

# OPL1000\_WIFI\_BLE\_API\_GUIDE

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# Chapter 1

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  - CM APIs : BLE CM APIs
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## Chapter 4

# Module Documentation

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BLE ALL APIs.

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- [BLE GAP APIs](#)
- [BLE GATT APIs](#)
- [BLE MSG APIs](#)
- [BLE SMP APIs](#)

#### 4.1.1 Detailed Description

BLE ALL APIs.

## 4.2 BLE CM APIs

### Data Structures

- struct [LE\\_CM\\_CONNECTION\\_COMPLETE\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_ADVERTISE\\_REPORT\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_CONN\\_PARA\\_REQ\\_T](#)
- struct [LE\\_CM\\_MSG\\_CONN\\_UPDATE\\_COMPLETE\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_DATA\\_LEN\\_CHANGE\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_DIRECT\\_ADV\\_REPORT\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_DISCONNECT\\_COMPLETE\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_ENCRYPTION\\_CHANGE\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_ENCRYPTION\\_REFRESH\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_INIT\\_COMPLETE\\_CFM\\_T](#)
- struct [LE\\_CM\\_MSG\\_LTK\\_REQ\\_IND\\_T](#)
- struct [LE\\_CM\\_MSG\\_READ\\_ADV\\_TX\\_POWER\\_CFM\\_T](#)
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- struct [LE\\_CM\\_MSG\\_READ\\_RESOLVING\\_LIST\\_SIZE\\_CFM\\_T](#)
- struct [LE\\_CM\\_MSG\\_READ\\_RSSI\\_CFM\\_T](#)
- struct [LE\\_CM\\_MSG\\_READ\\_TX\\_POWER\\_CFM\\_T](#)
- struct [LE\\_CM\\_MSG\\_READ\\_WHITE\\_LIST\\_SIZE\\_CFM\\_T](#)
- struct [LE\\_CM\\_MSG\\_SET\\_DATA\\_LENGTH\\_CFM\\_T](#)
- struct [LE\\_CM\\_MSG\\_SET\\_DISCONNECT\\_CFM\\_T](#)
- struct [LE\\_CM\\_MSG\\_SIGNAL\\_UPDATE\\_REQ\\_T](#)
- struct [LE\\_CM\\_REQ\\_STATUS\\_T](#)

### Typedefs

- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_ADD\\_TO\\_RESOLVING\\_LIST\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_ADD\\_TO\\_WHITE\\_LIST\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_CANCEL\\_CONNECTION\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_CLEAR\\_RESOLVING\\_LIST\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_CLEAR\\_WHITE\\_LIST\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_CREATE\\_CONNECTION\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_ENTER\\_ADVERTISING\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_ENTER\\_SCANNING\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_EXIT\\_ADVERTISING\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_EXIT\\_SCANNING\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_REMOVE\\_FROM\\_RESOLVING\\_LIST\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_REMOVE\\_FROM\\_WHITE\\_LIST\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_SET\\_ADVERTISING\\_DATA\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_SET\\_ADVERTISING\\_PARAMS\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_SET\\_CHANNEL\\_MAP\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_SET\\_RANDOM\\_ADDRESS\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_SET\\_RPA\\_TIMEOUT\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_SET\\_SCAN\\_PARAMS\\_CFM\\_T](#)
- typedef [LE\\_CM\\_REQ\\_STATUS\\_T](#) [LE\\_CM\\_MSG\\_SET\\_SCAN\\_RSP\\_DATA\\_CFM\\_T](#)



## Enumerations

- enum {
  - LE\_CM\_MSG\_INIT\_COMPLETE\_CFM = LE\_CM\_MSG\_BASE, LE\_CM\_MSG\_SET\_DISCONNECT\_CFM,
  - LE\_CM\_MSG\_DISCONNECT\_COMPLETE\_IND, LE\_CM\_MSG\_SET\_ADVERTISING\_DATA\_CFM,
  - LE\_CM\_MSG\_SET\_SCAN\_RSP\_DATA\_CFM, LE\_CM\_MSG\_SET\_ADVERTISING\_PARAMS\_CFM,
  - LE\_CM\_MSG\_ENTER\_ADVERTISING\_CFM, LE\_CM\_MSG\_EXIT\_ADVERTISING\_CFM,
  - LE\_CM\_MSG\_SET\_SCAN\_PARAMS\_CFM, LE\_CM\_MSG\_ENTER\_SCANNING\_CFM,
  - LE\_CM\_MSG\_EXIT\_SCANNING\_CFM, LE\_CM\_MSG\_CREATE\_CONNECTION\_CFM,
  - LE\_CM\_MSG\_CANCEL\_CONNECTION\_CFM, LE\_CM\_MSG\_READ\_TX\_POWER\_CFM,
  - LE\_CM\_MSG\_READ\_BD\_ADDR\_CFM, LE\_CM\_MSG\_READ\_RSSI\_CFM,
  - LE\_CM\_MSG\_SET\_RANDOM\_ADDRESS\_CFM, LE\_CM\_MSG\_READ\_ADV\_TX\_POWER\_CFM,
  - LE\_CM\_MSG\_READ\_WHITE\_LIST\_SIZE\_CFM, LE\_CM\_MSG\_CLEAR\_WHITE\_LIST\_CFM,
  - LE\_CM\_MSG\_ADD\_TO\_WHITE\_LIST\_CFM, LE\_CM\_MSG\_REMOVE\_FROM\_WHITE\_LIST\_CFM,
  - LE\_CM\_MSG\_SET\_CHANNEL\_MAP\_CFM, LE\_CM\_MSG\_READ\_CHANNEL\_MAP\_CFM,
  - LE\_CM\_MSG\_SET\_DATA\_LENGTH\_CFM, LE\_CM\_MSG\_DATA\_LEN\_CHANGE\_IND,
  - LE\_CM\_MSG\_ADD\_TO\_RESOLVING\_LIST\_CFM, LE\_CM\_MSG\_REMOVE\_FROM\_RESOLVING\_LIST\_CFM,
  - LE\_CM\_MSG\_CLEAR\_RESOLVING\_LIST\_CFM, LE\_CM\_MSG\_READ\_RESOLVING\_LIST\_SIZE\_CFM,
  - LE\_CM\_MSG\_SET\_RPA\_TIMEOUT\_CFM, LE\_CM\_MSG\_SIGNAL\_UPDATE\_REQ,
  - LE\_CM\_MSG\_CONN\_UPDATE\_COMPLETE\_IND, LE\_CM\_MSG\_CONN\_PARA\_REQ,
  - LE\_CM\_MSG\_ENCRYPTION\_CHANGE\_IND, LE\_CM\_MSG\_ENCRYPTION\_REFRESH\_IND,
  - LE\_CM\_MSG\_LTK\_REQ\_IND, LE\_CM\_MSG\_ADVERTISE\_REPORT\_IND,
  - LE\_CM\_MSG\_DIRECT\_ADV\_REPORT\_IND,
  - LE\_CM\_CONNECTION\_COMPLETE\_IND,
  - LE\_CM\_MSG\_READ\_LOCAL\_RPA\_CFM, LE\_CM\_MSG\_TOP }

*BLE connection management message id.*

## Functions

- void [LeCmInit](#) (TASK appTask)
  - BLE Connection Management Module Init.*

### 4.2.1 Detailed Description

### 4.2.2 Typedef Documentation

#### 4.2.2.1 LE\_CM\_MSG\_ADD\_TO\_RESOLVING\_LIST\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_ADD_TO_RESOLVING_LIST_CFM_T
```

#### 4.2.2.2 LE\_CM\_MSG\_ADD\_TO\_WHITE\_LIST\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_ADD_TO_WHITE_LIST_CFM_T
```

#### 4.2.2.3 LE\_CM\_MSG\_CANCEL\_CONNECTION\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_CANCEL_CONNECTION_CFM_T
```

#### 4.2.2.4 LE\_CM\_MSG\_CLEAR\_RESOLVING\_LIST\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_CLEAR_RESOLVING_LIST_CFM_T
```

#### 4.2.2.5 LE\_CM\_MSG\_CLEAR\_WHITE\_LIST\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_CLEAR_WHITE_LIST_CFM_T
```

#### 4.2.2.6 LE\_CM\_MSG\_CREATE\_CONNECTION\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_CREATE_CONNECTION_CFM_T
```

#### 4.2.2.7 LE\_CM\_MSG\_ENTER\_ADVERTISING\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_ENTER_ADVERTISING_CFM_T
```

#### 4.2.2.8 LE\_CM\_MSG\_ENTER\_SCANNING\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_ENTER_SCANNING_CFM_T
```

#### 4.2.2.9 LE\_CM\_MSG\_EXIT\_ADVERTISING\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_EXIT_ADVERTISING_CFM_T
```

#### 4.2.2.10 LE\_CM\_MSG\_EXIT\_SCANNING\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_EXIT_SCANNING_CFM_T
```

**4.2.2.11 LE\_CM\_MSG\_REMOVE\_FROM\_RESOLVING\_LIST\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_REMOVE_FROM_RESOLVING_LIST_CFM_T
```

**4.2.2.12 LE\_CM\_MSG\_REMOVE\_FROM\_WHITE\_LIST\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_REMOVE_FROM_WHITE_LIST_CFM_T
```

**4.2.2.13 LE\_CM\_MSG\_SET\_ADVERTISING\_DATA\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_SET_ADVERTISING_DATA_CFM_T
```

**4.2.2.14 LE\_CM\_MSG\_SET\_ADVERTISING\_PARAMS\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_SET_ADVERTISING_PARAMS_CFM_T
```

**4.2.2.15 LE\_CM\_MSG\_SET\_CHANNEL\_MAP\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_SET_CHANNEL_MAP_CFM_T
```

**4.2.2.16 LE\_CM\_MSG\_SET\_RANDOM\_ADDRESS\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_SET_RANDOM_ADDRESS_CFM_T
```

**4.2.2.17 LE\_CM\_MSG\_SET\_RPA\_TIMEOUT\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_SET_RPA_TIMEOUT_CFM_T
```

**4.2.2.18 LE\_CM\_MSG\_SET\_SCAN\_PARAMS\_CFM\_T**

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_SET_SCAN_PARAMS_CFM_T
```

## 4.2.2.19 LE\_CM\_MSG\_SET\_SCAN\_RSP\_DATA\_CFM\_T

```
typedef LE_CM_REQ_STATUS_T LE_CM_MSG_SET_SCAN_RSP_DATA_CFM_T
```

## 4.2.3 Enumeration Type Documentation

## 4.2.3.1 anonymous enum

```
anonymous enum
```

BLE connection management message id.

## Enumerator

LE_CM_MSG_INIT_COMPLETE_CFM	initialize complete
LE_CM_MSG_SET_DISCONNECT_CFM	set disconnect confirm
LE_CM_MSG_DISCONNECT_COMPLETE_IND	disconnect complete indication
LE_CM_MSG_SET_ADVERTISING_DATA_CFM	set advertising data confirm
LE_CM_MSG_SET_SCAN_RSP_DATA_CFM	set scan response data confirm
LE_CM_MSG_SET_ADVERTISING_PARAMS_CFM	set advertising parameters confirm
LE_CM_MSG_ENTER_ADVERTISING_CFM	enter advertising confirm
LE_CM_MSG_EXIT_ADVERTISING_CFM	exit advertising confirm
LE_CM_MSG_SET_SCAN_PARAMS_CFM	set scan parameters confirm
LE_CM_MSG_ENTER_SCANNING_CFM	enter scanning confirm
LE_CM_MSG_EXIT_SCANNING_CFM	exit scanning confirm
LE_CM_MSG_CREATE_CONNECTION_CFM	create connection confirm
LE_CM_MSG_CANCEL_CONNECTION_CFM	cancel connection confirm
LE_CM_MSG_READ_TX_POWER_CFM	read tx power confirm
LE_CM_MSG_READ_BD_ADDR_CFM	read device address confirm
LE_CM_MSG_READ_RSSI_CFM	read RSSI confirm
LE_CM_MSG_SET_RANDOM_ADDRESS_CFM	set random address confirm
LE_CM_MSG_READ_ADV_TX_POWER_CFM	read advertising tx power confirm
LE_CM_MSG_READ_WHITE_LIST_SIZE_CFM	read whitelist size confirm
LE_CM_MSG_CLEAR_WHITE_LIST_CFM	clear whitelist confirm
LE_CM_MSG_ADD_TO_WHITE_LIST_CFM	add to whitelist confirm
LE_CM_MSG_REMOVE_FROM_WHITE_LIST_CFM	remove from whitelist confirm
LE_CM_MSG_SET_CHANNEL_MAP_CFM	set channel map confirm
LE_CM_MSG_READ_CHANNEL_MAP_CFM	read channel map confirm
LE_CM_MSG_SET_DATA_LENGTH_CFM	set data length confirm
LE_CM_MSG_DATA_LEN_CHANGE_IND	data length change indication
LE_CM_MSG_ADD_TO_RESOLVING_LIST_CFM	add to resolving list confirm
LE_CM_MSG_REMOVE_FROM_RESOLVING_LIST_CFM	remove from resolving list confirm
LE_CM_MSG_CLEAR_RESOLVING_LIST_CFM	clear resolving list confirm
LE_CM_MSG_READ_RESOLVING_LIST_SIZE_CFM	read resolving list size confirm
LE_CM_MSG_SET_RPA_TIMEOUT_CFM	set resolving private address timeout confirm
LE_CM_MSG_SIGNAL_UPDATE_REQ	signal update request

## Enumerator

LE_CM_MSG_CONN_UPDATE_COMPLETE_IND	connection update complete indication
LE_CM_MSG_CONN_PARA_REQ	connection parameters request
LE_CM_MSG_ENCRYPTION_CHANGE_IND	encryption change indication
LE_CM_MSG_ENCRYPTION_REFRESH_IND	encryption refresh indication
LE_CM_MSG_LTK_REQ_IND	long term key indication
LE_CM_MSG_ADVERTISE_REPORT_IND	advertising report indication
LE_CM_MSG_DIRECT_ADV_REPORT_IND	direct advertising report indication
LE_CM_CONNECTION_COMPLETE_IND	connection complete indication
LE_CM_MSG_READ_LOCAL_RPA_CFM	read local resolving private address confirm
LE_CM_MSG_TOP	top of CM message id

## 4.2.4 Function Documentation

## 4.2.4.1 LeCmInit()

```
void LeCmInit (
    TASK appTask )
```

BLE Connection Management Module Init.

## Parameters

<i>the</i>	reference of BLE task.
------------	------------------------

## Returns

None.

## 4.3 BLE GAP APIs

### Data Structures

- struct [LE\\_GAP\\_ADVERTISING\\_PARAM\\_T](#)
- struct [LE\\_GAP\\_CONN\\_PARAM\\_T](#)
- struct [LE\\_GAP\\_SCAN\\_PARAM\\_T](#)

### Macros

- `#define GAP_ADTYPE_128BIT_COMPLETE 0x07`
- `#define GAP_ADTYPE_128BIT_MORE 0x06`
- `#define GAP_ADTYPE_16BIT_COMPLETE 0x03`
- `#define GAP_ADTYPE_16BIT_MORE 0x02`
- `#define GAP_ADTYPE_32BIT_COMPLETE 0x05`
- `#define GAP_ADTYPE_32BIT_MORE 0x04`
- `#define GAP_ADTYPE_3D_INFO_DATA 0x3D`
- `#define GAP_ADTYPE_ADV_INTERVAL 0x1A`
- `#define GAP_ADTYPE_APPEARANCE 0x19`
- `#define GAP_ADTYPE_FLAGS 0x01`
- `#define GAP_ADTYPE_FLAGS_BREDR_NOT_SUPPORTED 0x04`
- `#define GAP_ADTYPE_FLAGS_GENERAL 0x02`
- `#define GAP_ADTYPE_FLAGS_LIMITED 0x01`
- `#define GAP_ADTYPE_LE_BD_ADDR 0x1B`
- `#define GAP_ADTYPE_LE_ROLE 0x1C`
- `#define GAP_ADTYPE_LOCAL_NAME_COMPLETE 0x09`
- `#define GAP_ADTYPE_LOCAL_NAME_SHORT 0x08`
- `#define GAP_ADTYPE_MANUFACTURER_SPECIFIC 0xFF`
- `#define GAP_ADTYPE_OOB_CLASS_OF_DEVICE 0x0D`
- `#define GAP_ADTYPE_OOB_SIMPLE_PAIRING_HASHC 0x0E`
- `#define GAP_ADTYPE_OOB_SIMPLE_PAIRING_RANDOM 0x0F`
- `#define GAP_ADTYPE_POWER_LEVEL 0x0A`
- `#define GAP_ADTYPE_PUBLIC_TARGET_ADDR 0x17`
- `#define GAP_ADTYPE_RANDOM_TARGET_ADDR 0x18`
- `#define GAP_ADTYPE_SERVICE_DATA 0x16`
- `#define GAP_ADTYPE_SERVICE_DATA_128BIT 0x21`
- `#define GAP_ADTYPE_SERVICE_DATA_32BIT 0x20`
- `#define GAP_ADTYPE_SERVICES_LIST_128BIT 0x15`
- `#define GAP_ADTYPE_SERVICES_LIST_16BIT 0x14`
- `#define GAP_ADTYPE_SIGNED_DATA 0x13`
- `#define GAP_ADTYPE_SIMPLE_PAIRING_HASHC_256 0x1D`
- `#define GAP_ADTYPE_SIMPLE_PAIRING_RANDOM_256 0x1E`
- `#define GAP_ADTYPE_SLAVE_CONN_INTERVAL_RANGE 0x12`
- `#define GAP_ADTYPE_SM_OOB_FLAG 0x11`
- `#define GAP_ADTYPE_SM_TK 0x10`
- `#define GAP_PUBLIC_ADDR 0`
- `#define GAP_RAND_ADDR_NRPA 2`
- `#define GAP_RAND_ADDR_RPA 3`
- `#define GAP_RAND_ADDR_STATIC 1`
- `#define GAP_SCAN_TYPE_ACTIVE 1`
- `#define GAP_SCAN_TYPE_PASSIVE 0`
- `#define GAP_TX_PWR_CURR_VAL 0`
- `#define GAP_TX_PWR_MAX_VAL 1`

- #define `GAPBOND_IO_CAP_DISPLAY_ONLY` 0x00
- #define `GAPBOND_IO_CAP_DISPLAY_YES_NO` 0x01
- #define `GAPBOND_IO_CAP_KEYBOARD_DISPLAY` 0x04
- #define `GAPBOND_IO_CAP_KEYBOARD_ONLY` 0x02
- #define `GAPBOND_IO_CAP_NO_INPUT_NO_OUTPUT` 0x03
- #define `GAPBOND_PAIRING_MODE_INITIATE` 0x02
- #define `GAPBOND_PAIRING_MODE_NO_PAIRING` 0x00
- #define `GAPBOND_PAIRING_MODE_WAIT_FOR_REQ` 0x01
- #define `LE_GAP_ADV_MAX_SIZE` 31

## Functions

- `LE_ERR_STATE LeGapAddToResolvingList (LE_BT_ADDR_T *bt_addr, UINT8 *irk)`  
*Add device to resolving-list.*
- `LE_ERR_STATE LeGapAddToWhiteList (LE_BT_ADDR_T *bt_addr)`  
*Add device to whitelist.*
- `LE_ERR_STATE LeGapAdvertisingEnable (BOOL start)`  
*Enable or disable advertising function.*
- `LE_ERR_STATE LeGapCentralConnectReq (LE_BT_ADDR_T *taddr, UINT8 own_addr_type)`  
*Central connect request.*
- `LE_ERR_STATE LeGapCentralSetDataChannel (UINT8 *ch)`  
*Central set data channel.*
- `LE_ERR_STATE LeGapClearResolvingList (void)`  
*Clear the resolving-list in the controller.*
- `LE_ERR_STATE LeGapClearWhiteList (void)`  
*Clear whitelist in the controller.*
- `LE_ERR_STATE LeGapConnectCancelReq (void)`  
*Cancel connect request.*
- `void LeGapConnParaRequestRsp (UINT16 conn_hdl, BOOL accept)`  
*Connection parameters request response.*
- `void LeGapConnUpdateRequest (UINT16 conn_hdl, LE_CONN_PARA_T *para)`  
*Connection parameters update request.*
- `void LeGapConnUpdateResponse (UINT16 conn_hdl, UINT8 identifier, BOOL accept)`  
*Connection parameters update response.*
- `LE_ERR_STATE LeGapDisconnectReq (UINT16 conn_hdl)`  
*Disconnect the physical connection.*
- `LE_ERR_STATE LeGapGenRandAddr (UINT8 type, BD_ADDR addr)`  
*Called to generation random address.*
- `void LeGapGetBtAddr (void)`  
*Get owner device address.*
- `void LeGapReadAdvChannelTxPower (void)`  
*Read ADV channel txpower.*
- `LE_ERR_STATE LeGapReadChannelMap (UINT16 conn_hdl)`  
*Read channel map.*
- `void LeGapReadResolvingListSize (void)`  
*Read the resolving-list size in the controller.*
- `LE_ERR_STATE LeGapReadRssi (UINT16 conn_hdl)`  
*Read RSSI value from controller.*
- `LE_ERR_STATE LeGapReadTxPower (UINT16 conn_hdl, UINT8 type)`  
*Read tx power value for the specified connection.*
- `void LeGapReadWhiteListSize (void)`

- Read whitelist size in the controller.*

  - LE\_ERR\_STATE [LeGapRemoveFromWhiteList](#) (LE\_BT\_ADDR\_T \*bt\_addr)

*Remove device from whitelist.*
- LE\_ERR\_STATE [LeGapScanningReq](#) (BOOL start, BOOL filter)

*Request scanning start.*
- LE\_ERR\_STATE [LeGapSetAdvData](#) (UINT8 len, UINT8 \*data)

*Called to set ADV data.*
- LE\_ERR\_STATE [LeGapSetAdvParameter](#) (LE\_GAP\_ADVERTISING\_PARAM\_T \*params)

*Called to set ADV parameters.*
- LE\_ERR\_STATE [LeGapSetConnParameter](#) (UINT16 interval\_min, UINT16 interval\_max, UINT16 slave\_latency, UINT16 supervision\_timeout)

*Called to set connection parameters.*
- LE\_ERR\_STATE [LeGapSetDataChannelPduLen](#) (UINT16 conn\_hdl, UINT16 tx\_octets, UINT16 tx\_time)

*Set data channel PDU length.*
- LE\_ERR\_STATE [LeGapSetRandAddr](#) (BD\_ADDR addr)

*Called to set random address.*
- LE\_ERR\_STATE [LeGapSetRpaTimeout](#) (UINT16 timeout)

*Set resolvable private address timeout.*
- LE\_ERR\_STATE [LeGapSetStaticAddr](#) (BD\_ADDR addr)

*Called to set static address.*
- LE\_ERR\_STATE [LeSetScanParameter](#) (LE\_GAP\_SCAN\_PARAM\_T \*params)

*Called to set scan parameters.*
- LE\_ERR\_STATE [LeSetScanRspData](#) (UINT8 len, UINT8 \*data)

*Called to set scan response data.*

#### 4.3.1 Detailed Description

#### 4.3.2 Macro Definition Documentation

##### 4.3.2.1 GAP\_ADTYPE\_128BIT\_COMPLETE

```
#define GAP_ADTYPE_128BIT_COMPLETE 0x07
```

##### 4.3.2.2 GAP\_ADTYPE\_128BIT\_MORE

```
#define GAP_ADTYPE_128BIT_MORE 0x06
```

##### 4.3.2.3 GAP\_ADTYPE\_16BIT\_COMPLETE

```
#define GAP_ADTYPE_16BIT_COMPLETE 0x03
```



#### 4.3.2.4 GAP\_ADTYPE\_16BIT\_MORE

```
#define GAP_ADTYPE_16BIT_MORE 0x02
```

#### 4.3.2.5 GAP\_ADTYPE\_32BIT\_COMPLETE

```
#define GAP_ADTYPE_32BIT_COMPLETE 0x05
```

#### 4.3.2.6 GAP\_ADTYPE\_32BIT\_MORE

```
#define GAP_ADTYPE_32BIT_MORE 0x04
```

#### 4.3.2.7 GAP\_ADTYPE\_3D\_INFO\_DATA

```
#define GAP_ADTYPE_3D_INFO_DATA 0x3D
```

#### 4.3.2.8 GAP\_ADTYPE\_ADV\_INTERVAL

```
#define GAP_ADTYPE_ADV_INTERVAL 0x1A
```

#### 4.3.2.9 GAP\_ADTYPE\_APPEARANCE

```
#define GAP_ADTYPE_APPEARANCE 0x19
```

#### 4.3.2.10 GAP\_ADTYPE\_FLAGS

```
#define GAP_ADTYPE_FLAGS 0x01
```

#### 4.3.2.11 GAP\_ADTYPE\_FLAGS\_BREDR\_NOT\_SUPPORTED

```
#define GAP_ADTYPE_FLAGS_BREDR_NOT_SUPPORTED 0x04
```

#### 4.3.2.12 GAP\_ADTYPE\_FLAGS\_GENERAL

```
#define GAP_ADTYPE_FLAGS_GENERAL 0x02
```

#### 4.3.2.13 GAP\_ADTYPE\_FLAGS\_LIMITED

```
#define GAP_ADTYPE_FLAGS_LIMITED 0x01
```

#### 4.3.2.14 GAP\_ADTYPE\_LE\_BD\_ADDR

```
#define GAP_ADTYPE_LE_BD_ADDR 0x1B
```

#### 4.3.2.15 GAP\_ADTYPE\_LE\_ROLE

```
#define GAP_ADTYPE_LE_ROLE 0x1C
```

#### 4.3.2.16 GAP\_ADTYPE\_LOCAL\_NAME\_COMPLETE

```
#define GAP_ADTYPE_LOCAL_NAME_COMPLETE 0x09
```

#### 4.3.2.17 GAP\_ADTYPE\_LOCAL\_NAME\_SHORT

```
#define GAP_ADTYPE_LOCAL_NAME_SHORT 0x08
```

#### 4.3.2.18 GAP\_ADTYPE\_MANUFACTURER\_SPECIFIC

```
#define GAP_ADTYPE_MANUFACTURER_SPECIFIC 0xFF
```

#### 4.3.2.19 GAP\_ADTYPE\_OOB\_CLASS\_OF\_DEVICE

```
#define GAP_ADTYPE_OOB_CLASS_OF_DEVICE 0x0D
```

**4.3.2.20 GAP\_ADTYPE\_OOB\_SIMPLE\_PAIRING\_HASHC**

```
#define GAP_ADTYPE_OOB_SIMPLE_PAIRING_HASHC 0x0E
```

**4.3.2.21 GAP\_ADTYPE\_OOB\_SIMPLE\_PAIRING\_RANDR**

```
#define GAP_ADTYPE_OOB_SIMPLE_PAIRING_RANDR 0x0F
```

**4.3.2.22 GAP\_ADTYPE\_POWER\_LEVEL**

```
#define GAP_ADTYPE_POWER_LEVEL 0x0A
```

**4.3.2.23 GAP\_ADTYPE\_PUBLIC\_TARGET\_ADDR**

```
#define GAP_ADTYPE_PUBLIC_TARGET_ADDR 0x17
```

**4.3.2.24 GAP\_ADTYPE\_RANDOM\_TARGET\_ADDR**

```
#define GAP_ADTYPE_RANDOM_TARGET_ADDR 0x18
```

**4.3.2.25 GAP\_ADTYPE\_SERVICE\_DATA**

```
#define GAP_ADTYPE_SERVICE_DATA 0x16
```

**4.3.2.26 GAP\_ADTYPE\_SERVICE\_DATA\_128BIT**

```
#define GAP_ADTYPE_SERVICE_DATA_128BIT 0x21
```

**4.3.2.27 GAP\_ADTYPE\_SERVICE\_DATA\_32BIT**

```
#define GAP_ADTYPE_SERVICE_DATA_32BIT 0x20
```

#### 4.3.2.28 GAP\_ADTYPE\_SERVICES\_LIST\_128BIT

```
#define GAP_ADTYPE_SERVICES_LIST_128BIT 0x15
```

#### 4.3.2.29 GAP\_ADTYPE\_SERVICES\_LIST\_16BIT

```
#define GAP_ADTYPE_SERVICES_LIST_16BIT 0x14
```

#### 4.3.2.30 GAP\_ADTYPE\_SIGNED\_DATA

```
#define GAP_ADTYPE_SIGNED_DATA 0x13
```

#### 4.3.2.31 GAP\_ADTYPE\_SIMPLE\_PAIRING\_HASHC\_256

```
#define GAP_ADTYPE_SIMPLE_PAIRING_HASHC_256 0x1D
```

#### 4.3.2.32 GAP\_ADTYPE\_SIMPLE\_PAIRING\_RANDR\_256

```
#define GAP_ADTYPE_SIMPLE_PAIRING_RANDR_256 0x1E
```

#### 4.3.2.33 GAP\_ADTYPE\_SLAVE\_CONN\_INTERVAL\_RANGE

```
#define GAP_ADTYPE_SLAVE_CONN_INTERVAL_RANGE 0x12
```

#### 4.3.2.34 GAP\_ADTYPE\_SM\_OOB\_FLAG

```
#define GAP_ADTYPE_SM_OOB_FLAG 0x11
```

#### 4.3.2.35 GAP\_ADTYPE\_SM\_TK

```
#define GAP_ADTYPE_SM_TK 0x10
```

**4.3.2.36 GAP\_PUBLIC\_ADDR**

```
#define GAP_PUBLIC_ADDR 0
```

**4.3.2.37 GAP\_RAND\_ADDR\_NRPA**

```
#define GAP_RAND_ADDR_NRPA 2
```

**4.3.2.38 GAP\_RAND\_ADDR\_RPA**

```
#define GAP_RAND_ADDR_RPA 3
```

**4.3.2.39 GAP\_RAND\_ADDR\_STATIC**

```
#define GAP_RAND_ADDR_STATIC 1
```

**4.3.2.40 GAP\_SCAN\_TYPE\_ACTIVE**

```
#define GAP_SCAN_TYPE_ACTIVE 1
```

**4.3.2.41 GAP\_SCAN\_TYPE\_PASSIVE**

```
#define GAP_SCAN_TYPE_PASSIVE 0
```

**4.3.2.42 GAP\_TX\_PWR\_CURR\_VAL**

```
#define GAP_TX_PWR_CURR_VAL 0
```

**4.3.2.43 GAP\_TX\_PWR\_MAX\_VAL**

```
#define GAP_TX_PWR_MAX_VAL 1
```

#### 4.3.2.44 GAPBOND\_IO\_CAP\_DISPLAY\_ONLY

```
#define GAPBOND_IO_CAP_DISPLAY_ONLY 0x00
```

#### 4.3.2.45 GAPBOND\_IO\_CAP\_DISPLAY\_YES\_NO

```
#define GAPBOND_IO_CAP_DISPLAY_YES_NO 0x01
```

#### 4.3.2.46 GAPBOND\_IO\_CAP\_KEYBOARD\_DISPLAY

```
#define GAPBOND_IO_CAP_KEYBOARD_DISPLAY 0x04
```

#### 4.3.2.47 GAPBOND\_IO\_CAP\_KEYBOARD\_ONLY

```
#define GAPBOND_IO_CAP_KEYBOARD_ONLY 0x02
```

#### 4.3.2.48 GAPBOND\_IO\_CAP\_NO\_INPUT\_NO\_OUTPUT

```
#define GAPBOND_IO_CAP_NO_INPUT_NO_OUTPUT 0x03
```

#### 4.3.2.49 GAPBOND\_PAIRING\_MODE\_INITIATE

```
#define GAPBOND_PAIRING_MODE_INITIATE 0x02
```

#### 4.3.2.50 GAPBOND\_PAIRING\_MODE\_NO\_PAIRING

```
#define GAPBOND_PAIRING_MODE_NO_PAIRING 0x00
```

#### 4.3.2.51 GAPBOND\_PAIRING\_MODE\_WAIT\_FOR\_REQ

```
#define GAPBOND_PAIRING_MODE_WAIT_FOR_REQ 0x01
```

## 4.3.2.52 LE\_GAP\_ADV\_MAX\_SIZE

```
#define LE_GAP_ADV_MAX_SIZE 31
```

## 4.3.3 Function Documentation

## 4.3.3.1 LeGapAddToResolvingList()

```
LE_ERR_STATE LeGapAddToResolvingList (
    LE_BT_ADDR_T * bt_addr,
    UINT8 * irk )
```

Add device to resolving-list.

## Parameters

<i>bt_addr</i>	BT device address.
<i>irk</i>	IRK, Identity Resolving Key

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.3.3.2 LeGapAddToWhiteList()

```
LE_ERR_STATE LeGapAddToWhiteList (
    LE_BT_ADDR_T * bt_addr )
```

Add device to whitelist.

## Parameters

<i>bt_addr</i>	BT device address.
----------------	--------------------

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.3 LeGapAdvertisingEnable()

```
LE_ERR_STATE LeGapAdvertisingEnable (
    BOOL start )
```

Enable or disable advertising function.

##### Parameters

<i>start</i>	TRUE is enable, FALSE is disable.
--------------	-----------------------------------

##### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.4 LeGapCentralConnectReq()

```
LE_ERR_STATE LeGapCentralConnectReq (
    LE_BT_ADDR_T * taddr,
    UINT8 own_addr_type )
```

Central connect request.

##### Parameters

<i>taddr</i>	advertisers device address.
<i>own_addr_type</i>	owner address type.

##### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.5 LeGapCentralSetDataChannel()

```
LE_ERR_STATE LeGapCentralSetDataChannel (
    UINT8 * ch )
```

Central set data channel.

##### Parameters

<i>ch</i>	data channel.
-----------	---------------



**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.6 LeGapClearResolvingList()**

```
LE_ERR_STATE LeGapClearResolvingList (
    void )
```

Clear the resolving-list in the controller.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.7 LeGapClearWhiteList()**

```
LE_ERR_STATE LeGapClearWhiteList (
    void )
```

Clear whitelist in the controller.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.8 LeGapConnectCancelReq()**

```
LE_ERR_STATE LeGapConnectCancelReq (
    void )
```

Cancel connect request.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.9 LeGapConnParaRequestRsp()**

```
void LeGapConnParaRequestRsp (
    UINT16 conn_hdl,
    BOOL accept )
```

Connection parameters request response.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>accept</i>	TRUE is accept, FALSE is not.

**Returns**

None.

**4.3.3.10 LeGapConnUpdateRequest()**

```
void LeGapConnUpdateRequest (
    UINT16 conn_hdl,
    LE_CONN_PARA_T * para )
```

Connection parameters update request.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>para</i>	update connection parameters.

**Returns**

None.

**4.3.3.11 LeGapConnUpdateResponse()**

```
void LeGapConnUpdateResponse (
    UINT16 conn_hdl,
    UINT8 identifier,
    BOOL accept )
```

Connection parameters update response.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>identifier</i>	TBD
<i>accept</i>	accept request, or not.

**Returns**

None.

#### 4.3.3.12 LeGapDisconnectReq()

```
LE_ERR_STATE LeGapDisconnectReq (
    UINT16 conn_hdl )
```

Disconnect the physical connection.

##### Parameters

<i>conn_hdl</i>	connection handle.
-----------------	--------------------

##### Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.13 LeGapGenRandAddr()

```
LE_ERR_STATE LeGapGenRandAddr (
    UINT8 type,
    BD_ADDR addr )
```

Called to generation random address.

##### Parameters

<i>type</i>	address type.
<i>addr</i>	address.

##### Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.14 LeGapGetBtAddr()

```
void LeGapGetBtAddr (
    void )
```

Get owner device address.

#### 4.3.3.15 LeGapReadAdvChannelTxPower()

```
void LeGapReadAdvChannelTxPower (
    void )
```

Read ADV channel txpower.

#### 4.3.3.16 LeGapReadChannelMap()

```
LE_ERR_STATE LeGapReadChannelMap (
    UINT16 conn_hdl )
```

Read channel map.

##### Parameters

<i>conn_hdl</i>	connection handle.
-----------------	--------------------

##### Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.17 LeGapReadResolvingListSize()

```
void LeGapReadResolvingListSize (
    void )
```

Read the resolving-list size in the controller.

##### Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.18 LeGapReadRssi()

```
LE_ERR_STATE LeGapReadRssi (
    UINT16 conn_hdl )
```

Read RSSI value from controller.

## Parameters

<i>conn_hdl</i>	connection handle.
-----------------	--------------------

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.3.3.19 LeGapReadTxPower()

```
LE_ERR_STATE LeGapReadTxPower (
    UINT16 conn_hdl,
    UINT8 type )
```

Read tx power value for the specified connection.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>type</i>	current tx power, or maximum tx power. Don't support.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.3.3.20 LeGapReadWhiteListSize()

```
void LeGapReadWhiteListSize (
    void )
```

Read whitelist size in the controller.

## 4.3.3.21 LeGapRemoveFromWhiteList()

```
LE_ERR_STATE LeGapRemoveFromWhiteList (
    LE_BT_ADDR_T * bt_addr )
```

Remove device from whitelist.

Remove device from resolving-list.

**Parameters**

<i>bt_addr</i>	BT device address.
----------------	--------------------

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.22 LeGapScanningReq()**

```
LE_ERR_STATE LeGapScanningReq (  
    BOOL start,  
    BOOL filter )
```

Request scanning start.

**Parameters**

<i>start</i>	TRUE is start, FALSE is not.
<i>filter</i>	scan policy, refer to <code>LE_HCI_SCAN_FILT_*</code> in <a href="#">ble_hci_if.h</a>

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.23 LeGapSetAdvData()**

```
LE_ERR_STATE LeGapSetAdvData (  
    UINT8 len,  
    UINT8 * data )
```

Called to set ADV data.

**Parameters**

<i>len</i>	ADV data length.
<i>data</i>	ADV data.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.3.3.24 LeGapSetAdvParameter()

```
LE_ERR_STATE LeGapSetAdvParameter (
    LE_GAP_ADVERTISING_PARAM_T * params )
```

Called to set ADV parameters.

## Parameters

<i>params</i>	advertising params.
---------------	---------------------

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.3.3.25 LeGapSetConnParameter()

```
LE_ERR_STATE LeGapSetConnParameter (
    UINT16 interval_min,
    UINT16 interval_max,
    UINT16 slave_latency,
    UINT16 supervision_timeout )
```

Called to set connection parameters.

## Parameters

<i>interval_min</i>	mininum connection interval.
<i>interval_max</i>	maxinum connection interval.
<i>slave_latency</i>	slave letency.
<i>supervision_timeout</i>	supervison timeout.

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.3.3.26 LeGapSetDataChannelPduLen()

```
LE_ERR_STATE LeGapSetDataChannelPduLen (
    UINT16 conn_hdl,
```

```
UINT16 tx_octets,  
UINT16 tx_time )
```

Set data channel PDU length.

#### Parameters

<i>tx_octets</i>	the maximum number of octets in the Payload field that the local device will send to the remote device.
<i>tx_time</i>	the maximum number of microseconds that the local device will take to transmit a PDU to the remote device.

#### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.27 LeGapSetRandAddr()

```
LE_ERR_STATE LeGapSetRandAddr (  
    BD_ADDR addr )
```

Called to set random address.

#### Parameters

<i>addr</i>	the random address which should be set.
-------------	---

#### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.3.3.28 LeGapSetRpaTimeout()

```
LE_ERR_STATE LeGapSetRpaTimeout (  
    UINT16 timeout )
```

Set resolvable private address timeout.

#### Parameters

<i>timeout</i>	RPA_Timeout, measured in seconds.
----------------	-----------------------------------



**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.29 LeGapSetStaticAddr()**

```
LE_ERR_STATE LeGapSetStaticAddr (
    BD_ADDR addr )
```

Called to set static address.

**Parameters**

<i>addr</i>	the static address which should be set.
-------------	---

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.30 LeSetScanParameter()**

```
LE_ERR_STATE LeSetScanParameter (
    LE_GAP_SCAN_PARAM_T * params )
```

Called to set scan parameters.

**Parameters**

<i>params</i>	scan parameters.
---------------	------------------

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.3.3.31 LeSetScanRspData()**

```
LE_ERR_STATE LeSetScanRspData (
    UINT8 len,
    UINT8 * data )
```

Called to set scan response data.

**Parameters**

<i>len</i>	scan response data length.
<i>data</i>	scan response data.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.4 BLE GATT APIs

### Data Structures

- struct [LE\\_GATT\\_ATTR\\_T](#)
- struct [LE\\_GATT\\_MSG\\_ACCESS\\_READ\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_ACCESS\\_WRITE\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_CHAR\\_DESCRIPTOR\\_INFO\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_CHARACTERISTIC\\_DECL\\_INFO\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_CHARACTERISTIC\\_VAL\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_CONFIRMATION\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_EXCHANGE\\_MTU\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_EXCHANGE\\_MTU\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_EXECUTE\\_WRITE\\_RELIABLE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_FIND\\_ALL\\_CHAR\\_DESC\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_FIND\\_ALL\\_PRIMARY\\_SERVICE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_FIND\\_CHARACTERISTIC\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_FIND\\_INCLUDED\\_SERVICE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_FIND\\_PRIMARY\\_SERVICE\\_BY\\_UUID\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_INCLUDE\\_SERVICE\\_INFO\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_INDICATE\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_NOTIFY\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_NOTIFY\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_OPERATION\\_TIMEOUT\\_T](#)
- struct [LE\\_GATT\\_MSG\\_PREPARE\\_WRITE\\_RELIABLE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_READ\\_CHAR\\_VAL\\_BY\\_UUID\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_READ\\_CHARACTERISTIC\\_VALUE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_READ\\_LONG\\_CHAR\\_VAL\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_READ\\_MULTIPLE\\_CHAR\\_VAL\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_SERVICE\\_INFO\\_IND\\_T](#)
- struct [LE\\_GATT\\_MSG\\_SIGNED\\_WRITE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_WRITE\\_CHAR\\_VAL\\_RELIABLE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_WRITE\\_CHAR\\_VALUE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_WRITE\\_LONG\\_CHAR\\_VALUE\\_CFM\\_T](#)
- struct [LE\\_GATT\\_MSG\\_WRITE\\_NO\\_RSP\\_CFM\\_T](#)
- struct [LE\\_GATT\\_SERVICE\\_T](#)

### Macros

- [#define CHAR\\_AGGREGATE\\_DESCRIPTOR](#)(len, pVal) {0, LE\_GATT\_UUID16, (UINT16 \*)&gcCharAggregateUuid, LE\_GATT\_PERMIT\_READ, 0, len, (UINT8 \*)&pVal}
- [#define CHAR\\_CLIENT\\_CONFIG\\_DESCRIPTOR](#)(permit, pVal) {0, LE\_GATT\_UUID16, (UINT16 \*)&gcClientCharConfigUuid, LE\_GATT\_PERMIT\_READ | permit, 0, 2, (UINT8 \*)&pVal}
- [#define CHAR\\_DECL\\_UUID16\\_ATTR\\_VAL](#)(prop, type) {(prop), 0, 0, UINT16\_LO(type), UINT16\_HI(type)}
- [#define CHAR\\_EXT\\_PROP\\_DESCRIPTOR](#)(pVal) {0, LE\_GATT\_UUID16, (UINT16 \*)&gcCharExtPropUuid, LE\_GATT\_PERMIT\_READ, 0, 2, (UINT8 \*)&pVal}
- [#define CHAR\\_PRESENT\\_FORMAT\\_DESCRIPTOR](#)(pVal) {0, LE\_GATT\_UUID16, (UINT16 \*)&gcCharFormatUuid, LE\_GATT\_PERMIT\_READ, 0, 7, (UINT8 \*)&pVal}
- [#define CHAR\\_SERVER\\_CONFIG\\_DESCRIPTOR](#)(permit, pVal) {0, LE\_GATT\_UUID16, (UINT16 \*)&gcServerCharConfigUuid, LE\_GATT\_PERMIT\_READ | permit, 0, 2, (UINT8 \*)&pVal}
- [#define CHAR\\_USER\\_DESC\\_DESCRIPTOR](#)(permit, maxLen, len, pVal) {0, LE\_GATT\_UUID16, (UINT16 \*)&gcCharUserDescUuid, permit, maxLen, len, (UINT8 \*)&pVal}

- `#define CHARACTERISTIC_DECL_UUID128(pVal) {0, LE_GATT_UUID16, (UINT16 *)&gcCharacteristicUuid, LE_GATT_PERMIT_READ, 0, 19, (UINT8 *) (pVal)}`
- `#define CHARACTERISTIC_DECL_UUID16(pVal) {0, LE_GATT_UUID16, (UINT16 *)&gcCharacteristicUuid, LE_GATT_PERMIT_READ, 0, 5, (UINT8 *) (pVal)}`
- `#define CHARACTERISTIC_UUID128(pUuid, permit, maxLen, len, pVal) {0, LE_GATT_UUID128, (UINT16 *) pUuid, permit, maxLen, len, (UINT8 *) (pVal)}`
- `#define CHARACTERISTIC_UUID16(pUuid, permit, maxLen, len, pVal) {0, LE_GATT_UUID16, (UINT16 *) pUuid, permit, maxLen, len, (UINT8 *) (pVal)}`
- `#define GATT_CHAR_AGG_FORMAT_UUID 0x2905`
- `#define GATT_CHAR_EXT_PROPS_UUID 0x2900`
- `#define GATT_CHAR_FORMAT_UUID 0x2904`
- `#define GATT_CHAR_USER_DESC_UUID 0x2901`
- `#define GATT_CHARACTERISTIC_UUID 0x2803`
- `#define GATT_CLIENT_CHAR_CFG_UUID 0x2902`
- `#define GATT_EXT_REPORT_REF_UUID 0x2907`
- `#define GATT_INCLUDE_UUID 0x2802`
- `#define GATT_PRIMARY_SERVICE_UUID 0x2800`
- `#define GATT_REPORT_REF_UUID 0x2908`
- `#define GATT_SECONDARY_SERVICE_UUID 0x2801`
- `#define GATT_SERV_CHAR_CFG_UUID 0x2903`
- `#define GATT_VALID_RANGE_UUID 0x2906`
- `#define INCLUDE_DECL_UUID128(pVal) {0, LE_GATT_UUID16, (UINT16 *)&gcIncludeUuid, LE_GATT_PERMIT_READ, 0, 4, (UINT8 *) (pVal)}`
- `#define INCLUDE_DECL_UUID128_ATTR_VAL() {0, 0, 0, 0}`
- `#define INCLUDE_DECL_UUID16_ATTR_VAL(uuid) {0, 0, 0, 0, UINT16_LO(uuid), UINT16_HI(uuid)}`
- `#define INCLUDE_DECL_UUID16(pVal) {0, LE_GATT_UUID16, (UINT16 *)&gcIncludeUuid, LE_GATT_PERMIT_READ, 0, 6, (UINT8 *) (pVal)}`
- `#define LE_ATT_UUID_SIZE 2`
- `#define LE_GATT_CHAR_PROP_AUTH 0x40`
- `#define LE_GATT_CHAR_PROP_BCAST 0x01`

*Characteristic Properties Bit.*

- `#define LE_GATT_CHAR_PROP_EXT_PROP 0x80`
- `#define LE_GATT_CHAR_PROP_IND 0x20`
- `#define LE_GATT_CHAR_PROP_NTF 0x10`
- `#define LE_GATT_CHAR_PROP_RD 0x02`
- `#define LE_GATT_CHAR_PROP_WR 0x08`
- `#define LE_GATT_CHAR_PROP_WR_NO_RESP 0x04`
- `#define LE_GATT_CLIENT_CFG_INDICATION 0x02`
- `#define LE_GATT_CLIENT_CFG_NOTIFICATION 0x01`
- `#define LE_GATT_EXT_PROP_RELIABLE_WR 0x0001`
- `#define LE_GATT_EXT_PROP_WR_AUX 0x0002`
- `#define LE_GATT_FLAG_PREPARE_WRITE 0x02`
- `#define LE_GATT_FLAG_WRITE_CMD 0x01`
- `#define LE_GATT_FLAG_WRITE_REQ 0x00`
- `#define LE_GATT_PERM_AUTH_READABLE (0x1 << 4)`
- `#define LE_GATT_PERM_AUTH_WRITABLE (0x1 << 6)`
- `#define LE_GATT_PERM_NONE (0x00)`
- `#define LE_GATT_PERM_READ (0x1 << 1)`
- `#define LE_GATT_PERM_RELIABLE_WRITE (0x1 << 5)`
- `#define LE_GATT_PERM_WRITE_CMD (0x1 << 2)`
- `#define LE_GATT_PERM_WRITE_REQ (0x1 << 3)`
- `#define LE_GATT_PERMIT_AUTHEN_READ (0x0040)`
- `#define LE_GATT_PERMIT_AUTHEN_WRITE (0x0080)`
- `#define LE_GATT_PERMIT_AUTHOR_READ (0x0004)`
- `#define LE_GATT_PERMIT_AUTHOR_WRITE (0x0008)`

- `#define LE_GATT_PERMIT_ENCRYPT_READ (0x0010)`
- `#define LE_GATT_PERMIT_ENCRYPT_WRITE (0x0020)`
- `#define LE_GATT_PERMIT_READ (0x0001)`
- `#define LE_GATT_PERMIT_READABLE (LE_GATT_PERMIT_READ | LE_GATT_PERMIT_AUTHEN_READ | LE_GATT_PERMIT_AUTHOR_READ | LE_GATT_PERMIT_ENCRYPT_READ | LE_GATT_PERMIT_SC_AUTHEN_READ)`
- `#define LE_GATT_PERMIT_SC_AUTHEN_READ (0x0100)`
- `#define LE_GATT_PERMIT_SC_AUTHEN_WRITE (0x0200)`
- `#define LE_GATT_PERMIT_WRITABLE (LE_GATT_PERMIT_WRITE | LE_GATT_PERMIT_AUTHEN_WRITE | LE_GATT_PERMIT_AUTHOR_WRITE | LE_GATT_PERMIT_ENCRYPT_WRITE | LE_GATT_PERMIT_SC_AUTHEN_WRITE)`
- `#define LE_GATT_PERMIT_WRITE (0x0002)`
- `#define PRIMARY_SERVICE_DECL_UUID128(pUuid) {0, LE_GATT_UUID16, (UINT16 *)&gcPrimaryServiceUuid, LE_GATT_PERMIT_READ, 0, 16, (UINT8 *)&(pUuid)}`
- `#define PRIMARY_SERVICE_DECL_UUID16(pUuid) {0, LE_GATT_UUID16, (UINT16 *)&gcPrimaryServiceUuid, LE_GATT_PERMIT_READ, 0, 2, (UINT8 *)&(pUuid)}`
- `#define SECONDARY_SERVICE_DECL_UUID128(pUuid) {0, LE_GATT_UUID16, (UINT16 *)&gcSecondaryServiceUuid, LE_GATT_PERMIT_READ, 0, 16, (UINT8 *)&(pUuid)}`
- `#define SECONDARY_SERVICE_DECL_UUID16(pUuid) {0, LE_GATT_UUID16, (UINT16 *)&gcSecondaryServiceUuid, LE_GATT_PERMIT_READ, 0, 2, (UINT8 *)&(pUuid)}`

### Enumerations

- `enum {`
- `LE_GATT_MSG_INIT_CFM = LE_GATT_MSG_BASE, LE_GATT_MSG_EXCHANGE_MTU_IND,`
- `LE_GATT_MSG_EXCHANGE_MTU_CFM,`
- `LE_GATT_MSG_ACCESS_READ_IND,`
- `LE_GATT_MSG_ACCESS_WRITE_IND, LE_GATT_MSG_SERVICE_INFO_IND,`
- `LE_GATT_MSG_FIND_ALL_PRIMARY_SERVICE_CFM,`
- `LE_GATT_MSG_FIND_PRIMARY_SERVICE_BY_UUID_CFM,`
- `LE_GATT_MSG_FIND_INCLUDED_SERVICE_CFM, LE_GATT_MSG_CHARACTERISTIC_DECL_INFO_IND,`
- `LE_GATT_MSG_FIND_CHARACTERISTIC_CFM, LE_GATT_MSG_CHAR_DESCRIPTOR_INFO_IND,`
- `LE_GATT_MSG_FIND_ALL_CHAR_DESC_CFM, LE_GATT_MSG_CHARACTERISTIC_VAL_IND,`
- `LE_GATT_MSG_READ_CHARACTERISTIC_VALUE_CFM, LE_GATT_MSG_READ_CHAR_VAL_BY_UUID_CFM,`
- `LE_GATT_MSG_READ_LONG_CHAR_VAL_CFM, LE_GATT_MSG_READ_MULTIPLE_CHAR_VAL_CFM,`
- `LE_GATT_MSG_WRITE_CHAR_VALUE_CFM, LE_GATT_MSG_WRITE_LONG_CHAR_VALUE_CFM,`
- `LE_GATT_MSG_WRITE_CHAR_VAL_RELIABLE_CFM, LE_GATT_MSG_PREPARE_WRITE_RELIABLE_CFM,`
- `LE_GATT_MSG_EXECUTE_WRITE_RELIABLE_CFM, LE_GATT_MSG_WRITE_NO_RSP_CFM,`
- `LE_GATT_MSG_SIGNED_WRITE_CFM, LE_GATT_MSG_NOTIFY_IND, LE_GATT_MSG_NOTIFY_CFM,`
- `LE_GATT_MSG_INDICATE_IND,`
- `LE_GATT_MSG_CONFIRMATION_CFM, LE_GATT_MSG_OPERATION_TIMEOUT,`
- `LE_GATT_MSG_SIGN_RESOLUTION_FAIL,`
- `LE_GATT_MSG_INCLUDE_SERVICE_INFO_IND,`
- `LE_GATT_MSG_TOP }`

*BLE GATT message id.*

### Functions

- `LE_ERR_STATE LeGattAccessReadRsp (UINT16 conn_hdl, UINT16 handle, UINT8 att_err)`  
*Gatt access read response.*
- `LE_ERR_STATE LeGattAccessWriteRsp (UINT16 conn_hdl, UINT8 method, UINT16 handle, UINT8 att_err)`  
*Gatt access write response.*
- `LE_ERR_STATE LeGattChangeAttrVal (LE_GATT_SERVICE_T *svc, UINT16 attrId, UINT16 len, void *val)`  
*Change attribute value.*
- `LE_ERR_STATE LeGattCharValConfirmation (UINT16 conn_hdl)`  
*Prepare write characteristic value response.*
- `LE_ERR_STATE LeGattCharValIndicate (UINT16 conn_hdl, UINT16 hdl, UINT16 len, UINT8 *pval)`  
*Gatt characteristic value indication.*

- LE\_ERR\_STATE [LeGattCharValNotify](#) (UINT16 conn\_hdl, UINT16 hdl, UINT16 len, UINT8 \*pval)  
*Gatt characteristic value notification.*
- LE\_ERR\_STATE [LeGattExchangeMtuReq](#) (UINT16 conn\_hdl, UINT16 mtu)  
*Exchange MTU request.*
- LE\_ERR\_STATE [LeGattExchangeMtuRsp](#) (UINT16 conn\_hdl, UINT16 mtu)  
*Exchange MTU response.*
- LE\_ERR\_STATE [LeGattExecuteWriteCharValReliable](#) (UINT16 conn\_hdl, BOOL yesno)  
*Execute write characteristic value request.*
- LE\_ERR\_STATE [LeGattFindAllCharacteristic](#) (UINT16 conn\_hdl, UINT16 start\_hdl, UINT16 end\_hdl)  
*Find all characteristic.*
- LE\_ERR\_STATE [LeGattFindAllCharDescriptor](#) (UINT16 conn\_hdl, UINT16 start\_hdl, UINT16 end\_hdl)  
*Find all characteristic description.*
- LE\_ERR\_STATE [LeGattFindAllPrimaryService](#) (UINT16 conn\_hdl)  
*Find all primary service.*
- LE\_ERR\_STATE [LeGattFindCharacteristicByUuid](#) (UINT16 conn\_hdl, UINT16 start\_hdl, UINT16 end\_hdl, UINT8 format, UINT16 \*uuid)  
*Find characteristic by UUID.*
- LE\_ERR\_STATE [LeGattFindIncludedService](#) (UINT16 conn\_hdl, UINT16 start\_hdl, UINT16 end\_hdl)  
*Find include service.*
- LE\_ERR\_STATE [LeGattFindPrimaryServiceByUuid](#) (UINT16 conn\_hdl, UINT8 format, UINT16 \*uuid)  
*Find primary service by UUID.*
- UINT16 [LeGattGetAttrHandle](#) (LE\_GATT\_SERVICE\_T \*svc, UINT16 attrId)  
*Get attribute handle.*
- LE\_ERR\_STATE [LeGattGetAttrVal](#) (LE\_GATT\_SERVICE\_T \*svc, UINT16 attrId, UINT16 \*len, void \*val)  
*Get attribute value.*
- UINT16 [LeGattGetAttrValLen](#) (LE\_GATT\_SERVICE\_T \*svc, UINT16 attrId)  
*Get the length of attribute value.*
- UINT16 [LeGattGetAttrValMaxLen](#) (LE\_GATT\_SERVICE\_T \*svc, UINT16 attrId)  
*Get the max length of attribute value.*
- void [LeGattInit](#) (TASK appTask)  
*BLE Gatt module init.*
- LE\_ERR\_STATE [LeGattModifyAttrVal](#) (LE\_GATT\_SERVICE\_T \*svc, UINT16 attrId, UINT16 offset, UINT16 len, void \*val)  
*Modify attribute value.*
- LE\_ERR\_STATE [LeGattPrepareWriteCharValReliable](#) (UINT16 conn\_hdl, UINT16 handle, UINT16 offset, UINT16 len, UINT8 \*val)  
*Prepare write characteristic value request.*
- LE\_ERR\_STATE [LeGattReadCharValByUuid](#) (UINT16 conn\_hdl, UINT16 start\_hdl, UINT16 end\_hdl, UINT8 format, UINT16 \*uuid)  
*Read a characteristic value by UUID.*
- LE\_ERR\_STATE [LeGattReadCharValue](#) (UINT16 conn\_hdl, UINT16 handle)  
*Read a characteristic value.*
- LE\_ERR\_STATE [LeGattReadLongCharVal](#) (UINT16 conn\_hdl, UINT16 handle, UINT16 offset)  
*Read a long characteristic value.*
- LE\_ERR\_STATE [LeGattReadMultipleCharVal](#) (UINT16 conn\_hdl, UINT16 count, UINT16 \*handle)  
*Read Multiple characteristic values.*
- LE\_ERR\_STATE [LeGattRegisterIncludeService](#) (UINT16 inc\_hdl, UINT16 start\_hdl, UINT16 end\_hdl, UI↔NT16 uuid)  
*Called to register an include service.*
- LE\_GATT\_SERVICE\_T \* [LeGattRegisterService](#) (LE\_GATT\_ATTR\_T \*attrTable, UINT16 numAttr)  
*Called to register a service.*

- LE\_ERR\_STATE [LeGattSignedWriteNoRsp](#) (UINT16 conn\_hdl, UINT16 handle, UINT16 len, UINT8 \*val)  
*Signed write without response.*
- void [LeGattStopCurrentProcedure](#) (UINT16 conn\_hdl)  
*Stop current procedure.*
- LE\_ERR\_STATE [LeGattWriteCharVal](#) (UINT16 conn\_hdl, UINT16 handle, UINT16 len, UINT8 \*val)  
*Write characteristic value.*
- LE\_ERR\_STATE [LeGattWriteCharValReliable](#) (UINT16 conn\_hdl, UINT16 handle, UINT16 offset, UINT16 len, UINT8 \*val)  
*Write characteristic value reliable.*
- LE\_ERR\_STATE [LeGattWriteLongCharVal](#) (UINT16 conn\_hdl, UINT16 handle, UINT16 offset, UINT16 len, UINT8 \*val)  
*Write long characteristic value.*
- LE\_ERR\_STATE [LeGattWriteNoRsp](#) (UINT16 conn\_hdl, UINT16 handle, UINT16 len, UINT8 \*val)  
*Write without response.*

## Variables

- const UINT16 [gcCharacteristicUuid](#)
- const UINT16 [gcCharAggregateUuid](#)
- const UINT16 [gcCharExtPropUuid](#)
- const UINT16 [gcCharFormatUuid](#)
- const UINT16 [gcCharUserDescUuid](#)
- const UINT16 [gcClientCharConfigUuid](#)
- const UINT16 [gcExtReportRefUuid](#)
- const UINT16 [gcIncludeUuid](#)
- const UINT16 [gcPrimaryServiceUuid](#)
- const UINT16 [gcReportRefUuid](#)
- const UINT16 [gcSecondaryServiceUuid](#)
- const UINT16 [gcServerCharConfigUuid](#)
- const UINT16 [gcValidRangeUuid](#)

### 4.4.1 Detailed Description

### 4.4.2 Macro Definition Documentation

#### 4.4.2.1 CHARAggregateDescriptor

```
#define CHARAggregateDescriptor(  
    len,  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcCharAggregateUuid, LE_GATT_PERMIT_READ,  
0, len, (UINT8 *) (pVal)}
```

#### 4.4.2.2 CHAR\_CLIENT\_CONFIG\_DESCRIPTOR

```
#define CHAR_CLIENT_CONFIG_DESCRIPTOR(  
    permit,  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcClientCharConfigUuid, LE_GATT_PERMIT_READ  
| permit, 0, 2, (UINT8 *) (pVal)}
```

#### 4.4.2.3 CHAR\_DECL\_UUID16\_ATTR\_VAL

```
#define CHAR_DECL_UUID16_ATTR_VAL(  
    prop,  
    type ) {(prop), 0, 0, UINT16_LO(type), UINT16_HI(type)}
```

#### 4.4.2.4 CHAR\_EXT\_PROP\_DESCRIPTOR

```
#define CHAR_EXT_PROP_DESCRIPTOR(  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcCharExtPropUuid, LE_GATT_PERMIT_READ, 0,  
2, (UINT8 *) (pVal)}
```

#### 4.4.2.5 CHAR\_PRESENT\_FORMAT\_DESCRIPTOR

```
#define CHAR_PRESENT_FORMAT_DESCRIPTOR(  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcCharFormatUuid, LE_GATT_PERMIT_READ, 0,  
7, (UINT8 *) (pVal)}
```

#### 4.4.2.6 CHAR\_SERVER\_CONFIG\_DESCRIPTOR

```
#define CHAR_SERVER_CONFIG_DESCRIPTOR(  
    permit,  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcServerCharConfigUuid, LE_GATT_PERMIT_READ  
| permit, 0, 2, (UINT8 *) (pVal)}
```

#### 4.4.2.7 CHAR\_USER\_DESC\_DESCRIPTOR

```
#define CHAR_USER_DESC_DESCRIPTOR(  
    permit,  
    maxLen,  
    len,  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcCharUserDescUuid, permit, maxLen, len,  
(UINT8 *) (pVal)}
```



#### 4.4.2.8 CHARACTERISTIC\_DECL\_UUID128

```
#define CHARACTERISTIC_DECL_UUID128(  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcCharacteristicUuid, LE_GATT_PERMIT_READ,  
    0, 19, (UINT8 *) (pVal)}
```

#### 4.4.2.9 CHARACTERISTIC\_DECL\_UUID16

```
#define CHARACTERISTIC_DECL_UUID16(  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcCharacteristicUuid, LE_GATT_PERMIT_READ,  
    0, 5, (UINT8 *) (pVal)}
```

#### 4.4.2.10 CHARACTERISTIC\_UUID128

```
#define CHARACTERISTIC_UUID128(  
    pUuid,  
    permit,  
    maxLen,  
    len,  
    pVal ) {0, LE_GATT_UUID128, (UINT16 *)pUuid, permit, maxLen, len, (UINT8 *) (pVal)}
```

#### 4.4.2.11 CHARACTERISTIC\_UUID16

```
#define CHARACTERISTIC_UUID16(  
    pUuid,  
    permit,  
    maxLen,  
    len,  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)pUuid, permit, maxLen, len, (UINT8 *) (pVal)}
```

#### 4.4.2.12 GATT\_CHAR\_AGG\_FORMAT\_UUID

```
#define GATT_CHAR_AGG_FORMAT_UUID 0x2905
```

#### 4.4.2.13 GATT\_CHAR\_EXT\_PROPS\_UUID

```
#define GATT_CHAR_EXT_PROPS_UUID 0x2900
```

#### 4.4.2.14 GATT\_CHAR\_FORMAT\_UUID

```
#define GATT_CHAR_FORMAT_UUID 0x2904
```

#### 4.4.2.15 GATT\_CHAR\_USER\_DESC\_UUID

```
#define GATT_CHAR_USER_DESC_UUID 0x2901
```

#### 4.4.2.16 GATT\_CHARACTERISTIC\_UUID

```
#define GATT_CHARACTERISTIC_UUID 0x2803
```

#### 4.4.2.17 GATT\_CLIENT\_CHAR\_CFG\_UUID

```
#define GATT_CLIENT_CHAR_CFG_UUID 0x2902
```

#### 4.4.2.18 GATT\_EXT\_REPORT\_REF\_UUID

```
#define GATT_EXT_REPORT_REF_UUID 0x2907
```

#### 4.4.2.19 GATT\_INCLUDE\_UUID

```
#define GATT_INCLUDE_UUID 0x2802
```

#### 4.4.2.20 GATT\_PRIMARY\_SERVICE\_UUID

```
#define GATT_PRIMARY_SERVICE_UUID 0x2800
```

#### 4.4.2.21 GATT\_REPORT\_REF\_UUID

```
#define GATT_REPORT_REF_UUID 0x2908
```

#### 4.4.2.22 GATT\_SECONDARY\_SERVICE\_UUID

```
#define GATT_SECONDARY_SERVICE_UUID 0x2801
```

#### 4.4.2.23 GATT\_SERV\_CHAR\_CFG\_UUID

```
#define GATT_SERV_CHAR_CFG_UUID 0x2903
```

#### 4.4.2.24 GATT\_VALID\_RANGE\_UUID

```
#define GATT_VALID_RANGE_UUID 0x2906
```

#### 4.4.2.25 INCLUDE\_DECL\_UUID128

```
#define INCLUDE_DECL_UUID128(  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcIncludeUuid, LE_GATT_PERMIT_READ, 0, 4,  
(UINT8 *) (pVal)}
```

#### 4.4.2.26 INCLUDE\_DECL\_UUID128\_ATTR\_VAL

```
#define INCLUDE_DECL_UUID128_ATTR_VAL( ) {0, 0, 0, 0}
```

#### 4.4.2.27 INCLUDE\_DECL\_UUID16\_ATTR\_VAL

```
#define INCLUDE_DECL_UUID16_ATTR_VAL(  
    uuid ) {0, 0, 0, 0, UINT16_LO(uuid), UINT16_HI(uuid)}
```

#### 4.4.2.28 INCLUDE\_DECL\_UUIN16

```
#define INCLUDE_DECL_UUIN16(  
    pVal ) {0, LE_GATT_UUID16, (UINT16 *)&gcIncludeUuid, LE_GATT_PERMIT_READ, 0, 6,  
(UINT8 *) (pVal)}
```

#### 4.4.2.29 LE\_ATT\_UUID\_SIZE

```
#define LE_ATT_UUID_SIZE 2
```

#### 4.4.2.30 LE\_GATT\_CHAR\_PROP\_AUTH

```
#define LE_GATT_CHAR_PROP_AUTH 0x40
```

#### 4.4.2.31 LE\_GATT\_CHAR\_PROP\_BCAST

```
#define LE_GATT_CHAR_PROP_BCAST 0x01
```

Characteristic Properties Bit.

#### 4.4.2.32 LE\_GATT\_CHAR\_PROP\_EXT\_PROP

```
#define LE_GATT_CHAR_PROP_EXT_PROP 0x80
```

#### 4.4.2.33 LE\_GATT\_CHAR\_PROP\_IND

```
#define LE_GATT_CHAR_PROP_IND 0x20
```

#### 4.4.2.34 LE\_GATT\_CHAR\_PROP\_NTF

```
#define LE_GATT_CHAR_PROP_NTF 0x10
```

#### 4.4.2.35 LE\_GATT\_CHAR\_PROP\_RD

```
#define LE_GATT_CHAR_PROP_RD 0x02
```

**4.4.2.36 LE\_GATT\_CHAR\_PROP\_WR**

```
#define LE_GATT_CHAR_PROP_WR 0x08
```

**4.4.2.37 LE\_GATT\_CHAR\_PROP\_WR\_NO\_RESP**

```
#define LE_GATT_CHAR_PROP_WR_NO_RESP 0x04
```

**4.4.2.38 LE\_GATT\_CLIENT\_CFG\_INDICATION**

```
#define LE_GATT_CLIENT_CFG_INDICATION 0x02
```

**4.4.2.39 LE\_GATT\_CLIENT\_CFG\_NOTIFICATION**

```
#define LE_GATT_CLIENT_CFG_NOTIFICATION 0x01
```

**4.4.2.40 LE\_GATT\_EXT\_PROP\_RELIABLE\_WR**

```
#define LE_GATT_EXT_PROP_RELIABLE_WR 0x0001
```

**4.4.2.41 LE\_GATT\_EXT\_PROP\_WR\_AUX**

```
#define LE_GATT_EXT_PROP_WR_AUX 0x0002
```

**4.4.2.42 LE\_GATT\_FLAG\_PREPARE\_WRITE**

```
#define LE_GATT_FLAG_PREPARE_WRITE 0x02
```

**4.4.2.43 LE\_GATT\_FLAG\_WRITE\_CMD**

```
#define LE_GATT_FLAG_WRITE_CMD 0x01
```

#### 4.4.2.44 LE\_GATT\_FLAG\_WRITE\_REQ

```
#define LE_GATT_FLAG_WRITE_REQ 0x00
```

#### 4.4.2.45 LE\_GATT\_PERM\_AUTH\_READABLE

```
#define LE_GATT_PERM_AUTH_READABLE (0x1<<4)
```

#### 4.4.2.46 LE\_GATT\_PERM\_AUTH\_WRITABLE

```
#define LE_GATT_PERM_AUTH_WRITABLE (0x1<<6)
```

#### 4.4.2.47 LE\_GATT\_PERM\_NONE

```
#define LE_GATT_PERM_NONE (0x00)
```

#### 4.4.2.48 LE\_GATT\_PERM\_READ

```
#define LE_GATT_PERM_READ (0x1<<1)
```

#### 4.4.2.49 LE\_GATT\_PERM\_RELIABLE\_WRITE

```
#define LE_GATT_PERM_RELIABLE_WRITE (0x1<<5)
```

#### 4.4.2.50 LE\_GATT\_PERM\_WRITE\_CMD

```
#define LE_GATT_PERM_WRITE_CMD (0x1<<2)
```

#### 4.4.2.51 LE\_GATT\_PERM\_WRITE\_REQ

```
#define LE_GATT_PERM_WRITE_REQ (0x1<<3)
```

**4.4.2.52 LE\_GATT\_PERMIT\_AUTHEN\_READ**

```
#define LE_GATT_PERMIT_AUTHEN_READ (0x0040)
```

**4.4.2.53 LE\_GATT\_PERMIT\_AUTHEN\_WRITE**

```
#define LE_GATT_PERMIT_AUTHEN_WRITE (0x0080)
```

**4.4.2.54 LE\_GATT\_PERMIT\_AUTHOR\_READ**

```
#define LE_GATT_PERMIT_AUTHOR_READ (0x0004)
```

**4.4.2.55 LE\_GATT\_PERMIT\_AUTHOR\_WRITE**

```
#define LE_GATT_PERMIT_AUTHOR_WRITE (0x0008)
```

**4.4.2.56 LE\_GATT\_PERMIT\_ENCRYPT\_READ**

```
#define LE_GATT_PERMIT_ENCRYPT_READ (0x0010)
```

**4.4.2.57 LE\_GATT\_PERMIT\_ENCRYPT\_WRITE**

```
#define LE_GATT_PERMIT_ENCRYPT_WRITE (0x0020)
```

**4.4.2.58 LE\_GATT\_PERMIT\_READ**

```
#define LE_GATT_PERMIT_READ (0x0001)
```

**4.4.2.59 LE\_GATT\_PERMIT\_READABLE**

```
#define LE_GATT_PERMIT_READABLE (LE_GATT_PERMIT_READ | LE_GATT_PERMIT_AUTHEN_READ |  
LE_GATT_PERMIT_AUTHOR_READ | LE_GATT_PERMIT_ENCRYPT_READ | LE_GATT_PERMIT_SC_AUTHEN_READ)
```

#### 4.4.2.60 LE\_GATT\_PERMIT\_SC\_AUTHEN\_READ

```
#define LE_GATT_PERMIT_SC_AUTHEN_READ (0x0100)
```

#### 4.4.2.61 LE\_GATT\_PERMIT\_SC\_AUTHEN\_WRITE

```
#define LE_GATT_PERMIT_SC_AUTHEN_WRITE (0x0200)
```

#### 4.4.2.62 LE\_GATT\_PERMIT\_WRITABLE

```
#define LE_GATT_PERMIT_WRITABLE (LE_GATT_PERMIT_WRITE | LE_GATT_PERMIT_AUTHEN_WRITE |  
LE_GATT_PERMIT_AUTHOR_WRITE | LE_GATT_PERMIT_ENCRYPT_WRITE | LE_GATT_PERMIT_SC_AUTHEN_WRITE)
```

#### 4.4.2.63 LE\_GATT\_PERMIT\_WRITE

```
#define LE_GATT_PERMIT_WRITE (0x0002)
```

#### 4.4.2.64 PRIMARY\_SERVICE\_DECL\_UUID128

```
#define PRIMARY_SERVICE_DECL_UUID128(  
    pUuid ) {0, LE_GATT_UUID16, (UINT16 *)&gcPrimaryServiceUuid, LE_GATT_PERMIT_READ,  
0, 16, (UINT8 *) (pUuid)}
```

#### 4.4.2.65 PRIMARY\_SERVICE\_DECL\_UUID16

```
#define PRIMARY_SERVICE_DECL_UUID16(  
    pUuid ) {0, LE_GATT_UUID16, (UINT16 *)&gcPrimaryServiceUuid, LE_GATT_PERMIT_READ,  
0, 2, (UINT8 *) (pUuid)}
```

#### 4.4.2.66 SECONDARY\_SERVICE\_DECL\_UUID128

```
#define SECONDARY_SERVICE_DECL_UUID128(  
    pUuid ) {0, LE_GATT_UUID16, (UINT16 *)&gcSecondaryServiceUuid, LE_GATT_PERMIT_READ,  
0, 16, (UINT8 *) (pUuid)}
```



## 4.4.2.67 SECONDARY\_SERVICE\_DECL\_UUID16

```
#define SECONDARY_SERVICE_DECL_UUID16(  
    pUuid ) {0, LE_GATT_UUID16, (UINT16 *)&gcSecondaryServiceUuid, LE_GATT_PERMIT_READ,  
    0, 2, (UINT8 *) (pUuid)}
```

## 4.4.3 Enumeration Type Documentation

## 4.4.3.1 anonymous enum

anonymous enum

BLE GATT message id.

## Enumerator

LE_GATT_MSG_INIT_CFM	initialize confirm message
LE_GATT_MSG_EXCHANGE_MTU_IND	exchange MTU indication
LE_GATT_MSG_EXCHANGE_MTU_CFM	exchange MTU confirm
LE_GATT_MSG_ACCESS_READ_IND	access read indication
LE_GATT_MSG_ACCESS_WRITE_IND	access write indication
LE_GATT_MSG_SERVICE_INFO_IND	service information indication
LE_GATT_MSG_FIND_ALL_PRIMARY_SERVICE_↔ _CFM	find all primary service confirm
LE_GATT_MSG_FIND_PRIMARY_SERVICE_BY_↔ _UUID_CFM	find primary service by UUID confirm
LE_GATT_MSG_FIND_INCLUDED_SERVICE_CFM	find include service confirm
LE_GATT_MSG_CHARACTERISTIC_DECL_INF_↔ O_IND	characteristic declaration info indication
LE_GATT_MSG_FIND_CHARACTERISTIC_CFM	find characteristic confirm
LE_GATT_MSG_CHAR_DESCRIPTOR_INFO_IND	characteristic descriptor info indication
LE_GATT_MSG_FIND_ALL_CHAR_DESC_CFM	find all characteristic descriptors confirm
LE_GATT_MSG_CHARACTERISTIC_VAL_IND	characteristic value, indication message
LE_GATT_MSG_READ_CHARACTERISTIC_VAL_↔ UE_CFM	read characteristic value, confirm message
LE_GATT_MSG_READ_CHAR_VAL_BY_UUID_↔ CFM	read characteristic value by UUID confirm message
LE_GATT_MSG_READ_LONG_CHAR_VAL_CFM	read long characteristic value confirm message
LE_GATT_MSG_READ_MULTIPLE_CHAR_VAL_↔ CFM	read multiple characteristic value confirm
LE_GATT_MSG_WRITE_CHAR_VALUE_CFM	write characteristic value confirm
LE_GATT_MSG_WRITE_LONG_CHAR_VALUE_↔ CFM	write long characteristic value confirm
LE_GATT_MSG_WRITE_CHAR_VAL_RELIABLE_↔ _CFM	write characteristic value reliable confirm
LE_GATT_MSG_PREPARE_WRITE_RELIABLE_↔ CFM	prepare write reliable confirm
LE_GATT_MSG_EXECUTE_WRITE_RELIABLE_↔ CFM	execute write reliable confirm

## Enumerator

LE_GATT_MSG_WRITE_NO_RSP_CFM	write no response confirm
LE_GATT_MSG_SIGNED_WRITE_CFM	signed write confirm
LE_GATT_MSG_NOTIFY_IND	notify indication
LE_GATT_MSG_NOTIFY_CFM	notify confirm
LE_GATT_MSG_INDICATE_IND	indicate indication
LE_GATT_MSG_CONFIRMATION_CFM	confirmation confirm
LE_GATT_MSG_OPERATION_TIMEOUT	operation timeout
LE_GATT_MSG_SIGN_RESOLUTION_FAIL	sign resolution fail
LE_GATT_MSG_INCLUDE_SERVICE_INFO_IND	include service information
LE_GATT_MSG_TOP	top of GATT message id

## 4.4.4 Function Documentation

## 4.4.4.1 LeGattAccessReadRsp()

```
LE_ERR_STATE LeGattAccessReadRsp (
    UINT16 conn_hdl,
    UINT16 handle,
    UINT8 att_err )
```

Gatt access read response.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>handle</i>	attribute handle.
<i>att_err</i>	0 is OK, others refer to LE_ATT_ERR_* in <a href="#">ble_att_if.h</a> .

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.4.4.2 LeGattAccessWriteRsp()

```
LE_ERR_STATE LeGattAccessWriteRsp (
    UINT16 conn_hdl,
    UINT8 method,
    UINT16 handle,
    UINT8 att_err )
```

Gatt access write response.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>method</i>	refer to LE_GATT_FLAG_* in <a href="#">ble_gatt_if.h</a>
<i>handle</i>	attribute handle.
<i>att_err</i>	0 is OK, others refer to LE_ATT_ERR_* in <a href="#">ble_att_if.h</a> .

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.4.4.3 LeGattChangeAttrVal()

```
LE_ERR_STATE LeGattChangeAttrVal (
    LE_GATT_SERVICE_T * svc,
    UINT16 attrId,
    UINT16 len,
    void * val )
```

Change attribute value.

## Parameters

	<i>svc</i>	service.
	<i>attrId</i>	attribute index of service.
in	<i>len</i>	attribute value length.
in	<i>val</i>	attribute value.

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.4.4.4 LeGattCharValConfirmation()

```
LE_ERR_STATE LeGattCharValConfirmation (
    UINT16 conn_hdl )
```

Prepare write characteristic value response.

## Parameters

<i>conn_hdl</i>	connection handle.
-----------------	--------------------

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.4.5 LeGattCharValIndicate()**

```
LE_ERR_STATE LeGattCharValIndicate (
    UINT16 conn_hdl,
    UINT16 hdl,
    UINT16 len,
    UINT8 * pval )
```

Gatt characteristic value indication.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>hdl</i>	characteristic value handle.
<i>len</i>	value length.
<i>pval</i>	value.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.4.6 LeGattCharValNotify()**

```
LE_ERR_STATE LeGattCharValNotify (
    UINT16 conn_hdl,
    UINT16 hdl,
    UINT16 len,
    UINT8 * pval )
```

Gatt characteristic value notification.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>hdl</i>	characteristic value handle.
<i>len</i>	value length.
<i>pval</i>	value.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.7 `LeGattExchangeMtuReq()`

```
LE_ERR_STATE LeGattExchangeMtuReq (
    UINT16 conn_hdl,
    UINT16 mtu )
```

Exchange MTU request.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>mtu</i>	MTU.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.8 `LeGattExchangeMtuRsp()`

```
LE_ERR_STATE LeGattExchangeMtuRsp (
    UINT16 conn_hdl,
    UINT16 mtu )
```

Exchange MTU response.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>mtu</i>	MTU.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.9 LeGattExecuteWriteCharValReliable()

```
LE_ERR_STATE LeGattExecuteWriteCharValReliable (
    UINT16 conn_hdl,
    BOOL yesno )
```

Execute write characteristic value request.

##### Parameters

<i>conn_hdl</i>	connection handle.
<i>yesno</i>	execute write or not.

##### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.10 LeGattFindAllCharacteristic()

```
LE_ERR_STATE LeGattFindAllCharacteristic (
    UINT16 conn_hdl,
    UINT16 start_hdl,
    UINT16 end_hdl )
```

Find all characteristic.

##### Parameters

<i>conn_hdl</i>	connection handle.
<i>start_hdl</i>	start handle.
<i>end_hdl</i>	end handle.

##### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.11 LeGattFindAllCharDescriptor()

```
LE_ERR_STATE LeGattFindAllCharDescriptor (
    UINT16 conn_hdl,
    UINT16 start_hdl,
    UINT16 end_hdl )
```

Find all characteristic description.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>start_hdl</i>	start handle.
<i>end_hdl</i>	end handle.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.12 `LeGattFindAllPrimaryService()`

```
LE_ERR_STATE LeGattFindAllPrimaryService (
    UINT16 conn_hdl )
```

Find all primary service.

## Parameters

<i>conn_hdl</i>	connection handle.
-----------------	--------------------

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.13 `LeGattFindCharacteristicByUuid()`

```
LE_ERR_STATE LeGattFindCharacteristicByUuid (
    UINT16 conn_hdl,
    UINT16 start_hdl,
    UINT16 end_hdl,
    UINT8 format,
    UINT16 * uuid )
```

Find characteristic by UUID.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>start_hdl</i>	start handle.
<i>end_hdl</i>	end handle.
<i>format</i>	UUID type.
<i>uuid</i>	UUID.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.4.14 LeGattFindIncludedService()**

```
LE_ERR_STATE LeGattFindIncludedService (
    UINT16 conn_hdl,
    UINT16 start_hdl,
    UINT16 end_hdl )
```

Find include service.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>start_hdl</i>	start handle.
<i>end_hdl</i>	end handle.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.4.15 LeGattFindPrimaryServiceByUuid()**

```
LE_ERR_STATE LeGattFindPrimaryServiceByUuid (
    UINT16 conn_hdl,
    UINT8 format,
    UINT16 * uuid )
```

Find primary service by UUID.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>format</i>	UUID type.
<i>uuid</i>	UUID.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).



## 4.4.4.16 LeGattGetAttrHandle()

```

UINT16 LeGattGetAttrHandle (
    LE_GATT_SERVICE_T * svc,
    UINT16 attrId )

```

Get attribute handle.

## Parameters

<i>svc</i>	service.
<i>attrId</i>	attribute index of service.

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.4.4.17 LeGattGetAttrVal()

```

LE_ERR_STATE LeGattGetAttrVal (
    LE_GATT_SERVICE_T * svc,
    UINT16 attrId,
    UINT16 * len,
    void * val )

```

Get attribute value.

## Parameters

	<i>svc</i>	service.
	<i>attrId</i>	attribute index of service.
out	<i>len</i>	attribute value length.
out	<i>val</i>	attribute value.

## Returns

- SYS\_ERR\_SUCCESS: success.
- others: refer to error code in [ble\\_err.h](#).

## 4.4.4.18 LeGattGetAttrValLen()

```

UINT16 LeGattGetAttrValLen (
    LE_GATT_SERVICE_T * svc,
    UINT16 attrId )

```

Get the length of attribute value.

## Parameters

<i>svc</i>	service.
<i>attr↔ Id</i>	attribute index of service.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.19 `LeGattGetAttrValMaxLen()`

```
UINT16 LeGattGetAttrValMaxLen (
    LE_GATT_SERVICE_T * svc,
    UINT16 attrId )
```

Get the max length of attribute value.

## Parameters

<i>svc</i>	service.
<i>attr↔ Id</i>	attribute index of service.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.20 `LeGattInit()`

```
void LeGattInit (
    TASK appTask )
```

BLE Gatt module init.

## Parameters

<i>appTask</i>	the reference of BLE task.
----------------	----------------------------

## Returns

None.

#### 4.4.4.21 LeGattModifyAttrVal()

```
LE_ERR_STATE LeGattModifyAttrVal (
    LE_GATT_SERVICE_T * svc,
    UINT16 attrId,
    UINT16 offset,
    UINT16 len,
    void * val )
```

Modify attribute value.

##### Parameters

<i>svc</i>	servie.
<i>attrId</i>	attribute index of service.
<i>offset</i>	modify offset.
<i>len</i>	modify length.
<i>val</i>	modify value.

##### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.22 LeGattPrepareWriteCharValReliable()

```
LE_ERR_STATE LeGattPrepareWriteCharValReliable (
    UINT16 conn_hdl,
    UINT16 handle,
    UINT16 offset,
    UINT16 len,
    UINT8 * val )
```

Prepare write characteristic value request.

##### Parameters

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.
<i>offset</i>	offset written.
<i>len</i>	length written.
<i>val</i>	value.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.23 `LeGattReadCharValByUuid()`

```
LE_ERR_STATE LeGattReadCharValByUuid (
    UINT16 conn_hdl,
    UINT16 start_hdl,
    UINT16 end_hdl,
    UINT8 format,
    UINT16 * uuid )
```

Read a characteristic value by UUID.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>start_hdl</i>	start handle.
<i>end_hdl</i>	end handle.
<i>format</i>	UUID type.
<i>uuid</i>	UUID.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.24 `LeGattReadCharValue()`

```
LE_ERR_STATE LeGattReadCharValue (
    UINT16 conn_hdl,
    UINT16 handle )
```

Read a characteristic value.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.25 LeGattReadLongCharVal()

```
LE_ERR_STATE LeGattReadLongCharVal (
    UINT16 conn_hdl,
    UINT16 handle,
    UINT16 offset )
```

Read a long characteristic value.

##### Parameters

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.
<i>offset</i>	characteristic value offset.

##### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.26 LeGattReadMultipleCharVal()

```
LE_ERR_STATE LeGattReadMultipleCharVal (
    UINT16 conn_hdl,
    UINT16 count,
    UINT16 * handle )
```

Read Multiple characteristic values.

##### Parameters

<i>conn_hdl</i>	connection handle.
<i>count</i>	handle count.
<i>handle</i>	handle table.

##### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.27 LeGattRegisterIncludeService()

```
LE_ERR_STATE LeGattRegisterIncludeService (
    UINT16 inc_hdl,
```

```
UINT16 start_hdl,  
UINT16 end_hdl,  
UINT16 uuid )
```

Called to register an include service.

#### Parameters

<i>inc_hdl</i>	include service handle.
<i>start_hdl</i>	start handle.
<i>end_hdl</i>	end handle.
<i>uuid</i>	include service UUID.

#### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.28 LeGattRegisterService()

```
LE_GATT_SERVICE_T* LeGattRegisterService (  
    LE_GATT_ATTR_T * attrTable,  
    UINT16 numAttr )
```

Called to register a service.

#### Parameters

<i>attrTable</i>	service attribute table.
<i>numAttr</i>	the attribute number of service.

#### Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

#### 4.4.4.29 LeGattSignedWriteNoRsp()

```
LE_ERR_STATE LeGattSignedWriteNoRsp (  
    UINT16 conn_hdl,  
    UINT16 handle,  
    UINT16 len,  
    UINT8 * val )
```

Signed write without response.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.
<i>len</i>	length of the data to be written.
<i>val</i>	the value to be written.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.4.30 LeGattStopCurrentProcedure()**

```
void LeGattStopCurrentProcedure (
    UINT16 conn_hdl )
```

Stop current procedure.

**Parameters**

<i>conn_hdl</i>	connection handle.
-----------------	--------------------

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.4.31 LeGattWriteCharVal()**

```
LE_ERR_STATE LeGattWriteCharVal (
    UINT16 conn_hdl,
    UINT16 handle,
    UINT16 len,
    UINT8 * val )
```

Write characteristic value.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.
<i>len</i>	length of the data to be written.
<i>val</i>	the value to be written.



## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.32 `LeGattWriteCharValReliable()`

```
LE_ERR_STATE LeGattWriteCharValReliable (
    UINT16 conn_hdl,
    UINT16 handle,
    UINT16 offset,
    UINT16 len,
    UINT8 * val )
```

Write characteristic value reliable.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.
<i>offset</i>	offset written.
<i>len</i>	length written.
<i>val</i>	value.

## Returns

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

4.4.4.33 `LeGattWriteLongCharVal()`

```
LE_ERR_STATE LeGattWriteLongCharVal (
    UINT16 conn_hdl,
    UINT16 handle,
    UINT16 offset,
    UINT16 len,
    UINT8 * val )
```

Write long characteristic value.

## Parameters

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.
<i>offset</i>	value position offset.
<i>len</i>	length of the data to be written.
<i>val</i>	the value to be written.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.4.34 LeGattWriteNoRsp()**

```
LE_ERR_STATE LeGattWriteNoRsp (
    UINT16 conn_hdl,
    UINT16 handle,
    UINT16 len,
    UINT8 * val )
```

Write without response.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>handle</i>	characteristic value handle.
<i>len</i>	length of the data to be written.
<i>val</i>	the value to be written.

**Returns**

- `SYS_ERR_SUCCESS`: success.
- others: refer to error code in [ble\\_err.h](#).

**4.4.5 Variable Documentation****4.4.5.1 gcCharacteristicUuid**

```
const UINT16 gcCharacteristicUuid
```

**4.4.5.2 gcCharAggregateUuid**

```
const UINT16 gcCharAggregateUuid
```

#### 4.4.5.3 gcCharExtPropUuid

```
const UINT16 gcCharExtPropUuid
```

#### 4.4.5.4 gcCharFormatUuid

```
const UINT16 gcCharFormatUuid
```

#### 4.4.5.5 gcCharUserDescUuid

```
const UINT16 gcCharUserDescUuid
```

#### 4.4.5.6 gcClientCharConfigUuid

```
const UINT16 gcClientCharConfigUuid
```

#### 4.4.5.7 gcExtReportRefUuid

```
const UINT16 gcExtReportRefUuid
```

#### 4.4.5.8 gcIncludeUuid

```
const UINT16 gcIncludeUuid
```

#### 4.4.5.9 gcPrimaryServiceUuid

```
const UINT16 gcPrimaryServiceUuid
```

#### 4.4.5.10 gcReportRefUuid

```
const UINT16 gcReportRefUuid
```

#### 4.4.5.11 gcSecondaryServiceUuid

```
const UINT16 gcSecondaryServiceUuid
```

#### 4.4.5.12 gcServerCharConfigUuid

```
const UINT16 gcServerCharConfigUuid
```

#### 4.4.5.13 gcValidRangeUuid

```
const UINT16 gcValidRangeUuid
```

## 4.5 BLE MSG APIs

### Data Structures

- struct [LE\\_SYS\\_MSG\\_BUF\\_OVERFLOW\\_T](#)

### Macros

- `#define LE\_ATT\_MSG\_BASE 0x1400`
- `#define LE\_CM\_MSG\_BASE 0x1100`
- `#define LE\_GATT\_MSG\_BASE 0x1500`
- `#define LE\_HCI\_MSG\_BASE 0x1000`
- `#define LE\_L2CAP\_MSG\_BASE 0x1200`
- `#define LE\_SMP\_MSG\_BASE 0x1300`
- `#define LE\_SYS\_MSG\_BASE 0x8000`
- `#define MESSAGE\_ALLOCATE(M, S) PanicUnlessMalloc(sizeof(M##_T) + S)`
- `#define MESSAGE\_BULID(M) M##_T *msg = PanicUnlessMalloc(sizeof(M##_T))`
- `#define MESSAGE\_DATA\_BULID(M, S) M##_T *msg = PanicUnlessMalloc(sizeof(M##_T) + S)`
- `#define MESSAGE\_OFFSET(M) ((UINT8 *)msg + sizeof(M##_T))`
- `#define T\_HOUR(h) ((UINT32)((h) * (UINT32)1000 * (UINT32)60) * (UINT32)60)`
- `#define T\_MIN(m) ((UINT32)((m) * (UINT32)1000 * (UINT32)60))`
- `#define T\_SEC(s) ((UINT32)((s) * (UINT32)1000))`

### Typedefs

- `typedef MsgData MESSAGE`
- `typedef UINT16 MESSAGEID`
- `typedef void const * MsgData`
- `typedef const UINT8 * MsgLock`
- `typedef MsgLock MSGLOCK`
- `typedef UINT16 MSGSUBID`
- `typedef UINT32 MSGTIMER`
- `typedef TASKPACK * Task`
- `typedef Task TASK`
- `typedef void(* TASKHANDLER) (Task, UINT16, MsgData)`
- `typedef void ** TASKPACK`

### Enumerations

- `enum { LE\_SYS\_MSG\_BUF\_OVERFLOW = (LE\_SYS\_MSG\_BASE + 1), LE\_SYS\_MSG\_TOP }`  
*BLE system message id.*

## Functions

- UINT16 [LeCancelAllMessage](#) (TASK task, MESSAGEID id)  
*Cancel all message in queue.*
- UINT16 [LeCancelAllSubMessage](#) (TASK task, MESSAGEID id, MSGSUBID subId)  
*Cancel all sub message in queue.*
- BOOL [LeCancelFirstMessage](#) (TASK task, MESSAGEID id)  
*Cancel the first message in queue.*
- BOOL [LeCancelFirstSubMessage](#) (TASK task, MESSAGEID id, MSGSUBID subId)  
*Cancel the first sub message in queue.*
- UINT16 [LeGetSubMsgId](#) (UINT16 \*s)  
*Get sub message id.*
- BOOL [LeHostCreateTask](#) (TASK task, TASKHANDLER hdl)  
*Create BLE task.*
- void [LeHostMessageLoop](#) (void)  
*message loop run.*
- void [LeSendMessage](#) (TASK task, MESSAGEID msgId, MESSAGE msg)  
*Send message to BLE task.*
- void [LeSendMessageAfter](#) (TASK task, MESSAGEID msgId, MESSAGE msg, UINT32 delay)  
*Delay, then send message to BLE task.*
- void [LeSendMessageUnlock](#) (TASK task, MESSAGEID id, MESSAGE msg, MSGLOCK lock)  
*Send message until lock is 0.*
- void [LeSendSubMessage](#) (TASK task, MESSAGEID msgId, MSGSUBID subId, MESSAGE msg)  
*Send sub message.*
- void [LeSendSubMessageAfter](#) (TASK task, MESSAGEID msgId, MSGSUBID subId, MESSAGE msg, UINT32 delay)  
*Delay, then send sub message.*
- void [LeSendSubMessageUnlock](#) (TASK task, MESSAGEID id, MSGSUBID subId, MESSAGE msg, MSGLOCK lock)  
*Send sub message until lock is 0.*

### 4.5.1 Detailed Description

### 4.5.2 Macro Definition Documentation

#### 4.5.2.1 LE\_ATT\_MSG\_BASE

```
#define LE_ATT_MSG_BASE 0x1400
```

#### 4.5.2.2 LE\_CM\_MSG\_BASE

```
#define LE_CM_MSG_BASE 0x1100
```

#### 4.5.2.3 LE\_GATT\_MSG\_BASE

```
#define LE_GATT_MSG_BASE 0x1500
```

#### 4.5.2.4 LE\_HCI\_MSG\_BASE

```
#define LE_HCI_MSG_BASE 0x1000
```

#### 4.5.2.5 LE\_L2CAP\_MSG\_BASE

```
#define LE_L2CAP_MSG_BASE 0x1200
```

#### 4.5.2.6 LE\_SMP\_MSG\_BASE

```
#define LE_SMP_MSG_BASE 0x1300
```

#### 4.5.2.7 LE\_SYS\_MSG\_BASE

```
#define LE_SYS_MSG_BASE 0x8000
```

#### 4.5.2.8 MESSAGE\_ALLOCATE

```
#define MESSAGE_ALLOCATE(  
    M,  
    S ) PanicUnlessMalloc(sizeof(M##_T) + S)
```

#### 4.5.2.9 MESSAGE\_BULID

```
#define MESSAGE_BULID(  
    M ) M##_T *msg = PanicUnlessMalloc(sizeof(M##_T))
```

#### 4.5.2.10 MESSAGE\_DATA\_BULID

```
#define MESSAGE_DATA_BULID(  
    M,  
    S ) M##_T *msg = PanicUnlessMalloc(sizeof(M##_T) + S)
```

#### 4.5.2.11 MESSAGE\_OFFSET

```
#define MESSAGE_OFFSET(  
    M ) ((UINT8 *)msg + sizeof(M##_T))
```

#### 4.5.2.12 T\_HOUR

```
#define T_HOUR(  
    h ) ((UINT32)(h) * (UINT32)1000 * (UINT32)60 * (UINT32)60)
```

#### 4.5.2.13 T\_MIN

```
#define T_MIN(  
    m ) ((UINT32)(m) * (UINT32)1000 * (UINT32)60)
```

#### 4.5.2.14 T\_SEC

```
#define T_SEC(  
    s ) ((UINT32)(s) * (UINT32)1000)
```

### 4.5.3 Typedef Documentation

#### 4.5.3.1 MESSAGE

```
typedef MsgData MESSAGE
```



#### 4.5.3.2 MESSAGEID

```
typedef UINT16 MESSAGEID
```

#### 4.5.3.3 MsgData

```
typedef void const* MsgData
```

#### 4.5.3.4 MsgLock

```
typedef const UINT8* MsgLock
```

#### 4.5.3.5 MSGLOCK

```
typedef MsgLock MSGLOCK
```

#### 4.5.3.6 MSGSUBID

```
typedef UINT16 MSGSUBID
```

#### 4.5.3.7 MSGTIMER

```
typedef UINT32 MSGTIMER
```

#### 4.5.3.8 Task

```
typedef TASKPACK* Task
```

#### 4.5.3.9 TASK

```
typedef Task TASK
```

#### 4.5.3.10 TASKHANDLER

```
typedef void(* TASKHANDLER) (Task, UINT16, MsgData)
```

#### 4.5.3.11 TASKPACK

```
typedef void** TASKPACK
```

### 4.5.4 Enumeration Type Documentation

#### 4.5.4.1 anonymous enum

anonymous enum

BLE system message id.

##### Enumerator

LE_SYS_MSG_BUF_OVERFLOW	message buffer overflow
LE_SYS_MSG_TOP	top of system message id

### 4.5.5 Function Documentation

#### 4.5.5.1 LeCancelAllMessage()

```
UINT16 LeCancelAllMessage (
    TASK task,
    MESSAGEID id )
```

Cancel all message in queue.

##### Parameters

<i>task</i>	task.
<i>id</i>	message id.

**Returns**

0 is ok, others is error.

**4.5.5.2 LeCancelAllSubMessage()**

```
UINT16 LeCancelAllSubMessage (
    TASK task,
    MESSAGEID id,
    MSGSUBID subId )
```

Cancel all sub message in queue.

**Parameters**

<i>task</i>	the task of recvice message.
<i>id</i>	message id.
<i>sub↔ id</i>	sub message id.

**Returns**

0 is ok, others is error.

**4.5.5.3 LeCancelFirstMessage()**

```
BOOL LeCancelFirstMessage (
    TASK task,
    MESSAGEID id )
```

Cancel the first message in queue.

**Parameters**

<i>task</i>	task.
<i>id</i>	message id.

**Returns**

True is ok, false is error.

#### 4.5.5.4 LeCancelFirstSubMessage()

```
BOOL LeCancelFirstSubMessage (
    TASK task,
    MESSAGEID id,
    MSGSUBID subId )
```

Cancel the first sub message in queue.

##### Parameters

<i>task</i>	the task of recvice message.
<i>id</i>	message id.
<i>subId</i>	sub message id.

##### Returns

True is ok, false is error.

#### 4.5.5.5 LeGetSubMsgId()

```
UINT16 LeGetSubMsgId (
    UINT16 * s )
```

Get sub message id.

##### Parameters

<i>sub</i>	message id.
------------	-------------

##### Returns

0 is ok, others is error.

#### 4.5.5.6 LeHostCreateTask()

```
BOOL LeHostCreateTask (
    TASK task,
    TASKHANDLER hdl )
```

Create BLE task.

**Parameters**

<i>task</i>	the reference of BLE task.
<i>hdl</i>	callback handle of BLE task.

**Returns**

TRUE is success, FALSE is failed.

**4.5.5.7 LeHostMessageLoop()**

```
void LeHostMessageLoop (
    void )
```

message loop run.

**Returns**

None.

**4.5.5.8 LeSendMessage()**

```
void LeSendMessage (
    TASK task,
    MESSAGEID msgId,
    MESSAGE msg )
```

Send message to BLE task.

**Parameters**

<i>task</i>	reference of BLE task.
<i>msgId</i>	message ID.
<i>msg</i>	message.

**Returns**

None.

**4.5.5.9 LeSendMessageAfter()**

```
void LeSendMessageAfter (
    TASK task,
```

```

MESSAGEID msgId,
MESSAGE msg,
UINT32 delay )

```

Delay, then send message to BLE task.

#### Parameters

<i>task</i>	reference of BLE task.
<i>msg</i> ↔ <i>Id</i>	message ID.
<i>msg</i>	message.
<i>delay</i>	delay time, ms.

#### Returns

None.

#### 4.5.5.10 LeSendMessageUnlock()

```

void LeSendMessageUnlock (
    TASK task,
    MESSAGEID id,
    MESSAGE msg,
    MSGLOCK lock )

```

Send message until lock is 0.

#### Parameters

<i>task</i>	the task of recvice message.
<i>id</i>	message id.
<i>msg</i>	message.
<i>lock</i>	lock number.

#### Returns

None.

#### 4.5.5.11 LeSendSubMessage()

```

void LeSendSubMessage (
    TASK task,
    MESSAGEID msgId,
    MSGSUBID subId,
    MESSAGE msg )

```

Send sub message.

## Parameters

<i>task</i>	the task of recvice message.
<i>msg↔ Id</i>	message id.
<i>subId</i>	sub message id.
<i>msg</i>	message.

## Returns

None.

## 4.5.5.12 LeSendSubMessageAfter()

```
void LeSendSubMessageAfter (
    TASK task,
    MESSAGEID msgId,
    MSGSUBID subId,
    MESSAGE msg,
    UINT32 delay )
```

Delay, then send sub message.

## Parameters

<i>task</i>	the task of recvice message.
<i>msg↔ Id</i>	message id.
<i>subId</i>	sub message id.
<i>msg</i>	message.
<i>delay</i>	delay time.

## Returns

None.

## 4.5.5.13 LeSendSubMessageUnlock()

```
void LeSendSubMessageUnlock (
    TASK task,
    MESSAGEID id,
    MSGSUBID subId,
    MESSAGE msg,
    MSGLOCK lock )
```

Send sub message until lock is 0.

**Parameters**

<i>task</i>	the task of recvice message.
<i>id</i>	message id.
<i>sub↔ id</i>	sub message id.
<i>msg</i>	message.
<i>lock</i>	lock number.

**Returns**

None.



## 4.6 BLE SMP APIs

### Data Structures

- struct [LE\\_SMP\\_MSG\\_ENCRYPTION\\_CHANGE\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_ENCRYPTION\\_REFRESH\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_OOB\\_DATA\\_REQUEST\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_PAIRING\\_ACTION\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_PAIRING\\_COMPLETE\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_PASSKEY\\_DISPLAY\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_PASSKEY\\_INPUT\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_SC\\_OOB\\_DATA\\_REQUEST\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_SLAVE\\_SECURITY\\_REQUEST\\_IND\\_T](#)
- struct [LE\\_SMP\\_MSG\\_USER\\_CONFIRM\\_IND\\_T](#)
- struct [LE\\_SMP\\_SC\\_OOB\\_DATA\\_T](#)

### Macros

- `#define LE_MAX_BOND_COUNT 8`
- `#define LE_SM_IO_CAP_DISP_ONLY 0x00`
- `#define LE_SM_IO_CAP_DISP_YES_NO 0x01`
- `#define LE_SM_IO_CAP_KEYBOARD_DISP 0x04`
- `#define LE_SM_IO_CAP_KEYBOARD_ONLY 0x02`
- `#define LE_SM_IO_CAP_NO_IO 0x03`
- `#define LE_SM_PAIR_MITM_NO 0x00`
- `#define LE_SM_PAIR_MITM_YES 0x01`
- `#define LE_SM_PAIR_OOB_NO 0x00`
- `#define LE_SM_PAIR_OOB_YES 0x01`
- `#define LE_SM_PAIR_SC_NO 0x00`
- `#define LE_SM_PAIR_SC_YES 0x01`

### Enumerations

- enum {  
[LE\\_SMP\\_MSG\\_SLAVE\\_SECURITY\\_REQUEST\\_IND](#) = [LE\\_SMP\\_MSG\\_BASE](#),  
[LE\\_SMP\\_MSG\\_PAIRING\\_ACTION\\_IND](#),  
[LE\\_SMP\\_MSG\\_PASSKEY\\_DISPLAY\\_IND](#), [LE\\_SMP\\_MSG\\_PASSKEY\\_INPUT\\_IND](#),  
[LE\\_SMP\\_MSG\\_OOB\\_DATA\\_REQUEST\\_IND](#), [LE\\_SMP\\_MSG\\_SC\\_OOB\\_DATA\\_REQUEST\\_IND](#),  
[LE\\_SMP\\_MSG\\_USER\\_CONFIRM\\_IND](#) [LE\\_SMP\\_MSG\\_ENCRYPTION\\_CHANGE\\_IND](#),  
[LE\\_SMP\\_MSG\\_ENCRYPTION\\_REFRESH\\_IND](#), [LE\\_SMP\\_MSG\\_PAIRING\\_COMPLETE\\_IND](#),  
[LE\\_SMP\\_LONG\\_TERM\\_KEY\\_REQ](#),  
[LE\\_SMP\\_KEYS\\_IND](#),  
[LE\\_SMP\\_MSG\\_TOP](#) }  
*BLE SMP message id.*
- enum {  
[LE\\_SMP\\_PAIR\\_JUST\\_WORK](#), [LE\\_SMP\\_PAIR\\_OOB](#), [LE\\_SMP\\_PAIR\\_PASSKEY\\_INPUT](#), [LE\\_SMP\\_PAIR\\_DISPLAY](#),  
[LE\\_SMP\\_PAIR\\_NUM\\_COMPARE](#) }

## Functions

- void [LeSmpInit](#) (TASK appTask)  
*BLE SMP Module Init.*
- void [LeSmpOobAuthDataRsp](#) (UINT16 conn\_hdl, UINT8 \*data, UINT16 len)  
*SMP OOB authenticate data response.*
- UINT16 [LeSmpOobPresent](#) (UINT16 conn\_hdl, BOOL oob\_present)  
*SMP OOB present.*
- void [LeSmpPasskeyInput](#) (UINT16 conn\_hdl, UINT32 passkey)  
*Input passkey.*
- UINT16 [LeSmpScOobComputeConfirmVal](#) (UINT8 \*rand, UINT8 \*confirm)  
*SMP secure connection OOB compute confirm value.*
- void [LeSmpScOobDataRsp](#) (UINT16 conn\_hdl, UINT8 \*our\_rand, [LE\\_SMP\\_SC\\_OOB\\_DATA\\_T](#) \*peer)  
*OOB data response.*
- UINT16 [LeSmpSecurityReq](#) (UINT16 conn\_hdl)  
*BLE SMP security request.*
- UINT16 [LeSmpSecurityRsp](#) (UINT16 conn\_hdl, BOOL accept)  
*BLE SMP security request.*
- UINT16 [LeSmpSetDefaultConfig](#) (UINT8 iocap, BOOL mitm, BOOL sc, BOOL bond)  
*Set default configure for pairing.*
- UINT16 [LeSmpUserConfirmRsp](#) (UINT16 conn\_hdl, BOOL accept)  
*User confirm response.*

### 4.6.1 Detailed Description

### 4.6.2 Macro Definition Documentation

#### 4.6.2.1 LE\_MAX\_BOND\_COUNT

```
#define LE_MAX_BOND_COUNT 8
```

#### 4.6.2.2 LE\_SM\_IO\_CAP\_DISP\_ONLY

```
#define LE_SM_IO_CAP_DISP_ONLY 0x00
```

display only

#### 4.6.2.3 LE\_SM\_IO\_CAP\_DISP\_YES\_NO

```
#define LE_SM_IO_CAP_DISP_YES_NO 0x01
```

display + yes or no

#### 4.6.2.4 LE\_SM\_IO\_CAP\_KEYBOARD\_DISP

```
#define LE_SM_IO_CAP_KEYBOARD_DISP 0x04
```

display + keyboard

#### 4.6.2.5 LE\_SM\_IO\_CAP\_KEYBOARD\_ONLY

```
#define LE_SM_IO_CAP_KEYBOARD_ONLY 0x02
```

keyboard only

#### 4.6.2.6 LE\_SM\_IO\_CAP\_NO\_IO

```
#define LE_SM_IO_CAP_NO_IO 0x03
```

no input and output

#### 4.6.2.7 LE\_SM\_PAIR\_MITM\_NO

```
#define LE_SM_PAIR_MITM_NO 0x00
```

#### 4.6.2.8 LE\_SM\_PAIR\_MITM\_YES

```
#define LE_SM_PAIR_MITM_YES 0x01
```

#### 4.6.2.9 LE\_SM\_PAIR\_OOB\_NO

```
#define LE_SM_PAIR_OOB_NO 0x00
```

#### 4.6.2.10 LE\_SM\_PAIR\_OOB\_YES

```
#define LE_SM_PAIR_OOB_YES 0x01
```

#### 4.6.2.11 LE\_SM\_PAIR\_SC\_NO

```
#define LE_SM_PAIR_SC_NO 0x00
```

#### 4.6.2.12 LE\_SM\_PAIR\_SC\_YES

```
#define LE_SM_PAIR_SC_YES 0x01
```

### 4.6.3 Enumeration Type Documentation

#### 4.6.3.1 anonymous enum

```
anonymous enum
```

BLE SMP message id.

##### Enumerator

LE_SMP_MSG_SLAVE_SECURITY_REQUEST_IND	slave security request
LE_SMP_MSG_PAIRING_ACTION_IND	pairing action indication
LE_SMP_MSG_PASSKEY_DISPLAY_IND	passkey display indication
LE_SMP_MSG_PASSKEY_INPUT_IND	passkey input indication
LE_SMP_MSG_OOB_DATA_REQUEST_IND	OOB data request indication
LE_SMP_MSG_SC_OOB_DATA_REQUEST_IND	SC OOB data request indication
LE_SMP_MSG_USER_CONFIRM_IND	user confirm indication
LE_SMP_MSG_ENCRYPTION_CHANGE_IND	encryption change indication
LE_SMP_MSG_ENCRYPTION_REFRESH_IND	encryption refresh indication
LE_SMP_MSG_PAIRING_COMPLETE_IND	pairing complete indication
LE_SMP_LONG_TERM_KEY_REQ	long term key request
LE_SMP_KEYS_IND	keys indication
LE_SMP_MSG_TOP	top of SMP message id

#### 4.6.3.2 anonymous enum

```
anonymous enum
```

##### Enumerator

LE_SMP_PAIR_JUST_WORK	just work
LE_SMP_PAIR_OOB	out of band
LE_SMP_PAIR_PASSKEY_INPUT	passkey entry
LE_SMP_PAIR_DISPLAY	display
LE_SMP_PAIR_NUM_COMPARE	number compare

## 4.6.4 Function Documentation

### 4.6.4.1 LeSmpInit()

```
void LeSmpInit (
    TASK appTask )
```

BLE SMP Module Init.

#### Parameters

<i>appTask</i>	the reference of BLE task.
----------------	----------------------------

#### Returns

None.

### 4.6.4.2 LeSmpOobAuthDataRsp()

```
void LeSmpOobAuthDataRsp (
    UINT16 conn_hdl,
    UINT8 * data,
    UINT16 len )
```

SMP OOB authenticate data response.

#### Parameters

<i>conn_hdl</i>	connection handle.
<i>data</i>	response data.
<i>len</i>	data length.

#### Returns

None.

### 4.6.4.3 LeSmpOobPresent()

```
UINT16 LeSmpOobPresent (
    UINT16 conn_hdl,
    BOOL oob_present )
```

SMP OOB present.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>oob_present</i>	present or not.

**Returns**

0 is Ok, others refer to SMP\_ERR\_\* in [ble\\_err.h](#).

**4.6.4.4 LeSmpPasskeyInput()**

```
void LeSmpPasskeyInput (
    UINT16 conn_hdl,
    UINT32 passkey )
```

Input passkey.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>passkey</i>	passkey.

**Returns**

None.

**4.6.4.5 LeSmpScOobComputeConfirmVal()**

```
UINT16 LeSmpScOobComputeConfirmVal (
    UINT8 * rand,
    UINT8 * confirm )
```

SMP secure connection OOB compute confirm value.

**Parameters**

<i>rand</i>	random data.
<i>confirm</i>	confirm data.

**Returns**

0 is Ok, others refer to SMP\_ERR\_\* in [ble\\_err.h](#).

#### 4.6.4.6 LeSmpScOobDataRsp()

```
void LeSmpScOobDataRsp (
    UINT16 conn_hdl,
    UINT8 * our_rand,
    LE_SMP_SC_OOB_DATA_T * peer )
```

OOB data response.

##### Parameters

<i>conn_hdl</i>	connection handld.
<i>our_rand</i>	our random data.
<i>peer</i>	peer OOB data.

##### Returns

None.

#### 4.6.4.7 LeSmpSecurityReq()

```
UINT16 LeSmpSecurityReq (
    UINT16 conn_hdl )
```

BLE SMP security request.

##### Parameters

<i>conn_hdl</i>	connection handle.
-----------------	--------------------

##### Returns

0 is Ok, others refer to SMP\_ERR\_\* in [ble\\_err.h](#).

#### 4.6.4.8 LeSmpSecurityRsp()

```
UINT16 LeSmpSecurityRsp (
    UINT16 conn_hdl,
    BOOL accept )
```

BLE SMP security request.

##### Parameters

<i>conn_hdl</i>	connection handle.
<i>accept</i>	TRUE is accept, FALSE is not.

**Returns**

0 is Ok, others refer to SMP\_ERR\_\* in [ble\\_err.h](#).

**4.6.4.9 LeSmpSetDefaultConfig()**

```
UINT16 LeSmpSetDefaultConfig (
    UINT8 iocap,
    BOOL mitm,
    BOOL sc,
    BOOL bond )
```

Set default configure for pairing.

**Parameters**

<i>iocap</i>	IO capability.
<i>mitm</i>	TRUE is MITM protected, FALSE is not.
<i>sc</i>	TRUE is request BLE secure connection pairing, FALSE is not.
<i>bond</i>	TRUE: bonding, FALSE: no bonding.

**Returns**

0 is Ok, others refer to SMP\_ERR\_\* in [ble\\_err.h](#).

**4.6.4.10 LeSmpUserConfirmRsp()**

```
UINT16 LeSmpUserConfirmRsp (
    UINT16 conn_hdl,
    BOOL accept )
```

User confirm response.

**Parameters**

<i>conn_hdl</i>	connection handle.
<i>accept</i>	yes or no.

**Returns**

0 is Ok, others refer to SMP\_ERR\_\* in [ble\\_err.h](#).



## 4.7 WIFI APIS

WIFI APIS.

### Modules

- [WIFI Common APIs](#)
- [WIFI STA APIs](#)
- [Enumeration](#)

### Data Structures

- struct [wifi\\_active\\_scan\\_time\\_t](#)  
*Range of active scan times per channel.*
- struct [wifi\\_ap\\_config\\_t](#)  
*This structure is the Wi-Fi configuration for initialization for Soft-AP mode.*
- struct [wifi\\_auto\\_connect\\_info\\_f](#)  
*WiFi auto connect info parameters.*
- union [wifi\\_config\\_t](#)  
*Wi-Fi configuration for initialization.*
- struct [wifi\\_fast\\_scan\\_threshold\\_t](#)  
*Structure describing parameters for a Wi-Fi fast scan.*
- struct [wifi\\_init\\_config\\_t](#)  
*WiFi stack configuration parameters.*
- struct [wifi\\_scan\\_config\\_t](#)  
*Parameters for an SSID scan.*
- struct [wifi\\_scan\\_info\\_t](#)  
*This structure defines the inforamtion of scanned APs.*
- struct [wifi\\_scan\\_list\\_t](#)  
*This structure defines the list of scanned APs with their corresponding information.*
- union [wifi\\_scan\\_time\\_t](#)  
*Aggregate of active & passive scan time per channel.*
- struct [wifi\\_sta\\_config\\_t](#)  
*This structure is the Wi-Fi configuration for initialization for STA mode.*

### Macros

- #define [WIFI\\_BEACON\\_INTERVAL\\_LENGTH](#) (2)  
*Beacon interval length in a frame header.*
- #define [WIFI\\_CAPABILITY\\_INFO\\_LENGTH](#) (2)  
*Length of capability information in a frame header.*
- #define [WIFI\\_LENGTH\\_802\\_11](#) (24)  
*Length of 802.11 MAC header.*
- #define [WIFI\\_LENGTH\\_PASSPHRASE](#) (64)  
*The maximum length of passphrase used in WPA-PSK and WPA2-PSK encryption types.*
- #define [WIFI\\_MAC\\_ADDRESS\\_LENGTH](#) (6)  
*MAC address length.*
- #define [WIFI\\_MAX\\_LENGTH\\_OF\\_SSID](#) (32+1)  
*The maximum length of SSID.*
- #define [WIFI\\_MAX\\_SCAN\\_AP\\_NUM](#) (16)  
*maximum number of ap list items which can stored*
- #define [WIFI\\_MAX\\_SUPPORTED\\_RATES](#) (8)  
*maximum number of supported rates which can used*

## Typedefs

- typedef int(\* [wifi\\_event\\_notify\\_cb\\_t](#)) (void \*data)

## Functions

- int [wifi\\_event\\_process\\_handler](#) ([wifi\\_event\\_t](#) event, uint8\_t \*payload, uint32\_t length)  
*Default event handler for system events.*
- void [wifi\\_install\\_default\\_event\\_handlers](#) (void)  
*Set discoverability and connectability mode for legacy bluetooth. This function should.*
- int [wifi\\_register\\_event\\_handler](#) ([wifi\\_event\\_t](#) idx, [wifi\\_event\\_handler\\_t](#) handler)  
*Set discoverability and connectability mode for legacy bluetooth. This function should.*

### 4.7.1 Detailed Description

WIFI APIs.

### 4.7.2 Macro Definition Documentation

#### 4.7.2.1 WIFI\_BEACON\_INTERVAL\_LENGTH

```
#define WIFI_BEACON_INTERVAL_LENGTH (2)
```

Beacon interval length in a frame header.

#### 4.7.2.2 WIFI\_CAPABILITY\_INFO\_LENGTH

```
#define WIFI_CAPABILITY_INFO_LENGTH (2)
```

Length of capability information in a frame header.

#### 4.7.2.3 WIFI\_LENGTH\_802\_11

```
#define WIFI_LENGTH_802_11 (24)
```

Length of 802.11 MAC header.

#### 4.7.2.4 WIFI\_LENGTH\_PASSPHRASE

```
#define WIFI_LENGTH_PASSPHRASE (64)
```

The maximum length of passphrase used in WPA-PSK and WPA2-PSK encryption types.

#### 4.7.2.5 WIFI\_MAC\_ADDRESS\_LENGTH

```
#define WIFI_MAC_ADDRESS_LENGTH (6)
```

MAC address length.

#### 4.7.2.6 WIFI\_MAX\_LENGTH\_OF\_SSID

```
#define WIFI_MAX_LENGTH_OF_SSID (32+1)
```

The maximum length of SSID.

#### 4.7.2.7 WIFI\_MAX\_SCAN\_AP\_NUM

```
#define WIFI_MAX_SCAN_AP_NUM (16)
```

maximum number of ap list items which can stored

#### 4.7.2.8 WIFI\_MAX\_SUPPORTED\_RATES

```
#define WIFI_MAX_SUPPORTED_RATES (8)
```

maximum number of supported rates which can used

### 4.7.3 Typedef Documentation

#### 4.7.3.1 wifi\_event\_notify\_cb\_t

```
typedef int (* wifi_event_notify_cb_t) (void *data)
```

## 4.7.4 Function Documentation

### 4.7.4.1 wifi\_event\_process\_handler()

```
int wifi_event_process_handler (
    wifi_event_t event,
    uint8_t * payload,
    uint32_t length )
```

Default event handler for system events.

This function performs default handling of system events. When using event\_loop APIs, it is called automatically before invoking the user-provided callback function.

Applications which implement a custom event loop must call this function as part of event processing.

#### Parameters

in	<i>event</i>	event type Set the event type,Options are <ul style="list-style-type: none"> <li>• WIFI_EVENT_INIT_COMPLETE</li> <li>• WIFI_EVENT_SCAN_COMPLETE</li> <li>• WIFI_EVENT_STA_START</li> <li>• WIFI_EVENT_STA_STOP</li> <li>• WIFI_EVENT_STA_CONNECTED</li> <li>• WIFI_EVENT_STA_DISCONNECTED</li> <li>• WIFI_EVENT_STA_CONNECTION_FAILED</li> <li>• WIFI_EVENT_STA_GOT_IP</li> </ul>
in	<i>payload</i>	Data block that transmitted to event
in	<i>length</i>	The length of data block

#### Returns

0 : success  
other : failed

### 4.7.4.2 wifi\_install\_default\_event\_handlers()

```
void wifi_install_default_event_handlers (
    void )
```

Set discoverability and connectability mode for legacy bluetooth. This function should.

#### 4.7.4.3 wifi\_register\_event\_handler()

```
int wifi_register_event_handler (
    wifi_event_t idx,
    wifi_event_handler_t handler )
```

Set discoverability and connectability mode for legacy bluetooth. This function should.

##### Parameters

in	<i>idx</i>	one of the enums of bt_scan_mode_t
in	<i>handler</i>	the Wi-Fi event handler

##### Returns

0 : success  
other : failed

## 4.8 WIFI Common APIs

### Data Structures

- struct `event_msg_t`  
*Send information to event by `event_msg_t`.*
- union `wifi_event_info_t`  
*`wifi_event_info_t`*
- struct `wifi_event_sta_connected_t`  
*`wifi_event_sta_connected_t`*
- struct `wifi_event_sta_disconnected_t`  
*`wifi_event_sta_disconnected_t`*
- struct `wifi_event_sta_got_ip_t`  
*`wifi_event_sta_got_ip_t`*
- struct `wifi_event_sta_scan_done_t`  
*`wifi_event_sta_scan_done_t`*

### Typedefs

- typedef int(\* `wifi_event_cb_t`) (`wifi_event_id_t` event, void \*data, uint16\_t length)  
*Application specified event callback function.*

### Functions

- int `wifi_event_loop_init` (`wifi_event_cb_t` cb)  
*Event Loop Initialization Create the event handler and call back funtion.*
- int `wifi_event_loop_send` (`event_msg_t` \*msg)  
*Send an event to event task.*
- void `wifi_event_loop_set_cb` (`wifi_event_cb_t` cb, void \*ctx)  
*Set application specified event callback function.*
- int `wifi_event_process_handler` (`wifi_event_t` event, uint8\_t \*payload, uint32\_t length)  
*Default event handler for system events.*

#### 4.8.1 Detailed Description

#### 4.8.2 Typedef Documentation

##### 4.8.2.1 `wifi_event_cb_t`

```
typedef int(* wifi_event_cb_t) (wifi_event_id_t event, void *data, uint16_t length)
```

Application specified event callback function.

### 4.8.3 Function Documentation

#### 4.8.3.1 wifi\_event\_loop\_init()

```
int wifi_event_loop_init (  
    wifi_event_cb_t cb )
```

Event Loop Initialization Create the event handler and call back funtion.

**Parameters**

<i>cb</i>	: application specified event callback
-----------	--

**Returns**

0 : success  
other : failed

**4.8.3.2 wifi\_event\_loop\_send()**

```
int wifi_event_loop_send (
    event_msg_t * msg )
```

Send an event to event task.

**Attention**

1. Other task/modules, such as the TCP/IP module, can call this API to send an event to event task

**Parameters**

<i>event_msg_t</i>	* msg: Send information to event by msg
--------------------	---

**Returns**

0 : success  
other : failed

**4.8.3.3 wifi\_event\_loop\_set\_cb()**

```
void wifi_event_loop_set_cb (
    wifi_event_cb_t cb,
    void * ctx )
```

Set application specified event callback function.

**Attention**

1. If cb is NULL, means application does not need to handle. If cb is not NULL, it will be called when an event is received and after the default event callback is completed



## Parameters

<i>wifi_event_cb_t</i>	cb : callback
<i>void</i>	*ctx : reserved for user

## 4.8.3.4 wifi\_event\_process\_handler()

```
int wifi_event_process_handler (
    wifi_event_t event,
    uint8_t * payload,
    uint32_t length )
```

Default event handler for system events.

This function performs default handling of system events.

Applications which implement a custom event loop must call this function as part of event processing.

## Parameters

in	<i>event</i>	event type Set the event type,Options are <ul style="list-style-type: none"> <li>• WIFI_EVENT_INIT_COMPLETE</li> <li>• WIFI_EVENT_SCAN_COMPLETE</li> <li>• WIFI_EVENT_STA_START</li> <li>• WIFI_EVENT_STA_STOP</li> <li>• WIFI_EVENT_STA_CONNECTED</li> <li>• WIFI_EVENT_STA_DISCONNECTED</li> <li>• WIFI_EVENT_STA_CONNECTION_FAILED</li> <li>• WIFI_EVENT_STA_GOT_IP</li> </ul>
in	<i>payload</i>	Data block transmitted to event
in	<i>length</i>	The length of the data block

## Returns

0 : success  
other : failed

## 4.9 WIFI STA APIs

### Typedefs

- typedef int32\_t(\* [wifi\\_event\\_handler\\_t](#)) ([wifi\\_event\\_t](#) event, uint8\_t \*payload, uint32\_t length)  
*This defines the Wi-Fi event handler. Call [wifi\\_connection\\_register\\_event\\_handler\(\)](#) to register a handler, then the Wi-Fi driver generates an event and sends it to the handler.*
- typedef void(\* [wifi\\_init\\_complete\\_cb\\_t](#)) (void \*ctx)  
*Initialization of complete callback function.*
- typedef int32\_t [wifi\\_result\\_t](#)

### Functions

- int [wifi\\_auto\\_connect\\_del\\_ap\\_info](#) (u8 index)  
*Delete automatically connected AP information stored in flash.*
- int [wifi\\_auto\\_connect\\_get\\_ap\\_info](#) (u8 index, [wifi\\_auto\\_connect\\_info\\_f](#) \*info)  
*Get ap detailed information saved in flash.*
- u8 [wifi\\_auto\\_connect\\_get\\_ap\\_num](#) (void)  
*Get the number of automatically connected aps that have been saved in the flash.*
- u8 [wifi\\_auto\\_connect\\_get\\_mode](#) (void)  
*Get the status of the current automatic connection mode.*
- int [wifi\\_auto\\_connect\\_init](#) (void)  
*Initialize wifi automatic connection.*
- int [wifi\\_auto\\_connect\\_set\\_ap\\_num](#) (u8 num)  
*Save the number of automatically connected ap to flash.*
- int [wifi\\_auto\\_connect\\_set\\_mode](#) (u8 mode)  
*Set the connection type.*
- int [wifi\\_auto\\_connect\\_start](#) (void)  
*Start wifi automatic connection process.*
- int [wifi\\_config\\_get\\_bandwidth](#) ([wifi\\_mode\\_t](#) interface, [wifi\\_bandwidth\\_t](#) \*bandwidth)  
*Get the bandwidth of OPL1000 specified interface.*
- int [wifi\\_config\\_get\\_bssid](#) (uint8\_t \*bssid)  
*get bssid after scan*
- int [wifi\\_config\\_get\\_channel](#) ([wifi\\_mode\\_t](#) interface, uint8\_t \*channel)  
*Get the primary/secondary channel of OPL1000.*
- int [wifi\\_config\\_get\\_dtim\\_interval](#) (uint8\_t \*interval)  
*Get the interval of DTIM.*
- int [wifi\\_config\\_get\\_listen\\_interval](#) (uint8\_t \*interval)  
*Get the interval of listen.*
- int [wifi\\_config\\_get\\_mac\\_address](#) ([wifi\\_mode\\_t](#) interface, uint8\_t \*address)  
*Get mac of specified interface.*
- int [wifi\\_config\\_get\\_opmode](#) (uint8\_t \*mode)  
*Set wifi operation mode.*
- int [wifi\\_config\\_get\\_skip\\_dtim](#) (uint8\_t \*value)  
*Get the Skip DTIM value in current wifi setting of OPL1000.*
- int [wifi\\_config\\_get\\_ssid](#) (uint8\_t \*ssid, uint8\_t \*ssid\_length)  
*Get ssid value of AP.*
- int [wifi\\_config\\_set\\_bandwidth](#) ([wifi\\_mode\\_t](#) interface, [wifi\\_bandwidth\\_t](#) bandwidth)  
*Set the bandwidth of OPL1000 specified interface.*
- int [wifi\\_config\\_set\\_bssid](#) (uint8\_t \*bssid)

- config OPL1000 Wi-Fi bssid.*

  - int [wifi\\_config\\_set\\_channel](#) ([wifi\\_mode\\_t](#) interface, uint8\_t channel)  
*Set primary/secondary channel of OPL1000.*
  - int [wifi\\_config\\_set\\_dtim\\_interval](#) (uint8\_t interval)  
*Set the interval of DTIM.*
  - int [wifi\\_config\\_set\\_listen\\_interval](#) (uint8\_t interval)  
*Set the interval of listen.*
  - int [wifi\\_config\\_set\\_mac\\_address](#) ([wifi\\_mode\\_t](#) interface, uint8\_t \*address)  
*Set MAC address of OPL1000 Wi-Fi station or the soft-AP interface.*
  - int [wifi\\_config\\_set\\_opmode](#) (uint8\_t mode)  
*Set wifi operation mode.*
  - int [wifi\\_config\\_set\\_skip\\_dtim](#) (uint8\_t value)  
*Set the Skip DTIM value of OPL1000.*
  - int [wifi\\_config\\_set\\_ssid](#) ([wifi\\_mode\\_t](#) interface, uint8\_t \*ssid, uint8\_t ssid\_length)  
*Set the ssid value of the current device.*
  - int [wifi\\_connection\\_connect](#) ([wifi\\_config\\_t](#) \*config)  
*Connect OPL1000 Wi-Fi station to certain AP.*
  - int [wifi\\_connection\\_disconnect\\_ap](#) (void)  
*Disconnect the link between OPL1000 and connected AP.*
  - int [wifi\\_connection\\_disconnect\\_sta](#) (uint8\_t \*address)  
*Disconnect the link between the current device and the station.*
  - int [wifi\\_connection\\_get\\_rssi](#) (int8\_t \*rssi)  
*get signal strength of AP*
  - int [wifi\\_connection\\_register\\_event\\_handler](#) ([wifi\\_event\\_t](#) event, [wifi\\_event\\_handler\\_t](#) handler)  
*register wifi call back handler*
  - int [wifi\\_connection\\_scan\\_start](#) (uint8\_t \*ssid, uint8\_t ssid\_length, uint8\_t \*bssid, uint8\_t scan\_mode, uint8\_t scan\_option)  
*Scan start.*
  - int [wifi\\_connection\\_unregister\\_event\\_handler](#) ([wifi\\_event\\_t](#) event, [wifi\\_event\\_handler\\_t](#) handler)  
*unregister wifi call back handler*
  - int [wifi\\_deinit](#) (void)  
*De-init Wi-Fi Initialization and Configuration functions.*
  - u8 [wifi\\_fast\\_connect\\_get\\_mode](#) (u8 ap\_index)  
*Get the status of AP fast connection.*
  - int [wifi\\_fast\\_connect\\_set\\_mode](#) (u8 mode, u8 ap\_index)  
*Set the fast connection type.*
  - int [wifi\\_fast\\_connect\\_start](#) (void)  
*Start the fast connection process.*
  - int [wifi\\_get\\_config](#) ([wifi\\_mode\\_t](#) interface, [wifi\\_config\\_t](#) \*conf)  
*Get configuration of specified interface.*
  - int [wifi\\_init](#) (const [wifi\\_init\\_config\\_t](#) \*config, [wifi\\_init\\_complete\\_cb\\_t](#) init\_cb)  
*Init Wi-Fi Initializes the wifi according to the specified parameters in the config.*
  - int [wifi\\_scan\\_get\\_ap\\_list](#) ([wifi\\_scan\\_list\\_t](#) \*scan\_list)  
*Get list of APs that found in last scan operation.*
  - int [wifi\\_scan\\_get\\_ap\\_num](#) (uint16\_t \*number)  
*Get the number of scanned APs.*
  - int [wifi\\_scan\\_get\\_ap\\_records](#) (uint16\_t \*number, [wifi\\_scan\\_info\\_t](#) \*ap\_records)  
*Get AP list found in last scan operation.*
  - int [wifi\\_scan\\_scan\\_stop](#) (void)  
*Stop scanning process.*
  - int [wifi\\_scan\\_start](#) (const [wifi\\_scan\\_config\\_t](#) \*config, bool block)

Scan all available APs. After invoke the [wifi\\_set\\_config\(\)](#) and [wifi\\_start\(\)](#), then call [wifi\\_scan\\_start\(\)](#) to scan APs.

- int [wifi\\_set\\_config](#) ([wifi\\_mode\\_t](#) interface, [wifi\\_config\\_t](#) \*conf)

Set configuration of OPL1000 STA.

- int [wifi\\_sta\\_get\\_ap\\_info](#) ([wifi\\_scan\\_info\\_t](#) \*ap\_info)

Get information of AP which OPL1000 station is associated with.

- int [wifi\\_start](#) (void)

Start Wi-Fi working.

- int [wifi\\_stop](#) (void)

Stop wifi working.

## 4.9.1 Detailed Description

## 4.9.2 Typedef Documentation

### 4.9.2.1 wifi\_event\_handler\_t

```
typedef int32_t(* wifi_event_handler_t) (wifi\_event\_t event, uint8_t *payload, uint32_t length)
```

This defines the Wi-Fi event handler. Call [wifi\\_connection\\_register\\_event\\_handler\(\)](#) to register a handler, then the Wi-Fi driver generates an event and sends it to the handler.

#### Parameters

in	<i>event</i>	is an optional event to register. For more details, please refer to <a href="#">wifi_event_t</a> .
in	<i>payload</i>	is the payload for the event. When the event is WIFI_EVENT_IOT_CONNECTED in AP mode, payload is the connected STA's MAC address. When the event is WIFI_EVENT_IOT_CONNECTED in STA mode, payload is the connected AP's BSSID.
in	<i>length</i>	is the length of a packet.

#### Returns

The return value is reserved and it is ignored.

### 4.9.2.2 wifi\_init\_complete\_cb\_t

```
typedef void(* wifi_init_complete_cb_t) (void *ctx)
```

Initialization of complete callback function.

Invoked when Wi-Fi initialization is complete.

#### Parameters

<i>ctx</i>	is context pointer that provided to <a href="#">wifi_init()</a> . It will be passed back to the callback.
------------	---

#### 4.9.2.3 wifi\_result\_t

```
typedef int32_t wifi_result_t
```

### 4.9.3 Function Documentation

#### 4.9.3.1 wifi\_auto\_connect\_del\_ap\_info()

```
int wifi_auto_connect_del_ap_info (
    u8 index )
```

Delete automatically connected AP information stored in flash.

##### Parameters

in	<i>index</i>	: Index of ap information, The range is 0 to 3
----	--------------	--

##### Returns

0 : success  
other : failed

#### 4.9.3.2 wifi\_auto\_connect\_get\_ap\_info()

```
int wifi_auto_connect_get_ap_info (
    u8 index,
    wifi_auto_connect_info_f * info )
```

Get ap detailed information saved in flash.

##### Parameters

in	<i>index</i>	: Index of ap information, The range is 0 to 3
in	<i>info</i>	: <a href="#">wifi_auto_connect_info_f</a> array to hold the found APs

##### Returns

0 : success  
other : failed

#### 4.9.3.3 wifi\_auto\_connect\_get\_ap\_num()

```
u8 wifi_auto_connect_get_ap_num (
    void )
```

Get the number of automatically connected aps that have been saved in the flash.

##### Returns

0-3 ap number

#### 4.9.3.4 wifi\_auto\_connect\_get\_mode()

```
u8 wifi_auto_connect_get_mode (
    void )
```

Get the status of the current automatic connection mode.

##### Returns

0 : off  
1 : on

#### 4.9.3.5 wifi\_auto\_connect\_init()

```
int wifi_auto_connect_init (
    void )
```

Initialize wifi automatic connection.

##### Returns

0 : success  
other : failed

#### 4.9.3.6 wifi\_auto\_connect\_set\_ap\_num()

```
int wifi_auto_connect_set_ap_num (
    u8 num )
```

Save the number of automatically connected ap to flash.

**Parameters**

in	<i>Connection</i>	Type
----	-------------------	------

**Returns**

0 : success  
other : failed

**4.9.3.7 wifi\_auto\_connect\_set\_mode()**

```
int wifi_auto_connect_set_mode (  
    u8 mode )
```

Set the connection type.

**Parameters**

in	<i>Connection</i>	Type
		<ul style="list-style-type: none"><li>• WIFI_MODE_STA</li><li>• WIFI_MODE_AP (currently not support)</li></ul>

**Returns**

0 : success  
other : failed

**4.9.3.8 wifi\_auto\_connect\_start()**

```
int wifi_auto_connect_start (  
    void )
```

Start wifi automatic connection process.

**Returns**

0 : success  
other : failed

#### 4.9.3.9 wifi\_config\_get\_bandwidth()

```
int wifi_config_get_bandwidth (
    wifi_mode_t interface,
    wifi_bandwidth_t * bandwidth )
```

Get the bandwidth of OPL1000 specified interface.

##### Attention

1. API returns false if try to get an interface which is not enable

##### Parameters

in	<i>interface</i>	Configure the current wifi working mode,The options are <ul style="list-style-type: none"> <li>• WIFI_MODE_STA</li> <li>• WIFI_MODE_AP (currently not support)</li> </ul>
out	<i>bandwidth</i>	Get the bandwidth value of the current wifi module working through the pointer

##### Returns

0 : success  
other : failed

#### 4.9.3.10 wifi\_config\_get\_bssid()

```
int wifi_config_get_bssid (
    uint8_t * bssid )
```

get bssid after scan

##### Parameters

out	<i>bssid</i>	the string of bssid
-----	--------------	---------------------

##### Returns

0 : success  
other : failed

#### 4.9.3.11 wifi\_config\_get\_channel()

```
int wifi_config_get_channel (
    wifi_mode_t interface,
    uint8_t * channel )
```



Get the primary/secondary channel of OPL1000.

#### Attention

1. API returns false if try to get an interface which is not enabled

#### Parameters

in	<i>interface</i>	Configure the current wifi working mode,The options are <ul style="list-style-type: none"><li>• WIFI_MODE_STA</li><li>• WIFI_MODE_AP (currently not support)</li></ul>
out	<i>channel</i>	Get Current module wifi work channel number

#### Returns

0 : success  
other : failed

#### 4.9.3.12 wifi\_config\_get\_dtim\_interval()

```
int wifi_config_get_dtim_interval (
    uint8_t * interval )
```

Get the interval of DTIM.

#### Parameters

in	<i>interval</i>	the interval of DTIM
----	-----------------	----------------------

#### Returns

0 : success  
other : failed

#### 4.9.3.13 wifi\_config\_get\_listen\_interval()

```
int wifi_config_get_listen_interval (
    uint8_t * interval )
```

Get the interval of listen.

#### Parameters

in	<i>interval</i>	the interval of listen
----	-----------------	------------------------

**Returns**

0 : success  
other : failed

**4.9.3.14 wifi\_config\_get\_mac\_address()**

```
int wifi_config_get_mac_address (
    wifi_mode_t interface,
    uint8_t * address )
```

Get mac of specified interface.

**Parameters**

in	<i>interface</i>	Configure the current wifi working mode, The options are <ul style="list-style-type: none"><li>• WIFI_MODE_STA</li><li>• WIFI_MODE_AP (currently not support)</li></ul>
out	<i>address</i>	Get the MAC address of the device through this interface, The address is similar to this structure: xx:xx:xx:xx:xx:xx

**Returns**

0 : success  
other : failed

**4.9.3.15 wifi\_config\_get\_opmode()**

```
int wifi_config_get_opmode (
    uint8_t * mode )
```

Set wifi operation mode.

**Parameters**

<i>mode</i>	refer to <a href="#">wifi_mode_t</a>
-------------	--------------------------------------

**Returns**

0 : success  
other : failed

#### 4.9.3.16 wifi\_config\_get\_skip\_dtim()

```
int wifi_config_get_skip_dtim (
    uint8_t * value )
```

Get the Skip DTIM value in current wifi setting of OPL1000.

##### Parameters

out	<i>value</i>	Get the Skip DTIM value in current wifi setting
-----	--------------	---

##### Returns

0 : success  
other : failed

#### 4.9.3.17 wifi\_config\_get\_ssid()

```
int wifi_config_get_ssid (
    uint8_t * ssid,
    uint8_t * ssid_length )
```

Get ssid value of AP.

##### Parameters

out	<i>ssid</i>	Get ssid by pointer
out	<i>ssid_length</i>	Get the length of the ssid character

##### Returns

0 : success  
other : failed

#### 4.9.3.18 wifi\_config\_set\_bandwidth()

```
int wifi_config_set_bandwidth (
    wifi_mode_t interface,
    wifi_bandwidth_t bandwidth )
```

Set the bandwidth of OPL1000 specified interface.

**Parameters**

in	<i>interface</i>	Configure the current wifi working mode,The options are <ul style="list-style-type: none"><li>WIFI_MODE_STA</li><li>WIFI_MODE_AP (currently not support)</li></ul>
in	<i>bandwidth</i>	Set the working bandwidth of wifi

**Returns**

0 : success  
other : failed

**4.9.3.19 wifi\_config\_set\_bssid()**

```
int wifi_config_set_bssid (  
    uint8_t * bssid )
```

config OPL1000 Wi-Fi bssid.

**Parameters**

in	<i>bssid</i>	the string of bssid
----	--------------	---------------------

**Returns**

0 : success  
other : failed

**4.9.3.20 wifi\_config\_set\_channel()**

```
int wifi_config_set_channel (  
    wifi_mode_t interface,  
    uint8_t channel )
```

Set primary/secondary channel of OPL1000.

**Attention**

1. This is a special API for sniffer
2. This API should be called after [wifi\\_start\(\)](#)

**Parameters**

in	<i>interface</i>	Configure the current wifi working mode,The options are <ul style="list-style-type: none"><li>• WIFI_MODE_STA</li><li>• WIFI_MODE_AP (currently not support)</li></ul>
in	<i>channel</i>	Set current Wi-Fi work channel number

**Returns**

0 : success  
other : failed

**4.9.3.21 wifi\_config\_set\_dtim\_interval()**

```
int wifi_config_set_dtim_interval (  
    uint8_t interval )
```

Set the interval of DTIM.

**Parameters**

in	<i>interval</i>	the interval of DTIM
----	-----------------	----------------------

**Returns**

0 : success  
other : failed

**4.9.3.22 wifi\_config\_set\_listen\_interval()**

```
int wifi_config_set_listen_interval (  
    uint8_t interval )
```

Set the interval of listen.

**Parameters**

in	<i>interval</i>	the interval of listen
----	-----------------	------------------------

**Returns**

0 : success  
other : failed

#### 4.9.3.23 wifi\_config\_set\_mac\_address()

```
int wifi_config_set_mac_address (
    wifi_mode_t interface,
    uint8_t * address )
```

Set MAC address of OPL1000 Wi-Fi station or the soft-AP interface.

##### Attention

1. This API can only be called when the interface is disabled
2. OPL1000 soft-AP and station have different MAC addresses, do not set them to be the same.

##### Parameters

in	<i>interface</i>	Configure the current wifi working mode,The options are <ul style="list-style-type: none"><li>• WIFI_MODE_STA</li><li>• WIFI_MODE_AP (currently not support)</li></ul>
in	<i>address</i>	set MAC address

##### Returns

0 : success  
other : failed

#### 4.9.3.24 wifi\_config\_set\_opmode()

```
int wifi_config_set_opmode (
    uint8_t mode )
```

Set wifi operation mode.

##### Parameters

<i>mode</i>	refer to <a href="#">wifi_mode_t</a>
-------------	--------------------------------------

##### Returns

0 : success  
other : failed

#### 4.9.3.25 wifi\_config\_set\_skip\_dtim()

```
int wifi_config_set_skip_dtim (
    uint8_t value )
```

Set the Skip DTIM value of OPL1000.

##### Parameters

in	<i>value</i>	Set the Skip DTIM value
----	--------------	-------------------------

##### Attention

1. This API will set the skip DTIM value to share memory and stored in flash, please use [wifi\\_config\\_get\\_skip\\_dtim\(\)](#) to check it.
2. The setting will be effect after next connect. We recommend re-connect AP after setting to make sure the value is correct.

##### Returns

0 : success  
other : failed

#### 4.9.3.26 wifi\_config\_set\_ssid()

```
int wifi_config_set_ssid (
    wifi_mode_t interface,
    uint8_t * ssid,
    uint8_t ssid_length )
```

Set the ssid value of the current device.

##### Parameters

in	<i>interface</i>	Configure the current wifi working mode,The options are <ul style="list-style-type: none"><li>• WIFI_MODE_STA</li><li>• WIFI_MODE_AP (currently not support)</li></ul>
in	<i>ssid</i>	Set the value of ssid
in	<i>ssid_length</i>	The length of ssid parameter

##### Returns

0 : success  
other : failed

#### 4.9.3.27 wifi\_connection\_connect()

```
int wifi_connection_connect (
    wifi_config_t * config )
```

Connect OPL1000 Wi-Fi station to certain AP.

##### Attention

1. This API only impact WIFI\_MODE\_STA or WIFI\_MODE\_AP mode
2. If OPL1000 is connected to an AP, call wifi\_disconnect to disconnect.

##### Parameters

in	<i>config</i>	Establish connection parameters
----	---------------	---------------------------------

##### Returns

0 : success  
other : failed

#### 4.9.3.28 wifi\_connection\_disconnect\_ap()

```
int wifi_connection_disconnect_ap (
    void )
```

Disconnect the link between OPL1000 and connected AP.

##### Returns

0 : success  
other : failed

#### 4.9.3.29 wifi\_connection\_disconnect\_sta()

```
int wifi_connection_disconnect_sta (
    uint8_t * address )
```

Disconnect the link between the current device and the station.

##### Parameters

in	<i>address</i>	station address
----	----------------	-----------------



**Returns**

0 : success  
other : failed

**4.9.3.30 wifi\_connection\_get\_rssi()**

```
int wifi_connection_get_rssi (
    int8_t * rssi )
```

get signal strength of AP

**Attention**

1. If the scan is successful, this API returns signal strength value, otherwise it will get wrong result

**Parameters**

out	<i>rssi</i>	rssi value
-----	-------------	------------

**Returns**

0 : success  
other : failed

**4.9.3.31 wifi\_connection\_register\_event\_handler()**

```
int wifi_connection_register_event_handler (
    wifi_event_t event,
    wifi_event_handler_t handler )
```

register wifi call back handler

**Parameters**

in	<i>event</i>	The type of the registered event. Options are <ul style="list-style-type: none"> <li>• WIFI_EVENT_INIT_COMPLETE</li> <li>• WIFI_EVENT_SCAN_COMPLETE</li> <li>• WIFI_EVENT_STA_START</li> <li>• WIFI_EVENT_STA_STOP</li> <li>• WIFI_EVENT_STA_CONNECTED</li> <li>• WIFI_EVENT_STA_DISCONNECTED</li> <li>• WIFI_EVENT_STA_CONNECTION_FAILED</li> <li>• WIFI_EVENT_STA_GOT_IP</li> </ul>
in	<i>handler</i>	registered event handler

**Returns**

0 : success  
other : failed

**4.9.3.32 wifi\_connection\_scan\_start()**

```
int wifi_connection_scan_start (
    uint8_t * ssid,
    uint8_t  ssid_length,
    uint8_t * bssid,
    uint8_t  scan_mode,
    uint8_t  scan_option )
```

Scan start.

**Parameters**

<i>ssid</i>	ssid string
<i>ssid_length</i>	ssid string length
<i>bssid</i>	bssid
<i>scan_mode</i>	refer to #wifi_scan_mode_ext in wpa_common_patch.h
<i>scan_option</i>	if scan_option is true, this API will block the caller until the scan is done, otherwise it will return immediately

**Returns**

0 : success  
other : failed

**4.9.3.33 wifi\_connection\_unregister\_event\_handler()**

```
int wifi_connection_unregister_event_handler (
    wifi_event_t event,
    wifi_event_handler_t handler )
```

unregister wifi call back handler

**Parameters**

in	<i>event</i>	The type of the unregistered event. Options please refer to <a href="#">wifi_connection_register_event_handler()</a>
in	<i>handler</i>	unregistered event handler

**Returns**

0 : success  
other : failed

**4.9.3.34 wifi\_deinit()**

```
int wifi_deinit (
    void )
```

De-init Wi-Fi Initialization and Configuration functions.

**Attention**

1. This API should be called if want to remove Wi-Fi driver from the system

**Returns**

0 : success  
other : failed

**4.9.3.35 wifi\_fast\_connect\_get\_mode()**

```
u8 wifi_fast_connect_get_mode (
    u8 ap_index )
```

Get the status of AP fast connection.

**Parameters**

in	<i>ap_index</i>	: Index of ap information, The range is 0 to 3
----	-----------------	--

**Returns**

0 : success  
other : failed

**4.9.3.36 wifi\_fast\_connect\_set\_mode()**

```
int wifi_fast_connect_set_mode (
    u8 mode,
    u8 ap_index )
```

Set the fast connection type.

**Parameters**

in	<i>mode</i>	: Configure the fast connect mode ,0 means disable fast connection, and 1 enable the fast connection mode
in	<i>ap_index</i>	: Index of ap information,The range is 0 to 3

**Returns**

0 : success  
other : failed

**4.9.3.37 wifi\_fast\_connect\_start()**

```
int wifi_fast_connect_start (
    void )
```

Start the fast connection process.

**Returns**

0 : success  
other : failed

**4.9.3.38 wifi\_get\_config()**

```
int wifi_get_config (
    wifi_mode_t interface,
    wifi_config_t * conf )
```

Get configuration of specified interface.

**Parameters**

in	<i>interface</i>	Configure wifi working mode, The options are <ul style="list-style-type: none"> <li>• WIFI_MODE_STA</li> <li>• WIFI_MODE_AP (currently not support)</li> </ul>
out	<i>conf</i>	return wifi's current operating parameters

**Returns**

0 : success  
other : failed

**4.9.3.39 wifi\_init()**

```
int wifi_init (
    const wifi_init_config_t * config,
    wifi_init_complete_cb_t init_cb )
```

Init Wi-Fi Initializes the wifi according to the specified parameters in the config.

**Attention**

1. This API must be called before other Wi-Fi APIs are invoked

**Parameters**

in	<i>config</i>	pointer to Wi-Fi init configuration structure; can point to a temporary variable.
in	<i>init_cb</i>	pointer to Wi-Fi init complete configuration structure; can point to a temporary variable.

**Returns**

0 : success  
other : failed

**4.9.3.40 wifi\_scan\_get\_ap\_list()**

```
int wifi_scan_get_ap_list (
    wifi_scan_list_t * scan_list )
```

Get list of APs that found in last scan operation.

**Attention**

This API only be called when scan is completed, otherwise it may get wrong value.

**Parameters**

out	<i>scan_list</i>	store APs' informaton that found in last scan operation
-----	------------------	---

**Returns**

0 : success  
 other : failed

**4.9.3.41 wifi\_scan\_get\_ap\_num()**

```
int wifi_scan_get_ap_num (
    uint16_t * number )
```

Get the number of scanned APs.

**Parameters**

out	<i>number</i>	store number of APs found in last scan operation
-----	---------------	--

**Attention**

This API only be called when scan is completed, otherwise it may get wrong value.

**Returns**

the scan result of AP number

**4.9.3.42 wifi\_scan\_get\_ap\_records()**

```
int wifi_scan_get_ap_records (
    uint16_t * number,
    wifi_scan_info_t * ap_records )
```

Get AP list found in last scan operation.

**Parameters**

out	<i>number</i>	As input param, it stores max AP number that ap_records can hold. As output param, it receives the actual AP number that this API returns.
out	<i>ap_records</i>	<a href="#">wifi_scan_info_t</a> array stores the found APs

**Returns**

0 : success  
other : failed

**4.9.3.43 wifi\_scan\_scan\_stop()**

```
int wifi_scan_scan_stop (
    void )
```

Stop scanning process.

**Attention**

This API shall be called after [wifi\\_scan\\_start\(\)](#)

**Returns**

0 : success  
other : failed

**4.9.3.44 wifi\_scan\_start()**

```
int wifi_scan_start (
    const wifi\_scan\_config\_t * config,
    bool block )
```

Scan all available APs. After invoke the [wifi\\_set\\_config\(\)](#) and [wifi\\_start\(\)](#), then call [wifi\\_scan\\_start\(\)](#) to scan APs.

**Parameters**

in	<i>config</i>	Configure parameters for scan operation
in	<i>block</i>	if block is true, this API blocks the caller until scan operation is done, otherwise it returns immediately

**Returns**

0 : success  
other : failed

**4.9.3.45 wifi\_set\_config()**

```
int wifi_set_config (
    wifi\_mode\_t interface,
    wifi\_config\_t * conf )
```

Set configuration of OPL1000 STA.

#### Attention

1. This API is called only when specified interface is enabled, otherwise API calling will be failed
2. For station configuration, bssid\_set shall be set to 0; set to 1 means user want to check MAC address of certain AP.
3. OPL1000 is limited to working on one channel.

#### Parameters

in	<i>interface</i>	Configure wifi working mode, The options are <ul style="list-style-type: none"> <li>• WIFI_MODE_STA</li> <li>• WIFI_MODE_AP (currently not support)</li> </ul>
in	<i>conf</i>	structure of configuration paremeters

#### Returns

0 : success  
other : failed

#### 4.9.3.46 wifi\_sta\_get\_ap\_info()

```
int wifi_sta_get_ap_info (
    wifi_scan_info_t * ap_info )
```

Get information of AP which OPL1000 station is associated with.

#### Parameters

out	<i>ap_info</i>	get AP information from list
-----	----------------	------------------------------

#### Returns

0 : success  
other : failed

#### 4.9.3.47 wifi\_start()

```
int wifi_start (
    void )
```

Start Wi-Fi working.

- If mode is WIFI\_MODE\_STA, it creates station control block and starts station



**Returns**

0 : success  
other : failed

**4.9.3.48 wifi\_stop()**

```
int wifi_stop (  
    void )
```

Stop wifi working.

- If mode is WIFI\_MODE\_STA, it stops station and releases station control block

**Returns**

0 : success  
other : failed

## 4.10 Enumeration

### Enumerations

- enum `wifi_auth_mode_t` {  
`WIFI_AUTH_OPEN` = 0, `WIFI_AUTH_WEP`, `WIFI_AUTH_WPA_PSK`, `WIFI_AUTH_WPA2_PSK`,  
`WIFI_AUTH_WPA_WPA2_PSK`, `WIFI_AUTH_WPA2_ENTERPRISE` }  
*This enumeration defines the wireless authentication mode to indicate the Wi-Fi device authentication attribute.*
- enum `wifi_bandwidth_t` { `WIFI_BW_HT20` = 1, `WIFI_BW_HT40` }
- enum `wifi_cipher_type_t` {  
`WIFI_CIPHER_TYPE_NONE` = 0, `WIFI_CIPHER_TYPE_WEP40`, `WIFI_CIPHER_TYPE_WEP104`,  
`WIFI_CIPHER_TYPE_TKIP`,  
`WIFI_CIPHER_TYPE_CCMP`, `WIFI_CIPHER_TYPE_TKIP_CCMP`, `WIFI_CIPHER_TYPE_UNKNOWN` }  
*This enumeration defines wireless security cipher suits.*
- enum `wifi_event_t` {  
`WIFI_EVENT_NONE` = -1, `WIFI_EVENT_INIT_COMPLETE` = 0, `WIFI_EVENT_SCAN_COMPLETE`,  
`WIFI_EVENT_STA_START`,  
`WIFI_EVENT_STA_STOP`, `WIFI_EVENT_STA_CONNECTED`, `WIFI_EVENT_STA_DISCONNECTED`,  
`WIFI_EVENT_STA_CONNECTION_FAILED`,  
`WIFI_EVENT_STA_GOT_IP`, `WIFI_EVENT_MAX` }  
*This enumeration defines the supported events generated by the Wi-Fi driver. The event will be sent to the upper layer handler registered in `wifi_register_event_handler()`.*
- enum `wifi_mode_t` { `WIFI_MODE_NULL` = 0, `WIFI_MODE_STA`, `WIFI_MODE_AP`, `WIFI_MODE_MAX` }
- enum `wifi_reason_code_t` {  
`WIFI_REASON_CODE_SUCCESS`, `WIFI_REASON_CODE_FIND_AP_FAIL`,  
`WIFI_REASON_CODE_PREV_AUTH_INVALID`,  
`WIFI_REASON_CODE_DEAUTH_LEAVING_BSS`,  
`WIFI_REASON_CODE_DISASSOC_INACTIVITY`, `WIFI_REASON_CODE_DISASSOC_AP_OVERLOAD`,  
`WIFI_REASON_CODE_CLASS_2_ERR`, `WIFI_REASON_CODE_CLASS_3_ERR`,  
`WIFI_REASON_CODE_DISASSOC_LEAVING_BSS`, `WIFI_REASON_CODE_ASSOC_BEFORE_AUTH`,  
`WIFI_REASON_CODE_DISASSOC_PWR_CAP_UNACCEPTABLE`,  
`WIFI_REASON_CODE_DISASSOC_SUP_CHS_UNACCEPTABLE`, `WIFI_REASON_CODE_INVALID_INFO_ELEM` = 13,  
`WIFI_REASON_CODE_MIC_FAILURE`, `WIFI_REASON_CODE_4_WAY_HANDSHAKE_TIMEOUT`,  
`WIFI_REASON_CODE_GROUP_KEY_UPDATE_TIMEOUT`,  
`WIFI_REASON_CODE_DIFFERENT_INFO_ELEM`, `WIFI_REASON_CODE_GROUP_CIPHER_INVALID_VALID`,  
`WIFI_REASON_CODE_PAIRWISE_CIPHER_INVALID`, `WIFI_REASON_CODE_AKMP_INVALID`,  
`WIFI_REASON_CODE_UNSUPPORTED_RSNE_VERSION`, `WIFI_REASON_CODE_INVALID_RSNE_CAPABILITIES`,  
`WIFI_REASON_CODE_IEEE_802_1X_AUTH_FAILED`, `WIFI_REASON_CODE_CIPHER_REJECTED`,  
`WIFI_REASON_CODE_AUTO_CONNECT_FAILED` = 200, `WIFI_REASON_CODE_CONNECT_NOT_FOUND`,  
`WIFI_REASON_CODE_CONNECT_TIMEOUT` }  
*This enumeration defines the reason code of the `WIFI_EVENT_STA_CONNECTION_FAILED` event in `wifi_event_t`. Find the details for the reason code below.*
- enum `wifi_scan_method_t` { `WIFI_FAST_SCAN` = 0, `WIFI_ALL_CHANNEL_SCAN` }
- enum `wifi_scan_type_t` { `WIFI_SCAN_TYPE_ACTIVE` = 0, `WIFI_SCAN_TYPE_PASSIVE` }  
*This enumeration defines the wireless STA scan type.*
- enum `wifi_sort_method_t` { `WIFI_CONNECT_AP_BY_SIGNAL` = 0, `WIFI_CONNECT_AP_BY_SECURITY` }

#### 4.10.1 Detailed Description

#### 4.10.2 Enumeration Type Documentation

##### 4.10.2.1 `wifi_auth_mode_t`

enum `wifi_auth_mode_t`

This enumeration defines the wireless authentication mode to indicate the Wi-Fi device authentication attribute.

## Enumerator

WIFI_AUTH_OPEN	authenticate mode : open
WIFI_AUTH_WEP	authenticate mode : WEP
WIFI_AUTH_WPA_PSK	authenticate mode : WPA_PSK
WIFI_AUTH_WPA2_PSK	authenticate mode : WPA2_PSK
WIFI_AUTH_WPA_WPA2_PSK	authenticate mode : WPA_WPA2_PSK
WIFI_AUTH_WPA2_ENTERPRISE	authenticate mode : WPA2_ENTERPRISE

## 4.10.2.2 wifi\_bandwidth\_t

```
enum wifi_bandwidth_t
```

## Enumerator

WIFI_BW_HT20	Bandwidth is HT20
WIFI_BW_HT40	Bandwidth is HT40

## 4.10.2.3 wifi\_cipher\_type\_t

```
enum wifi_cipher_type_t
```

This enumeration defines wireless security cipher suits.

## Enumerator

WIFI_CIPHER_TYPE_NONE	0, the cipher type is none
WIFI_CIPHER_TYPE_WEP40	1, the cipher type is WEP40
WIFI_CIPHER_TYPE_WEP104	2, the cipher type is WEP104
WIFI_CIPHER_TYPE_TKIP	3, the cipher type is TKIP
WIFI_CIPHER_TYPE_CCMP	4, the cipher type is CCMP
WIFI_CIPHER_TYPE_TKIP_CCMP	5, the cipher type is TKIP and CCMP
WIFI_CIPHER_TYPE_UNKNOWN	6, the cipher type is unknown

## 4.10.2.4 wifi\_event\_t

```
enum wifi_event_t
```

This enumeration defines the supported events generated by the Wi-Fi driver. The event will be sent to the upper layer handler registered in [wifi\\_register\\_event\\_handler\(\)](#).

## Enumerator

WIFI_EVENT_NONE	Reserved
WIFI_EVENT_INIT_COMPLETE	Wi-Fi initialization complete event.
WIFI_EVENT_SCAN_COMPLETE	Scan completed event
WIFI_EVENT_STA_START	station start
WIFI_EVENT_STA_STOP	station stop
WIFI_EVENT_STA_CONNECTED	station connected to AP event
WIFI_EVENT_STA_DISCONNECTED	station disconnected from AP
WIFI_EVENT_STA_CONNECTION_FAILED	Connection has failed. For the reason code, please refer to <a href="#">wifi_reason_code_t</a> .
WIFI_EVENT_STA_GOT_IP	station got IP from connected AP
WIFI_EVENT_MAX	

## 4.10.2.5 wifi\_mode\_t

```
enum wifi_mode_t
```

## Enumerator

WIFI_MODE_NULL	null mode
WIFI_MODE_STA	Wi-Fi station mode
WIFI_MODE_AP	Wi-Fi soft-AP mode
WIFI_MODE_MAX	

## 4.10.2.6 wifi\_reason\_code\_t

```
enum wifi_reason_code_t
```

This enumeration defines the reason code of the WIFI\_EVENT\_STA\_CONNECTION\_FAILED event in [wifi\\_event\\_t](#). Find the details for the reason code below.

## Enumerator

WIFI_REASON_CODE_SUCCESS	0 Reserved.
WIFI_REASON_CODE_FIND_AP_FAIL	1 (Internal) No AP found.
WIFI_REASON_CODE_PREV_AUTH_INVALID	2 Previous authentication is no longer valid.
WIFI_REASON_CODE_DEAUTH_LEAVING_BSS	3 Deauthenticated because sending STA is leaving (or has left) IBSS or ES.
WIFI_REASON_CODE_DISASSOC_INACTIVITY	4 Disassociated due to inactivity.
WIFI_REASON_CODE_DISASSOC_AP_OVERLOAD	5 Disassociated because AP is unable to handle all currently associated STAs.
WIFI_REASON_CODE_CLASS_2_ERR	6 Class 2 frame received from nonauthenticated STA.
WIFI_REASON_CODE_CLASS_3_ERR	7 Class 3 frame received from nonauthenticated STA.

## Enumerator

WIFI_REASON_CODE_DISASSOC_LEAVING_BSS	8 Disassociated because sending STA is leaving (or has left) BSS.
WIFI_REASON_CODE_ASSOC_BEFORE_AUTH	9 STA requesting (re)association is not authenticated with responding STA.
WIFI_REASON_CODE_DISASSOC_PWR_CAP_↔ UNACCEPTABLE	10 Disassociated because the information in the Power Capability element is unacceptable.
WIFI_REASON_CODE_DISASSOC_SUP_CHS_U↔ NACCEPTABLE	11 Disassociated because the information in the Supported Channels element is unacceptable.
WIFI_REASON_CODE_INVALID_INFO_ELEM	13 Invalid information element.
WIFI_REASON_CODE_MIC_FAILURE	14 Message integrity code (MIC) failure.
WIFI_REASON_CODE_4_WAY_HANDSHAKE_TI↔ MEOUT	15 4-Way Handshake time out.
WIFI_REASON_CODE_GROUP_KEY_UPDATE_↔ TIMEOUT	16 Group Key Handshake time out.
WIFI_REASON_CODE_DIFFERENT_INFO_ELEM	17 Information element in 4-Way Handshake different from (Re)Association Request/Probe Response/Beacon frame.
WIFI_REASON_CODE_GROUP_CIPHER_INVALID↔ D_VALID	18 Invalid group cipher.
WIFI_REASON_CODE_PAIRWISE_CIPHER_INV↔ ALID	19 Invalid pairwise cipher.
WIFI_REASON_CODE_AKMP_INVALID	20 Invalid AKMP.
WIFI_REASON_CODE_UNSUPPORTED_RSNE_↔ VERSION	21 Unsupported RSN information element version.
WIFI_REASON_CODE_INVALID_RSNE_CAPABI↔ LITIES	22 Invalid RSN information element capabilities.
WIFI_REASON_CODE_IEEE_802_1X_AUTH_FAI↔ LED	23 IEEE 802.1X authentication failed.
WIFI_REASON_CODE_CIPHER_REJECTED	24 Cipher suite rejected because of the security policy.
WIFI_REASON_CODE_AUTO_CONNECT_FAILED	200 Auto connect failed.
WIFI_REASON_CODE_CONNECT_NOT_FOUND	201 The target AP is not found.
WIFI_REASON_CODE_CONNECT_TIMEOUT	202 Connect to AP timeout.

## 4.10.2.7 wifi\_scan\_method\_t

```
enum wifi_scan_method_t
```

## Enumerator

WIFI_FAST_SCAN	Do fast scan, scan will end after find SSID match AP
WIFI_ALL_CHANNEL_SCAN	All channel scan, scan will end after scan all the channel

#### 4.10.2.8 wifi\_scan\_type\_t

enum `wifi_scan_type_t`

This enumeration defines the wireless STA scan type.

##### Enumerator

WIFI_SCAN_TYPE_ACTIVE	Actively scan a network by sending 802.11 probe(s)
WIFI_SCAN_TYPE_PASSIVE	Passively scan a network by listening for beacons from APs

#### 4.10.2.9 wifi\_sort\_method\_t

enum `wifi_sort_method_t`

##### Enumerator

WIFI_CONNECT_AP_BY_SIGNAL	Sort match AP in scan list by RSSI
WIFI_CONNECT_AP_BY_SECURITY	Sort match AP in scan list by security mode

## Chapter 5

# Data Structure Documentation

### 5.1 auto\_conn\_info\_t Struct Reference

```
#include <controller_wifi_com_patch.h>
```

#### Data Fields

- u8 [ap\\_channel](#)
- u16 [beacon\\_interval](#)
- u8 [bssid](#) [MAC\_ADDR\_LEN]
- u16 [capabilities](#)
- u8 [dtim\\_prod](#)
- u8 [fast\\_connect](#)
- bool [free\\_ocpy](#)
- s8 [hid\\_ssid](#) [IEEE80211\_MAX\_SSID\_LEN+1]
- u64 [latest\\_beacon\\_rx\\_time](#)
- s8 [passphrase](#) [MAX\_LEN\_OF\_PASSPHRASE]
- u8 [psk](#) [32]
- u8 [rsn\\_ie](#) [100]
- s8 [rsni](#)
- s8 [ssid](#) [IEEE80211\_MAX\_SSID\_LEN+1]
- u8 [supported\\_rates](#) [SUPPORTED\_RATES\_MAX]
- wpa\_ie\_data\_t [wpa\\_data](#)
- u8 [wpa\\_ie](#) [100]

#### 5.1.1 Field Documentation

##### 5.1.1.1 ap\_channel

u8 [ap\\_channel](#)

**5.1.1.2 beacon\_interval**

u16 beacon\_interval

**5.1.1.3 bssid**

u8 bssid[MAC\_ADDR\_LEN]

**5.1.1.4 capabilities**

u16 capabilities

**5.1.1.5 dtim\_prod**

u8 dtim\_prod

**5.1.1.6 fast\_connect**

u8 fast\_connect

**5.1.1.7 free\_ocpy**

bool free\_ocpy

**5.1.1.8 hid\_ssid**

s8 hid\_ssid[IEEE80211\_MAX\_SSID\_LEN+1]

**5.1.1.9 latest\_beacon\_rx\_time**

u64 latest\_beacon\_rx\_time



**5.1.1.10 passphrase**

```
s8 passphrase[MAX_LEN_OF_PASSPHRASE]
```

**5.1.1.11 psk**

```
u8 psk[32]
```

**5.1.1.12 rsn\_ie**

```
u8 rsn_ie[100]
```

**5.1.1.13 rssi**

```
s8 rssi
```

**5.1.1.14 ssid**

```
s8 ssid[IEEE80211_MAX_SSID_LEN+1]
```

**5.1.1.15 supported\_rates**

```
u8 supported_rates[SUPPORTED_RATES_MAX]
```

**5.1.1.16 wpa\_data**

```
wpa_ie_data_t wpa_data
```

**5.1.1.17 wpa\_ie**

```
u8 wpa_ie[100]
```

## 5.2 auto\_connect\_cfg\_t Struct Reference

```
#include <controller_wifi_com_patch.h>
```

### Data Fields

- bool [flag](#)
- s8 [front](#)
- u8 [max\\_save\\_num](#)
- [auto\\_conn\\_info\\_t](#) \* [pFCInfo](#)
- s8 [rear](#)
- u8 [retryCount](#)
- u8 [targetIdx](#)
- u32 [uFCApNum](#)

### 5.2.1 Field Documentation

#### 5.2.1.1 flag

```
bool flag
```

#### 5.2.1.2 front

```
s8 front
```

#### 5.2.1.3 max\_save\_num

```
u8 max_save_num
```

#### 5.2.1.4 pFCInfo

```
auto\_conn\_info\_t* pFCInfo
```

#### 5.2.1.5 rear

s8 rear

#### 5.2.1.6 retryCount

u8 retryCount

#### 5.2.1.7 targetIdx

u8 targetIdx

#### 5.2.1.8 uFCapNum

u32 uFCapNum

## 5.3 event\_msg\_t Struct Reference

Send information to event by [event\\_msg\\_t](#).

```
#include <event_loop.h>
```

### Data Fields

- uint32\_t [event](#)
- uint32\_t [length](#)
- uint8\_t \* [param](#)

### 5.3.1 Detailed Description

Send information to event by [event\\_msg\\_t](#).

### 5.3.2 Field Documentation

#### 5.3.2.1 event

```
uint32_t event
```

event type

#### 5.3.2.2 length

```
uint32_t length
```

Packet length

#### 5.3.2.3 param

```
uint8_t* param
```

event paramment

### 5.4 hap\_control\_t Struct Reference

```
#include <controller_wifi_com_patch.h>
```

#### Data Fields

- [auto\\_conn\\_info\\_t](#) \* [hap\\_ap\\_info](#)
- int [hap\\_bitvector](#)
- u8 [hap\\_en](#)
- int [hap\\_final\\_index](#)
- int [hap\\_index](#)
- char [hap\\_ssid](#) [IEEE80211\_MAX\_SSID\_LEN+1]

#### 5.4.1 Field Documentation

##### 5.4.1.1 hap\_ap\_info

```
auto\_conn\_info\_t* hap_ap_info
```

##### 5.4.1.2 hap\_bitvector

```
int hap_bitvector
```

#### 5.4.1.3 hap\_en

u8 hap\_en

#### 5.4.1.4 hap\_final\_index

int hap\_final\_index

#### 5.4.1.5 hap\_index

int hap\_index

#### 5.4.1.6 hap\_ssid

char hap\_ssid[IEEE80211\_MAX\_SSID\_LEN+1]

## 5.5 LE\_BT\_ADDR\_T Struct Reference

```
#include <ble.h>
```

### Data Fields

- BD\_ADDR [addr](#)
- UINT8 [type](#)

### 5.5.1 Field Documentation

#### 5.5.1.1 addr

BD\_ADDR addr

address

### 5.5.1.2 type

UINT8 type

address type

## 5.6 LE\_CM\_CONNECTION\_COMPLETE\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [conn\\_interval](#)
- UINT16 [conn\\_latency](#)
- UINT16 [dev\\_id](#)
- BD\_ADDR [peer\\_addr](#)
- UINT8 [peer\\_addr\\_type](#)
- UINT8 [role](#)
- UINT16 [status](#)
- UINT16 [supervison\\_timeout](#)

### 5.6.1 Field Documentation

#### 5.6.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.6.1.2 conn\_interval

UINT16 conn\_interval

connection interval

#### 5.6.1.3 conn\_latency

UINT16 conn\_latency

connection latency

#### 5.6.1.4 dev\_id

UINT16 dev\_id

device ID

#### 5.6.1.5 peer\_addr

BD\_ADDR peer\_addr

peer address

#### 5.6.1.6 peer\_addr\_type

UINT8 peer\_addr\_type

peer address type

#### 5.6.1.7 role

UINT8 role

master or slave

#### 5.6.1.8 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

#### 5.6.1.9 supervision\_timeout

UINT16 supervision\_timeout

supervision timeout

## 5.7 LE\_CM\_MSG\_ADVERTISE\_REPORT\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- BD\_ADDR [addr](#)
- UINT8 [addr\\_type](#)
- UINT8 [data](#) [1]
- UINT8 [event\\_type](#)
- UINT8 [len](#)
- INT8 [rssi](#)

## 5.7.1 Field Documentation

### 5.7.1.1 addr

BD\_ADDR addr

address

### 5.7.1.2 addr\_type

UINT8 addr\_type

address type

### 5.7.1.3 data

UINT8 data[1]

### 5.7.1.4 event\_type

UINT8 event\_type

### 5.7.1.5 len

UINT8 len

### 5.7.1.6 rssi

INT8 rssi

RSSI

## 5.8 LE\_CM\_MSG\_CONN\_PARA\_REQ\_T Struct Reference

```
#include <ble_cm_if.h>
```



## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [itv\\_max](#)
- UINT16 [itv\\_min](#)
- UINT16 [latency](#)
- UINT32 [sv\\_tmo](#)

### 5.8.1 Field Documentation

#### 5.8.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.8.1.2 itv\_max

UINT16 itv\_max

maximum connection interval

#### 5.8.1.3 itv\_min

UINT16 itv\_min

minimum connection interval

#### 5.8.1.4 latency

UINT16 latency

slave latency

#### 5.8.1.5 sv\_tmo

UINT32 sv\_tmo

supervision timeout

## 5.9 LE\_CM\_MSG\_CONN\_UPDATE\_COMPLETE\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [interval](#)
- UINT16 [latency](#)
- UINT16 [status](#)
- UINT32 [supervision\\_timeout](#)

### 5.9.1 Field Documentation

#### 5.9.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.9.1.2 interval

UINT16 interval

connection interval

#### 5.9.1.3 latency

UINT16 latency

slave letency

#### 5.9.1.4 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

#### 5.9.1.5 supervision\_timeout

UINT32 supervision\_timeout

supervision timeout

## 5.10 LE\_CM\_MSG\_DATA\_LEN\_CHANGE\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [max\\_rx\\_octets](#)
- UINT16 [max\\_rx\\_time](#)
- UINT16 [max\\_tx\\_octets](#)
- UINT16 [max\\_tx\\_time](#)

### 5.10.1 Field Documentation

#### 5.10.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.10.1.2 max\_rx\_octets

UINT16 max\_rx\_octets

connMaxRxOctets

#### 5.10.1.3 max\_rx\_time

UINT16 max\_rx\_time

connMaxRxTime

#### 5.10.1.4 max\_tx\_octets

UINT16 max\_tx\_octets

connMaxTxOctets

#### 5.10.1.5 max\_tx\_time

UINT16 max\_tx\_time

connMaxTxTime

## 5.11 LE\_CM\_MSG\_DIRECT\_ADV\_REPORT\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- BD\_ADDR [direct\\_addr](#)
- UINT8 [direct\\_addr\\_type](#)
- BD\_ADDR [peer\\_addr](#)
- UINT8 [peer\\_addr\\_type](#)
- INT8 [rssi](#)

### 5.11.1 Field Documentation

#### 5.11.1.1 `direct_addr`

BD\_ADDR `direct_addr`

direct address

#### 5.11.1.2 `direct_addr_type`

UINT8 `direct_addr_type`

direct address type

#### 5.11.1.3 `peer_addr`

BD\_ADDR `peer_addr`

peer address

#### 5.11.1.4 `peer_addr_type`

UINT8 `peer_addr_type`

peer address type

#### 5.11.1.5 `rssi`

INT8 `rssi`

RSSI

## 5.12 LE\_CM\_MSG\_DISCONNECT\_COMPLETE\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT8 [reason](#)
- UINT16 [status](#)

### 5.12.1 Field Documentation

#### 5.12.1.1 conn\_hdl

UINT16 [conn\\_hdl](#)

connection handle

#### 5.12.1.2 reason

UINT8 [reason](#)

disconnect reason

#### 5.12.1.3 status

UINT16 [status](#)

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.13 LE\_CM\_MSG\_ENCRYPTION\_CHANGE\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT8 [enabled](#)
- UINT16 [status](#)

### 5.13.1 Field Documentation

#### 5.13.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.13.1.2 devid

UINT16 devid

device ID

#### 5.13.1.3 enabled

UINT8 enabled

#### 5.13.1.4 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

### 5.14 LE\_CM\_MSG\_ENCRYPTION\_REFRESH\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

#### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- BOOL [enabled](#)
- UINT16 [status](#)

#### 5.14.1 Field Documentation

##### 5.14.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.14.1.2 devid

UINT16 devid

device ID

#### 5.14.1.3 enabled

BOOL enabled

enable or disable

#### 5.14.1.4 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.15 LE\_CM\_MSG\_INIT\_COMPLETE\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT16 [status](#)

### 5.15.1 Field Documentation

#### 5.15.1.1 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.16 LE\_CM\_MSG\_LTK\_REQ\_IND\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [ediv](#)
- UINT8 [rand](#) [8]

### 5.16.1 Field Documentation

#### 5.16.1.1 conn\_hdl

UINT16 [conn\\_hdl](#)

connection handle

#### 5.16.1.2 devid

UINT16 [devid](#)

device ID

#### 5.16.1.3 ediv

UINT16 [ediv](#)

#### 5.16.1.4 rand

UINT8 [rand](#)[8]

## 5.17 LE\_CM\_MSG\_READ\_ADV\_TX\_POWER\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- INT8 [pwr\\_level](#)
- UINT16 [status](#)



### 5.17.1 Field Documentation

#### 5.17.1.1 pwr\_level

INT8 pwr\_level

power level

#### 5.17.1.2 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.18 LE\_CM\_MSG\_READ\_BD\_ADDR\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- BD\_ADDR [bd\\_addr](#)
- UINT16 [status](#)

### 5.18.1 Field Documentation

#### 5.18.1.1 bd\_addr

BD\_ADDR bd\_addr

#### 5.18.1.2 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.19 LE\_CM\_MSG\_READ\_CHANNEL\_MAP\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT8 [ch\\_map](#) [5]
- UINT16 [conn\\_hdl](#)
- UINT16 [status](#)

### 5.19.1 Field Documentation

#### 5.19.1.1 [ch\\_map](#)

```
UINT8 ch_map[5]
```

channel map

#### 5.19.1.2 [conn\\_hdl](#)

```
UINT16 conn_hdl
```

connection handle

#### 5.19.1.3 [status](#)

```
UINT16 status
```

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.20 LE\_CM\_MSG\_READ\_RESOLVING\_LIST\_SIZE\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT8 [size](#)
- UINT16 [status](#)

### 5.20.1 Field Documentation

#### 5.20.1.1 size

UINT8 size

resolving list size

#### 5.20.1.2 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.21 LE\_CM\_MSG\_READ\_RSSI\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- INT8 [rssi](#)
- UINT16 [status](#)

### 5.21.1 Field Documentation

#### 5.21.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.21.1.2 rssi

INT8 rssi

RSSI

#### 5.21.1.3 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.22 LE\_CM\_MSG\_READ\_TX\_POWER\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [status](#)
- INT8 [tx\\_power](#)

### 5.22.1 Field Documentation

#### 5.22.1.1 [conn\\_hdl](#)

UINT16 [conn\\_hdl](#)

connection handle

#### 5.22.1.2 [status](#)

UINT16 [status](#)

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

#### 5.22.1.3 [tx\\_power](#)

INT8 [tx\\_power](#)

tx power

## 5.23 LE\_CM\_MSG\_READ\_WHITE\_LIST\_SIZE\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT8 [size](#)
- UINT16 [status](#)

### 5.23.1 Field Documentation

#### 5.23.1.1 size

UINT8 size

white list size

#### 5.23.1.2 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.24 LE\_CM\_MSG\_SET\_DATA\_LENGTH\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [status](#)

### 5.24.1 Field Documentation

#### 5.24.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.24.1.2 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.25 LE\_CM\_MSG\_SET\_DISCONNECT\_CFM\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- UINT16 [handle](#)
- UINT16 [status](#)

### 5.25.1 Field Documentation

#### 5.25.1.1 handle

UINT16 handle

connection handle

#### 5.25.1.2 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.26 LE\_CM\_MSG\_SIGNAL\_UPDATE\_REQ\_T Struct Reference

```
#include <ble_cm_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [identifier](#)
- UINT16 [interval\\_max](#)
- UINT16 [interval\\_min](#)
- UINT16 [slave\\_latency](#)
- UINT32 [timeout\\_multiplier](#)

### 5.26.1 Field Documentation

#### 5.26.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.26.1.2 identifier

UINT16 identifier

#### 5.26.1.3 interval\_max

UINT16 interval\_max

maximum connection interval

#### 5.26.1.4 interval\_min

UINT16 interval\_min

minimum connection interval

#### 5.26.1.5 slave\_latency

UINT16 slave\_latency

slave latency

#### 5.26.1.6 timeout\_multiplier

UINT32 timeout\_multiplier

## 5.27 LE\_CM\_REQ\_STATUS\_T Struct Reference

```
#include <ble_cm_if.h>
```

### Data Fields

- UINT16 [status](#)

### 5.27.1 Field Documentation

#### 5.27.1.1 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.28 LE\_CONN\_PARA\_T Struct Reference

```
#include <ble.h>
```

### Data Fields

- UINT16 [itv\\_max](#)
- UINT16 [itv\\_min](#)
- UINT16 [latency](#)
- UINT16 [sv\\_timeout](#)

### 5.28.1 Field Documentation

#### 5.28.1.1 itv\_max

UINT16 itv\_max

maximum connection interval

#### 5.28.1.2 itv\_min

UINT16 itv\_min

mininum connection interval

#### 5.28.1.3 latency

UINT16 latency

slave latency

#### 5.28.1.4 sv\_timeout

UINT16 sv\_timeout

supervision timeout



## 5.29 LE\_GAP\_ADVERTISING\_PARAM\_T Struct Reference

```
#include <ble_gap_if.h>
```

### Data Fields

- UINT8 [channel\\_map](#)
- UINT8 [filter\\_policy](#)
- UINT16 [interval\\_max](#)
- UINT16 [interval\\_min](#)
- UINT8 [own\\_addr\\_type](#)
- BD\_ADDR [peer\\_addr](#)
- UINT8 [peer\\_addr\\_type](#)
- UINT8 [type](#)

### 5.29.1 Field Documentation

#### 5.29.1.1 [channel\\_map](#)

UINT8 [channel\\_map](#)

advertising channel map

#### 5.29.1.2 [filter\\_policy](#)

UINT8 [filter\\_policy](#)

advertising filter policy

#### 5.29.1.3 [interval\\_max](#)

UINT16 [interval\\_max](#)

maximum advertising interval

#### 5.29.1.4 [interval\\_min](#)

UINT16 [interval\\_min](#)

minimum advertising interval

#### 5.29.1.5 own\_addr\_type

UINT8 own\_addr\_type

owner address type

#### 5.29.1.6 peer\_addr

BD\_ADDR peer\_addr

peer address

#### 5.29.1.7 peer\_addr\_type

UINT8 peer\_addr\_type

peer address type

#### 5.29.1.8 type

UINT8 type

advertising type

### 5.30 LE\_GAP\_CONN\_PARAM\_T Struct Reference

```
#include <ble_gap_if.h>
```

#### Data Fields

- UINT16 [interval\\_max](#)
- UINT16 [interval\\_min](#)
- UINT16 [latency](#)
- UINT16 [supervision\\_timeout](#)

#### 5.30.1 Field Documentation

##### 5.30.1.1 interval\_max

UINT16 interval\_max

maximum connection interval

#### 5.30.1.2 interval\_min

UINT16 interval\_min

minimum connection interval

#### 5.30.1.3 latency

UINT16 latency

slave latency

#### 5.30.1.4 supervision\_timeout

UINT16 supervision\_timeout

supervision timeout for the LE Link

## 5.31 LE\_GAP\_SCAN\_PARAM\_T Struct Reference

```
#include <ble_gap_if.h>
```

### Data Fields

- UINT8 [filter\\_policy](#)
- UINT16 [interval](#)
- UINT8 [own\\_addr\\_type](#)
- UINT8 [type](#)
- UINT16 [window](#)

### 5.31.1 Field Documentation

#### 5.31.1.1 filter\_policy

UINT8 filter\_policy

scan filter policy

#### 5.31.1.2 interval

UINT16 interval

scan interval

#### 5.31.1.3 own\_addr\_type

UINT8 own\_addr\_type

owner address type

#### 5.31.1.4 type

UINT8 type

scan type

#### 5.31.1.5 window

UINT16 window

scan window

## 5.32 LE\_GATT\_ATTR\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT8 [format](#)
- UINT16 [handle](#)
- UINT16 [len](#)
- UINT16 [maxLen](#)
- UINT16 [permit](#)
- UINT16 \*const [pUuid](#)
- UINT8 \*const [pVal](#)

### 5.32.1 Field Documentation

#### 5.32.1.1 format

UINT8 format

UUID type

#### 5.32.1.2 handle

UINT16 handle

handle

#### 5.32.1.3 len

UINT16 len

value length

#### 5.32.1.4 maxLen

UINT16 maxLen

maximum value length

#### 5.32.1.5 permit

UINT16 permit

permit

#### 5.32.1.6 pUuid

UINT16\* const pUuid

UUID

#### 5.32.1.7 pVal

UINT8\* const pVal

value

### 5.33 LE\_GATT\_MSG\_ACCESS\_READ\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

#### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [offset](#)

### 5.33.1 Field Documentation

#### 5.33.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.33.1.2 devid

UINT16 devid

device index

#### 5.33.1.3 handle

UINT16 handle

attribute handle

#### 5.33.1.4 offset

UINT16 offset

attribute handle value

## 5.34 LE\_GATT\_MSG\_ACCESS\_WRITE\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT8 [flag](#)
- UINT16 [handle](#)
- UINT16 [len](#)
- UINT16 [offset](#)
- UINT8 \* [pVal](#)

### 5.34.1 Field Documentation

#### 5.34.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.34.1.2 devid

UINT16 devid

device ID

#### 5.34.1.3 flag

UINT8 flag

refer to LE\_GATT\_FLAG\_\* in [ble\\_gatt\\_if.h](#)

#### 5.34.1.4 handle

UINT16 handle

attribute handle

#### 5.34.1.5 len

UINT16 len

length written

#### 5.34.1.6 offset

UINT16 offset

attribute handle value

#### 5.34.1.7 pVal

UINT8\* pVal

value written

### 5.35 LE\_GATT\_MSG\_CHAR\_DESCRIPTOR\_INFO\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT8 [format](#)
- UINT16 [handle](#)
- UINT16 [uuid](#) [8]

### 5.35.1 Field Documentation

#### 5.35.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.35.1.2 devid

UINT16 devid

device ID

#### 5.35.1.3 format

UINT8 format

UUID type

#### 5.35.1.4 handle

UINT16 handle

characteristic descriptor handle

#### 5.35.1.5 uuid

UINT16 uuid[8]

UUID

## 5.36 LE\_GATT\_MSG\_CHARACTERISTIC\_DECL\_INFO\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```



## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT8 [format](#)
- UINT16 [handle](#)
- UINT8 [property](#)
- UINT16 [uuid](#) [8]
- UINT16 [val\\_hdl](#)

### 5.36.1 Field Documentation

#### 5.36.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.36.1.2 devid

UINT16 devid

device ID

#### 5.36.1.3 format

UINT8 format

UUID type

#### 5.36.1.4 handle

UINT16 handle

characteristic declaration handle

#### 5.36.1.5 property

UINT8 property

property

#### 5.36.1.6 uuid

```
UINT16 uuid[8]
```

UUID

#### 5.36.1.7 val\_hdl

```
UINT16 val_hdl
```

characteristic value handle

### 5.37 LE\_GATT\_MSG\_CHARACTERISTIC\_VAL\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

#### Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [len](#)
- UINT16 [offset](#)
- UINT8 \* [val](#)

#### 5.37.1 Field Documentation

##### 5.37.1.1 att\_err

```
UINT8 att_err
```

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

##### 5.37.1.2 conn\_hdl

```
UINT16 conn_hdl
```

connection handle

#### 5.37.1.3 devid

UINT16 devid

device ID

#### 5.37.1.4 handle

UINT16 handle

characteristic value handle

#### 5.37.1.5 len

UINT16 len

value length

#### 5.37.1.6 offset

UINT16 offset

value position offset

#### 5.37.1.7 val

UINT8\* val

value

## 5.38 LE\_GATT\_MSG\_CONFIRMATION\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)

### 5.38.1 Field Documentation

#### 5.38.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.38.1.2 devid

UINT16 devid

device ID

#### 5.38.1.3 handle

UINT16 handle

attribute handle

### 5.39 LE\_GATT\_MSG\_EXCHANGE\_MTU\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

#### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [current\\_rx\\_mtu](#)
- UINT16 [devid](#)

#### 5.39.1 Field Documentation

##### 5.39.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

##### 5.39.1.2 current\_rx\_mtu

UINT16 current\_rx\_mtu

current receive MTU

### 5.39.1.3 devid

UINT16 devid

device ID

## 5.40 LE\_GATT\_MSG\_EXCHANGE\_MTU\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [client\\_rx\\_mtu](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)

### 5.40.1 Field Documentation

#### 5.40.1.1 client\_rx\_mtu

UINT16 client\_rx\_mtu

client receive MTU

#### 5.40.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.40.1.3 devid

UINT16 devid

device ID

## 5.41 LE\_GATT\_MSG\_EXECUTE\_WRITE\_RELIABLE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [err\\_hdl](#)
- UINT16 [status](#)

### 5.41.1 Field Documentation

#### 5.41.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.41.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.41.1.3 devid

UINT16 devid

device ID

#### 5.41.1.4 err\_hdl

UINT16 err\_hdl

TBD

#### 5.41.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.42 LE\_GATT\_MSG\_FIND\_ALL\_CHAR\_DESC\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.42.1 Field Documentation

#### 5.42.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.42.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.42.1.3 devid

UINT16 devid

device ID

#### 5.42.1.4 handle

UINT16 handle

characteristic descriptor handle

#### 5.42.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.43 LE\_GATT\_MSG\_FIND\_ALL\_PRIMARY\_SERVICE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.43.1 Field Documentation

#### 5.43.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.43.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.43.1.3 devid

UINT16 devid

device ID

#### 5.43.1.4 handle

UINT16 handle

#### 5.43.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.44 LE\_GATT\_MSG\_FIND\_CHARACTERISTIC\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```



## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.44.1 Field Documentation

#### 5.44.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.44.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.44.1.3 devid

UINT16 devid

device ID

#### 5.44.1.4 handle

UINT16 handle

characteristic descriptor handle

#### 5.44.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.45 LE\_GATT\_MSG\_FIND\_INCLUDED\_SERVICE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.45.1 Field Documentation

#### 5.45.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.45.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.45.1.3 devid

UINT16 devid

device ID

#### 5.45.1.4 handle

UINT16 handle

include service start handle

#### 5.45.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.46 LE\_GATT\_MSG\_FIND\_PRIMARY\_SERVICE\_BY\_UUID\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.46.1 Field Documentation

#### 5.46.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.46.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.46.1.3 devid

UINT16 devid

device ID

#### 5.46.1.4 handle

UINT16 handle

service start handle

#### 5.46.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.47 LE\_GATT\_MSG\_INCLUDE\_SERVICE\_INFO\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [end\\_hdl](#)
- UINT8 [format](#)
- UINT16 [handle](#)
- UINT16 [start\\_hdl](#)
- UINT16 [uuid](#) [8]

### 5.47.1 Field Documentation

#### 5.47.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.47.1.2 devid

UINT16 devid

device ID

#### 5.47.1.3 end\_hdl

UINT16 end\_hdl

end handle

#### 5.47.1.4 format

UINT8 format

UUID type

#### 5.47.1.5 handle

UINT16 handle

include servie handle

#### 5.47.1.6 start\_hdl

UINT16 start\_hdl

start handle

#### 5.47.1.7 uuid

UINT16 uuid[8]

UUID

## 5.48 LE\_GATT\_MSG\_INDICATE\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [len](#)
- UINT8 \* [val](#)

### 5.48.1 Field Documentation

#### 5.48.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.48.1.2 devid

UINT16 devid

device ID

#### 5.48.1.3 handle

UINT16 handle

attribute handle

#### 5.48.1.4 len

UINT16 len

value length

#### 5.48.1.5 val

UINT8\* val

value

## 5.49 LE\_GATT\_MSG\_NOTIFY\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.49.1 Field Documentation

#### 5.49.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.49.1.2 devid

UINT16 devid

device ID

#### 5.49.1.3 handle

UINT16 handle

attribute handle

#### 5.49.1.4 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.50 LE\_GATT\_MSG\_NOTIFY\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [len](#)
- UINT8 \* [val](#)

### 5.50.1 Field Documentation

#### 5.50.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.50.1.2 devid

UINT16 devid

device ID

#### 5.50.1.3 handle

UINT16 handle

attribute handle

#### 5.50.1.4 len

UINT16 len

value length

#### 5.50.1.5 val

UINT8\* val

value

## 5.51 LE\_GATT\_MSG\_OPERATION\_TIMEOUT\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT8 [att\\_op](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)

### 5.51.1 Field Documentation

#### 5.51.1.1 att\_op

UINT8 att\_op

refer to LE\_ATT\_OP\_\* in [ble\\_att\\_if.h](#)

#### 5.51.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.51.1.3 devid

UINT16 devid

device ID

## 5.52 LE\_GATT\_MSG\_PREPARE\_WRITE\_RELIABLE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```



## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.52.1 Field Documentation

#### 5.52.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.52.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.52.1.3 devid

UINT16 devid

device ID

#### 5.52.1.4 handle

UINT16 handle

attribute handle

#### 5.52.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.53 LE\_GATT\_MSG\_READ\_CHAR\_VAL\_BY\_UUID\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.53.1 Field Documentation

#### 5.53.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.53.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.53.1.3 devid

UINT16 devid

device ID

#### 5.53.1.4 handle

UINT16 handle

characteristic value handle

#### 5.53.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.54 LE\_GATT\_MSG\_READ\_CHARACTERISTIC\_VALUE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.54.1 Field Documentation

#### 5.54.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.54.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.54.1.3 devid

UINT16 devid

device ID

#### 5.54.1.4 handle

UINT16 handle

characteristic value handle

#### 5.54.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.55 LE\_GATT\_MSG\_READ\_LONG\_CHAR\_VAL\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.55.1 Field Documentation

#### 5.55.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.55.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.55.1.3 devid

UINT16 devid

device ID

#### 5.55.1.4 handle

UINT16 handle

characteristic value handle

#### 5.55.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.56 LE\_GATT\_MSG\_READ\_MULTIPLE\_CHAR\_VAL\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

## Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [err\\_hdl](#)
- UINT16 [len](#)
- UINT16 [status](#)
- UINT8 \* [val](#)

### 5.56.1 Field Documentation

#### 5.56.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.56.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.56.1.3 devid

UINT16 devid

device ID

#### 5.56.1.4 err\_hdl

UINT16 err\_hdl

TBD

#### 5.56.1.5 len

UINT16 len

value length

#### 5.56.1.6 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

#### 5.56.1.7 val

UINT8\* val

value

### 5.57 LE\_GATT\_MSG\_SERVICE\_INFO\_IND\_T Struct Reference

```
#include <ble_gatt_if.h>
```

#### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [end\\_hdl](#)
- UINT8 [format](#)
- UINT16 [start\\_hdl](#)
- UINT16 [uuid](#) [8]

#### 5.57.1 Field Documentation

##### 5.57.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

##### 5.57.1.2 devid

UINT16 devid

device ID

##### 5.57.1.3 end\_hdl

UINT16 end\_hdl

end handle

#### 5.57.1.4 format

UINT8 format

UUID type

#### 5.57.1.5 start\_hdl

UINT16 start\_hdl

start handle

#### 5.57.1.6 uuid

UINT16 uuid[8]

UUID

## 5.58 LE\_GATT\_MSG\_SIGNED\_WRITE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.58.1 Field Documentation

#### 5.58.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.58.1.2 devid

UINT16 devid

device ID

#### 5.58.1.3 handle

UINT16 handle

attribute handle

#### 5.58.1.4 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

### 5.59 LE\_GATT\_MSG\_WRITE\_CHAR\_VAL\_RELIABLE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

#### Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

#### 5.59.1 Field Documentation

##### 5.59.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

##### 5.59.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

##### 5.59.1.3 devid

UINT16 devid

device ID



#### 5.59.1.4 handle

UINT16 handle

characteristic value handle

#### 5.59.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.60 LE\_GATT\_MSG\_WRITE\_CHAR\_VALUE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.60.1 Field Documentation

#### 5.60.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.60.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.60.1.3 devid

UINT16 devid

device ID

#### 5.60.1.4 handle

UINT16 handle

attribute handle

#### 5.60.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.61 LE\_GATT\_MSG\_WRITE\_LONG\_CHAR\_VALUE\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT8 [att\\_err](#)
- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.61.1 Field Documentation

#### 5.61.1.1 att\_err

UINT8 att\_err

0 is ok, others refer to LE\_ATT\_ERR\_\* in [ble\\_att\\_if.h](#)

#### 5.61.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.61.1.3 devid

UINT16 devid

device ID

#### 5.61.1.4 handle

UINT16 handle

characteristic value handle

#### 5.61.1.5 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

## 5.62 LE\_GATT\_MSG\_WRITE\_NO\_RSP\_CFM\_T Struct Reference

```
#include <ble_gatt_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [devid](#)
- UINT16 [handle](#)
- UINT16 [status](#)

### 5.62.1 Field Documentation

#### 5.62.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.62.1.2 devid

UINT16 devid

device ID

#### 5.62.1.3 handle

UINT16 handle

attribute handle

#### 5.62.1.4 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

### 5.63 LE\_GATT\_SERVICE\_T Struct Reference

```
#include <ble_gatt_if.h>
```

#### Data Fields

- UINT16 [endHdl](#)
- [LE\\_GATT\\_ATTR\\_T](#) \* [pAttr](#)
- UINT16 [startHdl](#)
- UINT16 [svc\\_id](#)

#### 5.63.1 Field Documentation

##### 5.63.1.1 endHdl

UINT16 endHdl

end handle

##### 5.63.1.2 pAttr

[LE\\_GATT\\_ATTR\\_T](#)\* [pAttr](#)

pointer attribute table

##### 5.63.1.3 startHdl

UINT16 startHdl

start handle

##### 5.63.1.4 svc\_id

UINT16 svc\_id

service ID

## 5.64 LE\_SMP\_MSG\_ENCRYPTION\_CHANGE\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- BOOL [enable](#)

#### 5.64.1 Field Documentation

##### 5.64.1.1 conn\_hdl

UINT16 [conn\\_hdl](#)

connection handle

##### 5.64.1.2 enable

BOOL [enable](#)

enable or disable

## 5.65 LE\_SMP\_MSG\_ENCRYPTION\_REFRESH\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT16 [status](#)

#### 5.65.1 Field Documentation

##### 5.65.1.1 conn\_hdl

UINT16 [conn\\_hdl](#)

connection handle

#### 5.65.1.2 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

### 5.66 LE\_SMP\_MSG\_OOB\_DATA\_REQUEST\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

#### Data Fields

- UINT16 [conn\\_hdl](#)

#### 5.66.1 Field Documentation

##### 5.66.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

### 5.67 LE\_SMP\_MSG\_PAIRING\_ACTION\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

#### Data Fields

- UINT8 [action](#)
- UINT16 [conn\\_hdl](#)
- BOOL [lost\\_bond](#)
- UINT8 [sc](#)

#### 5.67.1 Field Documentation

##### 5.67.1.1 action

UINT8 action

refer to LE\_SM\_IO\_CAP\_\* in [ble\\_smp\\_if.h](#)

#### 5.67.1.2 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.67.1.3 lost\_bond

BOOL lost\_bond

remote lost bond

#### 5.67.1.4 sc

UINT8 sc

secure connection

## 5.68 LE\_SMP\_MSG\_PAIRING\_COMPLETE\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- UINT8 [authenticated](#)
- UINT8 [bonded](#)
- UINT16 [conn\\_hdl](#)
- [LE\\_BT\\_ADDR\\_T](#) [peer\\_id\\_addr](#)
- UINT8 [sc](#)
- UINT16 [status](#)

### 5.68.1 Field Documentation

#### 5.68.1.1 authenticated

UINT8 authenticated

authenticated

#### 5.68.1.2 bonded

UINT8 bonded

bonded

#### 5.68.1.3 conn\_hdl

UINT16 conn\_hdl

connection handle

#### 5.68.1.4 peer\_id\_addr

[LE\\_BT\\_ADDR\\_T](#) peer\_id\_addr

peer device address

#### 5.68.1.5 sc

UINT8 sc

secure connection

#### 5.68.1.6 status

UINT16 status

refer to LE\_ERR\_STATE in [ble\\_err.h](#)

### 5.69 LE\_SMP\_MSG\_PASSKEY\_DISPLAY\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

#### Data Fields

- UINT16 [conn\\_hdl](#)
- UINT32 [passkey](#)

#### 5.69.1 Field Documentation

##### 5.69.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle



### 5.69.1.2 passkey

UINT32 passkey

passkey

## 5.70 LE\_SMP\_MSG\_PASSKEY\_INPUT\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)

### 5.70.1 Field Documentation

#### 5.70.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

## 5.71 LE\_SMP\_MSG\_SC\_OOB\_DATA\_REQUEST\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- UINT16 [conn\\_hdl](#)

### 5.71.1 Field Documentation

#### 5.71.1.1 conn\_hdl

UINT16 conn\_hdl

connection handle

## 5.72 LE\_SMP\_MSG\_SLAVE\_SECURITY\_REQUEST\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- `UINT8` [bondable](#)
- `UINT16` [conn\\_hdl](#)
- `UINT8` [keypress](#)
- `UINT8` [mitm](#)
- `UINT8` [sc](#)

### 5.72.1 Field Documentation

#### 5.72.1.1 `bondable`

`UINT8` `bondable`

bonding

#### 5.72.1.2 `conn_hdl`

`UINT16` `conn_hdl`

connection handle

#### 5.72.1.3 `keypress`

`UINT8` `keypress`

keypress status

#### 5.72.1.4 `mitm`

`UINT8` `mitm`

MITM

#### 5.72.1.5 `sc`

`UINT8` `sc`

secure connection

## 5.73 LE\_SMP\_MSG\_USER\_CONFIRM\_IND\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- UINT32 [confirm\\_num](#)
- UINT16 [conn\\_hdl](#)

#### 5.73.1 Field Documentation

##### 5.73.1.1 confirm\_num

UINT32 [confirm\\_num](#)

confirm number

##### 5.73.1.2 conn\_hdl

UINT16 [conn\\_hdl](#)

connection handle

## 5.74 LE\_SMP\_SC\_OOB\_DATA\_T Struct Reference

```
#include <ble_smp_if.h>
```

### Data Fields

- UINT8 [confirm](#) [16]
- UINT8 [rand](#) [16]

#### 5.74.1 Field Documentation

##### 5.74.1.1 confirm

UINT8 [confirm](#)[16]

confirm data

#### 5.74.1.2 rand

```
UINT8 rand[16]
```

random data

### 5.75 LE\_SYS\_MSG\_BUF\_OVERFLOW\_T Struct Reference

```
#include <ble_msg.h>
```

#### Data Fields

- UINT16 [conn\\_hdl](#)

#### 5.75.1 Field Documentation

##### 5.75.1.1 conn\_hdl

```
UINT16 conn_hdl
```

connection handle

### 5.76 mw\_wifi\_auto\_connect\_ap\_info\_t Struct Reference

```
#include <controller_wifi_com_patch.h>
```

#### Data Fields

- u8 [ap\\_channel](#)
- u16 [beacon\\_interval](#)
- u8 [bssid](#) [MAC\_ADDR\_LEN]
- u16 [capabilities](#)
- u8 [dtim\\_prod](#)
- u8 [fast\\_connect](#)
- bool [free\\_ocpy](#)
- s8 [hid\\_ssid](#) [IEEE80211\_MAX\_SSID\_LEN+1]
- u64 [latest\\_beacon\\_rx\\_time](#)
- s8 [passphrase](#) [64]
- u8 [psk](#) [32]
- u8 [rsn\\_ie](#) [100]
- s8 [rssi](#)
- s8 [ssid](#) [IEEE80211\_MAX\_SSID\_LEN+1]
- u8 [supported\\_rates](#) [SUPPORTED\_RATES\_MAX]
- wpa\_ie\_data\_t [wpa\\_data](#)
- u8 [wpa\\_ie](#) [100]

## 5.76.1 Field Documentation

### 5.76.1.1 ap\_channel

u8 ap\_channel

### 5.76.1.2 beacon\_interval

u16 beacon\_interval

### 5.76.1.3 bssid

u8 bssid[MAC\_ADDR\_LEN]

### 5.76.1.4 capabilities

u16 capabilities

### 5.76.1.5 dtim\_prod

u8 dtim\_prod

### 5.76.1.6 fast\_connect

u8 fast\_connect

### 5.76.1.7 free\_ocpy

bool free\_ocpy

**5.76.1.8 hid\_ssid**

```
s8 hid_ssid[IEEE80211_MAX_SSID_LEN+1]
```

**5.76.1.9 latest\_beacon\_rx\_time**

```
u64 latest_beacon_rx_time
```

**5.76.1.10 passphrase**

```
s8 passphrase[64]
```

**5.76.1.11 psk**

```
u8 psk[32]
```

**5.76.1.12 rsn\_ie**

```
u8 rsn_ie[100]
```

**5.76.1.13 rssi**

```
s8 rssi
```

**5.76.1.14 ssid**

```
s8 ssid[IEEE80211_MAX_SSID_LEN+1]
```

**5.76.1.15 supported\_rates**

```
u8 supported_rates[SUPPORTED_RATES_MAX]
```

#### 5.76.1.16 wpa\_data

```
wpa_ie_data_t wpa_data
```

#### 5.76.1.17 wpa\_ie

```
u8 wpa_ie[100]
```

## 5.77 MwFimAutoConnectCFG\_t Struct Reference

```
#include <controller_wifi_com_patch.h>
```

### Data Fields

- bool [flag](#)
- s8 [front](#)
- u8 [max\\_save\\_num](#)
- s8 [rear](#)
- u8 [targetIdx](#)

### 5.77.1 Field Documentation

#### 5.77.1.1 flag

```
bool flag
```

#### 5.77.1.2 front

```
s8 front
```

#### 5.77.1.3 max\_save\_num

```
u8 max_save_num
```

#### 5.77.1.4 rear

s8 rear

#### 5.77.1.5 targetIdx

u8 targetIdx

## 5.78 T\_RfCmd Struct Reference

```
#include <controller_wifi_patch.h>
```

### Data Fields

- int [iArgc](#)
- char \* [saArgv](#) [RF\_CMD\_PARAM\_NUM]
- uint32\_t [u32Type](#)

### 5.78.1 Field Documentation

#### 5.78.1.1 iArgc

int iArgc

#### 5.78.1.2 saArgv

char\* saArgv [RF\_CMD\_PARAM\_NUM]

#### 5.78.1.3 u32Type

uint32\_t u32Type

## 5.79 T\_RfEvt Struct Reference

```
#include <controller_wifi_patch.h>
```



## Data Fields

- void \* [pParam](#)
- uint16\_t [u16RfMode](#)
- uint16\_t [u16RxCnt](#)
- uint16\_t [u16RxCrcOkCnt](#)
- uint32\_t [u32Freq](#)
- uint32\_t [u32Mode](#)
- uint32\_t [u32RfChannel](#)
- uint32\_t [u32Type](#)
- uint8\_t [u8Freq](#)
- uint8\_t [u8IpcEnable](#)
- uint8\_t [u8Len](#)
- uint8\_t [u8Pkt](#)
- uint8\_t [u8Reserved](#)
- uint8\_t [u8Status](#)
- uint8\_t [u8Unicast](#)

### 5.79.1 Field Documentation

#### 5.79.1.1 pParam

void\* pParam

#### 5.79.1.2 u16RfMode

uint16\_t u16RfMode

#### 5.79.1.3 u16RxCnt

uint16\_t u16RxCnt

#### 5.79.1.4 u16RxCrcOkCnt

uint16\_t u16RxCrcOkCnt

**5.79.1.5 u32Freq**

```
uint32_t u32Freq
```

**5.79.1.6 u32Mode**

```
uint32_t u32Mode
```

**5.79.1.7 u32RfChannel**

```
uint32_t u32RfChannel
```

**5.79.1.8 u32Type**

```
uint32_t u32Type
```

**5.79.1.9 u8Freq**

```
uint8_t u8Freq
```

**5.79.1.10 u8IpcEnable**

```
uint8_t u8IpcEnable
```

**5.79.1.11 u8Len**

```
uint8_t u8Len
```

**5.79.1.12 u8Pkt**

```
uint8_t u8Pkt
```

#### 5.79.1.13 u8Reserved

```
uint8_t u8Reserved
```

#### 5.79.1.14 u8Status

```
uint8_t u8Status
```

#### 5.79.1.15 u8Unicast

```
uint8_t u8Unicast
```

## 5.80 wifi\_active\_scan\_time\_t Struct Reference

Range of active scan times per channel.

```
#include <wifi_types.h>
```

### Data Fields

- uint32\_t [max](#)
- uint32\_t [min](#)

### 5.80.1 Detailed Description

Range of active scan times per channel.

### 5.80.2 Field Documentation

#### 5.80.2.1 max

```
uint32_t max
```

maximum active scan time per channel, units: millisecond, values above 1500ms may cause station to disconnect from AP and are not recommended.

### 5.80.2.2 min

`uint32_t min`

minimum active scan time per channel, units: millisecond

## 5.81 wifi\_ap\_config\_t Struct Reference

This structure is the Wi-Fi configuration for initialization for Soft-AP mode.

```
#include <wifi_types.h>
```

### Data Fields

- [wifi\\_auth\\_mode\\_t auth\\_mode](#)
- [uint16\\_t beacon\\_interval](#)
- [uint8\\_t channel](#)
- [wifi\\_cipher\\_type\\_t encrypt\\_type](#)
- [uint8\\_t max\\_connection](#)
- [uint8\\_t password \[WIFI\\_LENGTH\\_PASSPHRASE\]](#)
- [uint8\\_t password\\_length](#)
- [uint8\\_t ssid \[WIFI\\_MAX\\_LENGTH\\_OF\\_SSID\]](#)
- [uint8\\_t ssid\\_hidden](#)
- [uint8\\_t ssid\\_length](#)

### 5.81.1 Detailed Description

This structure is the Wi-Fi configuration for initialization for Soft-AP mode.

### 5.81.2 Field Documentation

#### 5.81.2.1 auth\_mode

`wifi_auth_mode_t auth_mode`

The authentication mode.

#### 5.81.2.2 beacon\_interval

`uint16_t beacon_interval`

Beacon interval, 100 ~ 60000 ms, default 100 ms

#### 5.81.2.3 channel

uint8\_t channel

The channel of Soft-AP.

#### 5.81.2.4 encrypt\_type

wifi\_cipher\_type\_t encrypt\_type

The encryption mode.

#### 5.81.2.5 max\_connection

uint8\_t max\_connection

Max number of stations allowed to connect in, default 4, max 4

#### 5.81.2.6 password

uint8\_t password[WIFI\_LENGTH\_PASSPHRASE]

The password of the Soft-AP.

#### 5.81.2.7 password\_length

uint8\_t password\_length

The length of the password.

#### 5.81.2.8 ssid

uint8\_t ssid[WIFI\_MAX\_LENGTH\_OF\_SSID]

The SSID of the Soft-AP.

#### 5.81.2.9 ssid\_hidden

uint8\_t ssid\_hidden

Broadcast SSID or not, default 0, broadcast the SSID

#### 5.81.2.10 ssid\_length

uint8\_t ssid\_length

The length of the SSID.

## 5.82 wifi\_auto\_connect\_info\_f Struct Reference

WiFi auto connect info parameters.

```
#include <wifi_types.h>
```

### Data Fields

- uint8\_t [ap\\_channel](#)
- uint16\_t [beacon\\_interval](#)
- uint8\_t [bssid](#) [[WIFI\\_MAC\\_ADDRESS\\_LENGTH](#)]
- uint16\_t [capabilities](#)
- uint8\_t [dtim\\_prod](#)
- uint8\_t [fast\\_connect](#)
- bool [free\\_ocpy](#)
- int8\_t [hid\\_ssid](#) [[WIFI\\_MAX\\_LENGTH\\_OF\\_SSID](#)]
- unsigned long [latest\\_beacon\\_rx\\_time](#)
- int8\_t [passphrase](#) [[WIFI\\_LENGTH\\_PASSPHRASE](#)]
- uint8\_t [psk](#) [32]
- uint8\_t [rsn\\_ie](#) [100]
- int8\_t [rsni](#)
- int8\_t [ssid](#) [[WIFI\\_MAX\\_LENGTH\\_OF\\_SSID](#)]
- uint8\_t [supported\\_rates](#) [[WIFI\\_MAX\\_SUPPORTED\\_RATES](#)]
- wpa\_ie\_data\_t [wpa\\_data](#)
- uint8\_t [wpa\\_ie](#) [100]

### 5.82.1 Detailed Description

WiFi auto connect info parameters.

### 5.82.2 Field Documentation

#### 5.82.2.1 ap\_channel

```
uint8_t ap_channel
```

#### 5.82.2.2 beacon\_interval

```
uint16_t beacon_interval
```

### 5.82.2.3 bssid

uint8\_t bssid[WIFI\_MAC\_ADDRESS\_LENGTH]

### 5.82.2.4 capabilities

uint16\_t capabilities

### 5.82.2.5 dtim\_prod

uint8\_t dtim\_prod

### 5.82.2.6 fast\_connect

uint8\_t fast\_connect

### 5.82.2.7 free\_ocpy

bool free\_ocpy

### 5.82.2.8 hid\_ssid

int8\_t hid\_ssid[WIFI\_MAX\_LENGTH\_OF\_SSID]

### 5.82.2.9 latest\_beacon\_rx\_time

unsigned long latest\_beacon\_rx\_time

### 5.82.2.10 passphrase

int8\_t passphrase[WIFI\_LENGTH\_PASSPHRASE]

#### 5.82.2.11 psk

```
uint8_t psk[32]
```

#### 5.82.2.12 rsn\_ie

```
uint8_t rsn_ie[100]
```

#### 5.82.2.13 rssi

```
int8_t rssi
```

#### 5.82.2.14 ssid

```
int8_t ssid[WIFI_MAX_LENGTH_OF_SSID]
```

#### 5.82.2.15 supported\_rates

```
uint8_t supported_rates[WIFI_MAX_SUPPORTED_RATES]
```

#### 5.82.2.16 wpa\_data

```
wpa_ie_data_t wpa_data
```

#### 5.82.2.17 wpa\_ie

```
uint8_t wpa_ie[100]
```

## 5.83 wifi\_config\_t Union Reference

Wi-Fi configuration for initialization.

```
#include <wifi_types.h>
```



## Data Fields

- [wifi\\_ap\\_config\\_t ap\\_config](#)
- [wifi\\_sta\\_config\\_t sta\\_config](#)

### 5.83.1 Detailed Description

Wi-Fi configuration for initialization.

### 5.83.2 Field Documentation

#### 5.83.2.1 ap\_config

[wifi\\_ap\\_config\\_t](#) ap\_config

The configurations for certain AP. It should be set when the OPMODE is #WIFI\_MODE\_AP\_ONLY .

#### 5.83.2.2 sta\_config

[wifi\\_sta\\_config\\_t](#) sta\_config

The configurations for the STA. It should be set when the OPMODE is #WIFI\_MODE\_STA\_ONLY.

## 5.84 wifi\_event\_info\_t Union Reference

[wifi\\_event\\_info\\_t](#)

```
#include <wifi_event.h>
```

## Data Fields

- [wifi\\_event\\_sta\\_connected\\_t](#) connected
- [wifi\\_event\\_sta\\_disconnected\\_t](#) disconnected
- [wifi\\_event\\_sta\\_got\\_ip\\_t](#) got\_ip
- [wifi\\_event\\_sta\\_scan\\_done\\_t](#) scan\_done

### 5.84.1 Detailed Description

[wifi\\_event\\_info\\_t](#)

## 5.84.2 Field Documentation

### 5.84.2.1 connected

[wifi\\_event\\_sta\\_connected\\_t](#) connected

station connected to AP

### 5.84.2.2 disconnected

[wifi\\_event\\_sta\\_disconnected\\_t](#) disconnected

station disconnected to AP

### 5.84.2.3 got\_ip

[wifi\\_event\\_sta\\_got\\_ip\\_t](#) got\_ip

station got IP, first time got IP or when IP is changed

### 5.84.2.4 scan\_done

[wifi\\_event\\_sta\\_scan\\_done\\_t](#) scan\_done

station scan (APs) done

## 5.85 [wifi\\_event\\_sta\\_connected\\_t](#) Struct Reference

[wifi\\_event\\_sta\\_connected\\_t](#)

```
#include <wifi_event.h>
```

### Data Fields

- [wifi\\_auth\\_mode\\_t](#) authmode
- uint8\_t bssid [6]
- uint8\_t channel
- uint8\_t ssid [32]
- uint8\_t ssid\_len

### 5.85.1 Detailed Description

[wifi\\_event\\_sta\\_connected\\_t](#)

## 5.85.2 Field Documentation

### 5.85.2.1 authmode

`wifi_auth_mode_t` authmode

### 5.85.2.2 bssid

`uint8_t` bssid[6]

BSSID of connected AP

### 5.85.2.3 channel

`uint8_t` channel

channel of connected AP

### 5.85.2.4 ssid

`uint8_t` ssid[32]

SSID of connected AP

### 5.85.2.5 ssid\_len

`uint8_t` ssid\_len

SSID length of connected AP

## 5.86 wifi\_event\_sta\_disconnected\_t Struct Reference

`wifi_event_sta_disconnected_t`

```
#include <wifi_event.h>
```

### Data Fields

- `uint8_t` [bssid](#) [6]
- `uint8_t` [reason](#)
- `uint8_t` [ssid](#) [32]
- `uint8_t` [ssid\\_len](#)

### 5.86.1 Detailed Description

[wifi\\_event\\_sta\\_disconnected\\_t](#)

### 5.86.2 Field Documentation

#### 5.86.2.1 bssid

```
uint8_t bssid[6]
```

BSSID of disconnected AP

#### 5.86.2.2 reason

```
uint8_t reason
```

reason of disconnection

#### 5.86.2.3 ssid

```
uint8_t ssid[32]
```

SSID of disconnected AP

#### 5.86.2.4 ssid\_len

```
uint8_t ssid_len
```

SSID length of disconnected AP

## 5.87 wifi\_event\_sta\_got\_ip\_t Struct Reference

[wifi\\_event\\_sta\\_got\\_ip\\_t](#)

```
#include <wifi_event.h>
```

### Data Fields

- [bool ip\\_changed](#)

### 5.87.1 Detailed Description

[wifi\\_event\\_sta\\_got\\_ip\\_t](#)

### 5.87.2 Field Documentation

#### 5.87.2.1 ip\_changed

bool ip\_changed

## 5.88 wifi\_event\_sta\_scan\_done\_t Struct Reference

[wifi\\_event\\_sta\\_scan\\_done\\_t](#)

```
#include <wifi_event.h>
```

### Data Fields

- uint8\_t [number](#)
- uint8\_t [scan\\_id](#)
- uint32\_t [status](#)

### 5.88.1 Detailed Description

[wifi\\_event\\_sta\\_scan\\_done\\_t](#)

### 5.88.2 Field Documentation

#### 5.88.2.1 number

uint8\_t number

The number of devices scanned

#### 5.88.2.2 scan\_id

uint8\_t scan\_id

scan id

### 5.88.2.3 status

`uint32_t status`

status of scanning APs

## 5.89 wifi\_fast\_scan\_threshold\_t Struct Reference

Structure describing parameters for a Wi-Fi fast scan.

```
#include <wifi_types.h>
```

### Data Fields

- [wifi\\_auth\\_mode\\_t](#) authmode
- `int8_t` rssi

### 5.89.1 Detailed Description

Structure describing parameters for a Wi-Fi fast scan.

### 5.89.2 Field Documentation

#### 5.89.2.1 authmode

`wifi_auth_mode_t` authmode

The weakest authmode to accept in the fast scan mode

#### 5.89.2.2 rssi

`int8_t` rssi

The minimum rssi to accept in the fast scan mode

## 5.90 wifi\_init\_config\_t Struct Reference

WiFi stack configuration parameters.

```
#include <wifi_types.h>
```

## Data Fields

- [wifi\\_event\\_notify\\_cb\\_t](#) event\_handler
- int [magic](#)

### 5.90.1 Detailed Description

WiFi stack configuration parameters.

### 5.90.2 Field Documentation

#### 5.90.2.1 event\_handler

[wifi\\_event\\_notify\\_cb\\_t](#) event\_handler

WiFi event handler

#### 5.90.2.2 magic

int magic

WiFi init magic number, it should be the last field

## 5.91 wifi\_scan\_config\_t Struct Reference

Parameters for an SSID scan.

```
#include <wifi_types.h>
```

## Data Fields

- uint8\_t \* [bssid](#)
- uint8\_t [channel](#)
- [wifi\\_scan\\_time\\_t](#) scan\_time
- [wifi\\_scan\\_type\\_t](#) scan\_type
- bool [show\\_hidden](#)
- uint8\_t \* [ssid](#)

### 5.91.1 Detailed Description

Parameters for an SSID scan.

## 5.91.2 Field Documentation

### 5.91.2.1 bssid

```
uint8_t* bssid
```

MAC address of AP

### 5.91.2.2 channel

```
uint8_t channel
```

channel, scan the specific channel

### 5.91.2.3 scan\_time

```
wifi_scan_time_t scan_time
```

scan time per channel

### 5.91.2.4 scan\_type

```
wifi_scan_type_t scan_type
```

scan type, active or passive

### 5.91.2.5 show\_hidden

```
bool show_hidden
```

enable to scan AP whose SSID is hidden

### 5.91.2.6 ssid

```
uint8_t* ssid
```

SSID of AP

## 5.92 wifi\_scan\_info\_t Struct Reference

This structure defines the information of scanned APs.

```
#include <wifi_types.h>
```



## Data Fields

- [wifi\\_auth\\_mode\\_t](#) auth\_mode
- [uint16\\_t](#) beacon\_interval
- [uint8\\_t](#) bssid [[WIFI\\_MAC\\_ADDRESS\\_LENGTH](#)]
- [uint16\\_t](#) capability\_info
- [uint8\\_t](#) channel
- [wifi\\_cipher\\_type\\_t](#) group\_cipher
- [wifi\\_cipher\\_type\\_t](#) pairwise\_cipher
- [int](#) rssi
- [uint8\\_t](#) ssid [[WIFI\\_MAX\\_LENGTH\\_OF\\_SSID](#)]
- [uint8\\_t](#) ssid\_length

### 5.92.1 Detailed Description

This structure defines the information of scanned APs.

### 5.92.2 Field Documentation

#### 5.92.2.1 auth\_mode

[wifi\\_auth\\_mode\\_t](#) auth\_mode

Please refer to the definition of [wifi\\_auth\\_mode\\_t](#).

#### 5.92.2.2 beacon\_interval

[uint16\\_t](#) beacon\_interval

Indicates the beacon interval.

#### 5.92.2.3 bssid

[uint8\\_t](#) bssid [[WIFI\\_MAC\\_ADDRESS\\_LENGTH](#)]

AP's MAC address.

#### 5.92.2.4 capability\_info

[uint16\\_t](#) capability\_info

The Capability Information field contains a number of subfields that are used to indicate requested or advertised optional capabilities.

#### 5.92.2.5 channel

```
uint8_t channel
```

The channel used.

#### 5.92.2.6 group\_cipher

```
wifi_cipher_type_t group_cipher
```

group cipher of AP

#### 5.92.2.7 pairwise\_cipher

```
wifi_cipher_type_t pairwise_cipher
```

pairwise cipher of AP, Please refer to the definition of #wifi\_encrypt\_type\_t.

#### 5.92.2.8 rssi

```
int rssi
```

Records the RSSI value when probe response is received.

#### 5.92.2.9 ssid

```
uint8_t ssid[WIFI_MAX_LENGTH_OF_SSID]
```

Stores the predefined SSID.

#### 5.92.2.10 ssid\_length

```
uint8_t ssid_length
```

Length of the SSID.

### 5.93 wifi\_scan\_list\_t Struct Reference

This structure defines the list of scanned APs with their corresponding information.

```
#include <wifi_types.h>
```

#### Data Fields

- [wifi\\_scan\\_info\\_t ap\\_record](#) [WIFI\_MAX\_SCAN\_AP\_NUM]
- int [num](#)

### 5.93.1 Detailed Description

This structure defines the list of scanned APs with their corresponding information.

### 5.93.2 Field Documentation

#### 5.93.2.1 ap\_record

```
wifi_scan_info_t ap_record[WIFI_MAX_SCAN_AP_NUM]
```

The information about an AP obtained through the scan result is stored

#### 5.93.2.2 num

```
int num
```

number of AP in the list

## 5.94 wifi\_scan\_time\_t Union Reference

Aggregate of active & passive scan time per channel.

```
#include <wifi_types.h>
```

### Data Fields

- [wifi\\_active\\_scan\\_time\\_t](#) `active`
- `uint32_t` `passive`

### 5.94.1 Detailed Description

Aggregate of active & passive scan time per channel.

### 5.94.2 Field Documentation

#### 5.94.2.1 active

```
wifi_active_scan_time_t active
```

active scan time per channel, units: millisecond.

### 5.94.2.2 passive

uint32\_t passive

passive scan time per channel, units: millisecond, values above 1500ms may cause station to disconnect from AP and are not recommended.

## 5.95 wifi\_sta\_config\_t Struct Reference

This structure is the Wi-Fi configuration for initialization for STA mode.

```
#include <wifi_types.h>
```

### Data Fields

- uint8\_t [bssid](#) [[WIFI\\_MAC\\_ADDRESS\\_LENGTH](#)]
- uint8\_t [bssid\\_present](#)
- uint8\_t [password](#) [[WIFI\\_LENGTH\\_PASSPHRASE](#)]
- uint8\_t [password\\_length](#)
- [wifi\\_scan\\_method\\_t](#) [scan\\_method](#)
- [wifi\\_sort\\_method\\_t](#) [sort\\_method](#)
- uint8\_t [ssid](#) [[WIFI\\_MAX\\_LENGTH\\_OF\\_SSID](#)]
- uint8\_t [ssid\\_length](#)
- [wifi\\_fast\\_scan\\_threshold\\_t](#) [threshold](#)

### 5.95.1 Detailed Description

This structure is the Wi-Fi configuration for initialization for STA mode.

### 5.95.2 Field Documentation

#### 5.95.2.1 bssid

uint8\_t [bssid](#) [[WIFI\\_MAC\\_ADDRESS\\_LENGTH](#)]

The MAC address of the target AP.

#### 5.95.2.2 bssid\_present

uint8\_t [bssid\\_present](#)

The BSSID is present if it is set to 1. Otherwise, it is set to 0.

#### 5.95.2.3 password

```
uint8_t password[WIFI_LENGTH_PASSPHRASE]
```

The password of the target AP.

#### 5.95.2.4 password\_length

```
uint8_t password_length
```

The length of the password. If the length is 64, the password is regarded as PMK.

#### 5.95.2.5 scan\_method

```
wifi_scan_method_t scan_method
```

do all channel scan or fast scan

#### 5.95.2.6 sort\_method

```
wifi_sort_method_t sort_method
```

sort the connect AP in the list by rssi or security mode

#### 5.95.2.7 ssid

```
uint8_t ssid[WIFI_MAX_LENGTH_OF_SSID]
```

The SSID of the target AP.

#### 5.95.2.8 ssid\_length

```
uint8_t ssid_length
```

The length of the SSID.

#### 5.95.2.9 threshold

```
wifi_fast_scan_threshold_t threshold
```

When scan\_method is set to WIFI\_FAST\_SCAN, only APs which have an auth mode that is more secure than the selected auth mode and a signal stronger than the minimum RSSI will be used.



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