iControl Incorporated

http://www.iControl-Inc.com

# miKEY Operations

## Background

The miKEY “key fob” is a small, battery powered 802.15.4 compliant radio transmitter. A miKEY has one LED and three buttons and resembles the keyless entry device found with most modern cars.

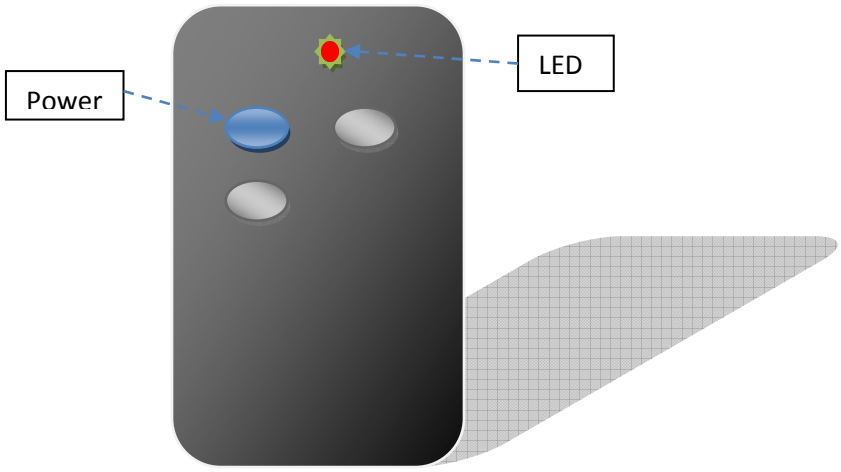
The intent of the miKEY is to allow control of a mLOCK at times when no other communication link is possible. For example, a truck driver may carry a miKEY along with cargo which is secured by an mLOCK so that, in the case of an unscheduled inspection, he could unlock and then re-lock the cargo.

## Operation

There are three buttons on the key fob:

**Power** – blue button located top left. This button is pressed and held to power the radio transmitter and to begin transmission of a 1-second burst of radio traffic. The LED will illuminate (and possibly blink) for the duration of the button press.

**Note**: *the other two buttons (grey) are intended for future use and currently do nothing. These buttons do not power the device, and therefore would have to be held in combination with the Power button.*



Each miKEY is typically paired with one mLOCK. The two devices share common configuration which may include: channel designations, encryption keys, and addressing information. It is also possible to configure a one-to-many scenario whereby one miKEY could communicate with many mLOCKs.

## Maintenance

The miKEY uses a small replaceable battery. Battery replacement is currently only done by the manufacturer.

## Radio Transmission

When the Power button is pressed, the 802.15.4 radio will transmit a burst of approximately 100 frames with a short (several milliseconds) gap between frames. The duration of the "burst" will be approximately 1 second or until the miKEY receives an acknowledgment from the targeted mLOCK. The intent of the burst is to signal a mLOCK which may be in a low power state. When the mLOCK receives one of the frames in the burst it will acknowledge the signal and the burst will terminate. When this occurs, the LED on the miKEY will blink once. All communication between the miKEY and the mLOCK is done using 802.15.4 data frames which are typically encrypted.

## 802.15.4 Channels

The IEEE 802.15.4 specific ion defines a set of channels: 11 (2405 MHz) though 26 (2480 MHz). A miKEY will typically be configured to utilize two of these channels known as the "wake" and "sleep" channels. The signal burst consists of one frame on the "wake" channel followed by repeated frames on the "sleep" channel. If an mLOCK is not in low power mode (i.e. "awake") it will respond immediately, otherwise it will respond to the first "sleep" frame it receives.

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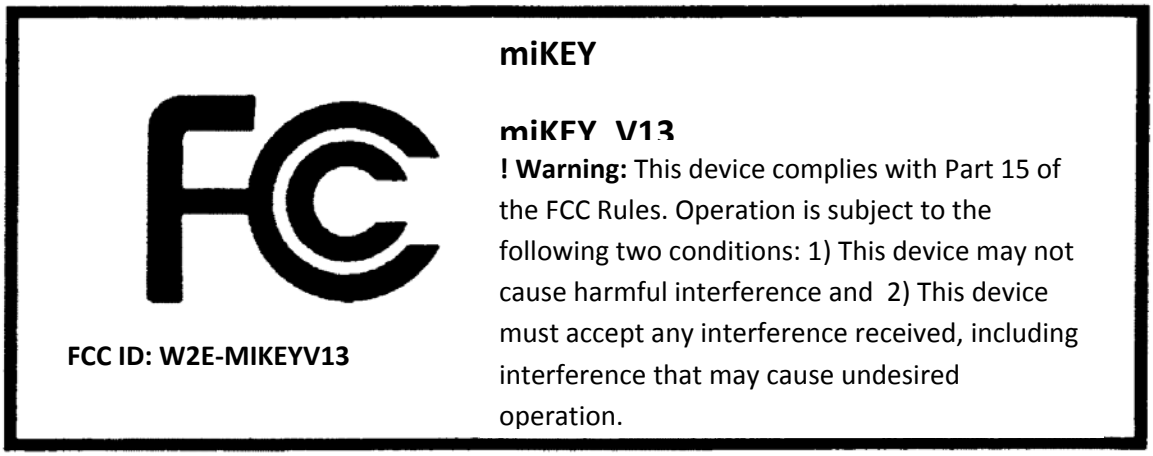
**FCC NOTICE:**




**FCC COMPLIANCE:**

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 or more of the following measures:

1. Reorient or relocate the receiving antenna.

2. Increase the separation between the equipment and receiver.

3. Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

4. Consult the dealer or an experienced radio/TV technician.

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

2. This device must accept any interference received, including interference that

may cause undesired operation.

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## FCC WARNING:

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC Rules.

This equipment has been evaluated in accordance with the FCC bulletin 56 "Hazards of radio frequency and electromagnetic fields" and bulletin 65 " Human exposure to radio frequency and electromagnetic fields. Safe operation in an uncontrolled environment will result if the following distances from the device are maintained as a minimum.