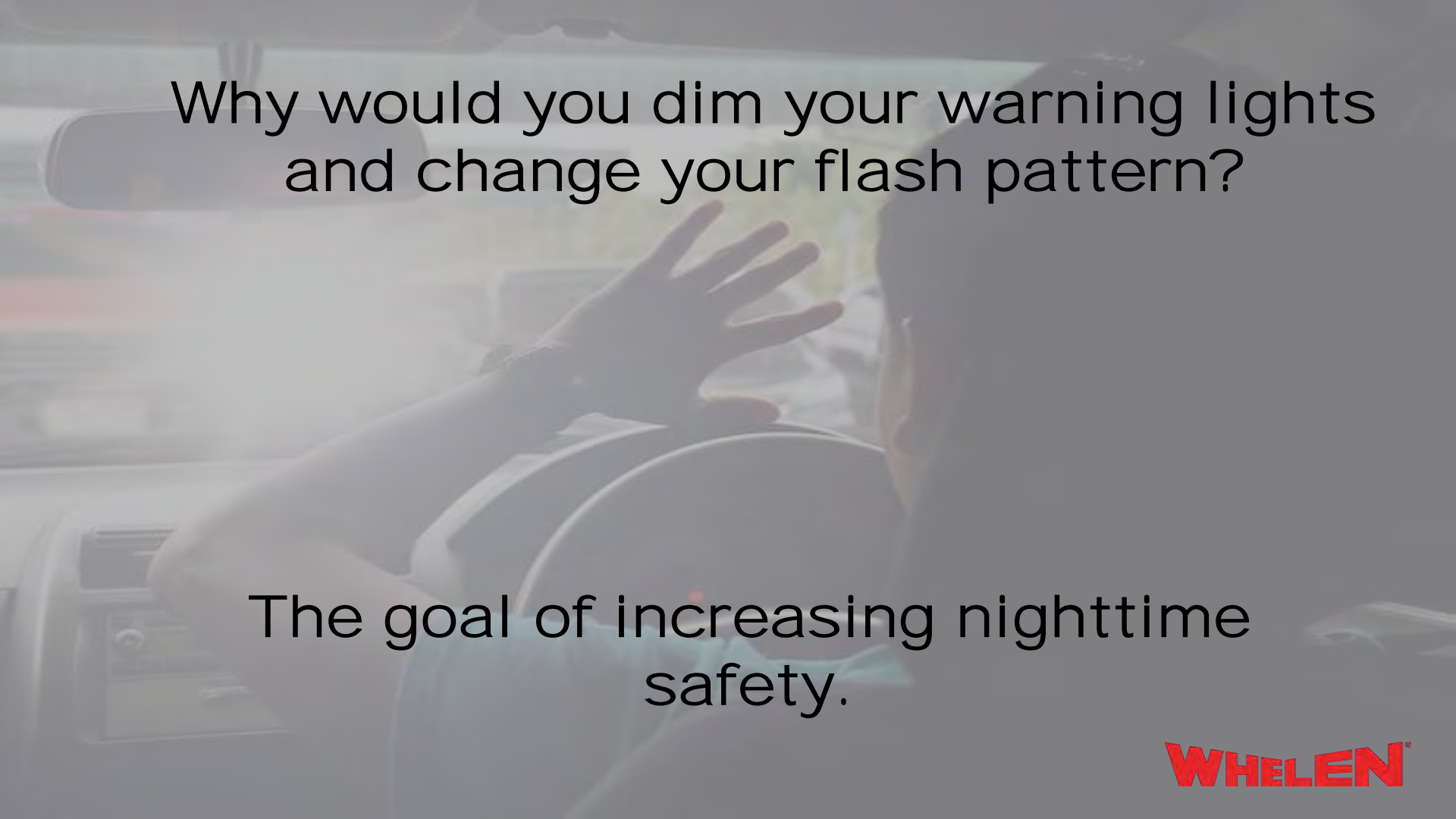


# Sutphen Dealer Meeting 2022

Whelen Engineering Workshop

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A person is driving a car at night, with their hand on the steering wheel. The background is dark, and the car's interior is visible. The text is overlaid on the image.

Why would you dim your warning lights  
and change your flash pattern?

The goal of increasing nighttime  
safety.

**WHELEN®**



FDIC SHOW  
1992  
CINCINATI, OH  
NFPA STUDY



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# MINIMUM INTENSITY REQUIREMENTS

## LARGE APPARATUS > 25'

Table 13.8.13.5 Minimum Optical Power Requirements for Large Apparatus

		Mode of Operation					
		Calling for Right-of-Way			Blocking Right-of-Way		
Zone	Level	<i>H</i> Total	At Any <i>H</i> Point	At Any Point 5 Degrees Up or 5 Degrees Down from <i>H</i>	<i>H</i> Total	At Any <i>H</i> Point	At Any Point 5 Degrees Up or 5 Degrees Down from <i>H</i>
A	Upper	1,000,000	10,000	3,500	400,000	10,000	3,500
B	Upper	400,000	10,000	3,500	400,000	10,000	3,500
C	Upper	400,000	10,000	3,500	800,000	10,000	3,500
D	Upper	400,000	10,000	3,500	400,000	10,000	3,500
A	Lower	150,000	3,750	1,300	150,000	3,750	1,300
B	Lower	150,000	3,750	1,300	150,000	3,750	1,300
C	Lower	150,000	3,750	1,300	150,000	3,750	1,300
D	Lower	150,000	3,750	1,300	150,000	3,750	1,300

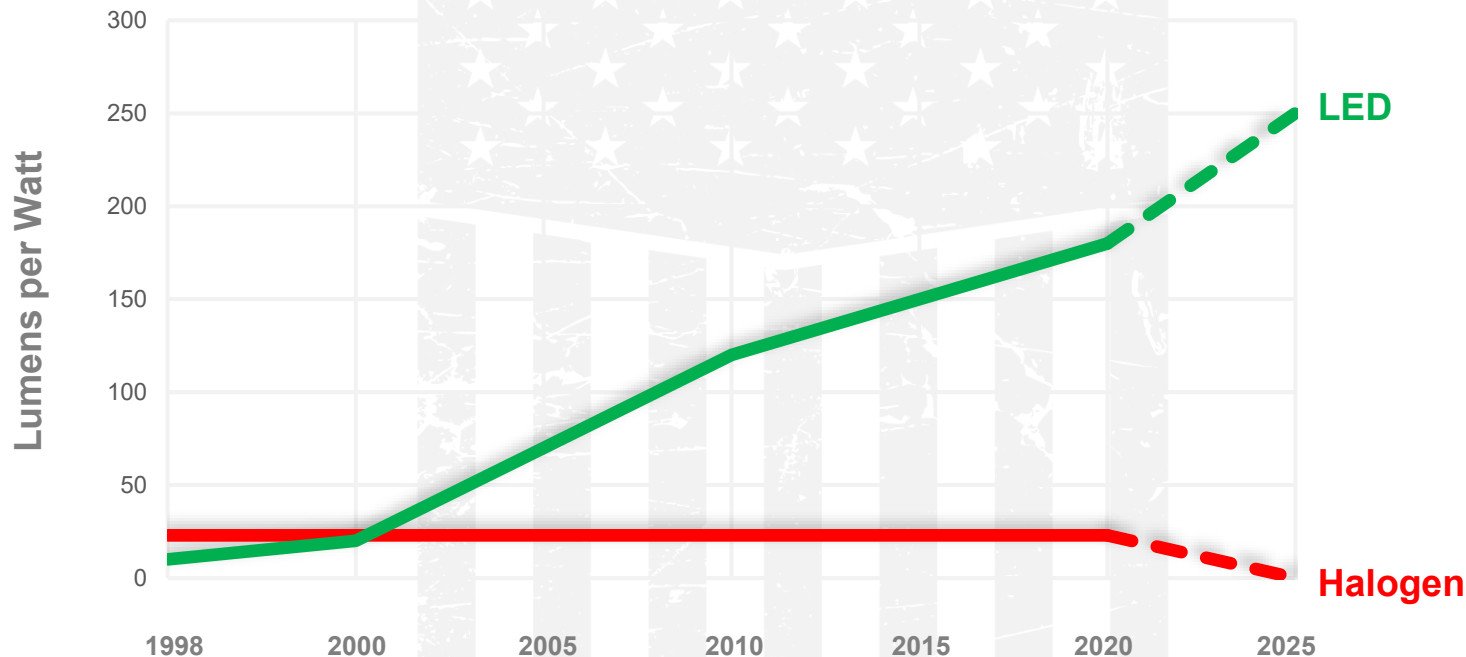
Notes:

1. All values are in candela-seconds/minute.
2. *H* = Horizontal plane passing through the optical center.
3. The values in the *H* Total columns are the total of 19 data point values for each light, with data points on the boundary between zones counted in both zones.



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# The INTENSITY of LED's has increased ten-fold in the last 10 years



Halogen vs. LED

**WHELEN®**



# INDUSTRY STUDIES

## **NCHRP 13-02 - Development of Guidelines for Warning Lights on Maintenance Vehicles**

Virginia TECH Transportation Institute

[Dr. Ronald B. Gibbons](#)

## **Warning Beacons for Front Line Service Worker Safety**

NIOSH Grant No. R01 OH010165

Lighting Research Center, Rensselaer Polytechnic Institute

[Mark S. Rea, Ph.D., Principal Investigator](#)

## **Research reveals “visual chaos” in service truck warning light**

Lighting Research Center

Rensselaer Polytechnic Institute

[Dr. John Bullough](#)

## **Effects of Warning Lamp Color and Intensity on Driver Vision**

Report of work on Non-Blinding Emergency Vehicle Lighting (NBEVL)

The University of Michigan - Transportation Research Institute

[Michael J. Flannagan](#)

[Daniel F. Blower](#)

[Joel M. Devonshire](#)

## **Do More Emergency Lights Make You Safer?**

[Mark Karczewski](#)

[John Swain](#)

## **Florida Highway Patrol Experimental Lighting Study**

[Jim Wells](#)

## **Police Vehicle Warning Signals. An Invocative Approach to Officer Safety**

[Scott Potter](#)

## **Evaluation of Nighttime Mobile Warning Lights**

Illinois Center for Transportation

Research Report No. FHWA-ICT-13-032

## **Discomfort of Glare and Brightness as Function of Wavelength**

[Michael J. Flannagan](#)

[Micheal Sivak](#)

[Eric C. Traube](#)

## **Bright ideas: Emergency lighting Intensity for Day and Night Conditions**

[Andrew Vasta](#)

## **Risk Reduction for Emergency Response**

Federal Signal

## **Nighttime Glare and Driving Performance**

NHTSA - Report to Congress

## **EFFECTS OF WARNING LAMPS ON PEDESTRIAN VISIBILITY AND DRIVER BEHAVIOR**

[Micheal Flannagan](#)

[Joel M. Devonshire](#)

## **Pilot Perception of Light Emitting Diodes Versus Incandescent Elevated Runway Guard Lights**

Embry-Riddle

Aeronautical University

[Hillary Stevens](#)

## **Roadside Safety: Retro-Reflective Cars & Auto-Dimmed Lightbars**

[Stephen Marsh](#)

## **Study of Protecting Emergency Responders on the Highways and Operation of Emergency Vehicles**

Cumberland Valley Volunteer Firemen's Association

The logo for WHELEN, featuring the word "WHELEN" in a bold, red, sans-serif font. The letters are slightly stylized, with the 'W' and 'H' having a unique, blocky appearance. The logo is positioned in the bottom right corner of the page.

# Case Studies

*With smarter control of the flash rates and intensities while in park, Massachusetts State Police feel that 'We have created the safest police vehicle possible with today's technology'*

Karl Brenner  
Fleet Administrator

*University of Rhode Island  
Independent Study shows slow  
synchronized low intensity flash  
patterns, especially at night, will  
increase officer safety*

Rick Davids  
Human Factors Engineer

A faded, grayscale American flag with stars and stripes, serving as a background for the title text.

# Nighttime Dimming Initiative

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# DAYTIME BRIGHT SUN

*Cellphone Screen is hard to see*



# NIGHTTIME INTENSITY GLARE

*Too bright at night  
Need to decrease screen brightness*



# INDUSTRY IMPLEMENTATION NIGHTTIME DIMMING TECHNOLOGY

- DeKalb Co. FD, GA
- Delta Twp FD, MI
- Lake Travis FD, TX
- Des Moines FD, IA
- and more

A faded, stylized American flag with stars and stripes, serving as a background for the title text.

# DVI PATTERNS

## Dynamic Variable Intensity

# What is DVI?

Dynamic Variable Intensity (DVI)  
flash patterns



# Effects of Flash Patterns



## Signal Alert 75

Some Flicker Some ON Time

Calling Right of Way  
daytime



## Signal Alert 75

Some Flicker Some ON Time

Calling Right of Way  
nighttime



## Signal Alert 75

Some Flicker Some ON Time

Blocking Right of Way  
daytime



## DVI 75

No Flicker Calming Flash

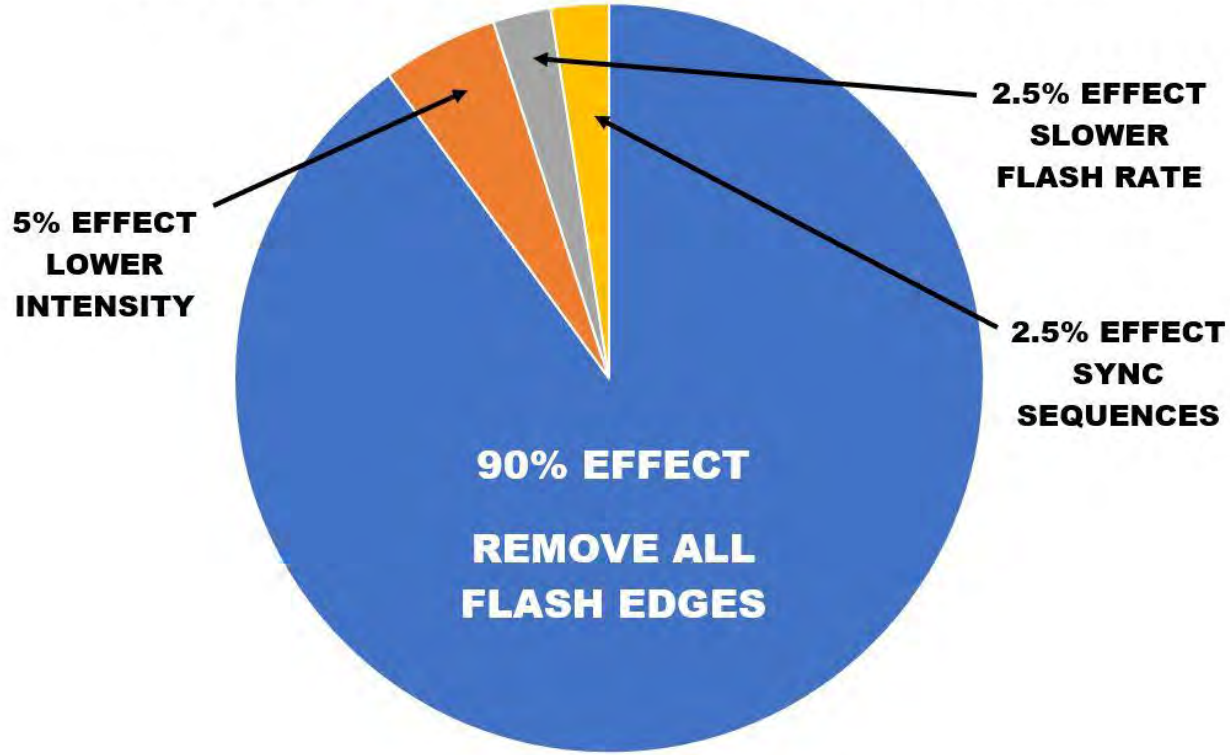
Blocking Right of Way  
nighttime



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## EFFECT OF 4 KEY SAFETY FEATURES





# 4 Key Safety Features

Nighttime or Low Ambient Light

1. *Remove all EDGES in Flash Patterns*
2. *Lower Intensity to minimum NFPA Standards*
3. *Use Slower Flash Patterns*
4. *Use Synchronized Flash Sequences*

# Calling Right of way

☀ *Daytime*

- Fire Apparatus is MOVING
- Public vehicles must STOP
- DANGER crossing intersections



Maximum High Intensity  
100% PWM

# Calling Right of way

☀ *Daytime Features*

## Single Flash 75

### Some Flicker – More On Time

- Eye catching in bright sun
- Very conspicuous
- Signals the Apparatus is MOVING

**100%** PWM  
Intensity



### Maximum Brightness

Visible over the bright sun

# Blocking Right of way

☀ *Daytime*

- Fire Apparatus parked at scene
- Public vehicles MOVING past scene



Maximum High Intensity  
100% PWM

# Blocking Right of way

☀ *Daytime Features*

## Single Flash 75

**Some Flicker – More On Time**

- Eye catching in bright sun
- Very conspicuous

**100%** PWM  
Intensity



**Maximum Brightness**

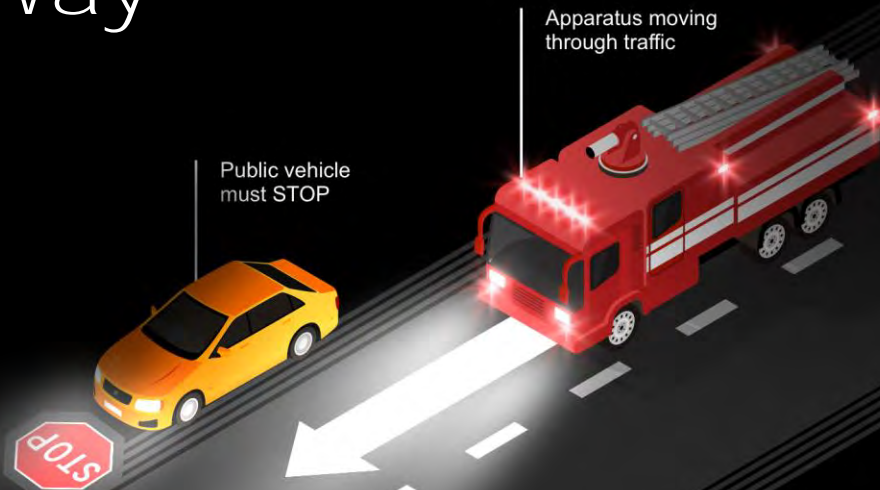
Visible over the bright sun



# Calling Right of Way

🌙 *Nighttime*

- Fire Apparatus is MOVING
- Public vehicles must STOP
- DANGER crossing intersections



Apparatus moving  
through traffic

Public vehicle  
must STOP

**100%** PWM  
Intensity



Whelen Engineering Company

# Calling Right of Way

☾ *Nighttime Features*

## Signal Alert 75

### Some Flicker – More On Time

- Attention getting - Less flash edges
- Signals Apparatus is MOVING

100% PWM  
Intensity



### High Intensity

Moving Apparatus

High Priority Messaging

Public MUST pull over

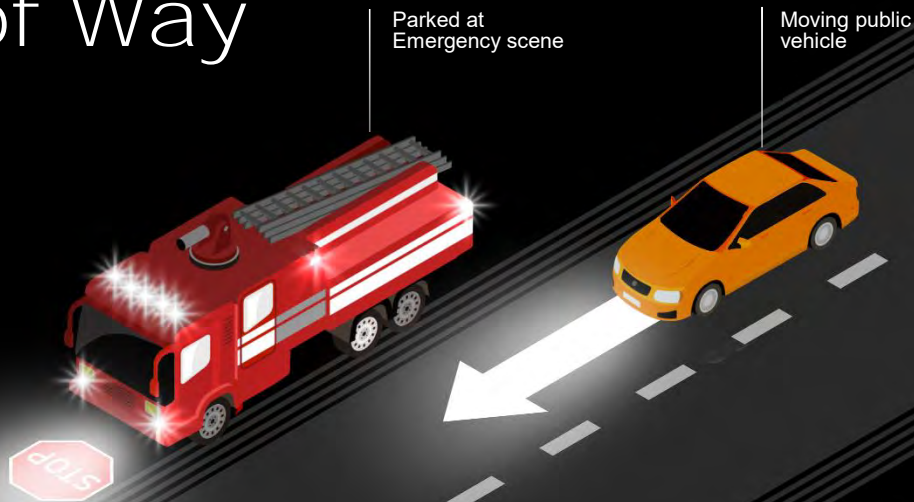


Whelen Engineering Company

# Blocking Right of Way

🌙 *Nighttime*

- Parked at Emergency Scene
- Moving public vehicle



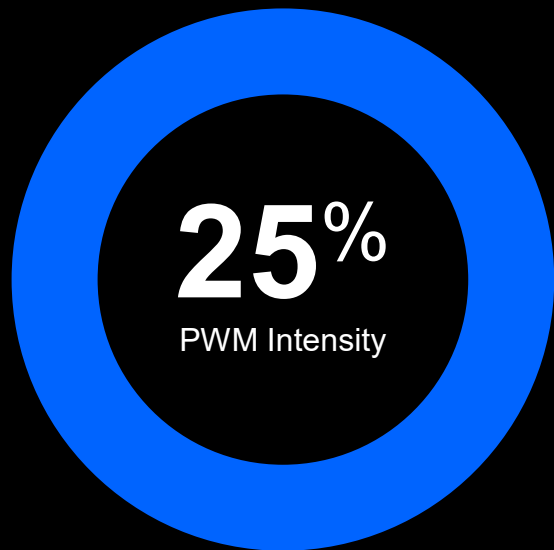
**25%** PWM  
Intensity



Whelen Engineering Company

# Blocking Right of Way

 *Nighttime Features*



## DVI 75

*Calming Flash Pattern*

DVI 75 - Dynamic Variable Intensity

More calming effect to the eyes

NO flash edges

### **LOW Intensity**

Reduce to the minimum

NFPA requirements

Reduces Glare



Whelen Engineering Company

A large, faded American flag serves as the background for the slide. The stars are visible in the upper left, and the stripes run vertically down the center.

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# Synchronized Flash Patterns

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# 2022 Whelen FDIC Demo

**Whelen's CenCom Core® Experience**





# W E C A N Vehicle-to-Vehicle Sync module



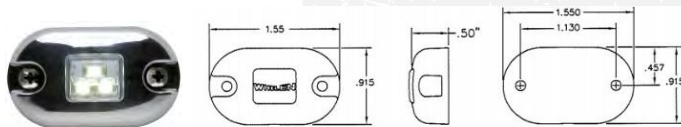
**WHELEN**

# Whelen DVI Enabled Products

## RUNNING CHANGE

- Current **MODEL** Numbers will **NOT** change
- *Same* Item Number with with REV change
- New Calibrated Low Power Intensity
- Backwards compatibility





## FEATURES

The **MODEL LCPHOTO** is a compact photocell sensor with a digital output. The illuminance trip point is fixed at 50 lux maximum, which indicates dusk. The output is at 0 VDC during the daylight hours and switched to + battery voltage at dusk. This sensor is primarily used to control the HI to LO intensity control of LED warning lightheads. The 250ma output driver can drive up to 25 lighting products and is output short circuit protected. The light sensor input has a hysteresis of 50ms response to dark and 15 second response to light, which helps ignore the quick variations of sunlight. The sensor detects IR energy of the sun, which helps to ignore warning and scene lighting. Available in chrome or black.

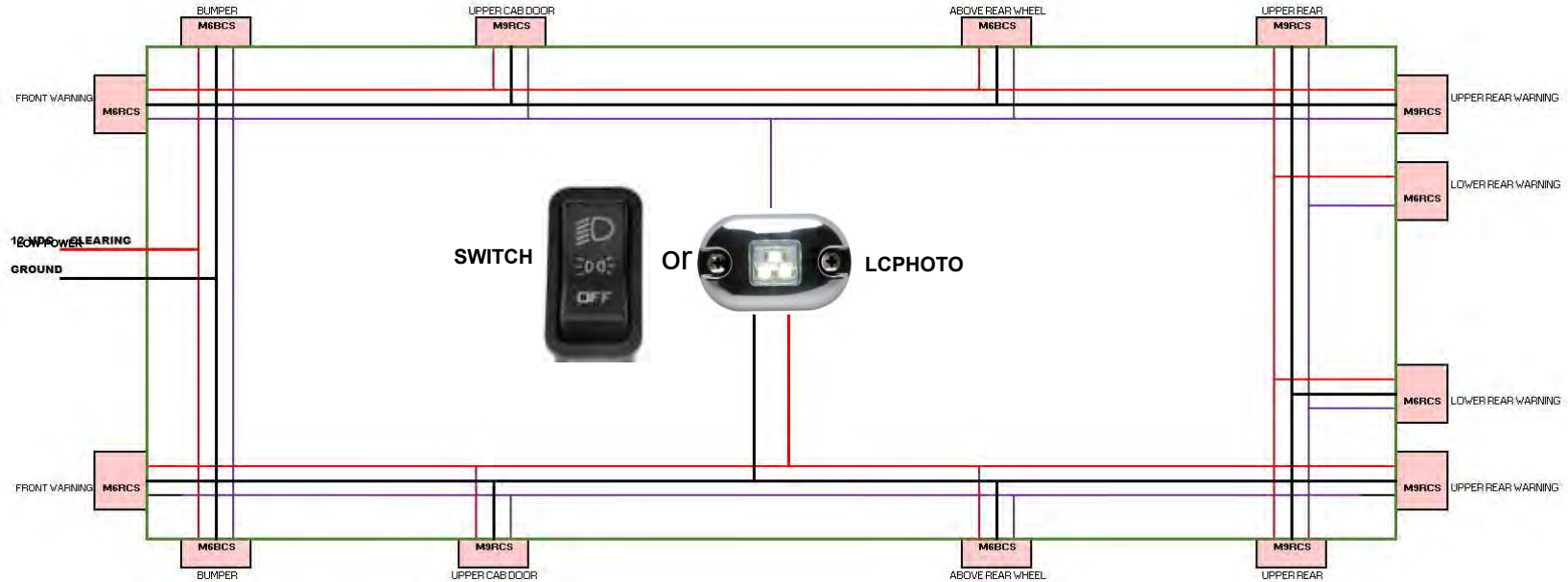
## WIRE DIAGRAM



**WHELEN®**

# BASIC LOW POWER WIRING DIAGRAM

## BLOCKING and CLEARING logic controlled by OEM



# CenCom Core System



**WHELEN®**

# W E C A N Vehicle-to-Vehicle Sync module



Model – CV2V

- Synchronize lights and tones on an unlimited number of vehicles within any proximity.
- Has diagnostic indicator



SYSTEM TYPE

JOB

DEPT

CONTRACT

VEHICLE

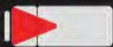
TOTAL CURRENT DRAW

Peak: 3.00 Average: 1.20

Standalone Lights

## ZONE A

FRONT OF VEHICLE



UPPER

Current Draw Peak: N/A Avg: N/A

LOWER

Current Draw Peak: N/A Avg: N/A

## ZONE C

REAR OF VEHICLE



## ZONE B

PASSENGER SIDE (RIGHT)

☐ MIRROR TO ZONE D

UPPER

Current Draw Peak: 3.00 Avg: 1.20

Source

Qty

Calling Intensity

Blocking Intensity

Obstructed

Rotation

M9RC-Red

1

High

High

None

None

LOWER

Current Draw Peak: N/A Avg: N/A

## ZONE D

DRIVER SIDE (LEFT)


☐ MIRROR TO ZONE B

PERFORM CALCULATION

+ ADD A LIGHT SOURCE

## MY LIGHT SOURCES

## MY SAVED LIGHT SOURCES

-  M9RC-M9 RED - CLEAR LENS
-  TLIR-ION T-SERIES RED - CLEAR LENS

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# New Products – WeCanX 2250 & EZ Scene



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# New Product – 900 EZ Scene Light

- Multiple Turn on styles
  - Slow (800 milliseconds) to Fast (0 mS)
  - Three low power settings – 25%, 50% and 75
- Identical mounting footprint of existing 900 Scene lights



900 EZ Scene Light

# New Product – M9 EZ Scene Light

- Multiple Turn on styles
  - Slow (800 milliseconds) to Fast (0 mS)
  - Three low power settings – 25%, 50% and 75
- Fire & EMS Lifetime Warranty
- Identical mounting footprint of existing M9



M9 EZ Scene Light



**WHELEN®**

# New Product – WeCanX 2250



- IP67 Rated
- Flush Mount (Slide bolt)
- 10-30 VDC Input Voltage
- Powered by WC
- Available in Multiple Lengths
- Light head colors configurable in WeCad
- Functionality configurable in Whelen Command
- DUO™ support in warning light options
- Angled end caps



# New Product – WeCanX 2250



## Dimensions

- 2.28" D x 1.66" (2.57" with Vertex™) H
- 30" (6-light), 40" (8-light), 50" (10-light), 60" (12-light), 70" (14-light), 80" (16-light)

Models	Description
<b>WX2230</b>	30" Long, 6 Total Lightheads, Includes Two Angled End Caps*
<b>WX2240</b>	40" Long, 8 Total Lightheads, Includes Two Angled End Caps
<b>WX2250</b>	50" Long, 10 Total Lightheads, Includes Two Angled End Caps
<b>WX2260</b>	60" Long, 12 Total Lightheads, Includes Two Angled End Caps
<b>WX2270</b>	70" Long, 14 Total Lightheads, Includes Two Angled End Caps
<b>WX2280</b>	80" Long, 16 Total Lightheads, Includes Two Angled End Caps

# Lifetime Warranty

- Applicable Product Families
  - Freedom IV Series Lightbars
  - All M Series Lights
  - L31 Series Beacons
  - B6 Series
  - Micro Freedom Series
  - Pioneer Scene Lights
  - Strip Light Plus Tank Gauge (PSTANK)
  - Strip Light Plus Illumination Lights
  - TANF Series Traffic Advisors
  - 6" and 8" Interior Lights

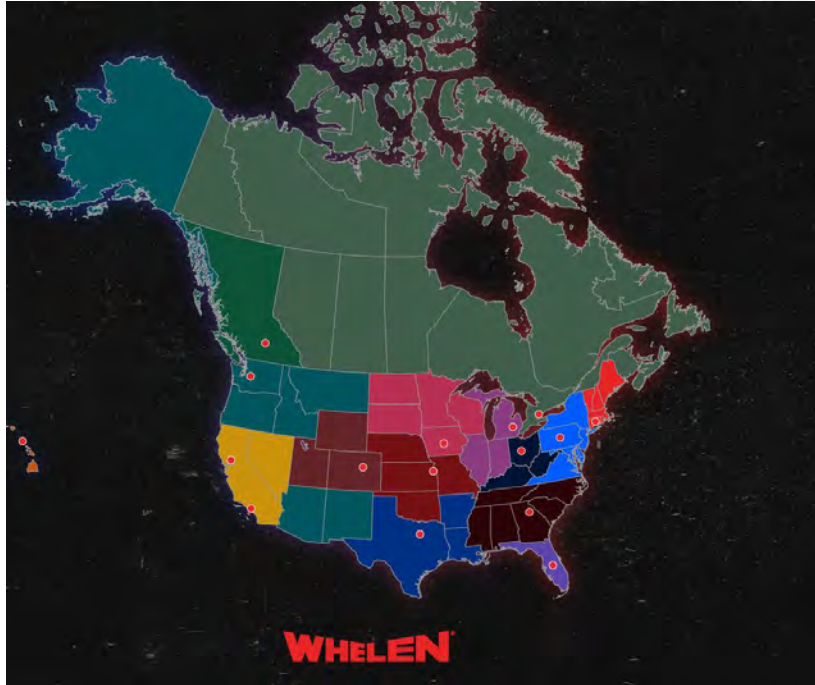


**Warranty valid on new products with a MFG date on/after January 1, 2021.**

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# Sales and Support



- Sales and service support throughout North America
- Pre-sale consultations
- Post-sale service and support

**WHELEN®**



**THANK YOU!**

**QUESTIONS?**

**WHELEN<sup>®</sup>**