SoC Designer
DS-5 Debugger Application Note

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Release Information

The following changes have been made to this document.

<table>
<thead>
<tr>
<th>Date</th>
<th>Issue</th>
<th>Confidential</th>
<th>Change</th>
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<tbody>
<tr>
<td>May 2016</td>
<td>A</td>
<td>Non-Confidential</td>
<td>Restamp release with 8.4</td>
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<tr>
<td>November 2016</td>
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<td>Non-Confidential</td>
<td>Release with 9.0.0</td>
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Product Status

The information in this document is final, that is for a developed product.

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1 Introduction

This document describes how to integrate the ARM® Development Studio 5 (DS-5) Debugger with ARM SoC Designer.

1.1 Audience

This application note is intended for experienced developers who are familiar with the following products and technology:

- ARM DS-5
- SoC Designer

1.2 Requirements, Limitations, and Supported Models

1.2.1 DS-5-related Requirements

The instructions in this document have been verified using DS-5 Version 5.24. Note that:

- From the Help > ARM License Manager pop-up dialog, you must select the “ARM DS-5 Ultimate Edition” toolkit.

Refer to the DS-5 documentation for platform requirements.

In general, you should maintain multiple DS-5 debug configurations that represent various system and software configurations. For example, two different software programs running on the same SoC Designer system require separate debug configurations.

1.2.2 SoC Designer Support

SoC Designer Version 9.0.0 or later is required for the DS-5 integration described in this document.

The SoC Designer integration of DS-5 currently supports SoC Designer Models only. ARM Processor Fast Models running in SoC Designer are not supported.
1.2.3 Supported Models

Using the procedures in this document, ARM has validated DS-5 support for the following ARMv8 processors:

- Cortex-A53
- Cortex-A57
- Cortex-A72

Both single-core and multicore designs are supported.

ARM has validated DS-5 support for the following ARMv7 processors:

- Cortex-A5
- Cortex-A7
- Cortex-A9
- Cortex-A15
- Cortex-R5
- Cortex-R7
- Cortex-M0
- Cortex-M3
- Cortex-M4

Currently, the Cortex-R4 Cycle Model cannot be connected to the DS-5 Debugger.

1.2.4 Limitations and Restrictions

Only designs with cores that are built with CMS Version 9.0.0 or later may be used with this DS-5 Debugger integration.
2 DS-5 Installation Prerequisites

Before getting started, download DS-5 from ds.arm.com and install it according to the ARM instructions.

2.1 First-Time Configuration Instructions

The first time you configure DS-5, follow the instructions below:

1. Open the DS-5 Configuration Perspective by clicking Window > Open Perspective > Other and selecting “DS-5 Configuration.”

2. Select File > New > Configuration Database and give your database a name. This creates a folder you can see in the Project Explorer view:
Subsequently, each time you start debugging the core, right-click in the Project Explorer view and select New > Model Configuration. Choose the database in which to create the entry and click Next.

3 Enabling DS-5 for use with SoC Designer

SoC Designer

To configure the DS-5 debugger to connect to a SoC Designer simulation:

1. Start sdsim (SoC Designer Simulator) with your system and load the desired application. Do not start running the simulation.

2. Launch DS-5 and import the desired model into DS-5.

3. Start with a clean workspace, then launch Eclipse.


5. Follow these instructions until you reach the following dialog box:

6. At this point, the flow of these SoC Designer/DS-5 integration instructions diverges from the generic DS-5 instructions. Select Browse for model running on local host (rather than “Launch and connect to specific model” as indicated by the ARM instructions).
7. Click **Next**. The “Model Running on Local Host” dialog appears:

![Model Running on Local Host dialog](image1)

8. Click **Browse**. DS-5 searches for the SoC Designer Simulator sessions running on the host. When finished searching, a list of systems is displayed:

![Model Browser dialog](image2)

9. Select the desired system from the list and click **Select**.

10. In the “Model Running on Local Host” dialog, click **Finish**.
11. In the “model.mdf” dialog, you are prompted to select a core to debug:

12. On the “Model Devices and Cluster…” tab:

   a. Delete the unnecessary instance (in the following example, A7-MP1-CCI400.cortexa7integration[0]):

   b. Select the core to debug.
13. On the “Debug Connections” tab:

a. Delete unnecessary debug activities (in the following example, there are two multicore SMP activities to delete):

```
*modelmdf.mdf

Simulation Name: A7-MP1-CCI400.mxp
Manufacturer Name: Imported  Platform Name: A7-MP1-CCI400.mxp

Model Devices and Cluster Configuration | Debug Connections | Model Launch Configuration | Advanced Options

Debug Activities

- Bare Metal Debug
- Cortex-A15
- MULTICLUSTER SMP
- Linux Kernel and/or Device Driver Debug
- Cortex-A15
- MULTICLUSTER SMP

Drag Cores or Clusters on right hand side and drop them into Debug Activities

Enable Linux Application Debug

Delete these
```

b. Select the debug activity to debug.
14. Return to the “Model Devices and Cluster Configuration” tab (see the following figure):

15. As shown above, click **Edit selected row**.
The “Edit Instance” dialog appears (see the following figure):

16. As shown above, set Cluster to 0. (*Note: If you are working with a Cortex-A7 model, leave “Device Name” and “Type” as Cortex-A15. Currently, the Cortex-A7 model lists itself as the Cortex-A15).

17. Also as shown above, add the following parameters:

<table>
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<th>Parameter</th>
<th>Value</th>
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<tr>
<td>Secure memory space ID</td>
<td>0</td>
</tr>
<tr>
<td>Hypervisor memory space ID</td>
<td>1</td>
</tr>
<tr>
<td>Non-Secure memory space ID</td>
<td>2</td>
</tr>
</tbody>
</table>

18. Click **Debug**. The Debug Configuration dialog appears.
19. On the “Connection” tab, ensure that the desired model is listed as a target. For example, in the figure below the Cortex-A57_0 is the target:
20. On the Files tab, select the desired application (.axf file). For example, in the figure below the application is sort_fpu.axf:

21. On the Debugger tab, confirm that “Connect Only” is enabled:
22. Click **Debug**. You are prompted to confirm the change to debug perspective:

![Confirm Perspective Switch]

This launch is associated with the DS-5 Debug perspective.
Do you want to open this perspective now?

- [ ] Remember my decision

[No] [Yes]

23. Enable “Remember my decision” if desired to prevent subsequent prompts, and click **Yes**.

The connected debug session launches in the DS-5 Debug view.