Engineering Specification

PART NAME: SPEC - ELECTRICAL & ELECTRONIC SYSTEM	PART NUMBER
ICE BLUE™ and LINCOLN WHITE INTERIOR ILLUMINATION WITH DAYTIME DIMMING	ES-DS7T-1A278-BC

LET	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
FR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
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	LET	FR	REVISIONS	DR	CK	REFERENCE
	A	1-19	Release ES-DS7T-1A278-BA	DV	DV	
20110307			AE00-E-12394067-156			PREPARED/APPROVED BY
		3	Sections 1.1 and 1.2 changed White to Lincoln White			David VanAmberg
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			White			
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		9	Added dual display and single large display cluster in			Sherri Bettendorf
			Table 2			EESE System Engrg Director
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			Lincoln White			Manufacturing Engrg.
		13	Updated details in Table 5 for BacklitLEDCmd signal			
		14	Updated details in Tables 7 and 9 for BacklitLEDCmd			Quality Control
			signal			
	B	1-19	Release ES-DS7T-1A278-BB	DV	DV	Purchasing Supervisor
20120410			AE00-E-12416946-255			
		9	Table 2: added line item for switches in rear quarter panel			Supplier Quality Assistance
		13	Table 6: updated note 3 and added note 5			
		15	Table 11: updated notes 2 and 8, added note 10; added			
			row to Table			
	C	1-19	Release ES-DS7T-1A278-BC	DV	DV	
20120725			AE00-E-12416946-361			

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1.0 INTRODUCTION

1.1 Purpose and Scope

This specification is solely for those 2013 MY and beyond Ford and Lincoln vehicle programs with the Common Global Electrical Architecture (CGEA) version 1.3. This specification defines the targets of the Ice Blue™ and Lincoln White interior illumination system that have both nighttime and daytime illuminated/dimmable components.

1.2 Document Intent

This specification is intended as a guideline for components that require Ice Blue™ and Lincoln White interior illumination and is a supplement to ES-DS7T-1A278-A. It covers several different lighting technologies and defines the common requirements for these differing applications. Due to the dynamic nature of Ice Blue™ and Lincoln White lighting, this specification will serve as a supplement to the Interior Harmony Subsystem Design Specification (INTHARMY SDS).

2.0 INTERIOR ILLUMINATION SUBSYSTEM OVERVIEW

2.1 Subsystem Components

Figure 1 shows a generic block diagram for the interior illumination dimming subsystem. The main components of this system include the Light Switch Module, Ambient Light Sensor (ALS), BCM (Body Control Module), DDM (Driver Door Module), PDM (Passenger Door Module) and the illuminated components. Illuminated components include, but are not limited to: instrument cluster (including ePRNDL), Electronic Control Panel (ECP), trailer brake module, shifter, door trim switches, steering wheel switches, IP switches, Overhead console and floor console components.

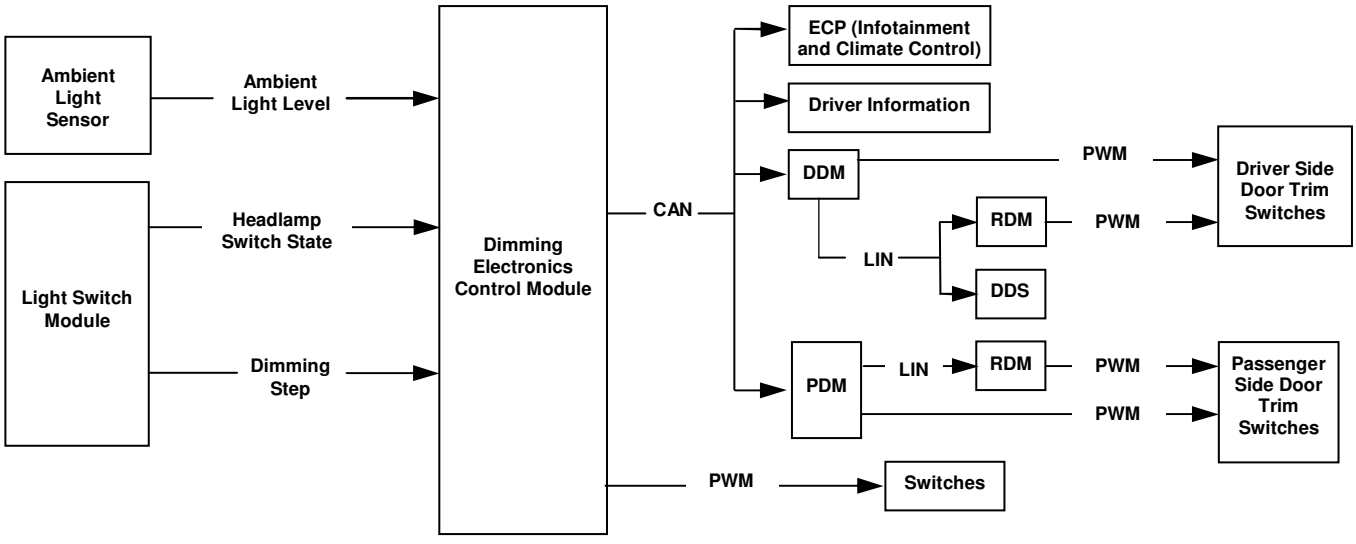


Figure 1. Interior Illumination Subsystem Dimming Block Diagram

2.2 Functional Description

The main function of the interior illumination system is to provide legible, illuminated graphics for all controls and displays in all ambient lighting conditions. All component illumination will either be controlled by the BCM, via hardwire Pulse Width Modulated (PWM) signal or Controller Area Network (CAN) Communication protocol.

2.2.1 Daytime

The illumination subsystem is in daytime mode when: 1) the Parklamps are ON and the ALS senses daytime or 2) the Parklamps are OFF and Ignition is in Run or Start. All electronic displays in the instrument cluster and centerstack illuminate at their daytime brightness levels. The ePRNDL primary gear indicator and all Climate Control indicators will also illuminate at their daytime illumination level.

If Parklamps are ON and the ALS senses daytime, all components that are not daytime dimmable illuminate at their minimum nighttime lighting level. If Parklamps are OFF, all components that are not daytime dimmable are completely OFF. The driver cannot adjust or dim these illumination levels.

For those components that are daytime dimmable, the initial daytime illumination setting for the graphics, symbols and/or text, stored in the BCM, will be maximum daytime brightness. Using the dimmer switch, the driver can then adjust or "dim" these graphics, symbols and/or text to his/her preferred illumination level for optimum visibility. This new daytime lighting level or set point will replace the initial default setting stored in the BCM. The next daytime drive cycle, all daytime dimmable graphics, symbols and/or text will illuminate to this new daytime illumination level.

If Parklamps are ON and the vehicle is without an ALS, the driver has the option to revert the subsystem into daytime mode by entering the User Selectable Daytime mode. If the driver continuously depresses the dim up button on the dimmer switch until the last nighttime dimming level is attained, the very next dim up press will put the subsystem into daytime mode. The BCM will transmit a predetermined daytime illumination level for the daytime dimmable component(s) to use. All other illuminated components will remain at maximum nighttime brightness while all electronic displays, the ePRNDL primary gear indicator and all Climate Control indicators will illuminate at their daytime brightness levels.

2.2.2 Nighttime

When the Parklamps are ON in dusk/dawn or nighttime conditions, the illumination subsystem is in nighttime mode. The initial default nighttime setting, stored in the BCM, for all illuminated components will be maximum nighttime brightness. Using the dimmer switch, the driver can then adjust or "dim" the illuminated components to his/her preferred illumination level for optimum visibility. This new nighttime lighting level or set point will replace the initial default setting stored in the BCM. The next nighttime drive cycle, all illuminated components will illuminate to this new nighttime illumination level.

3.0 DAYTIME APPEARANCE

Color chromaticity design targets are based on the 1931 CIE Standard. All target data is based on applying 12.5 Volts to the dimming circuit of standalone/hardwired (non-intelligent) components or 13.5 Volts to the voltage supply pins of Electronic Control Units (ECUs) which control dimming internally (intelligent components).

3.1 Non-Illuminated Daytime Components

The daytime appearance for all components that do not illuminate in the daytime must match color Masters defined in the Ford Color Trax database and approved by Ford Color & Trim.

3.2 Daytime Illuminated Graphics, Text and Symbols

3.2.1 Non Illuminated Color Target

The daytime appearance for all components that illuminate in the daytime must match color Masters defined in the Ford Color Trax database and approved by Ford Color & Trim.

3.2.2 Ice Blue™ Illuminated Color Target

Illuminated graphics for backlit component graphics, i.e. bezels, switches and instrument clusters, must match the following target color coordinates for Ice Blue™:

x = 0.187 with Tolerance based on Figure 2
y = 0.275 with Tolerance based on Figure 2

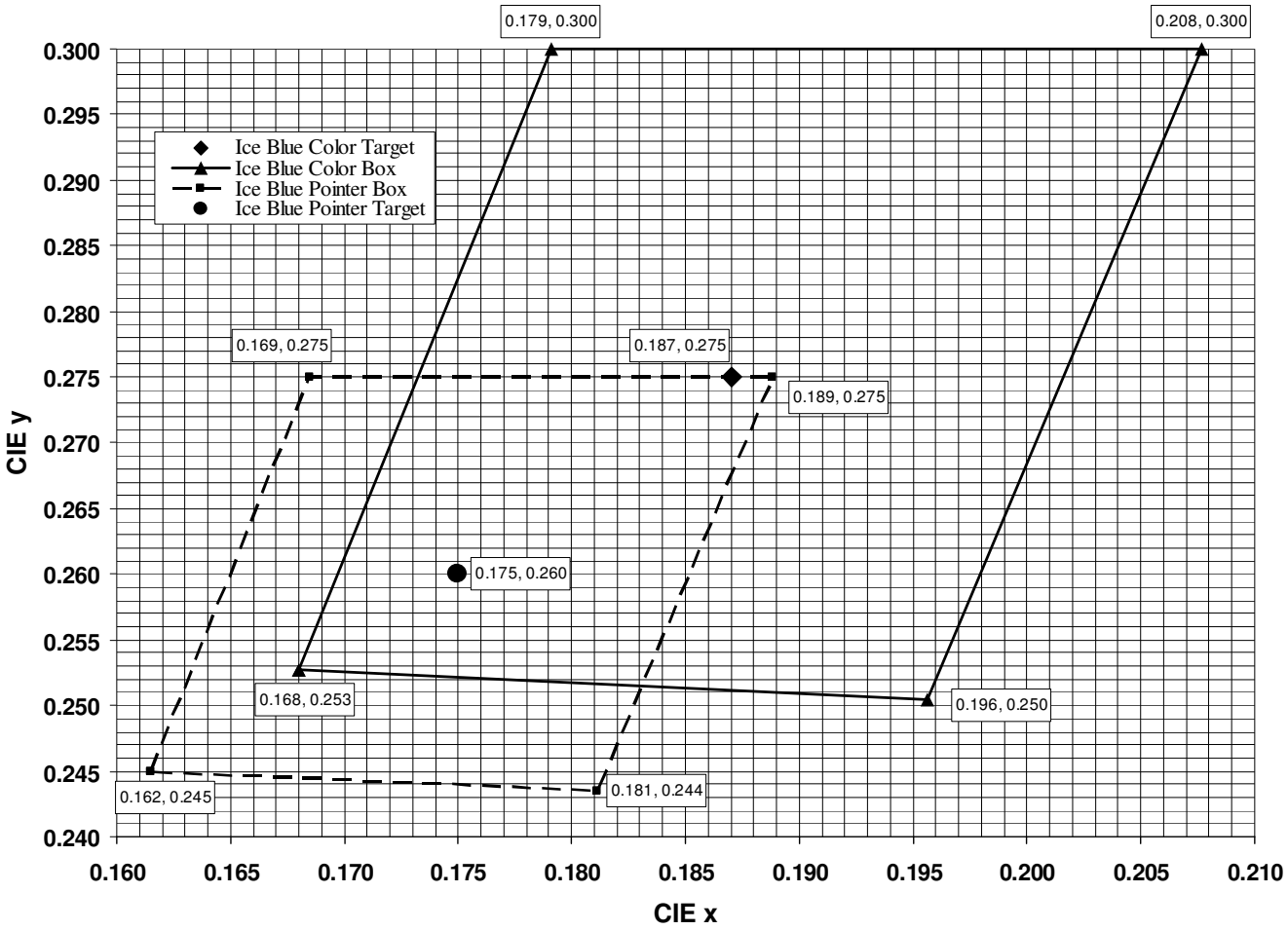


Figure 2. Color Box Tolerance for ICE BLUE™ Interior Illumination

3.2.3 Lincoln White Illuminated Color Target

Illuminated graphics for all backlit component graphics, i.e. bezels, switches and instrument clusters, must match the following target color coordinates for Lincoln White:

x = 0.338 with Tolerance based on Figure 3
y = 0.335 with Tolerance based on Figure 3

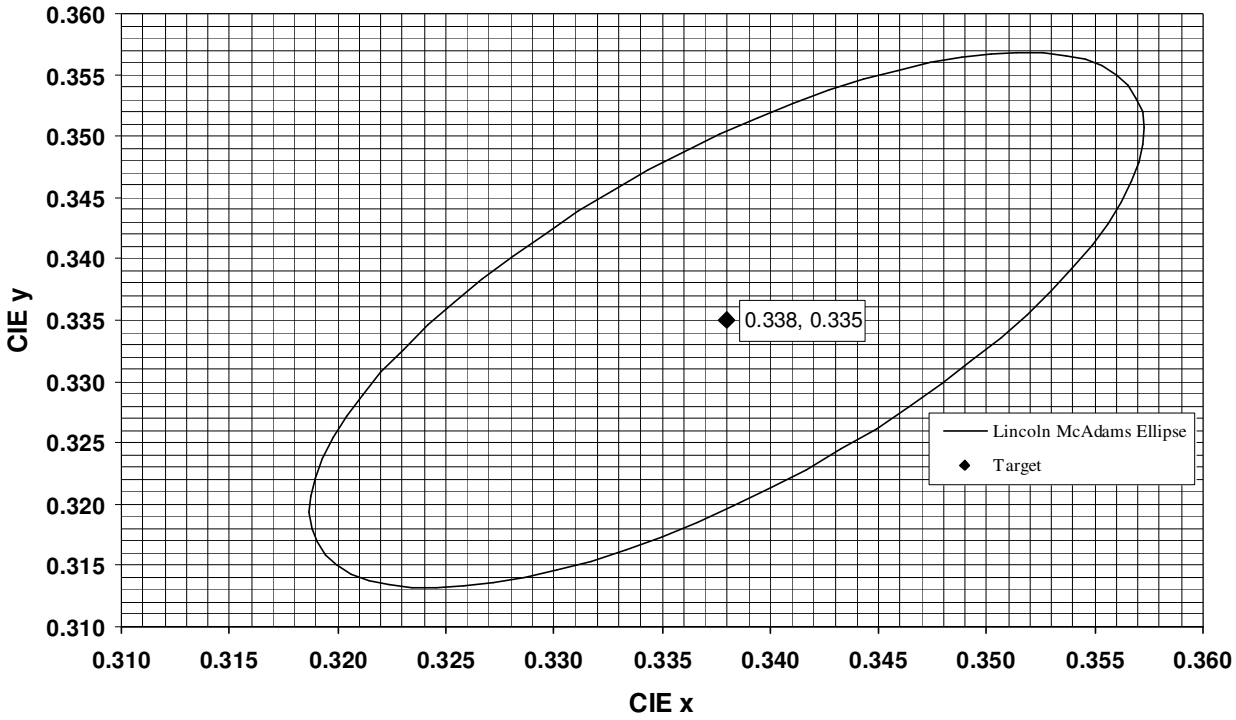


Figure 3. Lincoln White McAdams Ellipse

3.2.4 Intensity Target for Symbols, Graphics and Text

The target maximum daytime intensity for illuminated Instrument Clusters graphics and/or text behind a neutral density lens is 50.0 ftL (171.3 cd/m^2) ± 12.5 ftL (42.8 cd/m^2). The target maximum daytime intensity for deadfront illuminated Infotainment and Climate Control graphics, text or symbols is 146.0 ftL (500.0 cd/m^2) ± 36.5 ftL (125 cd/m^2). Maximum daytime intensity is defined as Parklamps OFF and dimmer switch at Daytime step 6.

3.3 Instrument Cluster Pointer Illumination

3.3.1 Color Target

The target color for a Lincoln White instrument cluster pointer is described in Section 3.2.3. The target color for a red instrument cluster pointer is described by the following x and y color chromaticity coordinates: (0.69, 0.27), (0.69, 0.31), (0.73, 0.27). The equivalent dominant wavelength is 630 ± 10 nm. The target color for an Ice Blue™ instrument cluster pointer is:

x = 0.175 with Tolerance based on Figure 2
y = 0.260 with Tolerance based on Figure 2

3.3.2 Intensity Target

The daytime target intensity for all pointers is detailed in Table 1.

Table 1. Instrument Cluster Pointer Daytime Intensities

Pointer Color	Daytime Pointer Intensity	
	(ftL)	(cd/m^2)
Red	35.5 ± 8.8	121.6 ± 30.1
Lincoln White	50.0 ± 12.5	171.3 ± 42.8
Ice Blue™	50.0 ± 12.5	171.3 ± 42.8

3.4 Displays

3.4.1 Ice Blue™ Color Target for Vacuum Fluorescent Displays

The Ice Blue™ target color coordinates for all monochrome, negative mode VF Displays is:

x = 0.20 with ± 0.02 tolerance
y = 0.30 with ± 0.02 tolerance

3.4.2 Lincoln White Color Target for Vacuum Fluorescent Displays

The Lincoln White target color coordinates for all monochrome, negative mode VF Displays is:

x = 0.31 with ± 0.02 tolerance
y = 0.35 with ± 0.02 tolerance

3.4.3 Color Targets for Monochrome Liquid Crystal Displays

The target color coordinates for all monochrome, negative mode LCDs are described in Sections 3.2.2 and 3.2.3 for Ice Blue™ and Lincoln White, respectively.

3.4.4 Intensity Target

The target daytime intensity for all monochrome, negative mode Displays is 42.0 ftL (144.0 cd/m^2) ± 10.5 ftL (36.0 cd/m^2).

3.4.5 Intensity Target for Full Color Liquid Crystal Displays

The bare display white luminance target for all full color LCDs is 146.0 ftL (500.0 cd/m^2). No other active areas of the display shall be less than 85% of the bare display white luminance target.

4.0 NIGHTTIME APPEARANCE

Color chromaticity design targets are based on the 1931 CIE Standard. All target data is based on applying 12.5 Volts to the dimming circuit of standalone/hardwired (non-intelligent) components or 13.5 Volts to the voltage supply pins of Electronic Control Units (ECUs) which control dimming internally (intelligent components).

4.1 Backlit Components

4.1.1 Color Target

Illuminated nighttime graphics for all backlit component graphics, i.e. bezels, switches and instrument clusters, must match the target color coordinates described in Sections 3.2.2 and 3.2.3 for Ice Blue™ and Lincoln White, respectively.

4.1.2 Intensity Target

The target maximum nighttime intensity for all bezels and switches is defined in Table 2. Maximum nighttime intensity is defined as Parklamps ON and dimmer switch at dimming step 12.

Table 2. Nighttime Intensity Targets

Component	Nighttime Intensity Target	
	(ftL)	(cd/m^2)
Instrument Cluster Graphics	3.5 ±1.0	12.0 ± 3.4
Instrument Cluster Acrylic Chaplets, Glow Rings, etc. (same color as illuminated graphics)	6.0 ± 1.5	20.5 ± 5.1
Instrument Cluster Graphics, Acrylic Chaplets, Glow Rings, etc. in Dual Display Cluster or Single Large Display Cluster	10.0 ± 2.5	34.3 ± 8.6
Deadfront Infotainment and Climate Control Bezels	10.0 ± 2.5	34.3 ± 8.6
Non-Deadfront Infotainment, Climate Control and Shifter Bezels	1.75 ± 0.4	6.0 ± 1.4
Dimmable Steering Wheel and Overhead Console Switches	1.1 ± 0.3	3.8 ± 1.0
Dimmable Instrument Panel and Door Trim Switches	1.75 ± 0.4	6.0 ± 1.4
All Rear Seat Controls	1.75 ± 0.4	6.0 ± 1.4
Non-Dimmable Switches Door Trim Switches	0.75 ± 0.2	2.5 ± 0.7
Non-Dimmable Switches located in the rear quarter panel (behind the last row of seats)	1.75 ± 0.4	6.0 ± 1.4
Red or Yellow Color Zones or Graduations (Instrument Cluster)	1.4 ± 0.3	4.8 ± 1.0
Hot (Red) Temperature Selection (Climate Control) & Red Hazard Symbol	1.1 ± 0.3	3.8 ± 1.0
Cool (Blue) Temperature Selection (Climate Control)	0.8 ± 0.2	2.7 ± 0.7

4.2 Instrument Cluster Pointer Illumination

4.2.1 Color Target

See Section 3.3.1.

4.2.2 Intensity Target

The target nighttime intensity for all pointers is detailed in Table 3.

Table 3. Instrument Cluster Pointer Nighttime Intensities

Pointer Color	Nighttime Pointer Intensity	
	(ftL)	(cd/m^2)
Red	2.5 ± 0.6	8.5 ± 2.0
Ice Blue™	3.5 ± 1.0	12.0 ± 3.4
Lincoln White	7.0 ± 1.8 [1]	24.0 ± 6.2
Red [2]	7.0 ± 1.8	24.0 ± 6.2
Ice Blue™ [2]	10.0 ± 2.5	34.3 ± 8.6
Lincoln White [2]	20.0 ± 5.0	68.6 ± 17.1

1. For pointers where the pointer blade is encapsulated. If not encapsulated, pointer intensity would be 12.0 ± 3.0 ftL (41.1 ± 10.3 cd/m^2)
2. For Dual Display Instrument clusters

4.3 Displays

4.3.1 Color Target

The target color coordinates for all monochrome, negative mode VF Displays are described in Sections 3.4.1 and 3.4.2 for Ice Blue™ and white, respectively. The target color coordinates for all monochrome, negative mode LCDs are described in Sections 3.2.2 and 3.2.3 for Ice Blue™ and Lincoln White, respectively.

4.3.2 Ice Blue™ Intensity Target

The target nighttime intensity for all Ice Blue™ monochrome, negative mode VF Displays and LCDs is 14.0 ftL (48.0 cd/m^2) ± 3.5 ftL (12.0 cd/m^2) with Parklamps On and dimmer control at nighttime dimming step 12.

4.3.3 Lincoln White Intensity Target

The target nighttime intensity for all Lincoln White monochrome, negative mode VF Displays is 17.0 ftL (58.2 cd/m^2) ± 4.3 ftL (14.7 cd/m^2) with Parklamps On and dimmer control at dimming step 12. The target nighttime intensity for all white monochrome, negative mode LCDs is 14.0 ftL (48.0 cd/m^2) ± 3.5 ftL (12.0 cd/m^2) with Parklamps On and dimmer control at nighttime dimming step 12.

4.3.4 Intensity Target for Full Color Liquid Crystal Displays

The bare display white luminance target in Night mode for all full color LCDs is 67.2 ftL (230.0 cd/m^2) with Parklamps On and dimmer control at nighttime dimming step 12. No other active areas of the display shall be less than 85% of the bare display white luminance target.

5.0 DIMMING STRATEGY

The BCM controls dimming for all of the Interior Illumination Subsystem components defined in Section 2.1 using Standard Dimming. All hardwired components are controlled directly by the BCM or one of four Door Modules; therefore, their responses are predetermined.

5.1 BCM Configurations

5.1.1 Ambient Light Sensor Present

In order for Daytime Dimming to function properly, the BCM must correctly configure the following parameter:

AmbientLightSensorPresent_Cfg = [Present, Not_Present]

This parameter determines the presence of an ALS which is used to determine the value of the Day_Night_Status signal.

5.1.2 User Selectable Daytime Level

In order for User Selectable Daytime Mode to function properly, the BCM must correctly configure the following parameter:

Dim_UserDayLevel_Cfg = [Night_12 or Day_3]

If there is an ALS present then configure to Night_12, otherwise, Day_3.

5.2 Network Signals

The BCM will send CAN signals to communicate the dimming level to all illuminated components on the network. Daytime and Nighttime illumination are controlled by the Parklamp_Status, Backlit_LED_Status, Dimming_Lvl, Litval and Day_Night_Status signals. These signals appear in MS1-CAN Message 0x3B3 _BodyInfo_3_MS1and HS3-CAN Message 0x3B3 _BodyInfo_3_HS3. All illuminated components on CAN need to respond to any changes in dimming within 100 milliseconds to prevent any customer perceived latency. Details of the CAN signals are shown in Table 4 below.

Table 4. CAN Dimming Signal Details for Message 0x3B3

Description	Length	Detailed Meaning	State Encoded	Min	Max	Comment
Parklamp_Status	2			0 (0x0)	3 (0x3)	
		Off	0x0			
		On	0x1			
		Unknown [1]	0x2			
		Invalid [1]	0x3			
Day_Night_Status	2			0 (0x0)	2 (0x2)	
		Null	0x0			
		Day	0x1			
		Night	0x2			
Dimming_Lvl	8			0 (0x0)	253 (0xFD)	
		Off	0x0			
		Night_1	0x1			
		Night_2	0x2			
		Night_3	0x3			
		Night_4	0x4			
		Night_5	0x5			
		Night_6	0x6			
		Night_7	0x7			
		Night_8	0x8			
		Night_9	0x9			
		Night_10	0xA			
		Night_11	0xB			
		Night_12	0xC			
		Day_1	0xD			
		Day_2	0xE			
		Day_3	0xF			
		Day_4	0x10			
		Day_5	0x11			
		Day_6	0x12			
		Unknown [1]	0xFE			
		Invalid [1]	0xFF			
Litval	8			0 (0x0)	253 (0xFD)	
		Night	0x0			
		Twilight_1	0x1			
		Twilight_2	0x2			
		Twilight_3	0x3			
		Twilight_4	0x4			
		Day	0x5			
		Unknown [1]	0xFE			
		Invalid [1]	0xFF			
Backlit_LED_Status	4			0 (0x0)	253 (0xFD)	
		Off	0x0			Illumination Off
		Night_1	0x1			Barely Discernible
		Night_2	0x2			
		Night_3	0x3			
		Night_4	0x4			
		Night_5	0x5			
		Night_6	0x6			
		Night_7	0x7			
		Night_8	0x8			
		Night_9	0x9			
		Night_10	0xA			
		Night_11	0xB			
		Night_12	0xC			Max Nighttime Brightness

1. **NEVER** sent by BCM

The DDM will send LIN signals to the Driver Door Switch (DDS) and Rear Door Module (RDM) to communicate the dimming levels to the illuminated components on the driver side doors. The PDM will send LIN signals to the RDM to communicate the dimming levels to the illuminated components on the passenger side doors. Nighttime illumination will be controlled by the IndicationIllumCmd and BacklitLEDCmd signals. All illuminated components on LIN need to respond to any changes in dimming within 100 milliseconds to prevent any customer perceived latency. Details of the LIN signals are shown in Table 5 below.

Table 5. LIN Dimming Signal Details

Signal Name	Length	Description	Hex	Comment
IndicationIllumCmd				Indicator Illumination Level
		Day	0x1	Daytime
		Night	0x2	Nighttime
BacklitLEDCmd				Graphic Illumination Level
		Off	0x0	Illumination Off
		Night_12	0xC	Nighttime Dimming Step 12

5.3 Components without Daytime Dimming

5.3.1 CAN Controlled Components

Components on CAN that do not have daytime dimming shall use the Backlit_LED_Status signal to control their LED illumination and Dimming_Lvl signal to control their display and Indicator illumination and respond as describe in Table 6.

Table 6. Expected Dimming Responses for CAN Components without Daytime Dimming

Dimming Inputs			Illumination Outputs			Comments
Dimming_Lvl	**Backlit_LED_Status**	**Day_Night_Status or Litval**	**Backlit Graphics**	**Display**	**Indicators[1,2]**	
OFF	OFF	Don't Care	OFF	OFF	OFF	
OFF	OFF	Don't Care	Night_12[3,4,5]	Night_12[3,4,5]	OFF	For Infotainment Components only
Day_1 – Day_6	OFF	Don't Care	OFF	Day_1 – Day_6	Daytime	
Day_1 – Day_6	Night_1 – Night_12	Don't Care	Night_1 – Night_12	Day_1 – Day_6	Daytime	
Night_1 – Night_12	Night_1 – Night_12	Don't Care	Night_1 – Night_12	Night_1 – Night_12	Nighttime	
0x3B3 _BodyInformation_3_MS not received[6] since Wake-Up for < 5 seconds since battery ON			OFF	OFF	OFF	Module Wake-up w/o valid message
Missing 0x3B3 _BodyInformation_3_MS for < 5 seconds			No State Change	No State Change	No State Change	
Missing 0x3B3 _BodyInformation_3_MS for ≥ 5 seconds			Night_12	Night_12	Nighttime	

1. Indicators illuminate to indicate feature activation without the use of symbols or words. If indicators are not capable of step-down dimming, use Nighttime Brightness for all Daytime Brightness responses. For chromaticity and luminance, see Interior Harmony SDS.
2. If Ignition_Status ≠ Run or Start, Indicators will be OFF.
3. On CGEA 1.3 HS3-CAN bus: Response when (HMI_HMIMode_St=ON) AND [(PowerMode=KeyOut or Accessory_1) OR (Ignition_Status=OFF or ACC)] AND (Dimming_Lvl=OFF) – Note if bus is asleep then use last state of signals
4. On CGEA 1.3 MS-CAN1 bus: Response when (Multimedia_System=ON) AND (Ignition_Status=OFF or ACC) AND (last state of Dimming_Lvl=OFF) – Note if bus is asleep then use last state of signals
5. For Police Vehicles, all illumination is OFF if Dimming_Lvl = OFF AND Backlit_LED_Status = OFF.
6. Not Received = No message received and missing message timer no yet expired

5.3.2 LIN Controlling Components

Components on CAN that control illumination of other components over LIN, shall use the Parklamp_Status, Backlit_LED_Status and Day_Night_Status signals and send the LIN signals as described in Tables 7 and 8.

Table 7. BacklitLEDCmd Output

Backlit_LED_Status	BacklitLEDCmd
OFF	OFF
Night_1 – Night_12	Night_12

Table 8. IndicationIllumCmd Output

CAN Dimming Inputs		LIN Output	Comments
Parklamp_Status	Day_Night_Status	IndicationIllumCmd	
Don't Care	Night	Night	Sensor Present
Don't Care	Day	Day	
OFF	Null	Day	Sensor Not Present
ON	Null	Night	

5.3.3 LIN Controlled Components

Components on LIN that do not have daytime dimming shall use the BacklitLEDCmd signal to control their illuminated graphics, text or symbols as described in Table 9.

Table 9. Expected LED Illumination Response for LIN Components

BacklitLEDCMD LIN Input Signal	Illuminated Graphics, Text or Symbols Response	Comments
OFF	OFF	Ignition Off
Night_12	Night_12	Nighttime Brightness

The IndicationIllumCmd signal shall be used to control the illumination level of any functional indicators or jewels as described in Table 10.

Table 10. Expected Indicator Response for LIN Components

IndicationIllumCmd	Indicators[1,2]
Night	Nighttime Brightness
Day	Daytime Brightness

1. Indicators or jewels illuminate to indicate feature activation without the use of symbols or words. If indicators are not capable of step-down dimming, use Nighttime Brightness for all Daytime Brightness responses. For chromaticity and luminance, see Interior Harmony SDS
2. If Ignition_Status ≠ Run or Start, Indicators will be OFF.

5.4 Components with Daytime Dimming

Any component that has daytime dimming shall use the Dimming_Lvl and Day_Night_Status signals over CAN and respond to the dimming inputs as described in Table 11.

Table 11. Expected Dimming Responses for Components with Daytime Dimming

Dimming Inputs			Dimming Response				Comments
Dimming_Lvl	Day_Night_Status	Litval	Illuminated Graphics, Text or Symbols	Display[1]	ePRNDL Indicators[2]	Dimmable Indicators & Telltales[3]	
OFF	Don't Care	Don't Care	OFF	Daytime Brightness[4]	OFF	OFF	Ignition OFF/ACC
OFF	Don't Care	Don't Care	Night_12[8,9,10]	Night_12[8,9,10]	OFF	OFF	For Infotainment Components only
Day_1 – Day_6	Don't Care	Don't Care	Day_1 – Day_6	Daytime Brightness	Daytime Brightness	Daytime Brightness	Maximum Daytime Brightness & AutoDim = Off
Day_1 – Day_6	Null[5]	Don't Care	Day_1 – Day_6	Daytime Brightness	Daytime Brightness	Daytime Brightness	AutoDim = On
Day_1 – Day_6	≠ Null[6]	Night[6]	Night_6	Night_6	Night_6	Nighttime Brightness	AutoDim = On
Day_1 – Day_6	≠ Null	≠ Night	Day_1 – Day_6	Daytime Brightness	Daytime Brightness	Daytime Brightness	AutoDim = On
Night_1 – Night_12	Don't Care	Don't Care	Night_1 – Night_12	Night_1 – Night_12	Night_1 – Night_12	Nighttime Brightness	Nighttime Dimming Mode
0x3B3 _BodyInformation_3_MS not received[7] for < 5 seconds since battery ON			OFF	OFF	OFF	OFF	Module Wake-up w/o valid message
Missing 0x3B3 _BodyInformation_3_MS for < 5 seconds			No State Change	No State Change	No State Change	No State Change	
Missing 0x3B3 _BodyInformation_3_MS for ≥ 5 seconds			Night_12	Night_12	Night_12	Nighttime Brightness	Maximum Nighttime Brightness

1. SST Display should turn Off when there is no SST display commanded.
2. Primary ePRNDL gear indicator. For chromaticity and luminance, see Interior Harmony SDS requirements. ePRNDL indicators can only turn OFF under certain vehicle conditions, see Electronic PRNDL specification , EPRNDL ES v2011.1 or later.
3. Telltales illuminate a symbol or words to alert the customer about a feature condition. Indicators illuminate to indicate feature activation without the use of symbols or words. If Telltales or Indicators are not capable of step-down dimming, use Nighttime Brightness for all Daytime Brightness responses. For chromaticity and luminance, see Interior Harmony SDS.
4. If Ignition_Status = OFF, Instrument Clusters Display illuminated only if Warning or Odometer present.
5. If AutoDim is configured On and Day_Night_Status = Null, AutoDim feature is ignored. AutoDim feature only pertains to illuminated components in the instrument cluster.
6. If AutoDim is configured On, then must use Litval to determine Night. AutoDim feature only pertains to illuminated components in the instrument cluster.
7. Not Received = No message received and missing message timer no yet expired
8. On CGEA 1.3 HS3-CAN bus: Response when (HMI_HMIMode_St=ON) AND [(PowerMode=KeyOut or Accessory_1) OR (Ignition_Status=OFF)] AND (Dimming_Lvl=OFF) – Note if bus is asleep then use last state of signals
9. On CGEA 1.3_MS-CAN1 bus: Response when (Multimedia_System=ON) AND (Ignition_Status=OFF) AND (last state of Dimming_Lvl=OFF) – Note if bus is asleep then use last state of signals
10. For Police Vehicles, all illumination is OFF if Dimming_Lvl = OFF

5.5 Network and Module Sleep with Illumination Active

For Components with Daytime Dimming, active dimming/illumination, Dimming_Lvl ≠ OFF, is a local sleep inhibitor. Modules on the network will allow the network(s) to sleep but illumination will remain ON indefinitely, no timeouts allowed. Local sleep is allowed when Dimming_Lvl = OFF.

For Components without Daytime Dimming, active dimming/illumination, Backlit_LED_Status ≠ OFF, is a local sleep inhibitor. Modules on the network will allow the network(s) to sleep but illumination will remain ON indefinitely, no timeouts allowed. Local sleep is allowed when Backlit_LED_Status = OFF.

Network sleep means the network is powered down but the module may still be awake. Local sleep means the network is asleep (powered down) and the module is in sleep mode (powered down).

6.0 DIMMING RESPONSE

6.1 Daytime Dimming

The BCM controls dimming for all of the Interior Illumination Subsystem components defined in Section 2.1. When the Parklamps are OFF, the BCM will receive a signal from the Dimmer Switch then output the appropriate CAN message. All daytime dimmable components on CAN will use the Dimming_Lvl signal to control component dimming. Tables 12 and 13 detail the nominal daytime intensity targets for the different illumination technologies at various dimming levels:

Table 12. Instrument Cluster Daytime Dimming Intensity Targets

Dimming_Lvl	*Illuminated Graphics & Acrylic Chaplets/Rings		*White or Ice Blue™ Instrument Cluster Pointer		*Red Instrument Cluster Pointer	
	(ftL)	(cd/m^2)	(ftL)	(cd/m^2)	(ftL)	(cd/m^2)
OFF	OFF	OFF	OFF	OFF	OFF	OFF
Day_1	6.0	17.1	6.0	17.1	3.5	12.0
Day_2	10.0	34.3	10.0	34.3	7.0	24.0
Day_3	20.0	68.5	20.0	68.5	14.0	48.0
Day_4	30.0	102.8	30.0	102.8	21.0	71.9
Day_5	40.0	137.0	40.0	137.0	28.0	95.9
Day_6	50.0	171.3	50.0	171.3	35.5	121.6

***Subject to change based on Jury Evaluation.**

Table 13. Deadfront Infotainmnent and Climate Control Bezel Daytime Dimming Intensity Targets

Dimming_Lvl	* White or Ice Blue™ Illuminated Graphics, Text or Symbols (ftL)	
	(ftL)	(cd/m^2)
OFF	OFF	OFF
Day_1	14.6	50.0
Day_2	29.2	100.0
Day_3	58.4	200.0
Day_4	87.6	300.0
Day_5	116.8	400.0
Day_6	146.0	500.0

***Subject to change based on Jury Evaluation**

6.2 Nighttime Dimming

The BCM controls dimming for all of the Interior Illumination Subsystem components defined in Section 2.1. When the Parklamps are ON, the BCM will receive a signal from the Dimmer Switch and ALS then output the appropriate PWM signal(s) or CAN message to the illumination subsystem components. All subsystem components on CAN will use the Dimming_Lvl, Backlit_LED_Status and Day_Night_Status signals to control component dimming.

The tables and figures that follow indicate the nominal intensity targets for the different illumination technologies at various dimming levels:

Table 14. Nighttime Dimming Intensity Targets for Displays and Instrument Cluster Graphics

Dimming_Lvl	*Monochrome Ice Blue™ Displays (14.0 ftL)	*Monochrome White Displays (17.0 ftL)	*Full Color LCDs (ftL)	*Instrument Cluster Graphics (3.5 ftL)	Instrument Cluster Glow Rings /Acyrlic Chaplets (6.0 ftL)	*Red Instrument Cluster Pointer (2.5 ftL)	*White Instrument Cluster Pointer (7.0 ftL)
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Night_1	0.280	0.340	3.50	0.070	0.120	0.050	0.140
Night_2	0.980	1.190	9.29	0.245	0.420	0.175	0.490
Night_3	1.498	1.819	15.08	0.375	0.642	0.268	0.749
Night_4	2.100	2.550	20.86	0.525	0.900	0.375	1.050
Night_5	2.800	3.400	26.65	0.700	1.200	0.500	1.400
Night_6	3.486	4.233	32.44	0.872	1.494	0.623	1.743
Night_7	4.410	5.355	38.23	1.103	1.890	0.788	2.205
Night_8	5.320	6.460	44.01	1.330	2.280	0.950	2.660
Night_9	6.342	7.701	49.80	1.586	2.718	1.133	3.171
Night_10	7.756	9.418	55.59	1.939	3.324	1.385	3.878
Night_11	10.122	12.291	61.37	2.531	4.338	1.808	5.061
Night_12	14.000	17.000	67.16	3.500	6.000	2.500	7.000
Day_1 – Day_6	42.000	42.000	146.00	See Table 12	See Table 12	See Table 12	See Table 12

***Subject to change based on Jury Evaluation.**

Table 15. Nighttime Dimming Intensity Targets for Instrument Cluster with Dual Displays

Dimming_Lvl	*Instrument Cluster Graphics, Glow Rings/Acrylic Chaplets & Deadfront Infotainment and Climate Control Bezels (10.0 ftL)	*White Instrument Cluster Pointer (20.0 ftL)
0	OFF	OFF
Night_1	0.200	0.400
Night_2	0.700	1.400
Night_3	1.070	2.140
Night_4	1.500	3.000
Night_5	2.000	4.000
Night_6	2.490	4.980
Night_7	3.150	6.300
Night_8	3.800	7.600
Night_9	4.530	9.060
Night_10	5.540	11.080
Night_11	7.230	14.460
Night_12	10.000	20.000
Day_1 – Day_6	See Table 12	See Table 12

***Subject to change based on Jury Evaluation.**

Figure 4. Dimming Curves For Monochrome Displays and Instrument Cluster Graphics

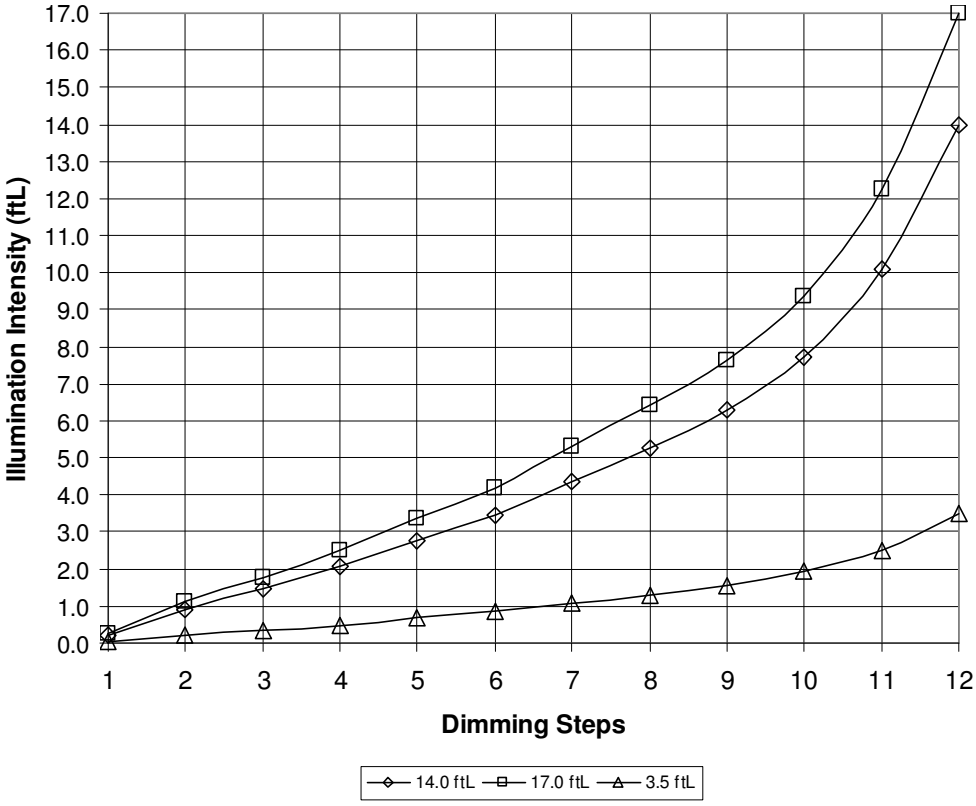
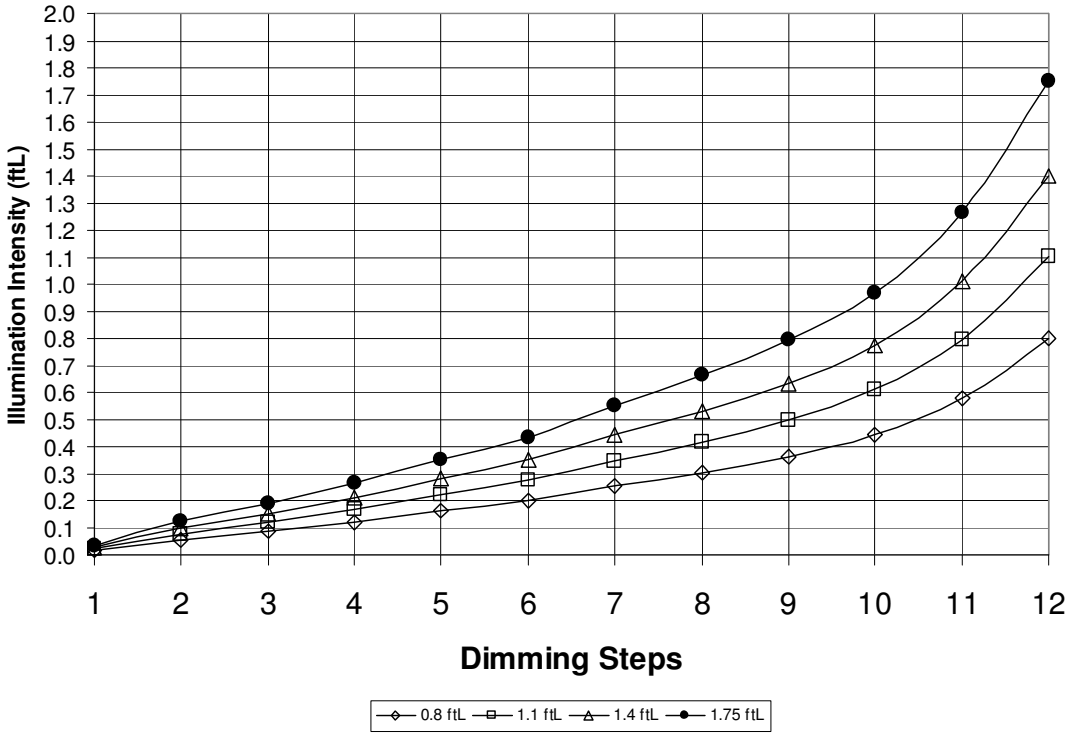


Table 16. Nighttime Dimming Intensity Targets for LED Backlighting

Backlit_LED_Status	*LED Backlighting (1.75 ftL)	*LED Backlighting (1.4 ftL)	*LED Backlighting (1.1 ftL)	*LED Backlighting (0.8 ftL)
0	OFF	OFF	OFF	OFF
Night_1	0.035	0.028	0.022	0.016
Night_2	0.122	0.098	0.077	0.056
Night_3	0.188	0.150	0.118	0.086
Night_4	0.263	0.210	0.165	0.120
Night_5	0.350	0.280	0.220	0.160
Night_6	0.435	0.349	0.274	0.199
Night_7	0.552	0.441	0.347	0.252
Night_8	0.665	0.532	0.418	0.304
Night_9	0.792	0.634	0.498	0.362
Night_10	0.969	0.776	0.609	0.443
Night_11	1.265	1.012	0.795	0.578
Night_12	1.7500	1.400	1.100	0.800

***Subject to change based on Jury Evaluation.**

Figure 5. Dimming Curves for LED Backlighting



7.0 LIST OF REFERENCES

- Interior Harmony SDS
- Vehicle Interior Illumination with Daytime Dimming, ES-DS7T-1A278-A
- Ice Blue™ and White Interior Illumination with Daytime Dimming, ES-BC3T-1A278-B