BROADCOM

WPS Customer Reference

For BCM963xx DSL Linux

Version 2.0

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Broadcom Corporation

WPS Customer Reference

REVISION HISTORY

Revision Number	Date	Change Description
V1.0	04/17/2008	Initial Release.
V2.0	08/21/2009	Add new WPS information

There are two WPS implementation in Commengine release. One is the older design (will be obsolete) located at impl3, another is the new design.

This document describes old and new design WPS related information.

1   OLD(IMPL3) WPS IMPLEMENTATION

1.1   Files included in WPS module

WPS module is released in two ways:

1.   Binary executive file

Binary file wsccmd is included in the release package.

2.   library and partial source files

This new release method allows customer control WPS LED behavior easily.

Following files are included in the release package

1.   wsc_dslcpe_led.c
2.   wsc_dslcpe_led.h
3.   libwps.a
4.   Makefile

Customers are allowed to update these source files and build customized WPS module using library libwps.a.

1.2   WPS related Nvram parameters

Nvram variables are used to exchange configuration parameters, state and WPS command.

This section list all the WPS related nvram parameters for your reference.

1.2.1   Device Information

Name	Values	Default	comments
wsc_device_pin		40039862	A PIN number for this WPS device
wsc_device_name		Broadcom AP	A device name for this WPS device
wsc_uuid		0x000102030405060708090A0B0C0D0EBB	A UUID for this WPS device
wsc_mfstring		Broadcom	A manufacturer string for this WPS device

wsc_modelname		Broadcom AP	A model name for this WPS device
wsc_modelnum		Broadcom AP	A model number for this WPS device
Boardnum		83258	A serial number for this WPS device
wsc_config_method		0x88	Wsc config method

1.2.2   WPS related Setting

Name	value	Default	Comments
wsc_timeout_enable	0: disabled 1:enabled	1	Enable or disable WPS timeout
wl<N>_wsc_mode	enabled, disabled	enabled	Enable or disable WPS on wireless interface N
wsc_mode	enabled, disabled	enabled	Enable or disable WPS
wl_wsc_reg	enabled, disabled	disabled	Enable or disable Built-in Registrar
wsc_config_state	0: unconfig 1: configed	unconfig	Set WPS device to configed/unconfig state
Wl_wsc_enable	0:disabled 1:enabled	1	Enable/disable WPS
wsc_apLockCap	0:disabled 1:enabled	none	Enable/disable AP setup Lock
wsc_mixedmode	0: mixed mode enable 1:send wpa-psk+tkip 2:send wpa-psk2+aes	none	Enable/disable wpa-psk mixed mode
wsc_auto_addER	enabled disabled	none	Enable/disable wps auto addER

1.2.3   WPS status Report(Read Only)

Name	Values	Default	comments
wsc_proc_mac		NULL	The latest sta mac address which be processed by WPS
wsc_status	0: Waitting to be config 1: Built-in Registrar 2: Built-in Registrar and Proxy 3. Proxy		WPS current status for read only

	0: init		
	1: Station associated, processing WPS		
	2: success		
	3 fail due to message error		
wsc_proc_status	4: fail due to time out		WPS current process status for read only
	5: Send message M2		
	6: get message M7		
	7: message done		
	8: PBC overlap detection		
wsc_current_band			The RF band used in this WPS message period

1.2.4   WPS process parameter

Name	Values	Default	comments
wsc_sta_pin			A PIN number of station
wsc_method	1: PIN 2: Push button		WPS config method selection
wsc_config_command	0: None 1: Start 2: Break		Start/break command
wsc_sta_devname		NULL	The latest sta device name which be processed by WPS
wsc_force_restart	Y: restart WPS N: not restart WPS	Y	Restart WPS or not while wlmngr restarts wireless interface

1.3   WPS LED Control

Source files wsc_dslcpe_led.c and wsc_dslcpe_led.h includes a sample WPS LED control mechanism.

Due to customers' different requirement on LED behavior, wsc_dslcpe_led.c and wsc_dslcpe_led.h are release for customer to customize the LED behavior.

1.3.1   LED State Definition

32 bits LED state is defined as bellow. Please refer wsc_dslcpe_led.h for detail.

Bit	32--------24	23----16	15---8	7-----2	1-0
Meaning	BlinkType(Reserved)	EVENT	STATUS	Reserved	BLINK(2)/ON(1)/OFF(0)

1.3.2   LED Control
There are two types LED: **GPIO LED from 43xx** and **GPIO LED from 63xx.**

WPS module controls LED based on WPS status(nvram variable wsc_proc_status). WPS LED Control function wscLedSet() in file wsc_dslcpe_led.c shows how to control the GPIO LED, as bellow.

```
static void wscLedSet(int fd, int led, int blink_type, int event, int status)
{
        BOARD_IOCTL_PARMS IoctlParms = {0};
        char cmd[64];
/*If WPS LED from 43XX GPIO, enable compiler flag WPS_LED_FROM_43XX*/
//#define WPS_LED_FROM_43XX


#ifdef WPS_LED_FROM_43XX
/*Control LED from 43xx GPIO*/
        Code here controls GPIO LED from 43xx
#else
 /*Control 63xx GPIO LED. */
        Code here controls GPIO LED from 43xx

…
```

```
#endif
```

```
}
```

Enabling WPS_LED_FROM_43XX compiler flag, GPIO LED from 43xx will be used for WPS LED.

Default WPS LED is from 63xx GPIO.

You may need to consult hardware design to choose which LED you need to use.

More information on GPIo LED from 63xx

GPIO LED from 63xx parameters are defined in source file
shared/opensource/boardparms/bcm963xx/boardparam.c.

```
Please refer function board_ioctl()in
bcmdrivers/opensource/char/board/bcm963xx/impl1/board.c,for GPIO LED from 63xx.
```

More information on GPIO LED from 43xx

The behavior handling for GPIO LED from 43xx is embedded in Wlan Driver. One IOCTL is provided to allow you regular the LED behavior. WPS uses this IOCTL to setup the this LED behavior. There are five parameters in this IOCTL, as bellow.

Parameter	GPIO Pin#	Behavior	GPIO Polarity	LED on period	LED off period
Meaning	GPIO LED Pin Number	LED OFF(32) LED ON(33) LED Blink(34)	0 Low for LED On 1 High for LED On	LED On period in ms unit	LED Off period in ms unit

For example, parameter 0 34 0 50 50 will generate a LED blink with 1000ms/(50ms+50ms)=10 HZ blink behavior.

Please refer wl_led() in bcmdrivers/Broadcom/net/wl/impl2/wlctl/wlu.c for more detail and wsc_dslcpe_led.c for sample.

2   NEW WPS IMPLEMENTATION

2.1   Files included in WPS module

WPS module is released in two ways:

3. Binary executive file

    Binary file wps_monitor, wps_ap and wps_enr are included in the release package.

4. library and partial source files

    This new release method allows customer control WPS LED behavior easily.

    Following files are included in the release package

    5. wpc_gpio_dslcpe.c

    6. wsc_dslcpe_led.h

    7. lwps_monitor.lib

    8. libwps.so

    9. Makefile

Customers are allowed to update these source files and build customized WPS module using library wps_monitor.lib

2.2   WPS related Nvram parameters

Nvram variables are used to exchange configuration parameters, status and WPS command between wlmngr and WPS module.

This section list all the WPS related nvram parameters for your reference.

2.2.1   Device Information

Name	Values	Default	comments
wps_device_pin			A PIN number for this WPS device
wps_device_name		BroadcomAP	A device name for this WPS device
wps_uuid		9BEE59172E992D827ABF15837C43A058	A UUID for this WPS device
wps_mfstring		Broadcom	A manufacturer string for this WPS device
wps_modelname		Broadcom	A model name for this WPS device
wps_modelnum		123456	A model number for this WPS device
Boardnum		1234	A serial number for this WPS device

wps_config_method		0x88	Wsc config method

2.2.2   WPS related Setting

Name	Values	Default	comments
wps_timeout_enable	0: disabled 1:enabled	1	Enable or disable WPS timeout
wl<N>_wsc_mode	enabled, disabled	enabled	Enable or disable WPS on wireless interface N
wps_mode	enabled, disabled	enabled	Enable or disable WPS
wl_wps_reg	enabled, disabled	disabled	Enable or disable Built-in Registrar
wps_config_state	0: unconfig 1: configed	unconfig	Set WPS device to configed/unconfig state
wps_addER	enabled disabled	none	Enable/disable wps auto addER
wps_mixedmode	0: mixed mode enable 1:send wpa-psk+tkip 2:send wpa-psk2+aes	none	Enable/disable wpa-psk mixed mode
wps_aplockdown_cap	1:enable ap lockdown	none	Enable/disable AP lockdown function
wps_aplockdown_count		30	Failure count before ap lockdown
wps_aplockdown_duration		300(5 min)	AP lockdown duration
wps_aplockdown_ageout		300(5 min)	Lock down age out time
wl<N>_hwaddr			wireless interface N mac address

2.2.3   WPS status Report(Read Only)

Name	Values	Default	comments
wps_proc_mac		NULL	The latest sta mac address which be processed by WPS
wps_status	0: Waitting to be config 1: Built-in Registrar 2: Built-in Registrar and Proxy 3. Proxy		WPS current status for read only

wps_proc_status	0: init 1: Station associated, processing WPS 2: success 3 fail due to message error 4: fail due to time out 5: Send message M2 6: get message M7 7: message done 8: PBC overlap detection		WPS current process status for read only
wps_currentband			The RF band used in this WPS message period
wps_aplockdown	1: AP is lockup 0: AP is not lockup	0	AP lockup status

2.2.4   WPS process parameter

Name	Values	Default	comments
wps_sta_pin			A PIN number of station
wps_method	1: PIN 2: Push button		WPS config method selection
wps_config_command	0: None 1: Start 2: Break		Start/break command
wps_sta_devname		NULL	The latest sta device name which be processed by WPS

wsc_force_restart	Y: restart WPS N: not restart WPS	Y	Restart WPS or not while wlmngr restarts wireless interface

2.3   WPS LED Control

Source files wps_gpio_dslcpe.c and wsc_dslcpe_led.h includes a sample WPS LED control mechanism and physical push-button control handling.

Due to customers' different requirement on LED behavior, wps_gpio_dslcpe.c and wsc_dslcpe_led.h are release for customer to customize the LED behavior.

2.3.1   LED State Definition

32 bits LED state is defined as bellow. Please refer wsc_dslcpe_led.h for detail.

Bit	32--------24	23----16	15---8	7-----2	1-0
Meaning	BlinkType(Reserved)	EVENT	STATUS	Reserved	BLINK(2)/ON(1)/OFF(0)

2.3.2   LED Control

There are two types LED: **GPIO LED from 43xx** and **GPIO LED from 63xx.**

WPS module controls LED behavior based on WPS status(nvram variable wps_proc_status).

There are two major functions to handle WPS LED behavior

static void wscLedSet(int led_action, int led_blink_type, int led_event, int led_status)

  Controls LED operation

void wps_led_blink(wps_blinktype_t blinktype)

  callback function. Called from wps_monitor whenever WPS status (from nvram variable wps_proc_status) is changed.

Enabling WPS_LED_FROM_43XX compiler flag, GPIO LED from 43xx will be used for WPS LED.

Default WPS LED is from 63xx GPIO.

You may need to consult hardware design to choose which LED you need to use.

More information on GPIO LED from 63xx

GPIO LED from 63xx parameters are defined in source file
shared/opensource/boardparms/bcm963xx/boardparam.c.

```
Please refer function board_ioctl()in
bcmdrivers/opensource/char/board/bcm963xx/impl1/board.c,for GPIO LED from 63xx.
```

More information on GPIO LED from 43xx

The behavior handling for GPIO LED from 43xx is embedded in Wlan Driver. One IOCTL is provided to allow
you regular the LED behavior. WPS uses this IOCTL to setup the this LED behavior. Please refer to wlctl
command led_blinkslow, led_blinkcustom.