

LigoDLB software manual

User's Guide

Revision 1.0

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Notice

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FCC Statement

Federal Communication Commission Interference Statement

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 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.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antennas(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IC warning

This device complies with Industry Canada license-exempt RSS standard(s).

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 présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This device and its antennas(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with IC multi-transmitter product procedures. Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionner en association avec une autre antenne ou transmetteur.

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

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About this Guide

Prerequisite Skills and Knowledge

To use this document effectively, you should have a working knowledge of Local Area Networking (LAN) concepts and wireless Internet access infrastructures.

Conventions Used in this Document

The following typographic conventions and symbols are used throughout this document:



Additional information that may be helpful but which is not required.



Important information that should be observed.

bold Menu commands, buttons, input fields, links, and configuration keys are displayed in bold

italic References to sections inside the document are displayed in italic.

`code` File names, directory names, form names, system-generated output, and user typed entries are displayed in constant-width type

FWBD-2600 specification

The FWBD-2600 is a versatile, very efficient, and stable 2.4 GHz hardware platform. Platform is equipped with 802.11n MIMO radio.

The robust hardware is coupled with an advanced and feature-rich operating system optimized for high performance communications which allows compatibility with older 802.11b/g standard while adding support for the latest in wireless communications. The device supports access point and station operating modes acting as bridge or as router, thus making it one of the most flexible devices on the market.

Note 1: Antenna 0 and Antenna 1 frequency range is 2412MHz - 2462MHz (CH1 to CH11).

Note 2: FEM - Front End Module. FEM includes RF PA, RF Switch and RF LNA.

Note 3: BPF – Band Pass Filter.

Note 4: LPF – Low Pass Filter.

Note 5: AR9341 contains contains internal Voltage Regulator making +1.2V from 3.3V.

Hardware information

Feature	Description	Notes
CPU	AR9341	
RAM	64MB	
Flash memory	16MB	
Watchdog timer	Built into CPU	
Reset push button	Connected to GPIO	
LED's	6 LED's connected to GPIO	Power, LAN, 4x received signal strength
Ethernet	One 10/100 Ethernet port	
Power options	Power-Over-Ethernet	PoE polarity independent via Eth pins 4/5 and 7/8.
Power supply	24V	
Serial port (UART)	Testpoints	3.3V TTL level, not end user accessible
Operating temperature range	From 0C to +40C	
Humidity	0 ~ 90 % (non-condensing)	
Power consumption	up to 4.6W	

Wireless information

Parameter	Description
WLAN standard	IEEE 802.11 b/g/n
Radio mode	SISO 1x1 and MIMO 2x2
Radio frequency band	2.4 GHz (Country dependent from 2.412 GHz to 2.462GHz)
Channel size	5, 10, 20, 40MHz
Modulation schemes	802.11 g/n: OFDM (64-QAM, 16-QAM, QPSK, BPSK) 802.11 b: DSSS (BPSK / QPSK / CCK)
Data rates	802.11 n: 300, 270, 240, 180, 120, 90, 60, 30 Mbps 802.11 g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11 b: 11, 5.5, 2, 1 Mbps

Software

Features	
General	Ability to define/limit frequency, channel width, EIRP, modulation
Advanced wireless functionality	Auto-channel, auto-modulation
Operating mode	Router, Bridge
Wireless operating modes	AP auto WDS, Station, Station WDS, Virtual radios (VSSID), iPoll access point, iPoll client
Wireless security	WPA/WPA2 Personal, WPA/WPA2 Enterprise
Wireless QoS	WMM
WAN protocols	Static IP, DHCP client, PPPoE client
Network	NAT
Services	DHCP server, SNMP server, Wireless and Ethernet statistics
Management	HTTP GUI, SSH CLI, SNMP read, WNMS, troubleshooting file, reset via reset tool
Tools	Site survey, Antenna alignment

Power consumption

State	Current	Voltage	Power consumption
Idle	103 mA	24 V	2.47 W
Max load	192 mA	24 V	4.61 W

First Connection

The default product address is 192.168.2.66.

The default administrator login settings are:

Login: **admin**

Password: **admin01**

Follow the steps for first connection to the device:

- Step 1.** Connect an Ethernet cable between your computer and the AP.
- Step 2.** Make sure your computer is set to the same subnet as the AP, i.e. 192.168.2.150
- Step 3.** Start your Web browser.
- Step 4.** Each devices uses following default settings.

- WAN IP: **192.168.2.66**
- Subnet mask: **255.255.255.0**
- Username: **admin**
- Password: **admin01**

The initial login screen looks as follow:

- Step 5. Confirm the user agreement.** According to the chosen country the regulatory domain settings may differ. You are not allowed to select radio channels and RF output power values other the permitted values for your country and regulatory domain.
- Step 6.** After successful administrator login you will see the main page of the device Web management interface. The device now is ready for configuration.

Configuration Guide

This document contains product's powerful web management interface configuration description allowing setups ranging from very simple to very complex.

Applying and Saving Configuration Changes

There are three general buttons located on the right top corner of the WEB GUI allowing managing device configuration:

Save changes – if pressed new configuration settings are applied instantly and written to the permanent device memory.

Test changes – if pressed the device will start operating with newly set configuration settings for 3 minutes. During this test time the administrator is able to gauge if device is working properly, and then Save changes. In case wrong settings were chosen (or even after faulty settings administrator have lost connection with the device), the device automatically reverts back configuration to an old one.

Discard changes – if pressed parameter changes are discarded. It should be noted that if Save changes is pressed it is not possible to discard changes.

Status

After login, the main Web management page displays Status Information page. The header of Web management page displays main information about device: Firmware version, Product name, Uptime, CPU load, Ethernet port(s) status, Connected client count.

Information

The Information page displays a summary of status information of your device. It shows important information for the APC operating mode, radio and network settings.

If APC device is dual-band, then Information page will be divided into two tabs (for 2.4GHz and 5GHz radio), each containing appropriate information.

Radio – displays summary of the radio interface configuration.

Wireless – displays general information about the wireless connection. The wireless information will differ on Access Point, Station, iPoll wireless modes:

- **Access point (autoWDS) and (Access Point (iPoll 2)** – displays access point operating information: SSID, Security type, SSID Broadcast status, VLAN and number of connected clients.
- **Station (WDS/iPoll) and Station (ARPNAT)** – displays settings at which the station is connected to the access point: SSID, Security type, Peer's MAC address, Tx/Rx rate, Protocol.

Network mode – displays short summary about current network configuration (bridge or router).

Statistics

The **Statistics** sections are divided into two sections and displays network interface counters and traffic graphs of wired and wireless interfaces:

Interface counters – displays table of interface statistics. The SSID name is displayed in the brackets near the radio interface (and VAPs).

MAC address– displays the MAC address of the particular interface.

Tx data – displays the transmitted data.

Rx data – displays the received data.

Tx packets – displays the number of transmitted packets.

Rx packets – displays the number of received packets.

Tx errors – displays the number of the TX errors.

Rx errors – displays the number of the RX errors.

The wired and wireless interface graphs display real-time data traffic. If particular device is working as Station, the additional graph of the signal and noise levels will be displayed:

Settings

Network Configuration

The **Settings | Network Configuration** page allows you to control the network configuration of the device. First, the device operation mode must be defined to work as a bridge or router (IPv4 or IPv6). The content of the window varies depending on your selection:

Network mode – choose the device operating mode. Network settings will vary according to the selected Network mode. The Bridge mode allows configuring device IPv4 and IPv6 LAN IP settings, while the Router mode requires more parameters such as LAN network settings, WAN network settings, LAN DHCP settings.

Bridge Mode

When device is configured to operate in Bridge mode, only device LAN settings should be configured on the **Network configuration** page:

Enable management VLAN – enable a VLAN tagging for management traffic. Access to the AP for management purposes can further be limited using VLAN tagging. By defining Management VLAN, the device will only accept management frames that have the appropriate Management VLAN ID. All other frames using any management protocol will be rejected.

Management VLAN ID – specify the VLAN ID [2-4095]. When device interfaces are configured with a specific VLAN ID value, only management frames that matching configured VLAN ID will be accepted by device.

IPv4 Configuration

IP method – specify IP reception method: IP addresses can either be retrieved from a DHCP server or configured manually:

- **Static** – the IP address must be specified manually.
- **Dynamic** – the IP address for this device will be assigned from the DHCP server. If DHCP server is not available, the device will try to get an IP. If has no success, it will use pre-configured fallback IP address. The fallback IP settings can be changed to custom values.

IP address – specify IP address for device

Subnet mask – specify a subnet mask for device.

Default gateway – specify a gateway IP address for device.

DNS server – specify the Domain Naming Server.

Secondary IP – specify the alternative IP address and the netmask for APC unit management.

IPv6 Configuration

Click the **IPv6** slide to enable IPv6 configuration:

IPv6 method – specify IPv6 reception method: IPv6 addresses can either be retrieved from a DHCPv6 server or configured manually:

- **Static** – the IPv6 address must be specified manually.
- **Dynamic stateless IP** – the DHCPv6 client only obtains network parameters other than IPv6 address
- **Dynamic stateful IP** – the DHCPv6 clients require IPv6 address together with other network parameters (e.g. DNS Server, Domain Name, etc.).

IPv6 address – specify the IPv6 Address for the interface.

IPv6 prefix length – enter the Prefix Length for the address.

IPv6 default gateway – specify IPv6 address for default gateway.

IPv6 DNS server – specify the Domain Naming Server IPv6 addresses.

Router IPv4 Mode

This section allows customizing parameters of the Router to suit the needs of network, including ability to use the built-in DHCP server. When device is configured to operate as Router, the following sections should be specified: WAN network settings, LAN network settings and LAN DHCP settings.

Enable NAT – select to enable NAT (Network Address Translation), that functions by transforming the private IP address of packets originating from hosts on your network so that they appear to be coming from a single public IP address and by restoring the destination public IP address to the appropriate private IP address for packets entering the private network, the multiple PCs on your network would then appear as a single client to the WAN interface.

WAN Settings

WAN network settings include settings related to the WAN interface. The access type of the WAN interface can be configured as: Static IP, Dynamic IP, PPPoE client.

IP method – choose **Static** to specify IP settings for device WAN interface:

IP address – specify static IP address.

Subnet mask – specify a subnet mask.

Default gateway – specify a gateway.

DNS server – specify primary and/or secondary DNS server

Secondary IP – enable to specify the alternative IP address and the netmask for APC unit management.

WAN mode – choose **Dynamic** to enable DHCP client on the WAN side. This option does not need any parameters:

DHCP fallback setting – specify IP address, Subnet mask, Default gateway and optionally DNS server for DHCP fallback. In case the APC unit will not get the IP address from the DHCP, the specified fallback IP settings will be used.

Enable secondary IP – specify the alternative IP address and the netmask for APC unit management.

DNS servers – allows selecting if automatically assigned or alternative DNS servers should be used

WAN mode – choose PPPoE to configure WAN interface to connect to an ISP via a PPPoE:

User name – specify the user name for PPPoE.

Password – specify the password for PPPoE.

MTU – specify the MTU (Maximum Transmission Unit) in bytes.

Enable secondary IP – specify the alternative IP address and the netmask for APC unit management.

DNS settings – allows selecting if automatically assigned or alternative DNS servers should be used.

LAN Network Settings

LAN configuration include settings related to the LAN interface.

IP address – specify the IP address of the device LAN interface.

Subnet mask – specify the subnet mask of the device LAN interface.

Enable DHCP server – select to enable DHCP server on LAN interface.

- **IP address from** – specify the starting IP address of the DHCP address pool.
- **IP address to** – specify the ending IP address of DHCP address pool.
- **Lease time** – specify the expiration time in seconds for the IP address assigned by the DHCP server.

Wireless

The APC device can operate in four wireless modes: Access Point (autoWDS), Access Point (iPoll 2), Station (auto iPoll 2) and Station (ARPNAT).

Depending on the wireless operation mode selection some of the displayed configuration parameters will differ (e.g. security or advanced wireless settings).

Operating mode – select wireless operation mode:

- **Access Point (auto WDS)** – enables the APC function as an access point to connect multiple wireless clients. Auto WDS mode allows connect wireless clients with and without WDS enabled (the packet forwarding at layer 2 level).
- **Access Point (iPoll 2)** – enables APC radio function as access point for point-to-multipoint solution. The Access Point communicates with Station in iPoll 2 protocol, other clients requests will be not accepted.
- **Station (auto iPoll 2)** – with this wireless mode the APC will act as Station and will automatically turn on iPoll 2 mode if detects that selected AP is operating in iPoll 2 protocol.
- **Station (ARPNAT)** – in this mode Station connects to other radios operating as an Access Point.

Wireless Mode: Access Point (auto WDS)

Enable radio – use slide to enable or disable APC radio.

Operating country - displays APC unit operating country. The Country selection determines the available channels and transmission power level based on regulatory restrictions in the operating country. The country has been selected on the first step of the APC unit's installation, though can be updated if required.

IEEE mode – specify the wireless network mode.

Tx power (dBm) – set the unit's transmitting power at which the device will transmit data. The larger the distance, the higher transmit power is required. To set transmit power level use the slider or enter the value manually. When entering the transmit power value manually, the slider position will change according to the entered value. The maximum transmit power level is limited to the allowed value by country in which device is operating regulatory agency.

Channel – displays the channel at which the AP is operating, or indicates that autochannel function is used. Click the button and the channel selection window will be displayed:

Channel width – The default channel bandwidth for 802.11 radio is 20MHz. The 802.11n allow channel bonding in such way the total channel width becomes 40MHz.

Channel table – select the channel(s) at which the Access Point will operate. If more than one channel is selected, then autochannel feature will be enabled. Automatic channel selection allows AP to select a channel which is not used by any other wireless device or, if there are no free channels available - to select a channel which is least occupied.

Advanced Radio Settings

Advanced parameters allow configuring the device to get the best performance/capacity of the link.

Max 802.11n MCS index – choose the maximum rates to specify the modulation and coding scheme (MCS) rates at which data can be transmitted between the access point and the client. If there will be an interference encountered, the APC will step down to the highest rate that allows data transmission.

Max legacy data rate – choose the maximum data rate in Mbps at which AP should transmit packets. The AP will attempt to transmit data at the highest data rate set. If there will be an interference encountered, the APC will step down to the highest rate that allows data transmission.

AMSDU – enable the AMSDU packet aggregation. If enabled, the maximum size of the 802.11 MAC frames will be increased.


Short GI – enable short guard interval. If selected, then 400ns value will be used, else 800ns.

Fragmentation – specify the Fragmentation threshold using slider or enter the value manually [256-2346 bytes]. This is the maximum size for a packet before data is fragmented into multiple packets. Setting the Fragmentation threshold too low may result in poor network performance. Only minor modifications of this value are recommended.

RTS/CTS – specify the RTS threshold using slider or enter the value manually [0-2347 bytes]. The RTS threshold determines the packet size of a transmission and, through the use of an access point, helps control traffic flow.

ACK timeout – specify the ACK timeout using slider or enter the value manually. Ack timeout can be entered by defining the link distance or specifying time value. Too low value of the ACK timeout will give very low throughput. A high value may slow down the link in noisy environment. A low value is far worse than a value slightly too high. ACK Timeout value should be tuned to the optimal value for the maximum link throughput.

Wireless Settings (AP)

The wireless table allows configure main AP parameters, such as SSID, Security, WACL, etc. Click on the edit icon  and the wireless settings window will be displayed:

SSID – specify the SSID of the wireless network device.

Broadcast SSID – enables or disables the broadcasting of the SSID for AP.

Advanced AP Settings

Client isolation – select to enable the layer 2 isolation that blocks clients from communicating with each other. Client isolations is available only in Access Point (auto WDS) and Access Point Repeater mode.

Map to data VLAN ID – specify the VLAN ID for traffic tagging on particular radio interface. The Station devices that associate using the particular SSID will be grouped into this VLAN.

Max connected clients - specify the maximum number of associated wireless clients on the AP radio.

Min client signal (dBm) - if enabled, the AP will drop the connection for clients that have signal level below configured threshold.

Quality of service (WMM) – enable to support quality of service for prioritizing traffic.

Management over wireless – controls the wireless administrative access. For security reasons, it is recommended disable wireless access and instead requires a physical network connection using an Ethernet cable for administrative access to APC.

Wireless Mode: Access Point (iPoll 2)

The iPoll 2 wireless mode is designed for point to multipoint wireless solutions. The iPoll 2 Access Point establishes a connection only with iPoll 2 Stations thus creating a reliable network.

Enable radio – use slide to enable or disable APC radio.

Operating country - displays APC unit operating country. The Country selection determines the available channels and transmission power level based on regulatory restrictions in the operating country. The country has been selected on the first step of the APC unit's installation, though can be updated if required.

Tx power (dBm) – set the unit's transmitting power at which the device will transmit data. The larger the distance, the higher transmit power is required. To set transmit power level use the slider or enter the value manually. When entering the transmit power value manually, the slider position will change according to the entered value. The maximum transmit power level is limited to the allowed value by country in which device is operating regulatory agency.

Channel – displays the channel at which the AP is operating, or indicates that autochannel function is used. Click the button and the channel selection window will be displayed:


Channel width – The default channel bandwidth for 802.11 radio is 20MHz. The 802.11n allow channel bonding in such way the total channel width becomes 40MHz.

Channel table – select the channel(s) at which the Access Point iPoll 2 will operate. If more than one channel is selected, then autochannel feature will be enabled. Automatic channel selection allows AP to select a channel which is not used by any other wireless device or, if there are no free channels available - to select a channel which is least occupied.

Advanced Radio Settings

Max data rate (Mbps) – choose the maximum rates to specify the modulation and coding scheme (MCS) rates at which data can be transmitted between the access point and the client. If there will be an interference encountered, the APC will step down to the highest rate that allows data transmission.

Wireless Settings (AP)

The wireless table allows configure main AP parameters, such as SSID, Security, WACL, etc. Click on the edit icon  and the wireless settings window will be displayed:

Advanced AP Settings

Client isolation – select to enable the layer 2 isolation that blocks clients from communicating with each other. Client isolations is available only in Access Point (auto WDS) and Access Point Repeater mode.

Map to data VLAN ID – specify the VLAN ID for traffic tagging on particular radio interface. The Station devices that associate using the particular SSID will be grouped into this VLAN.

Max connected clients - specify the maximum number of associated wireless clients on the AP radio.

Min client signal (dBm) - if enabled, the AP will drop the connection for clients that have signal level below configured threshold.

Quality of service (WMM) – enable to support quality of service for prioritizing traffic.

Management over wireless – controls the wireless administrative access. For security reasons, it is recommended disable wireless access and instead requires a physical network connection using an Ethernet cable for administrative access to APC.

Wireless Mode: Station (WDS/iPoll 2)

With this wireless mode, the APC will operate as wireless Station, though it automatically switch on the iPoll 2 mode if the specified access point will be detected as an AP iPoll 2. If the Station finds two networks with the same SSID, where one is iPoll 2, another 11n, the connection priority will be iPoll 2.

Use Wireless Configuration to setup radio interface of the device.

Enable radio – use slide to enable or disable APC radio.

Operating country - displays APC unit operating country. The Country selection determines the available channels and transmission power level based on regulatory restrictions in the operating country. The country has been selected on the first step of the APC unit's installation, though can be updated if required.

Tx power (dBm) – set the unit's transmitting power at which the device will transmit data. The larger the distance, the higher transmit power is required. To set transmit power level use the slider or enter the value manually. When entering the transmit power value manually, the slider position will change according to the entered value. The maximum transmit power level is limited to the allowed value by country in which device is operating regulatory agency.

Channel width - The default channel bandwidth for 802.11 radio is 20MHz. The 802.11n allow channel bonding in such way the total channel width becomes 40MHz.

Advanced Radio Settings

Advanced parameters allow configuring the device to get the best performance/capacity of the link.

Max 802.11n MCS index – choose the maximum rates to specify the modulation and coding scheme (MCS) rates at which data can be transmitted between the access point and the client. If there will be an interference encountered, the device will step down to the highest rate that allows data transmission.

Max legacy data rate – choose the maximum data rate in Mbps at which device should transmit packets. It will attempt to transmit data at the highest data rate set. If there will be an interference encountered, the device will step down to the highest rate that allows data transmission.

AMSDU – enable the AMSDU packet aggregation. If enabled, the maximum size of the 802.11 MAC frames will be increased.


Short GI – enable short guard interval. If selected, then 400ns value will be used, else 800ns.

Fragmentation – specify the Fragmentation threshold using slider or enter the value manually [256-2346 bytes]. This is the maximum size for a packet before data is fragmented into multiple packets. Setting the Fragmentation threshold too low may result in poor network performance. Only minor modifications of this value are recommended.

RTS/CTS – specify the RTS threshold using slider or enter the value manually [0-2347 bytes]. The RTS threshold determines the packet size of a transmission and, through the use of an access point, helps control traffic flow.

ACK timeout – specify the ACK timeout using slider or enter the value manually. Ack timeout can be entered by defining the link distance or specifying time value. Too low value of the ACK timeout will give very low throughput. A high value may slow down the link in noisy environment. A low value is far worse than a value slightly too high. ACK Timeout value should be tuned to the optimal value for the maximum link throughput.

Wireless Settings (Station)

The wireless table allows configure main station parameters, such as SSID of the AP unit, Security, etc. Click on the edit icon  and the wireless settings window will be displayed:

SSID – specify the SSID of the wireless network device manually, or scan for iPoll 2 Access Points automatically.

If auto scan for SSID is used, the results will be displayed in the Search SSID table, thus simply click on the required AP and SSID will be selected.

Advanced AP Settings

Quality of service (WMM) – enable to support quality of service for prioritizing traffic.

Wireless VLAN ID – specify the VLAN ID for traffic tagging on particular radio interface. The Station devices that associate using the particular SSID will be grouped into this VLAN.

Wireless Mode: Station (ARPNAT)

Use Wireless Configuration to setup radio interface of the device.

Enable radio – use slide to enable or disable APC radio.

Operating country - displays APC unit operating country. The Country selection determines the available channels and transmission power level based on regulatory restrictions in the operating country. The country has been selected on the first step of the APC unit's installation, though can be updated if required.

IEEE mode – specify the wireless network mode.

Tx power (dBm) – set the unit's transmitting power at which the device will transmit data. The larger the distance, the higher transmit power is required. To set transmit power level use the slider or enter the value manually. When entering the transmit power value manually, the slider position will change according to the entered value. The maximum transmit power level is limited to the allowed value by country in which device is operating regulatory agency.

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The wireless table allows configure main station parameters, such as SSID of the AP unit, Security, etc. Click on the edit icon  and the wireless settings window will be displayed.

SSID – specify the SSID of the wireless network device manually, or scan for iPoll 2 Access Points automatically.

If auto scan for SSID is used, the results will be displayed in the Search SSID table, thus simply click on the required AP and SSID will be selected:

Advanced AP Settings

Quality of service (WMM) – enable to support quality of service for prioritizing traffic.

Wireless VLAN ID – specify the VLAN ID for traffic tagging on particular radio interface. The Station devices that associate using the particular SSID will be grouped into this VLAN.

Wireless Security

If APC acts as an Access Point (auto WDS) or Access Point (iPoll 2) the wireless security settings will be used by the wireless stations for association. Thus wireless station security settings must conform the settings configured on the AP that station is associated with.

The APC supports various authentication/encryption methods:

- **Open** – no encryption.
- **WEP** – encrypts the data portion of each packet exchanged on a wireless network using a 64-bit or 128-bit WEP encryption key.
- **Personal WPA/WPA2** – authorizes and identifies clients based on a secret key that changes automatically at regular intervals.
- **Enterprise WPA/WPA2** – RADIUS server based authentication (requires configured RADIUS server).

Available security methods, according APC operating wireless mode is listed in the table below:

Security method	Access Point (autoWDS)	Access Point (iPoll 2)	Station (WDS/iPoll 2)	Station (ARPNAT)
Open	x	x	x	x
WEP 64bit/128bit			x	x
Personal WPA/WPA2	x	x	x	x
Enterprise WPA/WPA2	x	x	x	x

Open

By default there is no encryption enabled on the APC device.

WEP Encryption

WEP encryption can be either 64bit or 128bit. Select the required one and enter the rest parameters:

Key index - select the WEP key index [1-4]. Each number represents one of the four static keys of WEP. The selected key index will be used for frame encryption and decryption.

Key – specify the passkey, for the chosen WEP security:

- For **WEP 64bit** encryption – 5 HEX pairs (e.g. aa:bb:cc:dd:ee), or 5 ASCII characters (e.g. abcde);
- For **WEP 128bit** encryption – 13 HEX pairs (e.g. aa:bb:cc:dd:ee:ff:gg:hh:00:11:22:33:44), or 13 ASCII characters (e.g. abcdefghijklm);

WPA/WPA2 Personal

To setup WPA/WPA2 Personal encryption, need to select appropriate security type and specify the passphrase.

Passphrase – specify WPA or WPA2 passphrase [8-63 characters].

Auth. server IP/Port – specify the IP address and the port of the authentication RADIUS server where the authentication requests will be send to.

Auth. server key – enter the key for the authentication on specified RADIUS server.

Accounting server – use slide to enable accounting RADIUS server, if required.

Acc. server IP/Port – specify the IP address and the port of the accounting RADIUS server where the accounting stats will be send to.

Acc. server key – enter the key for the authentication on specified accounting RADIUS server.

Services Configuration

Use **Services** menu is divided into further five sections:

- Date & time
- Remote management
- SNMP
- Ping watchdog
- WNMS

Date & time

Use this section to manage the system time and date on the device automatically, using the Network Time Protocol (NTP), or manually, by setting the time and date on the device.

The NTP (Network Time Protocol) client synchronizes the clock of the device with the defined time server. Choose NTP from the configuration menu, select your location time zone and enter NTP server in order to use the NTP service.

Enable NTP – select this option as enabled to configure NTP.

Timezone – select the timezone. Time zone should be specified as a difference between local time and GMT time.

NTP server – specify the trusted NTP server IP or hostname for time synchronization.

Test NTP servers - click this button to check if the specified servers responses successfully.

Enable NTP – disable this option to set date&time manually.

Timezone – select the timezone. Time zone should be specified as a difference between local time and UTC time.

Date – specify the new date value in format DD/MM/YYYY

Time – specify the time in format HH:MM.

Remote Management

Use this menu to manage access to the APC via SSH and Telnet.

Enable SSH – enable or disable SSH access to device.

SSH port – specify the SSH service port. By default SSH port is 22.

Enable telnet – enable or disable telnet access to device.

Telnet port – specify the telnet port. By default SSH port is 23.

SNMP

SNMP is the standard protocol that is widely used for remote network management over the Internet. With the SNMP service enabled, the device will act as SNMP agent.

Enable SNMP – specify the SNMP service status.

R/O community – specify the read-only community name for SNMP version 1 and version 2c. The read-only community allows an APC unit manager to read values, but denies any attempt to change values.

Ping watchdog

Enable Ping Watchdog for continuous monitoring of the APC unit network connection with the specified trusted host. If enabled, the APC unit will send Ping requests periodically to the host and in case there is no response within a specified time period, the Ping Watchdog will reboot the APC unit.

Enable ping watchdog – click to enable Ping Watchdog function.

Host/IP address – specify the host where the Ping requests will be sent to.

Test host/IP address - click this button to check if the specified host responses successfully.

Ping interval - specify the interval, in minutes, between Ping requests.

Ping fail count to reboot - specify the count of failed Ping replies. After specified count of Ping failures, the APC unit will reboot itself automatically.

WNMS

Wireless Network Management System (WNMS) is a centralized monitoring and management system for wireless network devices. The communication between managed devices and the WNMS server is always initiated by an WNMS client service running on every device.

Enable WNMS agent – select to enable WNMS agent.

Server/Collector URL – specify the URL of the WMS server to which that heartbeat notifications will be sent to.

Test connection - click this button to check if the specified server responses successfully.