LOHU 5158P Extreme

Long Range Outdoor Wireless Bridge

User Manual
Version 2.4

LohuisNetworks

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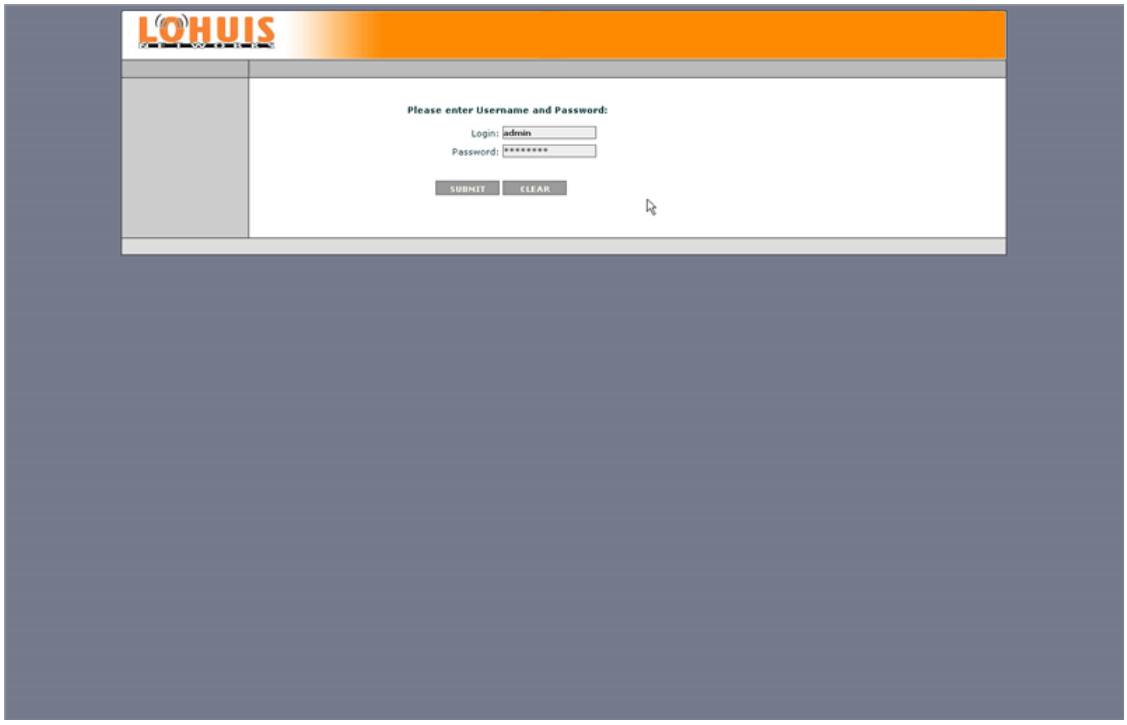
Software setup and configuration

Lohuis 5158P Extreme devices are configurable via WWW interface. Each device uses following default settings:

IP Address: 192.168.1.254
Subnet Mask: 255.255.255.0
Login: admin
Password: public

The initial login screen looks as follows:

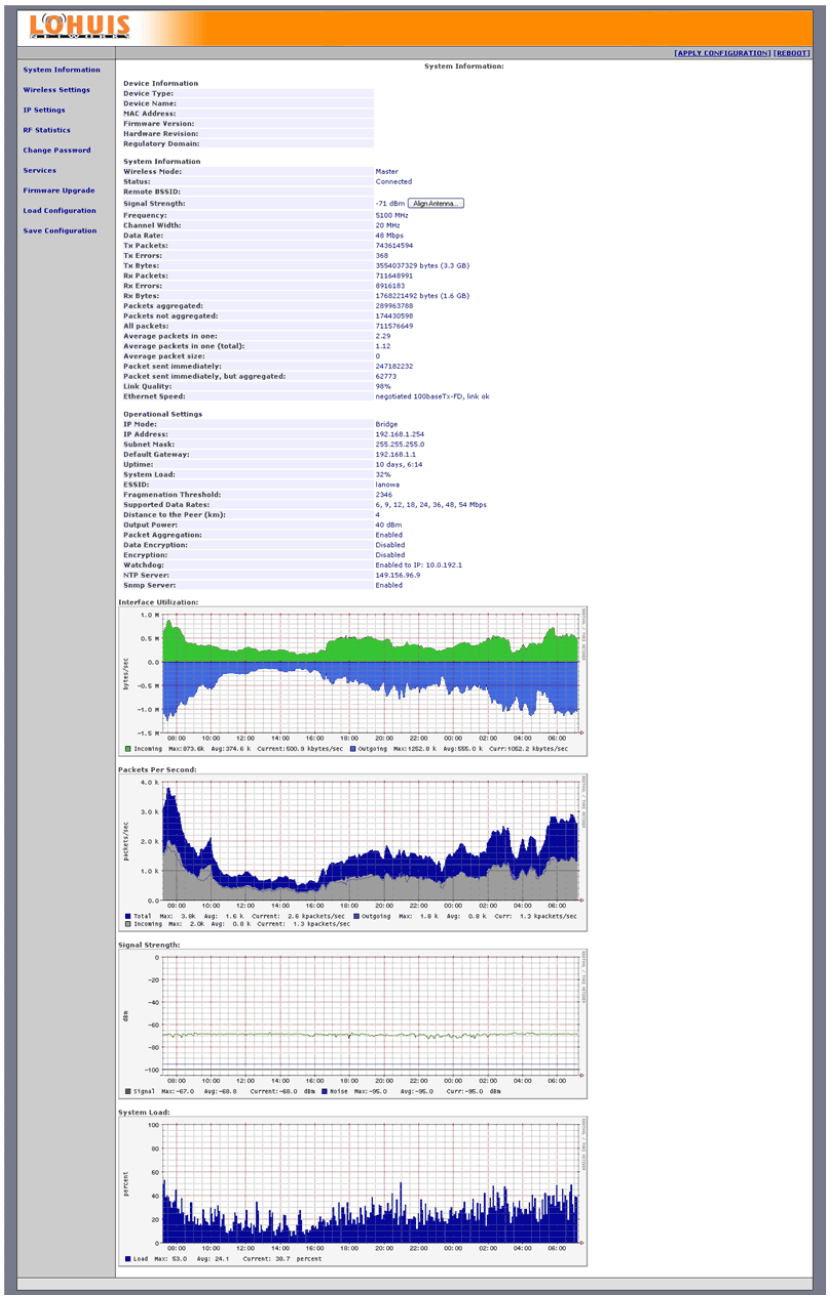


Please enter username and passwords, then press submit to log into the device.

Please note that after changing device parameters and pressing submit button, new settings will only be saved when you press "Apply Changes" button at the right bottom of the configuration page. You also need to reboot the device for the device to start with new settings.

System Information

System information tab shows information about system hardware and operational parameters:



Device Information:
Device Type – Device type you are logged into.
Device Name - System Name for easy identification of the Lohuis 5158P Extreme unit.
MAC Address – Device MAC address.
Firmware Version – Current firmware version.
Hardware Revision – Device Hardware version.
Regulatory Domain – Currently configured regulatory domain.

Connection Information:
Status – Connected – device is currently connected.
Not Connected – the connection has not yet been established.
Remote BSSID – MAC address of the other network bridge.
Signal Strength – Measure of how strongly a transmitted signal is being received by this device.
Align Antenna – Pressing this button brings up little tool to help proper antenna alignment.
Frequency – Frequency the device is operating on.
Channel Width - Configured Channel Width (Depending on Regulatory Domain available values are 5, 10, 20 and 40 MHz).
Data Rate - Bit Data Rate at which this device sends packets to the other peer.
TX Packets – Number of data packets that have been sent to the other peer.
TX Errors - Number of data packets that have been sent but not delivered to the other peer.
TX Bytes – Number of bytes sent to the other peer.
RX Packets – Number of data packets that have been received from the other peer.
RX Errors - Number of data packets that have been received from the other peer but had errors.
RX Bytes – Number of bytes received from the other peer.
Packets Aggregated - Number of aggregated superpackets that have been sent.
Packets not Aggregated - Number of not aggregated packets that have been sent.
All Packets - Number of all packets that have been sent.
Average Packets in one - Average number of packets being aggregated into one superpacket during last 10 minutes.
Average Packets in one (total) - Average number of all packets being aggregated into one superpacket.
Average Packets Size - Average size of packets being aggregated.
Packet sent immediately - Number of aggregated packets sent without waiting for timeout.
Packet sent immediately but Aggregated - Number of aggregated packets sent

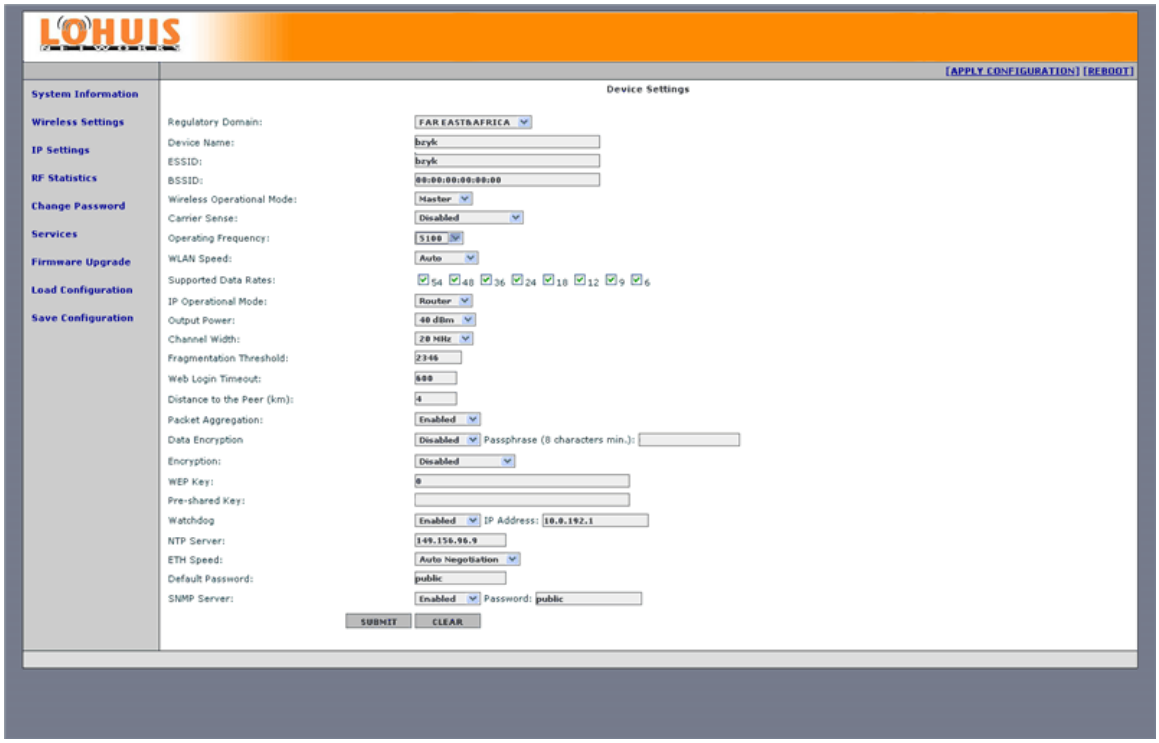
after waiting for timeout.
Link Quality - Number of aggregated packets sent without waiting for timeout.
Ethernet Speed – Current Ethernet port connection speed (or No Connection if there is no connection).

Operational Settings:
IP Mode – Network mode the device has been configured to operate. Available modes are Bridge and Router.
IP Address – Device IP address.
Subnet Mask – Currently defined subnet mask.
Default Gateway – Currently defined default gateway for IP traffic.
Uptime – How long the device has been up and running since last reboot.
System Load – Percentage of current CPU utilization.
ESSID - An ESSID is the name of a wireless network.
Fragmentation Threshold - Packet Size at which WLAN packets are fragmented.
Supported Data Rates – Wireless Data rates the device supports.

Available Data Rates are:
6, 9, 12, 18, 24, 36, 48 and 54 Mbps for regular 802.11a mode (20 MHz channel width),
12, 18, 24, 36, 48, 72, 96 and 108 Mbps in 802.11a Turbo mode (40 MHz channel width),
3, 4.5, 6, 9, 12, 18, 24 and 27 Mbps for 802.11a mode with 10 MHz channel width,
1.5, 2.25, 3, 4.5, 6, 9, 12 and 13.5 Mbps for 802.11a mode with 5 MHz channel width.

Distance to the Peer – Configured distance between Lohuis 5158P Extreme and the other device it is connecting to.
Output Power - Currently configured Output Power.
Packet Aggregation - Configuration status of Packet Aggregation feature.
Data Encryption - Configuration status of Data Encryption feature.
Encryption - Configuration status of WPA/WEP encryption feature.
Watchdog – Disabled or Enabled, depending on current Watchdog configuration.
NTP Server - IP Address of the external NTP server device will obtain current time from.
SNMP Server - Configuration status of built in SNMP server.

Wireless Settings



Regulatory Domain – Please select regulatory domain that is most appropriate to your location.

Supported Regulatory Domains and allowed frequency ranges are defined as follows:
Europe – 5500 – 5700 MHz with DFS, 20 MHz, 10 MHz and 5 MHz selectable channel sizes
OFCOM UK – 5735 MHz, 5755 MHz, 5775 MHz, 5835 MHz with DFS, 20 MHz, 10 MHz and 5 MHz selectable channel sizes
USA – 5180 – 5320 MHz, 5745 - 5825MHz, 20 MHz, 10 MHz and 5 MHz selectable channel sizes
Far East & Africa – 4920 – 6100 MHz (236 channels), 40 MHz, 20 MHz, 10 MHz and 5 MHz selectable channel sizes.

Device Name - This is the system name for easy identification of the Lohuis 5158P Extreme device.
ESSID - An ESSID is the unique name shared among all peers in your wireless network. The name must be identical for all devices attempting to connect to the same network.

It shall be up to 32 characters length.
BSSID - BSSID corresponds to the MAC Address of the peer you want to connect to. Using 00:00:00:00:00:00 as BSSID will make the device connect to any peer based on proper ESSID only.
Wireless Operational Mode - Wireless LAN Operational mode for the device. Available modes are Master and Slave.
Carrier Sense - Choose either 802.11a compliant CSMA collision protocol or disable carrier sense at all. Disabling carrier sense may greatly improve device performance in environment with noise from non 802.11a compliant devices.
Operating Frequency - Depending on configured Regulatory Domain you can manually select frequency the Master device is operating on, or it is selected automatically using DFS (Dynamic Frequency Selection).
WLAN Speed - Choose Fixed Data Rate the device will use while connecting to the other peer.

Available Data Rates are:
6, 9, 12, 18, 24, 36, 48 and 54 Mbps for regular 802.11a mode (20 MHz channel width),
12, 18, 24, 36, 48, 72, 96 and 108 Mbps in 802.11a Turbo mode (40 MHz channel width),
3, 4.5, 6, 9, 12, 18, 24 and 27 Mbps for 802.11a mode with 10 MHz channel width,
1.5, 2.25, 3, 4.5, 6, 9, 12 and 13.5 Mbps for 802.11a mode with 5 MHz channel width.

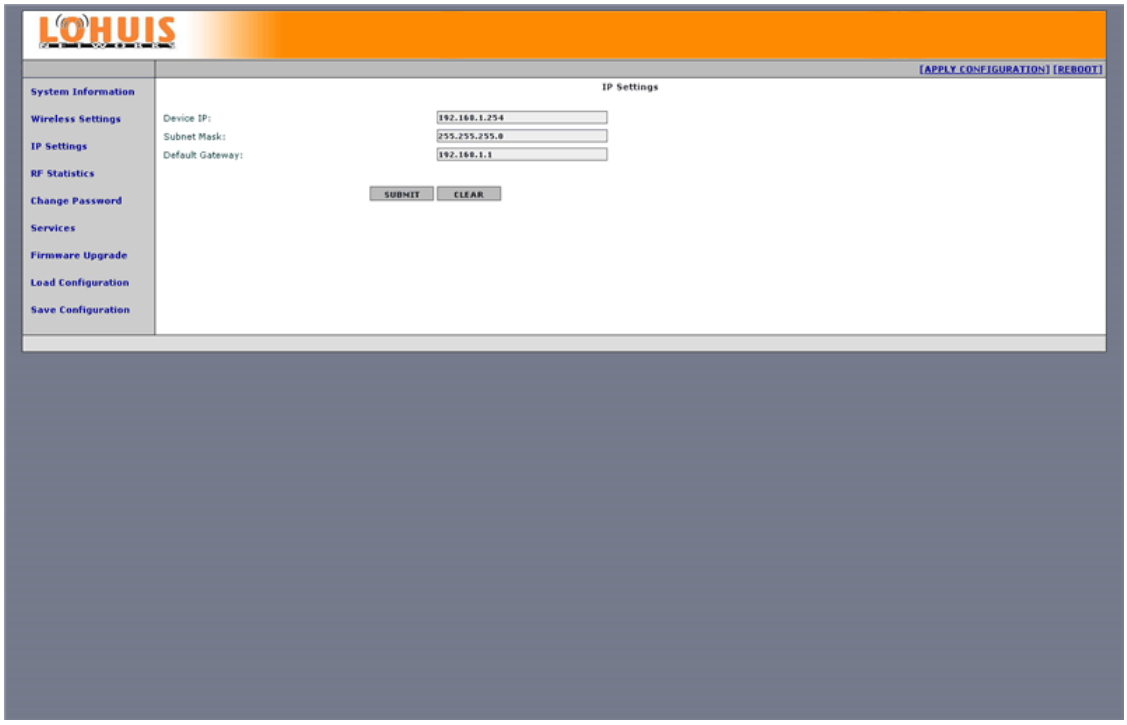
Supported Data Rates - Enable or Disable WLAN Data Rates the Lohuis device should support when communicating with other devices.

IP Operational Mode
Bridge - Bridge works at OSI model Layer 2. This means it does not know anything about protocols, but just forwards data depending on the destination address in the data packet. This address is not the IP address, but the MAC (Media Access Control) address that is unique to each network adapter card. With a Bridge, all your computers are in the same network subnet, so you don't have to worry about not being able to communicate between computers or share an Internet connection. The only data that is allowed to cross the bridge is data that is being sent to a valid address on the other side of the bridge.
Router - Router is an OSI model Layer 3 device, and forwards data depending on the network address, not the hardware (MAC) address. For TCP/IP networks this means the IP address of the network interface. Routers isolate each LAN into a separate subnet. Routers provide bandwidth control by keeping data out of subnets where it doesn't belong, however routes need to be set up before they can get going.

Output Power - Configure Device Transmit Power, available values depend on configured Regulatory Domain.
Channel Width - Channel width the device uses to operate. Available values (depending on Regulatory Domain) are 20 MHz (standard width), 10 MHz (half width), 5 MHz (quarter width) and 40 MHz (802.11a Turbo mode).
Fragmentation Threshold - Enter the size at which the packets will be fragmented.
Web Login Timeout - Enter the time after which web management session will be timed out.
Distance to the Peer - Configure distance between Lohuis 5158P Extreme device and it's peer. Please note that this setting is essential to proper link operation - if the value configured is too low then bridges won't operate reliably.
Packet Aggregation - Enable or Disable built in packet aggregation.
Data Encryption - Enable or Disable over the air Lohuis proprietary data Encryption here. This encryption scheme only works between compatible Lohuis devices.
Encryption - Please select generic WLAN encryption scheme: WEP, WPA-PSK TKIP or WPA-PSK CCMP (AES).
WEP Key - Enter WEP encryption key here. Keys are entered as hexadecimal numbers in following format:
64 bit WEP: xxxx-xxxx-xx
128 bit WEP: xxxx-xxxx-xxxx-xxxx-xxxx-xxxx-xx
156 bit WEP: xxxx-xxxx-xxxx-xxxx-xxxx-xxxx-xxxx-xxxx
Pre-shared WPA Key - the key is entered as 8-63 characters long string, ie. Lohuis.
Watchdog - If enabled then Lohuis 5158P Extreme device will send 3 ICMP Echo Requests to the configured IP address, each with 1 minute interval. If there is no single ICMP Echo Reply to any of these requests then the device will reboot itself.
NTP Server - Configure IP address of the external NTP (Network Time Protocol) server Lohuis device will obtain current time from at startup time.
ETH Speed - LAN Port connection speed - available values are Auto (Auto Negotiation), 100Mbps FDX, 100Mbps HDX, 10Mbps FDX, 10Mbps HDX.
SNMP Server - Configure operation of built in SNMP daemon and enter community string required to access it.

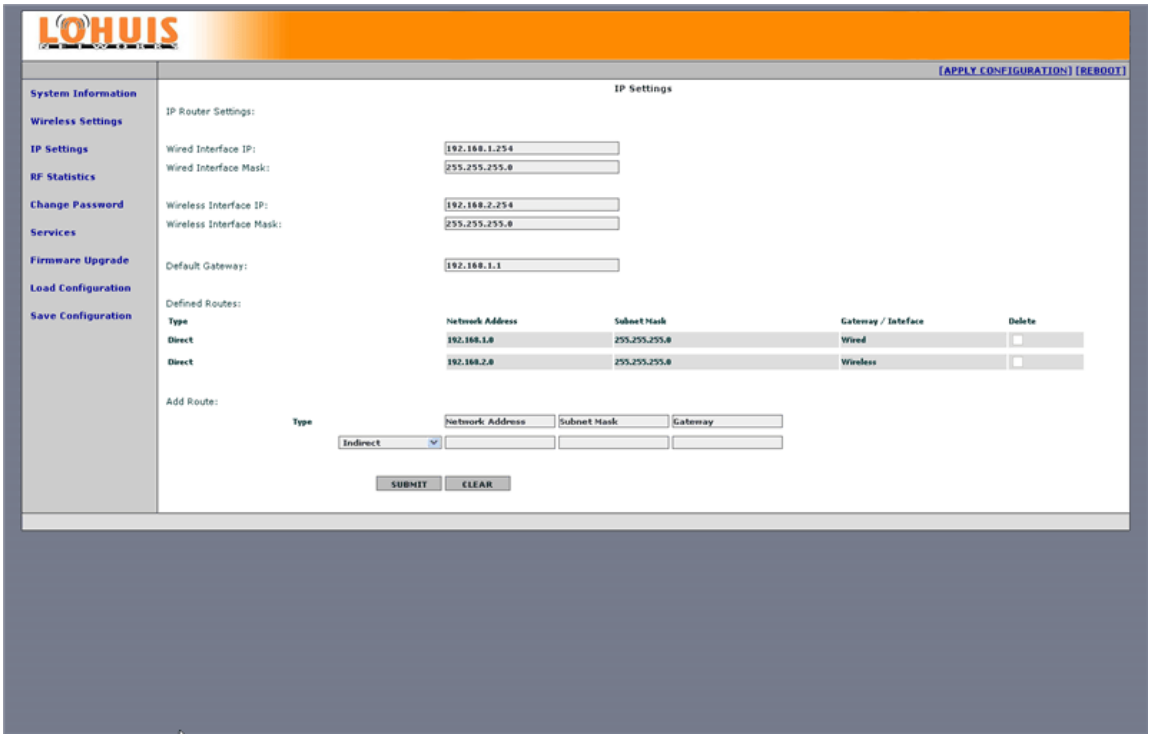
IP Settings

Bridge mode



Device IP – Enter device IP address here.
Subnet Mask – Enter network subnet mask here.
Default Gateway – IP address of a router where traffic going outside of the local network will be forwarded.

Router Mode



Wired Interface IP – Enter IP address of the wired interface here.
Wired Interface Mask – Enter wired network subnet mask here.
Wireless Interface IP – Enter IP address of the wireless interface here.
Wireless Interface Mask – Enter wireless network subnet mask here.
Default Gateway – IP address of a router where traffic not destined for defined routes / local routes will be forwarded.
Defined Routes – This table displays currently defined static routes. To delete a route select "Delete" checkbox and press Submit on the bottom of the page. Please note that it is not possible to delete first two entries – direct routes to local interfaces.

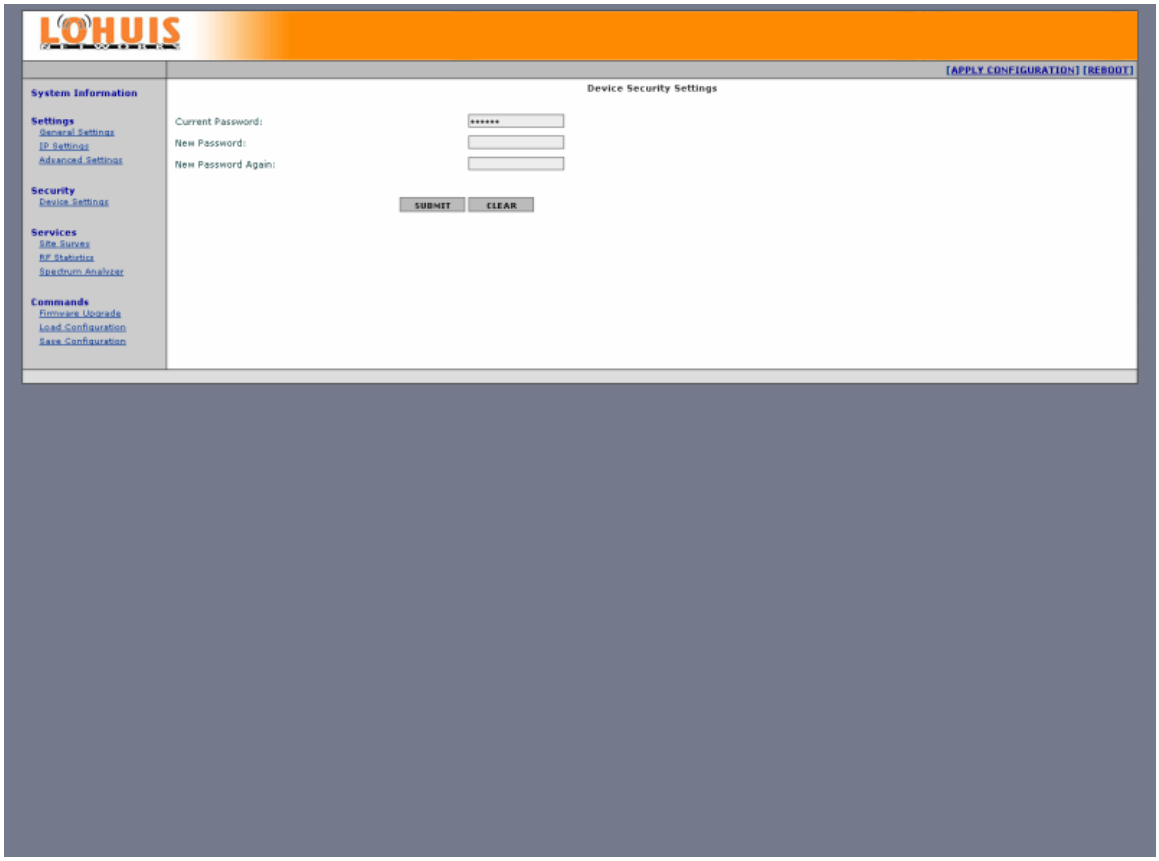
Add Route:

Direct – on wired or wireless interface - When router has two or more IP subnets directly attached to its different interfaces, it can route IP packets between those subnets using a direct route. A direct route consists of an IP Address which specifies the basic IP address to route, a Subnet Mask which defines the class of IP addresses that will be routed, and an interface which specifies where the IP subnet is attached. When an IP packet addressed to a system on the directly routed subnet arrives at the router, the

router will send it directly to the target machine on the interface specified. When entering direct route use 0.0.0.0 as Gateway.

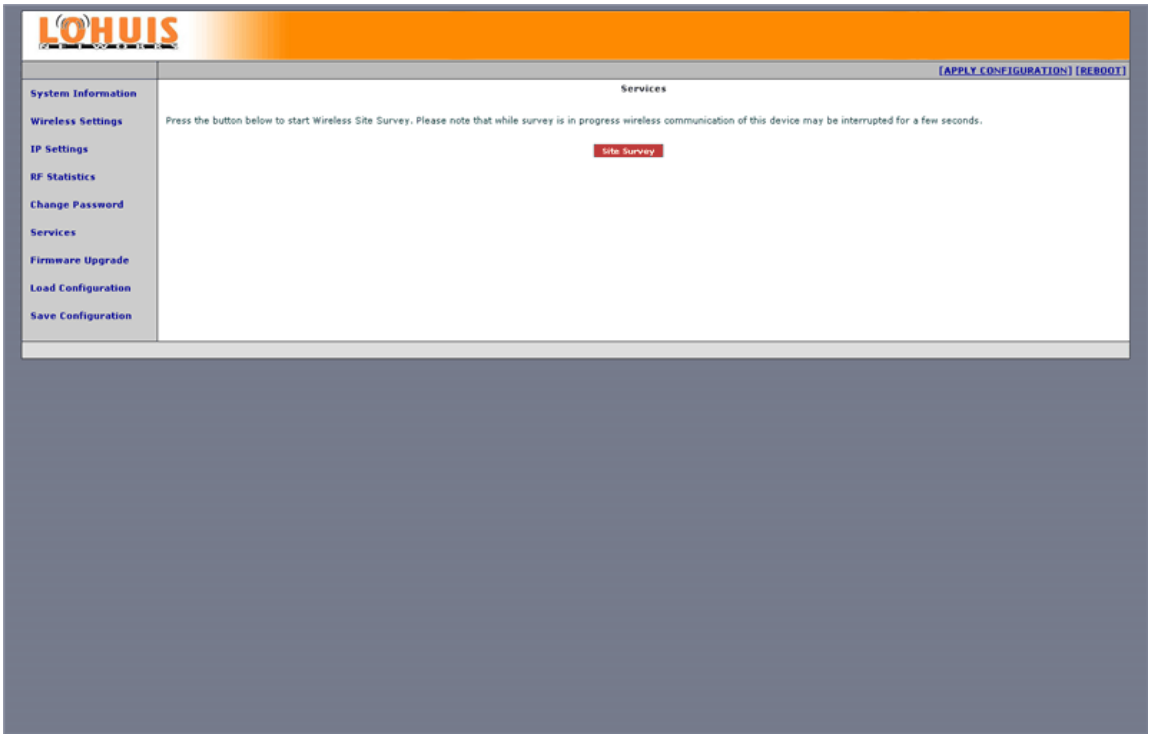
Indirect - When router needs to send IP packets between IP subnets which are not directly connected to one of its interfaces, it must have an indirect route for sending those packets. An indirect route consists of an IP Address which specifies the basic IP address to route, a Subnet Mask which defines the class of IP addresses that will be routed and a Gateway that will relay the IP packet. When an IP packet addressed to a system on the indirectly routed subnet arrives at the router, the router will route it over to the specified Gatway to be routed further.

Change Password



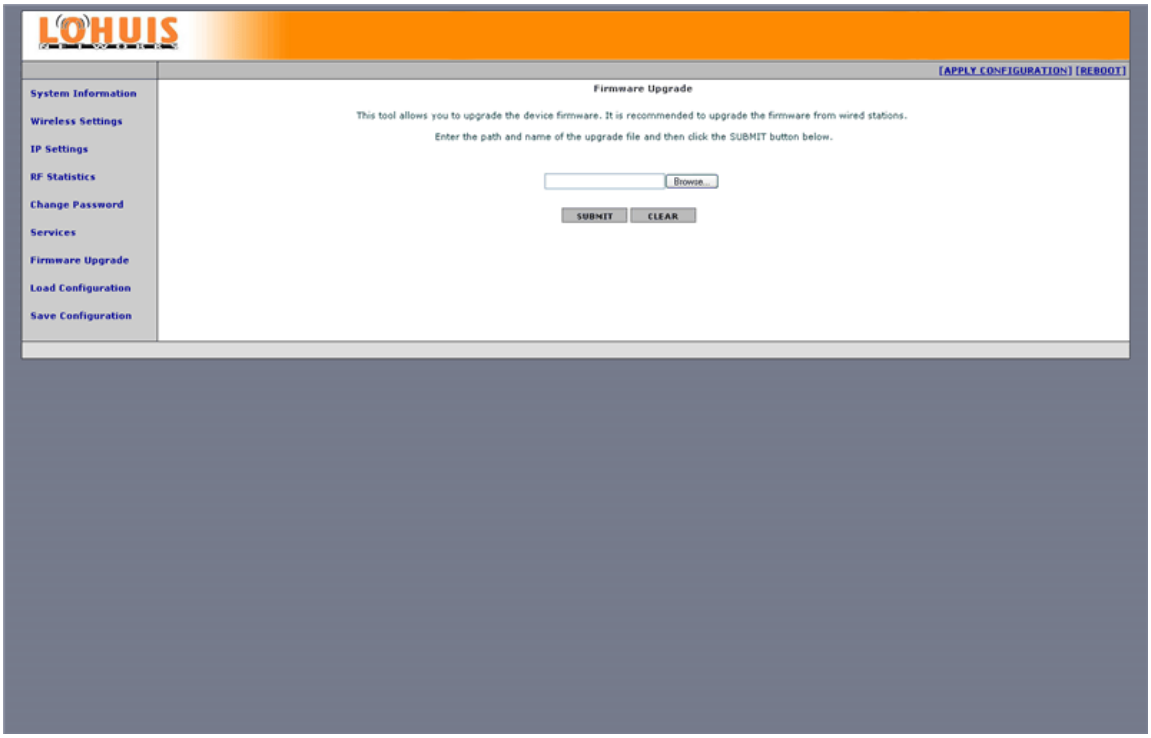
Use this screen to change password which is used to access and configure the device.

Services - Site Survey



Use this screen to see other Access Points in range.

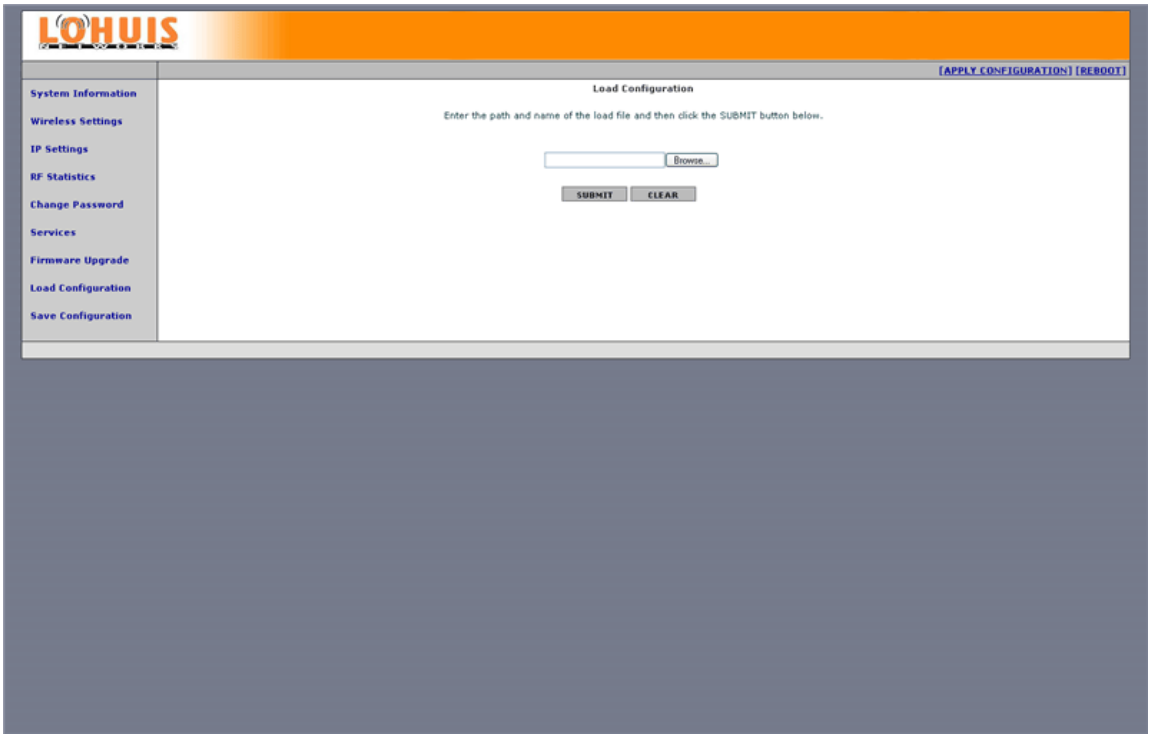
Firmware Upgrade



This page allows you to upgrade the device firmware. It is recommended to upgrade firmware only to newer version than the one currently installed in the device.

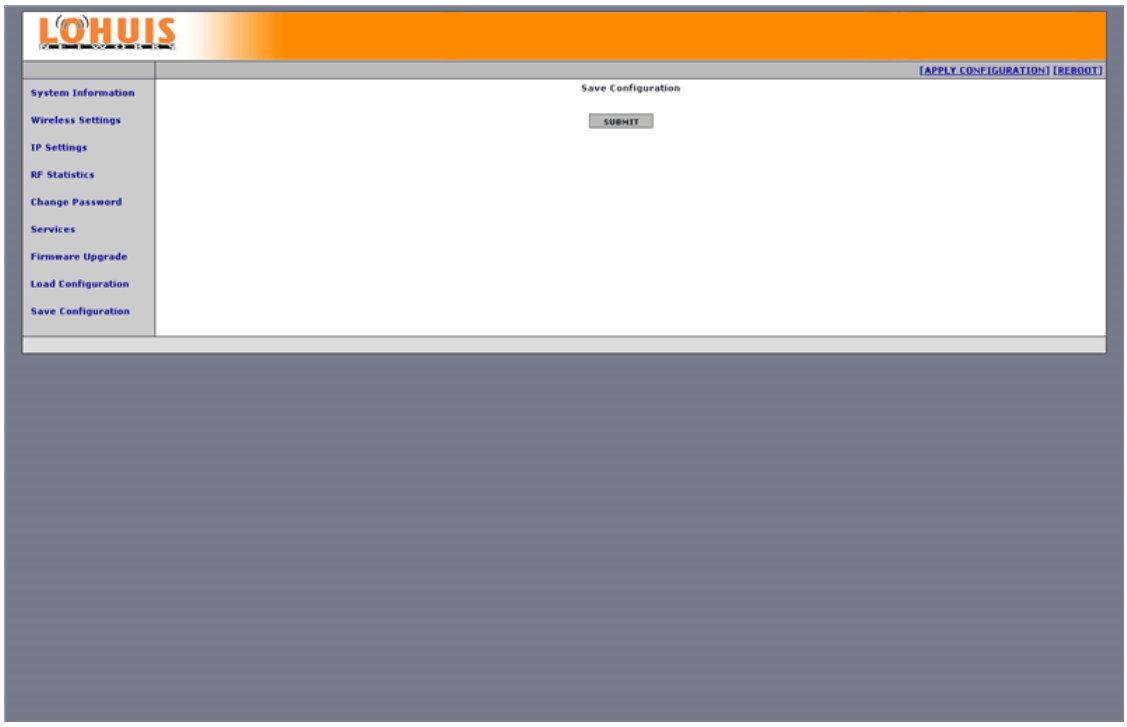
Please always remember to reboot the device first before you proceed with firmware upgrade.

Load Configuration



You can use this option to load device configuration from file.

Save Configuration



You can use this option to store current device configuration in a file.

TFTP Firmware upgrade

Each Lohuis device allows firmware upgrade via TFTP.

From the Windows DOS box you need to enter following command:

```
X:\>tftp -i -s 192.168.1.254 PUT Lohuis_5158P Extreme_3.25R.bin admin_public

WinAgents TFTP Client version 1.3 Copyright (c)2004-2005 by Tandem Systems,Ltd.
http://www.winagents.com - Software for network administrators

Transferring file Lohuis_5158P Extreme_3.25R.bin to server in octet mode...
Using blocksize = 512
Using TFTP timeout = 10s
File Lohuis_5158P Extreme_3.25R.bin was transferred successfully.
1964844 bytes transferred for 63 seconds, 31188 bytes/second

X:\>
```

Please note that username (admin) and password (public in this case) required for authorization are sent to the device as remote file name (admin_public).

The device will accept firmware, reflash and reboot automatically.

Emergency firmwares restore procedure.

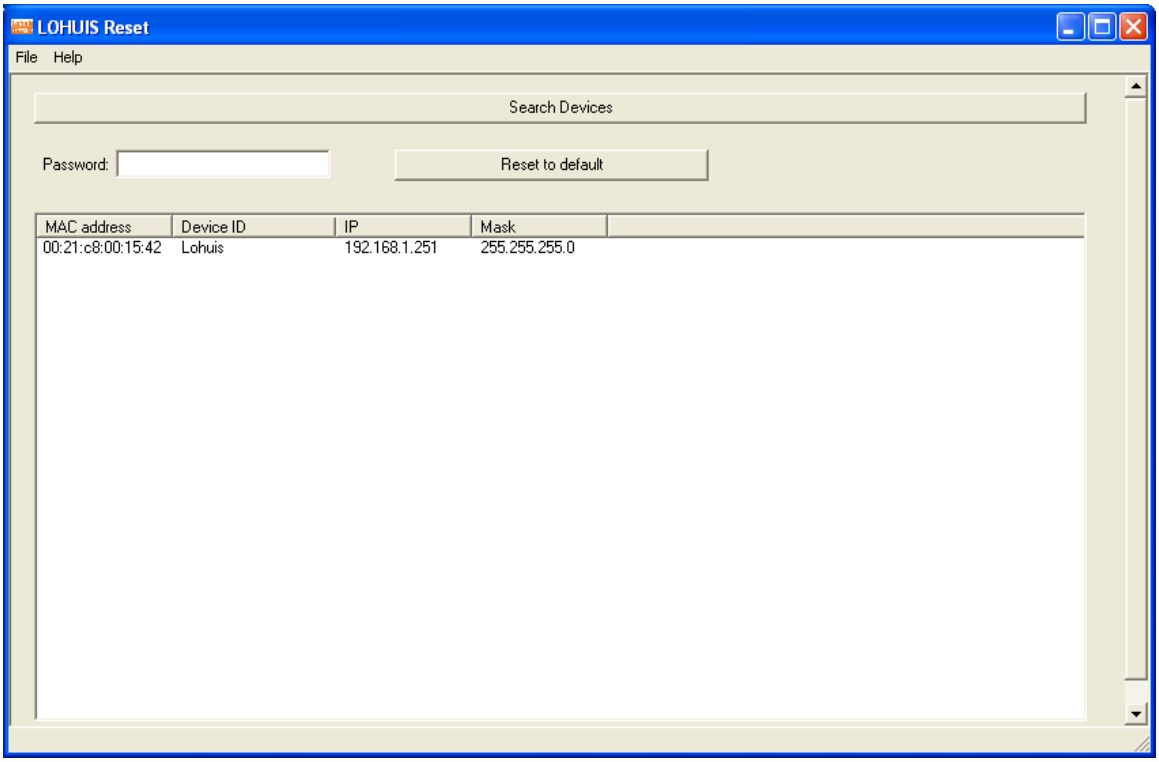
Should the Lohuis device fail or loose power during firmware upgrade the built-in bootloader allows easy firmware restore.

This is the step by step procedure required to perform:
1. You need to obtain tftp server software, the free one is available at http://tftpd32.jounin.net/
2. Install tftpd32.exe into the catalog where firmware files are located
3. Rename the firmware file into upgrade.bin
4. Change your computer IP address to 192.168.1.23 netmask 255.255.255.0
5. Connect the Lohuis device to the computer via cross-over cable or via network switch
6. Turn on the Lohuis device, it should initiate the transfer automatically, automatically reflash and reboot itself.

Resetting device to default settings

In order to Reset Lohuis device to factory default settings you need to use Lohuis Reset software .

Reset will locate any compatible Lohuis device regardless of its IP address located on the same physical subnetwork with the computer it is running on.



After selecting the device you want to Reset enter "Reset to Default Password" in the Password: field and press button.

If you have changed Reset to Default Password to one you no longer remember then please email us at support@Lohuisnetworks.com stating device type and MAC Address and we will provide you one time, generated password that will let you Reset the device to factory default settings.