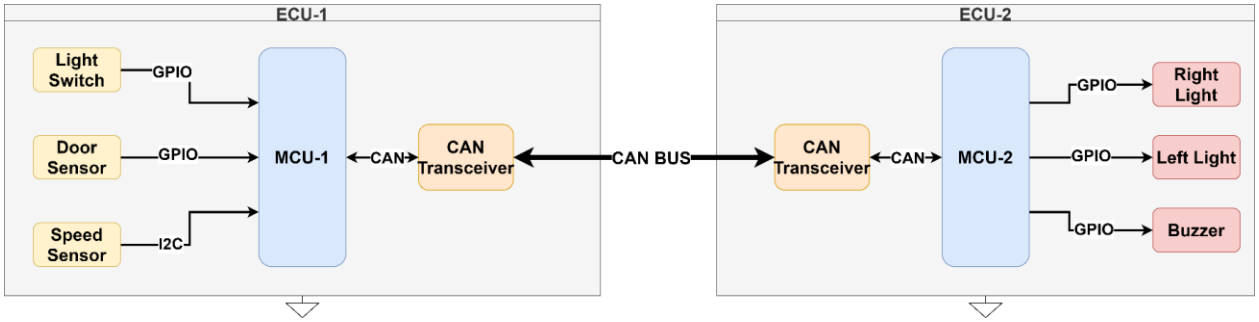
FWD Design Project

Name: Ahmed Sherif Mohamed

Contents

Static Design

System Schematic



ECU 1 API

ECU Name	ECU 1
Module name	DIO
API Name	DIO_Init
API Description	Intializes the DIO Module
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	DIO
API Name	DIO_Read
API Description	Gets Pin Value
Sync/Async	Synchrounous
Reentrancy	Reentrent
Parameters(in)	PortNum : uint8, pinNumber : uint8
Parameters (out)	pinValue : bool
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	DIO
API Name	DIO_Write
API Description	Writes Pin Value
Sync/Async	Synchrounous
Reentrancy	Reentrent
Parameters(in)	PortNum : uint8, pinNumber : uint8, value : bool
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	RCC
API Name	RCC_Init
API Description	Intializes the RCC Module
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	RCC
API Name	RCC_Enable
API Description	Enables the RCC On a periphral
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Periphral : enum
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Door
API Name	DoorSensor_SendState
API Description	Send door data to ecu2
Sync/Async	Asynchrounous
Reentrancy	None
Parameters(in)	None
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Speed
API Name	SpeedSensor_SendState
API Description	send speed data to ecu2
Sync/Async	Asynchrounous
Reentrancy	None
Parameters(in)	None
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Light
API Name	LightSwitch_SendState
API Description	send switch data to ecu2
Sync/Async	Asynchrounous
Reentrancy	None
Parameters(in)	None
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	BCM
API Name	BCM_Init
API Description	intialize bcm module
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	BCM
API Name	BCM_SendMessage
API Description	send messege through bcm
Sync/Async	Asynchrounous
Reentrancy	Reentrent
Parameters(in)	MessageId : uint8, Message : uint 32
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Canif
API Name	CanIf_Init
API Description	intitialize the canif
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Canif
API Name	CanIf_Transmit
API Description	transmit throught the canif
Sync/Async	Asynchrounous
Reentrancy	None
Parameters(in)	ID : uint16, data : uint32
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Canif
API Name	CanIf_SetTrcvMode
API Description	sets the treanceivers mode
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Mode : uint8
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Can
API Name	Can_Init
API Description	intialize can module
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 1
Module name	Can
API Name	Can_Write
API Description	write throught the can
Sync/Async	Asynchrounous
Reentrancy	Reentrent
Parameters(in)	ID : uint16, data : uint32
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU 2 API

ECU Name	ECU 2
Module name	Switch
API Name	LightSwitch_ReciveState
API Description	recive switch data to ecu2
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	None
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	Buzzer
API Name	Buzzer_Control
API Description	sends buzzer data to ecu2
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	None
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	Light
API Name	Light_Control
API Description	sends light data to ecu2
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	None
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	DIO
API Name	DIO_Init
API Description	Intializes the DIO Module
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	DIO
API Name	DIO_Read
API Description	Gets Pin Value
Sync/Async	Synchrounous
Reentrancy	Reentrent
Parameters(in)	PortNum : uint8, pinNumber : uint8
Parameters (out)	pinValue : bool
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	DIO
API Name	DIO_Write
API Description	Writes Pin Value
Sync/Async	Synchrounous
Reentrancy	Reentrent
Parameters(in)	PortNum : uint8, pinNumber : uint8, value : bool
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

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Module name	RCC
API Name	RCC_Init
API Description	Intializes the RCC Module
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Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

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Module name	RCC
API Name	RCC_Enable
API Description	Enables the RCC On a periphral
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Periphral : enum
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	BCM
API Name	BCM_Init
API Description	intialize bcm module
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	BCM
API Name	BCM_SendMessage
API Description	send messege through bcm
Sync/Async	Asynchrounous
Reentrancy	Reentrent
Parameters(in)	MessageId : uint8, Message : uint 32
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	Canif
API Name	CanIf_Init
API Description	intitialize the canif
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	Canif
API Name	CanIf_Transmit
API Description	transmit throught the canif
Sync/Async	Asynchrounous
Reentrancy	None
Parameters(in)	ID : uint16, data : uint32
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	Canif
API Name	CanIf_SetTrcvMode
API Description	sets the treanceivers mode
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Mode : uint8
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	Can
API Name	Can_Init
API Description	intialize can module
Sync/Async	Synchrounous
Reentrancy	None
Parameters(in)	Configuration : Struct
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

ECU Name	ECU 2
Module name	Can
API Name	Can_Write
API Description	write throught the can
Sync/Async	Asynchrounous
Reentrancy	Reentrent
Parameters(in)	ID : uint16, data : uint32
Parameters (out)	None
Parameters(in/out)	None
Return Type	errorr_t

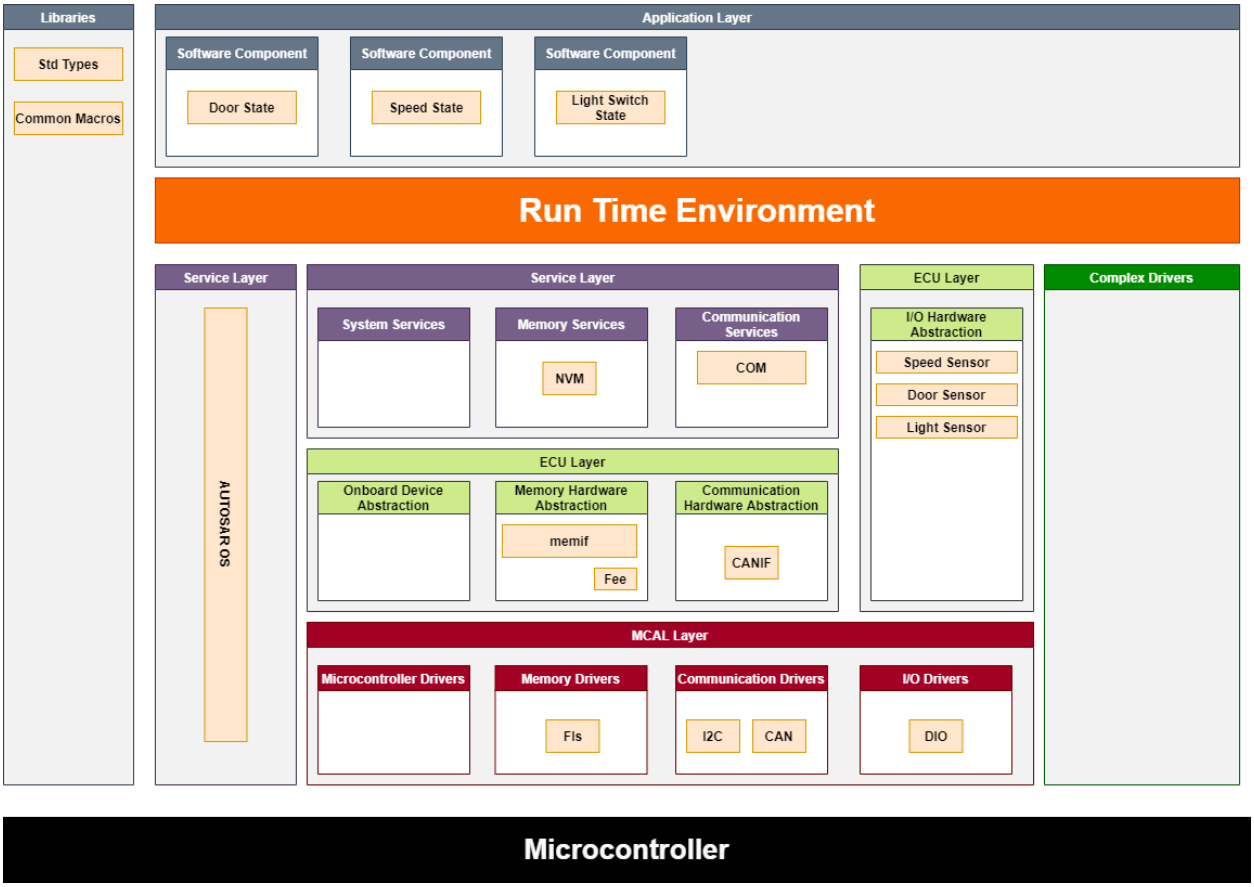
ECU 1 Typedefs used

typedef	DoorStatus	uint8
typedef	SpeedValue	uint16
typedef	DioChannelType	uint11
typedef	DioChannelType	uint8

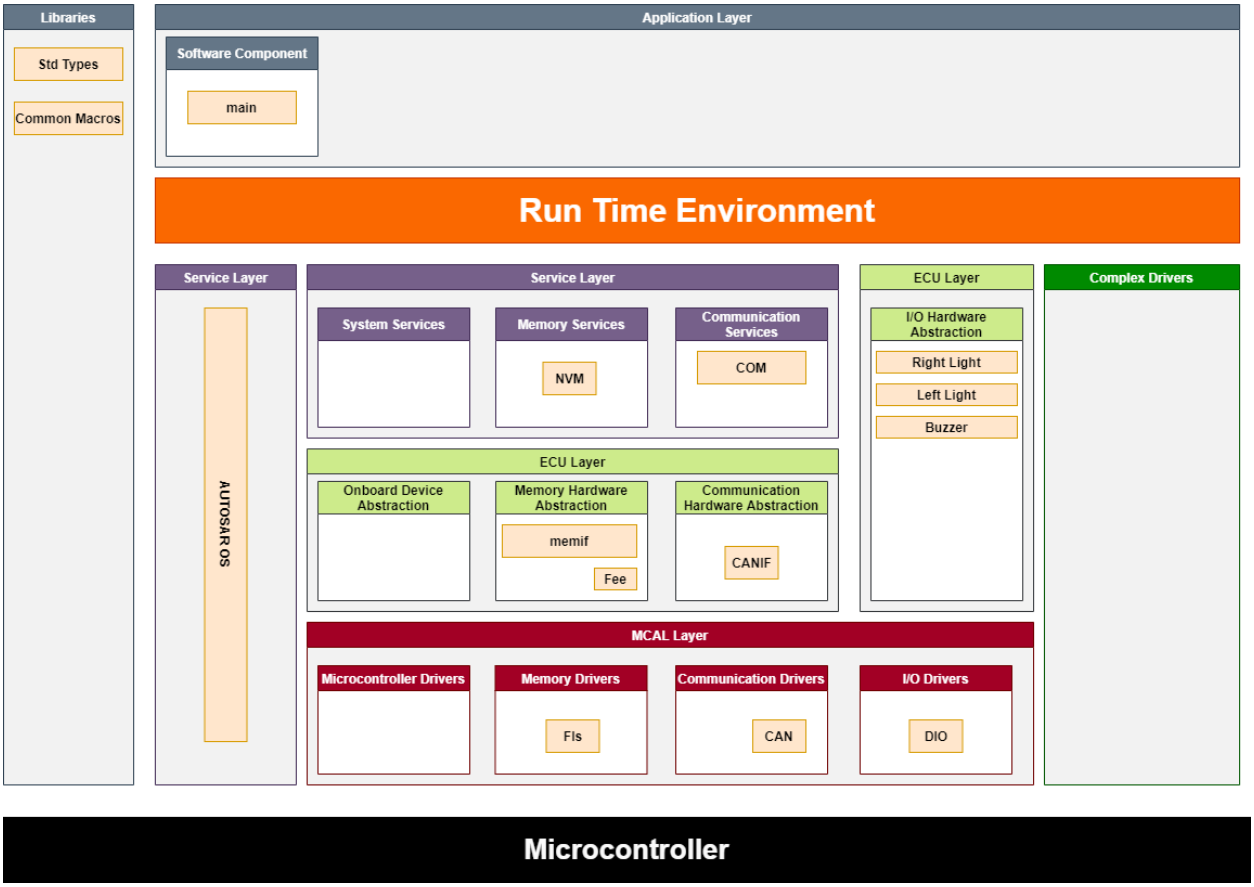
ECU 2 Typedefs

typedef	DioChannelType	uint8
typedef	LightLevelType	uint9
typedef	BuzzerLevelType	uint10
typedef	DioChannelType	uint11

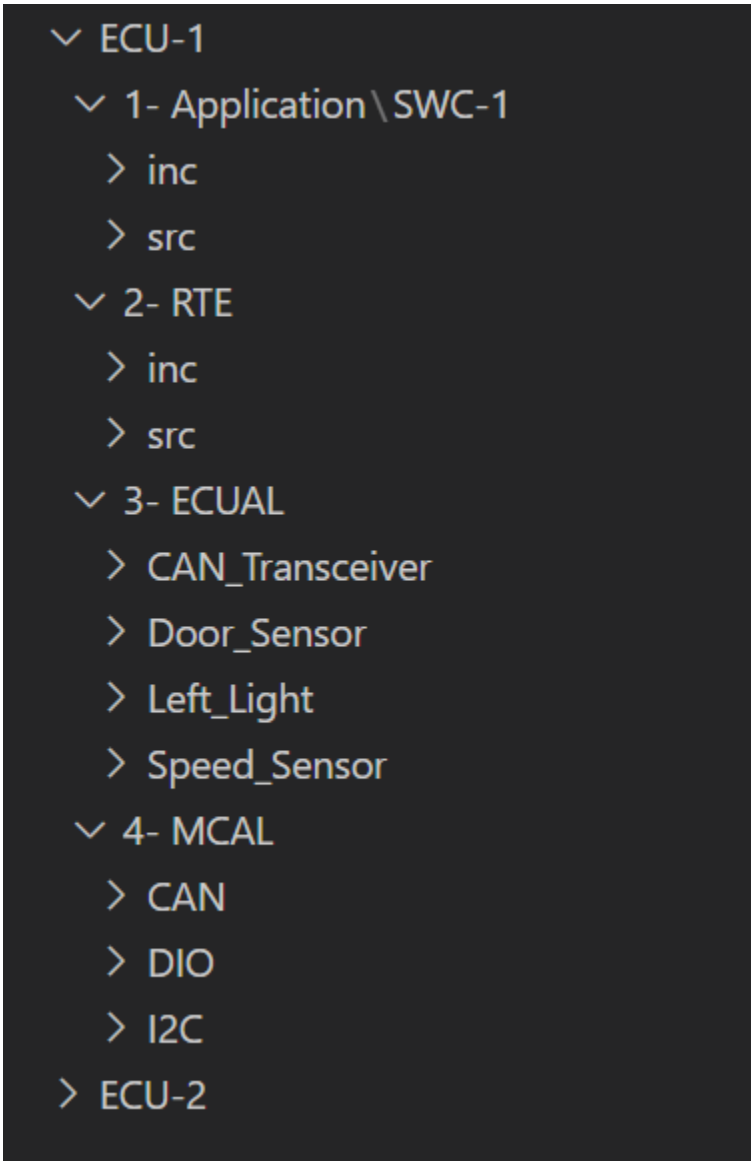
ECU 1 Layered Architecture



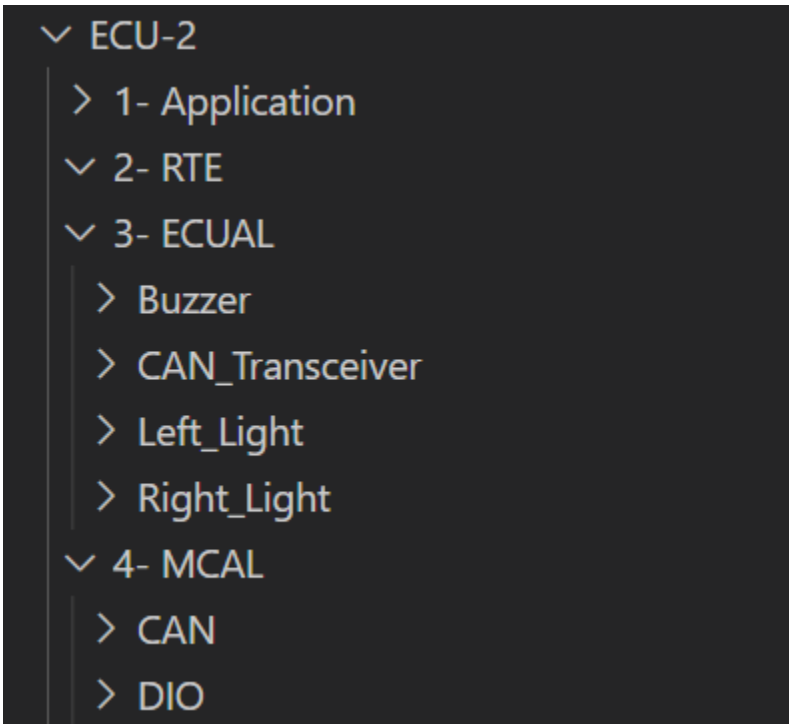
ECU 2 Layered Architecture



ECU 1 Folder Structure

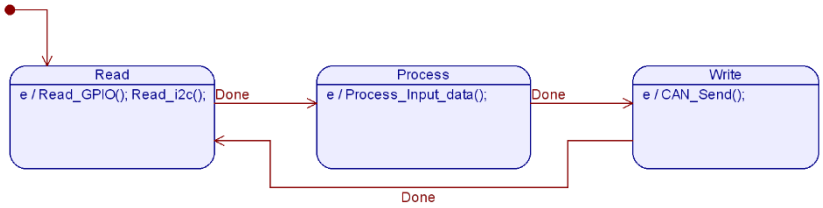


ECU 2 Folder Structure

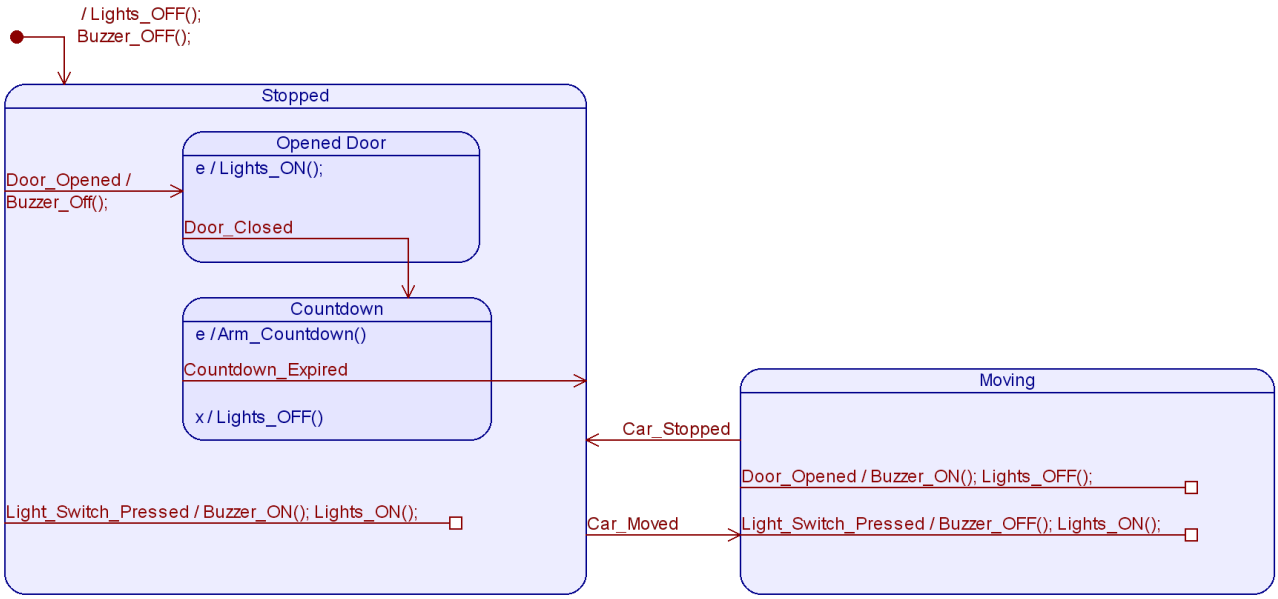


Dynamic Design

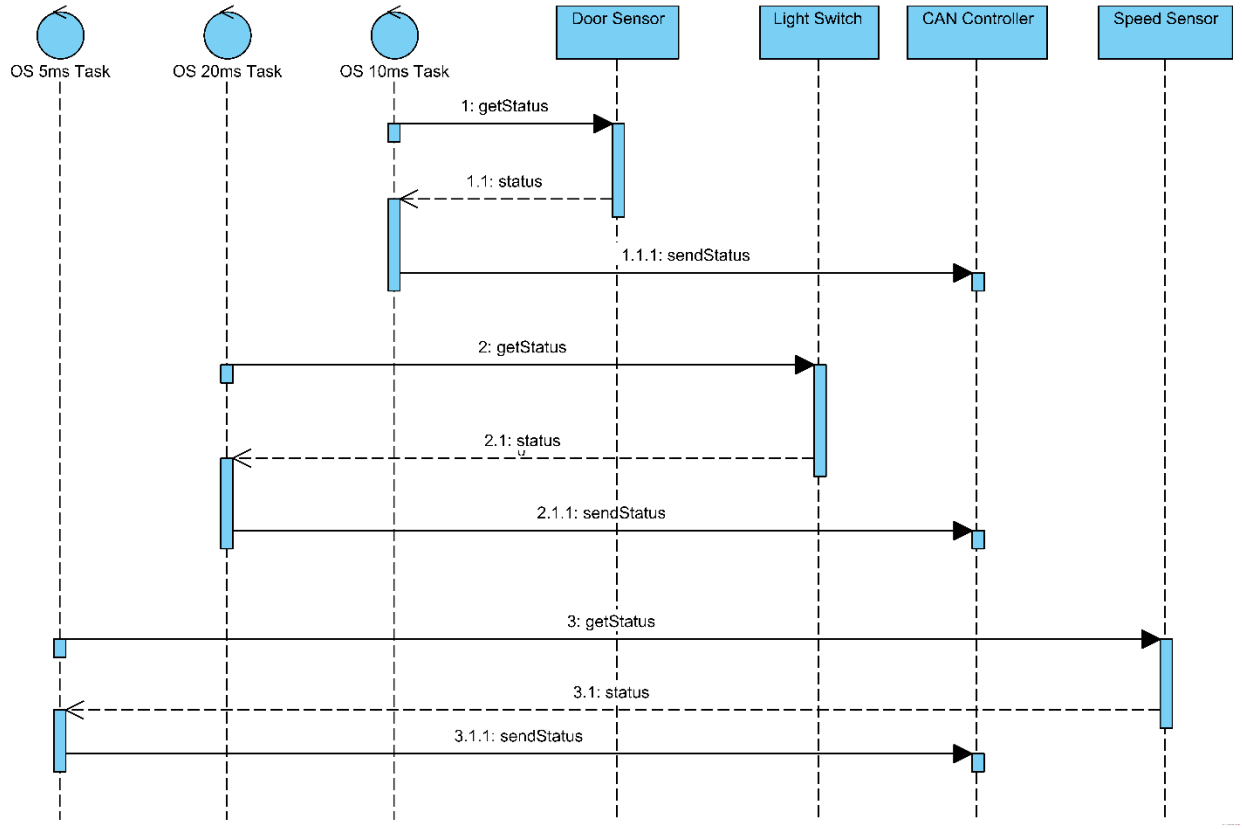
ECU 1 State Machine



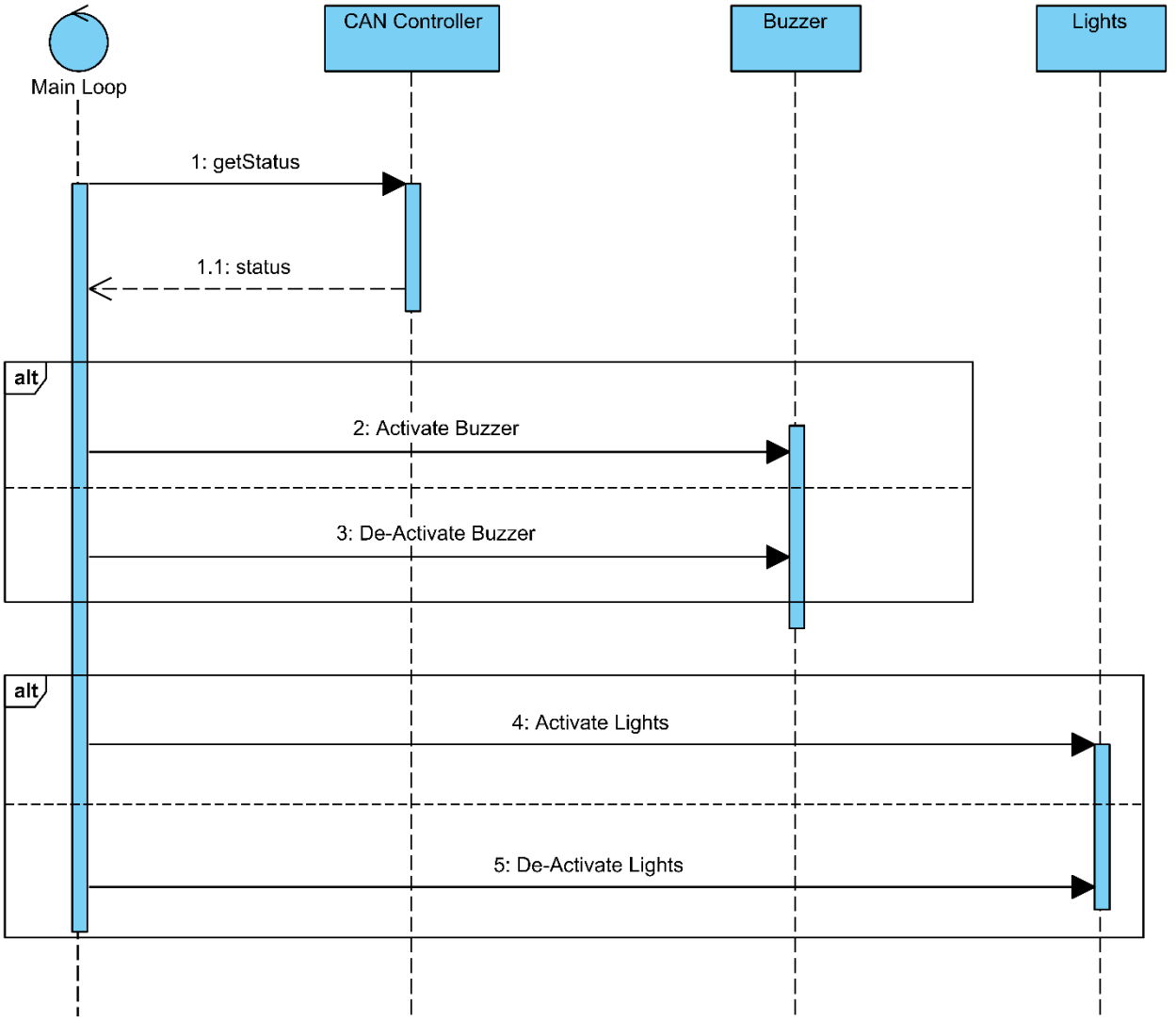
ECU 2 State Machine



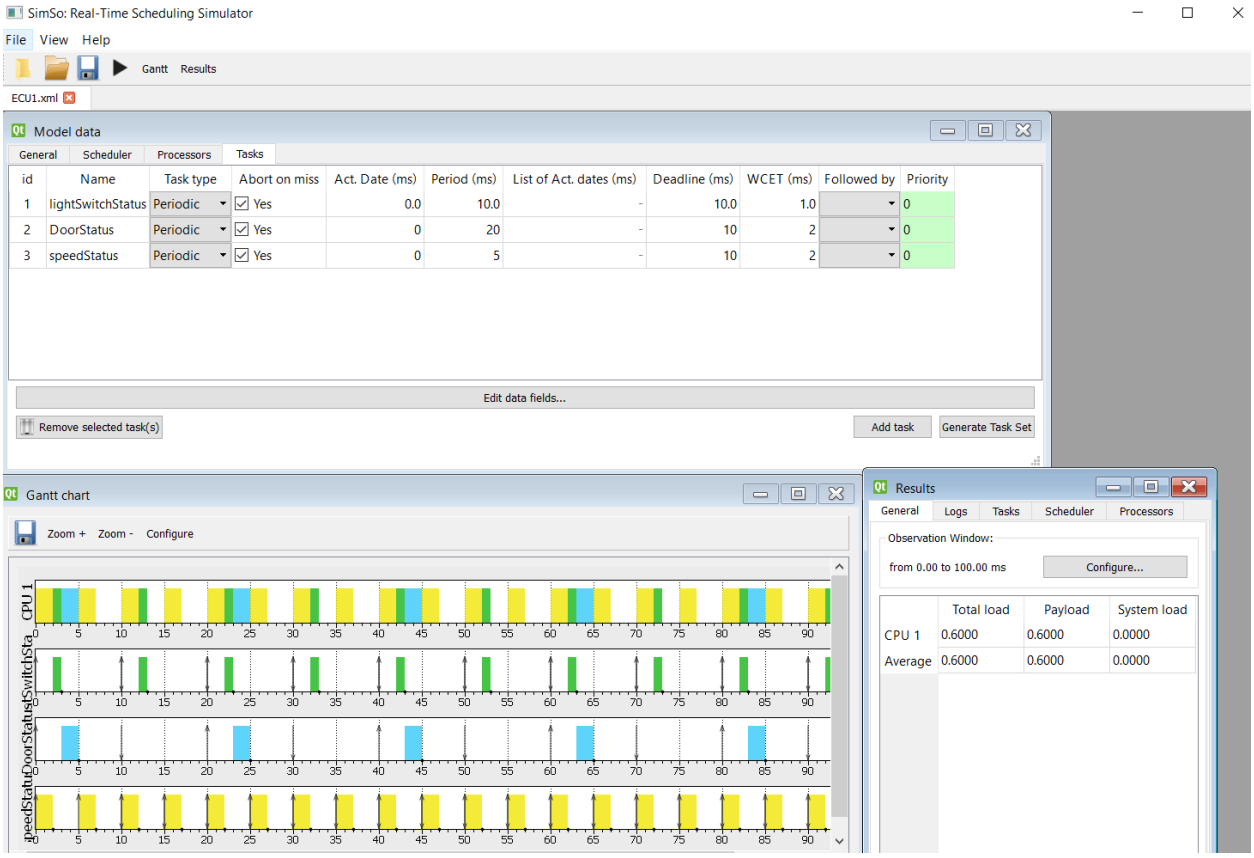
ECU 1 Sequence Diagram



ECU 2 Sequence Diagram



CPU Load


SimSo: Real-Time Scheduling Simulator
File View Help
Gantt Results
ECU1.xml
Model data
General Scheduler Processors Tasks
id Name Task type Abort on miss Act. Date (ms) Period (ms) List of Act. dates (ms) Deadline (ms) WCET (ms) Followed by Priority
1 lightSwitchStatus Periodic Yes 0.0 10.0 - 10.0 1.0 0
2 DoorStatus Periodic Yes 0 20 - 10 2 0
3 speedStatus Periodic Yes 0 5 - 10 2 0
Edit data fields...
Remove selected task(s)
Add task
Generate Task Set
Gantt chart
Zoom + Zoom - Configure
CPU 1
lightSwitchSta
DoorStatus
speedStatus
Results
General Logs Tasks Scheduler Processors
Observation Window:
from 0.00 to 100.00 ms
Configure...
Total load Payload System load
CPU 1 0.6000 0.6000 0.0000
Average 0.6000 0.6000 0.0000

Bus Load Calculation

Bus Load = Total bits / 12500 = 32 / 125000 = 0.000256 = 0.0256%