WICED Studio

WICED - BLE WiFi Introducer

Doc. No.: 002-19364 Rev. *A

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About This Document

The BLE WiFi Introducer app shows an example interfacing the BLE and WiFi components on a combo chip. It demonstrates GATT database initialization, DCT configuration, processing read/write requests from a BLE client, and sending data to the client. The BLE WiFi Introducer has two components, an app running on a WICED devices, and an app running on an iOS device.

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WICED App Functionality

- Reads WiFi network configuration from DCT and attempts to connect to the network
- Upon failure to join the network, BLE GATT server is started to advertise network connection characteristic values
- When the iOS app triggers the BLE GATT characteristic write event, the network credential values are received. The WICED device will attempt to connect to the network and send the result via a notification message to the iOS device
- Pressing the user button on the WICED board wipes the WiFi network credentials from the DCT and the system is rebooted

iOS App Functionality

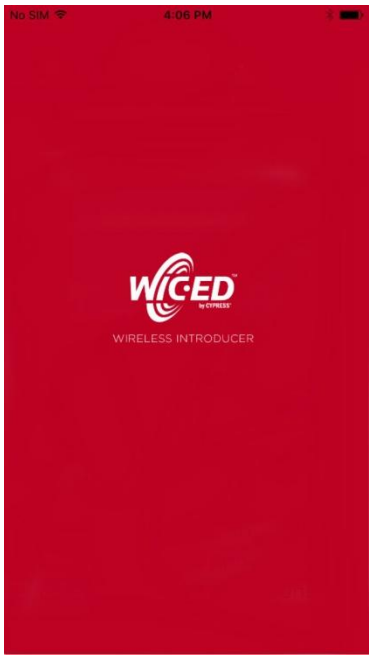
- Scans for a WICED based device and reads advertising data
- Connects to the WICED device and allows user to enter network credentials for the currently connected network
- Writes the network credentials to the corresponding BLE GATT characteristic values
- Indicates the success or failure state of the WICED device network connection and allows for re-entering credentials upon connection failure

1 Step by step usage guide

1. Use an OS X system to install the iOS Demo App (WiFiIntroducer) onto an iOS device. The files are located at <WICED_SDK>/apps/demo/ble_wifi_introducer/peerapps/iOS
2. Compile and download the ble_wifi_introducer app onto a WICED device using the target "demo.ble_wifi_introducer-<platform> download run"
3. Open a terminal to view the output. Since WiFi network credentials were not edited in the wifi_config_dct, the connection will fail and the BLE GATT server will start advertising. You should see output similar to the following,

```
Starting WICED v3.7.0
Platform BCM94343W_AVN initialised
Started ThreadX v5.6
Initialising NetX_Duo v5.7_sp2
Creating Packet pools
WWD SDIO interface initialised
WLAN MAC Address : B0:38:29:3A:42:BE
WLAN Firmware    : wl0: May  5 2016 03:06:34 version 7.45.45.13 (r635786) FWID 01-3c7fac4b
WiFi Introducer Sensor Start
Joining : YOUR_AP_SSID
Failed to join : YOUR_AP_SSID
Joining : YOUR_AP_SSID
Failed to join : YOUR_AP_SSID
Joining : YOUR_AP_SSID
Failed to join : YOUR_AP_SSID
00:00:23.052248 GKI_create_task func=0x801bbad  id=1  name=BTU  stack=0x0  stackSize=6144
00:00:23.060248 GKI_create_task func=0x801d0c5  id=0  name=HCISU  stack=0x0  stackSize=4096

 wifi_introducer_bt_management_callback: 15
[WiFi Introducer] Local Identity Keys Request Event

 wifi_introducer_bt_management_callback: 0
apollo_config_management_callback:wiced_bt_dev_write_local_addr result = 0x0
> wifi_introducer_gatt_server_init

 wiced_bt_gatt_register: 0
wiced_bt_gatt_db_init 0
wiced_bt_ble_set_advertisement_data 0

 wifi_introducer_bt_management_callback: 17
Advertisement State Change: 3
wiced_bt_start_advertisements 0

 wifi_introducer_bt_management_callback: 14
[WiFi Introducer] Local Identity Keys Update type:1

 wifi_introducer_bt_management_callback: 14
[WiFi Introducer] Local Identity Keys Update type:3
```

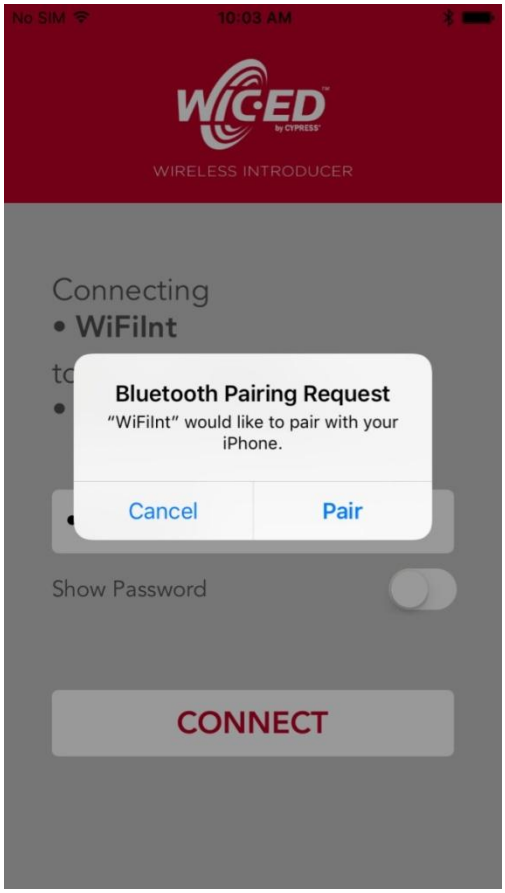
4. On the iOS device, connect to the WiFi AP that you want the WICED device to connect to. Open the WiFi Introducer application and you should be greeted with the following splash screen,



5. The app will scan until a nearby WICED device is detected. Bring the WICED device close to the iOS device and the following screen will be brought up

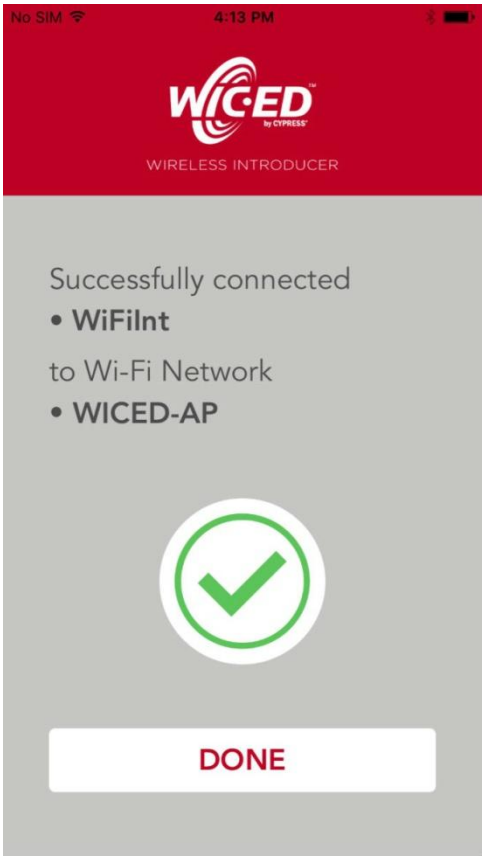
Note: If the iOS app does not detect the WICED device, kill and reopen the iOS application.

6. Enter the WiFi AP passphrase and press connect. You will be prompted to pair the device. Select "Pair" and a secure LE connection will be made between the iOS device and the WICED device using the ECDH algorithm to generate and exchange the secure keys.



Note: If the device has been previously paired, it may be necessary to remove the pairing before the app will run correctly. Do this by going to Settings > Bluetooth. Under My Devices, click the "i" icon next to WiFiInt and select "Forget This Device".

7. The WiFi network credentials will be sent to the WICED device and the connection result will be pushed back to the iOS device. If the connection fails, press "Try Again" to re-input the passphrase. Upon successful connection, the network credentials will be saved to the DCT.




```
 wifi_introducer_gatt_server_write_request_handler:wifi_introducer_char_nw_passphrase_value value: 123456789
Infra 94:10:3E:D2:CC:64  -36  72.2   11  WPA2 AES   PSK         wiced_a
wifi_introducer_char_nw_ssid_value  = wiced_a
Joining : wiced_a
Failed to join : wiced_a
Joining : wiced_a
Failed to join : wiced_a
Joining : wiced_a
Failed to join : wiced_a
Join result 1025: Some part of the join process did not complete
Join Failed!!!
```

```
 wifi_introducer_gatt_server_write_request_handler:wifi_introducer_char_nw_passphrase_value value: 12345678
Infra 94:10:3E:D2:CC:64  -37  72.2   11  WPA2 AES   PSK         wiced_a
wifi_introducer_char_nw_ssid_value  = wiced_a
Joining : wiced_a
Successfully joined : wiced_a
Obtaining IPv4 address via DHCP
DHCP CLIENT hostname WICED IP
IPv4 network ready IP: 192.168.2.4
Setting IPv6 link-local address
IPv6 network ready IP: FE80:0000:0000:0000:000A:F7FF:FEBB:BB5F
Join Succeeded!!!
```

8. When rebooting the WICED device, since the DCT has configured Network credentials, the BLE GATT server will not be started. You can press the user button on the WICED board to reset the DCT. The device will reboot and the BLE GATT server will start advertising.

Document Revision History

Document Title: WICED - BLE WiFi Introducer

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Revision	ECN	Issue Date	Description of Change
**	–	10/13/2016	Initial release
*A	5686732	04/27/2017	Converted to Cypress template format

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