



# Linux Application Debug Tutorial

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# Linux Application Debug Tutorial

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## Release information

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# Contents

1. Prerequisites.....	6
2. Context.....	7
3. Procedure.....	8
4. Results.....	13
5. Related information.....	14

# 1. Prerequisites

The following list items are prerequisites for debugging Linux applications:

- Downloaded DS-5 CE as either a complete IDE or an Eclipse plugin, and installed it on your host machine (Windows, Linux or, for plugin-only installation, Mac).
- Prepared your Arm-based Linux target platform using the instructions on how to build a kernel and setup a file system for your own board (see manufacturers' website).
- To allow Linux application debug, you need to ensure gdbserver is present on the target (apt-get install gdbserver on Ubuntu systems).
- To make use of the Remote System Explorer (RSE) that is provided within DS-5, a ssh daemon (sshd) must be running on the target.
- For file transfer, RSE makes use of sftp-server, so that must be present in your embedded Linux system.
- To run a graphics-intensive application like [Xaos](#), you may need some graphics libraries, such as, gtk, cairo, pango, glib (available through apt-get).
- Have built your application. The Xaos application is provided within the examples supplied with DS-5 or can alternatively be downloaded from [SourceForge](#).

## 2. Context

This tutorial shows how to debug the open source fractal rendering application [Xaos](#) running on Linux on an Arm Cortex-A8 processor-based development board using Arm Development Studio 5 (DS-5) Community Edition. You can also use DS-5 CE to develop Linux or Android applications on other Arm-based platforms in a similar way.

For the purposes of this tutorial, Xaos is built as a multi-threaded application.

### 3. Procedure

Linux application debug procedure:

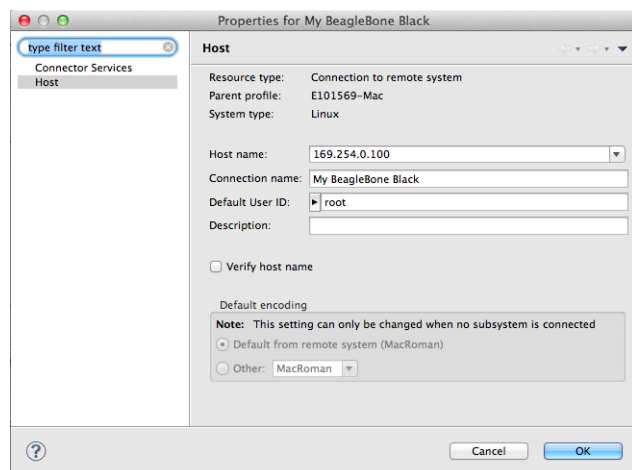
1. Set up a SSH connection using the RSE, and create a debug launch configuration that uses that connection.

In the **Remote Systems** tab, create a **New connection**. Select **Linux**, then click **Next**. Enter the IP Address, and name it (for example `My BeagleBone Black`).

Click **Next**. Select **ssh.files**, then click **Finish**.

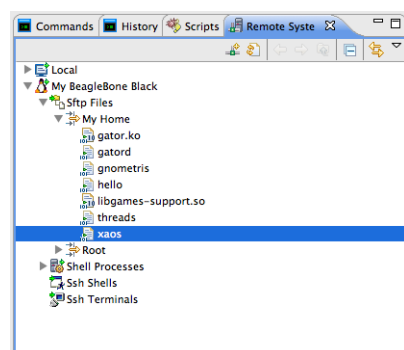
When you first try to connect to the target, RSE prompts you to enter the User ID and Password. The resulting properties for the connection look similar to:

**Figure 3-1: User ID and password prompt in the RSE window.**



Following a successful RSE connection, you can drill down into the remote target's file system in Eclipse, and drag and drop files from host to target:

**Figure 3-2: RSE file system**

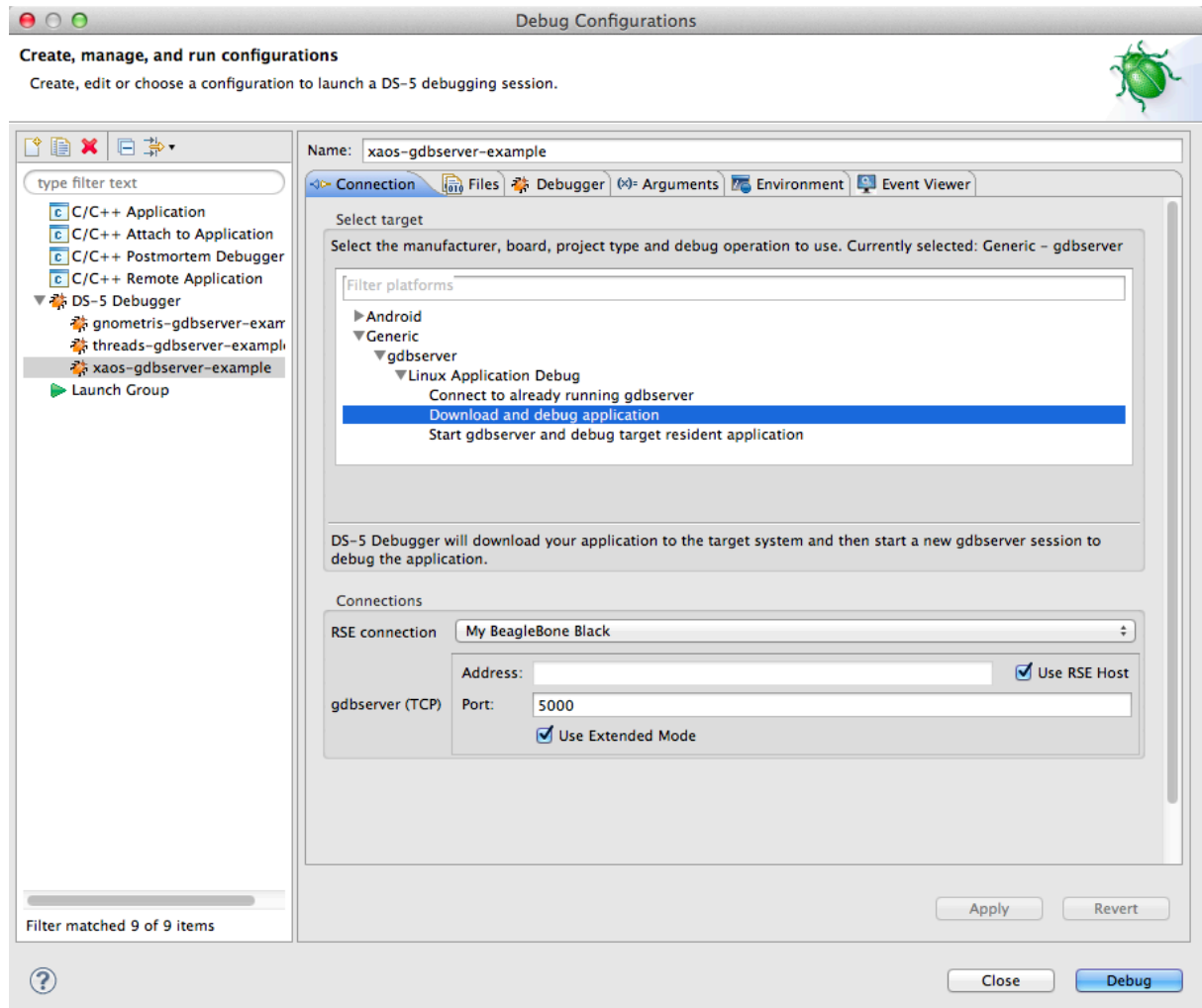




- To create a debug launch configuration that uses that RSE connection, select **Run > Debug Configurations....** Create a **New launch configuration** and give it a name, for example, `xaos-gdbserver-example`.
- In the target tree view of the **Connection** tab, select **Generic > Linux Application Debug > Download and debug application**.

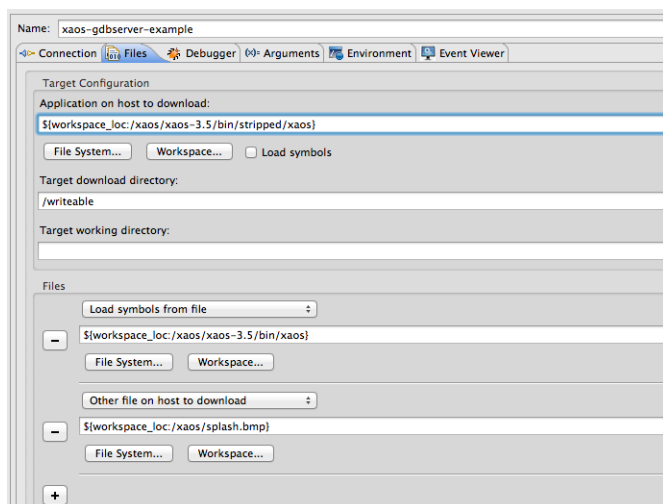
The RSE connection made earlier is automatically used by default:

**Figure 3-3: Tree view of Connection tab**



- In the **Files** tab, enter the stripped executable to download, and the location of the unstripped executable containing the debug information to allow debug at source level.

The resulting dialog looks similar to:

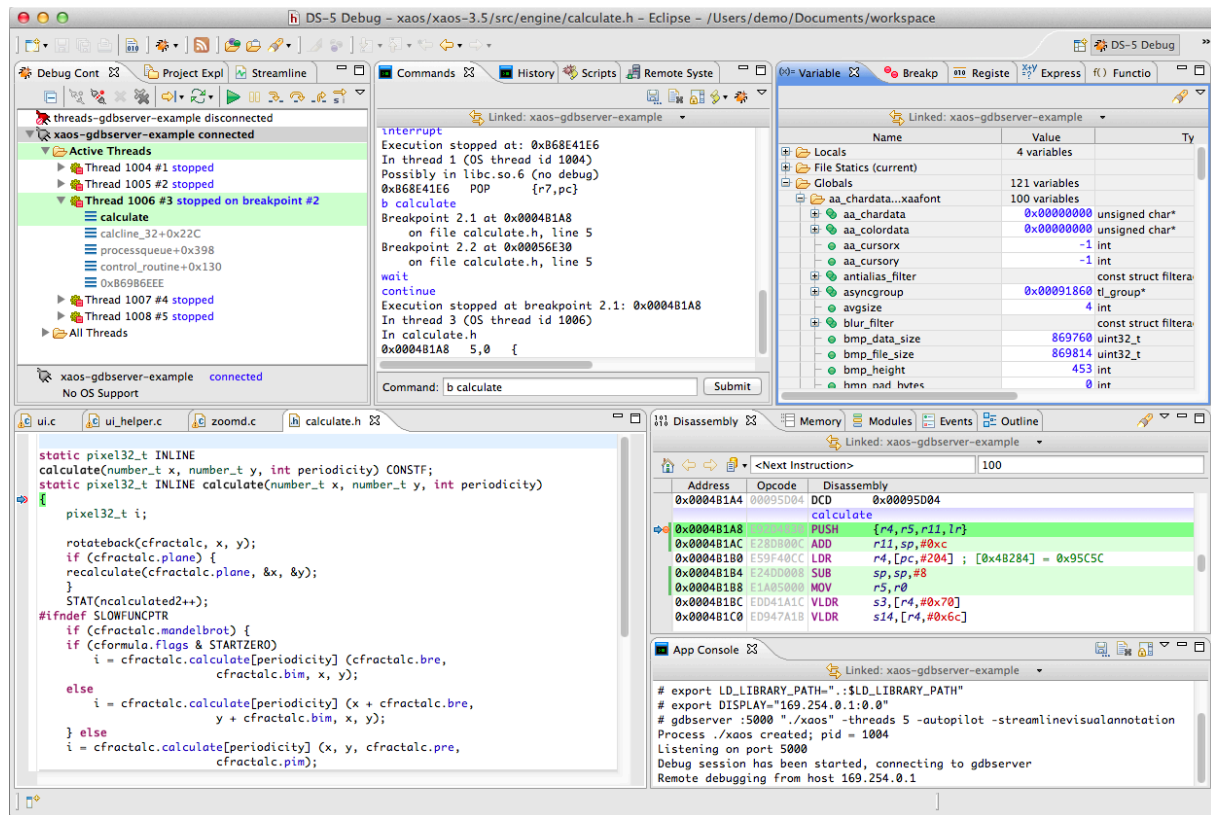
**Figure 3-4: Files tab dialog**

5. Click **Debug**.

DS-5 Debugger downloads the stripped executable onto the target via RSE, starts gdbserver on the target, reads the debug information from the unstripped executable, and runs to a breakpoint at main().

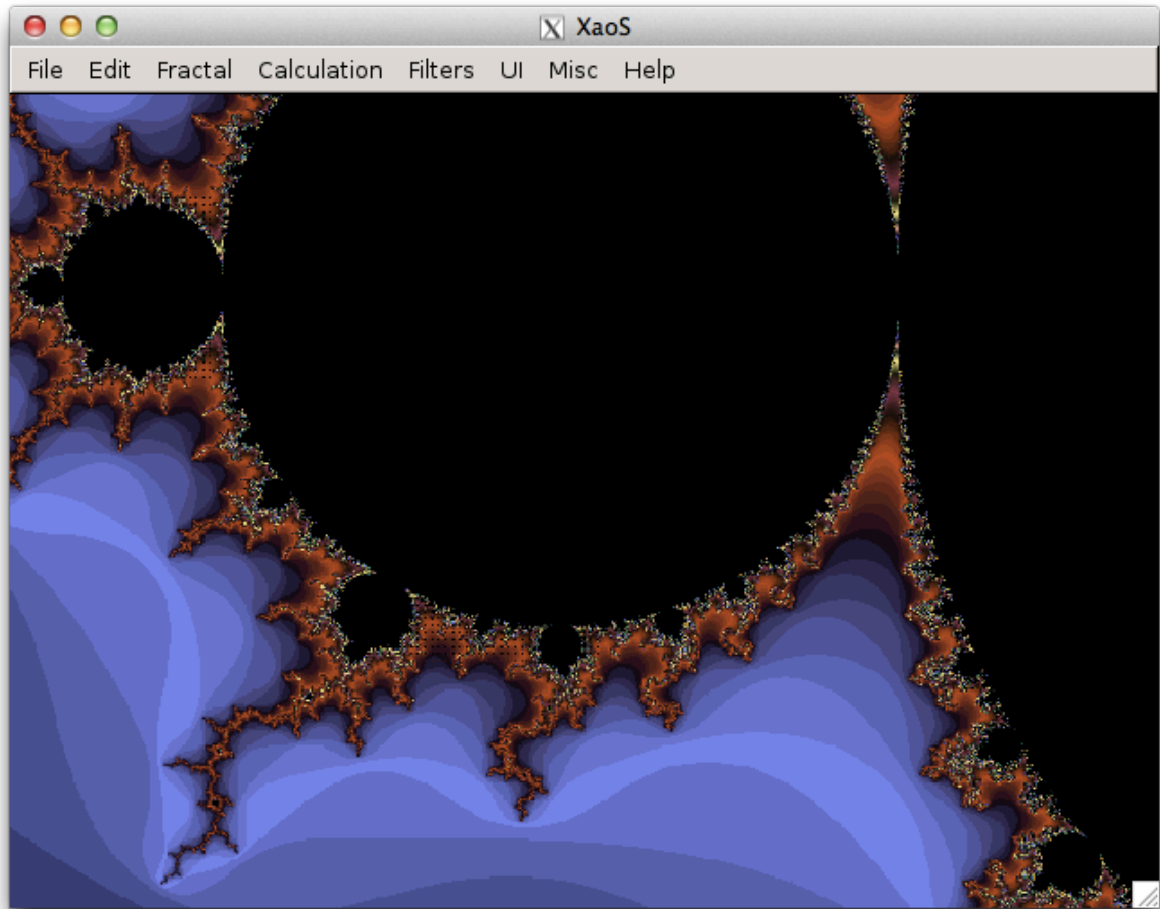
You can view the source, run, stop, single-step, set breakpoints, set watchpoints, view registers, view variables, view disassembly, view memory, view symbols, view the stack backtrace for each thread, and so on.

Figure 3-5: Debug view



6. To view the graphical output from Xaos either:

- Connect an LCD screen to the board
- Redirect the graphical screen output to the XQuartz X server by setting, for example, `export DISPLAY=[host IP address]:0.0` in the **Environment** tab of the **Debug Configurations** dialog.

**Figure 3-6: Example graphical output from Xaos**

This display uses the XQuartz X server to view the graphical output from Xaos.

## 4. Results

That is it. You are debugging an Arm Linux application.

## 5. Related information

Here are some resources related to material in this guide:

- [Resources](#)
- [Tutorials](#)
- [DS-5 documentation](#)