DS2401 Resistive Sensor Simulation Board

RTI Reference

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dSPACE

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About This Reference

Contents

This reference provides a full description of the Real-Time Interface (RTI) software support for the DS2401 Resistive Sensor Simulation Board.

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.
	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.

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 DS2401 Blockset

Introduction

Here you get basic information on the DS4201 blockset.

Overview of the DS2401 Blockset

About the board

The DS2401 Resistive Sensor Simulation Board features four resistor output channels. It can be used to simulate sensors with resistance output such as thermistors or resistance temperature detectors (RTDs). The resistance written to the DS2401 board is simulated electronically between the two output plugs of each channel.

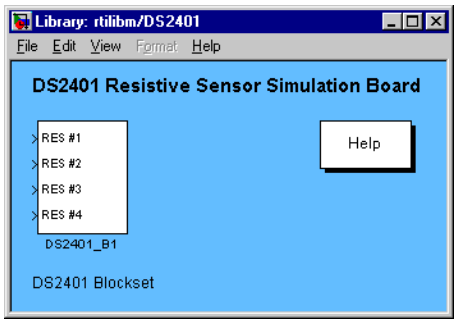
RTI blockset

The Real-Time Interface (RTI) board library for the DS2401 Resistive Sensor Simulation Board provides the RTI blocks that implement the functionality and I/O capabilities of the DS2401 board in Simulink models.

Library access

DS2401

After you double-click the corresponding board library icon in the library rtilibm the Library: rtilibm/DS2401 opens:



Libray components

The following I/O unit can be accessed by the RTI blockset for the DS2401:

- Resistive Sensor Simulation Unit on page 11

Demo model

For Simulink models, that shows how to use the RTI blocks of the DS2401 board, refer to the RTI demo library of your processor board. You can find the model files also at `<RCP_HIL_InstallationPath>\Demos\ds100x\RTI`.

Resistive Sensor Simulation Unit

Introduction

The Library: rtilibm/DS2401 provides access to the Resistive Sensor Simulation unit of the DS2401.

DS2401_Bx

Purpose

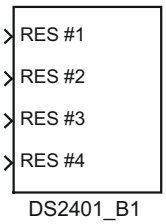
To provide write access to the 4 resistive sensor simulation channels.

Where to go from here

Information in this section

Block Description (DS2401_Bx)

Illustration



Purpose

To provide write access to the 4 resistive sensor simulation channels.

I/O mapping

For details on the I/O connector pinouts of the DS2401, refer to Details of the Resistive Sensor Simulation Unit (DS2401 Features 🕮).

I/O characteristics

- The scaling between the output resistance and the input of the block is:

Output Resistance	Simulink Input
10 Ω … 500 kΩ.	10.0 … 500,000.0

- Block inputs outside the valid range are saturated to the minimum or maximum limit, respectively.
- The resolution of all channels is 12 bits.

⚠ WARNING

The resistors operate in the range between ±20 V and ±20 mA. The overload protection withstands up to 100 V.

Dialog pages

The dialog settings can be specified on the following pages:

- Unit Page (refer to Unit Page (DS2401_Bx) on page 13)
- Initialization Page (refer to Initialization Page (DS2401_Bx) on page 13)
- Termination Page (refer to Termination Page (DS2401_Bx) on page 14)

Related topics

Basics

Resistive Sensor Simulation Unit (DS2401 Features 🕮)

Unit Page (DS2401_Bx)

Purpose

To specify the board number.

Dialog settings

Board number Lets you select the board number in the range 1 … 16. If your system contains several boards of the same type, RTI uses the board number to distinguish between them.

Related topics

References

Initialization Page (DS2401_Bx)

Purpose

To specify the initial output resistance value at the start of the simulation.

Dialog settings

Initialization value Lets you select valid values within the range 10 Ω … 500 kΩ for each channel. To assign one value to all of the 4 channels, specify the desired value in the lowest row before pushing the **Set all** button.

Related topics

References

Termination Page (DS2401_Bx)..... 14
Unit Page (DS2401_Bx)..... 13

Termination Page (DS2401_Bx)

Purpose

To specify the termination resistance value.

Description

The total output resistance range is automatically switched between the 4 board-internal ranges:

- 10 Ω … 250 Ω
- 200 Ω … 5 kΩ
- 2 kΩ … 50 kΩ
- 20 kΩ … 500 kΩ

Dialog settings

Output on termination Either keep the current output resistance when the simulation terminates or select the checkbox to specify the desired value of the output resistance. Valid values must remain within 10 Ω … 500 kΩ. It is selectable for each channel. To assign one termination state to all of the channels, select the checkbox in the lowest row and specify the desired value before clicking **Set all**.

The specified termination values of I/O channels are set when the simulation executes its termination function by setting the `simState` variable to STOP. If you stop the real-time application by using ControlDesk's **Stop RTP** command, the processor resets immediately without executing termination functions. The current values of the I/O channels are kept and the specified termination values are not set.

Related topics

References

Initialization Page (DS2401_Bx)..... 13
simState (RTI and RTI-MP Implementation Reference 🕮)
Stop RTP (ControlDesk Platform Management 🕮)
Unit Page (DS2401_Bx)..... 13