



# XT-1010 User Guide

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**Model: XT-1010**

**FCC ID: GKM-XT1000**

**IC: 10281A-XT1000**

Version 1.1

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## 1. Introduction

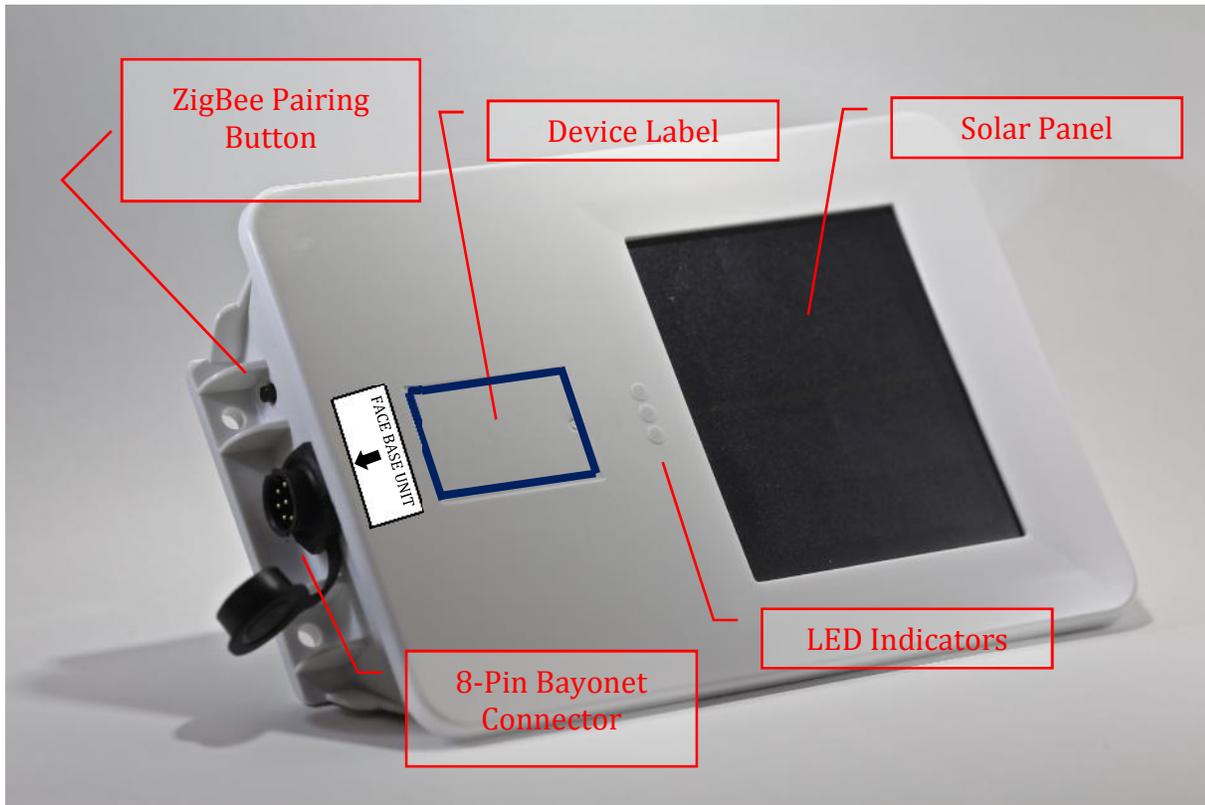
The XT-1010 is a wireless ZigBee sensor that pairs with the XT-4860G5 generally known as the Base Unit to provide inclination data based on a 3-axis digital accelerometer readout with an accuracy of  $\pm 1$  degree. Additional general purpose digital IO sensors can also be queried and transmitted to the XT-4860G5. The XT-1010 leverages a high efficiency solar energy harvesting platform to support long term, remote deployments without the burden of frequent battery replacement. This installation guide describes the physical hardware, associated parts, mounting options, and a quick start-up procedure.

### 1.1 Feature Matrix

Feature Description	XT-1010
High Efficiency Solar Panel	✓
6600mAh Rechargeable Li-Ion Battery	✓
Diagnostic LEDs	✓
Optional Digital IO Sensors and 1-Wire Serial Bus	✓
ZigBee pairing with XT-4860G5	✓
Inclinometer Data based on 3-axis Dig Accel. with 1 deg. accuracy	✓
Over-the-air FW upgrade via XT-4860G5	✓

## 2. Hardware Description

Below is a depiction of key interfaces of the XT-1010:



An optional Cable Harness that interfaces with the unit is shown below. The Cable provides external power, when available, as well as interface to the IO HW options



## 2.1 Hardware Specifications

ZigBee Specification	
Technology	ZigBee IEEE 802.15.4 DSSS modem
Frequency Band	2405-2483.5MHz
Antenna gain	0.5 dBi (peak again), -0.5 dBi (Average gain)
Transmit power	12dBm/MHz
Data Rate	250 kbps
Power Requirements	
D.C. Power (if Avail.)	8-24V, 12 V nominal
Battery	Internal 6600mAh rechargeable Li-Ion
Physical Connection	
Interface Connector	8-pin Bayonet type
Programming	Serial (UART Logic Level)
Mechanical	
Case Material	ABS plastic with weather-proofing for outdoor use
Dimension	7.6" X 4.9" X 1.4"
Weight	18 oz.
Operating Temperature	-30°C to +70°C
Protection Rating	IP67

## 2.2 Cable Harness Description

Pin #	Wire Color	Pin Name	Functional Description	Port Characteristic
1	White	IN1	Ignition Sense	8v to 24v, Internally pulled low
2	Yellow	IN2	Input port	2.4 to 24V, < 0.2 V Note: Internally pulled high
3	Black	Ground	Ground	
4	Green	Out	Output Port (Defaulted open circuit)	
5	Blue	UART-Rx	External battery negative terminal	3.3V Logic Interface Com Port Settings: Baud rate: 115200 bps; Flow control: None; 8N1
6	Brown	UART-Tx		3.3V Logic Interface Com Port Settings: Baud rate: 115200 bps; Flow control: None;8N1
7	Red	VBATT	Main battery voltage, DC	8-24 V, 12V Nom.
8	Orange	ADC	Analog Input	8-24 V

## 2.3 LED Description

LED	Description	Status
GPS (Green)	Pairing Successful	Solid for 30 Seconds then OFF
	Stand-by for Pairing	Blinking Steadily

## 3. Device Mounting Options:

### 3.1 Screw Mounting

The XT-1010 can be mounted via 4 mounting screw, 2 per side as depicted below.



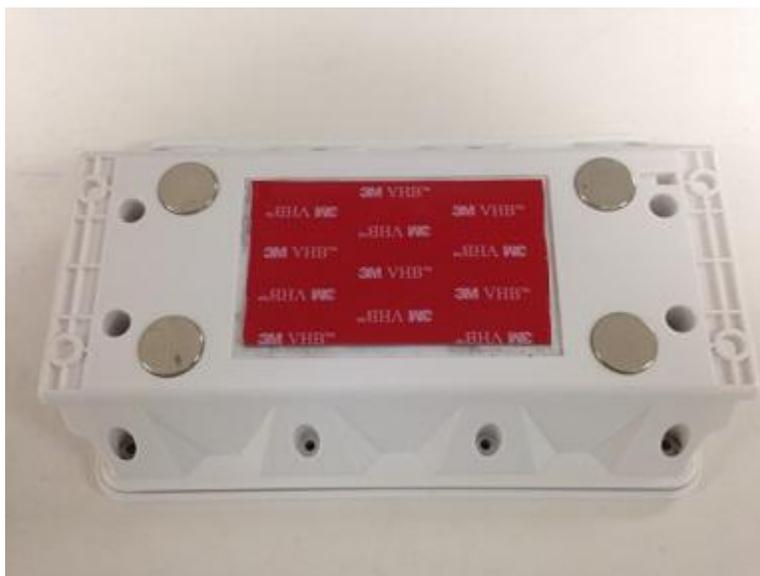
### 3.2 Magnetic Mounting

The XT-1010 can also be provided with 4 pre-installed (or kitted separately) magnets as depicted below.



### 3.3 VHB Tape Mounting

For semi-permanent mounting option, the device can be mounted with 3M VHB tape as shown below.

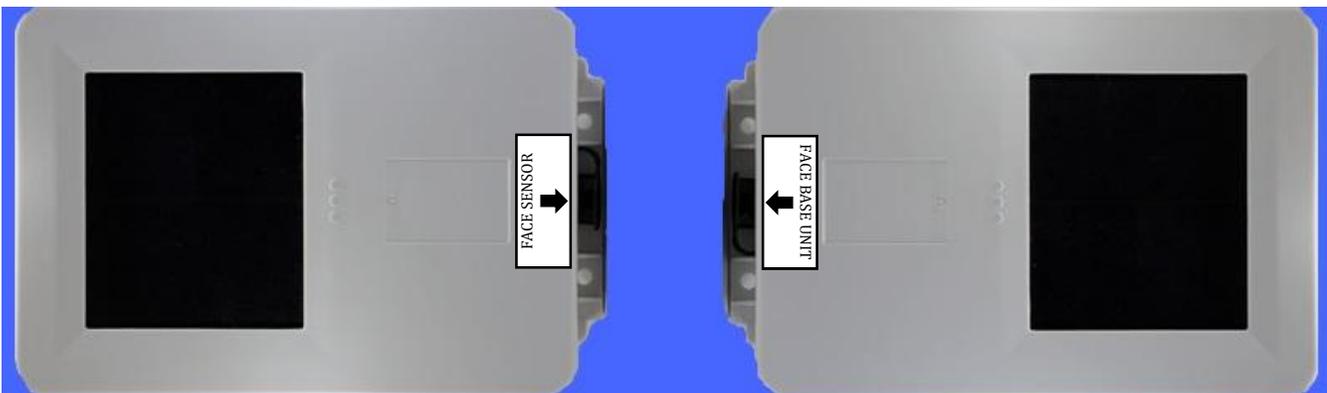


## 4. Quick Start Guide

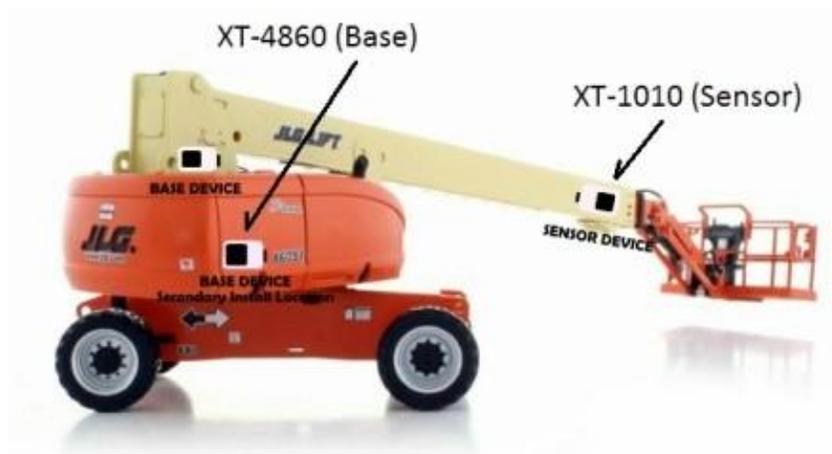
### 4.1 Device Installation

The XT1010 (Sensor unit) pairs with the XT-4860G5 (Base unit) and provides inclinometer data based on the on-board 3-axis digital accelerometer output which in turn is transmitted to end user Server over the cellular network. The proper installation of the unit is critical to acquiring accurate inclinometer data. An application note entitled “Installing and Pairing the XT-4860 and XT-1010 for Wireless Inclinometer Functionality” contains detailed instructions for installing and pairing the two devices. This quick start guide will give you basic steps for installation and pairing of the two devices. Refer to the application note for any additional detail and instructions.

When installing the device, make sure the Base unit (XT-4860G5) faces the Sensor unit (XT-1010) Each Unit has a label near the 8-pin Connector to show the direction of device installation. The Base and the Sensor must be on the same plane and facing each other for optimal performance. The picture below illustrates the ideal orientation of the two devices



As an example, below depicts possible mounting positions of the two Units for a man-lift application.



## 4.2 Pairing the XT1010Z and the XT4860G5

With both Base and Sensor units properly oriented, the pairing process of the two devices can begin. Note that only one Sensor unit can be paired with one Base unit. During the pairing process, the devices are calibrated and normalized relative to each other. Once the calibration is complete, the Devices must not be moved or repositioned.

To begin the pairing process, press the black button located near the circular connector on the side of the Base unit for 5 seconds. You should see the amber LED light (marked with “Z”) flashing 4 times per second. This LED pattern signifies that the Base unit is searching for the Sensor unit that it is meant to pair with. There is a 60-second window for the pairing process to complete. If the pairing process was not successful within 60 seconds, then the unit will return to its configured normal state and the process needs to be repeated if pairing is still needed. At any time during pairing, the process can be stopped or reset by pressing and holding the button on either device for 15 seconds, then releasing, or by simply waiting for a timeout.



During the Base unit 60-second pairing time, press and hold the pairing button on the Sensor unit for 5 seconds. The green LED (marked with a “C”) will flash 4 times per second as well. A typical pairing process takes about 3 to 5 seconds after pressing the pairing buttons of both Units. After successful pairing, the Base unit’s orange LED will turn off and the Sensor unit’s green LED will turn solid for 30 seconds, then it will turn off. After the pairing process, the Sensor unit will automatically send inclinometer data to the base unit at a rate of 1 sample per 5 seconds.

## 4.3 Un-pairing Devices

To un-pair a set of paired XT-4860 and XT-1010 devices, press and hold the button on the XT-4860 device for 15 seconds, then release. That device will attempt to notify its XT-1010 pair of the pairing reset. There is no LED feedback for a pairing reset. The pairing reset can be performed individually on an XT-4860 or XT-1010 device if the paired device is no longer present.

## **FCC/IC:** REGULATORY COMPLIANCE INFORMATION

This equipment with FCC-ID: GKM-XT1000 and IC: 10281A-XT-1000, Model: XT-1010 is subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules.

### NOTICE:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules and with license exempt Radio Standard Specifications of Industry Canada.

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.

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser l'équipement.

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.

### Radio frequency radiation exposure Information:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.