

# **SysStateMachine**

## **Design Description**

**CHENJH43**

# SysStateMachine: Design Description

CHENJH43

Publication date 01-Aug-2018 15:31:33

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# Chapter 1. Model Version

**Version:** 1.74

**Last modified:** Wed Aug 01 15:31:10 2018

**Checksum:** 662948551 2299993080 2452589842 4072069038

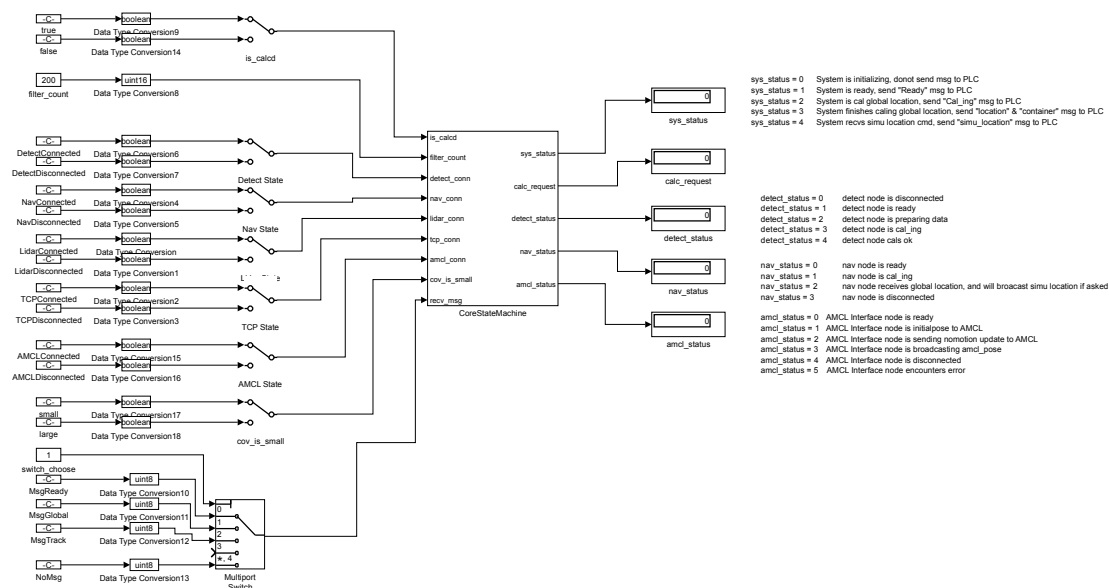


# Chapter 2. Root System

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**Figure 2.1. SysStateMachine**



## 2.1. Blocks

### 2.1.1. Parameters

#### 2.1.1.1. "AMCL State" (ManualSwitch)

**Table 2.1. "AMCL State" Parameters**

Parameter	Value
Allow the two inputs to differ in size (Results in variable-size output signal)	off
Sample time (-1 for inherited)	-1

### 2.1.1.2. "amcl\_status" (Display)

**Table 2.2. "amcl\_status" Parameters**

Parameter	Value
Format	short
Decimation	1
Floating display	off

### 2.1.1.3. "AMCLConnected" (Constant)

**Table 2.3. "AMCLConnected" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.4. "AMCLDisconnected" (Constant)

**Table 2.4. "AMCLDisconnected" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.5. "calc\_request" (Display)

**Table 2.5. "calc\_request" Parameters**

Parameter	Value
Format	short
Decimation	1
Floating display	off

### 2.1.1.6. "cov\_is\_small" (ManualSwitch)

**Table 2.6. "cov\_is\_small" Parameters**

Parameter	Value
Allow the two inputs to differ in size (Results in variable-size output signal)	off
Sample time (-1 for inherited)	-1

### 2.1.1.7. "Data Type Conversion" (DataTypeConversion)

**Table 2.7. "Data Type Conversion" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.8. "Data Type Conversion1" (DataTypeConversion)

**Table 2.8. "Data Type Conversion1" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.9. "Data Type Conversion10" (DataTypeConversion)

**Table 2.9. "Data Type Conversion10" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.10. "Data Type Conversion11" (DataTypeConversion)

**Table 2.10. "Data Type Conversion11" Parameters**

Parameter	Value
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.11. "Data Type Conversion12" (DataTypeConversion)

**Table 2.11. "Data Type Conversion12" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint8
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.12. "Data Type Conversion13" (DataTypeConversion)

**Table 2.12. "Data Type Conversion13" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint8

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.13. "Data Type Conversion14" (DataTypeConversion)

**Table 2.13. "Data Type Conversion14" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.14. "Data Type Conversion15" (DataTypeConversion)

**Table 2.14. "Data Type Conversion15" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.15. "Data Type Conversion16" (DataTypeConversion)

**Table 2.15. "Data Type Conversion16" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.16. "Data Type Conversion17" (DataTypeConversion)

**Table 2.16. "Data Type Conversion17" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.17. "Data Type Conversion18" (DataTypeConversion)

**Table 2.17. "Data Type Conversion18" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.18. "Data Type Conversion2" (DataTypeConversion)

**Table 2.18. "Data Type Conversion2" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off



Parameter	Value
Sample time (-1 for inherited)	-1

### 2.1.1.19. "Data Type Conversion3" (DataTypeConversion)

**Table 2.19. "Data Type Conversion3" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.20. "Data Type Conversion4" (DataTypeConversion)

**Table 2.20. "Data Type Conversion4" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.21. "Data Type Conversion5" (DataTypeConversion)

**Table 2.21. "Data Type Conversion5" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.22. "Data Type Conversion6" (DataTypeConversion)

**Table 2.22. "Data Type Conversion6" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.23. "Data Type Conversion7" (DataTypeConversion)

**Table 2.23. "Data Type Conversion7" Parameters**

Parameter	Value
Output minimum	[]

Parameter	Value
Output maximum	[]
Output data type	boolean
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.24. "Data Type Conversion8" (DataTypeConversion)

**Table 2.24. "Data Type Conversion8" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	uint16
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.25. "Data Type Conversion9" (DataTypeConversion)

**Table 2.25. "Data Type Conversion9" Parameters**

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	boolean

Parameter	Value
Lock output data type setting against changes by the fixed-point tools	off
Input and output to have equal	Real World Value (RWV)
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

### 2.1.1.26. "Detect State" (ManualSwitch)

**Table 2.26. "Detect State" Parameters**

Parameter	Value
Allow the two inputs to differ in size (Results in variable-size output signal)	off
Sample time (-1 for inherited)	-1

### 2.1.1.27. "detect\_status" (Display)

**Table 2.27. "detect\_status" Parameters**

Parameter	Value
Format	short
Decimation	1
Floating display	off

### 2.1.1.28. "DetectConnected" (Constant)

**Table 2.28. "DetectConnected" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.29. "DetectDisconnected" (Constant)

**Table 2.29. "DetectDisconnected" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.30. "false" (Constant)

**Table 2.30. "false" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.31. "filter\_count" (Constant)

**Table 2.31. "filter\_count" Parameters**

Parameter	Value
Constant value	200
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.32. "is\_calcd" (ManualSwitch)

**Table 2.32. "is\_calcd" Parameters**

Parameter	Value
Allow the two inputs to differ in size (Results in variable-size output signal)	off
Sample time (-1 for inherited)	-1

### 2.1.1.33. "large" (Constant)

**Table 2.33. "large" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Sample time	inf
Frame period	inf

### 2.1.1.34. "Lidar State" (ManualSwitch)

**Table 2.34. "Lidar State" Parameters**

Parameter	Value
Allow the two inputs to differ in size (Results in variable-size output signal)	off
Sample time (-1 for inherited)	-1

### 2.1.1.35. "LidarConnected" (Constant)

**Table 2.35. "LidarConnected" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.36. "LidarDisconnected" (Constant)

**Table 2.36. "LidarDisconnected" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.37. "MsgGlobal" (Constant)

**Table 2.37. "MsgGlobal" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.38. "MsgReady" (Constant)

**Table 2.38. "MsgReady" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off



Parameter	Value
Sample time	inf
Frame period	inf

### 2.1.1.39. "MsgTrack" (Constant)

**Table 2.39. "MsgTrack" Parameters**

Parameter	Value
Constant value	2
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.40. "Multiport Switch" (MultiPortSwitch)

**Table 2.40. "Multiport Switch" Parameters**

Parameter	Value
Data port order	Zero-based contiguous
Number of data ports	5
Data port indices (e.g. {1, [2,3]})	{1,2,3}
Data port for default case	Last data port
Diagnostic for default case	Error
Require all data port inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off

Parameter	Value
Integer rounding mode	Floor
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1
Allow different data input sizes (Results in variable-size output signal)	off

### 2.1.1.41. "Nav State" (ManualSwitch)

**Table 2.41. "Nav State" Parameters**

Parameter	Value
Allow the two inputs to differ in size (Results in variable-size output signal)	off
Sample time (-1 for inherited)	-1

### 2.1.1.42. "nav\_status" (Display)

**Table 2.42. "nav\_status" Parameters**

Parameter	Value
Format	short
Decimation	1
Floating display	off

### 2.1.1.43. "NavConnected" (Constant)

**Table 2.43. "NavConnected" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]

Parameter	Value
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### 2.1.1.44. "NavDisconnected" (Constant)

**Table 2.44. "NavDisconnected" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

#### 2.1.1.45. "NoMsg" (Constant)

**Table 2.45. "NoMsg" Parameters**

Parameter	Value
Constant value	4
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.46. "small" (Constant)

**Table 2.46. "small" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.47. "switch\_choose" (Constant)

**Table 2.47. "switch\_choose" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.48. "sys\_status" (Display)

**Table 2.48. "sys\_status" Parameters**

Parameter	Value
Format	short

Parameter	Value
Decimation	1
Floating display	off

### 2.1.1.49. "TCP State" (ManualSwitch)

**Table 2.49. "TCP State" Parameters**

Parameter	Value
Allow the two inputs to differ in size (Results in variable-size output signal)	off
Sample time (-1 for inherited)	-1

### 2.1.1.50. "TCPConnected" (Constant)

**Table 2.50. "TCPConnected" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.51. "TCPDisconnected" (Constant)

**Table 2.51. "TCPDisconnected" Parameters**

Parameter	Value
Constant value	0
Interpret vector parameters as 1-D	on

Parameter	Value
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.1.52. "true" (Constant)

**Table 2.52. "true" Parameters**

Parameter	Value
Constant value	1
Interpret vector parameters as 1-D	on
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit from 'Constant value'
Lock output data type setting against changes by the fixed-point tools	off
Sample time	inf
Frame period	inf

### 2.1.2. Block Execution Order

1. Memory2 [30] (Memory)
2. AMCLConnected [3] (Constant)
3. Data Type Conversion15 [7] (DataTypeConversion)
4. AMCLDisconnected [3] (Constant)
5. Data Type Conversion16 [8] (DataTypeConversion)
6. AMCL State [2] (ManualSwitch)
7. small [21] (Constant)
8. Data Type Conversion17 [8] (DataTypeConversion)
9. large [15] (Constant)
10. Data Type Conversion18 [9] (DataTypeConversion)
11. cov\_is\_small [4] (ManualSwitch)
12. *AMCL\_Interface*
  1. SFunction (S-Function)
13. amcl\_status [2] (Display)
14. DetectConnected [13] (Constant)
15. Data Type Conversion6 [11] (DataTypeConversion)

16. DetectDisconnected [14] (Constant)
17. Data Type Conversion7 [11] (DataTypeConversion)
18. Detect State [13] (ManualSwitch)
19. filter\_count [14] (Constant)
20. Data Type Conversion8 [12] (DataTypeConversion)
21. true [23] (Constant)
22. Data Type Conversion9 [12] (DataTypeConversion)
23. false [14] (Constant)
24. Data Type Conversion14 [7] (DataTypeConversion)
25. is\_calcd [15] (ManualSwitch)
26. *DetectState*
  1. SFunction (S-Function)
27. calc\_request [4] (Display)
28. detect\_status [13] (Display)
29. NavConnected [19] (Constant)
30. Data Type Conversion4 [10] (DataTypeConversion)
31. NavDisconnected [20] (Constant)
32. Data Type Conversion5 [10] (DataTypeConversion)
33. Nav State [19] (ManualSwitch)
34. Memory1 [29] (Memory)
35. *NavState*
  1. SFunction (S-Function)
36. nav\_status [19] (Display)
37. LidarConnected [16] (Constant)
38. Data Type Conversion [4] (DataTypeConversion)
39. LidarDisconnected [16] (Constant)
40. Data Type Conversion1 [4] (DataTypeConversion)
41. Lidar State [16] (ManualSwitch)
42. TCPConnected [22] (Constant)
43. Data Type Conversion2 [9] (DataTypeConversion)
44. TCPDisconnected [22] (Constant)
45. Data Type Conversion3 [10] (DataTypeConversion)
46. TCP State [22] (ManualSwitch)
47. switch\_choose [21] (Constant)
48. MsgReady [17] (Constant)
49. Data Type Conversion10 [5] (DataTypeConversion)
50. MsgGlobal [17] (Constant)
51. Data Type Conversion11 [5] (DataTypeConversion)
52. MsgTrack [18] (Constant)
53. Data Type Conversion12 [6] (DataTypeConversion)
54. NoMsg [20] (Constant)
55. Data Type Conversion13 [6] (DataTypeConversion)
56. Multiport Switch [18] (MultiPortSwitch)
57. *StateMachine*
  1. SFunction (S-Function)
58. sys\_status [21] (Display)

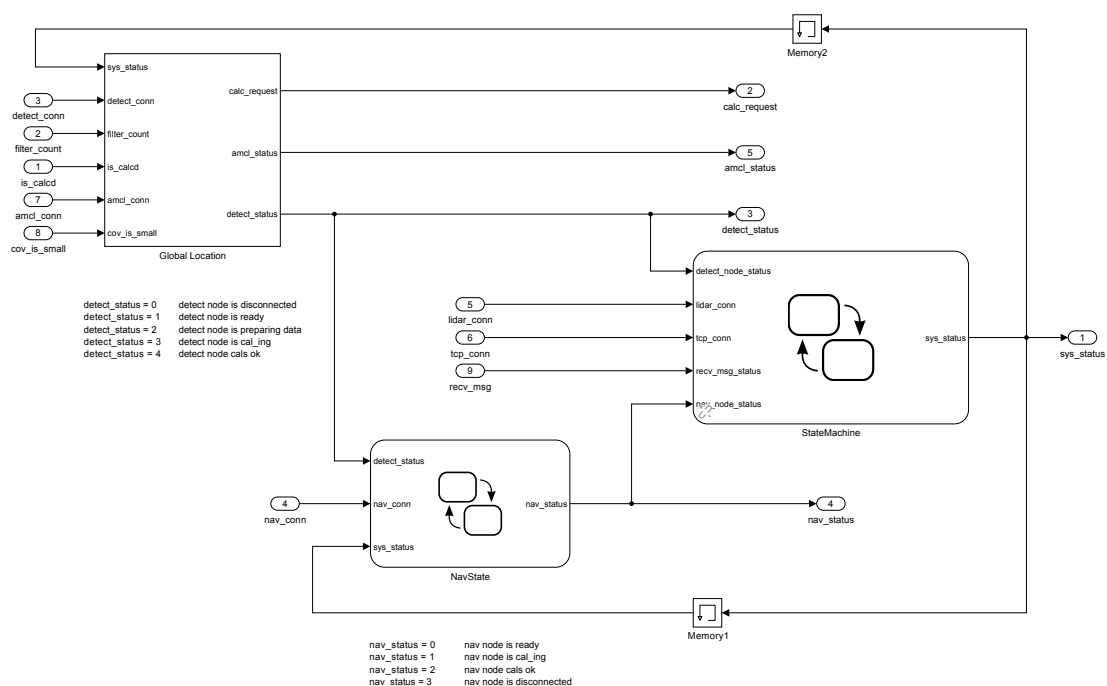
# Chapter 3. Subsystems

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## 3.1. CoreStateMachine

Figure 3.1. SysStateMachine/CoreStateMachine



### 3.1.1. Blocks

#### 3.1.1.1. Parameters

##### 3.1.1.1.1. "amcl\_conn" (Inport)

Table 3.1. "amcl\_conn" Parameters

Parameter	Value
Port number	7



Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### 3.1.1.1.2. "amcl\_status" (Outport)

**Table 3.2. "amcl\_status" Parameters**

Parameter	Value
Port number	5
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

### 3.1.1.1.3. "calc\_request" (Outport)

**Table 3.3. "calc\_request" Parameters**

Parameter	Value
Port number	2

Parameter	Value
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

#### 3.1.1.1.4. "cov\_is\_small" (Inport)

**Table 3.4. "cov\_is\_small" Parameters**

Parameter	Value
Port number	8
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### 3.1.1.1.5. "detect\_conn" (Inport)

**Table 3.5. "detect\_conn" Parameters**

Parameter	Value
Port number	3

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### 3.1.1.1.6. "detect\_status" (Outport)

**Table 3.6. "detect\_status" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

### 3.1.1.1.7. "filter\_count" (Inport)

**Table 3.7. "filter\_count" Parameters**

Parameter	Value
Port number	2

Parameter	Value
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### 3.1.1.1.8. "is\_calcd" (Inport)

**Table 3.8. "is\_calcd" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### 3.1.1.1.9. "lidar\_conn" (Inport)

**Table 3.9. "lidar\_conn" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### 3.1.1.1.10. "Memory1" (Memory)

**Table 3.10. "Memory1" Parameters**

Parameter	Value
Initial condition	0

Parameter	Value
Inherit sample time	off
Direct feedthrough of input during linearization	off
Treat as a unit delay when linearizing with discrete sample time	off
State name must resolve to Simulink signal object	off

### 3.1.1.1.11. "Memory2" (Memory)

**Table 3.11. "Memory2" Parameters**

Parameter	Value
Initial condition	0
Inherit sample time	off
Direct feedthrough of input during linearization	off
Treat as a unit delay when linearizing with discrete sample time	off
State name must resolve to Simulink signal object	off

### 3.1.1.1.12. "nav\_conn" (Inport)

**Table 3.12. "nav\_conn" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**3.1.1.1.13. "nav\_status" (Outport)****Table 3.13. "nav\_status" Parameters**

Parameter	Value
Port number	4
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

**3.1.1.1.14. "recv\_msg" (Inport)****Table 3.14. "recv\_msg" Parameters**

Parameter	Value
Port number	9
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

### 3.1.1.1.15. "sys\_status" (Outport)

**Table 3.15. "sys\_status" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

### 3.1.1.1.16. "tcp\_conn" (Inport)

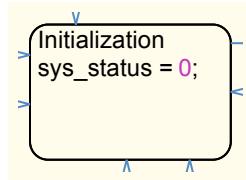
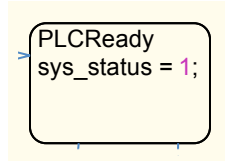
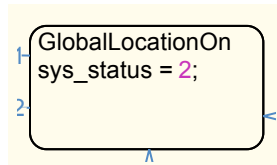
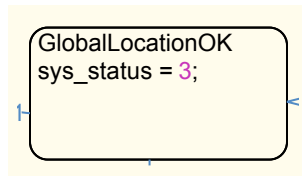
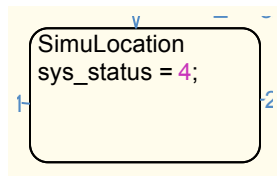
**Table 3.16. "tcp\_conn" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

## 3.1.2. State Charts





**3.1.2.2.2. OR State - Initialization****3.1.2.2.3. OR State - PLCReady****3.1.2.2.4. OR State - GlobalLocationOn****3.1.2.2.5. OR State - GlobalLocationOK****3.1.2.2.6. OR State - SimuLocation****3.1.2.3. Data****Table 3.17. Data - detect\_node\_status**

Scope	Input
Data Type	uint8

**Table 3.18. Data - lidar\_conn**

Scope	Input
Data Type	boolean

**Table 3.19. Data - nav\_node\_status**

Scope	Input
-------	-------

Data Type	uint8
-----------	-------

**Table 3.20. Data - recv\_msg\_status**

Scope	Input
Data Type	uint8

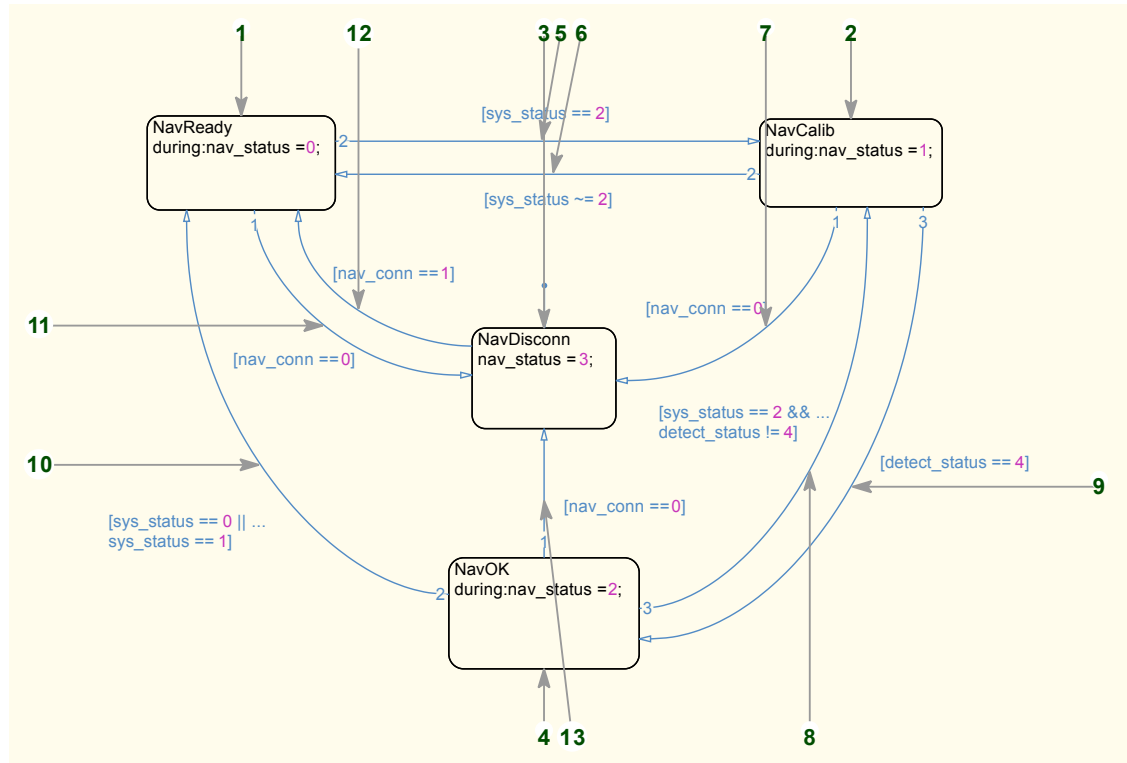
**Table 3.21. Data - sys\_status**

Scope	Output
Data Type	uint8

**Table 3.22. Data - tcp\_conn**

Scope	Input
Data Type	boolean

### 3.1.2.4. Chart

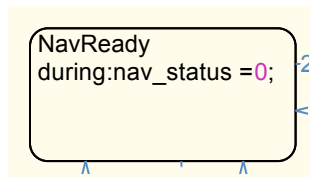


- ❶ NavReady [36]
- ❷ NavCalib [36]
- ❸ NavDisconn [36]
- ❹ NavOK [36]
- ❺ [sys\_status == 2]
- ❻ [sys\_status ~= 2]
- ❼ [nav\_conn == 0]

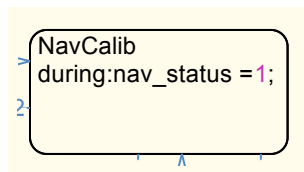
- ⑧ [sys\_status == 2 && .....
- ⑨ [detect\_status == 4]
- ⑩ [sys\_status == 0 || .....
- ⑪ [nav\_conn == 0]
- ⑫ [nav\_conn == 1]
- ⑬ [nav\_conn == 0]

### 3.1.2.5. States

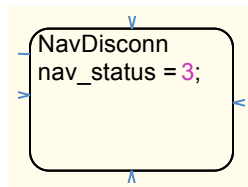
#### 3.1.2.5.1. OR State - NavReady



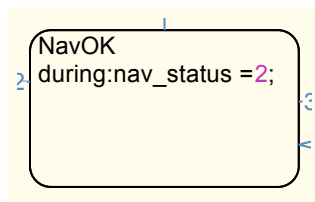
#### 3.1.2.5.2. OR State - NavCalib



#### 3.1.2.5.3. OR State - NavDisconn



#### 3.1.2.5.4. OR State - NavOK



### 3.1.2.6. Data

**Table 3.23. Data - detect\_status**

Scope	Input
Data Type	uint8

**Table 3.24. Data - nav\_conn**

Scope	Input
Data Type	boolean

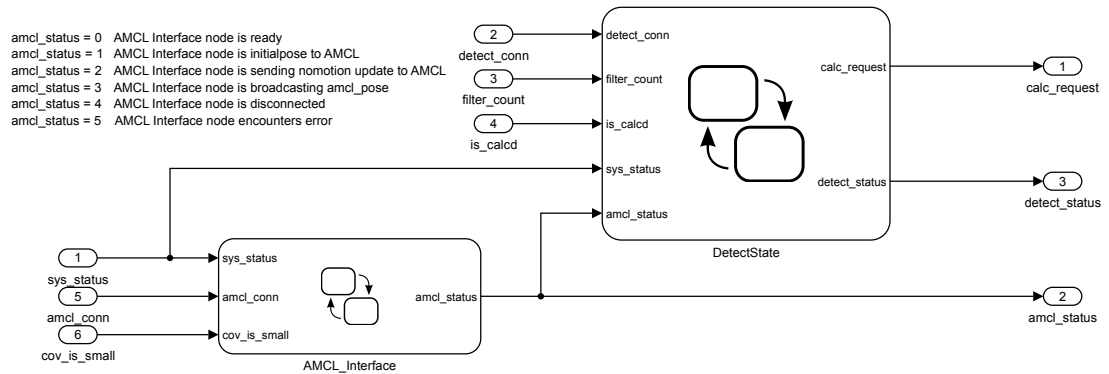
**Table 3.25. Data - nav\_status**

Scope	Output
Data Type	uint8

**Table 3.26. Data - sys\_status**

Scope	Input
Data Type	uint8

## 3.2. Global Location

**Figure 3.2. SysStateMachine/CoreStateMachine/Global Location**

### 3.2.1. Blocks

#### 3.2.1.1. Parameters

##### 3.2.1.1.1. "amcl\_conn" (Inport)

**Table 3.27. "amcl\_conn" Parameters**

Parameter	Value
Port number	5
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**3.2.1.1.2. "amcl\_status" (Outport)****Table 3.28. "amcl\_status" Parameters**

Parameter	Value
Port number	2
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

**3.2.1.1.3. "calc\_request" (Outport)****Table 3.29. "calc\_request" Parameters**

Parameter	Value
Port number	1
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off

Parameter	Value
Unit (e.g., m, m/s <sup>2</sup> , N*-m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

#### 3.2.1.1.4. "cov\_is\_small" (Inport)

**Table 3.30. "cov\_is\_small" Parameters**

Parameter	Value
Port number	6
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

#### 3.2.1.1.5. "detect\_conn" (Inport)

**Table 3.31. "detect\_conn" Parameters**

Parameter	Value
Port number	2
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**3.2.1.1.6. "detect\_status" (Outport)****Table 3.32. "detect\_status" Parameters**

Parameter	Value
Port number	3
Icon display	Port number
Minimum	[]
Maximum	[]
Data type	Inherit: auto
Lock output data type setting against changes by the fixed-point tools	off
Output as nonvirtual bus in parent model	off
Unit (e.g., m, m/s <sup>2</sup> , N*m)	inherit
Port dimensions (-1 for inherited)	-1
Variable-size signal	Inherit
Sample time (-1 for inherited)	-1
Ensure outport is virtual	off
Source of initial output value	Dialog
Output when disabled	held
Initial output	[]

**3.2.1.1.7. "filter\_count" (Inport)****Table 3.33. "filter\_count" Parameters**

Parameter	Value
Port number	3
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**3.2.1.1.8. "is\_calcd" (Inport)****Table 3.34. "is\_calcd" Parameters**

Parameter	Value
Port number	4
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

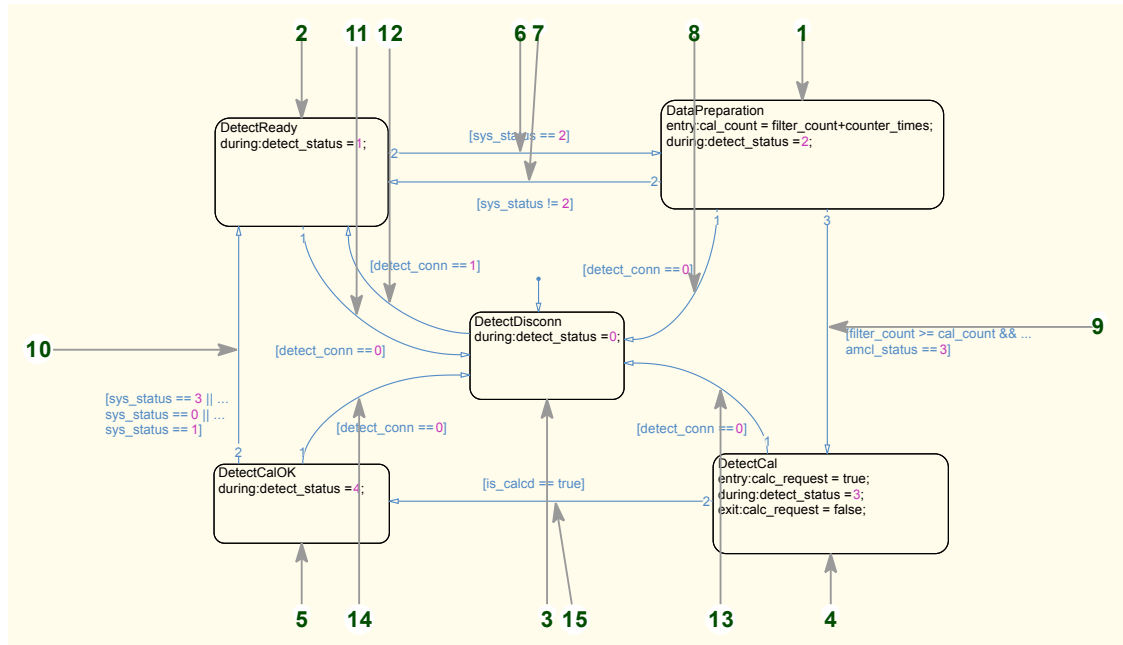
**3.2.1.1.9. "sys\_status" (Inport)****Table 3.35. "sys\_status" Parameters**

Parameter	Value
Port number	1
Port dimensions (-1 for inherited)	-1
Sample time (-1 for inherited)	-1
Minimum	[]
Maximum	[]
Data type	Inherit: auto

**3.2.2. State Charts**



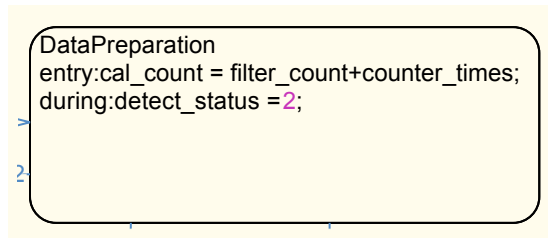
### 3.2.2.1. Chart

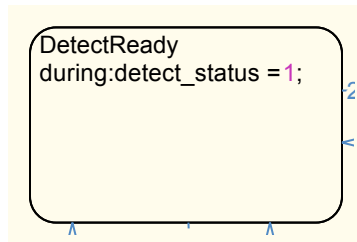
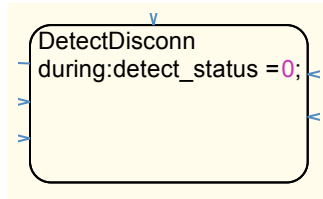
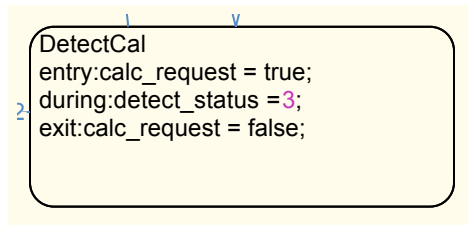
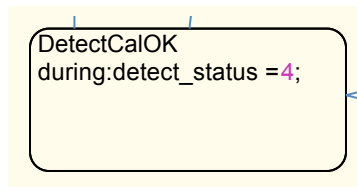


- ❶ DataPreparation [42]
- ❷ DetectReady [43]
- ❸ DetectDisconn [43]
- ❹ DetectCal [43]
- ❺ DetectCalOK [43]
- ❻ [sys\_status == 2]
- ❼ [sys\_status != 2]
- ❽ [detect\_conn == 0]
- ❾ [filter\_count >= cal\_count && .....]
- ❿ [sys\_status == 3 || .....]
- ⓫ [detect\_conn == 0]
- ⓬ [detect\_conn == 1]
- ⓭ [detect\_conn == 0]
- ⓮ [detect\_conn == 0]
- ⓯ [is\_calcd == true]

### 3.2.2.2. States

#### 3.2.2.2.1. OR State - DataPreparation



**3.2.2.2.2. OR State - DetectReady****3.2.2.2.3. OR State - DetectDisconn****3.2.2.2.4. OR State - DetectCal****3.2.2.2.5. OR State - DetectCalOK****3.2.2.3. Data****Table 3.36. Data - amcl\_status**

Scope	Input
Data Type	uint8

**Table 3.37. Data - cal\_count**

Scope	Local
Data Type	uint16

**Table 3.38. Data - calc\_request**

Scope	Output
-------	--------

Data Type	boolean
InitValue	false

**Table 3.39. Data - counter\_times**

Scope	Parameter
Data Type	uint16

**Table 3.40. Data - detect\_conn**

Scope	Input
Data Type	boolean

**Table 3.41. Data - detect\_status**

Scope	Output
Data Type	uint8

**Table 3.42. Data - filter\_count**

Scope	Input
Data Type	uint16

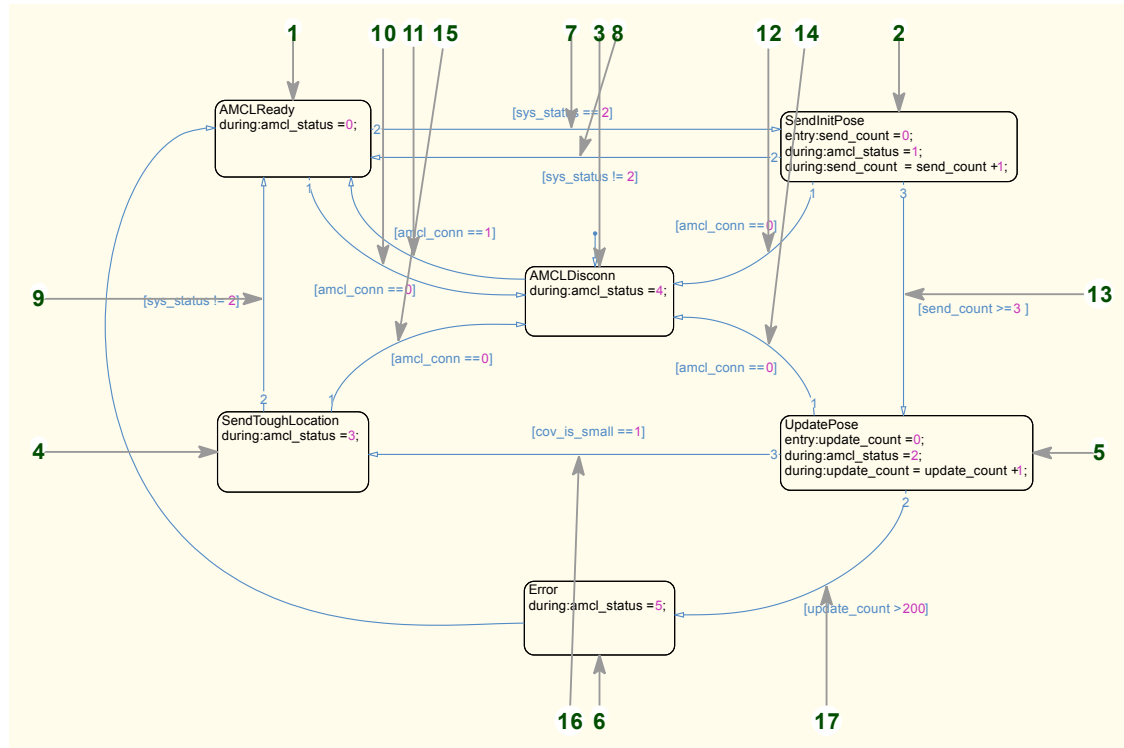
**Table 3.43. Data - is\_calcd**

Scope	Input
Data Type	boolean

**Table 3.44. Data - sys\_status**

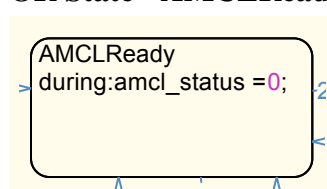
Scope	Input
Data Type	uint8

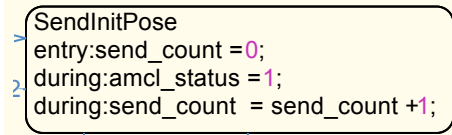
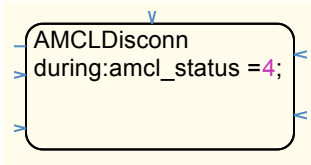
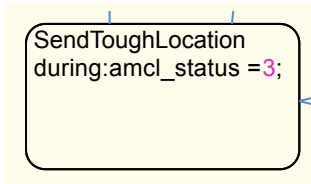
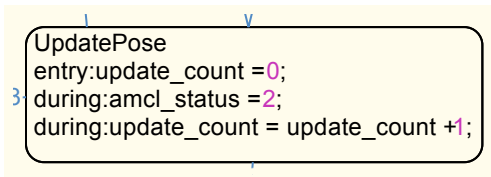
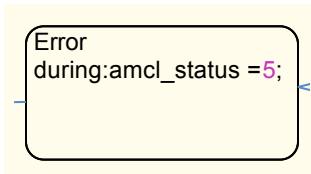
### 3.2.2.4. Chart



### 3.2.2.5. States

#### 3.2.2.5.1. OR State - AMCLReady



**3.2.2.5.2. OR State - SendInitPose****3.2.2.5.3. OR State - AMCLDisconn****3.2.2.5.4. OR State - SendToughLocation****3.2.2.5.5. OR State - UpdatePose****3.2.2.5.6. OR State - Error****3.2.2.6. Data****Table 3.45. Data - amcl\_conn**

Scope	Input
Data Type	boolean

**Table 3.46. Data - amcl\_status**

Scope	Output
Data Type	uint8

**Table 3.47. Data - cov\_is\_small**

Scope	Input
Data Type	boolean

**Table 3.48. Data - init\_count**

Scope	Local
Data Type	uint16

**Table 3.49. Data - send\_count**

Scope	Local
Data Type	uint16

**Table 3.50. Data - sys\_status**

Scope	Input
Data Type	uint8

**Table 3.51. Data - update\_count**

Scope	Local
Data Type	uint16

---

# Chapter 4. System Design Variables

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## 4.1. Design Variable Summary

**Table 4.1. Design Variables**

Variable Name	Parent Blocks	Size	Bytes	Class	Value
counter_times	DetectState [40]	1x1	8	double	200

## 4.2. Design Variable Details

**counter\_times.** 200

### Used by Blocks:

- SysStateMachine/CoreStateMachine/Global Location/DetectState [40]

Resolved in: base workspace

---

# Chapter 5. Requirements Traceability

SysStateMachine does not contain requirements traceability links.



---

# Chapter 6. System Model Configuration

Source: Model  
Source Name: SysStateMachine

**Table 6.1. SysStateMachine Configuration Set**

Property	Value
Description	
Components	[SysStateMachine Configuration Set.Components(1) [50], SysStateMachine Configuration Set.Components(2) [51], SysStateMachine Configuration Set.Components(3) [52], SysStateMachine Configuration Set.Components(4) [53], SysStateMachine Configuration Set.Components(5) [56], SysStateMachine Configuration Set.Components(6) [57], SysStateMachine Configuration Set.Components(7) [58], SysStateMachine Configuration Set.Components(8) [59], SysStateMachine Configuration Set.Components(9) [60], SysStateMachine Configuration Set.Components(10) [62], SysStateMachine Configuration Set.Components(11) [62]]
Name	Configuration
SimulationMode	normal
ConfigType	Model

**Table 6.2. SysStateMachine Configuration Set.Components [50](1)**

Property	Value
Name	Solver
Description	
Components	
StartTime	0.0
StopTime	inf
AbsTol	auto
FixedStep	0.01
InitialStep	auto
MaxNumMinSteps	-1
MaxOrder	5
ZcThreshold	auto
ConsecutiveZCsStepRelTol	10*128*eps
MaxConsecutiveZCs	1000
ExtrapolationOrder	4

NumberNewtonIterations	1
MaxStep	auto
MinStep	auto
MaxConsecutiveMinStep	1
RelTol	1e-3
SolverMode	SingleTasking
EnableMultiTasking	off
EnableConcurrentExecution	off
ConcurrentTasks	off
Solver	FixedStepAuto
SolverName	FixedStepAuto
SolverType	Fixed-step
SolverJacobianMethodControl	auto
ShapePreserveControl	DisableAll
ZeroCrossControl	UseLocalSettings
ZeroCrossAlgorithm	Nonadaptive
SolverResetMethod	Fast
PositivePriorityOrder	off
AutoInsertRateTranBlk	off
SampleTimeConstraint	Unconstrained
InsertRTBMode	Whenever possible
SampleTimeProperty	

**Table 6.3. SysStateMachine Configuration Set.Components [50](2)**

Property	Value
Name	Data Import/Export
Description	
Components	
Decimation	1
ExternalInput	[t, u]
FinalStateName	xFinal
InitialState	xInitial
LimitDataPoints	off
MaxDataPoints	1000
LoadExternalInput	off
LoadInitialState	off
SaveFinalState	off
SaveCompleteFinalSimState	off
SaveFormat	Dataset

SaveOutput	on
SaveState	off
SignalLogging	on
DSMLogging	on
InspectSignalLogs	off
VisualizeSimOutput	on
StreamToWorkspace	off
StreamVariableName	streamout
SaveTime	on
ReturnWorkspaceOutputs	off
StateSaveName	xout
TimeSaveName	tout
OutputSaveName	yout
SignalLoggingName	logout
DSMLoggingName	dsmout
OutputOption	RefineOutputTimes
OutputTimes	[]
ReturnWorkspaceOutputsName	out
Refine	1
LoggingToFile	off
LoggingFileName	out.mat
LoggingIntervals	[-inf, inf]

**Table 6.4. SysStateMachine Configuration Set.Components [50](3)**

Property	Value
Name	Optimization
Description	
Components	
BlockReduction	on
BooleanDataType	on
ConditionallyExecuteInputs	on
DefaultParameterBehavior	Tunable
InlineParams	off
UseDivisionForNetSlopeComputation	off
UseFloatMulNetSlope	off
DefaultUnderspecifiedDataType	double
UseSpecifiedMinMax	off
InlineInvariantSignals	off
OptimizeBlockIOStorage	on

BufferReuse	on
GlobalBufferReuse	on
GlobalVariableUsage	None
StrengthReduction	off
AdvancedOptControl	
EnforceIntegerDowncast	on
ExpressionFolding	on
BooleansAsBitfields	off
BitfieldContainerType	uint_T
EnableMemcpy	on
MemcpyThreshold	64
PassReuseOutputArgsAs	Structure reference
PassReuseOutputArgsThreshold	12
FoldNonRolledExpr	on
LocalBlockOutputs	on
RollThreshold	5
StateBitsets	off
DataBitsets	off
ActiveStateOutputEnumStorageType	Native Integer
UseTempVars	off
ZeroExternalMemoryAtStartup	on
ZeroInternalMemoryAtStartup	on
InitFltsAndDblsToZero	off
NoFixptDivByZeroProtection	off
EfficientFloat2IntCast	off
EfficientMapNaN2IntZero	on
LifeSpan	auto
EvaldLifeSpan	1
MaxStackSize	64
BufferReusableBoundary	on
SimCompilerOptimization	off
AccelVerboseBuild	off

**Table 6.5. SysStateMachine Configuration Set.Components [50](4)**

Property	Value
Name	Diagnostics
Description	
Components	
RTPrefix	error

ConsistencyChecking	none
ArrayBoundsChecking	none
SignalInfNanChecking	none
SignalRangeChecking	none
ReadBeforeWriteMsg	UseLocalSettings
WriteAfterWriteMsg	UseLocalSettings
WriteAfterReadMsg	UseLocalSettings
AlgebraicLoopMsg	warning
ArtificialAlgebraicLoopMsg	warning
SaveWithDisabledLinksMsg	warning
SaveWithParameterizedLinksMsg	warning
CheckSSInitialOutputMsg	on
UnderspecifiedInitializationDetection	Simplified
MergeDetectMultiDrivingBlocksExec	error
CheckExecutionContextRuntimeOutputMsg	off
SignalResolutionControl	UseLocalSettings
BlockPriorityViolationMsg	warning
MinStepSizeMsg	warning
TimeAdjustmentMsg	none
MaxConsecutiveZCsMsg	error
MaskedZcDiagnostic	warning
IgnoredZcDiagnostic	warning
SolverPrmCheckMsg	none
InheritedTsInSrcMsg	warning
MultiTaskDSMMsg	error
MultiTaskCondExecSysMsg	error
MultiTaskRateTransMsg	error
SingleTaskRateTransMsg	none
TasksWithSamePriorityMsg	warning
SigSpecEnsureSampleTimeMsg	warning
CheckMatrixSingularityMsg	none
IntegerOverflowMsg	warning
Int32ToFloatConvMsg	warning
ParameterDowncastMsg	error
ParameterOverflowMsg	error
ParameterUnderflowMsg	none
ParameterPrecisionLossMsg	warning
ParameterTunabilityLossMsg	error
FixptConstUnderflowMsg	none

FixptConstOverflowMsg	none
FixptConstPrecisionLossMsg	none
UnderSpecifiedDataTypeMsg	none
UnnecessaryDatatypeConvMsg	none
VectorMatrixConversionMsg	none
InvalidFcnCallConnMsg	error
FcnCallInpInsideContextMsg	error
SignalLabelMismatchMsg	none
UnconnectedInputMsg	warning
UnconnectedOutputMsg	warning
UnconnectedLineMsg	warning
UseOnlyExistingSharedCode	error
SFcnCompatibilityMsg	none
FrameProcessingCompatibilityMsg	error
UniqueDataStoreMsg	none
BusObjectLabelMismatch	warning
RootOutportRequireBusObject	warning
AssertControl	UseLocalSettings
Echo	
EnableOverflowDetection	off
AllowSymbolicDim	on
ModelReferenceIOMsg	none
ModelReferenceVersionMismatchMessage	none
ModelReferenceIOMismatchMessage	none
ModelReferenceCSMismatchMessage	none
ModelReferenceSimTargetVerbose	off
UnknownTsInhSupMsg	warning
ModelReferenceDataLoggingMessage	warning
ModelReferenceSymbolNameMessage	warning
ModelReferenceExtraNoncontSigs	error
StateNameClashWarn	none
SimStateInterfaceChecksumMismatchMsg	warning
SimStateOlderReleaseMsg	error
InitInArrayFormatMsg	warning
StrictBusMsg	ErrorLevel1
BusNameAdapt	WarnAndRepair
NonBusSignalsTreatedAsBus	none
SFUnusedDataAndEventsDiag	warning
SFUnexpectedBacktrackingDiag	error

SFInvalidInputDataAccessInChartInitDiag	warning
SFNoUnconditionalDefaultTransitionDiag	error
SFTransitionOutsideNaturalParentDiag	warning
SFUnconditionalTransitionShadowingDiag	warning
SFUnreachableExecutionPathDiag	warning
SFUndirectedBroadcastEventsDiag	warning
SFTransitionActionBeforeConditionDiag	warning
SFOutputUsedAsStateInMooreChartDiag	error
SFTemporalDelaySmallerThanSampleTimeDiag	warning
SFUnconditionalPathOutOfParentDiag	warning
SFSelfTransitionDiag	warning
SFExecutionAtInitializationDiag	warning
SFMachineParentedDataDiag	warning
SFUnreachableStateOrJunctionDiag	warning
SFDanglingTransitionDiag	warning
IntegerSaturationMsg	warning
AllowedUnitSystems	all
UnitsInconsistencyMsg	warning
AllowAutomaticUnitConversions	on

**Table 6.6. SysStateMachine Configuration Set.Components [50](5)**

Property	Value
Name	Hardware Implementation
Description	
Components	
ProdBitPerChar	8
ProdBitPerShort	16
ProdBitPerInt	32
ProdBitPerLong	64
ProdBitPerLongLong	64
ProdBitPerFloat	32
ProdBitPerDouble	64
ProdBitPerPointer	64
ProdBitPerSizeT	64
ProdBitPerPtrDiffT	64
ProdLargestAtomicInteger	Char
ProdLargestAtomicFloat	Float
ProdIntDivRoundTo	Zero
ProdEndianness	LittleEndian

ProdWordSize	64
ProdShiftRightIntArith	on
ProdLongLongMode	off
ProdHWDeviceType	Intel->x86-64 (Linux 64)
TargetBitPerChar	8
TargetBitPerShort	16
TargetBitPerInt	32
TargetBitPerLong	32
TargetBitPerLongLong	64
TargetBitPerFloat	32
TargetBitPerDouble	64
TargetBitPerPointer	32
TargetBitPerSizeT	32
TargetBitPerPtrDiffT	32
TargetLargestAtomicInteger	Char
TargetLargestAtomicFloat	None
TargetShiftRightIntArith	on
TargetLongLongMode	off
TargetIntDivRoundTo	Undefined
TargetEndianness	Unspecified
TargetWordSize	32
TargetTypeEmulationWarnSuppressLevel	0
TargetPreprocMaxBitsSint	32
TargetPreprocMaxBitsUint	32
TargetHWDeviceType	Specified
TargetUnknown	off
ProdEqTarget	on
UseEmbeddedCoderFeatures	on
UseSimulinkCoderFeatures	on

**Table 6.7. SysStateMachine Configuration Set.Components [50](6)**

Property	Value
Name	Model Referencing
Description	
Components	
UpdateModelReferenceTargets	IfOutOfDateOrStructuralChange
SkipRefExpFcnMdlSchedulingOrderCheck	off
EnableRefExpFcnMdlSchedulingChecks	on
CheckModelReferenceTargetMessage	error



EnableParallelModelReferenceBuilds	off
ParallelModelReferenceErrorOnInvalidPool	on
ParallelModelReferenceMATLABWorkerInit	None
ModelReferenceNumInstancesAllowed	Multi
PropagateVarSize	Infer from blocks in model
ModelDependencies	
ModelReferencePassRootInputsByReference	on
ModelReferenceMinAlgLoopOccurrences	off
PropagateSignalLabelsOutOfModel	on
SupportModelReferenceSimTargetCustomCode	off

**Table 6.8. SysStateMachine Configuration Set.Components [50](7)**

Property	Value
Name	Simulation Target
Description	
Components	
SimCustomSourceCode	
SimCustomHeaderCode	
SimCustomInitializer	
SimCustomTerminator	
SimReservedNameArray	
SimUserSources	
SimUserIncludeDirs	
SimUserLibraries	
SimUserDefines	
SFSimEnableDebug	off
SFSimOverflowDetection	on
SFSimEcho	on
SimBlas	on
SimCtrlC	on
SimExtrinsic	on
SimIntegrity	on
SimUseLocalCustomCode	off
SimParseCustomCode	on
SimBuildMode	sf_incremental_build
SimDataInitializer	
SimGenImportedTypeDefs	off
CompileTimeRecursionLimit	50
EnableRuntimeRecursion	on

**Table 6.9. SysStateMachine Configuration Set.Components [50](8)**

Property	Value
Name	Code Generation
SystemTargetFile	ert.tlc
HardwareBoard	Robot Operating System (ROS)
TLCOptions	-aInlineSetEventsForThisBaseRateFcn=TLC_FALSE -aSuppressMultiTaskScheduler=TLC_FALSE -aRateBasedStepFcn=0
CodeGenDirectory	
GenCodeOnly	off
MakeCommand	make_rtw
GenerateMakefile	on
PackageGeneratedCodeAndArtifacts	off
PackageName	
TemplateMakefile	ert_default_tmf
PostCodeGenCommand	codertarget.postCodeGenHookCommand(h)
Description	Embedded Coder
GenerateReport	on
SaveLog	off
RTWVerbose	on
RetainRTWFile	off
ProfileTLC	off
TLCDebug	off
TLCCoverage	off
TLCAssert	off
ProcessScriptMode	Default
ConfigurationMode	Optimized
ProcessScript	ert_make_rtw_hook
ConfigurationScript	
ConfigAtBuild	off
RTWUseLocalCustomCode	off
RTWUseSimCustomCode	off
CustomSourceCode	
CustomHeaderCode	
CustomInclude	
CustomSource	
CustomLibrary	
CustomDefine	
CustomLAPACKCallback	

CustomInitializer	
CustomTerminator	
Toolchain	Catkin
BuildConfiguration	Faster Builds
CustomToolchainOptions	
IncludeHyperlinkInReport	on
LaunchReport	on
RecursionLimit	50
PortableWordSizes	off
GenerateErtSFunction	off
CreateSILPILBlock	None
CodeExecutionProfiling	off
CodeExecutionProfileVariable	executionProfile
CodeProfilingSaveOptions	SummaryOnly
CodeProfilingInstrumentation	off
CodeCoverageSettings	SysStateMachine Configuration Set.Components(-8).CodeCoverageSettings [62]
SILDebugging	off
TargetLang	C++
IncludeERTFirstTime	off
GenerateTraceInfo	on
GenerateTraceReport	on
GenerateTraceReportSl	on
GenerateTraceReportSf	on
GenerateTraceReportEml	on
GenerateCodeInfo	off
GenerateWebview	on
GenerateCodeMetricsReport	off
GenerateCodeReplacementReport	off
RTWCompilerOptimization	off
ObjectivePriorities	
RTWCustomCompilerOptimizations	
CheckMdlBeforeBuild	Off
CustomRebuildMode	OnUpdate
DataInitializer	
Components	[SysStateMachine Configuration Set.Components(8).Components(1) [62], SysStateMachine Configuration Set.Components(8).Components(2) [-64]]

**Table 6.10. SysStateMachine Configuration Set.Components [50](9)**

Property	Value
Description	Simulink Coverage Configuration Component
Components	
Name	Simulink Coverage
CovEnable	off
CovScope	EntireSystem
CovIncludeTopModel	on
RecordCoverage	off
CovPath	/
CovSaveName	covdata
CovCompData	
CovMetricSettings	dwe
CovFilter	
CovHTMLOptions	
CovNameIncrementing	off
CovHtmlReporting	off
CovForceBlockReductionOff	on
CovEnableCumulative	on
CovSaveCumulativeToWorkspaceVar	off
CovSaveSingleToWorkspaceVar	off
CovCumulativeVarName	covCumulativeData
CovCumulativeReport	off
CovSaveOutputData	on
CovOutputDir	slcov_output/\$modelName\$
CovDataFileName	\$modelName\$_cvdata
CovShowResultsExplorer	on
CovReportOnPause	on
CovModelRefEnable	off
CovModelRefExcluded	
CovExternalEMLEnable	on
CovSFcnEnable	on
CovBoundaryAbsTol	1.0000e-05
CovBoundaryRelTol	0.0100
CovUseTimeInterval	off
CovStartTime	0
CovStopTime	0
CovMetricStructuralLevel	Decision
CovMetricLookupTable	off

CovMetricSignalRange	off
CovMetricSignalSize	off
CovMetricObjectiveConstraint	off
CovMetricSaturateOnIntegerOverflow	off
CovMetricRelationalBoundary	off
CovLogicBlockShortCircuit	off
CovUnsupportedBlockWarning	on
CovHighlightResults	off

**Table 6.11. SysStateMachine Configuration Set.Components [50](10)**

Property	Value
Description	HDL Coder custom configuration component
Components	
Name	HDL Coder

**Table 6.12. SysStateMachine Configuration Set.Components [50](11)**

Property	Value
Description	Coder Target
Components	
Name	Coder Target
CoderTargetData	SysStateMachine Configuration Set.Components(-11).CoderTargetData [67]

**Table 6.13. SysStateMachine Configuration Set.Components(8) [59].CodeCoverageSettings**

Property	Value
TopModelCoverage	off
ReferencedModelCoverage	off
CoverageTool	None

**Table 6.14. SysStateMachine Configuration Set.Components(8).Components [60](1)**

Property	Value
Name	Code Appearance
Description	
Components	
ForceParamTrailComments	on
GenerateComments	on
CommentStyle	Auto

IgnoreCustomStorageClasses	off
IgnoreTestpoints	off
IncHierarchyInIds	off
MaxIdLength	31
PreserveName	off
PreserveNameWithParent	off
ShowEliminatedStatement	on
OperatorAnnotations	on
IncAutoGenComments	off
SimulinkDataObjDesc	on
SFDataObjDesc	on
MATLABFcnDesc	on
IncDataTypeInIds	off
PrefixModelToSubsysFcnNames	on
MangleLength	1
CustomSymbolStr	\$R\$N\$M
CustomSymbolStrGlobalVar	\$R\$N\$M
CustomSymbolStrType	\$N\$R\$M_T
CustomSymbolStrField	\$N\$M
CustomSymbolStrFcn	\$R\$N\$M\$F
CustomSymbolStrSimulinkFcn	\$R\$N
CustomSymbolStrFcnArg	rt\$I\$N\$M
CustomSymbolStrBlkIO	rtb_\$N\$M
CustomSymbolStrTmpVar	\$N\$M
CustomSymbolStrMacro	\$R\$N\$M
CustomSymbolStrUtil	\$N\$C
CustomUserTokenString	
CustomCommentsFcn	
DefineNamingRule	None
DefineNamingFcn	
ParamNamingRule	None
ParamNamingFcn	
SignalNamingRule	None
SignalNamingFcn	
InsertBlockDesc	on
InsertPolySpaceComments	off
SimulinkBlockComments	on
MATLABSourceComments	on
EnableCustomComments	off

InternalIdentifier	Shortened
InlinedPrmAccess	Literals
ReqsInCode	off
UseSimReservedNames	off
ReservedNameArray	

**Table 6.15. SysStateMachine Configuration Set.Components(8).Components [60](2)**

Property	Value
Name	Target
Description	
Components	
IsERTTarget	on
TargetFcnLib	ansi_tfl_table_tmw.mat
TargetLibSuffix	
TargetPreCompLibLocation	
GenFloatMathFcnCalls	NOT IN USE
TargetLangStandard	C89/C90 (ANSI)
TargetFunctionLibrary	NOT IN USE
CodeReplacementLibrary	None
UtilityFuncGeneration	Auto
ERTMultiwordTypeDef	System defined
ERTMultiwordLength	256
MultiwordLength	2048
GenerateFullHeader	on
InferredTypesCompatibility	off
ExistingSharedCode	
GenerateSampleERTMain	off
GenerateTestInterfaces	off
ModelReferenceCompliant	on
ParMdlRefBuildCompliant	on
CompOptLevelCompliant	on
ConcurrentExecutionCompliant	on
IncludeMdlTerminateFcn	on
CombineOutputUpdateFcns	on
CombineSignalStateStructs	off
SuppressErrorStatus	off
ERTFirstTimeCompliant	on
IncludeFileDelimiter	Auto

ERTCustomFileBanners	on
SupportAbsoluteTime	on
LogVarNameModifier	rt_
MatFileLogging	off
MultiInstanceERTCode	off
CodeInterfacePackaging	Nonreusable function
SupportNonFinite	on
SupportComplex	on
PurelyIntegerCode	off
SupportContinuousTime	off
SupportNonInlinedSFcns	off
RemoveDisableFunc	off
RemoveResetFunc	on
SupportVariableSizeSignals	off
ParenthesesLevel	Nominal
CastingMode	Nominal
GenerateClassInterface	off
ModelStepFunctionPrototypeControlCompliant	on
CPPClassGenCompliant	on
GRTInterface	off
GenerateAllocFcn	off
UseToolchainInfoCompliant	on
GenerateSharedConstants	on
GenerateASAP2	off
ExtMode	off
ExtModeTransport	0
ExtModeStaticAlloc	off
ExtModeStaticAllocSize	1000000
ExtModeTesting	off
ExtModeMexFile	ext_comm
ExtModeMexArgs	
ExtModeIntrflLevel	Level1
InlinedParameterPlacement	Hierarchical
TargetOS	BareBoardExample
MultiInstanceErrorCode	Error
RateGroupingCode	on
RootIOFormat	Individual arguments
RTWCAPISignals	off
RTWCAPIParams	off



RTWCAPISStates	off
RTWCAPIRootIO	off
ERTSrcFileBannerTemplate	ert_code_template.cgt
ERTHdrFileBannerTemplate	ert_code_template.cgt
ERTDataSrcFileTemplate	ert_code_template.cgt
ERTDataHdrFileTemplate	ert_code_template.cgt
ERTCustomFileTemplate	codertarget_file_process.tlc
EnableDataOwnership	off
SignalDisplayLevel	10
ParamTuneLevel	10
GlobalDataDefinition	Auto
DataDefinitionFile	global.c
GlobalDataReference	Auto
ERTFilePackagingFormat	Modular
DataReferenceFile	global.h
PreserveExpressionOrder	off
PreserveIfCondition	off
ConvertIfToSwitch	on
PreserveExternInFcnDecls	on
SuppressUnreachableDefaultCases	on
EnableSignedLeftShifts	on
EnableSignedRightShifts	on
IndentStyle	K&R
IndentSize	2
EnableUserReplacementTypes	off
ReplacementTypes	SysStateMachine Configuration Set.Components(-8).Components(2).ReplacementTypes [67]
MaxIdInt32	MAX_int32_T
MinIdInt32	MIN_int32_T
MaxIdUInt32	MAX_uint32_T
MaxIdInt16	MAX_int16_T
MinIdInt16	MIN_int16_T
MaxIdUInt16	MAX_uint16_T
MaxIdInt8	MAX_int8_T
MinIdInt8	MIN_int8_T
MaxIdUInt8	MAX_uint8_T
BooleanTrueId	true
BooleanFalseId	false
TypeLimitIdReplacementHeaderFile	

MemSecPackage	--- None ---
MemSecDataConstants	Default
MemSecDataIO	Default
MemSecDataInternal	Default
MemSecDataParameters	Default
MemSecFuncInitTerm	Default
MemSecFuncExecute	Default
MemSecFuncSharedUtil	Default

**Table 6.16. SysStateMachine Configuration Set.Components(11) [62].CoderTargetData**

Field	Value
UseCoderTarget	true
TargetHardware	Robot Operating System (ROS)
RTOS	Linux
RTOSBaseRateTaskPriority	40
Scheduler_interrupt_source	0
Packaging	SysStateMachine Configuration Set.Components(-11).CoderTargetData.Packaging [68]
BoardParameters	SysStateMachine Configuration Set.Components(-11).CoderTargetData.BoardParameters [68]
Runtime	SysStateMachine Configuration Set.Components(-11).CoderTargetData.Runtime [68]
ROS	SysStateMachine Configuration Set.Components(-11).CoderTargetData.ROS [68]
DataVersion	2016.02

**Table 6.17. SysStateMachine Configuration Set.Components(8).Components(2) [64].ReplacementTypes**

Field	Value
double	
single	
int32	
int16	
int8	
uint32	
uint16	
uint8	
boolean	

int	
uint	
char	

**Table 6.18. SysStateMachine Configuration Set.Components(11).CoderTargetData [67].Packaging**

Field	Value
MaintainerName	ROS User
MaintainerEmail	rosuser@test.com
License	BSD
Version	1.0.0

**Table 6.19. SysStateMachine Configuration Set.Components(11).CoderTargetData [67].BoardParameters**

Field	Value
DeviceAddress	
Username	

**Table 6.20. SysStateMachine Configuration Set.Components(11).CoderTargetData [67].Runtime**

Field	Value
BuildAction	None

**Table 6.21. SysStateMachine Configuration Set.Components(11).CoderTargetData [67].ROS**

Field	Value
Install	/opt/ros/indigo
CatkinWS	~/catkin_ws

---

# Chapter 7. Glossary

**Atomic Subsystem.** A subsystem treated as a unit by an implementation of the design documented in this report. The implementation computes the outputs of all the blocks in the atomic subsystem before computing the next block in the parent system's block execution order (sorted list).

**Block Diagram.** A Simulink block diagram represents a set of simultaneous equations that relate a system or subsystem's inputs to its outputs as a function of time. Each block in the diagram represents an equation of the form  $y = f(t, x, u)$  where  $t$  is the current time,  $u$  is a block input,  $y$  is a block output, and  $x$  is a system state (see the Simulink documentation for information on the functions represented by the various types of blocks that make up the diagram). Lines connecting the blocks represent dependencies among the blocks, i.e., inputs whose current values are the outputs of other blocks. An implementation of a design described in this document computes a root or atomic system's outputs at each time step by computing the outputs of the blocks in an order determined by block input/output dependencies.

**Block Parameter.** A variable that determines the output of a block along with its inputs, for example, the gain parameter of a Gain block.

**Block Execution Order.** The order in which Simulink evaluates blocks during simulation of a model. The block execution order determined by Simulink ensures that a block executes only after all blocks on whose outputs it depends are executed.

**Checksum.** A number that indicates whether different versions of a model or atomic subsystem differ functionally or only cosmetically. Different checksums for different versions of the same model or subsystem indicate that the versions differ functionally.

**Design Variable.** A symbolic (MATLAB) variable or expression used as the value of a block parameter. Design variables allow the behavior of the model to be altered by altering the value of the design variable.

**Signal.** A block output, so-called because block outputs typically vary with time.

**Virtual Subsystem.** A subsystem that is purely graphical, i.e., is intended to reduce the visual complexity of the block diagram of which it is a subsystem. An implementation of the design treats the blocks in the subsystem as part of the first nonvirtual ancestor of the virtual subsystem (see Atomic Subsystem).

---

# Chapter 8. About this Report

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## 8.1. Report Overview

This report describes the design of the SysStateMachine system. The report was generated automatically from a Simulink model used to validate the design. It contains the following sections:

**Model Version.** Specifies information about the version of the model from which this design description was generated. Includes the model checksum, a number that indicates whether different versions of the model differ functionally or only cosmetically. Different checksums for different versions indicate that the versions differ functionally.

**Root System.** Describes the design's root system.

**Subsystems.** Describes each of the design's subsystems.

**Design Variables.** Describes system design variables, i.e., MATLAB variables and expressions used as block parameter values.

**System Model Configuration.** Lists the configuration parameters, e.g., start and stop time, of the model used to simulate the system described by this report.

**Requirements Traceability.** Shows design requirements associated with elements of the design model. This section appears only if the design model contains requirements links.

**Glossary.** Defines Simulink terms used in this report.

## 8.2. Root System Description

This section describes a design's root system. It contains the following sections:

**Diagram.** Simulink block diagram that represents the algorithm used to compute the root system's outputs.

**Description.** Description of the root system. This section appears only if the model's root system has a Documentation property or a Doc block.

**Interface.** Name, data type, width, and other properties of the root system's input and output signals. The number of the block port that outputs the signal appears in angle brackets appended to the signal name. This section appears only if the root system has input or output ports.

**Blocks.** This section has two subsections:

- **Parameters.** Describes key parameters of blocks in the root system. This section also includes graphical and/or tabular representations of lookup table data used by lookup table blocks, i.e., blocks that use lookup tables to compute their outputs.

- **Block Execution Order.** Order in which blocks must be executed at each time step in order to ensure that each block's inputs are available when it executes.

**State Charts.** Describes state charts used in the root system. This section appears only if the root system contains Stateflow blocks.

## 8.3. Subsystem Descriptions

This section describes a design's subsystems. Each subsystem description contains the following sections:

**Checksum.** This section appears only if the subsystem is an atomic subsystem. The checksum indicates whether the version of the model subsystem used to generate this report differs functionally from other versions of the model subsystem. If two model checksums differ, the corresponding versions of the model differ functionally.

**Diagram.** Simulink block diagram that graphically represents the algorithm used to compute the subsystem's outputs.

**Description.** Description of the subsystem. This section appears only if the subsystem has a Documentation property or contains a Doc block.

**Interface.** Name, data type, width, and other properties of the subsystem's input and output signals. The number of the block port that outputs the signal appears in angle brackets appended to the signal name. This section appears only if the subsystem is atomic and has input or output ports.

**Blocks.** Blocks that this subsystem contains. This section has two subsections:

- **Parameters.** Key parameters of blocks in the subsystem. This section also includes graphical and/or tabular representations of lookup table data used by lookup table blocks, blocks that use lookup tables to compute their outputs.
- **Block Execution Order.** Order in which the subsystem's blocks must be executed at each time step in order to ensure that each block's inputs are available when the block executes. This section appears only if the subsystem is atomic. Note: in Acrobat(PDF) reports, the number in square brackets next to the block name is a hyperlink to the block parameter table. The number has no model significance.

**State Charts.** Describes state charts used in the subsystem. This section appears only if the root system contains Stateflow blocks.

## 8.4. State Chart Descriptions

This section describes the state machines used by Stateflow blocks to compute their outputs, i.e., Stateflow blocks. Each state machine description contains the following sections:

**Chart.** Diagram representing the state machine.

**States.** Describes the state machine's states. Each state description includes the state's diagram and diagrams and/or descriptions of graphical functions, Simulink functions, truth tables, and MATLAB functions parented by the state.

**Transitions.** Transitions between the state machine's states. Each transition description specifies the values of key transition properties. Appears only if a transition has properties that do not appear on the chart.

**Junctions.** Transition junctions. Each junction description specifies the values of key junction properties. Appears only if a junction has properties that do not appear on the chart.

**Events.** Events that trigger state transitions. Each event description specifies the values of key event properties.

**Data.** Data types and other properties of the Stateflow block's inputs, outputs, and other state machine data.

**Targets.** Executable implementations of the state machine used to compute the outputs of the corresponding Stateflow block.

**MATLAB Supporting Functions.** List of functions invoked by MATLAB functions defined in the chart.