

**K2500DP-BC
Wings-A-Loft™
Door Lock Upgrade Combo System**
(Revised 7/2008)

Please read and understand all of the instructions before starting this installation. The procedures outlined in these installation instructions require moderate mechanical skills, as well as a general understanding of automotive electrical systems, including basic electrical diagnostic techniques.

This Installation Kit includes the following components:

- (1) - Digital Door Lock Control Unit (module) – Series 3 with self-diagnostics
 - (2) - Linear actuators with brackets and connectors
 - (2) - Linkage rods with clamps
 - (4) – Bolts for installation of the actuators
- Complete Diagnostic Guide

Background

The door lock module (also called the door lock impulse unit) that came standard in the DeLorean has a number of known weaknesses and negative qualities. The PCB-mounted relays are prone to burned contacts, resulting in prolonged power input to the door lock solenoids. This typically results in damage to the solenoids, and failure of the central locking system. The capacitors that fire the relays are somewhat inadequate for long life, and create a current drain that is often to blame for a dead battery in the car. There is a voltage regulator component that is often melted from excessive current passage. Overall, the quality of the module is low, and the technology is archaic. For these reasons, many DeLorean owners have compromised the functionality of their cars by disconnecting the module in order to prevent some of these issues. This leaves the car with only manual door locks, which are not convenient, and detract from the overall impression of the DeLorean. The practice of disconnecting the module also defeats the safety unlock function from working in the event of a collision.

The DeLorean Motor Company Digital Door Lock Control Unit utilizes current technology to provide much better reliability, enhanced functionality, and absolutely no latent current drain when not in use. This module has been optimized for direct connection to the entire line of Wings-A-Loft controllers for remote keyless entry. It also features internal self-diagnostics to determine whether the door lock mechanisms and linkage are working correctly inside the doors, and will make attempts to correct temporary mechanism or linkage-based errors in the lock / unlock functions.

This “combo system” also includes our exclusive door lock actuators that replace the solenoids that were original equipment in the DeLorean. The solenoids are very heavy, inefficient, require a large activation current, and are prone to burning out. The Digital Door Lock Control Unit has been designed to directly drive our actuators without added relays or other interface requirements. This system is the ultimate solution for the DeLorean door lock system.

NOTE: The digital door lock control unit (module) included in this system **WILL NOT** correct door lock problems caused by incorrect adjustment of the linkages or door bell crank switches, bent or damaged linkage rods, or damaged door latch assemblies. Refer to the DeLorean Workshop manual for information on troubleshooting and repair techniques for the DeLorean door lock system.

Getting Started

- Remove the relay compartment cover.
- Verify that both door locks are in the “unlocked” position.
- Unplug the red power wire from the door lock module that is connected to the “aux” terminal of the circuit breaker that is situated next to the module.
- Verify that the circuit breaker is providing +12 volt power at the “aux” terminal using a voltmeter, multimeter, or test light. Replace if required.
- Disconnect the 9-pin connector for the module from the DeLorean wiring harness, and remove the module from the relay compartment by loosening the two cover screws.
- Remove the upper and lower door panels to gain access to the solenoids for removal as described in the DeLorean Workshop Manual, Section P:03:04, and in other articles. With the window down you can use a long screwdriver through the opening from the outside to gently pry the upper panel upward. The lower panels are easier to remove if you remove the plastic door lock escutcheons and reach down to remove the two bolts that attach the door grab handle brackets, using a 10mm socket or # 1 Philips screwdriver (depending upon which type of bolt was used in your car. This is different from the procedure that is outlined in the manual.

CAUTION – Disconnect the battery before proceeding with this installation. This will prevent possible short circuits during the installation, which can result in damage or personal injury.

NOTE - This system is designed to lock and unlock properly adjusted, lubricated and functioning doors. Please see the DeLorean Workshop Manual “Door Lock Setting Procedure”, found in Section P: 02:11 for specific information regarding proper door mechanism adjustments.

Installation of the Actuators

- Manually close the door latches.



Figure 1: Latches manually CLOSED



Figure 2: Latches shown normally OPEN.

CAUTION - *DO NOT* operate the door locks with the doors open and the latches in the “unlatched” position! They were not designed to work that way, and you could damage the latch mechanisms. If you manually close the latches you can then cycle the locks as if the doors were closed. **JUST REMEMBER TO PULL THE DOOR HANDLE AND MANUALLY RE-OPEN EACH LATCH BEFORE CLOSING THE DOORS.**

- With the door panels off, unplug the solenoid wire connectors and remove the solenoids. Remove the black ground wire to the solenoid. It is no longer required.
- Insert the steel linkage rods into the actuator arms such that the rods are towards the inside of the car with the actuators installed. This will prevent interference between the linkage rods and door structure.
- Install the new actuator assemblies into the same bolt locations as the solenoids. Note that the actuator assemblies are opposite for right and left hand doors. Figure 5 shows the left hand actuator and bracket installed; Figure 6 shows the actuator in place and linkage attached. The appearance of the components shown may vary from the components supplied.
- Manually cycle both the lock mechanism and new actuator back and forth, and tighten the parallel rod clamp so that the actuator stops slightly before the end of its stroke with the locking bell crank in the fully retracted or “unlock” position.
- During this procedure, it would be a good idea to clean and inspect the wiper switches that are part of the locking bell crank. We recommend using fine emery cloth to remove all glaze and contamination from all contacts in the switch.
- Plug the actuator connector into the DMC connector. Note that one pin location in the connector is not used.



Figure 3: Bellcrank switch in LOCKED position.



Figure 4: Bellcrank switch UNLOCKED.

Installation of the Digital Door Lock Control Unit (module)

- Locate the new module in the same place as the removed module.
- Reconnect the battery at this time to allow verification of the functionality of the module installation.
- Connect the 9-pin connector first. If the module comes to life when the 9-pin connector is connected, wait until the module times out and turns itself off before connecting the red circuit breaker power lead to the “AUX” terminal of the circuit breaker.
- Secure the module to the metal shelf using double-stick tape or self-adhesive Velcro fasteners.

NOTE: If the module comes to life when connecting the 9-pin connector (with the circuit breaker wire not connected) and will not power itself off after a few seconds, the door locks are not both in the fully unlocked position, or they may be misadjusted. *The module power lead should not be connected until the lock problems are first corrected.* Refer to the DeLorean Workshop manual for further information.

- With the module turned off, and any required repairs or adjustments completed, connect the red power lead to the “aux” terminal of the circuit breaker.
- The installation is complete. Perform self-diagnostic test to confirm correct lock system function. See page 6 for the procedure and diagnostic codes.
- Restore the relay compartment cover.
- The module has two additional wires from it – these are for direct connection of input wires from any Wings-A-Loft (or other) remote keyless entry system. If your car is not equipped with a remote keyless entry system (at this time), these wires are not used and should be stowed safely. Do not clip these wires, so that they will be available for future installation of a remote keyless entry system. (You’ll be glad you did)
 - Yellow wire – input wire for negative unlock signal.
 - Orange wire – input wire for negative lock signal.

NOTE: The Digital Door Lock Control Unit is designed to provide power signals to the stock door lock solenoids in a phased fashion. The driver’s side door lock solenoid will respond first, and the passenger’s side solenoid will respond after about a ½ second delay. The reason for this phased functionality is to reduce in-rush currents and power spikes that may be caused by simultaneous activation of both door lock solenoids. This function is normal for this unit. The actuators just installed do not require this phased operation, but the module is designed to work with either configuration.

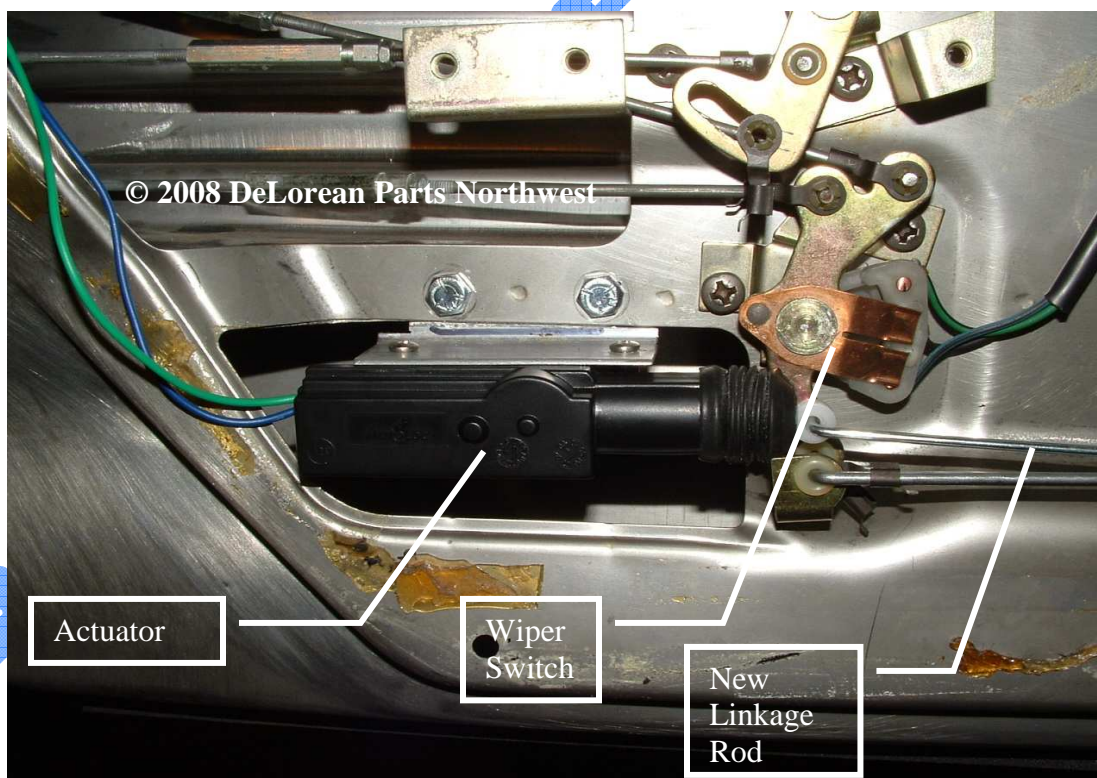


Figure 5

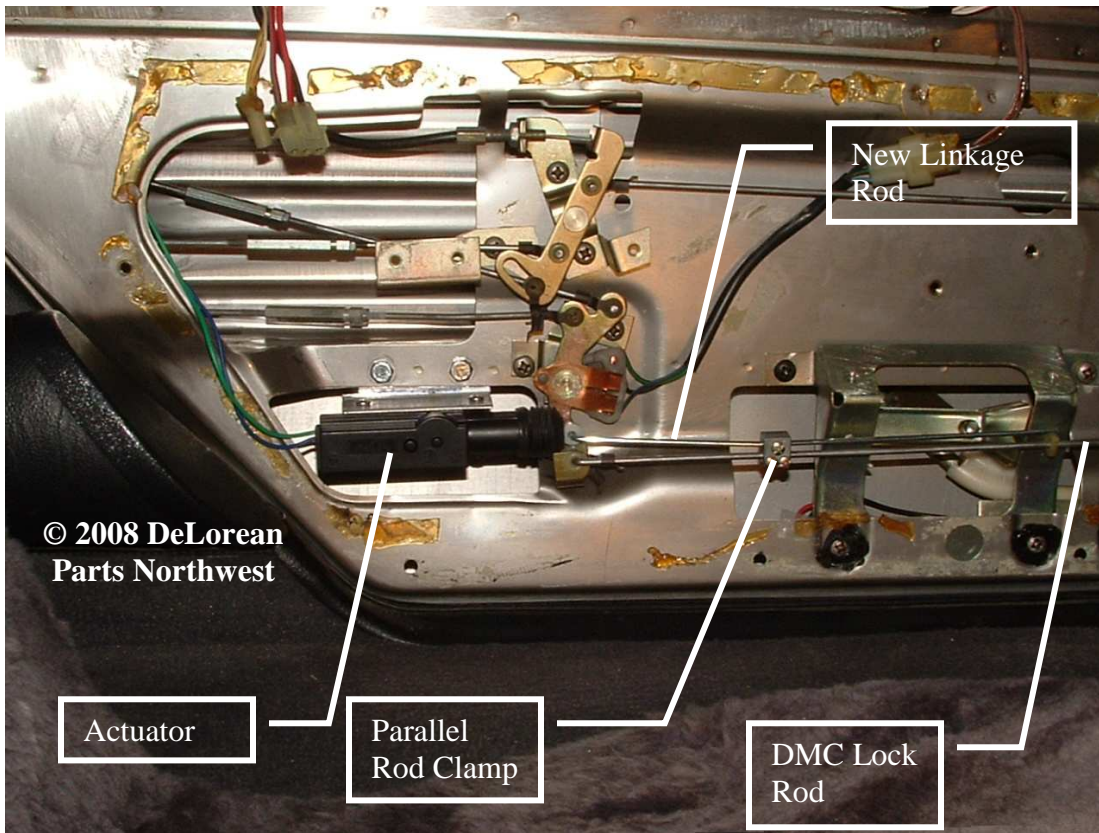


Figure 6

See the following pages for a guide to operating indicators and tone signals, and a guide to the self-diagnostic test indicators and tone signals

- **NOTE:** Please retain these instructions for future reference.

SPECIAL NOTE: The Series 3 version of the Digital Door Lock Control Unit has two fuses incorporated onto the internal printed circuit board. These fuses are designed to provide overload protection for the module in the event that there is a fault in the DeLorean wiring or locking mechanism that may create a power surge or feedback into the module upon installation. If the module fails to perform when installed according to these instructions, these fuses should be checked to see if they have blown.

To visually check these two fuses, carefully remove the top cover of the module to reveal the internal printed circuit board and electronics. The fuses are located at the end of the circuit board on either side of the main wire bundle that exits the module.

If either of the fuses is blown, this indicates that there is a fault in the DeLorean wiring that must be corrected before the module can be used. Failure to correct serious faults in the DeLorean wiring or door locking mechanisms may result in damage to the module. You are encouraged to contact the vendor that supplied you with the Digital Door Lock Control Unit for further guidance. After correcting any faults, the fuse(s) must be replaced before the module will operate properly.

Operating Indicators

 Or  Are Flashing LED's



Executing unlock sequence



Executing lock sequence



Drivers unlock solenoid energized.



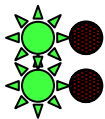
Drivers lock solenoid energized.



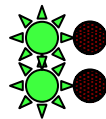
Passengers unlock solenoid energized.



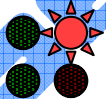
Passengers lock solenoid energized.



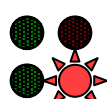
Sequence successful.



Sequence successful.



Unlock failed. Unit will perform a reversing attempt.



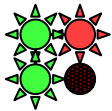
Lock failed. Unit will perform a reversing attempt.

Self-Test Diagnostics

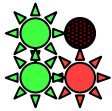
After installing the module according to the installation instructions, the module can perform a complete diagnostic test of the door lock solenoids (or actuators) and the bellcrank linkages. Ensure both doors are unlocked, both doors are latched (either by closing both doors or manually tripping the door latches), and the unit is connected and quiet.

Press and hold the test button on the module for several seconds and then release. After a moment, the module will proceed with a complete door lock diagnostic sequence. If the module finds both door locks in proper operating condition, the module will end the sequence with a green LED three flash acknowledgement and power itself off. If the module detects a problem, it will display one of the diagnostic codes below. The door lock fault must be corrected before the module can be used. Disconnect the module until you have corrected the fault, and confirm the fix by repeating the self-diagnostic test procedure.

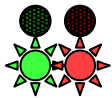
Indicators Flashing Together



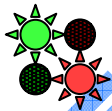
Test fault before starting. One of the door bellcranks is not unlocked and is touching the locked position. Both doors must be unlocked at start of test.



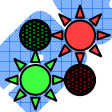
Test fault after locking both doors. One of the door bellcranks is not locked and is touching the unlocked position.



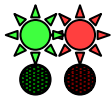
Passenger lock action failed to activate lock bellcrank contact.



Driver lock action failed to activate lock bellcrank contact.

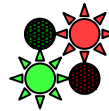


Passenger unlock action failed to activate unlock bellcrank contact.

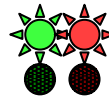


Driver unlock action failed to activate unlock bellcrank contact.

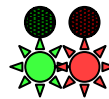
Indicators Flashing Alternating



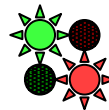
Passenger unlock action failed to deactivate lock bellcrank contact.



Driver unlock action failed to deactivate lock bellcrank contact.



Passenger lock action failed to deactivate unlock bellcrank contact.



Driver lock action failed to deactivate unlock bellcrank contact.

Module Diagnostics Overview

The digital door lock module detects and responds to lock faults and will avoid damage to the actuators or solenoids by only sending an occasional short pulse to the actuators or solenoids. However, the module will not go into standby until it finds a lock setting that does not have a fault. If you attempt to lock the doors and the module senses a fault after throwing the locks, the module will perform a back off by unlocking the doors in order to attempt to avoid leaving the locks in a fault condition. The module will not correct lock linkage problems, wiring faults, or solenoid problems.

The module is energized as a result of the door lock bellcranks being in opposite settings. The module can only power down if the bellcranks on both doors are in the same setting (either locked or unlocked).

Trouble Shooting

Symptom	Possible Cause
When I lock a door, the doors unlock themselves after a couple seconds.	One of the door locks is not registering as being locked after the lock sequence, causing the module to clear the fault by unlocking the doors. This is typically due to linkage misadjustment on either (or both) locks which prevents the full throw of the action, or is due to a failed lock coil on either of the solenoids. See Fault Isolation & Diagnostics instructions.
When I unlock a door, the doors lock themselves after a couple seconds.	One of the door locks is not registering as being unlocked after the unlock sequence, causing the module to clear the fault by throwing the locks back to the fault-free locked position. This is typically due to linkage misadjustment on either (or both) locks which prevents the full throw of the action, or is due to a failed unlock coil on either of the solenoids. See Fault Isolation & Diagnostics instructions.
After I install the module and activate it by throwing a lock, the module repeatedly locks and unlocks the doors every few seconds.	The module is unable to find a fault-free door lock setting in either the locked or unlocked settings. This is typically due to a severe linkage misadjustment or solenoid failures that result in poor lock performance in both the lock and unlock action. See Fault Isolation & Diagnostics instructions.

Fault Isolation & Diagnostics

The fault isolation procedure refers to some of the diagnostic indicators identified in the previous table. Position the module so you can see the indicators for the fault isolation procedure. Since locking/unlocking the doors should only be done with the doors closed, it is most convenient to perform the operations from the driver's seat while looking over into the relay compartment at the module's indicators.

NOTE – The following procedures are written for basic diagnostics with solenoids installed. After the DPNW actuators have been installed to replace the solenoids, simply replace the word “solenoid” with “actuator”. The diagnostic procedures would be similar.

	Step	Diagnostic
1	Disconnect the lone power lead for the module but leave the main wiring harness connector attached. Manually put both door locks in the unlocked position using the lock/unlock buttons on each door.	The module may come to life briefly but should power off after a couple seconds. If the module comes to life and then powers down, the last sequence it performs before powering down should be the unlock sequence (see diagnostic indicators). If it does not power down, one of the door lock linkages is misadjusted and one of the bellcranks is touching the lock sense contacts even in the unlocked position.
2	Manually put the driver's door lock in the locked position and put the passenger door lock in the unlocked position using the lock/unlock buttons on each door.	The module should come to life and continually cycle without shutting down. If the module powers off and the last sequence executed before it turns off is the lock sequence, the linkage for the passenger door lock is misadjusted. If the module powers off and the last sequence executed before it turns off is the unlock sequence, the linkage for the driver's door is misadjusted.
3	Manually put the driver's door lock in the unlocked position and put the passenger door lock in the locked position using the lock/unlock buttons on each door.	The module should come to life and continually cycle without shutting down. If the module powers off and the last sequence executed before it turns off is the lock sequence, the linkage for the driver's door is misadjusted. If the module powers off and the last sequence executed before it turns off is the unlock sequence, the linkage for the passenger's door is misadjusted.
4	Manually put both door locks in the locked position using the lock/unlock buttons on each door.	The module should come to life briefly and then power off after a couple seconds. The last sequence it should perform before powering down is the lock sequence. If it does not power down, one of the door lock linkages is misadjusted and one of the bellcranks is touching the unlock sense contacts even in the locked position.
5	Proceed with the following steps only if steps 1-4 all check out. Manually put both door locks in the unlocked position and then plug in the module's power lead.	If the module comes to life, disconnect the power lead and start over with step 1.
6	Lock the driver's door using the lock/unlock button.	If the module does not come to life, start over with step 1. If the passenger door lock is not thrown, the passenger solenoid lock coil is defective. If the passenger lock is thrown, but the module reverses the locks after a couple seconds, then the passenger solenoid is weak or the passenger linkage is misadjusted so that the lock is not thrown far enough through its range of motion. You can confirm a weak solenoid or linkage misadjustment of the passenger locking action by doing this step again but help the passenger lock along by pushing the passenger lock button after the solenoid engages it. If helping the locking action along causes the lock sequence to complete successfully, the problem is confirmed.

7	Manually return both locks to the unlocked position and confirm the module is powered off. Lock the passenger's door using the lock/unlock button.	If the module does not come to life, start over with step 1. If the driver's door lock is not thrown, the driver's solenoid lock coil is defective. If the driver's lock is thrown, but the module reverses the locks after a couple seconds, then the driver's solenoid is weak or the driver's linkage is misadjusted so that the lock is not thrown far enough through its range of motion. You can confirm a weak solenoid or linkage misadjustment of the drivers locking action using the same method described in step 6.
8	Proceed with the following steps only if all previous steps check out. Lock the doors using either the driver or passenger lock/unlock button.	The module should lock the opposite door and then power itself off. If it does not, go back to step 5.
9	Unlock the driver's door using the lock/unlock button.	If the module does not come to life, start over with step 1. If the passenger door lock is not thrown, the passenger solenoid unlock coil is defective. If the passenger lock is thrown, but the module reverses the locks after a couple seconds, then the passenger solenoid is weak or the passenger linkage is misadjusted so that the lock is not thrown far enough through its range of motion. You can confirm a weak solenoid or linkage misadjustment of the passenger unlocking action using the same method as in step 6.
10	Return both locks to the locked position (as in step 8) and confirm the module is powered off. Unlock the passenger's door using the lock/unlock button.	If the module does not come to life, start over with step 1. If the driver's door lock is not thrown, the driver's solenoid unlock coil is defective. If the driver's lock is thrown, but the module reverses the locks after a couple seconds, then the driver's solenoid is weak or the driver's linkage is misadjusted so that the lock is not thrown far enough through its range of motion. You can confirm a weak solenoid or linkage misadjustment of the drivers unlocking action using the same method described in step 6.
11	At this point diagnostics using the internal door lock buttons is complete. Exercise the locking/unlocking action on both the driver and passenger side using the key.	If using the key produces a different result than using the lock/unlock buttons in the doors, the linkage or bellcranks for the corresponding door needs adjustment.

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