Specification
Ver.01g

iBS02 Specification

iBS02 Series Sensor Beacon

iBS02 is a BLE beacon with different sensor options. The BLE is a very low power 2.4G radio that can transmit the beacon information efficiently. The typical beacon battery life is around 3 years in default settings for different sensors..

Features

General

- ARM Cortex™-M3 32-bit processor
- Support BLE 4.2 and BLE 5 long range
- Powered with 2XCR2032 battery or external USB
- Long battery life: 2-4 year in typical beacon setting
- Android APP for configuration
- Power on/off switch
- Sensor activity wake up mechanism to save power
- Size: 55mmx47mmx6mm(height 18.5mm w/ PIR);
- Weight: 16g w/ 2XCR2032 battery
- Operating temperature: -20'C to 60'C
- Certificate: FCC/IC/TELEC/CE

Sensor

- iBS02M2: External on/off input through micro-USB connector
- iBS02IR2: Infrared(IR) proximity sensor for short range detection below 50cm.
- iBS02PIR2: Passive Infrared Sensor for motion or activity detection within 5M range

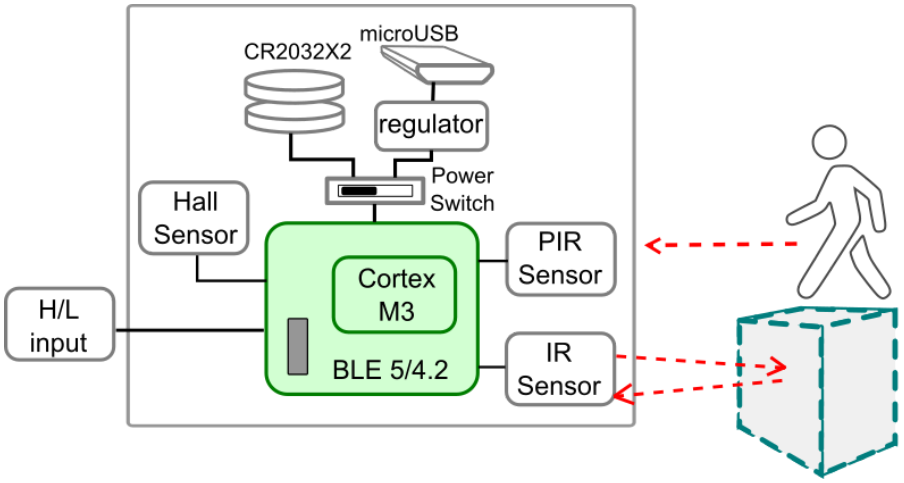
RF

- 2.4GHz frequency band
- Maximum transmit power +5dB
- Receiver sensitivity: -97 dBm@1Mbps, 0.1% BER
- On board chip antenna
- >30M range in open space

Applications

- Sensor network
- Building automation
- Health and wellness monitoring
- Activity monitoring
- Security
- Smart home
- Access management
- Advertisement
- Industrial automation

Block Diagram

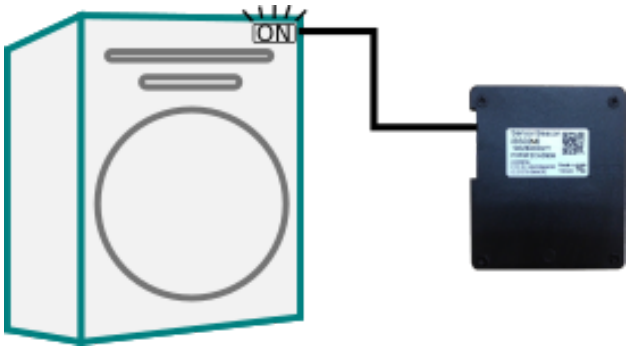


Models

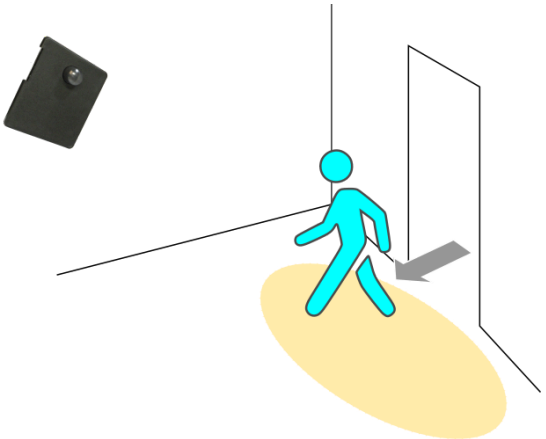
	Photo	Description	Advertising interval	Others
iBS02M2		Beacon for H/L input detection	User configurable from 100ms~10 min. Default: 10 s	
iBS02IR2		Beacon for short Range(<50cm) proximity/ occupation detection	User configurable from 100ms~10 min. Default: 10 s	Sensor sampling period: 1sec
iBS02PIR2		Beacon for motion or activity detection within 5M range	User configurable from 100ms~10 min. Default: 10 s	

Typical Applications

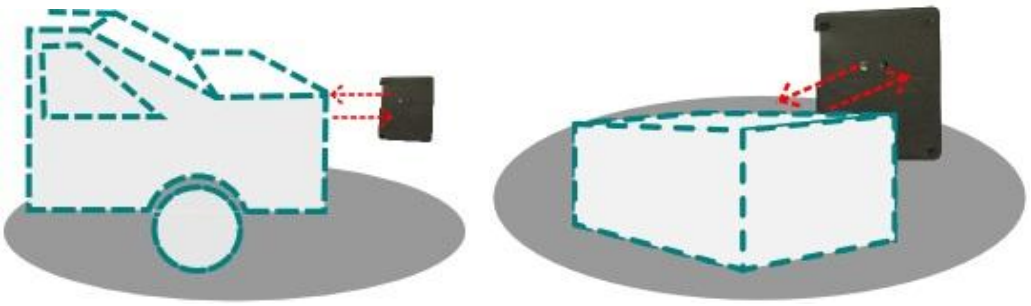
1. iBS02M2, switch input detection.
   For example, a machine power on/off detection or an external switch status detection.



2. iBS02PIR2, entrance monitoring



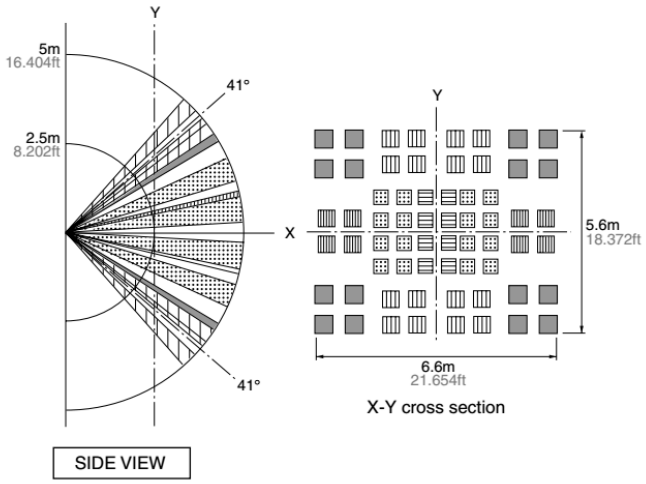
3. iBS02IR2, occupation detection for chairs, parking lot, trash can, and so on.

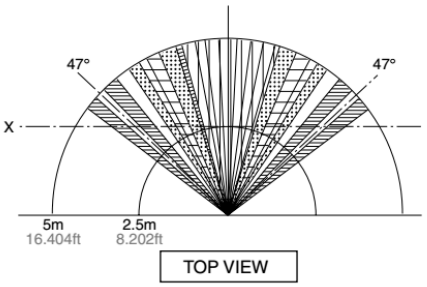


4. Beacon is always broadcasting messages with status and sensor data. You can use APP to receive the message. We also have a beacon gateway iGS01 can be used as a receiver.

PIR Performance

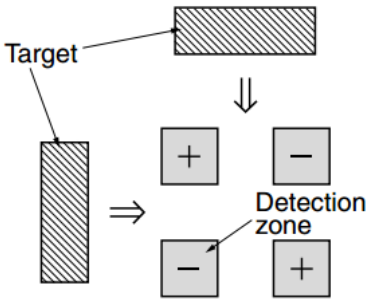
PIR Detection Range





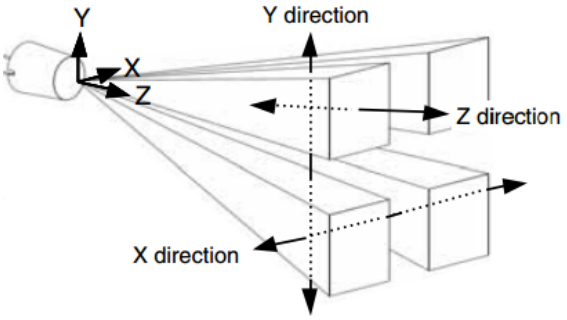
PIR Detection Area

The detection zone is polarized so if a target enters zones + and - at the same time, the signals are cancelled and can't be detected.



Detection Direction

Please install the sensor so that the X-Y is the main detection direction.



Specification

Absolute Maximum Rating

Supply Power	Max. +5.5 Volt
Storage Temperature	-20° to 70° Celsius
Voltage Ripple	+-2%

Recommendable Operation Condition

Operating Temperature	-20° to 60° Celsius
Humidity	Max 95%, Non condensing, relative humidity
VDD	+5 Volt +- 5% by USB power or +3V by CR2032 battery

Average Current Consumption

iBS02M2 (120 times/day of detected event)	8.25uA*, in default 10s transmit period@1Mbps. 16.3 uA*, in default 10s transmit period@125Kbps(long range).

iBS02IR2 (120 times/day of detected event)	18.8 uA*, in default 10s transmit period@1Mbps. 25.8 uA*, in default 10s transmit period@125Kbps(long range).
iBS02PIR2 (120 times/day of detected event)	13.2 uA*, in default 10s transmit period@1Mbps. 21.2 uA*, in default 10s transmit period@125Kbps(long range).

* Measured with CR2032 batteries.

Battery Life Simulation

iBS02M2 (120 times/day of detected event)	4.9 yr*, in default 10s transmit period@1Mbps. 2.5 yr*, in default 10s transmit period@125Kbps(long range).
iBS02IR2 (120 times/day of detected event)	2.1 yr*, in default 10s transmit period@1Mbps. 1.6 yr*, in default 10s transmit period@125Kbps(long range).
iBS02PIR2 (120 times/day of detected event)	3.0 yr*, in default 10s transmit period@1Mbps. 1.9 yr*, in default 10s transmit period@125Kbps(long range).

* Calculated with 2 X CR2032 with 220mAH capacity. Considering the battery discharge characteristic, only 70% of capacity is used for calculation. This value is just for reference and may be varied with component tolerance and different environments.

iBS02M2 Input Characteristic

Dry Contact	VinL: close VinH: open
Wet Contact	VinL: 0-0.5VDC VinH: 2-50VDC

IR Sensor Characteristic

Detection distance	50cm: A4 size white paper 30cm: A4 size black paper

PIR Sensor Characteristic

Detection distance	5M
Detection Range (Horizontal X Vertical)	94° X 82°
Detection zone	64 zones

BLE RF Specification

Transmit Power	Max.: 5dBm
RSSI Accuracy	+- 4 dB@1Mbps
Receiver Sensibility	-97 dBm @1Mbps, 0.1 %BER -103dB @125Kbps, 0.1 %BER
Maximum Received Signal	+4dBm @1Mbps, 0.1 %BER >+5dBm @125Kbps, 0.1 %BER
Frequency band	2.400 – 2.483 GHz
Frequency Deviation	+-350 kHz @1Mbps, -260~310KHz @125Kbps

Antenna	on board chip antenna
Range	30M in open space

Dimension

Dimensions L x W x H (mm)	55 x 47 x 6

Packaging

One packing box(size: 11cmX5.5cmx6.5cm) contains 10 units of iBS02PIR2 or 18 units of iBS02M2/iBS02IR2.

10X  or 18X  

Certification

Japan MIC Regulatory
211-180707

FCC Regulatory
2AH2IIBM40R2

IC Regulatory
21379-IBM40R2

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.

CE Regulatory

iBS02 series has been tested and complies with the essential requirements of the DIRECTIVE 2014/53/EU. Below is the copy of the CE Conformity of Declaration.

DECLARATION OF CONFORMITY

EU EU RED - DIRECTIVE 2014/53/EU -

This Declaration that the following designated product

Sensor Beacon
Model No.: iBS02
Multi-listing Model No.:
iBS02M2, iBS02H2, iBS02IR2, IBS02PIR2
Brand Name: INGICS

(Product identification)

complies with the essential requirements of the EU RED - DIRECTIVE 2014/53/EU on the approximation of the laws of the Member States relating to ***Radio Spectrum Matters/Health Matters.***.
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 (V2.2.2,2019-07)	EN 60950-1:2006+A11:2009 +A1:2010+A12:2011+A2:2013
EN 301 489 – 17: V 3.2.0 (2017)		Health
		EN 62479 : 2010
		EN 50663 : 2017

(Identification of regulations / standards)

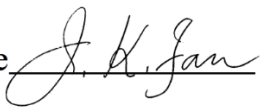
This declaration is issued for

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

(Name / Address)

Furthermore we declare that our product will be produce in correspondence with all requirements according to the Directive **2014/53/EU** .

Name: J.K.Fan Title: President

Signature 

Date: 2021. 06. 02

Revision History

DATE	REVISION	CHANGES
Nov 5, 2019	01	Initial release
Jan 15, 2020	01a	Add conformity declaration of CE certification
Mar. 18, 2020	01b	fix CE(pending) to CE since certificated
May 4, 2020	01c	Add input range for iBS02M2
Sep 24,2020	01d	1. Add BLE 5 long range support to document 2. Update BLE RF specification table with more BLE5 long range parameters 3. Update current consumption and battery life estimation. 4. Add BLE 5 long range current consumption and battery life estimation
Oct 19, 2020	01e	Update the current consumption and battery life simulation of iBS02IR2 @1Mbps in def. setting from 14.4uA and 2.8 year to 18.8uA and 2.1 year. 14.4uA and 2.8 year are calculated with 2 sec. of IR detection period while the def. detection period is 1 sec.
Jun 3, 2021	01f	Update the content of the certification chapter
Jan 17,2025	01g	Remove iBS02H2 related sections since it isn't in mass production