RTI LIN MultiMessage Blockset

Reference

For RTI LIN MultiMessage Blockset 3.6

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dSPACE

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How to Contact dSPACE Support

If you encounter a problem when using dSPACE products, contact your local dSPACE representative:

- Local dSPACE companies and distributors: http://www.dspace.com/go/locations
- For countries not listed, contact dSPACE GmbH in Paderborn, Germany.
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You can also use the support request form: http://www.dspace.com/go/supportrequest. If you are logged on to mydSPACE, you are automatically identified and do not need to add your contact details manually.

If possible, always provide the relevant dSPACE License ID or the serial number of the CmContainer in your support request.

Software Updates and Patches

dSPACE strongly recommends that you download and install the most recent patches for your current dSPACE installation. Visit http://www.dspace.com/go/patches for software updates and patches.

Important Notice

Contents

About This Document

Contents

This reference provides a full description of the RTI LIN MultiMessage Blockset, which is supported by:

- MicroAutoBox II with LIN interface
- DS1006-/DS1007-based systems with a DS4330 LIN Interface Board
- SCALEXIO systems with a DS2671 Bus Board, DS2672 Bus Module, DS6301 CAN/LIN Board, and/or DS6351 LIN Board

Note

The RTI LIN MultiMessage Blockset is not supported by the MicroAutoBox III. If you work with the MicroAutoBox III, you must use the Bus Manager to implement LIN bus simulation.

Symbols

dSPACE user documentation uses the following symbols:

Symbol	Description
⚠ DANGER	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a hazard that, if not avoided, could result in property damage.
Note	Indicates important information that you should take into account to avoid malfunctions.
Tip	Indicates tips that can make your work easier.
	Indicates a link that refers to a definition in the glossary, which you can find at the end of the document unless stated otherwise.

Symbol	Description
🕮	Precedes the document title in a link that refers to another document.

Naming conventions

dSPACE user documentation uses the following naming conventions:

%name% Names enclosed in percent signs refer to environment variables for file and path names.

< > Angle brackets contain wildcard characters or placeholders for variable file and path names, etc.

Examples:

- Where you find terms such as `rti<XXXX>` replace them by the RTI platform support you are using, for example, `rti1007`.
- Where you find terms such as `<model>` or `<submodel>` in this document, replace them by the actual name of your model or submodel. For example, if the name of your Simulink model is `smd_1007_sl.slx` and you are asked to edit the `<model>_usr.c` file, you actually have to edit the `smd_1007_sl_usr.c` file.

RTI block name conventions All I/O blocks have default names based on dSPACE's board naming conventions:

- Most RTI block names start with the board name.
- A short description of functionality is added.
- Most RTI block names also have a suffix.

Suffix	Meaning
B	Board number (for PHS-bus-based systems)
M	Module number (for MicroAutoBox II)
C	Channel number
G	Group number
CON	Converter number
BL	Block number
P	Port number
I	Interrupt number

A suffix is followed by the appropriate number. For example, DS2201IN_B2_C14 represents a digital input block located on a DS2201 board. The suffix indicates board number 2 and channel number 14 of the block. For more general block naming, the numbers are replaced by variables (for example, DS2201IN_Bx_Cy).

Special folders

Some software products use the following special folders:

Common Program Data folder A standard folder for application-specific configuration data that is used by all users.

`%PROGRAMDATA%\dSPACE\<InstallationGUID>\<ProductName>`

or

`%PROGRAMDATA%\dSPACE\<ProductName>\<VersionNumber>`

Documents folder A standard folder for user-specific documents.

`%USERPROFILE%\Documents\dSPACE\<ProductName>\<VersionNumber>`

Local Program Data folder A standard folder for application-specific configuration data that is used by the current, non-roaming user.

`%USERPROFILE%\AppData\Local\dSPACE\<InstallationGUID>\<ProductName>`

Accessing dSPACE Help and PDF Files

After you install and decrypt dSPACE software, the documentation for the installed products is available in dSPACE Help and as PDF files.

dSPACE Help (local) You can open your local installation of dSPACE Help:

- On its home page via Windows Start Menu
- On specific content using context-sensitive help via **F1**

dSPACE Help (Web) You can access the Web version of dSPACE Help at www.dspace.com/go/help.

To access the Web version, you must have a *mydSPACE* account.

PDF files You can access PDF files via the icon in dSPACE Help. The PDF opens on the first page.

General Information on the RTI LIN MultiMessage Blockset

Where to go from here

Information in this section

Information in other sections

Features of the RTI LIN MultiMessage Blockset

Introduction

The RTI LIN MultiMessage Blockset is a Simulink blockset for efficient and dynamic handling of complex LIN setups in hardware-in-the-loop (HIL) applications. All the incoming RX frames and outgoing TX frames of an entire LIN controller can be controlled by a single Simulink block. The LIN communication can be configured via database container (DBC) files, LIN database files (LDF) and AUTOSAR system description files.

Supported platforms

The RTI LIN MultiMessage Blockset is supported by the following platforms:

- SCALEXIO systems with a DS2671 Bus Board, DS2672 Bus Module, DS6301 CAN/LIN Board, and/or DS6351 LIN Board
- PHS-bus-based systems (DS1006 or DS1007 modular systems) with a DS4330 LIN Interface Board
- MicroAutoBox II with LIN interface

If you switch the platform from a SCALEXIO system to a non-SCALEXIO system or vice versa, you have to recreate all RTILINMM blocks. To recreate all RTILINMM blocks at once, select **Create S-function for all LIN Blocks** from the **Options** menu of the GeneralSetup block (refer to Options Menu (RTILINMM GeneralSetup) on page 31).

If you switch the platform from one non-SCALEXIO system to another (for example, from a DS1006 to a MicroAutoBox II) but the board and channel settings are not suitable for the new platform, you have to open the RTILINMM ControllerSetup blocks and recreate the S-functions for the blocks.

Note

The RTI LIN MultiMessage Blockset is not supported by the MicroAutoBox III. If you work with the MicroAutoBox III, you must use the Bus Manager to implement LIN bus simulation.

Supported LIN specifications and SAE standards

- LIN specifications 1.2 and 1.3
- LIN specifications 2.0, 2.1 and 2.2
- SAE J2602 standard (protocol version: J2602_1_1.0, language version: J2602_3_1.0)

  SAE J2602 is a vehicle LIN bus standard based on LIN 2.0 and defined by the Society of Automotive Engineers (SAE).

Database files

You can use database files in LDF file format, DBC file format, FIBEX file format, MAT file format, or AUTOSAR XML file format.

LDF file format The LDF file format describes a complete LIN network and contains all the information necessary to configure it. The file format was specially developed for LIN networks, so it can describe all the features of a LIN network.

DBC file format The DBC file format is designed by Vector Informatik GmbH for the CANalyzer database files. Although it was developed for CAN buses, it can also be used for LIN buses with some limitations:

- As the CAN protocol has no standard definitions for master nodes and schedules, such definitions are not supported by the DBC files.
- According to the LIN specification only byte layouts in the Intel format are supported. Byte layouts in Motorola format are not supported.

FIBEX file format The Field Bus Exchange (FIBEX) format is an XML exchange file format. It is used for data exchange between different tools that work with message-oriented bus communication. A FIBEX file usually describes more than one bus system. You therefore have to select one of the available bus systems if you work with a FIBEX file as the database.

The RTI LIN MultiMessage Blockset supports FIBEX 3.1, FIBEX 4.1, FIBEX 4.1.1, and FIBEX 4.1.2 files.

MAT file format You can use a MAT file generated by the M-script as the database. The MAT file requires a particular structure. For more information on the structure, refer to General Settings Page (RTILINMM MainSetup) on page 57.

AUTOSAR XML file format AUTOSAR (AUTomotive Open System ARchitecture) is an industry partnership that aims to develop and establish an open standard for automotive electric/electronic (E/E) architectures.

AUTOSAR system description files are XML files that describe a system according to AUTOSAR. A system is a combination of a hardware topology, a software architecture, a network communication, and information on the mappings between these elements. AUTOSAR system description files are instances of the AUTOSAR System Template. The AUTOSAR System Template contains a description of the network communication and hardware topology according to the FIBEX standard defined by ASAM e.V.

AUTOSAR system description files are files of AUTOSAR XML file type that can be used to export or exchange information on system descriptions.

The RTI LIN MultiMessage Blockset supports the AUTOSAR System Template based on AUTOSAR Release 3.1.4, 3.2.1, 3.2.2, 4.0.3, 4.1.1, 4.1.2, 4.2.1, 4.2.2, 4.3.0, 4.3.1, and 4.4.0, and AUTOSAR Classic Platform Release R19-11 and R20-11.

MEX compiler

To work with the RTI LIN MultiMessage Blockset, you need a MEX compiler.

Only the MinGW and Microsoft Visual Studio 2017 Professional compilers are supported as MEX compilers. For details and limitations, refer to Required C and C++ Compilers (Installing dSPACE Software 🕮).

In MATLAB, the compiler has to be initialized via the **`mex -setup`** command.

Related topics

Basics

Modeling a LIN Bus Interface (Model Interface Package for Simulink - Modeling Guide 🕮)
Using the RTI LIN MultiMessage Blockset (DS4330 Features 🕮)
Using the RTI LIN MultiMessage Blockset (MicroAutoBox II Features 🕮)

Overview of the RTI LIN MultiMessage Blockset

Introduction

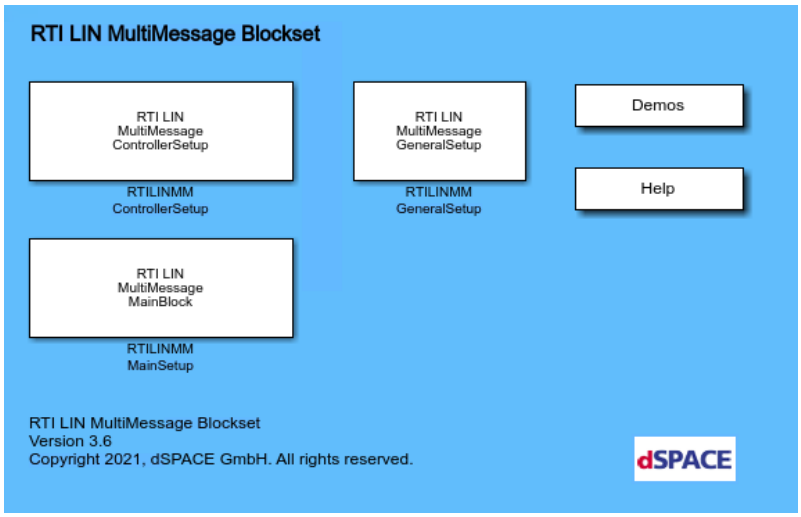
The library contains a dSPACE RTI block to initialize a LIN controller as well as a block to set up the entire LIN communication via the controller.

Opening the library

Double-click the RTI LINMM Blockset icon in the dSPACE_Blocksets library to open the rtilinmmlib library.

Tip

You can open the RTI LIN MultiMessage Blockset directly by entering `rtilinmm` in the MATLAB Command Window.



Available blocks

The following blocks belong to the RTI LIN MultiMessage Blockset:

- RTILINMM ControllerSetup on page 23
- RTILINMM GeneralSetup on page 29
- RTILINMM MainSetup on page 35

Demo models

For Simulink models that show how to use the RTILINMM blocks, refer to the RTI demo library of the RTI LIN MultiMessage Blockset.

To use one of the demo models that come with the RTI LIN MultiMessage Blockset, you must first update the S-functions for all its RTILINMM blocks. You can use the **Create S-Function for all LIN Blocks** command from the **Options** menu of the RTILINMM GeneralSetup block for this. Refer to Options Menu (RTILINMM GeneralSetup) on page 31.

System target

Most of the basic settings in your modeling environment depend on the specified system target. For this reason, the system target file match fit the real-time hardware for which you want to generate code. The system target file is specified on the **Code Generation** page of the **Configuration Parameters** dialog. You open the **Configuration Parameters** dialog via the **Simulation** ribbon. On the ribbon, click **Prepare** – **Model settings**.

When selecting a dSPACE RTI platform support in MATLAB, the corresponding board-specific system target file (`rti<xxxx>.tlc`) is automatically selected in the Simulink® Coder™. If you work with a SCALEXIO system, you must select `dsrt.tlc` as the system target file.

Related topics

Basics

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HowTos

How to Create a Model Using the RTI LIN MultiMessage Blockset..... 19

Basics on Network Node Configuration

Introduction

Node configuration ensures that each slave node of a LIN bus has a unique node address. This prevents conflicts between the slave nodes in a LIN cluster.

Node configuration

Network node configuration was introduced with LIN specification 2.0. Node configuration is used to avoid conflicts on the LIN bus if the LIN cluster consists

of several off-the-shelf slave nodes. Node configuration ensures that each slave node of a LIN bus has a unique node address (NAD).

Node configuration can be successfully completed only if the slave nodes of a LIN cluster can be uniquely identified beforehand. In many cases, this is ensured by the slave node parameters *LIN product identification* and *initial node address* defined in the LIN specification. For example, if several absolutely identical devices are to be used on the LIN bus, the *serial number* is additionally required to identify the single slave nodes. During node configuration, the LIN master detects and identifies the slave nodes on the basis of these slave node parameters and assigns unique network node addresses to them. The LIN master can then unambiguously assign identifiers to the frames of each slave node.

Parameters for node identification Each slave node of a LIN bus must be uniquely identified. Each node compliant with LIN 2.0 and later or with J2602 provides the following node configuration parameters for this purpose:

- *LIN product identification*: The LIN product identification is specified for physical slave nodes and consists of the following settings:

Setting	Description
Supplier ID	A 16-bit value that identifies the supplier of a slave node. The ID is assigned to the supplier by the LIN Consortium and cannot be changed.
Function ID	A 16-bit value that identifies the function of a slave node. The ID differs for slave nodes with different functions such as different LIN communication or physical world interaction. The function ID is assigned by the slave supplier and cannot be changed.
Variant ID	An 8-bit value that identifies a variant of a slave node. A variant of a slave node is a node which was modified without changing its function. The variant ID is assigned by the slave supplier and cannot be changed.

The LIN product identification cannot identify slave nodes uniquely if:

- Identical slave nodes are members of the LIN bus (for example, ECUs for off-the-shelf stepper motors).
- A physical slave node consists of several logical slave nodes.

In these cases, the serial number and/or initial NAD can be used to identify slave nodes uniquely.

Note

RTILINMM does not support initial NAD lists as defined in the LIN specification. You can specify the initial ID for a slave node on the Network Node Identification Page (RTILINMM MainSetup) on page 73 instead.

- *Serial number*: The serial number is a unique 4-byte value. It can identify physical slave nodes that have an identical function and set-up. It cannot identify logical slave nodes if they are part of one physical slave node. The serial number is optional.

- *Node address (NAD)*: The node address (NAD) is an address for logical slave nodes. The NAD is mandatory for each slave node and is a numeric value in the range 1 ... 127.

NAD value	Description
1 ... 125 (0x7D)	Standard node address
126 (0x7E)	Functional node address, only used for diagnostic purposes via the transport layer
127 (0x7F)	Broadcast node address

After the master of a LIN cluster has executed node configuration, each slave node should have a unique NAD.

Configuring slave nodes

Slave nodes can be configured for unambiguous node identification. The master transmits master request frames via the bus for this purpose. The structure of a master request frame depends on the node configuration parameter that is to be changed. The master request frame is addressed to a slave node and contains the new value of the parameter. If the node configuration of the addressed slave node is changed successfully, the slave transmits a positive slave response frame.

Types of configurable slave nodes

There are three types of configurable slave nodes:

- Unconfigured slave node: After reset, the slave node does not contain a valid configuration. It cannot receive or transmit frames. It must be configured before it can communicate on the bus.
- Preconfigured slave node: After reset, the slave node provides a basic configuration. This configuration might not be unique. To guarantee an unambiguous node configuration, this slave node should be configured after reset. However, after the next reset all the changes in the configuration are lost and the basic configuration is used again.
- Fully configured slave node: After reset, the slave node provides a full configuration. All the changes in this configuration are stored and are available after the next reset.

Note

RTILINMM does not support fully configured slave nodes. Changed configuration settings cannot be saved after the end of the simulation run time.

Node configuration services

There are several node configuration services defined for LIN 2.0 and later or for J2602. The services determine the structure and content of the master request frames.

- Assign NAD: Changes the current NAD of the addressed slave node.
- Assign frame ID: Changes the protected identifier of a single frame of the addressed slave node (only LIN 2.0 or J2602).

- Assign frame ID range: Changes the protected identifier (PID) of up to four frames of the addressed slave node (only LIN 2.1 or later).
- Conditional change NAD: Helps to identify unknown slave nodes and changes their current NAD. For further information, refer to the LIN specification.
- Read by identifier: Reads out the supplier ID and other properties of a slave node.

Note

RTILINMM does not support the following services:
- Data dump
- Save configuration
- FreeFormat

Slave node configuration using the RTI LIN MultiMessage Blockset

The RTI LIN MultiMessage Blockset allows you to simulate slave node configuration for up to 63 LIN slave nodes (exception: if you work with a MicroAutoBox II, the maximum number of supported LIN slave nodes is 15). For example, you can change initial parameters defined in the database file to simulate unconfigured or preconfigured slave nodes.

If you select a slave node to simulate its node configuration via RTILINMM, the RTILINMM real-time simulation automatically reacts to master request frames transmitted by the master during run time to change the node configuration of the slave. After the node configuration of the simulated slave node is changed successfully, the real-time simulation automatically transmits a positive slave response frame.

Note

Node configuration was introduced with LIN specification 2.0, so you can only select slave nodes of LIN 2.0 and later or of J2602 for simulation.

The RTI LIN MultiMessage Blockset does not support all node configuration services (see above). However, you can use raw data access for the master request and the slave response frames to let the simulated slave node react to node configuration services that are not supported by RTILINMM. If a master request frame for a service unsupported by RTILINMM is transmitted on the bus, RTILINMM forwards it to the raw data interface of the master request frame. You can react to the master request frame in the Simulink model, and then parameterize and send the slave response frame via the raw data interface.

Note

The RTI LIN MultiMessage Blockset supports the slave node configuration only. You can implement master functionality for a node configuration in the Simulink model, for example, by using raw data access for the master request frame.

Related topics

References

Network Node Configuration Page (RTILINMM MainSetup)..... 70

How to Create a Model Using the RTI LIN MultiMessage Blockset

Objective

Models are created with blocks from the RTI LIN MultiMessage Blockset in the same way as without these blocks. However, there are some limitations to note when working with the RTI LIN MultiMessage Blockset. Refer to Limitations of RTI LIN MultiMessage Blockset on page 162.

Basics

Before you can build a real-time application for a model with blocks from the RTI LIN MultiMessage Blockset, you have to let S-functions be created for the blocks of the RTI LIN MultiMessage Blockset. Creating these S-functions requires no handcoding.

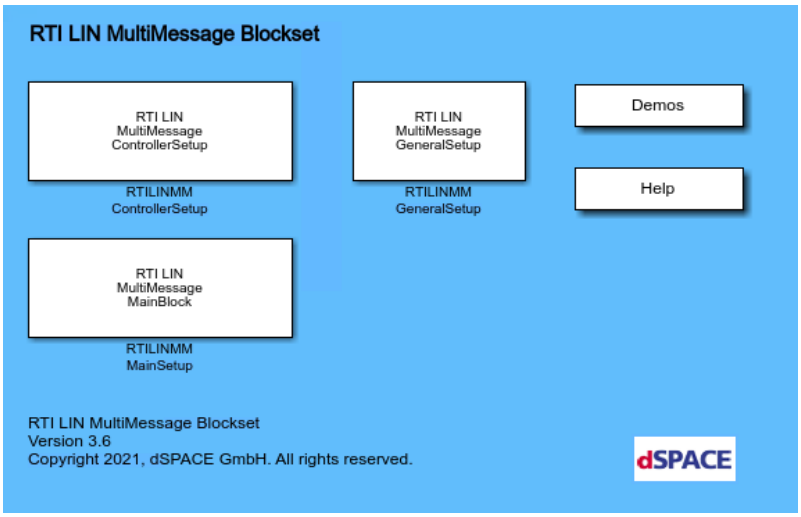
Specifics for SCALEXIO systems

If you model the LIN communication for a SCALEXIO system and want to perform model separation later on in ConfigurationDesk to execute the separated models on single cores of the SCALEXIO system, you need to know some specifics. Refer to Separating Models That Contain CAN or LIN Bus Communication (Model Interface Package for Simulink - Modeling Guide 🕮).

Method

To create a model using the RTI LIN MultiMessage Blockset

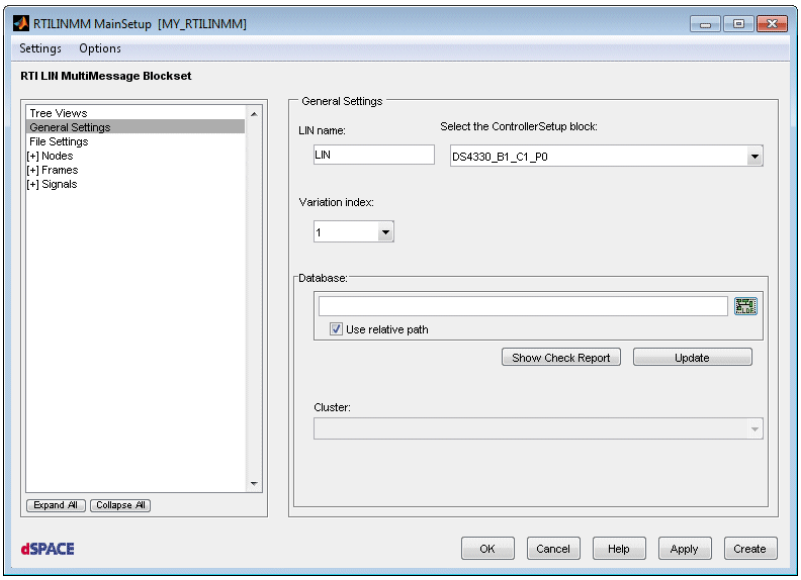
1. Open a new Simulink model and save it.
2. In the MATLAB Command Window, enter `rtilinmm`.
   The rtilinmmlib library opens.



3. From the rtilinmmlib library, add an RTILINMM GeneralSetup block to the model.
4. Double-click the RTILINMM GeneralSetup block.
   The RTILINMM GeneralSetup block dialog opens.
5. In the dialog, specify the destination folder for all generated S-functions.
6. In the dialog, click OK.
   This parameterizes the RTILINMM GeneralSetup block and defines general settings for the RTILINMM blocks you will use in the model.
7. Save the model.
8. From the rtilinmmlib library, add an RTILINMM ControllerSetup block to the model.
9. Double-click the RTILINMM ControllerSetup block.
   The RTILINMM ControllerSetup block dialog opens.
10. In the dialog, specify the parameters of your LIN controller.
11. From the rtilinmmlib library, add an RTILINMM MainSetup block to the model.

12 Double-click the **RTILINMM MainSetup** block.

The **RTILINMM MainSetup** dialog opens and the **General Settings** page is displayed.



13 In the **Database** frame, specify the LDF file, DBC file, FIBEX file, or AUTOSAR system description file you want to use as the database for LIN communication.

This makes the selected database available for the **RTILINMM MainSetup** block.

14 If more than one LIN bus is defined in the selected database, select the relevant bus for the **RTILINMM MainSetup** block from the **Cluster** drop-down list.

15 On the dialog pages of the **RTILINMM MainSetup** block, specify LIN communication according to your requirements. For details on the dialog pages, refer to Pages of RTILINMM MainSetup Block on page 52.

16 Click **Create**.

This creates the S-function and USR.TRC file for the **RTILINMM MainSetup** block.

17 Save the model.

Result

You have built a model containing blocks from the RTI LIN MultiMessage Blockset.

Next steps

You must build the real-time application for the model and download it to the dSPACE real-time hardware.

- If you work with a DS1006-/DS1007-based system with a DS4330 LIN Interface Board or with a MicroAutoBox II, refer to How to Start the Build and Download (RTI and RTI-MP Implementation Guide 🕮).

- The build process for SCALEXIO systems with a DS2671 Bus Board, DS2672 Bus Module, DS6301 CAN/LIN Board, and/or DS6351 LIN Board is started in ConfigurationDesk. Refer to LIN Bus Connection (SCALEXIO – Hardware and Software Overview 🕮) and Building Real-Time Applications (ConfigurationDesk Real-Time Implementation Guide 🕮).

A bus configuration file (LINCFG file) is created together with the real-time application. ControlDesk uses the LINCFG file to generate the bus configuration. You can use the bus configuration to control the dSPACE hardware's LIN communication from within ControlDesk while the real-time application is running. For further information on working with the **Bus Navigator** in ControlDesk, refer to ControlDesk Bus Navigator 🕮.

Related topics

Basics

Modeling a LIN Bus Interface (Model Interface Package for Simulink - Modeling Guide 🕮)
Using the RTI LIN MultiMessage Blockset (DS4330 Features 🕮)
Using the RTI LIN MultiMessage Blockset (MicroAutoBox II Features 🕮)

References

RTILINMM ControllerSetup

Introduction

The RTILINMM ControllerSetup block is used to specify the basic settings of the LIN controller.

Where to go from here

Information in this section

Information in other sections

Block Description (RTILINMM ControllerSetup)

Block

Purpose

To specify the basic settings of the LIN controller and block port settings.

Description

On the Controller page, you can specify the parameters of the LIN controller in this block. On the Options page, you can specify the block port settings.

Note

For each LIN bus (channel) one and only one RTILINMM ControllerSetup block must be specified.

The RTILINMM library is platform-independent. Models designed for the DS4330 LIN Interface Board can be easily reconfigured to be used for the MicroAutoBox II. The default values are set for the DS4330. The parameters are not automatically changed when using the MicroAutoBox II.

I/O characteristics

The table below describes the available block inports:

Simulink Inport	Range	Simulink Data Type	Description
Variation	0 … 20	uint8	Specifies the variation for the LIN controller. You can use this inport to activate the RTILINMM MainSetup that corresponds to the specified LIN controller variation. The variation of a RTILINMM MainSetup can be specified on the General Settings Page (RTILINMM MainSetup) on page 57. If the input is `0`, the LIN controller is disabled.
Baudrate	500 … 22000	uint16	(Available only if **Enable baudrate input port** is selected on the Options Page (RTILINMM ControllerSetup)) Defines the baud rate to be used for the LIN bus (channel).
Breaklength	1 … 128	uint8	(Available only if **Enable break input ports** is selected on the Options Page (RTILINMM ControllerSetup)) Defines the break length (synchronization break) of the selected LIN bus (channel).
Breakdelimiter	1 … 128	uint8	(Available only if **Enable break input ports** is selected on the Options Page (RTILINMM ControllerSetup)) Defines the synchronization break delimiter for the LIN bus (channel).

Simulink Inport	Range	Simulink Data Type	Description
Termination	0 … 1	uint8	(Available only if **Enable master termination input port** is selected on the Options Page (RTILINMM ControllerSetup)) Specifies the termination of the LIN controller: ▪ 0 = slave termination A 30 kΩ resistor is used as the termination for a LIN slave. ▪ 1 = master termination A 1 kΩ pull-up resistor must be added.

The table below describes the available block outports:

Simulink Outport	Range	Simulink Data Type	Description
Baudrate	500 … 22000	uint16	(Available only if **Enable baudrate output port** is selected on the Options Page (RTILINMM ControllerSetup)) Displays the baud rate of the frame last received on the LIN bus (channel).

Dialog pages

The dialog settings can be specified on the following pages:

- Controller Page (RTILINMM ControllerSetup) on page 25
- Options Page (RTILINMM ControllerSetup) on page 27

Related topics

HowTos

How to Create a Model Using the RTI LIN MultiMessage Blockset..... 19

Controller Page (RTILINMM ControllerSetup)

Purpose

To specify the basic settings for the LIN controller.

Dialog settings

Controller name Lets you specify a name for the LIN controller. Controller names are used to identify the different RTILINMM ControllerSetup blocks in an RTI model. Each controller name can therefore be used only once within an RTI model. This also applies to RTI-MP (multiprocessor) models. For SCALEXIO systems, the controller name must be unique in a whole multicore application.

The RTI LIN MultiMessage Blockset automatically creates a default controller name. You are recommended to change the default name to guarantee that the controller name is unique. When you change the controller name, you have to

recreate the RTILINMM ControllerSetup block and the dependent RTILINMM MainSetup blocks.

Board/module type (Available only for DS4330 and MicroAutoBox II) Lets you select the dSPACE LIN board for which you want to set up LIN communication.

Board number (Available only for DS4330) Lets you select the board number of the LIN board in the range 1 ... 16. If your system contains several boards of the same type, RTI uses the board number to distinguish between them.

Module number (Available only for MicroAutoBox II) Lets you select the module number of the LIN module in the range 1 ... 16 (The maximum depends on your MicroAutoBox II variant). If your MicroAutoBox II contains several LIN modules, RTI uses the module number to distinguish between them.

Channel number (Available only for DS4330 and MicroAutoBox II) Lets you specify the channel number of the currently selected LIN board.

For the mapping of LIN channel numbers to LIN signals and pins of dSPACE hardware, refer to the topics in the table below:

dSPACE Hardware		Topic with Mapping Information
DS4330		Signal Mapping to I/O Pins (PHS Bus System Hardware Reference 🕮)
MicroAutoBox II	1401/1507	Signal Mapping to I/O Pins (1401/1507) (refer to Interfaces (MicroAutoBox II Hardware Reference 🕮))
	1401/1511	Signal Mapping to I/O Pins (1401/1511) (refer to Interfaces (MicroAutoBox II Hardware Reference 🕮))
	1401/1511/1514	Signal Mapping to I/O Pins (1401/1511/1514) (refer to Interfaces (MicroAutoBox II Hardware Reference 🕮))
	1401/1513	Signal Mapping to I/O Pins (1401/1513) (refer to Interfaces (MicroAutoBox II Hardware Reference 🕮))
	1401/1513/1514	Signal Mapping to I/O Pins (1401/1513/1514) (refer to Interfaces (MicroAutoBox II Hardware Reference 🕮))
SCALEXIO	DS2671 Bus Board	Signal Mapping of the DS2671 Bus Board (SCALEXIO Hardware Installation and Configuration 🕮)
	DS2672 Bus Module	Signal Mapping of the DS2672 Bus Module (SCALEXIO Hardware Installation and Configuration 🕮)
	DS6301 CAN/LIN Board	Signal Mapping of the DS6301 CAN/LIN Board (SCALEXIO Hardware Installation and Configuration 🕮)
	DS6351 LIN Board	Signal Mapping of the DS6351 LIN Board (SCALEXIO Hardware Installation and Configuration 🕮)

Baud rate Lets you specify the baud rate for your LIN communication set up. Valid baud rates are in the range 1000 … 20000 bit/s.

Break length Lets you specify the break length for your LIN communication set up. The break length must be in the range 13 … 27 bit times. The total sum of break length and break delimiter must not exceed 28 bit times.

Break delimiter Lets you specify the break delimiter for your LIN communication set up. The break delimiter must be in the range 1 … 15 bit times. The total sum of break length and break delimiter must not exceed 28 bit times.

Transceiver type Lets you select the transceiver type. The following transceiver types are supported:

Hardware	Setting
DS4330	ISO9141
MicroAutoBox II	ISO9141
DS2671[1)]	▪ LIN Transceiver ▪ Piggyback module
DS2672[1)]	LIN Transceiver
DS6301[1)]	LIN Transceiver
DS6351[1)]	LIN Transceiver

[1)] In a SCALEXIO system.

Termination resistance - Master termination (1kOhm) Lets you select the termination resistor. By default, a 30 kΩ resistor is used as the termination for a LIN slave (checkbox cleared). If a LIN master is simulated by the LIN hardware, a 1 kΩ pull-up resistor must be added.

The method depends on the used platform:

- For DS4330, select the checkbox. The 1 kΩ pull-up resistor is added via software.
- For MicroAutoBox II, you must install the 1 kΩ pull-up resistor yourself. For more information, refer to How to Configure MicroAutoBox II as the LIN Master (MicroAutoBox II Hardware Installation and Configuration Guide 🕮).
- For SCALEXIO systems, select the checkbox. The 1 kΩ pull-up resistor is added via software.

Related topics

Basics

Introduction to the Features of the DS4330 (DS4330 Features 🕮)

References

Block Description (RTILINMM ControllerSetup) 24
Options Page (RTILINMM ControllerSetup) 27

Options Page (RTILINMM ControllerSetup)

Purpose

To specify block port settings for the ControllerSetup block.

Dialog settings

Enable baudrate input port Lets you add a Baudrate input port to the RTILINMM ControllerSetup block to specify the baud rate to be used for the LIN bus. If the Generate constant blocks with defaults checkbox is selected, a constant block is added to the model and connected to the Baudrate input port. By default, the constant block is assigned to the baud rate setting made on the block's Controller page.

Enable baudrate output port Lets you add a Baudrate output port to the RTILINMM ControllerSetup block, which outputs the baud rate of the last received frame.

Note

- To let RTILINMM automatically adjust to the current baud rate of the LIN bus, you must specify the maximum possible baud rate on the Controller page of the RTILINMM ControllerSetup block, and lead the baud rate output back to the baud rate input port.
- The increment of the baud rate must not exceed 30 percent, i.e., the step-by-step change of the baud rate must meet the following condition: new baud rate ≤ 1.3 · old baud rate

Enable break input ports Lets you add a Breaklength input port and a Breakdelimiter input port to the RTILINMM ControllerSetup block to specify the break length and break delimiter. If the Generate constant blocks with defaults checkbox is selected, two constant blocks are added to the model and connected to the Breaklength and Breakdelimiter input ports. By default, the constant blocks are assigned to the break length and break delimiter settings made on the block's Controller page.

Enable master termination input port Lets you add a Termination input port to the RTILINMM ControllerSetup block to switch termination during run time. The port has a value of 1 for master termination, otherwise (for slave termination) the value is 0. If the Generate constant blocks with defaults checkbox is selected, a constant block is added to the model and connected to the Termination input port. By default, the constant block is assigned to the termination resistance setting made on the block's Controller page.

Enable operation pending output port (Available only for SCALEXIO systems) Lets you add an Operation pending output port to the RTILINMM ControllerSetup block. This outport indicates whether a channel modification is pending. If the output is "1", a channel modification is pending and frame transmission is not possible.

Related topics

References

Block Description (RTILINMM ControllerSetup)..... 24
Controller Page (RTILINMM ControllerSetup)..... 25

RTILINMM GeneralSetup

Introduction

The RTILINMM GeneralSetup block is used to define the necessary folders for working with the RTI LIN MultiMessage Blockset.

Where to go from here

Information in this section

Information in other sections

Block Description (RTILINMM GeneralSetup)

Block

Purpose

To specify general settings for using the RTI LIN MultiMessage Blockset.

Description

You have to specify the folder to which the RTI LIN MultiMessage Blockset saves all the generated files (destination folder).

The RTI LIN MultiMessage Blockset supports LIN bus monitoring with the Bus Navigator.

- LIN bus monitoring always uses host service 30 for the following platforms:
  - DS1006-/DS1007-based systems with a DS4330
  - MicroAutoBox II
- LIN bus monitoring always uses host service 62 for SCALEXIO systems.

Note

The settings you specify in the RTILINMM GeneralSetup block apply to all the RTILINMM blocks in a model. For this reason, there must always be one and only one RTILINMM GeneralSetup block in your model if you want to use any of the other RTILINMM blocks.
Before you add the RTILINMM GeneralSetup block to the model, you must save the model.

Options menu

The block has an Options menu with commands for global settings to the RTILINMM GeneralSetup block. For a description of the commands, refer to Options Menu (RTILINMM GeneralSetup) on page 31.

Dialog pages

The dialog settings can be specified on the main page. Refer to Main Page (RTILINMM GeneralSetup) on page 32.

Related topics

HowTos

How to Create a Model Using the RTI LIN MultiMessage Blockset..... 19

Options Menu (RTILINMM GeneralSetup)

Purpose

To describe the commands of the Options menu.

Menu commands

Create S-Function for All LIN Blocks Lets you create S-functions for all the RTILINMM blocks in the current model.

Create S-Function for Some LIN Blocks Lets you create S-functions for one or more RTILINMM blocks in the current model. A list containing all the blocks in the model is displayed. Select the blocks from the list (multiple selection is possible) and start S-function creation for the selected blocks by clicking the Create button.

Check LIN Lets you check the correct use of the RTILINMM MainSetup blocks in your model without having to start a build process.

Select Compiler Options Lets you set the compiler options to the compiler default optimization `-O` (minimum compiler optimization). You should use these options to avoid long compilation times when working with extensive LIN communication.

Tip

If the compilation times are too long even though you selected the minimum compiler optimization, you can deactivate the optimization.

- If you work with a DS1006-/DS1007-based system with a DS4330 LIN Interface Board or with a MicroAutoBox II, refer to the RTI general build options page in the Code Generation Dialog (Model Configuration Parameters Dialogs) (RTI and RTI-MP Implementation Reference 🕮).
- If you work with a SCALEXIO system, refer to Build Configuration Table (ConfigurationDesk User Interface Reference 🕮).

Clean up Destination Folder Lets you delete the files which RTI LIN MultiMessage Blockset does not need any longer from your file system.

Related topics

References

Main Page (RTILINMM GeneralSetup)

Purpose

To specify the folders on your file system required for working with the RTI LIN MultiMessage Blockset.

Dialog settings

Model root Displays the root folder of the current model. You cannot change the setting.

Note

All the paths you specify in the RTI LIN MultiMessage Blockset are relative to the model root folder per default. This also applies to the paths of the files generated by the RTI LIN MultiMessage Blockset, such as TRC files. For this reason, you should change the location of the model only if you also change the location of all other files generated by the RTI LIN MultiMessage Blockset.

Destination folder for generated files Lets you specify the folder to which the RTI LIN MultiMessage Blockset will save all the generated files.

Use relative path Lets you set the folder relative to the model root folder or as an absolute path.

Tip

Using a relative path allows you to easily move the model and all the files belonging to it to another location on your file system without having to change any path settings.

Add paths to MATLAB search path Lets you add the destination folder to the MATLAB search path. You do not have to select this option if you add the

destination folder to the MATLAB search yourself. To use Simulink® Coder™, the destination folder must be in the MATLAB search path.

Remove paths when model is closed Lets you remove the destination folder from the MATLAB search path whenever you close the current model.

Note

If you do not remove the destination folder, an error may occur when you open another model.

Add TRC exclusions to RTILINMM blocks Lets you hide all the blocks under the RTILINMM blocks that they are not visible in the model root. They are sorted under `Bus Systems\LIN`.

Note

You must not select this checkbox if you want to use mask and workspace parameters for parameter tuning.

Bus Navigator Monitoring Service Displays the host service used for LIN bus monitoring with the **Bus Navigator**. LIN bus monitoring always uses the displayed host service.

For further information on LIN bus monitoring with the **Bus Navigator** in ControlDesk, refer to ControlDesk Bus Navigator 🕮.

Related topics

References

Block Description (RTILINMM GeneralSetup)..... 30
Options Menu (RTILINMM GeneralSetup)..... 31

RTILINMM MainSetup

Introduction

The RTILINMM MainSetup block is used to setup and configure LIN communication on a LIN controller.

Where to go from here

Information in this section

Information in other sections

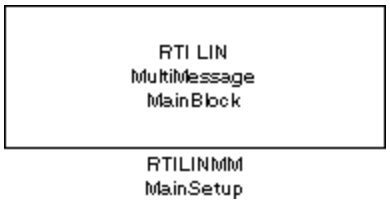
General Information on RTILINMM MainSetup Block

Where to go from here

Information in this section

Block Description (RTILINMM MainSetup)

Block



Purpose

To set up and configure LIN communication on a LIN controller.

Description

The RTILINMM MainSetup block allows you to configure the entire communication on a LIN controller of a dSPACE LIN board. You can configure the LIN communication using a database container (DBC) file, LIN database file (LDF), FIBEX file, MAT file, or AUTOSAR system description file.

- *Names of LIN signals*: To identify LIN signals, the RTILINMM MainSetup block displays their names together with the names of the corresponding frames: `FrameName.SignalName`
- *S-function*: You have to create a separate S-function for each RTILINMM MainSetup block by clicking **Create** in the RTILINMM MainSetup block dialog. The S-functions created for the RTILINMM MainSetup block in the model are included in the model's build process.

Tip

Some pages do not enable **Create** when you change their properties. This applies to all the settings that do not directly affect the generated code. Your changes are stored internally and activated in the next create process. If you want to apply your changes immediately, right-click **Create** and select **Force "Create"**, or select **Force "Create"** from the Options menu.

- *TRC file and ControlDesk*: Whenever you create an S-function for an RTILINMM MainSetup block, a TRC file is also automatically created. The TRC file contains entries for all the LIN signals of the LIN controller concerned. The entries allow you to analyze received signals and change the value of signals to be transmitted in ControlDesk.

I/O characteristics

The table below describes the available block inport:

Simulink Inport	Range	Simulink Data Type	Description
TX Data (struct array)	–	Depends on the struct	The inport is available only if at least one signal is selected as a block inport. You can use the following signals at the block inport. ▪ TX signals (enabled on Model Signals (TX) Page (RTILINMM MainSetup) on page 125) ▪ Node enable signals (enabled on Network Node Enable Page (RTILINMM MainSetup) on page 79) ▪ Frame enable signals (enabled on Enable Frames Page (RTILINMM MainSetup) on page 99) ▪ WakeUp signals (enabled on Network Node Wakeup Page (RTILINMM MainSetup) on page 83) ▪ Sleep signals (enabled on Network Node Sleep Page (RTILINMM MainSetup) on page 81) ▪ TX frames lengths (enabled on Frame Length Page (RTILINMM MainSetup) on page 114) ▪ FrameID and FrameKickout (if the direct header send functionality is enabled on Master Selection Page (RTILINMM MainSetup) on page 68) All the signals which are enabled for block inport must be collected in one input structure. To ensure the input structure is correct, you can let the Mapping to RTILINMM Block on page 149 be connected to this inport automatically (see Periphery Options Page (RTILINMM MainSetup) on page 145).

The table below describes the available block outports:

Simulink Outport	Range	Simulink Data Type	Description
RX Data (struct array)	–	Depends on the struct: ▪ RX Status: boolean	The outport is available only if at least one signal is selected as a block outport. You can get the following signals at the block outport. ▪ RX signals (enabled on Model Signals (RX) Page (RTILINMM MainSetup) on page 142)

Simulink Outport	Range	Simulink Data Type	Description
			▪ RX status and Time signals (enabled on RX Status and Time Ports Page (RTILINMM MainSetup) on page 103) ▪ RX raw data (enabled on RX Raw Data Ports Page (RTILINMM MainSetup) on page 109) ▪ RX errors (enabled on RX Error Ports Page (RTILINMM MainSetup) on page 111) ▪ LIN bus state and sleep signals (enabled on Network Node Sleep Page (RTILINMM MainSetup) on page 81) ▪ WakeUp signals (enabled on Network Node Wakeup Page (RTILINMM MainSetup) on page 83) ▪ RX frames checksums (enabled on RX Frames Checksum Ports Page (RTILINMM MainSetup) on page 105) All signals are available in one array. To access each signal, you can use Simulink's Bus Selector.

Dialog menu

Settings global to the RTILINMM MainSetup block can be specified on the Settings menu. Refer to Settings Menu (RTILINMM MainSetup) on page 46.

Dialog pages

The dialog settings are structured on several dialog pages. The pages can be accessed via the dialog tree on the left of the dialog.

To improve handling, you can hide dialog pages from the dialog tree or create your own structure of dialog pages. You can use predefined selections of dialog pages or work with your own selection of dialog pages (see Tree Views Page (RTILINMM MainSetup) on page 56). You can set your own selection of dialog pages using the commands of the dialog tree's context menu (see Commands of the Dialog Tree (RTILINMM MainSetup) on page 48).

For an overview of all the dialog pages, refer to Dialog Tree (RTILINMM MainSetup) on page 39.

Related topics

Basics

Basics on the RTI LIN MultiMessage Blockset (DS4330 Features 🕮)
Basics on the RTI LIN MultiMessage Blockset (MicroAutoBox II Features 🕮)
Basics on the RTI LIN MultiMessage Blockset (Model Interface Package for Simulink - Modeling Guide 🕮)

HowTos

How to Create a Model Using the RTI LIN MultiMessage Blockset..... 19

Dialog Tree (RTILINMM MainSetup)

Filter configuration

The RTILINMM MainSetup block has various dialog pages which can be accessed using the dialog tree. You do not have to work with all the available dialog pages. The RTILINMM MainSetup block provides predefined filters, so you can reduce the size of the dialog tree for easier handling. The following table describes the predefined filter settings.

Number	Name	Description
1	Minimum	The dialog pages are always available.
2	Instrumentation & Automation Interface	The dialog pages allow the access to the frames via the TRC file in ControlDesk.
3	Model interface	The dialog pages are necessary if you want to link the signals of RX and TX frames in the Simulink model.
4	Manipulation interface	The dialog pages are necessary when you want to manipulate frames.
5	Extras	Dialog pages for advanced handling of the RTI LIN MultiMessage blockset

You can set the filter configuration on Tree Views Page (RTILINMM MainSetup) on page 56.

Note

If a dialog page is hidden, all its parameters are set to their default values.

Dialog pages

The dialog settings can be specified on the following pages (listed in the maximum tree). The Filter Configuration column shows which page is visible (✓) or hidden (-) by which filter configuration.

Dialog Pages	Filter Configuration				
	1	2	3	4	5
Tree Views Page (RTILINMM MainSetup)	✓	-	-	-	-
General Settings Page (RTILINMM MainSetup)	✓	-	-	-	-
File Settings Page (RTILINMM MainSetup)	✓	-	-	-	-
Naming Options Page (RTILINMM MainSetup)	-	-	-	-	✓
Naming Page (RTILINMM MainSetup)	-	-	-	-	✓
Naming Mapping Page (RTILINMM MainSetup)	-	-	-	-	✓

Dialog Pages	Filter Configuration				
	1	2	3	4	5
Network Nodes Page (RTILINMM MainSetup)	✓	-	-	-	-
Network Node Preselection Page (RTILINMM MainSetup)	✓	-	-	-	-
Master Selection Page (RTILINMM MainSetup)	✓	-	-	-	-
Network Node Configuration Page (RTILINMM MainSetup)	-	✓	-	-	-
Network Node Selection Page (RTILINMM MainSetup)	-	✓	-	-	-
Network Node Identification Page (RTILINMM MainSetup)	-	✓	-	-	-
Frame ID Assignment Page (RTILINMM MainSetup)	-	✓	-	-	-
Network Node Interfaces Page (RTILINMM MainSetup)	-	✓	✓	-	-
Network Node Enable Page (RTILINMM MainSetup)	-	✓	✓	-	-
Network Node Sleep Page (RTILINMM MainSetup)	-	✓	✓	-	-
Network Node Wakeup Page (RTILINMM MainSetup)	-	✓	✓	-	-

Dialog Pages	Filter Configuration				
	1	2	3	4	5
Frames Page (RTILINMM MainSetup)	✓	-	-	-	-
Choose Frames Page (RTILINMM MainSetup)	✓	-	-	-	-
TX Frames Page (RTILINMM MainSetup)	✓	-	-	-	-
RX Frames Page (RTILINMM MainSetup)	✓	-	-	-	-
Eventtriggered Frames Page (RTILINMM MainSetup)	✓	-	-	-	-
Event Triggered TX Page (RTILINMM MainSetup)	✓	-	-	-	-
Event Triggered RX Page (RTILINMM MainSetup)	✓	-	-	-	-
Collision Resolver Page (RTILINMM MainSetup)	✓	-	-	-	-
Capture Frames Page (RTILINMM MainSetup)	-	-	-	-	✓
Enable Frames Page (RTILINMM MainSetup)	-	✓	✓	-	-
TX Timeout Enable Page (RTILINMM MainSetup)	-	-	-	✓	-
Frame Interfaces Page (RTILINMM MainSetup)	-	✓	✓	✓	✓
RX Status and Time Ports Page (RTILINMM MainSetup)	-	-	✓	-	-
RX Frames Length Port Page (RTILINMM MainSetup)	-	-	✓	-	-
RX Frames Checksum Ports Page (RTILINMM MainSetup)	-	-	✓	-	-
RX Frames Checksum Display Page (RTILINMM MainSetup)	-	✓	-	-	-
Raw Data Page (RTILINMM MainSetup)	-	✓	-	✓	✓
TX Raw Data Page (RTILINMM MainSetup)	-	-	-	✓	✓
TX Raw Data Display Page (RTILINMM MainSetup)	-	✓	-	-	-
RX Raw Data Ports Page (RTILINMM MainSetup)	-	-	-	-	✓
RX Raw Data Display Page (RTILINMM MainSetup)	-	✓	-	-	-
Errors Page (RTILINMM MainSetup)	-	✓	✓	-	-
RX Error Ports Page (RTILINMM MainSetup)	-	-	✓	-	-
RX Error Display Page (RTILINMM MainSetup)	-	✓	-	-	-
Frame Manipulation Page (RTILINMM MainSetup)	-	-	-	✓	-
Frame Length Page (RTILINMM MainSetup)	-	-	-	✓	-
Frame Defaults Page (RTILINMM MainSetup)	-	-	-	-	✓
Checksum Page (RTILINMM MainSetup)	-	-	-	✓	-
User Checksum Definition Page (RTILINMM MainSetup)	-	-	-	✓	-
User Checksum Frames Page (RTILINMM MainSetup)	-	-	-	✓	-
Dynamic LIN Frame Checksum Page (RTILINMM MainSetup)	-	-	-	✓	-
Custom Code Page (RTILINMM MainSetup)	-	-	-	✓	-

Dialog Pages	Filter Configuration				
	1	2	3	4	5
Signals Page (RTILINMM MainSetup)	✓	-	-	-	-
TX Page (RTILINMM MainSetup)	✓	-	-	-	-
Model Signals (TX) Page (RTILINMM MainSetup)	✓	-	-	-	-
Input Manipulation Page (RTILINMM MainSetup)	-	-	-	✓	-
Saturation Options Page (RTILINMM MainSetup)	-	-	✓	-	-
Saturation Page (RTILINMM MainSetup)	-	-	✓	-	-
Signal Defaults Page (RTILINMM MainSetup)	-	-	-	-	✓
Signal Ranges Page (RTILINMM MainSetup)	-	-	-	-	✓
Signal Errors Page (RTILINMM MainSetup)	-	-	-	✓	-
Signal Manipulation Page (RTILINMM MainSetup)	-	-	-	✓	-
Dynamic Signal Page (RTILINMM MainSetup)	-	-	-	✓	-
Dynamic Signal Values Page (RTILINMM MainSetup)	-	-	-	✓	-
Dynamic Signal Defaults Page (RTILINMM MainSetup)	-	-	-	✓	-
Counter Page (RTILINMM MainSetup)	-	-	-	✓	-
Signal Default Manipulation Page (RTILINMM MainSetup)	-	-	-	-	✓
Model Signals (RX) Page (RTILINMM MainSetup)	✓	-	-	-	-
General Options Page (RTILINMM MainSetup)	-	-	✓	-	✓
TRC Page (RTILINMM MainSetup)	-	-	-	-	✓
TRC Options Page (RTILINMM MainSetup)	-	-	-	-	✓
TRC Extras Page (RTILINMM MainSetup)	-	-	-	-	✓
Periphery Options Page (RTILINMM MainSetup)	-	-	-	-	✓
Mapping Page (RTILINMM MainSetup)	-	-	✓	-	✓

Related topics

References

Commands of the Dialog Tree (RTILINMM MainSetup) 48
Tree Views Page (RTILINMM MainSetup) 56

Configuration File

Introduction

Configuration files are M files. You can use them to store configuration settings of many pages of the RTILINMM MainSetup block.

Creating a configuration file

You can create a configuration file in two ways:

Creating a configuration file via GUI You can create a configuration file easily with the Configuration File – Create context menu command. It is available on the relevant pages of the RTILINMM MainSetup block.

Creating a configuration file manually You can also create a configuration file manually. The first line of the file must be:

```
function configdata = <mfilename>()
```

The list below shows the structure the configuration file must have:

Variable Name	Variable Type	Corresponding Page of the RTILINMM MainSetup Block
`configdata.<FrameName>.timeout.countdown` `configdata.<FrameName>.timeout.counter`	Integer value ≥ `0` `'STOP'` or `'CONTINUE'`	TX Timeout Enable Page (RTILINMM MainSetup) on page 100

`configdata.<FrameName>.<SignalName>.crc.default`
`configdata.<FrameName>.<SignalName>.crc.algorithm`
`configdata.<FrameName>.<SignalName>.crc.dynamic`
	`'Enable'` or `'Disable'`
	String of algorithm name
	`'Enable'` or `'Disable'`
		User Checksum Frames Page (RTILINMM MainSetup) on page 118

`configdata.<FrameName>.<SignalName>.counter.start`
`configdata.<FrameName>.<SignalName>.counter.step`
`configdata.<FrameName>.<SignalName>.counter.steplength`
`configdata.<FrameName>.<SignalName>.counter.max`
	Numeric value
	Numeric value
	Integer value ≥ 0
	Numeric value
		Counter Page (RTILINMM MainSetup) on page 138

`configdata.<FrameName>.<SignalName>.saturation`
 	
`configdata.settings.saturation.usebitsaturation`
	String for saturation
	Possible strings:
	▪ `'None'`
	▪ `'Both'`
	▪ `'Input'`
	▪ `'Output'`
	Numeric value (0 or 1)
		Saturation Page (RTILINMM MainSetup) on page 127

`configdata.<FrameName>.<SignalName>.manipulationdefault`
 	
`configdata.<FrameName>.<SignalName>.manipulationfields`
	String for default manipulation
	String for available manipulation options
	Possible strings:
	▪ `'Input'`
	▪ `'Counter'`
	▪ `'Constant'`
	▪ `'DynValue'`
	▪ `'DynValueConst'`
		Signal Default Manipulation Page (RTILINMM MainSetup) on page 140

`configdata.<FrameName>.<SignalName>.default`	Numeric value	Signal Defaults Page (RTILINMM MainSetup) on page 129
`configdata.<FrameName>.<SignalName>.signalrange.min` `configdata.<FrameName>.<SignalName>.signalrange.max`	Numeric value Numeric value The maximum value must be greater than the minimum value.	Signal Ranges Page (RTILINMM MainSetup) on page 130

Variable Name	Variable Type	Corresponding Page of the RTILINMM MainSetup Block
`configdata.<NetworkNodeName>.NODEConfiguration.Mode`	`'non-relevant'` or `'simulated'`	Network Node Selection Page (RTILINMM MainSetup) on page 70

`configdata.<NetworkNodeName>.NODEConfiguration.InitialNAD`
`configdata.<NetworkNodeName>.NODEConfiguration.SerialNo`
`configdata.<NetworkNodeName>.NODEConfiguration.Option`
	Hexadecimal value in the range 0x1 ... 0x7F
	Hexadecimal value (4-byte)
	`'Both'`, `'TRC'`, `'Outport'`, or `'None'`
		Network Node Identification Page (RTILINMM MainSetup) on page 73

`configdata.<NetworkNodeName>.<FrameName>.FRAMEConfiguration.InitialID` `configdata.<NetworkNodeName>.<FrameName>.FRAMEConfiguration.Option`	`'Unconfigured'` or numeric value `'None'`, `'TRC'`, `'Outport'`, or `'Both'`	Frame ID Assignment Page (RTILINMM MainSetup) on page 76

`configdata.<NetworkNodeName>.NODEEnable.Source`
`configdata.<NetworkNodeName>.NODEEnable.Logic`
`configdata.<NetworkNodeName>.NODEEnable.Default`
	`'None'`, `'TRC'`, `'Inport'`, or `'Both'`
	`'AND'`, `'OR'`, or `'-'`
	`'Enable'`, `'Disable'`, or `'-'`
		Network Node Enable Page (RTILINMM MainSetup) on page 79

`configdata.<NetworkNodeName>.NODESleep.Source`
`configdata.<NetworkNodeName>.NODESleep.Logic`
`configdata.<NetworkNodeName>.NODESleep.Sink`
	`'None'`, `'TRC'`, `'Inport'`, or `'Both'`
	`'AND'`, `'OR'`, or `'-'`
	`'None'`, `'TRC'`, `'Outport'`, or `'Both'`
		Network Node Sleep Page (RTILINMM MainSetup) on page 81

`configdata.<NetworkNodeName>.NODEWakeup.Source`
`configdata.<NetworkNodeName>.NODEWakeup.Logic`
`configdata.<NetworkNodeName>.NODEWakeup.Sink`
	`'None'`, `'TRC'`, `'Inport'`, or `'Both'`
	`'AND'`, `'OR'`, or `'-'`
	`'None'`, `'TRC'`, `'Outport'`, or `'Both'`
		Network Node Wakeup Page (RTILINMM MainSetup) on page 83

`configdata.<FrameName>.<AssociatedFrameName>.txeventtriggered.source`
`configdata.settings.txeventtriggered.usedefault`
`configdata.settings.txeventtriggered.default`
	`'None'`, `'TRC'`, `'Inport'`, or `'Both'`
	Numeric value (0 or 1)
	`'None'`, `'TRC'`, `'Inport'`, or `'Both'`
		Event Triggered TX Page (RTILINMM MainSetup) on page 88

`configdata.<FrameName>.<AssociatedFrameName>.rxeventtriggered.source`
`configdata.<FrameName>.<AssociatedFrameName>.rxeventtriggered.default`
`configdata.<FrameName>.<AssociatedFrameName>.rxeventtriggered.logic`
	`'None'`, `'TRC'`, `'Inport'`, or `'Both'`
	`'Enable'` or `'Disable'`
	`'AND'`, `'OR'`, or `'-'`
		Event Triggered RX Page (RTILINMM MainSetup) on page 92

`configdata.<FrameName>.collisionresolver.schedulename`	String for collision resolver	Collision Resolver Page (RTILINMM MainSetup) on page 96

Variable Name	Variable Type	Corresponding Page of the RTILINMM MainSetup Block

`configdata.<FrameName>.FRAMEEnable.Source`
`configdata.<FrameName>.FRAMEEnable.Logic`
`configdata.<FrameName>.FRAMEEnable.Default`
	`'None'`, `'TRC'`, `'Inport'`, or `'Both'`
	`'AND'`, `'OR'`, or `'-'`
	`'Enable'`, `'Disable'`, or `'-'`
		Enable Frames Page (RTILINMM MainSetup) on page 99

`configdata.<FrameName>.TXRAWData.active`
`configdata.<FrameName>.TXRAWData.Source`
`configdata.<FrameName>.TXRAWData.default`
	`'Active'` or `'Inactive'`
	`'Inport'` or `'TRC'`
	`'Raw Data'`, or `'Signals'`
		TX Raw Data Page (RTILINMM MainSetup) on page 107

`configdata.<FrameName>.framelength.AdjustOption`
`configdata.<FrameName>.framelength.Default`
`configdata.settings.framelength.dynamic`
	`'TRC'`, `'Inport'`, or `'None'`
	Numeric value ≥ 0
	Numeric value (0 or 1)
		Frame Length Page (RTILINMM MainSetup) on page 114

`configdata.<FrameName>.framedefault.value`	String for default value (e.g., '0x1234')	Frame Defaults Page (RTILINMM MainSetup) on page 115
`configdata.<FrameName>.txframechecksum.countdown` `configdata.<FrameName>.txframechecksum.offset`	Numeric value ≥ 0 Numeric value ≥ 0	Dynamic LIN Frame Checksum Page (RTILINMM MainSetup) on page 120
`configdata.<FrameName>.<SignalName>.error`	`[]` for no error, or numeric value	Signal Errors Page (RTILINMM MainSetup) on page 132
`configdata.<FrameName>.<SignalName>.dynvalue.value` `configdata.<FrameName>.<SignalName>.dynvalue.countdown`	Numeric value Integer value ≥ 0	Dynamic Signal Defaults Page (RTILINMM MainSetup) on page 137
`configdata.<FrameName>.triggermapping.<SignalName>`	String for mapping structure	Mapping Page (RTILINMM MainSetup) on page 146

Note

- Incorrect naming of signals and frames in configuration files leads to errors when you load them. Use the correct variable types for the variables.
- Frames whose names begin with an underscore are ignored.

Related topics

References

RTILINMM MainSetup 35

Commands and Dialogs of RTILINMM MainSetup Block

Where to go from here

Information in this section

Settings Menu (RTILINMM MainSetup)

Purpose

To handle the settings of the RTILINMM MainSetup block.

Description

The RTILINMM MainSetup block stores its settings in a MAT file and/or an intermediate file. The **Settings** menu provides you with commands to work with both files:

- *MAT file*: Whenever you create an S-function for an RTILINMM MainSetup block, a MAT file containing the block's settings is also created. The MAT file contains the settings of the RTILINMM MainSetup block and also the settings relating to the database file specified for the RTILINMM MainSetup block. Whenever you open an RTILINMM MainSetup block again, its settings are automatically loaded from the MAT file.
- *Intermediate file*: If you close an RTILINMM MainSetup block without creating an S-function for it, an intermediate file is created. This contains the settings of the RTILINMM MainSetup block and also the settings relating to the database file specified for the RTILINMM MainSetup block, but normally it does not correspond to the S-function generated for the block.

Menu commands

Load settings Lets you load the settings for the current RTILINMM MainSetup block. Specify the MAT file with the desired settings. Note that the structure of the dialog tree is not updated. Because all parameters on hidden dialog pages are set to their default values, you are recommended to display the maximum tree before loading the settings. Alternatively, you can load a specified dialog tree structure. To do so, use the **Load tree** command from the context

menu of the dialog tree (refer to Commands of the Dialog Tree (RTILINMM MainSetup) on page 48).

Save settings Lets you save the settings of the RTILINMM MainSetup block to a MAT file.

Load current Tabsettings Lets you load the settings for the current page in the RTILINMM MainSetup block. Specify the MAT file with the desired settings.

Save current Tabsettings Lets you save the settings of the current page in the RTILINMM MainSetup block to a MAT file.

Reset current Tab to defaults Lets you reset the current page settings to the default.

Reset to default settings Lets you reset the RTILINMM MainSetup block settings to the default.

Undo settings Lets you undo the most recent changes to the settings of the current RTILINMM MainSetup block. All settings since the last Close, Apply, or Create are undone.

Undo intermediate settings Lets you delete the intermediate file, and load the settings of the MAT file. This ensures that the settings correspond to the S-function generated for the block.

OK Lets you apply the changes in the dialog as intermediate settings and close the dialog. You can also click the OK button of the dialog.

Apply Lets you apply the changes in the dialog as intermediate settings. You can also click the Apply button of the dialog.

Cancel Lets you close the dialog without applying the changes in the dialog. You can also click the Cancel button of the dialog.

Create Lets you create the S-function for the RTILINMM MainSetup block.

Tip

Some pages do not enable the Create button of the dialog when you change their properties. Your changes are stored internally and activated in the next create process. If you want to apply your changes immediately, select Create in the settings menu, or right-click the Create button and select Force "Create".

Related topics

References

RTILINMM MainSetup 35

Options Menu (RTILINMM MainSetup)

Purpose

To create the whole MainSetup block.

Description

Some pages do not enable **Create** when you change their properties. This applies to all the settings that do not directly affect the generated code. Your changes are stored internally and activated in the next create process. If you want to apply your changes immediately, select **Force "Create"**, or right-click the **Create** button and select **Force "Create"**.

Menu commands

Force "Create" Lets you create the whole MainSetup block immediately.

Related topics

References

RTILINMM MainSetup.....35

Commands of the Dialog Tree (RTILINMM MainSetup)

Purpose

To setup a user-specific dialog tree of the RTILINMM MainSetup block.

The commands are available only if you work with the user-specific configuration view setting (see Tree Views Page (RTILINMM MainSetup) on page 56).

Description

The dialog settings are structured on several dialog pages and can be accessed via the dialog tree on the left of the dialog. To improve handling, you can hide dialog pages from the dialog tree or create your own structure of dialog pages.

When adding dialog pages to the dialog tree, you can choose between **User pages** and **RTILINMM pages**. The RTILINMM pages contain the actual configuration settings, while user pages let you group the RTILINMM pages to achieve the desired structure.

It is also possible to load preconfigured dialog trees, such as the minimum tree or maximum tree.

Note

If new features are available for the RTILINMM MainSetup block, they are added automatically only to the maximum tree. You are recommended to use the maximum tree for this reason.

The structure documented in this reference is that of the maximum tree.

Context menu

Delete page Lets you remove the selected dialog page from the dialog tree.

Note

All the settings in the deleted dialog page are reset to their default values.

Add page on current level Lets you place a dialog page on the same level as the selected page. The new dialog page is inserted above the selected one.

- Add user page Lets you add a dialog page which is not part of the standard RTI LIN MultiMessage blockset.
- Add RTILINMM page Lets you select an RTILINMM dialog page from the list of available dialog pages, i.e., the maximum tree. You can only add RTILINMM dialog pages that are not already contained in the dialog tree.

Add page below current level Lets you place a dialog page below the level of the selected page.

- Add user page Lets you add a dialog page which is not part of the standard RTI LIN MultiMessage blockset.
- Add RTILINMM page Lets you select an RTILINMM dialog page from the list of available dialog pages, i.e., the maximum tree. You can only add RTILINMM dialog pages that are not already contained in the dialog tree.

Move selected page Lets you modify the structure of the dialog tree. If a certain move is not possible for the selected dialog page, it is ignored.

- Up/Down Lets you move the selected dialog page vertically in the dialog tree.
- Level up/Level down Lets you move the selected dialog page horizontally in the dialog tree.

Preconfigured trees Lets you select one of the preconfigured dialog trees:

- Minimum tree Provides you with the dialog pages that are absolutely essential for configuring the Communication Block.
- Maximum tree Provides you with all the available dialog pages.

User defined trees Lets you select a user defined tree.

Direct Link Lets you directly select a page located anywhere in the dialog tree. The Direct Link menu structure always corresponds to the maximum tree.

Load tree Lets you load a previously saved structure of the dialog tree from a MAT file.

Save tree Lets you save the current structure of the dialog tree to a MAT file.

Buttons

Expand All Lets you expand all the nodes of the dialog tree.

Collapse All Lets you collapse all the nodes of the dialog tree.

Load Lets you load the settings for the current RTILINMM MainSetup block. Specify the MAT file with the desired settings.

Save Lets you save the settings of the RTILINMM MainSetup block to a MAT file.

Related topics

HowTos

How to Create a Model Using the RTI LIN MultiMessage Blockset..... 19

References

RTILINMM MainSetup..... 35
Tree Views Page (RTILINMM MainSetup)..... 56

Filter Dialog (RTILINMM MainSetup)

Access

This dialog appears if you click **Filter** in the context menu of several pages.

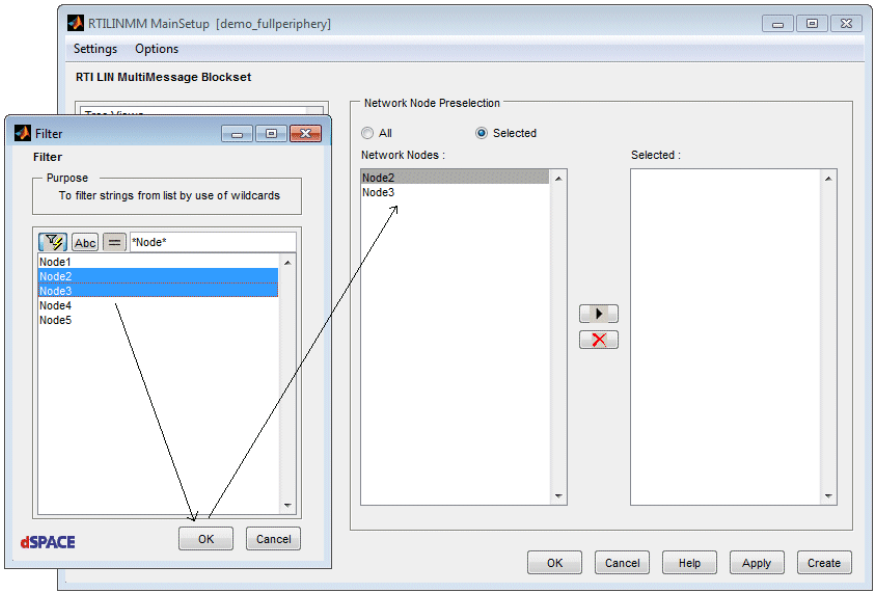
Purpose

To filter and select signals.

Description

This dialog lists the signals of all TX frames.

- *Filtering signals*: You can perform a wildcard search in the list via filter buttons. Enter the search string in the dialog's edit field. You can also enter * as a wildcard. Press the **Enter** key to apply the wildcard filter setting.
- *Selecting signals*: You can select any signals from the (filtered) list. When you click **OK**, your signal selection is transferred to the list on the page on which you clicked the **Filter** button.



Dialog settings

Filter buttons Let you specify the wildcard filter:

State	Description
	The wildcard filter is not active.
	The wildcard filter is active.
Abc	The wildcard filter is case-sensitive.
ABC	The wildcard filter is case-insensitive.
=	Search results contain the specified wildcard string.
≠	Search results do not contain the specified wildcard string.

OK Transfers the selected signals to the list on the page on which you clicked Filter.

Related topics

References

RTILINMM MainSetup.....35

Pages of RTILINMM MainSetup Block

Where to go from here

Information in this section

Tree Views Page (RTILINMM MainSetup)

Access

Located at the top level of the dialog tree.

Purpose

To select the dialog pages for working with the RTILINMM MainSetup block.

Description

On the Tree Views page, you can select dialog pages to display in the dialog tree. All the parameters on the hidden dialog pages are set to the default values. You can use predefined selections of dialog pages (Filter Configuration View by Feature option) or work with your own selection of dialog pages (User Specific Configuration View Setting option).

Note

- If a dialog page is hidden, all its parameters are set to their default values.
- Earlier RTI LIN MultiMessage Blockset versions provided fewer dialog pages than the current blockset version. If a MainSetup block created with an earlier RTI LIN MultiMessage Blockset version is opened with the current blockset version, only the dialog pages provided by the earlier blockset version are displayed. To display the new dialog pages as well, you must either specify to use the preconfigured maximum tree providing all the available dialog pages via the dialog tree's context menu, or expand the selection of dialog pages using the User Specific Configuration View Setting option.

Dialog settings

Filter Configuration View by Feature Lets you select the dialog pages necessary for your implementation. The dialog pages are grouped depending on implementation features, for example, the interface you want to use. By default all the features are deselected and the minimum tree is displayed. You can select one or more options depending on your use case. For information on which pages are displayed in the interfaces, refer to Dialog Tree (RTILINMM MainSetup) on page 39.

Feature	Description
Instrumentation & Automation Interface	The dialog tree contains all the dialog pages which are necessary to set up a LIN communication for an instrumentation and automation interface. In this case the RX and TX frames are accessed via the TRC file. This is the fastest method to build the real-time application. It should therefore be used in large real-time application, for example, applications for hardware-in-the-loop simulation.

Feature	Description
Model Interface	The dialog tree contains all the dialog pages which are necessary to set up a LIN communication for a model interface. All the frames can be accessed in the Simulink model. The RX frames are available at an outport of the RTILINMM MainSetup block. The TX frames can be read by an inport of the RTILINMM MainSetup block. You should use the Mapping to RTILINMM Block to map the inports of the block.
Manipulation Interface	The dialog tree contains all the dialog pages which are necessary to manipulate RX and TX frames.
Extras	The dialog tree contains all the rest dialog pages.

Note

If you change the filter settings, the parameter of the removed pages are set to their default values.

User Specific Configuration View Setting Lets you set your own dialog tree. You can add or delete dialog pages using the context menu of the dialog tree. Additionally you can save or load your selection of dialog pages. Refer to Commands of the Dialog Tree (RTILINMM MainSetup) on page 48.

Related topics

Basics

Dialog Tree (RTILINMM MainSetup)..... 39

References

Commands of the Dialog Tree (RTILINMM MainSetup)..... 48
Mapping to RTILINMM Block..... 149
RTILINMM MainSetup..... 35

General Settings Page (RTILINMM MainSetup)

Access

Located on the top level of the dialog tree.

Purpose

To specify a database file and select the LIN controller variation for which you want to set up LIN communication.

LDF/DBC file as the database

You can use an LDF or DBC file as the database for an RTILINMM MainSetup block.

- *LDF/DBC file parser and LDF/DBC file attributes*: The RTI LIN MultiMessage Blockset provides an LDF/DBC file parser that allows you to specify a DBC file or LDF file as the database. The DBC file format was developed by Vector Informatik GmbH, Stuttgart, Germany. As the DBC format was developed for CAN, it cannot specify a LIN master. If a LIN master should be simulated, you must use the LDF format.
- *Consistency check for LDF/DBC files*: The RTI LIN MultiMessage Blockset's LDF/DBC file parser automatically performs a consistency check on the LDF/DBC file you specify.
- *Unsupported features of DBC file*: Some features of the DBC file are not supported by LIN, for example, Motorola signals. Frames using unsupported features may be omitted.

FIBEX file as the database

The Field Bus Exchange (FIBEX) format is an XML exchange file format developed by ASAM e. V. It is used for data exchange between different tools that work with message-oriented bus communication.

- *FIBEX file parser*: The RTI LIN MultiMessage Blockset provides a FIBEX file parser that allows you to specify a FIBEX file as the database. Since a FIBEX file usually describes more than one bus system, you have to select one of the available bus systems if you use a FIBEX file as the database.
- *Consistency check for FIBEX files*: The RTI LIN MultiMessage Blockset's FIBEX file parser automatically performs a consistency check on the FIBEX file you specify. A LOG file is generated which provides information on the bus systems defined in the FIBEX file. Errors, warnings and general information on the messages and signals specified in the bus systems are displayed.

The RTI LIN MultiMessage Blockset supports FIBEX 3.1, FIBEX 4.1, FIBEX 4.1.1, and FIBEX 4.1.2 files.

AUTOSAR system description file as the database

You can use an AUTOSAR system description file as the database for an RTILINMM MainSetup block.

AUTOSAR system description files are files of AUTOSAR XML file type that describe a system according to AUTOSAR. A system is a combination of a hardware topology, a software architecture, a network communication, and information on the mappings between these elements. AUTOSAR system description files are instances of the AUTOSAR System Template. The AUTOSAR System Template contains a description of the network communication and hardware topology according to the FIBEX standard defined by ASAM e.V.

The RTI LIN MultiMessage Blockset supports the AUTOSAR System Template based on AUTOSAR Release 3.1.4, 3.2.1, 3.2.2, 4.0.3, 4.1.1, 4.1.2, 4.2.1, 4.2.2, 4.3.0, 4.3.1, and 4.4.0, and AUTOSAR Classic Platform Release R19-11 and R20-11.

- *AUTOSAR XML file parser*: The RTI LIN MultiMessage Blockset provides an AUTOSAR XML file parser that allows you to import an AUTOSAR system

description file as the database. Since an AUTOSAR system description file usually describes more than one bus system, you have to select one of the available bus systems if you use an AUTOSAR system description file as the database.

- *Consistency check for AUTOSAR system description files*: The RTI LIN MultiMessage Blockset's AUTOSAR XML file parser automatically performs a consistency check on the AUTOSAR system description file you specify.

You can also import a single AUTOSAR ECU Extract as the database. An AUTOSAR ECU Extract is the extract of a system description that contains information about signals and messages concerning a single ECU.

MAT file as the database

You can use a MAT file generated by the M-script as the database for an RTILINMM MainSetup block.

- *Using other database file formats via MAT file*: You can also specify other database file formats as the database via the MAT file format. You must convert your specific database files into the MAT file format for this purpose. The MAT file structure must be like this:

Structure	Type	Description
databasedata.		
Master	String	Node name of the master node
Baudrate	Integer	Baud rate
Schedule(scheduleIdx).		
Name	String	Schedule name
ScheduleEntry.		
FrameName	String	Name of a frame in the schedule
DelayTime	Double	Delay time in the schedule
FrameID	Integer	Frame ID in the schedule
Size	Integer	Size of the frame
Node(nodeIdx).		
NodeName	String	Node name
NodeType	String	Node type: 'MASTER' or 'SLAVE'
NodeProtocol	String	Node protocol: '1.3', '2.0', '2.1' etc.
NodeNAD	UInt8	Node address (NAD)
NodeInitialNAD	UInt8	For LIN 2.1 or later: initial node address (optional)
NodeSupplierID	UInt16	Supplier ID of the node
NodeFunctionID	UInt16	Function ID of the node
NodeVariantID	UInt8	Variant ID of the node
ConfigurableFrames(ConfigurableFrameIDx).		
FrameName	String	Name of the configurable frame of the node (LIN 2.0 and later)
MessageID	UInt16	Mandatory for LIN 2.0 frames only ID that is required to set the protected identifier (PID) of LIN 2.0 frames
Frame(frameIdx).		
Name	String	Frame name
FrameID	Integer	Frame ID
Size	Integer	Size of the frame
Sender	{String}	Node which sends the frame
Receiver	{String, String, ...}	Nodes which receive the frame
ChecksumType	String	Checksum type: 'ENHANCED' for LIN 2.0 or 'CLASSIC' for LIN 1.3
Signal(signalIdx).		
StartBit	Integer	Start bit for the signal
Name	String	Name of the signal
Receiver	{String}	Frame which receives the signal
InitValue	Double	Initial value of the signal
Length	Integer	Length of the signal
SgnDataType	String	Signal data type

Structure	Type	Description
		All standard C data types are supported (in upper cases): 'DOUBLE', 'UINT32', 'UINT16', 'UINT8', 'INT32,' 'INT16', 'INT8', 'BOOLEAN'
BitLayout	Array	Array of occupied bits (e.g., [0 1 2 3])
DataType	String	Data type ('unsigned integer' or 'signed integer')
ValueNamePairs	[]	Structure of value/name pair, must exist
ValueNamePairs(idx).		
Value	Integer	Current value, use it only for logic values
Name	String	Name of current value
EncodingTypes.		
Scale	Double	Scale value
Offset	Double	Offset value
Min	Integer	Minimum value of raw data `Min = 0 · Scale + Offset`
Max	Integer	Maximum value of raw data `Max = (2^Bits-1) · Scale + Offset`
MinPhy	Double	Minimum physical value `MinPhy = AbsMin · Scale + Offset`
MaxPhy	Double	Maximum physical value `MaxPhy = AbsMax · Scale + Offset`
AbsMin	Double	Absolutely minimum value (raw data) of signal (AbsMin must not be negative)
AbsMax	Double	Absolutely maximum value (raw data) of signal
EventFrames(eventFrameIdx).		
EventFrameName	String	Event-triggered frame name
EventFrameID	Integer	Event-triggered frame ID in the schedule
Size	Integer	Size of the event-triggered frame
Sender	{String, String, ...}	Nodes which can send their frame responses in the frame slot of the event-triggered frame
Receiver	{String, String, ...}	Nodes which receive the frame
ChecksumType	String	Checksum type: 'ENHANCED' (no other checksum type allowed)
FrameNames	{String, String, ...}	List of frame responses which are sent via the frame slot of the event-triggered frame
CollisionResolver	String	Name of collision resolver schedule which is used to solve collisions

LIN communication variants

Working with different LIN communication variants on one LIN controller allows you to use the same LIN controller in different LIN buses, and to easily switch between the buses and their respective communication variants.

To work with different LIN communication variants, you have to implement them in the model.

- The RTILINMM ControllerSetup block of the RTI LIN MultiMessage Blockset provides a Variation inport. You can specify a LIN communication variant via this inport. A corresponding entry in the TRC file generated for the model allows you to switch the variant during run time.
- You have to specify the LIN communication for each variant in a separate MainSetup block. On this page, you specify the corresponding Variation index.

Dialog settings

LIN name Lets you specify the name of the LIN bus. Each LIN bus name can be used only once in an RTI model. If you work with a real-time application of a dSPACE multiprocessor (MP) or multicore (MC) system, the LIN bus name must be unique in the whole application. The length of the LIN bus name is limited to 20 characters.

Select the ControllerSetup block Lets you select the ControllerSetup block for which you want to set up LIN communication.

Variation index Lets you specify the LIN controller variation for which you want to set up LIN communication. Range: 1 … 20.

The RTILINMM MainSetup block that corresponds to the selected RTILINMM ControllerSetup block and the selected variation is currently active. You can specify the LIN controller variation during run time via the Variation inport of the RTILINMM ControllerSetup block.

Database Lets you specify an LDF file, DBC file, FIBEX file, AUTOSAR system description file, or MAT file as the database.

Use relative path Lets you set the folder relative to the model root folder or as an absolute path.

Tip

Using a relative path allows you to easily move the model and all the files belonging to it to another location on your file system without having to change any path settings.

Show Check Report Lets you view a report (HTML file) containing warnings and errors on the selected database file.

- Errors indicate, for example, overlapping signals, or frames without signals.
- Warnings indicate, for example, that the database file contains the same value for the minimum and maximum values of a signal.
- Information indicates, for example, if the default delay between two schedule entries is too short.

Note

Frames containing errors will be ignored by the RTI LIN MultiMessage Blockset.

Update Lets you update the settings of the RTILINMM MainSetup block according to the database file used.

Note

Settings of pages that are changed manually and applied using the **Set** button on the pages are not updated automatically during a database update.

Cluster (Not enabled if a MAT file is specified as the database) Lets you select the relevant bus for the RTILINMM MainSetup block. Since a database file can contain several buses, you have to specify which bus is relevant for the block.

Related topics

Basics

Limitations of RTI LIN MultiMessage Blockset 162
Mapping Implicitly Generated Signals 154

References

RTILINMM MainSetup 35

File Settings Page (RTILINMM MainSetup)

Access

Located on the top level of the dialog tree.

Purpose

This page is obsolete. The settings located on this page in earlier RTI LIN MultiMessage Blockset versions are now available on the General Settings Page (RTILINMM MainSetup) on page 57.

Dialog settings

None.

Naming Options Page (RTILINMM MainSetup)

Access

Located on the top level of the dialog tree.

Dialog pages

You can specify naming options on the following pages:

- Naming Page (RTILINMM MainSetup) on page 64
- Naming Mapping Page (RTILINMM MainSetup) on page 65

Related topics

References

RTILINMM MainSetup.....35

Naming Page (RTILINMM MainSetup)

Access

Located in Naming Options Page (RTILINMM MainSetup) on page 64.

Purpose

To specify the naming of TRC file attributes.

Description

You can influence how dynamic attributes of your model such as frame names and signal names are named in the generated variable description (TRC) file.

You can also use macros to name these attributes. In this case, these macros are replaced by their actual values during the generation of the TRC file. The following macros are available depending on the selected attribute:

Macro	Description
`%Controller`	Controller name
`%LIN`	LIN bus name
`%NODE`	Node name
`%ReceiveNODE`	Receive node name
`%FRAME`	Frame name
`%FrameID`	Frame ID
`%FrameDesc`	Frame description

Note

You cannot use macros for some names such as the name of the LIN bus.

For further information on working with generated TRC variables, refer to Functions with Activated TRC Variable Generation on page 157.

Dialog settings

Function naming list Lists the various functions with their names.

Name Lets you edit the name of the function selected from the Function naming list.

Description Lets you edit a description for the function selected from the Function naming list.

Set Lets you assign the specified name and description to the function selected from the Function naming list.

Macros Lets you open a list of the macros that you can use for the function selected from the function naming list.

Related topics

Basics

Functions with Activated TRC Variable Generation 157

References

RTILINMM MainSetup 35

Naming Mapping Page (RTILINMM MainSetup)

Access

Located in Naming Options Page (RTILINMM MainSetup) on page 64.

Purpose

To specify the naming of specific strings in TRC files.

Description

The Naming Page (RTILINMM MainSetup) allows you to influence how dynamic attributes of your model such as frame names and signal names are named in the generated variable description (TRC) file.

The Naming Mapping page allows you to rename specific strings before the TRC file is generated. The settings of this page are applied *after* the settings of the Naming Page (RTILINMM MainSetup).

Dialog settings

String to replace Lets you enter a string to be renamed.

New string Lets you enter the new name of the attribute.

Macro Lets you select one of the following:

Macro	Description
`all`	Replaces the entire String to replace with the New string
`%Controller`	Replaces the controller name
`%LIN`	Replaces the LIN name
`%NODE`	Replaces the node name
`%ReceiveNODE`	Replaces the receive node name
`%FRAME`	Replaces the frame name
`%FrameID`	Replaces the frame ID
`%FrameDesc`	Replaces the frame description
`%SigName`	Replaces the signal name
`%SignalDesc`	Replaces the signal description
`%delete%`	Deletes the entire String to replace

Set Lets you add the string to the list of Strings to be replaced.

Delete Lets you delete the string selected from the list of Strings to be replaced.

Strings to be replaced Displays all the available mapping items. You can sort the items by String to replace, New string or Macro via context menu.

Related topics

References

RTILINMM MainSetup..... 35

Network Nodes Page (RTILINMM MainSetup)

Access

Located on the top level of the dialog tree.

Dialog pages

You can specify nodes on the following pages:

- Network Node Preselection Page (RTILINMM MainSetup) on page 67
- Master Selection Page (RTILINMM MainSetup) on page 68

- Network Node Configuration Page (RTILINMM MainSetup) on page 70
- Network Node Interfaces Page (RTILINMM MainSetup) on page 79

Related topics

References

RTILINMM MainSetup 35

Network Node Preselection Page (RTILINMM MainSetup)

Access

Located in Network Nodes Page (RTILINMM MainSetup) on page 66.

Purpose

To specify a selection of nodes for use with the context menu.

Description

Several pages of the RTILINMM MainSetup block provide context menus that let you specify node- or frame-specific settings according to the nodes that are selected on this page. With several node-specific pages, the following context menu is available:

- Select according to Selected Network Nodes

With several frame-specific pages, the following context menus are available:

- Choose frames received from selected Node(s)
- Choose frames not received from selected Node(s)
- Choose frames transmitted from selected Node(s)
- Choose frames not transmitted from selected Node(s)

Example The TX Frames Page (RTILINMM MainSetup) on page 86 lets you specify frames as TX frames according to the selected node(s) they are received from etc.

The settings on this page have no direct effects on the model or simulation.

Dialog settings

All Lets you select all the displayed nodes.

Selected Lets you select a set of the displayed nodes. You can select the nodes in the **Network Nodes** list and select them using . You can deselect the nodes using  .

Network Nodes Displays all the nodes that are available in the database file. You can filter the nodes by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected Displays the selection of nodes that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup.....35

Master Selection Page (RTILINMM MainSetup)

Access

Located in Network Nodes Page (RTILINMM MainSetup) on page 66.

Purpose

To specify the master of the LIN communication bus.

Description

You can specify the LIN master node on this page. Normally, the master node is specified in the LDF file. The LIN master is only simulated by the RTI LIN MultiMessage Blockset if a node is specified as master node.

Dialog settings

No master Indicates that the LIN communication setup is only slave-based. The master is represented by different hardware connected to the dSPACE system.

Selected Indicates that the master node is simulated by the dSPACE system. Select the master node in the selection box.

Default schedule table Lets you select the schedule for starting LIN communication if you simulate a master node with the dSPACE system.

Schedule table source Lets you select the source to switch online between different schedule tables. The following values are possible.

Value	Description
TRC	The schedule tables can be changed via the TRC.
INPORT	The schedule tables can be changed via inport in the model.

Schedule table status Lets you specify where you can watch the status of the schedule table. The status shows the frame slot ID of the current schedule table, i.e., the current schedule position. The following values are possible.

Value	Description
NONE	Status is not watched.
TRC	Status is watched via the TRC.
OUTPORT	Status is watched via outport in the model.
BOTH	Status is watched via TRC and outport in the model.

Schedule breakable Lets you specify the schedule as breakable. A breakable schedule means that a currently running schedule is interruptable. This allows you to switch the active schedule to another schedule during run time. If you select YES, the schedule is interrupted after the currently executed schedule task has finished, i.e., the schedule task is switched after the current frame is sent. If you select NO, the schedule is not terminated until the last schedule task is executed.

Note

If you want to perform direct frame header transmission, you should work with breakable schedules.

Direct Header send Lets you allow the LIN master to directly transmit a frame header from a simulation model without the need for a schedule.

If the direct header send option is enabled, the Frame ID and Frame Kickout block inports are mapped to the TX Data inport of the RTILINMM MainSetup block. The frame ID specifies the LIN frame ID that is sent using the direct header send functionality. It must be in the range 0 ... 63, otherwise no frame is sent. The kickout value is used to trigger the sending of the LIN header frame.

Note

To perform direct frame header transmission, there must be no active schedule. Otherwise enabling the direct header send option might have no effect. For example, if you work with a nonbreakable schedule and the schedule has not finished when the sending of the LIN header frame is triggered, the active schedule runs to the end, and the triggered LIN header frame is not sent.

To ensure that direct frame header transmission is performed, Schedule0 (No schedule) must be set as the current schedule. You can switch to Schedule0 via TRC or inport.

Related topics

References

RTILINMM MainSetup.....35

Network Node Configuration Page (RTILINMM MainSetup)

Access

Located in Network Nodes Page (RTILINMM MainSetup) on page 66.

Dialog pages

You can select nodes for node configuration, specify their node identification and assign IDs to configurable frames on the following pages:

- Network Node Selection Page (RTILINMM MainSetup) on page 70
- Network Node Identification Page (RTILINMM MainSetup) on page 73
- Frame ID Assignment Page (RTILINMM MainSetup) on page 76

Related topics

References

Network Node Selection Page (RTILINMM MainSetup)

Access

Located in Network Node Configuration Page (RTILINMM MainSetup) on page 70.

Purpose

To select slave nodes for node configuration simulation via RTILINMM.

Description

The RTI LIN MultiMessage Blockset allows you to simulate slave node configuration. Refer to Basics on Network Node Configuration on page 15. For example, you can change initial parameters defined in the database file to simulate unconfigured or preconfigured slave nodes.

On this page, you can select the slave nodes for which node configuration simulation via RTILINMM is to be enabled. You can specify node configuration parameters used for node identification purposes (LIN product identification, initial node address and serial number) for the selected slave nodes on the Network Node Identification Page (RTILINMM MainSetup) on page 73.

The maximum number of LIN slave nodes whose configuration can be simulated in one RTILINMM configuration depends on the platform:

Platform	Maximum Number of LIN Nodes
DS1006-/DS1007-based system with a DS4330	63
MicroAutoBox II	15
SCALEXIO system	63

For slave nodes that are selected for node configuration simulation via RTILINMM, the real-time simulation automatically reacts to master request frames to change the node configuration.

Note

Node configuration was introduced with LIN specification 2.0, so you can only select slave nodes of LIN 2.0 and later or of J2602.

The slave nodes that are selected for node configuration simulation on this page can still be configured outside of RTILINMM in the Simulink model. This is useful, for example, if the slave node has to react to node configuration services that are not supported by RTILINMM (see Basics on Network Node Configuration on page 15).

Note

If a slave node is selected on this page and also configured (externally or via RTILINMM) to react to node configuration services supported by RTILINMM, the slave response frame sent by RTILINMM has the higher priority.

Example: A slave node is selected for node configuration simulation via RTILINMM. If a master request frame for a service supported by RTILINMM (for example, assign NAD) is transmitted on the bus, the data specified by RTILINMM is used to check if the slave node is addressed in the master request frame. If it is, the new NAD is assigned to the slave node and RTILINMM transmits the positive frame response on the bus.

Interactions between slave node configuration defined by RTILINMM and other RTILINMM-specific settings Using RTILINMM, you can only define initial parameters for the slave node configuration. You cannot change the slave node configuration during run time. This can only be done by the master node, that is, by transmitting master request frames on the LIN bus. However, settings of other RTILINMM MainSetup pages might influence the slave node configuration during run time:

- If the addressed slave node is disabled via settings of the Network Node Enable Page (RTILINMM MainSetup) on page 79, the node is not configured and no slave response frame is sent.

- If slave response frames of the addressed slave node are disabled via settings of the Enable Frames Page (RTILINMM MainSetup) on page 99, the slave node configuration is changed but no slave response frame is sent. The information in the slave response frame is lost.

Dialog settings

Declare external/simulated Network Nodes Lets you select slave nodes for node configuration simulation via RTILINMM. All slave nodes defined in the specified database file and compliant with LIN 2.0 and later or with J2602 are displayed. The following commands are available via context menu:

- Select according to selected Network Nodes
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Select according to selected Network Nodes (Available via context menu) Lets you select the nodes that are selected on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Simulation Type Lets you specify the source for defining the initial parameters of the node configuration of the selected node(s).

Value	Description
Simulated	Simulation of slave node configuration via RTILINMM is enabled for the selected node(s). The initial parameters of the node configuration can be set via the RTILINMM MainSetup block.
Non-relevant	The real-time simulation generated by RTILINMM does not react to node configuration requests in any way for the selected node(s). The node configuration of the selected node(s) cannot be set by RTILINMM. The node configuration can only be modified outside of RTILINMM.

Set Lets you assign the settings to the selected node(s).

Related topics

Basics

Basics on Network Node Configuration 15

References

RTILINMM MainSetup 35

Network Node Identification Page (RTILINMM MainSetup)

Access

Located in Network Node Configuration Page (RTILINMM MainSetup) on page 70.

Purpose

To specify initial node configuration parameters for slave nodes.

Precondition

One or more nodes must be specified as **simulated** on the Network Node Selection Page (RTILINMM MainSetup) on page 70.

The node configuration of nodes that are specified as **non-relevant** cannot be set by RTILINMM. The node configuration can only be modified outside of RTILINMM.

Description

Each slave node of a LIN bus must be uniquely identified. Each node compliant with LIN 2.0 and later or with J2602 provides a LIN product identification, a serial number, and a node address (NAD) for this purpose. For further information, refer to Basics on Network Node Configuration on page 15.

On this page, you can specify the initial node configuration parameters for the slave nodes selected for node configuration simulation via RTILINMM. Suitable parameter values are necessary for an external master to execute node configuration.

Defining initial parameters for slave node configuration using RTILINMM You can specify initial configuration parameter values for slave nodes selected for node configuration simulation via RTILINMM. For example, you can change the initial values specified in the database file to simulate unconfigured or preconfigured slave nodes. You cannot change the settings during run time. However, you can enable TRC file entries and/or outports to read out the current parameters of the node configuration during run time.

Note

When defining initial parameters of the node configuration, you must take some RTILINMM-specific aspects into account, refer to Network Node Selection Page (RTILINMM MainSetup) on page 70.

Dialog settings

Select simulated network node properties Lets you select node(s) to change their configuration. The following commands are available via context menu:

- Set all to database defaults
- Set selected to database defaults
- Select according to selected Network Nodes
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Set all to database defaults (Available via context menu) Lets you set all the list items to the values specified in the database file.

Set selected to database defaults (Available via context menu) Lets you set the selected list items to the values specified in the database file.

Select according to selected Network Nodes (Available via context menu) Lets you select the list items according to the nodes that are selected on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Node name Displays the node name that is specified in the database file for the selected node(s) (view-only).

Protocol version Displays the LIN protocol version that is specified in the database file for the selected node(s) (view-only). Only slave nodes of LIN 2.1 or later can be configured on this page.

Supplier ID Displays the supplier ID that is specified in the database file for the selected node(s) (view-only).

Function ID Displays the function ID that is specified in the database file for the selected node(s) (view-only).

Variant ID Displays the variant ID that is specified in the database file for the selected node(s) (view-only).

Initial NAD Lets you specify an initial NAD in the range 1 ... 126. The value can be specified in decimal or hexadecimal format. If you do not specify an initial NAD, the selected node is interpreted as an unconfigured slave node. During run time, the initial NAD can be overwritten by master *assign NAD* or *conditional change NAD* services.

Note

RTILINMM does not support a broadcast node address (127) as an initial NAD.

Serial no. Lets you specify a serial number. RTILINMM generates a default serial number for each slave node. You therefore only have to change the serial number if you do not want to use the default value. If you select several nodes, * is displayed. This allows you to change other options without changing this one.

TRC/Port Lets you generate a TRC file entry and/or an RX Data outport to read out the current NAD of the selected slave node(s).

Value	Description
NONE	Neither a TRC file entry nor an RX Data outport is generated for the selected node(s). If an outport already exists, its structure remains unchanged.
TRC	Generates a TRC file entry for each selected node. The path of the TRC file entry is `BusSystems/LIN/<Bus>/<Node>_CurrentNAD`. The entry lets you read out the current NAD during run time via ControlDesk. No RX Data outport is generated. If an outport already exists, its structure remains unchanged.
OUTPORT	Generates an RX Data outport for the selected node(s) if the outport does not yet exist. The entry lets you read out the current NAD via the model during run time. No TRC file entry is generated.
BOTH	Generates a TRC file entry and an RX Data outport for the selected node(s). The path of the TRC file entry is `BusSystems/LIN/<Bus>/<Node>_CurrentNAD`.
*	The current NAD interface of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Set Lets you assign the specified conditions to the selected node(s).

Note

After you have clicked Set for any node, a database update has no effect on the initial NAD settings for all the nodes displayed in the list (for database update, refer to General Settings Page (RTILINMM MainSetup) on page 57).

Related topics

Basics

Basics on Network Node Configuration 15

References

RTILINMM MainSetup 35

Frame ID Assignment Page (RTILINMM MainSetup)

Access

Located in Network Node Configuration Page (RTILINMM MainSetup) on page 70.

Purpose

To assign frame IDs to slave node frames compliant with LIN 2.0 and later or with J2602.

Precondition

One or more nodes must be specified as **simulated** on the Network Node Selection Page (RTILINMM MainSetup) on page 70.

Description

Each LIN frame provides a protected identifier (PID). The PID is part of the frame header and is used to assign the header to a frame response. The PID consists of a frame identifier (frame ID) and a parity. The frame ID is a 6-bit value in the range 0 ... 63. During node configuration, the PID of configurable frames can be changed, for example, to set a valid PID or disable it.

Successful node configuration requires that the frames of a slave can be identified uniquely before the master assigns the final PIDs. Message IDs are provided by the LIN 2.0 specification for this, i.e., message IDs are mandatory elements of the frames of LIN 2.0 or J2602 slaves. As of LIN 2.1, message IDs are obsolete. Slave frames compliant with LIN 2.1 or later do not contain message IDs. They are identified according to the order in which they are registered as configurable frames for a node in the LDF file.

RTILINMM supports the services of LIN 2.0, 2.1 and 2.2 and of J2602 to configure PIDs. You can specify an initial frame ID for frames compliant with LIN 2.0, 2.1 and 2.2 or with J2602 on this page. In addition, you can enable TRC file entries and/or outports to read out the current frame ID during run time. You cannot change the frame IDs of slave nodes directly during run time. This can only be done by master request frames that are transmitted to the slave node on the LIN bus.

Note

- A configured frame ID applies to TX frames only. RX frames are always decoded according to the frame ID specified in the database file.
- When defining initial parameters of the node configuration, you must take some RTILINMM-specific aspects into account, refer to Network Node Selection Page (RTILINMM MainSetup) on page 70.

Dialog settings

Select Frame properties of configurable frames Lets you select configurable frames to specify an initial frame ID and/or to enable an outport or a TRC file entry. The following commands are available via context menu:

- Set all to database defaults
- Set selected to database defaults
- Select according to selected Network Nodes
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Set all to database defaults (Available via context menu) Lets you set all the list items to the values specified in the database file.

Set selected to database defaults (Available via context menu) Lets you set the selected list items to the values specified in the database file.

Select according to selected Network Nodes (Available via context menu) Lets you select the list items according to the nodes that are selected on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Initial Frame ID Lets you select an initial frame ID.

Value	Description
Unconfigured	Lets you specify a frame ID of 0xFF for the selected frame(s). Since this value is not a valid frame ID the frames are unconfigured and not transmitted.
0 ... 63	Lets you assign an initial frame ID of 0 ... 63.
*	The frame ID of the selected frame(s) remains unchanged. This allows you to change other options without changing this one.

TRC/Port Lets you generate a TRC file entry and/or an RX Data outport to read out the current frame ID of the selected frame(s).

Value	Description
NONE	Neither a TRC file entry nor an RX Data outport is generated for the selected frame(s). If an outport already exists, its structure remains unchanged.
TRC	Generates a TRC file entry for each selected frame(s). The path of the TRC file entry is `BusSystems/LIN/<Controller>/<Frame>/RX/<Nodename>_CurrentID`. The entry lets you read out the current frame ID during run time via ControlDesk. No RX Data outport is generated. If an outport already exists, its structure remains unchanged.
OUTPORT	Generates an RX Data outport for the selected frame(s) if the outport does not yet exist. The entry lets you read out the current frame ID via the model during run time. No TRC file entry is generated.
BOTH	Generates a TRC file entry and an RX Data outport for the selected frame(s). The path of the TRC file entry is `BusSystems/LIN/<Controller>/<Frame>/RX/<Nodename>_CurrentID`.
*	The current NAD interface of the selected frame(s) remains unchanged. This allows you to change other options without changing this one.

Set Lets you assign the specified conditions to the selected frame(s).

Related topics

Basics

Basics on Network Node Configuration 15

References

RTILINMM MainSetup 35

Network Node Interfaces Page (RTILINMM MainSetup)

Access

Located in Network Nodes Page (RTILINMM MainSetup) on page 66.

Dialog pages

You can enable nodes and specify the sleep and wakeup behavior on the following page:

- Network Node Enable Page (RTILINMM MainSetup) on page 79
- Network Node Sleep Page (RTILINMM MainSetup) on page 81
- Network Node Wakeup Page (RTILINMM MainSetup) on page 83

Related topics

References

Network Node Enable Page (RTILINMM MainSetup)

Access

Located in Network Node Interfaces Page (RTILINMM MainSetup) on page 79.

Purpose

To specify the default status of the nodes for LIN communication.

Description

You can specify the

- Default status (whether a node is enabled or disabled when the real-time application starts)
- Source for enabling (whether the node is enabled via an inport and/or TRC variable)

If a node is disabled, it still receives RX frames and sends them but it does not send TX frames.

Dialog settings

Enable options Lists all the nodes and their settings. The following commands are available via context menu:

- Select according to selected Network Nodes
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Select according to selected Network Nodes (Available via context menu) Lets you select the list items according to the nodes that are selected on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Source Lets you select the source of the enable option.

Value	Description
NONE	Node cannot be disabled. In this case, you cannot specify a default status.
TRC	Node is enabled via TRC variable.
INPORT	Node is enabled via inport in the model.
BOTH	Node is enabled via TRC variable and/or inport in the model (see Logic parameter below).
*	The source value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Default Lets you select the default status of the TRC variable.

Value	Description
Enable	The TRC variable is enabled per default.
Disable	The TRC variable is disabled per default.
*	The default value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Logic Lets you select the logic for enabling when the Source parameter is BOTH.

Value	Description
AND	Node is enabled via TRC variable and inport in the model.
OR	Node is enabled via TRC variable or inport in the model.
*	The logic value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Set Lets you assign the specified conditions to the selected node(s).

Related topics

References

RTILINMM MainSetup 35

Network Node Sleep Page (RTILINMM MainSetup)

Access

Located in Network Node Interfaces Page (RTILINMM MainSetup) on page 79.

Purpose

To specify the sending of sleep commands.

Only the LIN master node can set a LIN bus to sleep mode. The LIN master ends the current schedule first and then sends the sleep request.

Dialog settings

Sleep options Lists all the nodes and their settings. The following commands are available via context menu:

- Select according to selected Network Nodes
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Select according to selected Network Nodes (Available via context menu) Lets you select the list items according to the nodes that are selected on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Source Lets you select the source of the signal that triggers the sleep event. Since only the LIN master node can set a LIN bus to sleep mode, the source value can be specified for the master node only.

Value	Description
NONE	The LIN master will not be able to send a sleep command.
TRC	The sending of a sleep command is triggered by a TRC variable. The trigger is invoked with a rising signal edge.
INPORT	The sending of a sleep command is triggered by an inport in the model. The trigger is invoked with a rising edge at the inport.
BOTH	The sending of a sleep command is triggered by a TRC variable and/or inport in the model (see Logic parameter below). The trigger is invoked with a rising edge.

Value	Description
*	The source value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Logic Lets you select the logic for setting to sleep mode when the Source parameter is BOTH.

Value	Description
AND	The sending of a sleep command is triggered by a TRC variable *and* an inport in the model.
OR	The sending of a sleep command is triggered by a TRC variable *or* an inport in the model.
*	The logic value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Sink Lets you select where you can watch the trigger for the sleep event.

Value	Description
NONE	Trigger is not watched.
TRC	Trigger is watched via the TRC variable.
OUTPORT	Trigger is watched via outport in the model.
BOTH	Trigger is watched via TRC variable and outport in the model.
*	The sink value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

The following values are available:

- 1 = Sleep command was received
- 2 = Bus timeout (no activity took place on the LIN bus for 4 seconds)
- 0 = No command

Set Lets you assign the specified conditions to the selected node(s).

Go to sleep without sending sleep command (master only) Lets you specify to set the transceiver to sleep mode without sending a sleep command.

- If the checkbox is selected, a separate input port for going to sleep without sending a sleep command is created. A rising edge at this inport causes the master to go to sleep.
- If the checkbox is not selected, the LIN master sends a sleep command and then goes to sleep itself.

Generate Bus State Output Port Lets you create a bus state output displaying the current status of the LIN bus. The bus state is output by an outport and a TRC variable. The following status information is available:

- 0 = Bus is sleeping
- 1 = Bus is awake

Related topics

References

Network Node Wakeup Page (RTILINMM MainSetup)

Access

Located in Network Node Interfaces Page (RTILINMM MainSetup) on page 79.

Purpose

To specify which nodes can send a wake-up frame. Each network node can transmit a wakeup pattern on the bus to wake up the other network nodes.

If a wake-up signal is received by the simulated LIN master node, the specified schedule is automatically started afterwards. The change of LIN bus state is displayed at the bus state outport if generation of the bus state output is activated on the Network Node Sleep Page (RTILINMM MainSetup) on page 81.

To prevent automatic schedule start, the model must be adapted to check the LIN bus state outport and to set the schedule table source (see Master Selection Page (RTILINMM MainSetup) on page 68) to 0 when the bus state outport indicates that the LIN bus is sleeping.

Dialog settings

Wake options Lists all the nodes and their settings. The following commands are available via context menu:

- Select according to selected Network Nodes
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Select according to selected Network Nodes (Available via context menu) Lets you select the list items according to the nodes that are selected on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Source Lets you select the source of the enable option.

Value	Description
NONE	Node cannot send a wake-up signal.
TRC	Sending of a wake-up frame is triggered by a TRC variable. The trigger is invoked with a rising signal edge.
INPORT	Sending of a wake-up frame is triggered by an inport in the model. The trigger is invoked with a rising edge at the inport.
BOTH	Sending of a wake-up frame is triggered by an TRC variable and/or inport in the model (see Logic parameter below). The trigger is invoked with a rising edge.
*	The source value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Logic Lets you select the logic for waking up when the Source parameter is BOTH.

Value	Description
AND	Sending of a wake-up frame is triggered by a TRC variable *and* an inport in the model.
OR	Sending of a wake-up frame is triggered by a TRC variable *or* an inport in the model.
*	The logic value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

Sink Lets you specify where you can watch if a wake-up request was received.

Value	Description
NONE	Event is not watched.
TRC	Event is watched via the TRC variable.
OUTPORT	Event is watched via outport in the model.
BOTH	Event is watched via TRC variable and outport in the model.
*	The sink value of the selected node(s) remains unchanged. This allows you to change other options without changing this one.

The following values are possible:

- 1 = A wake-up command was received in the previous model sample step.
- 0 = Other

Set Lets you assign the specified conditions to the selected node(s).

Related topics

References

Network Node Sleep Page (RTILINMM MainSetup)....81
RTILINMM MainSetup....35

Frames Page (RTILINMM MainSetup)

Access

Located on the top level of the dialog tree.

Dialog pages

You can specify frames on the following pages:

- Choose Frames Page (RTILINMM MainSetup) on page 85
- Capture Frames Page (RTILINMM MainSetup) on page 98
- Enable Frames Page (RTILINMM MainSetup) on page 99
- TX Timeout Enable Page (RTILINMM MainSetup) on page 100
- Frame Interfaces Page (RTILINMM MainSetup) on page 102
- Frame Manipulation Page (RTILINMM MainSetup) on page 114

Related topics

References

RTILINMM MainSetup....35

Choose Frames Page (RTILINMM MainSetup)

Access

Located in Frames Page (RTILINMM MainSetup) on page 85.

Dialog pages

You can choose the frames on the following page:

- TX Frames Page (RTILINMM MainSetup) on page 86
- RX Frames Page (RTILINMM MainSetup) on page 87

Related topics

Basics

Transmitting and Receiving LIN Frames (DS4330 Features 🕮)
Transmitting and Receiving LIN Frames (MicroAutoBox II Features 🕮)
Transmitting and Receiving LIN Frames (Model Interface Package for Simulink - Modeling Guide 🕮)

References

RTILINMM MainSetup....35

TX Frames Page (RTILINMM MainSetup)

Access

Located in Choose Frames Page (RTILINMM MainSetup) on page 85.

Purpose

To specify the frames to be transmitted by the LIN controller.

Description

The Available frames list of this page lists all the frames contained in the database file specified on the General Settings Page (RTILINMM MainSetup) on page 57. You can select any of these frames for transmission.

Dialog settings

All Lets you specify all the frames as TX frames.

None Lets you select none of the available frames for transmission.

Selected Lets you specify a set of the available frames for transmission. You can select the frames in the Frames list and select them using  . You can deselect the frames using .

Frames Displays all the frames that are available in the database file. You can filter the frames by their names for easier selection via context menu.

Selected Displays the selection of frames that is active if you select the Selected option. You can select specific frames via context menu:

- All
- None
- Choose the same frames as RX
- Choose frames not chosen as RX
- Choose frames received from selected node(s)
- Choose frames not received from selected node(s)
- Choose frames transmitted from selected node(s)
- Choose frames not transmitted from selected node(s)
- Choose frames not transmitted by any node
- Choose frames not received by any node

You can specify the *selected nodes* on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Related topics

Basics

Transmitting and Receiving LIN Frames (DS4330 Features 🕮)
Transmitting and Receiving LIN Frames (MicroAutoBox II Features 🕮)
Transmitting and Receiving LIN Frames (Model Interface Package for Simulink - Modeling Guide 🕮)

References

RTILINMM MainSetup..... 35

RX Frames Page (RTILINMM MainSetup)

Access

Located in Frames Page (RTILINMM MainSetup) on page 85.

Purpose

To specify the frames to be received by the LIN controller.

Description

The Available frames list of this page lists all the frames contained in the database file specified on the General Settings Page (RTILINMM MainSetup) on page 57. You can select any of these frames for reception.

Dialog settings

All Lets you specify all the frames as RX frames.

None (just loopback) Lets you specify that none of the available frames are received. Only loopback frames are received.

Selected Lets you specify a set of the available frames for reception. You can select the frames in the Frames list and select them using ▸. You can deselect the frames using ✕.

Frames: Displays all the frames that are available in the database file. You can filter the frames by their names for easier selection via context menu.

Selected: Displays the selection of frames that is active if you select the Selected option. You can select specific frames via context menu:

- All
- None
- Choose the same frames as TX
- Choose frames not chosen as TX
- Choose frames received from selected node(s)
- Choose frames not received from selected node(s)
- Choose frames transmitted from selected node(s)

- Choose frames not transmitted from selected node(s)
- Choose frames not received by any node
- Choose frames not transmitted by any node

You can specify the *selected nodes* on the Network Node Preselection Page (RTILINMM MainSetup) on page 67.

Related topics

Basics

Transmitting and Receiving LIN Frames (DS4330 Features 🕮)
Transmitting and Receiving LIN Frames (MicroAutoBox II Features 🕮)
Transmitting and Receiving LIN Frames (Model Interface Package for Simulink - Modeling Guide 🕮)

References

RTILINMM MainSetup....35

Eventtriggered Frames Page (RTILINMM MainSetup)

Access

Located in Choose Frames Page (RTILINMM MainSetup) on page 85.

Dialog pages

You can specify event-triggered frames on the following pages:

- Event Triggered TX Page (RTILINMM MainSetup) on page 88
- Event Triggered RX Page (RTILINMM MainSetup) on page 92
- Collision Resolver Page (RTILINMM MainSetup) on page 96

Related topics

References

RTILINMM MainSetup....35

Event Triggered TX Page (RTILINMM MainSetup)

Access

Located in Eventtriggered Frames Page (RTILINMM MainSetup) on page 88.

Purpose

To specify the event-triggered frames to be transmitted by the LIN controller.

Description

Unconditional frames and event-triggered frames LIN 2.0 or later or J2602 defines event-triggered frames for LIN communication. The following table shows the differences between standard LIN frames (unconditional frames) and event-triggered frames.

Unconditional Frame	Event-Triggered Frame
Frame header is assigned to one frame response	Frame header is assigned to several frame responses sent by different LIN nodes
One frame per frame slot	Several frames per frame slot possible
No collisions	Collisions possible
Cyclic transmission	Transmission according to a trigger event and if a node needs to transmit data
Frame response is always sent	Frame slot is empty if no node has to transmit data

In contrast to an unconditional frame, the frame header of an event-triggered frame is assigned to several frame responses of different LIN nodes. This allows you to transmit the frames of different nodes via the same frame slot. However, once transmitted via the bus, the data of an event-triggered frame can hardly be distinguished from the data of an unconditional frame.

Transmission of event-triggered frames A frame response assigned to a header of an event-triggered frame is transmitted only if data is updated. The data is updated if:

- New data is available since the last transmission of the frame response.
- A specific time has passed (cyclic update, for example, to confirm that a node is working accurately).

To support both update types, RTILINMM uses a port or TRC variable for triggering the transmission of event-triggered frame responses.

Collision of event-triggered frames Since several frame responses of different LIN nodes are assigned to one frame header, collisions can occur. If two or more nodes try to send their responses at the same time, a collision occurs because the nodes use the same frame slot for their responses. Frame collisions have to be resolved by the LIN master. The LIN standard 2.1 or later allows you to define collision resolver schedules for this purpose.

Tip

- If you work with LIN 2.1 or later, you can select collision resolver schedules defined in the database file on the Collision Resolver Page (RTILINMM MainSetup) on page 96.
- The **RX Data** outport provides an error bit to indicate collisions, refer to RX Error Ports Page (RTILINMM MainSetup) on page 111.

Sample time of data of an event-triggered frame The data of an event-triggered frame is sampled at the point of time when a trigger event occurs and not when a header is received. Since new headers can be received before a sampled event-triggered frame is transmitted via the bus, the data of this frame

might be obsolete. To avoid obsolete data on the bus, you can define trigger events more frequently.

Length of frame responses of an event-triggered frame According to the LIN standard, all the frame responses assigned to a frame header of an event-triggered frame must have the same length. However, when you work with RTILINMM, the lengths of the frame responses can differ. In this case, the length of the longest assigned frame response defined in the database is the default value. As an alternative, you can specify to use the frame length of the triggering frame as the default length via the **Get event triggered frame length from unconditional frame** checkbox.

Limitations for working with event-triggered frames in RTILINMM

- When you define event-triggered frames in RTILINMM, one unconditional frame response can only be assigned to exactly one event-triggered frame.
- Since data placed in an event-triggered frame cannot be directly mapped to individual signals (see also Event Triggered RX Page (RTILINMM MainSetup) on page 92), the following limitations apply:
  - You cannot specify timeout values (refer to TX Timeout Enable Page (RTILINMM MainSetup) on page 100).
  - You cannot assign user-defined checksum algorithms or enable dynamic checksums (refer to User Checksum Frames Page (RTILINMM MainSetup) on page 118).
  - You can change only frame-specific settings via the TRC file entries in ControlDesk but no signal-specific settings. Event-triggered frames can be displayed in ControlDesk's **Variables** controlbar, but they do not contain signals.

Note

Event-triggered frames are supported as of LIN 2.0 and by J2602. You therefore cannot use event-triggered frames with LIN 1.3. In this case, this page is empty.

Dialog settings

Select Trigger source for event triggered frames Lets you select event-triggered frames to define the triggering source for them. This list displays all the event-triggered frames you selected on the TX Frames Page (RTILINMM MainSetup) on page 86. In the **Frame Name** column, all the frame responses that are assigned to the event-triggered frames listed in the **Associated Frame** column are displayed. According to the specifications of this list, the frame responses are sampled to be transmitted as event-triggered frames via the bus. This list is disabled if **Use these options for all** is selected.

Tip

You can select multiple frames by pressing **Shift** or **Ctrl**.

The following commands are available via context menu:

- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Source Lets you specify the trigger source for the selected event-triggered frame(s). You can let an entry be included in the TRC file and/or generate a **TX Data** inport for the block as the trigger source. An event-triggered frame is transmitted once if a trigger event occurs.

Setting	Description
NONE	Neither a TRC file entry nor a **TX Data** inport is generated for the selected event-triggered frame(s). No event-triggered frames can be transmitted. This is the default value.
TRC	One entry is included in the TRC file for each selected event-triggered frame. The entry lets you trigger the selected event-triggered frame(s) via ControlDesk. No **TX Data** inport is generated. If an inport already exists, its structure remains unchanged. After a frame is transmitted, the corresponding TRC file entry is automatically reset so that you can immediately retrigger the frame.
INPORT	A **TX Data** inport is generated if the inport does not yet exist. The entry lets you trigger the selected event-triggered frame(s) via the model. No TRC file entry is generated. A frame is sampled and marked for transmission each time the inport receives a rising edge.
BOTH	For each selected event-triggered frame, one entry is included in the TRC file and a **TX Data** inport is generated if the inport does not yet exist. This option is evaluated by a logical OR operation, i.e., the selected event-triggered frame(s) are transmitted if a trigger event occurs via ControlDesk*or* the model.

Set Lets you assign the specified source condition to the selected event-triggered frame(s). This button is disabled if **Use these options for all** is selected.

Use these options for all Select the checkbox to apply the specified settings to all event-triggered frames. If the checkbox is selected, **Set** and **Select Trigger source for event triggered frames** are disabled. The checkbox is selected by default.

Get event triggered frame length from unconditional frame Lets you specify to use the frame response length of the triggering frame as the default length for all the frame responses assigned to an event-triggered frame. The

frame length of the triggering frame is specified in the database file or on the Frame Length Page (RTILINMM MainSetup) on page 114.

Note

Dynamic length values cannot be used as the default frame response length.

Related topics

References

Collision Resolver Page (RTILINMM MainSetup)..... 96
Event Triggered RX Page (RTILINMM MainSetup)..... 92

Event Triggered RX Page (RTILINMM MainSetup)

Access

Located in Eventtriggered Frames Page (RTILINMM MainSetup) on page 88.

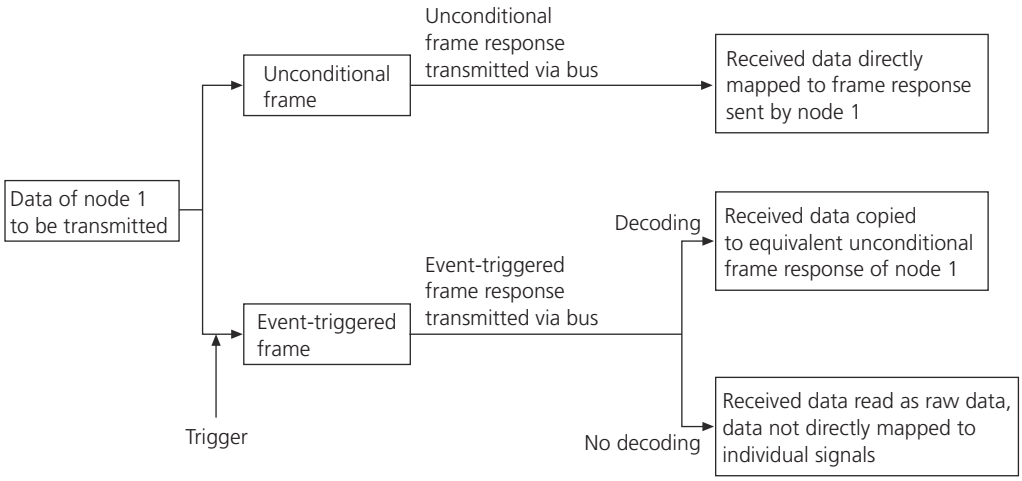
Purpose

To specify decoding options for event-triggered frames received by the LIN controller.

Description

In contrast to an unconditional frame, you have to decode event-triggered frames if you want to continue working with the signals included in the frame response.

Data flow of unconditional and event-triggered frames The data flows of unconditional and event-triggered frames differ mainly for the reception of the frames.

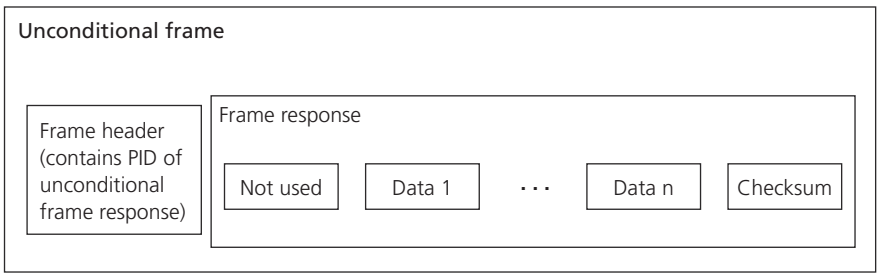


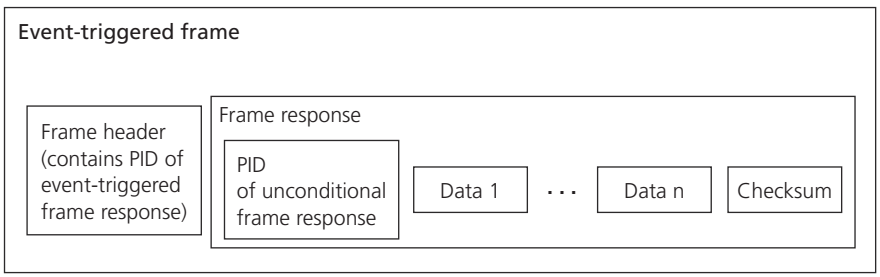
- When an unconditional frame is received, the transmitted data is unambiguously mapped to the frame response of the sending node. You can still distinguish between the individual signals sent with the frame response and use them, for example, for signal manipulation.
- When an event-triggered frame is received, you have to decode it if you want to continue working with the individual signals.
  - *Decoding of an event-triggered frame*: If you decode an event-triggered frame, the event-triggered frame response is mapped to the equivalent unconditional frame response. The signal values transmitted with the event-triggered frame response are copied to the unconditional frame response.

You can then work with the unconditional frame response containing the copied signal values.

- *No decoding of an event-triggered frame*: If an event-triggered frame is not decoded, the signal values transmitted with the frame response can only be read as raw data values. The values cannot be mapped to the individual signals.

Decoding of event-triggered frames For the decoding of an event-triggered frame, the PID (protected identifier) transmitted with the event-triggered frame response is used.





The PID transmitted with the event-triggered frame response is identical to the PID a frame header would transmit to place the data of this frame response in an unconditional frame response. This PID is used to map the data of the frame response unambiguously to the equivalent unconditional frame response.

Note

Event-triggered frames are supported as of LIN 2.0 and by J2602. You therefore cannot use event-triggered frames with LIN 1.3. In this case, this page is empty.

Dialog settings

Enable transfer of data to associated frame Lets you select event-triggered frames to change their default decoding options. All the event-triggered frames you selected on the RX Frames Page (RTILINMM MainSetup) on page 87 are listed in the **Frame Name** column, their assigned frame responses are displayed in the **Associated Frame** column.

Tip

- By default, all the event-triggered frames displayed in the list are decoded and changing the decoding option during run time is disabled.
- You can select multiple frames by pressing **Shift** or **Ctrl**.

The following commands are available via context menu:

- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Source Lets you enable to change the **Default** value of the selected event-triggered frame(s) during run time and specify the source for changing it. You can let an entry be included in the TRC file and/or generate a **TX Data** inport for the block as the source.

Setting	Description
NONE	Neither a TRC file entry nor a **TX Data** inport is generated for the selected event-triggered frame(s). The **Default** value for the selected event-triggered frames cannot be changed during run time. This is the default value.
TRC	One entry is included in the TRC file for each selected event-triggered frame. The entry lets you change the **Default** value for the selected event-triggered frame via ControlDesk during run time. No **TX Data** inport is generated. If an inport already exists, its structure remains unchanged.
INPORT	A **TX Data** inport is generated if the inport does not yet exist. The entry lets you change the **Default** value for the selected event-triggered frame(s) via the model during run time. No TRC file entry is generated.
BOTH	For each selected event-triggered frame, one entry is included in the TRC file and a **TX Data** inport is generated if the inport does not yet exist. The **Default** value of the selected event-triggered frame(s) can be changed via the model and/or ControlDesk during run time.
*	The source value of the selected frame(s) remains unchanged. This allows you to change other options without changing this one.

Default Lets you enable or disable the decoding of the selected event-triggered frame(s) by default. You can enable to change this value during run time via the sources specified in the **Source** drop-down list.

Value	Description
Enable	The decoding of the selected event-triggered frame(s) is enabled by default. This is the default value.
Disable	The decoding of the selected event-triggered frame(s) is disabled by default.
*	The logic value of the selected frame(s) remains unchanged. This allows you to change other options without changing this one.

Logic Lets you select how the source values are combined logically if Both is selected.

Settings	Description
AND	The source is evaluated by an AND operation. This is the default value.
OR	The source is evaluated by an OR operation.
*	The logic value of the selected frame(s) remains unchanged. This allows you to change other options without changing this one.

Set Lets you assign the specified conditions to the selected event-triggered frame(s).

Related topics

References

Collision Resolver Page (RTILINMM MainSetup)....96
Event Triggered TX Page (RTILINMM MainSetup)....88
RTILINMM MainSetup....35

Collision Resolver Page (RTILINMM MainSetup)

Access

Located in Eventtriggered Frames Page (RTILINMM MainSetup) on page 88.

Purpose

To resolve collisions of event-triggered frames.

Description

If two or more event-triggered frames are sent at the same time via the same frame slot, a collision can occur. The LIN master has to resolve the collision. LIN 2.1 or later allows you to define collision schedules in the database file. The LIN master uses a collision schedule to resolve collisions. Once triggered, event-triggered frames can cause collisions until all the frames are called by the master. To ensure that all the possible collisions can be resolved, all the frames that can be transmitted via the same frame slot should be included in a collision resolve schedule.

Note

- This page is only enabled if you select a master on the Master Selection Page (RTILINMM MainSetup) on page 68.
- Event-triggered frames are supported as of LIN 2.0 and by J2602. You therefore cannot use event-triggered frames with LIN 1.3. In this case, this page is empty.

The Choose collision resolving schedules list displays all the event-triggered frames defined in the database file. If you work with LIN 2.1 or later, the default collision resolver schedule for all the frames is the schedule defined in the database file. If you work with LIN 2.0 or J2602, no default collision resolver schedule is defined. In this case, collisions that occur during transmission are not resolved by the LIN master.

Dialog settings

Choose collision resolving schedules Lets you select event-triggered frames and specify collision resolver schedules for them. The following commands are available via context menu:

- None
- Set all to database defaults
- Set selected to database defaults
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

None (Available via context menu) Lets you remove all the list items.

Set all to database defaults (Available via context menu) Lets you set all the list items to the values specified in the database file.

Set selected to database defaults (Available via context menu) Lets you set the selected list items to the values specified in the database file.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Collision Resolver Lets you select a schedule defined in the database file to be used as a collision resolver schedule. If you select "NONE", no schedule applies to the selected event-triggered frame(s).

Set Lets you assign the selected collision resolver schedule to the selected event-triggered frame(s).

Related topics

References

Event Triggered RX Page (RTILINMM MainSetup)..... 92
RTILINMM MainSetup..... 35

Capture Frames Page (RTILINMM MainSetup)

Access

Located in Frames Page (RTILINMM MainSetup) on page 85.

Purpose

To specify the capturing of frames.

Description

You can capture all the frames included in the database file or frames which are not defined as RX frames. Additionally, you can specify whether a frame is output by an outport and/or a TRC variable.

Dialog settings

Number of frames to capture in one sample step Lets you select the number of frames which are captured in one sample step of the model. To deactivate frame capturing, select 0.

Also capture frames marked as RX frames Lets you specify whether all the frames defined in the database or all the frames except those that are defined as RX frames are captured. If the checkbox is cleared, all the frames except for RX frames are captured.

Create outport for captured frames Lets you create an outport for the captured frames. Then the values are available as signal in the Simulink model.

Add captured frames to TRC file Lets you create a TRC file entry for the captured frames. This lets you monitor the values in ControlDesk using the TRC file.

Validate LIN frame checksum Lets you enable to validate the checksum of the frames to be captured.

Related topics

References

RTILINMM MainSetup..... 35

Enable Frames Page (RTILINMM MainSetup)

Access

Located in Frames Page (RTILINMM MainSetup) on page 85.

Purpose

To set the enable/disable option for frames and specify the default status

Description

You can specify whether a frame can be enabled or disabled by an inport and/or a TRC variable. You can specify a default status for frames which can be enabled. The default status is the status (enabled or disabled) when the real-time application is started.

Dialog settings

Enable options Lists all the frames and their settings. The following commands are available via context menu:

- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Source Lets you select the source of the enable option.

Value	Description
NONE	Frame cannot be enabled or disabled. In this case, you cannot specify a default status.
TRC	Frame is enabled or disabled via TRC variable.
INPORT	Frame is enabled or disabled via inport in the model.
BOTH	Frame is enabled or disabled via TRC variable and/or inport in the model (see Logic parameter below).

Default Lets you select the status of the frame when the real-time application is started.

Value	Description
Enable	The frame is enabled.
Disable	The frame is disabled.

Logic Lets you select the logic for enabling when the Source parameter is "BOTH".

Value	Description
AND	Frame is enabled via TRC variable and inport in the model.
OR	Frame is enabled via TRC variable or inport in the model.

Set Lets you assign the specified conditions to the selected frame(s).

Related topics

References

RTILINMM MainSetup..... 35

TX Timeout Enable Page (RTILINMM MainSetup)

Access

Located in Frames Page (RTILINMM MainSetup) on page 85.

Purpose

To specify start values for the timeout of TX frames.

Description

You can specify the default number of timeouts for each TX frame.

The timeout value is the number of possible transmissions of a TX frame that are ignored. It specifies how often the TX frame will not be transmitted even if transmission is scheduled. For example, if the timeout value is 5, and a frame is scheduled 6 times, only the sixth frame transmission will be carried out.

You can also specify a timeout to simulate failures on the LIN bus.

To specify default values for the timeout, the timeout mechanism must be enabled.

Note

- Using the timeout mechanism reduces performance since additional code has to be generated.
- You cannot specify timeouts for event-triggered frames (refer to Event Triggered TX Page (RTILINMM MainSetup) on page 88).

Dialog settings

Activate timeouts Indicates whether timeouts are activated or not.

Default for timeout enable value Displays the frames that are available for user-defined default timeout enable values. The following commands are available via context menu:

- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Countdown Lets you enter the default for the number of possible transmissions of the selected frame(s). The valid values are in the range 0 … 255.

Counter Lets you choose the behavior of the counter during timeout. You can specify whether the transmissions of a TX frame are counted during timeout.

Value	Description
STOP	The number of frame transmissions is not counted during timeout. The counter acts as if the header has not been received.
CONTINUE	The counter continues counting the number of frame transmissions during timeout. The timeout value indicates the number of transmissions of a TX frame that are ignored.

Set Lets you assign the specified default value to the frame(s) selected from the list.

Example

Suppose the timeout mechanism is enabled, and the number of possible transmissions is 255.

- If the TX frame transmissions are not be to counted during timeout (Counter = STOP), only the actually sent frames are counted.

Frame Transmission	Timeout Value	Counter Value
1	0	1
2	0	2
3	0	3
4	2	(3)[1)]
5	1	(3)[1)]
6	0	4

[1)] Visible value (no update of the output)

- If the counter is to continue counting the number of frame transmissions during timeout (Counter = CONTINUE), its behavior is as follows:

Frame Transmission	Timeout Value	Counter Value
1	0	1
2	0	2
3	0	3
4	2	(3)[1]/ [4][2]
5	1	(3)[1]/ [5][2]
6	0	6

[1] Visible value (no update of the output)
[2] Internal value

Related topics

References

RTILINMM MainSetup....35

Frame Interfaces Page (RTILINMM MainSetup)

Access

Located in Frames Page (RTILINMM MainSetup) on page 85.

Dialog pages

You can specify the settings specific to frame interfaces on the following pages:

- RX Status and Time Ports Page (RTILINMM MainSetup) on page 103
- RX Frames Length Port Page (RTILINMM MainSetup) on page 104
- RX Frames Checksum Ports Page (RTILINMM MainSetup) on page 105
- RX Frames Checksum Display Page (RTILINMM MainSetup) on page 105
- Raw Data Page (RTILINMM MainSetup) on page 106
- Errors Page (RTILINMM MainSetup) on page 111

Related topics

References

RTILINMM MainSetup....35

RX Status and Time Ports Page (RTILINMM MainSetup)

Access

Located in Frame Interfaces Page (RTILINMM MainSetup) on page 102.

Purpose

To enable status ports and time ports for RX frames.

Description

You can enable status ports and time ports for one or more RX frames. The current RTILINMM MainSetup block gets the **RX Data** outport if the outport does not yet exist.

The **RX Data** outport provides the following status information relating to the reception of RX frames.

RX_Status	Description
1	An RX frame has been received in this model sample step.
0	Otherwise

The **RX Data** outport provides the following information:

- RX_Time – the point in time (in seconds) when the frame was received.
- RX_DeltaTime – the time difference (in seconds) between the points in time when the current frame and the previous frame were received.

Dialog settings

All Lets you enable status ports and time ports for all RX frames.

None Lets you disable status ports and time ports for all RX frames.

Selected Lets you enable status ports and time ports for a set of RX frames.

Available frames Displays the available RX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected frames Displays the selection of frames that is active if you select the **Selected** option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup....35

RX Frames Length Port Page (RTILINMM MainSetup)

Access

Located in Frame Interfaces Page (RTILINMM MainSetup) on page 102.

Purpose

To get the length of RX frames.

Description

You can get the length of last received RX frames. The value is provided as signal at the RX Data outport.

Dialog settings

All Lets you get the length of all the RX frames.

None Lets you get no length of RX frames.

Selected Lets you get length of a set of RX frames.

Messages Displays the available RX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup....35

RX Frames Checksum Ports Page (RTILINMM MainSetup)

Access

Located in Frame Interfaces Page (RTILINMM MainSetup) on page 102.

Purpose

To enable checksum ports for RX frames.

Description

You can enable checksum ports for one or more RX frames. The current RTILINMM MainSetup block gets the **RX Data** outport if the outport does not yet exist.

The checksum values of the selected RX frames are provided at the **RX Data** outport.

Dialog settings

All Lets you enable checksum ports for all the RX frames.

None Lets you disable checksum ports for all RX frames.

Selected Lets you enable checksum ports for a set of RX frames.

Messages Displays the available RX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup..... 35
RX Frames Checksum Display Page (RTILINMM MainSetup)..... 105

RX Frames Checksum Display Page (RTILINMM MainSetup)

Access

Located in Frame Interfaces Page (RTILINMM MainSetup) on page 102.

Purpose	To enable checksum displays for RX frames.
Description	You can specify to let entries for frames checksums of RX frames be included in the generated TRC file. You can then display RX frames checksums in ControlDesk.
Dialog settings	**All** Lets you enable checksum displays for all RX frames. **None** Lets you disable checksum displays for all RX frames. **Selected** Lets you enable checksum displays for a set of RX frames. **Available frames** Displays the available RX frames. You can filter the frames by their names for easier selection via context menu. **Filter** (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50. **Selected frames** Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu: ▪ All ▪ None **All** (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list. **None** (Available via context menu) Lets you remove all the list items.
Related topics	References RTILINMM MainSetup..... 35 RX Frames Checksum Ports Page (RTILINMM MainSetup)..... 105

Raw Data Page (RTILINMM MainSetup)

Access	Located in Frame Interfaces Page (RTILINMM MainSetup) on page 102.
Raw data	You can use raw data of the frames to get access to each single bit of a frame. Raw data contains data of the last received frame. If a checksum error occurred or the frame length is not correct, the frame is not decoded. In this case you can decode the frame yourself using the raw data of the frame.

Dialog pages

You can specify the settings specific to raw data on the following page:

- TX Raw Data Page (RTILINMM MainSetup) on page 107
- TX Raw Data Display Page (RTILINMM MainSetup) on page 108
- RX Raw Data Ports Page (RTILINMM MainSetup) on page 109
- RX Raw Data Display Page (RTILINMM MainSetup) on page 110

Related topics

References

RTILINMM MainSetup.....35

TX Raw Data Page (RTILINMM MainSetup)

Access

Located in Raw Data Page (RTILINMM MainSetup) on page 106.

Purpose

To let you manipulate TX frames with raw data.

Description

The frames can be manipulated either via TRC file or via inport. During run time you can select whether raw data or signals are used. The default setting for this switch can also be specified on this dialog page.

Dialog settings

Frames for manipulation with raw data from inport or TRC Displays the frames that can be manipulated with raw data from inport or TRC. The following commands are available via context menu:

- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Activate raw data option Lets you activate or deactivate the raw data option for the selected frame(s).

Source of raw data Lets you select the source of raw data for the selected frame(s). This can be either an **Inport** or the **TRC** file.

Default Lets you specify the default for the selected frame(s). This can be either **Signals** or **Raw Data**.

Set Lets you assign the specified settings to the frame(s) selected from the list.

Related topics

References

RTILINMM MainSetup.....35

TX Raw Data Display Page (RTILINMM MainSetup)

Access

Located in Raw Data Page (RTILINMM MainSetup) on page 106.

Purpose

To enable raw data displays for TX frames.

Description

You can specify to let entries for TX raw data be included in the generated TRC file. In this case, you can display TX raw data with the **Bus Navigator** of ControlDesk.

Note

The TRC file entries for TX raw data are generated only if the manipulation option is activated for the TX frame(s) on the TX Raw Data Page (RTILINMM MainSetup) on page 107.

Dialog settings

All Lets you enable raw data displays for all TX frames.

None Lets you disable raw data displays for all TX frames.

Selected Lets you enable raw data displays for a set of TX frames.

Available frames Displays the available TX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected frames Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup....35

RX Raw Data Ports Page (RTILINMM MainSetup)

Access

Located in Raw Data Page (RTILINMM MainSetup) on page 106.

Purpose

To enable raw data ports for RX frames.

Description

You can enable raw data ports for one or more RX frames. The current RTILINMM MainSetup block gets the RX Data outport if the outport does not yet exist.

The RX Data outport provides direct access to the unchanged bytes (raw data) of an RX frame. This allows you to access a frame byte-wise.

Dialog settings

All Lets you enable raw data ports for all RX frames.

None Lets you disable raw data ports for all RX frames.

Selected Lets you enable raw data ports for a set of RX frames.

Available frames Displays the available RX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected frames Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup 35

RX Raw Data Display Page (RTILINMM MainSetup)

Access

Located in Raw Data Page (RTILINMM MainSetup) on page 106.

Purpose

To enable raw data displays for RX frames.

Description

You can specify to let entries for RX raw data be included in the generated TRC file. You can then display RX raw data in ControlDesk.

Dialog settings

All Lets you enable raw data displays for all RX frames.

None Lets you disable raw data displays for all RX frames.

Selected Lets you enable raw data displays for a set of RX frames.

Available frames Displays the available RX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected frames Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup....35

Errors Page (RTILINMM MainSetup)

Access

Located in Frame Interfaces Page (RTILINMM MainSetup) on page 102.

Dialog pages

You can specify the settings specific to LIN communication errors on the following page:

- RX Error Ports Page (RTILINMM MainSetup) on page 111
- RX Error Display Page (RTILINMM MainSetup) on page 113

Related topics

References

RTILINMM MainSetup....35

RX Error Ports Page (RTILINMM MainSetup)

Access

Located in Errors Page (RTILINMM MainSetup) on page 111.

Purpose

To enable error ports for RX frames.

Description

You can enable error ports for one or more RX frames. The current RTILINMM MainSetup block gets the **RX Data** outport if the outport does not yet exist.

The **RX Data** outport provides RX_Error bits relating to the reception of RX frames. If an error bit is 1, the corresponding error has occurred. The outport holds the value until the next frame received.

RX Error Bit	Error
a0	LINMM checksum error
a1	-

RX Error Bit	Error
a2	LINMM counter error
a3	Frame checksum error
a4	Slave not responding
a5	Data lost (RX monitor data overflow)
a6	Collision occurred (available only if event-triggered frames are used, refer to Eventtriggered Frames Page (RTILINMM MainSetup) on page 88)

Frame Checksum error If a checksum algorithm is applied to an RX frame, a checksum is calculated for the frame and compared to the checksum within the received RX frame. The RX_Error bit is set to 1 if these checksums differ. You can specify the algorithm on the User Checksum Definition Page (RTILINMM MainSetup).

Dialog settings

All Lets you enable error ports for all RX frames.

None Lets you disable error ports for all RX frames.

Selected Lets you enable error ports for a set of RX frames.

Available frames Displays the available RX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected frames Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup....35
User Checksum Definition Page (RTILINMM MainSetup)....117

RX Error Display Page (RTILINMM MainSetup)

Access

Located in Errors Page (RTILINMM MainSetup) on page 111.

Purpose

To enable error displays for RX frames.

Description

You can specify that entries for RX errors are included in the generated TRC file. You can then display RX errors in ControlDesk.

Dialog settings

All Lets you enable error displays for all RX frames.

None Lets you disable error displays for all RX frames.

Selected Lets you enable error displays for a set of RX frames.

Available frames Displays the available RX frames. You can filter the frames by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected frames Displays the selection of frames that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup..... 35

Frame Manipulation Page (RTILINMM MainSetup)

Access

Located in Frames Page (RTILINMM MainSetup) on page 85.

Dialog pages

You can manipulate frames on the following pages:

- Frame Length Page (RTILINMM MainSetup) on page 114
- Frame Defaults Page (RTILINMM MainSetup) on page 115
- Checksum Page (RTILINMM MainSetup) on page 116
- Custom Code Page (RTILINMM MainSetup) on page 121

Related topics

References

RTILINMM MainSetup 35

Frame Length Page (RTILINMM MainSetup)

Access

Located in Frame Manipulation Page (RTILINMM MainSetup) on page 114.

Purpose

To let you modify the lengths of RX and TX frames during either model creation or run time, and activate TX frame manipulation during run time.

Description

The lengths of RX and TX frames can be modified via TRC, via inport, or statically.

With the dynamic frame length option, you can manipulate the lengths of TX frames during run time for n transmissions.

Dialog settings

Frames with adjustable length(s) Lists the frames with adjustable frame length. The following commands are available via context menu:

- Set all to database defaults
- Set selected to database defaults
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Set all to database defaults (Available via context menu) Lets you set the default frame length of all the TX frames displayed in the list to the default values specified in the database file.

Set selected to database defaults (Available via context menu) Lets you set the default frame length of the selected TX frame(s) to the default values specified in the database file.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Adjust option Lets you specify the adjust option for the frame(s) selected from the **Frames with adjustable length(s)** list:

Value	Description
NONE	The frame length cannot be changed during run time.
TRC	The frame length can be changed via the TRC file.
INPORT	The frame length can be changed via inport in the model.

Frame length Lets you specify the frame length. The new frame length applies to RX and TX frames.

Set Lets you assign the specified adjust option to the frame(s) selected from the list.

Activate dynamic frame length Lets you activate dynamic frame length. If dynamic frame length is enabled, you can change the length of a TX frame for n transmissions in ControlDesk. TRC variables for the dynamic length value and the dynamic length countdown are used for this purpose.

Related topics

References

RTILINMM MainSetup.....35

Frame Defaults Page (RTILINMM MainSetup)

Access

Located in Frame Manipulation Page (RTILINMM MainSetup) on page 114.

Purpose

To define the bits' default value in a frame data field.

Description

You can define the default values of bits in a LIN frame that do not belong to a signal. You can address each bit via a unique hexadecimal value, and set the default value to '0' or '1' for each bit individually.

The default value is ignored if a bit is being used by a signal.

Dialog settings

All 0x0 Lets you set the default value of all bits to 0.

All 0xFFFFFFFFFFFFFFFF Lets you set the default value of all bits to 1.

User-defined defaults Lets you specify user-defined default values for the bits. Select this option to enable the frame list, the **Default value** edit field and the **Set** button. The frame list shows all the available frames. Select one or more frames to define their bits' default values.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Default value Lets you specify the default value of each bit in the selected frame(s). The value must be entered in decimal or hexadecimal format. The edit field is enabled if **User-defined defaults** is selected.

Set Lets you assign the user-defined default values to the bits of the selected frame(s). The button is enabled if **User-defined defaults** is selected.

Related topics

References

RTILINMM MainSetup.....35

Checksum Page (RTILINMM MainSetup)

Access

Located in Frame Manipulation Page (RTILINMM MainSetup) on page 114.

Dialog pages

You can specify the checksum definitions and frames on the following pages:

- User Checksum Definition Page (RTILINMM MainSetup) on page 117
- User Checksum Frames Page (RTILINMM MainSetup) on page 118
- Dynamic LIN Frame Checksum Page (RTILINMM MainSetup) on page 120

Related topics

References

RTILINMM MainSetup 35

User Checksum Definition Page (RTILINMM MainSetup)

Access

Located in Checksum Page (RTILINMM MainSetup) on page 116.

Purpose

To specify checksum algorithms.

Description

You can implement user-defined checksum algorithms for frames via a *checksum header file*. Each algorithm must have a C-coded switch-case directive in the header file. The header file must contain at least one switch-case directive. For instructions on how to create a checksum header file, refer to:

- How to Define a Checksum Algorithm (DS4330 Features 🕮)
- How to Define a Checksum Algorithm (MicroAutoBox II Features 🕮)
- How to Define a Checksum Algorithm (Model Interface Package for Simulink - Modeling Guide 🕮)

Dialog settings

Header file Lets you specify a header file containing checksum algorithms. Click h to browse to the file.

Use relative path Lets you set the folder relative to the model root folder or as an absolute path.

Tip

Using a relative path allows you to easily move the model and all the files belonging to it to another location on your file system without having to change any path settings.

Check Header File Lets you check the specified header file for syntax errors. The check also returns the number of calculation algorithms (switch-case directives) contained in the header file.

Note

This option does not check the entire C code of the header file for syntax errors. The C code of the header file is checked by MATLAB during the build process of the model.

Edit Header File Lets you edit the selected header file in MATLAB's M-File Editor.

Identifier for cases Lets you define an identifier for a checksum algorithm (switch-case directives).

Defined cases identifier Lists the defined cases identifiers. For each defined cases identifier, Case <n> indicates the checksum case (switch-case directive) in the checksum header file to which it refers when a header file is created via the Create Header File button. You can sort the identifiers via buttons.

Note

Sorting the identifiers via the buttons does not affect the order in checksum header files that have already been created. It only affects the order in files that will be created via the Create Header File button.

Create Header File Lets you create a header file according to the switch-case directives you defined.

Related topics

References

RTILINMM MainSetup..... 35

User Checksum Frames Page (RTILINMM MainSetup)

Access

Located in Checksum Page (RTILINMM MainSetup) on page 116.

Purpose

To assign checksum algorithms to frames.

Description

You can assign one checksum algorithm defined in the *checksum header file* to each frame. The way the checksum algorithm is applied is different for TX frames and RX frames:

- *Checksum calculation for TX frames*: You can assign a checksum algorithm to each TX frame. In this case, a checksum is calculated according to the applied

algorithm, and assigned to the TX frame. Then the frame is transmitted together with the calculated checksum.

- *Checksum check for RX frames*: You can assign a checksum algorithm to each RX frame. In this case, a checksum is calculated for the frame and compared to the checksum in the RX frame. If they differ, this is indicated at the corresponding error ports for RX frames if these ports are enabled. For details, refer to RX Error Ports Page (RTILINMM MainSetup) on page 111.

Note

- You cannot assign more than one checksum algorithm to a frame.
- You cannot assign checksum algorithms to event-triggered frames (refer to Event Triggered TX Page (RTILINMM MainSetup) on page 88).

During run time, you can activate or deactivate checksum calculation for each frame via ControlDesk.

For further information on defining checksum algorithms, see also:

- User Checksum Definition Page (RTILINMM MainSetup) on page 117
- How to Define a Checksum Algorithm (DS4330 Features 🕮)
- How to Define a Checksum Algorithm (MicroAutoBox II Features 🕮)
- How to Define a Checksum Algorithm (Model Interface Package for Simulink - Modeling Guide 🕮)

Dialog settings

Frame Lets you select a frame to which you want to assign a checksum algorithm.

Signal Lets you specify one signal contained in the selected frame as the checksum signal. The signal selection effects only the `CsBitPos` and `CsLength` input parameters of the checksum algorithm. As you access raw data of the frames, the checksum can be any one byte of the 8 bytes of raw data.

Algorithm Lets you select the checksum algorithm to be applied. The displayed algorithms are contained in the header file selected on the User Checksum Definition Page (RTILINMM MainSetup).

Default There is an entry in the generated TRC file that lets you enable or disable checksum calculation. This option lets you specify whether checksum calculation for the selected frame is enabled or disabled by default.

Dynamic checksum Lets you enable dynamic checksum. If dynamic checksum is enabled, you can change the checksum algorithm of a TX frame during run time. Entries in the generated TRC file let you select a checksum algorithm and specify a countdown value. The countdown value specifies the number of transmissions the selected checksum algorithm applies to. After the frame has been transmitted the specified number of times, the standard checksum algorithm is used again for the frame.

Set Lets you assign the checksum calculation settings.

- If you did not yet specify checksum calculation settings for the selected frame, a new entry is added to the list of checksum frames.

- If you already specified checksum calculation settings for the selected frame, the new settings are applied.

Delete Lets you delete the selected frame from the List of defined checksum signals.

Filter Lets you filter and select signals in the Filter Dialog (RTILINMM MainSetup) on page 50.

Defined checksum signals Lists the defined checksum signals. The following commands are available via context menu:

- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Related topics

References

Dynamic LIN Frame Checksum Page (RTILINMM MainSetup)

Access

Located in Checksum Page (RTILINMM MainSetup) on page 116.

Purpose

To specify default values for LIN frame checksum manipulation.

Description

You can manipulate the checksums of LIN frames for a defined number of times.

The checksum manipulation applies to the LIN frame checksum only. It cannot be used with user checksums.

Dialog settings

Defaults for LIN frame checksum manipulation values Displays the frames that are available for LIN frame checksum manipulation. The following commands are available via context menu:

- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Enable LIN Frame checksum manipulation Lets you enable the manipulation of the LIN frame checksums. If the checkbox is selected, you can specify the manipulation settings.

Countdown Lets you enter the number of possible manipulations of the LIN frame checksum for the selected frame(s). The valid values are in the range 0 … 255.

Offset Lets you specify the offset value which will be added to the LIN frame checksum for the selected frame(s) for the defined number of times. The valid offset values are in the range 0 … 255.

Set Lets you assign the specified checksum manipulation to the frame(s) selected from the list.

Related topics

References

RTILINMM MainSetup.....35

Custom Code Page (RTILINMM MainSetup)

Access

Located in Frame Manipulation Page (RTILINMM MainSetup) on page 114.

Purpose

To specify custom code functions for TX frames.

Description

You can manipulate the raw data in TX frames with functions defined in a custom code header file. You can let these functions be executed before or after checksum calculation for the frame.

Note

You must use different header files for checksum calculation and custom code.

Dialog settings

Frame Lets you select a TX frame to which you want to apply a function defined in the custom code.

Function name Lets you enter the name of the custom code function you want to execute.

Option Lets you specify when the specified custom code function is applied.

Value	Description
pre CRC	The function is executed before checksum calculation but after RTILINMM generates the PID of the frame in byte 0. This function therefore cannot manipulate the PID of the TX frame.
post CRC	The function is executed after checksum calculation but before RTILINMM generates the PID of the frame in byte 0. You therefore have to select this function if you want to manipulate the PID of the TX frame.
*	The option of the selected frame remains unchanged. This allows you to change other settings without changing this one.

Default An entry in the generated TRC file lets you enable or disable the custom code function. This option lets you specify whether the custom code function for the selected frame is enabled or disabled by default.

Value	Description
Enable	The custom code function is enabled per default.
Disable	The custom code function is disabled per default.

Value	Description
*	The default value of the selected frame remains unchanged. This allows you to change other settings without changing this one.

Custom code (header file) Lets you specify a header file containing custom code. Click  to browse to the file.

Use relative path Lets you set the folder relative to the model root folder or as an absolute path.

Tip

Using a relative path allows you to easily move the model and all the files belonging to it to another location on your file system without having to change any path settings.

Set Lets you assign the custom code function settings to the selected frame.

- If you did not yet specify custom code function settings for the selected frame, a new entry will be added to the list of Defined custom code functions.
- If you already specified custom code function settings for the selected frame, the new settings will be applied.

Delete Lets you delete the selected entry from the list of Defined custom code functions.

Create Header File Lets you create a header file according to the settings you defined.

Edit Header File Lets you edit the selected header file in MATLAB's M-File Editor.

Defined custom code functions Lists the defined custom code functions. The following commands are available via context menu for sorting the frames:

- Sort Frame
- Sort File Name
- Sort Function
- Sort Option
- Sort Default

Related topics

References

RTILINMM MainSetup.....35

Signals Page (RTILINMM MainSetup)

Access

Located on the top level of the dialog tree.

Dialog pages

You can specify signals on the following pages:

- TX Page (RTILINMM MainSetup) on page 124
- Model Signals (RX) Page (RTILINMM MainSetup) on page 142

Related topics

References

RTILINMM MainSetup.....35

TX Page (RTILINMM MainSetup)

Access

Located on Signals Page (RTILINMM MainSetup) on page 124.

Dialog pages

You can specify signals on the following pages:

- Model Signals (TX) Page (RTILINMM MainSetup) on page 125
- Input Manipulation Page (RTILINMM MainSetup) on page 126
- Saturation Options Page (RTILINMM MainSetup) on page 127
- Signal Defaults Page (RTILINMM MainSetup) on page 129
- Signal Ranges Page (RTILINMM MainSetup) on page 130
- Signal Errors Page (RTILINMM MainSetup) on page 132
- Signal Manipulation Page (RTILINMM MainSetup) on page 134
- Signal Default Manipulation Page (RTILINMM MainSetup) on page 140

Related topics

References

RTILINMM MainSetup.....35

Model Signals (TX) Page (RTILINMM MainSetup)

Access

Located in TX Page (RTILINMM MainSetup) on page 124.

Purpose

To specify TX signals as TX inport signals (TX model signals).

Description

The frames defined as TX frames on the TX Frames Page (RTILINMM MainSetup) contain the signals to be transmitted (TX signals). The generated TRC file gets an entry for each signal in a TX frame. This entry allows you to manipulate the TX signal from within ControlDesk.

TX model signals: If you want to manipulate TX signals from within the model, you have to specify them as TX model signals. For signals specified as TX model signals, the RTILINMM MainSetup block gets a **TX Data** inport that allows you to manipulate the signal values from within the model. If input manipulation is turned off, the generated TRC file gets no entries for signals specified as TX model signals.

Note

For optimum performance, you should specify as few TX model signals as possible.

Tip

The **Input Manipulation Page (RTILINMM MainSetup)** lets you specify input manipulation for TX model signals. The generated TRC file also gets entries for these TX model signals. This allows you to manipulate the signal values either from within the model, or from within ControlDesk.

Dialog settings

All Lets you specify all TX signals as TX model signals.

None Lets you specify none of the available TX signals as TX model signals.

Selected Lets you specify a set of the available TX signals as TX model signals.

Available signals Displays the TX signals that are available in the TX frames. You can filter the signals by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected signals Displays the selection of TX model signals that is active if you select the **Selected** option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

Input Manipulation Page (RTILINMM MainSetup)..... 126
TX Frames Page (RTILINMM MainSetup)..... 86

Input Manipulation Page (RTILINMM MainSetup)

Access

Located in TX Page (RTILINMM MainSetup) on page 124.

Purpose

To specify input manipulation for TX model signals.

Description

When you select standard TX signals as TX model signals on the Model Signals (TX) Page (RTILINMM MainSetup) on page 125, the RTILINMM MainSetup block gets the **TX Data** inport for the TX model signals. You can disable or enable input manipulation for TX model signals.

- *Input manipulation disabled*: If you disable input manipulation for a TX model signal, its value is determined by the corresponding model input via the **TX Data** inport. In the generated TRC file, there are no entry for the TX model signals for which you disable input manipulation.
- *Input manipulation enabled*: If you enable input manipulation for a TX model signal, its value is determined either by the respective model input via the **TX Data** inport, or via an entry in the generated TRC file. In the generated TRC file, there will also be an entry for each TX model signal that lets you switch between using the model input and the TRC file entry.

Dialog settings

All Lets you enable input manipulation for all TX model signals.

None Lets you disable input manipulation for all of the TX model signals.

Selected Lets you enable input manipulation for a set of TXmodel signals.

Available signals Displays the TX signals that are available in the TX frames. You can filter the signals by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected signals Displays the selection of signals that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup....35

Saturation Options Page (RTILINMM MainSetup)

Access

Located on TX Page (RTILINMM MainSetup) on page 124.

Dialog pages

You can specify options for saturation on the following pages:

- Saturation Page (RTILINMM MainSetup) on page 127

Related topics

References

RTILINMM MainSetup....35

Saturation Page (RTILINMM MainSetup)

Access

Located in Saturation Options Page (RTILINMM MainSetup) on page 127.

Purpose

To specify signal saturation.

Description

Signal saturation means:

- TX model signals are limited according to the limits specified in the database file (input saturation) or on the Signal Ranges Page (RTILINMM MainSetup) on page 130.

- After signal manipulation and before conversion of signal values into raw data, the signal values are limited according to the limits of the raw data (output saturation).

The Signal Ranges Page (RTILINMM MainSetup) lets you specify saturation limits other than the limits specified in the database file.

Note

For optimum performance, you should specify saturation for as few signals as possible.

Dialog settings

Option Lets you specify the saturation.

- No saturations Lets you specify to perform no signal saturation.
- All signals both saturations Lets you specify input saturation and output saturation for all the signals.
- User-defined saturations Lets you specify signal saturation individually for each signal via the Saturation drop-down list.

Use bit saturations Lets you specify to use bit saturations. Bit saturation means saturating signals to limits that are based on their data types and the bit width available for the LIN bus. Bit saturation is applied to integer signals only, it is not possible in connection with signals of float or double data type. If the checkbox is selected, bit saturation is enabled for all signals. The signals are saturated to the bit ranges of the coded signals, that is, if a signal exceeds its limit, it is saturated to the highest or lowest value which can be transmitted in coded format on the LIN bus. If the checkbox is cleared, the signals also remain within their bit ranges. But after a signal reaches its upper bit range limit, it turns around to its lower bit range limit.

Example: Suppose you have a 16-bit unsigned integer signal and your LIN bus signal has a bit width of 8 bits. With bit saturation enabled, a signal value of 258 (0x102) is saturated to 255 (0xFF). With bit saturation disabled, the signal value is cut to 2 (0x02).

User-defined saturations Displays the frames that are available for user-defined saturations. You can create or load a configuration file or add these page settings to an existing configuration file via context menu:

- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Saturation Lets you specify the signal direction the saturation will be applied to:

- Both: Saturation applies to both the input and output signal (input and output saturation).
- Input: Saturation applies to the input signal (input saturation)). All other signal sources (for example, error value, constant, counter) are not saturated. Input saturation uses the values specified on the Signal Ranges Page (RTILINMM MainSetup) on page 130.
- Output: Saturation applies to the output signal (output saturation). The RTI LIN MultiMessage Blockset provides several signal sources for the signal to be transmitted, such as model input, counter or constant. The signal value that has been selected by the signal source switch is saturated, regardless of which signal source is used. Output saturation uses the values specified on the Signal Ranges Page (RTILINMM MainSetup) on page 130.
- None: No saturation is performed.

Click Set to assign the setting to the selected signal(s).

Set Lets you assign the specified saturation to the frame(s) selected in the User-defined saturations list.

Related topics

References

RTILINMM MainSetup..... 35

Signal Defaults Page (RTILINMM MainSetup)

Access

Located in TX Page (RTILINMM MainSetup) on page 124.

Purpose

To specify default values for the signals to be transmitted (TX signals).

Description

You can specify default values for the signals to be transmitted. You can either specify default values according to your requirements, or use the default values specified in the database file.

Dialog settings

Defaults to zero Lets you set the default values of all TX signals to zero.

Defaults from DBC Lets you set the default values of all TX signals according to the specification in the DBC file. This option is only sensible if you work with a DBC file. Refer to General Settings Page (RTILINMM MainSetup) on page 57.

User-defined defaults Lets you set default signal values individually for each TX signal.

User-defined signal defaults Lists the user-defined signal defaults. The following commands are available via context menu:

- Set all to database defaults
- Set selected to database defaults
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Set all to database defaults (Available via context menu) Lets you set all the list items to the values specified in the database file.

Set selected to database defaults (Available via context menu) Lets you set the selected list items to the values specified in the database file.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Default value Lets you specify the default signal value for the selected frame(s). You can enter a numeric value in decimal format, or type **`fromDBC`** or **`fromLDF`** to take the default signal value from the DBC or LDF file. Then click Set.

Set Lets you assign the specified default signal value to the TX signal(s) selected from the list.

Related topics

References

RTILINMM MainSetup....35

Signal Ranges Page (RTILINMM MainSetup)

Access Located in TX Page (RTILINMM MainSetup) on page 124.

Purpose To specify saturation range limits.

Description

Signal saturation requires appropriate saturation range limits. You can use the range limits specified in the DBC file or specify other range limits.

Dialog settings

Ranges from database Lets you use the saturation range limits specified in the database file. This option is only sensible if you work with a database file (DBC file, LDF file, FIBEX file, or AUTOSAR system description file). Refer to General Settings Page (RTILINMM MainSetup) on page 57.

Note

There is no consistency check for the saturation range limits specified in the database file. However, you can get information on the range limits specified in the database file via the file check report (HTML file). The check is available on the General Settings Page (RTILINMM MainSetup).

User-defined ranges Lets you specify saturation range limits according to your requirements. The list displays the frames available for user-defined ranges. The following commands are available via context menu:

- Set all to database defaults
- Set all to database defaults (bit)
- Set selected to database defaults
- Set selected to database defaults (bit)
- Set all (min =0 & max =0) to database defaults (bit)
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Set all to database defaults (Available via context menu) Lets you assign the saturation range limits specified in the database file to all the signals displayed in the list. The signals are saturated according to the physical range limits.

Set all to database defaults (bit) (Available via context menu) Lets you assign the saturation range limits specified in the database file to all the signals displayed in the list. The signal(s) are saturated according to the bit range limits.

Set selected to database defaults (Available via context menu) Lets you assign the saturation range limits specified in the database file to the selected signal(s). The signals are saturated according to the physical range limits.

Set selected to database defaults (bit) (Available via context menu) Lets you assign the saturation range limits specified in the database file to the selected signal(s). The signal(s) are saturated according to the bit range limits.

Set all (min =0 & max =0) to database defaults (bit) (Available via context menu) Lets you specify saturation according to the bit range limits for the signals for which `0` is specified as the minimum value and maximum value in the database file.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Min Lets you enter the minimum value for the selected signal(s). Click Set to assign the setting to the selected signal(s).

Max Lets you enter the maximum value for the selected signal(s). Click Set to assign the setting to the selected signal(s).

Set Lets you assign the specified ranges to the frame(s) selected from the User-defined ranges list.

Related topics

References

RTILINMM MainSetup..... 35

Signal Errors Page (RTILINMM MainSetup)

Access

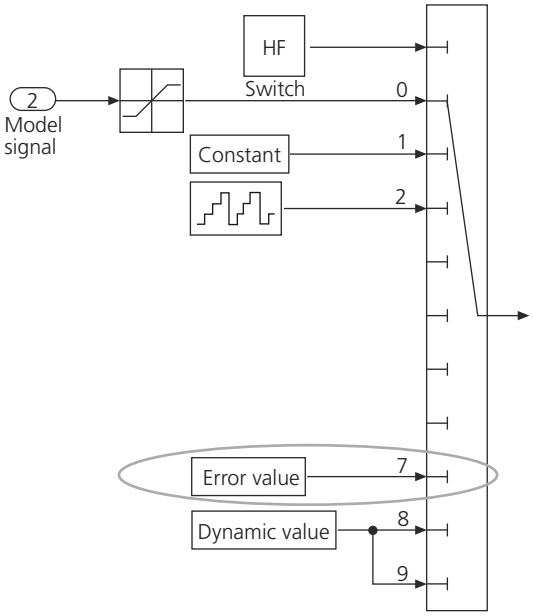
Located in TX Page (RTILINMM MainSetup) on page 124.

Purpose

To specify error values for signals to be transmitted.

Description

You can specify an error value for each signal to be transmitted. If you specify error values, there will be entries in the generated TRC file for each signal. The entries let you switch to transmitting the error value. The illustration below visualizes this switch.



Error value You can either specify error values according to your requirements, or use error values according to the bit ranges defined in the database file (DBC, LDF, MAT, FIBEX, or AUTOSAR system description file, refer to General Settings Page (RTILINMM MainSetup) on page 57). The error value of a signal is then the highest possible value in the signal's bit range if the signal's physical range is smaller. If the signal's bit range and the physical ranges are the same, there is no error value available according to the database file.

In ControlDesk, you can use a Variable Array (MultiState LED value cell type) to indicate if the error value of a signal is being transmitted.

Note

You cannot change the error value during run time.

Example An 8-bit signal has a scale factor of 2 and an offset of -10. The signal's value range is -10 … 500. The signal's physical range is -10 … 400. The error value according to the bit ranges is then 500, which is the highest possible value within the signal's bit range and outside the physical range.

Dialog settings

No errors Lets you specify not to use error values for the signals to be transmitted. In that case, you cannot switch to transmitting an error value for any signal to be transmitted.

Errors from DBC Lets you set the error values of all signals to be transmitted according to the specification in the database file (DBC, LDF, MAT, FIBEX, or AUTOSAR system description file). Refer to General Settings Page (RTILINMM MainSetup) on page 57.

User-defined errors Lets you set error values individually for each signal to be transmitted.

User-defined signal errors Lists the user-defined signal errors. The following commands are available via context menu:

- Set all to database defaults
- Set selected to database defaults
- Configuration File - Create
- Configuration File - Add
- Configuration File - Load

Set all to database defaults (Available via context menu) Lets you set the error values of all the TX signals displayed in the list to the default values specified in the database file.

Set selected to database defaults (Available via context menu) Lets you set the error values of the selected TX signal(s) to the default values specified in the database file.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Error value Lets you enter an error value. Enter **X** if you do not want to specify an error value for the selected signal(s). In that case, you cannot switch to transmitting an error value for the selected signal(s). Then click Apply.

Apply Lets you assign the specified error value to the frame(s) selected from the User-defined signal errors list.

Related topics

References

RTILINMM MainSetup..... 35

Signal Manipulation Page (RTILINMM MainSetup)

Access

Located on TX Page (RTILINMM MainSetup) on page 124.

Dialog pages

You can specify manipulation of TX signals on the following pages:

- Dynamic Signal Page (RTILINMM MainSetup) on page 135
- Counter Page (RTILINMM MainSetup) on page 138

Related topics

References

RTILINMM MainSetup..... 35

Dynamic Signal Page (RTILINMM MainSetup)

Access

Located in Signal Manipulation Page (RTILINMM MainSetup) on page 134.

Dialog pages

You can specify the settings for dynamic signals on the following pages:

- Dynamic Signal Values Page (RTILINMM MainSetup) on page 135
- Dynamic Signal Defaults Page (RTILINMM MainSetup) on page 137

Related topics

References

RTILINMM MainSetup..... 35

Dynamic Signal Values Page (RTILINMM MainSetup)

Access

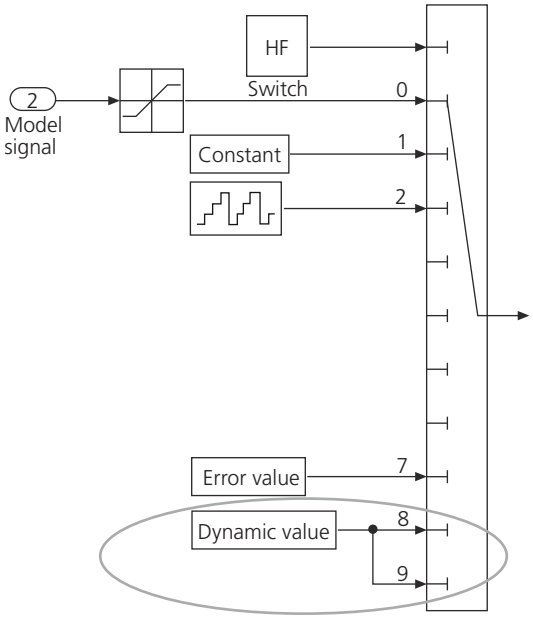
Located in Dynamic Signal Page (RTILINMM MainSetup) on page 135.

Purpose

To specify the use of dynamic values for signals to be transmitted.

Description

You can specify to use a dynamic value for each signal to be transmitted. If you specify a dynamic value for a signal, there will be an entry in the generated TRC file that lets you switch to transmitting the dynamic value. The illustration below visualizes this switch.



- *Dynamic value and countdown value*: If you switch to the dynamic value of a signal, this value is transmitted for a defined number of times. This number is the **countdown** value. After the signal value was transmitted for the defined countdown, the signal manipulation automatically switches back to the signal manipulation option used before the dynamic value.

  For example, suppose you specify a dynamic value of 8 and a countdown value of 3. If you switch to the dynamic value of this signal, the signal value 8 is sent the next 3 times the TX frame is transmitted. Then the signal manipulation option is set to the previous manipulation mode.

  The generated TRC file gets corresponding entries for the dynamic value and the countdown value. You can specify default values on the Dynamic Signal Defaults Page (RTILINMM MainSetup) on page 137.
- *Dynamic value of counter signals*: For a signal you specify as a counter signal (see Counter Page (RTILINMM MainSetup) on page 138), the dynamic value can represent either the counter increment value or the transmitted counter signal value, i.e., a constant value is transmitted. After the frame was transmitted the defined number of times, the counter increment value is reset to its old value and the counter continues to count from the original value. Using the dynamic value, you cannot change the counter direction (i.e., from a positive increment value to a negative increment value) but you can set the increment value to zero.

Dialog settings

All Lets you enable the use of dynamic values for all signals to be transmitted.

None Lets you disable the use of dynamic values for all signals to be transmitted.

Selected Lets you enable the use of dynamic values for a set of signals to be transmitted.

Available signals Displays the signals that are available in the TX frames. You can filter the signals by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected signals Displays the selection of signals that is active if you select the Selected option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

Dynamic Signal Defaults Page (RTILINMM MainSetup)

Access

Located in Dynamic Signal Page (RTILINMM MainSetup) on page 135.

Purpose

To specify default dynamic values for signals to be transmitted.

Description

You can specify a default dynamic value and a default countdown value for each signal to be transmitted. For details on dynamic values and countdown values, refer to Dynamic Signal Values Page (RTILINMM MainSetup) on page 135.

Dialog settings

All defaults to zero Lets you specify the default dynamic values for all signals to zero.

User-defined defaults Lets you specify default dynamic values individually for each signal. The list displays the signals available for user-defined defaults. The following commands are available via context menu:

- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Value Lets you specify the default dynamic value. Click **Set** to assign the value to the selected signal(s).

Countdown Lets you specify the countdown value. Click **Set** to assign the value to the selected signal(s).

Set Lets you assign the specified value and countdown to the signal(s) selected in the **User-defined defaults** list.

Related topics

References

Dynamic Signal Values Page (RTILINMM MainSetup)..... 135
RTILINMM MainSetup..... 35

Counter Page (RTILINMM MainSetup)

Access

Located in Signal Manipulation Page (RTILINMM MainSetup) on page 134.

Purpose

To specify counter signals.

Description

TX frames are counted when they are transmitted.

Counter signal: For each TX frame, you can specify one or more counter signals that provide the number of frame transmissions. You can specify the counter start value, the increment, and the counter stop value. Each time the counter reaches the stop value, it turns around to the counter start value.

If you specify a counter signal and input manipulation is turned on, there is an entry in the generated TRC file that lets you switch to transmit the counter signal value.

You can manipulate TX signals with the following properties:

- Signals without encoding
- Logical values

- Physical values with an integer factor
- Length of at least 2 bits

Dialog settings

Frame Lets you specify a TX frame to be counted.

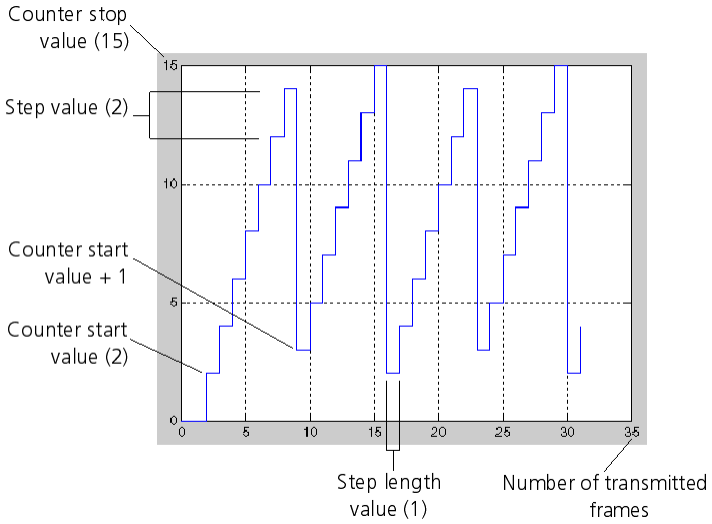
Signal Lets you specify the counter signal.

Start Lets you specify the counter start value.

Step Lets you specify the increment of the counter.

Step length Lets you specify the step length of the counter. If you specify a step length of 3, for example, the counter value remains constant for 3 frame transmissions. After the next frame transmission, the counter value is incremented by the Step value.

Max Lets you specify the counter stop value. The counter value exceeds the stop value periodically: Suppose you specify Max = 15 and Step = 2. The counter turns around to (counter start value + 1) when it reaches 14 (first period). For the second period, the counter reaches the counter stop value and turns around to the counter start value. The cycle starts again with the first period.



Show Lets you plot the specified counter signal graphically.

Set Lets you add the selected signal to the list of counter signals, or – if the selected signal already is on the list – apply a change.

Delete Lets you delete the signal selected from the list of counter signals.

Filter Lets you filter and select signals in the Filter Dialog (RTILINMM MainSetup).

User-defined counter signals Lists the user-defined counter signals. The following commands are available via context menu:

- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Related topics

References

Filter Dialog (RTILINMM MainSetup)..... 50
RTILINMM MainSetup..... 35

Signal Default Manipulation Page (RTILINMM MainSetup)

Access

Located in TX Page (RTILINMM MainSetup) on page 124.

Purpose

To set the default signal manipulation option of signals to be transmitted (TX signals).

Description

You can define a default signal manipulation option for each signal to be transmitted.

Dialog settings

All to default Lets you set the default manipulation option of all signals to be transmitted. The first applicable default from the following sequence is used:

- Input
- Counter
- Constant

User-defined defaults Lets you set the default signal manipulation option individually for each signal to be transmitted. The list displays the user-defined defaults. The following commands are available via context menu:

- Set All to Default
- Set All to Constant

- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Set All to Default Lets you set the default manipulation option of all signals to be transmitted.The first applicable default from the following sequence is used:

- Input
- Counter
- Constant

Set All to Constant Lets you set the default signal manipulation option of all signals to be transmitted to **Constant**.

For input signals for which you did not enable input manipulation on the Input Manipulation Page (RTILINMM MainSetup) on page 126, you cannot select **Constant** as a data source.

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Default Manipulation Lets you specify the default manipulation to the signal(s) selected from the list of **User-defined defaults**. The following signal manipulation options are available depending on the signal manipulation option you enabled:

Signal Manipulation Option	Option is Available if …
Constant	Always available except for the following case: The signal is specified as a TX model signal on the Model Signals (TX) Page (RTILINMM MainSetup) on page 125, and input manipulation is disabled for the signal on the Input Manipulation Page (RTILINMM MainSetup) on page 126.
Input	The signal is specified as a TX model signal on the Model Signals (TX) Page (RTILINMM MainSetup) on page 125.
Counter	The signal is specified as a counter signal on the Counter Page (RTILINMM MainSetup) on page 138.

Set Lets you assign the specified default manipulation to the signal(s) selected from the list of **User-defined defaults**.

Related topics

References

RTILINMM MainSetup..... 35

Model Signals (RX) Page (RTILINMM MainSetup)

Access

Located in Signals Page (RTILINMM MainSetup) on page 124.

Purpose

To specify RX signals as RX outport signals (RX model signals).

Description

You can analyze received signals (RX signals). The generated TRC file gets an entry for each signal in an RX frame for this purpose. This allows you to analyze the RX signal from within ControlDesk.

RX model signals: You can also analyze RX signals in the model. You have to specify them as RX model signals for this purpose.

- The RTILINMM MainSetup block gets a corresponding **RX Data** outport (see RTILINMM MainSetup on page 35) that allows you to analyze RX model signals in the model. Connecting a Simulink Bus Selector block to this outport gives you easy access to all RX model signals.
- The generated TRC file also gets entries for signals specified as RXmodel signals.

Note

For optimum performance, you should specify as few RX model signals as possible.

Dialog settings

All Lets you specify all RX signals as RX model signals.

None Lets you select none of the available RX signals as RX model signals.

Selected Lets you specify a set of the available RX signals as RX model signals.

Available signals Displays the signals that are available in the RX frames. You can filter the signals by their names for easier selection via context menu.

Filter (Available via context menu) Lets you filter and select list items via the Filter Dialog (RTILINMM MainSetup) on page 50.

Selected signals Displays the selection of RX model signals that is active if you select the **Selected** option. The following commands are available via context menu:

- All
- None

All (Available via context menu) Lets you add all the available items (nodes, frames, or signals) to the list.

None (Available via context menu) Lets you remove all the list items.

Related topics

References

RTILINMM MainSetup....35

General Options Page (RTILINMM MainSetup)

Access

Located on the top level of the dialog tree.

Dialog pages

You can specify general options on the following pages:

- TRC Page (RTILINMM MainSetup) on page 143
- Periphery Options Page (RTILINMM MainSetup) on page 145
- Mapping Page (RTILINMM MainSetup) on page 146

Related topics

References

RTILINMM MainSetup....35

TRC Page (RTILINMM MainSetup)

Access

Located on General Options Page (RTILINMM MainSetup) on page 143.

Dialog pages

You can specify options for the TRC file on the following pages:

- TRC Options Page (RTILINMM MainSetup) on page 144
- TRC Extras Page (RTILINMM MainSetup) on page 144

Related topics

References

RTILINMM MainSetup....35

TRC Options Page (RTILINMM MainSetup)

Access

Located in TRC Page (RTILINMM MainSetup) on page 143.

Purpose

To specify general settings for the TRC file.

Dialog settings

Hierarchy of TRC tree to this block (use / to separate levels) Lets you specify the hierarchy of nodes in the TRC file. You can specify the hierarchy starting from the BusSystems/LIN/ node down to the level of the current RTILINMM MainSetup block. Enter / to separate the hierarchy levels. For example, `BusSystems/LIN/Node_Level1/Node_Level2`.

Macros Lets you open a list of the macros that you can use for the Hierarchy of TRC tree to this block (use / to separate levels).

Frame name as top level Lets you use frame names as the topmost TRC file nodes for the current RTILINMM MainSetup block.

TX/RX as top level Lets you use "TX" and "RX" as the topmost TRC file nodes for the current RTILINMM MainSetup block. This allows you to separate TX and RX frames in the generated TRC file.

Related topics

References

RTILINMM MainSetup.....35

TRC Extras Page (RTILINMM MainSetup)

Access

Located in TRC Page (RTILINMM MainSetup) on page 143.

Purpose

To add additional information to the TRC file.

Description

RTI LIN MultiMessage Blockset lets you include database file attributes and user-defined variables to the TRC file and monitor them in ControlDesk. This allows you to display, for example, database file version information in ControlDesk. If you do not use a database, you can add only user-defined variables (see General Settings Page (RTILINMM MainSetup) on page 57).

In ControlDesk the variables and their values are read-only.

Dialog settings

Extra TRC variables Lists the additional variables and their values. You can select the variables to edit their names and values or delete them.

Name Lets you enter any character to define the name of a variable.

Note

You cannot add variables with identical names to the variable list. If you add a variable whose name already exists, the value of the existing variable is overwritten by the new value. The old value cannot be restored.

Value Lets you select an attribute of the database file or specify a user-defined value. If you select **userdefined =>**, the edit field is enabled and you can enter any numeric value. If you do not use a database, you can only add a user-defined value (see General Settings Page (RTILINMM MainSetup) on page 57).

Delete Lets you delete the selected variable from the variable list.

Set Lets you add a variable to the variable list.

Related topics

References

RTILINMM MainSetup....35

Periphery Options Page (RTILINMM MainSetup)

Access

Located in General Options Page (RTILINMM MainSetup) on page 143.

Purpose

To specify general settings for the Mapping to RTILINMM block.

Description

The **Mapping to RTILINMM Block** contains Constant blocks for every TX inport. These Constant blocks can be replaced by user data sources via the **Mapping Page (RTILINMM MainSetup)**.

Dialog settings

Create traffic output port Lets you create a **Traffic** outport. This can be useful for network management purposes. The port has a value of 1 if there is traffic on the bus, for example, when any frame or wake-up request is received. The outport value is 0 if there is no bus activity.

Create mapping block to TX Lets you add a **Mapping to RTILINMM Block** to the model. The block is connected to the **TX Data** inport of the RTILINMM

MainSetup block. The **Mapping to RTILINMM Block** is automatically added the next time you create an S-function for the RTILINMM MainSetup block. For details, refer to Mapping to RTILINMM Block on page 149.

Create option for mapping block Lets you specify how to proceed with an existing **Mapping to RTILINMM Block**. The following options are available:

Option	Description
Ask if exists	Lets you decide how to proceed with an existing **Mapping to RTILINMM Block** each time the S-function for the RTILINMM MainSetup block is created.
Overwrite if exists	Lets you overwrite the old **Mapping to RTILINMM Block** by a new one.
Add new block	Lets you add a new **Mapping to RTILINMM Block** without overwriting the old one.
Do nothing if exists	Lets you leave the existing **Mapping to RTILINMM Block** unchanged.

Name of mapping block (Available only if you select **Create mapping block to TX**) Lets you enter a name for the mapping block to be created. If you leave this field empty, a default name is used.

Related topics

References

RTILINMM MainSetup.....35

Mapping Page (RTILINMM MainSetup)

Access

Located in General Options Page (RTILINMM MainSetup) on page 143.

Purpose

To specify mapping to a user bus structure.

Description

You can connect a user-defined bus structure directly to the LINMM bus structure via a **Mapping to RTILINMM** block. This block is automatically generated if a **TX Data** inport is added to the MainSetup block (refer to Block Description (RTILINMM MainSetup) on page 36). You can define the internal structure of the **Mapping to RTILINMM** block on this page.

Note

If mapping is used in the RTILINMM MainSetup block, all errors involving incorrect structure will appear inside the RTILINMM MainSetup block.

Dialog settings

No mapping Lets you specify not to use your own mapping structure for the signals available at the TX data inport. In this case, Constant blocks are connected to the signals in the subsystems of the Mapping to RTILINMM block.

User-defined mapping Lets you specify your own mapping structure via the User-defined mapping list.

Mapping direct to MainBlock (Available only if all the signals displayed in the User-defined mapping list are assigned to a mapping structure) Lets you map the signals displayed in the User-defined mapping: list directly to the TX Data inport of the MainSetup block. In this case, the Mapping to RTILINMM block is not necessary and can be deleted if it already exists.

Note

The Mapping to RTILINMM block automatically converts all the incoming signals to the data types required by the TX Data inport. If you map signals directly to the inport, you have to make sure that all the incoming signals are already of the data type required by the inport.

User-defined mapping: Displays the signals of TX frames that are available for user-defined mapping. The following commands are available via context menu:

- Select from Bus Selector
- Configuration File – Create
- Configuration File – Add
- Configuration File – Load

Select from Bus Selector Lets you specify your own mapping structure using an existing Simulink Bus Selector block. The structure of the selected Bus Selector block is used to specify the mapping structure of the selected signal(s).

Configuration File - Create (Available via context menu) Lets you create a new configuration file from the settings on the current page. For details, refer to Configuration File on page 42.

Configuration File - Add (Available via context menu) Lets you add the settings on the current page to an existing configuration file.

Configuration File - Load (Available via context menu) Lets you load the settings of a configuration file to the current page.

Mapping structure Lets you enter the mapping structure for the selected signal(s). Then click Set.

Set Lets you assign the specified mapping structure to the signals(s) selected from the list.

Related topics

References

RTILINMM MainSetup....35

Peripheral Blocks

Introduction

The RTILINMM MainSetup block can automatically create peripheral blocks. You can use these blocks to provide the connected RTILINMM MainSetup block with frame triggering options and signals from the model to be transmitted via the corresponding LIN controller.

Where to go from here

Information in this section

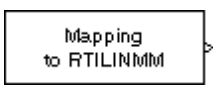
Mapping to RTILINMM Block..... 149
To map model signals to the TX data inport of the RTILINMM Main Setup block.

Information in other sections

RTILINMM MainSetup..... 35
To setup and configure LIN communication on a LIN controller.

Mapping to RTILINMM Block

Block



Purpose

To map model signals to the TX Data inport of the RTILINMM Main Setup block.

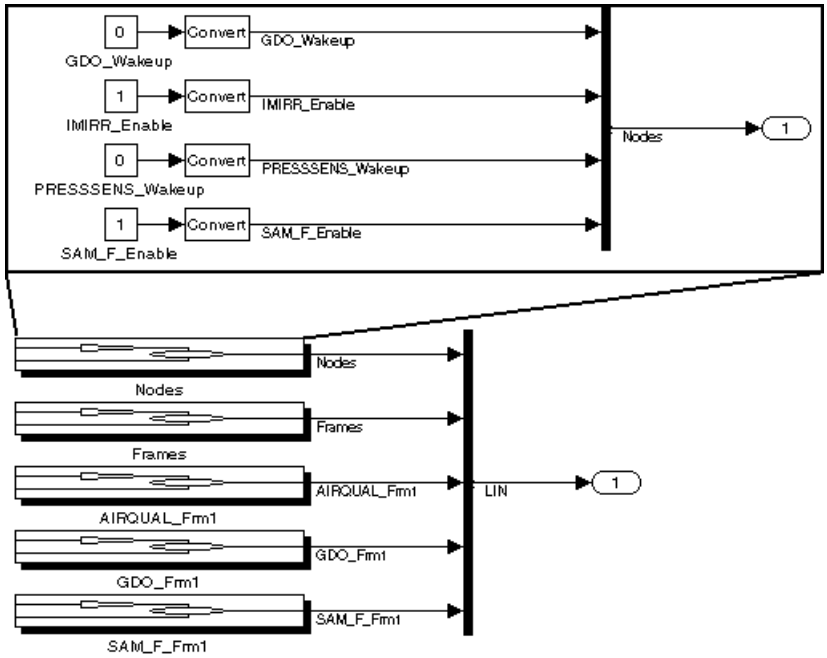
Description

This block is automatically created if the following conditions are met:

- You selected **Create mapping block to TX** on the **Periphery Options Page (RTILINMM MainSetup)**
- You specified one or more signals as TX model signals on the **Model Signals (TX) Page (RTILINMM MainSetup)**

The corresponding **RTILINMM MainSetup** gets the **TX Data** inport. This inport is automatically connected to the Mapping to RTILINMM block.

- *Signals from the model to be transmitted*: The Mapping to RTILINMM block provides the connected **RTILINMM MainSetup** with a struct containing the signals from the model to be transmitted.
- *Internal structure of the Mapping to RTILINMM block*: The illustration below shows a Mapping to RTILINMM block and its internal structure. The Mapping to RTILINMM block contains subsystems for the TX frames. Within the subsystem one Simulink Constant block is assigned to each TX model signal.



- *Specifying TX model signals from within the model*: To specify a TX model signal from within the model, replace the Simulink Ground block that corresponds to the TX model signal by an empty Simulink subsystem. Name the subsystem according to the TX model signal. Connect the model signal to the subsystem. This ensures that the TX model signal label will not get lost when you specify the model signal. To connect the model signals use the **Mapping to RTILINMM Block**. If you connect the blocks manually, the connections get lost when a new Mapping to RTILINMM block is generated.

Related topics

References

Model Signals (TX) Page (RTILINMM MainSetup)..... 125

Appendix

Where to go from here

Information in this section

Mapping Imported LDF/DBC Files and AUTOSAR System Description Files

Mapping Implicitly Generated Signals

Introduction

Unlike LDF and DBC files, AUTOSAR system description files contain signals that are not explicitly defined. Instead, they are implicitly generated from other AUTOSAR elements to make them available in RTILINMM.

Examples of such signals are listed below. The associated descriptions in the AUTOSAR system description file and in the LDF/DBC file are displayed for each example, and you can see how the database entries are mapped to the signals in RTILINMM.

Update bit for PDUs

The update bit of a PDU indicates whether data of at least one signal in the PDU is updated.

Description in AUTOSAR system description file

```
<FRAME>
   <SHORT-NAME>frame_18</SHORT-NAME>
   <FRAME-LENGTH>8</FRAME-LENGTH>
   <PDU-TO-FRAME-MAPPINGS>
      <PDU-TO-FRAME-MAPPING>
         <SHORT-NAME>frame_18_pdu</SHORT-NAME>
         <PACKING-BYTE-ORDER>MOST-SIGNIFICANT-BYTE-LAST</PACKING-BYTE-ORDER>
         <PDU-REF DEST="SIGNAL-I-PDU">signal_i_pdu_10</PDU-REF>
         <START-POSITION>0</START-POSITION>
         <UPDATE-INDICATION-BIT-POSITION>63</UPDATE-INDICATION-BIT-POSITION>
      </PDU-TO-FRAME-MAPPING>
   </PDU-TO-FRAME-MAPPINGS>
</FRAME>
```

This AUTOSAR description results in an implicit signal with the name 'frame_18_pdu_UB'.

The general rule for determining the name of a PDU update bit is `<PDU short name>_UB`.

Description in LDF file

```
Signals{
   ...
   frame_18_pdu_UB: 1, 1, SendingECU, ECU1, ECU2;
   ...
}
```

The following illustration shows what the signal description consists of:

```
<SIGNAL NAME> : 1, 1, SendingECU, ECU1,ECU2;
       |        |  |     |           |____|
       |        |  |     |             |_____ Receiving ECUs
       |        |  |     |___________________ Sending ECU
       |        |  |_________________________ Initial value
       |        |____________________________ Signal length
       |_____________________________________ Signal name
```

Description in DBC file

```
SG_ frame_18_pdu_UB  : 63|1@1+ (1,0) [0|1] "" ECU1,ECU2
```

Signal presentation in RTILINMM Based on the descriptions above, RTILINMM generates the following signal:

Signal Property	Value
Name	signal_i_pdu_10_UB
Length	1
MinValue	0
MaxValue	1
Offset	0
Scale	1
StartBit	63

Update bit for signals

The update bit of a signal indicates whether data of the signal the update bit signal belongs to is updated.

Description in AUTOSAR system description file

```
<I-SIGNAL>
   <SHORT-NAME>i_signal_113</SHORT-NAME>
   <SYSTEM-SIGNAL-REF DEST="SYSTEM-SIGNAL">system_signal_17</SYSTEM-SIGNAL-REF>
</I-SIGNAL>
<I-SIGNAL-TO-I-PDU-MAPPING>
   <SHORT-NAME>i_signal_to_i_pdu_mapping_113</SHORT-NAME>
   <PACKING-BYTE-ORDER>MOST-SIGNIFICANT-BYTE-LAST</PACKING-BYTE-ORDER>
   <SIGNAL-REF DEST="I-SIGNAL">system_signal_17</SIGNAL-REF>
   <START-POSITION>48</START-POSITION>
   <UPDATE-INDICATION-BIT-POSITION>59</UPDATE-INDICATION-BIT-POSITION>
</I-SIGNAL-TO-I-PDU-MAPPING>
```

This AUTOSAR description results in an implicit signal with the name 'system_signal_17_UB'.

The general rule for determining the name of a signal update bit is `<ISignal short name>_UB`.

Description in LDF file

```
Signals{
   ...
   system_signal_17_UB: 1, 1, SendingECU, ECU1, ECU2;
   ...
}
```

Description in DBC file

```
SG_ system_signal_17_UB : 59|1@1+ (1,0) [0|1] "" ECU1,ECU2
```

Signal presentation in RTILINMM Based on the descriptions above, RTILINMM generates the following signal:

Signal Property	Value
Name	system_signal_17_UB
Length	59
MinValue	0
MaxValue	1
Offset	0
Scale	1
StartBit	1

Related topics

References

General Settings Page (RTILINMM MainSetup)..... 57

Working with Generated TRC File Entries

Introduction

The RTI LIN MultiMessage Blockset lets you generate TRC variables for many functions. This section gives you an overview of these functions and the resulting TRC file entries.

Functions with Activated TRC Variable Generation

Introduction

The RTI LIN MultiMessage Blockset lets you activate the generation of TRC variables for many functions. This topic gives an overview of the functions for which you can enable the generation of TRC file entries and provides helpful information for working with them.

Description

The table below serves as a guide to generated TRC file entries. It provides the following information on functions for which the generation of TRC file entries can be generated:

- Default name of generated TRC variable
- Default description
- TRC path name (path which is displayed in the variable tree of ControlDesk's Variables controlbar)

Tip

For example, influencing the naming of dynamic attributes in the generated TRC file via the Naming Page (RTILINMM MainSetup) can make it difficult to find generated TRC file entries. The TRC path name helps you to locate TRC variables in ControlDesk.

- Page of the RTILINMM MainSetup block that deals with the function
- Configuration setting on the dialog page that results in generating the TRC variable

Function	Default Name	Default Description	TRC Path Name `BusSystems/LIN/<LIN controller>/...`	Page of RTILINMM MainSetup Block	Activation of TRC Variable Generation
LINName	LIN	Name of this LIN bus	`BusSystems/LIN/<LIN controller>`[1)]	General Settings Page (RTILINMM MainSetup) on page 57	Activated by default
BusState	BusState	State of LIN Bus	`BusState`	Network Node Sleep Page (RTILINMM MainSetup) on page 81	Select Generate Bus State Output Port.

Function	Default Name	Default Description	TRC Path Name `BusSystems/LIN/<LIN controller>/...`	Page of RTILINMM MainSetup Block	Activation of TRC Variable Generation
Node(RXTX) Current NAD	%NODE_CurrentNAD	Current Node Address	`<Node>_CurrentNAD`	Network Node Identification Page (RTILINMM MainSetup) on page 73	TRC/Port = 'TRC' or 'BOTH'
Node(TX) Enable	%NODE_Enable	Enable %NODE	`<Node>_Enable`	Network Node Enable Page (RTILINMM MainSetup) on page 79	Source = 'TRC' or 'BOTH'
Node(TX) GoToSleep	%NODE_GoToSleep	Enable SleepMode	`<Node>_GoToSleep`	Network Node Sleep Page (RTILINMM MainSetup) on page 81	Source = 'TRC' or 'BOTH'
Node(TX) SendSleep	%NODE_SendSleep	Send Sleep Command	`<Node>_SendSleep`	Network Node Sleep Page (RTILINMM MainSetup) on page 81	Source = 'TRC' or 'BOTH'
Node(TX) Wakeup	%NODE_Wakeup	Wakeup LIN Bus as %NODE	`<Node>_Wakeup`	Network Node Wakeup Page (RTILINMM MainSetup) on page 83	Source = 'TRC' or 'BOTH'
Node(RX) Sleep	%NODE_SleepRequest	Sleep Request received	`<Node>_SleepRequest`	Network Node Sleep Page (RTILINMM MainSetup) on page 81	Sink = 'TRC' or 'BOTH'
Node(RX) Wakeup	%NODE_ WakeupRequest	Wakeup Request received	`<Node>_WakeupRequest`	Network Node Wakeup Page (RTILINMM MainSetup) on page 83	Sink = 'TRC' or 'BOTH'
Frame(TX) Enable	%FRAME_Enable	Enable %FRAME	`<Frame>/TX/<Frame>_ Enable`	Enable Frames Page (RTILINMM MainSetup) on page 99	Source = 'TRC' or 'BOTH'
Frame(TX) Trigger Event	%FRAME_Trigger_ %ETFRAME	Trigger associated event triggered frame	`<Frame>/TX/<Frame>_ Trigger_ <EventTriggeredFrame>`	Event Triggered TX Page (RTILINMM MainSetup) on page 88	Source = 'TRC' or 'BOTH'
Frame(TX) Timeout	%FRAME_Timeout	Timeout %FRAME	`<Frame>/TX/<Frame>_ Timeout`	TX Timeout Enable Page (RTILINMM MainSetup) on page 100	Select Activate timeouts.
Frame(TX) Checksum Manipulation	%FRAME_Checksum_ Manipulation	Manipulate LIN Frame Checksum	`<Frame>/TX/<Frame>_ Checksum_Manipulation`	Dynamic LIN Frame Checksum Page (RTILINMM MainSetup) on page 120	Select Enable LIN Frame checksum manipulation.
Frame(TX) RAW Data Switch	%FRAME_RAW_DATA_ Switch	%FRAME RAW Data Switch	`<Frame>/TX/<Frame>_ RAW_DATA_Switch`	TX Raw Data Page (RTILINMM MainSetup) on page 107	Activate raw data option = 'Active' and Source of raw data = 'TRC'
Frame(TX) RAW Data	%FRAME_RAW_DATA	%FRAME RAW Data	`<Frame>/TX/<Frame>_ RAW_DATA`	TX Raw Data Display Page (RTILINMM MainSetup) on page 108	Activate raw data option = 'Active' and Source of

Function	Default Name	Default Description	TRC Path Name `BusSystems/LIN/<LIN controller>/...`	Page of RTILINMM MainSetup Block	Activation of TRC Variable Generation
					raw data = 'TRC'
Frame(TX) CRC Enable	%FRAME_crc	%FRAME CRC Switch	`<Frame>/TX/<Frame>_crc`	User Checksum Frames Page (RTILINMM MainSetup) on page 118	Select checksum algorithm for a frame.
Frame(TX) CRC Algorithm	%FRAME_CRC_Algorithm	Algorithm Index of CRC %FRAME	`<Frame>/TX/<Frame>_CRC_Algorithm`	User Checksum Frames Page (RTILINMM MainSetup) on page 118	Select checksum algorithm for a frame.
Frame(TX) CRC dynamic Algorithm	%FRAME_dyn_algorithm	Dynamic CRC Algorithm %FRAME	`<Frame>/TX/<Frame>_dyn_algorithm`	User Checksum Frames Page (RTILINMM MainSetup) on page 118	Dynamic Checksum = 'Enable'
Frame(TX) CRC dynamic Countdown	%FRAME_dyn_countdown	Dynamic countdown of CRC %FRAME	`<Frame>/TX/<Frame>_dyn_countdown`	User Checksum Frames Page (RTILINMM MainSetup) on page 118	Dynamic Checksum = 'Enable'
Frame(TX) Length	%FRAME_TX_length	%FRAME TX Length	`<Frame>/TX/<Frame>_TX_length`	Frame Length Page (RTILINMM MainSetup) on page 114	Adjust Option = 'TRC'
Frame(TX) Dynamic Length Value	%FRAME_DynamicLengthValue	Frame Dynamic Length Value	`<Frame>/TX/<Frame>_DynamicLengthValue`	Frame Length Page (RTILINMM MainSetup) on page 114	Adjust Option = 'TRC' and select Activate dynamic frame length.
Frame(TX) Dynamic Length Countdown	%FRAME_DynamicLengthCountdown	Frame Dynamic Length Countdown	`<Frame>/TX/<Frame>_DynamicLengthCountdown`	Frame Length Page (RTILINMM MainSetup) on page 114	Adjust Option = 'TRC' and select Activate dynamic frame length.
Frame(TX) CCEnable(1)	%FRAME_CC_preCRC	Enable CC %FRAME pre CRC	`<Frame>/TX/<Frame>_CC_preCRC`	Custom Code Page (RTILINMM MainSetup) on page 121	Option = 'pre CRC'
Frame(TX) CCEnable(2)	%FRAME_CC_postCRC	Enable CC %FRAME post CRC	`<Frame>/TX/<Frame>_CC_postCRC`	Custom Code Page (RTILINMM MainSetup) on page 121	Option = 'post CRC'
Frame(RXTX) Current ID	%NODE_%FRAME_CurrentID	current Frame ID for Node %NODE	`<Frame>/TX/<Frame>_CurrentID`	Frame ID Assignment Page (RTILINMM MainSetup) on page 76	TRC/Port = 'TRC' or 'BOTH'
Signal(TX) Switch	%SigName_Switch	Switch %SigName	`<Frame>/TX/<Signal>_Switch`	TX Page (RTILINMM MainSetup) on page 124	Select two or more signal manipulation

Function	Default Name	Default Description	TRC Path Name `BusSystems/LIN/<LIN controller>/...`	Page of RTILINMM MainSetup Block	Activation of TRC Variable Generation
					options (e.g., TRC and Inport).
Signal(TX) Constant	%SigName	%SignalDesc	`<Frame>/TX/<Signal>`	TX Frames Page (RTILINMM MainSetup) on page 86	Select a frame containing a signal.
Signal(TX) DynValue	x%SigName_dynvalue	Dynamic Value for %SigName	`<Frame>/TX/<Signal>_dynvalue`	Dynamic Signal Values Page (RTILINMM MainSetup) on page 135	Select a signal.
Signal(TX) DynCountdown	%SigName_dyncount	Countdown for Dynamic Value	`<Frame>/TX/<Signal>_dyncount`	Dynamic Signal Values Page (RTILINMM MainSetup) on page 135	Select a signal.
Frame(RX) Status	%FRAME_status	%FRAME Status	`<Frame>/RX/<Frame>_status`	RX Status and Time Ports Page (RTILINMM MainSetup) on page 103	Select a frame.
Frame(RX) Time	%FRAME_time	%FRAME Time	`<Frame>/RX/<Frame>_time`	RX Status and Time Ports Page (RTILINMM MainSetup) on page 103	Select a frame.
Frame(RX) Delta Time	%FRAME_delta_time	%FRAME Delta Time	`<Frame>/RX/<Frame>_delta_time`	RX Status and Time Ports Page (RTILINMM MainSetup) on page 103	Select a frame.
Frame(RX) Length	%FRAME_length	%FRAME Length	`<Frame>/RX/<Frame>_length`	Frame Length Page (RTILINMM MainSetup) on page 114	Adjust Option = 'TRC'
Frame(RX) Checksum	%FRAME_checksum	%FRAME Checksum	`<Frame>/RX/<Frame>_checksum`	RX Frames Checksum Display Page (RTILINMM MainSetup) on page 105	Select a frame.
Frame(RX) ID	%FRAME_ID	%FRAME ID	`<Frame>/RTILINMMCaptureMessage_[number]/RTILINMMCaptureMessage_[number]_ID`	Capture Frames Page (RTILINMM MainSetup) on page 98	Set Number of frames to capture in one sample step to a value > 0, and select Add captured frames to TRC file.
Frame(RX) Error	%FRAME_error	%FRAME Error	`<Frame>/RX/<Frame>_error`	RX Error Display Page (RTILINMM MainSetup) on page 113	Select a frame.
Frame(RX) Autodecode	%FRAME_Decode_%ETFRAME	copy data from event triggered frame	`<Frame>/RX/<Frame>_Decode_<EventTriggeredFrame>`	Event Triggered RX Page (RTILINMM MainSetup) on page 92	Source = 'TRC' or 'BOTH'
Frame(RX) RAW Data	RAW_DATA	%FRAME RAW Data	`<Frame>/RX/RAW_DATA`	RX Raw Data Display Page (RTILINMM MainSetup) on page 110	Select a frame.

Function	Default Name	Default Description	TRC Path Name `BusSystems/LIN/<LIN controller>/...`	Page of RTILINMM MainSetup Block	Activation of TRC Variable Generation
Signal(RX) Name	%SigName	%SignalDesc	`<Frame>/RX/<Signal>_ <frame number>`	RX Frames Page (RTILINMM MainSetup) on page 87	Select a frame.

[1] `BusSystems/LIN/<LIN controller>` is the full TRC path for the variable.

Related topics

References

Naming Page (RTILINMM MainSetup)..... 64

Limitations

Limitations of RTI LIN MultiMessage Blockset

Introduction

Limitations apply when you use the RTI LIN MultiMessage Blockset.

RTI LIN MultiMessage Blockset

The following limitations apply to the RTI LIN MultiMessage Blockset:

- Do not use the RTI LIN MultiMessage Blockset in enabled subsystems, triggered subsystems and configurable subsystems. As an alternative, you can disable nodes or frames of the RTI LIN MultiMessage Blockset by setting the corresponding option.
- Do not run the RTI LIN MultiMessage Blockset in a separate task.
- Do not copy blocks of the RTI LIN MultiMessage Blockset. To add further blocks of the RTI LIN MultiMessage Blockset to a model, always take them directly from the **rtilinmmlib** library.
- If you switch the platform from a SCALEXIO system to a non-SCALEXIO system or vice versa, you have to recreate all RTILINMM blocks. To recreate all RTILINMM blocks at once, select **Create S-function for all LIN Blocks** from the **Options** menu of the GeneralSetup block (refer to Options Menu (RTILINMM GeneralSetup) on page 31).

  If you switch the platform from one non-SCALEXIO system to another (for example, from a DS1006 to a MicroAutoBox II) but the board and channel settings are not suitable for the new platform, you have to open the RTILINMM ControllerSetup blocks and recreate the S-functions for the blocks.
- RTILINMM ControllerSetup blocks that are added to the model but that are not assigned to RTILINMM MainSetup blocks (i.e., 'free floating' RTILINMM ControllerSetup blocks) do not initialize LIN channels of the real-time hardware. Therefore, these LIN channels cannot be accessed during run time via ControlDesk or Real-Time Testing (RTT) (e.g., for monitoring purposes).
- The RTI LIN MultiMessage Blockset is not included in the RTI update mechanism and is not updated when you open a model with an older version. To update the RTI LIN MultiMessage Blockset, invoke **Create S-Function for all LIN Blocks** from the **Options** menu of the RTILINMM GeneralSetup block (refer to RTILINMM GeneralSetup on page 29).

  As an alternative, you can create new S-functions for all RTILINMM blocks manually (use the following order):

  1. RTILINMM GeneralSetup
  2. RTILINMM ControllerSetup
  3. RTILINMM MainSetup
- Model path names with multi-byte character encodings are not supported.
- The RTI LIN MultiMessage Blockset generates data structures on the basis of the relevant element names specified in the database file. The length of an

element name is limited to 56 characters. If an element name exceeds this limit, the RTI LIN MultiMessage Blockset shortens the name to 56 characters, using a checksum to ensure name uniqueness, and makes an entry in the log file.

The following list shows the element types whose maximum name length must not exceed 56 characters:

- Frames
- Event-triggered frames
- Signals
- UpdateBit signals
- Nodes
- Schedules
- Schedule entries

- Simulink can store design data that your model uses in a data dictionary as a persistent repository. Data dictionaries are not supported by the RTI LIN MultiMessage Blockset.

DBC file as the database

The following limitations apply if your database file is in the DBC file format:

- As the CAN protocol has no standard definitions for master nodes and schedules, such definitions are not supported by the DBC files.
- According to the LIN specification only byte layouts in the Intel format are supported. Byte layouts in Motorola format are not supported.

LDF file as the database

The RTI LIN MultiMessage Blockset does not support multiple physical encodings in the LDF file. If several physical encoding types are defined for a signal, the RTI LIN MultiMessage Blockset uses the first type it finds for the signal.

FIBEX file as the database

The following limitations apply if you import a FIBEX file as the database:

- The RTI LIN MultiMessage Blockset does not support multiple computation methods for signals. If several CompuMethods are defined for a signal in the FIBEX file, the RTI LIN MultiMessage Blockset uses the first linear computation method it finds for the signal.
- You cannot specify the checksum calculation type individually for each LIN communication frame. The RTI LIN MultiMessage Blockset always uses specific checksum calculation types as follows:
  - As of LIN protocol version 2.0, the 'ENHANCED' checksum calculation type is used.
  - For LIN protocol versions < 2.0, the 'CLASSIC' checksum calculation type is used.
  - The 'CLASSIC' checksum calculation type is always used for the master request and slave response frames.

MAT file as the database

In the RTI LIN MultiMessage Blockset, the length of signal names is restricted to 32 characters. However, MATLAB allows longer signal names. When MATLAB entries are mapped to the signals in RTILINMM, the signal names are truncated at the end and supplemented by a consecutive number, if necessary. To ensure that unchanged signal names are used in the RTI LIN MultiMessage Blockset, the signal names in the Simulink model must not exceed 32 characters.

AUTOSAR system description file as the database

The following limitations apply if you import an AUTOSAR system description file as the database:

Limitation	Limitation Applies to AUTOSAR Release												
	3.1.4	3.2.1	3.2.2	4.0.3	4.1.1	4.1.2	4.2.1	4.2.2	4.3.0	4.3.1	4.4.0	Classic R19-11[1)]	Classic R20-11[2)]
Configuring selected slave nodes via RTI LIN MultiMessage Blockset is not possible due to the following limitations, which apply to AUTOSAR System Templates:													
▪ In AUTOSAR, it is not possible to define collision resolver schedules for event-triggered frames. So if your database file is an AUTOSAR system description file, you have to manually assign a collision schedule to each event-triggered frame on the Collision Resolver Page (RTILINMM MainSetup).	✓	✓	✓	–	–	–	–	–	–	–	–	–	–
▪ The following initial node configuration parameters for slave nodes are not provided by AUTOSAR system description files: ▪ Supplier ID ▪ Function ID ▪ Variant ID ▪ Initial NAD For the first three parameters, no identifier values are displayed on the Network Node Identification Page (RTILINMM MainSetup). However, you can specify an initial node address (NAD). By default, the configured NAD is used. If you do not specify an initial NAD, the selected node is interpreted as an unconfigured slave node.	✓	✓	✓	–	–	–	–	–	–	–	–	–	–
▪ AUTOSAR does not support the assignment of lists of configurable frames to network nodes. Thus, you cannot select configurable frames to specify an initial frame ID.	✓	✓	✓	–	–	–	–	–	–	–	–	–	–
When importing an AUTOSAR system description file as the database, the RTI LIN MultiMessage Blockset supports the computation method from source value to physical representation (converted value) only.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
The RTI LIN MultiMessage Blockset does not support the following features that can be defined in an AUTOSAR system description file: ▪ End-to-end communication protection (E2E protection) ▪ Unit groups	– [3)]	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Limitation	Limitation Applies to AUTOSAR Release												
	3.1.4	3.2.1	3.2.2	4.0.3	4.1.1	4.1.2	4.2.1	4.2.2	4.3.0	4.3.1	4.4.0	Classic R19-11[1)]	Classic R20-11[2)]
When working with an AUTOSAR ECU Extract as the database, the RTI LIN MultiMessage Blockset does not support the import of an AUTOSAR ECU Extract that describes a slave node.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1) AUTOSAR Classic Platform Release R19-11
2) AUTOSAR Classic Platform Release R20-11
3) E2E protection is not supported by this AUTOSAR Release.

- The RTI LIN MultiMessage Blockset does not support the new features of AUTOSAR Release 4.4.0 and AUTOSAR Classic Platform Release R19-11 and R20-11.

Limitations with LIN specifications 2.x

- The RTI LIN MultiMessage Blockset does not support sporadic frames.
- The RTI LIN MultiMessage Blockset does not support dynamic frames. (Dynamic frames are provided by the LIN 2.0 specification only.)
- With a LIN node configuration compliant with LIN 2.0 and later, the RTI LIN MultiMessage Blockset supports the slave node configuration only. You can implement master functionality for a node configuration in the Simulink model, for example, by using raw data access for the master request frame. Refer to Network Node Configuration Page (RTILINMM MainSetup) on page 70.
- The RTI LIN MultiMessage Blockset does not support assign NAD frames.
- The RTI LIN MultiMessage Blockset does not support assign frame ID range frames.
- The RTI LIN MultiMessage Blockset does not support conditional change NAD frames.

Limitations with SAE J2602 support

The following limitations apply to J2602 support by the RTI LIN MultiMessage Blockset:

- The RTI LIN MultiMessage Blockset supports the SAE J2602 standard. It expects LIN protocol version J2602_1_1.0 and LIN language version J2602_3_1.0. If you use an LDF or AUTOSAR system description file with a different J2602 protocol version or language version (the version must also start with "J2602"), the RTI LIN MultiMessage Blockset continues working but this may lead to unpredictable behavior. A warning message is generated in the log file.
- The RTI LIN MultiMessage Blockset does not support sporadic frames.
- With a LIN node configuration compliant with J2602, the RTI LIN MultiMessage Blockset supports the slave node configuration according to LIN 2.0 only. You can implement master functionality for a node configuration in the Simulink model, for example, by using raw data access for the master request frame. Refer to Network Node Configuration Page (RTILINMM MainSetup) on page 70.

- When you import a J2602-compliant LDF or AUTOSAR system description file, the following optional master parameters are ignored by the RTI LIN MultiMessage Blockset:
  - max_header_length
  - response_tolerance
- When you import a J2602-compliant LDF or AUTOSAR system description file, the following optional node attributes are ignored by the RTI LIN MultiMessage Blockset:
  - response_tolerance
  - wakeup_time
  - poweron_time
- Compliance with J2602 response tolerances cannot be ensured.
- The maximum number of supported schedule table entries is 255.
- In contrast to the SAE J2602 specification, the unused bits of a frame are transmitted as dominant bits (0), not as recessive bits.
- Every clearly identified signal may be contained only once in a frame.
- The RTI LIN MultiMessage Blockset does not abort header transmission if an error occurs.
- The RTI LIN MultiMessage Blockset cannot access certain error states (ID parity error, framing error, bit error). There is no possibility to react to these errors within the model.
- There is no automatic parameterization of the J2602 status byte.
- The RTI LIN MultiMessage Blockset does not automatically support the Targeted Reset.
- The RTI LIN MultiMessage Blockset does not support the J2602 broadcast reset functionality.
- The RTI LIN MultiMessage Blockset does not support wake-up timings as specified in the J2602 standard. There is no automatic generation of wake up request sequences. If necessary, you can implement wake up request sequences in the Simulink model by using wake up requests which are supported by the RTI LIN MultiMessage Blockset.
- According to the J2602 specification, a sleep mode that lasts for at least four seconds is interpreted as a bus error. This error is indicated by the J2602 status byte. The RTI LIN MultiMessage Blockset does not interpret a sleep mode of this length as an error.
- According to the J2602 specification, a baud rate accuracy of ±0.5% is required. For the MicroAutoBox II, this condition is not met for the standard base baud rate of 10417 bit/s. The closest available baud rate of 10472 bit/s (which corresponds to a variance of +0.53%) is used instead.

Visualization with the Bus Navigator

The current version of the RTI LIN MultiMessage Blockset supports visualization with the **Bus Navigator** in ControlDesk 4.2.1 or later. You cannot work with earlier versions of ControlDesk in connection with applications created with the current version of the RTI LIN MultiMessage Blockset.

Related topics

References

Collision Resolver Page (RTILINMM MainSetup)....96
Network Node Identification Page (RTILINMM MainSetup)....73

Migration

Migrating from an Earlier Version of the RTI LIN MultiMessage Blockset

Working with models from earlier RTI LIN MultiMessage Blockset versions

To reuse a model created with an earlier RTI LIN MultiMessage Blockset version, you must update the S-functions for all the RTILINMM blocks and save the model before modifying the LIN configuration.

To create new S-functions for all the RTILINMM blocks in a model in one step, you can perform one of the following actions after opening the model:

- In the MATLAB Command Window, enter `rtimmsu_update('System', bdroot)`.

  For more information on the command and its options, enter `help rtimmsu_update` in the MATLAB Command Window.
- Select the **Create S-Function for all LIN Blocks** command from the **Options** menu of the RTILINMM GeneralSetup block.

For more information, refer to Limitations of RTI LIN MultiMessage Blockset on page 162.