



Research & Vehicle Technology
“Infotainment Systems Product Development”

Feature – Zone Lighting

**APIM Infotainment Subsystem Part Specific
Specification (SPSS)**

Version 1.4

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Version Date: February 12, 2020

FORD CONFIDENTIAL



Revision History

Date	Version	Notes	
December 12, 2017	1.0	Initial Release	50% of “initial” requirements
February 7, 2018	1.1		
	LGT360-474294/B-Architectural Design	tmertiri: added new req to the structure	
	LGT360-FUR-REQ-273752/B-360 Lighting Logical Signal Mapping	tmertiri: updated signal names in the mapping table	
	FUR-REQ-294559/A-Individual Light States	tmertiri: added new requirement	
	LGT360-MD-REQ-274293/B-LeftLight	tmertiri: naming update	
	LGT360-MD-REQ-274294/B-RightLight	tmertiri: naming update	
	LGT360-MD-REQ-274295/B-FrontLight	tmertiri: naming update	
	LGT360-MD-REQ-274296/B-RearLight	tmertiri: naming update	
	LGT360-MD-REQ-273988/B-FeatureSt	tmertiri: naming update	
	LGT360-MD-REQ-273983/B-FeatureTimer	tmertiri: update signal values	
	LGT360-MD-REQ-273984/B-FrontSt	tmertiri: naming update	
	LGT360-MD-REQ-273985/B-RearSt	tmertiri: naming update	
	LGT360-MD-REQ-273986/B-LeftSt	tmertiri: naming update	
	LGT360-MD-REQ-273987/B-RightSt	tmertiri: naming update	
	LGT360-MD-REQ-290353/B-VehicleSpeedSt	tmertiri: naming update	
	LGT360-474295/B-General Requirements	tmertiri: structure update	
	LGT360-REQ-273969/B-Vehicle Speed Conditions	tmertiri: update requirement	
	REQ-294557/A-Missing Light Signals	tmertiri: new req	
	REQ-294558/A-Missing Vehicle Speed Signal	tmertiri: new req	
	LGT360-473875/B-Use Cases	tmertiri: update structure in VSEM	
	UC-REQ-295474/A-Lights Status Update	tmertiri: new usecase	
	LGT360-473877/B-Activity Diagram	tmertiri: update structure in VSEM	
	LGT360-REQ-273759/B-Lighting360 Operation AD	tmertiri: updated diagram	
	LGT360-REQ-295466/A-Lights Status Update	tmertiri: new diagram	
	LGT360-473878/B-Sequence Diagram	tmertiri: update structure	
	LGT360-REQ-273760/B-Lighting360 Operation SD	tmertiri: update diagram	
	LGT360-REQ-295467/A-Light Status Update SD	tmertiri: new diagram	
	LGT360-473879/B-Appendix	tmertiri:added reference docs	
July 31, 2018	1.2		
	LGT360-FUR-REQ-273752/C-360 Lighting Logical Signal Mapping	tmertiri: updated signal names.	
	LGT360-FUR-REQ-294559/B-Individual Light States	tmertiri: added signals names to the table.	
	LGT360-REQ-284000/B-Rolling Counter	tmertiri: Added text to try to better explain rolling counter purpose and behaviour.	
	LGT360-REQ-273755/B-360 Lighting Client_Tx	tmertiri: added new signals.	
	LGT360-MD-REQ-324031/A-LghtOvrrd	tmertiri: new requirement	
	LGT360-MD-REQ-323976/A-ExitEntrySt	tmertiri: new requirement	
	LGT360-MD-REQ-273756/B-360 Lighting Client_Rx	tmertiri: added new signals	
	LGT360-MD-REQ-273988/C-FeatureSt	tmertiri: updated signal parameters	
	LGT360-MD-REQ-323932/A-LLamp1	tmertiri: added new signal	
	LGT360-MD-REQ-323933/A-LLamp2	tmertiri: added new signal	
	LGT360-MD-REQ-323934/A-LLamp3	tmertiri: added new signal	
	LGT360-MD-REQ-323935/A-LLamp4	tmertiri: added new signal	
	LGT360-MD-REQ-323936/A-LLamp5	tmertiri: added new signal	
	LGT360-MD-REQ-323937/A-LLamp6	tmertiri: added new signal	
	LGT360-MD-REQ-323938/A-LLamp7	tmertiri: added new signal	



LGT360-MD-REQ-323941/A-LLamp8	tmertiri: added new signal
LGT360-MD-REQ-323943/A-LLamp9	tmertiri: added new signal
LGT360-MD-REQ-323944/A-LLamp10	tmertiri: added new signal
LGT360-MD-REQ-323952/A-ExitEntryRmtSt	tmertiri: added new signal
LGT360-474295/C-General Requirements	tmertiri: updated requirements
LGT360-REQ-273969/C-Vehicle Speed Conditions	tmertiri: updated text of the conditions.
LGT360-REQ-273970/B-Timer expiration	tmertiri: updated wording of the requirement
LGT360-REQ-290355/B-Error States	tmertiri: updated req wording
LGT360-REQ-323981/A-Battery Low Feedback	tmertiri: new req
LGT360-REQ-323985/A-Client Reset	tmertiri: new req
LGT360-REQ-323988/A-Receiving Not Used Light Zones Status	tmertiri: new req
LGT360-REQ-323993/A-Overriding Auto Headlamps	tmertiri: new req
LGT360-REQ-323996/A-Feature Status Change	tmertiri: new req
LGT360-REQ-323998/A-Feature Active, Non Active	tmertiri: new req
LGT360-REQ-324009/A-Zone Status Request	tmertiri: new req
LGT360-REQ-324010/A-Zone button press	tmertiri: new req
LGT360-REQ-323931/A-Cargo Lamp Status	tmertiri: new req
LGT360-REQ-324117/A-Light Override value retainment	tmertiri: new req
LGT360-473875/C-Use Cases	tmertiri: update structure in VSEM
UC-REQ-323977/A-Zone Request Retry Strategy	tmertiri: new req
LGT360-REQ-273760/C-Lighting360 Operation SD	tmertiri: update diagram
LGT360-REQ-295467/B-Light Status Update SD	tmertiri: update diagram

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1.3

LGT360-FUR-REQ-273752/D-360 Lighting Logical Signal Mapping	tmertiri: Added new signals. Ign and vehicle speed
LGT360-MD-REQ-273756/C-360 Lighting Client_Rx	tmertiri: added new signal, Ignition and vehicle speed
REQ-326829/A-LVehSpeed	tmertiri: added new signal
REQ-326830/A-LIgnSt	tmertiri: added new signal
LGT360-474295/D-General Requirements	tmertiri: Added new req to the structure
REQ-326831/A-Missing Speed and Ignition Signals	tmertiri: new requirement
LGT360-UC-REQ-273972/B-Vehicle On Feature On request	tmertiri: No content change
LGT360-UC-REQ-273973/B-Vehicle On feature Off request	tmertiri: No content change
LGT360-UC-REQ-273974/B-Vehicle Off feature On request	tmertiri: No content change
LGT360-UC-REQ-273975/B-Vehicle Off feature Off request	tmertiri: No content change
LGT360-UC-REQ-273976/B-Timer about to expire	tmertiri: No content change
LGT360-UC-REQ-273977/B-Feature On vehicle starts moving	tmertiri: No content change
LGT360-UC-REQ-273978/B-Feature On vehicle moves than it stops again	tmertiri: No content change
UC-REQ-295474/B-Lights Status Update	tmertiri: No content change

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1.4

LGT360-474294/C-Architectural Design	tmertiri: structure updates
STR-473881/B-Overview+	tmertiri: content reword
STR-473881/C-Overview	tmertiri: content for feature name change
LGT360-CLD-REQ-273757/B-360 Lighting Client	tmertiri: content reword
LGT360-CLD-REQ-273758/B-360 Lighting Server	tmertiri: Update wording
LGT360-FUR-REQ-273752/E-360 Lighting Logical Signal Mapping	tmertiri: added feature inhibit. remove duplicate veh speed logical signal
LGT360-FUR-REQ-294559/C-Individual Light States	tmertiri: added cargo lights signal



LGT360-IIR-REQ-273755/C-360 Lighting Client_Tx	tmertiri: structure changes
LGT360-IIR-REQ-273756/D-360 Lighting Client_Rx	tmertiri: Update featureSt and featuretimer signals
LGT360-MD-REQ-362364/A-LLamp11	tmertiri: new signal for cargo lights added. this removes req 323931 from SPSS
LGT360-MD-REQ-326829/B-LVehSpeed	tmertiri: no content change
LGT360-MD-REQ-326830/B-LIgnSt	tmertiri: no content change
LGT360-474295/E-General Requirements	tmertiri: removed req 323931
LGT360-REQ-273969/D-Vehicle Speed Conditions	tmertiri: update logical name of signal
LGT360-REQ-294558/B-Missing Vehicle Speed Signal	tmertiri: update logical name of signal
LGT360-474296/B-Functional Definition	tmertiri: structure updates
LGT360-FUN-REQ-273967/B-360 Lighting	tmertiri: changes in structure. Update diagrams
LGT360-REQ-295467/C-Light Status Update SD	tmertiri: update diagram with new cargo light signal



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1 Architectural Design

1.1 Overview

Zone Lighting is a feature that allows the user to control the vehicle's exterior lights through an app in their mobile device. The exterior vehicle lights are divided into multiple zones and the user can switch the state of the lights to On/Off independently. This feature was previously known as 360 Lighting, so throughout this documentation you may see both references.

1.2 LGT360-CLD-REQ-273757/B-360 Lighting Client

Client: The Client is the vehicle device that takes user's input and forwards them to the server. It may also provide the user with feature status and other related information.

The client may also serve as a middleman between user's mobile device and the server if there is a link established between Client and the user's mobile device.

1.3 LGT360-CLD-REQ-273758/B-360 Lighting Server

Server: Among its other duties it may have, it receives feature requests from the user through the Client and processes them. Server provides feedback details to the client about the current state of the feature.

1.4 LGT360-FUR-REQ-273752/E-360 Lighting Logical Signal Mapping

The CAN signals mentioned throughout this document shall refer to the CAN signal's logical name. The logical names shall be mapped to their actual CAN signal names. Please use the table below to perform the mapping. The InfoCAN database file is the master file for the actual CAN signal names. Note: There may be cases where the actual CAN signal name is used in this documentation.

Logical Name	CAN Signal Name
LeftSt	ExtLghtLeft_D_Stat
RightSt	ExtLghtRight_D_Stat
FrontSt	ExtLghtFront_D_Stat
RearSt	ExtLghtRear_D_Stat
FeatureSt	ExtLght_D_Falt
FeatureTimer	ExtLghtAlrt_B_Rq
LeftLight	ExtLghtLeft_D_RqMnu
RightLight	ExtLghtRight_D_RqMnu
FrontLight	ExtLghtFront_D_RqMnu
RearLight	ExtLghtRear_D_RqMnu
LghtOvrrd	AutoLghtOvrrd_B_RqDrv
ExitEntrySt	ExtLghtDsply_D_Stat
ExitEntryRmtSt	ExtLghtDsply_B_StatArb
LVehSpeed	Veh_V_ActIENG
LIgnSt	Ignition_Status

Table: Logical name/CAN signal mapping

1.5 LGT360-FUR-REQ-294559/C-Individual Light States

This table consists of individual light signals. The client shall display this light status upon users' request.

Logical Names used in SPSS	Can Signal Names	Other names used elsewhere
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LLamp1	FogLghtFrontOn_B_Stat	Fog Lamps
LLamp2	HeadLghtHiOn_B_Stat	High Beam
LLamp3	Parklamp_Status	Park Lamps
LLamp4	TrukBedLght_B_Stat	Bed Lamps
LLamp5	RvrseLghtOn_B_Stat	Reverse Lamps
LLamp6	LicPlateLght_B_Stat	License Plate Lamps
LLamp7	TrlrHitchLamp_D_Stat	Trailer Assist Lamps
LLamp8	PudLamp_D_Rq	Puddle Lamps
LLamp9	SpotLghtLeft_D_Stat	Spot Lamps Left
LLamp10	SpotLghtRight_D_Stat	Spot Lamps Right
LLamp11	CargoLght_D_Stat	Cargo Lights

1.6 LGT360-REQ-284000/B-Rolling Counter

Rolling Counter is the technique of encoding the data sent by the client to the server for feature changes request. If the user wants to turn any of the light zones On and value of the zonelight request signal is 2, next time the user wants the zone to be Off, the signal would have a value of 3. Next time they want the feature On the signal would have a value of 4 and so on. Look at the signal parameter values to know about applicable counter limits and other details. Keep in mind that this feature provides multiple inputs options and values. A button press may not necessarily require a +1 increment to the rolling counter.

1.7 LGT360-IIR-REQ-273755/C-360 Lighting Client_Tx

1.7.1 LGT360-MD-REQ-274293/B-LeftLight

LeftLight: This signal is sent from the client to the server to request left light zone status changes.

Name	Literals	Value	Description
LeftLight			
		0x0	Reset
		0x1	Light zone Off
		0x2	Light zone On
		0x3	Light zone Off
		0x4	Light zone On
		0x5	Light zone Off
		0x6	Light zone On
		0x7	Not Used

**1.7.2 LGT360-MD-REQ-274294/B-RightLight**

RightLight: This signal is sent from the client to the server to request right light zone status changes.

Name	Literals	Value	Description
RightLight			
		0x0	Reset
		0x1	Light zone Off
		0x2	Light zone On
		0x3	Light zone Off
		0x4	Light zone On
		0x5	Light zone Off
		0x6	Light zone On
		0x7	Not Used

1.7.3 LGT360-MD-REQ-274295/B-FrontLight

FrontLight: This signal is sent from the client to the server to request front light zone status changes.

Name	Literals	Value	Description
FrontLight			
		0x0	Reset
		0x1	Light zone Off
		0x2	Light zone On
		0x3	Light zone Off
		0x4	Light zone On
		0x5	Light zone Off
		0x6	Light zone On
		0x7	No Used

**1.7.4 LGT360-MD-REQ-274296/B-RearLight**

RearLight: This signal is sent from the client to the server to request rear light zone status changes.

Name	Literals	Value	Description
RearLight			
		0x0	Reset
		0x1	Light zone Off
		0x2	Light zone On
		0x3	Light zone Off
		0x4	Light zone On
		0x5	Light zone Off
		0x6	Light zone On
		0x7	Not Used

1.7.5 LGT360-MD-REQ-324031/A-LghtOvrdd

LghtOvrdd: This signal is sent from the client to the server to indicate user preference for light overriding.

Name	Literals	Value	Description
LghtOvrdd			
		0x0	Not allowed
		0x1	Allowed

1.7.6 LGT360-MD-REQ-323976/A-ExitEntrySt

ExitEntrySt: This signal is sent from onboard client to gateway to request status change to power state.

Name	Literals	Value	Description
ExitEntrySt			
		0x0	Reset
		0x1	Light zone Off
		0x2	Light zone On
		0x3	Light zone Off
		0x4	Light zone On
		0x5	Light zone Off
		0x6	Light zone On



		0x7	Not Used
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1.8 LGT360-IIR-REQ-273756/D-360 Lighting Client_Rx

1.8.1 LGT360-MD-REQ-273988/C-FeatureSt

FeatureSt: This signal is sent from the server to the client to provide the client with some vehicle information. Consult with the CAN database for all the correct values.

Name	Literals	Value	Description
FeatureSt			
	NULL	0x0	Null
		0x1	Restart Engine
		0x2	Not Stationary
		0x3	Error

1.8.2 LGT360-MD-REQ-273983/B-FeatureTimer

FeatureTimer: This signal is sent from the server to the client so that client may show a notification to the user that the lights, are to be turned off soon.

Name	Literals	Value	Description
FeatureTimer			
		0x0	Do not send alert
		0x1	Send Alerts

1.8.3 LGT360-MD-REQ-273984/B-FrontSt

FrontSt: This signal is sent from the server to the client to indicate front light zone status.

Name	Literals	Value	Description
FrontSt			
	NULL	0x0	Do nothing. Stay in current state.
		0x1	Light zone is Off
		0x2	Light zone is On
		0x3	Unused.

**1.8.4 LGT360-MD-REQ-273985/B-RearSt**

RearSt: This signal is sent from the server to the client to indicate rear light zone status.

Name	Literals	Value	Description
RearSt			
	NULL	0x0	Do nothing. Stay in current state.
		0x1	Light zone is Off
		0x2	Light zone is On
		0x3	Unused.

1.8.5 LGT360-MD-REQ-273986/B-LeftSt

LeftSt: This signal is sent from the server to the client to indicate left light zone status.

Name	Literals	Value	Description
LeftSt			
	NULL	0x0	Do nothing. Stay in current state.
		0x1	Light zone is Off
		0x2	Light zone is On
		0x3	Unused.

1.8.6 LGT360-MD-REQ-273987/B-RightSt

RightSt: This signal is sent from the server to the client to indicate right light zone status.

Name	Literals	Value	Description
RightSt			
	NULL	0x0	Do nothing. Stay in current state.
		0x1	Light zone is Off
		0x2	Light zone is On
		0x3	Unused.



1.8.7 LGT360-MD-REQ-323932/A-LLamp1

Name	Value	Description
LLamp1		
	0x0	Off
	0x1	On

1.8.8 LGT360-MD-REQ-323933/A-LLamp2

Name	Value	Description
LLamp2		
	0x0	Off
	0x1	On

1.8.9 LGT360-MD-REQ-323934/A-LLamp3

Name	Value	Description
LLamp3		
	0x0	Off
	0x1	On
	0x2	Unknown. Treat as Off
	0x3	Invalid. Treat as Off

1.8.10 LGT360-MD-REQ-323935/A-LLamp4

Name	Value	Description
LLamp4		
	0x0	Off
	0x1	On

1.8.11 LGT360-MD-REQ-323936/A-LLamp5

Name	Value	Description
LLamp5		
	0x0	Off
	0x1	On

**1.8.12 LGT360-MD-REQ-323937/A-LLamp6**

Name	Value	Description
LLamp6		
	0x0	Off
	0x1	On

1.8.13 LGT360-MD-REQ-323938/A-LLamp7

Name	Value	Description
LLamp7		
	0x0	Off
	0x1	On

1.8.14 LGT360-MD-REQ-323941/A-LLamp8

Name	Value	Description
LLamp8		
	0x0	Off
	0x1	On
	0x2	Ramp Up. Treat as On
	0x3	Ramp Down. Treat as Off

1.8.15 LGT360-MD-REQ-323943/A-LLamp9

Name	Value	Description
LLamp9		
	0x0	Off
	0x1	On

1.8.16 LGT360-MD-REQ-323944/A-LLamp10

Name	Value	Description
LLamp10		
	0x0	Off
	0x1	On

1.8.17 LGT360-MD-REQ-362364/A-LLamp11

LLamp11: This signal is sent from the server to the client to provide the client with cargo light status. Consult with the CAN database for all the correct values.



Name	Literals	Value	Description
LLamp11			
		0x0	Null
		0x1	Manual
		0x2	Automatic
		0x3	NotUsed

1.8.18 LGT360-MD-REQ-323952/A-ExitEntryRmtSt

ExitEntryRmtSt: This signal is sent from gateway to onboard client and the server to indicate whether the zone lighting screen is active or not.

Name	Literals	Value	Description
ExitEntryRmtSt			
		0x0	Off
		0x1	On

1.8.19 LGT360-MD -REQ-326829/B-LVehSpeed

LVehSpeed: This signal is sent to the client and represent the vehicle speed. Refer to database for signal parameters.

1.8.20 LGT360-MD REQ-326830/B-LIgnSt

LIgnSt: this signal provides ignition status to the client.

Signal parameter	Parameter description
0x0	Unknown
0x1	Off
0x2	Accessory
0x4	Run
0x8	Start
0xF	Invalid



2 General Requirements

Power Button and Override (Brief clarification):

This feature gives the user the ability to control the Auto headlamps in various conditions. The users can choose whether the feature (Zone Lighting) controls Auto headlamps or not by sending users' selection through Override signal. So by sending LghtOvrrd (0x1) the user can control the Auto headlamps through this feature. If LghtOvrrd (0x0) the Zone Lighting feature has no control on the Auto headlamps.

2.1 LGT360-REQ-273968/A-Light Zones

Vehicle exterior lights are divided among different zones.

Zone 1 – Front lights

Zone 2 – Rear lights

Zone 3 – Left side lights

Zone 4 – Right side lights

Each zone has its own CAN Signal for controlling the zone lights. Please consult architectural design section of this SPSS for details.

Some vehicles may have 2 zones and some others may have 4 zones. The Client should have the means of determining how many zones to support.

2.2 LGT360-REQ-273969/D-Vehicle Speed Conditions

The client should limit the user access to the feature depending on vehicle speed.

If LVehSpeed<=4kph, the feature should have proper operation.

If LVehSpeed> 4kph and LVehSpeed< driver distraction speed, the Client will receive a notification to display a popup when user tries to access the feature. Implement the non stationary text display for the popup.

For LVehSpeed>= driver distraction speed the client shall gray out the feature selections per the driver distraction HMI Specification.

2.3 LGT360-REQ-273970/B-Timer expiration

When FeatureTimer gets sent by the server with a value of 0x1 display the timer alert text popup.

2.4 LGT360-REQ-273979/A-Feature feedback

The Client shall display to the user the lights status state it gets from the server.

2.5 LGT360-REQ-290355/B-Error States

If client receives the signal FeatureSt with data 0x3 it should display Error pop up to the client.

2.6 REQ-294557/A-Missing Light Signals

If light status signals go missing, the client shall display last known light states.

2.7 REQ-294558/B-Missing Vehicle Speed Signal

If vehicle speed (LVehSpeed) goes missing for less than 5 seconds, the clients shall perform normal feature operation.

If vehicle speed (LVehSpeed) goes missing for more than 5 seconds, the clients shall prevent feature operation to the user.



2.8 LGT360-REQ-323981/A-Battery Low Feedback

If Server send the Signal Feature St = 0x1 (restart engine) the client shall display the Battery low popup text message.

2.9 LGT360-REQ-323985/A-Client Reset

In case of a client reset, Client shall receive and process the Server transmit signals LeftSt, RightSt , FrontSt , RearSt after it gets initialized.

In case of a client reset, the client should send these signals LeftLight, RightLight, FrontLight, RearLight to the server after initialization with a value of 0x0, until user asks for a change of state.

ExitEntrySt shall be sent with a value of 0x0 until user presses the power button to request a status change.

2.10 LGT360-REQ-323988/A-Receiving Not Used Light Zones Status

When one or any of the signals LeftSt, RightSt, FrontSt, RearSt comes with a value of Not used, Client shall maintain the previous value of the respective signals.

2.11 LGT360-REQ-323993/A-Overriding Auto Headlamps

The client shall use LghtOvrdd signal to indicate to the server the users' preference on overriding Auto Headlamps.

2.12 LGT360-REQ-323996/A-Feature Status Change

Client shall send ExitEntrySt signal to server to request a change in status of the feature.

2.13 LGT360-REQ-323998/A-Feature Active, Non Active

Client shall use ExitEntryRmtSt signal from server to update the current status of zone lighting feature whether the feature is active or not active.

2.14 LGT360-REQ-324009/A-Zone Status Request

The client should send a zone status request opposite from that of current zone status.

2.15 LGT360-REQ-324010/A-Zone button press

Every button press should generate a new rolling counter value (different form the previous button press) and matching the users' request intention. This does NOT necessarily mean a rolling counter incremented by 1 from the previous value.

2.16 LGT360-REQ-324117/A-Light Override value retainment

Default value for LghtOvrdd signal should be 0.

In case of Master reset, the signal should go to default value of 0.

In case of ignition cycles, battery resets or client reset (ecu reset) the value of the signal should be retained to the value that the user had previously chosen.

2.17 REQ-326831/A-Missing Speed and Ignition Signals

LignSt	LVehSpeed	Client ON/OFF	Feature HMI on Client
0x4- Run or 0x8 Start	Not available for < 5 seconds	Client ON	Hold on to previous value
0x4- Run or 0x8 Start	Not available for > 5 seconds	Client ON	Notification-driver distraction



0x4- Run or 0x8 Start	Don't care	Client OFF	Feature CLIENT HMI shall be unavailable
0x2 - Accessory	Don't care	CLIENT ON	Feature CLIENT HMI shall be available*
0x2 - Accessory	Don't care	CLIENT OFF	Feature CLIENT HMI shall be unavailable
0x1 -OFF	Don't care	CLIENT ON (with extended play mode)	Feature CLIENT HMI shall be available*
0x1 -OFF	Don't care	CLIENT OFF	Feature CLIENT HMI shall be unavailable
0x0- Unknown or 0xF Invalid or Faulted	Available	CLIENT ON (with extended play mode)	Feature CLIENT HMI shall be available *
0x0- Unknown or 0xF Invalid or Faulted	Available	CLIENT OFF	Feature CLIENT HMI shall be unavailable
0x0- Unknown or 0xF Invalid or Faulted	Not available	Don't care	Feature CLIENT HMI shall be unavailable

Feature availability while driving depends on driver restrictions as specified in HMI and SPSS requirements.



3 Functional Definition

3.1 LGT360-FUN-REQ-273967/B-360 Lighting

3.1.1 Use Cases

3.1.1.1 *LGT360-UC-REQ-273972/B-Vehicle On Feature On request*

Actors	User
Pre-conditions	Vehicle is ON; Vehicle is stationary; 360 Lighting zone(s) OFF
Scenario Description	User selects zone(s) on In-vehicle 360 Lighting feature UI. Client sends a request to turn on zone(s)
Post-conditions	Client receives status for zone(s) to turn on Client shall display updated status. Lights OFF in selected zone(s) will turn ON instantaneously; Lights ON in selected zone(s) shall remain ON
List of Exception	
Interfaces	

3.1.1.2 *LGT360-UC-REQ-273973/B-Vehicle On feature Off request*

Actors	User
Pre-conditions	Vehicle is ON; Vehicle is stationary; 360 Lighting zone(s) ON
Scenario Description	User de-selects zone(s) on In-vehicle 360 Lighting feature UI. Client sends a request to turn off zone(s)
Post-conditions	Client receives status for zone(s) to turn off Client shall display updated status. Lights ON by 360 feature in selected zone(s) will turn OFF; Lights not actuated by 360 Lighting shall continue to display default/previous behavior;
List of Exception	
Interfaces	

3.1.1.3 *LGT360-UC-REQ-273974/B-Vehicle Off feature On request*

Actors	User
Pre-conditions	Vehicle OFF; Client screen is available. Vehicle is stationary; 360 Lighting zone(s) OFF
Scenario Description	User selects zone(s) on In-vehicle UI. Client sends a request to turn on zone(s)
Post-conditions	Client receives status for zone(s) to turn on Client shall display updated status.



	Lights OFF in selected zone(s) will turn ON instantaneously and remain ON until time out; Lights ON in selected zone(s) shall remain ON
List of Exception	- Not enough battery to support feature
Interfaces	

3.1.1.4 LGT360-UC-REQ-273975/B-Vehicle Off feature Off request

Actors	User
Pre-conditions	Vehicle OFF; Client screen is available. Vehicle is stationary; 360 Lighting zone(s) ON
Scenario Description	User de-selects zone(s) on In-vehicle UI. Client sends a request to turn off zone(s)
Post-conditions	Client receives status for zone(s) to turn off Client shall display updated status Lights ON by 360 feature in selected zone(s) will turn OFF; Lights not actuated by 360 Lighting shall continue to display default/previous behavior;
List of Exception	
Interfaces	

3.1.1.5 LGT360-UC-REQ-273976/B-Timer about to expire

Actors	User
Pre-conditions	Vehicle is OFF; Client screen is available. 360 Lighting zone(s) ON
Scenario Description	Feature Timer about to expire. Client receives signal indicating the timer about to expire pop up should be displayed.
Post-conditions	User gets feedback on user interface about timer expiration
List of Exception	-Not enough battery to support the feature
Actors	User

3.1.1.6 LGT360-UC-REQ-273977/B-Feature On vehicle starts moving

Actors	User
Pre-conditions	Vehicle is stationary; 360 Lighting zone(s) ON
Scenario Description	User moves the vehicle. Client receives signal to display not stationary pop up Client receives status that the zone(s) lights are Off
Post-conditions	Client should update display to new zone status; User gets non stationary notification on App/In-vehicle user interface
List of Exception	
Interfaces	

**3.1.1.7 LGT360-UC-REQ-273978/B-Feature On vehicle moves than it stops again**

Actors	User
Pre-conditions	Vehicle is stationary; 360 Lighting zone(s) ON;
Scenario Description	User moves the vehicle; 360 Lighting gets disabled; User makes the vehicle stationary again;
Post-conditions	Zone Lighting screen continues to show zone(s) status of Off.
List of Exception	
Interfaces	

3.1.1.8 UC-REQ-295474/B-Lights Status Update

Actors	User
Pre-conditions	Vehicle stationary.
Scenario Description	User goes into the 360 lighting feature screen (Turn the main feature power button ON)
Post-conditions	The screen shall show the status of the lights, if they are on or off.
List of Exception Use Cases	
Interfaces	

3.1.1.9 UC-REQ-323977/A-Zone Request Retry Strategy

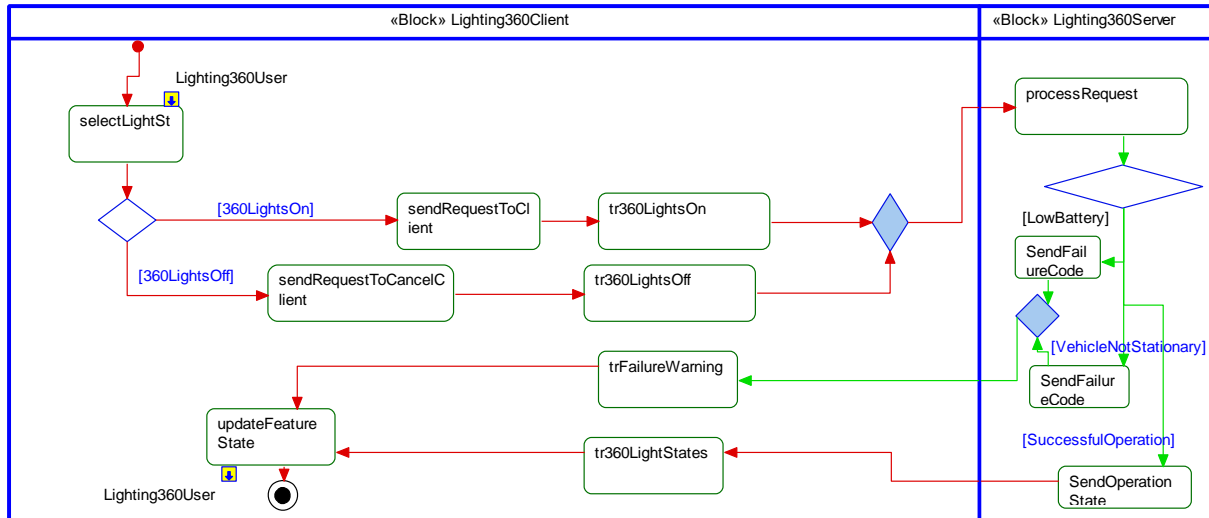
Actors	User
Pre-conditions	Vehicle is stationary;
Scenario Description	User request zone lighting changes. Server ignores client requests and keeps the current zone status unchanged. User presses the Zone Lighting soft buttons multiple times, each time the server ignores the user's request.
Post-conditions	At every button press the Client shall generate and update the rolling counter. Since the zone status doesn't change, the zone lighting request will always be the opposite value of the status. Since this is not a Boolean value, but instead a rolling counter, at each button press, the value will be incremented accordingly. For example, if first button press was a 2, the next value should be a 4 next a 6 next a 2 again and so on. If the initial value sent to the bus was a 1, than the next would be a 3, 5, 1 again and so on.
List of Exception	
Interfaces	



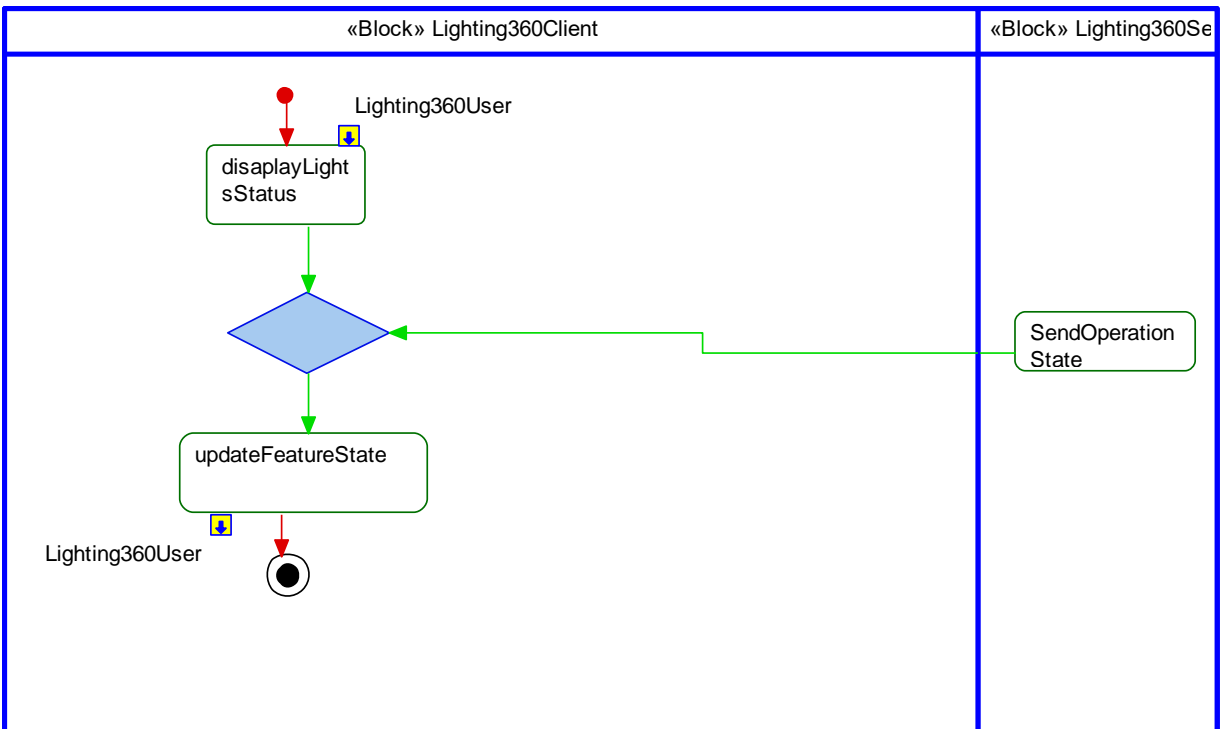
3.1.2 White Box Views

3.1.2.1 Activity Diagram

3.1.2.1.1 LGT360-REQ-273759/B-Lighting360 Operation AD



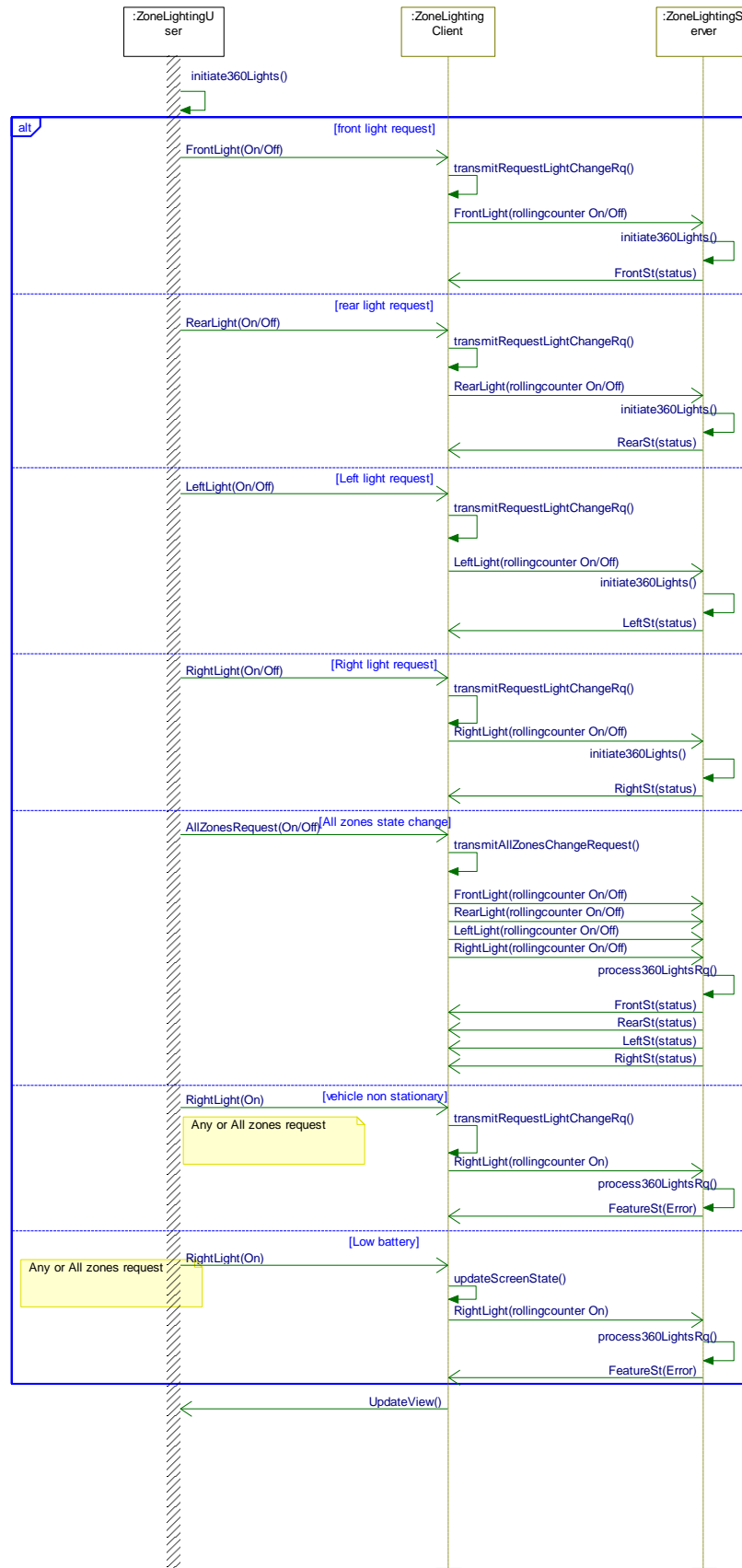
3.1.2.1.2 LGT360-REQ-295466/A-Lights Status Update





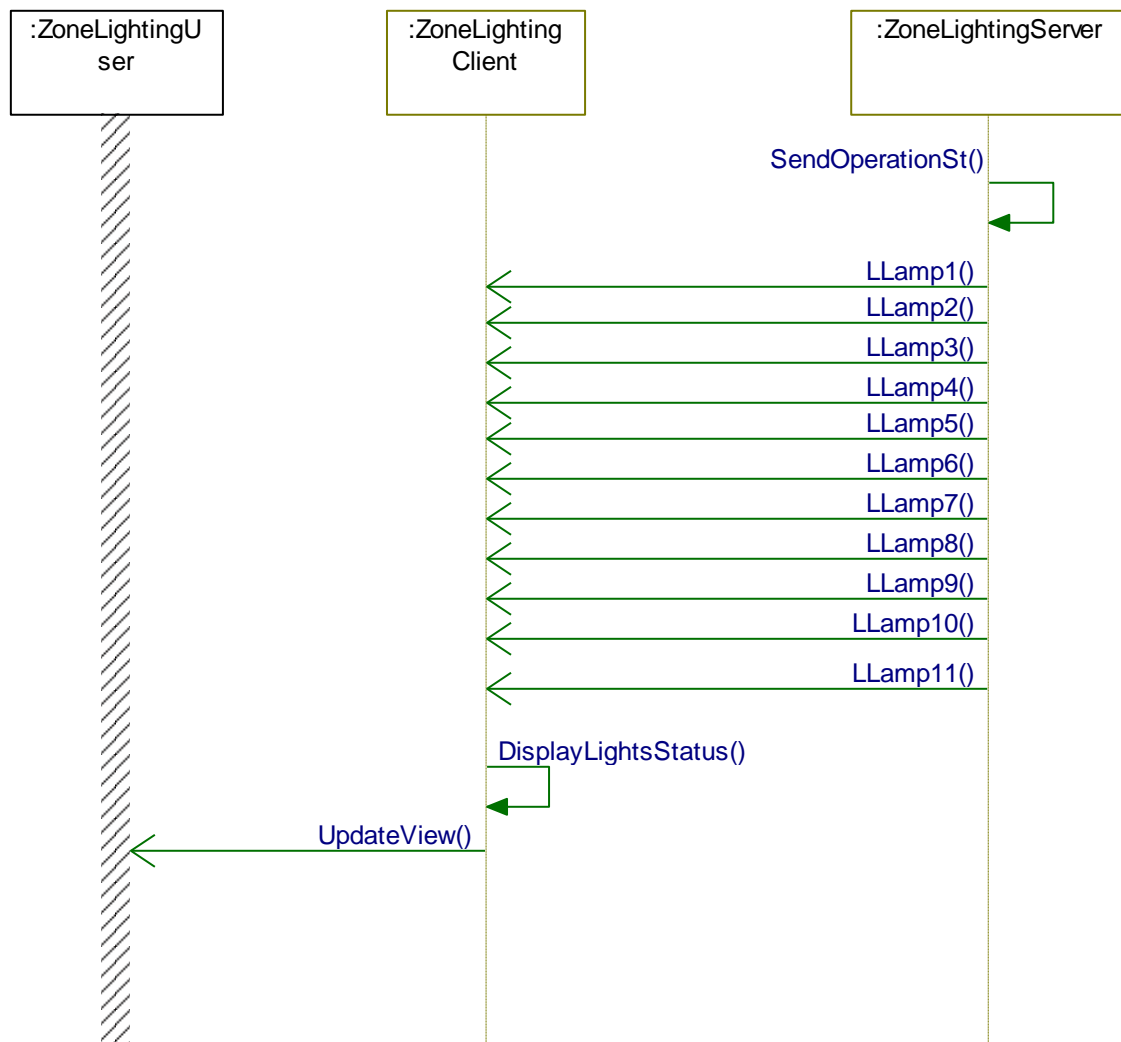
3.1.2.2 Sequence Diagram

3.1.2.2.1 LGT360-REQ-273760/C-Lighting360 Operation SD





3.1.2.2.2 LGT360-SD-REQ-295467/C-Light Status Update SD





4 Appendix

1	Driver distraction HMI Specification.