



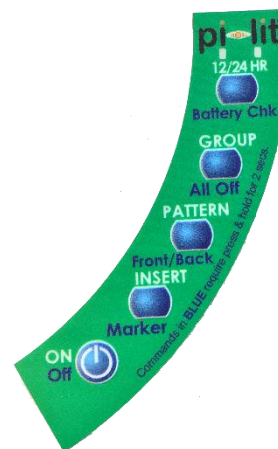
Operating Instructions

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Important: Prior to **YOUR** first deployment, please view the 2-minute video at: www.pi-lit.com/Watch_This/

A) - Quick Start Instructions

- 1) **Turning the 1st Lamp on** - Tap the **On/Off** button. The red LED will illuminate for 5 seconds. During this period the *pi-Lit*® system is “listening” for other devices. After the red LED goes off the lamp will begin to flash. It is ready to deploy. ***Wait until the red LED goes out before turning on the next lamp.***
- 2) **Turning on the 2nd, 3rd, 4th...lamps** – Turn on each successive lamp by pressing the **On/Off** button. **IMPORTANT:** ***Wait until each lamp begins to flash before turning on the next lamp.*** Maximum range is 100 meters (330 feet), however, most highway applications will require 40 meters (130 feet) between units or less.
- 3) **Patterns** – Tap the Pattern button to choose one of 5 available flash patterns. The default is pattern 4, our favorite.
- 4) **Battery Status** – Press and hold for 2 seconds the 12/24 Hour button. The green LED will flash 5 or 6 times for a full battery, then 4, 3, 2(red) and 1 (red) as the battery depletes.
- 5) **Turning the units Off** – Simply press and hold the **On/Off** button for 2 seconds and that individual unit will turn off. The settings (pattern, 12/24 Hour, Group ID) are preserved as long as the battery is connected. When disconnecting from the battery, previously saved settings are reset to default.
- 6) **Group Off** – You can turn off all the lamps in a string from any one lamp by pressing and holding down the **Group ID** button for 2-3 seconds. The red LED indicator will flash twice. It will take 4 or 5 seconds for all of the lamps to turn off.
- 7) **Inserting / Replacing a lamp** – If it is necessary to replace a lamp owing to damage or battery depletion simply walk to within 20 meters (60 feet) of the position of the non-functioning lamp. **The non-functioning lamp must be turned off!** Press the **Insert** button on the new replacement lamp. The LED will turn green indicating Insert Mode and the lamp will begin to flash in the correct position, replacing the broken lamp. Place the new lamp in the location of the non-working unit. That’s all there is to inserting a *pi-Lit*® lamp. Smart little fella’s.
- 8) **Night time only operation** – *pi-Lit*® provides the option of 24 hour operation (Default) or night time only. Battery life is prolonged in 12-hour night time only mode. After turning the lamps on press the **12/24 Hour** button. The green LED will flash once (12-Hour mode) or twice (24-Hour mode). Any of the lamps in a string can be programmed for 12/24 Hour. It then sends the command to all the other lamps so you don’t have to program each individual lamp. It may take 5 minutes for the lamps to turn off in daylight.



B) -Turning On and Off the pi-Lit® Lamp

Turning On Lamps:

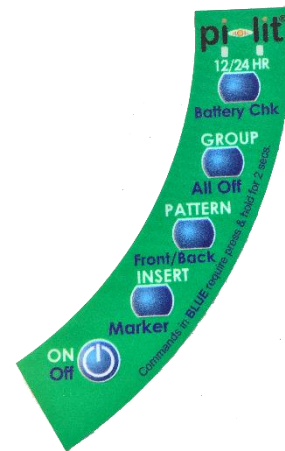
1. Press power (On/Off) button.
2. Red LED indicator will turn on.
 - First lamp turned on will show red LED indicator for 5 seconds and then begin to flash.
 - Wait until lamp begins to flash.
 - Turn on the next lamp. The red LED indicator will turn on for 1 second and then the lamp will begin to flash in sequence.
 - Turn on successive lamps in the same manner.
3. **IMPORTANT: Make sure each lamp is turned on and flashing before turning on the next lamp.**

Turning Off Lamps:

1. Press and hold the **power (On/Off)** button for 2 seconds.
2. Red LED indicator will flash twice.
3. The lamp will stop flashing.

Additional Information:

- A. If the lamp is already on, pressing the **power (On/Off)** will result in two green flashes indicating that the lamp is on. This feature allows a user to interrogate a lamp that is not flashing during the daytime or inhibited to determine whether it is simply sleeping in 12 hour mode (as it should) or is, indeed, off.
- B. Holding the **Group ID** button for 2 seconds on any lamp in the string **will turn off the entire string of lamps.** When taking the lamps off the road, it is easier to turn them all off by pressing a single button then by turning each one off individually. Simply press and hold the **Group ID button on any lamp** for 2 seconds and the red LED indicator will flash twice and send the message up and down the string. It is often more convenient to collect the lamps and place them in the stowage case before turning them off. Once in the case, press and hold the **Group ID** button for 2 seconds on any one lamp and within 5 seconds all of the lamps will turn off. The red LED will flash for 10 seconds while the message is passed along.



- C. When powering down the lamps they will lose their sequence number. However, each lamp will retain other user-programmed features such as Pattern, Group ID, 12/24 Hour.
- D. When turning the lamps on, all features (Pattern, Group ID, 12/24 Hour) will remember their most recent configuration. The *pi-Lit®* system is designed to retain previous configuration data so that your preference does not have to be programmed each time.

C) - Group ID Function

Group ID information:

- A. A string of lamps is considered a group. Many groups (strings) may be used in close proximity to each other without interference. This is possible because each group is identified by a group identification number (**Group ID**). All the lamps within radio range (500 meters) with the same Group ID will “talk” to each other and respond to information sent up and down the Group.
- B. Default Group ID is 1.
- C. There is no limit to the number of lamps that can make up a group. A string of lamps using the same Group ID may stretch for many kilometers (or miles).
- D. The operator may choose any one of 10 **Group IDs** by the simple push of a button. Thus, in a parking garage or sports arena, for example, 10 different groups may be used in close proximity without interfering with one another.

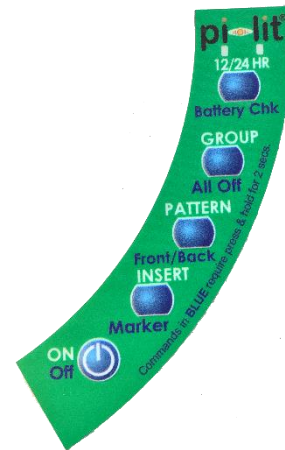
Programming (choosing) Groups:

1. **Must be done before turning on lamp.**
2. Press the **Group ID** button to determine which group it is currently in.
 - Green LED indicator light will flash to indicate the Group ID that is currently in memory.
 - Group 1 (1 green LED flash), Group 2 (2 green LED flash), Group 3 (3 green LED flash) and so on up to Group 10.
3. Once green LED stops flashing, quickly press the **Group ID** button again.
 - Each quick press of the **Group ID** button will increment the Group ID.
 - Example:
 - Group ID 1 = 1 press of **Group ID** button.
 - Group ID 2 = 2 presses of **Group ID** button.
 - Group ID 3 = 3 presses of **Group ID** button.
 - Group ID 10 = 10 presses of **Group ID** button.

4. When finished pressing the button, the green LED indicator will “echo” back what group it believes you have chosen.
 - For example, if you choose the Group ID to be 5, the green LED indicator will flash 5 times.
5. If the green LED indicator flashes a different number of times (for example, you chose Group ID to be 3 but the green LED flashes 4 times) then the button press may not have been counted or counted multiple times. Simply press the **Group ID** button again the correct number of times to get the Group ID you desire.
6. Once you are satisfied that you have chosen the correct Group ID, stop pressing the button. Within 4 seconds a red LED indicator light will flash twice specifying that your choice has been stored into memory. If you wish to check the Group again, simply press the **Group ID** button after the red LED has flashed. All programming of Group ID must be done before the red LED flashes twice. To change the Group ID (you made a mistake, maybe) once the red LED flashes twice you must again interrogate the Group ID (press the button and count the green flashes) and then press it again to choose your Group ID. Practice makes perfect. Play with it to learn. You cannot hurt anything.

Additional Information (Group ID):

- A. Interrogation – to check to see what Group ID a particular lamp is set to, you may press the **Group ID** button at any time while the lamp is flashing (or when off) and the green LED indicator will “echo” back the Group ID. Remember in order to change the Group ID the lamp must be turned off.
- B. Recall that holding down the **Group ID** button will turn off the entire string of lamps in the same Group as the lamp you are working with. For example, if you have 10 lamps set to Group ID 1 and you want to turn off all 10 lamps, simply choose any one of the 10 lamps and hold down the **Group ID** button. The lamp on which you press the **Group ID** button will flash the red LED indicator twice and turn off. The message will be sent up and down the string turning off the remaining 9 lamps. It may take up to 5 seconds for all of the lamps to turn off.



D) - Insert Function

Inserting Information:

- A. *pi-Lit®* Sequential Lamps are the only sequential lamp available with the capability of replacing a damaged lamp with a simple press of a button. *pi-Lit®*

technology does not require the operator to reprogram each individual lamp in the string if one becomes damaged.

- B. The replacement lamp will automatically recognize the missing lamp and will “insert” itself into the correct position in the string.

Inserting a lamp:

1. If the lamp to be replaced is operating, first turn it off by holding down the **Power (On/Off)** button for 2 seconds or remove the battery pack.
2. Bring the replacement lamp to within 20 meters (60 feet) of the string of lamps.
3. Press the **Insert** button.
4. The replacement lamp will light the green LED indicator until it adopts the “identity” of the missing lamp and begin flashing in sequence.

Additional Information:

- A. It is important to turn off the lamp that is to be replaced (assuming that it is still operating). Otherwise, the lamp being inserted will not know what position to adopt.
- B. If several lamps are to be replaced, the first lamp being inserted will adopt the lowest missing number. Successive inserts will assume successively higher numbers.
- C. Interrogation – when a lamp is flashing, the operator may “ask” the lamp what number it is in sequence by momentarily pressing the **Insert** button. The green LED indicator will flash to tell the operator its position number.
 - The green LED indicator will flash in groups of 5.
 - For example, if the lamp is number 7 in a sequence, the green LED indicator will flash 5 times, pause, then 2 times more.

E) - Marker Function (Insert Button)

Marker Function Description:

1. Marker function is used to aid personnel in finding the entrance to a work zone.
2. When approaching a freeway construction zone it is often difficult for subcontractors or large trucks or other construction vehicles to know where to pull off into the work zone. With the *pi-Lit*® sequential lamps, any of the lamps can be set as a “Marker”. The “Marker” lamp has a noticeably different flash pattern so that personnel looking for the construction site pull-off can see the area in advance. Placing two “Marker” lamps on delineators or cones will designate a pull-off entry between them.

3. The “Marker” lamps will stay in sequence while flashing differently.

Turning Lamps into “Markers”:

1. Pick any lamp that is on and flashing.
 - Can be done with any number of lamps (best with 2)
2. Press and hold the **Insert** button until the flash pattern changes for that lamp only. (To turn off marker, press and hold **Insert** for 2 seconds).
3. Place it back into its previous position.

For example, place two cones on either side of work zone entry and press and hold the **Insert** button on these two lamps. The string will maintain the sequence but these two lamps will indicate to personnel where to pull off the roadway.

Big picture going forward

pi-Lit® technology is sophisticated but simple to use. There is only one thing to remember! **The user need only press a button on one lamp to change the behavior of all of the lamps. The request is sent up and down the string.**

F) - 12/24 Function

1. Each *pi-Lit®* lamp has a photocell to sense daylight and nighttime. The user may choose whether to have the lamp flash during day and night (24 hours) or nighttime only (12 hours).
2. Nighttime only operation does prolong battery capacity. Standard *pi-Lit®* lamps will operate for 3 months on a set of 4 AA-Alkaline batteries when operating in 12 hour mode. Two to 3 months of operation can be anticipated when flashing 24 hours a day.
3. *pi-Lit®* technology averages light over each 4 minute interval. When changing from 12 to 24 hour operation, *it may take up to 4 minutes for the lamps to turn off or on.*

Activating 12 or 24 hour function:

1. Press and release the **12/24 Hour** button on any one lamp. The green LED will flash once or twice. One flash indicates 12 hour mode while 2 flashes represents 24 hour mode. Repeated taps of the **12/24 Hour** button will toggle between these choices. It may take up to 4 minutes for the lamp to come on or go off depending upon the ambient light and averaging algorithm.

the pattern button will cycle from pattern 1 through pattern 5. The next press of pattern will result in pattern 1.

3. It is not necessary to change the pattern of each lamp. Pattern changes on any one lamp will be communicated to all the lamps! It may take several seconds for the pattern choice to be synchronized across the entire string, and for a few moments the pattern may appear “off beat.”

4. It is not necessary to wait until the green LED flashes indicate the pattern choice before incrementing to the next choice. For example, when in pattern 1 and pattern 5 is desired, simply press the pattern button 4 times (in pattern 1, the next press is pattern 2, then pattern 3, then pattern 4, then pattern 5 = 4 presses). The operator can increment slowly or quickly.

***NOTE:** Pattern choice – The team at Pi Variables, Inc., has observed the impact that different patterns have on driver perception. These data are neither published nor scientific. However, they may act as a guide for arriving at your own impression.

- 1) Pattern 1 – Single Lamp Flashing – Good general purpose sequence. **Brightest Flash!**
- 2) Pattern 2 – Two Lamps Flashing – More noticeable from a distance – good for taper
- 3) Pattern 3 – Slow tail-off of flash.
- 4) Pattern 4 – Fast march – more noticeable
- 5) Pattern 5 – Very Fast March – Most noticeable from a distance – Best warning pattern

It is **STRONGLY** recommended that the operator cycle through the various patterns to establish their own preference for each application.

I) - Brightness Control (Pattern button) – Beacon Only (not Barricade)

1) The default “brightness” of the *pi-Lit*® lamp may be dimmed by pressing and holding the Pattern button for 2 seconds. This procedure will toggle between the bright setting (80 millisecond flash duration) and standard brightness (40 millisecond flash duration). The default setting is quite bright and appropriate for most deployments (40 millisecond flash duration). Press and hold the Pattern button for 2 seconds to toggle between these choices. The green LED will flash twice to indicate bright setting and once to indicate standard.

J)- Locking Function: (Insert and On/Off buttons)

Locking Function Information:

A) Curious fingers will find their way to press the buttons. The operator may “lock” the buttons to prevent anyone from changing flash characteristics or turning the lamps off.

- B) Only one lamp needs to be “locked”. This lamp will send the command to all the lamps in the same Group (string). Thereafter, all of the lamps will be locked.
- C) While locked, the buttons will still allow Battery Status, Pattern, Group, and 12/24 option to be interrogated by pressing the appropriate button, but these parameters cannot be changed.

Locking the buttons:

- 1) Simultaneously press and release the **Insert** and **On/Off** buttons. The red LED will flash once to indicate that the membrane buttons are locked. Once locked, attempts to change any of the operating parameters will result in interrogation of that parameter (green LED flashing), but will not result in a change of the parameter.
- 2) Only one lamp needs to be locked. The lock command will be sent to all of the lamps in the operating group (string).
- 3) To unlock, simultaneously press and release the **Insert** and **On/Off** buttons. The LED will flash green once to indicate that the buttons are unlocked.
- 4) When locked, the user cannot turn off the lamp by pressing either the **On/Off** button or the **Group** button for 2 seconds. (**The lamps can be turned off using the Remote Control Unit**). If the buttons do not seem to work properly, perhaps they are locked!

K) - Inhibit Function Inhibit Function Information (Requires Remote Control Unit).

The operator may turn off the LED flashing of an entire string **WITHOUT** turning the lamps off. This feature allows the operator to turn off the flash of the lamps **but still maintain their sequence number**. The LEDs may be turned on again and they will be in sequence. This feature turns off the LED but the *pi-Lit*® lamps still transmit radio information and pass information up and down the string. The operator will see what appear to be lamps in a string that are turned off, but they are, in fact, still operating.

- 1) To inhibit flashing, momentarily press **Inhibit** on the Remote Control Unit. Pressing **Inhibit** will toggle between lamps flashing and inhibited.

Please remember that when the inhibit function is activated only the LED of each lamp is inhibited. The radio communication between lamps continues, hence battery depletion is taking place. **HOWEVER**, battery life will be substantially **longer** while the lamps are in the “inhibit mode”, as much of the battery drain is related to the LED flash. With the LED dark, less battery is being utilized. This is not to be used to turn off a string of lamps, merely to inhibit their flashing for a period of time (minutes, days, weeks, etc.). The battery life expected from each lamp while in **Inhibit Mode** is anticipated to be greater than 4 months (AA Alkaline batteries) and greater than 9 months (Barricade Style D-Cell batteries). **To turn off the lamp completely, either:**

- a) press for 2 seconds the **On/Off** button on the lamp (until the red LED flashes twice), or
- b) press for 2 seconds the **Group** button on any lamp (turns off all lamps in a Group) or
- c) on the Remote Control Unit press for 2 seconds the **All Off** button.

When turning off a Group of lamps, the red LED will flash for 10 seconds while the off command is sent up and down the string.

L) **pi-Lit® Barricade-Style Lamp – READ SECTION A**

The **pi-Lit™ Barricade-Style** lamp incorporates all of the features of the **pi-Lit® Beacon-Style** lamp. Beacon-Style and Barricade-Style lamps may be used together and controlled by any of the lamps or Remote Control Unit. A few differences are described below.

pi-Lit® Barricade-Style Lamp front/back illumination – The Barricade-Style lamp can be commanded to flash from the Front/Back or both faces. From the lamp, press and hold the **Pattern** button for 2 seconds. The back LED will toggle on and off. From the Remote Control, press the **Face** button.

Steady-On Lamp (Barricade-Style only) – Pressing **Pattern** and **On/Off** simultaneously (or **Steady Burn** on the Remote Control Unit) will toggle on and off the steady-burn feature between sequential flashes.

12/24 Hour – The Barricade-Style lamp flashes for 24 hours as its default status. To change to nighttime-only tap the **12/24 Hour** button. Battery life is anticipated to be greater than 6 months during 24 hour operation.

Battery Status – Press the **12/24 Hour** button for 2 seconds. Five greens = full battery.

Detailed instructions may be viewed and downloaded in .pdf format from

www.pi-lit.com



We love to hear from our customers. Don't hesitate to telephone or email with questions. (949)415-9411

info@pi-lit.com

M) Technical Specifications:

- a) Battery Voltage – 3.6 to 12 volts DC input – depending upon battery pack selected
- b) Range – Up to 100 meters ≈ 330 feet. Suggested maximum deployed range is 40 meters ≈ 130 feet maximum.
- c) Battery Life D-Cell Alkaline – 12 Hour ≈ 6 months; 24 Hour ≈ 4 months; battery life will be affected by distance between units.
- d) Battery Life AA-Cell Alkaline – 12 Hour ≈ 6 weeks; 24 Hour ≈ 4 weeks.
- e) Weight: Unit without batteries – 4 ounces. With 4 battery pack – 9 ounces. Barricade=2.3 lbs with 4 D-Cell alkaline batteries.
- f) Light Output – 2000 mcd (typical).
- g) Visible Range – 900 meters at night (≈3000 feet).
- h) Flashing timing – default – one flash per second.
- i) Flash duration – default – 40-80 millisecond – programmable by user.
- j) Latency between Units – 100 milliseconds default – programmable by user.
- k) Radio Frequency Power Output – 4 dbm.
- l) Frequency of Operation – 2.4 GigaHertz.
- m) Regulatory Compliance - FCC = US; IC = Canada; ETSI = Europe (See Notes 1 and 2 below).
- n) CE Compliant (European Union).
- o) Patent Protected.
- p) Material – Plastic housing – Polychrome; Lens – Polycarbonate .
- q) Temperature range: -30 to +55 degrees Celsius (-20 degrees F to +130 degrees F) .

Regulatory Compliance:

Note 1: Contains FCC ID: 2AA65-BM1

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.

Note 2:

(1)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:

- (2) Reorient or relocate the receiving antenna.
- (3) Increase the separation between the equipment and receiver.
- (4) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- (5) Consult the dealer or an experienced radio/TV technician for help.

2.1.1.3. RF

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Notice: *Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.*

Avis: *Sous la réglementation d'Industrie Canada, ce transmetteur radio ne peut fonctionner qu'en utilisant seulement une antenne d'un type et d'un maximum (ou moins) de gain approuvé pour l'émetteur par Industrie Canada. Pour réduire des potentielles interférences radio pour les autres utilisateurs, le type d'antenne et son gain doivent être choisis de sorte que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire pour une communication réussie.*

CE Mark Compliance Data

Pi Variables, Inc., 14831 Myford Road, Tustin, CA 92780, U.S.A.

Certification Report for Product BASEQ

EN 12352: 2006

Sequential Light Device: For warning and guiding traffic

Temporary Traffic Control

Performance under impact:	Class M1, M2, M3
Luminous Intensity:	Class L3; British WL4
Retro-reflective Devices:	Class R2
Colorimetric performance:	Class C Yellow 1

Durability:

Temperature resistance:	Class T1
Ingress of Dust and Water:	IP44
Mechanical Strength:	Class M3
Secure Fastening:	Class S2 – S3
Dangerous Substances:	None