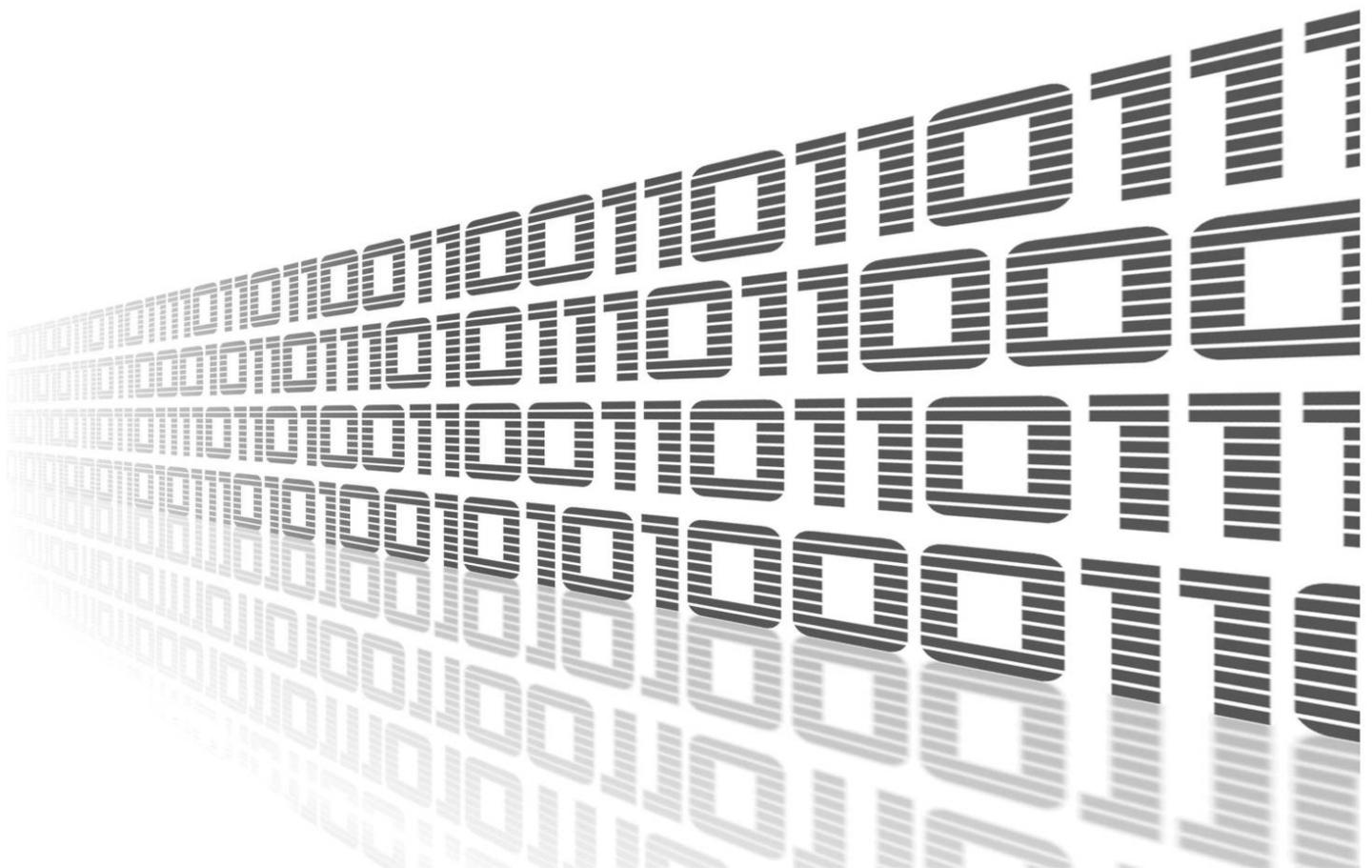


ADVANTECH



WiFi SSID Switch



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Used symbols

 *Danger* – Information regarding user safety or potential damage to the router.

 *Attention* – Problems that can arise in specific situations.

 *Information* – Useful tips or information of special interest.

 *Example* – Example of function, command or script.

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1. Changelog

1.1 WiFi SSID Switch Changelog

v1.0.0 (2020-06-05)

- First release.

v1.0.1 (2016-05-06)

- Changed organization of menu.

v1.0.2 (2016-05-16)

- Added support of different auth profile for each SSID.

v1.0.3 (2016-05-30)

- Fixed saving/loading IP addresses to/from configuration file.

v1.0.4 (2016-06-21)

- Added AP switching with the same SSID.

v1.0.5 (2018-09-27)

- Added expected ranges of values to JavaScript error messages.

2. Router App Description



Router app is not contained in the standard router firmware. Uploading of this router app is described in the Configuration manual (see Chapter [Related Documents](#)).



The router app is not v4 platform compatible.

The *WiFi SSID Switch* router app is an additional feature of Advantech routers. This allows the router to switch automatically between up to four SSIDs – WiFi networks. It is also possible to configure different SSIDs, the types of authentication and encryption, security keys or passwords and DHCP Clients. This feature overrides the settings on the WiFi page in the router and switches among SSIDs (networks) as configured. Automatic switching between networks is decided according to set priorities. When the WiFi signal is weak, the switching is based on the signal level of the networks. This can be used for example when the router is moving among known locations to automatically connect to the WiFi networks – see Figure below.

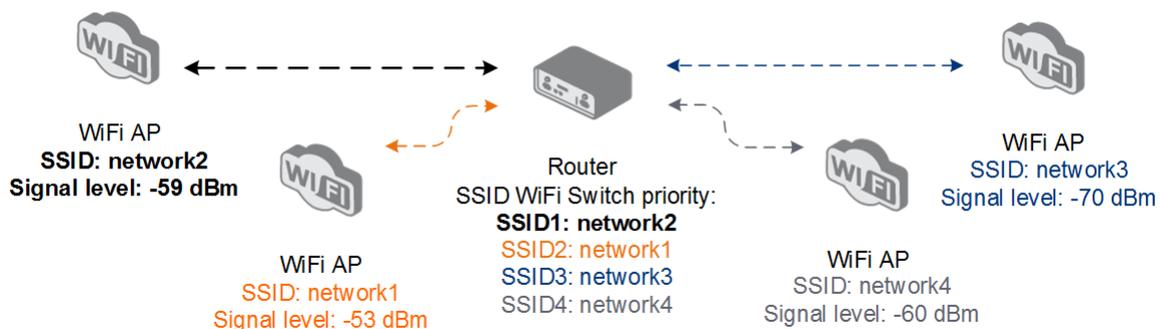


Figure 1: WiFi SSID Switch Principle

WiFi SSID Switch

Status
Overview
Syslog
Configuration
Global
SSID 1
SSID 2
SSID 3
SSID 4
Customization
Return

Figure 2: Router App Menu

To upload the router app archive file, go to the *Router Apps* page in the *Customization* section of the router's Web interface. After uploading the router app to the router, go to its Web interface by clicking on the router app's name. On the left you will then see the router app's menu as in Figure 2. There is an *Overview* landing page and *Syslog* page in the *Status* section. In the *Configuration* section there is a *Global* page with global configuration followed by *SSID1* to *SSID4* pages where different WiFi network connections can be configured. You can return to the Web interface of the router and the main menu using *Return* button in the *Customization* section.

3. Configuration

In this chapter, the configuration of the router app is described. Make sure that you know the following WiFi access points parameters – SSID, type of authentication and encryption and the security key or password. It is necessary to enable WLAN interface and WiFi in station mode before using the *WiFi SSID Switch* router app in the router:

3.1 Enable WLAN in STA mode

Enable the wlan0 network interface on the *WLAN* page in the router’s Web interface. Check the *Enable WLAN interface* check box, set the *Operating Mode* to *station (STA)*. The DHCP Client settings will be overridden by the router app. Click the *Apply* button to confirm the changes. See *Configuration Manual* [1, 2] for more details.

WLAN Configuration		
<input checked="" type="checkbox"/> Enable WLAN interface		
Operating Mode	station (STA) ▼	
	IPv4	IPv6
DHCP Client	enabled ▼	disabled ▼
IP Address	<input type="text"/>	<input type="text"/>
Subnet Mask / Prefix	<input type="text"/>	<input type="text"/>
Default Gateway	<input type="text"/>	<input type="text"/>
DNS Server	<input type="text"/>	<input type="text"/>

Figure 3: Enable WLAN Interface

3.2 Enable WiFi in STA mode

Enable connection to a WiFi network on WiFi page. Check the *Enable WiFi* box and make sure that the *station (STA)* operating mode is selected. The SSID, security and password information will be overridden by the *WiFi SSID Switch* router app settings. Click the *Apply* button to confirm the changes. See *Configuration Manual* [1, 2] for more details.

WiFi Configuration	
<input checked="" type="checkbox"/> Enable WiFi	
Operating Mode	station (STA) ▼
SSID	AnyNetwork
Broadcast SSID	enabled ▼
Probe Hidden SSID	<input type="checkbox"/>
Client Isolation	<input type="checkbox"/>
Country Code *	CZ
HW Mode	IEEE 802.11b ▼
Channel	1 ▼

Figure 4: Enable WiFi STA

3.3 Global

Go to *Router apps* page and go to *WiFi SSID Switch* router app's interface. Navigate to the *Global* page in the *Configuration* section – see Figure 5. The configuration items are explained in the table below.

Figure 5: Global Configuration

Item	Description
Enable WiFi SSID Switch service	Check this box to enable this router app. When enabled, the configuration on WiFi page of the router is overridden with multiple SSID configurations set on the <i>SSID1</i> to <i>SSID4</i> pages.
Good Signal Level (-)	Negative value of signal level in dBm. The default is -60 dBm. If a positive number is entered, it will be taken as a negative. Networks detected above this level are switched based on priority only.
Weak Signal Level (-)	Negative value of signal level in dBm. The default is -70 dBm. If a positive number is entered, it will be taken as a negative. Networks detected with between Good and Weak signal level are switched based on signal strength only – the one with the strongest signal is chosen. Networks detected with below Weak signal level are also switched based on signal strength.
Scan period	How often the WiFi networks are scanned for their signal strength. Switching to different networks (if required) is also carried out at these intervals. The default value is 10 minutes. Values ranging from 1 to 60 minutes are allowed.

Table 1: Global Configuration

Changes in this configuration will take effect after pressing the *Apply* button.

3.4 SSID1 – SSID4 Configuration

The router app switches among networks configured on pages *SSID1* to *SSID4*. SSID1 has the highest priority, SSID4 has the lowest priority. (Priority goes from top to the bottom.) When the signal strength is above good level, the network is chosen based on this priority list only. The configuration items are described in the table below. These settings will override the configuration on the *WiFi* page in the router. The DHCP Client will override the DHCP Client on *WLAN* configuration page in the router.

Figure 6: SSID1–SSID4 Configuration

Item	Description
Enable SSID1 (SSID2, SSID3, SSID4)	Add this SSID (network) to the selected networks to switch among. By default there is shown 'disabled' notice on the <i>Overview</i> page for the configured SSID.
SSID	The unique identifier of the WiFi network.
Probe Hidden SSID	Probes hidden SSIDs.

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Item	Description
Country Code	Code of the country where the router is installed. This code must be entered in ISO 3166-1 alpha-2 format. If a <i>country code</i> isn't specified, "US" code will be used as the default <i>country code</i> . If no <i>country code</i> is specified or if the wrong country code is entered, the router may violate country-specific regulations for the use of WiFi frequency bands.
Authentication	<p>Access control and authorization of users in the WiFi network.</p> <ul style="list-style-type: none"> • Open – Authentication is not required (free access point). • Shared – Basic authentication using WEP key. • WPA-PSK – Authentication using higher authentication methods PSK-PSK. • WPA2-PSK – WPA-PSK using newer AES encryption.
Encryption	<p>Type of data encryption in the WiFi network:</p> <ul style="list-style-type: none"> • None – No data encryption. • WEP – Encryption using static WEP keys. This encryption can be used for <i>Shared</i> authentication. • TKIP – Dynamic encryption key management that can be used for <i>WPA-PSK</i> and <i>WPA2-PSK</i> authentication. • AES – Improved encryption used for <i>WPA2-PSK</i> authentication.
WEP Key Type	<p>Type of WEP key for WEP encryption:</p> <ul style="list-style-type: none"> • ASCII – WEP key in ASCII format. • HEX – WEP key in hexadecimal format.
WEP Default Key	This specifies the default WEP key.
WEP Key 1–4	<p>Allows entry of four different WEP keys:</p> <ul style="list-style-type: none"> • WEP key in ASCII format must be entered in quotes. This key can be specified in the following lengths. <ul style="list-style-type: none"> – 5 ASCII characters (40b WEP key) – 13 ASCII characters (104b WEP key) – 16 ASCII characters (128b WEP key) • WEP key in hexadecimal format must be entered in hexadecimal digits. This key can be specified in the following lengths. <ul style="list-style-type: none"> – 10 hexadecimal digits (40b WEP key) – 26 hexadecimal digits (104b WEP key) – 32 hexadecimal digits (128b WEP key)

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Item	Description
WPA PSK Type	The possible key option for WPA-PSK authentication. <ul style="list-style-type: none"> • 256-bit secret • ASCII passphrase • PSK File
WPA PSK	Key for WPA-PSK authentication. This key must be entered according to the selected WPA PSK type as follows. <ul style="list-style-type: none"> • 256-bit secret – 64 hexadecimal digits • ASCII passphrase – 8 to 63 characters • PSK File – absolute path to the file containing the list of pairs (PSK key, MAC address)
Syslog Level	Logging level, when system writes to the system log. <ul style="list-style-type: none"> • Verbose debugging – The highest level of logging. • Debugging • Informational – Default level of logging. • Notification • Warning – The lowest level of system communication.
Extra options	Allows the user to define additional parameters.
DHCP Client	Activates/deactivates DHCP client.
IP Address	If DHCP Client is disabled only. The fixed IP address of the WiFi interface.
Subnet Mask	If DHCP Client is disabled only. Specifies a Subnet Mask for the IP address.
Default Gateway	Specifies the IP address of a default gateway. If filled-in, every packet with a destination not found in the routing table is sent here.
DNS Server	Specifies the IP address of the DNS server. When the IP address is not found in the Routing Table, this DNS server is requested.

Table 2: SSID1 – SSID4 Configuration

Changes to this configuration will take effect after pressing the *Apply* button.

4. Status

The status of the router app – *Overview* and *System Log* pages are described in this chapter.

4.1 Overview and Behavior

To see an overview and the status of the WiFi SSID switching, go to the *Overview* page of the router app (this is also the home page of the router app). When the router app is enabled (on the *Global* page), information will be displayed as in the Figure below. The parts of this overview are explained in the table below.

4.1.1 Switching Behavior



If the signal level is above *Good Signal Level*, the networks are switched according to priority only. If the signal level is between *Good* and *Weak*, the networks are switched according to signal strength only. The only exception is this: it remains connected to the prioritized network when the signal level is above *Good* level and then drops to the *Good/Weak* interval – as is shown in the Figure below (see *network2*). This is to prevent useless frequent switching – once the network is associated with Good signal level, it is switched only when the signal level drops below the Weak signal level. In such a case, the system switches to the network with the strongest signal level. Switching to the other SSID takes approximately 3 seconds (WiFi service is restarted).

```
Overview
-----
Services

Cron           : running
Scan period    : 9 min
Good signal level : -60 dBm
Weak signal level : -75 dBm

SSID priority  : 1. network2
                2. network1
                3. network3
                4. network4 (disabled)

SSID found     : SSID workbench -61 dBm BSS: 00:22:88:02:0d:c0 -
SSID found     : SSID network4 -49 dBm BSS: 20:c3:8f:f1:be:73 -
SSID found     : SSID network3 -53 dBm BSS: 54:4a:16:03:0e:61 -
SSID found     : SSID workbench -61 dBm BSS: 00:22:88:02:0d:b5 -
SSID found     : SSID conel -57 dBm BSS: 00:3a:98:eb:5a:30 -
SSID found     : SSID conel -61 dBm BSS: 00:3a:98:32:54:e0 -
SSID found     : SSID network1 -55 dBm BSS: 00:22:88:02:32:f7 -
SSID found     : SSID network2 -67 dBm BSS: 78:a5:04:2f:7c:2b associated
SSID found     : SSID TP-LINK_POP -81 dBm BSS: 94:0c:6d:f3:39:90 -
SSID found     : SSID conel-sklad -81 dBm BSS: 00:22:88:02:33:67 -
SSID found     : SSID conelguest -59 dBm BSS: 00:22:88:02:0b:bd -
SSID found     : SSID conel -85 dBm BSS: 00:3a:98:22:99:c0 -

SSID "network2" has the highest priority from founded SSIDs
SSID "network2" has signal level in good/weak range -> -67 dBm
SSID "network2" remains associated

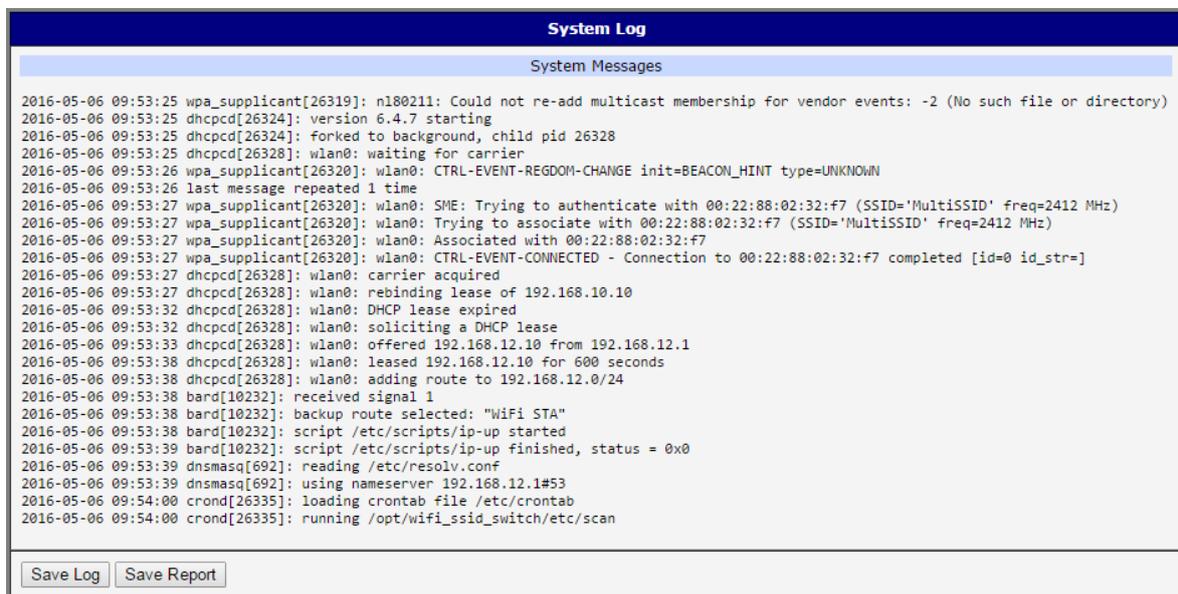
Last scan at 2016-05-06_09:52:06
```

Figure 7: WiFi SSID Switch Overview

Item	Description
Cron	Th status of the cron – job scheduler – of the WiFi scan which runs repeatedly at set intervals. This can be either <i>running</i> or <i>stopped</i> .
Scan period	The <i>Scan period</i> as set on <i>Configuration</i> page.
Good signal level	The <i>Good Signal Level</i> as set on <i>Global</i> page.
Weak signal level	The <i>Weak Signal Level</i> as set on <i>Global</i> page.
SSID priority	The priority for the networks as set on <i>SSID1</i> to <i>SSID4</i> pages (the lower the number the higher priority). A <i>disabled</i> notice is shown for disabled networks.
SSID found	The list of SSIDs found on a scheduled scan. This listing additionally contains signal strength and MAC address information. At a selected network there is shown an <i>associated</i> notice, so you can see the actual connected network.
<i>Other status entries</i>	Below all other information are shown log messages concerning switching decisions and the time of the last scan. If the WiFi is not enabled in the router, there is a notice at the top.

Table 3: Overview Items

4.2 System Log



The screenshot shows a window titled "System Log" with a sub-header "System Messages". The log contains the following entries:

```

2016-05-06 09:53:25 wpa_supplicant[26319]: nl80211: Could not re-add multicast membership for vendor events: -2 (No such file or directory)
2016-05-06 09:53:25 dhcpcd[26324]: version 6.4.7 starting
2016-05-06 09:53:25 dhcpcd[26324]: forked to background, child pid 26328
2016-05-06 09:53:25 dhcpcd[26328]: wlan0: waiting for carrier
2016-05-06 09:53:26 wpa_supplicant[26320]: wlan0: CTRL-EVENT-REGDOM-CHANGE init=BEACON_HINT type=UNKNOWN
2016-05-06 09:53:26 last message repeated 1 time
2016-05-06 09:53:27 wpa_supplicant[26320]: wlan0: SME: Trying to authenticate with 00:22:88:02:32:f7 (SSID='MultiSSID' freq=2412 MHz)
2016-05-06 09:53:27 wpa_supplicant[26320]: wlan0: Trying to associate with 00:22:88:02:32:f7 (SSID='MultiSSID' freq=2412 MHz)
2016-05-06 09:53:27 wpa_supplicant[26320]: wlan0: Associated with 00:22:88:02:32:f7
2016-05-06 09:53:27 wpa_supplicant[26320]: wlan0: CTRL-EVENT-CONNECTED - Connection to 00:22:88:02:32:f7 completed [id=0 id_str=]
2016-05-06 09:53:27 dhcpcd[26328]: wlan0: carrier acquired
2016-05-06 09:53:27 dhcpcd[26328]: wlan0: rebinding lease of 192.168.12.10
2016-05-06 09:53:32 dhcpcd[26328]: wlan0: DHCP lease expired
2016-05-06 09:53:32 dhcpcd[26328]: wlan0: soliciting a DHCP lease
2016-05-06 09:53:33 dhcpcd[26328]: wlan0: offered 192.168.12.10 from 192.168.12.1
2016-05-06 09:53:38 dhcpcd[26328]: wlan0: leased 192.168.12.10 for 600 seconds
2016-05-06 09:53:38 dhcpcd[26328]: wlan0: adding route to 192.168.12.0/24
2016-05-06 09:53:38 bard[10232]: received signal 1
2016-05-06 09:53:38 bard[10232]: backup route selected: "Wifi STA"
2016-05-06 09:53:38 bard[10232]: script /etc/scripts/ip-up started
2016-05-06 09:53:39 bard[10232]: script /etc/scripts/ip-up finished, status = 0x0
2016-05-06 09:53:39 dnsmasq[692]: reading /etc/resolv.conf
2016-05-06 09:53:39 dnsmasq[692]: using nameserver 192.168.12.1#53
2016-05-06 09:54:00 crond[26335]: loading crontab file /etc/crontab
2016-05-06 09:54:00 crond[26335]: running /opt/wifi_ssid_switch/etc/scan

```

At the bottom of the log window, there are two buttons: "Save Log" and "Save Report".

Figure 8: System Log

The *Syslog* page displays System Log messages. It is the same system log as the one in the main menu of the router. Router app messages are indicated by `wpa_supplicant` and `crond` strings. You can check the operation of the router app in the log or view messages in the event of configuration problems. You can download these messages and save them to a computer as a text file (.log) by clicking the *Save Log* button. You can also download a detailed report (.txt) for communication with support by clicking the *Save Report* button.

5. Related Documents

You can obtain product-related documents on *Engineering Portal* at icr.advantech.cz address.

To get your router's *Quick Start Guide*, *User Manual*, *Configuration Manual*, or *Firmware* go to the [Router Models](#) page, find the required model, and switch to the *Manuals* or *Firmware* tab, respectively.

The *Router Apps* installation packages and manuals are available on the [Router Apps](#) page.

For the *Development Documents*, go to the [DevZone](#) page.