 192.168.001.109 ]
3 - Mask        [ 255.255.255.255 ]
4 - Read_Access [ enabled ]
5 - Write_Access [ enabled ]
6 - Send_Trap   [ enabled ]
7 - Port_Trap   [ 162 ]
8 - Timeout     [ 1500 ]
9 - Retries     [ 3 ]

Select the manager to edit.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-28: **CONTROL** ► **SNMP** ► **MANAGER** ► **EDIT** menu

The menu contains the following commands:

Command	Description
ManagerName	Here you can select the SNMP Manager to be edited.
IP_Address	Here you can enter or change the IP address of the SNMP Manager.

Command	Description
Mask	<p>The mask can be used as parameter together with the IP address for grouping SNMP Manager systems.</p> <p>The method of operation is similar to the subnetmask for IP: Only bits set in both the IP address and the mask are evaluated.</p> <p>The default value is 255.255.255.255.</p>
Read_Access	<p>Here you define whether the SNMP Manager is allowed read access:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>enabled</i> <input type="checkbox"/> <i>disabled</i>
Write_Access	<p>Here you define whether the SNMP Manager is allowed read and write access:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>enabled</i> <input type="checkbox"/> <i>disabled</i>
Send_Trap	<p>Here you define whether SNMP traps may be sent to this SNMP Manager:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>enabled</i> <input type="checkbox"/> <i>disabled</i>
Port_Trap	<p>The IP port to which the SNMP traps are sent.</p> <p>The default value is 162.</p>
Timeout	<p>The waiting time in ms for acknowledging traps.</p>
Retries	<p>The maximum number of retransmissions if no acknowledge is received for traps.</p>

Table 9-24: Fields of **CONTROL** ➤ **SNMP** ➤ **MANAGER** ➤ **EDIT**

9.5.3 CONTROL Submenu SECURITY

In this menu you can show the various user levels, change their passwords and edit the Access Control List (ACL).

```

XAIR Multi2 - V2.73          XAIR Access Point    by BinTec Communications AG
                                test2
                                Control Security

Menu                               Submenu
-----|-----
1 - UserInfo [ -> ]              Show [3]
2 - ACL      [ -> ]              Edit

Show user level information.

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-29: CONTROL ► SECURITY menu

- CONTROL ► SECURITY ► USERINFO** You can use this menu to show the various user levels.
- CONTROL ► SECURITY ► USERINFO** You can also change the passwords for the individual user levels if you know the password for the user level "Admin".
- CONTROL ► SECURITY ► SHOW** Shows the designations of the various user levels. These are *admin*, *user* and *view*.
- CONTROL ► SECURITY ► SHOW** The passwords for the user levels are not shown.
- CONTROL ► SECURITY ► EDIT** This menu item offers you the possibility of changing the passwords of all three user levels at the "Admin" or "User" level. This menu item does not exist at the "View" level.



You must know the password for the user level "Admin" before you can change the passwords.

Proceed as follows to change a password:

- Select **CONTROL ► SECURITY ► USERINFO ► EDIT**.

- Tag the user level for which you want to change the password in the submenu on the right side of the table: **view**, **user** or **admin**. Press **Enter**.
 - Enter the "Admin" password in the prompt and press **Enter**.
 - Now enter the new password for the previously tagged user level twice in succession and press **Enter** each time.
- You can log in with the new password for the relevant user level when you set up the next Telnet connection.



Caution!

The passwords are not reset to the ex works settings by **ResetToFD**. If you forget the "Admin" password, you must send in your **XAir**.

- Remember the "Admin" password.

CONTROL ➤ **SECURITY** ➤ **ACL**

This menu is used to configure the local Access Control List and access to an external Access Control Server. If you activate this function, you can restrict access to the data network over **XAir**, as clients can only access your LAN over **XAir** if their MAC address is entered in the Access Control List.



The Access Control List (ACL) is an additional facility for better protection of your WLAN and increases access security.

With the optional BinTec **ACL Manager**, your WLAN can be simply administrated and unauthorized access attempts are logged.

If you decide on **AclLocal**, the list of the MAC addresses is kept in **XAir**. You must then maintain a separate list in each **XAir**.

If you want to use **AclRemote**, you must buy an **ACL Manager** from BinTec Communications AG. This then administrates the list centrally for all radio cells and all radio networks.

CONTROL ➤ **SECURITY** ➤ **ACL** menu:

```

XAIR Multi2 - V2.73          XAIR Access Point   by BinTec Communications AG
                             test2
                             Control Security ACL
                             Menu                Submenu
-----|-----
1 - Port_wl1_ap [ -> ]      AclLocal    [disabled]
2 - AclLocal    [ -> ]      AclRemote   [disabled]
3 - AclRemote   [ -> ]
4 - AclCache    [ 0 ]

Wireless ACL (Access Control List) menu

Enter a number or name, "=" main menu, [ESC] previous menu.
21:20:43[admin]>

```

Figure 9-30: **CONTROL** ➤ **SECURITY** ➤ **ACL** menu

The parameters are described in detail in the following table:

Parameters	Meaning
Port_wl1_ap	<p>For configuring the access control of the relevant wireless port.</p> <ul style="list-style-type: none"> ■ AclLocal Here you can activate (<i>enabled</i>) or deactivate (<i>disabled</i>) the use of a local Access Control List. ■ AclRemote Here you can activate (<i>enabled</i>) or deactivate (<i>disabled</i>) the use of an external ACL server.

Parameters	Meaning
AcLocal	<p>Used for configuring a local Access Control List.</p> <ul style="list-style-type: none"> ■ Show Shows the local Access Control List. ■ Add Adds a new entry to the Access Control List. <ul style="list-style-type: none"> – ClientMAC For entering the MAC address of the client to be added to the Access Control List. – Port Select the wireless port of XAir to which the client has access: <i>all ports</i>, to all wireless ports of XAir; <i><wireless port></i>, the corresponding wireless port. ■ Remove Removes an entry from the Access Control List. <ul style="list-style-type: none"> – ClientMAC For entering the MAC address of the client to be removed from the Access Control List.

Parameters	Meaning
AcIRemote	<p>Used for configuring communication with an external ACL server.</p> <ul style="list-style-type: none"><li data-bbox="802 365 1305 462">■ IPAddress Used for entering the IP address of the ACL server.<li data-bbox="802 488 1305 585">■ PortNumber Used for entering the IP port via which the ACL server is reachable.<li data-bbox="802 611 1305 708">■ CommState Shows the status of the connection to the ACL server.<li data-bbox="802 734 1305 970">■ DefaultAccess Indicates the access code used if the ACL server is not reachable.<ul style="list-style-type: none"><li data-bbox="848 838 1079 898">– <i>Denied</i> Access is denied.<li data-bbox="848 910 1086 970">– <i>Granted</i> Access is granted.<li data-bbox="802 995 1305 1123">■ SyncPeriod Enter the time interval (in minutes) after which the ACL cache is to be updated. This time runs separately for each client.

Parameters	Meaning
AcIcCache	<p>The number in the square brackets indicates the current number of internal and external entries in the Access Control List.</p> <p>You can show the list by pressing Enter. The list gives you information about the client's MAC address, the port to which the client is logged in, whether the access was granted or denied (<i>Error, InProgress, Granted, Denied</i>) and whether the client is included in the local or central list.</p> <p>For AcIRemote, the status of the request (<i>Request, Reply, Sync, Disconn</i>) and the time to the next update are also shown.</p>

Table 9-25: Parameters of **CONTROL** ➤ **SECURITY** ➤ **ACL**

9.5.4 **CONTROL** Submenu **VIEWLOGS**

You can show the saved system messages with **CONTROL** ➤ **VIEWLOGS**. The 50 most recent messages since the last system start are saved.

9.5.5 **CONTROL** Submenu **SYSTEMRESET**

Proceed as follows to reboot **XAir**:

- Select **CONTROL** ➤ **SYSTEMRESET**.
- XAir** is rebooted.

9.5.6 *CONTROL* Submenu *RESETToFD*

Proceed as follows to reboot **XAir** and reset to the ex works settings at the same time:



Resetting to the ex works settings can only be performed at the user level "Admin".

➤ Select **CONTROL** ➤ **RESETToFD**.

XAir is rebooted and the configuration is reset to the factory settings.

9.6 Commands

The **MAIN** menu contains the following commands:

- **REFRESH**
- **HELP**
- **EXIT**

REFRESH command The **REFRESH** command enables you to define at what time intervals a table screen (e.g. **STATUS** ➤ **SUMMARY**) is refreshed. The default value is five seconds.

```

XAIR Multi2 - V2.73          XAir Access Point   by BinTec Communications AG
                                test2

                                Main
Command          Parameters
-----
1 - Status      [ -> ]      Time [sec]
2 - Config      [ -> ]
3 - Control     [ -> ]
4 - Refresh     [ 5 ]
5 - Help
6 - Exit

                                Refresh interval [sec].

Enter a number or name.
0:26:00[admin]>

```

Figure 9-31: **REFRESH** menu

HELP command This command is for activating the integrated help facility. You can also use the **F1** key or the digit **0** to activate help.

EXIT command Proceed as follows to close your Telnet connection:

- Select the **EXIT** command.
- The Telnet connection is closed.

10 The Web User Interface

This chapter describes starting the web user interface and its structure.

It is divided into the following sections:

- Starting the Web User Interface (see [chapter 10.1, page 104](#))
- Structure of the Web User Interface (see [chapter 10.2, page 107](#))
- Navigating the Web User Interface (see [chapter 10.3, page 108](#))
- Menus and Parameters of the Web User Interface (see [chapter 10.4, page 109](#))

10.1 Starting the Web User Interface

There are two possible ways of starting **XAir**'s web user interface:

- Starting directly from the browser
- Starting via the **Configuration** menu in the **XAir** Manager

Starting directly from the browser

Proceed as follows to start the web user interface directly from the browser:

- Start your standard browser, e.g. the Microsoft Internet Explorer
- Enter the IP address of **XAir** in the address line.

`http:// <IP address of XAir>`

e.g. `http://192.168.1.5`

XAir's web user interface is started.

Starting via the **XAir** Manager

Proceed as follows to start the web user interface via the menu of the **XAir** Manager:

- Tag the **XAir** you wish to access over the web user interface in the main window of the **XAir** Manager.
- Select **Configuration** ➤ **Web**.

XAir's web user interface is started.

Start window of **XAIR**'s web user interface:



Figure 10-1: Start window of **XAIR**'s web user interface

Entering user name and password

You must enter the user name and password before you can access the configuration:



If you have not already done so, you should change the passwords for the three user levels "Admin", "User" and "View" immediately to prevent unauthorized access.

You will find a detailed description of changing the passwords in [chapter 9.5.3, page 95](#). The user-specific rights for each user level are described in detail in [chapter 9.1, page 42](#).

➤ Click the **XAIR** graphic.

The following dialog box appears:

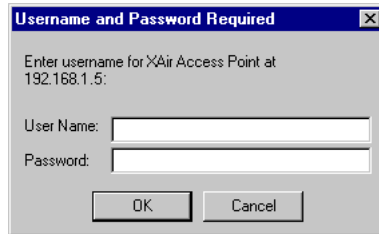


Figure 10-2: Dialog box for entering user name and password

- Enter the user name and password.
The user name and password for the user level "Admin" are set ex works to *admin*.

10.2 Structure of the Web User Interface

The web user interface is designed similarly to the Telnet interface.

You will find detailed information about this in [chapter 9.2, page 44](#).

Illustration of structure of **XAir**'s web user interface:

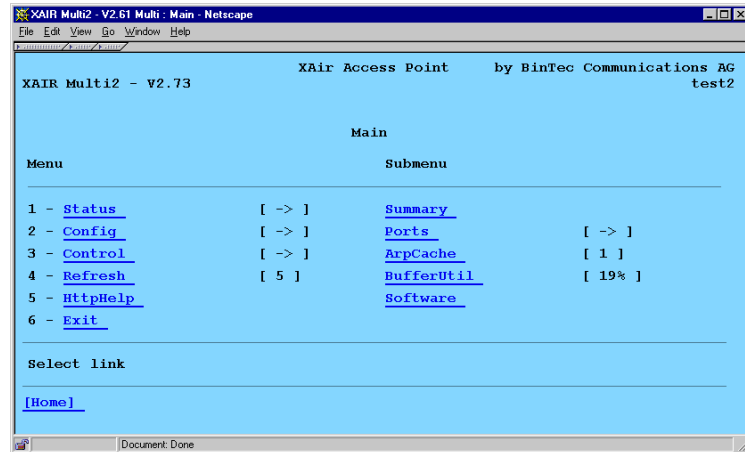


Figure 10-3: Structure of web user interface

10.3 Navigating the Web User Interface

Navigating the **XAIR**'s web user interface is similar to navigating Internet pages. You pass to the next level by clicking links. You receive input boxes for entering any necessary values.

Example of an input box:

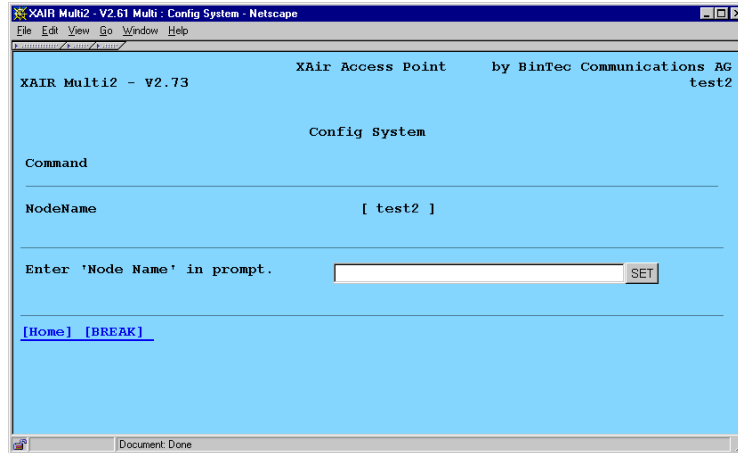


Figure 10-4: Example of an input box in **XAIR**'s web user interface

10.4 Menus and Parameters of the Web User Interface

You will find a detailed explanation of all menus and commands in the description of the Telnet user interface in [chapter 9.3, page 46](#).

11 XAir Bridge

If you have bought a BinTec **XAir** with bridge functionality or a bridge upgrade kit, not only can you allow mobile clients to access your LAN, you can also make wireless connections to various LAN segments.

The range of these wireless connections can be several kilometers, depending on the antennas used.



Always use the antennas and antenna cables supplied with the equipment to prevent unintentional violations of the applicable law. If you have special requirements, e.g. regarding cable lengths, please contact your dealer or BinTec Communications AG.

The use of this technology is free of charge. In Germany it is subject to regulations as follows: if a radio path runs outside the boundary of your property, you only need to notify the Regulatory Authority for Post and Telecommunications of the existence of the radio path. You will find the regulatory authority on the Internet at www.regtp.de. The field office of the authority responsible for your region can also be found on the Internet.

You will find a suitable registration form for Germany on BinTec's web site at www.bintec.net.



If you plan to use the equipment to connect open user groups to the Internet, you need a class 3 license. You can obtain more information about this from the responsible department of the regulatory authority in Germany on the Internet at www.regtp.de.

For other countries contact the authorities responsible for telecommunications.

11.1 Using the XAir Bridge

The operation and configuration of **XAir** as an access point is described in [chapter 9, page 41](#) of this manual.

The **XAir** bridge equipment family has many more possible applications. The **XAir** bridges are equipped with all the capabilities described above and with additional features.



Each wireless bridge port of an **XAir** can be operated in either Bridge Mode or Access Point Mode.

Bridges are generally used to interconnect various LAN segments at Layer 2 of the OSI 7-layer model. The special feature of **XAir** bridges is that the distances between these segments can be several kilometers, without the necessity for a cable for these ranges.

If you operate a wireless port in Bridge Mode, this can only be used for a bridge link. This means:

- The port has no **network name**.
- Wireless clients cannot log in (associate) to this port.
- There is no **node table** for this port (as there are no clients).
- There is no Access Control List (ACL) for this port.

This port will only connect to the partner bridge port you have configured and also only accept connections from this port.

The **XAir** bridges have transmission rates far above the possibilities of the ISDN S₀ or ISDN S_{2M}. The **XAir** Double Bridge (**XAir** Bridge Set 22 Mbps) even beats the Ethernet standard (10BaseT, 10Base2, 10Base5).



Never connect two bridges that have set up a connection to each other over radio to the same LAN segment. This leads to unavoidable overloading of your network and stops all network traffic.

Some of the possible network topologies are described here to give you an overview of the options available when you use **XAir** bridges:

1. Point-to-point topology

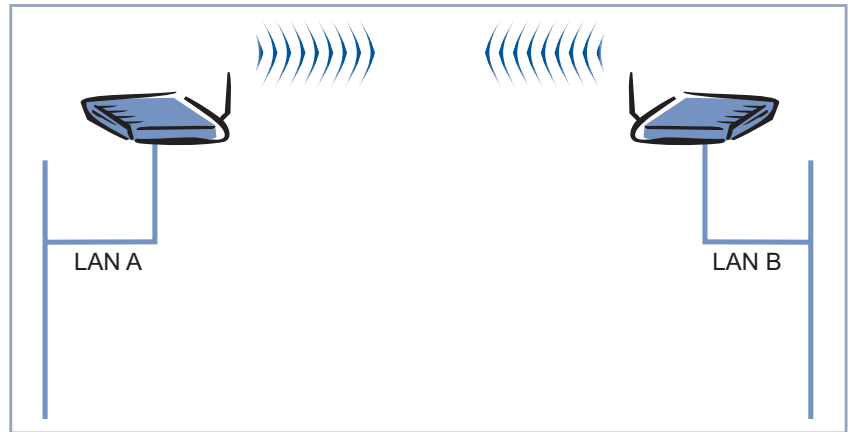


Figure 11-1: Connection of two 11-Mbps LAN segments

2. Point-to-multipoint topology

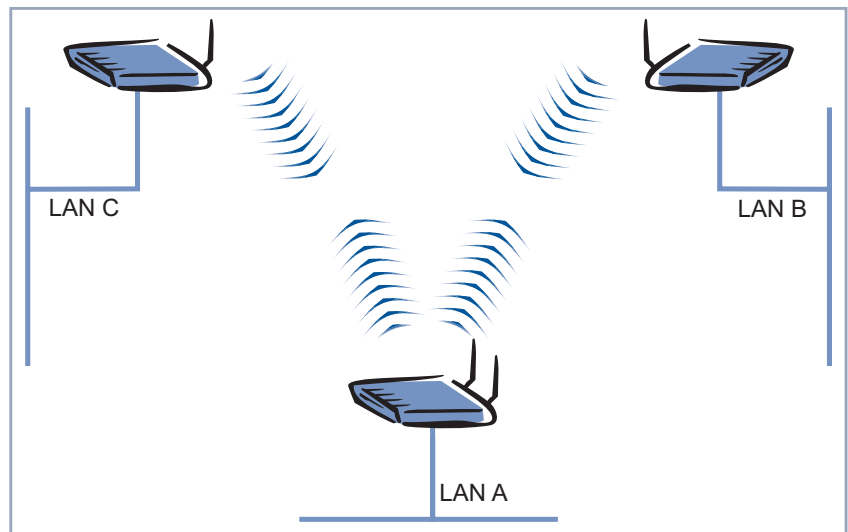


Figure 11-2: Connection of three 11-Mbps LAN segments

3. Wireless backbone

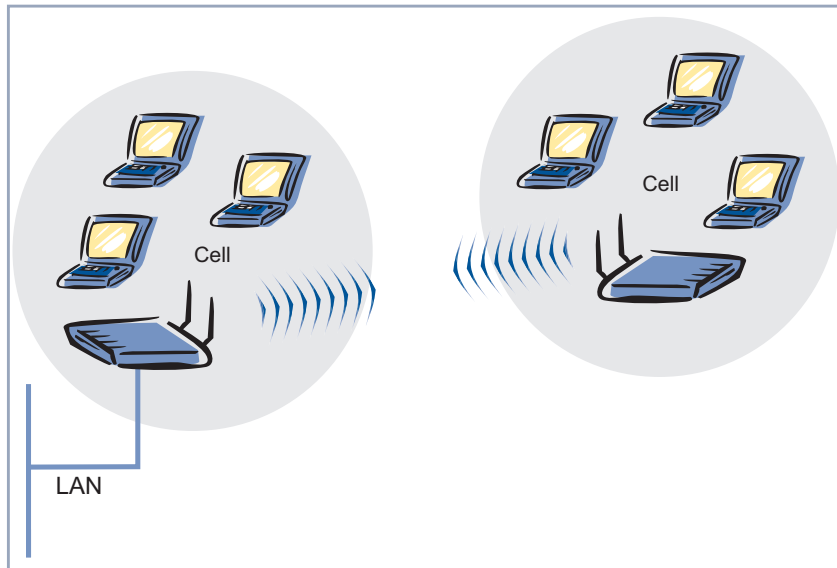


Figure 11-3: Access point with wireless connection to LAN, no reduction of data throughput

4. Wireless bridge with connection of wireless clients

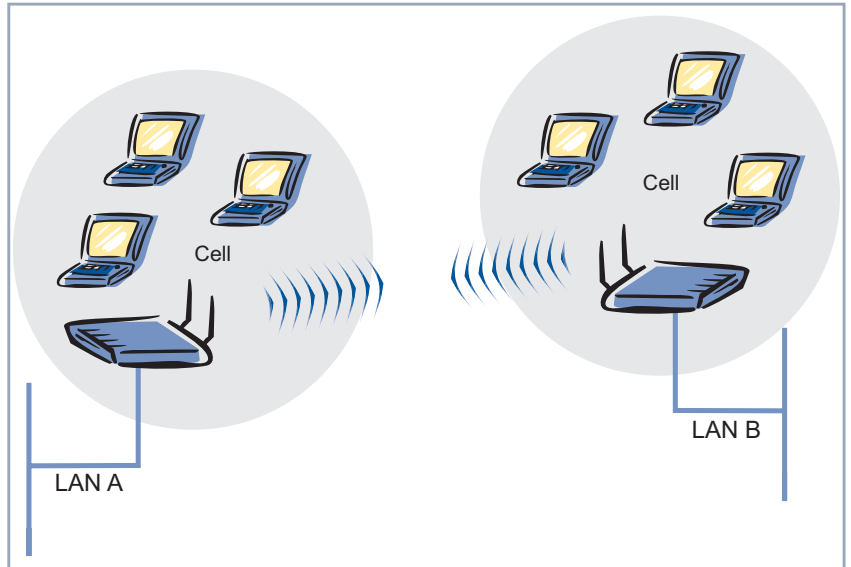


Figure 11-4: Connection of two radio cells and two LAN segments without LAN cables

5. High-speed connection (double bridge) of two LAN segments

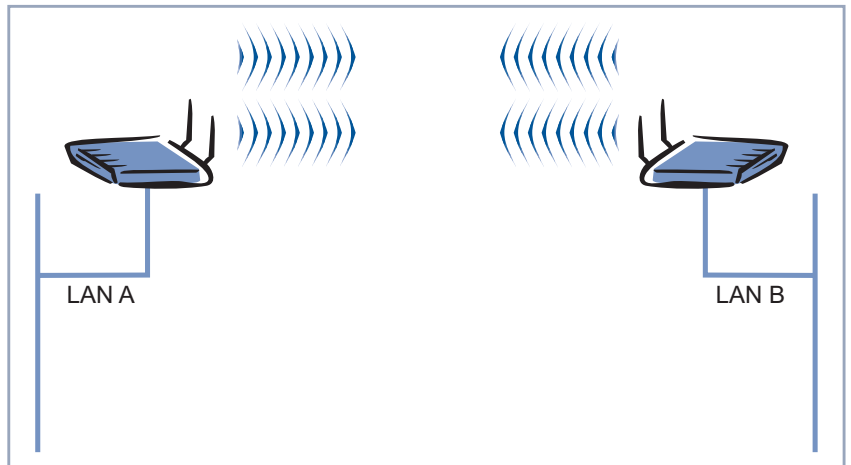


Figure 11-5: Double data throughput using channel bundling

11.2 Requirements for a Link to an XAir Bridge

To be able to set up a wireless link to XAir bridges, an uninterrupted view must exist between the antennas at both ends. This is called a line of sight, abbreviated to LOS.

The term line of sight does not just mean a straight line of vision between the two antennas, but a kind of tunnel, which must not be disturbed by obstacles.

This tunnel is called the 1st Fresnel zone. The Fresnel zone has the shape of an ellipse rotated around its longitudinal axis. At least 60 % of the 1st Fresnel zone must remain free of obstacles. The radius (or the small semi-axis) depends on the frequency used and the distance between the antennas.

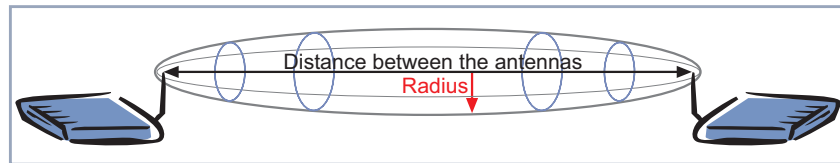


Figure 11-6: 1st Fresnel zone

Example Radius of 1st Fresnel zone as a function of distance from transmit antenna for antenna separation of 5 km at 2.45 GHz:

Distance from transmit antenna (km)	Radius of 1st Fresnel zone (m)	Radius at 60 % 1st Fresnel zone (m)
0.250	5.4	4.2
0.500	7.4	5.7
0.750	8.8	6.8
1.000	9.9	7.7
1.250	10.7	8.3
1.500	11.3	8.8
1.750	11.8	9.1
2.000	12.1	9.4
2.250	12.3	9.5
2.500	12.4	9.6
2.750	12.3	9.5
3.000	12.1	9.4
3.250	11.8	9.1
3.500	11.3	8.8
3.750	10.7	8.3
4.000	9.9	7.7
4.250	8.8	6.8
4.500	7.4	5.7
4.750	5.4	4.2

Table 11-1: Radius of 1st Fresnel zone for antenna separation of 5 km at 2.45 GHz

Example Radius of 1st Fresnel zone as a function of distance from transmit antenna for antenna separation of 700 m at 2.45 GHz:

Distance from transmit antenna (m)	Radius of 1st Fresnel zone (m)	Radius at 60 % 1st Fresnel zone (m)
100	1.6	1.25
200	2.1	1.6
300	2.3	1.75
400	2.3	1.75
500	2.1	1.6
600	1.6	1.25

Table 11-2: Radius of 1st Fresnel zone for antenna separation of 700 m at 2.45 GHz



When setting up a bridge link, make sure that no obstacles or trees protrude into the Fresnel zone. If obstacles exist, the transmission rate will drop and the path may eventually fail.

It is not essential to consider the LOS for short distances inside buildings, as the radius of the Fresnel zone will be very small here.

If you meet these requirements, the link can be set up and maintained without further limitations. A special feature of links with **XAir** bridges is that they are completely unaffected by weather conditions.

11.3 XAir Bridge Set 11 Mbps

Each bridge port of an **XAir** can be operated as a bridge or access point (AP).

If a bridge port is operated in AP Mode, all parameters are identical to the parameters described in [chapter 9, page 41](#) of this manual.

These parameters are therefore not dealt with again here.

Some menus have only minor differences between bridge and access point operation and many parameters retain their possible values and function. Only the differences and the new additional parameters are discussed here.



Refer to chapter 9: "The Telnet User Interface" of this manual for explanations of many general parameters.



For ease of reading, the order of the menus discussed is retained as in chapter 9: "The Telnet User Interface".

11.3.1 Menus

Starting a Telnet connection, logging in and setting up the user interface are explained in [chapter 9, page 41](#).

STATUS menu

The Status menu combines all information about the **XAir** bridge that is only displayed and cannot be configured by the user. You can find further information in [chapter 9.3, page 46](#).

STATUS ► **SUMMARY**

Ports in Bridge Mode have no **Network Name** and indicate the value *Bridge* for Mode. Such ports also have no associated clients. This means you cannot use an Access Control List (ACL) at a bridge port.

Bridge ports are shown as port_wlx_br.

STATUS ► **SUMMARY** menu:

```

XAir Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73   test2

State

-----
Primary If  IP Config      DHCP      Filter      SNMP      Up Time
-----
IP_Address  192.168.001.005  disabled  Prot:fwrdSome  on        0:26:51
Subnet_Mask 255.255.255.000      Mcst:forward
GateWay     000.000.000.000
                                           Sessions
                                           1

Port      MAC Address      Speed      Network Name      Mode      Client
-----
Port_eth1  00:01:CD:0A:00:4A  10
Port_wl1_ap  00:60:1D:22:E4:AC  11@01-2412~BinTec  AP        0
Port_wl2_br  00:02:2D:21:E9:11  11@13-2472        Bridge

Enter [SPACE]refresh, [q]quit:

```

Figure 11-7: **STATUS** ► **SUMMARY** menu**STATUS** ► **PORTS** ► There is no **node table** for a bridge port.**PORT_WLX_BR****STATUS** ► **PORTS** ► **PORT_WLX_BR** menu:

```

XAir Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73   test2

Status Ports Port_wl2_br

Command
-----
1 - MAC          [ 00:02:2D:21:E9:11 ]
2 - MaxSpeed     [ 11 ]
3 - Statistics
4 - CardFirmware [ 7.48 ]

Show traffic statistics of this port.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:10:46[admin]>

```

Figure 11-8: **STATUS** ► **PORTS** ► **PORT_WLX_BR** menu

STATUS ► **PORTS** ► You can reach the following window via **STATUS** ► **PORTS** ► **PORT_WLX_BR** ► **PORT_WLX_BR** ► **STATISTICS**. Further information can be found in "Statistics", **STATISTICS** [page 51](#).

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                     test2
                                Status Ports Port_wl2_br

Parameters                                             Value
-----
Received frames since last reset                       51
Transmitted frames since last reset                   73
Filtered frames since last reset                      0
MULTICAST received frames since last reset            51
MULTICAST transmitted frames since last reset         73
MULTICAST filtered frames since last reset             0
Filtered frames (on all ports) since last reset        0

Enter [SPACE]refresh, [r]reset, [q]quit:

```

Figure 11-9: **STATUS** ► **PORTS** ► **PORT_WLX_BR** ► **STATISTICS** menu

CONFIG menu

You can configure various parameters of the **XAir** bridge in the **CONFIG** menu, depending on the user level at which you are logged in (see [chapter 9.4, page 59](#)).



The descriptions below assume that you are logged in at the user level "Admin".

CONFIG ► **PORTS** Bridge ports are called port_wlx_br.

CONFIG ➤ **PORTS** ➤ **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** menu:
PORT_WLX_BR

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                     test2
                                Config Ports Port_wl2_br
                                Command                Parameters
-----|-----
1 - Interface                [ le0 ]                Interface_Name
2 - OperatingMode             [ Bridge ]
3 - BridgePort                [ -> ]
4 - WEP                       [ -> ]
5 - Extended                  [ -> ]
6 - RemoteConfig              [ -> ]
7 - LinkTest                  [ -> ]

                                Interface assignment for this port.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-10: **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** menu

The terms and options used in the menu are explained in the following table:

Option	Meaning
Interface	Enables the administrator to assign an interface. This menu item is only a static display at the user levels "User" and "View".

Option	Meaning
OperatingMode	<p>You can use this menu item at user level "Admin" to select the desired port operation mode from a list or enter it manually in the prompt. The operation mode cannot be changed at user levels "User" and "View".</p> <ul style="list-style-type: none"> <li data-bbox="801 474 1312 753"> <p>■ <i>D-Bridge</i> (depending on equipment) Enables channel bundling for a 22-Mbps link between two ends. Only possible for XAir Bridge Set 22 Mbps, a device that is bought as a double bridge. Only possible for w1, as w2 is automatic. Only a single logical wireless port is then still available.</p> <li data-bbox="801 770 1312 1043"> <p>■ <i>Bridge</i> This port operates in Bridge Mode. Wireless clients cannot log in. The port can now be used for connecting two LANs. This requires an XAir bridge in the other LAN segment and the general requirements (LOS) must be fulfilled as described in chapter 11.2, page 116.</p> <li data-bbox="801 1060 1312 1128"> <p>■ <i>AP</i> See Table 9-10, page 65.</p>
BridgePort	<p>Is used for manual configuration of a bridge link as described in "Manual configuration of a bridge link", page 142. A more detailed description is given below.</p>
WEP	<p>The configuration of Wireless Equivalent Privacy as described in Table 9-10, page 65.</p>
Extended	<p>Here you can make specific settings as described in Table 9-10, page 65.</p>

Option	Meaning
RemoteConfig	Is used for automatic configuration of a bridge link as described in " Automatic configuration of a bridge link ", page 128.
LinkTest	The link test provides all the data necessary for checking the bridge link (or both links for the double bridge). The link test also helps you to align the antennas. See " Checking a bridge link (link test) ", page 137.

Table 11-3: Options of **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR**

CONFIG ➤ **PORTS** ➤ **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **BRIDGEPORT** menu:
PORT_WLX_BR ➤
BRIDGEPORT

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                     test2
                                Config Ports Port_wl2_br BridgePort
                                Command                                     Parameters
-----|-----
1 - BridgePort                [ disabled ]
2 - DstMac                      [ 00:02:2D:21:E9:12 ]
3 - DSChannel                    [ 01-2412 ]
4 - TxSpeedMode                  [ AutoFallBack ]
5 - CurTxSpeed                   [ - ]

                                Enable or disable bridge link.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-11: **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **BRIDGEPORT** menu

The terms and options used in the menu are explained in the following table:

Option	Meaning
BridgePort	For switching the bridge function on and off. Possible values of this parameter: ■ <i>enabled</i> ■ <i>disabled</i>
DstMac	Contains the MAC address of the wireless card of the partner bridge intended as distant terminal. The address can be edited manually.
DSChannel	For setting the channel (frequency).
TxSpeedMode	For setting the transmit speed. Possible values of this parameter: ■ <i>AutoFallBack</i> Adapts the transmit speed to the connection quality. ■ <i>1_MbitFixed</i> ■ <i>2_MbitFixed</i> ■ <i>5.5_MbitFixed</i> ■ <i>11_MbitFixed</i>
CurTxSpeed	Shows the current transmit speed.

Table 11-4: Options of **CONFIG** ► **PORTS** ► **PORT_WLX_BR** ► **BRIDGEPORT**

CONFIG ► **PORTS** ► **PORT_WLX_BR** ► **WEP** The configuration of Wireless Equivalent Privacy as described in [Table 9-10, page 65](#).

CONFIG ► **PORTS** ► **PORT_WLX_BR** ► **EXTENDED** Here you can make specific settings as described in [Table 9-10, page 65](#).

CONFIG ➤ **PORTS** ➤ **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu:
PORT_WLX_BR ➤
REMOTECONFIG

```

XAIR Multi2 - V2.73
XAir Access Point by BinTec Communications AG
test2
Config Ports Port_wl2_br RemoteConfig
-----
Command                                     Parameters
-----
1 - RemoteMac [ 00:01:CD:0A:08:6D ] | Partner_Mac
2 - RemoteConfig [ disabled ]
-----

To perform the remote configuration, please enter the MAC
address of the remote partner.
(This entry is only relevant for the 'perform' operation)

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-12: **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu

The parameters **RemoteBridge**, **Settings** and **Connection** contained in the following table do not appear in the menu until the automatic configuration has been carried out. See ["Automatic configuration of a bridge link", page 128](#).

The terms and options used in the menu are explained in the following table:

Option	Meaning
RemoteMac	MAC address of Ethernet interface of the partner device in the radio path.

Option	Meaning
RemoteConfig	<p>Possible values of this parameter:</p> <ul style="list-style-type: none"> <li data-bbox="802 338 1306 406">■ <i>disabled</i> RemoteConfig is not active. <li data-bbox="802 423 1306 526">■ <i>allowed</i> The bridge can be configured from another bridge. <li data-bbox="802 543 1306 645">■ <i>perform</i> Execution of configuration at this bridge and the partner bridge. <li data-bbox="802 662 1306 731">■ <i>done</i> The configuration has been executed. <li data-bbox="802 748 1306 816">■ <i>failed</i> The configuration could not be executed.
RemoteBridge	<p>Possible values of this parameter:</p> <ul style="list-style-type: none"> <li data-bbox="802 884 1306 953">■ <i>found</i> The partner bridge has been found. <li data-bbox="802 970 1306 1038">■ <i>not_found</i> The partner bridge has not been found. <li data-bbox="802 1055 1306 1255">■ <i>ambiguous</i> The partner bridge has been found, but it has two wireless bridge ports and the RemoteConfig option is set to <i>allowed</i> on both. See "Partner bridge with two bridge ports", page 137.

Option	Meaning
Settings	<p>Allows you to check the following parameters and correct them if necessary:</p> <ul style="list-style-type: none"> ■ DSCchannel (frequency) ■ Transmission speed ■ WEP settings
Connection	<p>Possible values of this parameter:</p> <ul style="list-style-type: none"> ■ <i>unestablished</i> ■ <i>established</i>

Table 11-5: Options of **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG**

11.3.2 Configuration of an 11-Mbps XAir Bridge

Automatic configuration of a bridge link

The following steps are necessary for automatic configuration of a bridge link:

- Set **RemoteConfig** to *allowed* for the first bridge in the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu:

In the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu:

```

XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                               test2
      Config Ports Port_wl2_br RemoteConfig
-----|-----
1 - RemoteMac      [ ]                          disabled
2 - RemoteConfig   [ allowed ]                   allowed
                                                perform

Allowed enables configuration by remote.
Perform to execute configuration for both bridges.

Select from list or enter 'RemoteConfig' in prompt. [ESC] break.
18:16:10[admin]>
    
```

Figure 11-13: **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu



The ex works setting for the **RemoteConfig** option is preset to *allowed* for each **XAir** bridge.

The bridge then displays the following menu:

```

XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                               test2
      Config Ports Port_wl2_br RemoteConfig
-----|-----
1 - RemoteMac      [ ]                          Partner_Mac
2 - RemoteConfig   [ allowed ]
-----|-----
Parameters

To perform the remote configuration, please enter the MAC
address of the remote partner.
(This entry is only relevant for the 'perform' operation)

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>
    
```

Figure 11-14: **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu

- On the second bridge, enter the MAC address of the Ethernet interface of the first bridge under **RemoteMac** in the **CONFIG ➤ PORTS ➤ PORT_WLX_BR ➤ REMOTECONFIG** menu.

You will find this printed on the device and the package of **XAir** or in the **STATUS ➤ SUMMARY** menu.

In the **CONFIG ➤ PORTS ➤ PORT_WLX_BR ➤ REMOTECONFIG** menu:

```

                                XAir Access Point    by BinTec Communications AG
XAIR Multi2 - V2.73                                     test3
                                Config Ports Port_wl1_br RemoteConfig
                                Command                Parameters
-----|-----
1 - RemoteMac                [ 00:01:CD:0A:00:4A ] | Partner_Mac
2 - RemoteConfig              [ disabled ]       |
                                |
                                To perform the remote configuration, please enter the MAC
                                address of the remote partner.
                                (This entry is only relevant for the 'perform' operation)

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-15: **CONFIG ➤ PORTS ➤ PORT_WLX_BR ➤ REMOTECONFIG** menu

- On the second bridge, set the **RemoteConfig** parameter to *perform* in the **CONFIG ➤ PORTS ➤ PORT_WLX_BR ➤ REMOTECONFIG** menu.

In the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu:

```

XAIR Multi2 - V2.73
XAir Access Point by BinTec Communications AG
test3
Config Ports Port_wl1_br RemoteConfig
-----|-----
1 - RemoteMac [ 00:01:CD:0A:00:4A ] | disabled
2 - RemoteConfig [ allowed ] | allowed
                                     | perform

Allowed enables configuration by remote.
Perform to execute configuration for both bridges.

Select from list or enter 'RemoteConfig' in prompt. [ESC] break.
18:16:10[admin]>

```

Figure 11-16: **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu

The bridge will find its partner if the antennas are installed properly at both ends and a LOS exists (see [chapter 11.2, page 116](#)).

Partner bridge found The menu displays the following:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                     test3
                                Config Ports Port_wll_br RemoteConfig
                                Command                Parameters
-----|-----
1 - RemoteMac [ 00:01:CD:0A:00:4A ] | Partner_Mac
2 - RemoteConfig [ perform ]
3 - RemoteBridge [ found ]
4 - Settings [ -> ]
5 - Connection [ unestablished ]

To perform the remote configuration, please enter the MAC
address of the remote partner.
(This entry is only relevant for the 'perform' operation)

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-17: Display in **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu after partner bridge has been found in automatic configuration

You can now check the frequency (channel), transmission rate and WEP settings and make any necessary corrections under **Settings**.

- This is done by selecting the **SETTINGS** submenu in the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu.

The **SETTINGS** submenu:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                     test3
                                Config Ports Port_wll_br RemoteConfig
                                Menu                      Submenu
-----|-----
 1 - RemoteMac   [ 00:01:CD:0A:00:4A ] | TxSpeedMode [ AutoFallB
 2 - RemoteConfig [ perform ]          | DSChannel   [ 01-2412 ]
 3 - RemoteBridge [ found ]            | WEP_Status  [ disabled]
 4 - Settings    [ -> ]                | WEP_TxKeyNo [ 1 ]
 5 - Connection  [ unestablished ]     | WEP_Key1    [ *****
                                         | WEP_Key2    [ * NOT SET
                                         | WEP_Key3    [ * NOT SET
                                         | WEP_Key4    [ * NOT SET

                                Settings for this bridge link.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-18: Checking the settings in the **CONFIG** ► **PORTS** ► **PORT_WLX_BR** ► **REMOTECONFIG** menu

Activating the bridge ➤ Set **Connection** to *established* to set up the connection and finish the installation.

In the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                     test3
                                Config Ports Port_wll_br RemoteConfig
                                Command                Connection
-----|-----
1 - RemoteMac [ 00:01:CD:0A:00:4A ] | establish
2 - RemoteConfig [ perform ]
3 - RemoteBridge [ found ]
4 - Settings [ -> ]
5 - Connection [ unestablished ]

Execute configuration on both bridges to establish the
bridge link.

Select from list or enter 'Connection' in prompt. [ESC] break.
18:16:10[admin]>

```

Figure 11-19: Setting up the connection in the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu

This configuration method applies to all bridges.

The following message is displayed after configuration of both bridges:

In the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu:

```

XAIR Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73                                     test3
      Config Ports Port_wll_br RemoteConfig
      Command                                           Parameters
-----|-----
1 - RemoteMac [ 00:01:CD:0A:00:4A ] | Partner_Mac
2 - RemoteConfig [ done ]           |
                                         |
      To perform the remote configuration, please enter the MAC
      address of the remote partner.
      (This entry is only relevant for the 'perform' operation)

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-20: Successful bridge configuration in the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu

The bridge link is now active and data are transmitted between the LAN segments.

Partner bridge not found

If the partner bridge is not found, you receive the following display in the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu:

```

XAIR Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73                                     test3
      Config Ports Port_wll_br RemoteConfig
      Command                                           Parameters
-----|-----
1 - RemoteMac [ 00:01:CD:0A:00:4A ] | Partner_Mac
2 - RemoteConfig [ perform ]         |
3 - RemoteBridge [ not_found ]       |
                                         |
      To perform the remote configuration, please enter the MAC
      address of the remote partner.
      (This entry is only relevant for the 'perform' operation)

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-21: Display in **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **REMOTECONFIG** menu after partner bridge has not been found in automatic configuration

- In this case, check the addresses entered under **RemoteMac** at both ends, the line of sight and the antenna installation. If the **RemoteMac** address is not correct, enter the correct MAC address and execute *perform* again. The partner should then be found.

Partner bridge with two bridge ports

If the partner bridge has been found, but has two wireless bridge ports and the **RemoteConfig** option is set to *allowed* for both, the value *ambiguous* appears under **RemoteBridge** in the **CONFIG ► PORTS ► PORT_WLX_BR ► REMOTECONFIG** menu:

```

XAIR Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73                                         test3

      Config Ports Port_wll_br RemoteConfig
      Command
-----|-----
1 - RemoteMac [ 00:01:CD:0A:00:4A ] | Partner_Mac
2 - RemoteConfig [ perform ]
3 - RemoteBridge [ ambiguous ]

      To perform the remote configuration, please enter the MAC
      address of the remote partner.
      (This entry is only relevant for the 'perform' operation)

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-22: Display in **CONFIG ► PORTS ► PORT_WLX_BR ► REMOTECONFIG** menu

In this case you have two configuration options:

- On the first bridge with two bridge ports, set **RemoteConfig** to *disabled* for one of the two wireless bridge ports in the **CONFIG ► PORTS ► PORT_WLX_BR ► REMOTECONFIG** menu. Repeat the automatic configuration with the second bridge. Only one bridge port is now found on the partner bridge (the first bridge) and this is set to *allowed* for **RemoteConfig**.

The automatic configuration can now be carried out successfully.

or

- Carry out manual configuration of the bridge connection (see ["Manual configuration of a bridge link", page 142](#)), in which you enter the MAC address of the relevant wireless bridge port of the partner bridge.

Checking a bridge link (link test)

The link test provides all the data necessary for checking the bridge link (or both links for the double bridge). The link test also helps you to align the antennas.



Traffic data cannot be exchanged over the bridges during a link test.

Carrying out a link test



Before carrying out a link test, you should reduce the display interval from 5 seconds to 1 second (see "[REFRESH command](#)", page 102).

Proceed as follows to carry out the link test:

- Log in to your local bridge by Telnet or via the web user interface at the user level "Admin".
- Select **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **LINKTEST** to open the **LINKTEST** menu.
- If you have set up your bridge link by automatic configuration, the address of the test partner is already entered under the **LinkPartner** parameter. If not, you must enter this address manually. The address is the MAC address of the Ethernet interface of the partner bridge. You will find this printed on the device and the package of **XAir** or in the **STATUS** ➤ **SUMMARY** menu.
- To switch **XAir** to another mode that allows link test frames to be sent and received, select *enable* for **LinkTest**.

CONFIG ► PORTS ► PORT_WLX_BR ► LINKTEST menu:

```

XAIR Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73                                       test3
Config Ports Port_wl1_br LinkTest
Command
-----
1 - LinkPartner      [ 00:01:CD:0A:00:4A ] | disabled
2 - LinkTest         [ disabled ]         | enabled

Start the link test.

Select from list or enter 'Port_Mode' in prompt. [ESC] break.
18:16:10[admin]>

```

Figure 11-23: **CONFIG ► PORTS ► PORT_WLX_BR ► LINKTEST** menu

It is now no longer possible to transfer between the LAN segments. A new menu item appears in the **LINKTEST** menu.

A new menu item appears in the **CONFIG ► PORTS ► PORT_WLX_BR ► LINKTEST** menu:

```

XAIR Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73                                       test3
Config Ports Port_wl1_br LinkTest
Command
-----
1 - LinkPartner      [ 00:01:CD:0A:00:4A ] |
2 - LinkTest         [ enabled ]         |
3 - StartTest       |

Start link test.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-24: **CONFIG ► PORTS ► PORT_WLX_BR ► LINKTEST** menu

► Select **StartTest** to start the link test.

The screen now shows the results of the link test.

Screen display of results of link test for an 11-Mbps bridge:

```

XAir Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73   test3
Config Ports Port_wll_br LinkTest
                    Local Bridge      Remote Partner
-----
                    Link Quality
                    excellent         excellent
                    SNR: 51 dB       SNR: 53 dB
                    Signal: -37 dBm  Signal: -39 dBm
                    Noise: -96 dBm   Noise: -96 dBm

                    Received at Rate
                    11 Mbps: 561      11 Mbps: 561
                    5.5 Mbps: 0       5.5 Mbps: 0
                    2 Mbps: 0         2 Mbps: 0
                    1 Mbps: 0         1 Mbps: 0

                    Frames Sent:      561
                    Frames Received:  560
                    Frames Lost:       0

Enter [SPACE] refresh, [r]reset, [q]quit:

```

Figure 11-25: Results of link test for an 11-Mbps bridge

This screen display is updated on each refresh interval. You will find an explanation of the individual parameters at the end of this section.

Five test frames per interval are sent to the partner, who receives and evaluates the answers.

- Press `r(eset)` to reset the counters.
- To end the link test, press the **ESC** key or **q** (Telnet), or select **BACK** (web user interface).
- You must now set the **BridgePort** option to *enabled* in the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **BRIDGEPORT** menu to activate the link again so that the bridge returns to operation.

The parameters used for the link test results (see above) are explained in the following table:

Parameters	Meaning										
Link Quality	Forms the heading for the parameters that indicate radio quality.										
Rating and Quality	Possible values of Link Quality parameter: <ul style="list-style-type: none"> ■ <i>excellent</i> ■ <i>good</i> ■ <i>marginal</i> ■ <i>poor</i> 										
SNR	Signal-to-Noise Ratio in dB is an indicator of the quality of the radio connection. <table style="margin-left: 20px; border: none;"> <thead> <tr> <th>Values</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>> 25 dB</td> <td><i>excellent</i></td> </tr> <tr> <td>15-25 dB</td> <td><i>good</i></td> </tr> <tr> <td>2-15 dB</td> <td><i>marginal</i></td> </tr> <tr> <td>0-2 dB</td> <td><i>poor</i></td> </tr> </tbody> </table>	Values	Rating	> 25 dB	<i>excellent</i>	15-25 dB	<i>good</i>	2-15 dB	<i>marginal</i>	0-2 dB	<i>poor</i>
Values	Rating										
> 25 dB	<i>excellent</i>										
15-25 dB	<i>good</i>										
2-15 dB	<i>marginal</i>										
0-2 dB	<i>poor</i>										
Signal	Received signal strength at receiver in dBm.										
Noise	Received noise strength at receiver in dBm.										
Received at Rate	Forms the heading for the parameters that indicate the number of frames received.										
11 Mbps	Number of frames received at the transfer rate of 11 Mbps.										
5.5 Mbps	Number of frames received at the transfer rate of 5.5 Mbps.										
2 Mbps	Number of frames received at the transfer rate of 2 Mbps.										
1 Mbps	Number of frames received at the transfer rate of 1 Mbps.										

Parameters	Meaning
Frames Sent	Number of frames sent by this device since the start of the link test.
Frames Received	Number of frames received by this device since the start of the link test.
Frames Lost	Number of frames lost on this link since the start of the link test.

Table 11-6: Results screen for link test parameters

Manual configuration of a bridge link

Proceed as follows for manual configuration of a bridge link:

- Determine the MAC address of the bridge port of the partner bridge and make a note of it.

You can determine the MAC address of a bridge port under **STATUS** ➤

SUMMARY:

```

XAIR Multi2 - V2.73
XAir Access Point by BinTec Communications AG test2
State
-----
Primary If  IP Config      DHCP      Filter      SNMP      Up Time
-----
IP_Address  192.168.001.005  disabled  Prot:fwrSome  on        0:26:51
Subnet_Mask 255.255.255.000      Mcst:forward
GateWay     000.000.000.000
Sessions
1

Port        MAC Address      Speed      Network Name  Mode      Client
-----
Port_eth1   00:01:CD:0A:00:4A  10        11@01-2412~BinTec  Half
Port_wl1_ap 00:60:1D:22:E4:AC  11@01-2412~BinTec  AP           0
Port_wl2_br 00:02:2D:21:E9:11  11@13-2472      Bridge

Enter [SPACE]refresh, [q]quit:
    
```

Figure 11-26: **STATUS** ➤ **SUMMARY** menu

A connection is set up to port_wl2_br in this example. The MAC address is therefore 00:02:2D:21:E9:11. The address of the port of the second bridge in this example is 00:02:2D:21:E9:12. Important! Make a note of both addresses.

- Enter the MAC address of the wireless port of the respective partner bridge in the **DstMAC** parameter for each bridge in the **CONFIG** ➤ **PORTS** ➤ **PORT_WLX_BR** ➤ **BRIDGEPORT** menu.

CONFIG ► PORTS ► PORT_WLX_BR ► BRIDGEPORT menu:

```

XAir Access Point      by BinTec Communications AG
XAIR Multi2 - V2.73   test3
Config Ports Port_wll_br BridgePort
-----
Command                Parameters
-----
1 - BridgePort          [ disabled ]
2 - DstMac              [ 00:02:2D:21:E9:11 ]
3 - DSchannel           [ 01-2412 ]
4 - TxSpeedMode         [ AutoFallBack ]
5 - CurTxSpeed          [ - ]

MAC address of the wireless card of the remote device.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:10:46[admin]>00:02:2D:21:E9:11

```

Figure 11-27: **CONFIG ► PORTS ► PORT_WLX_BR ► BRIDGEPORT** menu

- Set the wireless ports of both bridges to the same channel. You can select the channel under the **DSchannel** parameter in the **CONFIG ► PORTS ► PORT_WLX_BR ► BRIDGEPORT** menu.

The following screen display shows setting the channel:

```

XAir Access Point    by BinTec Communications AG
XAIR Multi2 - V2.73                                test2

          Config Ports Port_wl2_br BridgePort
          Command                                     channel
-----
1 - BridgePort [ disabled ]                          01-2412  10-2457
2 - DstMac     [ 00:02:2D:21:E9:12 ]                 02-2417  11-2462
3 - DSChannel  [ 01-2412 ]                            03-2422  12-2467
4 - TxSpeedMode [ AutoFallBack ]                    04-2427  13-2472
5 - CurTxSpeed [ - ]                                 05-2432
                                                    06-2437
                                                    07-2442
                                                    08-2447
                                                    09-2452

          Direct Sequence channel on which this card is operating. The
          card of the remote device must be set to the same channel.

Select from list or enter 'channel' in prompt. [Esc] break.
18:10:46[admin]>

```

Figure 11-28: **CONFIG** ► **PORTS** ► **PORT_WLX_BR** ► **BRIDGEPORT** menu

► Set **BridgePort** on both bridges to *enabled*.

The following screen display shows you the setting of the value *enabled* for **BridgePort** in the **CONFIG ► PORTS ► PORT_WLX_BR ► BRIDGEPORT** menu on both bridges:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                           test3
                                Config Ports Port_wll_br BridgePort
                                Command
-----|-----
1 - BridgePort      [ disabled ]      disabled
2 - DstMac          [ 00:02:2D:21:E9:11 ] enabled
3 - DsChannel       [ 01-2412 ]
4 - TxSpeedMode    [ AutoFallback ]
5 - CurTxSpeed     [ - ]

                                Enable or disable bridge link.

Select from list or enter 'Port_Mode' in prompt. [Esc] break.
18:10:46[admin]>

```

Figure 11-29: **CONFIG ► PORTS ► PORT_WLX_BR ► BRIDGEPORT** menu

The link is set up as soon as both ports are *enabled*.

The **CurTxSpeed** parameter then shows the current transmission speed:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Multi2 - V2.73                                           test3
                                Config Ports Port_wll_br BridgePort
                                Command
-----|-----
1 - BridgePort      [ enabled ]
2 - DstMac          [ 00:02:2D:21:E9:11 ]
3 - DSChannel       [ 01-2412 ]
4 - TxSpeedMode    [ AutoFallback ]
5 - CurTxSpeed     [ 11 ]

                                Current transmission speed of the local card.

View only.
Enter a number or name, = main menu, [ESC] previous menu.
18:10:46[admin]>

```

Figure 11-30: **CurTxSpeed** parameter in the **CONFIG ► PORTS ► PORT_WLX_BR ► BRIDGEPORT** menu

Both LAN segments are interconnected as soon as you have set up a link using one of the methods shown (automatic or manual). This means that PCs from one segment can be connected to PCs from the other segment.

Checking a bridge link (link test)

The link test provides all the data necessary for checking the bridge link (or both links for the double bridge). The link test also helps you to align the antennas.

How to carry out a link test is described in "[Checking a bridge link \(link test\)](#)", [page 137](#).

11.4 XAir Bridge Set 22 Mbps (Double Bridge)

The double bridge differs from the "normal" bridge in that it uses two wireless links simultaneously. The incoming Ethernet traffic is distributed to the two wireless ports automatically according to spare capacity.



A subsequent upgrade to an **XAir** double bridge link is not available. If you want to use this functionality, you must buy the relevant devices right from the start.



Please note that an **XAir** double bridge can achieve a higher data throughput than a standard Ethernet. If you want to make full use of all its functions, you should connect your **XAir** double bridge to at least a 10BaseT full duplex port of a switch. We recommend connection to a 100BaseT switch port.

11.4.1 Special Configuration Features of Double Bridge

The double bridge is always physically equipped with two wireless modules; these are shown logically as one port.

This port is always designated port_wl1_brX.

The characteristics described in [chapter 11.1, page 112](#) also apply to this port:

- No **network name**
- No logging in of wireless clients
- No **node table**
- No ACL

The two channels used are set in the **CONFIG** ➤ **PORTS** ➤ **PORT_WL1_BRX** ➤ **BRIDGEPORTS** menu. Both **DstMAC** are also entered here if you decide on manual configuration.

Only the logical bridge port is displayed in the **STATUS ► SUMMARY** menu, so you cannot find out the MAC addresses of both radio modules there. These are shown in **CONFIG ► PORTS ► PORT_WL1_BRX ► BRIDGEPORTS**.

Automatic configuration is also available as well as manual configuration.

11.4.2 Modified CONFIG Submenu PORTS

The **CONFIG ► PORTS ► PORT_WL1_BRX** menu for a double bridge looks like this:

```

XAir Access Point    by BinTec Communications AG
XAIR Bridge22 - V2.73                               test4

Config Ports Port_wl1_brX
Menu                               Submenu
-----
1 - Interface                      [ 1e0 ] BridgePorts [ enabled ]
2 - OperatingMode                  [ D-Bridge ] TxSpeedMode [ AutoFallBack ]
3 - BridgePorts                   [ -> ] LocalCard1 [ 00:02:2D:21:E9:70 ]
4 - WEP                            [ -> ] RemoteCard2 [ 00:02:2D:21:E9:12 ]
5 - Extended                       [ -> ] DSChannel1 [ 13-2472 ]
6 - RemoteConfig                   [ -> ] CurTxSpeed [ 11 ]
7 - LinkTest                        [ -> ] LocalCard2 [ 00:02:2D:21:E9:11 ]
                                   RemoteCard1 [ 00:02:2D:21:E8:5C ]
                                   DSChannel2 [ 01-2412 ]
                                   CurTxSpeed [ 11 ]

Bridge link configuration.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>
    
```

Figure 11-31: **CONFIG ► PORTS ► PORT_WL1_BRX** menu for a double bridge

The **CONFIG ► PORTS ► PORT_WL1_BRX** menu contains the following items:

Option	Meaning
Interface	See " CONFIG ► PORTS ► PORT_WLX_BR ", page 122.
OperatingMode	See " CONFIG ► PORTS ► PORT_WLX_BR ", page 122.

Option	Meaning
BridgePorts	Menu for configuration of the logical bridge port or both physical radio modules. See following table.
WEP	The configuration of Wireless Equivalent Privacy as described in Table 9-10, page 65 .
Extended	Here you can make specific settings as described in Table 9-10, page 65 .
RemoteConfig	Is used for automatic configuration of a bridge link as described in " Automatic configuration ", page 153 .
LinkTest	The link test provides all the data necessary for checking both links for the double bridge. The link test also helps you to align the antennas. See " Checking the bridge link (link test) ", page 155 .

Table 11-7: Options of **CONFIG** ➤ **PORTS** ➤ **PORT_WL1_BRX**

Parameters of submenu **CONFIG** ➤ **PORTS** ➤ **PORT_WL1_BRX** ➤ **BRIDGEPORTS**:

Option	Meaning
BridgePorts	Possible values of this parameter: <ul style="list-style-type: none"> ■ <i>enabled</i> ■ <i>disabled</i>

Option	Meaning
TxSpeedMode	For setting the transmit speed. Possible values of this parameter: <ul style="list-style-type: none"> ■ <i>AutoFallback</i> Adapts the transmit speed to the connection quality. ■ <i>1_MbitFixed</i> ■ <i>2_MbitFixed</i> ■ <i>5.5_MbitFixed</i> ■ <i>11_MbitFixed</i>
LocalCard1	MAC address of local module 1.
RemoteCard2	MAC address of partner module 2.
DSChannel1	Channel number and frequency of module 1.
CurTxSpeed	Shows the current transmit speed of module 1.
LocalCard2	MAC address of local module 2.
RemoteCard1	MAC address of partner module 1.
DSChannel2	Channel number and frequency of module 2.
CurTxSpeed	Shows the current transmit speed of module 2.

Table 11-8: Parameters of **CONFIG** ➤ **PORTS** ➤ **PORT_WL1_BRX** ➤ **BRIDGEPORTS**

11.4.3 Configuration of a 22-Mbps XAir Bridge (Double Bridge)

- Verify in the **CONFIG** ➤ **PORTS** ➤ **PORT_WL1_BRX** menu that your devices are both configured as double bridges.

The **OperatingMode** parameter in the **CONFIG ► PORTS ► PORT_WL1_BRX** menu must be set to *D-Bridge*:

```

                                XAir Access Point   by BinTec Communications AG
XAIR Bridge22 - V2.73                                     test4
                                Config Ports Port_wl1_brX
                                Command                Parameters
-----
1 - Interface                    [ le0 ]             OperatingMode
2 - OperatingMode              [ D-Bridge ]
3 - BridgePorts                  [ -> ]
4 - WEP                           [ -> ]
5 - Extended                      [ -> ]
6 - RemoteConfig                 [ -> ]
7 - Linktest                      [ -> ]

                                Operating mode of this port.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-32: **CONFIG ► PORTS ► PORT_WL1_BRX** menu

- If this is not the case on one device, set this device to the Double Bridge Mode.

Changing the **operating mode**:

```

XAIR Bridge22 - V2.73
XAir Access Point by BinTec Communications AG
test4
Config Ports Port_wl1_brX
-----
Command                               OperatingMode
-----
1 - Interface                          [ 1e0 ]      D-Bridge
2 - OperatingMode                       [ AP ]      Bridge
3 - BridgePorts                         [ -> ]      AP
4 - WEP                                 [ -> ]
5 - Extended                            [ -> ]
6 - RemoteConfig                        [ -> ]
7 - LinkTest                            [ -> ]

Operating mode of this port.

Select from list or enter 'OperatingMode' in prompt. [Esc] break.
18:16:10[admin]>

```

Figure 11-33: **CONFIG** ➤ **PORTS** ➤ **PORT_WL1_BRX** menu

Automatic configuration

Automatic configuration functions as described for the "normal" bridge in ["Automatic configuration of a bridge link", page 128](#).

Manual configuration

You must carry out the following steps for manual configuration of a double bridge connection:

Determining the MAC addresses of radio modules

- To read the MAC addresses of the radio modules, open **CONFIG** ➤ **PORTS** ➤ **PORT_WL1_BRX** ➤ **BRIDGEPORTS**.

You will find the MAC addresses in the **CONFIG** ► **PORTS** ► **PORT_WL1_BRX** ► **BRIDGEPORTS** menu:

```

XAir Access Point      by BinTec Communications AG
XAIR Bridge22 - V2.73                               test4
Config Ports Port_wl1_brX BridgePorts
Command                                                    Parameters
-----|-----
1 - BridgePorts      [ enabled ]                               Port_Mode
2 - TxSpeedMode      [ AutoFallback ]
3 - LocalCard1       [ 00:02:2D:21:E9:70 ]
4 - RemoteCard2     [ 00:02:2D:21:E9:12 ]
5 - DSChannel1       [ 13-2472 ]
6 - CurTxSpeed       [ 11 ]
7 - LocalCard2       [ 00:02:2D:21:E9:11]
8 - RemoteCard1     [ 00:02:2D:21:E8:5C]
9 - DSChannel2       [ 01-2412 ]
10 - CurTxSpeed      [ 11 ]

Enable or disable bridge ports.

Enter a number or name, "=" main menu, [ESC] previous menu.
18:16:10[admin]>

```

Figure 11-34: **CONFIG** ► **PORTS** ► **PORT_WL1_BRX** ► **BRIDGEPORTS** menu for a double bridge

- Note the MAC address of **LocalCard1** and **LocalCard2**. Carry out this step for both bridges.

Entering corresponding addresses for each partner bridge

- Enter the addresses of **LocalCard1** and **LocalCard2** of the first bridge for **RemoteCard2** and **RemoteCard1** of the second bridge. Make sure that the respective Card1 is connected to Card2 of the partner bridge. The address of **LocalCard1** of the partner bridge must therefore be entered as **RemoteCard2** and the address of **LocalCard2** of the partner bridge as **RemoteCard1**.

Defining the radio channels

- Also enter the addresses of the second bridge for the first bridge.
- Configure the channels on the first bridge. Make sure you use two unconnected channels. It is best to use **DSChannel1 1** for **LocalCard1** and **DSChannel2 13** for **LocalCard2**.
- Set the channels on the second bridge. Make sure that the respective Card1 is connected to Card2 of the partner bridge. In our example, you must connect **DSChannel1 13** for **LocalCard1**

of the second bridge, and accordingly **DSChannel2 1** for **LocalCard2** of the second bridge.

- Enabling the connection** ➤ You must now enable the bridge port on both the first bridge and second bridge to set up the connection. This is done by setting **BridgePorts** to *enabled*.

Checking the bridge link (link test)

The link test provides all the data necessary for checking both links of the double bridge. The link test also helps you to align the antennas.

The following screen appears when carrying out a link test for a 22-Mbps bridge (double bridge):

```

XAIR Access Point      by BinTec Communications AG
XAIR Bridge22 - V2.73                                     test4
Config Ports Port_wll_brX LinkTest

Local Card 1      Remote Partner      Local Card 2      Remote Partner
-----
Link Quality
excellent          excellent          excellent          excellent
SNR:   54 dB      SNR:   52 dB      SNR:   51 dB      SNR:   53 dB
Signal: -40 dBm   Signal: -38 dBm   Signal: -37 dBm   Signal: -39 dBm
Noise:  -96 dBm   Noise:  -96 dBm   Noise:  -96 dBm   Noise:  -96 dBm

Received at Rate
11 Mbps:565      11 Mbps:565      11 Mbps:561      11 Mbps:561
5.5 Mbps:0       5.5 Mbps:0       5.5 Mbps:0       5.5 Mbps:0
2 Mbps: 0        2 Mbps: 0        2 Mbps: 0        2 Mbps: 0
1 Mbps: 0        1 Mbps: 0        1 Mbps: 0        1 Mbps: 0

Frames Sent:      561              Frames Sent:      561
Frames Received: 560              Frames Received: 560
Frames Lost:      0                Frames Lost:      0

Enter [SPACE] refresh, [r]reset, [q]quit:

```

Figure 11-35: Results of link test of a 22-Mbps bridge (double bridge)

How to carry out a link test is described in "[Checking a bridge link \(link test\)](#)", [page 137](#). Here you will also find a detailed description of the individual parameters.

12 LEDs

The five LEDs indicate radio status, radio activity, Ethernet activity and LED states of **XAir**. The LED states are indicated by combinations of the LEDs.

This chapter covers the following:

- Assignment of LEDs to Ports (see [chapter 12.1, page 158](#))
- LEDs for Ethernet Socket (see [chapter 12.2, page 160](#))
- Boot Operation (see [chapter 12.3, page 161](#))
- Error States in the Firmware (see [chapter 12.4, page 164](#))

12.1 Assignment of LEDs to Ports

Assignment of LEDs on **XAir**:

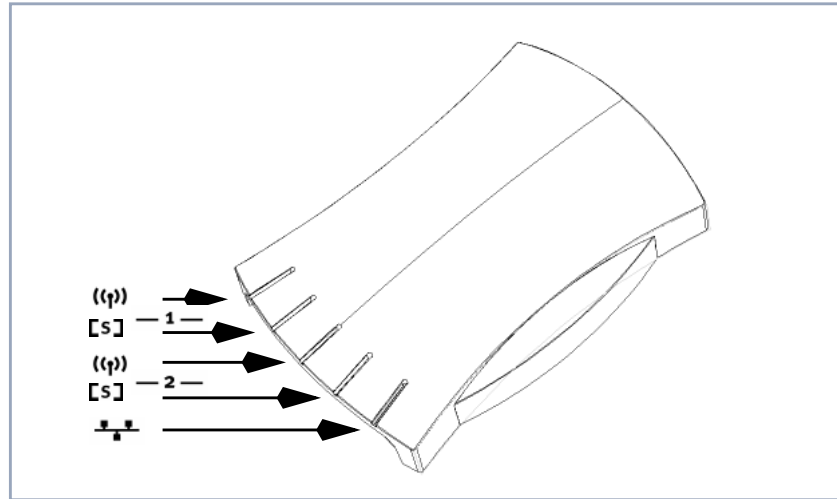


Figure 12-1: LEDs on **XAir**

The following table describes the appearance and function of the LEDs:

Wireless interfaces	LED	PCMCIA slot	Indication
— 1 —	((p)) yellow	This LED indicates the activity of the upper slot.	Indicates the amount of wireless data. The LED flashes briefly if little data is transmitted and lights continuously to indicate a large data flow.
	[S] green	This LED indicates the status of the upper slot.	It flashes if no wireless client is logged in to XAir and lights continuously as soon as at least one client is logged in.




Wireless interfaces	LED	PCMCIA slot	Indication
— 2 —	 yellow	This LED indicates the activity of the lower slot.	Indicates the amount of wireless data. The LED flashes briefly if little data is transmitted and lights continuously to indicate a large data flow.
	 green	This LED indicates the status of the lower slot.	It flashes if no wireless client is logged in to XAir and lights continuously as soon as at least one client is logged in.
	 Ethernet	This LED indicates the Ethernet activity.	It flashes briefly at low Ethernet activity and lights continuously at high activity.

Table 12-1: Functions of LEDs

12.2 LEDs for Ethernet Socket

The Ethernet socket on the back of the **XAir** is equipped with two LEDs:

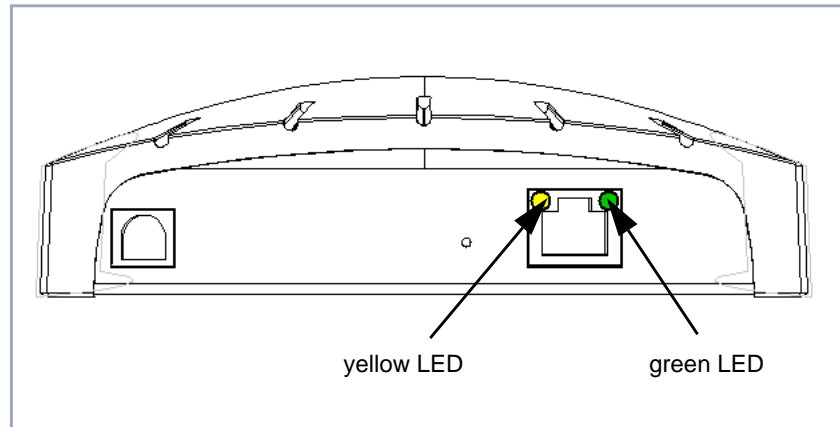






Figure 12-2: LEDs for Ethernet socket

The yellow LED indicates the connection speed. It lights continuously if the speed is 100 Mbps and does not light if the speed is 10 Mbps.

The green LED indicates the link status. The LED lights continuously if a connection exists and is switched off if no connection currently exists.

12.3 Boot Operation

The activity of **XAir**'s LEDs shows you what action is currently being executed in each boot operation. The tables below provide an overview of the various LEDs (shown as circles). The following color code is used:

-  The LED is off.
-  The LED is on and lights continuously.
-  The LED flashes.
-  The LED flashes very briefly and quickly.

LEDs for wireless interfaces:

Wireless interfaces		LED number
— 1 —	((p))	LED1
	[s]	LED2
— 2 —	((p))	LED3
	[s]	LED4

Table 12-2: LED numbers

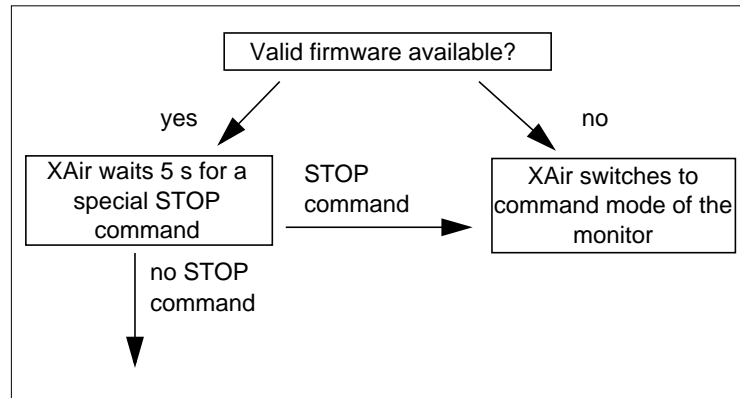
Boot operation in eight steps

The boot operation takes place in the following steps:

1. Start of monitor software, successful RAM test and successful initialization of LEDs:
LED1 is switched on.
2. Configuration successfully loaded from flash:
LED2 is switched on.
3. Own MAC address is read from flash:
LED3 is switched on.

4. Successful start of Inet stacks. The monitor software is ready to accept commands:

LED4 is switched on. All LEDs are switched on.



5. As soon as the firmware has been successfully copied into the RAM by the monitor and started:
LED1 and LED3 are switched on, LED2 and LED4 off.
6. Successful start of firmware:
All LEDs are switched off.
7. If the upper card (Port w11) has been detected:
LED1 shows its activity and LED2 its status.
8. If the upper and lower card (Port w11 and Port w12) have been detected:
LED1 and LED3 shows their activity in line with the above example, LED2 and LED4 their status.

LEDs during the boot operation:

Step	LED1	LED2	LED3	LED4
1	●	●	●	●
2	●	●	●	●
3	●	●	●	●
4	●	●	●	●
5	●	●	●	●
6	●	●	●	●
7	●	⊗	●	●
8	●	⊗	●	⊗

Table 12-3: Lighting of LEDs during boot operation

12.4 Error Display

You can detect certain error states in the firmware from the activity of the LEDs during normal operation of **XAir**. An overview of this is given in the following table:

Error state	LED1	LED2	LED3	LED4
Software error has occurred: Radio activity LED for port 1 lights continuously.	●	●	●	●
Operating system error has occurred: Radio activity and radio status LEDs for port 1 light continuously.	●	●	●	●
Fatal operating system error has occurred: Radio activity and radio status LEDs for port 1 and radio activity LED for port 2 light continuously.	●	●	●	●

Table 12-4: Lighting of LEDs for error states

Proceed as follows to clear the errors:

- Reboot your **XAir** (see [chapter 8.3.9, page 40](#)).

If the errors are not cleared by rebooting, then:

- Load the current **XAir** software from the download section at <http://www.bintec.net>.

If the error is not cleared by these two measures, a hardware defect exists. In this case contact the manufacturer.

A	ACL (Access Control List)	95
	ACL Manager	96
	Local	96
	Remote	96
	ARP processing	74
	ARP table	57
	Automatic configuration	
	Bridge	128
	Double bridge	153
B	BcstSSID (parameters)	62
	Boot operation	161
	Bridge	111
	Applications	112
	Automatic configuration	128
	Bridge Set 22 Mbps. See Double bridge	
	Config (menu)	121
	Double bridge. See Double bridge	
	Frequency	144
	Link testing	137
	MAC address	130, 143
	Manual configuration	142
	Not found	135
	Requirements	116
	Status (menu)	119
	Two bridge ports	137
	XAir Bridge Set 11 Mbps	119
	Buffer pool	57
C	Closing	
	Telnet user interface	102
	XAir Manager	40

Commands	
Exit	102
Help	102
Refresh	102
Config (menu)	59
Filtering	72
Interfaces	68
IPRoutes	86
Ports	60, 121, 149
System	59
Configuration	
Bridge	119
Double bridge	148
XAir	17, 25, 41
Control (menu)	91
DHCP client	90
ResetToFD	101
Security	95
SNMP	91
System reset	100
View logs	100
D DHCP	69, 90
Activating	69
Options	69
Parameters	90
Documentation, further	12
Double bridge	148
Automatic configuration	153
Frequency	154
Link testing	155
MAC address	153
Manual configuration	153
Special features	148
E Encapsulation	65
Error display	164

Ethernet parameters	24
Ethernet port	46
Configuring	60
Interface	60
Name conventions	21
Ex works settings, resetting to	40, 101
F Filters	72
ARP processing	74
Multicast frames	79
Protocols	75
Firmware upgrading	35
Frequency	23
Bridge	144
Configuring	23
Double bridge	154
Fresnel zone	116
G Gateway	24, 68
H Help	102
I Interfaces	19
Configuring	68
Ethernet port	60
Name conventions	19
Wireless ports	61
IP address	24, 46, 68
L LEDs	157
Ethernet socket	160
Link test	
Bridge	137
Double bridge	155

M	MAC address	46
	Bridge	130, 143
	Double bridge	153
	Manual configuration	
	Bridge	142
	Double bridge	153
	Multicast frames, filtering	79
	Multicast interface	27
	N	Name conventions
Ethernet port		21
Interfaces		19
Wireless ports		20
Network		11
Network name configuration		22, 62
Network parameters		46
Node name		59
Node table		54, 112
O	Online help	102
P	Passwords	18, 95
	Changing	18, 95
	Entering	33, 105
	Ex works setting	18
	User levels	18, 95
	Ports. See interfaces	
	Previous knowledge	11
	Protocol filtering	75
R	Rebooting	100
	Rebooting XAir	40, 100
	Refreshing the display	102
	Requirements for the use of a bridge	116
	Resetting to ex works settings	40, 101
	Routing table	86

S	Safety Precautions	15
	Security	22, 61, 95, 96
	SNMP	
	Manager	92
	Settings	91
	Software version	58
	SSID (Service Set Identifier)	22, 61
	Starting	
	Telnet user interface	34, 42
	Web user interface	35, 104
	Statistics	51, 53
	Status (menu)	46
	ARPCache	57
	BufferUtil	57
	Ports	49, 120
	Software	58
	Summary	46, 119
	System messages	100
T	Telnet user interface	44
	Closing	102
	Starting	34, 42
	Text passages, important	14
	Troubleshooting	164
	Typographical conventions	13
U	Upgrading, firmware	35
	User interface	
	Telnet	44
	Web	103
	XAir Manager	28
	User levels	18, 42, 95
	Passwords	18, 95

User's Guide	
Further documentation	12
Important text passages	14
Typographical conventions	13
W Web user interface	103
Menus	109
Navigating	108
Parameters	109
Passwords	105
Starting	35, 104
WEP	63
Wireless ports	46
Associated clients	54
Configuring	61
Interfaces	61
Name conventions	20
State	52
X XAir	
Adding	32
Basic configuration	33
Bridge	111
Bridge Set 11 Mbps. See Bridge	
Bridge Set 22 Mbps. See Double bridge	
Deleting	32
Finding	30
Information/status	46
Name	59
Rebooting	40, 100
XAir Manager	25
Closing	40
Multicast interface	27
User interface	28