

EMERGENCY LIGHTING SYSTEM

September 29, 2018

Contents

Introduction	2
System Overview	2
Enabling Emergency Mode	2
Ketra Lights in Emergency Mode	2
Ketra Controls in Emergency Mode	3
Emergency System Requirements	3
System Architecture	4
UPS System	4
Generator System	6
Support	8

Introduction

Ketra offers a cohesive system of lighting fixtures, controls and software that allows for easy deployment of natural light. Our lighting products can operate individually or as part of a larger lighting control solution. The Ketra system can be standalone or integrated with other lighting controls and building automation products.

This app note addresses Ketra's emergency lighting protocol. In the event of a loss of building power, the Ketra system can draw power from a generator or battery inverter. Ketra lights that have been configured for Emergency Mode (EM) go to a configurable default state (color and intensity). Those lights will ignore all state-change commands, including user input and time-clock events, until normal power is restored. Upon the restoration of normal power, the lights will automatically return to normal functionality.

This app note does not feature instructions on configuring EM in the Design Studio software. Those instructions can be found in the Design Studio Manual available on our website.

Note: In applications that integrate Ketra with a Homeworks QS system by Lutron, emergency lighting should be configured through Homeworks QS, not the Ketra system.

System Overview

ENABLING EMERGENCY MODE

EM is enabled in the Design Studio software.

Ketra supports EM for individual wireless lights and for runs of linear fixtures, but not for individual linear fixtures. We also do not support enabling EM on third-party lighting controlled by Ketra N3 Satellites or X2 Dimmers.

For instructions on enabling EM in Design Studio, see the Design Studio Manual available on our website.

KETRA LIGHTS IN EMERGENCY MODE

After EM has been enabled in Design Studio, any power cycle of at least 2 seconds will cause the enabled lights to go into EM. Power cycles should only occur upon a loss of building power, since Ketra lights should never be put on circuits with publicly accessible on/off switches.

A Ketra light in EM has two defining features:

- The light's *state* (color and intensity configuration) goes to a default configurable in Design Studio. The factory default setting is 3000K at 100% intensity.¹
- The light ignores all commands until it receives a signal from a Ketra N3 Satellite that normal power has been restored. (The N3's role in detecting emergency events is discussed below.)

¹ For instructions on setting default states in Design Studio, see the Design Studio Manual available on our website. The manual has sections dedicated to emergency mode and setting default states for Ketra lights

continued on next page

KETRA CONTROLS IN EMERGENCY MODE

The N4 Hub and X2 Keypad do not need power from an emergency circuit. The N3 Satellite only needs emergency power if linear lights enabled for Emergency Mode are connected to it.

The Ketra system does not rely on any wireless communication to enter EM. Instead, a 2-second (minimum) power cycle forces all Ketra light sources to their default states, as described in **Ketra Lights in Emergency Mode**, above. Once the system comes back online after normal power is restored, a wireless signal is transmitted from one N3 Satellite to the rest of the system, allowing normal functionality. Since this function only occurs once normal power has been restored, Ketra controls do not require emergency power.

EMERGENCY SYSTEM REQUIREMENTS

- The spacing, quantity, and emergency state (color and intensity) of the Ketra emergency lights must meet code requirements.
- The backup AC power source must produce a sinusoidal (sine) wave. If the system uses battery inverters, confirm before proceeding that the inverters do not produce a square wave.
- Loss of normal power, and restoration of normal power, must trigger a contact closure connected to a Ketra N3 Satellite. This can be done using a contact-closure UPS or a normally open, UL924-certified shunt relay.
 - *Why?* Without this contact closure, the Ketra system would be stuck in EM. When normal power is restored, the contact closure switches back to its normal state, causing the N3 to wirelessly broadcast an all-clear signal.
 - Only 1 emergency contact closure is required per installation.
 - For diagrams of valid emergency systems, see **System Architecture**, page 4. For instructions on configuring the N3's CC input in Design Studio, see the Emergency Mode section of our Design Studio Manual (available on our website).
- Other than the contact-closure N3, all emergency lights must lose power for at least 2 seconds before restoring with emergency power².
 - If backup batteries supply the emergency power, Ketra requires a **2-second power interrupt device**. (This system is illustrated in **System Architecture > UPS System**, page 4.)
 - If a generator supplies the emergency power, a 2-second delay will likely be built into the system, since generators typically take longer than 2 seconds to energize a system after power loss. This should be verified with the generator manufacturer. (This system is illustrated in **System Architecture > Generator System**, page 6.)

²We use a power cycle to enter EM because it is more reliable than a wireless signal. While we make every effort to ensure robust wireless communication, we cannot guarantee it in the case of an emergency.

System Architecture

UPS SYSTEM

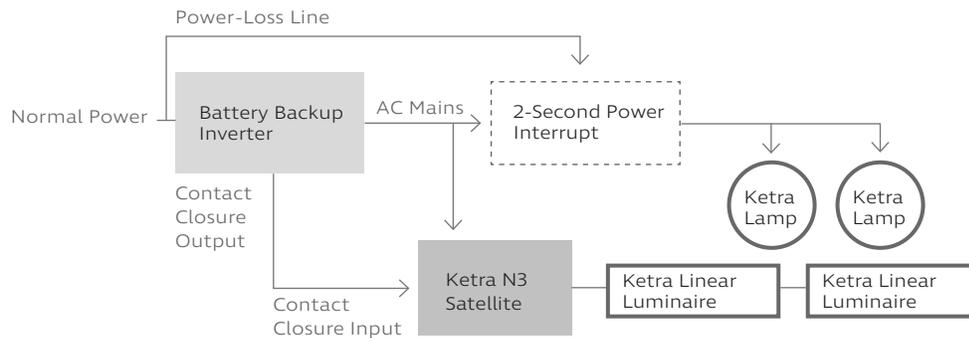


fig. 1

When normal power is lost:

1. UPS (battery backup inverter) switches to battery power, triggering contact closure
2. If enabled, N3 puts its own linear run into EM
3. 2-second power interrupt device detects loss of normal power, power cycles downstream emergency lights
4. All Ketra emergency lights now ignore state-change commands until restoration of normal power

When normal power is restored:

1. UPS switches to normal power, triggering contact closure
2. N3 broadcasts an "all clear" signal
3. Ketra emergency lights return to normal functionality

Notes:

- The N4 Hub does not need emergency power, because the Ketra system enters EM with a power cycle rather than relying on wireless signal.

continued on next page

- If the contact-closure N3 Satellite does not have attached emergency fixtures, it does not need power in an emergency. Consequently, it can use normal power, as shown in fig. 2.

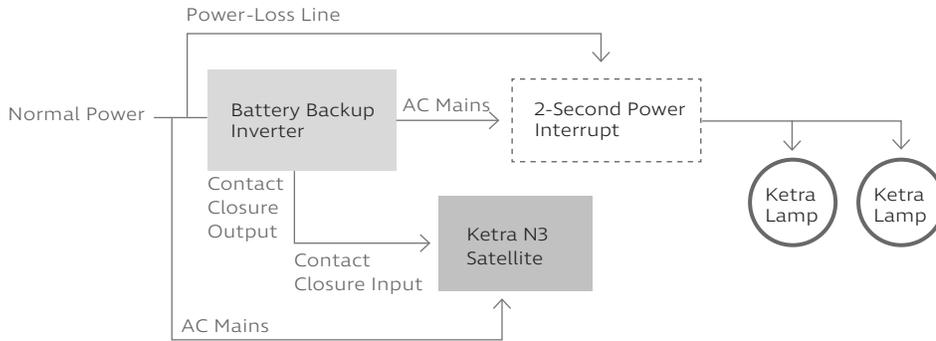


fig. 2

- If the UPS does not support contact-closure output, use a relay instead, as shown in fig. 3.

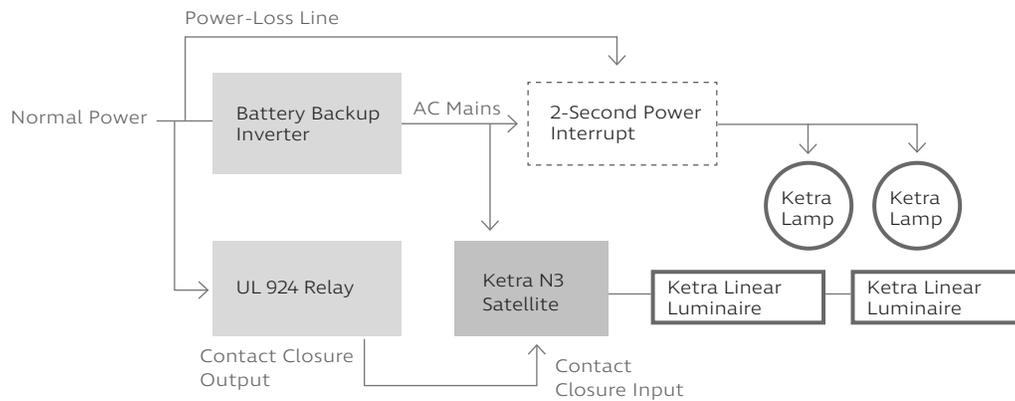


fig. 3

- Any additional N3 Satellites used for emergency lighting should be downstream of the 2-Second Power Interrupt device, as shown in fig. 4.

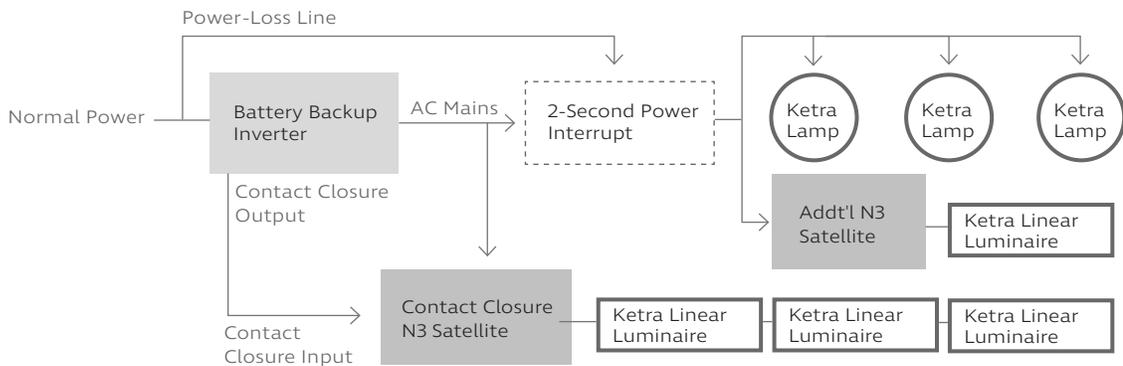


fig. 4

continued on next page

GENERATOR SYSTEM

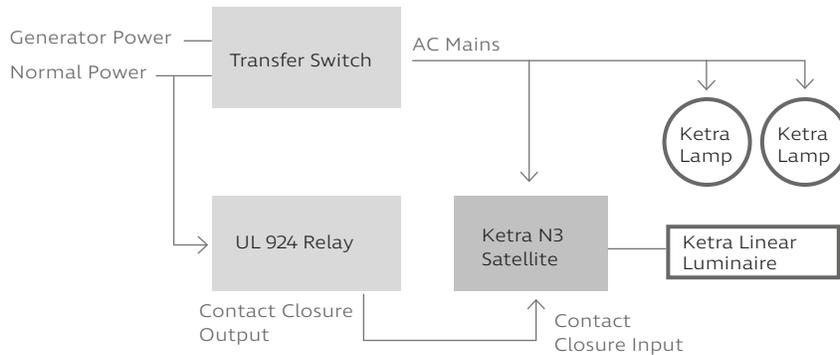


fig. 5

When normal power is lost:

1. Relay detects loss of normal power and triggers contact closure
2. Transfer switch detects loss of normal power and switches to generator power
3. System is unpowered for several seconds while generator initiates
4. Once generator provides emergency power, all Ketra emergency lights ignore state-change commands until restoration of normal power

When normal power is restored:

1. Relay detects normal power and triggers contact closure
2. N3 broadcasts an "all clear" signal
3. Ketra emergency lights return to normal functionality

Notes:

- The N4 Hub does not need emergency power, because the Ketra system enters EM with a power cycle rather than relying on wireless signal.

continued on next page

- If the contact-closure N3 Satellite does not have attached emergency fixtures, *it does not need power in an emergency*. Consequently, it can use normal power, as shown in fig. 6.

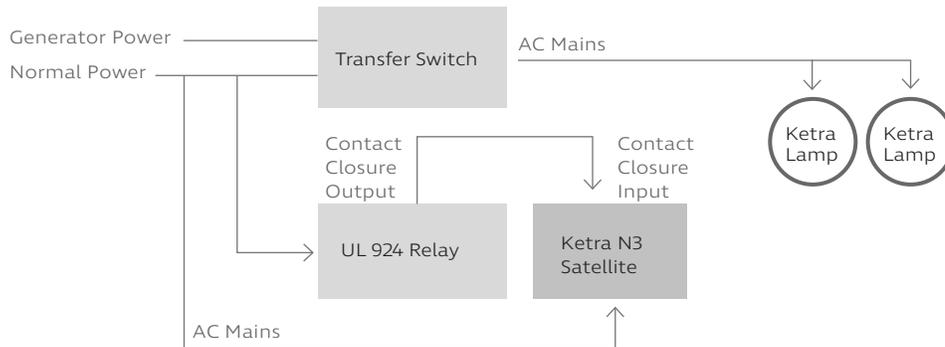


fig. 6

- Any N3 Satellites used for emergency lighting should be downstream of the transfer switch, as shown in fig. 7.

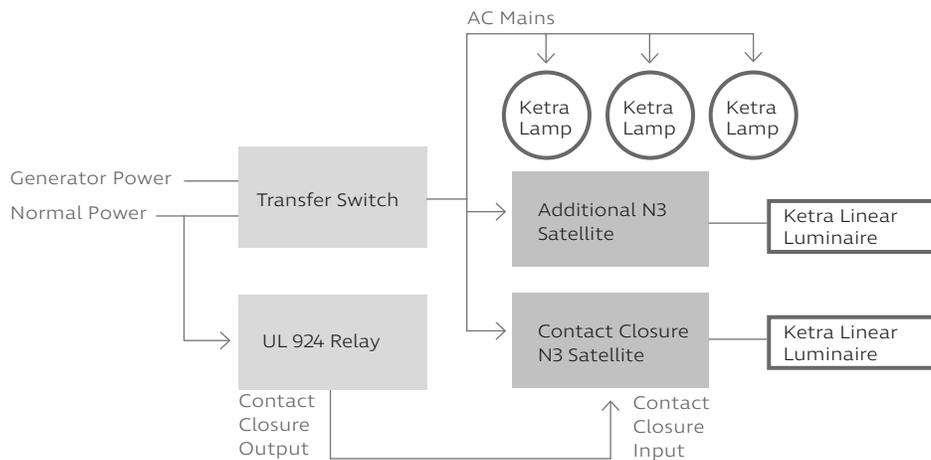


fig. 7

Support

Looking for instructions on using Design Studio to configure EM? Reference the Design Studio Manual available on our website, especially the two sections on enabling EM and setting default states for Ketra groups.

For questions and technical support please contact:

(512) 872-4357
support@ketra.com

continued on next page