ekahau

B4
Wi-Fi Badge Tag

User Guide

Ekahau, the Ekahau logo, Ekahau Site Survey, Ekahau Mobile Survey, Ekahau Location Survey, Ekahau HeatMapper, Ekahau RTLS Controller, Ekahau Activator, Ekahau Vision, Ekahau T201, Ekahau T301, Ekahau A4, Ekahau B4, Ekahau NIC-54, Ekahau NIC-300, Ekahau Client, and Ekahau Positioning Client are trademarks or registered trademarks of Ekahau.

Other product and company names may be trademarks or trade names of their respective owners.

The enclosed software contains implementations of Ekahau's patent pending inventions.

This manual and the Ekahau software described in it are copyrighted, with all rights reserved. This manual and the Ekahau software described in it may not be copied, except as otherwise provided in your software license.

The contents of this document are provided "as is." Except as may be required by applicable law, no warranties of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, are made in relation to the accuracy, reliability or contents of this document. Ekahau reserves the right to revise this document or withdraw it at any time without prior notice.

Export of this technology may be controlled by the United States Government. Diversion contrary to U.S. law prohibited.

Your use of the Ekahau software described in this user manual and its documentation are governed by the terms set forth in your license agreement. Your use of this Ekahau software contrary to the terms of this User Manual may void the warranty, if any, described in your license agreement.

Under no circumstances shall Ekahau be responsible for any loss of data or income, or any special, incidental, punitive, consequential or indirect damages howsoever caused.

You may not use any Ekahau software or hardware products in hazardous environments (such as operation of nuclear facilities, aircraft navigation or control, environments containing high levels of dust, or mines) or in Life-Critical Solutions, unless you have advised Ekahau that they will be used in a hazardous environment or in a Life-Critical Solution and Ekahau has had an opportunity to evaluate further whether, and on what terms and conditions, the software or hardware products may be licensed for your intended use. The term "Life-Critical Solution" means an application software package or hardware device whose functioning or malfunctioning may result directly or indirectly in physical injury or loss of human life.

Ekahau tags must always be used in compliance with the user environment and instructions contained in the User Manual for the tags.

Copyright © Ekahau, Inc. 2000-2012. All rights reserved.

Table of Contents

1 Introduction 1
1.1 Software Release Level 1
1.2 Features of B4 1
1.3 User Interface 2
1.4 Status Indication LEDs 2
2 Initial Activation of the Tag 5
2.1 Installing Ekahau Tag Activator 3 5
2.2 Supported Wi-Fi Adapters 5
2.3 Activation Procedure 5
2.3.1 Configuring Ekahau RTLS Controller Settings 6
2.3.2 Configuring WLAN Settings 7
2.3.3 Configuring Wi-Fi Channels in Use 8
2.3.4 Configuring IP Settings 9
2.3.5 Activation 10
2.3.6 List of Available Settings in the Activator 14
3 Configuration After Initial Activation 17
3.1 Tag Configuration Settings in ERC Configs Page 17
3.2 Tag Actions Available in ERC Tags Properties Page 19
4 Tag Operation 21
4.1 Button Activated Location Update and Maintenance Call 21
4.2 Safety Switch Activated Location Update 21
4.3 Working with the Display 21
4.3.1 Instant Messages 22
4.3.2 Standard Messages 22
4.4 Resetting to Factory Settings 23
4.5 Firmware Update 23
4.6 Optimizing Battery Life 24
4.7 Turning off the B4 Tag 24
4.8 Charging the B4 tag 25
5 Technical Specifications 27
5.1 General 27
5.2 Wi-Fi 27
5.3 Operating Ranges from an Access Point 27
5.4 Care and Maintenance 27
6 Certifications 29
6.1 FCC Rules 29
6.1.1 FCC RF Radiation Exposure Statement 29
6.1.2 Réglementations FCC 29
6.2 Industry Canada Statements for Portable Devices 30
7 Limited Warranty 31

1 Introduction

Introduction The Ekahau B4 Wi-Fi tag is part of Ekahau RTLS (Ekahau Real-Time Location System) that consists of Ekahau wi-fi tags, 5.x (ERC) software platform and Ekahau Vision (1.7 or 2.0) end-user application. The B4 tags are primarily targeted to be carried by people, but can be attached to any mobile object or asset as well. The Ekahau RTLS Controller software continuously reports the tag's location information such as coordinates and logical areas within the Wi-Fi coverage area both indoors and outdoors.

1.1 Software Release Level

This User Guide documents the functionality available with software release level 1.0 onwards.

1.2 Features of B4

The following features are included with this software release:

- Works with standard 802.11b, 802.11g, and 802.11n Wi-Fi networks at 2.4GHz frequency band.
- Support for 64 or 128-bit WEP key and WPA2-PSK authentication.
- Static and dynamic IP addressing.
- Safety switch for triggering an alarm.
- Three configurable buttons for sending and acknowledging alarms, and resetting the tag to its factory settings.
- Location reporting triggered by button, periodic timer, motion or safety switch.
- Two status indication LEDs for determining the tag status.
- A buzzer for audible alarms and notifications.
- An OLED (organic LED) display for receiving messages
- Configuration using Ekahau Tag Activator 3, standalone tag configuration software.
- Configuration using Ekahau RTLS Controller

1.3 User Interface

1. Left LED	5. Menu Button
2. Safety Switch	6. Red Button
3. Right LED	7. Display
4. Blue Button	8. Charging Port

1.4 Status Indication LEDs

The tag is equipped with two multi-color LEDs that provide status indication. The table below lists the different modes of the tag LEDs:

Action	Left LED	Right LED	Status
Activation. Press and hold the Menu button for 3 seconds	1xRed 2xGreen 2xRed	1xRed	Both LEDs blink Red after button press. . Finally Left LED blinks green or red. Green indicates successful activation
Charging	-	Orange Green	Charging Battery full
Periodic or motion activated scan	2xGreen blink	-	Successful scan and results sent to ERC

Action	Left LED	Right LED	Status
Periodic or motion activated scan	2xRed blink	-	Failed to scan or send results
Blue button press	1xOrange + 2xGreen blink or 2xRed blink	-	Success - green Failed to scan or send results - red
Red button press	1xOrange + 2xGreen blink or 2xRed blink		Success - green Failed to scan or send results - red
Menu button press	1xOrange + 2xGreen blink or 2xRed blink		Success - green Failed to scan or send results - red
Reset. Keep Blue button down until Right LED blinks orange, then immediately release the Blue button and press Red button button until both LEDs blink	1xOrange 1xOrange	- 1xOrange	After completing the sequence erases all configurations from the tag memory
Successfully sent scan results (Not dependent on scan reason)	2xGreen blink		
Unsuccesfully sent scan results	2XRed blink		

2 Initial Activation of the Tag

When the tag is delivered it does not have any of the necessary configuration settings. These environment specific settings need to be applied before the tag can connect to the network and the ERC. The B4 tags are delivered with the battery charged to a storage charge, it is recommended to fully charge the battery, before activating the tags first time. See charging instructions in chapter *Charging the B4 tag on page 25*.

Tag activation is done using Ekahau Activator software that configures Ekahau tags wirelessly. The activation of the tags is explained in more details in chapter *Installing Ekahau Tag Activator 3 on page 5*.

After successful Activation you will see the MAC address of the tag appears on the ERC list of tags. After successful connection with ERC the configurations can be managed directly from ERC using **Tag Configurations** page.

2.1 Installing Ekahau Tag Activator 3

The Ekahau Tag Activator 3 comes with the Ekahau RTLS installer. When you install Ekahau RTLS, you do not necessarily need to install the Ekahau Activator if the target computer cannot be used to activate tags with a supported Wi-Fi adapter. If you want to install the Ekahau Activator later on another computer, simply run the RTLS setup file on the target computer and choose to install only the Ekahau Activator. The Ekahau Activator is usually installed on a laptop as the Ekahau RTLS software is installed on a server.

The Ekahau Tag Activator 3 installation package can also be downloaded from **http://www.ekahau.com/download/activator**.

How to install Ekahau Activator:

1. Choose a laptop (or a desktop) computer running Windows 7 (32 or 64bit operating system) with a supported Wi-Fi adapter (and driver supporting virtual Wi-Fi), at least 256 MB of memory, free USB port, and 3.5 MB or more free hard disk space.
2. Run the Ekahau Activator setup file from it's location, and follow the on-screen instructions
3. Install a supported **Wi-Fi adapter** from th eprograms menu: Start -> Ekahau -> Ekahau Tag Activator 3 -> Ekahau USB Driver.

2.2 Supported Wi-Fi Adapters

Please visit our website for the complete list of supported Wi-Fi adapters: **http://www.ekahau.com/devices**.

2.3 Activation Procedure

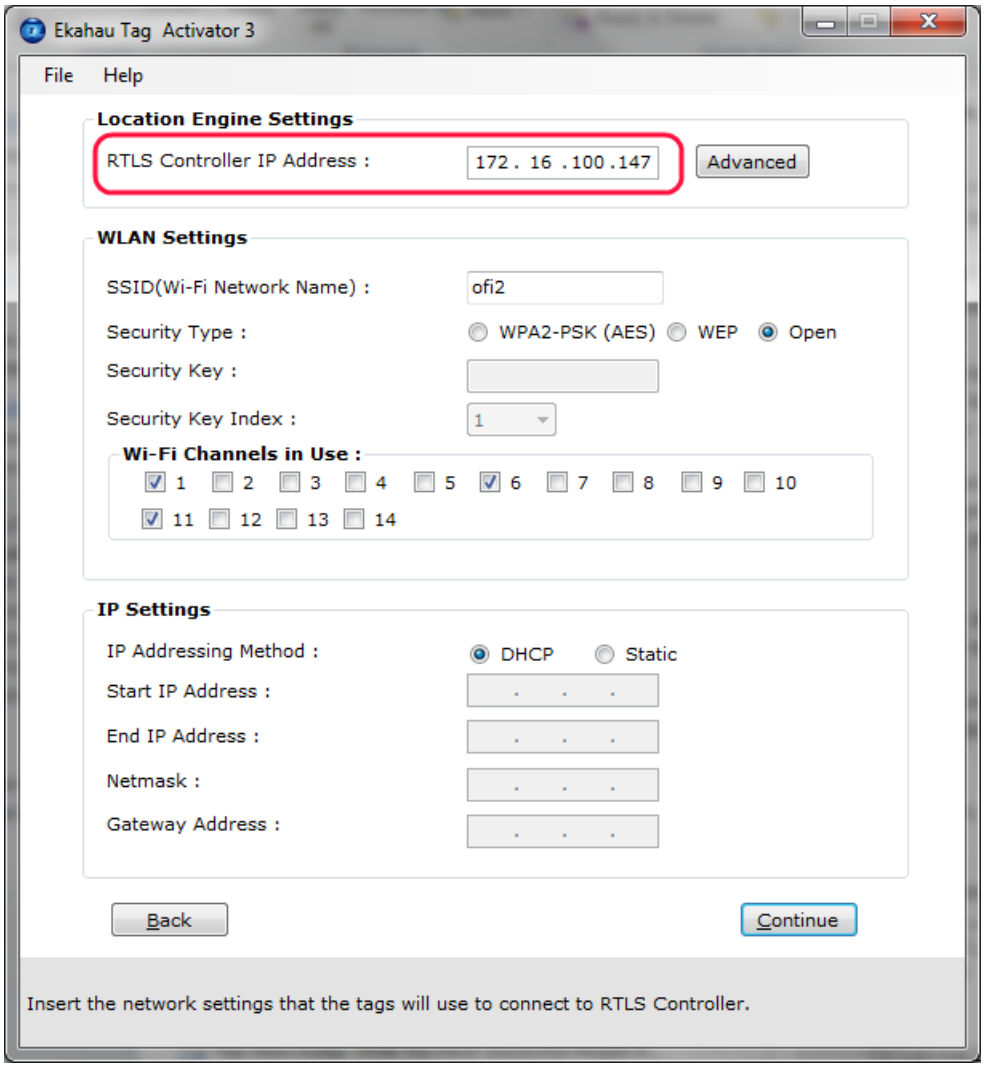
For the tags to be able to communicate with the Ekahau RTLS Controller, the tag needs to be activated e.g. the tag needs to be given the necessary parameter to associate with the network. At least the IP address of the Ekahau RTLS Controller, SSID of the network used and the IP configuration method are required. To activate B4 tags, you need to use the Ekahau Tag Activator

3 which you can run from Ekahau Programs menu. After that, follow the following Activator configuration procedure.

2.3.1 Configuring Ekahau RTLS Controller Settings

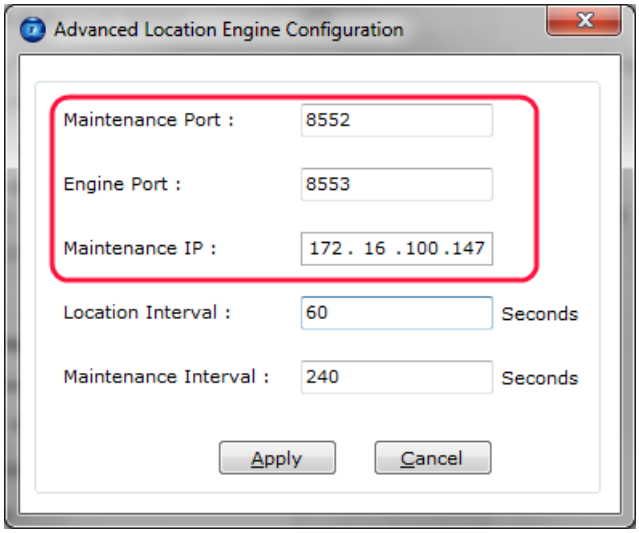
Input the IP address of the Ekahau RTLS Controller.

Figure 2.1. Specifying the Engine IP address and Maintenance interval



In case Engine Port, Maintenance port, and/or Maintenance IP needs to be changed, go to "Advanced" mode. The (Periodic) Location Update Interval is set to 60 seconds and the (Periodic) Maintenance Interval is set to 240 seconds by default , but shorter interval can be used if, for instance, messages are sent frequently to the B4 tag.

Figure 2.2. Specifying advanced Positioning Engine settings



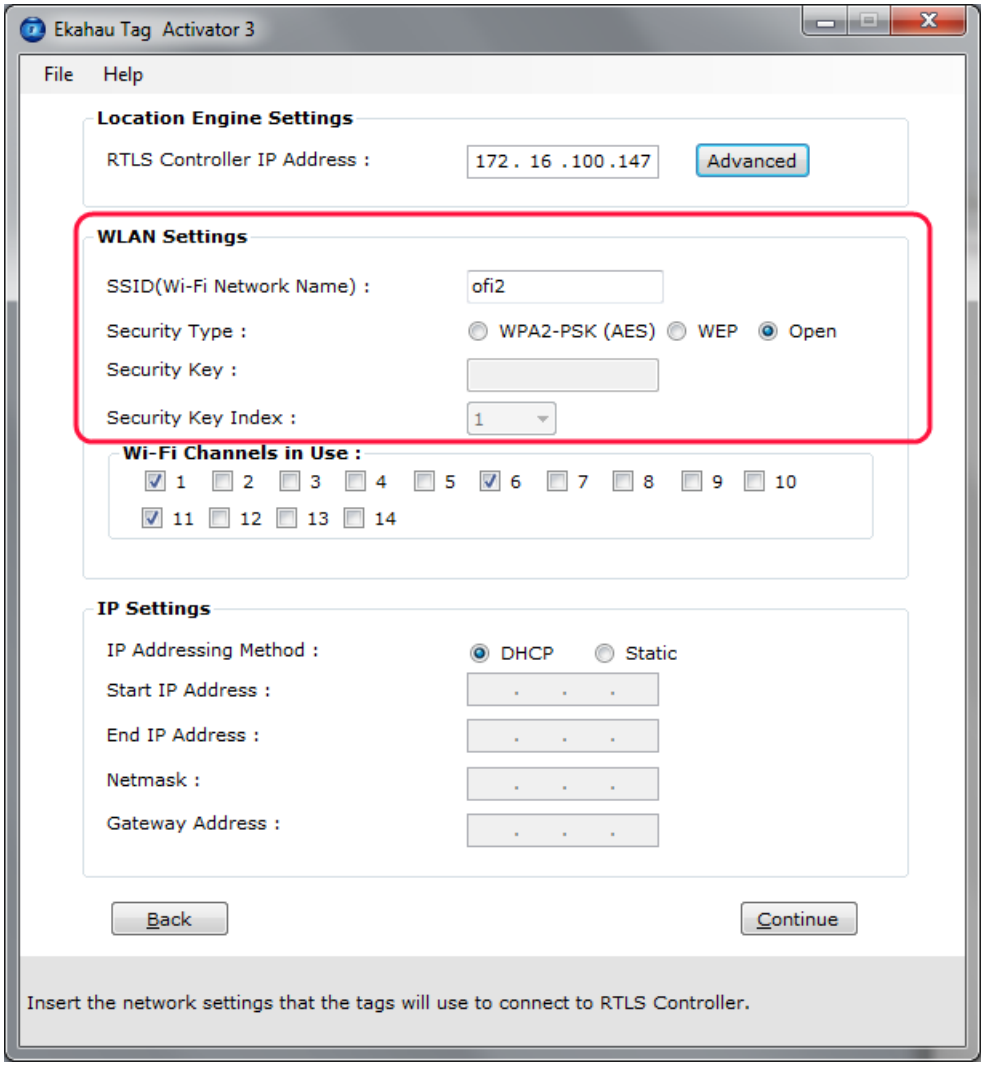
Note

When activating the B4 tags, only an initial setup is required for the tag to associate with the network. All settings can be set and changed from the Ekahau RTLS Controller. Ekahau Tag Activator 3 only provides a set of basic settings.

2.3.2 Configuring WLAN Settings

Input the Wi-Fi Network SSID and select the Encryption method used. If WEP 64/128 or WPA2-PSK is used type in the network key as well. Normally, 1st Security Key Index (for WEP encrytion) is used. Should you use key index other than the first one, please select the key index matching the Security Key.

Figure 2.3. Specifying Wi-Fi network settings



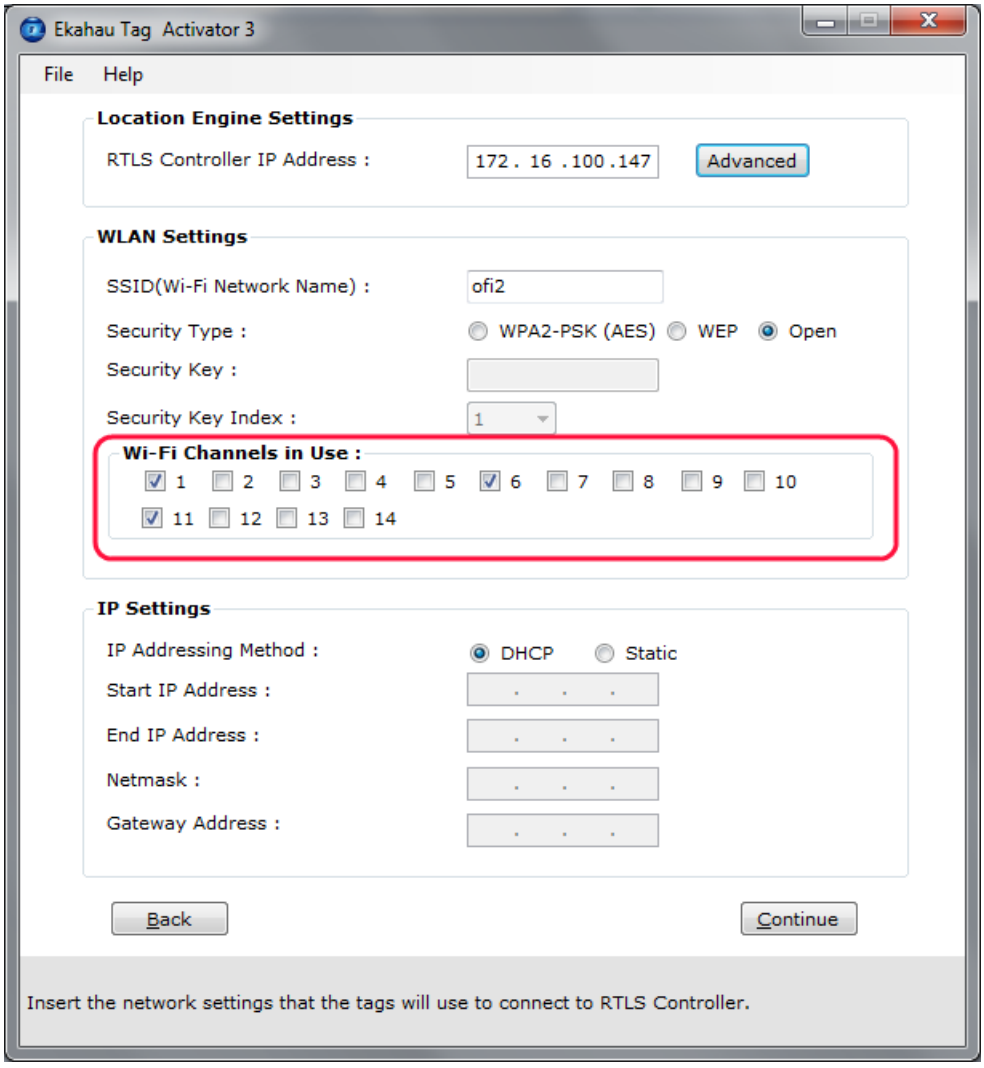
Tip

If WEP encryption is used the Activator automatically determines the key type and length from what you type. WEP 64 require 5 Ascii characters or 10 hex digits, respectively WEP 128 requires 13 Ascii characters or 26 hex digits.

2.3.3 Configuring Wi-Fi Channels in Use

It is recommended to only select the channels used in you network. Activating the unused channels will only reduce the battery lifetime of the tag. By default, the Scan Interval is 60 seconds. You may also use shorter interval, but it will drain faster the battery of the tag. Alternatively you can use longer Scan Interval and enable Motion Sensor through the Ekahau RTLS Controller after activation. This way the tag will scan only when it is in use and moving.

Figure 2.4. Specifying the channels used in the network



Warning

Only use channels that really exists in you Wi-Fi network. Activating unnecessary channels will reduce the tag's battery lifetime!

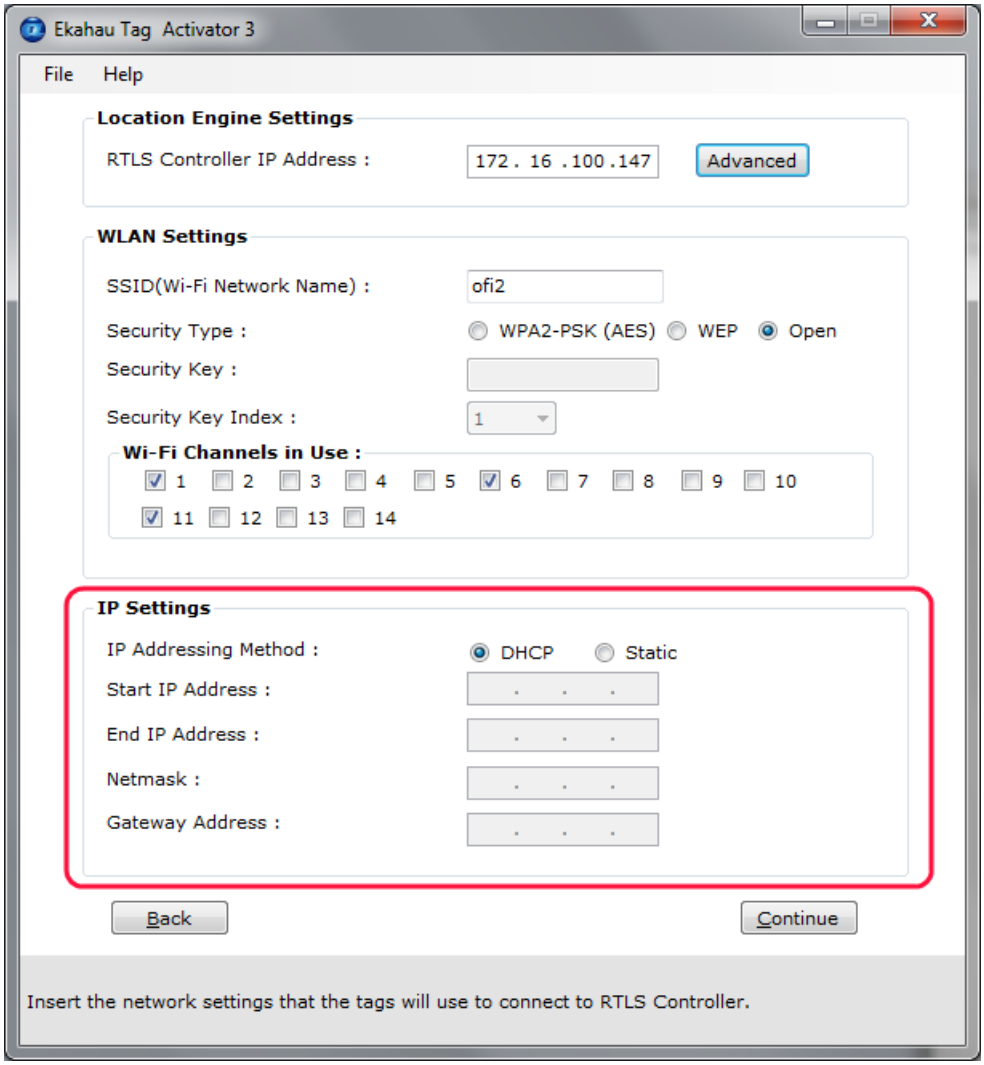
2.3.4 Configuring IP Settings

Check the IP settings. If DHCP is used nothing needs to be done. In case your network uses static IP addressing, type in the IP address range to be used for the B4 tags, Netmask and Gateway addresses.

Tip

If you only activate a single tag and wish to use static IP setting, enter same IP address in 'Start IP Address' and 'End IP Address'.

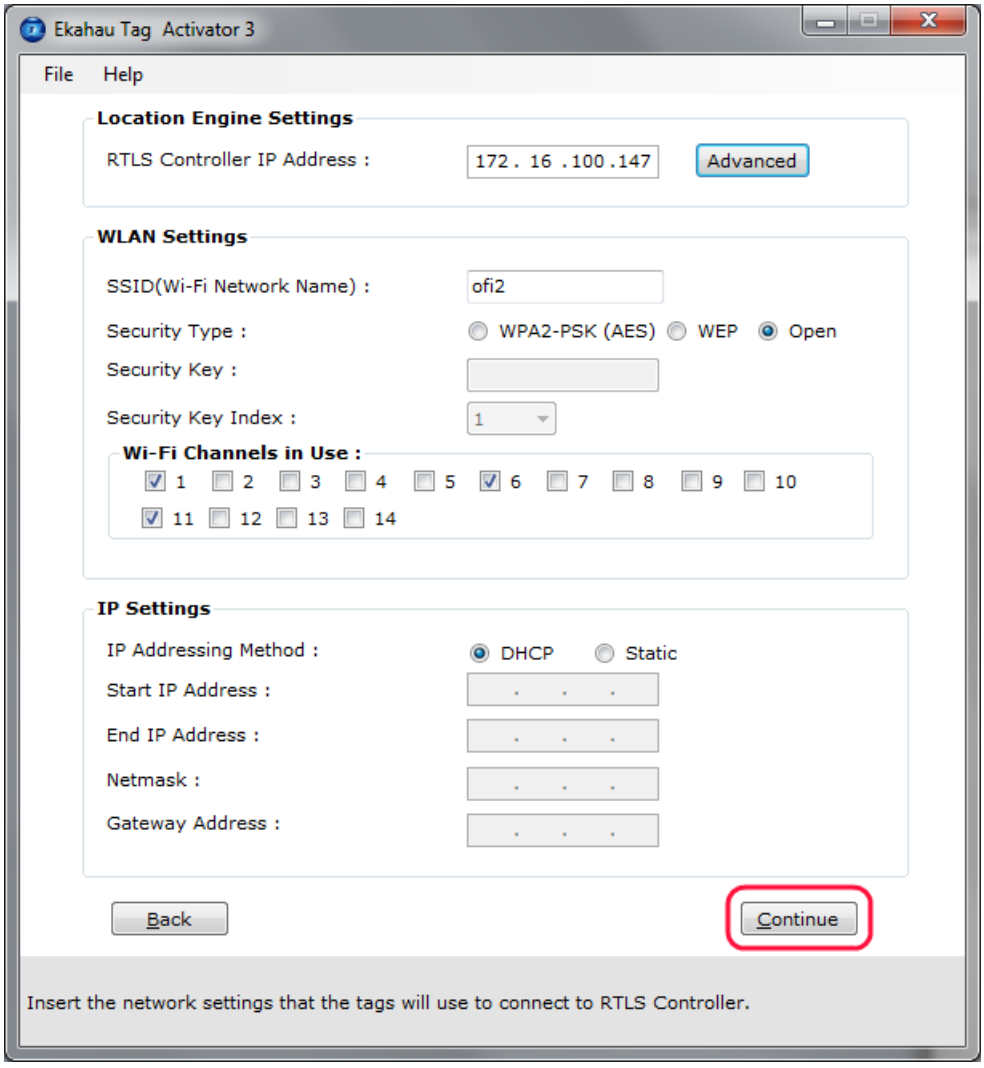
Figure 2.5. Specifying IP settings



2.3.5 Activation

Press 'Continue' button when all settings are ready.

Figure 2.6. When all the settings are done, you can start activating the tags

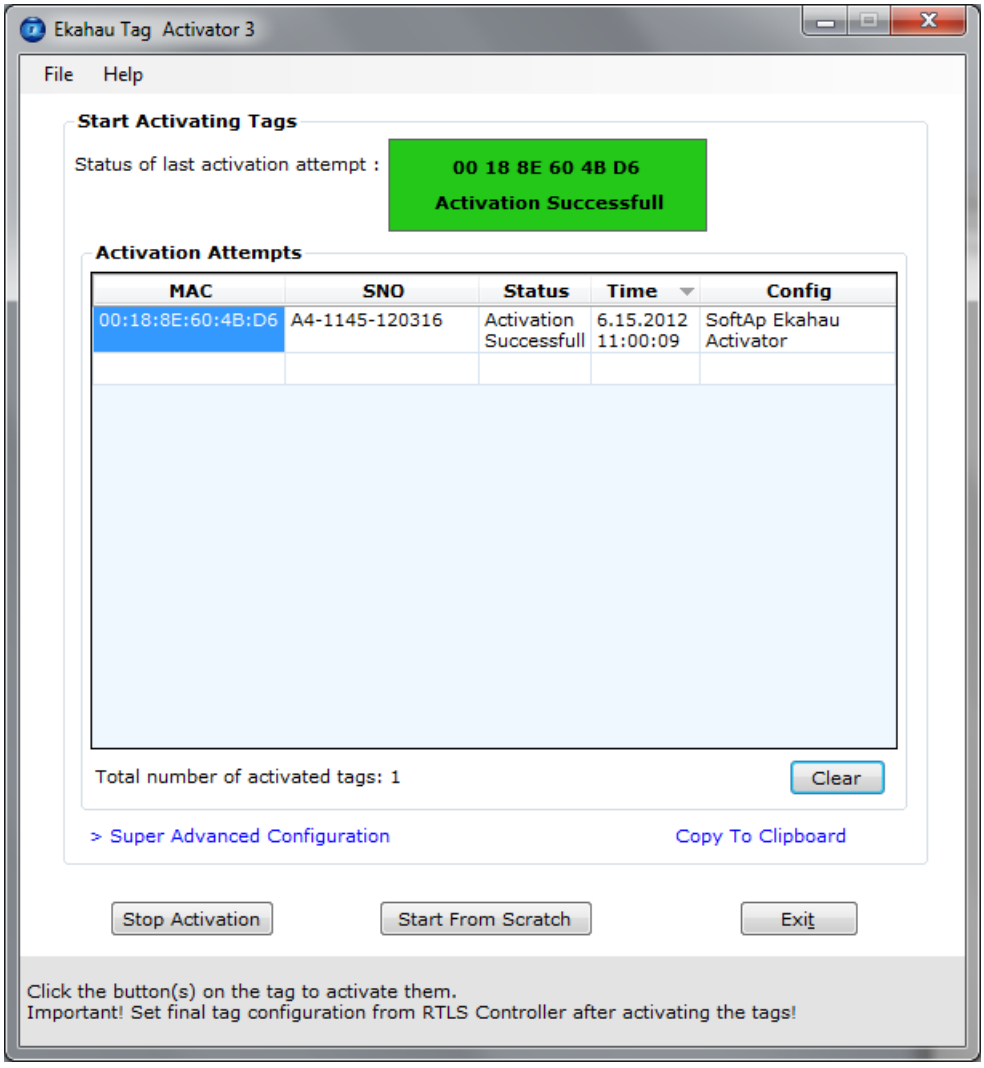


The Activation process is now started. The list of the activated tags will appead on the area below.

Figure 2.7. The Activator is ready to start activating the tags

Press the tag's **Menu** button to activate it. After successful activation, the tag MAC address appears on the activation window, showing Ok status. Repeat this for all the tags to be activated.

Figure 2.8. The Activator has activated one tag

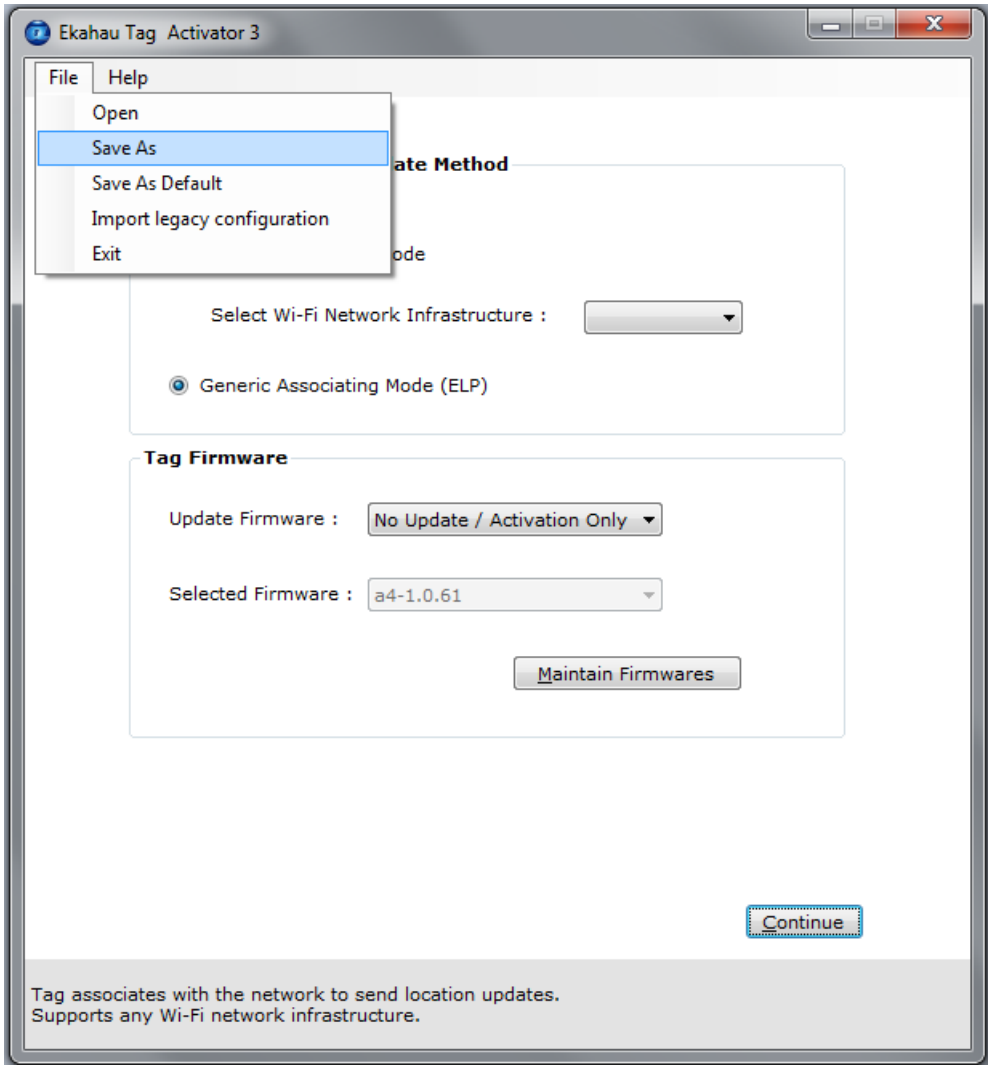


After completing activating the tags, click the 'Stop Activation' button and exit the activation window.

Tip

After you have finished the activation, you can save the configuration for future use from the file menu. If you save the settings with 'Save As Default' the setup will be the default every time the Activator is started.

Figure 2.9. Saving the configuration for later use



2.3.6 List of Available Settings in the Activator

The list of available settings in the Activator:

Setting	Description	Values	Default value
Positioning Engine settings			
Engine IP	IP Address Ekahau RTLS Controller	IP Address	0.0.0.0
Engine Port (UDP)	Port number of location protocol port of ERC	Port number	8552
Maintenance IP	IP Address of Ekahau RTLS Controller, from where TAG gets the settings. Typically same as the ERC IP	IP Address	0.0.0.0

Setting	Description	Values	Default value
Maintenance port (UDP)	Port number of maintenance protocol port of ERC	Port number	8553
Maintenance interval	The interval of the periodic maintenance calls in seconds	0 - 63072000	10
Scan Settings			
Scanning Interval	The interval of the periodic location scans in seconds	0 - 63072000	10
Scan Channels	Sets the channels that are scanned	Enabled; Disabled	1 - 11 Enabled; 12 - 14 Disabled
WLAN Settings			
SSID	Sets the Wi-Fi network name -*Service set identifier*	SSID=max 32 digits	default
Encryption	Selects if WEP encryption is used	No Encryption; WEP 64/128; WPA2-PSK	No Encryption
WEP	Sets the WEP passphrase	ASCII: 5 or 13 characters HEX: 10 or 26 hexadecimal numbers (0-f)	-
WEP Key Index	Sets the WEP Key index used	1 - 4	1
WPA2-PSK	Sets the WPA2-PSK encryption and passphrase	8 - 63 ASCII characters	-
WPA-PSK	Not supported in B4		
IP Settings			
IP method	Defines the IP address assigning method	DHCP; Static	DHCP
Static IP Settings			
Address range	Sets the start and end address of the range used to assign the IP addresses to the tags when Static IP is used	IP address	0.0.0.0 0.0.0.0
Network mask	Tag netmask when static addressing is used	IP address	0.0.0.0
IP gateway	IP network gateway when static addressing is used	IP address	0.0.0.0

3 Configuration After Initial Activation

The tag can be adjusted for each application and network settings by adjusting a set of parameters. The parameters can be changed wirelessly after resetting the tag by using the Ekahau Activator software or through **Tag Configurations** in Ekahau RTLS Controller.

Ekahau Activator is used for configuring the initial configuration settings that allows connecting the tag to ERC over the network. After connection is established with ERC, all configurations can be managed through Ekahau RTLS Controller.

3.1 Tag Configuration Settings in ERC Configs Page

In Ekahau RTLS Controller it is possible to create a configuration to a single tag or a group configuration to multiple tags. After the tags are activated, the configurations are applied to tags from the Tags page. It is also possible to apply a configuration automatically to all new tags via the Configs page. The list of available settings is in the following table:

Setting	Description	Values (Default underlined)
Network		
Scan Method	Allows using a vendor-specific method for signal measurement. The **Generic** method is vendorindependent	Generic, Aerohive, Aruba, Cisco CCX, Extricom, Meru, Motorola, Juniper Blink
SSID 1	SSID 1 name, Encryption, Passphrase and WEP index	See *Configuring WLAN Settings on page 7* for details
SSID 2	SSID 2 name, Encryption, Passphrase and WEP index	See *Configuring WLAN Settings on page 7* for details
SSID 2 Association	Sets whether tag attempts to associate on B4 SSID 2 network	No association and scan only; associate and scan; Disabled
Broadcast probe	Sets whether the tag uses broadcast probe when scanning	Enabled; Disabled
Tag IP Settings		
IP Setting	Sets the IP method used	Use DHCP for each access point Use DHCP once for all access points Preserve the IP-address that was given by Activator
Positioning Engine		
IP Address	Sets the ERC IP Address	IP Address
Location update Port (UDP)	Port number of location protocol port of ERC	Port number
Maintenance port (UDP)	Port number of maintenance protocol port of EPE	Port number
General		

Setting	Description	Values (Default underlined)
Name	Name for the configuration set	Free text
Description	Description for the configuration set	Free text
Channels		
Scan Channels	Sets the channels scanned during a location scan	1- 11; 12 (EU); 13 (EU); 14 (Japan)
Periodic Location Update and Maintenance		
Periodic Location Update	Enables or disables the periodic location update	Enabled; Disabled
Location Update Interval	Sets the interval for the periodic location update	The interval in Seconds, Minutes, Hours or Days
Periodic Maintenance	Enables or disables the periodic maintenance calls	Enabled; Disabled
Maintenance Interval	The interval of the periodic maintenance calls in seconds	The interval in Seconds, Minutes, Hours or Days
Sensors		
Motion Sensor	Enables or disables motion sensors	Disabled Profile 1 (in motion for 8s) Profile 2 (in motion for 4s) Profile 3 (in motion for 2s) Profile 4 (in motion for 1s)
Motion Update Method	Sets whether location updates are sent periodically during the motion or just when the motion starts and after the movement has ended	In-motion and after motion; After motion
Motion Update Interval	Sets the interval for motion updates	5s; 10s; 30s; 1min; 2min; 5min
Motion Stagnant Event	Enables or disables stagnant sensing	Enabled; Disabled
Motion Stagnant Treshold	Sets how long the tag has to remain stagnant to produce a stagnant event	The threshold in Seconds, Minutes, Hours or Days
Location Beacon Sensor	Enable or disable the location beacon sensor. In active mode a location update is done immediately when the tag notices a location beacon. In passive mode the recent observed location beacon ID is sent to ERC only when location update is initiated by other stimuli such as periodic or motion wakeup	Disabled, Passive Mode, Active Mode
Advanced scan settings		

Setting	Description	Values (Default underlined)
Initial Scan Count	Number of scans the tag does on each triggered scan despite the triggering event. Used to improve the accuracy in difficult conditions and for rarely scanning applications	1 - 10
Delay between initial scans	Delay between the scans	No Delay; 250ms; 500ms; 1000ms; 1500ms; 2000ms
After Motion Scan Count	The number of scans the tag performs for each after motion event	0 - 10
Button Scan Count	The number of scans the tag performs for each button event	0 - 10

Note

Network wide DHCP enables roaming between subnetworks. With this setting the tag refreshes its IP address whenever the tag associates with a new access point. It is not recommended to use the feature, if not required, due to higher power consumption.

Note

Using the **Advanced Scan Settings** needs a careful consideration. The scanning consumes a high amount of energy, and the more scanning is done the less battery life the tag has. Typically these parameters are used to improve accuracy in very difficult conditions or in cases the tag otherwise would scan rarely.

3.2 Tag Actions Available in ERC Tags Properties Page

Setting	Description	Values
User Data		
Name	A user given name for tag	Free text
Custom	A custom note	Free text
Member of Groups	The groups the tag belong to	List of groups or "No Groups created" if no groups exist. Go to groups page to create groups
Commands		
LED / Buzzer	Launches the alarm at the tag with LEDs and buzzer or silently with LEDs only. The alarm duration can be set	LED; LED and Buzzer Duration: 10s; 1min; 10min; 30min; 1h; 2h

Setting	Description	Values
Manual Commands	Manual command or a list of commands can be sent to a tag	-
Set Config	A pre defined config can be selected and sent to tag(s)	A list of available configs. Go to configs page to create tag configurations
Firmware Update		
Firmware	Tag firmware can be updated. The new firmware needs to be first uploaded in the configs page	A list of available firmware updates uploaded in ERC. The firmware needs first to be uploaded into ERC, this is done in configs page
Create New Group		
Group Name	New group is created and the tag is included into this created group	Free text
Manual IP Settings		
Manual IP address	Sets the tag IP Address	IP Address
Netmask	Sets the tag netmask	IP Address
Gateway	Sets the default gateway for the tag	IP Address
Delete		
Delete	The tag is deleted from the system. All statistics are cleared. The tag will appear in the system again when it report it's location next time	-

4 Tag Operation

4.1 Button Activated Location Update and Maintenance Call

In addition to periodic location updates, the tag can also be set to scan and update it's location when any of the buttons is pressed. After a button press the tag scans and sends the RSSI results to ERC immediately. If the Blue button was pressed the TAG will additionally do a maintenance call to update the settings and to read queued LED/Buzzer alerts and messages. The LEDs indicate the scan success or failure similarly as in the scan activated by the wake up interval. It is also possible to define button press based events with Ekahau Vision such as alarms. For more information, please refer to Ekahau Vision user guide.

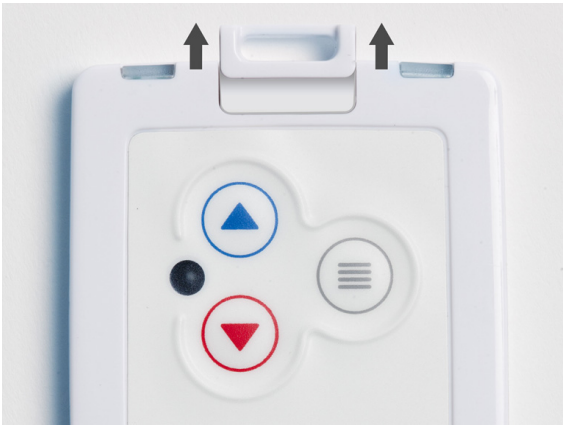
Ekahau RTLS Controller recognizes the B4 tag's button presses as different scan reasons:

- Red button corresponds *"scanreason 1 = Button"*
- Blue button corresponds *"scanreason 6 = Button2"*
- Menu button corresponds *"scanreason 8 = Button3"*

4.2 Safety Switch Activated Location Update

If the safety switch is pulled out from it's original position, the tag will update it's location to the ERC with the Safety Switch flag. If the location update is not succesful, the tag will retry until the succesful update. The Safety Switch can be used to send alerts to personnel via Ekahau Vision when the switch is pulled out. For more information, please refer to Ekahau Vision user guide.

Figure 4.1. Safety switch operation



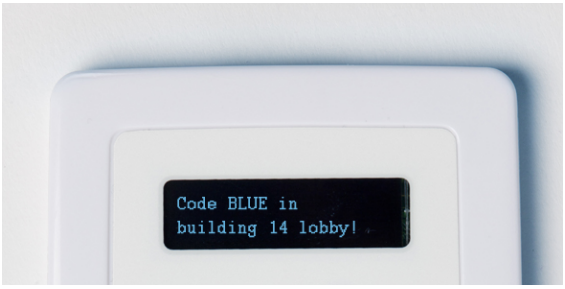
4.3 Working with the Display

The B4 tag's OLED display can be used to read messages sent from Ekahau Vision and Ekahau RTLS Controller. The B4 reads the queued messages during maintenance updates which are made at regular intervals defined by the maintenance interval or when the Red button is pressed. Thus, if the maintenance interval is 60 seconds, the tag can read the new messages every 60

seconds. This needs to be kept in mind if urgent messages need to be sent to the tag. When the tag receives a new message, a small notification sound is played.

It is possible to send 160 character long instant messages and standard messages to the B4 tag. In Ekahau Vision the message size is limited to 40 characters as the message includes additional location information. The maximum number of messages that can be saved to the tags memory depends on the length of the messages. For example, the tag can save 9 messages that are 100 character long and 15 messages with 50 characters.

Figure 4.2. An example message



4.3.1 Instant Messages

As the name implies, an instant message is displayed at the display right away. If the instant message was sent by a triggered event, the tag will also display the zone where the event was triggered. To exit from the instant message, press and hold the Menu button. Note that in contrast to the standard messages, instant messages will not be saved to the tag's memory and will be replaced by another incoming instant message.

4.3.2 Standard Messages

When a standard message is received, a "Message pending" is displayed. To read the standard message:

1. Press and hold the Menu button to access the tag's Messages menu
2. By default, the selector is automatically over the latest message, now simply press the Menu button to read the message

There is two ways to exit from the Message reading screen:

- Press the Menu button to either delete the message or to go back to Messages menu where you can read all the messages in the tag
- Press and hold the Menu button to exit from the tag's menus

You can read the saved standard messages as follows:

1. Press and hold the Menu button to enter the tag's Main menu
2. Browse to **Messages** menu with the Blue or Red button and press the Menu button to enter
3. Use Blue or Red button to browse to the message you want to read and press the Menu button to read it

To delete a standard message, follow the instruction explained above to first access the message reading screen and then do following:

1. Press the Menu button

2. Browse to **Delete** and press the Menu button to delete the message
3. After the delete, you will get back to the **Messages** menu where you can continue reading/deleting messages or go back to the Main menu

Note

You can exit from the tag's menus whenever by pressing and holding the Menu button.

Tip

You can disable the tag's buzzer by entering the Main menu and selecting **Enable silent mode**.

Tip

For more information on how to send messages to the B4 tag, please refer to Ekahau Vision and Ekahau RTLS Controller User Guides.

4.4 Resetting to Factory Settings

The tag can be reset to factory setting with the following button sequence .

1. Press and hold the Blue button until Right LED flashes orange. If the tag is busy this may take even 20 seconds.
2. Then immediately release the Blue button button and press down the Red button .
3. After approximately 2 seconds both LED's flash orange. If the tag is busy, it may flash only the Right LED.
4. The tag has now been reset to factory settings. The tag is in reset mode when it does not execute button scan as defined in section *Button Activated Location Update and Maintenance Call on page 21* and pressing the Menu button does not turn on the display.

Note

Resetting the tag to factory settings removes all messages from its memory!

4.5 Firmware Update

The tag firmware can be updated wirelessly using ERC. The firmware is uploaded to the tags from the **Tag Properties** page or directly from **Tags** page in ERC. Follow instruction in the ERC User Guide for updating the firmware.

Note

If the Tag battery level is below 50% - or below 10% when in charging - the FW update is not allowed. The corresponding error code in ERC is **TU**. To update the firmware, please first recharge the battery and try again.

4.6 Optimizing Battery Life

The B4 Wi-Fi tag uses an ultra-low power system-on-chip architecture that lowers the power consumption to minimal, but to ensure optimal performance with targeted lifetime, here are some considerations.

The principal in optimizing battery life is to determine the maximum interval for location updates, still sufficient for the use case, to minimize the amount of time the tag is active.

Recommendations for optimizing battery lifetime:

- Scan only channels that are in use in your network. Typically, because of overlap of channels, there are only 3 or 4 channels in use from the 11 (or 13/14) available.
- Use single SSID whenever possible. Using multiple SSIDs requires additional network scans and decreases battery lifetime.
- When using dynamic IP addressing tune the DHCP server to provide very long lease times for tags.
- The tag supports roaming between subnetworks. This feature renews tag's IP address whenever the access point association changes. Since renewing IP addresses consumes large amounts of energy, it is strongly recommended not to use the network wide dynamic addressing feature if it is not needed.
- Tune the wake up settings to match your application needs. More frequent updates lower the battery lifetime.

Tip

The battery level can be checked by briefly pressing the Menu button. The text will disappear automatically in a few seconds.

4.7 Turning off the B4 Tag

The B4 tag can only be turned off by resetting the tag to factory settings which is explained in chapter *Resetting to Factory Settings on page 23*. To continue using the tag after resetting, you have to re-activate it following the instructions explained in chapter *Activation Procedure on page 5*.

Note

Turning off the tag's display by exiting from the tag's menus, will not turn off the tag! The tag will stay operational until it is reset to factory settings.

4.8 Charging the B4 tag

Figure 4.3. Connecting the tag with a Single Charger

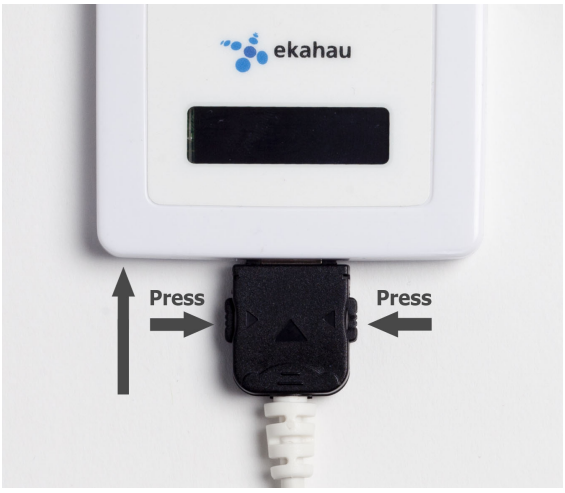


Figure 4.4. B4 tags in Multi Charger

The B4 tag is delivered with the battery charged to a storage charge, and it is recommended to fully charge the batteries before first time activating the tag. To ensure the tag battery is full, please put the tag in to a charger for 4 hours. To remove the charger plug, release the plug by pressing the latches on the plug and pull the plug out.

The tag will give a notification when the tag battery is low. Connect the charger and the Right LED will show orange light during the charging. after the tag is fully charged the Right LED will turn green. If the tag battery is completely empty, the tag will automatically turn off. After a charger is connected, the tag will automatically return to it's normal function, maintaining last settings.

The Ekahau supported adapters are

1. Ekahau C-T301B Charger
2. Ekahau C301B-10 Multi Charger

Note

In case the tag battery is completely empty, typically when left empty and uncharged for several days, it may take a long time for the tag even to turn on the orange led. Just connect the charger and leave the tag to recharge overnight.

Warning

Only use Ekahau supported adapters for charging the tags.

Warning

Recharge the tag only in room temperature conditions, 0 °C - 40°C (32 °F - 104 °F). Recharging the tag in too cold or too hot conditions may damage the tag.

5 Technical Specifications

5.1 General

- Outside Dimensions : 2.36 x 3.54 x 0.33 in / 60 x 90 x 8.5 mm.
- Weight: 1.6 oz / 46 g
- Power: Re-chargeable Lithium Polymer battery
- Charging with 5 VDC, 500 mA max.
- Three buttons with call button functionality
- Two red/green/orange status indication LEDs
- Organic LED display
- Operating Temperature: 32 to 122 ºF / 0 to 50 ºC, battery lifetime is lower on the low and high end of the temperature range.
- Storage Temperature: -40 to 140 ºF / -40 to 60 ºC, battery lifetime is lower on the low and high end of the range. Storage in room temperature is recommended.
- Humidity: From 20 % to 95 % non-condensing, relative humidity
- Environmental Protection: Protected against dust and spraying water

5.2 Wi-Fi

- Supported IEEE Standards: 802.11b/g
- Modulation Scheme: Direct Sequence Spread Spectrum (DSSS)
- Media Access: CSMA/CA
- Transmit Power: +12 dBm@2Mbps
- Receiver Sensitivity: -93 dBm@1Mbps
- Frequency Ranges:
  - 2.400 - 2.4835 GHz (USA, Canada, Europe)
  - 2.400 - 2.497 GHz (Japan)
- Supported Networking Protocols: UDP/IP, DHCP or static addressing
- Security: WEP Encryption 40/104 Bit, WPA2-PSK
- Antenna Type: Internal omni-directional ceramic multilayer
- Maximum Antenna Gain: 0 dBi

5.3 Operating Ranges from an Access Point

- Open Space: 100m (330 ft)
- Typical Office: 40m (130 ft)

5.4 Care and Maintenance

- Keep the tag dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the tag in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the tag in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the tag in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- The operating temperature of the tag is 0 to 50 ºC (32 - 122 ºF). Do not operate the tag outside this temperature range.

- Do not try to open the tag.
- Do not drop, knock or shake the tag. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the tag.
- Do not paint the tag. Paint can clog the moving parts, affect the radio communication and prevent proper operation.
- Use a soft, clean and dry cloth to clean the tag.
- Use only the supplied antenna. Unauthorized antennas, modifications or attachments could damage the tag and may violate regulations governing radio devices.

6 Certifications

6.1 FCC Rules

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.

FCC ID of this device is: TA7-B400

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate the equipment.

6.1.1 FCC RF Radiation Exposure Statement

This equipment complies with FCC Radio Frequency Electromagnetic Signal (RF) exposure limits set forth for an uncontrolled environment of portable transmission. This product has been evaluated for RF exposure at a distance of 0.3 inches (9 mm) from device antenna to body. Operation at a separation distance less than 0.3 inches (9 mm) from the radiating element to nearby persons will expose nearby persons to RF levels that exceed the FCC rules for RF exposure.

6.1.2 Réglementations FCC

Les changements ou modifications non expressément approuvés par Ekahau, Inc. peuvent annuler votre droit d.utiliser cet appareil aux termes des réglementations FCC.

Cet appareil est conforme à la section 15 des règlements FCC sur les appareils numériques de classe B.

Fonctionnement soumis aux conditions suivantes :

(1) Cet appareil ne doit pas causer d’interférences nuisibles.

(2) Cet appareil doit accepter toute autre interférence reçue, y compris les interférences susceptibles d'entraîner un fonctionnement non désiré.

6.2 Industry Canada Statements for Portable Devices

This Class [B] digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [B] est conforme à la norme NMB-003 du Canada.

IC: 6864A-B400

Section 7.1.3 of RSS-GEN

Operation is subject to the following two conditions:

1) this device may not cause interference, and

2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le fonctionnement de ce système est assorti aux deux conditions suivantes :

1 L’appareil ne peut causer d’interférences nuisibles, et

2 L’appareil doit accepter les interférences reçues, y compris celles qui pourraient nuire à son fonctionnement.

Section 7.1.2 of RSS-GEN

"Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication."

"Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante."

7 Limited Warranty

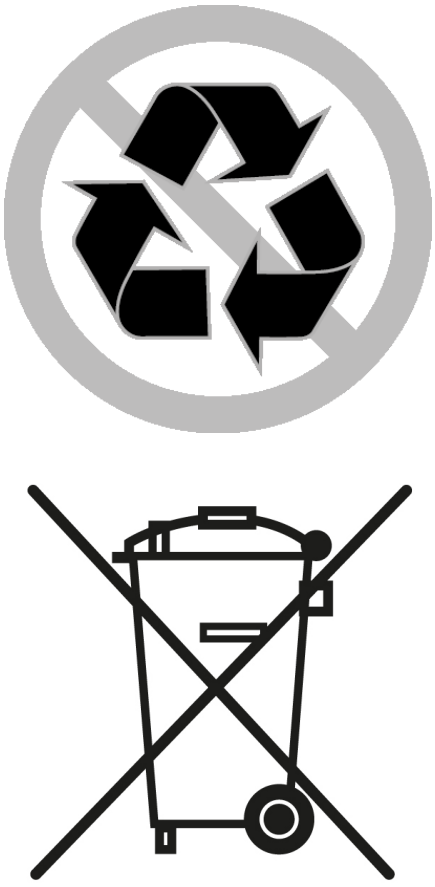
Ekahau warrants that the Tags will operate in accordance with and substantially conform to their published specifications when shipped or otherwise delivered to the end user and for a period of 1 year thereafter, provided, however, that Ekahau does not warrant any claim or damage under this Warranty if such claim or damage results from:

1. Misuse, neglect, accident or improper installation or maintenance of the Tags,
2. Tags that have been altered, modified, repaired or tampered with by anyone other than Ekahau,
3. Use of the Tags not in compliance with their respective documentation, user manuals, instructions, and any usage restrictions contained therein, including, but not limited to, the provisions relating to the environment and ranges where the tags must be used, or
4. Accident, fire, power failure, power surge, or other hazard.

Otherwise, the Tags are sold AS IS. In no event does Ekahau warrant that the Tags are error free or that end user will be able to operate the Tags without problems or interruptions.

End User is responsible for using the Tags within their specifications as contained in the Documentation.

Figure 7.1. The Ekahau B4 Wi-Fi tag is non-recyclable



Ekahau Inc.

USA

East Coast
1851 Alexander Bell Drive, Suite 105
Reston, VA 20191
Tel: 1-866-435-2428
Fax: 1-703-860-2028
sales-americas@ekahau.com

West Coast
12930 Saratoga Avenue, Suite B-8
Saratoga, CA 95070
Tel: 1-866-435-2428
Fax: 1-703-860-2028
sales-americas@ekahau.com

EUROPE

Hiilikatu 3
00180 Helsinki, Finland
Tel: +358-20-743 5910
Fax: +358-20-743 5919
sales-europe@ekahau.com

ASIA

1-64-7 Den-en-chofu, Oota-ku
Tokyo 145-0071, Japan
Tel: +81-90-8514 7882
sales-asia@ekahau.com