

**User's Guide**  
**bintec R230a / R230aw / R232b / R232bw**  
**Wireless LAN**

**Purpose** This document is part of the user's guide to the installation and configuration of bintec gateways running software release 7.2.10 or later. 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 be found at [www.funkwerk-ec.com](http://www.funkwerk-ec.com).

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**Guidelines and standards** bintec gateways comply with the following guidelines and standards:

R&TTE Directive 1999/5/EG

CE marking for all EU countries and Switzerland

You will find detailed information in the Declarations of Conformity at [www.funkwerk-ec.com](http://www.funkwerk-ec.com).

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# 1 Wireless LAN Menu

The fields of the *WIRELESS LAN* menu are described below.

R232bw Setup Tool	Funkwerk Enterprise Communications GmbH
[WLAN-2-0]: Configure WLAN Interface	MyGateway
Operation Mode	Off
Location	Germany
Channel	11
Wireless Interface >	
Advanced >	
SAVE	CANCEL

The *WIRELESS LAN* menu contains the general settings for the configuration of the gateway as an **▶▶ access point (AP)**.

Wireless LAN (WLAN = Wireless Local Area Network) comprises the setup of a network by means of radio technology.



## Note

Please note that only the gateways **R230aw** and **R232bw** are equipped with radio technology.

## Network functions

WLAN provides the same required network functions as a cabled network, i.e. access to servers, files, printers and mail system as well as the company Internet access. No cabling is required, so that with a WLAN no edificial constraints are to be considered (i.e. location of device is independent of position and number of connections).

## Standard: IEEE 802.11

IEEE 802.11g is presently the primarily used standard for radio-based LANs. This method operates at a frequency of 2,4GHz, which guarantees that buildings are penetrated with the required transmitting power that, however, does not affect health. WLAN transmits indoors and outdoors at a maximum of 100 mW.

802.11b WLANs offer all functions of a cabled network. WLAN systems are free of charge and are not to be registered inbetween 2400 MHz - 2485 MHz.

802.11b is compatible to 802.11g, operating with 2,4 GHz and offering a data transfer rate of 11 Mbps.

The **WIRELESS LAN** menu consists of the following fields:

Field	Description
Operation Mode	Defines, whether the gateway operates as access point ( <i>Access Point</i> ) or not ( <i>Off</i> , default value).
Location	The country setting of the AP. Possible values are all countries preconfigured on the wireless module of the gateway. The range of the optional channels differs according to the country setting selected. Default value is <i>Germany</i> .
Channel	The channel used by the AP. Possible values: <i>1 ... 13</i> . Default value is <i>11</i> (country specific).

Table 1-1: **WIRELESS LAN** menu fields

The menu provides access to the following submenus:

- **WIRELESS INTERFACE**
- **ADVANCED**

## 2 Wireless Interface Submenu

The fields of the *WIRELESS INTERACES* menu are described below.

R232bw Setup Tool		Funkwerk Enterprise Communications GmbH		
[WLAN-2-0] [WIRELESS]: Interface List		MyGateway		
Network Name	Status	Security	MAC-Filter	interface
-----				
*Funkwerk-ec	enable	NONE	disable	vss0
ADD	DELETE	EXIT		

The *WIRELESS LAN* → *WIRELESS INTERFACES* submenu displays a list with already configured wireless interfaces and contains essential settings such as network name, status, security mode etc. The '\*' in front of the *NETWORK NAME* (➤➤ **SSID**) means that the network name is visible on ➤➤ **active probing**.

Each wireless interface (with prefix ➤➤ **vss**) has its own IP settings and can use all standard interface specific features such as QoS, Stateful Inspection, Accounting, Access Lists, NAT etc. This opens a wide range of applications for the WLAN interface.

The bintec WLAN gateway not only offers bridging for wireless connections, but is also fully integrated into the routing environment.

### Securing your WLAN

**Security** As WLAN uses the air as transmission medium, the transferred data can theoretically be intercepted and read by anyone with the respective means. Thus, safeguarding the radio link is to be paid special attention.

**WEP** 802.11 defines the security standard WEP (Wired Equivalent Privacy = data encryption with 40/64 bit (**SECURITY MODE = WEP 40/64**) resp. 104/128 bit (**SECURITY MODE = WEP 104/128**)). The commonly used WEP, however, turned out to be vulnerable. For increased security you have to configure hardware-based encryption (as e.g. 3DES or AES) additionally. Thus even sensitive data can be transferred via the WLAN.

**IEEE 802.11i** The IEEE 802.11i standard for wireless systems comprises security specifications for radio networks especially concerning encryption. The relatively unsecure WEP (Wired Equivalent Privacy) is replaced by WPA (Wi-Fi Protected Access). In addition, the Advanced Encryption Standard (AES) is defined for data encryption. This complies with the Federal Information Processing Standards (FIPS).

**WPA** WPA (Wi-Fi Protected Access) provides enhanced encryption by using the so-called "Temporal Key Integrity Protocol" (TKIP).

WPA offers increased protection by means of dynamic keys, which are based on the Temporal Key Integrity Protocol (TKIP), and offers PSK (Pre-Shared-Keys) or Extensible Authentication Protocol (EAP) via 802.1x for the authentication of users.

The authentication via EAP is normally used in vast Wireless LAN installations, because it requires an authentication server (e.g. a RADIUS server). In smaller networks, mostly for SoHo (Small Office, Home Office), PSK (Pre-Shared-Keys) are normally used. All participants of the Wireless LAN must thus know the PSK, as the session key is generated by means of it.

**Security options** To safeguard the data transferred via WLAN you should if applicable configure the options of the **WIRELESS LAN → WIRELESS INTERFACES** menu:

- Change the default SSID, **NETWORK NAME = Funkwerk-ec**, of your access point.
- Set **WIRELESS INTERFACE → NAME IS VISIBLE = no**. Thus all WLAN clients are refused who try to connect with the common **NETWORK NAME** (SSID) Any and do not know the specified SSIDs.
- Use one of the provided encryption methods by selecting **SECURITY MODE = WEP 40/64, WEP 104/128 or WPA PSK (TKIP)**, and entering the respective



key for the access point into **KEY 1 - 4** resp. **PRESHARED KEY** and for the WLAN clients.

- The WEP key should regularly be changed by modifying the **DEFAULT KEY**. Chose the longer WEP key with 104/128 bits.
- To transfer highly sensitive data it is recommended to select **SECURITY MODE = WPA (TKIP + 802.1x)**. These methods comprise hardware based encryption and RADIUS authentication of the client. In special cases even a combined operation with IPSec is possible.
- Limit the access to the WLAN for allowed clients by entering the MAC addresses of the WLAN cards of these clients into the **MAC FILTER → ACCEPT** list. All other clients are rejected and listed under **REJECT**.

The generation of new wireless interfaces is carried out in **WIRELESS LAN → WIRELESS INTERFACES → ADD**:

R232bw Setup Tool		Funkwerk Enterprise Communications GmbH	
[WLAN-2-0] [EDIT]: Wireless Interface <Funkwerk-ec>		MyGateway	
AdminStatus	enable		
Network Name	Funkwerk-ec		
Name is visible	yes		
Security Mode	NONE		
		SAVE	CANCEL

The adjustment of already configured wireless interfaces is carried out in **WIRELESS LAN → WIRELESS INTERFACES → EDIT**:

R232bw Setup Tool		Funkwerk Enterprise Communications GmbH	
[WLAN-2-0] [WIRELESS] [EDIT]: Wireless Interface		MyGateway	
AdminStatus	enable	Network Name	Funkwerk-ec
Name is visible	yes	Security Mode	NONE
MAC Filter >		IP and Bridging >	
SAVE		CANCEL	

The **WIRELESS LAN** → **WIRELESS INTERFACE** → **EDIT** menu consists of the following fields:

Field	Description
AdminStatus	Defines the administrative status of the wireless interface. Possible values: <ul style="list-style-type: none"> <li>■ <i>enable</i> (default value): enable the interface</li> <li>■ <i>disable</i>: disable the interface</li> </ul>
Network Name	Name of the wireless interface (SSID). Enter an ASCII string of max. 32 characters.
Name is visible	Enable broadcasting of the network name (SSID) of the wireless interface. Possible values: <ul style="list-style-type: none"> <li>■ <i>yes</i> (default value): network name is visible for clients within reach.</li> <li>■ <i>no</i>: network name is hidden for the clients.</li> </ul>

Field	Description
Security Mode	<p>The security mode (encryption and authentication) of the wireless interface.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>NONE</i> (default value): no encryption or authentication</li> <li>■ <i>WEP 40/64</i>: WEP 40Bit</li> <li>■ <i>WEP 104/128</i>: WEP 104Bit</li> <li>■ <i>WPA PSK (TKIP)</i>: WPA Preshared Key</li> <li>■ <i>WPA (TKIP + 802.1x)</i>: 802.11i/TKIP</li> </ul> <p>If <b>SECURITY MODE</b> is set to <i>WPA (TKIP + 802.1x)</i> the following note is displayed: <i>A Radius Server configuration in RADIUS setup is required.</i></p>
Default Key	<p>Only for <b>SECURITY MODE</b> = <i>WEP 40/64</i>, <i>WEP 104/128</i></p> <p>Here you select one of the configured keys in <b>KEY &lt;1 - 4&gt;</b> to be the one used as default key. Default value is <i>Key 1</i>.</p>

Field	Description
Key <1 - 4>	<p>Only for <b>SECURITY MODE = WEP 40/64, WEP 104/128</b></p> <p>Here you enter the WEP key. WEP keys can be entered in three different ways:</p> <ul style="list-style-type: none"> <li>■ Automatic key generation (recommended): Entering any phrase not starting with 0x or " generates a MD5 based WEP phrase with the exact count of digits for the current WEP mode.</li> <li>■ Direct Digit Input in hexadecimal format Starting the key with 0x, disables the generator. Enter the key with the exact count of hexadecimal digits for the selected WEP mode. 10 digits for WEP40 or 26 digits for WEP104. E.g. WEP40: <i>0xA0B23574C5</i>, WEP104: <i>0x81DC9BDB52D04DC20036DBD831</i></li> <li>■ Direct ASCII based input Starting the key with ", disables the generator. Enter a string with the exact count of characters for the selected WEP mode. The phrase ends with ". For WEP40 the phrase must have 5 characters, for WEP104 13 characters. E.g. "hallo" for WEP40 "funkwerk-wep1" for WEP104.</li> </ul>

Field	Description
Preshared Key	Only for <b>SECURITY MODE = WPA PSK (TKIP)</b> Here you enter the WPA passphrase. Enter an ASCII String of 8 - 32 characters.

Table 2-1: **WIRELESS INTERFACES** menu fields

## 2.1 MAC Filter Submenu

The fields of the **MAC FILTER** submenu are described below.

R232bw Setup Tool		Funkwerk Enterprise Communications GmbH	
[WLAN-2-0] [EDIT] [MAC FILTER]: Settings		MyGateway	
AdminStatus	disable		
Accept Address		ADD	
ACCEPT		REJECT	
-----		-----	
Press 'a' to move selected Reject Address to Accept List.			
SAVE	REMOVE	EXIT	REFRESH

In the **WIRELESS LAN → WIRELESS INTERFACES → EDIT → MAC FILTER** submenu, hardware specific access control is configured. Thus it is possible to allow only specific clients to access the access point. This filter is checked before any other security mechanism is activated. The entered addresses are MAC based.

**MAC Address Lists** The **ACCEPT** list displays all MAC addresses to be accepted for the wireless interface.

The **REJECT** list displays all rejected addresses.

Default behaviour: If **ADMINSTATUS** = *disabled*, all clients are accepted. As soon as **ADMINSTATUS** = *enabled* is set and no MAC address is listed in the **ACCEPT** list, all clients are blocked. Only those clients whose MAC addresses are then entered manually into the **ACCEPT** list or are moved from the **REJECT** to the **ACCEPT** list are accepted.

**Additional buttons** The **REFRESH** button reloads the **REJECT** list, so that at any time the current status of rejects can be listed.

With the **REMOVE** button selected addresses can be deleted from the **ACCEPT** list. Removing an address from the **ACCEPT** list immediately disconnects an established link.

The menu consists of the following fields:

Field	Description
AdminStatus	Enable or disable the filter for this wireless interface. Possible values: <i>enable</i> , <i>disable</i> (default value)
Accept Address	Enter a MAC address to be accepted. Possible values: 12 digit MAC addresses; the addresses are entered without any ":". Press <b>ADD</b> to add the entered MAC address to the <b>ACCEPT</b> list. If you highlight an entry from the <b>REJECT</b> list and press <b>a</b> (must be lowercase) on your keyboard, the respective entry is moved to the <b>ACCEPT</b> list. Thus you do not have to manually enter acceptable addresses.

Table 2-2: **MAC FILTER** menu fields

## 2.2 IP and Bridging Submenu

The fields of the **IP AND BRIDGING** submenu are described below.

R232bw Setup Tool		Funkwerk Enterprise Communications GmbH	
[WLAN-2-0] [WIRELESS] [EDIT] [IP CONFIGURATION]: WLAN VSS		MyGateway	
Interface <Funkwerk-ec>			
local Communication		disabled	
Local IP Address			
Local Netmask			
Second Local IP Address			
Second Local Netmask			
Bridging anable		no	
Proxy ARP		no	
SAVE		CANCEL	

In the **WIRELESS LAN → WIRELESS INTERFACES → EDIT → IP AND BRIDGING** submenu you enter the interface specific IP configuration and activate the bridging mode if applicable.

The menu consists of the following fields:

Field	Description
local communication	Allows the communication between the clients, authenticated at this SSID, to e.g. access common shares. Possible values: <i>enabled</i> , <i>disabled</i> (default value)
Local IP Address	Here you assign an IP address to the wireless interface.
Local Netmask	Netmask for <b>LOCAL IP NUMBER</b> .
Second Local IP Address	Here you assign a second IP address to the wireless interface.

Field	Description
Second Local Netmask	Netmask for <b>SECOND LOCAL IP NUMBER</b> .
Bridging enable	<p>Defines the operation mode of the wireless interface.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>no</i> (default value): Routing is enabled on the wireless interface.</li> <li>■ <i>yes</i>: Bridging is enabled on the wireless interface.</li> </ul>
Proxy ARP	<p>Enables the gateway to answer ARP requests from its own LAN acting for a defined WAN partner.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>off</i> (default value)</li> <li>■ <i>on</i>.</li> </ul>

Table 2-3: **IP AND BRIDGING** menu fields



### 3 Advanced Submenu

The fields of the *ADVANCED* menu are described below.

R232bw Setup Tool	Funkwerk Enterprise Communications GmbH
[WLAN-2-0] [ADVANCED]: WLAN Specific Settings	MyGateway
Wireless Mode	802.11 mixed
Maximum Bitrate	AUTO
FOUR-X Burst	off
TX Power (dBm)	18
SAVE	CANCEL

In the *WIRELESS LAN* → *ADVANCED* menu you will find WLAN specific settings. Changes, however, are not necessary in general.

The menu consists of the following fields:

Field	Description
Wireless Mode	<p>Operating mode of the AP.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>802.11g</i>: 54Mbit Clients only</li> <li>■ <i>802.11b</i>: 11Mbit Mode only</li> <li>■ <i>802.11 mixed</i> (default value) / <i>802.11 mixed short</i>: 11Mbit and 54Mbit mixed mode</li> <li>■ <i>802.11 mixed long</i>: 11Mbit and 54Mbit mixed mode with long preamble. This mode is required for clients that only support 1 and 2 mbps. It is also used for Centrino Clients if there are connecting problems.</li> </ul>
Maximum Bitrate	<p>The maximum Bitrate from/to a client.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>AUTO</i> (default value)</li> <li>■ Chose a predefined value in the range of 1 up to 54 Mbit</li> </ul>

Field	Description
FOUR-X Burst	<p>This feature increases the maximum burst time for the transmission to a connected station, thus increasing the throughput in slower WLANs. ( i.e. mixed WLANs with 802.11b und 802.11g clients).</p> <p>FOUR-X Burst has two functions:  It activates Packet Bursting. The resulting data traffic enhancement is applicable with all clients.  It activates Frame Concatenation (i.e. several short data packets are summarized) and ACK emulation. The resulting additional data traffic enhancement is only applicable with TI clients.</p> <p>If FOUR-X Burst is activated, the burst time is set from 0 (= no bursting) to 3ms.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>off</i> (default value): deactivates the function</li> <li>■ <i>on</i>: activates the function.</li> </ul> <p>If problems arise with older WLAN hardware, the field should remain on <i>off</i>.</p>
TX Power (dBm)	<p>TX output from the AP in dBm.</p> <p>Possible values: 6, 9, 12, 15, 18.</p> <p>Default value is 18.</p>

Table 3-1: **ADVANCED** menu fields



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