

# WPS Customer Reference

For BCM963xx DSL Linux

Version 2.0

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#### **REVISION HISTORY**

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

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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:

- 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		0x000102030405060708090A0B0C 0D0EBB	A UUID for this WPS device
wsc_mfstring		Broadcom	A manufacturer string for this WPS device

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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</n>	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	
	0: mixed mode enable		Enable/disable wpa-psk mixed mode	
wsc_mixedmode	1:send wpa-psk+tkip	none		
	2:send wpa-psk2+aes			
wsc_auto_addER	enabled	none	Enable/disable wps auto addER	
wsc_auto_audEX	disabled	HOHE	Enable/disable wps auto addEX	

# 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	<ul><li>0: Waitting to be config</li><li>1: Built-in Registrar</li><li>2: Built-in Registrar and Proxy</li><li>3. Proxy</li></ul>		WPS current status for read only

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	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	150
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

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#### 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	3224	2316	158	72	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 loctlParms = {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

...
```

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#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

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#### 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.

dent

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

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wps_config_method	0x88	Wsc config method

# 2.2.2 WPS related Setting

Values Values		Default	comments	
wps_timeout_enable	0: disabled 1:enabled	1	Enable or disable WPS timeout	
wl <n>_wsc_mode</n>	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	none	Enable/disable wps auto addER	
wps_audER	disabled	none		
	0: mixed mode enable			
wps_mixedmode	1:send wpa-psk+tkip	none	Enable/disable wpa-psk mixed mode	
	2:send wpa-psk2+aes			
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</n>			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		WPS current status for read only	
	2: Built-in Registrar and Proxy			
	3. Proxy			

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	0: init		
	1: Station associated, processing WPS		
	2: success		
	3 fail due to message error		
wps_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		150
wps_currentband			The RF band used in this WPS message period
		124	
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
	1: PIN		418
wps_method	2: Push button		WPS config method selection
	0: None	$\cup$	
wps_config_command	1: Start		Start/break command
	2: Break		
wps_sta_devname		NULL	The latest sta device name which be processed by WPS

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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	3224	2316	158	72	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.

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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.

