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Ethernet Beacon Gateway iGS02E User Guide

iGS02E is a bridge to connect the local BLE devices, sensors, or beacons to the internet through Ethernet. With an easy web UI interface, one can configure the internet connection to a general cloud server, like TCP, HTTP(S), or MQTT(s). Through iGS02E, one can develop his application based on the collected BLE devices information on the cloud . This guide is to help the user to figure out how to operate and configure the iGS02E.

Contents
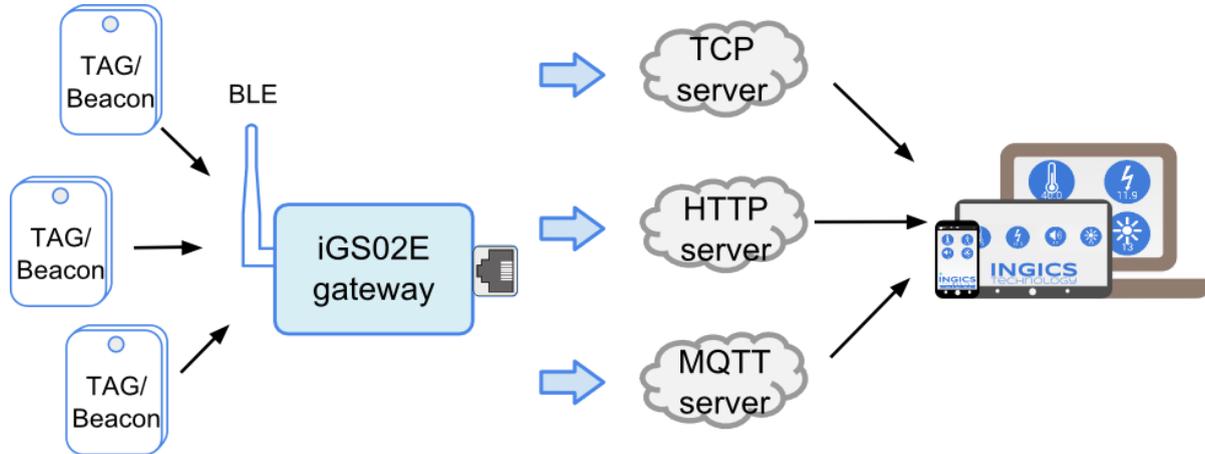
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Overview

The iGS02E gateway reads beacons(like iBeacon or Eddystone), customized tags, or BLE sensors and sends the information to the local TCP server or internet HTTP or MQTT server. User can configure the transmit period and server information through a simple web UI. Below is the typical application diagram of iGS02E.

Inside the box

There are one iGS02E unit, one 1M USB cable, one holder, and one 2dBi dipole antenna included in one full shipping package. iGS02E is powered by a standard micro-USB cable, rated at 5V&500mA. You can power this device with a standard smartphone charger or the USB port of any host device that can support 500mA or above.

Ethernet

It supports 10BASE-T and 100BASE-TX with HP Auto-MDIX. Through the Ethernet, the gateway can bridge your BLE devices to the local TCP server of cloud server for management.

BLE

BLE is normally in listening mode. It collects the messages advertised by other BLE devices.

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These messages are then transferred to WiFi and sent to the cloud server configured by the user. The packet format sent to the cloud server as below:

`$<report type>,<tag id>,<gateway id>,<rssi>,<raw packet content>,*<unix epoch timestamp>\r\n`

examples:
```
$GPRP,CCB97E7361A4,CB412F0C8EDC,-49,1309696773206D6573682023322028544553_5429020106
$GPRP,E5A706E3923A,CB412F0C8EDC,-87,0201041AFF59000215011223344556778899AABBCCDDEEFF0000100C3BB
$GPRP,0C61CFC1452E,E7DAE08E6FC3,-44,0201061AFF4C000215B9A5D27D56CC4E3AAB511F2153BCB9670001452ED6
(iBeacon, UUID: B9A5D27D56CC4E3AAB511F2153BCB967, Major: 0001, Minor: 452E)
```

```
*Note:
When NTP is enabled, a timestamp field is added to the packet. Check System section for the NTP
setting.
```

<report type>	GPRP: general purpose report . SRRP: active scan response report
<tag id>	MAC address or ID of tag/beacon
<gateway id>	MAC address of gateway's WiFi
<rssi>	RSSI of tag/beacon
<raw packet content>	Raw packet received by the gateway
<unix epoch timestamp>	Optional timestamp when NTP is enabled

Input and Output

Default Setting button

One button is on one side of the iGS02E as the figure showed.

It is used to reset to default settings. In case you need to go back to the original settings, keep pressing the reset/default button in your device for over 5 secs no matter in which mode the device is. The Ethernet LED will be turned off and when you release the button, the iGS02E will reboot to its default settings.

LEDs

There are two LEDs to indicate current status like the right figure. One is BLE LED and the other is Ethernet LED. Below is their behaviors.

	On	Flash
BLE LED	find tag/beacon in range	BLE transmission happening
Ethernet LED	Network connection is built up	Transmission happening The device quickly blinking while power on

How to configure

iGS02E is a DHCP client by default. To configure it, you have to connect it to a router with DHCP enabled. The first thing is to find iGS02E's IP address in this network so that you can get into it's webUI for configuration. If you don't know the IP address, you may need to use some tool to find it.(For example, "Fing" APP in Android & iOS. Join your smartphone or tablet with "Fing" in the same network. And use it to scan all the devices in this network)

Once you know iGS02E's IP, enter the IP address in your browser. The default account/password are both "**admin**". You can change the password later. In web UI, any change need to be saved first. After all changes made, click reboot to make the changes effective. The following sections describe details of the web UI.
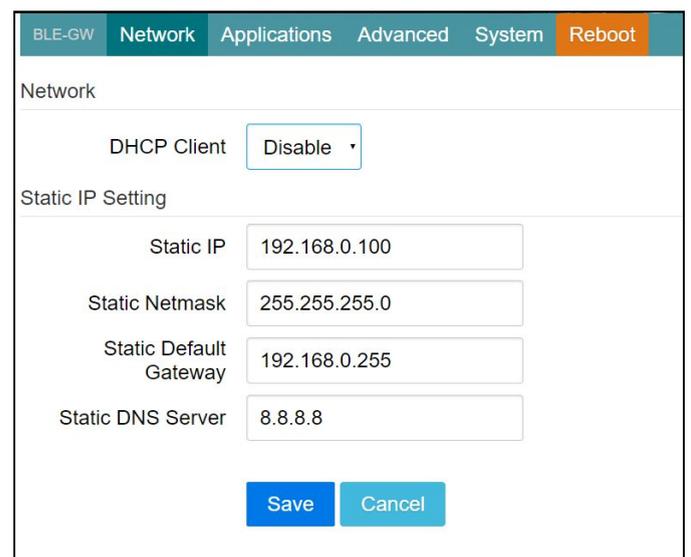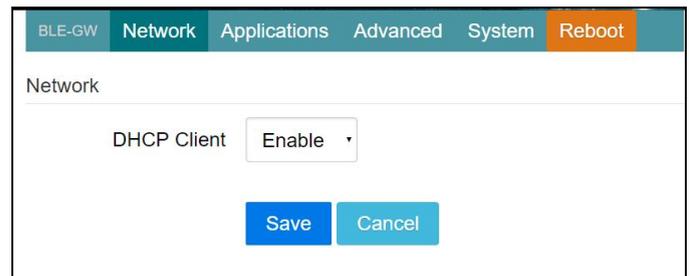
Web User Interface

Network

DHCP client

By default, iGS02E is a DHCP client.

STATIC IP

If user wants to manually assign an IP address for iGS02E, the DHCP client should be disabled. Once disabled, user should assign the IP, Netmask, Gateway, and/or DNS server.

Applications

TCP Server

iGS02E is a TCP server. The default port is 8080 and user can also assign the port.

TCP Client

If there is already a TCP server, one can set iGS02E as a TCP client to communicate with the server. Enter the address and port number of the TCP server to connect them.

Request Interval

One can also assign the request interval to upload the data to the server. This is useful and it can reduce the network traffic. When the interval is set as 0, the data will be sent immediately.When it is set as a non-zero value in second, the data will be sent whenever the buffer is full or the time interval is reached. If user prefers not uploading data when internal buffer is full, user can set "Drop report while cache full" setting then the device will only upload data when request interval timeout.

Throttle Control

If user select to enable throttle control, iGS02E will keep the last record for each TAG/Beacon ID in the given interval(request interval). In this way, one can reduce the upload connections to the server.

HTTP POST

Another popular server type is HTTP(s). iGS02E can use HTTP POST to communicate with the server. In this scenario, one has to assign the HTTP host address and port number. Also the url path is necessary to bring the BLE data to the HTTP server through the gateway. Some HTTP servers may need username and password. The others may need extra header and value.

HTTPS

In URL, start with https://.

Keep-Alive

Check it to enable http keep alive which will improve network throughput.

Request Interval and Throttle Control, please refer to TCP client.

MQTT Client

MQTT server is supported by the iGS02E. In this scenario, one has to assign the MQTT host address and port number. Also the publish topic need to be assigned. Client ID is defaultly assigned as the gateway name with part of MAC address, user can change it as well. If Client ID is not set, system will generate a random number for it. Username and password are optional.

MQTTS

User can enable MQTTS support. User can also enable RootCA/Use Certificate based on the server requirement. For example, to enable AWS-IOT, the user has to enable MQTTS/ROOT CA/ Use Certificate options and upload certificate and private key in advanced page.

Request Interval and Throttle Control, please refer to TCP client.

Advanced

There are several features in this page can help user to deal with the incoming BLE packet.

BLE Filter

User can set BLE filter to filter out the unwanted BLE information. There are two kind of filters. One is by BLE RSSI value and the other is by pattern/mask combination.

RSSI

If the bar is pulled right to -50dBm, only the BLE tag/beacon with RSSI larger than or equal to -50dBm(say -45dBm) will be sent out to the server.

Payload Whitelist

Three sets of payload mask are provided for filtering the unwanted beacon. Set pattern/mask fields to configure the whitelist.

If payload & mask != pattern & mask, the entry will be filtered out.

Some examples are provided in *AP007_iGS01_payload_filter*.

Advanced Filter

There are two more advanced filters:

Enter/Leave

User can set a ENTER/LEAVE RSSI threshold for detecting beacon in range / ENTER event (RSSI >= ENTER_RSSI) and out of range / LEAVE event (RSSI < LEEAVE_RSSI). If a beacon was in ENTER

state but not updated for a period of time (EXPIRED TIMEOUT), consider it as leave.

Status Change

This enables checking the entries in cache and filter out received report with the same payload. So only send out data if the BLE payload changes.

Device Key/Certification Update

User can upload certification and key here. This is used by MQTTS. AWS-IOT users must upload the certificate and private key here to publish data to AWS-IOT.

System

Firmware and device information, including MAC address and IP address in station mode are shown here. The web UI password can also be changed here(the username is fixed as "admin").

NTP setting

User can enable the NTP to add the timestamp information in the BLE package format as stated in page. 3. User has to set the time server and the update period of the NTP. Remember to save the setting and reboot to make the setting effective.

| BLE-GW | Network | Applications | Advanced | System | Reboot |

Firmware Revision: IGS02E-v0.5.0

MAC: 44:2C:05:80:65:D8

BLE MAC: 442C058065D9

Station IP: 192.168.1.107

Change Password

| Current Password | |
| New Password | |

Change Password

NTP Setting

Enable NTP	Enable ▾
Time Server	pool.ntp.org
Update Period	10 mins ▾

Save NTP Setting   Cancel

Logout

Revision History

DATE	REVISION	CHANGES
Apr 17, 2018	0a	Initial release
Feb 20,2019	01	Add FCC/IC statement and DOC for CE

Statement

Federal Communication Commission Interference Statement
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:
. Reorient or relocate the receiving antenna.
. Increase the separation between the equipment and receiver.
. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
. Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement
This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Statement
This device complies with Industry Canada licence-exempt RSS standard.
Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC Radiation Exposure Statement:
This equipment complies with IC RSS-102 radiation exposure limit set forth for an
uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Cet équipement est conforme aux CNR-102 d'Industrie Canada. Cet équipement
doit êtreinstallé et utilisé avec une distance minimale de 20 centimètres entre le
radiateur et votrecorps. Cet émetteur ne doit pas être co-localisées ou opérant en
conjonction avec autreantenne ou émetteur. Les antennes utilisées pour cet
émetteur doivent être installés etfournir une distance de séparation d'au moins
20 centimètre de toute personne et doit pas être co-située ni fonctionner en
conjonction avec une autre antenne ou émetteur.

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DECLARATION OF CONFORMITY

EU RED - DIRECTIVE 2014/53/EU -
EU-LOW VOLTAGE DIRECTIVE 2014/35/EU -
EU EMC-DIRECTIVE 2014/30/EU -

This Declaration that the following designated product

BLE-WiFi Gateway
Model No.: IGS02E
Brand Name: INGICS

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complies with the essential requirements of the EU RED - DIRECTIVE 2014/53/EU, EU-LOW VOLTAGE DIRECTIVE 2014/35/EU, EU EMC-DIRECTIVE 2014/30/EU on the approximation of the laws of the Member States relating to *Radio Spectrum Matters/RF Exposure.*
Assessment of compliance of the product with the requirements relating to radio spectrum matters was based on Annex IV of the Directive 2014/53/EU and the following standard:

EMC	Radio Spectrum	Safety
EN 301 489 -1: V 2.2.0 (2017)	EN 300 328 (V 2.1.1, 2016-11)	IEC 62368-1:2014, modified and
EN 301 489 –17: V 3.2.0 (2017)		EN 62368-1:2014/A11:2017

EMC
EN 55032 Class A(2015),
EN55024(2010/A1:2015), (IEC/EN61000-4-2(2009)/-3(2006+A2:2010)/-4(2012)/
-6(2014)/-8(2010))

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This declaration is issued by

INGICS TECHNOLOGY.
2F., No.15-2, Changshou St.,
Shulin Dist., New Taipei City 238,, Taiwan, R.O.C.

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Furthermore we declare that our product will be produced in correspondence with all requirements according to the Directive 2014/53/EU, LOW VOLTAGE DIRECTIVE 2014/35/EU and Council Directive 2014/30/EU.

Name:_____J.K.Fan_____   Title:_____President_____

Signature _J. K. Fan_

Date:____May 23, 2018____