



MK CONTROLS
ENGINEERED FOR YOUR IMAGINATION

LIGHTNING BUG™

INSTRUCTION MANUAL

Please remember that your safety is much more important than getting the shot. MK Controls is not liable for any injuries or damage that may occur while using our products. Being safe should always be your primary concern. Lightning can be lethal. Be sure to seek shelter if a storm is too close!

Please note: MK Controls Inc. is not liable for any damage or injury associated with the use of the Lightning Bug™.

MK Controls, Inc.
1160 Stone Drive
Harrison, OH 45030
support@mkcontrols.com

513-845-4633



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 2 of 21

Table of Contents

Lightning Bug™ Features	6
Specifications.....	7
Battery Installation/Removal.....	8
Camera Connection.....	9
Operation	10
Additional Features	12
Photography Tips.....	14
Synchronizing An External Flash.....	15
Troubleshooting	16
Lightning Safety	18
Warranty	19
Company Information.....	21

Please note: MK Controls Inc. is not liable for any damage or injury associated with the use of the Lightning Bug™. Lightning Bug™ is a trademark of MK Controls, Inc.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Introduction

The Lightning Bug™ – Engineered for your imagination.

The Lightning Bug™ is based upon the science of lightning. There are two components of lightning; the bright white flash everyone wants to capture and the unseen infrared light that always precedes it. The Lightning Bug™ uses a high-speed photodiode sensor optimized to the infrared burst that occurs just before a lightning strike. This infrared light comes from the vaporization of air and particles in the air. The Lightning Bug™ acts as a lookout for your camera, watching for a change in infrared light. When a significant change of infra-red light over a very short period of time is detected, it trips the camera shutter to capture the lightning bolt.

The Lightning Bug™ can also be used to take photos of fireworks, cannon shots, virtually anything that produces a fast-acting rise of light formed by a high-temperature event.

The Lightning Bug™ exclusive sensitivity adjustment circuitry allows the photographer to customize the unit's operation to any shooting situation. This gives the photographer full control over when to take the picture. If you only wanted to capture the brightest and closest lightning bolts you would decrease the sensitivity. If you wanted to capture lightning over the city or mountains from a long distance, just increase the sensitivity. Only the Lightning Bug™ gives you this level of control.

The Lightning Bug™ has, as standard, premium features not found in simpler lightning detectors. The user can limit the number of possible exposures per second to between 1 and 10. This feature allows you to capture repeated lightning strikes successfully, up to the maximum frame rate of your camera.

When trying to capture weather events, your photography gear can get wet, we've designed the Lightning Bug™ to withstand exposure to rain. The design incorporates weather resistant soft touch buttons.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 4 of 21

A PC port is included on the hot shoe mount. This allows the use of external flash unit(s) to be used as fill flash. When the Lightning Bug™ senses a strike, the shutter is released, and the camera will then fire the attached flash when it captures the image. The possibilities of using fill flash with the Lightning Bug™ are endless. The button on the flash foot is used to test any flashes attached to the PC port.

To help you get the most out of your purchase please take a few minutes to read this manual. If you still have questions about using your Lightning Bug™, feel free to email our technical support team at support@mkcontrols.com. We'll be happy to assist.

For examples of the kinds of images that can be taken using the Lightning Bug™, please look at the Gallery website page: <http://www.mkcontrols.com/gallery>

Here are a few images created using the Lightning Bug™.



Mike Lenoard Photo ©



Bill Lea Photo ©



Susan Candelario Photo ©



Bill Long Photo ©



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Lightning Bug™ Features

- 26 Levels of sensitivity adjustment.
- Automatic or manual operation of the camera's meter*.
- Attaches to your camera via an industry standard hot-shoe mount. Cables are available to fit a wide range of cameras.
- Three simple buttons control all of the features.
- Allows limiting of frames per second – can be adjusted from a 1 to 10 FPS.
- Water resistant overlay with soft-touch controls protects the Lightning Bug™ from inclement weather, and ensures that it won't be accidentally turned on or off.
- Highly visible orange LED display shows at a glance the current configuration settings.
- Bright yellow LED flashes when the unit detects an event within its field of view.
- Allows synchronizing of an external flash unit for unique 'foreground-fill' shots.
- Allows testing of your camera connection.
- Retains user settings, even with battery removed.
- Power saving mode to prolong battery life.
- Battery can be removed or replaced without removing the Lightning Bug™ from your camera.
- Power On Self-Test (POST) insures that the unit is operational every time you turn it on.
- Electrical isolation between the unit and your camera via MOSFET technology to protect the camera's electronics.

* Feature available on units with a serial number greater than 102501002046 – for older units you can send your unit back to MK Controls for a free upgrade – check our website for full details.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 6 of 21

Specifications

Front overhang from center of camera shoe:	3.51" / 89.15 mm
Rear overhang from center of camera shoe:	0.74" / 18.80 mm
Overall Height not including shoe mount:	1.13" / 28.70 mm
Overall Height including shoe mount:	2.10" / 53.34 mm
Overall Length:	4.25" / 107.95 mm
Overall Width:	2.60" / 66.04 mm
Weight without battery:	2.96 oz / 83.9 g
Weight with battery:	4.48 oz / 127.0 g
Camera connector port~:	2.5mm Stereo
Battery*:	Standard 9 Volt

~Please contact MK Controls Technical Support for more information if you intend to make your own cables.

* MK Controls recommends either an Alkaline or General Purpose battery. Rechargeable Lithium, NICAD and NiMH batteries are not recommended.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 7 of 21

Battery Installation/Removal

The Lightning Bug™ case incorporates a battery compartment at the rear of the unit. A small latch unlocks a removable battery compartment door.

A standard 9 Volt battery is required for operation. To insert it, gently pull the 9V connector wires out from the compartment and attach a battery. The leads will only allow the battery to be connected in one direction, and snap the leads in place.

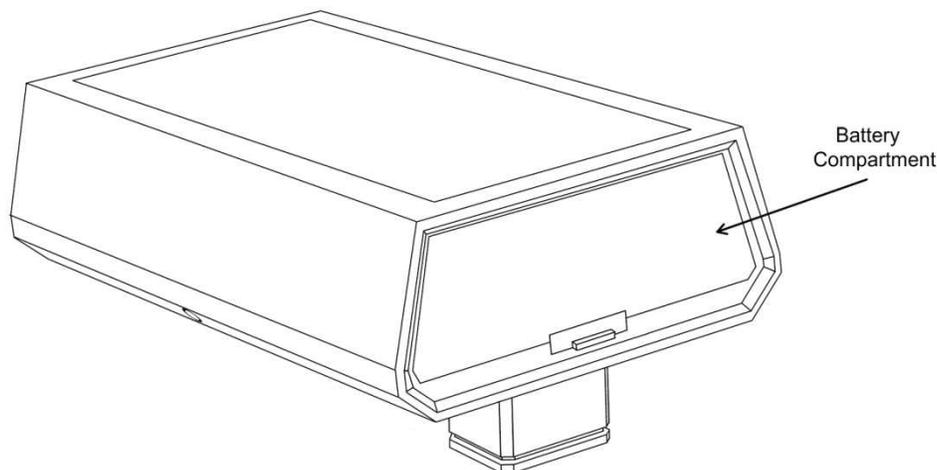
After installation of the battery, the compartment door should be replaced – it snaps into position with an audible click.

To remove the battery, reverse the process.

Please note:

MK Controls does not recommend leaving the battery in place during long storage periods. There is a slight current draw whenever the battery is installed, and after a period of months the battery may no longer have sufficient operating power if left in the Lightning Bug™ during long-term storage. In addition, batteries can, on occasion, leak electrolytes. This fluid is corrosive, and can damage the circuitry of the Lightning Bug™, in addition to the battery connector. The Lightning Bug™ Warranty does not cover damage due to a leaking battery.

Rechargeable batteries are not recommended for use in the Lightning Bug™ due to the current consumption characteristics of the circuitry during operation.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 8 of 21

Camera Connection

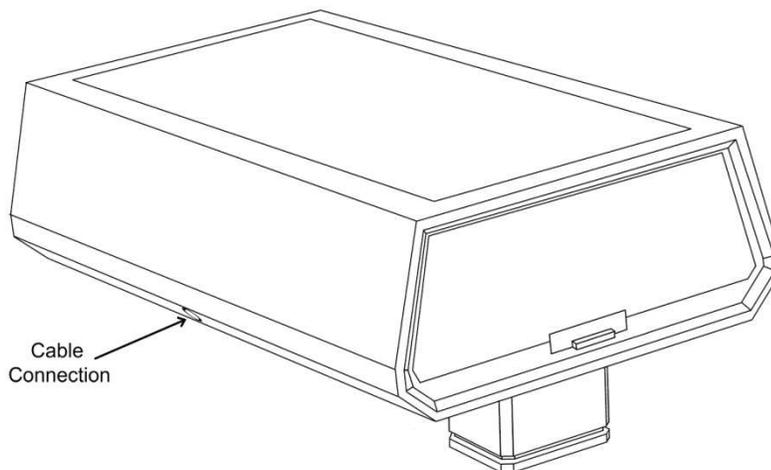
Each Lightning Bug™ purchased includes one cable for connection to your camera. Additional and/or replacement cables are available from MK Controls, or most resellers like camera shops.

The camera connector has a 2.5mm stereo male plug on one end, and the appropriate connector for your camera on the other. The 2.5mm female socket is located at the lower right on the unit. When inserting the cable, please make sure it is fully seated for proper operation.

The camera connector is specific for the model camera you're using – please follow manufacturer's recommendations for insertion of this connector.

When the Lightning Bug™ is powered on, it will automatically activate your camera's meter (on cameras that support this feature). Turning the unit 'off' automatically will release the meter. There is also a feature that allows your meter to always remain deactivated until the shutter is tripped – please see the 'Additional Features' section for more information.

The Lightning Bug™ is designed to fit an industry standard shoe mount, and is self-explanatory.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 9 of 21

Operation

Mounting the Lightning Bug™ on a Camera

First, make sure that both the Lightning Bug™ and your camera are powered off. Attach the unit to your camera's hot-shoe, and then install the shutter cable. You can then power both units on – either can be turned on first.

Point your camera, and then let the Lightning Bug™ do the rest!

Basic User Controls

The Lightning Bug™ has three 'soft-touch' buttons that are used to operate all of the features:

-  **On/Off**
-  **Decrease Sensitivity**
-  **Increase Sensitivity**

On/Off - Press and hold this button for approximately 2 seconds to turn the Lightning Bug™ on or off. When the unit is first turned on, it will execute a Power On Self-Test (POST), which will light up all of the LED's and perform an internal function verification. If during the POST you notice that any LED's fail to illuminate, please contact MK Controls Technical Support for troubleshooting.

Decrease Sensitivity - Tap this button to decrease the sensitivity of the Lightning Bug™. When this button is pressed, the bargraph display (orange LED's) will be show the current sensitivity level. There are a total of 26 levels of available sensitivity. The factory default setting is level 12.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 10 of 21

Increase Sensitivity - Tap this button to increase the sensitivity of the Lightning Bug™. When this button is pressed, the bargraph display (orange LED's) will be show the current sensitivity level. There are a total of 26 levels of available sensitivity**. The factory default setting is level 12.

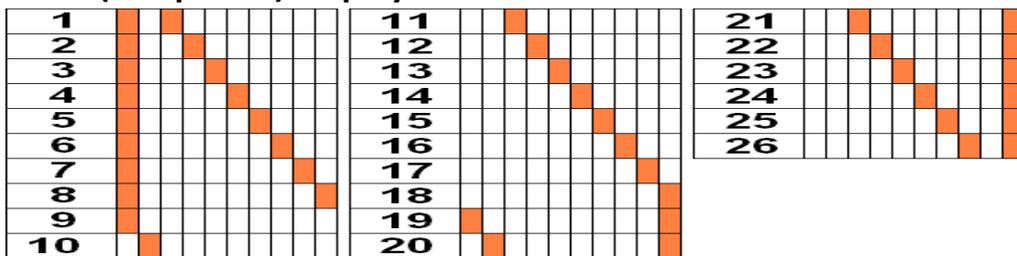
Determining the Current Sensitivity Level - The orange LEDs on the top of the Lightning Bug™ will always display the current sensitivity level when the unit is powered on, 1 being the least sensitive, and 26 being the highest. See Table 1 for more details.

Displayed Information - The orange LED display reflects the current sensitivity level, or when in FPS adjust mode, the frames per second (see Table 1, LED Bar graph Display). When adjusting the sensitivity, all the LED's to the leftmost side will illuminate to allow easier visualization of the setting. Within approximately 1 second of no further adjustments, the display will return to the normal display mode, showing the current sensitivity setting.

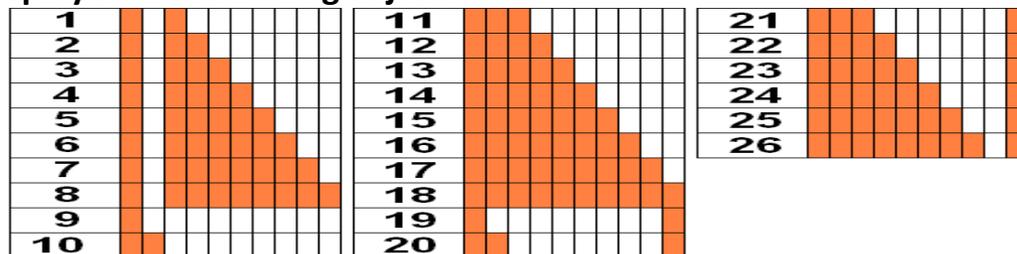
The yellow LED (shaped like a lightning bolt) illuminates whenever the unit has detected an event and has tripped the shutter. When adjusting the FPS, this LED flashes at a rate of approximately 2 times per second.

Table 1: LED Bar graph Display:

Normal (low power) Display:



Displayed while making adjustments:



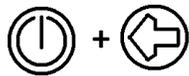
MK CONTROLS

Additional Features

Adjust Frames per Second

You can adjust the maximum number of frames per second that the Lightning Bug™ will cause a shutter trip. This can be adjusted from as few as 1 per second, to as many as 10 per second. The factory default setting is 4 FPS.

To adjust the FPS, the unit must be powered on. Simultaneously press the On/Off Button and the Decrease Sensitivity Button and hold them for approximately 1 second.



The yellow detection light will flash at a rate of approximately 2 times per second when this mode is correctly entered. Use the Sensitivity Buttons to decrease or increase the number of frames per second. The orange LED display will be updated to show the current setting. If no keystrokes are detected within approximately 3 seconds, the FPS setting is stored, and the unit returns to the normal operating mode (the yellow detection light will cease to flash).

Adjust Active/Inactive Meter Mode

By default, the Lightning Bug™ will activate your camera's meter anytime the unit is powered on. This functions on most cameras as if the shutter was held down halfway. This greatly reduces the lag between the Lightning Bug™ triggering the camera and the camera actually taking the image. In most situations, this is the ideal setting as it decreases the chance of missing an image.

Powering off the Lightning Bug™ will deactivate the camera meter. This allows easy review of any captured images. In some situations, it may be desirable to have the Lightning Bug™ activate the camera's meter only when the shutter is triggered. This will allow you to review your image on the camera's LCD after the image is captured without turning off the Lightning Bug™.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 12 of 21

Warning – if you enable this feature, you may miss shots. Enabling this feature will increase the time it takes for the shutter to be triggered by the Lightning Bug™

To modify this setting, the unit must first be powered on. Simultaneously press the On/Off Button and the Increase Sensitivity Button and hold them for approximately 1 second.



The yellow detection light will flash at a rate of approximately 2 times per second when this mode is correctly entered. Press either Sensitivity Button to toggle between the On and Off modes for automatic meter control. When the automatic mode is On, the rightmost orange LED (below the + sign) will be illuminated. When the automatic mode is Off, the leftmost orange LED (below the – sign) will be illuminated.

When the automatic meter control is Off, the meter will remain OFF until the shutter trips. When the automatic meter control is On (factory default), the meter will remain ON whenever the Lightning Bug™ is powered on (and will be turned OFF when the unit is powered off).

Verify Shutter Trip

You can verify that the unit is properly tripping your cameras shutter, and also verify the FPS rate, by holding down both the Decrease and Increase Sensitivity Buttons simultaneously.



While holding these buttons, the Lightning Bug™ will continuously trip your camera shutter at the current FPS setting~. Release both buttons to return the unit to the normal operating mode.

~ The Lightning Bug™ is not capable of exceeding your camera capacity for frames per second – this setting reflects the number of times per second that the unit will ‘attempt’ to trip your shutter.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 13 of 21

Photography Tips

Camera Settings - Day or Night

1. Set your lens to Manual focus. Prefocus on your subject, i.e. a tree, building etc. You can also focus on a distant subject, or set the lens on the infinity setting (∞). With some lenses it helps to place a piece of tape on the focus ring to hold the focus at the proper point.

Note: You can also use the hyperfocal method to ensure there will be enough Depth of Field in your images. If you are unaware of how to use hyperfocal focusing, the Internet is a valuable resource; there is ample information available.

2. Set the Lightning Bug™ to match the frames per second (FPS) that the camera is using (see your camera manual for more information). This will allow the Lightning Bug™ to drive the camera quickly in case of repeated lightning strikes. In the right conditions with a fast camera, you can capture up to 10 lightning strikes per second.

For day-time use

1. Set the camera to Aperture Priority (A mode). The camera will calculate the proper shutter speed. Set your aperture using the chart below.
2. You can increase or decrease the sensitivity on the Lightning Bug™ based on shooting conditions. The default sensitivity is 12, out of 26 levels. The Lightning Bug™ only triggers your camera's shutter. Changing the sensitivity only changes when the camera captures an image. It does not change the exposure used by the camera during the capture.
3. Use the chart below for recommended settings.

Day	Close	Middle	Distant
Very Dim	ISO 100 @ f5.6	ISO 100 @ f4	ISO 200 @ f2.8
Average	ISO 100 @ f8	ISO 100 @ f5.6	ISO 200 @ f2.8
Very Bright	ISO 100 @ f16	ISO 100 @ f11	ISO 200 @ f4



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 14 of 21

For night-time use

1. Set the camera to Manual Mode (M mode). Set your aperture using the chart below.
2. Set the shutter speed to 1/4 second or longer. When shooting cityscapes, capture several test images. Your exposure should be for the ambient light within your composition.
3. Be sure to experiment with shutter speeds.

Night	Close	Middle	Distant
Very Dim	ISO 200 @ f5.6	ISO 200 @ f4	ISO 400 @ f2.8
Average	ISO 200 @ f8	ISO 200 @ f5.6	ISO 400 @ f2.8
Very Bright	ISO 100 @ f16	ISO 100 @ f11	ISO 200 @ f4

Synchronizing An External Flash

The Lightning Bug™ allows the use of external flash(es) that are synchronized with your shutter trip. This can be used for unique foreground ‘fill’ effects, by lighting up rocks, flowers, plants, etc. in the foreground. This gives a more pleasing effect, preventing the foreground from becoming too dark to see.

Using a standard PC cable (available from your local camera store), attach your external flash device to the PC connector on the Lightning Bug™ hot-shoe adaptor.

For examples of shots using this effect, please visit our website at www.mkcontrols.com.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 15 of 21

Troubleshooting

1. **The Lightning Bug™ will not power on**
 - Try a fresh 9V battery.
 - Check that the battery connector is firmly attached to the battery.
2. **During the POST (Power On Self-Test), some of the LED's do not light up or appear dim**
 - Try a fresh 9V battery.
 - Check that the battery connector is firmly attached to the battery.
3. **Not all of the functions described in the manual seem to work on my unit**
 - If the unit was purchased before Dec 31, 2011, it may need an update. Contact us prior to returning your unit and we'll check if your unit can be updated.
4. **There's lightning all around me, but I'm not getting any pictures!**
 - Try pressing the LEFT and RIGHT buttons simultaneously with the unit powered on and connected to your camera. If your camera takes a picture once per second, the Lightning Bug™ is communicating with your camera.
 - Try a fresh 9V battery.
5. **My camera takes a picture when I press the LEFT and RIGHT buttons, but I'm still not getting any shots of lightning!**
 - Watch the yellow lightning bolt on the Lightning Bug - if it lights up, the unit is 'seeing' the lightning flashes. If your camera still isn't taking pictures when the yellow LED lights up the lightning bolt, your camera may not be configured correctly. - Make sure all of your camera settings are set to 'Manual' - the 'Auto' mode will, in many cases, prevent the Lightning Bug™ from correctly triggering your camera.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 16 of 21

- 6. When I press the LEFT and RIGHT buttons to test the system, nothing happens**
 - Please verify that your camera to Lightning Bug™ cable is fully inserted, and inserted correctly, into your camera. Some cables, like the Nikon DC2, can inadvertently be plugged in backwards.
- 7. There's lightning all around me, but the lightning bolt on the Lightning Bug™ never lights up**
 - Increase the sensitivity of the Lightning Bug™ by pressing the RIGHT arrow.
 - Make sure that the Lightning Bug™ is not behind a pane of glass - most modern glass windows in cars and homes block infra-red light, which the Lightning Bug™ needs to 'see' in order to function.
- 8. My camera keeps tripping the shutter whenever the Lightning Bug™ is attached to it**
 - Decrease the sensitivity of the Lightning Bug by pressing the LEFT arrow.
- 9. I can't see my pictures on the camera back immediately after a shot is taken**
 - Change the meter mode function in the Lightning Bug™ to set the meter to 'Always Off' - see the Operations section of this manual for more details.
- 10. What do I do if none of these suggestions works?**
 - You can either contact us to discuss the issue, or you can return the unit to us for service - see <http://www.mkcontrols.com/lightningbug/rma/> for instructions.



Lightning Safety

Please remember that your safety is much more important than getting the shot. MK Controls is not liable for any injuries or damage that may occur while using our products. Being safe should always be your primary concern.

MK Controls Inc. recommends that you follow all lightning safety tips that can be found at:

<http://www.lightningsafety.noaa.gov/>

<http://www.lightningsafety.com/>

<http://www.ready.gov/thunderstorms-lightning>

Please note: MK Controls Inc. is not liable for any damage or injury associated with the use of the Lightning Bug™.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Warranty

MK Controls, Inc. provides the following limited warranty on all products:

What Does This Warranty Cover?

This warranty covers any defects in materials or workmanship in the Lightning Bug™.

How Long Does The Coverage Last?

This warranty lasts three years from the date of purchase. Please save your original sales receipt, it will be needed for any warranty repairs.

What Will MK Controls Inc. Do Under Warranty Coverage?

During the warranty period, MK Controls Inc. will repair or replace any defective or malfunctioning product at no charge to you (including shipping charges).

What Does This Warranty Not Cover?

Any problem that is caused by abuse, misuse, or an act of God (such as a flood) is not covered. Battery leakage is also not covered.

Consequential and incidental damages are not recoverable under this warranty. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

If something goes wrong with your product, please send it along with a written description of the problem, including the make/model of the camera to:

MK Controls Inc.
419 S. Davis St.
Nashville, GA 31639

You must include a copy of your original sales receipt.

We will inspect and repair or replace the product at no charge to you once we have determined that the product is under warranty.

How Does State Law Apply? This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Rev: June 27, 2013

Page 19 of 21

What if my product is not covered by this warranty?

MK Controls is proud to offer a no-fault replacement policy.

If you damage your product beyond repair i.e. Back you car over it, drop it in the ocean, your puppy chews it to pieces, etc. we will repair or replace it for \$49.00 + shipping.

Send your product (or what is left of it), postage paid to:

**MK Controls Inc.
419 S. Davis St.
Nashville, GA 31639**

Please include a story of how the damage occurred. We reserve the right to use these stories on our website. Your name will not be revealed.

We must be able to indentify that the pieces were indeed our product; the internal circuit board must be identifiable for us to replace the unit under our replacement policy. Your damaged unit will not be returned.

Why do we offer a no-fault replacement policy?

We want you to actually use and enjoy our products, and not have to worry about accidental damage. We are very confident that our products will provide you with years of trouble free service, but if something bad happens, we've got you covered.



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION

Company Information

The Lightning Bug™ is produced and warranted by MK Controls, Inc., an Ohio Corporation. MK Controls is based in Harrison, OH, and has manufacturing facilities located in Nashville, GA.

Sales Inquiries: sales@mkcontrols.com

Technical Support: support@mkcontrols.com

Corporate Headquarters:

MK Controls, Inc.
1160 Stone Drive
Harrison, OH 45030

Manufacturing Headquarters:

MK Controls, Inc.
419 S. Davis St.
Nashville, GA 31639

Internet: <http://www.mkcontrols.com>



MK CONTROLS

ENGINEERED FOR YOUR IMAGINATION