

# Model A Ford Lighting Upgrades

How to get more light without doing permanent alterations.

# How to improve performance

- Install more powerful bulbs in lights.
- Recondition reflectors.
- Clean electrical connections.
- Improve electrical grounds.
- Make electrical system more stable.

# Presentation Format

- Two parts to be presented
  - Upgrading lamps with new bulbs
  - Upgrading reflectors and the electrical system

# Why upgrade the bulbs?

- Original bulbs were incandescent bulbs, their lifespan was limited and they are inefficient. Night-time driving is very risky using original equipment bulbs in modern traffic.

# Types of bulb upgrades

- Brighter incandescent: More light, but use more power.
- Quartz-halogen: More efficient light output and use even more power. Converting to an alternator is nearly mandatory. Also run very hot and may crack lenses.
- LED: More light, and uses far less power.

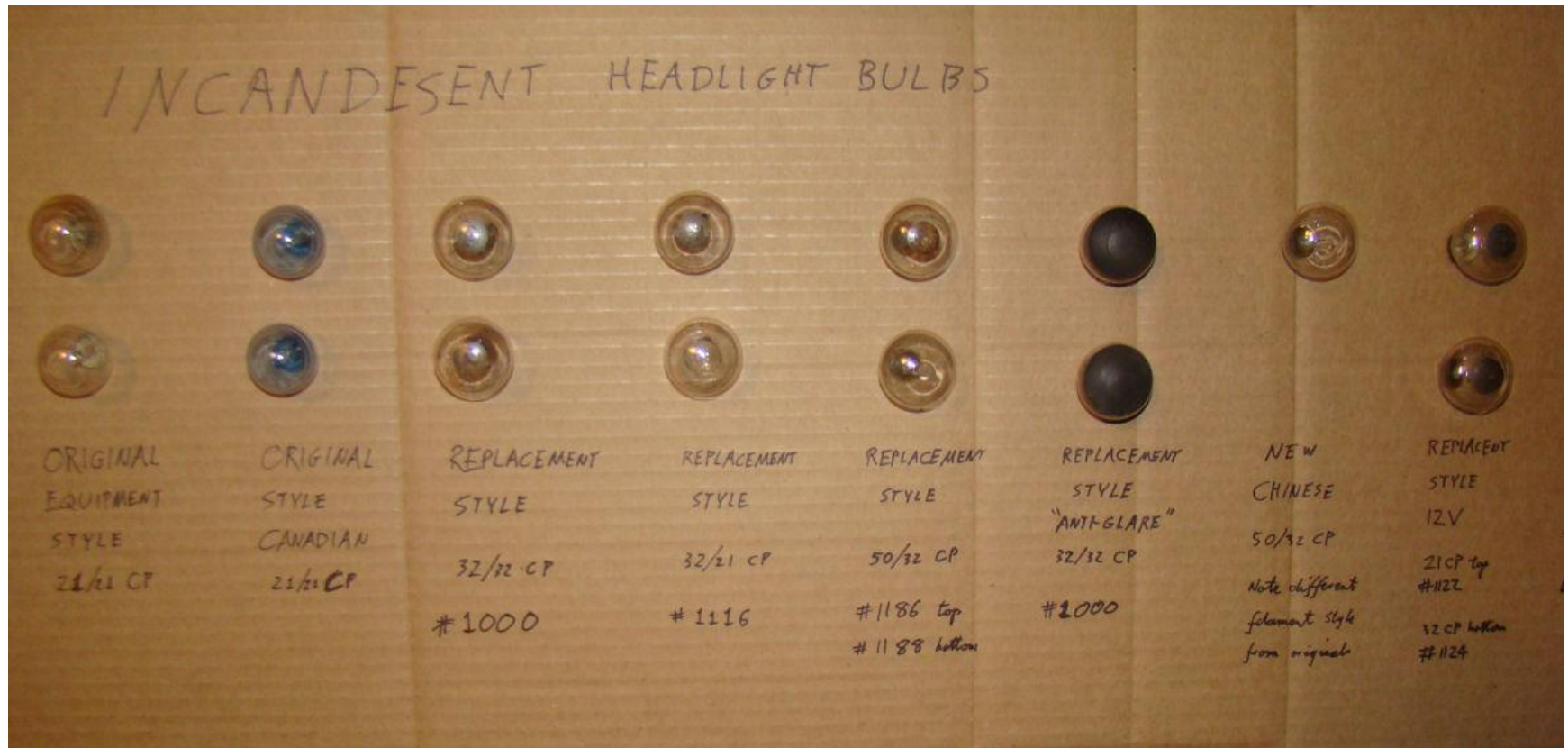
# How “High/Low” system works

- Original system bulbs had a low beam on top and high beam on bottom, beam deflects opposite direction from filament displacement. Lens deflects beam downward and laterally.
- LED bulbs use separate LED for upper and lower half of reflector. Focal point is moved to deflect low beam downward. The upper LED lights for low beam, both LEDs light for high beam.

# Incandescent bulbs

- The original bulbs were 21 CP bulbs, with 32 CP bulbs being optional starting in late 1930. There was also a dual power bulb that was 32 CP on high beam and 21 CP on low beam.
- Currently 32/32 CP and 50/32 CP bulbs are available. There are also 12V bulbs available to fit the stock sockets.
- Original bulbs rated at 10 hour lifespan!
- Low price, helps when keeping a supply of replacements on hand.

# Typical incandescent bulbs for Model A Fords





# Quartz-halogen bulbs

- They have a longer life than ordinary incandescent bulbs, currently rated at 300 hours lifespan
- They produce more light per watt
- Currently available ones draw lots of power and they run very hot! 20 Amps just for headlights and brake lights.
- Available for stock or special sockets. The stock version has filament too close to reflector, can't be focused properly
- Special handling is required
- Expensive!

# Picture of quartz-halogen bulb



An original style incandescent on the left, a quartz-halogen replacement on the right. Note that the filament of the quartz-halogen is further back than the original placement and is not the correct shape. Correct focusing is not possible.

# LED bulbs

- High efficiency, lots of light per watt
- Rugged design
- Improved light pattern
- Very long life
- Expensive!
- More susceptible to voltage transients

# Picture of LED bulbs



# Measured bulb performance

Bulb type	Current at 6V (Amps)	Current at 7.5V (Amps)	Brightness at 6V	Brightness at 7.5V
21 CP	2.2	2.5		
32 CP	3.5	4.0	20 ft-candles	
50 CP	4.0	4.7		
Quartz-halogen	4.4	5.0		
LED	0.52/1.04 (L/H)		30/15 ft-candles	

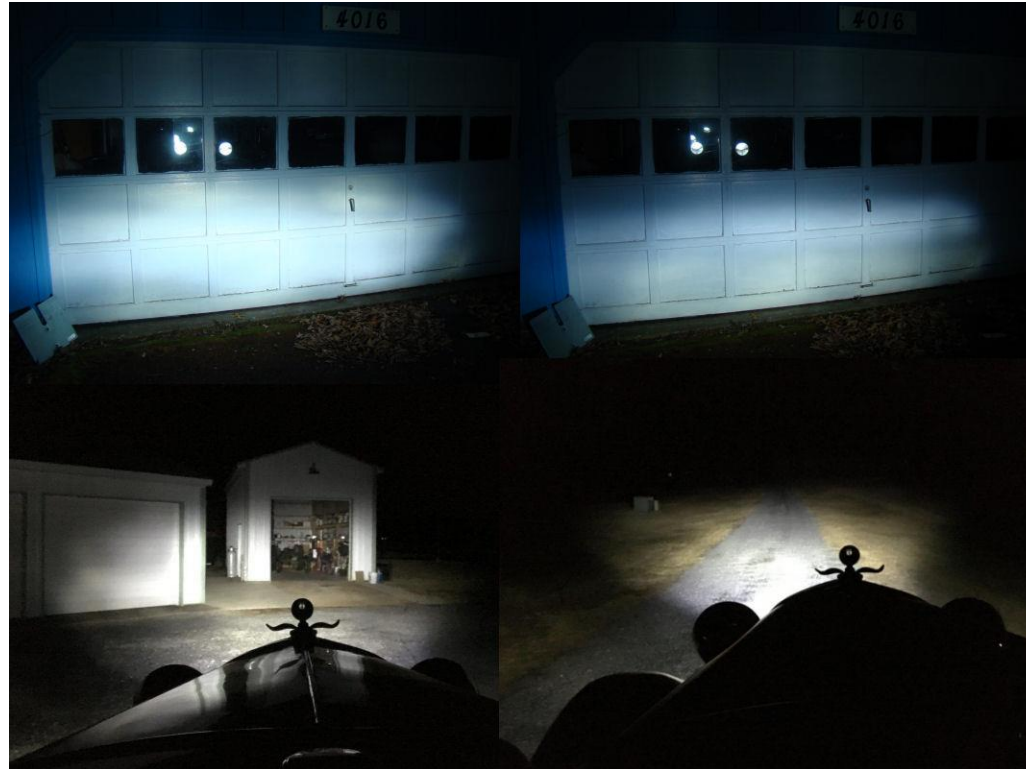
Brightness measurement was taken at 20 ft at center of “hot spot” in beam. LED bulbs produced a larger light pattern. See pictures.

# Pictures of Incandescent vs LED bulbs



32CP incandescent on top, LED bulbs on bottom. High beam on left, low beam on right. Focus was not changed.

# Pictures of LED bulb patterns



Top row, LED bulbs refocused, high beam on left, low beam on right. Bottom row, LED patterns with lights on car.

# Demonstration time!

- A pause here to actually show you the lights



# Other improvements that can be made

- Better reflectors
- Clean up connections
- Improved electrical grounds
- Regulating voltage

# Reflector improvements

- Re-silvering: This is restoring the original finish. Susceptible to oxidation which reduces light output
- “Uvira” method: Aluminum with glass flashed over it in a vacuum. Very good reflectivity.
- Reproduction reflectors with the “Uvira” style coating are available.
- Replace gaskets if needed to keep reflectors clean.

# Improving ground connections

- Better battery ground, clean up connection, add strap to engine.
- Better generator ground, add wire between generator and timing cover.
- Better headlight ground (explained in next slide)
- Better taillight ground, add wire between light and shock mounting bolt
- Cowl and dash lamps are very low power and don't need improvements, just clean and secure the mounts

# Improving light connections

- The headlight plug is a perpetual source of trouble, bullet connectors slip into the “triple connector” and contacts tend to flop over with time and short to each other or ground
- Headlight plug can be removed and replaced with a dummy ferrule to support the flex conduits. The wires can then be brought inside the light to bullet connectors installed on the socket wires to get a good connection. A new ground can then also be added and brought out to the shock mounts.
- Extra ground wire can be added to tail lights.

# Cleaning connections

- Bullet terminals must be tight in their sleeves, replace if needed.
- Flag terminals in the junction box and on generator should be in good condition.
- Steering gear oil dripping into the light switch can affect performance. An end plate with extension tube is recommended so that contacts remain clean.

# Regulated system warning

- There is currently only one supplier for LED bulbs to fit a Model A, and their web site says their bulbs are for “Regulated electrical systems”. Their instructions do address third-brush generator systems though.
- Adding a fuse to a car with a stock generator (unregulated) could cause massive failures due to voltage run-away if the fuse blows. Consider fusing lights directly to battery instead. A fuse can also be added to generator field to shut down generator if it goes out of control.

# Adding a regulator to a Model A generator

- A regulator that mounted inside the generator on the band was available and worked well, but seems to be no longer available
- “Mac’s auto parts” offers a replacement cutout with a regulator inside.
- Various regulators can be added onto a Model A generator by reconnecting the field coil to the regulator instead of using the third brush, which regulates current, not voltage

# Picture of several regulators added to Model A generators





# Sources

- LED bulb source:  
<http://www.dynamoregulatorconversions.com/online-shop-for-led-bulbs-and-light-boards-etc.php>
- Incandescent and quartz-halogen bulbs:  
<https://www.brattons.com/>
- Voltage regulator cutout: <https://www.macsautoparts.com>  
Part # 28-20675-1 Price \$74.49 each
- Band type regulator: James Peterson 541-389-0438. See <http://www.fordgarage.com/pages/generator.htm>
- UVIRA reflector treatment: 541-474-5050  
[UVIRAINC@GMAIL.COM](mailto:UVIRAINC@GMAIL.COM). Cost is \$75/pair AFTER you have them nickel plated.

# Summary

- Modern bulbs, particularly LED, are now available which outperform original incandescent bulbs
- Recondition reflectors if needed
- Clean and improve ground and electrical connections
- Control the generator output to prevent destroying your investment!