

BWLC

USER MANUAL

1 BWLC Modul

1.1 General

The BWLC-Module works as a wireless Ethernet Client Bridge and is used to connect a device with an Ethernet interface to a wireless network. The BWLC-Module will be mounted into the housings of these Ethernet devices. The connections are made by an RJ45 Ethernet LAN cable. The Ethernet device also has to deliver a power supply with 5V (-+ 10%)

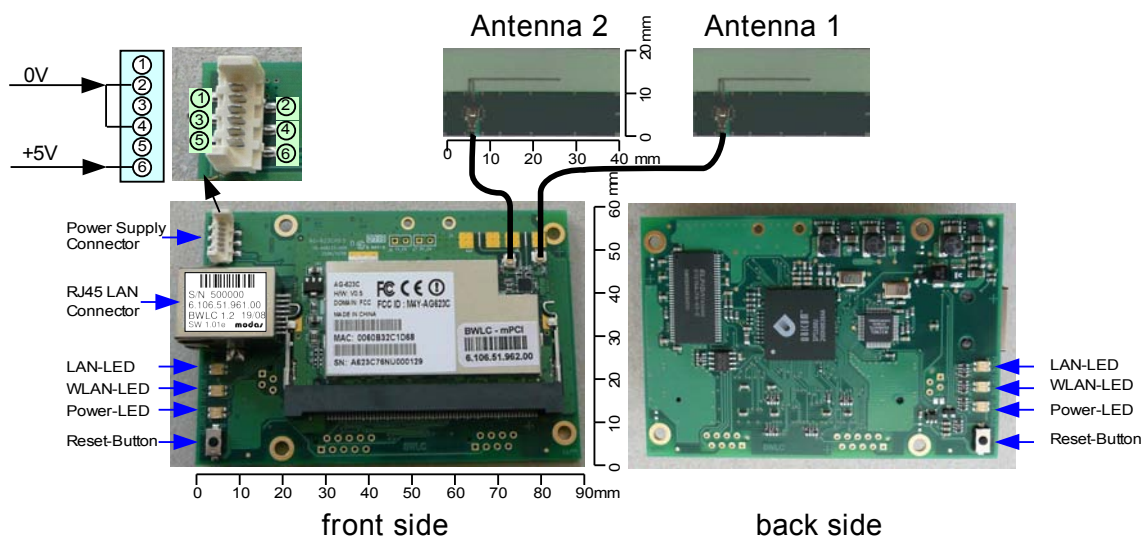


Abbildung 1: BWLC module front and back side

There are 3 LED's at the front side and 3 LED's at the back side which are connected parallel. The 2 pushbuttons are also connected parallel. The LED's are used to show the operation status of the BWLC-Module. Following status information are shown:

LED	LED status	operation status
LAN	off	no connection to Ethernet client
	green	10 Mbit link to Ethernet client
	green + red	100 Mbit link to Ethernet client
	blinking	receive or transmit data traffic
WLAN	off	mPCI module defect
	blinking red	searching for an appropriate WLAN connection
	green	connected to a WLAN accesspoint
	blinking red + green	receive or transmit data traffic
POWER	off	no power supply connected
	green	5V power supply connected
	blinking red + green	blinking red the 0,5 Hz to show that the CPU of the module is working properly.

The reset buttons can be used to restart the BWLC-Module or to reset the configuration to the factory default values. To reset the configuration the user has to push the reset button continuously for 10 seconds. After that time the BWLC-Module will restart with the factory default configuration.

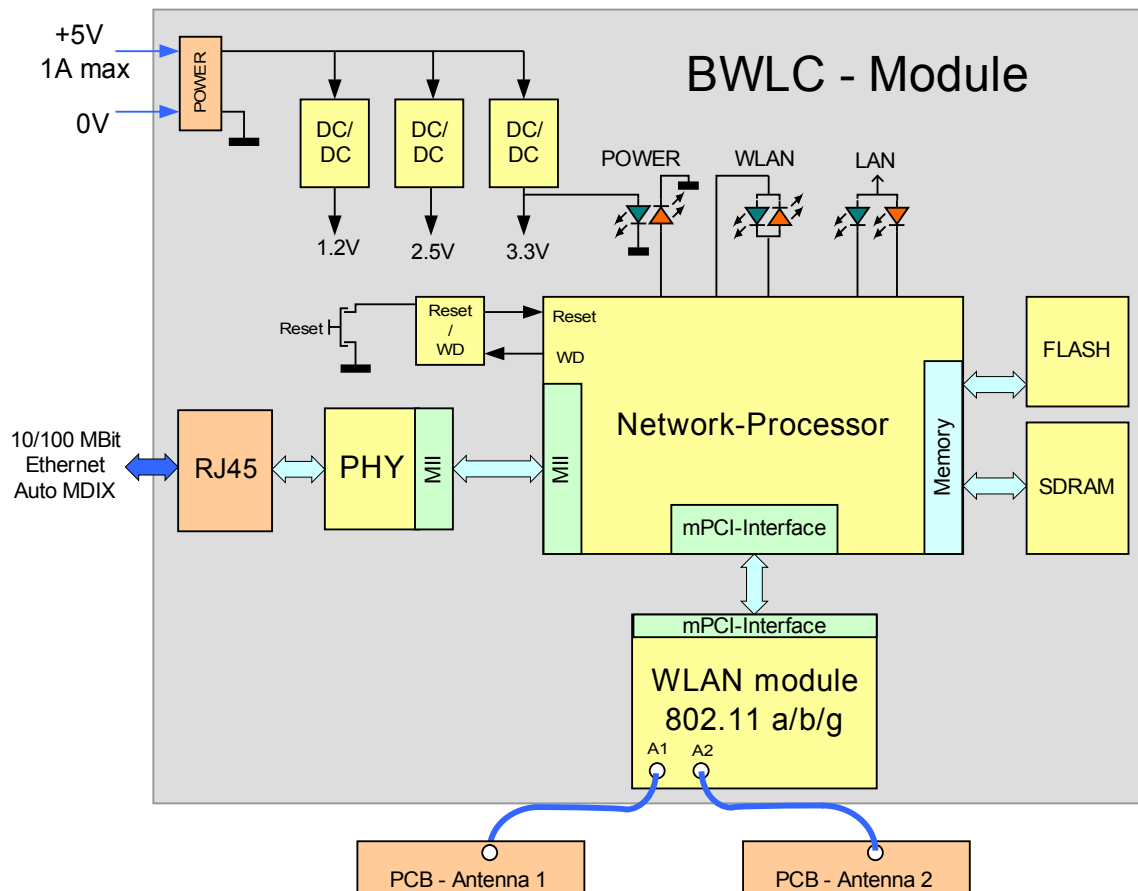


Figure 1: Block diagramm of the BWLC-Module

Power Supply Connection

The power supply is connected via an 6 pin plug.

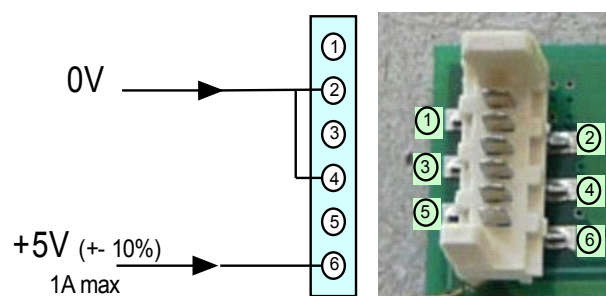


Figure 2: Power Supply Connection

The connector is of the following type:

Manufacturer: Molex

System: Picoflex

Order number: 90814-0906

1.2 Technical Data

General technology	BWLC (=> product name for Bizerba Wireless LAN Client) The BWLC module provides wireless LAN connections with up to 108 Mbit/s via the standards IEEE802.11a or IEEE802.11b/g. It is composed of: BWLC panel + WLAN mPCI card
Antenna	2 IF antenna Panel antenna with suitable U.FL antenna cable
Data transmission rate	IEEE802.11b: 11Mbps / 2.4 GHz, DSSS-Modulation IEEE802.11g: 54Mbps / 2.4 GHz, OFDM-Modulation IEEE802.11a: 54Mbps / 5 GHz, OFDM-Modulation
Protocol	IEEE802.11a/b/g
Firmware	There is only one firmware version for all countries (it is adapted via the country selection in the menu)
Client devices	Client devices have to be equipped with an Ethernet connection.
BWLC module operating type	The BWLC module in the Ethernet device has to be operated in Ethernet Client mode. Only one wired Ethernet end device may be connected to the module.
Encryption:	The following encryptions are available with BWLC: <ul style="list-style-type: none"> - no encryption - WEP 40 (64) /128 Bit - WPA-PSK/TKIP, (WPA1 without Enterprise) - WPA-PSK/AES CCMP, (WPA2 without Enterprise)
Authentication	IEEE802.11i (Personal (WPA, WPA2), IEEE802.1x (LEAP, EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAP v2)
Ad-Hoc mode	Ad-Hoc operation with the BWLC module is only supported in IEEE802.11b and IEEE802.11g Mode! In IEEE802.11a Mode the Ad-Hoc operation is not supported.
Ethernet connection BWLC module	The Ethernet connection of the BWLC module is identified via auto MDI/MDIX. It therefore makes no difference whether a patch or a crossover Ethernet cable is used.
Power Supply	Voltage: min 4,5V, max. 5.5V Current: max 1A

Environment Specification	
Operating	-10 ~ 50°C
Storage	-20 ~ 80°C
humidity	5 ~ 90% (non-condensating)
Interconnection of equipment	
Types of interconnection circuits	Interconnection circuits of SELV through the connectors




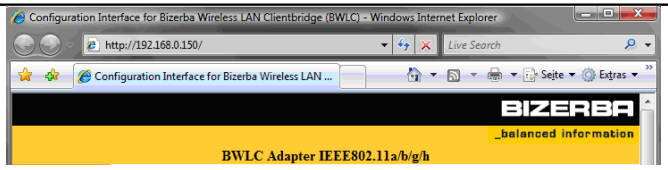
- The BWLC module should only be used within a building.
- The connecting cables should never be installed outdoors.

2 Configuration

The module can be addressed and configured via the wired Ethernet interface and also via the wireless interface. Two options are available:

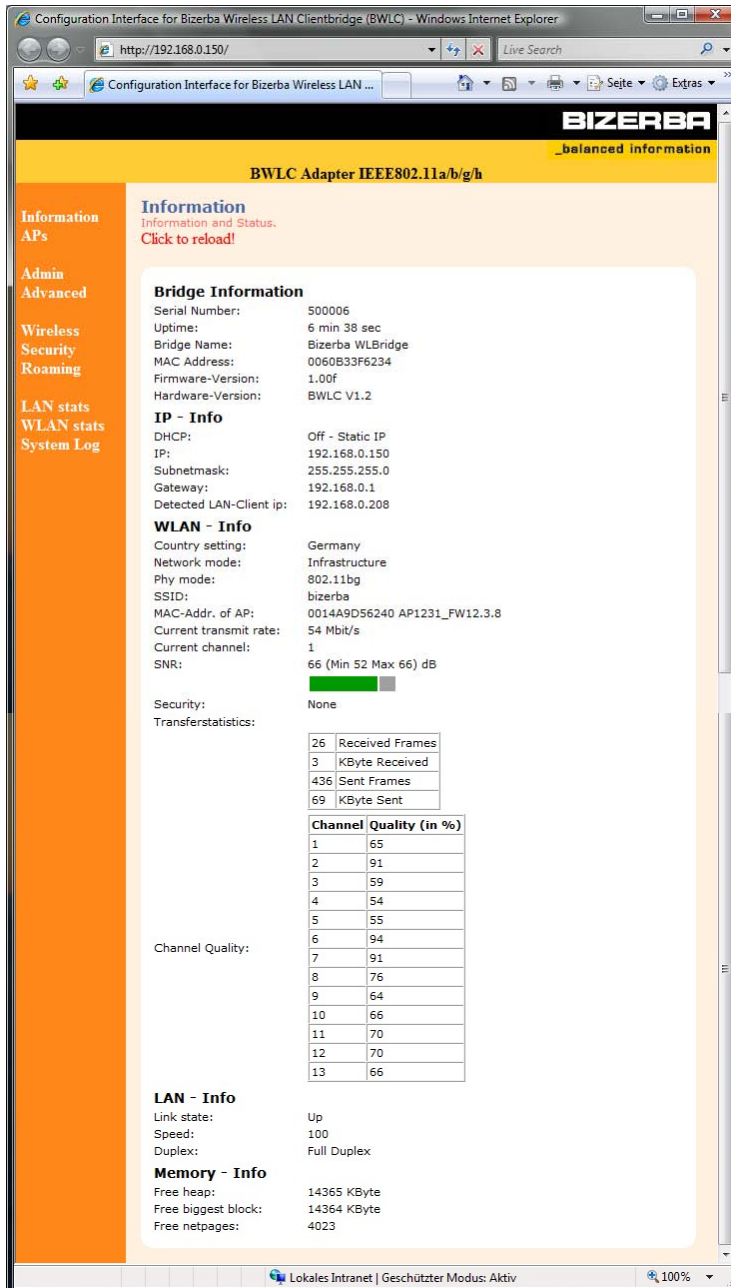
- WEB Browser (e.g. Internet Explorer Version ≥ 5.5)
- Configuration tool (ESCG_Config version ≥ 3.21)

Access to the BWLC module

ESCG configuration tool ESCG_Config (current version V3.21)	Web browser (e.g. Internet Explorer version ≥ 5.5)
Using this you can display the available BWLC modules (see note)	The BWLC module is actually configured via the Web browser
Start via ESCG_Config.exe	Start via IP address of BWLC module Default IP address: 192.168.0.150
	
The "Web" button opens a Web browser with the corresponding BWLC IP address. (only if the computer is located in the same network segment as the BWLC module)	Via the IP address of the BWLC module (standard IP address: 192.168.0.150) the homepage of the BWLC module is accessed.
<p>Note:</p> <ul style="list-style-type: none"> - If the computer (on which the ESCG_Config tool runs) is connected to the BWLC module directly via a wire Ethernet connection, you will only see the BWLC module that is directly connected. <p>If the ESCG_Config-tool is accessed from a central location (i.g. via an AP) subsequently all the modules that are in reach are displayed</p>	<p>Note:</p> <p>In a special configuration, this is achieved via the IP address of the connected device + port address (default 2153).</p>

2.1 Main menu item - Information

Basic information on the module is displayed here.



BWLC Adapter IEEE802.11a/b/g/h

Information
Information and Status.
Click to reload!

Bridge Information

Serial Number: 500006
Uptime: 6 min 38 sec
Bridge Name: Bizerba WLBridge
MAC Address: 0060B3F6234
Firmware-Version: 1.00f
Hardware-Version: BWLC V1.2

IP - Info

DHCP: Off - Static IP
IP: 192.168.0.150
Subnetmask: 255.255.255.0
Gateway: 192.168.0.1
Detected LAN-Client ip: 192.168.0.208

WLAN - Info

Country setting: Germany
Network mode: Infrastructure
Phy mode: 802.11bg
SSID: bizerba
MAC-Addr. of AP: 0014A9D56240 AP1231_FW12.3.8
Current transmit rate: 54 Mbit/s
Current channel: 1
SNR: 66 (Min 52 Max 66) dB

Security: None

Transferstatistics:

26	Received Frames
3	KByte Received
436	Sent Frames
69	KByte Sent

Channel Quality (in %)

1	65
2	91
3	59
4	54
5	55
6	94
7	91
8	76
9	64
10	66
11	70
12	70
13	66

LAN - Info

Link state: Up
Speed: 100
Duplex: Full Duplex

Memory - Info

Free heap: 14365 KByte
Free biggest block: 14364 KByte
Free netpages: 4023

The following information is relevant in assessing the strength of the wireless signal being received:

- SNR
- Current channel
- Channel quality

BWLC Bridge information

BWLC Network settings

BWLC Wireless settings

SNR:(Signal Noise Ration).

Ratio of wanted signal strength to noise.

I.e. the greater the value, the easier it is to assess the wireless signal.

The value should be ≥ 30 dB.

Current channel:

The channel used by the module (frequency band)

(only information, as this is determined by the AP)

This is required to assess channel quality

Channel quality:

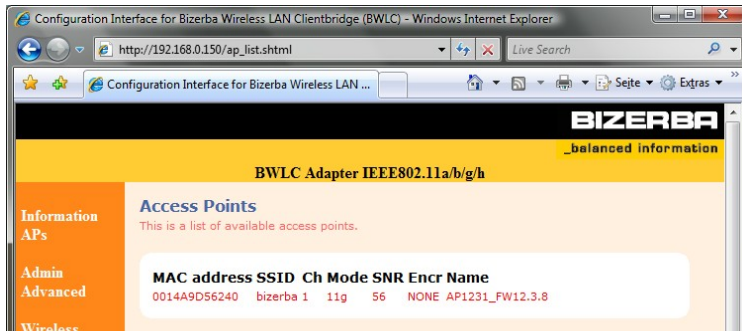
The BWLC module regularly scans the used ISM band. The value specifies the current quality of the signal.

100% corresponds to a completely free channel.

At ≥ 60 % performance can be expected to be normal.

At values of ≤ 30 % regular data traffic can hardly be expected.

2.2 Main menu item - APs



This is where the Access Points that can be detected by the BWLC module are listed.

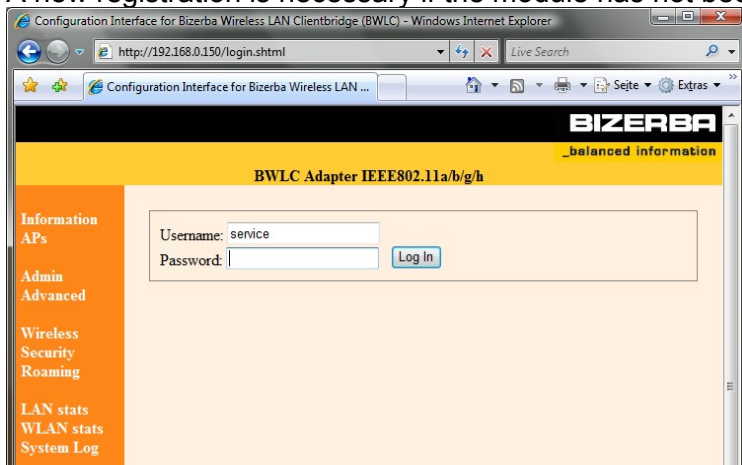
The Access Point currently used by the BWLC module is listed in red.

2.3 Configure the BWLC

With the exception of the main menu items [Information] and [AP], all other access points require authorization

2.3.1 BWLC log-in dialog user name/password

(=> [Admin], [Advanced], [Wireless], [Security], [Roaming], [LAN stats], [WLAN stats] and [System Log]). A new registration is necessary if the module has not been accessed for a while (several minutes).



Default:
Username: service
Password: bizerba

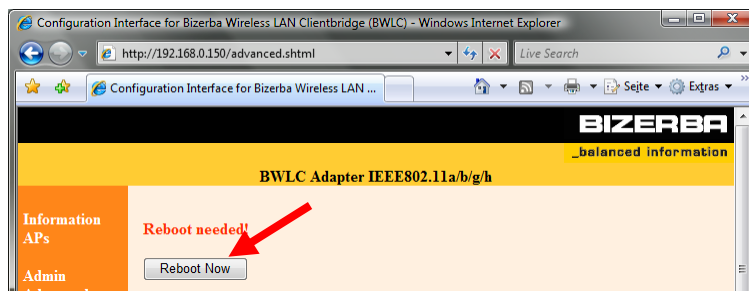
2.3.2 Parameter changes

If parameters in the BWLC module are changed, the following procedure should generally be followed:

- Change desired parameter via main menu item
- Press the "Send" button (bottom left of each Change mask) to have changes applied.

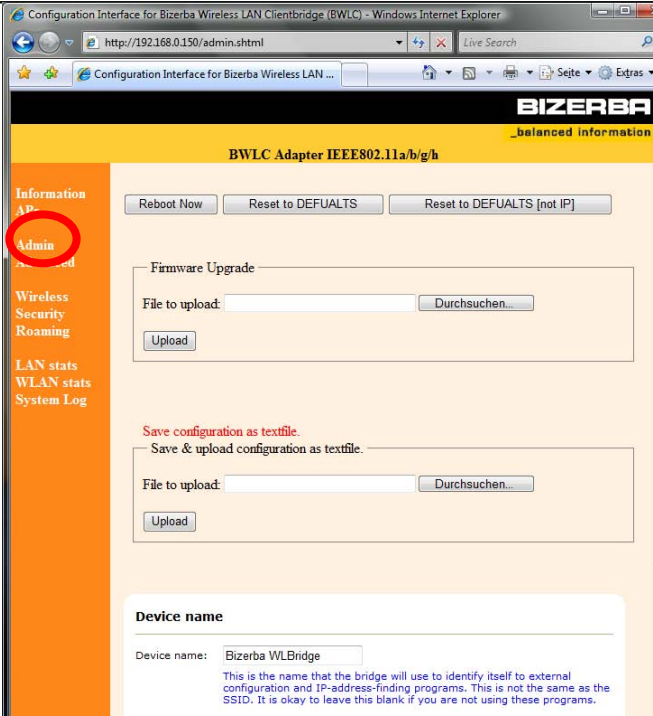


- Subsequently press the displayed "Reboot now" button to activate the changes. (This button appears automatically once the "Send" button has been pressed.



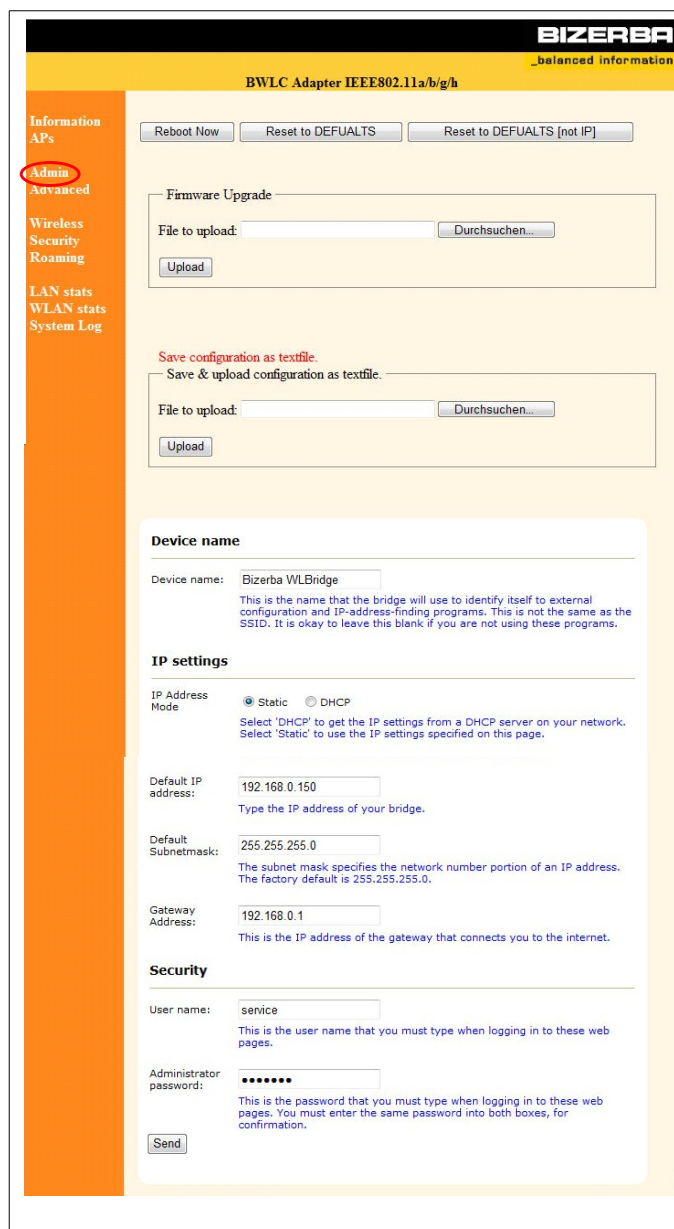
After the reboot, the parameters you changed are active.

2.3.3 Configuration - Admin

Factory Default (Press Reset button on the activated module for about 10 seconds)	IP address 192.168.0.150 Subnet mask 255.255.255.0
Press the Reset button briefly	Immediate reboot
Configuration sequence	<ol style="list-style-type: none"> 1. Perform firmware update if necessary (if required, save configuration) 2. Configuration of the WLAN parameters (SSID, Security, ...) 3. Configure network information (IP add., SubNet mask)
	Main menu item [Admin] <u>Reboot / Reset / Reboot /Reset to Defaults</u> Three buttons are displayed in the top row. Reboot Now: Switch module off/on without Change configuration parameters Reset to defaults: Reset all configuration parameters to default values Reset to defaults (not IP): Configuration parameters to default values, but not IP address. 2.3.3.1 Firmware upgrade Execute a firmware upgrade as follows: <ul style="list-style-type: none"> - Save configuration as required - Save new firmware version on computer - Firmware upgrade button [Search ...] - Select the firmware file - Press the [Upload] button. <ul style="list-style-type: none"> o Read instructions/information o The firmware update takes only a few seconds including an automatic reboot.
2.3.3.2 Save/load configuration The BWLC module configuration can be saved and reimported.	
Saving the configuration (text file):	<u>Apply configuration to the BWLC module</u>

- | | |
|--|---|
| <ul style="list-style-type: none"> - Select the link, "Save configuration as text file". (In red font.) - Press "Save" button - Adjust file names and target directory <ul style="list-style-type: none"> o Standard filenames correspond to the following syntax:
BWLC_Config_[IP addr. of Ethernet device].cfg | <ul style="list-style-type: none"> - Select the link, "Save & upload configuration as text file." - Press [Search ...] button - Select the configuration file from the respective directory - Press the [Upload] button. <ul style="list-style-type: none"> o Read instructions/information o The firmware update only takes a few seconds including automatic reboot. |
|--|---|

It is possible to upload an archived configuration to a different BWLC module.
Module name, IP address have to be adapted to suit the respective module.



The screenshot shows the BIZERBA web interface for a BWLC Adapter. The left sidebar contains a menu with 'Admin' highlighted. The main content area shows the 'Firmware Upgrade' section with a 'File to upload' field and a 'Durchsuchen...' button. Below this is the 'Save configuration as textfile' section, also with a 'File to upload' field and a 'Durchsuchen...' button. The 'Device name' section shows 'Bizerba WLBridge' as the device name. The 'IP settings' section shows 'Static' as the IP Address Mode, with fields for Default IP address (192.168.0.150), Default Subnetmask (255.255.255.0), and Gateway Address (192.168.0.1). The 'Security' section shows 'service' as the User name and a masked password for the Administrator password. A 'Send' button is at the bottom.

IP settings

2.3.3.1 Configuration of general network information

Wired network parameters are set as follows:

- Select DHCP or static IP address
- If a static IP address is used, the IP address, subnet mask and gateway need to be adjusted to suit the respective customer specifications.
- Press the "Send" button

Security

2.3.3.2 Change BWLC module log-in data

User name and administrator password for the BWLC module can be changed here.

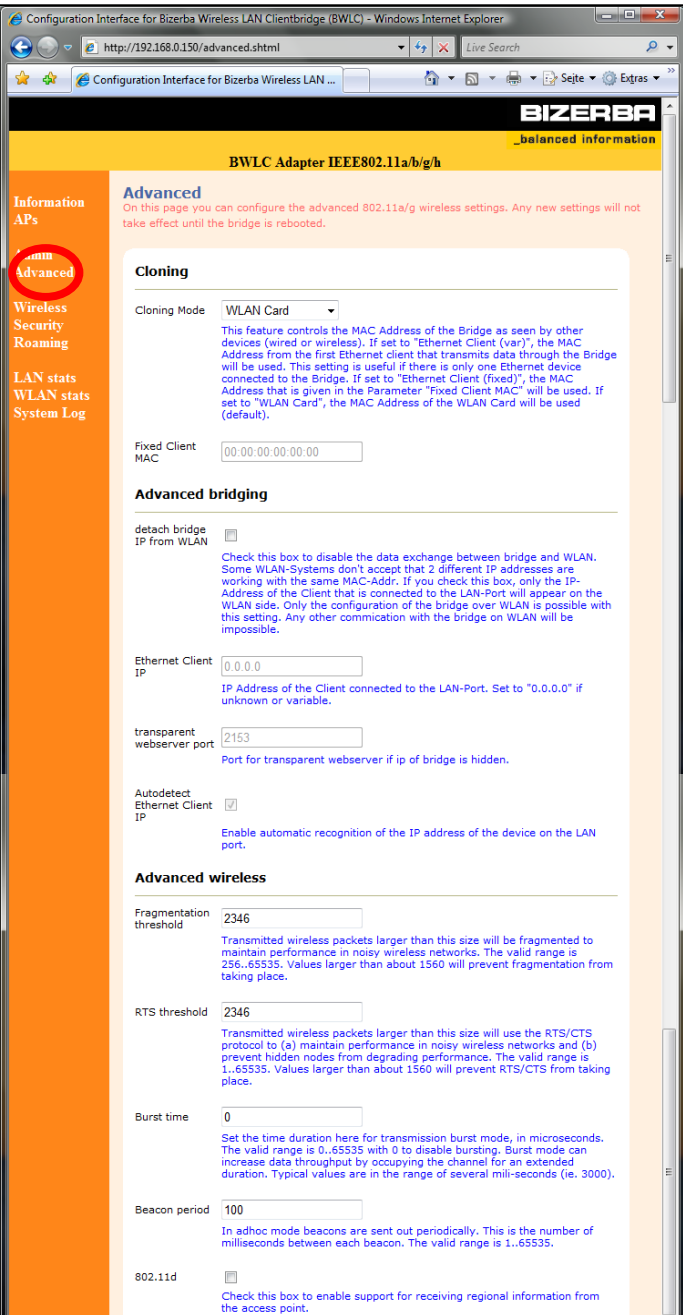
Press the "Send" button once you have made the change.

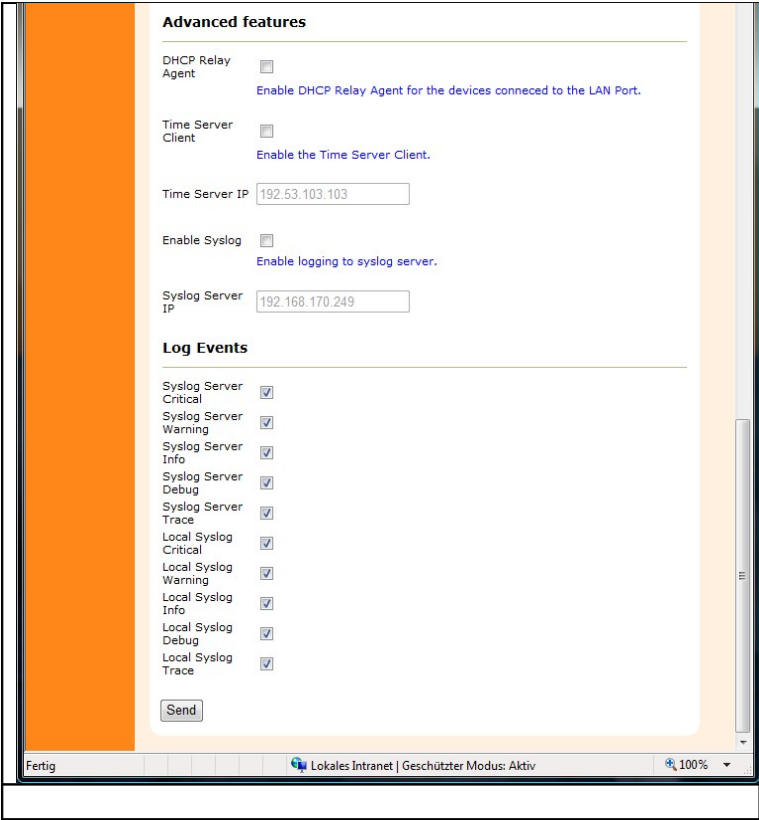
Once all the parameters in this main menu item have been set, press the "Send" button to have the data applied to the BWLC module.
(Subsequently press the "Reboot now" button that is displayed to have the changes activated.)

2.3.4 Configuration - Advanced

Advanced settings can be made in this menu item, including:

- MAC address for the BWLC module (cloning mode)
- Reveal/Hide BWLC IP address in WLAN
- Advanced wireless settings (package fragmentation, beacon specification for AdHoc operation)
- Synchronization via time server, event output to Syslog server and respective settings

	<p>Cloning</p> <p>2.3.4.1 MAC address for BWLC module</p> <p>Setting the MAC address you want to use</p> <ul style="list-style-type: none"> - The following items can be selected in the "Cloning Mode" selection menu: <ul style="list-style-type: none"> o WLAN Card: Using the MAC address for the BWLC module o Ethernet Client: Using the MAC address of the Ethernet device o Fixed Client MAC: Manual allocation of a MAC address - Press the "Send" button <p>2.3.4.2 Advanced bridging</p> <p>2.3.4.3 Reveal/Hide BWLC IP address in WLAN</p> <p>Property is activated = BWLC module can no longer be addressed via its own IP address in WLAN.</p> <p>A WLAN configuration is possible whereby the module uses a different IP address and port no. As standard, the BWLC module automatically uses (0.0.0.0) the IP address of the connected Ethernet device, with port no. 2153.</p> <ul style="list-style-type: none"> - Enable parameter "Detach bridge IP from WLAN": General switch for advanced bridging. This hides the IP address of the BWLC module in the WLAN - Parameter: "transparent webserver port": Provision of the port no. via which the BWLC menu is addressed by means of a Web browser. - Enable the "Autodetect Ethernet Client IP" parameter: This enables the BWLC module to use the IP address of the device that is connected via a wired connection - Press the "Send" button <p>It is imperative that the following address is entered in the Web browser: http://[IP addr.]:[Port no.]</p> <p>Example: The module uses the IP address of the Ethernet device 192.168.0.20 in order to access via WLAN; subsequently the Web browser address with port number 2153 is as follows:</p>
<p>Once all parameters have been set in this main menu item, press the "Send" button to have the data applied to the BWLC module. (Subsequently press the "Reset" button that is displayed to have the changes activated.)</p>	

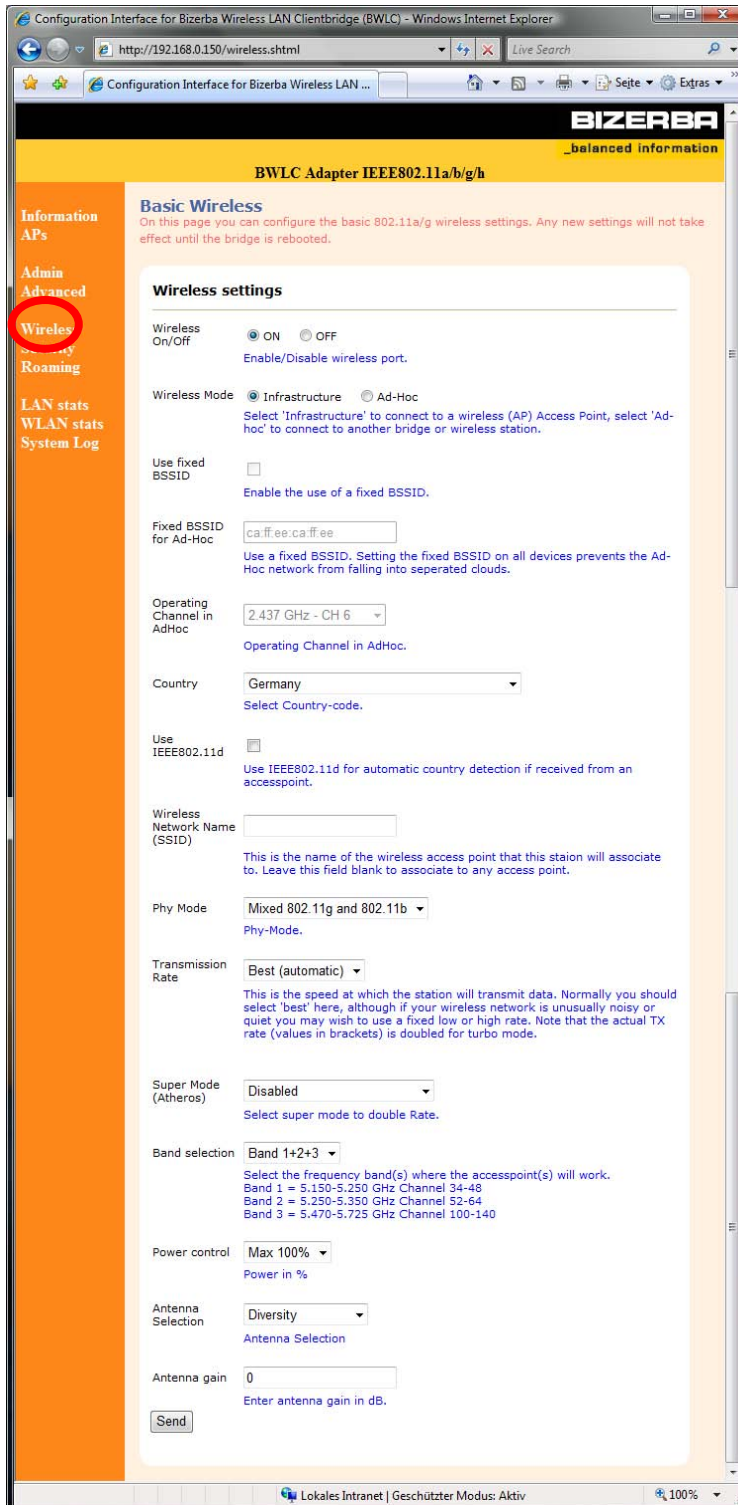


2.3.4.4 Advanced features
These settings should be set to default or disable.

2.3.5 Main menu item - Wireless

In this menu item, general wireless settings are carried out, including:

- Infrastructure / Ad-Hoc Mode
- Country setting
- SSID
- 802.11a/b/g specifications



Configuration Interface for Bizerba Wireless LAN Clientbridge (BWLC) - Windows Internet Explorer

http://192.168.0.150/wireless.shtml

BIZERBA
_balanced information

BWLC Adapter IEEE802.11a/b/g/h

Information
APs
Admin
Advanced
Wireless
Security
Roaming
LAN stats
WLAN stats
System Log

Basic Wireless
On this page you can configure the basic 802.11a/g wireless settings. Any new settings will not take effect until the bridge is rebooted.

Wireless settings

Wireless On/Off: ☒ ON ☐ OFF
Enable/Disable wireless port.

Wireless Mode: ☒ Infrastructure ☐ Ad-Hoc
Select 'Infrastructure' to connect to a wireless (AP) Access Point, select 'Ad-hoc' to connect to another bridge or wireless station.

Use fixed BSSID: ☐
Enable the use of a fixed BSSID.

Fixed BSSID for Ad-Hoc:
Use a fixed BSSID. Setting the fixed BSSID on all devices prevents the Ad-Hoc network from falling into separated clouds.

Operating Channel in AdHoc: 2.437 GHz - CH 6
Operating Channel in AdHoc.

Country: Germany
Select Country-code.

Use IEEE802.11d: ☐
Use IEEE802.11d for automatic country detection if received from an accesspoint.

Wireless Network Name (SSID):
This is the name of the wireless access point that this station will associate to. Leave this field blank to associate to any access point.

Phy Mode: Mixed 802.11g and 802.11b
Phy-Mode.

Transmission Rate: Best (automatic)
This is the speed at which the station will transmit data. Normally you should select 'best' here, although if your wireless network is unusually noisy or quiet you may wish to use a fixed low or high rate. Note that the actual TX rate (values in brackets) is doubled for turbo mode.

Super Mode (Atheros): Disabled
Select super mode to double Rate.

Band selection: Band 1+2+3
Select the frequency band(s) where the accesspoint(s) will work.
Band 1 = 5.150-5.250 GHz Channel 34-48
Band 2 = 5.250-5.350 GHz Channel 52-64
Band 3 = 5.470-5.725 GHz Channel 100-140

Power control: Max 100%
Power in %

Antenna Selection: Diversity
Antenna Selection

Antenna gain: 0
Enter antenna gain in dB.

Lokales Intranet | Geschützter Modus: Aktiv

Wireless settings

Wireless On/Off

General wireless switch

Wireless Mode

- **Infrastructure:**
Selection for communication via Access Point
- **Ad-Hoc:**
Selection for communication that is not via Access Point.
Note: Ad-Hoc is only available when "Phy Mode" is set to 802.11b (and/or) g .

Country setting

- Selection of the country in which the device is used

Use IEEE802.11d

- Selection when country-specific information is sent by the AP

Wireless Network Name - SSID

SSID (Service Set Identifier) - network ID used by the BWLC module at the Access Point or in an AdHoc network. The communication partner has to have an identical SSID.

Phy Mode - Configuration IEEE802.11a/b/g

Allocation of the utilized IEEE802.11 b and/or g or a standard. The communication partner must have exactly the same set standard.

- Selection of the utilized standard(s):

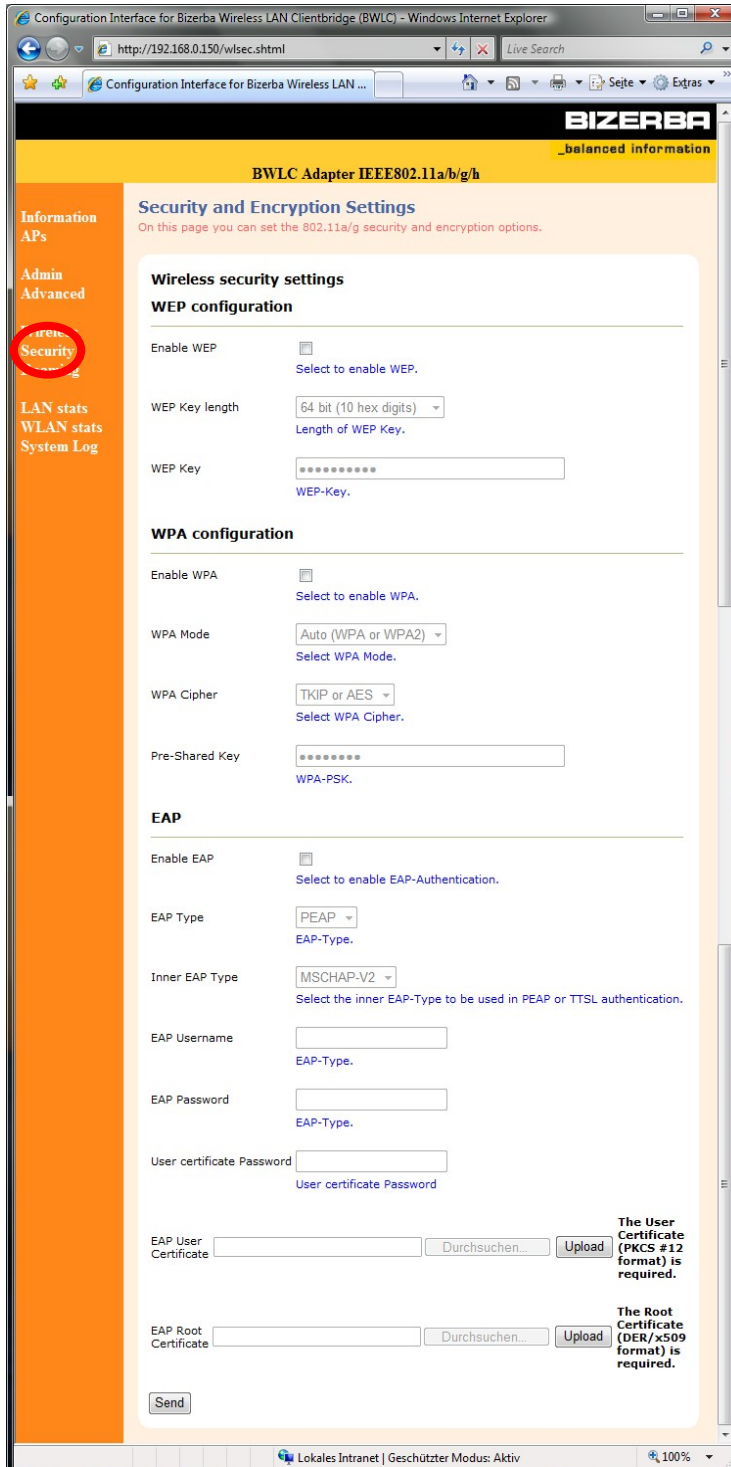
Phy Mode	Mixed 802.11g and 802.11b
	802.11b only
	802.11g only
	Mixed 802.11g and 802.11b
Transmission Rate	802.11a only

Once all parameters have been set in this main menu item, press the "Send" button to have the data applied to the BWLC module.
(Subsequently press the "Reset" button that is displayed to activate the changes.)

2.3.6 Main menu item - Security

The following security settings are made in this menu item:

- WEP
- WPA
- EAP



BIZERBA
_balanced information

BWLC Adapter IEEE802.11a/b/g/h

Security and Encryption Settings
On this page you can set the 802.11a/g security and encryption options.

Wireless security settings

WEP configuration

Enable WEP ☐ [Select to enable WEP.](#)

WEP Key length [Length of WEP Key.](#)

WEP Key [WEP-Key.](#)

WPA configuration

Enable WPA ☐ [Select to enable WPA.](#)

WPA Mode [Select WPA Mode.](#)

WPA Cipher [Select WPA Cipher.](#)

Pre-Shared Key [WPA-PSK.](#)

EAP

Enable EAP ☐ [Select to enable EAP-Authentication.](#)

EAP Type [EAP-Type.](#)

Inner EAP Type [Select the inner EAP-Type to be used in PEAP or TTSL authentication.](#)

EAP Username [EAP-Type.](#)

EAP Password [EAP-Type.](#)

User certificate Password [User certificate Password](#)

EAP User Certificate [Durchsuchen...](#) [Upload](#) **The User Certificate (PKCS #12 format) is required.**

EAP Root Certificate [Durchsuchen...](#) [Upload](#) **The Root Certificate (DER/x509 format) is required.**

[Send](#)

WEP configuration

WEP Key
Always specified in hex values

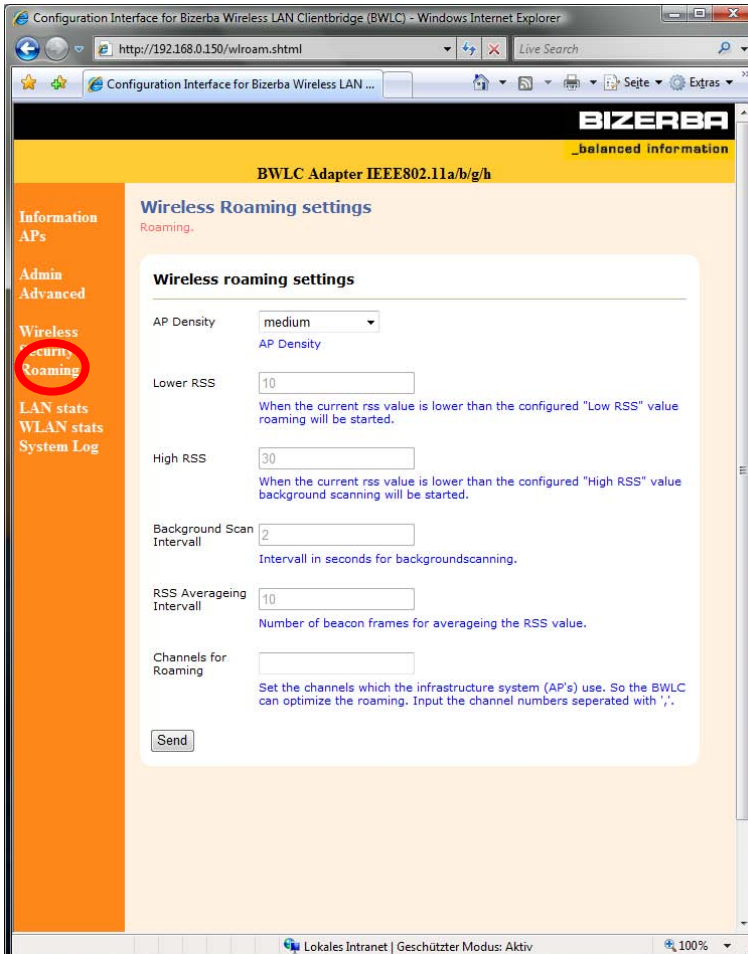
WPA configuration

Pre-Shared Key
Values are entered between 8 and 63 characters (no hex)

Once all parameters have been set in this main menu item, press the "Send" button to have the data applied to the BWLC module.
(Subsequently press the "Reboot now" button that is displayed to activate the changes.)

2.3.7 Main menu item - Roaming

In this menu item you can specify roaming properties for the BWLC module.



The screenshot shows the 'Configuration Interface for Bizerba Wireless LAN Clientbridge (BWLC)' in a Windows Internet Explorer browser. The address bar shows 'http://192.168.0.150/wlroam.shtml'. The page title is 'BIZERBA _balanced information'. The main heading is 'BWLC Adapter IEEE802.11a/b/g/h'. The left sidebar contains a menu with 'Information', 'APs', 'Admin', 'Advanced', 'Wireless', 'Security', 'Roaming' (highlighted with a red circle), 'LAN stats', 'WLAN stats', and 'System Log'. The main content area is titled 'Wireless Roaming settings' and contains the following settings:

- AP Density: medium (dropdown menu)
- Lower RSS: 10 (text input field)
- High RSS: 30 (text input field)
- Background Scan Interval: 2 (text input field)
- RSS Averaging Interval: 10 (text input field)
- Channels for Roaming: (empty text input field)

Each setting has a description below it. At the bottom of the settings area is a 'Send' button.

Wireless roaming settings

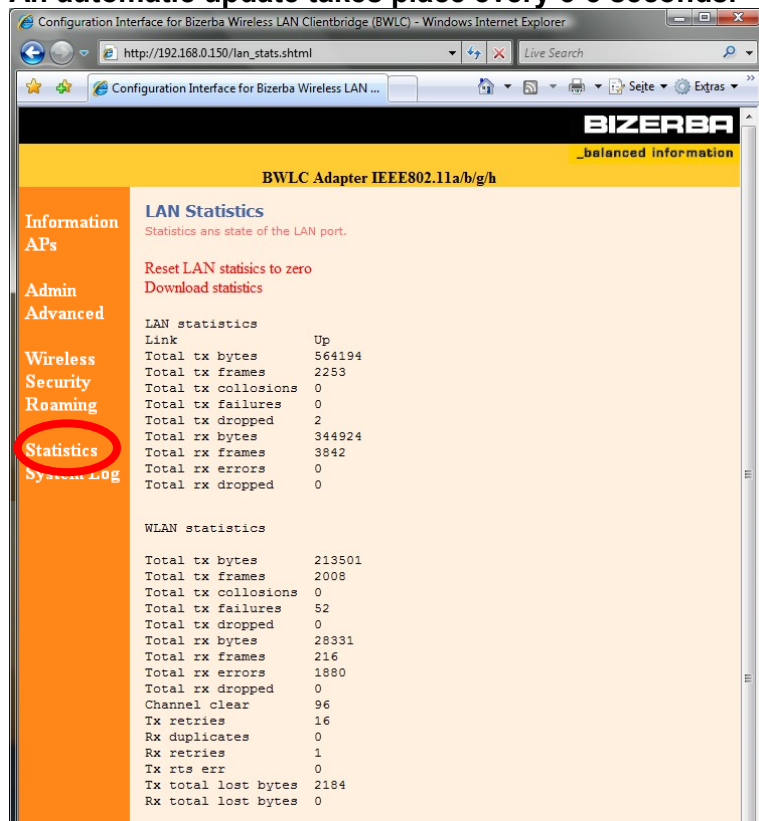
These settings should be set to default or disable.

Once all parameters have been set in this main menu item, press the "Send" button to have the data applied to the BWLC module.
(Subsequently press the "Reboot now" button that is displayed to activate the changes.)

2.3.8 Main menu item - Statistics

In this menu item, statistics can be output via the wired Ethernet and wireless side of the BWLC module.

An automatic update takes place every 3-5 seconds.



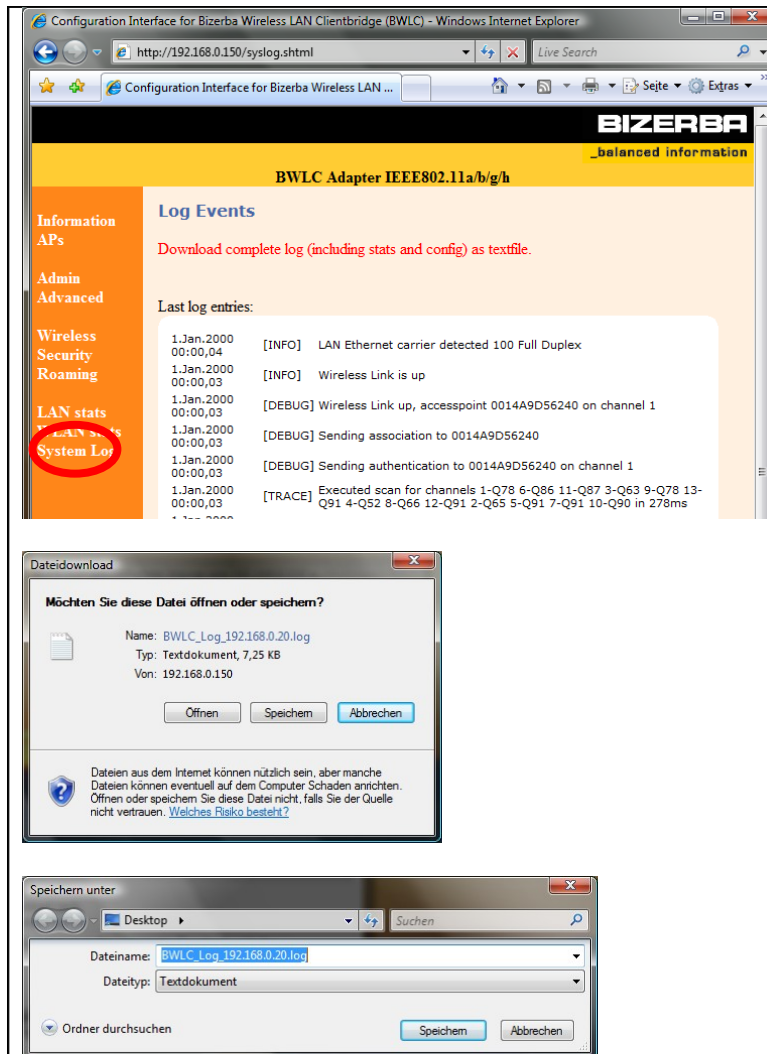
The screenshot shows the Bizerba BWLC Configuration Interface in a web browser. The left sidebar contains a menu with the following items: Information APs, Admin, Advanced, Wireless, Security, Roaming, **Statistics** (highlighted with a red circle), and System Log. The main content area displays the LAN Statistics for the BWLC Adapter IEEE802.11a/b/g/h. It includes a title bar, a subtitle, and two sections: LAN statistics and WLAN statistics. The LAN statistics section includes a link to reset statistics to zero and a download statistics button. The WLAN statistics section includes a link to reset statistics to zero and a download statistics button.

LAN statistics	
Link	Up
Total tx bytes	564194
Total tx frames	2253
Total tx collisions	0
Total tx failures	0
Total tx dropped	2
Total rx bytes	344924
Total rx frames	3842
Total rx errors	0
Total rx dropped	0

WLAN statistics	
Total tx bytes	213501
Total tx frames	2008
Total tx collisions	0
Total tx failures	52
Total tx dropped	0
Total rx bytes	28331
Total rx frames	216
Total rx errors	1880
Total rx dropped	0
Channel clear	96
Tx retries	16
Rx duplicates	0
Rx retries	1
Tx rts err	0
Tx total lost bytes	2184
Rx total lost bytes	0

2.3.9 Main menu item - System Log

In this menu item up to 50 event entries are displayed for the BWLC module. Use the F5 function key on the keyboard to refresh the page. Set which events are out put to the main menu item [Advanced] - "Log events" section.



Saving the system log file

- Link „Download complete log (including stats and config) as textfile.“ (In red font.)
- Press "Save" button
 - Adjust file names and target directory
 - Standard filenames correspond to the following syntax:
BWLC_Config_[IP addr. of Ethernet device].log
The IP addr. of the Ethernet device is used to enable allocation to the respective BWLC module to take place automatically.

The System Log file is in text form.

The log file is saved for service purposes. As well as event entries that have taken place since the last (re)boot (max. 10000), additional information is included here such as LAN/WLAN statistic values, ASCII-printable values from the main menu item [Information], previous switch-on times, currently visible wireless networks and the complete configuration of the BWLC module.

Statements and instructions according to FCC and Industry Canada Rules

1. Information for host integrators of the radio module

CAUTION:

Host integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral etc.). In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances the host integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

1.1 Labelling instructions for host devices

The FCC and IC ID are permanently fixed on a label on the module, and, if the identification numbers are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

"Contains Transmitter Module FCC ID: V98-BWLC-V1

"Contains Transmitter Module IC: 7821A-BWLCV1"

Any similar wording that expresses the same meaning may be used

Additionally the two part statement must be fixed on the host device:

"This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."

1.2 RF Exposure / collocation requirements

The fixed external antennas used for this mobile transmitter must provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

1.3 Information to end user

End users may not be provided with the module installation instructions.

For information to users, all relevant instructions that pertain to all components of a composite device are required. For example, Class A or Class B statements in Section 15.105; all warning statements and special instructions as required by Sections 15.21 and 15.27; and all Part 18 applicable instructions / attestations must be clearly stated. However, realistic variations in editing to clarify the language and structure are permitted as long as all the relevant points applicable to all of the components are represented.

2. FCC and Industry Canada warning statements and special instructions

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a **Class B digital device**, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

If the device is going to operated in 5.15 – 5.25 GHz frequency range, then is restricted in indoor environment only.

Note: High power radars are allocated as primary users of the bands 5.25 – 5.35 and 5.65 – 5.85 MHz and these radars could cause interference and/or damage to Wireless - LAN devices.