Chapter

45 *Symbols and Lines – Quick Reference*

The following notations are included in the quick reference:

- **DP - Deployment Diagrams**
- **HMSC – High-level Message Sequence Charts**
- **MSC – Message Sequence Charts**
- **OM – Object Model**
- **SC – State Charts**
- **SDL – Specification and Description Language**

The quick reference contains all the symbols and lines in those diagrams in combination with a short explanation of when they may be used.

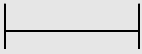
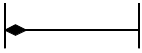
There is also a landscape oriented version of this document. It is called `symref.pdf` and is located in `/pdf/files` on the installation CD. If you want to make your own printout of the quick reference, that document is perhaps the most suitable.

Symbols and Lines in DP Diagrams

Symbols in DP Diagrams

Symbol	Name	Explanation
	Node	Is used to describe a run-time physical object that represents a computational resource.
	Component	Represents a physical, replacable part of a system that packages implementation.
	Thread	Represents an OS thread.
	Object	Represents an SDL entity (system, block or process).
	Text	Contains comments relevant for the diagram or build script information. Is not connected to any other symbol.

Lines in DP Diagrams

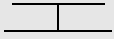
Line	Name	Explanation
	Association line	Defines an association between two node symbols. To create it, select one node symbol and drag the association line handle (a rectangle). To create a line breakpoint, click in the diagram background. To attach the association line to its final destination, click the border of the associated node symbol.
	Composite Aggregation line	Defines that the symbol connected to the simple line end is contained in the symbol connected to the diamond line end. To create it, select the container symbol and drag the aggregation line handle (a diamond). To create a line breakpoint, click in the diagram background. To attach the aggregation line to its final destination, click the border of the contained symbol.

Symbols and Lines in HMSC Diagrams

Symbols in HMSC Diagrams

Symbol	Name	Explanation
	Start	The start symbol in an HMSC diagram. Is followed by a condition, reference or a condition point symbol.
	Stop	The last symbol in an HMSC diagram.
	Condition	Represents a system or process state, or indicates that a certain condition is true. Contains the name of the represented state or condition.
	Reference	References another MSC or HMSC diagram in the same group of MSC diagrams. Contains the name of the other diagram.
	Connection point	Splits or joins lines. One to many, many to one, or many to many.
	Text	Contains comments relevant for the diagram. Is not connected to any other symbol.

Lines in HMSC Diagrams

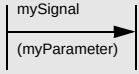
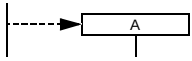
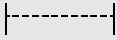
Line	Name	Explanation
	HMSC line	Defines how symbols can be traversed. Starts below the from-symbol and ends above the to-symbol. From-symbols can be start, condition, reference and connection point. To-symbols can be stop, condition, reference and connection point. To create the line, select a start, condition, reference or connection point symbol (a from symbol), and drag the line handle. To create a line endpoint, click in the diagram background. To attach the line to its final destination, click the symbol border.

Symbols and Lines in MSC Diagrams

Symbols in MSC Diagrams

Symbol	Name	Explanation
	Text	Contains comments relevant for the diagram. Is not connected to any other symbol.
	Comment	Contains comments relevant for a part of the diagram. Is connected to a symbol, a message sending or a message reception.
	Instance head	Represents an instance of something that can communicate by sending and receiving messages. The “start symbol” for a created or an already existing instance.
	Instance end	Used for graphically ending an instance axis without terminating the represented instance.
	Message	Represents a signal sending from one instance to another. Is connected to at least one instance axis. Usually connected to an instance axis in both ends.
	Condition	Represents a system or process state, or indicates that a certain condition is true. Contains a name of the represented state or condition. Is initially connected to one instance axis, but should often be connected to all.
	Timer	Represents the use of a timer in an instance. Is connected to an instance axis. One symbol represents both a timer set and either a timeout or a reset.
	Action	Is a kind of text symbol and is connected to an instance axis. Describes something that is happening in the instance.
	Create process	Describes the creation of an instance. The arrow should go from an instance axis (the creator) to an instance head (the creator instance). The instance head is created when the create process symbol is initially laid out.
	Process stop	Terminates an instance. The instance ceases to exist. Is connected to an instance axis.
	Coregion	Creates a part of an instance axis where the order of received and sent signals is undefined. Is connected to an instance axis.
	MSC reference	References another MSC or HMSC diagram in the same group of MSC diagrams. Contains the name of the other diagram. Is initially connected to one instance axis, but can be connected to several.
	Inline expression	Is used for specification of alternative or optional parts (that is, message sending sequences) which are contained in the symbol. Is initially connected to one instance axis, but should most likely be connected to several.
	Inline expression separator	Creates a new partition in an inline expression symbol. Initially, the inline expression symbol only contains one partition.

Lines in MSC Diagrams

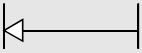
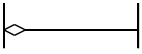
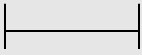
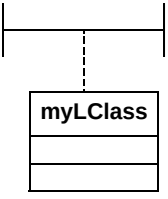
Line	Name	Explanation
	Message	Is used for defining a message sending and/or a message reception. Is at least connected to one instance axis, but is usually connected to an instance axis in both ends. Create it from the symbol menu.
	Create process line	Is used for defining the creation of an instance. The arrow should go from an instance axis (the creator) to an instance head (the created instance). Create the process line from the symbol menu. When the create process arrow is initially laid out, the instance head is created.
	Comment line	Associates a comment symbol with another symbol. To create it, select the comment symbol and drag the line handle to another symbol. Note that it is also possible to attach the comment symbol to a message sending or a message reception, by dragging the line handle to a connection point between a message and an instance axis.

Symbols and Lines in OM Diagrams

Symbols in OM Diagrams

Symbol	Name	Explanation
	Class	Specifies a class. Contains three sections: Name, attributes and operations.
	Object	Specifies an object instantiated from a class. Contains two sections: Name and attribute values
	Text	Contains comments relevant for the diagram. Not connected to any other symbol.

Lines in OM Diagrams

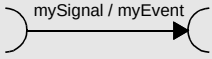
Line	Name	Explanation
	Generalization line	Defines that the class connected to the simple line end inherits from the class connected to the triangle line end. To create it, select the class symbol to inherit from and drag the generalization line handle (a triangle). To create a line break point, click in the diagram background. To attach the generalization line to its final destination, click the border of the inheriting class symbol.
	Aggregation line	Defines that the class connected to the simple line end is contained in the class connected to the diamond line end. To create it, select the container class symbol and drag the aggregation line handle (a diamond). To create a line breakpoint, click in the diagram background. To attach the aggregation line to its final destination, click the border of the contained class symbol.
	Association line	Defines an association between two class symbols. To create it, select one class symbol and drag the association line handle (a rectangle). To create a line breakpoint, click in the diagram background. To attach the association line to its final destination, click the border of the associated class symbol.
	Link class line	Defines a class connected to an association line or an aggregation line. To create it, select an association or an aggregation line and drag the link class handle. The class symbol is created at the same time. There can only be one class symbol connected to one association or aggregation line.

Symbols and Lines in SC Diagrams

Symbols in SC Diagrams

Symbol	Name	Explanation
	State	Represents a state in a state machine. May contain sub states when hierarchical state machines are specified. Is connected to other states via transition lines.
	Start	The start symbol on a level in a state chart. Is followed by a transition to a state symbol.
	Termination	Terminates a state machine. The state machine ceases to exist.
	Text	Contains comments relevant for the diagram. Is not connected to any other symbol.

Lines in SC Diagrams

Line	Name	Explanation
	Transition line	Defines a transition between two states. Is also used for defining the start transition and the last transition, by connecting a state symbol with either a start symbol or a termination symbol. To create it, select the start symbol or a state symbol and drag the transition line handle. To create a line breakpoint, click in the diagram background. To attach the transition line to its final destination, click the border of a state or termination symbol.

Symbols and Lines in SDL Diagrams

Symbols in Both SDL Structure and Behavior Diagrams

Symbol	Name	Explanation
	Class	Defines a newtype. Contains three sections: Name, attributes and operators.

Symbols in SDL Structure Diagrams

Symbol	Name	Explanation
	Text	Declares SDL entities such as signals and data types.
	Comment	Contains comments in the diagram. Is attached to other symbols.
	Text extension	Is attached to other symbols. Used if the text in another symbol is too large for the symbol. Put the last part of the text or the complete text in the text extension symbol.
	Block reference	References a block diagram in a system, system type, substructure, block or block type diagram. Also used for instantiation of a block type.
	Process reference	References a process diagram in a block or block type diagram. Is also used for instantiation of a process type
	Block substructure reference	References a substructure diagram from a block or block type diagram.[a]
	Service reference	References a service diagram in a process or process type diagram, from a service interaction page. Also used for instantiation of a service type.
	Procedure reference	References a procedure diagram from any other diagram.
	System type reference	References a system type diagram from a package diagram.
	Block type reference	References a block type diagram from a package, system, system type, block or block type diagram.
	Process type reference	References a process type diagram from a package, system, system type, block or block type diagram.
	Service type reference	References a service type diagram from a package, system, system type, block, block type, process or process type diagram.

Symbol	Name	Explanation
	Operator reference	References an operator diagram from any other diagram.
	Gate	Defines a gate in a block type, process type or service type diagram. Is attached to the diagram frame.

a. Not often used, because “block A in block C” is a commonly used shorthand for the more syntactically correct “block A in substructure B in block C”.

Symbols in SDL Behavior Diagrams 1(2)

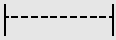
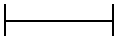
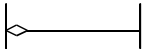
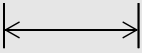
Symbol	Name	Explanation
	State	Defines a state or terminates a transition in an already defined state. Is followed by an input, save continuous signal or priority output signal.
	Input	Receives a signal. Always preceded by a state symbol. Together, they define the start of a transition. Is followed by the behavior of the transition.
	Save	Saves signals from being discarded when being received in the current state (that does not handle the signal). Always preceded by a state symbol. Is not followed by any symbols.
	Output	Sends a signal from a transition
	In/out connector	**Out connector:** A jump/join/goto symbol that finishes the definition of a transition on one page, if there is not enough space. Is always associated via a name with an in connector that continues the definition. **In connector:** The label symbol that is followed by the rest of the transition.
	Procedure call	Calls a procedure that does not return a value from a transition. (A value returning procedure is called from a task symbol.)
	Create request	Creates an instance of a process in a transition
	Enabling condition/ continuous signal	**Enabling condition:** Is preceded by an input symbol. Contains a boolean expression that decides if the transition below it should be taken or not. **Continuous signal:** Is preceded by a state symbol. Is followed by the behavior of a transition. Contains a boolean expression that is continuously evaluated while in the state. The following transition is taken when the expression evaluates to true.
	Priority input	Specifies that this signal reception has higher priority than normal signal reception in the same state. Primarily intended to give signals between services in the same process higher priority than other signals. Not often used.
	Procedure start	The start symbol in a procedure diagram. Is followed by the behavior of the start transition.
	Procedure return	The symbol in a procedure diagram that finishes the execution of the procedure and returns to the procedure caller.

Symbol	Name	Explanation
	Procedure reference	References a procedure diagram from any other diagram.
	Gate	Defines a gate in a block type, process type or service type diagram. Is attached to the diagram frame.

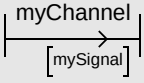
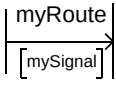
Symbols in SDL Behavior Diagrams 2(2)

Symbol	Name	Explanation
	Text	Declares the SDL entities such as variables, timers and types.
	Comment	Contains comments in the diagram. Is attached to other symbols.
	Text extension	Is attached to other symbols. Used if the text in a symbol is too large for the symbol. Put the last part of the text or the complete text in the text extension symbol.
	Decision	Specifies alternative paths in the behavior part of a transition. Contains an expression. Each path is labeled with an answer that should match the expression for the path to be taken.
	Task	Is used for writing textual code in the behavior part of a transition. Contains for example variable assignments, for-loops and calls of value returning procedures.
	Macro call	Calls a macro diagram in the behavior part of a transition. Macros are a depreciated feature of SDL, consider using procedures or diagram inheritance instead.
	Transition option	Specifies alternative paths in the behavior part of a transition. Similar to a decision symbol, but the expression must be built up of constants and (external) synonyms that can be evaluated once before execution of the system starts. Not often used.
	Start	Starts the execution of the current diagram instance in a process, process type, service or service type diagram. Is followed by the definition of the behavior of the start transition.
	Stop	Stops the execution of the current diagram instance in a process, process type, service or service type diagram.
	Macro inlet	The start symbol in a macro diagram. Macros are a depreciated feature of SDL, consider using procedures or diagram inheritance instead.
	Macro outlet	The end symbol in a macro diagram. Macros are a depreciated feature of SDL, consider using procedures or diagram inheritance instead.
	Operator reference	References an operator diagram from any other diagram.

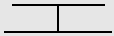
Lines in Both SDL Structure and Behavior Diagrams

Line	Name	Explanation
	Comment line	Associates a comment symbol with another symbol. To create it, select the comment symbol and drag the line handle to another symbol.
	Text extension line	Associates a text extension symbol with another symbol. To create it, select the text extension symbol and drag the line handle to another symbol.
	Gate line	Defines a gate in a block type, process type or service type diagram. To create it, select it from the symbol menu and attach it to the diagram frame.
	Aggregation line	Defines that the class connected to the simple line end is contained in the class connected to the diamond line end. To create it, select the container class symbol and drag the aggregation line handle (a diamond). To create a line breakpoint, click in the diagram background. To attach the aggregation line to its final destination, click the border of the contained class symbol.
	Association line	Defines an association between two class symbols, can be unidirected or bidirected. To create it, select one class symbol and drag the association line handle (a rectangle). To create a line breakpoint, click in the diagram background. To attach the association line to its final destination, click the border of the associated class symbol.

Lines in SDL Structure Diagrams Only

Line	Name	Explanation
	Channel	Defines a part of a communication path for signals, either between two blocks or between one block and the environment (i.e. the diagram frame). To create it, select a block symbol and drag the line handle. To make line breakpoints, click in the diagram background. To attach the line to its final destination (either another block or the diagram frame), click the symbol border. After creation, the channel can be reversed or made bidirectional. The arrow is movable and an arrow at the end of the channel indicates that the channel does not delay signals being sent.
	Signal route	Similar to a channel. The differences are that a signal route connects to processes and services instead of blocks, and that a signal route arrow cannot be moved around.
	Create line	Defines that the process where the create line starts, can create instances of the process where the create line ends. The create line is optional. To create it, select the process symbol and drag the create line handle. To make line breakpoints, click in the diagram background. To attach the create line to its final destination, click the symbol border.

Line in SDL Behavior Diagrams Only

Line	Name	Explanation
	Flow line	Defines the order that symbols are executed in. Starts at the bottom of a symbol and ends at the top of another symbol. To create it, select a symbol that can be followed by other symbols and drag the flow line handle. To make line breakpoints, click in the diagram background. To attach the flow line to its final destination, click the symbol border. Note that two symbols can only be connected with a flow line if the SDL syntax rules allow it.

Chapter 45 Symbols and Lines – Quick Reference