DS2101 D/A Board

Features

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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

Content	This document provides feature-oriented access to the information you need to implement the functions of the DS2101.

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.

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.

Introduction to the Features of the DS2101

Introduction

The DS2101 D/A Board provides five parallel D/A channels that you can use for D/A conversion.

For technical details, refer to Data Sheets (PHS Bus System Hardware Reference 📖).
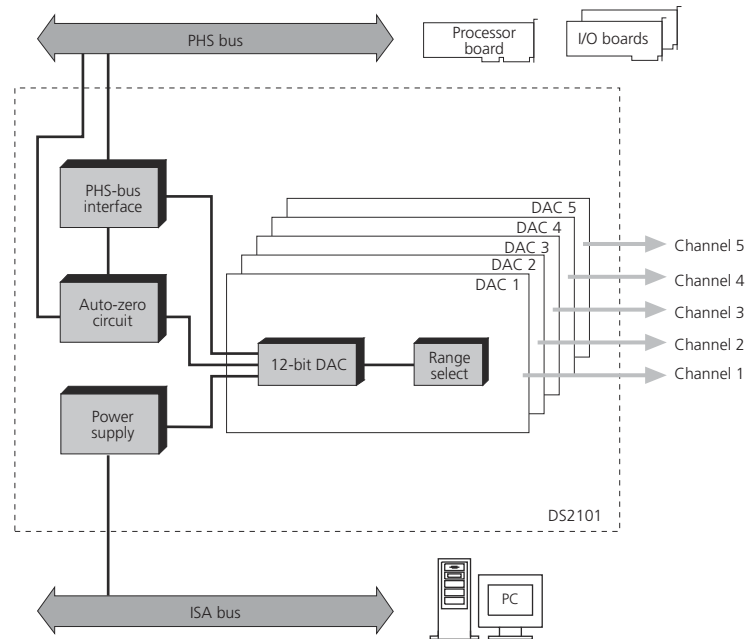
Where to go from here

Information in this section

Board Architecture

Board overview

The following illustration gives an overview of the functional units and architecture of the DS2101:

Integration Into a PHS-Bus-Based System

Basics

To be used, the DS2101 must be integrated into a PHS-bus-based system. While the DS2101 performs the required output tasks, the processor board takes over the calculation of the real-time model. That is, applications using DS2101 I/O features are implemented on the processor board.

Communication between processor board and I/O board is performed via the peripheral high speed bus: That is the PHS bus for connection to a dSPACE processor board.

Partitioning the PHS bus with the DS802   With the DS802 PHS Link Board you can spatially partition the PHS bus by arranging the I/O boards in several expansion boxes.

The DS802 can be used in combination with many types of available dSPACE I/O boards. However, some I/O boards and some functionalities of specific I/O boards are not supported.

The I/O board support depends on the dSPACE software release which you use. For a list of supported I/O boards, refer to DS802 Data Sheet (PHS Bus System Hardware Reference 📖).

Connection to external devices

Basics

There are two different ways to connect external devices to the DS2101. To access the I/O units of the DS2101, connect external devices:

- To the 25-pin DAC connector P1 of the DS2101
- To the optional connector panel CP2101, equipped with BNC connectors CP1 … CP5
- To the optional Sub-D/BNC adapter cable DAC-BNC5

DAC Unit

DAC Unit

Characteristics

The DS2101 provides a DAC unit featuring 5 parallel D/A converters. They have the following characteristics:

- 12-bit resolution
- ±5 V, ±10 V or 0 … 10 V output voltage range (selectable for each of the 5 D/A converters individually)

Transparent and latched mode

The DAC unit can be driven in two operating modes:

- In the *transparent mode* the converted value is output immediately.
- In the *latched mode* the converted value is output after a strobe command by the application from the processor board. This allows you to write output values to more than one channel, and output the values simultaneously.

  To generate the strobe command, use the ds2101_strobe function.

  This mode is not supported by RTI.

Reacting to I/O errors

If another I/O board activates the I/O error signal line of the PHS bus, the DS2101 provides two different modes:

- If the *I/O error mode* is enabled, the output is reset to zero and remains zero until a new output value is written to the channel.
- If the *I/O error mode* is disabled, an I/O error has no influence on the output value.

You can set the *I/O error mode* of the D/A converters with RTI and RTLib.

Power-up state

On power-up of the DS2101, each output channel of the DAC unit is set to 0 V.

RTI/RTLib support   You can access the DAC unit via DS2101 Blockset and RTLib. For details, see

- DAC Unit in the *DS2101 RTI Reference*
- DAC Unit in the *DS2101 RTLib Reference*

Execution times   For details on the execution times and the corresponding measurement setup, refer to Function Execution Times.

Connecting external devices   For an excerpt from the circuit diagram that shows the I/O circuit and for information on the electrical characteristics and signal conditioning of the DAC unit, refer to Signal Connection to External Devices.

I/O mapping   The following table shows the mapping between the RTI block and RTLib functions and the corresponding pins used by the DAC unit.

Related RTI Block	Ch (RTI)	Related RTLib Functions	Ch (RTLib)	Conn. Pin	Pin on CP	Signal
DS2101_Bx	Ch 1	See DAC Unit	Ch 1	P1 2	P1	DAC1
	Ch 2		Ch 2	P1 17	P2	DAC2
	Ch 3		Ch 3	P1 7	P3	DAC3
	Ch 4		Ch 4	P1 22	P4	DAC4
	Ch 5		Ch 5	P1 12	P5	DAC5