Lights - Exterior, Lucid Group Inc

Item: High Beam Assist / Adaptive Driving Beam

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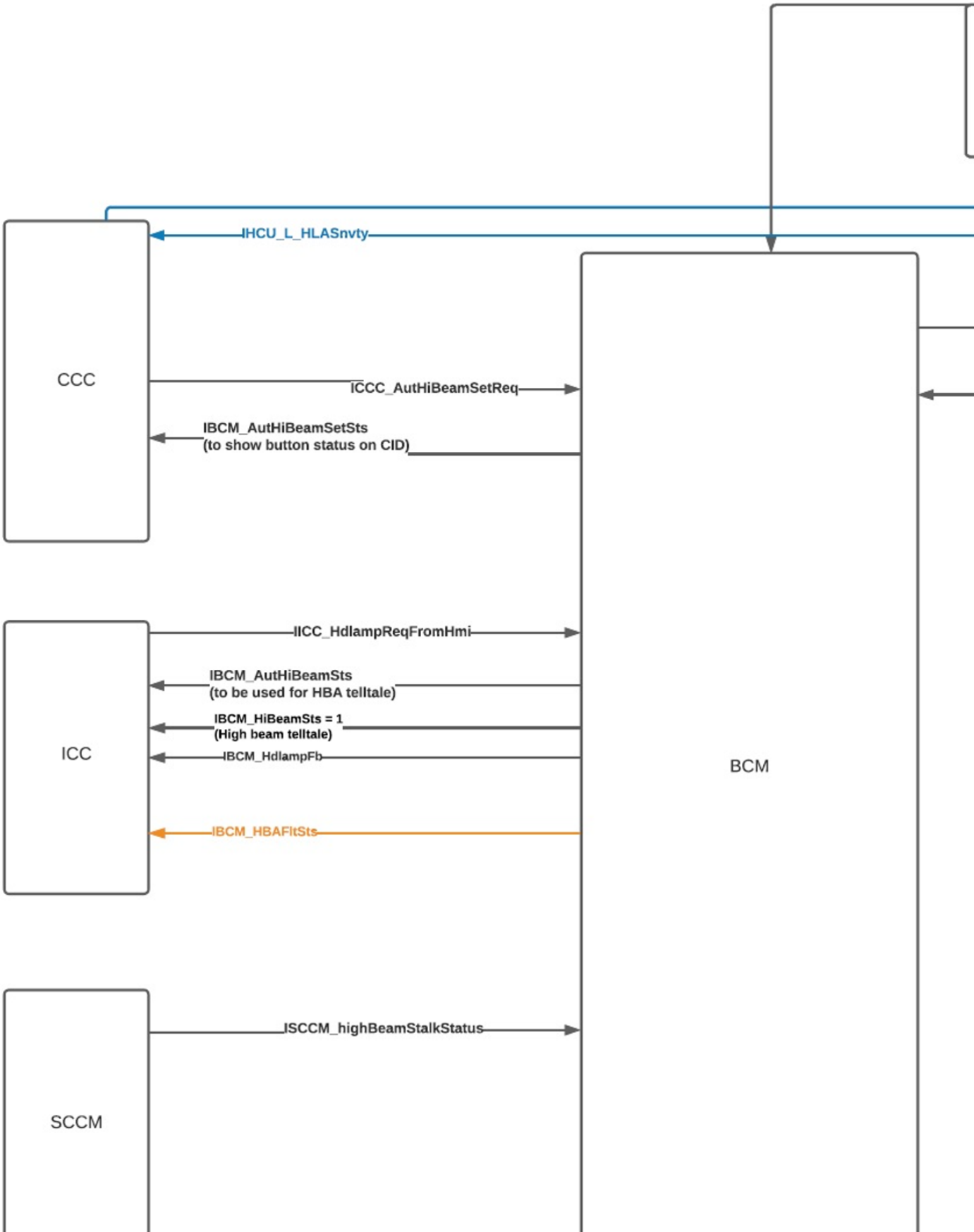
1 LIEXT-SUBSYSR-504 Overview

High Beam Assist function, i.e. automated switching between High Beam and Low Beam based on detection of oncoming or preceding vehicles from front camera.

ADB function i.e. adaptation of driving beam with up to 2 glare-free areas based on detection of oncoming or preceding vehicles from front camera.


IHCU_L_HLASnvty
CCC
ICCC_AutHiBeamSetReq
IBCM_AutHiBeamSetSts
(to show button status on CID)
IICC_HdlampReqFromHmi
IBCM_AutHiBeamSts
(to be used for HBA telltale)
IBCM_HiBeamSts = 1
(High beam telltale)
ICC
IBCM_HdlampFb
BCM
IBCM_HBAFltSts
ISCCM_highBeamStalkStatus
SCCM

ID	LIEXT-SUBSYSR-504
Current version	4
Name	Overview
Rationale	
Integration Target	S22.7
Requirement Class	Functional
L4 Component Allocation	BCM,CCC,HCU_L,HCU_R
Allocation Hardware	No
Allocation Software	No
Allocated Supplier(s)	
Release	
Status	Draft
Relationship Status	Orphan Item, Suspect Item, Missing Downstream

2 LIEXT-TXT-73 Figma

https://www.figma.com/file/HSdA2inAtWMU4k0GnFgXwu/Vehicle-Settings?node-id=278%3A247457

3 LIEXT-SUBSYSR-500 High Beam Assist user activation

When Region != EU, the CCC shall allow user to Enable / Disable **High Beam Assist**, and send this selection via [CCC_AutHiBeamSetReq].

HBA shall be enabled by default.

ID	LIEXT-SUBSYSR-500
Current version	4
Name	High Beam Assist user activation
Rationale	
Integration Target	Backlog
Requirement Class	Functional
L4 Component Allocation	CCC
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Unassigned
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

4 LIEXT-SUBSYSR-501 ADB activation

When Region == EU, the CCC shall allow user to Enable / Disable **Adaptive Driving Beam (ADB)** and send this selection via [CCC_AutHiBeamSetReq].

The ADB shall be enabled by default.

ID	LIEXT-SUBSYSR-501
Current version	4

Name	ADB activation
Rationale	
Integration Target	S22.7
Requirement Class	Functional
L4 Component Allocation	CCC
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Unassigned
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

5 LIEXT-SUBSYSR-503 ADB as an extra feature

DRAFT - not part of 22.7

When Veh_Param_ID1 == DREAM then Enabling / Disabling via [CCC_AutHiBeamSetReq] shall activate Adaptive Driving Beam (ADB).

When Veh_Param_ID1 == PURE then Enabling / Disabling via [CCC_AutHiBeamSetReq] shall activate High Beam Assist (HBA).

ID	LIEXT-SUBSYSR-503

Current version	7
Name	ADB as an extra feature
Rationale	
Integration Target	S22.7
Requirement Class	Functional
L4 Component Allocation	HCU,HCU_L,HCU_R
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

6 LIEXT-SUBSYSR-502 HBA / ADB persistance on BCM

The BCM shall store last valid selection of HBA / ADB from [CCC_AutHiBeamReq] in persistent memory and load it upon power cycle. Valid selections are [CCC_AutHiBeamReq] == 0x01 (Disable), [CCC_AutHiBeamReq] == 0x02 (Enable).

High Beam Assist / Adaptive Driving Beam setting shall be saved to the driver's user profile

ID	LIEXT-SUBSYSR-502
Current version	4
Name	HBA / ADB persistance on BCM

Rationale	
Integration Target	S22.7
Requirement Class	Functional
L4 Component Allocation	BCM
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

7 LIEXT-SUBSYSR-505 HBA / ADB persistence on CCC

The CCC shall store last valid value of [CCC_AutHiBeamReq] in persistent memory.

The CCC shall subscribe to [BCM_AutHiBeamSetSts] to know the status of the HBA/ADB from BCM and adjust the state of the UI button on CID during bootup accordingly. [BCM_AutHiBeamSetSts] shall have priority over value loaded from CCC persistence memory.

ID	LIEXT-SUBSYSR-505
Current version	3
Name	HBA / ADB persistence on CCC
Rationale	
Integration Target	S22.7

Requirement Class	Functional
L4 Component Allocation	CCC
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

8 LIEXT-SUBSYSR-506 HBA / ADB activation feedback to CCC

When [CCC_AutHiBeamSetReq] == 0x00 (Idle) or 0x03 (Reserved) the BCM shall write value loaded from persistent memory into [BCM_AutHiBeamSetSts].

When [CCC_AutHiBeamSetReq] == 0x01 (Disable) the BCM shall write to [BCM_AutHiBeamSetSts] = 0 (Disabled)

When [CCC_AutHiBeamSetReq] == 0x02 (Enable) the BCM shall write to [BCM_AutHiBeamSetSts] = 1 (Enabled)

ID	LIEXT-SUBSYSR-506
Current version	2
Name	HBA / ADB activation feedback to CCC
Rationale	
Integration Target	S22.7
Requirement Class	Functional

L4 Component Allocation	BCM
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Unassigned
Release	
Status	Draft
Relationship Status	Orphan Item, Missing Downstream

9 LIEXT-SUBSYSR-415 HBA / ADB function precondition

HCU shall monitor HBA / ADB input signals and allow activation of HBA / ADB function only if following conditions are met:

- FMC_HLAFctSts == 0x2 (RUNNING)
- FMC_HLAStsReco == 0x1 (ON) OR 0x2 (OFF)
- FMC_HLA message received periodically and without corruptions (i.e. E2E counter and CRC valid).

ID	LIEXT-SUBSYSR-415
Current version	3
Name	HBA / ADB function precondition
Rationale	
Integration Target	S2R-16
Requirement Class	Functional
L4 Component Allocation	HCU

Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Causing Suspect, Missing Downstream

10 LIEXT-SUBSYSR-416 HBA / ADB function fault status

If HBA / ADB function preconditions are not met, HCU shall set HBA status signal corresponding to left/right side HBALeSts/HBARiSts to value 0x3 (FAULT).

ID	LIEXT-SUBSYSR-416
Current version	2
Name	HBA / ADB function fault status
Rationale	
Integration Target	S21.6
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Internal

Release	
Status	Review
Relationship Status	Orphan Item, Causing Suspect, Missing Downstream

11 LIEXT-SUBSYSR-417 HBA / ADB function activation

HBA function shall be activated when IBCM_HdlampHiReq == 0x3 (HBA_On) AND HdlampReq != 0x0 (Off)

ID	LIEXT-SUBSYSR-417
Current version	3
Name	HBA / ADB function activation
Rationale	
Integration Target	S2R-16
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Causing Suspect, Missing Downstream

12 LIEXT-SUBSYSR-418 HBA / ADB function status feedback

HCU shall set HBA / ADB status signal corresponding to left/right side HBALeSts/HBARiSts to value:
- 0x0 (Off), when function is inactive
- 0x1 (On), when function is active.

ID	LIEXT-SUBSYSR-418
Current version	3
Name	HBA / ADB function status feedback
Rationale	
Integration Target	S2R-16
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Causing Suspect, Missing Downstream

13 LIEXT-SUBSYSR-521 HBA / ADB fault status feedback to CCC

When IBCM_HdlampHiReq == HDLAMP_HB_HBA and (HCUL_HbaLeSts == 0x3 (FAULT) OR HCUR_HbaRiSts == 0x3 (FAULT)) then BCM shall set IBCM_HBAFltSts = 0x1 (Faulted).

When IBCM_HdlampHiReq != HDLAMP_HB_HBA and (HCUL_HbaLeSts == 0x3 (FAULT) OR HCUR_HbaRiSts == 0x3 (FAULT)) then BCM shall set IBCM_HBAFltSts = 0x0 (No Fault).

ID	LIEXT-SUBSYSR-521
Current version	3
Name	HBA / ADB fault status feedback to CCC
Rationale	
Integration Target	S22.7
Requirement Class	Functional
L4 Component Allocation	BCM
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

14 LIEXT-SUBSYSR-419 High Beam status recommendation for HBA

When HBA is active, High Beam module shall be controlled based on FMC_HLAStsReco, i.e.:
- when FMC_HLAStsReco == 0x1 (ON), High Beam module shall be on
- when FMC_HLAStsReco == 0x2 (OFF), High Beam module shall be off.

ID	LIEXT-SUBSYSR-419
Current version	2
Name	High Beam status recommendation for HBA
Rationale	

Integration Target	S2R-16
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Causing Suspect, Missing Downstream

15 LIEXT-SUBSYSR-510 Adaptive Driving Beam status recommendation

When ADB is active, High Beam module shall be controlled based on:

- FMC_HLAStsReco

- FMC_HLABndryLeftAg_0 and FMC_HLABndryLeftAg_1

- FMC_HLABndryRightAg_0 and FMC_HLABndryRightAg_1

- FMC_HLAClosestObjDist_0 and FMC_HLAClosestObjDist_1

- FMC_HLAClosestObjSts_0 and FMC_HLAClosestObjSts_1

- FMC_HLAExistenceProb_0 and FMC_HLAExistenceProb_1

ID	LIEXT-SUBSYSR-510
Current version	4
Name	Adaptive Driving Beam status recommendation

Rationale	
Integration Target	S22.4
Requirement Class	Functional
L4 Component Allocation	HCU_L,HCU_R
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	
Release	
Status	Draft
Relationship Status	Orphan Item, Missing Downstream

16 LIEXT-SUBSYSR-420 Behavior upon HBA / ADB function fault

When HBA / ADB is requested (HdlampHiReq == 0x3 and HdlampReq != 0x0), but HBA / ADB activation preconditions are not met, system shall operate as FMC_HLAStsReco would be 0x1 (ON) and turn High Beam module on.

ID	LIEXT-SUBSYSR-420
Current version	2
Name	Behavior upon HBA / ADB function fault
Rationale	
Integration Target	S2R-16
Requirement Class	Functional
L4 Component	HCU

Allocation	
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Causing Suspect, Missing Downstream

17 LIEXT-SUBSYSR-421 HBA sensitivity setting from CCC to FMC

HCUL shall transmit periodically signal IHCU_HLASnvtyReq with value equal to last received value of signal ICCC_HLASnvtySel.

ID	LIEXT-SUBSYSR-421
Current version	1
Name	HBA sensitivity setting from CCC to FMC
Rationale	
Integration Target	S2R-16
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	Yes
Allocated	Internal

Supplier(s)	
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

18 LIEXT-SUBSYSR-422 HBA sensitivity feedback from FMC to CCC

HCUL shall transmit periodically signal IHCU_L_HLASnvty with value equal to last received value of signal IFMC_HLASnvtySts.

ID	LIEXT-SUBSYSR-422
Current version	1
Name	HBA sensitivity feedback from FMC to CCC
Rationale	
Integration Target	S2R-16
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	Yes
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

19 LIEXT-SUBSYSR-423 High Beam 'On'

HCU_L shall encode the signal IHCU_HLASts = 1 (On) when High Beam is ON

ID	LIEXT-SUBSYSR-423
Current version	1
Name	High Beam 'On'
Rationale	HCU_L and HCU_R shall coordinate internally to send out one status signal to camera. Please see https://lucidmotors.sharefile.com/home/shared/fo3d0579-86ba-4183-9a19-e788a8eca425 / OI#268_HLA_Technical_Questions_8_06.xlsx for detailed discussions with Conti
Integration Target	
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	No
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream

20 LIEXT-SUBSYSR-424 High Beam 'Off'

HCU_L shall encode the signal IHCU_HLASts = 2 (Off) when High Beam is OFF

ID	LIEXT-SUBSYSR-424
Current version	1
Name	High Beam 'Off'
Rationale	HCU_L and HCU_R shall coordinate internally to send out one status signal to camera. Please see https://lucidmotors.sharefile.com/home/shared/fo3d0579-86ba-4183-9a19-e788a8eca425 / OI#268_HLA_Technical_Questions_8_06.xlsx for detailed discussions with Conti
Integration Target	
Requirement Class	Functional
L4 Component Allocation	HCU
Allocation Hardware	No
Allocation Software	No
Allocated Supplier(s)	Internal
Release	
Status	Review
Relationship Status	Orphan Item, Missing Downstream