STANDARD REPORT

SEARCH CRITERIA
Requirement ID = RQT-002004-022094 Status = RELEASED

REQUIREMENTS SUMMARY

FSMS ID (SETK Legacy)	RQT Version	Requirement Title	Publish Date	Priority Level	Associated Detail ID(s)	Associated Verification Types
RQT-002004-022094 (27-0073)	5	Lincoln Embrace Welcome and Farewell Behavior	31-Oct-2017	Specification	DET022094-1	00.20-L-12995/1;1

REQUIREMENT

ID: RQT-002004-022094 **Rev:** 5 **Title:** Lincoln Embrace Welcome and Farewell Behavior

Legacy ID: 27-0073 **Owner:** Prescott,Jennifer-JPRESCO2 (jpresco2) **Priority Level:** Specification

Release Status: Released **Rqmt Published Date:** 31-Oct-2017 **Obsolete Date:** **Superseded Date:**

Recipient CPSCs:

002004-Harmony
010523-Switches - Rear End Trim
011016-Switches - Front Seat
011017-Switches - Rear Seat
011116-Switch Pack - Front Door
011117-Switch Pack - Rear Door
011207-Floor Console Switches
011211-Rear Console Switches
011214-Overhead Console
011220-Switch Pack - Instrument Panel
011221-Switches - Overhead
012901-Module - Overhead Complete
012902-Module - Overhead Console
050703-Gear Shift Module (GSM)
110501-Steering Column and Shroud Mounted - Switches and Clockspring
110602-Steering Wheel Mounted Switches
170000-Lighting System
170100-Front Lighting Subsystem
170104-Supplemental Front Lamps
170105-Side Repeater / Marker Lamps
170200-Interior Lighting Subsystem
170202-Lighting - Interior
170207-Lighting - Instrument Panel (IP) & Consoles
170208-Lighting - Ambient
170300-Rear Lighting Subsystem
170301-Rear Combination Lamp
170304-Supplemental Rear Lamps
170308-License Plate Lamp
170309-CHMSL (Center High Mount Stop Light)
170310-Supplemental Illumination
170500-Lighting Switches Subsystem
170501-Master Lighting Switchpack
180300-Electrical Distribution Switches Subsystem
180304-Hidden Switches and Sensors
191203-Exterior Switch Pack / Keypad

Rqmt Sources(s) :

Cascade To:

Cascade From:

Markets:
GLOBAL;

Vehicle Types:
GLOBAL:All

Comments:
1- Some of the CPSC codes dropped off with the last release. This release adds them back in. No change to the actual specification.

Requirement Description:

RQT-002004-022094

Lincoln Embrace

Lincoln Embrace is a sequence of events that occur as the customer approaches, enters, starts and exits the vehicle. It applies to all Lincoln vehicles in all markets. In order to meet the strategy, the Lincoln Embrace State Matrix must be followed. Features are as equipped, but the program must contain the minimum content as spelled out in the Embrace score card.

Embrace score card is located in the following folder:
https://comm.extsp.ford.com/sites/InteriorHarmony/Core%20Harmony1/Forms/AllItems.aspx?RootFolder=%2Fsites%2FInteriorHarmony%2FCore%20Harmony1%2FSpecifications%2FRQT%2D002004%2D022094%20Lincoln%20Embrace%20Welcome%20and%20Farewell%20Behavior

System level details for execution of this specification can be found in RQT 000600-022315 -Lincoln Embrace/ Ford Welcome Farewell compliance with feature specification.

Lincoln Embrace – RQT-002004-022094

Specification Table of Contents

INTRODUCTION

1.1 Document Intent

This specification is a guideline of the required elements for Lincoln vehicle programs to meet the Lincoln Motor Company Lincoln Embrace strategy.

2.0 LINCOLN EMBRACE STRATEGY OVERVIEW

The Lincoln Embrace strategy is a sequence of illumination events that occur as the customer activates remote start, approaches from a distance (with proximity detection technology), unlocks, enters, starts, stops, exits, and then locks the vehicle. The agreed upon state matrix for the Lincoln Motor Company Lincoln Embrace strategy is detailed in Appendix I.

2.1 Vision Statement

The vision statement for Lincoln Embrace is as follows:
“Lincoln Embrace anticipates your needs, knowing and welcoming you. It is warm and inviting, fluid and seemless as you enter and leave the vehicle.”

2.2 Lincoln Embrace Components

Exterior lighting components include:

- Headlamps (specifically, low-beams)
- Front side markers (to indicate body width; may be standalone or integrated into the headlight assembly)
- Fog Lamps
- Daytime Running Lamps/Front Park Lamps
- Rear parking lamps
- RAPL (*rear applique park lamp*, typically full width lens assembly joining both rear parking lamps; RAPL and rear license plate illumination are linked)
- Rear side markers (to indicate body width; may be standalone or integrated into the rear parking lamp assembly)
- Welcome mat (driver and passenger)
- Illuminated SecuriCode™ keypad
- Fog lamps
- Illuminated Lincoln star
- Illuminated door handle pockets
- Power folding mirrors
- Illuminated, power deployable running boards

Not all of these features are available on all Lincoln products. Some are trim level specific, while others are model specific (i.e., running boards).

Turn signals, sounder, and mirror fold behaviors for lock and unlock feedback are explained at a high level in Appendix II.

Interior illuminated components include:

- Pulsing push-to-start switch
- Courtesy lamps
- Centerstack display (for Sync® system)
- IP, door and overhead console switch/button illumination
- Odometer display
- Instrument cluster display (assumes all Lincoln instrument clusters are TFT-based)
- Headlamp switch
- Engine stop/start button status LED
- Night lock indicator (on instrument panel or door panel, indicating door lock status)
- Windshield heads-up display
- Illuminated scuff plates
- Illuminated seat belt buckles
- Ambient lighting (including any sequential lighting behaviors)

Not all of these features are available on all Lincoln products. Some are trim level specific, while others are model specific (like windshield heads-up display).

2.4 Passive Entry Passive Start

PEPS (Passive Entry, Passive Start) replaces the keyed ignition with a keyfob and Push-to-Start button on the instrument panel.

Note that PEPS is standard equipment on all Lincoln products. Therefore, there is no indication in the specification for key-based vehicles.

3.0 WELCOME STRATEGY OPERATIONAL DESCRIPTION

The Welcome Strategy for Lincoln Embrace is divided into a sequence of six events: Remote Start, Approach Detection, Vehicle Unlock, Vehicle Ingress, Settled in Seat and Ignition On & Powertrain either ON or OFF. Note that there is no difference in this last state in Lincoln products for ignition ON with the powertrain inactive (i.e., engine not running) and ignition ON with the powertrain active (i.e. engine running). Within each event, the Welcome Strategy controls elements of exterior and interior lighting. Transition between events is triggered by a customer action, such as unlocking a door, opening or closing a door or starting the vehicle.

Descriptions provided below are subject to change. Ultimately, the “Welcome-Farewell & Lincoln Embrace feature specification”, owned by EESE, is the primary guidance document for development of Lincoln Embrace.

3.1 Remote Start Event (*if equipped*)

The Remote Start feature enables the customer to start the vehicle from a significant distance via the keyfob. This feature is not available in all markets.

During the entire time Remote Start is active, the ignition is considered OFF. For a PEPS vehicle, the keyfob must be inside the vehicle and Push-to-Start button pressed while the brake is depressed in order to accomplish the transition to the ON state.

3.2 Approach Detection Event (*if equipped*)

The Approach Detection feature extends the “welcome” experience further, providing a thoughtful response to the driver as he/she comes within 2.7 meters (9 feet) of the vehicle with the key fob.

There are three core areas of the Approach experience we cover in this section: Front Lighting, Rear Lighting, and Other Features.

3.2.1 FRONT LIGHTING

The experience at the front of the vehicle is focused on:

- The signature lamps
- The lit Lincoln star (if equipped)
- The fog lamps (if equipped).

The headlamp low & high beams, front side markers, and daytime running lamps remain OFF during the Embrace experience, and only turn on once the vehicle has been started, as required. Should the daytime running lamps be the *same* component as the signature lamps, then treat them as ‘signature lamps’ during the rest of this section. All three affected component lights MUST contain the ability to:

- Fade on over 3 seconds
- Fade off over 5 seconds
- The signature lamps must contain the ability to fade on, and possess a sweeping (dynamic) capability.
- The lit Lincoln star and fog lamps must contain the ability to fade.
- All three components must contain the ability to adjust the timing and PWM of ramp-up, as these are subjective, jury evaluated elements which are tuned during the VP build period.

During an illumination trigger, typically “Approach Detection” or “Vehicle Unlock”, the sequence is as explained below, with T=0 indicating time of zero seconds, T=3 indicating time of 3 seconds, etc:

T=0 to T=3:

- LINCOLN STAR: The lit Lincoln star will statically fade up, in a *visually* linear manner from OFF to full brightness.
- SIGNATURE LAMPS: The signature lamps will always light at ‘Embrace Intensity’, but will illuminate from the centerline of the car and sweep outwards.
    - The march from center to edge should, like the lit Lincoln Star, be a linear experience, completing the full sweep in 3 seconds.

    - The ‘Embrace Intensity’ is an intensity setting which is typically lower than the federally regulated “drive” intensity. This lower intensity will be jury evaluated in a dark space to confirm it doesn’t dazzle approaching customers at nighttime, yet is bright enough to be effective during daytime. Once the vehicle is started, the intensity is permitted to snap to the required “drive” intensity.
- FOG LAMPS: The fog lamps will statically fade up, in a *visually* linear manner from OFF to full brightness.

T=3:

- LINCOLN STAR: Illuminated to full brightness.
- SIGNATURE LAMPS: Dynamic sweep has completed. Embrace intensity.
- FOG LAMPS: Illuminated to full brightness.

T=4 to T=25:

- LINCOLN STAR: Remain lit at full brightness.
- SIGNATURE LAMPS: Remain lit at Embrace intensity.
- FOG LAMPS: Remain lit at full brightness.

T=25 to T=30:

- LINCOLN STAR: Visually linear reduction in intensity from full brightness to OFF.
- SIGNATURE LAMPS: Remain lit at Embrace Intensity, but reverse-sweep, turning off lighting segments from outer edge of vehicle towards centerline.
    - The last illuminated lights should be at the centerline of the vehicle at T=29, fully extinguishing at T=30.
    - The sweep should be linear in appearance, as for the initial illumination.
- FOG LAMPS: Visually linear reduction in intensity from full brightness to OFF.

3.2.2 REAR LIGHTING

The experience is focused on:

- The RAPL (rear parking applique lamp)
- Corner lamp parking lamps
- Side marker lamps
- License plate lamps

Turn signals and reverse indication lamps are not a part of this experience and need only light as functionally required. All three affected component lights MUST contain the ability to:

- Fade on over 3 seconds
- Fade off over 5 seconds
- Protect for adjustments to PWM and timing of ramp behavior, subject to jury evaluation during VP build events.

Unlike front signature lamps, which require a lower-intensity value to avoid dazzling customers, all rear lamps are expected to illuminate to their drive, federally regulated intensity during this experience. This intensity is called “PARK intensity”.

During an illumination trigger, typically “Approach Detection” or “Vehicle Unlock”, the sequence is as explained below, with T=0 indicating time of zero seconds, T=3 indicating time of 3 seconds, etc:

T=0 to T=3:

- RAPL: The RAPL will statically, linearly fade up, from OFF to full PARK intensity.
    - This cadence will be identical to the corner and side marker lamps so as to appear as ‘one component’.
- CORNER LAMP: The corner parking lamps will statically, linearly fade up, from OFF to full PARK intensity.
    - This cadence will be identical to the RAPL and side marker lamps so as to appear as ‘one component’.
- SIDE MARKER: The side marker lamps will statically, linearly fade up, from OFF to full PARK intensity.
    - This cadence will be identical to the RAPL and corner lamps so as to appear as ‘one component’.
- LICENSE: The license plate lamps will statically, linearly fade up, from OFF to full brightness.

T=4 to T=25:

- RAPL: Remain lit at PARK intensity.
- CORNER LAMP: Remain lit at PARK intensity.
- SIDE MARKER: Remain lit at PARK intensity.
- LICENSE: Remain lit at full brightness.

T=25 to T=30:

- RAPL: The RAPL will statically, linearly fade down, from PARK to OFF intensity.
    - This cadence will be identical to the corner and side marker lamps so as to appear as ‘one component’.
- CORNER LAMP: The corner parking lamps will statically, linearly fade down, from PARK to OFF
    - This cadence will be identical to the RAPL and side marker lamps so as to appear as ‘one component’.
- SIDE MARKER: The side marker lamps will statically, linearly fade down, from PARK to OFF
    - This cadence will be identical to the RAPL and corner lamps so as to appear as ‘one component’.
- LICENSE: The license plate lamps will statically, linearly fade down, from PARK to OFF

3.2.3 OTHER FEATURES

The interior cabin remains OFF except for night lock indicators (if equipped) and the ambient lighting, which illuminate. Ambient lighting will illuminate in the customer preferred color during this time.

This feature dismisses after 25 seconds, and only re-activates if the keyfob exceeds the 2.7 meter range and then re-enters the 2.7 meter proximity “window” again. There is a limit to the number of re-occurrances that can be triggered before the ignition must be cycled (program customizable). Also, the duration of “stand-by” mode, in which the system is willing to permit approach detect while the vehicle is inactive for an extended duration, is also program customizable. Many programs choose 5 days of stand-by mode, after which time approach detect will not function. This duration may vary.

3.3 Vehicle Unlock Event

The Vehicle Unlock event represents the typical unlock sequence a customer will perform to gain access into their vehicle, and is similar to the BCM feature called Illuminated Entry. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

3.4 Vehicle Ingress Event

The Vehicle Ingress event represents the occurrence where a customer opens a door and enters the cabin of the vehicle. It is similar to the BCM feature called Courtesy Lighting. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

3.5 Settled In Seat Event

Settled In Seat is similar to the BCM feature called Courtesy Lighting Delay, and represents the occurrence where the driver has closed the door after entering the cabin. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

3.6 Ignition ON & Powertrain ON or OFF Event

The Ignition ON & Powertrain ON/OFF event captures the behavior of any powertrain-type vehicle in the Lincoln family, whether gasoline, diesel, hybrid, or battery-electric (BEV). PEPS vehicles can enter this state with either the powertrain active or inactive. The Lincoln Embrace behaviors are identical for either powertrain state.

The Ignition ON & Powertrain OFF state is entered by:
- PEPS: Pressing engine start/stop button (with keyfob in vehicle) but do not depress brake pedal simultaneously.

In other words, the driver has made no attempt to activate the powertrain on the vehicle. During this phase, various telltales will illuminate on the cluster, and some will remain active (such as check-engine) that would otherwise extinguish during the powertrain ON condition.

The Ignition ON & Powertrain ON state is entered by:
- PEPS: Pressing engine start/stop button (with keyfob in vehicle) and brake pedal simultaneously.

In other words, the driver has made an attempt to activate the powertrain on the vehicle. During this phase, various telltales will illuminate on the cluster, and only those indicating true faults will remain active (such as check-engine, TPMS, etc.) while all others extinguish after a lamp prove-out period.

All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

4 FAREWELL STRATEGY OPERATIONAL DESCRIPTION

The Farewell Strategy is divided into a sequence of six events as the customer completes the driving experience including: Powertrain Turned Off, Media Accessory Delay, Exit Vehicle/Vehicle Egress, Courtesy Lighting Delay, Security Locking, and Locking Confirmation. Within each event, the Farewell Strategy controls elements of exterior and interior lighting. Transition between events is triggered by a customer action; i.e. opening or closing a door or locking the vehicle.

4.1 Powertrain Turned Off

Powertrain Turned Off is similar to the BCM feature called Illuminated Exit, and represents the occurrence where the driver has turned off the powertrain, but has not yet opened any doors to exit the vehicle. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

4.2 Media Accessory Delay

Media Accessory Delay state represents the occurrence where the driver has turned off the powertrain, but has not yet opened any doors to exit the vehicle, *and the previous state has expired* (see 4.1). This permits the driver the courtesy of additional interior illumination during the extended functionality period of the radio and other controls; any active controls will be illuminated as a guide to the customer. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

4.3 Exit Vehicle/Vehicle Egress

Exit Vehicle/Vehicle Egress is similar to the BCM feature called Courtesy Lighting, and represents the occurrence where the driver opens the door to exit the vehicle. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

4.4 Courtesy Lighting Delay

Courtesy lighting delay represents the occurrence where the driver has shut the door after exiting the vehicle. For reduced complexity, it is identical to the Welcome state “Settled In Seat”. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

4.5 Security Locking

Security Locking represents the typical occurrence where the driver locks the vehicle after exiting, and is similar to the BCM feature called Locking Feedback Lighting. All event details and component statuses of this state are outlined in the state matrix; see Appendix I for complete details.

4.6 Locking Confirmation

The Locking Confirmation event is similar to the BCM feature called Locking Feedback Horn, and represents the occurrence where the customer presses the lock button twice to ensure they've locked the vehicle properly. Since some locking behaviors (sounder beeps, light flashes, etc.) can vary regionally, complete details are outlined in Appendix II for feedback behaviors.

5.0 LINCOLN EMBRACE OPERATIONAL ANAMOLIES

5.1 Factory and Transport Car Modes

If the vehicle is in Factory or Transport Car Mode, certain features behave differently during Welcome/Farewell to minimize energy use from the battery. Several Welcome-Farewell states may be disabled, or shortened as a result. Ensure any vehicles audited for Lincoln Embrace conformance are not in Factory or Transport Car Mode during testing.

5.2 Electronic Display Screens

The Welcome and Farewell Screens that are shown in the centerstack display as called out in Appendix I are left to the discretion of the HMI Design and broader Design Studio teams. Any animations presented must be identical for Welcome and Farewell if door triggered, due to the "mirrored" nature of the sequence, and the vehicle's inability to detect whether an occupant is truly entering or exiting the vehicle.

6.0 ASSESSMENT CRITERIA

6.1 **GREEN** ASSESSMENT
Vehicle fully aligned with Welcome-Farewell state matrix.
OR
Meets state matrix except for 3 or fewer minor failures.

6.2 **RED** ASSESSMENT
4 or greater minor failures
OR
1 or greater major failures

6.3 MINOR VS. MAJOR FAILURES
Designation of minor or major failures is ultimately at the discretion of Vehicle Harmony's S.M.E. for Welcome Farewell.
Major failures have a significant visual or auditory impact that erodes showroom consistency in the Ford/Lincoln fleet. These are also failures that would make the welcome/farewell experience worse for the customer. Examples include:
1) Animations that trigger at the wrong state, are far too long or short, or aren't available.

2) Incorrect locking feedback, such as too many/few turn signal flashes, and incorrect number of horn chirps.
3) Courtesy lamps that do not illuminate.
4) Ambient lighting that illuminates in the wrong color.
5) Missing states, such as illuminated exit, courtesy lighting, etc.

Minor failures have a less obvious impact on the experience, and may only be picked up on by experts. The impact on the welcome/farewell experience may be inconsequential, slightly negative, or positive. Examples include:

1) A non-vehicle-control switch that doesn't illuminate.
2) Ambient lighting that remains illuminated slightly longer than expected.
3) Components which remain illuminated during media accessory delay unnecessarily.

APPENDIX I - LINCOLN EMBRACE STATE MATRICIES

State Matrix is attached to this spec and available at the Vehicle Harmony Share point at the following link:

https://comm.extsp.ford.com/sites/InteriorHarmony/Core%20Harmony1/Forms/AllItems.aspx?RootFolder=%2Fsites%2FInteriorHarmony%2FCore%20Harmony1%2FSpecifications%2FRQT%2D002004%2D022094%20Lincoln%20Embrace%20Welcome%20and%20Farewell%20Behavior

APPENDIX II – DNA LOCK/UNLOCK CUSTOMER FEEDBACK

1.0 APPENDIX II: LOCK/UNLOCK FEEDBACK

1.1 Document Intent

This appendix covers the intended DNA lock/unlock vehicle-to-customer feedback under a variety of scenarios. It includes and is limited to the following components:

- Turn Signal Indicator Flashing (all applicable lenses on vehicle body)
- Mirror Fold/Unfold Behavior
- Sounder Beep Behavior

The feedback behaviors are, in summary:

Feedback Types		
Feedback	**Visual**	**Audible**
Momentary	Turn Signal Flash	Beeps
Permanent/Continuous	Mirror fold	-

This specification is not exhaustive; it does not cover all possible permutations and combinations of locking behavior, nor does it consider all available components. This document's intent is to cover the high frequency usage lock/unlock strategy. The Body Security team captures all possible combinations in their feature specifications.

For the purposes of program behavior auditing, only those locking requests outlined in the chart in section 1.6 which utilize the PEPs door handle or remote keyfob as the enabler are considered DNA-level behaviors. Any other method of locking the vehicle outlined in the chart (SecuriCode™ keypad, key cylinder, etc.) are considered specification-level behaviors.

1.2 Locking State Terminology

Hereafter lists the different vehicle lock states, and a brief explanation of each:

- **Unlocked:** At least one body door can be opened using an exterior or interior door handle without triggering an alarm or changing lock state.

- **Central Locked:** The most common type of vehicle lock state. All body doors are locked; i.e., the exterior door handles are disabled, but the interior door handles still function. A

customer outside the vehicle can action the door handle, but not gain access. A customer inside the vehicle can action the interior door handle, change lock state (to unlocked) and exit the vehicle.

- **Double Locked:** Less common type of vehicle lock state. Frequently seen in European-market vehicles, but not permitted in the U.S. and some other markets. All body doors are locked; i.e., the exterior AND interior door handles are disabled. A customer outside the vehicle cannot gain access by actioning the door handle. A customer inside the vehicle cannot exit the vehicle by actioning the door handle.

1.3 Flasher Feedback Timing

Turn signal flashing, hereafter known as “flashers” or “flasher feedback”, has timing which varies depending on state request. Specifically, a:

- **LOCK request:** Flashers turn ON for 250 milliseconds, and turn OFF for 250 milliseconds before subsequent flashes, as required. This is referred to in the state charts as a “short flash”.

- **UNLOCK request:** Flashers turn ON for 750 milliseconds, and turn OFF for 250 miliseconds before subsequent flashes, as required. This is referred to in the state charts as a “long flash”.

1.4 Quiet Market Designation (QM)

Quiet market designation indicates those regions where horn or sounder chirps are unacceptable noise pollution. In compliance with local ordinances, quiet market Ford Motor Company products provide either no audible feedback upon locking, or defeatable audible feedback (typically disabled through the instrument cluster menu).

Quiet Market Regions: EU*

Non-Quiet Market Regions: FNA, SA, AP, MEA

*The quiet market classification is based on regional experts’ feedback, competitor benchmarking, and customers’ expectations based on historical implementation.

1.5 Understanding “Slam Lock” versus “Slam Lock Protect”

“Slam Lock” is the ability to lock the vehicle while a body door is ajar. Conversely, “Slam Lock Protect” does not permit vehicle lock while a body door is open. For “Slam Lock Protect” equipped vehicles, all body doors must be closed before a lock request will be permitted.

The “Slam Lock” versus “Slam Lock Protect” market classification is based on regional experts’ feedback and customers’ expectations based on historical implementation.

Slam Lock regions: NA

Slam Lock Protect regions: EU, SA, AP, MEA

The Body Security team captures the various details about the Slam Lock & Slam Lock Protect Feature in their specification.

1.6 DNA Locking Feedback Behavior State Chart

Scenario	Customer Action	Flasher Feedback	Sounder Feedback	Mirror Fold/Unfold Feedback
Lock Request[2,3]	1st lock request	1 short flash	No sound	Mirrors Fold, if previously unfolded
	2 lock requests within 3 seconds *-CENTRAL LOCK*	2 short flashes	1 beep[1]	
	2 lock requests within 3 seconds *-CENTRAL LOCK -QUIET MARKET*	2 short flashes	No sound	
	2 lock requests within 3 seconds *-DOUBLE LOCK*	3 short flashes	1 beep[1]	
	2 lock requests within 3 seconds *-DOUBLE LOCK -QUIET MARKET*	3 short flashes	No sound	
Unlock Request[2]	1st unlock request	1 long flash	No sound	Mirrors unfold, if previously folded
	2 unlock requests within 3 seconds			
Door Ajar & Lock Request[2,3]	1st lock request *-SLAM LOCK ENABLED*	No flash	No sound	No action
	1st lock request *-SLAM LOCK PROTECT ENABLED*		2 beeps	
	2 lock requests within 3 seconds *-SLAM LOCK*		2 beeps	

	ENABLED *-SLAM LOCK PROTECT ENABLED*			

Superscript Notation Legend:

1: Sounder beep only occurs when using remote. All other exterior lock components will not cause sounder beep.
2: This chart only covers locking requests for exterior components, i.e. PEPS door handles, exposed key cylinder, remote key fob, or SecuriCode™ keypad. It does not cover interior door lock switch use.
3: Neither the PEPS feature nor the SecuriCode™ keypad will acknowledge a lock request if the requesting door is ajar.

TARGETS

DETAILS

Dataset Name:D... **...iption:**Lincoln Embrace State Chart **Dataset Attachment File Name:**

LincolnEmbraceS...

Welcome

	Body Module Feature Description			Illuminated Entry	Courtesy Lighting	Courtesy Lighting Delay	
	Event:	**Remote Start[2]**	**Approach Detection**	**Vehicle Unlock**	**Vehicle Ingress**	**Settled in Seat**	**Ignition ON** Powertrain System Not Yet Active and Powertrain Systems Active
	Event Trigger:	**Press** (on keyfob, within 3 seconds of each action)**:** **LOCK, then ENGINE START twice** Headlamp Switch Status: **AUTO**	**Come within 9 feet (2.7m) of vehicle with proximity key fob** (if equipped) Headlamp Switch Status: **AUTO**	Perform the following actions once with all doors closed (as equipped): **Press keyfob unlock button** OR **Touch/activate PEPS unlock sensor (door handle)** OR **Enter unique 5-digit SECURICODE™ access code using external keypad buttons** OR **Press trunk/liftgate/liftglass/power-sliding-door open button on keyfob** Headlamp Switch Status: **AUTO**	**Any Door**/Liftgate/Lift Glass **Ajar** Headlamp Switch Status**: AUTO**	**All Doors**/Liftgate/Lift Glass **Closed** Headlamp Switch Status**: AUTO**	**PEPS:** Ignition transition to ON with 1 button press, and no foot on brake. OR **PEPS:** Ignition transition to ON with 1 button press, and footbrake depressed. Headlamp Switch Status: **ON** or **AUTO**
	Ignition Status:	**OFF**	**OFF**	**OFF**	**OFF or ACC**	**OFF or ACC**	**RUN or START**
	Event Duration:	Customer Configurable	25 seconds	25 seconds	25 seconds and 10 minute battery saver [3]	25 seconds	No time dependency
	Event Interrupt Action and Result:	**Unlock vehicle** (w/keyfob, keypad, lock cylinder, door handle) and **open** then **close door,** then**:** Depress footbrake and engine stop/start button. **RESULT:** Go to "Ignition ON" state. **OR** Press ENGINE START on keyfob once **RESULT:** Remote start sequence cancelled. All exterior and interior illumination extinguishes immediately.	**Lock or unlock w/keyfob, door handle or keypad.** **RESULT:** Go to "Vehicle Unlock" state or "Security Locking" as appropriate.	Lock w/ key fob, keypad, door handle **RESULT:** Go to "Security Locking" state. **OR** Ignition transitions from OFF **RESULT:** Go to "Ignition ON" state.	Close all doors/liftgate/liftglass. **RESULT:** Go to "Settled In Seat" state. **OR** Ignition transitions from OFF **RESULT:** Go to "Ignition ON" state.	Ignition transition from OFF **RESULT:** Go to "Ignition ON" state. **OR** Open any door/liftgate/liftglass. **RESULT:** Go to "Vehicle Ingress" state.	Ignition transition to OFF **RESULT:** Go to "Illuminated Exit" state.
Front Illumination	Headlamps (Low Beams)	**OFF**	**OFF**	**OFF[26]**	**OFF[26]**	**OFF[26]**	**ON[1]**
Front Illumination	Front Side Markers	**OFF**	**OFF**	**OFF[26]**	**OFF[26]**	**OFF[26]**	**ON[1]**
Front Illumination	Signature Lamps/Daytime Running Lamps/ Front Park lamps[4]	**ON EMBRACE INT. (Fade 3 sec.)**	**ON EMBRACE INT. (Fade 3 sec.)**	**ON EMBRACE INT.[26]**	**ON EMBRACE INT.[26]**	**ON EMBRACE INT.[26]**	**ON**
Front Illumination	Fog Lamps[5]	**ON (Fade 3 sec.) (In sync with DRL/Park Lamp ON)**	**ON (Fade 3 sec.) (In sync with DRL/Park Lamp ON)**	**ON[26]**	**ON[26]**	**ON[26]**	**ON[6]**
Front Illumination	Illuminated Lincoln Star[5]	**ON (Fade 3 sec.) (In sync with DRL/Park Lamp ON)**	**ON (Fade 3 sec.) (In sync with DRL/Park Lamp ON)**	**ON[26]**	**ON[26]**	**ON[26]**	**ON[1,4]**
Rear Illumination	Rear Parking Lamps	**ON**	**ON PARK (Fade 3 sec.)**	**ON PARK[26]**	**ON PARK[26]**	**ON PARK[26]**	**ON PARK[1]**
Rear Illumination	RAPL (Rear Applique Park Lamp) (includes rear license plate lamp)	**ON**	**ON (Fade 3 sec.)**	**ON[26]**	**ON[26]**	**ON[26]**	**ON[1]**
Rear Illumination	Rear Side Markers	**ON**	**ON (Fade 3 sec.)**	**ON[26]**	**ON[26]**	**ON[26]**	**ON[1]**
Supplementary Illumination	Illuminated Door Handle Pockets	**OFF**	**ON[12] (Fade 3 sec.)**	**ON**	**ON**	**ON**	**OFF[12] (Fade 5 sec)**
Supplementary Illumination	Welcome Mat (Driver's)	**OFF**	**ON[12,23] (Fade 3 sec.)**	**ON[23]**	**OFF**	**OFF**	**OFF**
Supplementary Illumination	Welcome Mat (Passenger's)	**OFF**	**ON[12,23] (Fade 3 sec.)**	**ON[23]**	**OFF**	**OFF**	**OFF**
Supplementary Illumination	Illuminated Running Boards (Illumination)	**OFF**	**ON (Fade 3 sec.)**	**ON**	**ON**	**ON (After all doors closed, fade 5 sec.)**	**OFF**
Courtesy Lighting	Courtesy Lamps[11] (white non-colored lighting, incl. dome/map lights and cargo lighting)	**OFF**	**ON[12] (Fade 3 sec.)**	**ON**	**ON**	**ON**	**OFF[12] (Fade 5 sec)**
Ambient Lighting	Ambient Lighting[7]	**OFF**	**OFF**	**OFF**	**ON**	**ON**	**ON**
Dimmable Backlighting	Pulsing PTS Switch[24]	**OFF**	**OFF**	**OFF**	**PULSE ON/OFF[25]**	**PULSE ON/OFF[25]**	**ON[13]**
Dimmable Backlighting	Switch/Buttion Illumination for the following vehicle zones: -Instrument Panel -Overhead Console -Door Panel	**OFF**	**OFF**	**OFF**	**ON[13]**	**ON[13]**	**ON[13]**
Dimmable Backlighting	Switch/Button Illumination for: Contextual Steering Wheel	**OFF**	**OFF**	**OFF**	**ON[13] (Only Upper Switch Banks)**	**ON[13] (Only Upper Switch Banks)**	**ON[13] (As appropriate for drive condition, incl. paddle shifters)**
Dimmable Backlighting	Switch/Button Illumination for the following vehicle zones: -Liftgate Shutface -Cargo area controls (power folding seats, etc.)	**OFF**	**OFF**	**OFF**	**ON (Only if any door open for up to 10 minutes)**	**OFF**	**ON (Only if any door open for up to 10 minutes)**
Dimmable Backlighting	Switch/Button Illumination for the following vehicle zones: -eLatch Door Switches	**OFF**	**OFF**	**OFF**	**ON (For up to 10 minutes)**	**ON (For up to 10 minutes)**	**ON[13] (Maintain Max Nighttime Intensity During Day)**
Dimmable Backlighting	Headlamp Switch	**OFF**	**OFF**	**OFF**	**ON[17]**	**ON[17]**	**ON[17]**
Vehicle Displays	Odometer	**OFF**	**OFF**	**OFF**	**ON**	**ON**	**ON**
Vehicle Displays	Instrument Cluster Display	**OFF[15]**	**OFF**	**OFF**	**ON[13,14,20] (Welcome Animation)**	**ON[13,14,20] (Welcome Animation)**	**ON[13,14]**
Vehicle Displays	2nd Row Display(s)	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**0 - 2.2 Sec.: ON (Welcome Screen)[8,13,14] 2.2 - Beyond: HMI Display[13]**
Vehicle Displays	Windshield Heads up Display	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**ON[13,14] (Transition Screen, then AHUD Normal)**
Vehicle Displays	Centerstack Display	**OFF**	**OFF**	**OFF**	**ON[13,14,20] (Welcome Animation)**	**ON[13,14,20] (Welcome Animation)**	**ON[13,14] (Transition Screen, then Sync Screen)**
Other	Engine Start/Stop Button Status LED	**OFF**	**OFF**	**OFF**	**ON[18]**	**ON[18]**	**ON[19]**
Other	Night Lock Indicator[16]	**ON**	**ON**	**ON (for any locked doors)**	**ON (for any locked doors)**	**ON (for any locked doors)**	**ON (for any locked doors)**
Other	Illuminated Scuff Plates	**OFF**	**OFF**	**OFF**	**ON[12] (Fade-in, max intensity)**	**OFF**	**OFF**
Other	Illuminated SECURICODE™ keypad	**OFF**	**ON[12]**	**ON[12]**	**ON[12]**	**ON[12]**	**OFF**
Other	Illuminated Seat Belt Buckles (assumes unlatched buckle)	**OFF**	**OFF**	**OFF**	**ON[10,12] (Fade 3 sec.)**	**ON[10]**	**ON[10] (until transmission ≠ PARK)**

					(Driver's door closed)	
DNA Lock/Unlock Customer Feedback Including: - Turn Signal Indicators - Sounder Beeps - Mirror Folding Behavior	See Appendix II	See Appendix II	See Appendix II	See Appendix II	See Appendix II	See Appendix II
Illuminated Running Boards[6] (Deployment)	STOWED	DEPLOY	DEPLOYED	DEPLOYED	STOW	STOWED

1. With headlamps ON and/or ambient light sensor activates headlamps.
2. Vehicle omits "approach detect" state transition when vehicle is remote started and customer approaches during active remote-start phase (i.e., engine running).
3. This line item reserved for items assigned to "Battery Saver" 10 minute timer for courtesy and demand lighting. This timer resets at any ajar trigger.
4. Consult local market restrictions/requirements for more details. Local market restrictions/requirements supersede Lincoln Embrace requirements.
5. Fog lamps, Signature Lamps and Lit Star to turn on simultaneously over 3 seconds.
6. Only if customer activated. Defeatable feature.
7. Controlled by ambient light engines. Ambient light feature content, i.e. dimming capability and color selection, may vary program by program.
8. Display will stay OFF if user turned off screen previously (persistent state). In these instances, screen will display welcome animation only if screen is manually turned on by user.
9. Open.
10. Seat belt buckle illumination logic also dictated by latched vs. unlatched state. Unlatched buckles illuminate whereas latched buckles do not.
11. Only if dome-defeat not activated. Cargo lamp strategy must follow dome lamp strategy.
12. Any item with this superscript is currently limited to 0.7 second fade on, and 1.7 second fade off due to overhead console fade time limits; future want is 3s ON and 5s OFF configuration, when feasible.
13. Maintain user selected brightness level. If no signal available, use last known signal. SWITCHES ONLY: If HLS status = PARK or ON, switches must illuminate (as triggered by such cases as user input, autolamp delay, ambient light level, etc).
14. Product specific animations ("Built Ford Tough", Blue Oval, etc.) not to exceed 2.2 seconds in duration. As required, urgent HMI messages will supercede welcome animation (push brake to start, diesel wait-to-start, low battery, etc.).
15. Functional ownership group (HMI) may dictate messages be broadcast on instrument cluster during this time.
16. If so equipped. For ignition states ≠ ON, illumination will be for the specific state time period or 5 minutes, whichever occurs last, except for two scenarios:
    16.1: Approach detect (illumination extinguishes at state expiration)
    16.2: Courtesy lighting delay (timer carried forward from vehicle ingress)
17. This control's backlighting must be ON regardless of headlamp status/illumination strategy as part of "searchable" illumination. See General Illumination Dimming specification for more details.
18. Dictated by PTS Ignition Switch DNA. Steady on if footbrake is depressed.
19. Dictated by PTS Ignition Switch DNA. Fast flash: ON ign. status with powertrain off. Steady: ON ign. status with powertrain on.
20. Only display Welcome screen once, at first opportunity, unless vehicle times out between states. If time-out occurs then re-display Welcome screen at start of next state. Trigger with front doors only.
21. Open.
22. Open.
23. Welcome Mat illumination in Lincoln is triggered only by Approach lighting or Illuminated entry (Passive-Key or Keypad unlock are not considered for illuminated entry). Mat will stay illuminated for whole state if door is not opened.

Dataset Name: D… **…tion:** Lincoln Embrace State Chart **Dataset Attachment File Name:** LincolnEmbraceS…

Dataset Name:DE **iption:**Lincoln Embrace State Cl **ne:**

LincolnEmbraceSt

	Body Module Feature Description	Illuminated Exit	Media Accessory Delay	Courtesy Lighting	Courtesy Lighting Delay	Locking Feedback Lighting	Locking Feedback Horn
	Event:	**Powertrain Turned Off**	**Media Accessory Delay**	**Exit Vehicle/ Vehicle Egress**	**Courtesy Lighting Delay**	**Security Locking**	**Locking Confirmation**
	Event Trigger:	**PEPS:** Transmission position **P** (park) and ignition currently **ON.** Ignition button then depressed to cycle ignition to **OFF.** Headlamp Switch Status: **AUTO**	Conclusion of "Engine Stopped" phase. No door opened during either "Engine Stopped" or "Delayed Accessory Mode" phases. Headlamp Switch Status: **AUTO**	**Any Door**/Liftgate/Lift Glass **Ajar** Headlamp Switch Status: **AUTO**	**All Doors**/Liftgate/Lift Glass **Closed** Headlamp Switch Status: **AUTO**	Perform the following actions once within three seconds with all doors closed (*as equipped*): **Press keyfob lock button** OR **Touch PEPS lock sensor (door handle)** OR **Press 7-8 and 9-0 buttons simultaneously on external SECURICODE™ keypad** Headlamp Switch Status: **AUTO**	Perform the following actions twice within three seconds with all doors closed (*as equipped*): **Press keyfob lock button** OR **Touch PEPS lock sensor (door handle)** Headlamp Switch Status: **AUTO**
	Event Duration:	25 seconds	9 minutes, 35 seconds	25 seconds and 10 minute battery saver[3]	25 seconds	No time dependency	No time dependency
	Event Interrupt Action and Result:	Ignition transition to ON with footbrake depressed. **RESULT:** Go to "Ignition ON, Powertrain Systems Active" state. -OR- Door/Liftgate/Lift Glass is opened **RESULT:** Go to "Exit Vehicle/Vehicle Egress" state. -OR- Lock vehicle using keyfob or exterior door handle. **RESULT**: Go to "Security Locking State."	Ignition transition to ON with footbrake depressed. **RESULT:** Go to "Ignition ON, Powertrain Systems Active" state. -OR- Door/Liftgate/Lift Glass is opened **RESULT:** Go to "Exit Vehicle/Vehicle Egress" state. -OR- Lock vehicle using keyfob or exterior door handle. **RESULT**: Go to "Security Locking State."	Ignition transition to ON with footbrake depressed. **RESULT:** Go to "Ignition ON, Powertrain Systems Active" state. -OR- All Doors/Liftgate/Lift Glass closed **RESULT:** Go to "Courtesy Lighting Delay" state.	Ignition transition to ON with footbrake depressed. **RESULT:** Go to "Ignition ON, Powertrain Systems Active" state. -OR- Door/Liftgate/Lift Glass is opened **RESULT:** Go to "Exit Vehicle/Vehicle Egress" state. -OR- Lock vehicle using keyfob or exterior door handle. **RESULT**: Go to "Security Locking State."	Unlock vehicle (w/keyfob, keypad, lock cylinder, door handle) **RESULT:** Go to "Vehicle Unlock" state. -OR- Door/Liftgate/Lift Glass is opened **RESULT:** Go to "Vehicle Ingress/Courtesy Lighting" state. Alarm may sound if equipped.	Unlock vehicle (w/keyfob, keypad, lock cylinder, door handle) **RESULT:** Go to "Vehicle Unlock" state. -OR- Door/Liftgate/Lift Glass is opened **RESULT:** Go to "Vehicle Ingress/Courtesy Lighting" state. Alarm may sound if equipped.
Front Illumination	Headlamps (low beams)[2]	OFF	OFF	OFF[23]	OFF[23]	OFF	OFF
	Front Side Markers	OFF	OFF	OFF[23]	OFF[23]	OFF	OFF
	Daytime Running Lamps/ Front Park Lamps[4]	ON EMBRACE INT.	OFF	ON EMBRACE INT.[23]	ON EMBRACE INT.[23]	OFF (Fade 5 sec.)	OFF
	Fog Lamps[5]	ON	OFF	ON[23]	ON[23]	OFF (Fade 5 sec.)	OFF
	Illuminated Lincoln Star	ON	OFF	ON[23]	ON[23]	OFF (Fade 5 sec.)	OFF
Rear Illumination	Rear Parking Lamps	ON	OFF	ON[23]	ON[23]	OFF (Fade 5 sec.)	OFF
	RAPL (Rear Applique Park Lamp) (includes rear license plate lamp)	ON	OFF	ON[23]	ON[23]	OFF (Fade 5 sec.)	OFF
	Rear Side Markers	ON	OFF	ON[23]	ON[23]	OFF (Fade 5 sec.)	OFF
Supplementary Illumination	Illuminated Door Handle Pockets	OFF	OFF	ON[12] (Fade 3 sec)	ON	OFF[12] (Fade 5 sec.)	OFF
	Welcome Mat (Driver's)	OFF	OFF	OFF	OFF	OFF	OFF
	Welcome Mat (Passenger's)	OFF	OFF	OFF	OFF	OFF	OFF
	Illuminated Running Boards (Illumination)	OFF	OFF	ON (Fade 3 sec.)	OFF (Fade 5 sec.)	OFF	OFF
Courtesy Lighting	Courtesy Lamps[11] (white non-colored lighting, incl. dome/map lights and cargo lighting)	ON[12] (Fade 3 sec.)	OFF	ON	ON	OFF[12] (Fade 5 sec.)	OFF
Ambient Lighting	Ambient Lighting[7]	ON	OFF	ON[12,13] (Fade 3 sec)	ON	OFF[12] (Fade 5 sec)	OFF
Dimmable Backlighting	Pulsing PTS Switch[1]	ON[13]	OFF	ON[13]	ON[13]	OFF	OFF
	Switch/Button Illumination for the following vehicle zones: -Instrument Panel -Overhead Console -Door Panel	ON[13]	ON[13,22]	ON[13]	ON[13]	OFF[22]	OFF[22]
	Switch/Button Illumination for: Contextual Steering Wheel	ON[13] (Only Upper Switch Banks)	ON[13,22] (Only for functional switches)	ON[13] (Only Upper Switch Banks)	ON[13] (Only Upper Switch Banks)	OFF[22]	OFF[22]
	Switch/Button Illumination for the following vehicle zones: -Liftgate Shutface -Cargo area controls (power folding seats, etc.)	OFF	OFF	ON (Only if any door open for up to 10 minutes)	OFF	OFF	OFF
	Switch/Button Illumination for the following vehicle zones: -eLatch Door Switches	ON	ON	ON (For up to 10 minutes)	ON (For up to 10 minutes)	OFF	OFF
	Headlamp Switch	ON[17]	ON[17]	ON[17]	ON[17]	OFF	OFF
Vehicle Displays	Odometer	ON	OFF	ON[2]	ON	OFF	OFF
	Instrument Cluster Display	ON (Farewell Screen)[13,14,19]	OFF	OFF	OFF	OFF[8]	OFF[8]
	2nd Row Display(s)	ON[8,13]	ON[8,13,22]	OFF (Farewell Screen)[8,13,14,19]	OFF	OFF	OFF
	Windshield Heads up Display	OFF (Fade-Out Animation)[14]	OFF	OFF	OFF	OFF	OFF
	Centerstack Display	ON[13]	ON[13,22]	OFF (Farewell Animation)[13,14,19]	OFF	OFF	OFF
	Illuminated Seat Belt Buckles (assumes unlatched buckle)	ON[10,12] (Fade 3 sec.)	OFF[12] (Fade 5 sec.)	ON[10]	ON[10]	OFF[10,12] (Fade 5 sec.)	OFF
	Mirror Position[6]	UNFOLDED	UNFOLDED	UNFOLDED	UNFOLDED	FOLD	FOLDED
	Illuminated Running Boards[6] (Deployment)	STOWED	STOWED	DEPLOY	STOW	STOWED	STOWED
	Illuminated SECURICODE™ keypad	OFF	OFF	ON[12]	ON[12]	OFF	OFF

Printed: 10/11/2017
Revision Date: 1-May-2016

Including: - Turn Signal Indicators - Sounder Beeps - Mirror Folding Behavior	See Appendix II	See Appendix II	See Appendix II	See Appendix II	See Appendix II	See Appendix II
Illuminated Scuff Plates	OFF	OFF	ON[22] (Fade 3 sec.)	OFF	OFF	OFF
Night Lock Indicator[16]	ON (for any locked doors)	ON (for any locked doors)	ON (for any locked doors)	ON (for any locked doors)	ON	ON
Engine Stop/Start Button Status LED	ON[18]	ON[18]	ON[18]	ON[18]	OFF	OFF

1. Per DNA requirements, push to start switches must have backlighting for all text.
2. Assumes auto-lamp delay timer is set to 0.
3. This line item reserved for items assigned to "Battery Saver" 10 minute timer for courtesy and demand lighting. This timer resets at any ajar trigger.
4. Consult local market restrictions/requirements for more details. Local market restrictions/requirements supersede Lincoln Embrace requirements.
5. Fog lamps, Signature Lamps and Lit Star to turn off simultaneously over 5 seconds.
6. Only if customer activated. Defeatable feature.
7. Ambient light feature content, i.e. dimming capability and color selection, may vary program by program.
8. Functional ownership group (HMI) may dictate messages be broadcast on instrument cluster during this time, i.e. perimeter/central alarm warning messages.
9. Display will stay OFF if user turned off screen previously (persistent state). If screen is turned off by user BEFORE farewell screen would display, screen will not display farewell animation or screen at the correct trigger point. It shall remain OFF.
10. Seat belt buckle illumination logic also dictated by latched vs. unlatched state. Unlatched buckles illuminate whereas latched buckles do not.
11. Only if dome-defeat not activated. Cargo lamp strategy must follow dome lamp strategy.
12. Any item with this superscript is currently limited to 0.7 second fade on, and 1.7 second fade off due to overhead console fade time limits; future want is 3s ON and 5s OFF configuration, when feasible.
13. Maintain user selected brightness level. If no signal available, use last known signal. SWITCHES ONLY: If HLS status = PARK or ON, switches must illuminate (as triggered by such cases as user input, autolamp delay, ambient light level, etc).
14. Product specific animations ("Built Ford Tough", Blue Oval, etc.) not to exceed 2.2 seconds in duration, if enabled.
15. Open.
16. If so equipped. For ignition states ≠ ON, illumination will be for the specific state time period or 5 minutes, whichever occurs last, except for one scenario:
    16.1: Courtesy lighting delay (timer carried forward from courtesy lighting phase)
17. This control's backlighting must be ON regardless of headlamp status/illumination strategy as part of "searchable" illumination. See General Illumination Dimming specification for more details.
18. Dictated by PTS Ignition Switch DNA. Steady on only if footbrake is depressed.
19. Only display Farewell screen once, at first opportunity, unless vehicle times out between states. If time-out occurs then Welcome screen at start of next state. Trigger off front doors only.
20. Open.
21. Triggered on front doors only.
22. If vehicle is equipped with extended power play functionality, and radio is turned on during this phase, radio-related controls and displays will be illuminated. If dimming signal is absent for less than 5 seconds when the system is activated, use last known value. If dimming level is not published for greater than 5 seconds when extended power play is activated, use "Litval = Twilight 4 and Dimming_LVL = Night 12" as the dimming level.
23. If state is triggered (and previous state has expired), activation of lighting should follow Approach Detection behavior.

Printed: 10/11/2017
Revision Date: 1-May-2016

Dataset Name: DET022094-1 **Dataset Description:** Lincoln Embrace State Chart **Dataset Attachment File Name:** LincolnEmbraceSt

Requirement - Verification Links:

ID: 00.20-L-12995 **Rev:** 1 **Title:** Welcome Farewell and Lincoln Embrace Verification Testing

Acceptance Criteria:

Classification:

DVM Grouping:

Data Needed: Software verification

Recipient CPSCs:

002004-Harmony
010523-Switches - Rear End Trim
011016-Switches - Front Seat
011017-Switches - Rear Seat
011116-Switch Pack - Front Door
011117-Switch Pack - Rear Door
011207-Floor Console Switches
011211-Rear Console Switches
011214-Overhead Console
011220-Switch Pack - Instrument Panel
011221-Switches - Overhead
012901-Module - Overhead Complete
012902-Module - Overhead Console
050703-Gear Shift Module (GSM)
110501-Steering Column and Shroud Mounted - Switches and Clockspring
110602-Steering Wheel Mounted Switches
170000-Lighting System
170100-Front Lighting Subsystem
170104-Supplemental Front Lamps
170105-Side Repeater / Marker Lamps
170200-Interior Lighting Subsystem
170202-Lighting - Interior
170207-Lighting - Instrument Panel (IP) & Consoles
170208-Lighting - Ambient
170300-Rear Lighting Subsystem
170301-Rear Combination Lamp
170304-Supplemental Rear Lamps
170308-License Plate Lamp
170309-CHMSL (Center High Mount Stop Light)
170310-Supplemental Illumination
170500-Lighting Switches Subsystem
170501-Master Lighting Switchpack
180300-Electrical Distribution Switches Subsystem
180304-Hidden Switches and Sensors
191203-Exterior Switch Pack / Keypad

Recommended Milestone: PEC

Ride Along (Yes = Requesting data from another persons test): No

Sample Size: 1

Verification Usage: DV

Group Number:

Sequence Number:

VERIFICATION TYPE

ID: 00.20-L-12995 **Rev:** 1 **Title:** Welcome Farewell and Lincoln Embrace Verification Testing

Owner: Prescott,Jennifer-JPRESCO2 (jpresco2)

Verification Method Status: Released

Test Types: 6-General Standards

Test Site: Lab

Prototype Type: HIL_(HW-in-Loop)

Owning CPSC: 002004

Location Facility: APTL: Allen Park Test Labs

Legacy DVM: DVM-3338-51/1;1-00.20-L-12995

Operating Condition:

Sample Preparation:

Design Specific Info:

DVM Comments:

TEST METHOD

TITLE:	**Welcome Farewell and Lincoln Embrace Verification Testing.**	**Test Method #:**	**00.20-L-12995**
Supersedes:		**2/27/2017 9:20 AM**	**Page 1 of 6**

1.0 PURPOSE / GOAL OF TEST

1.1 This Test Method is a generic method for executing component level testing of DNA Welcome-Farewell (for Ford-branded products) and Lincoln Embrace (for Lincoln branded products). This test is designed to be performed without use of a prototype vehicle.

1.2 COMMONALITY. This test can be used to qualify components throughout the world. The test may be conducted at any location having the necessary equipment and facilities.

2.0 INSTRUMENTATION

2.1 All test measurement equipment must be calibrated and maintained per FAP03-015, Control, Calibration, and Maintenance of Measurement and Test Equipment.

2.2 All applicable safety guidelines and procedures must be followed.

2.3 Tests conducted at the component level require either a complete vehicle electrical breadboard (hereafter "breadboard") or hardware-in-the-loop signal testing board (hereafter "HIL board") to conduct test.

2.3.1 Breadboard Description and Identification:

Breadboards are built after VP builds commence, approximately 2-4 weeks post-VP start. Breadboard availability will vary based on scope of program (MCA programs will establish breadboards sooner than all-new programs). Breadboards have an owner, an engineer who monitors part and wiring harness integrity and captures/socializes issues seen with board operation. The owner also performs select tests by operating various inputs (such as checking headlamp functionality by turning headlamp switch). The breadboard is owned by VEV; the engineer also works for VEV. Breadboards are best identified by their use of physical parts and wiring harnesses, rather than the less production-intent HIL board. The breadboard is essentially a complete automobile without sheet metal or any trim. Operation of any component can only be checked visually, though CAN-logs can be provided by the breadboard owner if requested.

Photo 1: Picture of a breadboard set-up. Note use of production-intent components.

2.3.2 HIL Board Description and Identification:

HIL boards are constructed over a longer timeframe than breadboards, and are typically started slightly after FDJ, taking 4-6 weeks to complete. Unlike the breadboard which uses physical production components in its construction, the HIL board uses modules and automated signals to check system functionality. The HIL board is a far more sophisticated tool than the breadboard for checking functionality, such as for Welcome-Farewell and Lincoln Embrace.

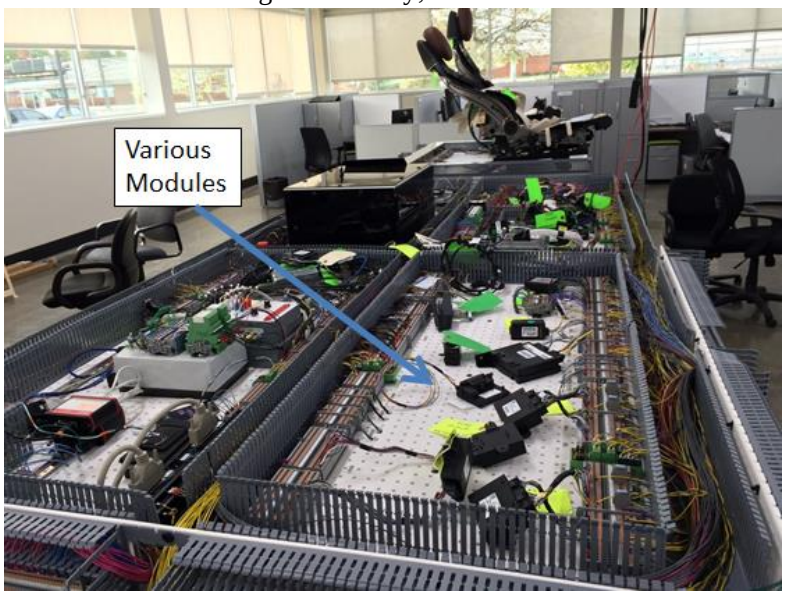

Photo 2: HIL testing board, only utilizing physical components where absolutely required.

All modules in a HIL board have their signal wiring hooked up to control busses, not vehicle harnesses (as in a breadboard). These busses feed back to a main computer. The computer is capable of simulating human input via series of 12V signals sent into the HIL board, and can monitor system responses as well. In this way, the system is capable of checking exacting behavior for ramp-ups, ramp-downs, durations, and other features of components throughout the vehicle, making it invaluble for Welcome-Farewell and Lincoln Embrace evaluation. Comparing to the breadboard headlamp operation example, the HIL board would apply 12V across the BCM input pin for the headlamp switch (to simulate headlamp switch movement) and then monitor output behavior at the LDM, the lighting module that controls headlamp power. If the HIL board records 12V output at the LDM, the system interprets this as: "Customer turned switch to turn on headlamps, and headlamps turned on."

The HIL board is capable of running complex simulations completely autonomously. A HIL board owner, like a breadboard owner, runs these tests. However, the HIL board tests involve no physical labor (unlike a breadboard which requires manual actuation of switches, buttons, and

levers) and processes tests autonomously once the operator creates the correct program in his/her terminal. The programs are created based on education from the feature owners, such as Vehicle Harmony for Welcome-Farewell & Embrace, or the transmission team for shift patterns.

3.0 EQUIPMENT AND FACILITIES

3.1 Either HIL board or breadboard, provided by VEV. HIL testing is performed autonomously. No additional equipment needed for HIL board testing.

3.2 BREADBOARD TESTING ONLY:

The following components are recommended to facilitate testing:

1) A large cardboard box (~1 foot by 1 foot) with one side cut out, and with a small viewing window (~3"x3") must be provided to cover components and view illumination behavior in a semi-dark space.

2) At least one assistant to assist with switch actuation.

3) Printed Welcome-Farewell or Lincoln Embrace state matrix, plus additional notepad for behavioral notes.

4.0 SAMPLE PREPARATION

4.1 **HIL BOARD TESTING:** For component level tests, Vehicle Harmony engineer must ensure that HIL board, if available, is used in lieu of breadboard for evaluation. Harmony engineer must establish contact with HIL team at FDJ to ensure HIL team is aligned on correct version of Welcome-Farewell or Lincoln-Embrace specification to use for automated tests. Harmony engineer must answer any logic-related questions for Welcome-Farewell or Lincoln Embrace that the HIL team may raise.

4.2 **BREADBOARD TESTING**: If breadboard must be used (due to minor program status or lack of funding), Vehicle Harmony engineer must note pedigree of all affected components for diagnostic purposes. Some components may be out of date and incorrectly programmed at breadboard. Harmony engineer should record software levels for each affected component (cluster, ECP, GSM, etc.) for diagnostic purposes, and in case of a test failure to aid with diagnosis.

5.0 PROCEDURE STEPS

5.1 **Testing with HIL Board**

5.1.1 Establish which Welcome-Farewell or Lincoln-Embrace related components vehicle program is equipped with. Welcome-Farewell and Lincoln Embrace is an *as-equipped* feature. Ensure VH engineer's understanding of expected equipment and tester's understanding of feature content are aligned. There should be no gaps in equipment for testing. For example, if program is

equipped with illuminated running boards, ensure test board will validate illuminated running board behavior.

5.1.2 Align on correct behavior for each component. Share correct version of Welcome-Farewell and Lincoln Embrace with operator. Operator will then take this state chart and produce programs based on its exacting details.

5.1.3 Testing results are usually produced ~1 month before VP build. Based on those results, board operator will produce a list of eTracker issues for failures (example: dome lamps do not turn on at door open). Vehicle Harmony engineer will understand and align on each eTracker result with the operator. If behavioral inconsistency is considered acceptable, operator and VH engineer will close eTracker line item. If inconsistency is considered unacceptable, VH engineer will update program healthchart and contact D&R to begin/lead resolution workstream.

5.1.4 Corrections to discrepencies should be validated at the HIL board as needed. HIL operator will assist with software updates and re-testing as needed.

5.1.5 VH engineer must lead resolution of all Welcome-Farewell and Lincoln Embrace related issues. In the event that issues are not resolved by start of VP, issues may need to be converted into AIMs issues to be tracked by program. Testing is not completed until all issues are closed, either fixed or agreed upon as acceptable behaviors.

5.2 Testing with Breadboard

5.2.1 Establish which Welcome-Farewell or Lincoln-Embrace related components vehicle program is equipped with. Welcome-Farewell and Lincoln Embrace is an *as-equipped* feature. Ensure understanding of expected equipment and breadboard's available content are aligned. There should be no gaps in equipment for testing. For example, if program is equipped with illuminated running boards, ensure breadboard will validate illuminated running board behavior. If required components are not available for breadboard (late part availability, etc.), document discrepancy and create work plan to test these features at a later date.

5.2.2 Coordinate an appropriate time with the breadboard owner to perform review. Typically 2-4 hours is required for a vehicle-level evaluation. Obtain at least 1 assistant to help actuate required switches for review.

5.2.3 At review, perform the following procedure to test Welcome-Farewell or Lincoln Embrace. Steps are broken up sequentially, with operator 1 (OP1) and operator 2 (OP2) outlined.

1) OP1: Align cardboard box over affected component to be evaluated. Ensure majority of light is blocked when box is seated over component. Part should be sufficiently dark to simulate dusk/dark condition.

2) OP2: Perform required steps to establish state transition in Welcome-Farewell or Lincoln Embrace. For example, to enter illuminated entry state, lock vehicle with keyfob, then unlock but do not actuate any door handles. OP2 must also start stop watch at beginning of state,

announcing state start, and announcing when state should end (i.e., 25 seconds, 10 minutes, etc.)

3) OP1: Observe and record behavior of affected component (headlamp, dome lamp, etc). Use printed state matrix as a guide.

4) OP1: Re-align box to next component.

5) OP2: Repeat step 2.

6) OP1: Repeat step 3.

7) Repeat steps 4-7 as needed until all components are assessed. Some efficiencies may be gained if components can be reviewed quickly in room ambient conditions without cardboard box cover. In those instances, attempt to review as many controls as possible at once.

5.2.4 Based on testing results, VH engineer must assess, like in HIL board testing, whether behavior is acceptable or not. For unacceptable concerns, VH engineer must raise AIMs issue and lead effort to correct concern with component D&R.

5.2.5 Corrections to discrepencies should be validated at the breadboard as needed. VH engineer will need to coordinate software updates and re-testing as needed with VEV board owner and part D&R.

5.2.6 Testing is not completed until all issues are closed, either fixed or agreed upon as acceptable behaviors.

6.0 GENERAL INSTRUCTION/SUPPLEMENTAL INFORMATION

7.0 DATA GENERATED & FORMATTING OF PRESENTATION

7.1 Section 5 explains the required data collection (test results). Information should be assembled into an excel matrix for tracking issues until completed.

8.0 REFERENCES

8.1 FAP03-179, Developing Corporate Engineering Test Procedures.

9.0 APPENDIX/ATTACHMENT