DS5202 FPGA Base Board

RTLib Reference

Release 2021-A – May 2021

dSPACE

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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 Reference

Content

This reference gives you a short overview of the DS5202 FPGA Base Board and describes the C functions and macros you need to program it.

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 DS5202

Objective

The DS5202 FPGA Base Board provides a field programmable gate array (FPGA) and connectors for a customization module (piggy-back module) for implementing customer-specific I/O adaptations. The FPGA application and the I/O drivers are developed at dSPACE according to project-specific requirements.

Where to go from here

Information in this section

DS5202 Board Architecture 8
Overview of the functional units and architecture of the DS5202.

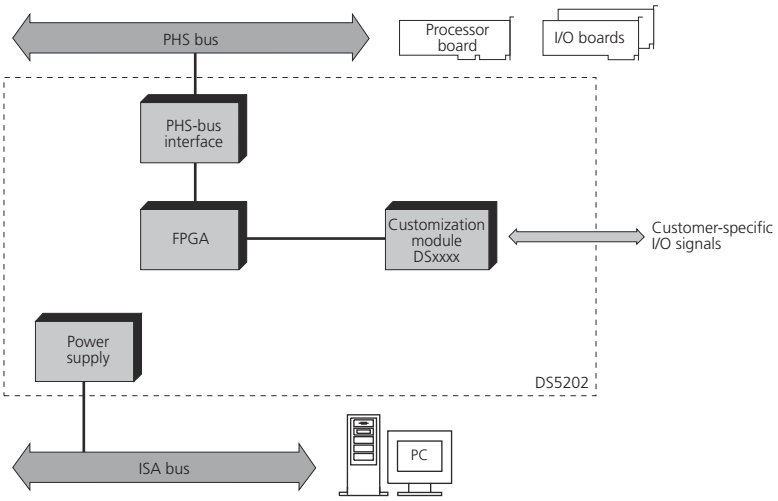
Information in other sections

DS5202 FPGA Base Board (PHS Bus System Hardware Reference 🕮)

DS5202 Board Architecture

Board architecture

The illustration gives an overview of the functional units and architecture of the DS5202.



Macros

Base Address of the I/O Board

DSxxxx_n_BASE Macros

When using I/O board functions, you always need the board's base address as a parameter. This address can easily be obtained by using the `DSxxxx_n_BASE` macros, where `DSxxxx` is the board name (for example, DS2001) and `n` is an index which counts boards of the same type. The board with the lowest base address is given index 1. The other boards of the same type are given consecutive numbers in order of their base addresses.

The macros reference an internal data structure which holds the addresses of all I/O boards in the system. The initialization function of the processor board (named `init`) creates this data structure. Hence, when you change an I/O board base address, it is not necessary to recompile the code of your application. For more information on the processor board's initialization function, refer to ds1006_init (DS1006 RTLib Reference 🕮) or init (DS1007 RTLib Reference 🕮).

Note

The `DSxxxx_n_BASE` macros can be used only after the processor board's initialization function `init` is called.

Example

This example demonstrates the use of the `DSxxxx_n_BASE` macros. There are two DS2001 boards, two DS2101 boards, and one DS2002 board connected to a PHS bus. Their base addresses have been set to different addresses. The following table shows the I/O boards, their base addresses, and the macros which can be used as base addresses:

Board	Base Address	Macro
DS2001	00H	`DS2001_1_BASE`
DS2002	20H	`DS2002_1_BASE`
DS2101	80H	`DS2101_1_BASE`

Board	Base Address	Macro
DS2001	90H	DS2001_2_BASE
DS2101	A0H	DS2101_2_BASE

Initialization Function

Introduction	You have to perform the initialization process before you can use the DS5202 board.

DS5202_init

Syntax	`void ds5202_init(` `  phs_addr_t base)`
Include file	`ds5202.h`
Purpose	To initialize the DS5202.
Description	This function enables the PHS++ mode and checks whether the customer hardware (piggy-back module family) matches the DS5202 FPGA application family.
Parameters	**base** Specifies the PHS-bus base address. Refer to Base Address of the I/O Board on page 9.
Return value	None

Error messages

The following messages are defined:

ID	Type	Message	Description
201	Error	ds5202_init(0x??): Invalid PHS-bus base address 0x??!	The value of the base parameter is not a valid PHS-bus address. This error may be caused if the PHS-bus connection of the I/O board is missing. Check the connection.
260	Error	ds5202_init(0x??): Board not found!	No DS5202 could be found at the specified PHS-bus board address. Check if the DSxxxx_n_BASE macro corresponds to the I/O board used.
261	Error	ds5202_init(0x??): Board is not responding! Hardware reset failed.!	The DS5202 board FPGA has not booted after power-up.
262	Error	ds5202_init(0x??): Piggy-back family 0x?? is not matching DS5202 FPGA family 0x??!	The piggy-back family does not match the FPGA application family.

Example

This example shows how to use the function:

```
void main(void)
{
   init();
   ds5202_init(DS5202_1_BASE);
   …
}
```

The DS5202 at address `DS5202_1_BASE` is initialized.

Related topics

References

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