LoRaWAN™ People Counter

by IM Buildings

Internal sensors

- Infra-Red Horizontal technology

The IM Buildings People Counter is a much-needed device at this time, enabling accurate recording of the numbers and movement of people on a given route. With current restrictions, rules and regulations in place concerning the numbers of people in establishments, shops and offices, the ability to keep records of how many people are in a room, building or any other space isn't just required, but in some cases, is a legal requirement. LoRaWAN has a perfect solution in this device, and we have put our stamp of approval on this discrete and easily installed device.

The creators of this product are well established in people-counting, and have recently added LoRaWAN technology to their expertise. The devices currently operate using older LoRaWAN standards V1.0.1 with new devices expected early next year utilising the very latest V1.0.3 LoRaWAN versions.

Supported channel plans - EU863-870, US902-928.

Supports Over-the-Air-Activation (**OTAA**) or Activation-by-Personalisation (**ABP**). Compatible with all LoRaWAN Network Servers including The Things Network, Orbiwise, Loriot, Wanesy, LoraServer and others.

Equipped with **NFC** for easy configuration by the Android app available on request to partners from IM Buildings. Sample rate, data rate, encryption keys, triggers, activation and other advanced features can be simply changed with a single tap of the sensor. Settings may also be updated remotely Over-The-Air from most LoRaWAN Network Servers or through cloud solutions using LNS API's.

Utilising Infra-Red technology, a pair of units placed either side of a walkway will record a count any time the beam is broken and also report which direction the person was travelling. Each unit, powered with a Pair of 1.5v AA batteries, is easily mounted on a flat surface, and the setup process allows for accurate placement. Accuracy largely depends on the installation but is flexible to allow for different applications and requirements.

People Counter

CONCEPT13.CO.UK
Sensors - Gateways - LoRaWAN

Device Specifications

Mechanical specifications	
Weight	150 g including batteries (each device)
Dimensions	116 x 69 x 22 mm
Enclosure	IP20 (optional Robust Housing for outdoor installation)
IR Count Line	8 meters max, 2 meters is suggested
Device Power Supply	
Battery Type	4 x 1.5V AA Alkaline or Lithium Batteries (2 per device)
Expected Battery Life	approximately 1 year
Device Logging Function	
Sampling Interval	Configurable via NFC
Data Upload Interval	Configurable via NFC

Radio / Wireless

LoRaWAN parameters	
Wireless Technology	LoRaWAN® 1.0.1 (v1.0.3 due early 2021)
Wireless Security	LoRaWAN® End-to-End encryption (AES-CTR), Data Integrity Protection (AES-CMAC)
LoRaWAN Device Type	Class A/C (configurable) End-device
Supported LoRaWAN® features	OTAA, ABP, ADR, Adaptive Channel Setup
Supported LoRaWAN® regions	US902 – 928, EU863 – 870,
Link Budget	137 dB (SF7) to 151 dB (SF12)
RF Transmit Power	14 dB / 20 dB (Region specific)

The nature of Radio Frequency (RF) technology including LoRaWAN is that the distances achieved are subject to the configuration, environmental conditions, possible obstacles, topography of the surrounding area and the risk of interference by other devices on the same frequency. LoRaWAN allows for a variance in the transmission speed known as Spread Factor (or Data Rates) which can be dynamically adjusted to achieve the best range while optimising battery use. Over greater distances or through obstacles, a higher Spread Factor may be used which will consume more time on air and therefore greater power. This along with frequency of samples, reducing battery life.

Payload Decoder

```
function Decoder(bytes, port) {
    var params = {
        "bytes": bytes
    };

    // Device stats
    params.battery = ((bytes[11] << 8) | bytes[12]) / 100;
    params.sensor_status = bytes[17];
    params.payload_counter = bytes[22];

    // There are separate counters for people travelling in each direction.
           These directions are marked on the units.
    // There are also running total counts (one for each direction), useful if
           some packets are lost.

    // Count of people travelling from counter_a to counter_b
    params.counter_a = (bytes[13] << 8) | bytes[14];
    params.total_counter_a = (bytes[18] << 8) | bytes[19];

    // Count of people travelling from counter_b to counter_a
    params.counter_b = (bytes[15] << 8) | bytes[16];
    params.total_counter_b = (bytes[20] << 8) | bytes[21];

    return params;
}
```