WIRELESS LAN

bintec User's Guide - R Series
Version 1.0

Purpose

This document is part of the user's guide to the installation and configuration of bintec gateways running software release 7.2.4 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.

Liability

While every effort has been made to ensure the accuracy of all information in this manual, Funkwerk Enterprise Communications GmbH 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, changes and **Release Notes** for bintec gateways can be found at www.funkwerk-ec.com.

As multiprotocol gateways, bintec gateways set up WAN connections in accordance with the system configuration. To prevent unintentional charges accumulating, the operation of the product should be carefully monitored. Funkwerk Enterprise Communications GmbH accepts no liability for loss of data, unintentional connection costs and damages resulting from unsupervised operation of the product.

Trademarks

bintec and the bintec logo are registered trademarks of Funkwerk Enterprise Communications GmbH.

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

Copyright

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

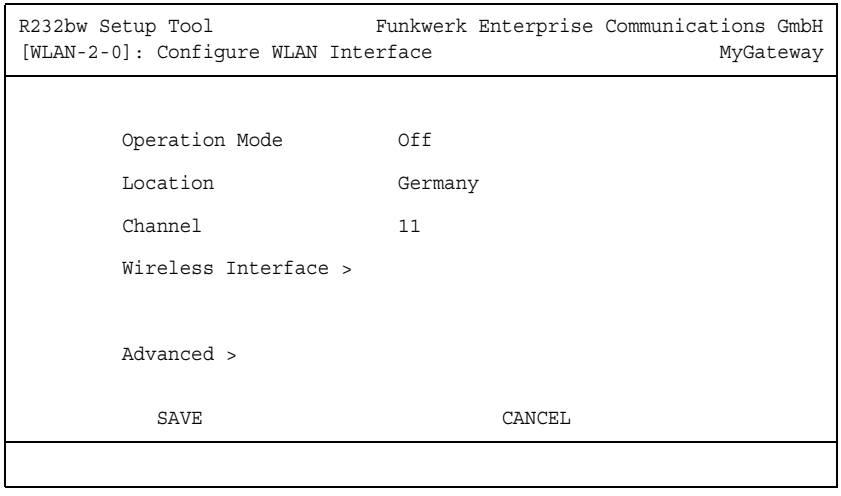
You will find detailed information in the Declarations of Conformity at www.funkwerk-ec.com.

How to reach Funkwerk Enterprise Communications GmbH

Funkwerk Enterprise Communications GmbH Suedwestpark 94 D-90449 Nuremberg Germany Telephone: +49 180 300 9191 0 Fax: +49 180 300 9193 0 Internet: www.funkwerk-ec.com	Bintec 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

1 Wireless LAN Menu

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



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.

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 (*Access Point*) or not (*Off*, 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 *Germany*.
Channel	The channel used by the AP. Possible values: *1* ... *13.* Default value is *11* (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 INTERACE* menu are described below.

```
R232bw Setup Tool              Funkwerk Enterprise Communications GmbH
[WLAN-2-0][WIRELESS]: Interface List                          MyGateway


Index  Network Name  Status   Security  MAC-Filter Cl.#  if
-------------------------------------------------------------------------
   0  *Funkwerk-ec   enable   NONE      disable     16   vss0









     ADD                 DELETE              EXIT
```

The ***WIRELESS LAN*** ➜ ***WIRELESS INTERFACE*** 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 INTERFACE*** 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 encrytion 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 adresses 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*** menu consists of the following fields:

Field	Description
AdminStatus	Defines the administrative status of the wireless interface. Possible values: ■ *enable* (default value): enable the interface ■ *disable*: disable the interface
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: ■ *yes* (default value): network name is visible for clients within reach. ■ *no*: network name is hidden for the clients.

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

Field	Description
Key <1 - 4>	Only for ***SECURITY MODE*** = *WEP 40/64, WEP 104/128* Here you enter the WEP key. WEP keys can be entered in three different ways: ■ Automatic key generation (recommenced): 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. ■ Direct Digit Input in hexadecimal format Starting the key with *0x*, disables the generator. Enter the key with the exact count of hexadeciaml digits for the selected WEP mode. 10 digits for WEP40 or 26 digits for WEP104. E.g. WEP40: *0xA0B23574C5*, WEP104: *0x81DC9BDB52D04DC20036DBD831* ■ 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.

Field	Description
Preshared Key	Only for ***SECURITY MODE*** = *WPA PSK (TKIP)* 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*** ➜ ***MAC FILTER*** submenu, hardware specific acces 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 whos 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: *enable*, *disable* (default value)
Accept Address	Enter a MAC address to be accepted. Possible values: 12 digit MAC addresses; the addresses are entered without any ":". Press **ADD** to add the entered MAC address to the ***ACCEPT*** list. If you highlight an entry from the ***REJECT*** list and press **a** (must be lowercase) on your keyboard, the respective entry is moved to the ***ACCEPT*** 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>


        Mode                    Routing

        local communication     disabled

        Local IP Address
        Local Netmask

        Second Local IP Address
        Second Local Netmask




             SAVE                        CANCEL
```

In the ***WIRELESS LAN*** ➜ ***WIRELESS INTERFACES*** ➜ ***ADD/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
Mode	Defines the operatin mode of the wireless interface. Possible values: ■ *Routing* (default value): Routing is enabled on the wireless interface. ■ *Bridging*: Bridging is enabled on the wireless interface.

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

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

3 Advanced

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	Operating mode of the AP. Possible values: ■ *802.11g*: 54Mbit Clients only ■ *802.11b*: 11Mbit Mode only ■ *802.11 mixed* (default value) / *802.11 mixed short*: 11Mbit and 54Mbit mixed mode ■ *802.11 mixed long*: 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.
Maximum Bitrate	The maximum Bitrate from/to a client. Possible values: ■ *AUTO* (default value) ■ Chose a predefined value in the range of *1* up to *54 Mbit*

Field	Description
FOUR-X Burst	This feature increases the maximum burst time for the transmission to a connected station, thus increasing the throughout in slower WLANs. (d.h. gemischte WLANs, also gleichzeitiger Betrieb mit 802.11b und 802.11g Clients). FOUR-X Burst has two functions: Firstly, it activates Packet Bursting. The resulting data traffic enhancement is applicable with all clients. Secondly, 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. If FOUR-X Burst is activated, the burst time is set from 0 (= no bursting) to 3ms. If problems arise with older WLAN hardware, the field should remain on *off*. Possible values: ■ *off* (default value): deactivates the function ■ *on*: activates the function.
TX Power (dBm)	TX output from the AP in dBm. Possible values: *6, 9, 12, 15, 18.* Default value is *18*.

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

3 Advanced

Index: Wireless LAN