# Mode Management Function

## *Scade model description*

**Summary:**
Generated documentation from the Scade model of Mode Management Function.

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**Authors:** Marielle Petit-Doche
**Reference:** openETCS - WP3
**Index:** <index>
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**Distribution List:** <distribution list>

<Corporate Info>

# Table Of Contents

<Corporate Info>

<Corporate Info>

<Corporate Info>

<Corporate Info>

<Corporate Info>

<Corporate Info>

# List Of Figures

<Corporate Info>

<Corporate Info>

# List Of Tables

<Corporate Info>

<Corporate Info>

<Corporate Info>

<Corporate Info>

# 1.  General Project Description

<description>

<Corporate Info>

# 2.  Software Architecture

## 2.1. Project Architecture

This section displays the package hierarchy of projects.

Project Modes
        Conditions
        Interfaces
        Librairies
        PriorityManagement
        Procedures

## 2.2. Call Graph

This Call Graph displays the dependency tree of model operators.

1. ManageModes
    1.1. ComputeModesConditions
        1.1.1. Conditions::ToFullSupervision
        1.1.2. Conditions::ToIsolate
        1.1.3. Conditions::ToNonLeading
        1.1.4. Conditions::ToNoPower
        1.1.5. Conditions::ToPassiveShunting
        1.1.6. Conditions::ToShunting
            1.1.6.1. Procedures::Procedure_SH_Initiated_By_Driver
                1.1.6.1.1. Procedures::SH_Initiated_By_Driver_On
            1.1.6.2. Procedures::Procedure_SH_Ordered_By_Track
                1.1.6.2.1. Procedures::Procedure_With_Mode_Profile
                    1.1.6.2.1.1. Librairies::Mode_Profile_Calculations
                        1.1.6.2.1.1.1. Librairies::Position_In_Ack_Area
                        1.1.6.2.1.1.2. Librairies::Position_In_Area
                    1.1.6.2.1.2. pwlinear::Counter
        1.1.7. Conditions::ToSleeping
        1.1.8. Conditions::ToStaffResponsible
        1.1.9. Conditions::ToStandBy
        1.1.10. Conditions::ToSystemFailure
        1.1.11. Conditions::ToSystemNational
        1.1.12. Conditions::ToTrip
        1.1.13. Conditions::ToUnfitted
        1.1.14. Merge_Conditions
        1.1.15. Procedures::Procedure_LimitedSupervision
            1.1.15.1. Librairies::Mode_Profile_Calculations
                1.1.15.1.1. Librairies::Position_In_Ack_Area
                1.1.15.1.2. Librairies::Position_In_Area
            1.1.15.2. Procedures::Procedure_With_Mode_Profile
                1.1.15.2.1. Librairies::Mode_Profile_Calculations
                    1.1.15.2.1.1. Librairies::Position_In_Ack_Area
                    1.1.15.2.1.2. Librairies::Position_In_Area
                1.1.15.2.2. pwlinear::Counter
        1.1.16. Procedures::Procedure_OnSight

<Corporate Info>

<Corporate Info>

# 3. Modes Project

## 3.1. Root Elements

### 3.1.1.    Open Packages

- TrainPosition_Types_Pck

### 3.1.2.    ComputeModesConditions Operator

Declared as **public node**

### 3.1.2.1.    Interface

**Table 1: Inputs of ComputeModesConditions**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Current_Level | M_LEVEL | last | M_LEVEL_Level_0 | |
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | | | |
| Train_Permitted_NL | bool | | | |
| Train_Permitted_PS | bool | | | |
| Train_Req_SL | bool | | | |
| All_Desks_Closed | bool | | | |
| Desk_Open | bool | | | |
| OnBoard_Powered | bool | | | |
| Valid_Train_Data_Stored | bool | | | |
| Driver_Ack_LS | bool | | | |
| Driver_Ack_OS | bool | | | |
| Driver_Ack_RV | bool | | | |
| Driver_Ack_SH | bool | | | |
| Driver_Ack_SN | bool | | | |
| Driver_Ack_SR | bool | | | |
| Driver_Ack_TR | bool | | | |
| Driver_Ack_UN | bool | | | |
| Driver_Req_Exit_SH | bool | | | |
| Driver_Req_NL | bool | | | |
| Driver_Req_Override | bool | | | |
| Driver_Req_SH | bool | | | |
| Driver_Req_Start | bool | | | |
| ETCS_Isolated | bool | | | |
| MA_SSP_Gradiant_Available | bool | | | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | | | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|------|------|------------|---|--------------------------|
| Shunting_Granted_By_RBC | bool | | | |
| Trip_Order_Given_By_Balise | bool | | | |
| List_BG_Related_To_SR_Empty | bool | | | |
| Stop_If_In_Shunting | bool | | | |
| Stop_If_In_SR | bool | | | |
| RBC_Ack_And_EB_Revocked | bool | | | |
| RBC_Authorized_SR | bool | | | |
| Reversing_Data | Level_And_Mode_Types_Pkg::T_Reversing_Data | | | |
| Emergency_Stop_Message_Received | bool | | | |
| Estimated_Front_End_Overpass_SR_Distance | bool | | | |
| Estimated_Front_End_Rear_Location_SSP_Or_Gradient | bool | | | |
| Override_Function_Active | bool | last | false | |
| Train_Overpass_EOA_Antenna | bool | last | false | |
| Train_Overpass_EOA_Front_End | bool | | | |
| Train_Speed_Under_Override_Limit | bool | | | |
| BG_In_Expected_List_In_SR | bool | | | |
| BG_In_Expected_List_In_SH | bool | | | |
| Linked_BG_Pased_In_Wrong_Direction | bool | | | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | | | |
| Train_Speed | Obu_BasicTypes_Pkg::Speed_T | | | |
| Train_Standstill | bool | | | |
| Interface_To_National_System | bool | | | |
| National_Trip_Order | bool | | | |
| T_NVCONTACT_Overpass | bool | | | |
| Error_BG_System_Version | bool | | | |
| Failure_Occured | bool | last | false | |
| Continue_Shunting_Function_Active | bool | | | |
| Stop_Shunting_Stored | bool | | | |
| Linking_Reaction_To_Trip | bool | | | |

<Corporate Info>

| Name | Type | Properties | Comments and Information |
|---|---|---|---|
| TripModeFromLevel | bool | | |

**Table 2: Outputs of ComputeModesConditions**

| Name | Type | Properties | Comments and Information |
|---|---|---|---|
| Condition1 | bool | | |
| Condition2 | bool | | |
| Condition3 | bool | | |
| Condition4 | bool | | |
| Condition5 | bool | | |
| Condition6 | bool | | |
| Condition7 | bool | | |
| Condition8 | bool | | |
| Condition10 | bool | | |
| Condition13 | bool | | |
| Condition14 | bool | | |
| Condition15 | bool | | |
| Condition19 | bool | | |
| Condition21 | bool | | |
| Condition22 | bool | | |
| Condition23 | bool | | |
| Condition25 | bool | | |
| Condition26 | bool | | |
| Condition27 | bool | | |
| Condition28 | bool | | |
| Condition29 | bool | | |
| Condition30 | bool | | |
| Condition31 | bool | | |
| Condition32 | bool | | |
| Condition34 | bool | | |
| Condition37 | bool | | |
| Condition40 | bool | | |
| Condition44 | bool | | |
| Condition45 | bool | | |
| Condition46 | bool | | |
| Condition47 | bool | | |
| Condition50 | bool | | |
| Condition51 | bool | | |
| Condition56 | bool | | |
| Condition58 | bool | | |
| Condition59 | bool | | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Condition60 | bool | | | |
| Condition61 | bool | | | |
| Condition62 | bool | | | |
| Condition63 | bool | | | |
| Condition68 | bool | | | |
| Condition70 | bool | | | |
| Condition71 | bool | | | |
| Condition72 | bool | | | |
| Condition73 | bool | | | |
| Condition74 | bool | | | |
| Condition_Trip | bool | | | |
| Ack_LS_Req_To_Driver | bool | | | |
| Ack_OS_Req_To_Driver | bool | | | |
| Ack_RV_Req_To_Driver | bool | | | |
| Ack_SH_Req_To_Driver | bool | | | |
| Ack_SN_Req_To_Driver | bool | | | |
| Ack_SR_Req_To_Driver | bool | | | |
| Ack_TR_Req_To_Driver | bool | | | |
| Ack_UN_Req_To_Driver | bool | | | |
| Clean_BG_List_SH_Area | bool | | | |
| EB_Requested | bool | | | |
| End_Of_Mission_Procedure_Req | bool | last | true | |
| MA_Req_To_RBC | bool | | | |
| Request_For_SH_To_RBC | bool | | | |
| Service_Brake_Command | bool | | | |
| SH_Refused_By_RBC_To_DMI | bool | | | |

### 3.1.2.2.     Locals

**Table 3: Locals of ComputeModesConditions**

| Name | Type | Properties | Comments and Information |
|---|---|---|---|
| Condition_to_Trip | bool | | |
| Loc_Ack_LS_Req_To_Driver_LS | bool | | |
| Loc_Ack_LS_Req_To_Driver_SoM | bool | | |

<Corporate Info>

| Name | Type | Properties | Comments and Information |
|---|---|---|---|
| Loc_Ack_LS_Req_To_Driver_TR | bool | | |
| Loc_Ack_OS_Req_To_Driver_OS | bool | | |
| Loc_Ack_OS_Req_To_Driver_SoM | bool | | |
| Loc_Ack_OS_Req_To_Driver_TR | bool | | |
| Loc_Ack_SH_Req_To_Driver_SH | bool | | |
| Loc_Ack_SH_Req_To_Driver_SoM | bool | | |
| Loc_Ack_SH_Req_To_Driver_TR | bool | | |
| Loc_Ack_SR_Req_To_Driver_SoM | bool | | |
| Loc_Ack_SR_Req_To_Driver_TR | bool | | |
| Loc_Clean_BG_List_Of_SoM | bool | | |
| Loc_Clean_BG_List_SH_Area_SH | bool | | |
| Loc_Clean_BG_List_SH_Area_TR | bool | | |
| Loc_Cond_15_OS | bool | | |
| Loc_Cond_15_SoM | bool | | |
| Loc_Cond_15_TR | bool | | |
| Loc_Cond_31_FS | bool | | |
| Loc_Cond_31_TR | bool | | |
| Loc_Cond_46_NL | bool | | |
| Loc_Cond_46_SoM | bool | | |
| Loc_Cond_50_SH | bool | | |
| Loc_Cond_50_SoM | bool | | |
| Loc_Cond_50_TR | bool | | |
| Loc_Cond_5_SH | bool | | |
| Loc_Cond_5_SoM | bool | | |
| Loc_Cond_5_TR | bool | | |
| Loc_Cond_6_SH | bool | | |
| Loc_Cond_6_SoM | bool | | |
| Loc_Cond_6_TR | bool | | |
| Loc_Cond_70_LS | bool | | |
| Loc_Cond_70_SoM | bool | | |
| Loc_Cond_70_TR | bool | | |
| Loc_Cond_8_SoM | bool | | |
| Loc_Cond_8_TR | bool | | |
| Loc_End_Of_Mission_Procedure_Req_SB | bool | | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|------|------|------------|---|--------------------------|
| Loc_End_Of_Mission_Procedure_Req_SH | bool | | | |
| Loc_End_Of_Mission_Procedure_Req_SoM | bool | | | |
| Loc_End_Of_Mission_Procedure_Req_TR | bool | | | |
| Loc_MA_Req_To_RBC_SoM | bool | | | |
| Loc_MA_Req_To_RBC_TR | bool | | | |
| Loc_Request_For_SH_To_RBC_SH | bool | | | |
| Loc_Request_For_SH_To_RBC_SoM | bool | | | |
| Loc_Request_For_SH_To_RBC_TR | bool | | | |
| Loc_Service_Brake_Command_LS | bool | | | |
| Loc_Service_Brake_Command_OS | bool | | | |
| Loc_Service_Brake_Command_SH | bool | | | |
| Loc_SH_Refused_By_RBC_To_DMI_SH | bool | | | |
| Loc_SH_Refused_By_RBC_To_DMI_SoM | bool | | | |
| Loc_SH_Refused_By_RBC_To_DMI_TR | bool | | | |
| On_Going_Mission | bool | last | false | |

## 3.1.2.3.    Operator Hierarchy

<u>diagram</u> : diagram_ComputeModesConditions_1

## 3.1.2.4.    Graphical and Textual Diagrams

3.1.2.4.1.    View of diagram_ComputeModesConditions_1 (ComputeModesConditions)
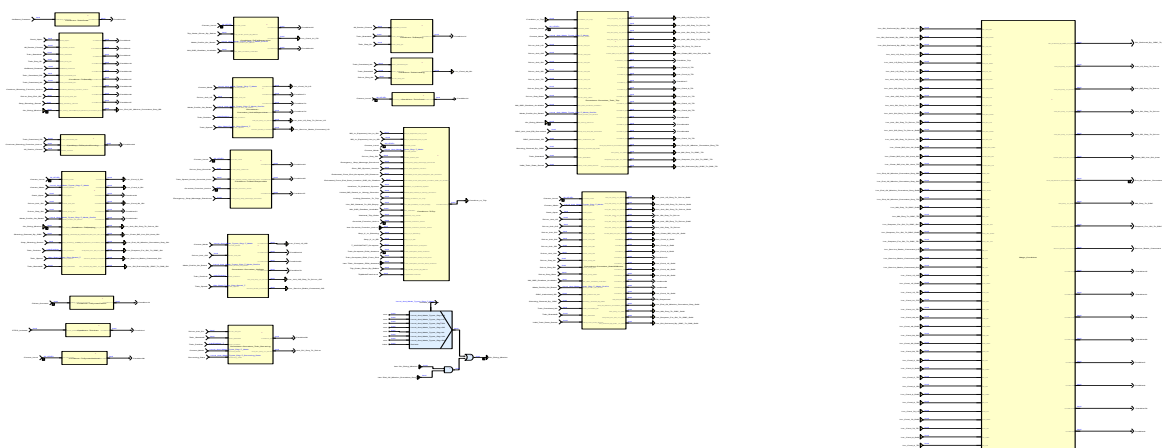


**Figure 1: View of diagram_ComputeModesConditions_1 (ComputeModesConditions)**

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## 3.1.3.        ManageModes Operator

Declared as **`public node`**

### 3.1.3.1.        Comments and Information

**ManageModes Comments:**
Root operator shared in for parts :
- the inputs management
- Computation of Mode conditions: this part covers the computation of conditions according to   subset 26 §4.6.3 and procedure related to mode mangement in § 5. Computation of conditions are organized by procedure and mode to reach (by line of of table in §4.6.2)
- SwitchMode: this part selects the new mode according conditions and priorities given in §4.6.2 : from each mode, the new mode is calculated (by column of table 4.6.2).
- the outputs management

### 3.1.3.2.        Interface

**Table 4: Inputs of ManageModes**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Current_Level | M_LEVEL | |
| Cab | TIU_Types_Pkg::cab_ID_T | |
| Data_From_DMI | Level_And_Mode_Types_Pkg::T_Data_From_DMI | |
| Data_From_F2_Functions | Level_And_Mode_Types_Pkg::T_Data_From_F2_functions | |
| Data_From_Localisation | Level_And_Mode_Types_Pkg::T_Data_From_Localisation | |
| Data_From_Speed_and_Supervision | Level_And_Mode_Types_Pkg::T_Data_From_Speed_Supervision | |
| Data_From_STM | Level_And_Mode_Types_Pkg::T_Data_From_STM | |
| Data_From_TIU | TIU_Types_Pkg::Message_Train_Interface_to_EVC_T | |
| Data_From_Track | Level_And_Mode_Types_Pkg::T_Data_From_Track_To_Mode | |
| TripModeFromLevel | bool | |

**Table 5: Outputs of ManageModes**

| Name | Type | Properties | | Comments and Information |
|------|------|------------|---|--------------------------|
| currentMode | Level_And_Mode_Types_Pkg::T_Mode | default | Level_And_Mode_Types_Pkg::SB | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|------|------|-----------|---|--------------------------|
|  |  | last | Level_And_Mode_Types_Pkg::SB |  |
| EB_Requested | bool |  |  |  |
| Service_Brake_Command | bool |  |  |  |
| Data_To_DMI | Level_And_Mode_Types_Pkg::T_Data_To_DMI |  |  |  |
| Data_To_BG_Management | Level_And_Mode_Types_Pkg::T_Data_To_BG_Management |  |  |  |

### 3.1.3.3.      Operator Hierarchy

<u>diagram</u> : diagram_ManageModes_1

### 3.1.3.4.      Graphical and Textual Diagrams

#### 3.1.3.4.1.      View of diagram_ManageModes_1 (ManageModes)
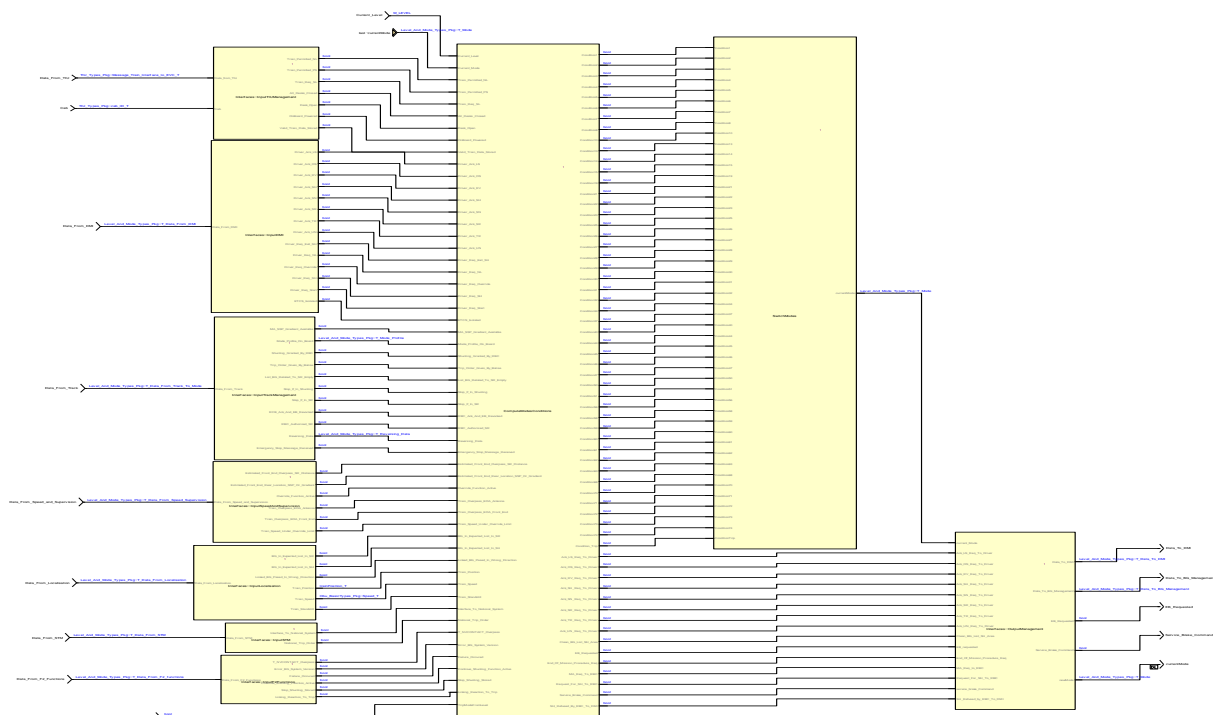


**Figure 2: View of diagram_ManageModes_1 (ManageModes)**

### 3.1.4.      Merge_Conditions Operator

Declared as **public function**

<Corporate Info>

## 3.1.4.1.   Interface

**Table 6: Inputs of Merge_Conditions**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| SH_Ref_SH | bool | |
| SH_Ref_SoM | bool | |
| SH_ref_TR | bool | |
| Ack_LS_LS | bool | |
| Ack_LS_SoM | bool | |
| Ack_LS_TR | bool | |
| Ack_OS_OS | bool | |
| Ack_OS_SoM | bool | |
| Ack_OS_TR | bool | |
| Ack_SH_SH | bool | |
| Ack_SH_SoM | bool | |
| Ack_SH_TR | bool | |
| Ack_SR_SoM | bool | |
| Ack_SR_TR | bool | |
| Clean_BG_SoM | bool | |
| Clean_BG_SH | bool | |
| Clean_BG_TR | bool | |
| EoM_SB | bool | |
| EoM_SH | bool | |
| EoM_SoM | bool | |
| EoM_TR | bool | |
| MA_SoM | bool | |
| MA_TR | bool | |
| Req_SH_SH | bool | |
| Req_SH_SoM | bool | |
| Req_SH_TR | bool | |
| SB_LS | bool | |
| SB_OS | bool | |
| SB_SH | bool | |
| C15_OS | bool | |
| C15_SoM | bool | |
| C15_TR | bool | |
| C31_FS | bool | |
| C31_TR | bool | |
| C46_NL | bool | |
| C46_SoM | bool | |
| C50_SH | bool | |
| C50_SoM | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|---|---|---|
| C50_TR | bool | |
| C5_SH | bool | |
| C5_SoM | bool | |
| C5_TR | bool | |
| C6_SH | bool | |
| C6_SoM | bool | |
| C6_TR | bool | |
| C70_LS | bool | |
| C70_SoM | bool | |
| C70_TR | bool | |
| C8_SoM | bool | |
| C8_TR | bool | |

**Table 7: Outputs of Merge_Conditions**

| Name | Type | Comments and Information |
|---|---|---|
| SH_Refused_By_RBC_To_DMI | bool | |
| Ack_LS_Req_To_Driver | bool | |
| Ack_OS_Req_To_Driver | bool | |
| Ack_SH_Req_To_Driver | bool | |
| Ack_SR_Req_To_Driver | bool | |
| Clean_BG_List_SH_Area | bool | |
| End_Of_Mission_Procedure_Req | bool | |
| MA_Req_To_RBC | bool | |
| Request_For_SH_To_RBC | bool | |
| Service_Brake_Command | bool | |
| Condition15 | bool | |
| Condition31 | bool | |
| Condition46 | bool | |
| Condition50 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition70 | bool | |
| Condition8 | bool | |

## 3.1.4.2. Operator Hierarchy

diagram : diagram_Operator44_1

## 3.1.4.3.  Graphical and Textual Diagrams

### 3.1.4.3.1.  View of diagram_Operator44_1 (Merge_Conditions)



**Figure 3: View of diagram_Operator44_1 (Merge_Conditions)**

## 3.1.5.  SwitchModes Operator

Declared as **public node**

### 3.1.5.1.  Interface

**Table 8: Inputs of SwitchModes**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition2 | bool | |
| Condition3 | bool | |
| Condition4 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition7 | bool | |
| Condition8 | bool | |
| Condition10 | bool | |
| Condition13 | bool | |
| Condition14 | bool | |
| Condition15 | bool | |
| Condition19 | bool | |
| Condition21 | bool | |
| Condition22 | bool | |
| Condition23 | bool | |
| Condition25 | bool | |
| Condition26 | bool | |
| Condition27 | bool | |
| Condition28 | bool | |

| Name | Type | Comments and Information |
|---|---|---|
| Condition29 | bool | |
| Condition30 | bool | |
| Condition31 | bool | |
| Condition32 | bool | |
| Condition34 | bool | |
| Condition37 | bool | |
| Condition40 | bool | |
| Condition44 | bool | |
| Condition45 | bool | |
| Condition46 | bool | |
| Condition47 | bool | |
| Condition50 | bool | |
| Condition51 | bool | |
| Condition56 | bool | |
| Condition58 | bool | |
| Condition59 | bool | |
| Condition60 | bool | |
| Condition61 | bool | |
| Condition62 | bool | |
| Condition63 | bool | |
| Condition68 | bool | |
| Condition70 | bool | |
| Condition71 | bool | |
| Condition72 | bool | |
| Condition73 | bool | |
| Condition74 | bool | |
| ConditionTrip | bool | |

**Table 9: Outputs of SwitchModes**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| currentMode | Level_And_Mode_Types_Pkg::T_Mode | default | Level_And_Mode_Types_Pkg::SB | |
| | | last | Level_And_Mode_Types_Pkg::SB | |

## 3.1.5.2.     Locals

**Table 10: Locals of SwitchModes**

| Name | Type | Properties | Comments and Information |
|---|---|---|---|
| FromFS | Level_And_Mode_Types_Pkg::T_Mode | | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| FromLS | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromNL | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromNP | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromOS | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromPS | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromPT | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromRV | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromSB | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromSF | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromSH | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromSL | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromSN | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromSR | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromTR | Level_And_Mode_Types_Pkg::T_Mode | | | |
| FromUN | Level_And_Mode_Types_Pkg::T_Mode | | | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | default | Level_And_Mode_Types_Pkg::SB | |

### 3.1.5.3.     Operator Hierarchy

diagram : diagram_SwitchModes_1

<Corporate Info>

### 3.1.5.4.          Graphical and Textual Diagrams

#### 3.1.5.4.1.     View of diagram_SwitchModes_1 (SwitchModes)
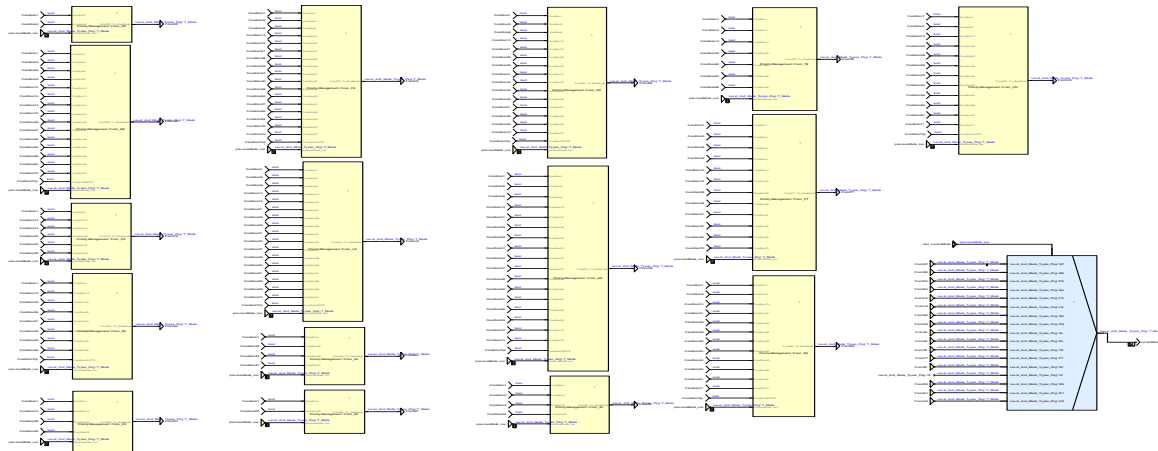


**Figure 4: View of diagram_SwitchModes_1 (SwitchModes)**

# 3.2. Conditions Package

## 3.2.1.          ToFullSupervision Operator

Declared as **public node**

### 3.2.1.1.          Comments and Information

**ToFullSupervision Comments:**
SRS-26 §4.6.3 C25 : "(ERTMS/ETCS level switches to 1,2 or 3) AND (MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile)"
SRS-26 §4.6.3 C31 : "(MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile) AND (ERTMS/ETCS level is 2 or 3)"
SRS-26 §4.6.3 C32 : "(MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile) AND (ERTMS/ETCS level is 1) AND (no trip order is given by balise)"

### 3.2.1.2.          Interface

**Table 11: Inputs of ToFullSupervision**

| Name | Type | Properties | | Comments and Information |
|------|------|-----------|---|--------------------------|
| Current_Level | M_LEVEL | last | M_LEVEL_Level_0 | |
| Trip_Order_Given_By_Balise | bool | | | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | | | |
| MA_SSP_Gradiant_Available | bool | | | |

<Corporate Info>

**Table 12: Outputs of ToFullSupervision**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition25 | bool | |
| Condition31 | bool | |
| Condition32 | bool | |

## 3.2.1.3.     Locals

**Table 13: Locals of ToFullSupervision**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| FS_Data_Condition | bool | |

## 3.2.1.4.     Operator Hierarchy

diagram : diagram_ToFullSupervision_1

<Corporate Info>

## 3.2.1.5.        Graphical and Textual Diagrams

### 3.2.1.5.1.        View of diagram_ToFullSupervision_1 (ToFullSupervision)
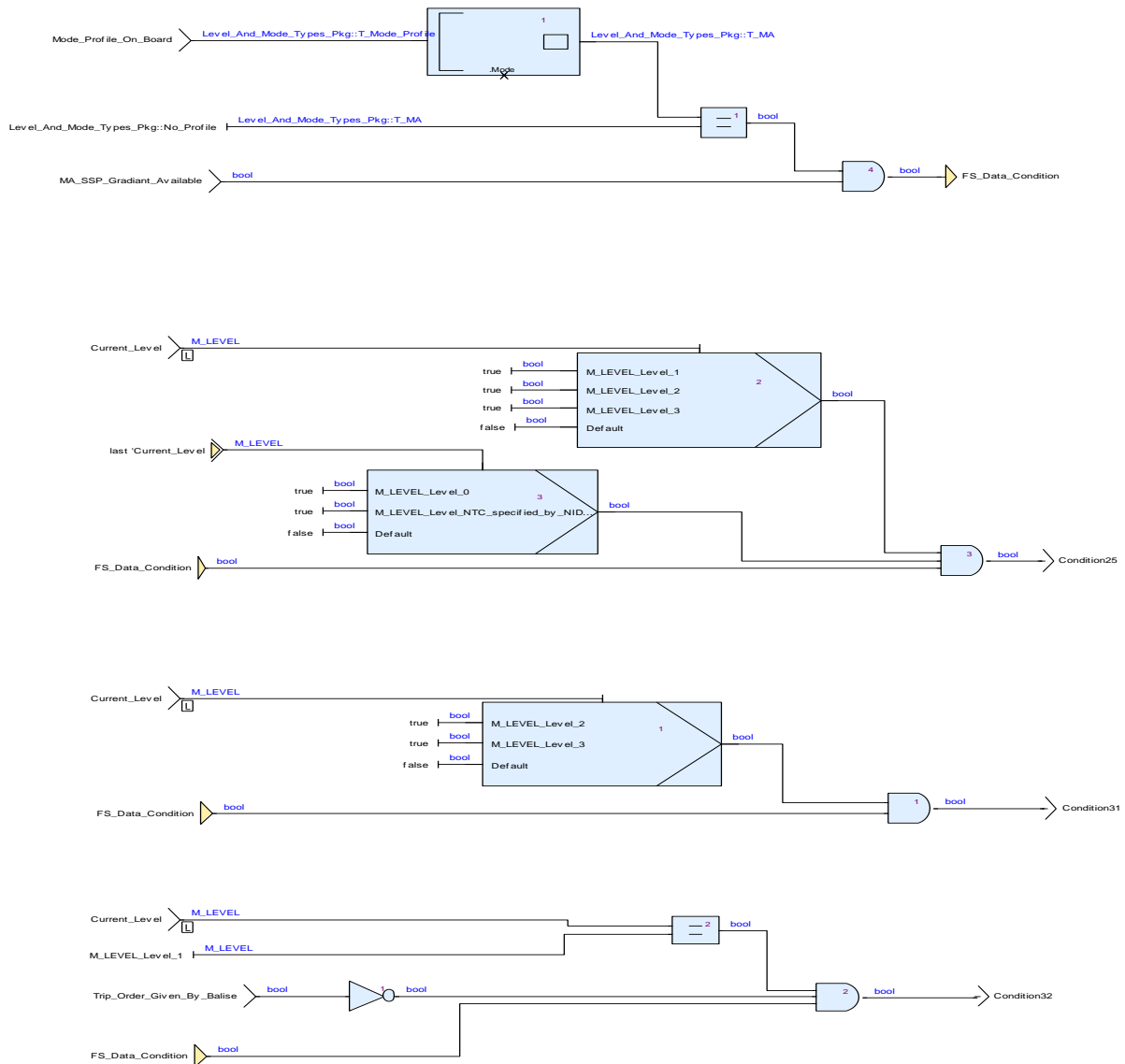


**Figure 5: View of diagram_ToFullSupervision_1 (ToFullSupervision)**

## 3.2.2.        ToIsolate Operator

Declared as **public function**

### 3.2.2.1.        Comments and Information

**ToIsolate Comments:**
§4.6.3 : Condition 1 : "The driver isolates the ERTMS/ETCS on-board equipment".

<Corporate Info>

### 3.2.2.2.    Interface

**Table 14: Inputs of ToIsolate**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| ETCS_Isolation_Status | bool | |

**Table 15: Outputs of ToIsolate**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition1 | bool | |

### 3.2.2.3.    Operator Hierarchy

diagram : diagram_ToIsolate_1

### 3.2.2.4.    Graphical and Textual Diagrams

#### 3.2.2.4.1.    View of diagram_ToIsolate_1 (ToIsolate)
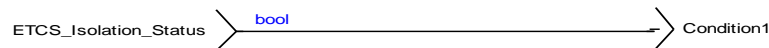


**Figure 6: View of diagram_ToIsolate_1 (ToIsolate)**

## 3.2.3.    ToNonLeading Operator

Declared as **public function**

### 3.2.3.1.    Comments and Information

**ToNonLeading Comments:**
§4.6.3 : Condition 46 " Driver selects non-leading AND train is at standstill AND non-leading input signal received

### 3.2.3.2.    Interface

**Table 16: Inputs of ToNonLeading**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Train_Permitted_NL | bool | |
| Train_Standstill | bool | |
| Driver_Req_NL | bool | |

**Table 17: Outputs of ToNonLeading**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition46 | bool | |

### 3.2.3.3.    Operator Hierarchy

diagram : diagram_ToNonLeading_1

<Corporate Info>

### 3.2.3.4.    Graphical and Textual Diagrams

3.2.3.4.1.    View of diagram_ToNonLeading_1 (ToNonLeading)
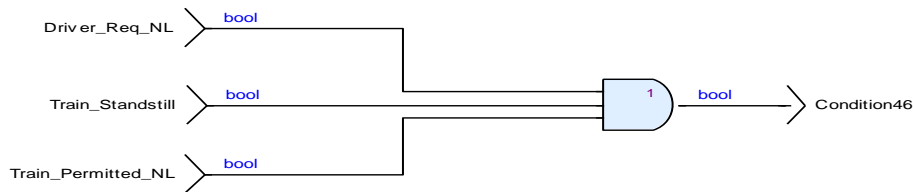


**Figure 7: View of diagram_ToNonLeading_1 (ToNonLeading)**

## 3.2.4.    ToNoPower Operator

Declared as **public function**

### 3.2.4.1.    Comments and Information

**ToNoPower Comments:**
§4.6.3 : Condition 29 : "The ERTMS/ETCS on -board equipment is not powered".

### 3.2.4.2.    Interface

**Table 18: Inputs of ToNoPower**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| OnBoard_Powered | bool | |

**Table 19: Outputs of ToNoPower**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition29 | bool | |

### 3.2.4.3.    Operator Hierarchy

<u>diagram</u> : diagram_ToNoPower_1

### 3.2.4.4.    Graphical and Textual Diagrams

3.2.4.4.1.    View of diagram_ToNoPower_1 (ToNoPower)
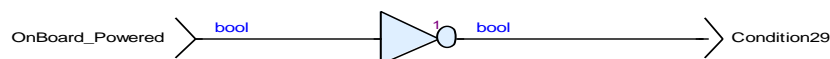


**Figure 8: View of diagram_ToNoPower_1 (ToNoPower)**

## 3.2.5.    ToPassiveShunting Operator

Declared as **public function**

### 3.2.5.1.    Comments and Information

**ToPassiveShunting Comments:**
§4.6.3 : Condition 26 : "desks are closed AND "continue shunting on desk closure" function is active AND the "passive shunting" input signal is active"

<Corporate Info>

### 3.2.5.2.      Interface

**Table 20: Inputs of ToPassiveShunting**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Train_Permitted_PS | bool | |
| Continue_Shunting_Function_Active | bool | |
| Desks_Closed | bool | |

**Table 21: Outputs of ToPassiveShunting**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition26 | bool | |

### 3.2.5.3.      Operator Hierarchy

<u>diagram</u> : diagram_ToPassiveShunting_1

### 3.2.5.4.      Graphical and Textual Diagrams

#### 3.2.5.4.1.      View of diagram_ToPassiveShunting_1 (ToPassiveShunting)
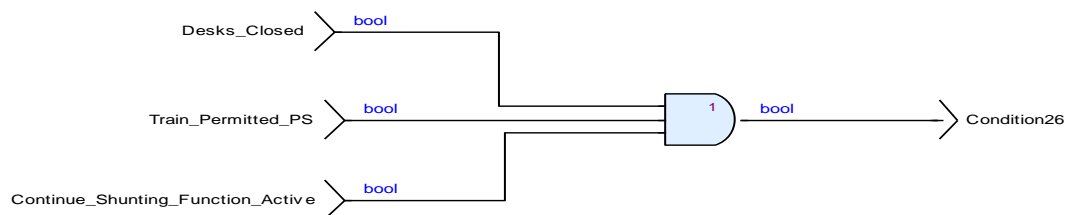


**Figure 9: View of diagram_ToPassiveShunting_1 (ToPassiveShunting)**

## 3.2.6.      ToShunting Operator

Declared as **public node**

### 3.2.6.1.      Interface

**Table 22: Inputs of ToShunting**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Current_Level | M_LEVEL | |
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Desk_Open | bool | |
| Driver_Ack_SH | bool | |
| Driver_Req_SH | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| On_Going_Mission | bool | |
| Shunting_Granted_By_RBC | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|---|---|---|
| Stop_Shunting_Stored | bool | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |
| Train_Speed | Obu_BasicTypes_Pkg:: Speed_T | |
| Train_Standstill | bool | |

**Table 23: Outputs of ToShunting**

| Name | Type | Comments and Information |
|---|---|---|
| Condition5 | bool | |
| Condition6 | bool | |
| Condition23 | bool | |
| Condition50 | bool | |
| Condition51 | bool | |
| Condition61 | bool | |
| Ack_SH_Req_To_Driver | bool | |
| Clean_BG_List_SH_Area | bool | |
| End_Of_Mission_Procedure_Req | bool | |
| Request_For_SH_To_RBC | bool | |
| Service_Brake_Command | bool | |
| SH_refused_By_RBC_To_DMI | bool | |

## 3.2.6.2.    Operator Hierarchy

<u>diagram</u> : diagram_ToShunting_1

<Corporate Info>

### 3.2.6.3.     Graphical and Textual Diagrams

#### 3.2.6.3.1.     View of diagram_ToShunting_1 (ToShunting)
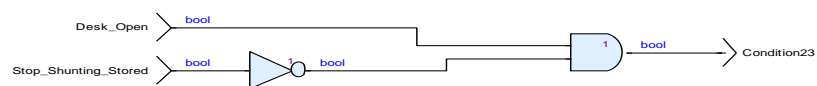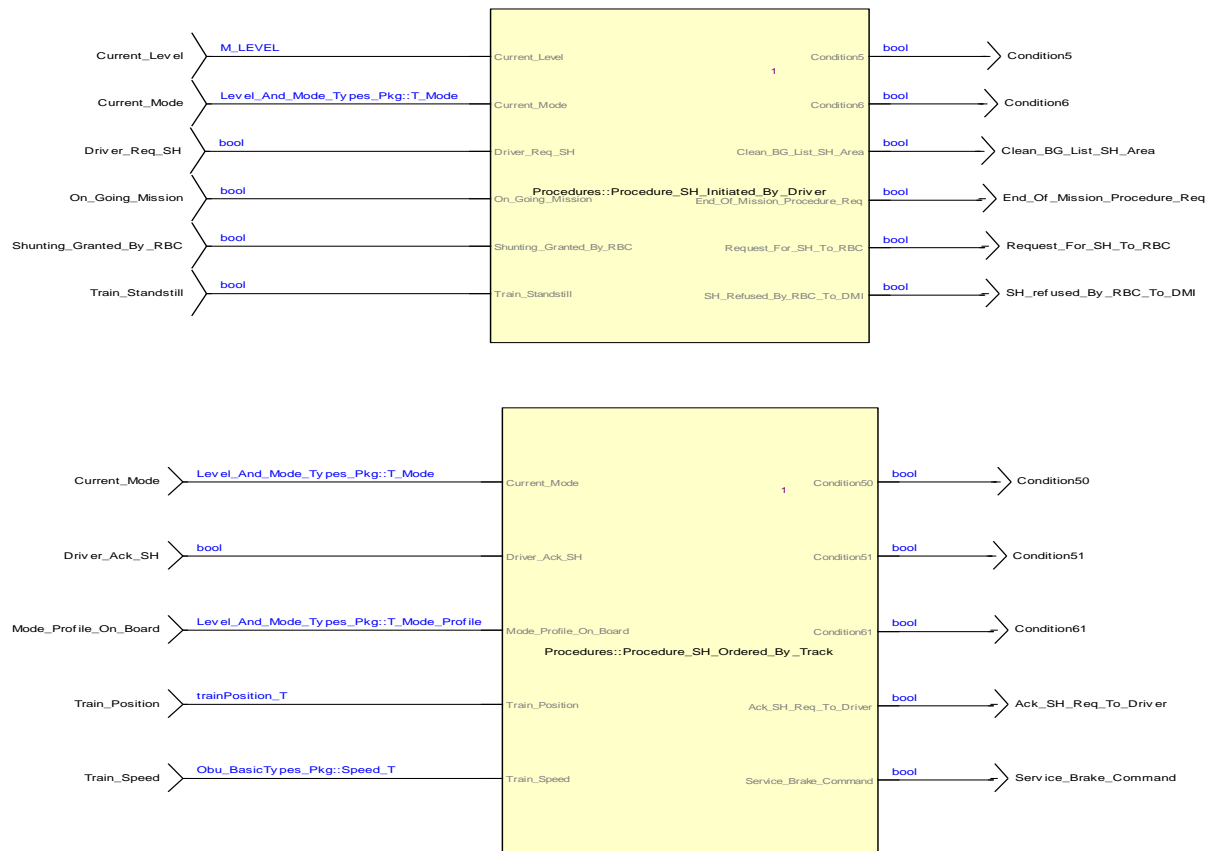


**Figure 10: View of diagram_ToShunting_1 (ToShunting)**

### 3.2.7.     ToSleeping Operator

Declared as **public function**

#### 3.2.7.1.     Comments and Information

**ToSleeping Comments:**
§4.6.3 : Condition 14 : "The sleeping input signal is received AND train is at standstill AND all desks connected to the ERTMS/ETCS on-board equipment are closed

<Corporate Info>

### 3.2.7.2.          Interface

**Table 24: Inputs of ToSleeping**

| Name | Type | Comments and Information |
|---|---|---|
| All_Desks_Closed | bool | |
| Train_Standstill | bool | |
| Train_Req_SL | bool | |

**Table 25: Outputs of ToSleeping**

| Name | Type | Comments and Information |
|---|---|---|
| Condition14 | bool | |

### 3.2.7.3.          Operator Hierarchy

diagram : diagram_ToSleeping_1

### 3.2.7.4.          Graphical and Textual Diagrams

### 3.2.7.4.1.          View of diagram_ToSleeping_1 (ToSleeping)
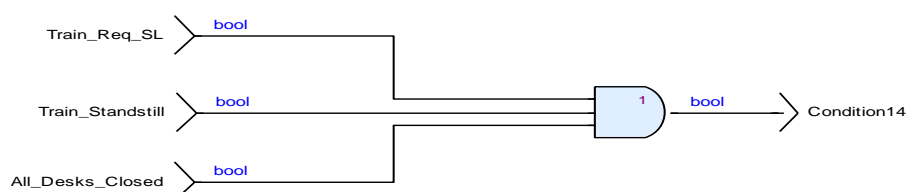


**Figure 11: View of diagram_ToSleeping_1 (ToSleeping)**

## 3.2.8.          ToStaffResponsible Operator

Declared as **public node**

### 3.2.8.1.          Interface

**Table 26: Inputs of ToStaffResponsible**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Current_Level | M_LEVEL | last | M_LEVEL_Level_0 | |
| Driver_Req_Override | bool | | | |
| Train_Speed_Under_Override_Limit | bool | | | |
| Override_Function_Active | bool | | | |
| Emergency_Stop_Message_Received | bool | | | |

**Table 27: Outputs of ToStaffResponsible**

| Name | Type | Comments and Information |
|---|---|---|
| Condition44 | bool | |
| Condition45 | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition37 | bool | |

### 3.2.8.2.     Locals

**Table 28: Locals of ToStaffResponsible**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Level_L1 | bool | |
| Level_L2_L3 | bool | |
| Level_prev_L0_LNTC | bool | |

### 3.2.8.3.     Operator Hierarchy

diagram : diagram_ToOnSight1_1

### 3.2.8.4.     Graphical and Textual Diagrams

#### 3.2.8.4.1.     View of diagram_ToOnSight1_1 (ToStaffResponsible)
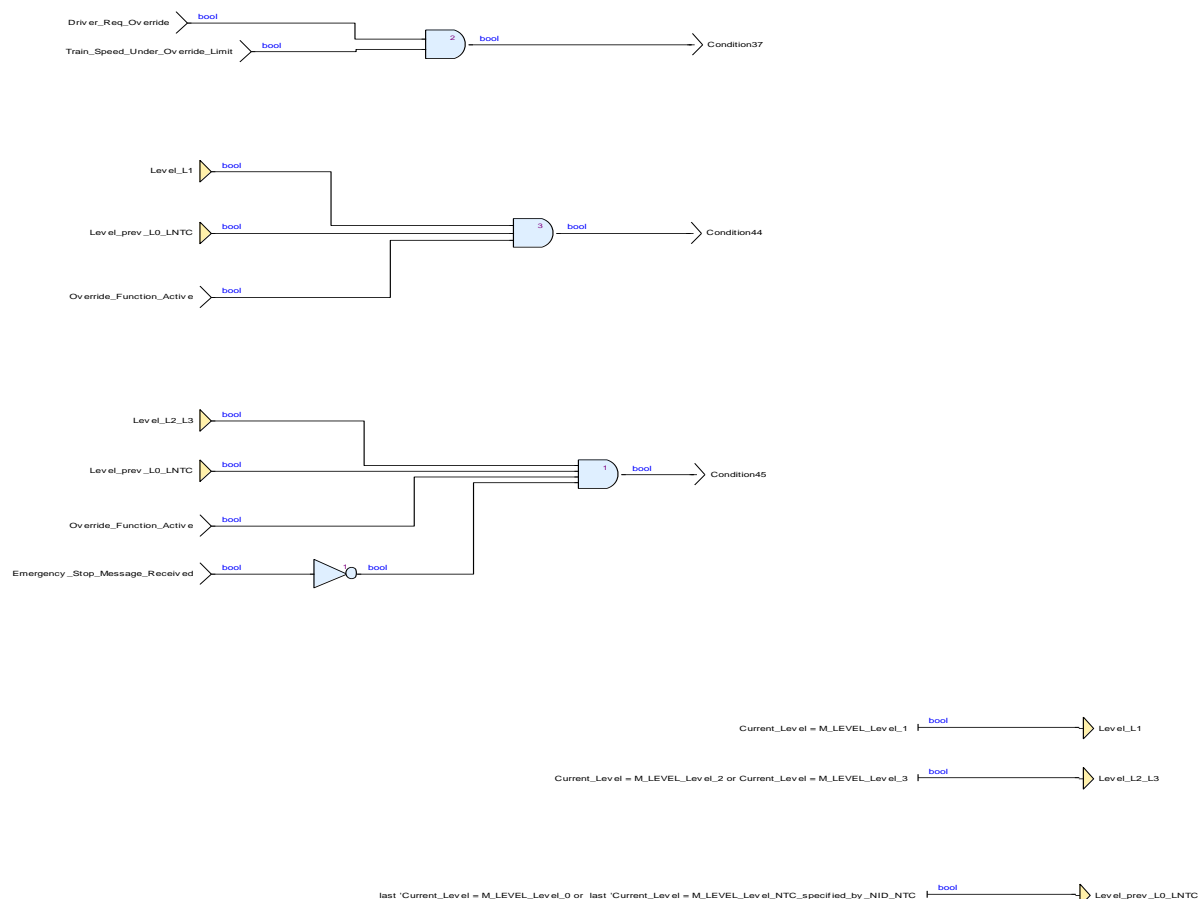


**Figure 12: View of diagram_ToOnSight1_1 (ToStaffResponsible)**

### 3.2.9.     ToStandBy Operator

Declared as **public function**

<Corporate Info>

### 3.2.9.1.     Comments and Information

**ToStandBy Comments:**
SRS-026 § 4.6.2 : C2 "(a desk is open)"
SRS-026 § 4.6.2 : C3 "(no "go sleeping" input signal is received any more) AND (train is at standstill)"
SRS-026 § 4.6.2 : C4 "The ERTMS/ETCS on-board equipment is powered."
SRS-026 § 4.6.2 : C19 "(driver selects "exit Shunting") AND (train is at standstill)."
SRS-026 § 4.6.2 : C22 "(a desk is open) AND ("Stop Shunting on desk opening" information is stored onboard)"
SRS-026 § 4.6.2 : C27 "(desks are closed) AND ("Continue Shunting on desk closure" function is not active)"
SRS-026 § 4.6.2 : C28 "(desks are closed) "
SRS-026 § 4.6.2 : C30 "(desks are closed) AND (no "passive shunting" input signal is received)"
SRS-026 § 4.6.2 : C47 "(no "non leading" input signal is received any more) AND (train is at standstill)"

### 3.2.9.2.     Interface

**Table 29: Inputs of ToStandBy**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Desk_Open | bool | |
| All_Desks_Closed | bool | |
| Train_Standstill | bool | |
| Train_Req_SL | bool | |
| OnBoard_Powered | bool | |
| Train_Permitted_PS | bool | |
| Train_Permitted_NL | bool | |
| Continue_Shunting_function_Active | bool | |
| Driver_Req_Exit_SH | bool | |
| Stop_Shunting_Stored | bool | |
| On_Going_Mission | bool | |

**Table 30: Outputs of ToStandBy**

| Name | Type | Properties | Comments and Information |
|------|------|-----------|--------------------------|
| Condition2 | bool | | |
| Condition3 | bool | | |
| Condition4 | bool | | |
| Condition19 | bool | | |
| Condition22 | bool | | |
| Condition27 | bool | | |
| Condition28 | bool | | |
| Condition30 | bool | | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|------|------|------------|---|-------------------------|
| Condition47 | bool | | | |
| End_Of_Mission_Procedure_Req | bool | default | false | |

### 3.2.9.3.       Operator Hierarchy

<u>diagram</u> : diagram_ToStandBy_1

### 3.2.9.4.       Graphical and Textual Diagrams

### 3.2.9.4.1.       View of diagram_ToStandBy_1 (ToStandBy)
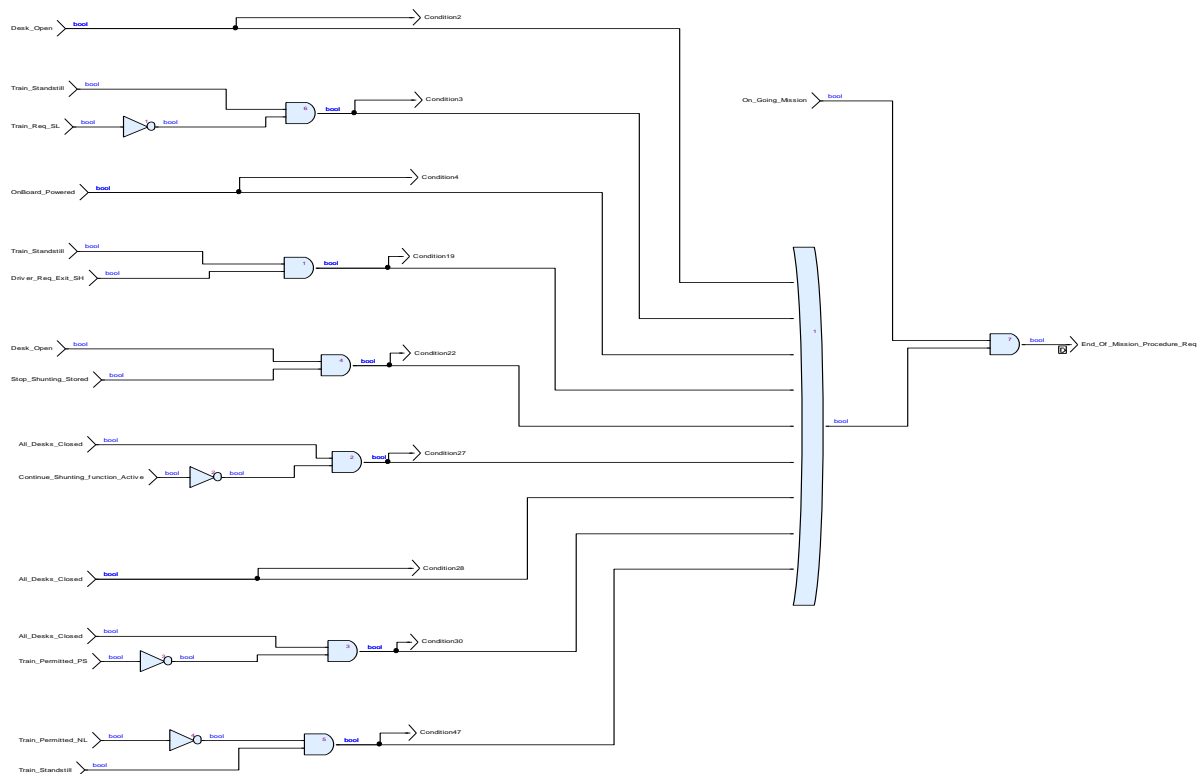


**Figure 13: View of diagram_ToStandBy_1 (ToStandBy)**

## 3.2.10.       ToSystemFailure Operator

Declared as **public function**

### 3.2.10.1.       Comments and Information

**ToSystemFailure Comments:**
§4.6.3 : Condition 13 : "The ERTMS/ETCS on-board equipment detects a fault that affects safety".

<Corporate Info>

### 3.2.10.2.    Interface

**Table 31: Inputs of ToSystemFailure**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Safety_Failure_Occured | bool | |

**Table 32: Outputs of ToSystemFailure**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition13 | bool | |

## 3.2.10.3.    Operator Hierarchy

<u>diagram</u> : diagram_ToSystemFailure_1

## 3.2.10.4.    Graphical and Textual Diagrams

### 3.2.10.4.1.    View of diagram_ToSystemFailure_1 (ToSystemFailure)
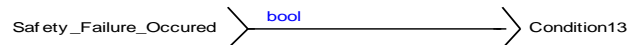


**Figure 14: View of diagram_ToSystemFailure_1 (ToSystemFailure)**

## 3.2.11.    ToSystemNational Operator

Declared as **public node**

### 3.2.11.1.    Comments and Information

**ToSystemNational Comments:**
SRS-026 § 4.6.2 : C56   "(the ERTMS/ETCS level switches to "NTC")"

### 3.2.11.2.    Interface

**Table 33: Inputs of ToSystemNational**

| Name | Type | Properties | | Comments and Information |
|------|------|------------|---|--------------------------|
| Current_Level | M_LEVEL | last | M_LEVEL_Level_0 | |

**Table 34: Outputs of ToSystemNational**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition56 | bool | |

## 3.2.11.3.    Operator Hierarchy

<u>diagram</u> : diagram_ToSystemNational1_1

<Corporate Info>

### 3.2.11.4.    Graphical and Textual Diagrams

### 3.2.11.4.1.    View of diagram_ToSystemNational1_1 (ToSystemNational)
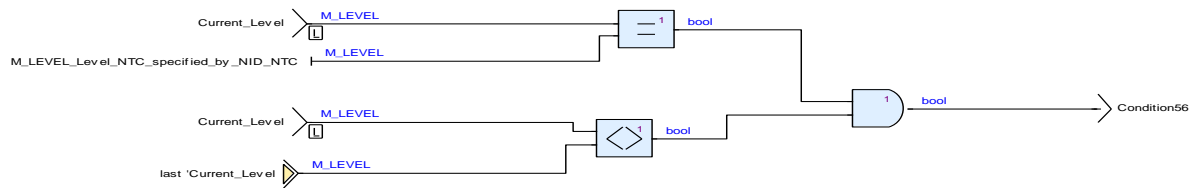


**Figure 15: View of diagram_ToSystemNational1_1 (ToSystemNational)**

## 3.2.12.    ToTrip Operator

Declared as **`public node`**

### 3.2.12.1.    Interface

**Table 35: Inputs of ToTrip**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| BG_In_Expected_List_In_SH | bool | | | |
| BG_In_Expected_List_In_SR | bool | | | |
| Current_Level | M_LEVEL | last | M_LEVEL_Level_0 | |
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | | | |
| Driver_Select_SH | bool | | | |
| Emergency_Stop_Message_Received | bool | | | |
| Error_BG_System_Version | bool | | | |
| Estimated_Front_End_Overpass_SR_Distance | bool | | | |
| Estimated_Front_End_Rear_Location_SSP_Or_Gradient | bool | | | |
| Interface_To_National_System | bool | | | |
| Linked_BG_Pased_In_Wrong_Direction | bool | | | |
| Linking_Reaction_To_Trip | bool | | | |
| List_BG_Related_To_SR_Empty | bool | | | |
| MA_Available | bool | | | |
| National_Trip_Order | bool | | | |
| Override_Function_Active | bool | | | |
| Override_Function_Former_Active | bool | | | |
| Stop_If_In_Shunting | bool | | | |
| Stop_If_In_SR | bool | | | |

<Corporate Info>

| Name | Type | Properties | Comments and Information |
|---|---|---|---|
| T_NVCONTACT_Overpass | bool | | |
| Train_Overpass_EOA_Antenna | bool | | |
| Train_Overpass_EOA_Front_End | bool | | |
| Train_Overpass_Former_EOA_Antenna | bool | | |
| Trip_Order_Given_By_Balise | bool | | |
| TripModeFromLevel | bool | | |

**Table 36: Outputs of ToTrip**

| Name | Type | Comments and Information |
|---|---|---|
| Condition2Trip | bool | |

### 3.2.12.2.  Locals

**Table 37: Locals of ToTrip**

| Name | Type | Comments and Information |
|---|---|---|
| Condition12 | bool | |
| Condition16 | bool | |
| Condition17 | bool | |
| Condition18 | bool | |
| Condition20 | bool | |
| Condition35 | bool | |
| Condition36 | bool | |
| Condition38 | bool | |
| Condition39 | bool | |
| Condition41 | bool | |
| Condition42 | bool | |
| Condition43 | bool | |
| Condition49 | bool | |
| Condition52 | bool | |
| Condition54 | bool | |
| Condition65 | bool | |
| Condition66 | bool | |
| Condition67 | bool | |
| Condition69 | bool | |
| Level_L1 | bool | |
| Level_L1_L2_L3 | bool | |
| Level_L2_L3 | bool | |
| Level_LNTC | bool | |
| Level_prev_L0_LNTC | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Level_prev_L1 | bool | |
| Mode_FS_LS_OS | bool | |
| Mode_SH | bool | |
| Mode_SN | bool | |
| Mode_SR | bool | |
| Mode_UN | bool | |

### 3.2.12.3.    Operator Hierarchy

diagram : diagram_ToTrip_1

### 3.2.12.4.    Graphical and Textual Diagrams

#### 3.2.12.4.1.    View of diagram_ToTrip_1 (ToTrip)
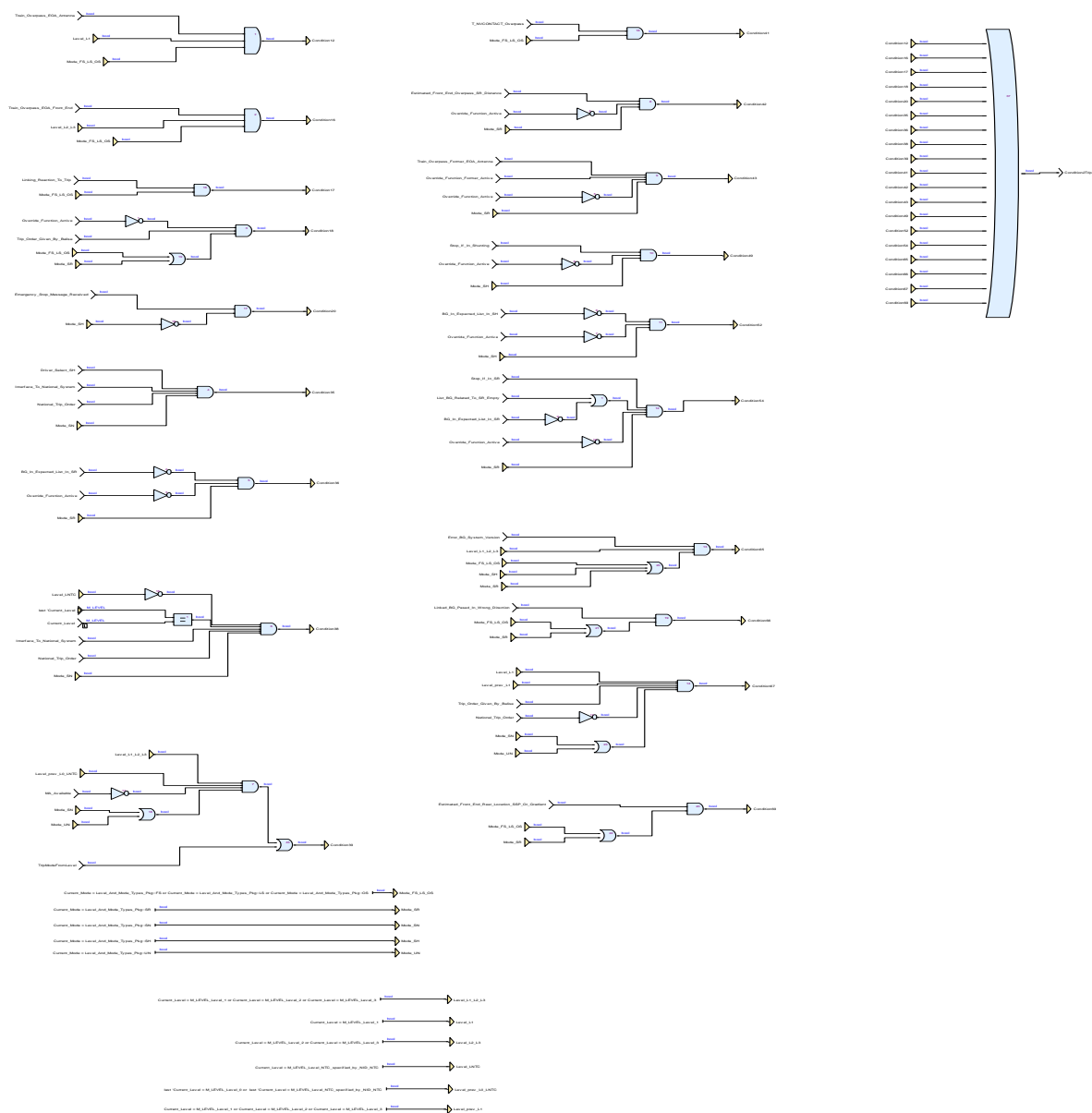


**Figure 16: View of diagram_ToTrip_1 (ToTrip)**

<Corporate Info>

### 3.2.13.     ToUnfitted Operator

Declared as **`public node`**

#### 3.2.13.1.     Comments and Information

**ToUnfitted Comments:**
SRS-026 § 4.6.2 : C21   "(the ERTMS/ETCS level switches to 0"

#### 3.2.13.2.     Interface

**Table 38: Inputs of ToUnfitted**

| Name | Type | Properties | | Comments and Information |
|------|------|-----------|---|--------------------------|
| Current_Level | M_LEVEL | last | M_LEVEL_Level_0 | |

**Table 39: Outputs of ToUnfitted**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition21 | bool | |

#### 3.2.13.3.     Operator Hierarchy

<u>diagram</u> : diagram_ToUnfitted_1

#### 3.2.13.4.     Graphical and Textual Diagrams

##### 3.2.13.4.1.     View of diagram_ToUnfitted_1 (ToUnfitted)
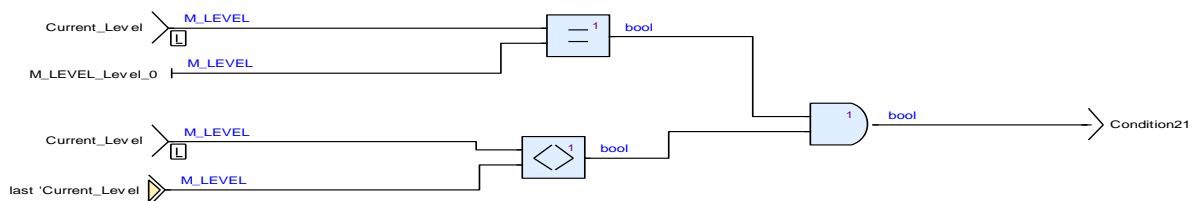


**Figure 17: View of diagram_ToUnfitted_1 (ToUnfitted)**

## 3.3. Interfaces Package

### 3.3.1.     InputDMI Operator

Declared as **`public function`**

#### 3.3.1.1.     Interface

**Table 40: Inputs of InputDMI**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Data_From_DMI | Level_And_Mode_Types_Pkg::T_Data_From_DMI | |

<Corporate Info>

**Table 41: Outputs of InputDMI**

| Name | Type | Comments and Information |
|---|---|---|
| Driver_Ack_LS | bool | |
| Driver_Ack_OS | bool | |
| Driver_Ack_RV | bool | |
| Driver_Ack_SH | bool | |
| Driver_Ack_SN | bool | |
| Driver_Ack_SR | bool | |
| Driver_Ack_TR | bool | |
| Driver_Ack_UN | bool | |
| Driver_Req_Exit_SH | bool | |
| Driver_Req_NL | bool | |
| Driver_Req_Override | bool | |
| Driver_Req_SH | bool | |
| Driver_Req_Start | bool | |
| ETCS_Isolated | bool | |

## 3.3.1.2.     Operator Hierarchy

diagram : diagram_Operator5_1

## 3.3.1.3.     Graphical and Textual Diagrams
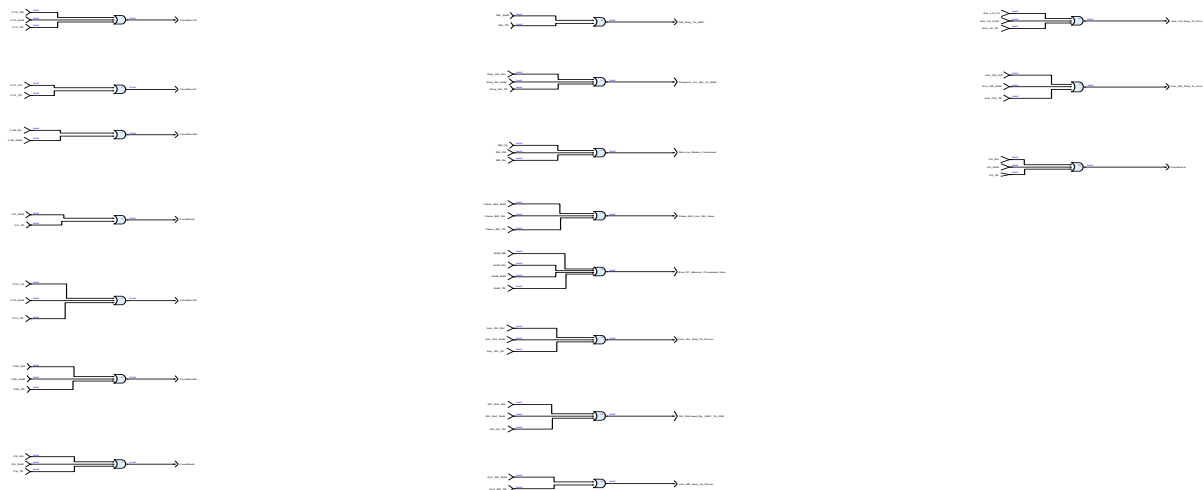
### 3.3.1.3.1.     View of diagram_Operator5_1 (InputDMI)



**Figure 18: View of diagram_Operator5_1 (InputDMI)**

<Corporate Info>

## 3.3.2.        InputF2Functions Operator

Declared as **public function**

### 3.3.2.1.        Interface

**Table 42: Inputs of InputF2Functions**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Data_From_F2_Functions | Level_And_Mode_Types_Pkg::T_Data_From_F2_functions | |

**Table 43: Outputs of InputF2Functions**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| T_NVCONTACT_Overpass | bool | |
| Error_BG_System_Version | bool | |
| Failure_Occured | bool | |
| Continue_Shunting_Function_Active | bool | |
| Stop_Shunting_Stored | bool | |
| Linking_Reaction_To_Trip | bool | |

### 3.3.2.2.        Operator Hierarchy

diagram : diagram_InputF2Functions_1

### 3.3.2.3.        Graphical and Textual Diagrams

#### 3.3.2.3.1.        View of diagram_InputF2Functions_1 (InputF2Functions)
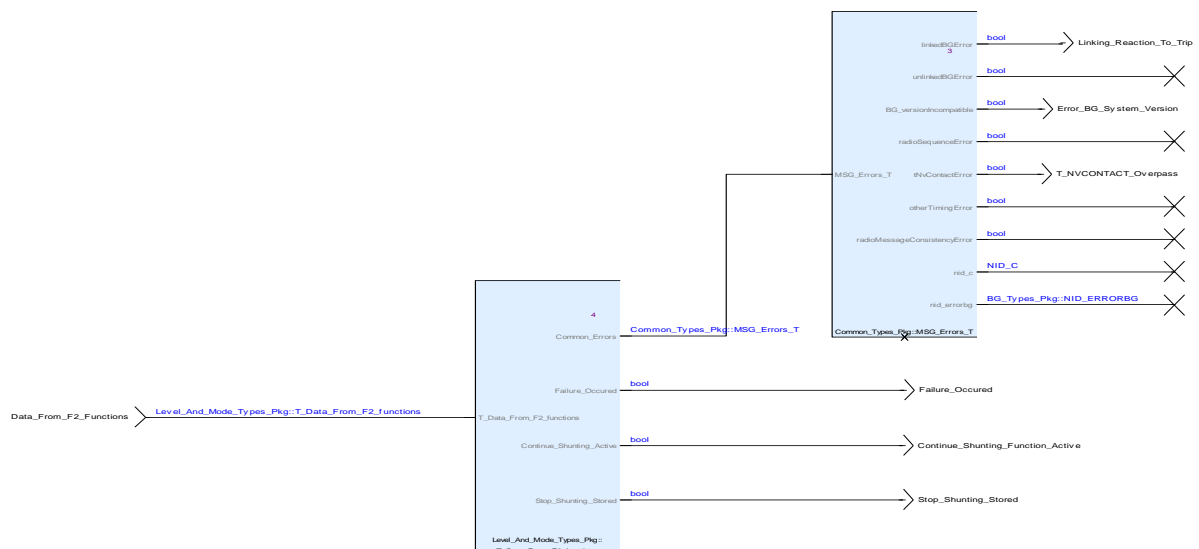


**Figure 19: View of diagram_InputF2Functions_1 (InputF2Functions)**

<Corporate Info>

### 3.3.3.        InputLocalisation Operator

Declared as **public function**

#### 3.3.3.1.        Interface

**Table 44: Inputs of InputLocalisation**

| Name | Type | Comments and Information |
|---|---|---|
| Data_From_Localisation | Level_And_Mode_Types_Pkg::T_Data_From_Localisation | |

**Table 45: Outputs of InputLocalisation**

| Name | Type | Comments and Information |
|---|---|---|
| BG_In_Expected_List_In_SR | bool | |
| BG_In_Expected_List_In_SH | bool | |
| Linked_BG_Pased_In_Wrong_Direction | bool | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |
| Train_Speed | Obu_BasicTypes_Pkg::Speed_T | |
| Train_Standstill | bool | |

#### 3.3.3.2.        Operator Hierarchy

<u>diagram</u> : diagram_InputSpeedAndSupervision1_1

#### 3.3.3.3.        Graphical and Textual Diagrams

##### 3.3.3.3.1.        View of diagram_InputSpeedAndSupervision1_1 (InputLocalisation)
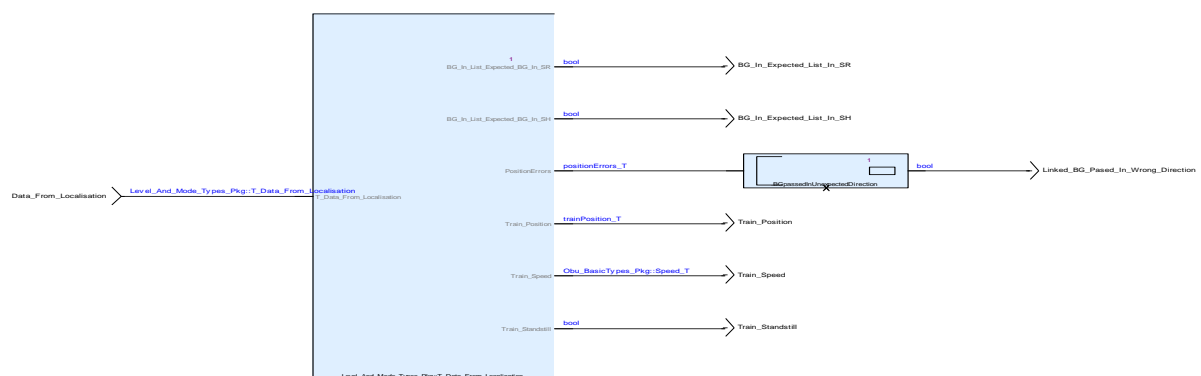


**Figure 20: View of diagram_InputSpeedAndSupervision1_1 (InputLocalisation)**

### 3.3.4.        InputSpeedAndSupervision Operator

Declared as **public function**

<Corporate Info>

### 3.3.4.1. Interface

**Table 46: Inputs of InputSpeedAndSupervision**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Data_From_Speed_and_Supervision | Level_And_Mode_Types_Pkg::T_Data_From_Speed_Supervision | |

**Table 47: Outputs of InputSpeedAndSupervision**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Estimated_Front_End_Overpass_SR_Distance | bool | |
| Estimated_Front_End_Rear_Location_SSP_Or_Gradient | bool | |
| Override_Function_Active | bool | |
| Train_Overpass_EOA_Antenna | bool | |
| Train_Overpass_EOA_Front_End | bool | |
| Train_Speed_Under_Override_Limit | bool | |

### 3.3.4.2. Operator Hierarchy

<u>diagram</u> : diagram_InputSpeedAndSupervision_1

### 3.3.4.3. Graphical and Textual Diagrams

#### 3.3.4.3.1. View of diagram_InputSpeedAndSupervision_1 (InputSpeedAndSupervision)
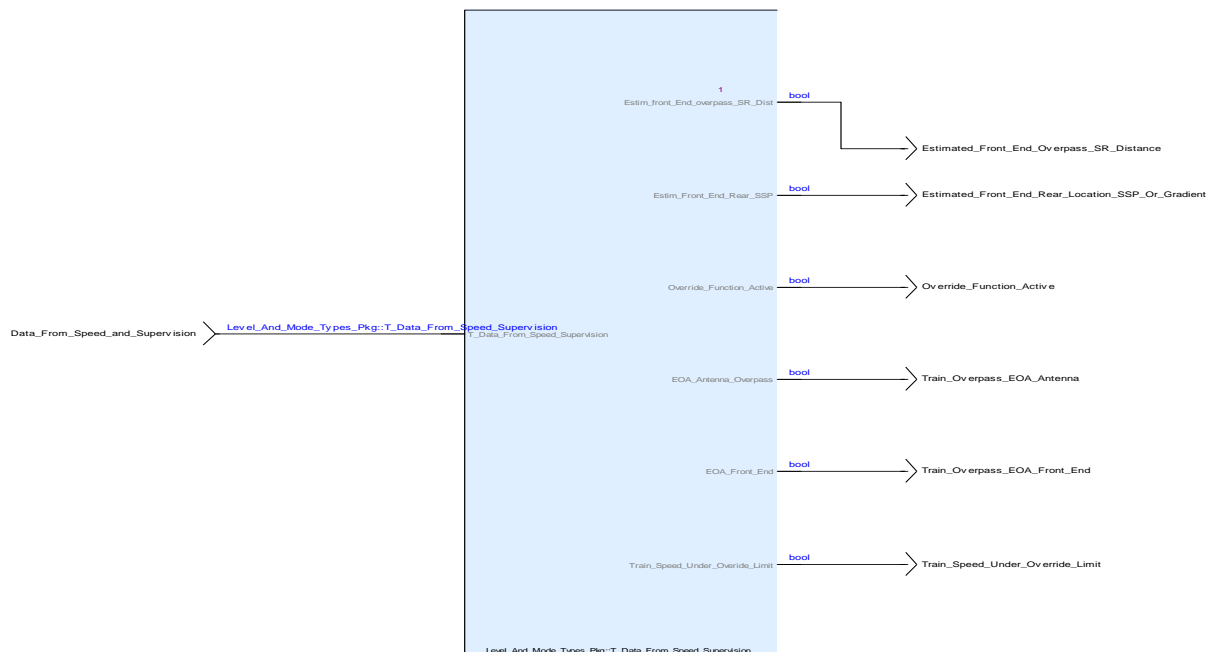


**Figure 21: View of diagram_InputSpeedAndSupervision_1 (InputSpeedAndSupervision)**

<Corporate Info>

## 3.3.5.     InputSTM Operator

Declared as **public function**

### 3.3.5.1.     Interface

**Table 48: Inputs of InputSTM**

| Name | Type | Comments and Information |
|---|---|---|
| Data_From_STM | Level_And_Mode_Types_Pkg::T_Data_From_STM | |

**Table 49: Outputs of InputSTM**

| Name | Type | Comments and Information |
|---|---|---|
| Interface_To_National_System | bool | |
| National_Trip_Order | bool | |

### 3.3.5.2.     Operator Hierarchy

diagram : diagram_InputSTM_1

### 3.3.5.3.     Graphical and Textual Diagrams

#### 3.3.5.3.1.     View of diagram_InputSTM_1 (InputSTM)
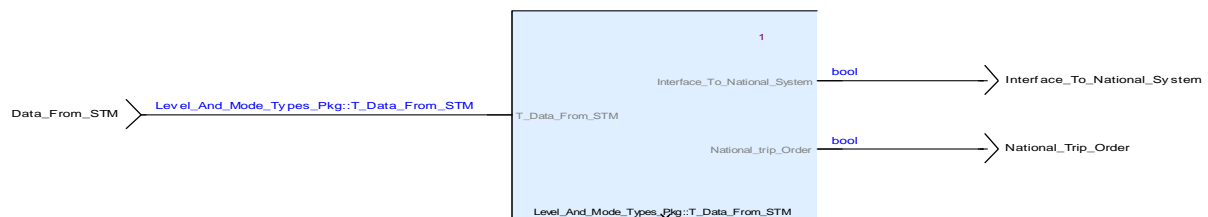


**Figure 22: View of diagram_InputSTM_1 (InputSTM)**

## 3.3.6.     InputTIUManagement Operator

Declared as **public function**

### 3.3.6.1.     Comments and Information

**InputTIUManagement Comments:**
What are the default values for the location if the train position is not valid ?
Do we use the last value or a defaut value ?

### 3.3.6.2.     Interface

**Table 50: Inputs of InputTIUManagement**

| Name | Type | Comments and Information |
|---|---|---|
| Data_from_TIU | TIU_Types_Pkg::Message_Train_Interface_to_EVC_T | |

<Corporate Info>

| Name | Type | Comments and Information |
|---|---|---|
| Cab | TIU_Types_Pkg::cab_ID_T | |

**Table 51: Outputs of InputTIUManagement**

| Name | Type | Comments and Information |
|---|---|---|
| Train_Permitted_NL | bool | |
| Train_Permitted_PS | bool | |
| Train_Req_SL | bool | |
| All_Desks_Closed | bool | |
| Desk_Open | bool | |
| OnBoard_Powered | bool | |
| Valid_Train_Data_Stored | bool | |

### 3.3.6.3. Locals

**Table 52: Locals of InputTIUManagement**

| Name | Type | Comments and Information |
|---|---|---|
| Loc_Cab_ST | TIU_Types_Pkg::M_cab_signal_status_T | |
| Loc_NL_ST | TIU_Types_Pkg::M_nonleading_signal_status_T | |
| Loc_PS_ST | TIU_Types_Pkg::M_passiveshunting_signal_status_T | |
| Loc_Sleeping_ST | TIU_Types_Pkg::M_sleeping_signal_status_T | |

### 3.3.6.4. Operator Hierarchy

diagram : diagram_InputTIUManagement_1

<Corporate Info>

### 3.3.6.5.     Graphical and Textual Diagrams

### 3.3.6.5.1.     View of diagram_InputTIUManagement_1 (InputTIUManagement)
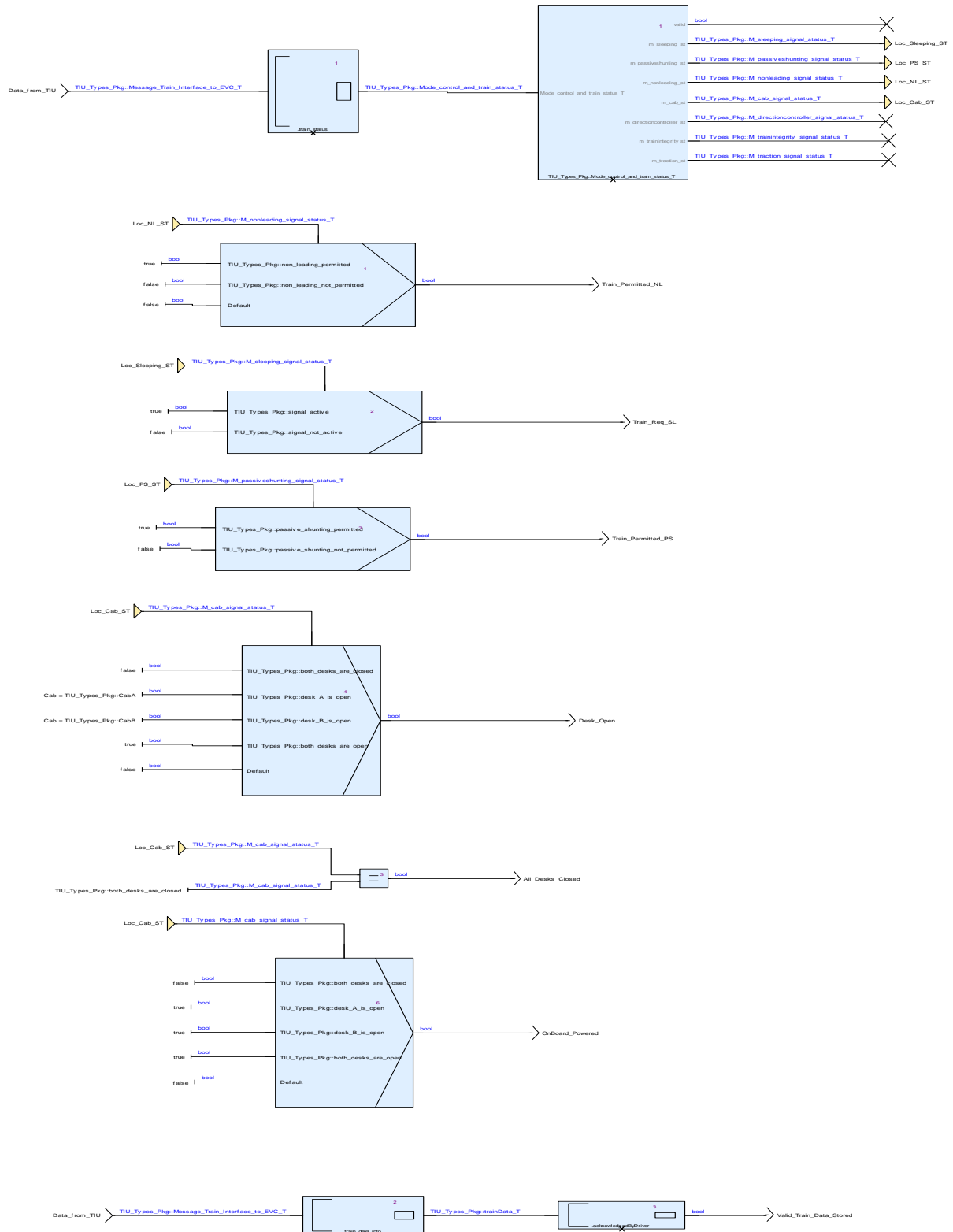


**Figure 23: View of diagram_InputTIUManagement_1 (InputTIUManagement)**

### 3.3.7.     InputTrackManagement Operator

Declared as **public function**

<Corporate Info>

### 3.3.7.1.     Interface

**Table 53: Inputs of InputTrackManagement**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Data_From_Track | Level_And_Mode_Types_Pkg::T_Data_From_Track_To_Mode | |

**Table 54: Outputs of InputTrackManagement**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| MA_SSP_Gradient_Available | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| Shunting_Granted_By_RBC | bool | |
| Trip_Order_Given_By_Balise | bool | |
| List_BG_Related_To_SR_Empty | bool | |
| Stop_If_In_Shunting | bool | |
| Stop_If_In_SR | bool | |
| RCB_Ack_And_EB_Revocked | bool | |
| RBC_Authorized_SR | bool | |
| Reversing_Data | Level_And_Mode_Types_Pkg::T_Reversing_Data | |
| Emergency_Stop_Message_Received | bool | |

### 3.3.7.2.     Operator Hierarchy

diagram : diagram_InputTrackManagement_1

<Corporate Info>

### 3.3.7.3. Graphical and Textual Diagrams

#### 3.3.7.3.1. View of diagram_InputTrackManagement_1 (InputTrackManagement)
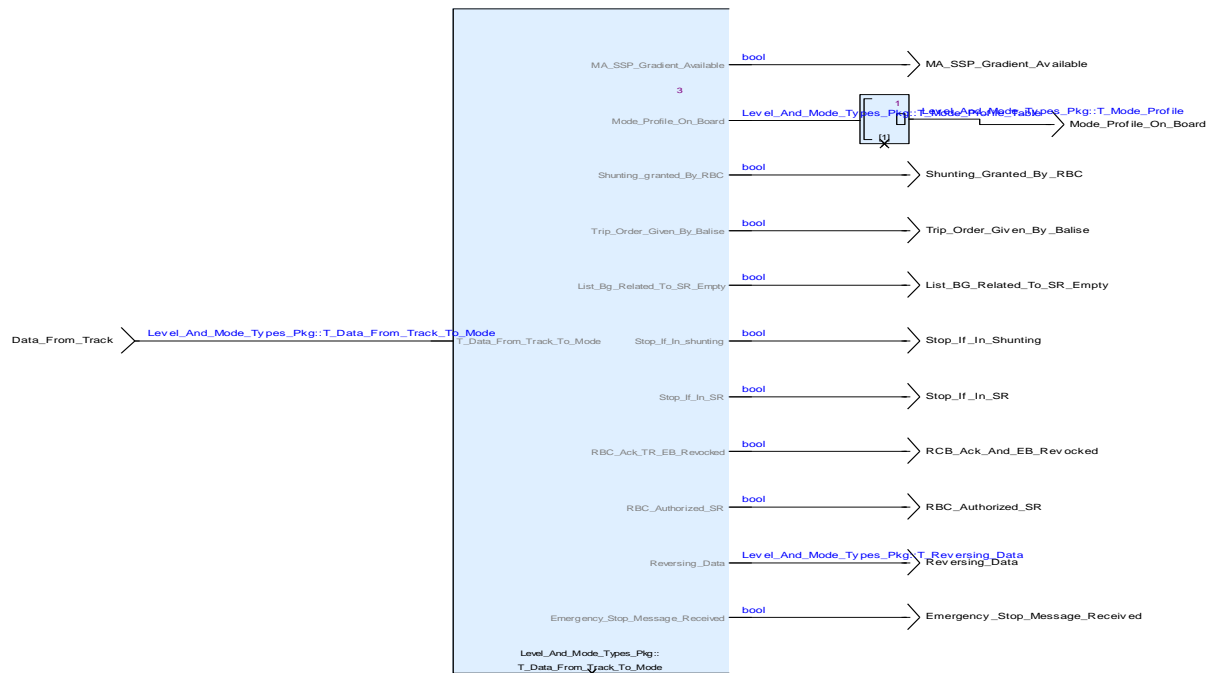


**Figure 24: View of diagram_InputTrackManagement_1 (InputTrackManagement)**

### 3.3.8. Output_To_BG_Management Operator

Declared as **public function**

#### 3.3.8.1. Interface

**Table 55: Inputs of Output_To_BG_Management**

| Name | Type | Comments and Information |
|---|---|---|
| End_Of_Mission_Procedure_Req | bool | |
| Clean_BG_List_SH_Area | bool | |
| MA_Req_To_RBC | bool | |
| Request_For_SH_To_RBC | bool | |

**Table 56: Outputs of Output_To_BG_Management**

| Name | Type | Comments and Information |
|---|---|---|
| Data_To_BG_Management | Level_And_Mode_Types_Pkg::T_Data_To_BG_Management | |

#### 3.3.8.2. Operator Hierarchy

<u>diagram</u> : diagram_Output_To_BG_Management_1

### 3.3.8.3.       Graphical and Textual Diagrams

#### 3.3.8.3.1.       View of diagram_Output_To_BG_Management_1 (Output_To_BG_Management)
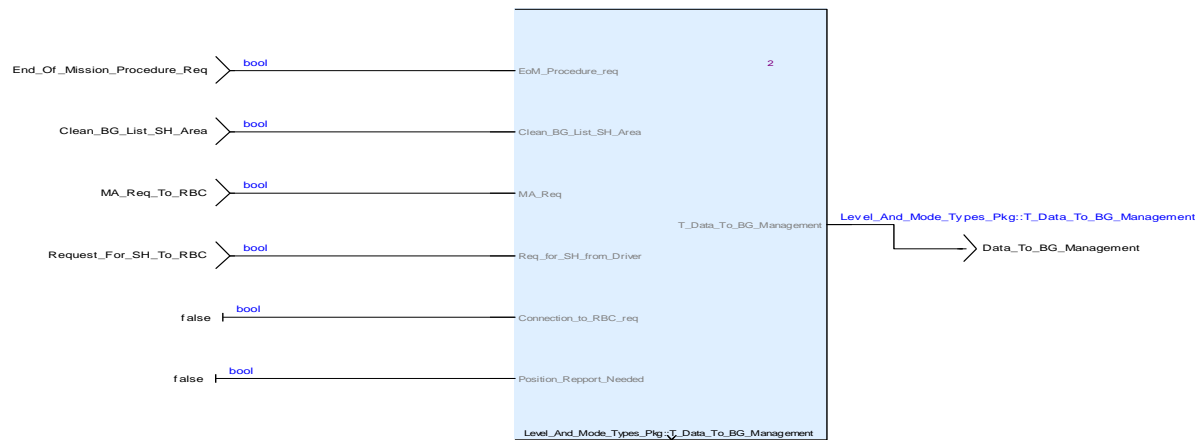


**Figure 25: View of diagram_Output_To_BG_Management_1 (Output_To_BG_Management)**

## 3.3.9.       Output_To_DMI Operator

Declared as **public function**

### 3.3.9.1.       Interface

**Table 57: Inputs of Output_To_DMI**

| Name | Type | Comments and Information |
|---|---|---|
| Ack_LS_Req_To_Driver | bool | |
| Ack_OS_Req_To_Driver | bool | |
| Ack_RV_Req_To_Driver | bool | |
| Ack_SH_Req_To_Driver | bool | |
| Ack_SN_Req_To_Driver | bool | |
| Ack_SR_Req_To_Driver | bool | |
| Ack_TR_Req_To_Driver | bool | |
| Ack_UN_Req_To_Driver | bool | |
| SH_Refused_By_RBC_To_DMI | bool | |

**Table 58: Outputs of Output_To_DMI**

| Name | Type | Comments and Information |
|---|---|---|
| Data_To_DMI | Level_And_Mode_Types_Pkg::T_Data_To_DMI | |

<Corporate Info>

### 3.3.9.2. Operator Hierarchy

diagram : diagram_Output_To_DMI_1

### 3.3.9.3. Graphical and Textual Diagrams

### 3.3.9.3.1. View of diagram_Output_To_DMI_1 (Output_To_DMI)



**Figure 26: View of diagram_Output_To_DMI_1 (Output_To_DMI)**

### 3.3.10. OutputManagement Operator

Declared as **public function**

### 3.3.10.1. Interface

**Table 59: Inputs of OutputManagement**

| Name | Type | Comments and Information |
|---|---|---|
| current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Ack_LS_Req_To_Driver | bool | |
| Ack_OS_Req_To_Driver | bool | |
| Ack_RV_Req_To_Driver | bool | |
| Ack_SH_Req_To_Driver | bool | |
| Ack_SN_Req_To_Driver | bool | |
| Ack_SR_Req_To_Driver | bool | |
| Ack_TR_Req_To_Driver | bool | |
| Ack_UN_Req_To_Driver | bool | |
| Clean_BG_List_SH_Area | bool | |
| EB_requested | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|------|------|--------------------------|
| End_Of_Mission_Procedure_Req | bool | |
| MA_Req_to_RBC | bool | |
| Request_For_SH_To_RBC | bool | |
| service_brake_Command | bool | |
| SH_Refused_by_RBC_To_DMI | bool | |

**Table 60: Outputs of OutputManagement**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Data_To_DMI | Level_And_Mode_Types_Pkg::T_Data_To_DMI | |
| Data_To_BG_Management | Level_And_Mode_Types_Pkg::T_Data_To_BG_Management | |
| EB_Requested | bool | |
| Service_Brake_Command | bool | |
| newMode | Level_And_Mode_Types_Pkg::T_Mode | |

## 3.3.10.2.    Operator Hierarchy

<u>diagram</u> : diagram_Operator48_1

<Corporate Info>

### 3.3.10.3.    Graphical and Textual Diagrams

### 3.3.10.3.1.    View of diagram_Operator48_1 (OutputManagement)
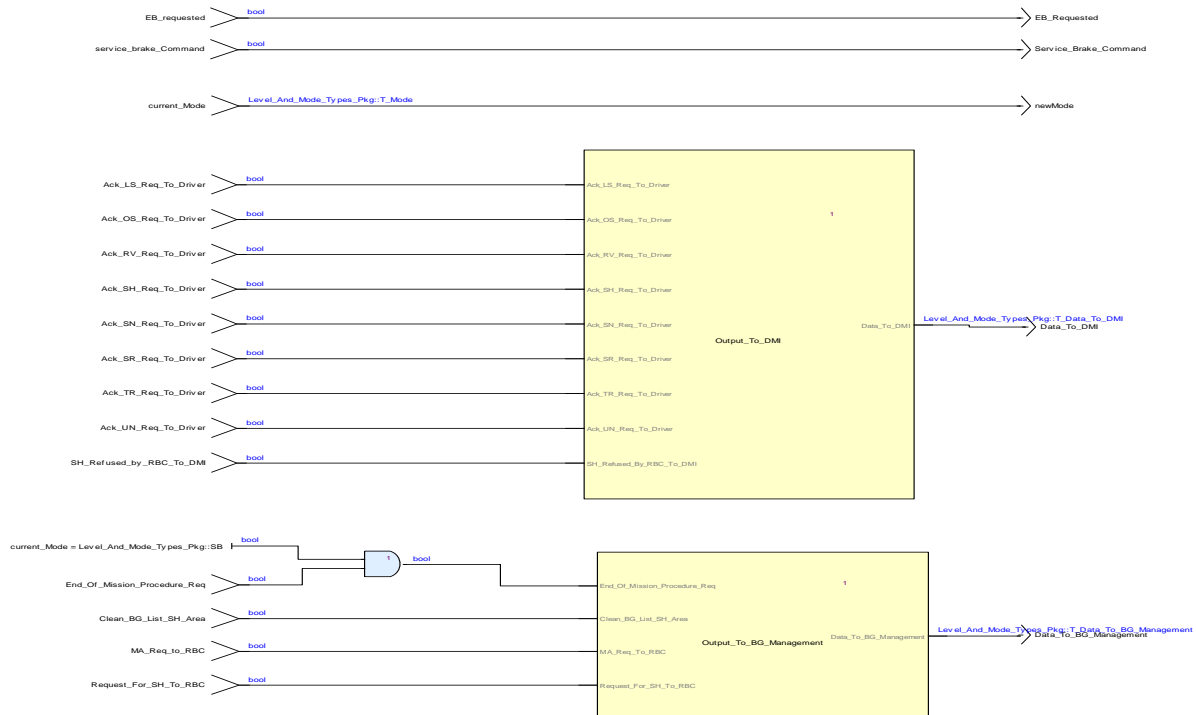


**Figure 27: View of diagram_Operator48_1 (OutputManagement)**

# 3.4. Librairies Package

## 3.4.1.    Mode_Profile_Calculations Operator

Declared as **public function**

### 3.4.1.1.    Interface

**Table 61: Inputs of Mode_Profile_Calculations**

| Name | Type | Comments and Information |
|---|---|---|
| Selected_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| Profile_Mode | Level_And_Mode_Types_Pkg::T_MA | |
| Train_Speed | Obu_BasicTypes_Pkg::Speed_T | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |

**Table 62: Outputs of Mode_Profile_Calculations**

| Name | Type | Comments and Information |
|---|---|---|
| Max_Safe_Front_In_Mode_Profile | bool | |
| Supervision_Condition_In_Mode_Profile | bool | |

| Name | Type | Comments and Information |
|------|------|-------------------------|
| Awaited_Mode_Profile | bool | |
| Estimated_front_End_In_Ack_Area | bool | |

### 3.4.1.2.     Locals

**Table 63: Locals of Mode_Profile_Calculations**

| Name | Type | Comments and Information |
|------|------|-------------------------|
| Condition_Loc | bool | |
| Condition_Ok | bool | |
| Estimated_Front_End | Obu_BasicTypes_Pkg:: Location_T | |
| Loc_MP_Distance | Obu_BasicTypes_Pkg:: Location_T | |
| Loc_MP_Length | Obu_BasicTypes_Pkg:: Location_T | |
| Loc_MP_Length_Ack | Obu_BasicTypes_Pkg:: Location_T | |
| Loc_MP_Mode | Level_And_Mode_Types_Pkg::T_MA | |
| Loc_MP_Speed | Obu_BasicTypes_Pkg:: Speed_T | |
| Max_Safe_Front_End | Obu_BasicTypes_Pkg:: Location_T | |
| Valid_Train_Position | bool | |

### 3.4.1.3.     Operator Hierarchy

diagram : diagram_Operator7_1
    *activate if* : IfBlock2
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else

<Corporate Info>

### 3.4.1.4.     Graphical and Textual Diagrams

#### 3.4.1.4.1.     View of diagram_Operator7_1 (Mode_Profile_Calculations)
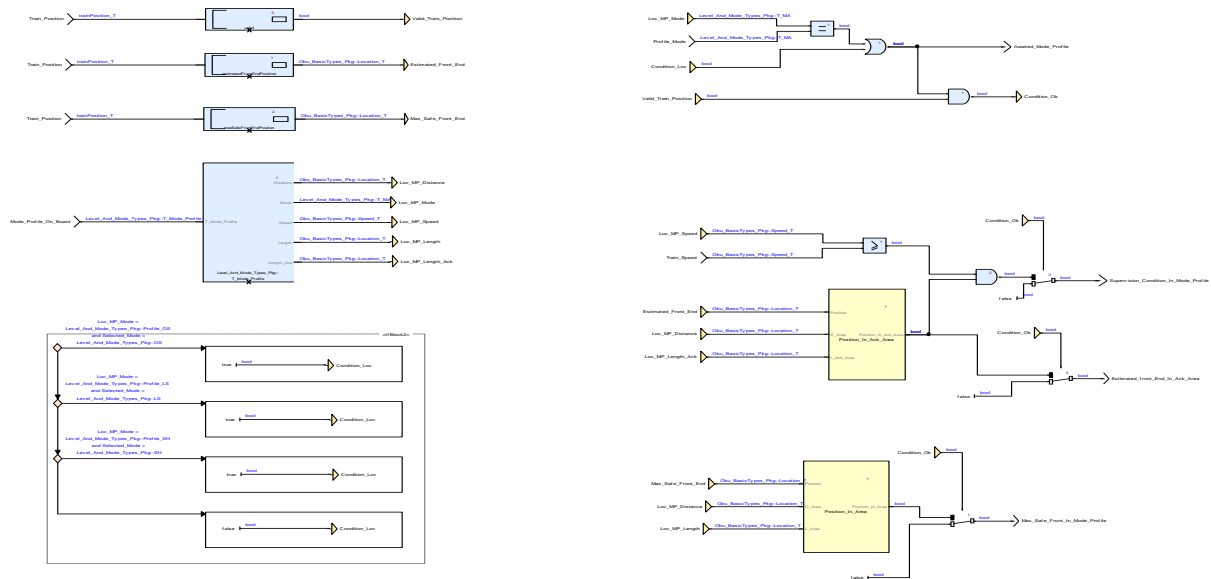


**Figure 28: View of diagram_Operator7_1 (Mode_Profile_Calculations)**

**Table 64: Conditional Blocks of diagram_Operator7_1**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock2 | |

**Table 65: Actions of diagram_Operator7_1**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock2:then | |
| IfBlock2:else:then | |
| IfBlock2:else:else:then | |
| IfBlock2:else:else:else | |

## 3.4.2.     Position_In_Ack_Area Operator

Declared as **public function**

### 3.4.2.1.     Interface

**Table 66: Inputs of Position_In_Ack_Area**

| Name | Type | Comments and Information |
|---|---|---|
| Position | Obu_BasicTypes_Pkg:: Location_T | |
| D_Area | Obu_BasicTypes_Pkg:: Location_T | |
| L_Ack_Area | Obu_BasicTypes_Pkg:: Location_T | |

<Corporate Info>

**Table 67: Outputs of Position_In_Ack_Area**

| Name | Type | Comments and Information |
|---|---|---|
| Position_In_Ack_Area | bool | |

### 3.4.2.2. Operator Hierarchy

diagram : diagram_Position_In_Ack_Area_1

### 3.4.2.3. Graphical and Textual Diagrams

#### 3.4.2.3.1. View of diagram_Position_In_Ack_Area_1 (Position_In_Ack_Area)
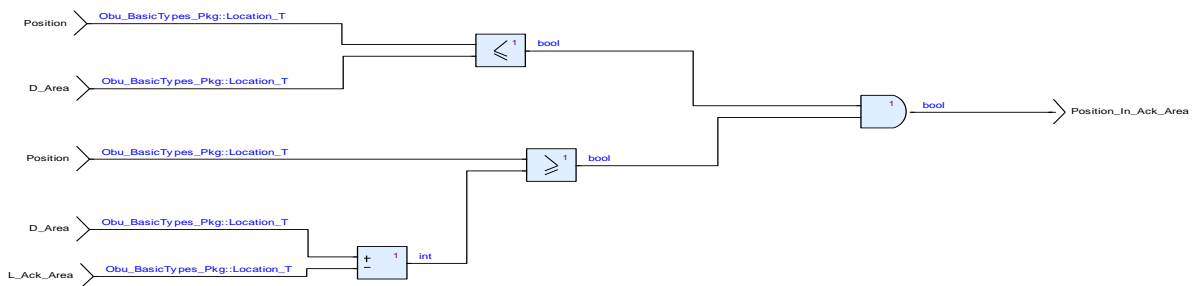


**Figure 29: View of diagram_Position_In_Ack_Area_1 (Position_In_Ack_Area)**

## 3.4.3. Position_In_Area Operator

Declared as **public function**

### 3.4.3.1. Interface

**Table 68: Inputs of Position_In_Area**

| Name | Type | Comments and Information |
|---|---|---|
| Position | Obu_BasicTypes_Pkg:: Location_T | |
| D_Area | Obu_BasicTypes_Pkg:: Location_T | |
| L_Area | Obu_BasicTypes_Pkg:: Location_T | |

**Table 69: Outputs of Position_In_Area**

| Name | Type | Comments and Information |
|---|---|---|
| Position_In_Area | bool | |

### 3.4.3.2. Operator Hierarchy

diagram : diagram_Position_In_Area_1

<Corporate Info>

### 3.4.3.3.       Graphical and Textual Diagrams

### 3.4.3.3.1.       View of diagram_Position_In_Area_1 (Position_In_Area)
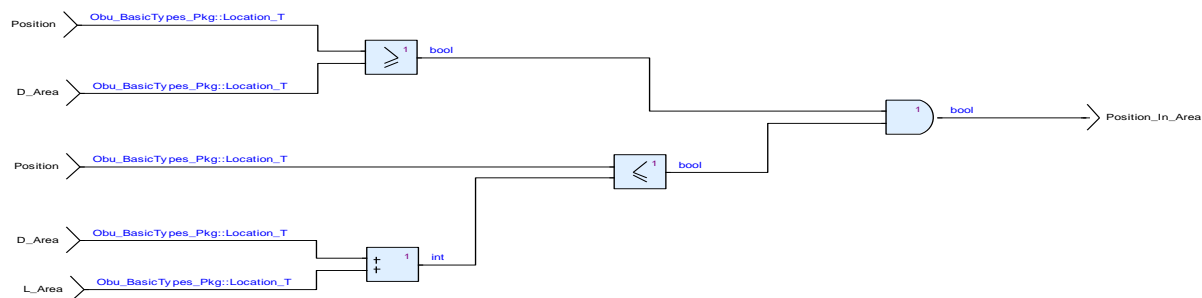


**Figure 30: View of diagram_Position_In_Area_1 (Position_In_Area)**

## 3.4.4.       Reversing_Calculations Operator

Declared as **public function**

### 3.4.4.1.       Interface

**Table 70: Inputs of Reversing_Calculations**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Reversing_Data | Level_And_Mode_Types_Pkg::T_Reversing_Data | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |

**Table 71: Outputs of Reversing_Calculations**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Max_Safe_Front_In_Reverse_Area | bool | |
| RV_Data_Available | bool | |

### 3.4.4.2.       Locals

**Table 72: Locals of Reversing_Calculations**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Loc_RV_Available | bool | |
| Loc_RV_Dist_Start | Obu_BasicTypes_Pkg::Location_T | |
| Loc_RV_Length | Obu_BasicTypes_Pkg::Location_T | |
| Max_Safe_Front_End | Obu_BasicTypes_Pkg::Location_T | |
| Valid_Train_Position | bool | |

### 3.4.4.3.       Operator Hierarchy

diagram : diagram_Operator7_1

<Corporate Info>

### 3.4.4.4.          Graphical and Textual Diagrams

### 3.4.4.4.1.          View of diagram_Operator7_1 (Reversing_Calculations)



**Figure 31: View of diagram_Operator7_1 (Reversing_Calculations)**

# 3.5. PriorityManagement Package

### 3.5.1.          From_FS Operator

Declared as **public function**

### 3.5.1.1.          Interface

**Table 73: Inputs of From_FS**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition13 | bool | |
| Condition15 | bool | |
| Condition21 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition37 | bool | |
| Condition40 | bool | |
| Condition46 | bool | |
| Condition50 | bool | |
| Condition51 | bool | |
| Condition56 | bool | |
| Condition59 | bool | |
| Condition70 | bool | |
| Condition72 | bool | |
| ConditionFS2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

<Corporate Info>

**Table 74: Outputs of From_FS**

| Name | Type | Comments and Information |
|---|---|---|
| FromFS_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

## 3.5.1.2. Locals

**Table 75: Locals of From_FS**

| Name | Type | Comments and Information |
|---|---|---|
| Condition2LS | bool | |
| Condition2OS | bool | |
| Condition2SH | bool | |

## 3.5.1.3. Operator Hierarchy

diagram : diagram_From_FS
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else
                    branch : then
                    branch : else
                        branch : then
                        branch : else
                            branch : then
                            branch : else
                                branch : then
                                branch : else
                                    branch :

then

else

branch : then

branch : else

branch : then

branch : else

<Corporate Info>

## 3.5.1.4.   Graphical and Textual Diagrams

### 3.5.1.4.1.   View of diagram_From_FS (From_FS)



**Figure 32: View of diagram_From_FS (From_FS)**

**Table 76: Conditional Blocks of diagram_From_FS**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 77: Actions of diagram_From_FS**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |

<Corporate Info>

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:else | |

## 3.5.2.      From_LS Operator

Declared as **public function**

### 3.5.2.1.      Interface

**Table 78: Inputs of From_LS**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition13 | bool | |
| Condition15 | bool | |
| Condition21 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition31 | bool | |
| Condition32 | bool | |
| Condition37 | bool | |
| Condition46 | bool | |
| Condition50 | bool | |
| Condition51 | bool | |
| Condition56 | bool | |
| Condition59 | bool | |
| Condition73 | bool | |
| ConditionLS2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

<Corporate Info>

**Table 79: Outputs of From_LS**

| Name | Type | Comments and Information |
|---|---|---|
| FromLS_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.2.2. Locals

**Table 80: Locals of From_LS**

| Name | Type | Comments and Information |
|---|---|---|
| Condition2FS | bool | |
| Condition2OS | bool | |
| Condition2SH | bool | |

### 3.5.2.3. Operator Hierarchy

diagram : diagram_From_LS
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else
                    branch : then
                    branch : else
                        branch : then
                        branch : else
                            branch : then
                            branch : else
                                branch : then
                                branch : else
                                    branch :

then

else

branch : then

branch : else

branch : then

branch : else

<Corporate Info>

### 3.5.2.4.    Graphical and Textual Diagrams

### 3.5.2.4.1.    View of diagram_From_LS (From_LS)
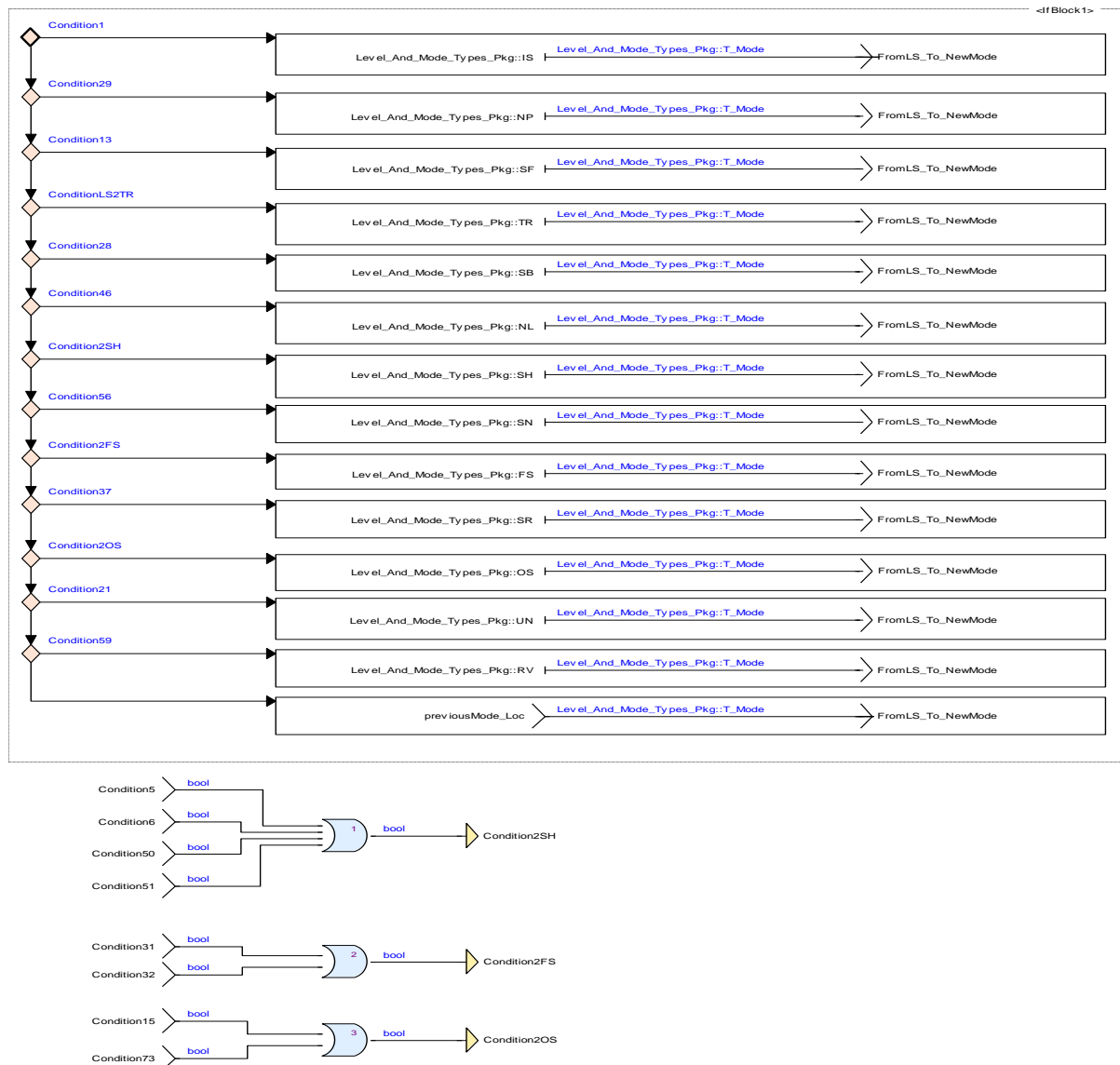


**Figure 33: View of diagram_From_LS (From_LS)**

**Table 81: Conditional Blocks of diagram_From_LS**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 82: Actions of diagram_From_LS**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |

<Corporate Info>

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:else | |

## 3.5.3.    From_NL Operator

Declared as **public function**

### 3.5.3.1.    Interface

**Table 83: Inputs of From_NL**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition47 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 84: Outputs of From_NL**

| Name | Type | Comments and Information |
|---|---|---|
| FromNL_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.3.2.    Operator Hierarchy

<u>diagram</u> : diagram_From_NL
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else

### 3.5.3.3.    Graphical and Textual Diagrams

#### 3.5.3.3.1.    View of diagram_From_NL (From_NL)



**Figure 34: View of diagram_From_NL (From_NL)**

**Table 85: Conditional Blocks of diagram_From_NL**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 86: Actions of diagram_From_NL**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else | |

## 3.5.4.    From_NP Operator

Declared as **public function**

### 3.5.4.1.    Interface

**Table 87: Inputs of From_NP**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition4 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 88: Outputs of From_NP**

| Name | Type | Comments and Information |
|---|---|---|
| FromNP_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

<Corporate Info>

### 3.5.4.2. Operator Hierarchy

<u>diagram</u> : diagram_From_NP
   *activate if* : IfBlock1
     branch : then
     branch : else
       branch : then
       branch : else

### 3.5.4.3. Graphical and Textual Diagrams

### 3.5.4.3.1. View of diagram_From_NP (From_NP)



**Figure 35: View of diagram_From_NP (From_NP)**

**Table 89: Conditional Blocks of diagram_From_NP**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 90: Actions of diagram_From_NP**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else | |

## 3.5.5. From_OS Operator

Declared as **public function**

### 3.5.5.1. Interface

**Table 91: Inputs of From_OS**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition13 | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition21 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition31 | bool | |
| Condition32 | bool | |
| Condition37 | bool | |
| Condition46 | bool | |
| Condition50 | bool | |
| Condition51 | bool | |
| Condition56 | bool | |
| Condition59 | bool | |
| Condition70 | bool | |
| Condition74 | bool | |
| ConditionOS2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 92: Outputs of From_OS**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| FromOS_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

## 3.5.5.2.     Locals

**Table 93: Locals of From_OS**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition2FS | bool | |
| Condition2LS | bool | |
| Condition2SH | bool | |

## 3.5.5.3.     Operator Hierarchy

<u>diagram</u> : diagram_From_OS
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else
                    branch : then
                    branch : else
                        branch : then
                        branch : else
                            branch : then
                            branch : else

<Corporate Info>

                                                                    branch : then
                                                                    branch : else
                                                                          branch : then
                                                                          branch : else
                                                                                branch : then
                                                                                branch : else
                                                                                      branch : then
                                                                                      branch : else
                                                                                            branch :

                                                                                            branch :

then

else

branch : then

branch : else

branch : then

branch : else

<Corporate Info>

### 3.5.5.4.　　　Graphical and Textual Diagrams

#### 3.5.5.4.1.　　　View of diagram_From_OS (From_OS)
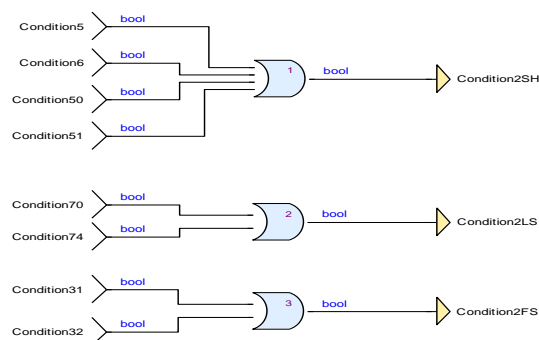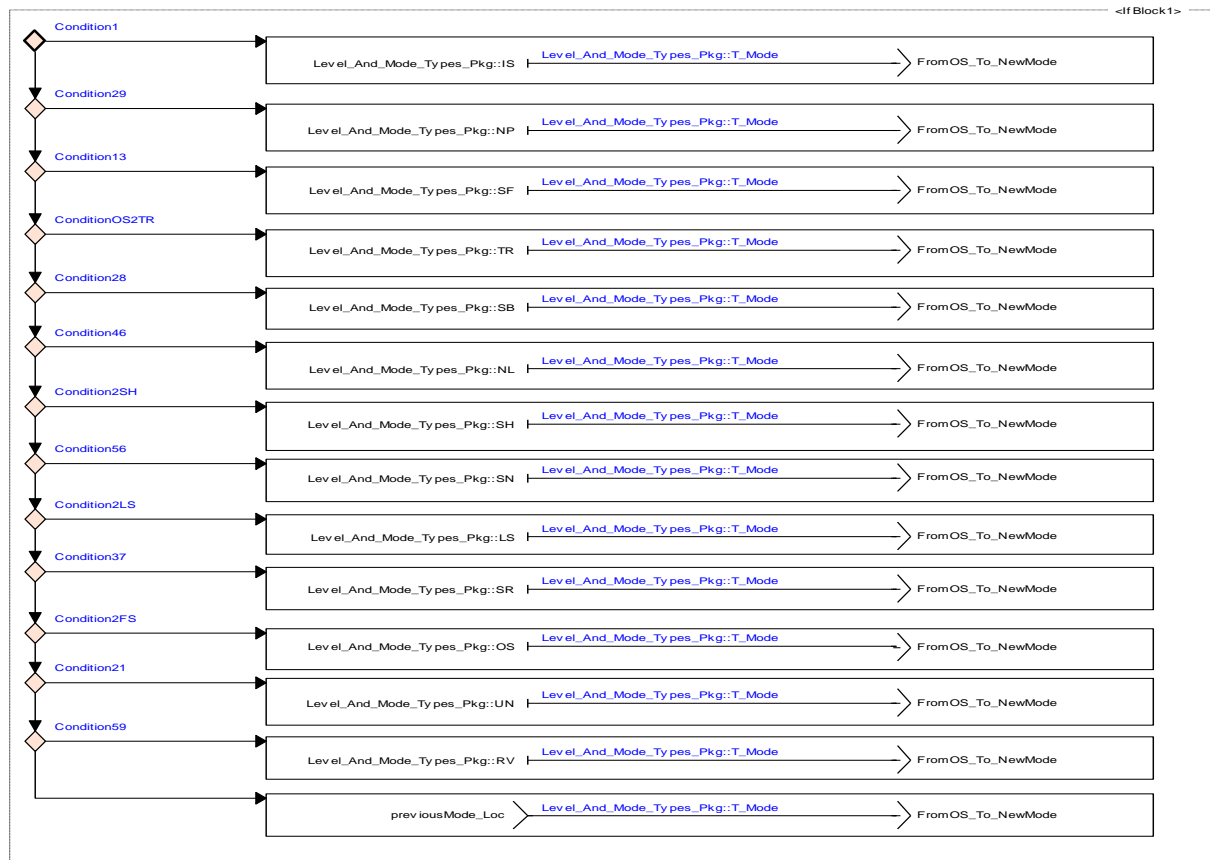


**Figure 36: View of diagram_From_OS (From_OS)**

**Table 94: Conditional Blocks of diagram_From_OS**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 95: Actions of diagram_From_OS**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:else | |

## 3.5.6.  From_PS Operator

Declared as **public function**

### 3.5.6.1.  Interface

**Table 96: Inputs of From_PS**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition13 | bool | |
| Condition14 | bool | |
| Condition22 | bool | |
| Condition23 | bool | |
| Condition29 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 97: Outputs of From_PS**

| Name | Type | Comments and Information |
|---|---|---|
| FromPS_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.6.2.  Operator Hierarchy

<u>diagram</u> : diagram_From_PS
    *activate if* : IfBlock1
        branch : then

<Corporate Info>

```
branch : else
        branch : then
        branch : else
                branch : then
                branch : else
                        branch : then
                        branch : else
                                branch : then
                                branch : else
                                        branch : then
                                        branch : else
```

## 3.5.6.3.    Graphical and Textual Diagrams

### 3.5.6.3.1.    View of diagram_From_PS (From_PS)



**Figure 37: View of diagram_From_PS (From_PS)**

**Table 98: Conditional Blocks of diagram_From_PS**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 99: Actions of diagram_From_PS**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else | |

<Corporate Info>

## 3.5.7. From_PT Operator

Declared as **public function**

### 3.5.7.1. Interface

**Table 100: Inputs of From_PT**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition8 | bool | |
| Condition13 | bool | |
| Condition15 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition31 | bool | |
| Condition37 | bool | |
| Condition50 | bool | |
| Condition70 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 101: Outputs of From_PT**

| Name | Type | Comments and Information |
|---|---|---|
| FromPT_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.7.2. Locals

**Table 102: Locals of From_PT**

| Name | Type | Comments and Information |
|---|---|---|
| Condition2SH | bool | |
| Condition2SR | bool | |

### 3.5.7.3. Operator Hierarchy

<u>diagram</u> : diagram_From_PT
        *activate if* : IfBlock1
                branch : then
                branch : else
                        branch : then
                        branch : else
                                branch : then
                                branch : else
                                        branch : then
                                        branch : else
                                                branch : then

<Corporate Info>

branch : else
 branch : then
branch : else
 branch : then
 branch : else
 branch : then
 branch : else
 branch : then
 branch : else

## 3.5.7.4.          Graphical and Textual Diagrams

### 3.5.7.4.1.          View of diagram_From_PT (From_PT)
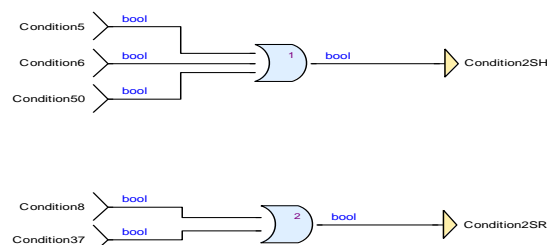


**Figure 38: View of diagram_From_PT (From_PT)**

<Corporate Info>

**Table 103: Conditional Blocks of diagram_From_PT**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 104: Actions of diagram_From_PT**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else | |

## 3.5.8.    From_RV Operator

Declared as **public function**

### 3.5.8.1.    Interface

**Table 105: Inputs of From_RV**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition13 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 106: Outputs of From_RV**

| Name | Type | Comments and Information |
|---|---|---|
| FromRV_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.8.2.    Operator Hierarchy

diagram : diagram_From_RV
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else

<Corporate Info>

```
branch : then
branch : else
        branch : then
        branch : else
```

## 3.5.8.3.   Graphical and Textual Diagrams

### 3.5.8.3.1.   View of diagram_From_RV (From_RV)



**Figure 39: View of diagram_From_RV (From_RV)**

**Table 107: Conditional Blocks of diagram_From_RV**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 108: Actions of diagram_From_RV**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else | |

## 3.5.9.   From_SB Operator

Declared as **public function**

### 3.5.9.1.   Interface

**Table 109: Inputs of From_SB**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition8 | bool | |
| Condition10 | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition13 | bool | |
| Condition14 | bool | |
| Condition15 | bool | |
| Condition29 | bool | |
| Condition37 | bool | |
| Condition46 | bool | |
| Condition50 | bool | |
| Condition58 | bool | |
| Condition60 | bool | |
| Condition70 | bool | |
| ConditionSB2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 110: Outputs of From_SB**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| FromSB_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.9.2.    Locals

**Table 111: Locals of From_SB**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition2SH | bool | |
| Condition2SR | bool | |

### 3.5.9.3.    Operator Hierarchy

<u>diagram</u> : diagram_From_SB
    *activate if* : IfBlock1
          branch : then
          branch : else
               branch : then
               branch : else
                    branch : then
                    branch : else
                        branch : then
                        branch : else
                             branch : then
                             branch : else
                                  branch : then
                                  branch : else
                                        branch : then
                                        branch : else
                                            branch : then

<Corporate Info>

branch : else
branch : then
branch : else
branch :

branch :

then

else

branch : then

branch : else

branch : then

branch : else

<Corporate Info>

### 3.5.9.4.    Graphical and Textual Diagrams

### 3.5.9.4.1.    View of diagram_From_SB (From_SB)



**Figure 40: View of diagram_From_SB (From_SB)**

**Table 112: Conditional Blocks of diagram_From_SB**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 113: Actions of diagram_From_SB**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |

<Corporate Info>

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:else | |

## 3.5.10.  From_SF Operator

Declared as **public function**

### 3.5.10.1.  Interface

**Table 114: Inputs of From_SF**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition29 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 115: Outputs of From_SF**

| Name | Type | Comments and Information |
|---|---|---|
| FromSF_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.10.2.  Operator Hierarchy

diagram : diagram_From_SF
  *activate if* : IfBlock1
    branch : then
    branch : else
      branch : then
      branch : else

<Corporate Info>

### 3.5.10.3.    Graphical and Textual Diagrams
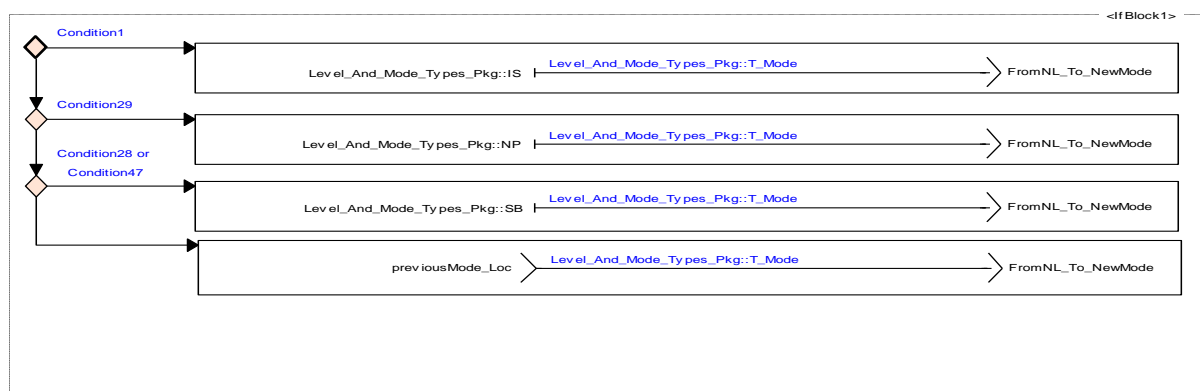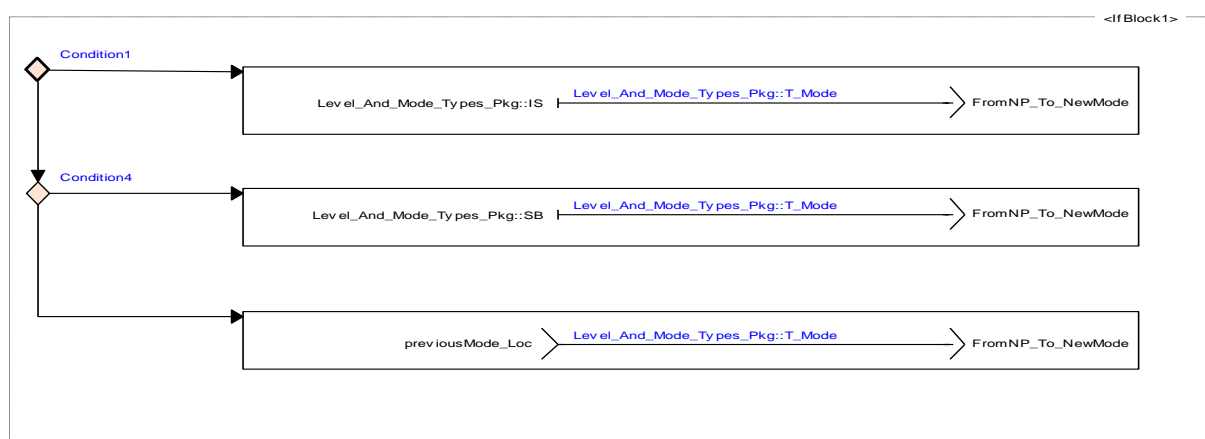
### 3.5.10.3.1.    View of diagram_From_SF (From_SF)



**Figure 41: View of diagram_From_SF (From_SF)**

**Table 116: Conditional Blocks of diagram_From_SF**

| Conditional Block | Comments and Information |
| --- | --- |
| IfBlock1 | |

**Table 117: Actions of diagram_From_SF**

| Conditional Block Action | Comments and Information |
| --- | --- |
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else | |

## 3.5.11.    From_SH Operator

Declared as **`public function`**

### 3.5.11.1.    Interface

**Table 118: Inputs of From_SH**

| Name | Type | Comments and Information |
| --- | --- | --- |
| Condition1 | bool | |
| Condtition13 | bool | |
| Condition19 | bool | |
| Condition26 | bool | |
| Condition27 | bool | |
| Condition29 | bool | |
| Condition30 | bool | |
| Condition46 | bool | |
| ConditionSH2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

<Corporate Info>

**Table 119: Outputs of From_SH**

| Name | Type | Comments and Information |
|------|------|-------------------------|
| FromSH_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.11.2.   Locals

**Table 120: Locals of From_SH**

| Name | Type | Comments and Information |
|------|------|-------------------------|
| Condition2SB | bool | |

### 3.5.11.3.   Operator Hierarchy

<u>diagram</u> : diagram_From_SH
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else
                    branch : then
                    branch : else
                        branch : then
                        branch : else
                            branch : then
                            branch : else

<Corporate Info>

### 3.5.11.4.    Graphical and Textual Diagrams

### 3.5.11.4.1.    View of diagram_From_SH (From_SH)



**Figure 42: View of diagram_From_SH (From_SH)**

**Table 121: Conditional Blocks of diagram_From_SH**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 122: Actions of diagram_From_SH**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else | |

### 3.5.12.    From_SL Operator

Declared as **public function**

<Corporate Info>

### 3.5.12.1.     Interface

**Table 123: Inputs of From_SL**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition1 | bool | |
| Condition3 | bool | |
| Condition2 | bool | |
| Condition29 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 124: Outputs of From_SL**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| FromSL_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.12.2.     Operator Hierarchy

<u>diagram</u> : diagram_From_SL
  *activate if* : IfBlock1
    branch : then
    branch : else
      branch : then
      branch : else
        branch : then
        branch : else
          branch : then
          branch : else

### 3.5.12.3.     Graphical and Textual Diagrams

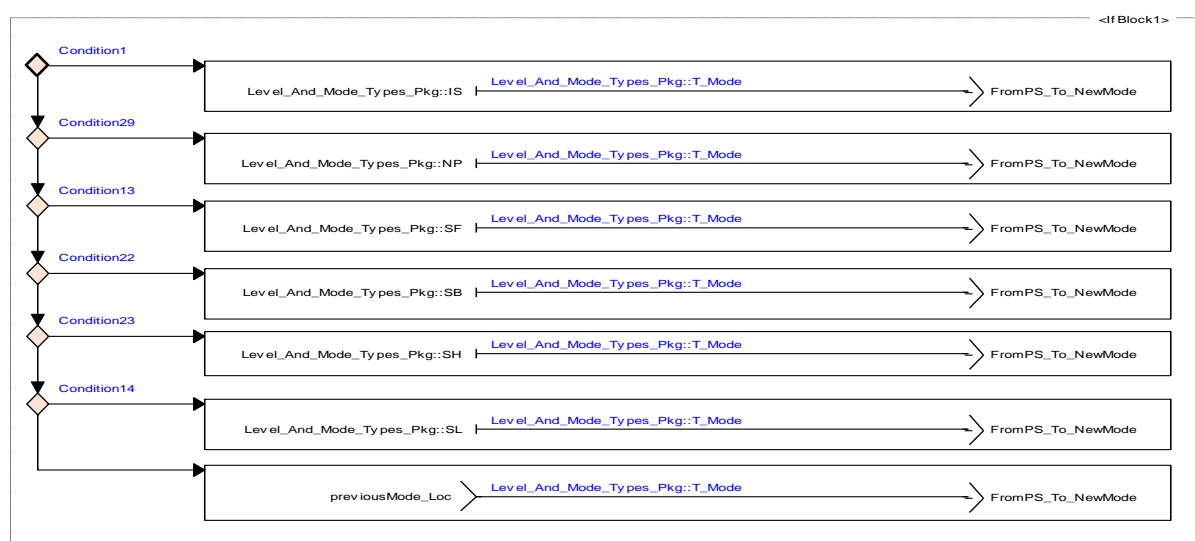### 3.5.12.3.1.     View of diagram_From_SL (From_SL)



**Figure 43: View of diagram_From_SL (From_SL)**

**Table 125: Conditional Blocks of diagram_From_SL**

| Conditional Block | Comments and Information |
|-------------------|--------------------------|
| IfBlock1 | |

**Table 126: Actions of diagram_From_SL**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else | |

## 3.5.13.    From_SN Operator

Declared as **public function**

### 3.5.13.1.    Interface

**Table 127: Inputs of From_SN**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition13 | bool | |
| Condition21 | bool | |
| Condition25 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition34 | bool | |
| Condition44 | bool | |
| Condition45 | bool | |
| Condition61 | bool | |
| Condition71 | bool | |
| ConditionSN2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 128: Outputs of From_SN**

| Name | Type | Comments and Information |
|---|---|---|
| FromSN_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.13.2.    Locals

**Table 129: Locals of From_SN**

| Name | Type | Comments and Information |
|---|---|---|
| Condition2SH | bool | |
| Condition2SR | bool | |

<Corporate Info>

### 3.5.13.3.    Operator Hierarchy

<u>diagram</u> : diagram_From_SN
        *activate if* : IfBlock1
                branch : then
                branch : else
                        branch : then
                        branch : else
                                branch : then
                                branch : else
                                        branch : then
                                        branch : else
                                                branch : then
                                                branch : else
                                                        branch : then
                                                        branch : else
                                                                branch : then
                                                                branch : else
                                                                        branch : then
                                                                        branch : else
                                                                                branch :
then
                                                                                branch :
else

<Corporate Info>

### 3.5.13.4.     Graphical and Textual Diagrams

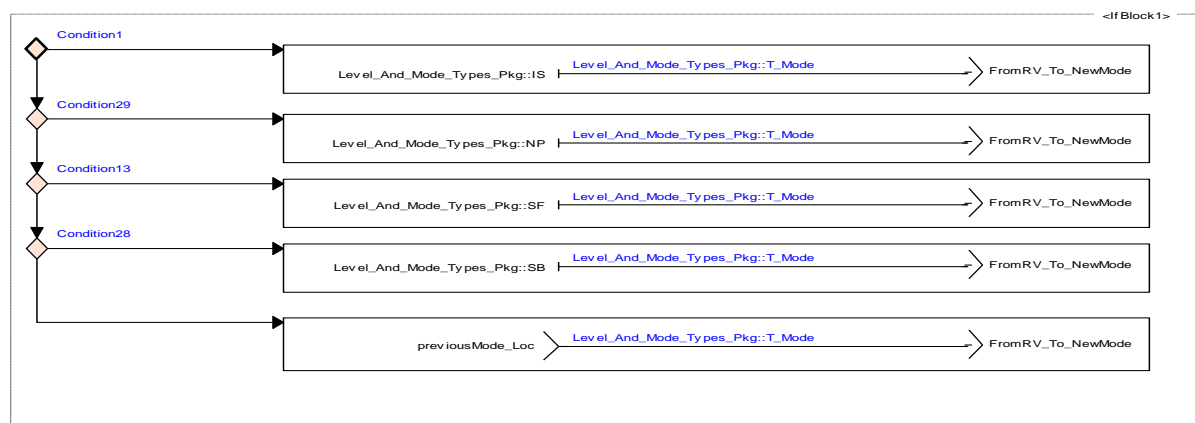### 3.5.13.4.1.     View of diagram_From_SN (From_SN)





**Figure 44: View of diagram_From_SN (From_SN)**

**Table 130: Conditional Blocks of diagram_From_SN**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 131: Actions of diagram_From_SN**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |

<Corporate Info>

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else | |

## 3.5.14.    From_SR Operator

Declared as **public function**

### 3.5.14.1.    Interface

**Table 132: Inputs of From_SR**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition6 | bool | |
| Condition13 | bool | |
| Condition21 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition31 | bool | |
| Condition32 | bool | |
| Condition40 | bool | |
| Condition46 | bool | |
| Condition51 | bool | |
| Condition56 | bool | |
| Condition59 | bool | |
| Condition72 | bool | |
| ConditionSR2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

<Corporate Info>

**Table 133: Outputs of From_SR**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| FromSR_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

## 3.5.14.2.    Locals

**Table 134: Locals of From_SR**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition2FS | bool | |
| Condition2SH | bool | |

## 3.5.14.3.    Operator Hierarchy

diagram : diagram_From_SR
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else
                    branch : then
                    branch : else
                        branch : then
                        branch : else
                            branch : then
                            branch : else
                                branch : then
                                branch : else
                                    branch : then
                                    branch : else
                                        branch :

then

else

branch : then

branch : else

branch : then

branch : else

<Corporate Info>

### 3.5.14.4.    Graphical and Textual Diagrams
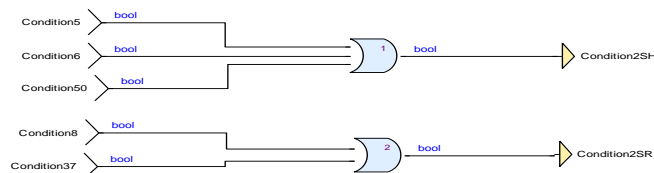
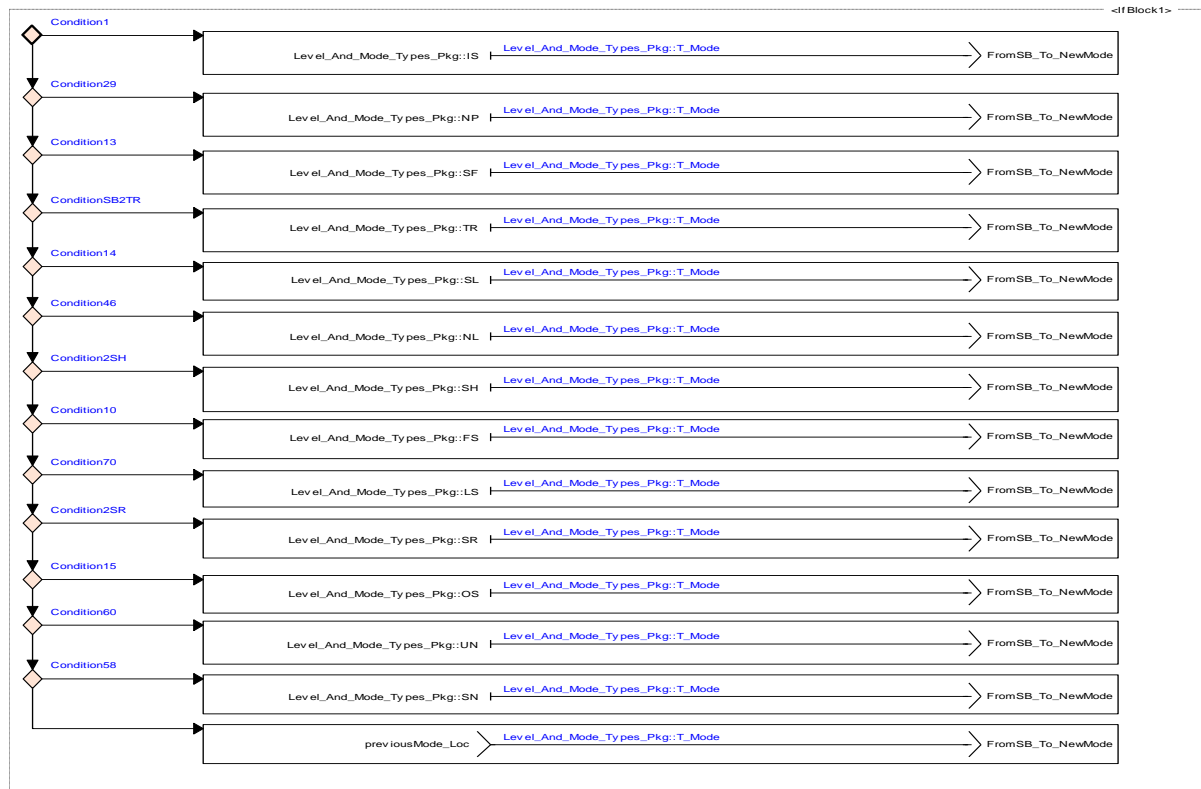### 3.5.14.4.1.    View of diagram_From_SR (From_SR)
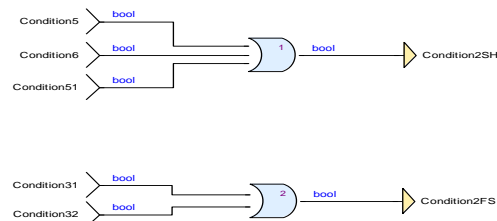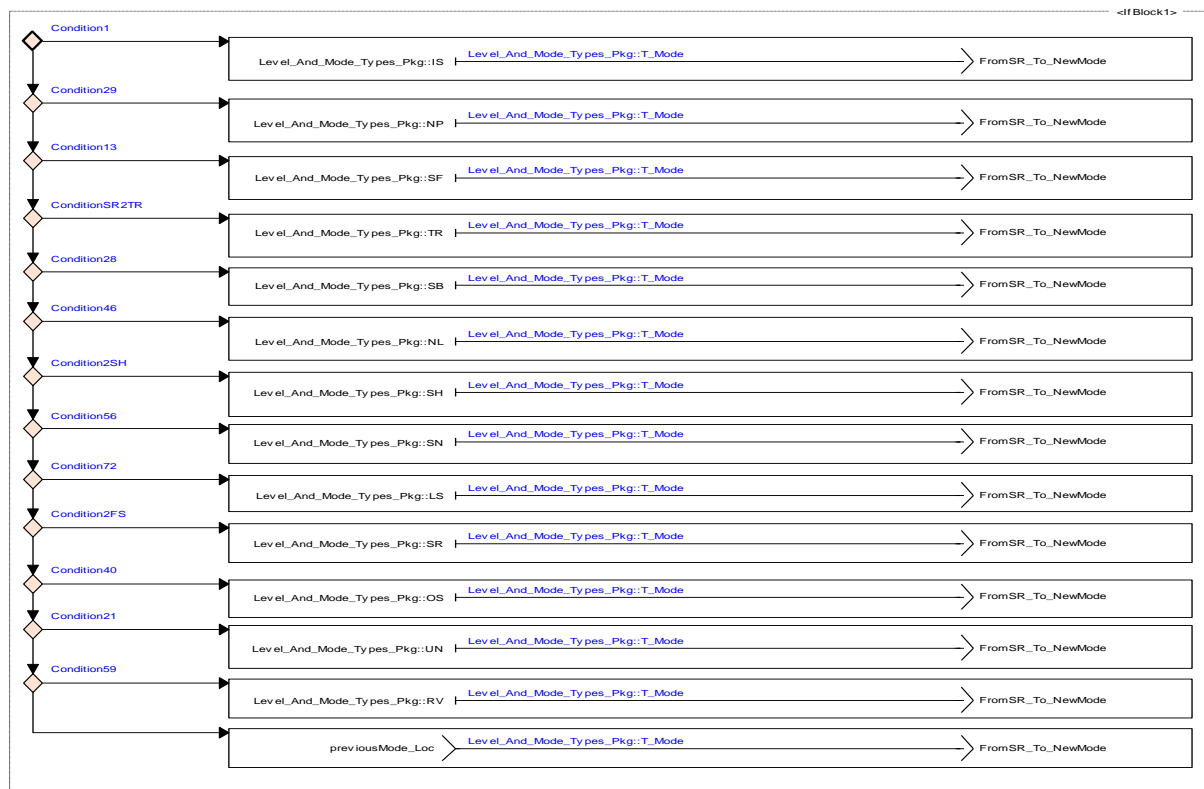


**Figure 45: View of diagram_From_SR (From_SR)**

**Table 135: Conditional Blocks of diagram_From_SR**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 136: Actions of diagram_From_SR**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |

<Corporate Info>

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else:else:else:else:else:else:else:else:else | |

## 3.5.15.    From_TR Operator

Declared as **public function**

### 3.5.15.1.    Interface

**Table 137: Inputs of From_TR**

| Name | Type | Comments and Information |
|---|---|---|
| Condition1 | bool | |
| Condition7 | bool | |
| Condition13 | bool | |
| Condition29 | bool | |
| Condition62 | bool | |
| Condition63 | bool | |
| Condition68 | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 138: Outputs of From_TR**

| Name | Type | Comments and Information |
|---|---|---|
| FromTR_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.15.2.    Operator Hierarchy

<u>diagram</u> : diagram_From_TR
        *activate if* : IfBlock1
                branch : then
                branch : else
                        branch : then
                        branch : else
                                branch : then

<Corporate Info>

```
branch : else
        branch : then
        branch : else
                branch : then
                branch : else
                        branch : then
                        branch : else
                                branch : then
                                branch : else
```

## 3.5.15.3.    Graphical and Textual Diagrams
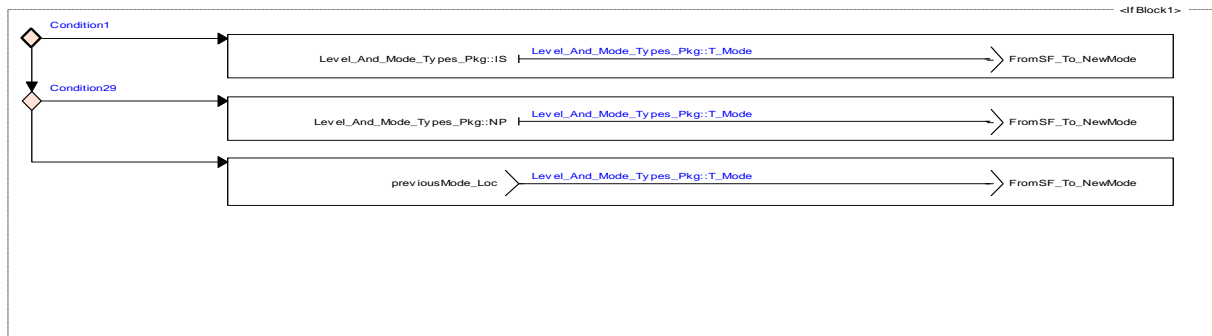
### 3.5.15.3.1.    View of diagram_From_TR (From_TR)
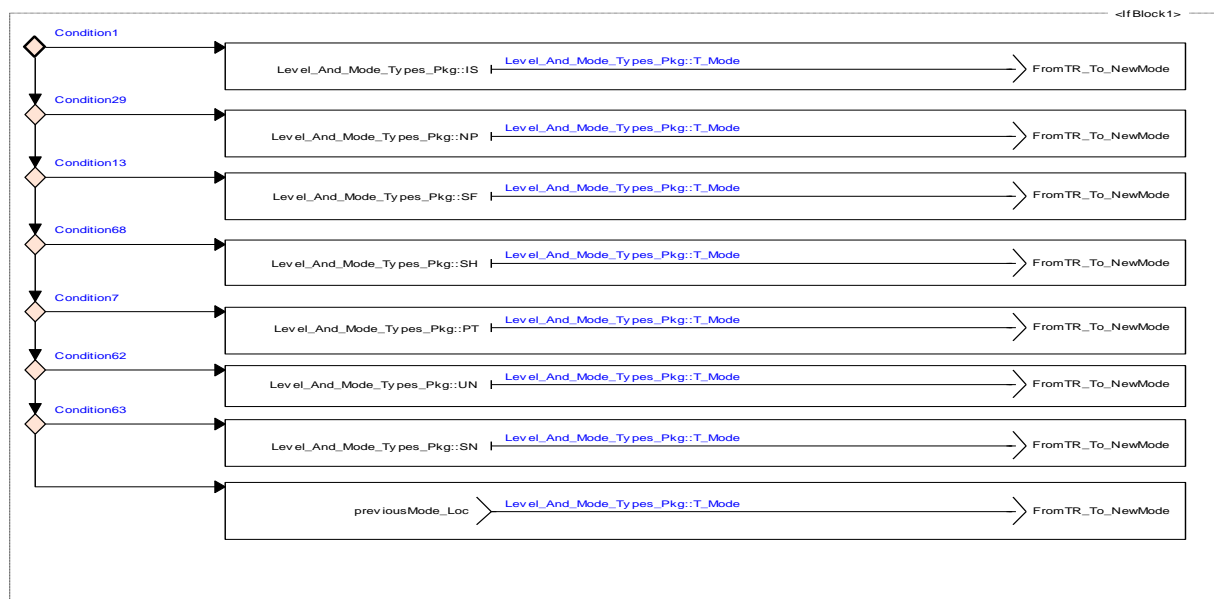


**Figure 46: View of diagram_From_TR (From_TR)**

**Table 139: Conditional Blocks of diagram_From_TR**

| Conditional Block | Comments and Information |
|---|---|
| IfBlock1 | |

**Table 140: Actions of diagram_From_TR**

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else | |

<Corporate Info>

## 3.5.16.     From_UN Operator

Declared as **public function**

### 3.5.16.1.     Interface

**Table 141: Inputs of From_UN**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition1 | bool | |
| Condition5 | bool | |
| Condition13 | bool | |
| Condition25 | bool | |
| Condition28 | bool | |
| Condition29 | bool | |
| Condition34 | bool | |
| Condition44 | bool | |
| Condition45 | bool | |
| Condition56 | bool | |
| Condition61 | bool | |
| Condition71 | bool | |
| ConditionUN2TR | bool | |
| previousMode_Loc | Level_And_Mode_Types_Pkg::T_Mode | |

**Table 142: Outputs of From_UN**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| FromUN_To_NewMode | Level_And_Mode_Types_Pkg::T_Mode | |

### 3.5.16.2.     Locals

**Table 143: Locals of From_UN**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition2SH | bool | |
| Condition2SR | bool | |

### 3.5.16.3.     Operator Hierarchy

diagram : diagram_From_UN
    *activate if* : IfBlock1
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else
                    branch : then
                    branch : else

<Corporate Info>

branch : then
branch : else
    branch : then
    branch : else
        branch : then
        branch : else
            branch : then
            branch : else
                branch : then
                branch : else
                    branch : then
                    branch : else
                        branch :

                            branch :
then

else

<Corporate Info>

### 3.5.16.4.    Graphical and Textual Diagrams
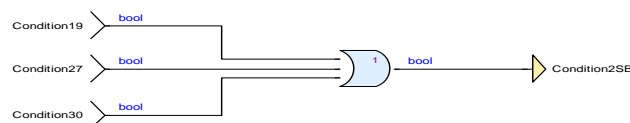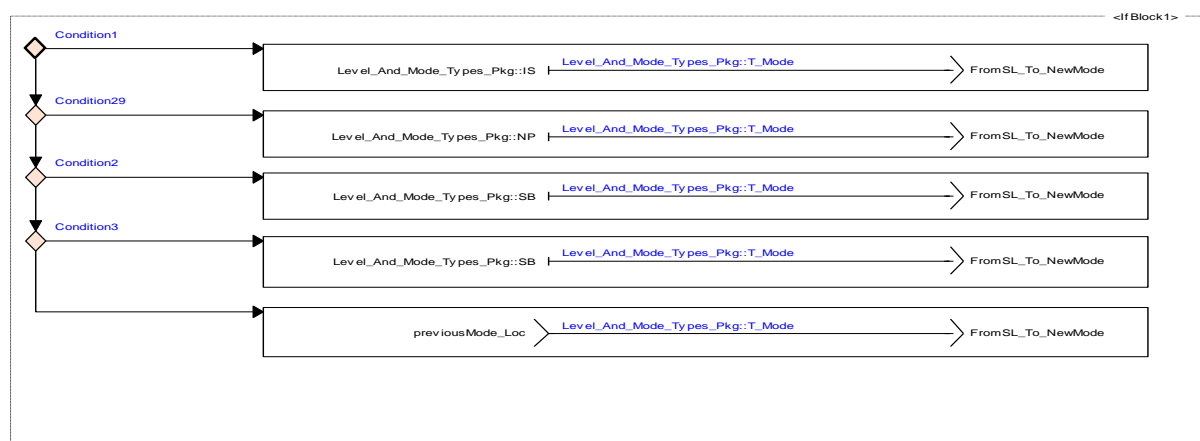
### 3.5.16.4.1.    View of diagram_From_UN (From_UN)



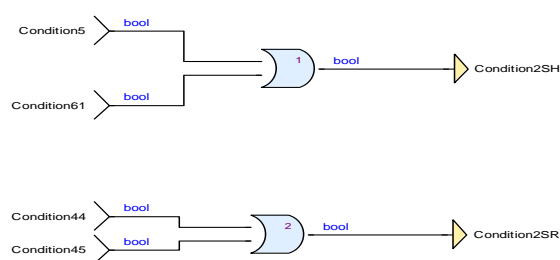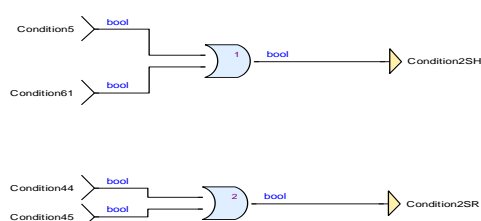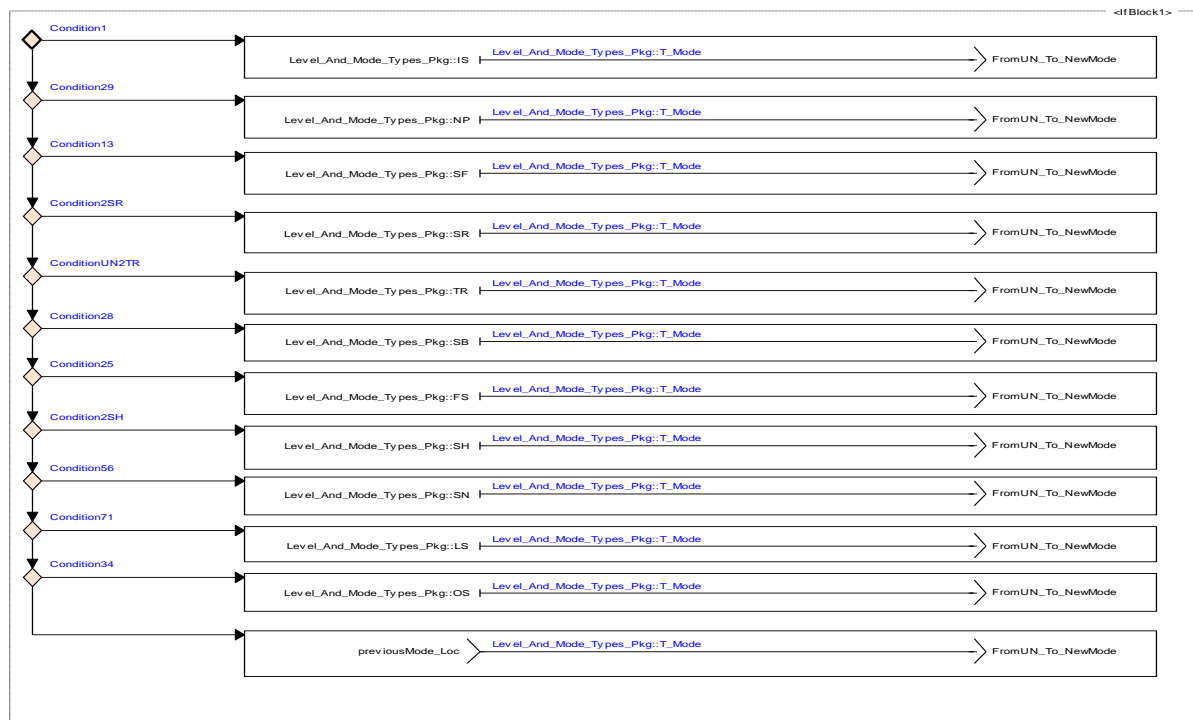**Figure 47: View of diagram_From_UN (From_UN)**

**Table 144: Conditional Blocks of diagram_From_UN**

| Conditional Block | Comments and Information |
| --- | --- |
| IfBlock1 | |

**Table 145: Actions of diagram_From_UN**

| Conditional Block Action | Comments and Information |
| --- | --- |
| IfBlock1:then | |
| IfBlock1:else:then | |
| IfBlock1:else:else:then | |

<Corporate Info>

| Conditional Block Action | Comments and Information |
|---|---|
| IfBlock1:else:else:else:then | |
| IfBlock1:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else :then | |
| IfBlock1:else:else:else:else:else:else:else :else:then | |
| IfBlock1:else:else:else:else:else:else:else :else:else:then | |
| IfBlock1:else:else:else:else:else:else:else :else:else:else:then | |
| IfBlock1:else:else:else:else:else:else:else :else:else:else:else | |

# 3.6. Procedures Package

## 3.6.1.       Procedure_LimitedSupervision Operator

Declared as **public node**

### 3.6.1.1.     Comments and Information

**Procedure_LimitedSupervision Comments:**
Case of starting mode is SB or PT is covered by the start of mission procedure and the train-trip procedure.

### 3.6.1.2.     Interface

**Table 146: Inputs of Procedure_LimitedSupervision**

| Name | Type | Comments and Information |
|---|---|---|
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Driver_Ack_LS | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |
| Train_Speed | Obu_BasicTypes_Pkg::Speed_T | |

**Table 147: Outputs of Procedure_LimitedSupervision**

| Name | Type | Comments and Information |
|---|---|---|
| Condition70 | bool | |
| Condition71 | bool | |
| Condition72 | bool | |

<Corporate Info>

| Name | Type | Comments and Information |
|---|---|---|
| Condition74 | bool | **Comments:**<br>§4.6.3 : Condition 74 : "((A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area) AND (The estimated front end of the train is not inside an OS acknowledgement area)" |
| Ack_LS_Req_To_Driver | bool | |
| Service_Brake_Command | bool | |

### 3.6.1.3.    Locals

**Table 148: Locals of Procedure_LimitedSupervision**

| Name | Type | Comments and Information |
|---|---|---|
| Loc_Condition_74 | bool | |
| Loc_Procedure_Possible | bool | |
| Loc_Supervision_Mode | bool | |

### 3.6.1.4.    Operator Hierarchy

<u>diagram</u> : diagram_Procedure_LimitedSupervision_1

### 3.6.1.5.    Graphical and Textual Diagrams

#### 3.6.1.5.1.    View of diagram_Procedure_LimitedSupervision_1 (Procedure_LimitedSupervision)
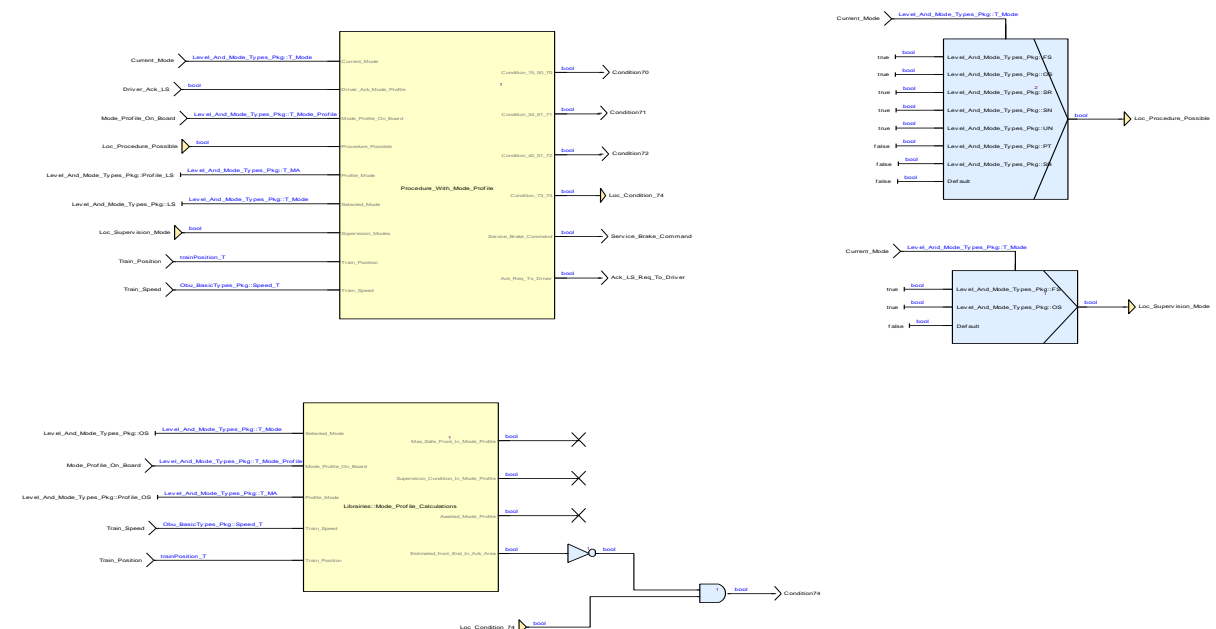


**Figure 48: View of diagram_Procedure_LimitedSupervision_1 (Procedure_LimitedSupervision)**

### 3.6.2.    Procedure_OnSight Operator

Declared as **public node**

<Corporate Info>

### 3.6.2.1.    Interface

**Table 149: Inputs of Procedure_OnSight**

| Name | Type | Comments and Information |
|---|---|---|
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Driver_Ack_OS | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |
| Train_Speed | Obu_BasicTypes_Pkg::Speed_T | |

**Table 150: Outputs of Procedure_OnSight**

| Name | Type | Comments and Information |
|---|---|---|
| Condition15 | bool | |
| Condition34 | bool | |
| Condition40 | bool | |
| Condition73 | bool | |
| Ack_OS_Req_To_Driver | bool | |
| Service_Brake_Command | bool | |

### 3.6.2.2.    Locals

**Table 151: Locals of Procedure_OnSight**

| Name | Type | Comments and Information |
|---|---|---|
| Loc_Condition_73 | bool | |
| Loc_Procedure_Possible | bool | |
| Loc_Supervision_Mode | bool | |

### 3.6.2.3.    Operator Hierarchy

diagram : diagram_Procedure_OnSight_1

<Corporate Info>

### 3.6.2.4.     Graphical and Textual Diagrams

#### 3.6.2.4.1.    View of diagram_Procedure_OnSight_1 (Procedure_OnSight)
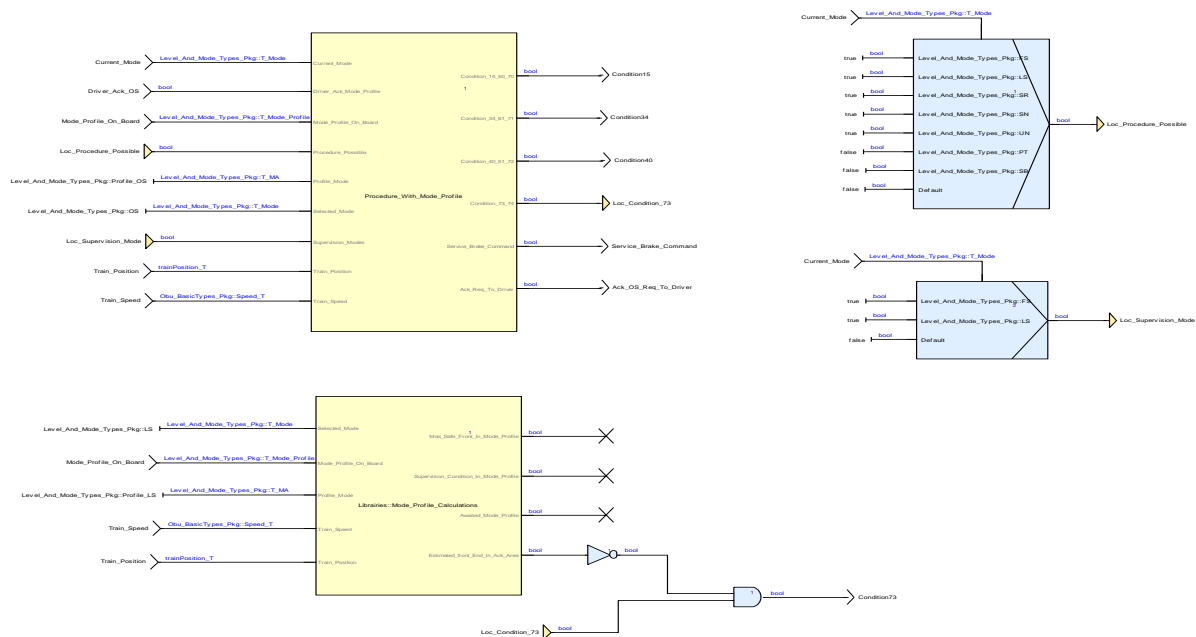


**Figure 49: View of diagram_Procedure_OnSight_1 (Procedure_OnSight)**

## 3.6.3.        Procedure_SH_Initiated_By_Driver Operator

Declared as **public node**

### 3.6.3.1.     Comments and Information

**Procedure_SH_Initiated_By_Driver Comments:**
From SRS-026 v3.3.0, §5.6 Shunting Initiated by Driver.
Assumptions:
  - A030   and National Trip   occurence is covered by Trip   conditions and procedures with higher priority.
  - Communication with RBC is out of the scope of this function ( repetition of message to RBC, waiting for acknoledgement,...)

### 3.6.3.2.     Interface

**Table 152: Inputs of Procedure_SH_Initiated_By_Driver**

| Name | Type | Comments and Information |
|---|---|---|
| Current_Level | M_LEVEL | |
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Driver_Req_SH | bool | |
| On_Going_Mission | bool | |
| Shunting_Granted_By_RBC | bool | |
| Train_Standstill | bool | |

<Corporate Info>

**Table 153: Outputs of Procedure_SH_Initiated_By_Driver**

| Name | Type | Properties | | Comments and Information |
|------|------|-----------|------|---------------------------|
| Condition5 | bool | default | false | |
| Condition6 | bool | default | false | |
| Clean_BG_List_SH_Area | bool | default | false | |
| End_Of_Mission_Procedure_Req | bool | default | false | |
| Request_For_SH_To_RBC | bool | default | false | |
| SH_Refused_By_RBC_To_DMI | bool | default | false | |

### 3.6.3.3.    Locals

**Table 154: Locals of Procedure_SH_Initiated_By_Driver**

| Name | Type | Comments and Information |
|------|------|---------------------------|
| Loc_Procedure_Possible | bool | |

### 3.6.3.4.    Operator Hierarchy

<u>diagram</u> : diagram_Procedure_SH_Initiated_By_Driver_1
        *state-machine* : SH_Initiated_By_Driver
                state : S0_SH_initiated_by_driver_procedure_on
                state : SH_initiated_by_driver_procedure_off

<Corporate Info>

### 3.6.3.5.    Graphical and Textual Diagrams

### 3.6.3.5.1.    View of diagram_Procedure_SH_Initiated_By_Driver_1 (Procedure_SH_Initiated_By_Driver)
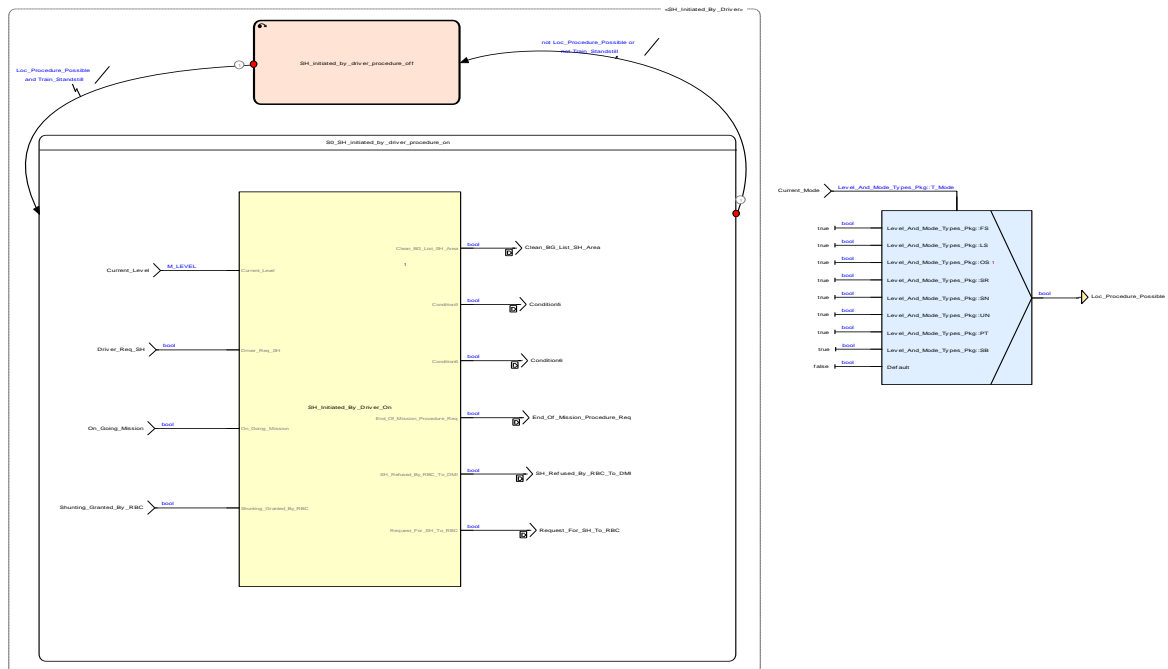


**Figure 50: View of diagram_Procedure_SH_Initiated_By_Driver_1
(Procedure_SH_Initiated_By_Driver)**

**Table 155: State Machines of diagram_Procedure_SH_Initiated_By_Driver_1**

| State Machine | Comments and Information |
|---|---|
| SH_Initiated_By_Driver | |

**Table 156: States of diagram_Procedure_SH_Initiated_By_Driver_1**

| State | Comments and Information |
|---|---|
| SH_Initiated_By_Driver:S0_SH_initiated_by_driver_procedure_on | **Comments:**<br>SRS § 5.6 state S0 |
| SH_Initiated_By_Driver:SH_initiated_by_driver_procedure_off | |

**Table 157: Transitions of diagram_Procedure_SH_Initiated_By_Driver_1**

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:**<br>SH_Initiated_By_Driver:S0_SH_initiated_by_driver_procedure_on<br>**Target:**<br>SH_Initiated_By_Driver:SH_initiated_by_driver_procedure_off | 1 | **Condition:**<br> not Loc_Procedure_Possible or  not Train_Standstill<br>**Actions:** | **Comments:**<br>Condition to   manage the procedure are no more available : train is moving or mode change (for example to Trip mode) |
| **Source:**<br>SH_Initiated_By_Driver:SH_initiated_by_driver_procedure_off<br>**Target:**<br>SH_Initiated_By_Driver:S0_SH_initiated_by_driver_procedure_on | 1 | **Condition:**<br>Loc_Procedure_Possible and Train_Standstill<br>**Actions:** | **Comments:**<br>S0 :   start of procedure is possible |

<Corporate Info>

## 3.6.4.     Procedure_SH_Ordered_By_Track Operator

Declared as **public node**

### 3.6.4.1.     Comments and Information

**Procedure_SH_Ordered_By_Track Comments:**
From SRS-026 v3.3.0, §5.7 Shunting Order from trackside
Assumptions:
  - Driver acknoledgement not possible in mode SR, UN and SN   see table
4.7.2.1.4 and   tables 4.6.2 and   4.6.3 conditon 51 and 61
  -

### 3.6.4.2.     Interface

**Table 158: Inputs of Procedure_SH_Ordered_By_Track**

| Name | Type | Comments and Information |
|---|---|---|
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Driver_Ack_SH | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |
| Train_Speed | Obu_BasicTypes_Pkg::Speed_T | |

**Table 159: Outputs of Procedure_SH_Ordered_By_Track**

| Name | Type | Comments and Information |
|---|---|---|
| Condition50 | bool | |
| Condition51 | bool | |
| Condition61 | bool | |
| Ack_SH_Req_To_Driver | bool | |
| Service_Brake_Command | bool | |

### 3.6.4.3.     Locals

**Table 160: Locals of Procedure_SH_Ordered_By_Track**

| Name | Type | Comments and Information |
|---|---|---|
| Loc_Procedure_Possible | bool | |
| Loc_Supervision_Mode | bool | |

### 3.6.4.4.     Operator Hierarchy

diagram : diagram_Procedure_SH_Ordered_By_Track_1

<Corporate Info>

### 3.6.4.5. Graphical and Textual Diagrams

#### 3.6.4.5.1. View of diagram_Procedure_SH_Ordered_By_Track_1 (Procedure_SH_Ordered_By_Track)
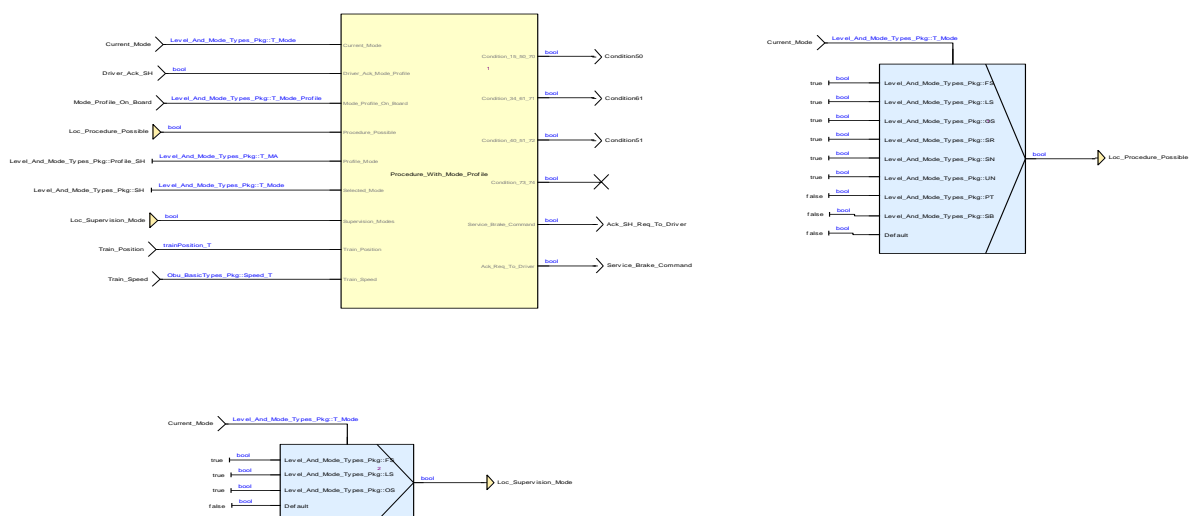


**Figure 51: View of diagram_Procedure_SH_Ordered_By_Track_1 (Procedure_SH_Ordered_By_Track)**

## 3.6.5. Procedure_Start_L1_L2_L3 Operator

Declared as **public node**

### 3.6.5.1. Interface

**Table 161: Inputs of Procedure_Start_L1_L2_L3**

| Name | Type | Comments and Information |
|---|---|---|
| Current_Level | M_LEVEL | |
| Driver_Ack_LS | bool | |
| Driver_Ack_OS | bool | |
| Driver_Ack_SH | bool | |
| Driver_Ack_SR | bool | |
| Driver_Req_Start | bool | |
| MA_SSP_Gradient_Available | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| RBC_Authorizes_SR | bool | |

**Table 162: Outputs of Procedure_Start_L1_L2_L3**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Ack_LS_Req_To_Driver | bool | default | false | |
| Ack_OS_Req_To_Driver | bool | default | false | |
| Ack_SH_Req_To_Driver | bool | default | false | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|------|------|-----------|---|--------------------------|
| Ack_SR_Req_To_Driver | bool | default | false | |
| Condition_8 | bool | default | false | |
| Condition_10_31 | bool | default | false | |
| Condition_15 | bool | default | false | |
| Condition_50 | bool | default | false | |
| Condition_70 | bool | default | false | |
| MA_Req_To_RBC | bool | default | false | |

### 3.6.5.2.    Locals

**Table 163: Locals of Procedure_Start_L1_L2_L3**

| Name | Type | Comments and Information |
|------|------|-------------------------|
| Loc_Mode_Profile | Level_And_Mode_Types_Pkg::T_MA | |

### 3.6.5.3.    Operator Hierarchy

diagram : diagram_Procedure_Start_L1_L2_L3_1
    *state-machine* : SM_Start_L1_L2_L3
        state : FS_Mode
        state : Level_1
        state : Level_2_3
        state : LS_Mode
        state : OS_Mode
        state : SH_Mode
        state : SR_Mode
        state : Wait_For_LS
        state : Wait_For_OS
        state : Wait_For_SH
        state : Waiting_Driver_Starting_Command

<Corporate Info>

### 3.6.5.4.        Graphical and Textual Diagrams

3.6.5.4.1.        View of diagram_Procedure_Start_L1_L2_L3_1
(Procedure_Start_L1_L2_L3)
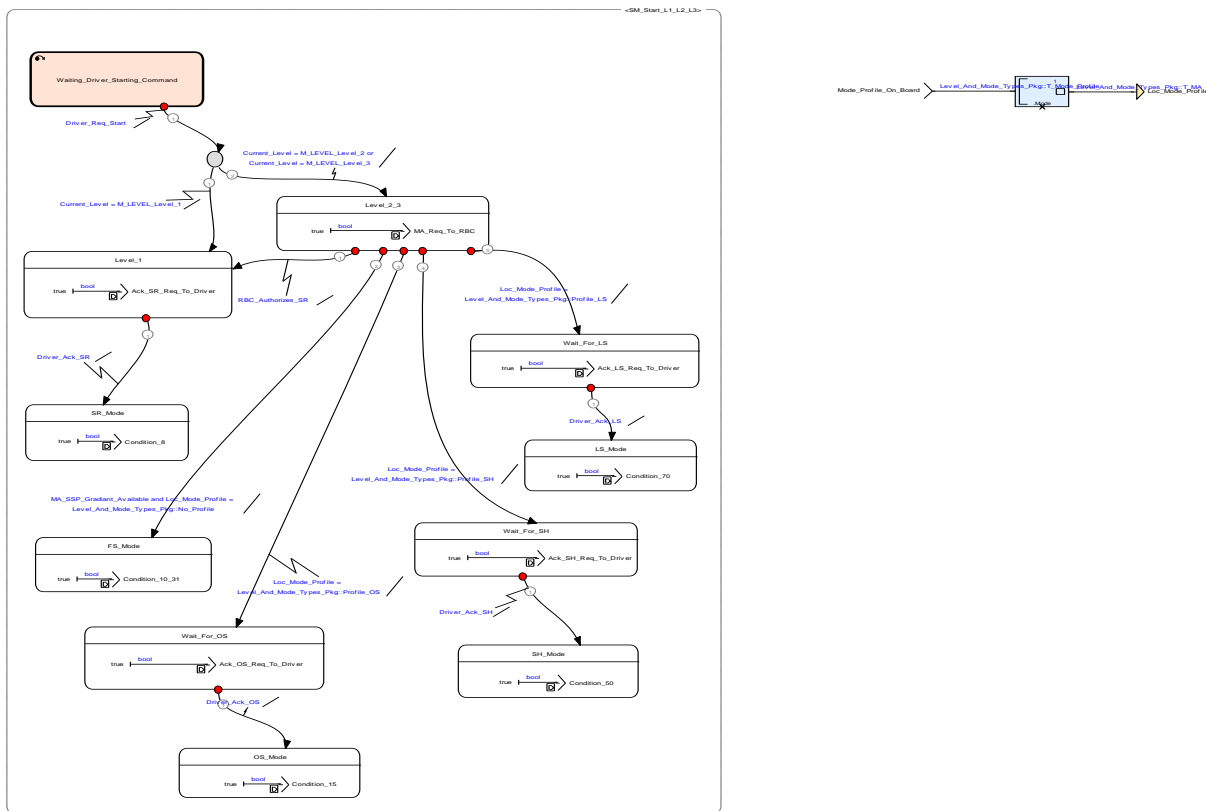


**Figure 52: View of diagram_Procedure_Start_L1_L2_L3_1 (Procedure_Start_L1_L2_L3)**

**Table 164: State Machines of diagram_Procedure_Start_L1_L2_L3_1**

| State Machine | Comments and Information |
|---|---|
| SM_Start_L1_L2_L3 | |

**Table 165: States of diagram_Procedure_Start_L1_L2_L3_1**

| State | Comments and Information |
|---|---|
| SM_Start_L1_L2_L3:FS_Mode | **Comments:**<br>SRS § 4.6.3 C10:"(valid Train Data is stored on board) AND (MA + SSP +gradient are on-board) AND (no specific mode is required by a Mode Profile)"<br>SRS § 4.6.3 C31: "(MA+SSP+gradient are on-board) AND (no specific mode is required by a Mode Profile) AND (ERTMS/ETCS level is 2 or 3)" |
| SM_Start_L1_L2_L3:Level_1 | **Comments:**<br>SRS § 5.4 state S24<br>SRS § 5.11 state S160 |
| SM_Start_L1_L2_L3:Level_2_3 | **Comments:**<br>SRS § 5.4 state S21<br>SRS § 5.11 state S150 |

<Corporate Info>

| State | Comments and Information |
|---|---|
| SM_Start_L1_L2_L3:LS_Mode | **Comments:**<br>SRS § 4.6.3 C70 : "(An ackn. request for Limited Supervision is displayed to the driver) AND (the driver acknowledges) "<br>{7} The request to acknowledge Limited Supervision is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "Limited Supervision" procedure" of SRS-§5 (for transitions from FS/OS/UN to LS) and the "Start of mission" procedure (for transition from SB to LS). |
| SM_Start_L1_L2_L3:OS_Mode | **Comments:**<br>SRS § 4.6.3 C15:"(An ackn. request for On Sight is displayed to the driver) AND (the driver acknowledges) "<br>{1} The request to acknowledge On Sight is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "On Sight" procedure" of SRS-§5 (for transitions from FS/LS/UN to OS) and the "Start of mission" procedure (for transition from SB to OS). |
| SM_Start_L1_L2_L3:SH_Mode | **Comments:**<br>SRS § 4.6.3 C50:"(An ackn. request for Shunting is displayed to the driver) AND (the driver acknowledges) "<br>{5} The request to acknowledge Shunting is displayed to the driver only if certain conditions are fulfilled. These conditions are not specified here. See the "Entry in Shunting" procedure and the "Start Of Mission" procedure of SRS-§5. |
| SM_Start_L1_L2_L3:SR_Mode | **Comments:**<br>SRS § 4.6.3 C8 "StaffResponsible Mode is proposed o the driver AND the driver acknoledges" |
| SM_Start_L1_L2_L3:Wait_For_LS | **Comments:**<br>SRS § 5.4 state S25<br>SRS § 5.11 state S170 |
| SM_Start_L1_L2_L3:Wait_For_OS | **Comments:**<br>SRS § 5.4 state S25<br>SRS § 5.11 state S170 |
| SM_Start_L1_L2_L3:Wait_For_SH | **Comments:**<br>SRS § 5.4 state S25<br>SRS § 5.11 state S170 |
| SM_Start_L1_L2_L3:Waiting_Driver_Starting_Command | **Comments:**<br>SRS § 5.4 state S20<br>SRS § 5.11 state S140 |

**Table 166: Transitions of diagram_Procedure_Start_L1_L2_L3_1**

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:**<br>SM_Start_L1_L2_L3:Level_1<br>**Target:**<br>SM_Start_L1_L2_L3:SR_Mode | 1 | **Condition:**<br>Driver_Ack_SR | **Comments:**<br>SRS § 5.4 state E32<br>SRS § 5.11 state E160 |
| **Source:**<br>SM_Start_L1_L2_L3:Level_2_3<br>**Target:**<br>SM_Start_L1_L2_L3:Level_1 | 1 | **Condition:**<br>RBC_Authorizes_SR | **Comments:**<br>SRS § 5.4 state E26<br>SRS § 5.11 state E26 |

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| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:**<br>SM_Start_L1_L2_L3:Level_2_3<br>**Target:**<br>SM_Start_L1_L2_L3:FS_Mode | 2 | **Condition:**<br>MA_SSP_Gradient_Available and<br>Loc_Mode_Profile = Level_And_Mode_Types_Pkg::No_Profile | **Comments:**<br>SRS § 5.4 state E29<br>SRS § 5.11 state E170 |
| **Source:**<br>SM_Start_L1_L2_L3:Level_2_3<br>**Target:**<br>SM_Start_L1_L2_L3:Wait_For_OS | 3 | **Condition:**<br>Loc_Mode_Profile = Level_And_Mode_Types_Pkg::Profile_OS<br>**Actions:** | **Comments:**<br>SRS § 5.4 state E27<br>SRS § 5.11 state E175 |
| **Source:**<br>SM_Start_L1_L2_L3:Level_2_3<br>**Target:**<br>SM_Start_L1_L2_L3:Wait_For_SH | 4 | **Condition:**<br>Loc_Mode_Profile = Level_And_Mode_Types_Pkg::Profile_SH<br>**Actions:** | **Comments:**<br>SRS § 5.4 state E27<br>SRS § 5.11 state E175 |
| **Source:**<br>SM_Start_L1_L2_L3:Level_2_3<br>**Target:**<br>SM_Start_L1_L2_L3:Wait_For_LS | 5 | **Condition:**<br>Loc_Mode_Profile = Level_And_Mode_Types_Pkg::Profile_LS<br>**Actions:** | **Comments:**<br>SRS § 5.4 state E27<br>SRS § 5.11 state E175 |
| **Source:**<br>SM_Start_L1_L2_L3:Wait_For_LS<br>**Target:**<br>SM_Start_L1_L2_L3:LS_Mode | 1 | **Condition:**<br>Driver_Ack_LS | **Comments:**<br>SRS § 5.4 state E33<br>SRS § 5.11 state E185 |
| **Source:**<br>SM_Start_L1_L2_L3:Wait_For_OS<br>**Target:**<br>SM_Start_L1_L2_L3:OS_Mode | 1 | **Condition:**<br>Driver_Ack_OS | **Comments:**<br>SRS § 5.4 state E33<br>SRS § 5.11 state E185 |
| **Source:**<br>SM_Start_L1_L2_L3:Wait_For_SH<br>**Target:**<br>SM_Start_L1_L2_L3:SH_Mode | 1 | **Condition:**<br>Driver_Ack_SH | **Comments:**<br>SRS § 5.4 state E33<br>SRS § 5.11 state E185 |
| **Source:**<br>SM_Start_L1_L2_L3:Waiting_Driver_Starting_Command<br>**Target:**<br>SM_Start_L1_L2_L3:Level_1 | 1 | **Condition:**<br>Driver_Req_Start | |
| | 1 | **Condition:**<br>Current_Level = M_LEVEL_Level_1<br>**Actions:** | **Comments:**<br>SRS § 5.4 state E22<br>SRS § 5.11 state E150 |
| **Source:**<br>SM_Start_L1_L2_L3:Waiting_Driver_Starting_Command<br>**Target:**<br>SM_Start_L1_L2_L3:Level_2_3 | 1 | **Condition:**<br>Driver_Req_Start | |
| | 2 | **Condition:**<br>Current_Level = M_LEVEL_Level_2 or Current_Level = M_LEVEL_Level_3<br>**Actions:** | **Comments:**<br>SRS § 5.4 state E24<br>SRS § 5.11 state E155 |

## 3.6.6.    Procedure_StartOfMission Operator

Declared as **public node**

<Corporate Info>

### 3.6.6.1.          Interface

**Table 167: Inputs of Procedure_StartOfMission**

| Name | Type | Comments and Information |
|---|---|---|
| Current_Level | M_LEVEL | |
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Desk_Open | bool | |
| Driver_Ack_LS | bool | |
| Driver_Ack_OS | bool | |
| Driver_Ack_SH | bool | |
| Driver_Ack_SN | bool | |
| Driver_Ack_SR | bool | |
| Driver_Ack_UN | bool | |
| Driver_Req_NL | bool | |
| Driver_Req_SH | bool | |
| Driver_Req_Start | bool | |
| MA_SSP_Gradient_Available | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| RBC_Authorizes_SR | bool | |
| Shunting_Granted_By_RBC | bool | |
| Train_Permitted_NL | bool | |
| Train_Standstill | bool | |
| Valid_Train_Data_Stored | bool | |

**Table 168: Outputs of Procedure_StartOfMission**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Ack_LS_Req_To_Driver | bool | default | false | |
| Ack_OS_Req_To_Driver | bool | default | false | |
| Ack_SH_Req_To_Driver | bool | default | false | |
| Ack_SN_Req_To_Driver | bool | default | false | |
| Ack_SR_Req_To_Driver | bool | default | false | |
| Ack_UN_Req_To_Driver | bool | default | false | |
| Clean_BG_List_SH_Area | bool | default | false | |
| Condition_5 | bool | default | false | |
| Condition_6 | bool | default | false | |
| Condition_8 | bool | default | false | |
| Condition_10 | bool | default | false | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Condition_15 | bool | default | false | |
| Condition_46 | bool | default | false | |
| Condition_50 | bool | default | false | |
| Condition_58 | bool | default | false | |
| Condition_60 | bool | default | false | |
| Condition_70 | bool | default | false | |
| EB_Requested | bool | default | false | |
| End_Of_Mission_Procedure_Req | bool | default | false | |
| MA_Req_To_RBC | bool | default | false | |
| Request_For_SH_To_RBC | bool | default | false | |
| SH_Refused_By_RBC_To_DMI | bool | default | false | |

### 3.6.6.2.     Operator Hierarchy

<u>diagram</u> : diagram_Procedure_StartOfMission_1
    *state-machine* : SM_StartOfMissionProcedure
        state : EB_Requested
        state : Procedure_Off
        state : Procedure_On
            *state-machine* : SM_SoM_On
                state : Level_0
                state : Level_NTC
                state : NL_Mode
                state : Procedure_SH_Initiated_By_Driver
                state : SN_Mode
                state : UN_Mode
                state : Waiting_Driver_Command
                state : Waiting_Driver_Selection
                state : Waiting_Driver_Strating_Command

<Corporate Info>

### 3.6.6.3.      Graphical and Textual Diagrams

### 3.6.6.3.1.      View of diagram_Procedure_StartOfMission_1 (Procedure_StartOfMission)
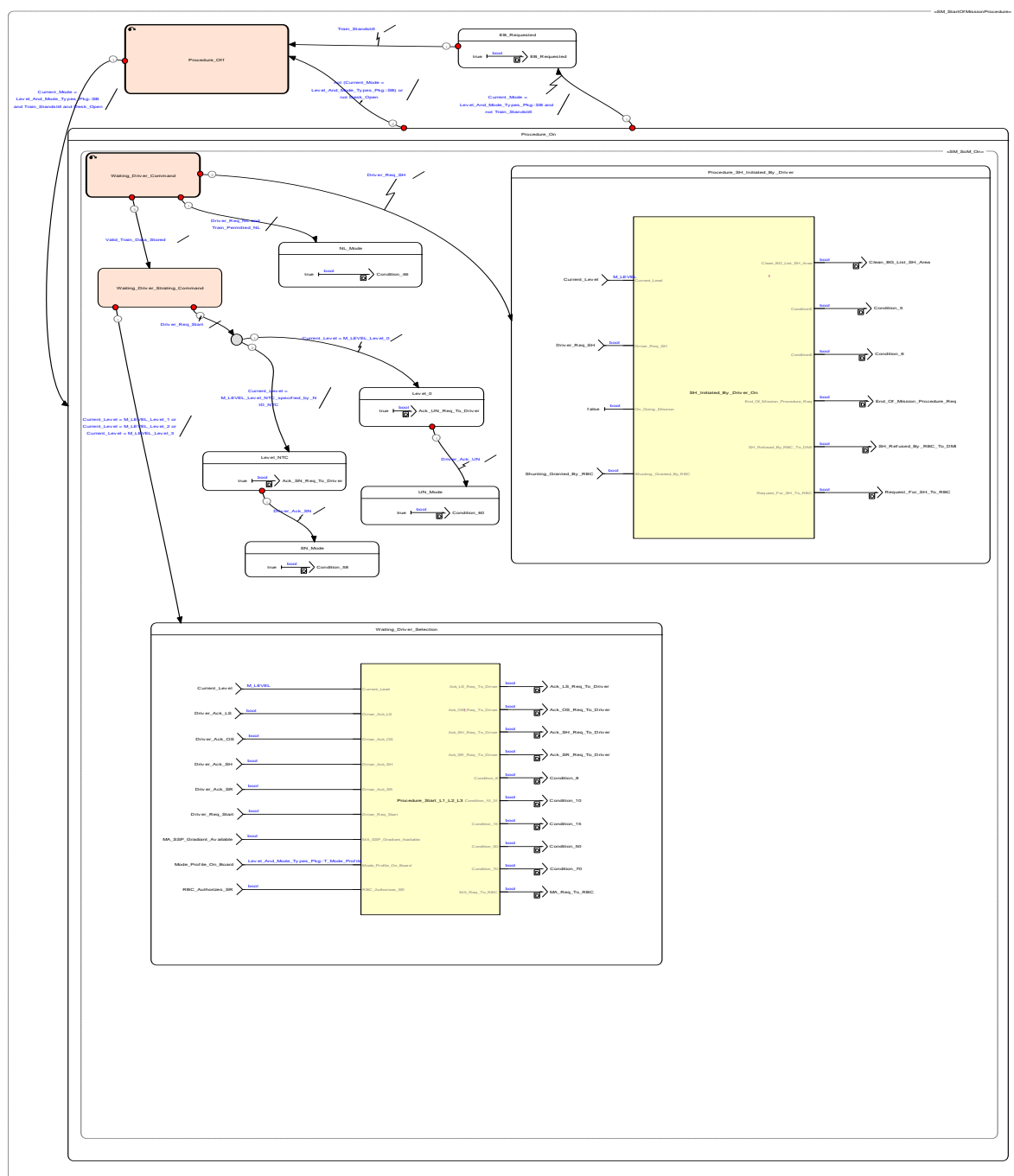


**Figure 53: View of diagram_Procedure_StartOfMission_1 (Procedure_StartOfMission)**

**Table 169: State Machines of diagram_Procedure_StartOfMission_1**

| State Machine | Comments and Information |
|---|---|
| SM_StartOfMissionProcedure | |
| SM_StartOfMissionProcedure: Procedure_On:SM_SoM_On | |

<Corporate Info>

**Table 170: States of diagram_Procedure_StartOfMission_1**

| State | Comments and Information |
|---|---|
| SM_StartOfMissionProcedure:EB_Requested | |
| SM_StartOfMissionProcedure:Procedure_Off | **Comments:**<br>SRS § 5.4 state S0 |
| SM_StartOfMissionProcedure:Procedure_On | |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Level_0 | **Comments:**<br>SRS § 5.4 state S23 |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Level_NTC | **Comments:**<br>SRS § 5.4 state S22 |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:NL_Mode | **Comments:**<br>SRS § 4.6.3 C46 : "(Driver selects NON LEADING) AND (train is at standstill) AND (The "non leading" input signal is received)" |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Procedure_SH_Initiated_By_Driver | |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:SN_Mode | **Comments:**<br>SRS § 4.6.3 C58 : "(the ERTMS/ETCS level is "NTC") AND (an acknowledgement request for SN mode is displayed to the driver) AND (the driver acknowledges) " |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:UN_Mode | **Comments:**<br>SRS § 4.6.3 C60 : " (an acknowledgement request for UN mode is displayed to the driver) AND (the driver acknowledges)" |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Command | **Comments:**<br>SRS § 5.4 state S11 |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Selection | **Comments:**<br>SRS § 5.4 state S20 |
| SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Strating_Command | **Comments:**<br>SRS § 5.4 state S20 |

**Table 171: Transitions of diagram_Procedure_StartOfMission_1**

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:**<br>SM_StartOfMissionProcedure:EB_Requested<br>**Target:**<br>SM_StartOfMissionProcedure:Procedure_Off | 1 | **Condition:**<br>Train_Standstill | |
| **Source:**<br>SM_StartOfMissionProcedure:Procedure_Off<br>**Target:**<br>SM_StartOfMissionProcedure:Procedure_On | 1 | **Condition:**<br>Current_Mode = Level_And_Mode_Types_Pkg::SB and Train_Standstill and Desk_Open | |

<Corporate Info>

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_StartOfMissionProcedure:Procedure_On **Target:** SM_StartOfMissionProcedure:EB_Requested | 1 | **Condition:** Current_Mode = Level_And_Mode_Types_Pkg::SB and not Train_Standstill **Actions:** | |
| **Source:** SM_StartOfMissionProcedure:Procedure_On **Target:** SM_StartOfMissionProcedure:Procedure_Off | 2 | **Condition:** not (Current_Mode = Level_And_Mode_Types_Pkg::SB) or not Desk_Open | |
| **Source:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Level_0 **Target:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:UN_Mode | 1 | **Condition:** Driver_Ack_UN | **Comments:** SRS § 5.4 state E31 |
| **Source:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Level_NTC **Target:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:SN_Mode | 1 | **Condition:** Driver_Ack_SN | **Comments:** SRS § 5.4 state E30 |
| **Source:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Command **Target:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:NL_Mode | 1 | **Condition:** Driver_Req_NL and Train_Permitted_NL | **Comments:** SRS § 5.4 state E10 |
| **Source:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Command **Target:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Procedure_SH_Initiated_By_Driver | 2 | **Condition:** Driver_Req_SH | **Comments:** SRS § 5.4 state E12 |
| **Source:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Command **Target:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Strating_Command | 3 | **Condition:** Valid_Train_Data_Stored | **Comments:** SRS § 5.4 state E14 |
| **Source:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Strating_Command **Target:** SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Selection | 1 | **Condition:** Current_Level = M_LEVEL_Level_1 or Current_Level = M_LEVEL_Level_2 or Current_Level = M_LEVEL_Level_3 | |
| **Source:** SM_StartOfMissionProcedure:Proce | 2 | **Condition:** Driver_Req_Start | |

<Corporate Info>

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| dure_On:SM_SoM_On:Waiting_Driver_Strating_Command<br>**Target:**<br>SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Level_0 | 1 | **Condition:**<br>Current_Level = M_LEVEL_Level_0<br>**Actions:** | **Comments:**<br>SRS § 5.4 state E21 |
| **Source:**<br>SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Waiting_Driver_Strating_Command<br>**Target:**<br>SM_StartOfMissionProcedure:Procedure_On:SM_SoM_On:Level_NTC | 2 | **Condition:**<br>Driver_Req_Start | |
| | 2 | **Condition:**<br>Current_Level = M_LEVEL_Level_NTC_specified_by_NID_NTC<br>**Actions:** | **Comments:**<br>SRS § 5.4 state E20 |

## 3.6.7. Procedure_Train_Reversing Operator

Declared as **public node**

### 3.6.7.1. Interface

**Table 172: Inputs of Procedure_Train_Reversing**

| Name | Type | Comments and Information |
|---|---|---|
| Driver_Ack_RV | bool | |
| Train_Standstill | bool | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Reversing_Data | Level_And_Mode_Types_Pkg::T_Reversing_Data | |

**Table 173: Outputs of Procedure_Train_Reversing**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Condition_59 | bool | default | false | |
| Ack_RV_Req_To_Driver | bool | default | false | |

### 3.6.7.2. Locals

**Table 174: Locals of Procedure_Train_Reversing**

| Name | Type | Comments and Information |
|---|---|---|
| Loc_Cond_Procedure_On | bool | |
| Loc_Max_Safe_Front_In_RV_Area | bool | |
| Loc_RV_Data_Available | bool | |

<Corporate Info>

### 3.6.7.3.     Operator Hierarchy

<u>diagram</u> : diagram_Procedure_Train_Reversing_1
  *state-machine* : SM_Train_Reversing
    state : Reversing_Condition
    state : Reversing_Data_Available
    state : Reversing_Procedure_Off
    state : RV_Mode

### 3.6.7.4.     Graphical and Textual Diagrams

#### 3.6.7.4.1.     View of diagram_Procedure_Train_Reversing_1 (Procedure_Train_Reversing)
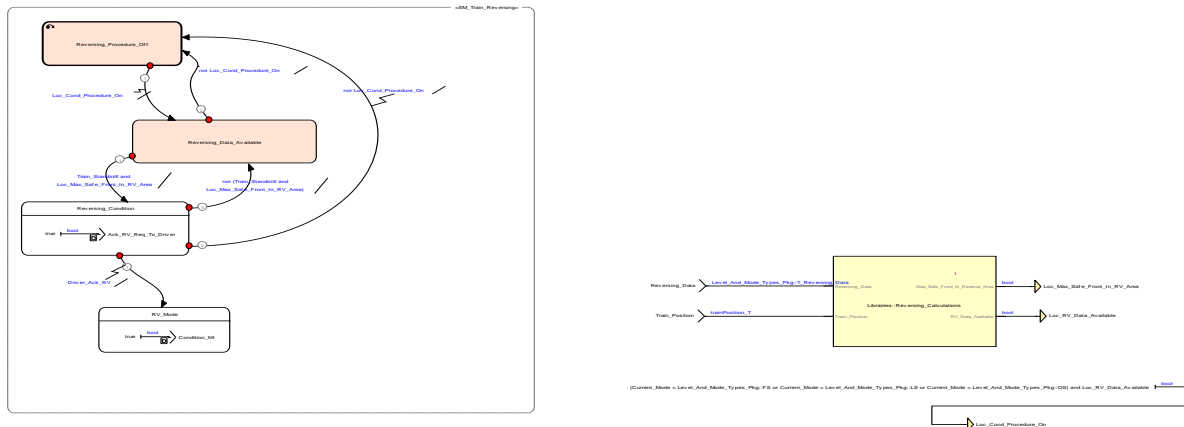


**Figure 54: View of diagram_Procedure_Train_Reversing_1 (Procedure_Train_Reversing)**

**Table 175: State Machines of diagram_Procedure_Train_Reversing_1**

| State Machine | Comments and Information |
|---|---|
| SM_Train_Reversing | |

**Table 176: States of diagram_Procedure_Train_Reversing_1**

| State | Comments and Information |
|---|---|
| SM_Train_Reversing:Reversing_Condition | **Comments:**<br>SRS § 5.4 state S24<br>SRS § 5.11 state S160 |
| SM_Train_Reversing:Reversing_Data_Available | **Comments:**<br>SRS § 5.4 state S25<br>SRS § 5.11 state S170 |
| SM_Train_Reversing:Reversing_Procedure_Off | **Comments:**<br>SRS § 5.4 state S20<br>SRS § 5.11 state S140 |
| SM_Train_Reversing:RV_Mode | **Comments:**<br>SRS § 4.6.3 C8 "StaffResponsible Mode is proposed o the driver AND the driver acknoledges" |

<Corporate Info>

**Table 177: Transitions of diagram_Procedure_Train_Reversing_1**

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_Train_Reversing:Reversing_Condition **Target:** SM_Train_Reversing:RV_Mode | 1 | **Condition:** Driver_Ack_RV | **Comments:** SRS § 5.4 state E32 SRS § 5.11 state E160 |
| **Source:** SM_Train_Reversing:Reversing_Condition **Target:** SM_Train_Reversing:Reversing_Procedure_Off | 2 | **Condition:** not Loc_Cond_Procedure_On | |
| **Source:** SM_Train_Reversing:Reversing_Condition **Target:** SM_Train_Reversing:Reversing_Data_Available | 3 | **Condition:** not (Train_Standstill and Loc_Max_Safe_Front_In_RV_Area) | |
| **Source:** SM_Train_Reversing:Reversing_Data_Available **Target:** SM_Train_Reversing:Reversing_Condition | 1 | **Condition:** Train_Standstill and Loc_Max_Safe_Front_In_RV_Area | |
| **Source:** SM_Train_Reversing:Reversing_Data_Available **Target:** SM_Train_Reversing:Reversing_Procedure_Off | 2 | **Condition:** not Loc_Cond_Procedure_On | |
| **Source:** SM_Train_Reversing:Reversing_Procedure_Off **Target:** SM_Train_Reversing:Reversing_Data_Available | 1 | **Condition:** Loc_Cond_Procedure_On | |

## 3.6.8.     Procedure_Train_Trip Operator

Declared as **public node**

### 3.6.8.1.     Comments and Information

**Procedure_Train_Trip Comments:**
SRS-026 §4.6.3 C7 :" (the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is different from 0, NTC)"
SRS-026 §4.6.3 C62 : "(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is 0) AND (valid Train Data is on-board)"
SRS-026 §4.6.3 C63: "(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is NTC) AND (valid Train Data is on-board)"
SRS-026 §4.6.3 C68 : "(the driver acknowledges the train trip) AND (the train is at standstill) AND (the ERTMS/ETCS level is 0 or NTC) AND (no valid Train Data is on-board)"

<Corporate Info>

### 3.6.8.2.    Interface

**Table 178: Inputs of Procedure_Train_Trip**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Condition_To_Trip | bool | |
| Current_Level | M_LEVEL | |
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Driver_Ack_LS | bool | |
| Driver_Ack_OS | bool | |
| Driver_Ack_SH | bool | |
| Driver_Ack_SR | bool | |
| Driver_Ack_TR | bool | |
| Driver_Req_SH | bool | |
| Driver_Req_Start | bool | |
| MA_SSP_Gradiant_Available | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| On_Going_Mission | bool | |
| RCB_Ack_And_EB_Revocked | bool | |
| RBC_Authorizes_SR | bool | |
| Shunting_Granted_By_RBC | bool | |
| Train_Standstill | bool | |
| Valid_Train_Data_Stored | bool | |

**Table 179: Outputs of Procedure_Train_Trip**

| Name | Type | Properties | | Comments and Information |
|------|------|-----------|---|--------------------------|
| Ack_LS_Req_To_Driver | bool | default | false | |
| Ack_OS_Req_To_Driver | bool | default | false | |
| Ack_SH_Req_To_Driver | bool | default | false | |
| Ack_SR_Req_To_Driver | bool | default | false | |
| Ack_TR_Req_To_Driver | bool | default | false | |
| Clean_BG_List_SH_Area | bool | default | false | |
| Condition_Trip | bool | default | false | |
| Condition_5 | bool | default | false | |
| Condition_6 | bool | default | false | |
| Condition_7 | bool | default | false | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|------|------|-----------|-----|--------------------------|
| Condition_8 | bool | default | false | |
| Condition_31 | bool | default | false | |
| Condition_15 | bool | default | false | |
| Condition_50 | bool | default | false | |
| Condition_62 | bool | default | false | |
| Condition_63 | bool | default | false | |
| Condition_68 | bool | default | false | |
| Condition_70 | bool | default | false | |
| End_Of_Mission_Procedure_Req | bool | default | false | |
| MA_Req_To_RBC | bool | default | false | |
| Request_For_SH_To_RBC | bool | default | false | |
| SH_Refused_By_RBC_To_DMI | bool | default | false | |

### 3.6.8.3.    Locals

**Table 180: Locals of Procedure_Train_Trip**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Loc_Procedure_Possible | bool | |

### 3.6.8.4.    Operator Hierarchy

<u>diagram</u> : diagram_Procedure_Train_Trip_1
    *state-machine* : SM_Train_Trip
        state : Post_Trip_Mode
        state : Procedure_SH_Initiated_By_Driver
        state : SH_Mode
        state : SN_Mode
        state : Train_Trip_procedure_off
        state : Trip_Mode
        state : Trip_Mode_Waiting_Ack
        state : UN_Mode
        state : Wait_RBC_Ack
        state : Waiting_Driver_Selection

<Corporate Info>

### 3.6.8.5.          Graphical and Textual Diagrams

### 3.6.8.5.1.          View of diagram_Procedure_Train_Trip_1 (Procedure_Train_Trip)
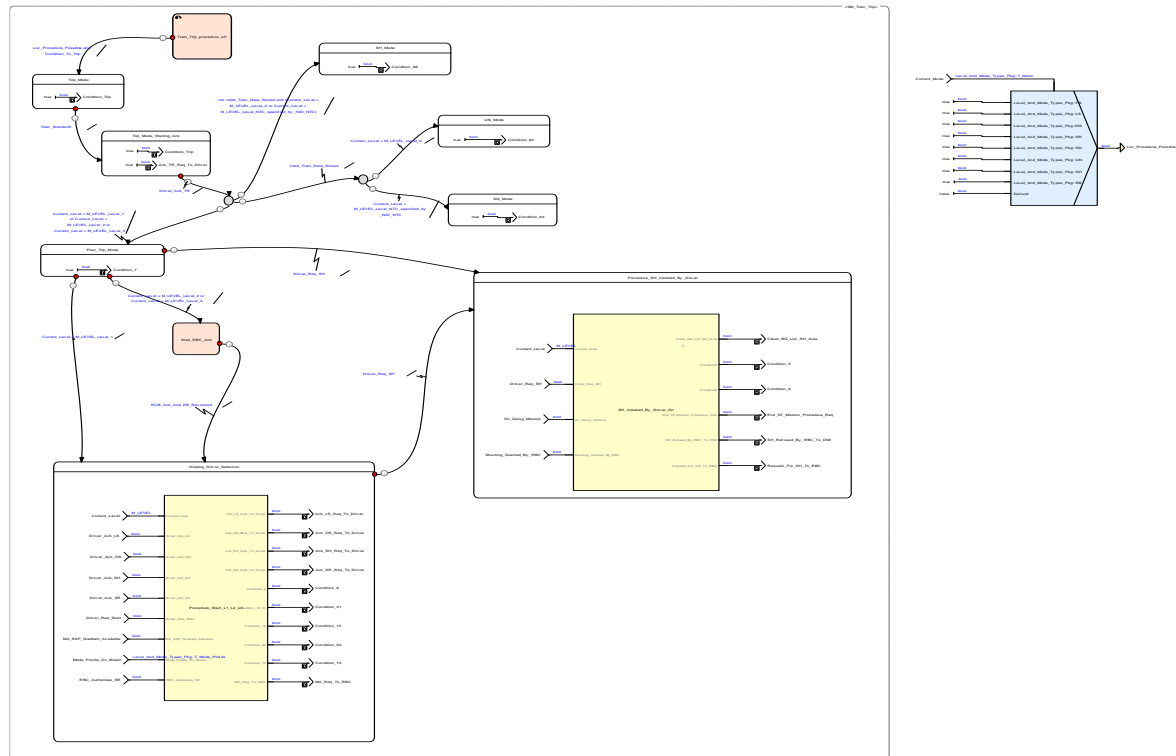


**Figure 55: View of diagram_Procedure_Train_Trip_1 (Procedure_Train_Trip)**

**Table 181: State Machines of diagram_Procedure_Train_Trip_1**

| State Machine | Comments and Information |
|---|---|
| SM_Train_Trip | |

**Table 182: States of diagram_Procedure_Train_Trip_1**

| State | Comments and Information |
|---|---|
| SM_Train_Trip:Post_Trip_Mode | |
| SM_Train_Trip:Procedure_SH_Initiated_By_Driver | |
| SM_Train_Trip:SH_Mode | |
| SM_Train_Trip:SN_Mode | |
| SM_Train_Trip:Train_Trip_procedure_off | |
| SM_Train_Trip:Trip_Mode | |
| SM_Train_Trip:Trip_Mode_Waiting_Ack | |
| SM_Train_Trip:UN_Mode | |
| SM_Train_Trip:Wait_RBC_Ack | |
| SM_Train_Trip:Waiting_Driver_Selection | |

<Corporate Info>

**Table 183: Transitions of diagram_Procedure_Train_Trip_1**

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_Train_Trip:Post_Trip_Mode **Target:** SM_Train_Trip:Waiting_Driver_Selection | 1 | **Condition:** Current_Level = M_LEVEL_Level_1 | |
| **Source:** SM_Train_Trip:Post_Trip_Mode **Target:** SM_Train_Trip:Wait_RBC_Ack | 2 | **Condition:** Current_Level = M_LEVEL_Level_2 or Current_Level = M_LEVEL_Level_3 | |
| **Source:** SM_Train_Trip:Post_Trip_Mode **Target:** SM_Train_Trip:Procedure_SH_Initiated_By_Driver | 3 | **Condition:** Driver_Req_SH | |
| **Source:** SM_Train_Trip:Train_Trip_procedure_off **Target:** SM_Train_Trip:Trip_Mode | 1 | **Condition:** Loc_Procedure_Possible and Condition_To_Trip **Actions:** | **Comments:** S0 : start of procedure is possible |
| **Source:** SM_Train_Trip:Trip_Mode **Target:** SM_Train_Trip:Trip_Mode_Waiting_Ack | 1 | **Condition:** Train_Standstill **Actions:** | |
| **Source:** SM_Train_Trip:Trip_Mode_Waiting_Ack **Target:** SM_Train_Trip:Post_Trip_Mode | 1 | **Condition:** Driver_Ack_TR | |
| | 1 | **Condition:** Current_Level = M_LEVEL_Level_1 or Current_Level = M_LEVEL_Level_2 or Current_Level = M_LEVEL_Level_3 | |
| **Source:** SM_Train_Trip:Trip_Mode_Waiting_Ack **Target:** SM_Train_Trip:SH_Mode | 1 | **Condition:** Driver_Ack_TR | |
| | 2 | **Condition:** not Valid_Train_Data_Stored and (Current_Level = M_LEVEL_Level_0 or Current_Level = M_LEVEL_Level_NTC_specified_by_NID_NTC) | |
| **Source:** SM_Train_Trip:Trip_Mode_Waiting_Ack **Target:** SM_Train_Trip:UN_Mode | 1 | **Condition:** Driver_Ack_TR | |
| | 3 | **Condition:** Valid_Train_Data_Stored **Actions:** | |
| | 1 | **Condition:** Current_Level = M_LEVEL_Level_0 **Actions:** | |

<Corporate Info>

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_Train_Trip:Trip_Mode_Waiting_Ack **Target:** SM_Train_Trip:SN_Mode | 1 | **Condition:** Driver_Ack_TR | |
| | 3 | **Condition:** Valid_Train_Data_Stored **Actions:** | |
| | 2 | **Condition:** Current_Level = M_LEVEL_Level_NTC_specified_by_NID_NTC **Actions:** | |
| **Source:** SM_Train_Trip:Wait_RBC_Ack **Target:** SM_Train_Trip:Waiting_Driver_Selection | 1 | **Condition:** RCB_Ack_And_EB_Revocked | |
| **Source:** SM_Train_Trip:Waiting_Driver_Selection **Target:** SM_Train_Trip:Procedure_SH_Initiated_By_Driver | 1 | **Condition:** Driver_Req_SH **Actions:** | |

## 3.6.9.     Procedure_With_Mode_Profile Operator

Declared as **public node**

### 3.6.9.1.     Interface

**Table 184: Inputs of Procedure_With_Mode_Profile**

| Name | Type | Comments and Information |
|---|---|---|
| Current_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Driver_Ack_Mode_Profile | bool | |
| Mode_Profile_On_Board | Level_And_Mode_Types_Pkg::T_Mode_Profile | |
| Procedure_Possible | bool | |
| Profile_Mode | Level_And_Mode_Types_Pkg::T_MA | |
| Selected_Mode | Level_And_Mode_Types_Pkg::T_Mode | |
| Supervision_Modes | bool | |
| Train_Position | TrainPosition_Types_Pck::trainPosition_T | |
| Train_Speed | Obu_BasicTypes_Pkg::Speed_T | |

**Table 185: Outputs of Procedure_With_Mode_Profile**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Condition_15_50_70 | bool | default | false | |

<Corporate Info>

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Condition_34_61_71 | bool | default | false | |
| Condition_40_51_72 | bool | default | false | |
| Condition_73_74 | bool | default | false | |
| Service_Brake_Command | bool | default | false | |
| Ack_Req_To_Driver | bool | | | |

### 3.6.9.2.  Locals

**Table 186: Locals of Procedure_With_Mode_Profile**

| Name | Type | Properties | | Comments and Information |
|---|---|---|---|---|
| Loc_Confirmation | bool | default | true | |
| | | last | true | |
| Loc_Mode_Available | bool | | | |
| Loc_Mode_Profile_Condition | bool | | | |
| Loc_Supervision_Condition_Covered | bool | | | |
| Loc_Timer | int | default | 0 | |
| | | last | 0 | |

**Table 187: Signals of Procedure_With_Mode_Profile**

| Name | Comments and Information |
|---|---|
| Loc_Ack_Req_To_Driver | |

### 3.6.9.3.  Operator Hierarchy

<u>diagram</u> : diagram_Procedure_With_Mode_Profile_1
    *state-machine* : SM_Mode_Profile_By_Trackside
        state : Current_Location
            *state-machine* : SM_Current_Location
                state : Ack_Not_Received
                state : Req_Current_Location
                state : Switch_Autorized_Waiting_Ack
                    *activate if* : IfBlock1
                        branch : then
                        branch : else
                            branch : then
                            branch : else
                state : Switch_Mode_Confirmed
                state : Waiting_Ack
        state : Futher_location
            *state-machine* : SM_Futher_Location
                state : Req_Futher_Location
                state : Start_Supervision
                state : Switch_Mode_Confirmed

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state : Waiting_Ack
state : Procedure_Off

## 3.6.9.4.    Graphical and Textual Diagrams

### 3.6.9.4.1.    View of diagram_Procedure_With_Mode_Profile_1 (Procedure_With_Mode_Profile)
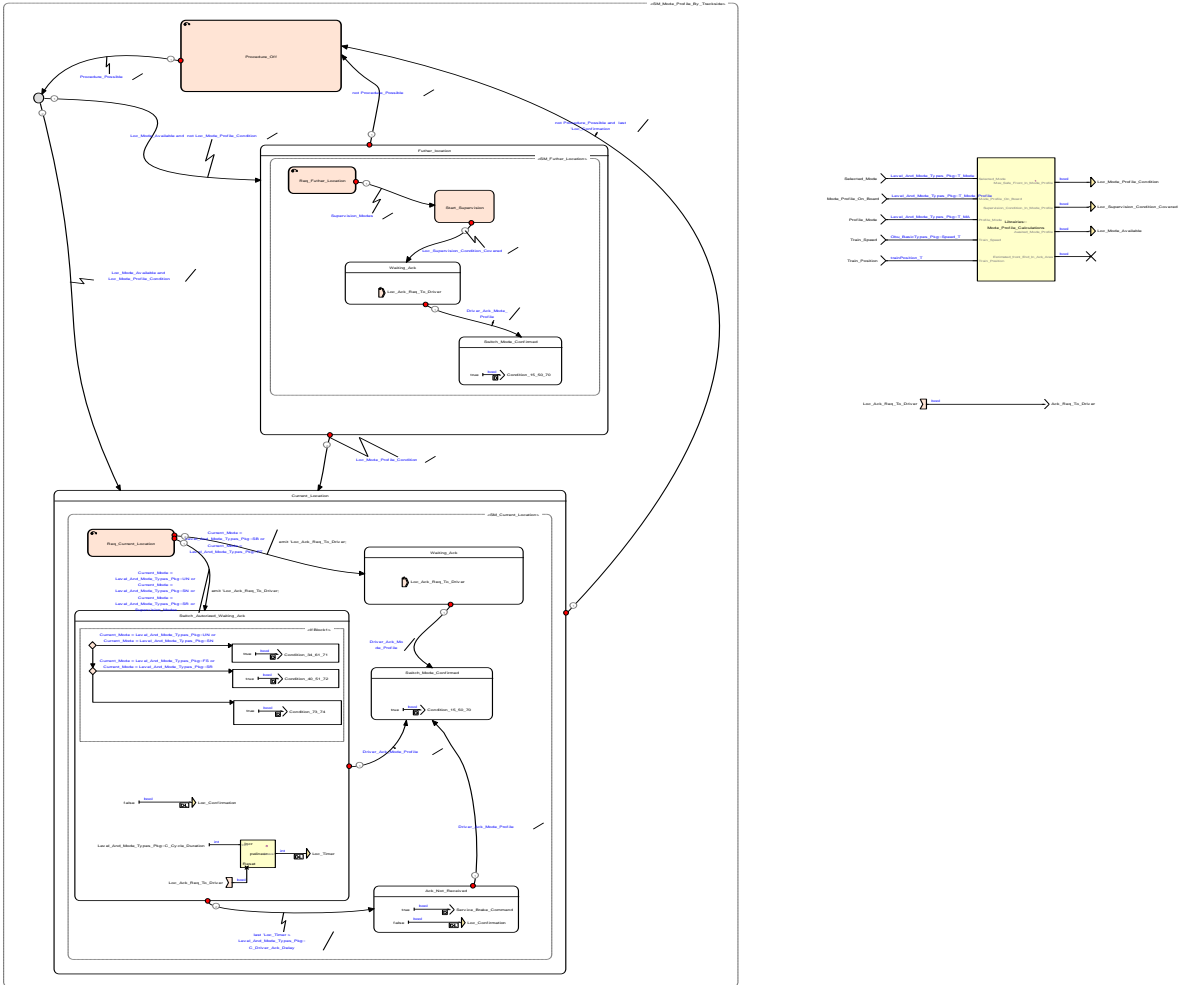


**Figure 56: View of diagram_Procedure_With_Mode_Profile_1 (Procedure_With_Mode_Profile)**

**Table 188: Counter (#8) hidden inputs assignment of diagram_Procedure_With_Mode_Profile_1**

| Rank | Name | Value |
|------|------|-------|
| 1 | Reset | *wired (_L4)* |

**Table 189: State Machines of diagram_Procedure_With_Mode_Profile_1**

| State Machine | Comments and Information |
|---------------|--------------------------|
| SM_Mode_Profile_By_Trackside | |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location | |
| SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location | |

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**Table 190: States of diagram_Procedure_With_Mode_Profile_1**

| State | Comments and Information |
|---|---|
| SM_Mode_Profile_By_Trackside:Current_Location | |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Ack_Not_Received | **Comments:**<br>SRS § 5.7.2.4, 5.9.2.4, 5.19.2.4<br>SRS § 5.7.3.7, 5.9.3.8, 5.19.3.8 |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Req_Current_Location | |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack | **Comments:**<br>SRS § 5.7.2.3, 5.9.2.3, 5.19.2.3<br>§4.6.3 : Condition 34 : "(An ackn. request for On Sight is displayed to the driver) AND (the driver acknowledges)    see {1} here under"<br>§4.6.3 : Condition 61 : "(An ackn. request for Shunting is displayed to the driver) AND (the driver acknowledges)    see {5} here under"<br>§4.6.3 : Condition 71 : "(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area) AND (The ERTMS/ETCS level switches to 1,2 or 3)"<br>§4.6.3 : Condition 40 : "(An ackn. request for On Sight is displayed to the driver) AND (the driver acknowledges)    see {1} here under"<br>§4.6.3 : Condition 51 : "((A Mode Profile defining the entry of a Shunting area is used on-board) AND (The max safe front end of the train is inside the Shunting area)"<br>§4.6.3 : Condition 72 : "(A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area)."<br>§4.6.3 : Condition 73 : "(A Mode Profile defining an On Sight area is on-board) AND (The max safe front end of the train is inside the On Sight area) AND (The estimated front end of the train is not inside an LS acknowledgement area)"<br>§4.6.3 : Condition 74 : "((A Mode Profile defining a Limited Supervision area is on-board) AND (The max safe front end of the train is inside the Limited Supervision area) AND (The estimated front end of the train is not inside an OS acknowledgement area)" |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Mode_Confirmed | **Comments:**<br>§4.6.3 : Condition 15 : "(An ackn. request for On Sight is displayed to the driver) AND (the driver acknowledges)    see {1} here under"<br>§4.6.3 : Condition 50 : "(An ackn. request for Shunting is displayed to the driver) AND (the driver acknowledges)    see {5} here under"<br>§4.6.3 : Condition 70 : "(An ackn. request for Limited Supervision is displayed to the driver) AND (the driver acknowledges) see {7} here under" |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Waiting_Ack | **Comments:**<br>SRS § 5.7.4.1, 5.9.5.1, 5.19.5.1 |
| SM_Mode_Profile_By_Trackside:Futher_location | |

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| State | Comments and Information |
|---|---|
| SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Req_Futher_Location | |
| SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Start_Supervision | |
| SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Switch_Mode_Confirmed | **Comments:**<br>SRS § 5.7.3.5, 5.9.3.6, 5.19.3.6<br>§4.6.3 : Condition 15 : "(An ackn. request for On Sight is displayed to the driver) AND (the driver acknowledges)   see {1} here under"<br>§4.6.3 : Condition 50 : "(An ackn. request for Shunting is displayed to the driver) AND (the driver acknowledges)   see {5} here under"<br>§4.6.3 : Condition 70 : "(An ackn. request for Limited Supervision is displayed to the driver) AND (the driver acknowledges) see {7} here under" |
| SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Waiting_Ack | **Comments:**<br>SRS § 5.7.3.3,, 5.9.3.5, 5.19.3.5 |
| SM_Mode_Profile_By_Trackside:Procedure_Off | |

**Table 191: Transitions of diagram_Procedure_With_Mode_Profile_1**

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_Mode_Profile_By_Trackside:Current_Location **Target:** SM_Mode_Profile_By_Trackside:Procedure_Off | 1 | **Condition:** not Procedure_Possible and last 'Loc_Confirmation | |
| **Source:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Ack_Not_Received **Target:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Mode_Confirmed | 1 | **Condition:** Driver_Ack_Mode_Profile **Actions:** | |
| **Source:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Req_Current_Location **Target:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack | 1 | **Condition:** Current_Mode = Level_And_Mode_Types_Pkg::UN or Current_Mode = Level_And_Mode_Types_Pkg::SN or Current_Mode = Level_And_Mode_Types_Pkg::SR or Supervision_Modes **Actions:** emit 'Loc_Ack_Req_To_Driver; | |

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| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Req_Current_Location **Target:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Waiting_Ack | 2 | **Condition:** Current_Mode = Level_And_Mode_Types_Pkg::SB or Current_Mode = Level_And_Mode_Types_Pkg::PT **Actions:**  emit 'Loc_Ack_Req_To_Driver; | |
| **Source:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack **Target:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Mode_Confirmed | 1 | **Condition:** Driver_Ack_Mode_Profile **Actions:** | |
| **Source:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack **Target:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Ack_Not_Received | 2 | **Condition:**  last 'Loc_Timer > Level_And_Mode_Types_Pkg::C_Driver_Ack_Delay **Actions:** | |
| **Source:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Waiting_Ack **Target:** SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Mode_Confirmed | 1 | **Condition:** Driver_Ack_Mode_Profile **Actions:** | **Comments:** SRS § 5.7.4.2, 5.9.5.2, 5.19.5.2 |
| **Source:** SM_Mode_Profile_By_Trackside:Futher_location **Target:** SM_Mode_Profile_By_Trackside:Procedure_Off | 1 | **Condition:**  not Procedure_Possible **Actions:** | |
| **Source:** SM_Mode_Profile_By_Trackside:Futher_location **Target:** SM_Mode_Profile_By_Trackside:Current_Location | 2 | **Condition:** Loc_Mode_Profile_Condition | **Comments:** SRS § 5.7.3.6,, 5.9.3.7, 5.19.3.7 |
| **Source:** SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Req_Futher_Location **Target:** SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Start_Supervision | 1 | **Condition:** Supervision_Modes **Actions:** | **Comments:** SRS § 5.7.3.2,, 5.9.3.2, 5.19.3.2 |

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| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Start_Supervision **Target:** SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Waiting_Ack | 1 | **Condition:** Loc_Supervision_Condition_Covered **Actions:** | **Comments:** SRS § 5.7.3.2,, 5.9.3.2, 5.19.3.2 |
| **Source:** SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Waiting_Ack **Target:** SM_Mode_Profile_By_Trackside:Futher_location:SM_Futher_Location:Switch_Mode_Confirmed | 1 | **Condition:** Driver_Ack_Mode_Profile **Actions:** | |
| **Source:** SM_Mode_Profile_By_Trackside:Procedure_Off **Target:** SM_Mode_Profile_By_Trackside:Futher_location | 1 | **Condition:** Procedure_Possible **Actions:** | |
| | 1 | **Condition:** Loc_Mode_Available and not Loc_Mode_Profile_Condition | |
| **Source:** SM_Mode_Profile_By_Trackside:Procedure_Off **Target:** SM_Mode_Profile_By_Trackside:Current_Location | 1 | **Condition:** Procedure_Possible **Actions:** | |
| | 2 | **Condition:** Loc_Mode_Available and Loc_Mode_Profile_Condition | |

**Table 192: Conditional Blocks of diagram_Procedure_With_Mode_Profile_1**

| Conditional Block | Comments and Information |
|---|---|
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack:IfBlock1 | |

**Table 193: Actions of diagram_Procedure_With_Mode_Profile_1**

| Conditional Block Action | Comments and Information |
|---|---|
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack:IfBlock1:then | |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack:IfBlock1:else:then | |
| SM_Mode_Profile_By_Trackside:Current_Location:SM_Current_Location:Switch_Autorized_Waiting_Ack:IfBlock1:else:else | |

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## 3.6.10.    SH_Initiated_By_Driver_On Operator

Declared as **public node**

### 3.6.10.1.    Interface

**Table 194: Inputs of SH_Initiated_By_Driver_On**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Current_Level | M_LEVEL | |
| Driver_Req_SH | bool | |
| On_Going_Mission | bool | |
| Shunting_Granted_By_RBC | bool | |

**Table 195: Outputs of SH_Initiated_By_Driver_On**

| Name | Type | Properties | | Comments and Information |
|------|------|------------|------|--------------------------|
| Clean_BG_List_SH_Area | bool | default | false | |
| Condition5 | bool | default | false | |
| Condition6 | bool | default | false | |
| End_Of_Mission_Procedure_Req | bool | default | false | |
| SH_Refused_By_RBC_To_DMI | bool | default | false | |
| Request_For_SH_To_RBC | bool | default | false | |

### 3.6.10.2.    Locals

**Table 196: Locals of SH_Initiated_By_Driver_On**

| Name | Type | Comments and Information |
|------|------|--------------------------|
| Loc_Level_2_3 | bool | |

### 3.6.10.3.    Operator Hierarchy

diagram : diagram_SH_Initiated_By_Driver_On_1
    *state-machine* : SM_SH_Initiated_By_Driver
        state : Issue_SH_Request_L2_L3
        state : SH_Authorized_L0_L1_LNTC
        state : SH_Authorized_L2_L3
        state : SH_procedure_possible

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## 3.6.10.4. Graphical and Textual Diagrams

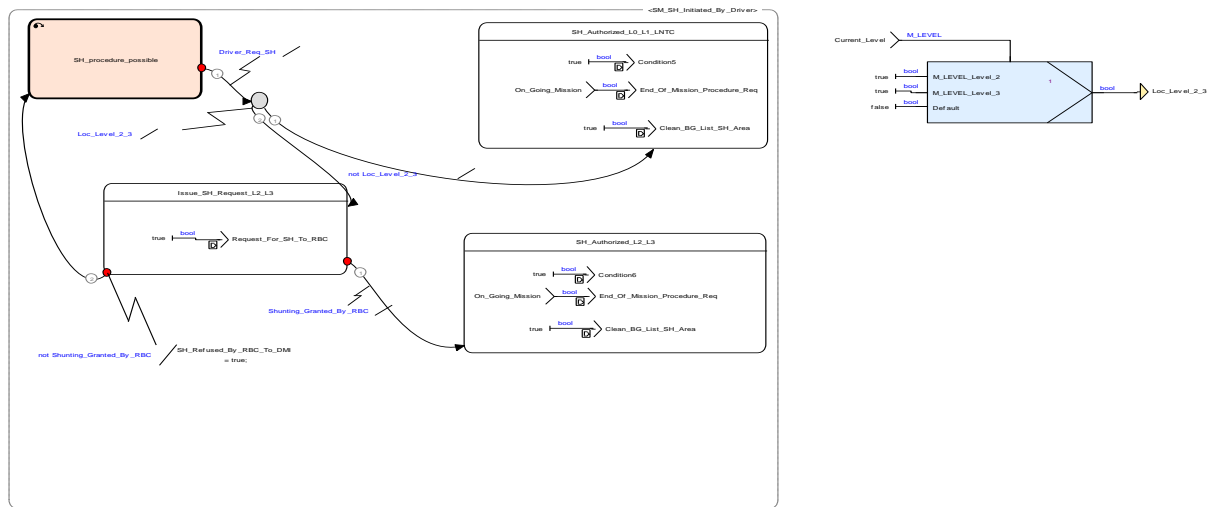### 3.6.10.4.1. View of diagram_SH_Initiated_By_Driver_On_1 (SH_Initiated_By_Driver_On)



**Figure 57: View of diagram_SH_Initiated_By_Driver_On_1 (SH_Initiated_By_Driver_On)**

**Table 197: State Machines of diagram_SH_Initiated_By_Driver_On_1**

| State Machine | Comments and Information |
|---|---|
| SM_SH_Initiated_By_Driver | |

**Table 198: States of diagram_SH_Initiated_By_Driver_On_1**

| State | Comments and Information |
|---|---|
| SM_SH_Initiated_By_Driver:Issue_SH_Request_L2_L3 | **Comments:**<br>SRS § 5.6 state A045 :  Issue SH request |
| SM_SH_Initiated_By_Driver:SH_Authorized_L0_L1_LNTC | **Comments:**<br>SRS § 5.6 state A050: Transition to SH<br>SRS § 5.5.2.3 : Entry in SH mode as End Of Mission<br>§4.6.3 : Condition 5 : "Train is at standstill AND ERTMS/ETCS level is 0 or NTC or 1 AND driver selects Shunting Mode" |
| SM_SH_Initiated_By_Driver:SH_Authorized_L2_L3 | **Comments:**<br>SRS § 5.6 state A050: Transition to SH<br>SRS § 5.6 state D040: On going Mission<br>SRS § 5.5.2.3 : Entry in SH mode as End Of Mission<br>§4.6.3 : Condition 6 : "Train is at standstill AND ERTMS/ETCS level is 2 or 3 AND reception of the information "Shunting granted by RBC", due to a shunting request from the driver" |
| SM_SH_Initiated_By_Driver:SH_procedure_possible | **Comments:**<br>SRS § 5.6 state S0 |

**Table 199: Transitions of diagram_SH_Initiated_By_Driver_On_1**

| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:**<br>SM_SH_Initiated_By_Driver:Issue_SH_Request_L2_L3<br>**Target:**<br>SM_SH_Initiated_By_Driver:SH_Authorized_L2_L3 | 1 | **Condition:**<br>Shunting_Granted_By_RBC<br>**Actions:** | **Comments:**<br>SRS § 5.6 state E09 : SH Authorized |

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| Source/Target | # | Conditions/Actions | Comments and Information |
|---|---|---|---|
| **Source:** SM_SH_Initiated_By_Driver:Issue_SH_Request_L2_L3 **Target:** SM_SH_Initiated_By_Driver:SH_procedure_possible | 2 | **Condition:** not Shunting_Granted_By_RBC **Actions:** SH_Refused_By_RBC_To_DMI = true; | **Comments:** SRS § 5.6 state E215 : transition SH refused |
| **Source:** SM_SH_Initiated_By_Driver:SH_procedure_possible **Target:** SM_SH_Initiated_By_Driver:SH_Authorized_L0_L1_LNTC | 1 | **Condition:** Driver_Req_SH **Actions:** | **Comments:** SRS § 5.6 state E015 transition : Driver selects shunting |
| | 1 | **Condition:** not Loc_Level_2_3 **Actions:** | |
| **Source:** SM_SH_Initiated_By_Driver:SH_procedure_possible **Target:** SM_SH_Initiated_By_Driver:Issue_SH_Request_L2_L3 | 1 | **Condition:** Driver_Req_SH **Actions:** | **Comments:** SRS § 5.6 state E015 transition : Driver selects shunting |
| | 2 | **Condition:** Loc_Level_2_3 **Actions:** | **Comments:** D020 : Level 2 or 3 |

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