



Wireless access point

# WEP-12ac

User manual

Firmware version 1.16.0

IP address: 192.168.1.10

Username: admin

Password: password

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# 1 Introduction


## 1.1 Annotation


Modern tendencies of telecommunication development necessitate operators to search for the most optimal technologies, allowing you to satisfy drastically growing needs of subscribers, maintaining at the same time consistency of business processes, development flexibility and reduction of costs of various services provision. Wireless technologies are spinning up more and more and have paced a huge way for short time from unstable low-speed communication networks of low radius to broadband networks equitable to speed of wired networks with high criteria to the quality of provided services. WEP-12ac device is a Wi-Fi access point of Enterprise class. The device is dedicated to be installed inside buildings as an access point and to create a seamless wireless network using several identical access points on a large area.

This manual specifies intended purpose, main technical parameters, design, installation procedure, safe operation rules and installation recommendations for WEP-12ac.

## 1.2 Symbols

### Notes and warnings

 Notes contain important information, tips or recommendations on device operation and setup.

 Warnings are used to inform the user about harmful situations for the device and the user alike, which could cause malfunction or data loss.

## 2 Device description

### 2.1 Purpose

WEP-12ac wireless access point (hereinafter the device) is designed for provision of users' access to high-speed safe network. The device is dedicated to create L2 wireless networks interfacing with a wired network. WEP-12ac is connected to a wired network via 10/100/1000M Ethernet interface and arrange high-speed access to the Internet for devices supporting Wi-Fi technology at 2.4 and 5 GHz. The device has two radio interfaces to organize two physical wireless networks.

WEP-12ac supports up-to-date requirements to service quality and allows transmitting more important traffic in higher priorities queues. Prioritization is based on main QoS technologies: CoS (special tags in VLAN packet field) and ToS (tags in IP packet field). Besides the standard methods of prioritization, the device allows you to assign demands for traffic transmission almost in every packet field from MAC to TCP/UDP port. The ACL rules and shaping allow you to control access, quality of service and restrictions for all subscribers as well as for each subscriber individually.

WEP-12ac is designed to be installed in offices, state buildings, conference halls, laboratories, hotels, etc. The creation of virtual access points with different types of encryption allows clients to delimit access rights among users and groups of users.

### 2.2 Device specification

#### *Interfaces:*

- 2 Ethernet ports of 10/100/1000Base-T, 1 port out them supports PoE+ technology
- Console RJ-45;

#### *Functions:*

##### *WLAN capabilities:*

- support for IEEE 802.11a/b/g/n/ac standards;
- data aggregation, including A-MPDU (Tx /Rx) and A-MSDU (Rx);
- WMM-based priorities and packet planning;
- dynamic frequency selection (DFS);
- support for hidden SSID;
- 32 virtual access points;
- third-party access point detection;
- support for Work Group Bridge.
- WDS;
- Mesh support;
- APSD;

##### *Network functions:*

- autonegotiation of speed, duplex mode and switching between MDI and MDI-X modes;
- support for VLAN;
- authentication support 802.1X;
- support for 802.11r;
- DHCP client;
- support for IPv6;
- LLDP;
- ACL;
- SNMP;
- GRE.

**Cluster operation mode:**

- organizing a cluster with capacity of up to 64 access points;
- auto synchronization of access point configurations in a cluster;
- auto update of access points firmware in a cluster;
- Single Management IP – united address to control access points in a cluster;
- autodistribution of frequency channels among access points;
- autodistribution of output power level among access points.

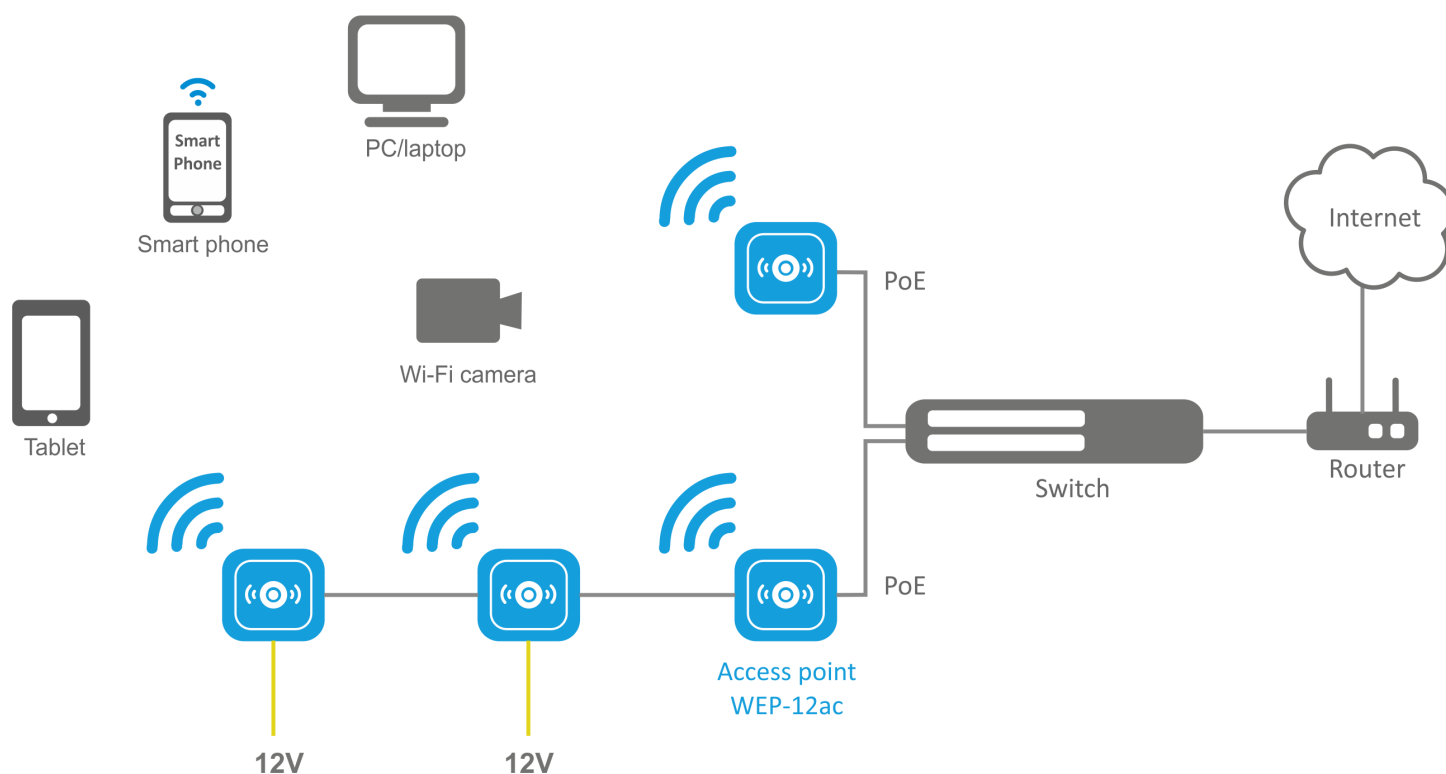
**QoS functions**

- priority and profile-based packet scheduling;
- bandwidth limiting for each SSID;
- changing WMM parameters for each radio interface.

**Safety**

- e-mail notifying on system events;
- centralized authorization via RADIUS server (WPA Enterprise);
- WPA/WPA2;
- Captive Portal;
- IPsec.

The figure below shows WEP-12ac application scheme.



WEP-12ac application scheme

## 2.3 The device technical parameters

Table 1 – The device main technical parameters

<b>WAN Ethernet interface parameters</b>	
Number of ports	2
electrical connectors	RJ-45
Data rate, Mbps	10/100/1000, auto-negotiation
Standards	BASE-T
<b>Wireless interface parameters</b>	
Standards	802.11a/b/g/n/ac
Frequency range, MHz	2412–2472 MHz, 5150–5850 MHz
Modulation	CCK, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Operating channels	<ul style="list-style-type: none"> <li>• 802.11b/g/n: 1–13 (2412–2472 MHz)</li> <li>• 802.11a/ac: 36-64 (5180–5320 MHz)</li> <li>• 100-144 (5500–5720 MHz)</li> <li>• 149-165 (5745–5825 MHz)</li> </ul>
Speed of data transmission, Mbps	6, 9, 12, 18, 24, 36, 48, 54, MCS0-MCS23, MCS0-9 NSS1, MCS0-9 NSS2, MCS0-9 NSS3 802.11n: <ul style="list-style-type: none"> <li>• up to 216.7 Mbps (20 MHz channel),</li> <li>• up to 450 Mbps (40 MHz channel)</li> </ul> 802.11ac: <ul style="list-style-type: none"> <li>• up to 1300 Mbps (80 MHz)</li> </ul>
Maximum output power of the transmitter	<ul style="list-style-type: none"> <li>• 2.4 GHz up to 19 dBm</li> <li>• 5 GHz up to 19 dBm</li> </ul> (Defined by Transmit Power Limit and Transmit Power Control regulators)
Receiver sensitivity	<ul style="list-style-type: none"> <li>• 2.4 GHz up to -98 dBm</li> <li>• 5 GHz up to -94 dBm</li> </ul>
Safety	<ul style="list-style-type: none"> <li>• centralized authorization via RADIUS server (WPA Enterprise)</li> <li>• 64/128/152-bit WEP data encryption, WPA/WPA2</li> <li>• Support for Captive Portal</li> <li>• E-mail notifying on system events;</li> </ul>
Dual-band antennas	

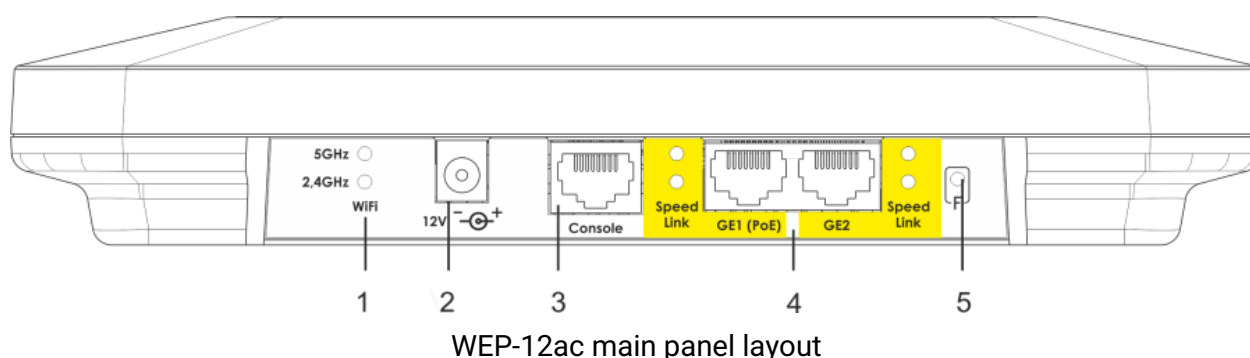
Support for 3x3 MIMO	
Two embedded Broadcom chips BCM43460	
<b>Control</b>	
Remote control	Web interface, Telnet, SSH, SNMP, EMS management system. Firmware updating and configuring through DHCP Autoprovisioning
Access restriction	by password, by IP address
<b>General parameters</b>	
Processor	Broadcom BCM53016/BCM58522
NAND	128 MB NAND Flash
RAM	256 MB RAM DDR3
Power supply	<ul style="list-style-type: none"> <li>power adapter 12 VDC, 2 A</li> <li>PoE+ - 48V/54V (IEEE 802.3at-2009)</li> </ul>
Power consumption	up to 14 W
Range of operation temperatures	from +5 to +40°C
Relative humidity at 25°C	up to 80%
Dimensions	224x235x42 mm
Weight	0.3 kg

## 2.4 Design

WEP-12ac enclosed in plastic case.

### 2.4.1 Device main panel

The layout of WEP-12ac is shown in the figure below.



WEP-12ac main panel layout

Connectors and controls located on the device main panel are listed in Table 2.



Table 2 – Description of ports and controls

Front panel elements		Description
1	Wi-Fi	Operation indicators of corresponding Wi-Fi modules
2	12 V	Connector for power supply
3	Console	Connector for console cable connection (RJ-45 connector)
4	LAN	2 ports of 10/100/1000Base-T (RJ-45 connector) GE1 port for power supply connection via PoE+
5	F	Functional key

## 2.5 Light indication

The current device state is displayed by **Wi-Fi**, **LAN**, **Power** indicators. The list of indicators' possible states is given below.

Table 3 – Light indication of device state

Indicator	Indicator's status	Device state
Wi-Fi	solid green	Wi-Fi network is enabled
	flashing green	the process of data transmission through a wireless network
LAN	solid green (10, 100 Mbps)/ solid orange (1000 Mbps)	the link with the connected network device is established
	flashing green	the process of packet data transmission through LAN interface
Power	solid green	the device power supply is enabled, normal operation, IP address is obtained
	solid orange	the device is loaded but IP address is not received via DHCP
	solid red	the device is loading

## 2.6 Reset to the default settings

In order to reset the device to factory settings, press and hold the 'F' button until «Power» indicator starts flashing. Device will be rebooted automatically. DHCP client will be launched by default. If the address is not received via DHCP the device will have IP address – 192.168.1.10, subnet mask – 255.255.255.0 and User Name/Password to access via Web interface: admin/password.

## 2.7 Delivery package

The delivery package includes:

- WEP-12ac wireless access point;
- Mounting kit;
- Operating manual (supplied on a CD);
- Conformity certificate;
- Technical passport.

## 3 Installation order

This section defines safety rules, installation recommendations, setup procedure and the device starting procedure.

### 3.1 Safety rules

- Do not install the device near heat source and at places where temperature may reach values below 5°C or higher 40°C.
- Do not use the device in places with high humidity. Do not expose the device to smoke, dust, water, mechanical vibrations or shocks.
- Do not open the device case. There are no user serviceable parts inside.
- Do not cover ventilation holes and do not put other objects on the device in order to prevent overheating of device components.

### 3.2 Installation recommendations

The recommended installation: horizontal, on a ceiling.

Before you install and enable device, check the device for visible mechanical defects. If defects are observed, you should stop the device installation, draw up corresponding act and contact the supplier.

If the device has been exposed for a long time at a low temperature, it must be left to stand for two hours at room temperature before use. After a long stay of the device in conditions of high humidity, let it stand under normal conditions for at least 12 hours before switching on.

During the device installation to provide Wi-Fi coverage area with the best characteristics take into account the following rules:

1. Install the device at the center of a wireless network;
2. Minimize the number of obstacles (walls, roof, furniture and etc.) between WEP-2ac and other wireless network devices;
3. Do not install the device near (about 2 m) electrical and radio devices;
4. It is not recommended to use radiophone and other equipment operating on the frequency of 2.4 GHz, 5 GHz in Wi-Fi effective radius;
5. Obstacles in the form of glass/metal constructions, brick/concrete walls, water cans and mirrors can significantly reduce Wi-Fi action radius. It is not recommended to place the device inside a false ceiling as metal frame causes multipath signal propagation and signal attenuation.

During the installation of several access points, cell action radius must overlap with action radius of a neighboring cell at level of -65 ÷ -70 dBm. Decreasing of the signal level on cells borders to -75 dBm is permitted if it involves the use of VoIP, streaming video and other traffic that is sensitive to losses in wireless network.

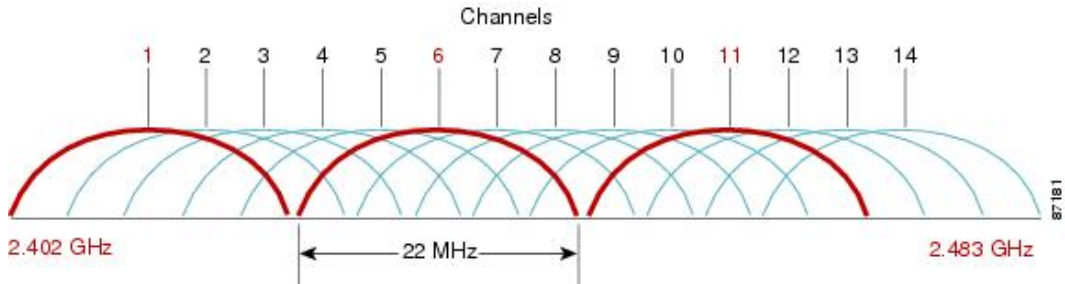
### 3.3 Calculating the number of required access points

To calculate the required number of access points, you should evaluate the required coverage zone. For a more accurate assessment, it is necessary to make a radio examination of the room. Approximate radius of coverage area of WEP-12ac with a good-quality signal in case of mounting on a ceiling in typical office: 2.4 GHz – 40–50 m, 5 GHz – 20–30 m. In case of no obstacles, the radius of the coverage area is up to 2.4 GHz – up to 100 m, 5 GHz – up to 60 m. The table below describes rough attenuation values.

Table 4 – Attenuation values

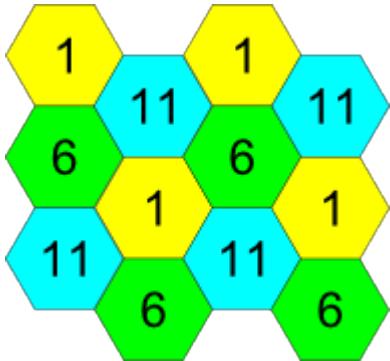
Material	Change of signal level, dB	
	2.4 GHz	5 GHz
Organic glass	-0.3	-0.9
Brick	-4.5	-14.6
Glass	-0.5	-1.7
Plaster slab	-0.5	-0.8
Wood laminated plastic	-1.6	-1.9
Plywood	-1.9	-1.8
Plaster with wirecloth	-14.8	-13.2
Breezeblock	-7	-11
Metal lattice (mesh 13*6 mm, metal 2mm)	-21	-13

It is recommended to set nonoverlapping channels to avoid interchannel interference among neighboring access points.



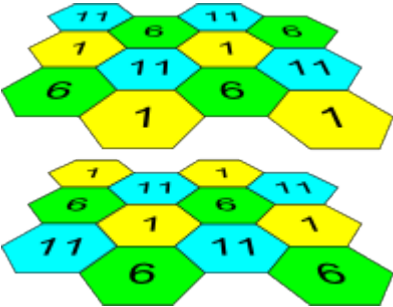
General diagram of frequency channel closure in the range of 2.4 GHz

For the example of channel allocation scheme among neighboring access points in frequency range of 2.4 GHz when channel width is 20 MHz, see figure below.



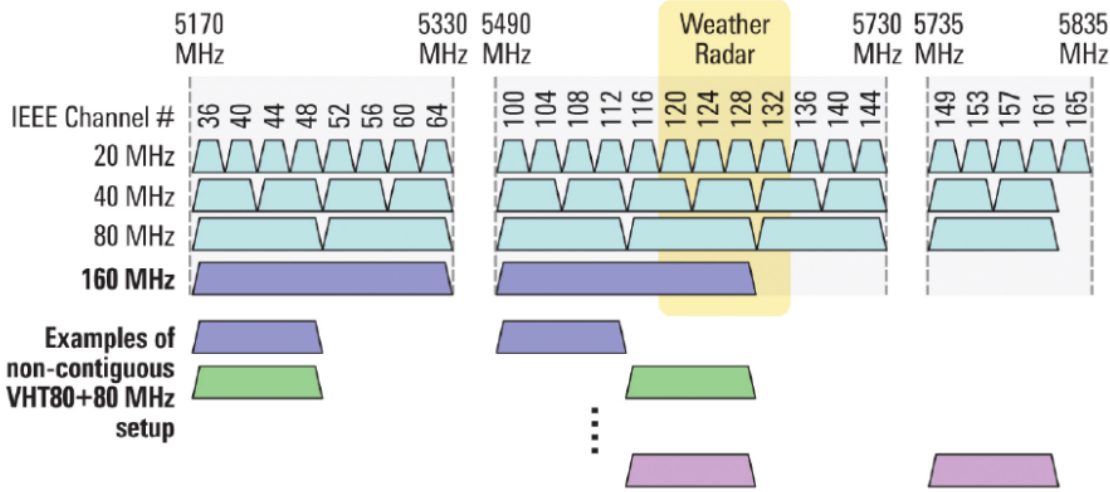
Scheme of channel allocation among neighboring access points in the frequency range of 2.4 GHz when channel width is 20 MHz

Similarly, the procedure of channel allocation is recommended to save for access point allocation between floors, see figure below.



Scheme of channel allocation between neighboring access points that are located between floors

When width of used channel is 40 MHz there is no non-overlapping channels in frequency range of 2.4 GHz. In such cases, you should select channels maximally separated from each other.



Channels used in range of 5 GHz when channel width is 20, 40 or 80 MHz

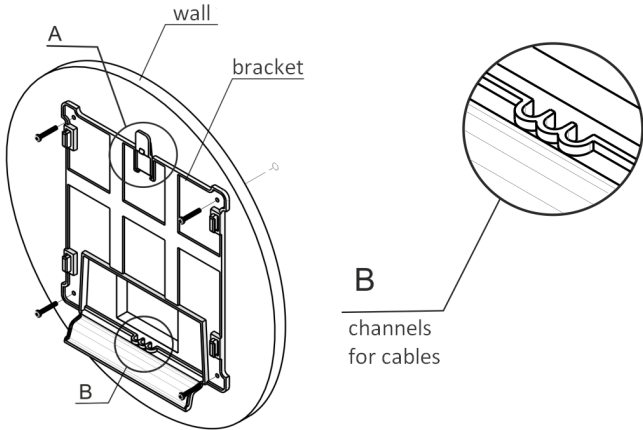
### 3.4 Installing WEP-12ac

The device should be attached to plain surface (wall or ceiling) in accordance with the safety instruction and recommendations listed above.

The device delivery package includes required mounting kit to attach the device to plain surface.

#### 3.4.1 Order for wall-mounting brackets

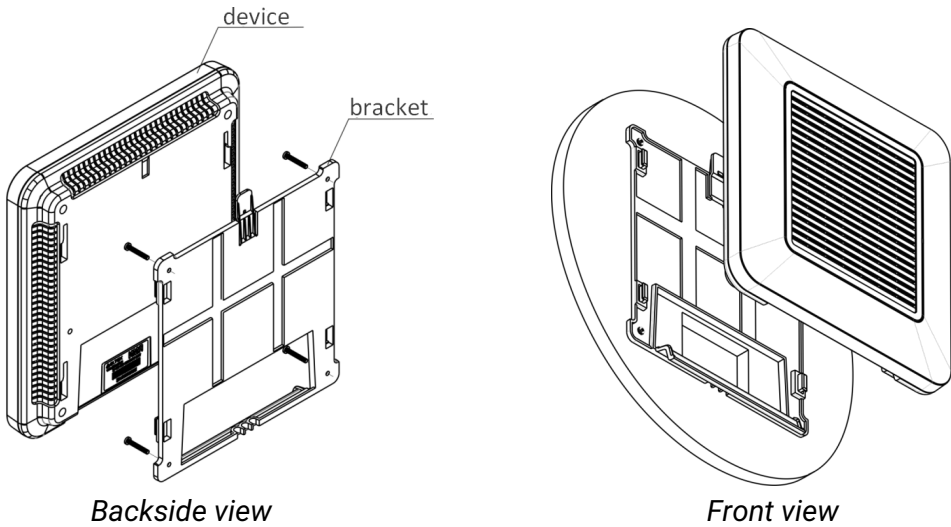
1. Fix the bracket (included in the delivery package) to the wall:



A – latch; B – channels for cables  
Attaching the bracket to a wall

- 1.1. Install the bracket in the way that the latch is on the top, see figure above.
- 1.2. When installing the bracket, pass wires through the corresponding channels of the bracket, see figure above.
- 1.3. Align together four boltholes on bracket and boltholes on the device surface. Screw the brackets to the device surface by using screwdriver.

2. The device installation

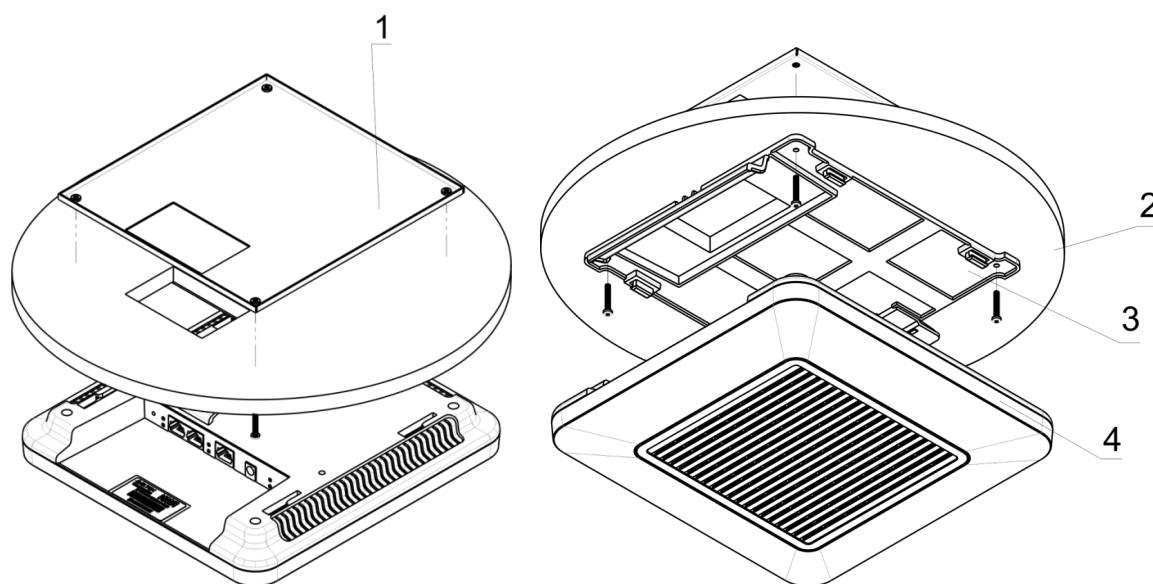


2.1 Connect cables to corresponding connector of the device. Description of the connectors is given in sector Design.

2.2 Align channels on the device case with the bracket and shift the device downward till fixation of the latch on the top.

### 3.4.2 Installing to false ceiling

It is not recommended to place the device inside a false ceiling as metal frame causes multipath signal propagation and signal attenuation.



1 – metal bracket; 2 – armstrong panel; 3 – plastic bracket; 4 – device.

#### Mounting to a false ceiling

1. Fasten metal and plastic bracket on a ceiling as shown in the figure 9. The plastic bracket (3) should be joined with the metal one (1) on the ceiling in the following order: metal bracket -> armstrong panel -> plastic bracket.
2. Cut the hole in the armstrong panel. The size of the hole should be equal to hole of metal bracket. Conduct wires through the hole.
3. Align holes in metal bracket with holes of armstrong panel and plastic bracket. Align together four boltholes on the plastic bracket and the boltholes on the metal bracket. Screw the brackets to the device surface by using a screwdriver.
4. Install the device.
  - 4.1. Connect cables to corresponding connector of the device. Description of the connectors is given in sector Design.
  - 4.2. Align channels on the device case with the bracket and shift the device downward till fixation of the latch on the top.

### 3.4.3 Removing the device from the bracket

To remove the device, press the latch and shift the device towards the latch.

### 4 Application A. WEP-12ac antennas patterns

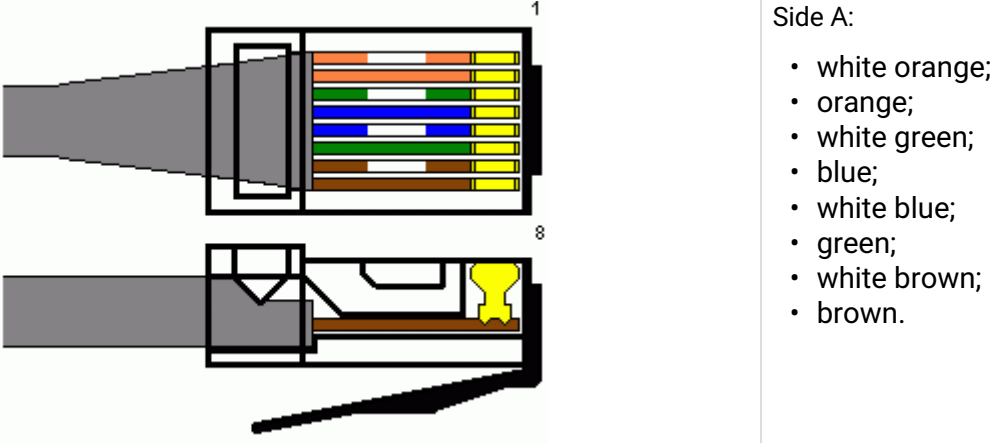




## 5 Application B. Pin array of the device connectors

### RJ-45 connector pin array

The next scheme is used for twisted-pair wiring.



Side A:

- white orange;
- orange;
- white green;
- blue;
- white blue;
- green;
- white brown;
- brown.

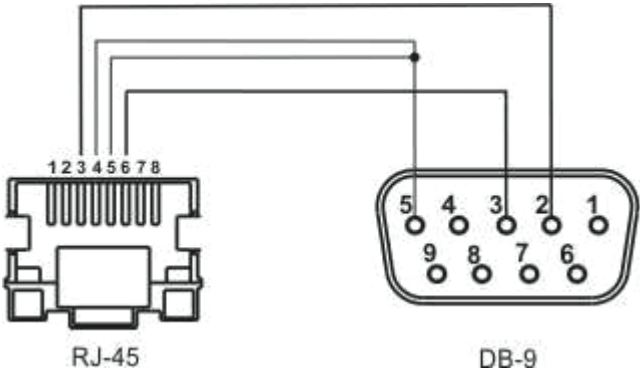
RJ-45 connector

### RJ45-DB9 console cable pin array

RJ45-DB9 connector pin array

Serial Port (RJ-45 Connector) Pin	Adapter (DB-9) Pin
3 (TXD)	2 (RXD)
4 (Signaling Ground)	5 (Signaling Ground)
5 (Signaling Ground)	5 (Signaling Ground)
6 (RXD)	3 (TXD)

The example of implementation is shown on the following figure:



## 6 The list of changes

Document version	Issue Date	Revisions
Version 1.15	12/02/2019	Synchronization with firmware version 1.16.0
Version 1.14	30/11/2018	Synchronization with firmware version 1.15.0
Version 1.13	10/08/2018	Synchronization with firmware version 1.14.0
Version 1.12	08/05/2018	Synchronization with firmware version 1.12.2 Changes in section: <ul style="list-style-type: none"> <li>• Device specification</li> </ul>
Version 1.11	27/12/2017	Synchronization with firmware version 1.11.4
Version 1.10	30/10/2017	Synchronization with firmware version 1.11.2
Version 1.9	01/07/2017	Synchronization with firmware version 1.10.0
Version 1.8	06/02/2017	Synchronization with firmware version 1.9.0
Version 1.7	20/09/2016	Synchronization with firmware version 1.8.0
Version 1.6	19/07/2016	Synchronization with firmware version 1.7.0 Changes in section: <ul style="list-style-type: none"> <li>• The device technical parameters</li> </ul>
Version 1.5	06/07/2016	Synchronization with firmware version 1.6.5
Version 1.4	16/05/2016	Synchronization with firmware version 1.6.4
Version 1.3	30/11/2015	Changes in section: <ul style="list-style-type: none"> <li>• The device technical parameters</li> </ul>
Version 1.2	13/10/2015	Synchronization with firmware version 1.6.2
Version 1.1	24/03/2015	Synchronization with firmware version 1.5.0 Changes in section: <ul style="list-style-type: none"> <li>• Application B. Pin array of the device connectors</li> </ul>
Version 1.0	29/08/2014	First issue
<b>Firmware version 1.16.0</b>		

## TECHNICAL SUPPORT

For technical assistance in issues related to handling of ELTEXALATAU Ltd. equipment please address to Service Centre of the company:

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