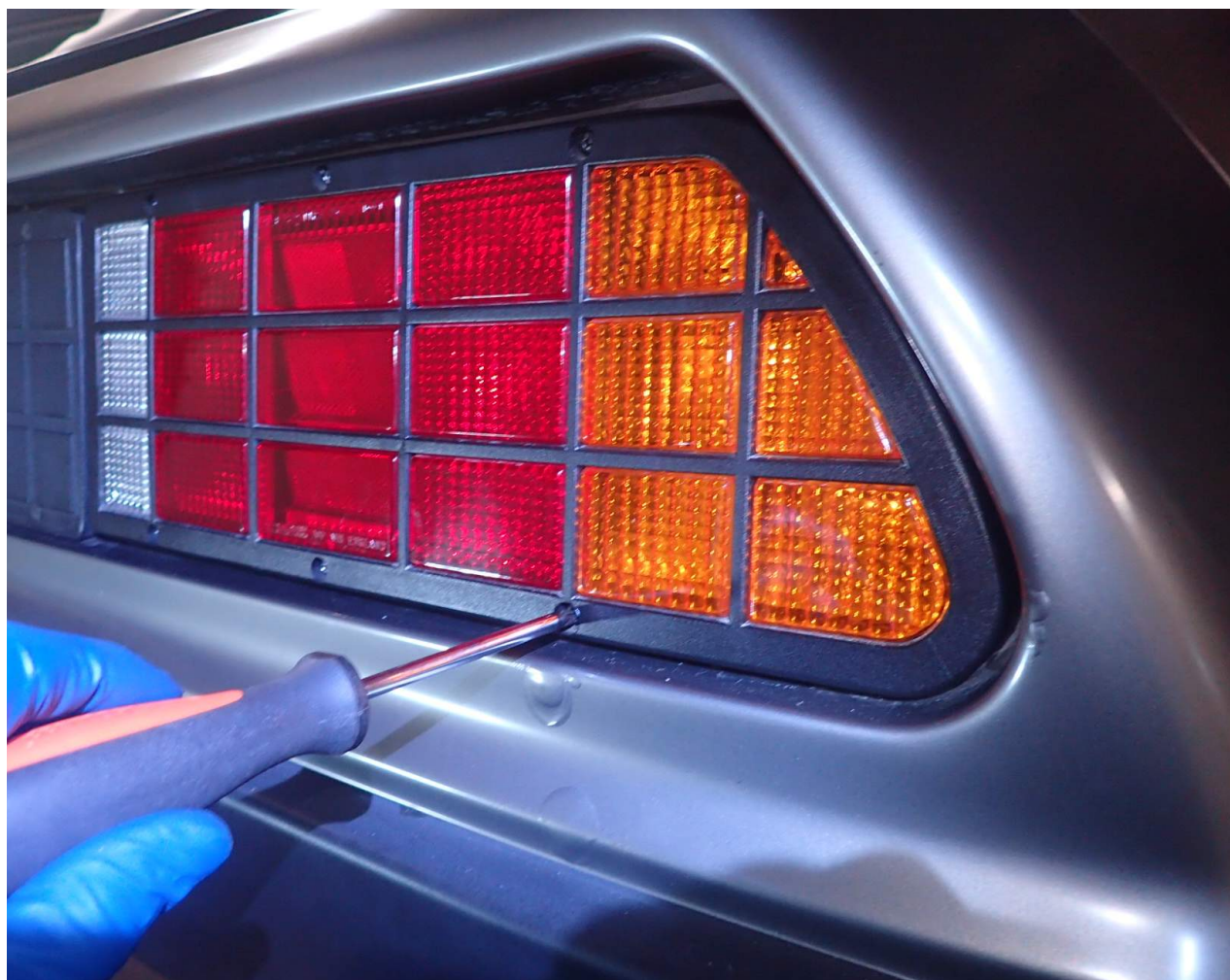


**DRAYTON**

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## DeLorean Taillight Sequencer Installation Instructions



June 5, 2022

# DRAYRON – Taillight Sequencer Installation

## Disclaimer

DRAYRON LLC makes no representations or warranties either express or implied, of merchantability or fitness for a specific purpose, for the product and services provided here. The intellectual property rights of the taillight sequencer are the sole property of DRAYRON LLC and in no case shall the information be considered a part of our terms and conditions of sale.

**NOTICE OF RISK:** This taillight sequencer product can involve substantial risk of injury, property damage, and other dangers. Dangers peculiar to such activities include, but are not limited to:

1. Injury during installation.
2. Damage to vehicle.
3. Failure of safety features.
4. Automotive damage and personal injury.

This product is sold for off-road vehicle use only.

DRAYRON does not accept returns or exchanges after 60 days unless the item you purchased is defective. If you received a defective item, please contact us at DRAYRON.com with details of the defect. DRAYRON will repair or replace any defective product. DRAYRON is not responsible for damage to the product if the damage is caused by incorrect electrical connections, modifications to the product, or incorrect installation by the customer. DRAYRON will be the sole arbitrator in assessing the cause of the failure.

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## Manual Version History

Manual Version	Date	Board HW Version
1.0	8/1/2020	1.2
1.1	8/9/2020	1.2
1.2	10/11/2020	1.3
1.3	4/5/2021	1.3
1.4	7/5/2021	1.4
1.5	6/5/2022	1.5

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# DRAYRON – Taillight Sequencer Installation

## 1. Overview

The taillight sequencer board is a direct replacement for the original DeLorean taillight board. Even though there is some variability of the taillight lenses throughout the production run, this board should fit and lock into the taillight lens. Do not force the board. If there are difficulties fitting the sequencer board to the taillight lens, please contact us for support. Please handle your taillight lenses with extreme care and proceed with caution. Replacement taillight lenses are very difficult to find or completely unavailable.

# DRAYRON – Taillight Sequencer Installation

## 2. Preparation

### Tools:

The only essential tool is a screwdriver. It's recommended that you use a Pozidriv size 2 screwdriver. This driver head will provide a better grip on the original screws used for the taillight lens. Standard Philips screwdrivers can be used but are more prone to strip the screw head.



### Additional Items:

It is also recommended that you have the following items:

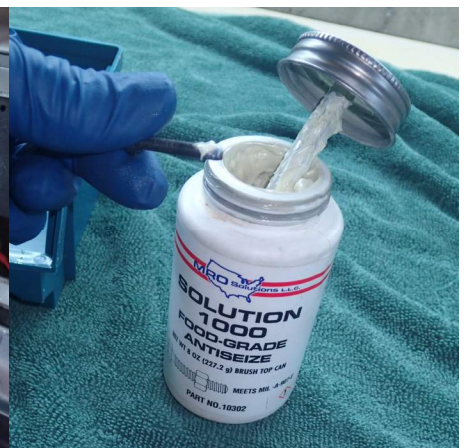
1. Small container to place screws and removed parts.



2. Anti-corrosion spray (such as Corrosion X or ACF50) to treat the lens Nutserts.



3. Anti-seize compound to treat the screw threads prior to reinstall.



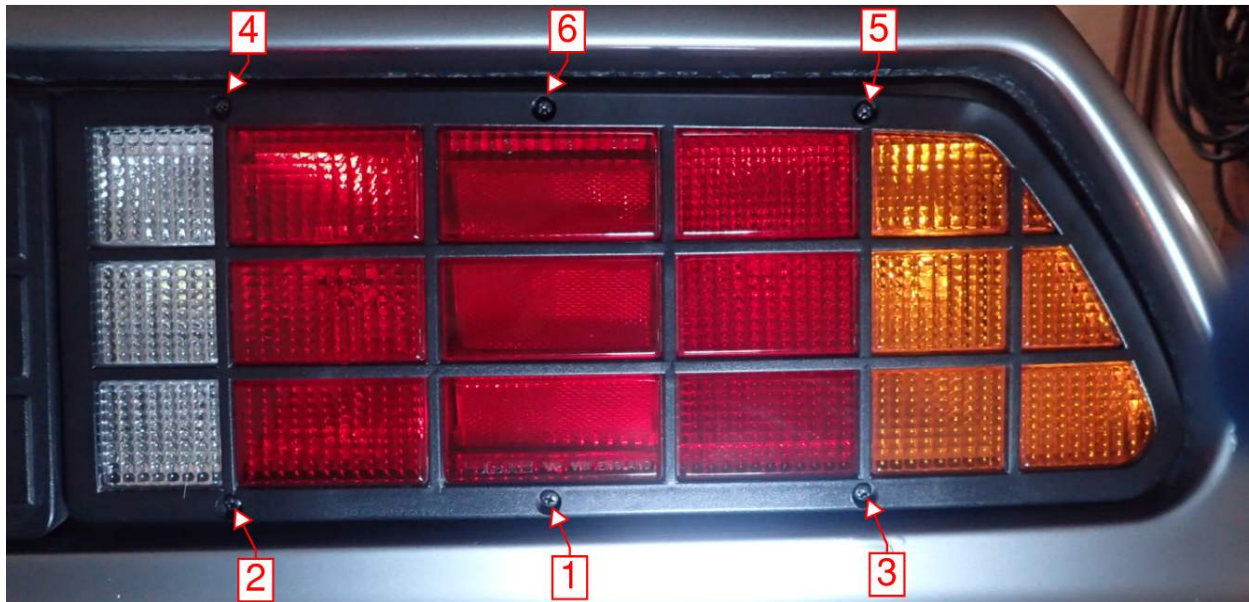


## DRAYRON – Taillight Sequencer Installation

### 3. Installation – Taillight Board

Remove the taillight lens. There are six screws that hold the DeLorean taillight lens in position. To remove the screws:

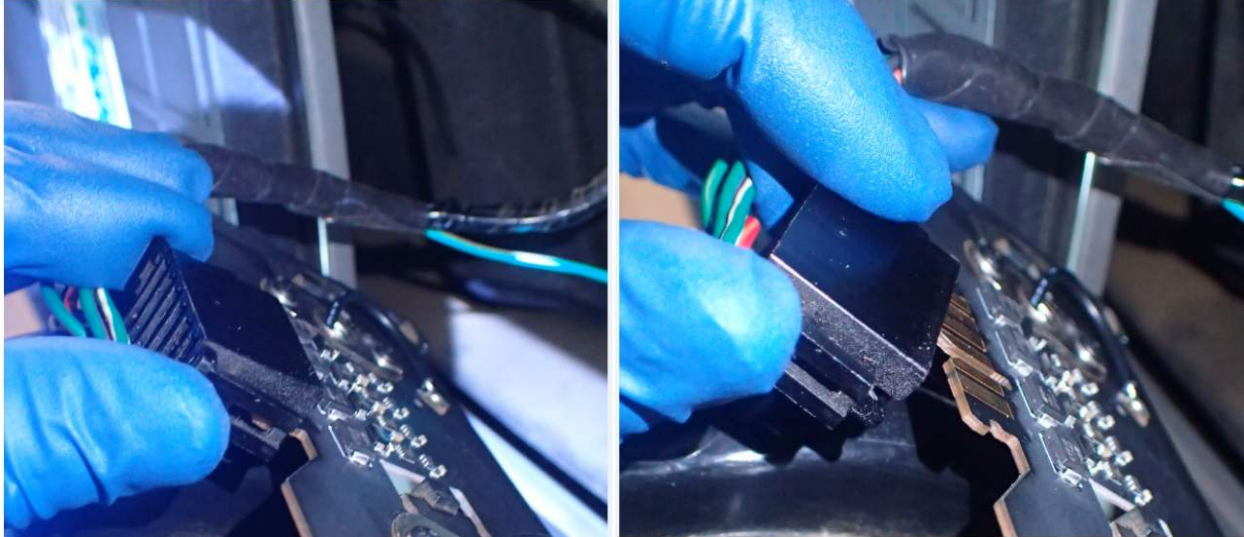
1. Carefully loosen each screw a few turns in the sequence shown below.
2. Insure all are loosened before fully removing the first screw.
3. Remove the screws fully, one at a time in the order shown below.



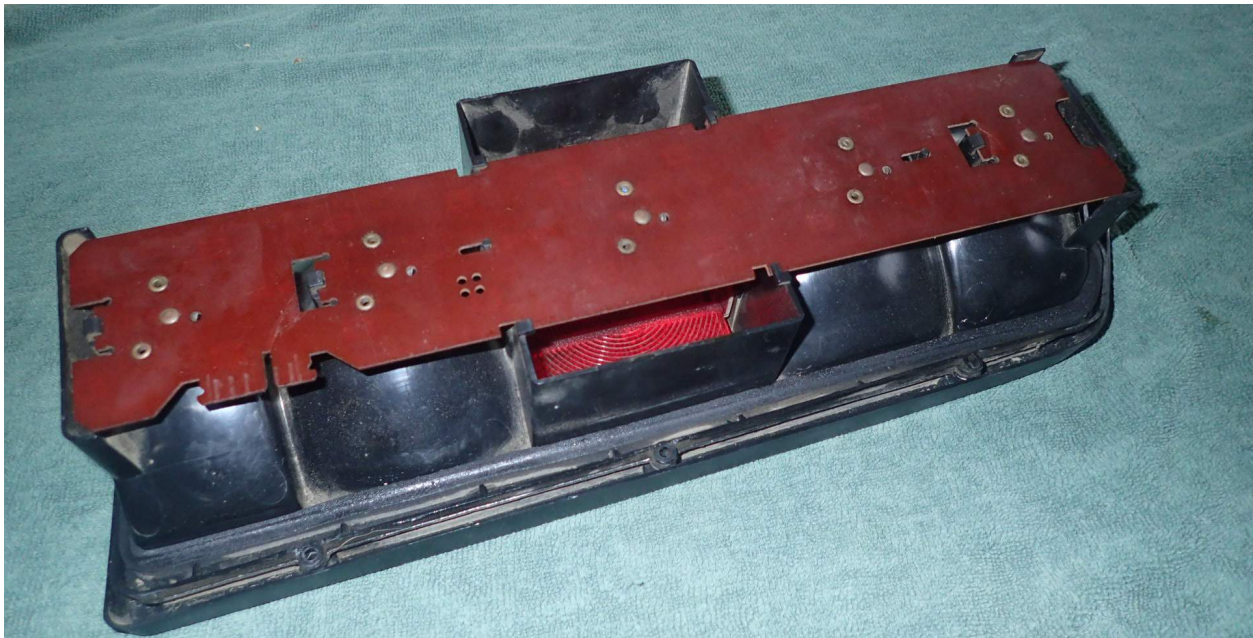
4. Support the lens while removing the last screw (center top). Don't let the lens fall out.
5. Carefully remove the lens. If the lens has not been removed for a long period, it may be stuck in position. Work slowly and carefully to loosen the lens. Do not use a screwdriver to pry. Just keep working the lens with moderate finger pressure until it loosens.

## DRAYRON – Taillight Sequencer Installation

6. Once the lens is loose, tilt it out and find the electrical connector. For the right lens it will be on the top left. For a left lens, it will be on the bottom right. The connector has retention arms at each end. Squeeze the ends of the connector top to release the arms and gently pull the connector from the board.



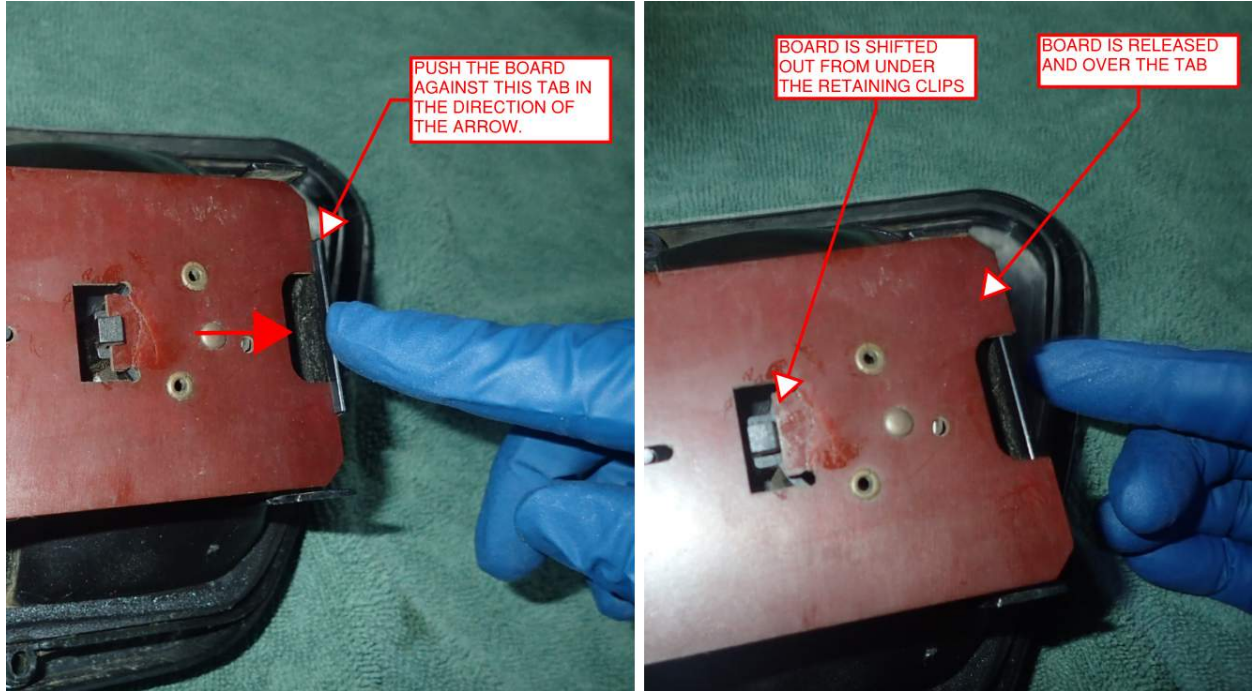
7. Now the taillight lens is free and can be placed on a flat working surface. Insure that the working surface has a soft towel or flannel to protect the lens.





## DRAYRON – Taillight Sequencer Installation

- The light circuit board is removed by pushing back a catch, lifting the board slightly, and shifting the board. For the orientation shown in the previous photo, the board would be shifted about 3/16 inch to the right to release the catches holding the board (you can also flex the board above the retaining tab to allow full movement to the right).



- Once the board is free of the retaining catches, it can be carefully lifted from the lens.



- Now carefully remove your new taillight board from the packaging. Set the new board on a flat surface and if you purchased the full kit with new LED bulbs, remove all the bulbs.



## DRAYRON – Taillight Sequencer Installation

11. LED Bulbs: New bulbs come with the board, here's how to identify them:

- a. The backup light is black with small segments and an optical lens at the bulb top (two required, one on each board):



- b. The turn signal light has segments that are orange-yellow (two required, one on each board):



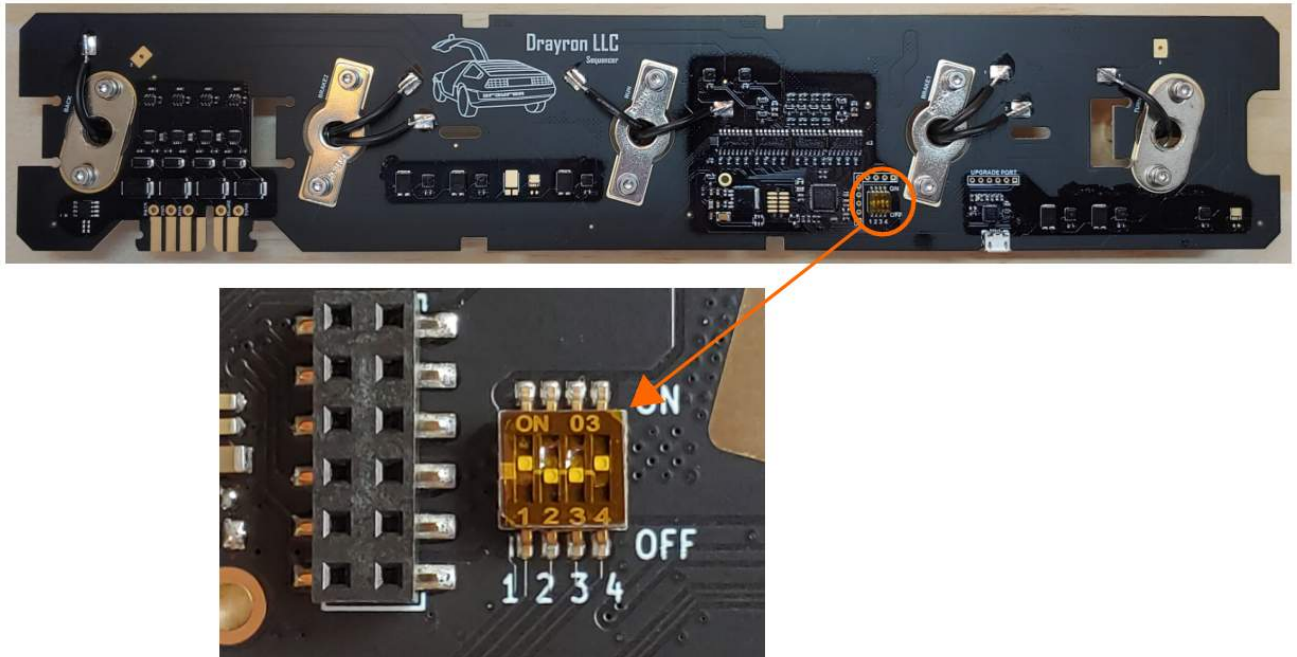
- c. The brake lights and running lights use the same bulb, with white segments (six required, three on each board):



We recommend these LED bulbs. They represent the brightest bulbs that we found thru our testing.

## DRAYRON – Taillight Sequencer Installation

12. Switch Settings: The backside of the taillight board has the electronic components and the mode selection switch. With this switch you can select your preferences. It's easier to do this now before the bulbs are installed. Here's how to find the selection switch (it is quite small). Use a small jeweler screwdriver or small probe to move the switches. A magnifying lens can assist while setting the switch positions. The switch may have tape over the top of it. This is removable, but it is recommended to leave it on to improve its water and dust resistance. The switches can be pushed through the tape.



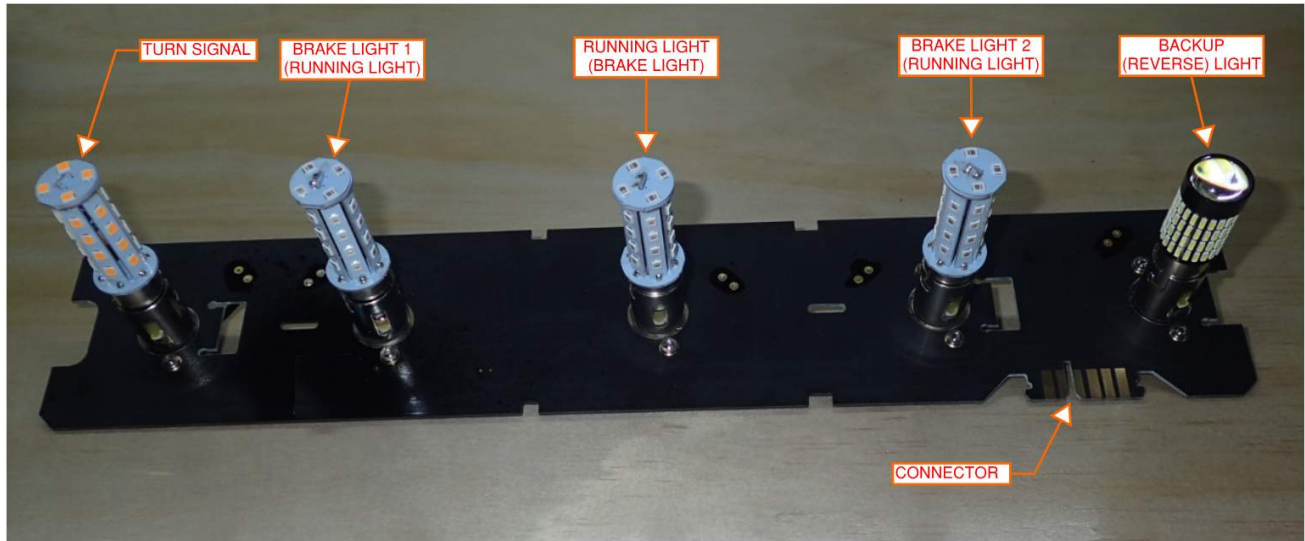
- a. Switch 1: This switch selects right or left taillight. Turn on for right, off for left.
- b. Switch 2 and 3: These two switches work together to select sequence modes:

Switch 2	Switch 3	Description
OFF	OFF	<b>Sweep Mode</b> – single segment sweep across the taillight (Default selection when shipped)
ON	OFF	<b>Sequence Mode</b> – all segments sequence on across the taillight (often referred to as Mustang mode)
OFF	ON	Reverse Sequence - all segments turn on - red segments then sequence off towards the turn
ON	ON	Reserved for Future Mode – Currently defaults to <b>Sweep</b>

- c. Switch 4: This switch selects enhanced brake and running lights (for dual element boards). Switch is on for enhanced where all three middle segments provide brake and running lights. Switch is off for traditional where middle segments function per traditional taillight.

## DRAYRON – Taillight Sequencer Installation

13. Install Bulbs: Place the circuit board on a flat soft surface and install the bulbs as shown:



Tips: Be gentle. It sometimes will help to lift the board with your hand under the socket in question and then insert the bulb. The sockets are spring loaded and need to push out the back side as the bulb is inserted.

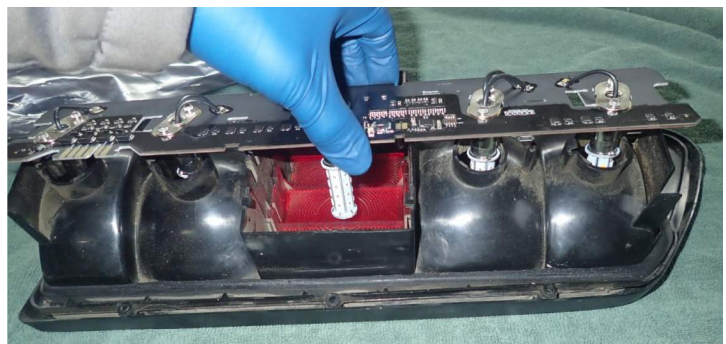
If your board is the dual element version, the middle three sockets are connection 1157 type. These sockets, in addition to having two contacts as you look into them, also have offset slots. On one side the slot is longer. Looking at the bulbs you will see the bayonets are offset. The bulb will only go into the socket one way. The lower bulb bayonet must be inserted into the longer slot. DO NOT FORCE. If it is not fitting easily, you are probably inserting it incorrectly.



Both left and right boards are identical. They get rotated when installed in the left or right taillight lens.

14. Install Board on Lens: With selector switch set and bulbs installed in both boards, install each board in its respective taillight lens.

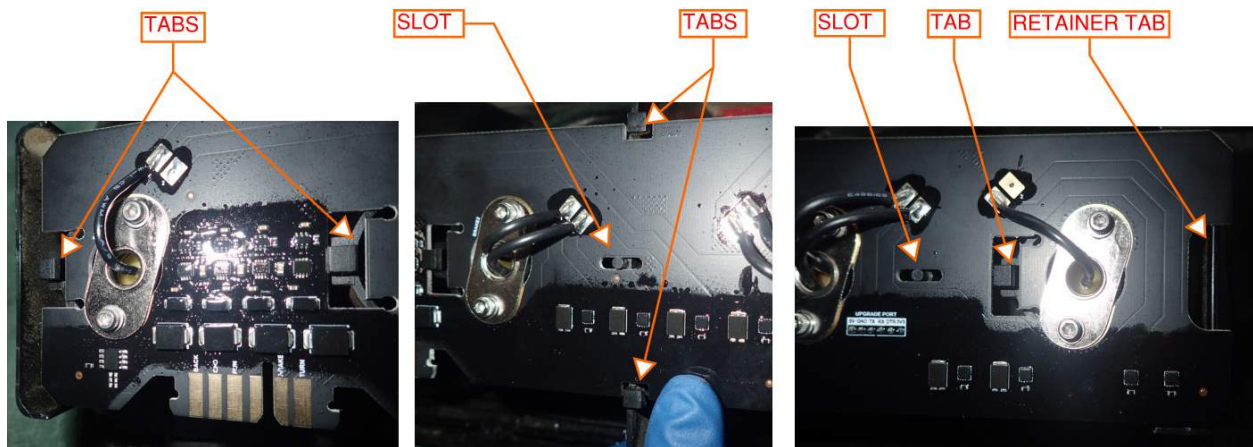
- a. Position board over lens and carefully lower into position:





## DRAYRON – Taillight Sequencer Installation

- b. Position board flat (elevate slightly near retainer tab) with center slots aligned and catches ready to slide under lens tabs:

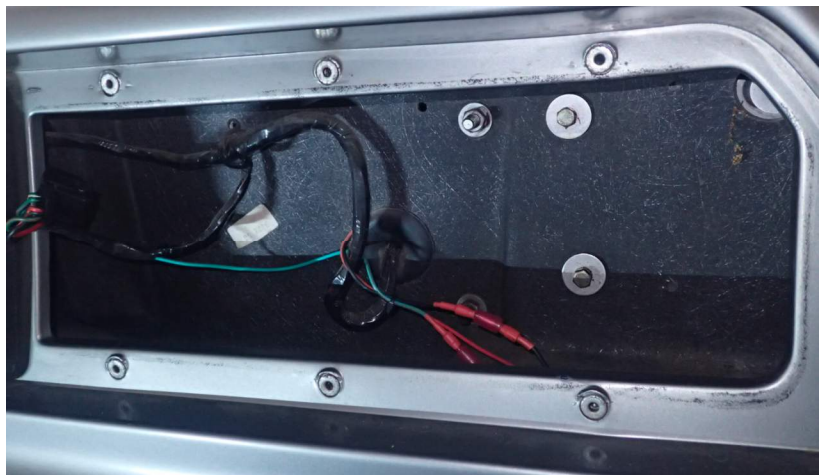


- c. Once the board is positioned (aligned in the slots with edges clear to slide under the tabs), gently slide the board to the left as you push out the retainer tab. The board should slide under the tabs until the retainer pops into position locking the board in place. Often one of the tabs will not be aligned and the board won't slide. Find the tab that's jammed and press down to provide clearance under the tab.



### 15. Install the lens:

- a. Now is a good time to clean the lens housing and make sure the wiring looks OK:

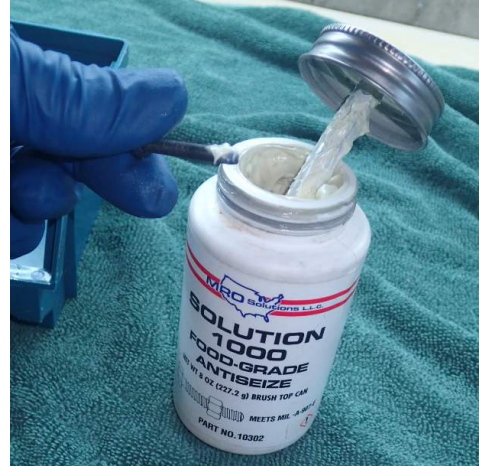


## DRAYRON – Taillight Sequencer Installation

- b. Add some corrosion protection to your nutserts and insure the threads are functional (you can chase the tread with a bottom tap, but only if necessary):



- c. Get all your lens screws ready by dabbing with antiseize:
- d. Also, if your lens was stuck during removal, consider putting some Molykote 111 on the gasket to soften and make future removal easier.



- e. Use some corrosion protectant on the taillight connector and insure that the connection pins are in position. Position the lens near the housing and carefully snap on the connector.



- f. Solder points are available if the original connectors are not functional.



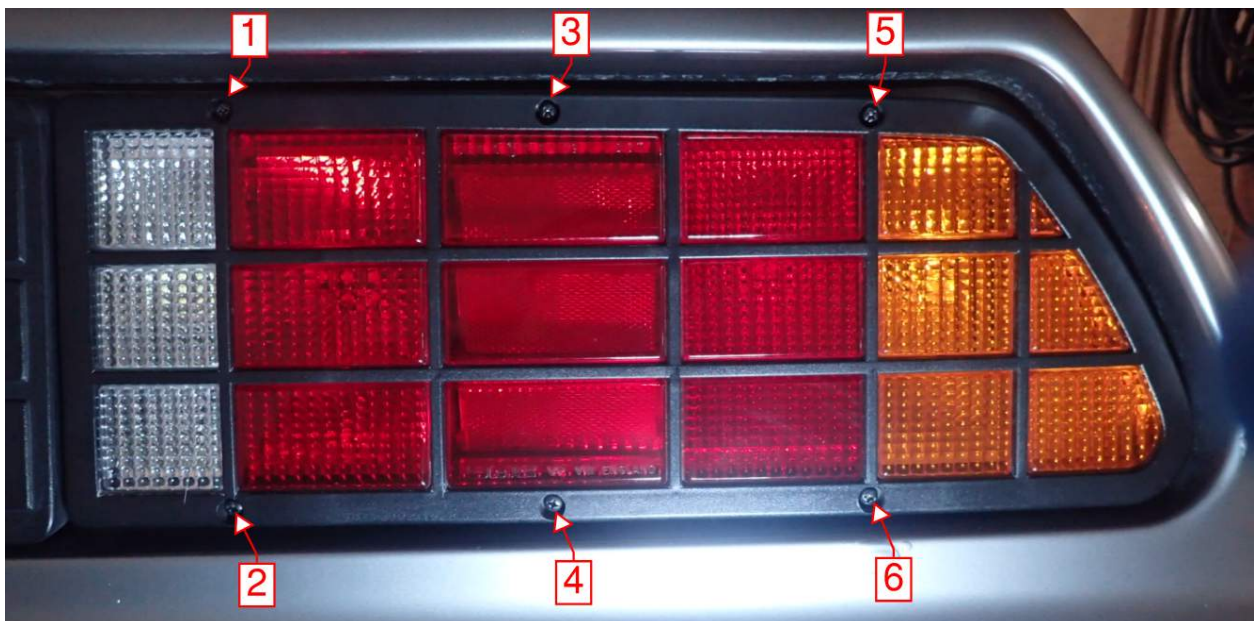


## DRAYRON – Taillight Sequencer Installation

- g. Align the screw holes as you position the lens, particularly the top center. Once in position insert the top center screw, catch the thread, and screw it in a few turns.



- h. Continue to insert the remaining screws and get them started a few turns.
- i. Use the sequence shown, very lightly snug up each screw. Now tighten in sequence till each screw is seated. This takes a delicate touch. Your lens is old and can be brittle. Consider the two digit technique using just thumb and forefinger on the screwdriver handle. Snug and don't over-tighten.





# DRAYRON – Taillight Sequencer Installation

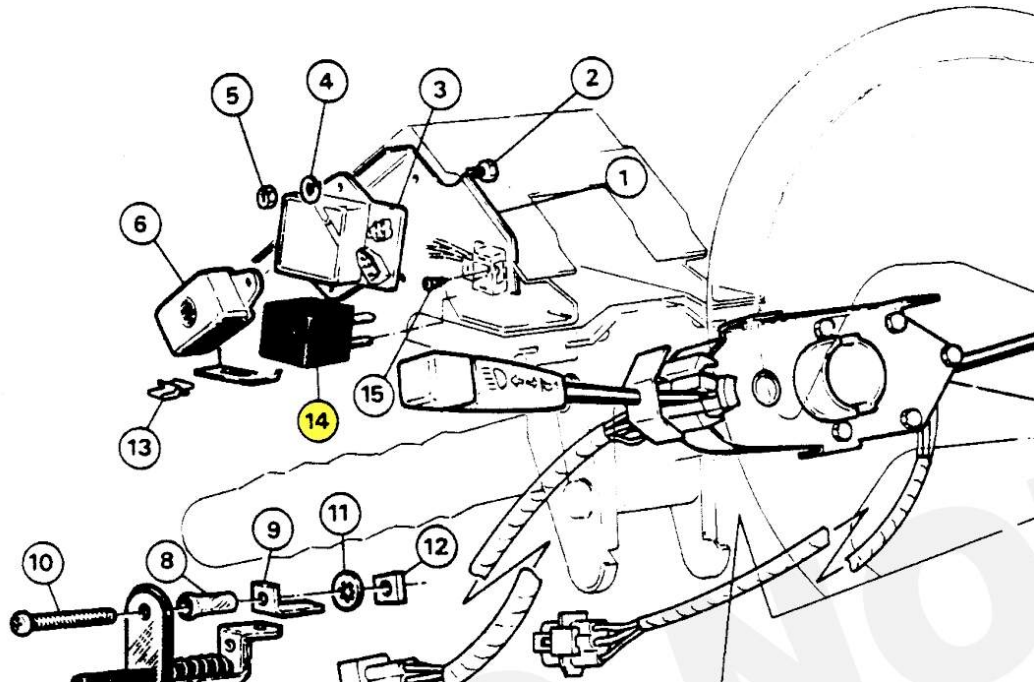
## 4. Installation – Flasher Relay

If your taillight kit includes the adjustable flasher, this section will help you find where on your car the flasher is located, how to remove it, and how to install the new variable flasher.

The adjustable flasher is in the same relay format as the original. It has three electrical tabs coming out the bottom with positive, ground, and output pin oriented correctly for the original DeLorean flasher socket. In addition, it has a knob on the top that adjusts the timing of the flash. Turning the knob counterclockwise increases the flash duration creating a slower flash, clockwise quickens the flash. The adjustable is recommended because it will enhance the effect of the taillight sequence. The normal non-adjustable electronic flashers will work fine, but they tend to flash quickly and the taillight sweep or sequence happens quickly. With the adjustable unit, you can slow the sequence down to your preference. The unit comes from us adjusted to our preference and it's suggested not to turn the knob until after the installation is working and you decide to tweak.

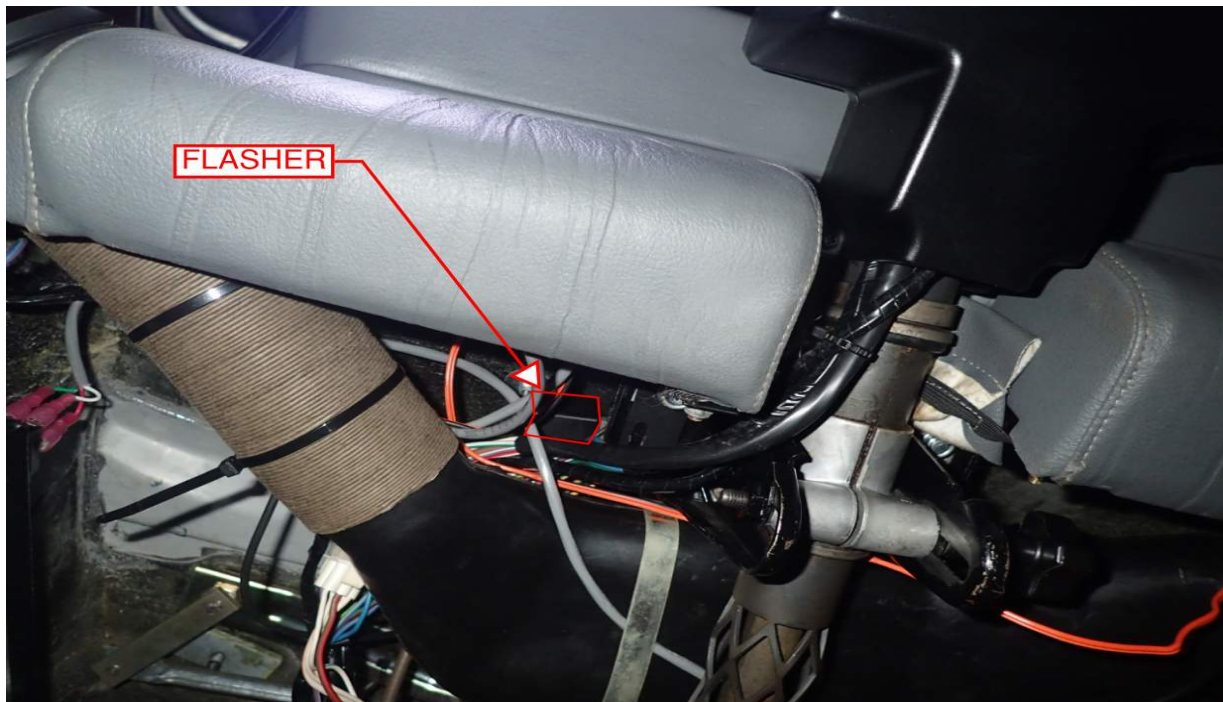


Finding the existing flasher is your first task. It's tucked up under the dash above the steering column; not at all located for easy access (item 14 in the parts breakout):



## DRAYRON – Taillight Sequencer Installation

In one of our test cars, per the parts diagram, the flasher is above and to the left of the steering column (see photo below):



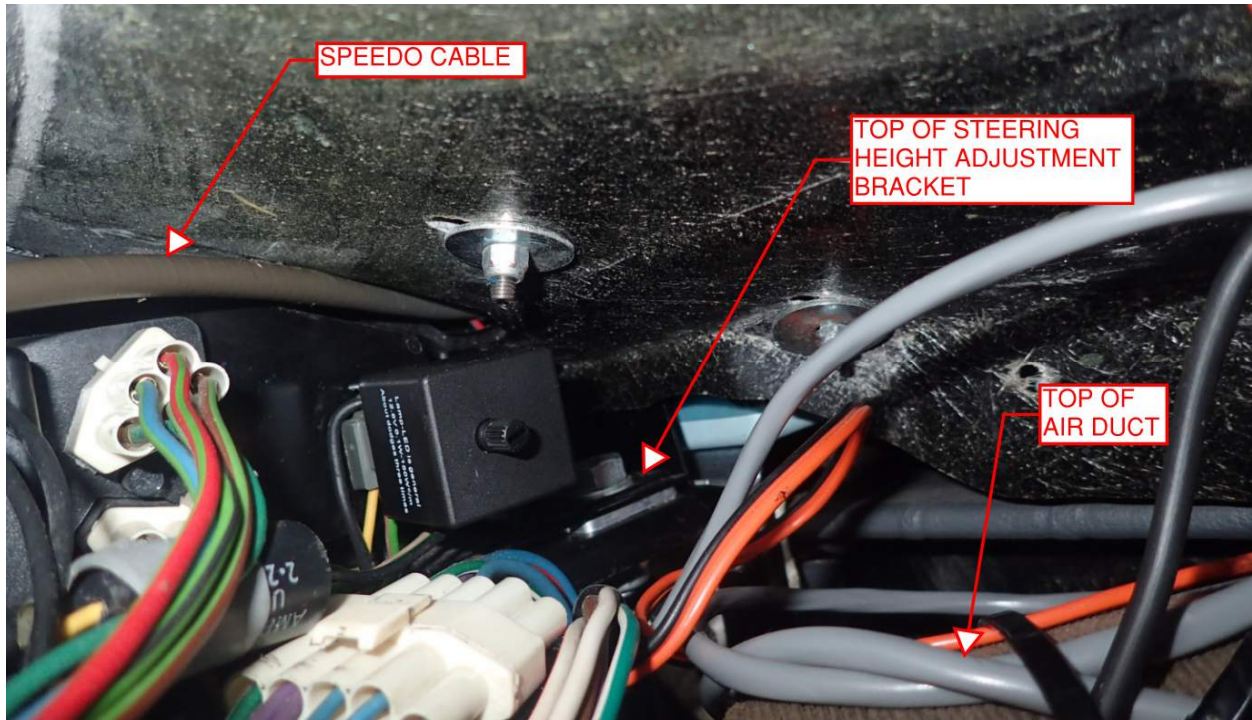
The photo is deceiving. Unless you have a small hand you cannot just reach up beside the steering column and grab the relay. The best tack is to reach up thru to the left of the air duct then reach across the top of the air duct to grip the relay.





## DRAYRON – Taillight Sequencer Installation

If you turn on the emergency flashers the flasher will make an audible click, which is helpful in finding it. Another trick for cars with the relay as shown is to follow the speedo cable. The flasher is right below where it disappears up into the binnacle:



If you have an original relay and wish to preserve it, you must be very careful when removing. After this many years the circuit board is brittle and aggressive flexing will break it inside the housing. The electrical tabs may also be corroded in place. Spray some anticorrosion lubricant, try to get the spray nozzle between the relay base and the socket, and let it set for a day. Remove it with careful wiggles back and forth until the tabs begin to loosen. Then try to get leverage under the bottom of the flasher to wiggle it free. As you remove it, retain the orientation so you will know how the new flasher tabs must be for insertion. Once it is out, spray the connector with anticorrosion agent such as Corrosion X. This will provide lubricant and protect the metal connectors from any further corrosion.

Insert the new adjustable flasher holding it in the same orientation as the original. On our test car the offset tab was toward the front of the car. The photos above show the new flasher installed.

Now remember how to get your hand back up there so you can adjust the knob as required. This can all be done without removing the seat. With a little practice you can replace the flasher or adjust the speed knob simply reaching in from outside the car.



# DRAYRON – Taillight Sequencer Installation

## 5. Operational Features

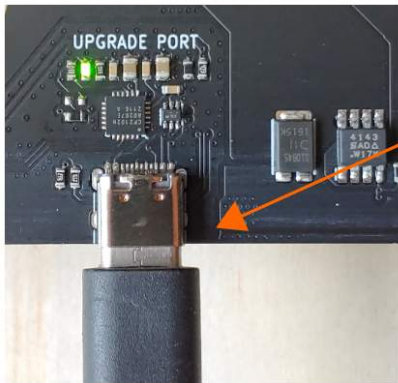
1. Parade Mode: Parade mode is a fun effect intended for car shows or classic car parades. We have selected a unique sweep that uses all the taillight segments. To enter parade mode:
  - a. Turn on the running lights, step and hold the brake (brakes lights on), and toggle the backup lights 4 times (turn signal and emergency flasher must be off). This will initiate parade mode.
  - b. Once in parade mode, you can release the brakes (as required) and turn on your emergency flashers (running lights must remain on). The taillight boards use the flasher as a coordination timer to stay in sync. Without the emergency flasher, the taillights will initiate one complete sweep and stop with the turn signal segments lit. If this happens, just turn on the emergency flashers; after a couple of flashes, the parade mode will take off. Should the lights get out of sync, turn off the emergency flashers, wait 10 seconds and turn back on to re-synchronize.
  - c. While the car is in parade mode, as a safety feature, the brake lights remain fully functional. Pressing the brake will not end parade mode but the brake lights will take priority over the parade mode until released.
  - d. To end parade mode, turn off the running lights and emergency flasher.
2. Sequence Learn Feature: The taillight sequencing is totally dependent on the timing of the flasher relay. There is a variance in flash timing with different models. Of course if you choose to use our adjustable timing flasher, the flashing speed can be set to your preference. When shipped, the taillight board comes with a default timing factor. When the board receives power from the turn signal or emergency flasher, it uses this timing factor as the expected duration of the flasher and sequences the lights to anticipate this duration. If the boards timing factor is not in agreement with the flasher timing the following behavior can be observed:
  - a. Fast board time factor and slow flasher: The sweep of the taillight elements will be too fast for the flasher. Segments will sweep quickly across leaving the final amber turn indicator on for inordinate amount of time.
  - b. Slow board time factor and fast flasher: The sweep of the taillight elements will be too slow for the flasher. Sweep of segments may not complete before flasher power goes off.

The *sequence learn mode* allows the board to automatically adjust to the flasher duration. To initiate the sequence learn mode, do the following:

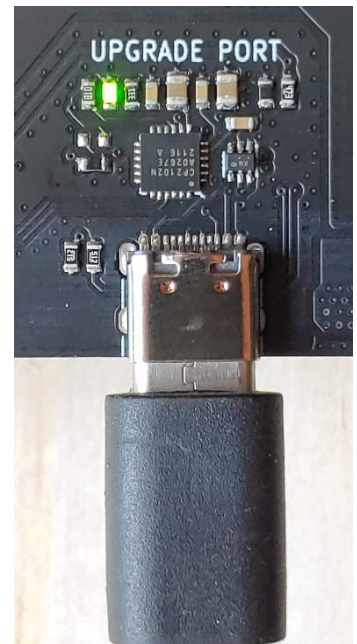
- c. Sequence learn mode: Press and hold the brake, put the car in reverse to turn on the backup lights, then engage the emergency flasher. Once a board detects 3 consecutive flashes of identical duration, it will adopt that timing factor for its new default time value.

## DRAYRON – Taillight Sequencer Installation

Putting the taillight boards into learn mode will correct issues (a) and (b) and align the sequence to the timing of your flasher. The light sequencing requires a minimum amount of time to complete. If the flasher relay is set below that time (very fast flasher or hyper flash) the board will instead only blink the turn signal light. If your emergency flasher is not working, you may accomplish the learning using your turn signals: Press the brake, put the car in reverse, and Initiate each turn signal, left and right, sequentially for a period of 15 seconds.

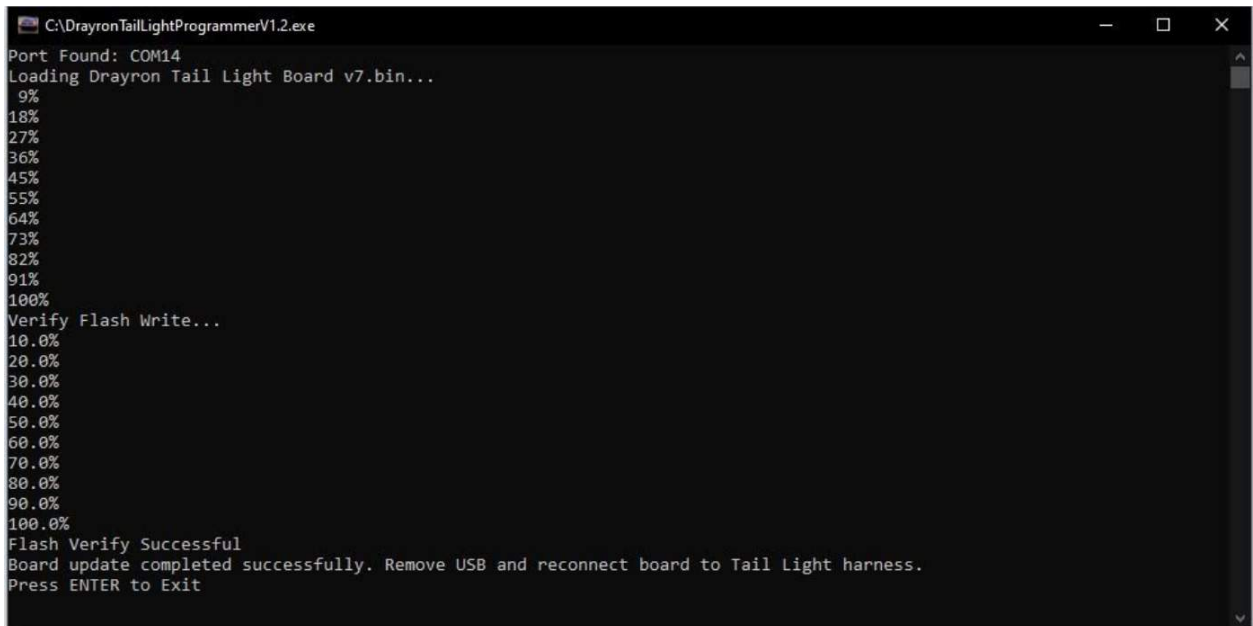


3. USB update port: Each taillight board has a USB port built into the circuitry. This port will allow firmware updates to be installed.
4. Requirements:
  - a. A laptop or desktop PC is required to do an update.
  - b. Executable update file. Download firmware update files from: <https://drayron.com/firmware/>
  - c. Update programs are available for Windows, MacOS and Linux
5. Firmware Update Procedure:
  - a. Remove the tail light boards from the car.
  - b. Use a USB type C cable to connect the tail light board to a computer. Be sure to select a USB DATA cable. Some USB cables are for charging only and do not have the extra conductors required for data transmission. Use a DATA cable not a charging cable.
  - c. Once the USB cable is plugged into the board and computer, an LED on the board near the connector should light.
  - d. A new serial port should show up in the computer's hardware automatically once the USB cable is connected. The programmer will find this automatically; you do not need to look for it.
  - e. Normally the device driver is loaded automatically, but if a device error message is shown or you have problems with further steps you may need to manually install the device driver.



## DRAYRON – Taillight Sequencer Installation

- i. For manual installation, the device driver is available here:
  1. <https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers>
  2. If the link no longer works, search for "Silicon Labs CP210x drivers"
- f. Run (double click) the firmware update program file.
  - i. Windows Users:
    1. You may be asked for your permission to run the program.
    2. The program may be falsely identified as suspicious because it is an uncommon executable that windows hasn't seen before.
      - a. If there is a pop up, choose "More Info" and then "Run Anyway"
- g. The programmer should automatically find the connected board and begin to update the board's firmware. Expect a short delay before the update starts.
- h. Progress status will be printed out during the update.



The screenshot shows a Windows application window titled "C:\DrayronTailLightProgrammerV1.2.exe". The window has a black background with white text. The text displays the following sequence of events: "Port Found: COM14", "Loading Drayron Tail Light Board v7.bin...", followed by a progress bar from 9% to 100% in 9% increments. After the progress bar, it says "Verify Flash Write...", followed by another progress bar from 10.0% to 100.0% in 10.0% increments. The final status messages are "Flash Verify Successful", "Board update completed successfully. Remove USB and reconnect board to Tail Light harness.", and "Press ENTER to Exit".

```
C:\DrayronTailLightProgrammerV1.2.exe
Port Found: COM14
Loading Drayron Tail Light Board v7.bin...
 9%
18%
27%
36%
45%
55%
64%
73%
82%
91%
100%
Verify Flash Write...
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
Flash Verify Successful
Board update completed successfully. Remove USB and reconnect board to Tail Light harness.
Press ENTER to Exit
```

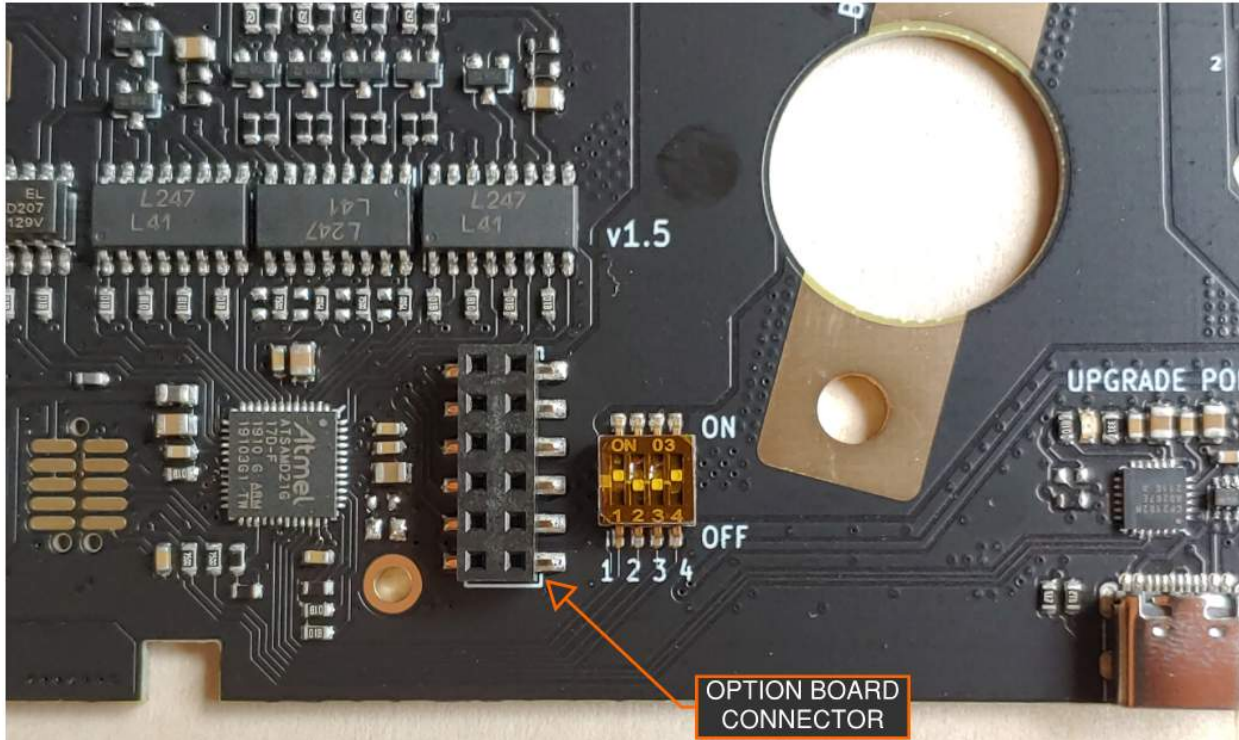
- i. If the update is interrupted for any reason, it will need to be started again and completed before the boards will function normally. Disconnect and reconnect the USB if needed.
  - j. Upon seeing a successful completion, unplug the USB cable and press ENTER to exit.
  - k. Both of your boards will need to be updated. Repeat the procedure for the second board.
  - l. Update process is now complete; reinstall the boards in the car. Perform an operational check prior to securing all the lens screws.
  - m. It's recommended you preform the *Sequence Learn Feature* (see Section 5.2) after any firmware update to set the board timing to match the setting of your flasher module.
6. Updates: There are several probable reasons for an Update:
- a. Fix of an existing issue with the current firmware.
  - b. Special case program feature requested by owner.



# DRAYRON – Taillight Sequencer Installation

## 6. Optional Expansion Board

1. Option Board: The taillight circuit board includes a connector for an optional input board:



2. Option Boards are separately available, adding additional features to the sequencer. The option boards accept 12 volt input signals. Custom programming added to the sequencer lets the taillight board activate special modes in response to the input signals. The boards can be programmed to implement almost any alteration of the lighting behavior. Some commonly program modes include:
  - a. Fog Light Mode: Makes the taillight compatible with the UK Fog light requirement. Fog light switch is added to the console and activated by the driver. 12 volt signal from switch is connected to an option board input that activates the fog light mode.
  - b. Sequence Turn Signal Inhibit: Sequencing of turn signals is prohibited in some countries. This feature allows the driver to disable the sequencing. When disabled, the turn signals resume the operation of an original car. Sequencing can be reinstated by the driver for car shows, parades, or when jurisdictions allow.
  - c. Sequence Mode Selection: The option board may be programmed to allow selection of the different sequence modes. This allows sequencing to be changed without removing the taillight to physically change the dip switch.

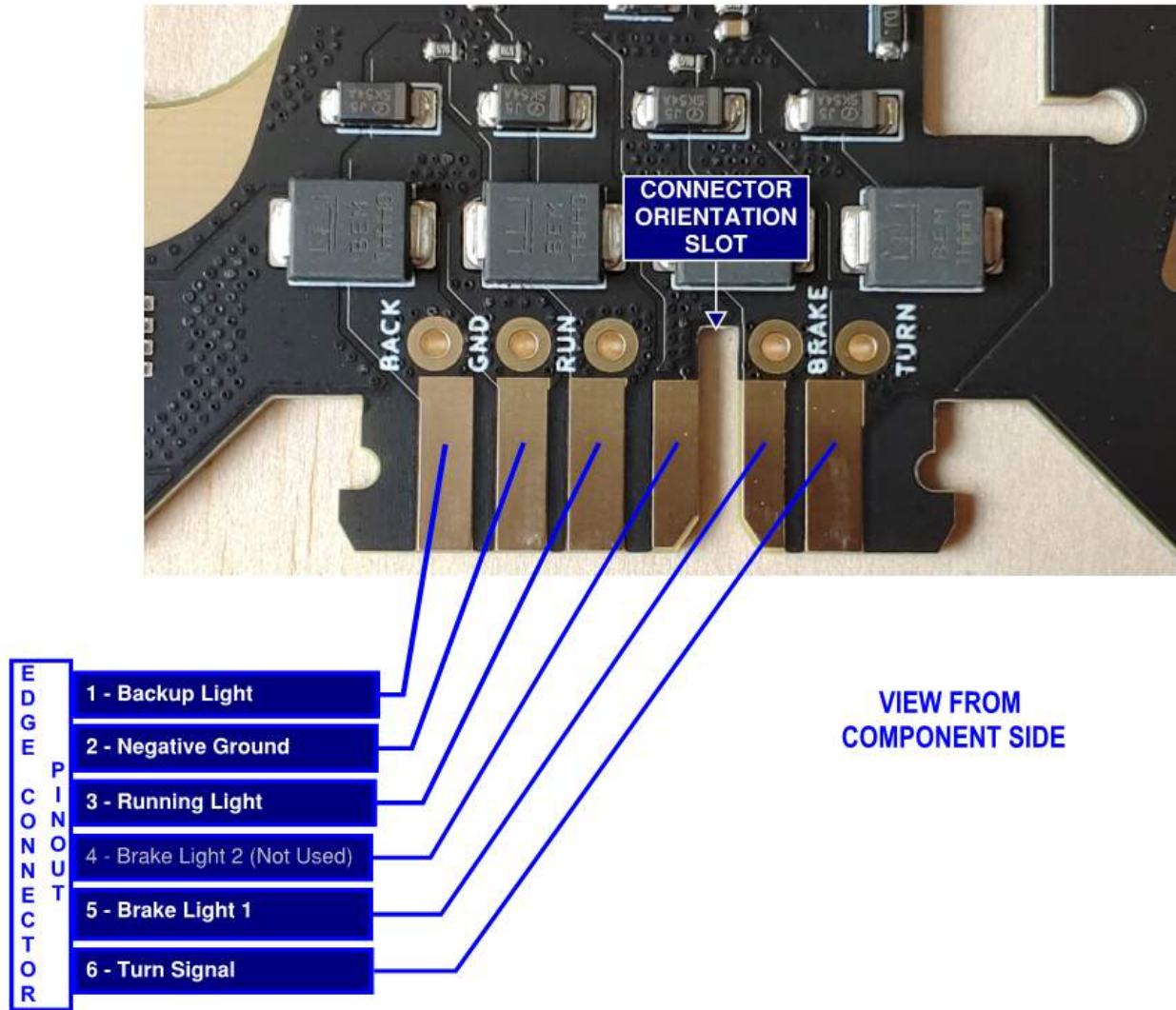
Contact DRAYRON for additional information on the input option boards.

# DRAYRON – Taillight Sequencer Installation

## 7. Troubleshooting

Issue	Things to check and try
No Lights work.	<p>Likely the board is not getting a ground connection. Check to confirm ground pins in taillight connector have a good connection to the negative battery terminal. Check taillight connector pins to make sure they make good contact with the edge connector on the taillight circuit board. Use the circuit board connector reference at the end of this section to know which pin is the negative ground. Correct the connector contact using the methods described in the next section.</p>
One function (brake, backup, turn signal or running light) does not work. Other lights work OK.	<p>Likely the taillight connector pin for that function is not making good contact. Use the circuit board connector reference at the end of this section to know which pin is associated with the non-functional light. Check the specific taillight connector pin to make sure it has good contact with the edge connector on the taillight circuit board. Clean the connecting pin surface with an emery board, folded emery cloth, or folded fine sandpaper. Using a jeweler screwdriver, carefully bend the connector pin so that it achieves a tighter “grip” on the board’s edge connector. If there is evidence of corrosion in the connector, spray with an anticorrosion product to stop and retard the corrosion. CorrosionX is recommended.</p> <p>You can also check for +12 volts on the taillight connector with the connector unplugged. Turn on the feature that is not working and verify with a multimeter that there is +12 volts on the pin.</p> <p>Check that the bulbs are properly inserted in the bulb sockets. This is particularly true for the middle three red running/stop lights. These are 1157 dual element bulbs and can only be inserted one way. The bayonets on these bulbs are offset, one being lower than the other. The lower one must be oriented into the longer slot on the bulb socket. The bulb is then rotated clockwise 12 degrees to lock the bayonets in position and align the contacts of the bulb and bulb socket. Remove the bulb by pushing down and rotating counterclockwise.</p>
Taillights get out of sync in Parade Mode	<p>Make sure that both boards have the same turn relay timing saved. Refer to the Sequence Learn Mode section for details.</p> <p>While in parade mode, turn off emergency flashers for 10 seconds then back on to re-sync the taillights (as long as you leave the running lights on, the taillights will remain in Parade mode).</p>

## DRAYRON – Taillight Sequencer Installation



Technical Assistance: Email us at [techsupport@drayron.com](mailto:techsupport@drayron.com) for technical assistance or with any questions.



### 8. Technical Specifications

- Silicone Conformal Coating for Water and Dust Resistance (MG Chemicals 422B)
- Reverse Voltage Input Protection
- Transient Voltage Input Protection
- Opto-Isolated Logic Inputs
- Hardware Controlled Redundant Light Power Paths
- Onboard Switch to Adjust Animation Mode
- Easily Upgrade Firmware for New Features via USB
- Dual Element Sockets for Running and Brake Functions – Accepts Standard 1157 Bulbs
- Single Element Sockets for Turn and Backup Functions – Accepts Standard 1156 Bulbs
- Compatible With Optional Expansion Board for Additional Signal Inputs
- Signal Input Voltage: 10.5 – 14.5 DC Volts

### 9. Warranty

DRAYRON warrants the taillight boards for 1 year. Warranty covers any failure of the board's components assuming the failure is not caused by incorrect electrical connections, modifications to the product, incorrect installation by the customer, or short circuit in the car wiring harness. DRAYRON will be the sole arbitrator in assessing the cause of the failure. Call DRAYRON for RMA and shipping instructions. DRAYRON, at the company's discretion, will repair or replace the board.