AC465
Application Note
Migrating a SoftConsole v5.1 Project to SoftConsole v5.2

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1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision 1.0

Revision 1.0 is the first publication of this document.

2 Migrating a SoftConsole v5.1 Project to SoftConsole v5.2

Microsemi offers Mi-V soft processors, which are the latest RISC-V processors. SoftConsole v5.2 tool is the latest version that supports the Mi-V soft processors. For a complete list of processors supported by SoftConsole v5.2, see the *SoftConsole v5.2 Release Notes*.

User applications targeted for Mi-V soft processors are compatible only with SoftConsole v5.2. This application note describes how to migrate a SoftConsole v5.1 project targeted for Mi-V soft processor to SoftConsole v5.2.

Note: This application note is only intended for SoftConsole v5.1 projects, targeted for RISC-V soft processor. SoftConsole v5.1 projects, targeted for ARM Cortex-M1 and Cortex-M3 are compatible with SoftConsole v5.2.

2.1 Reasons for Migration

The reasons for migrating SoftConsole v5.1 projects to SoftConsole v5.2 are as follows:

- Mi-V soft processors are based on the RISC-V Draft Privileged ISA Specification v1.10. The previous version of the RISC-V soft processor (CoreRISCV_AXI4) was based on the RISC-V Draft Privileged ISA Specification v1.9.
- Mi-V soft processors are supported with RISC-V HAL 2.1. The previous version of RISC-V HAL is deprecated.
- Mi-V soft processors support 'A' and 'F' instruction set architecture (ISA) extensions in addition to RV32IM (supports both 'I' and 'M' ISA extensions). There will be more ISA extensions supported in future.
- The versions of Eclipse plugin and GCC toolchain have been updated in SoftConsole v5.2. Hence, opening a SoftConsole v5.1 project in SoftConsole v5.2, does not retain the project properties.

Note: SoftConsole v5.2 uses GNU MCU Eclipse plugins, which support ARM and RISC-V architectures.

2.2 Prerequisites

- Download and install SoftConsole v5.2 from the following location: *https://www.microsemi.com/products/fpga-soc/design-resources/design-software/softconsole#downloads*
- Download and install Firmware Catalog from the following location: *https://www.microsemi.com/document-portal/doc_download/135449-download-firmware-catalog-v11-6-for-windows*

Note: If you have Libero® software installed, you need not install the Firmware Catalog as it is included in the Libero software.

2.3 Migration Process

The recommended way to migrate is to use a SoftConsole v5.2 example project from the Firmware Catalog.

The process of migration involves the following steps:

- Generate an example project using RISC-V HAL v2.1 or later in Firmware Catalog and import it into SoftConsole v5.2.
- Generate the latest versions of the required firmware drivers from the Firmware Catalog.
- Copy the drivers to the SoftConsole v5.2 project.
- From the SoftConsole v5.1 project, copy the application source files into the SoftConsole v5.2 project excluding the firmware drivers and HAL files.
- Replicate the SoftConsole v5.1 project properties like preprocessor, include paths, optimization levels and so on in the SoftConsole v5.2 project.
- Replicate the application-specific customizations in HAL 2.0 linker script of SoftConsole v5.1 into the HAL 2.1 linker script.
- Replicate the SoftConsole v5.1 Debug and Release build configurations in the SoftConsole v5.2 project.
- Build the Debug or Release target. Fix any build errors if they occur.
- Create a debug launch configuration.

For more information about how to migrate a SoftConsole v5.1 to SoftConsole v5.2, see Appendix: Steps to Migrate, page 4.

To create a new SoftConsole v5.2 project, see the "Creating a new project" section in *SoftConsole v5.2 Release Notes*.

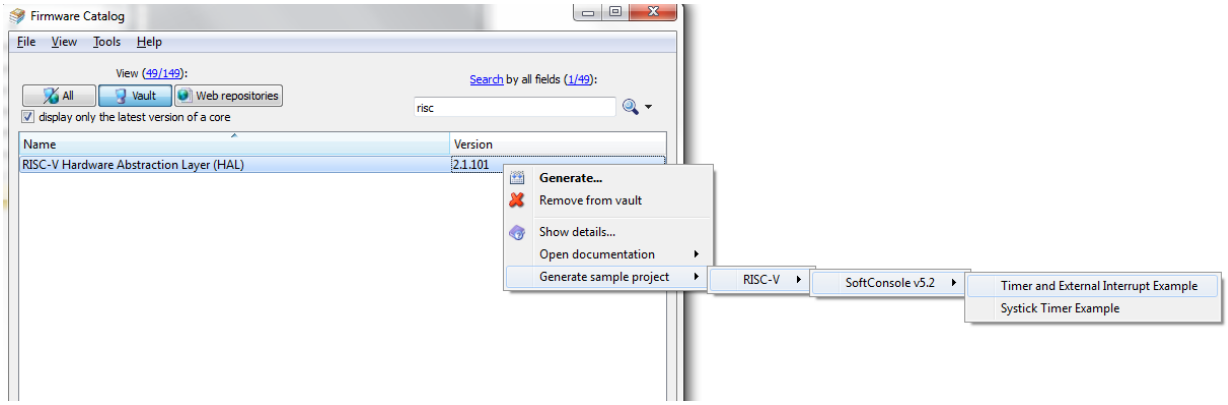
Note: Mi-V soft processors have an AHB interface to access the AHB peripherals, whereas the CoreRISCV_AXI4 has AXI interface and uses CoreAXItoAHBL bridge to access the AHB peripherals. Hence, design changes are required to replace CoreRISCV_AXI4 with Mi-V soft processor in Libero SmartDesign. For more information, see the *Mi-V Handbook*.

3 Appendix: Steps to Migrate

The following steps show an example of SoftConsole v5.2 migration:

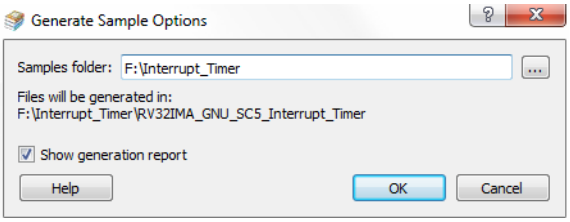
1. In the Firmware Catalog, search for the latest RISC-V HAL v2.1.101. Right-click **RISC-V Hardware Abstraction Layer (HAL)** to generate an example SoftConsole v5.2 project, as shown in the following figure.

Figure 1 • **Generating SoftConsole v5.2 Example Project**



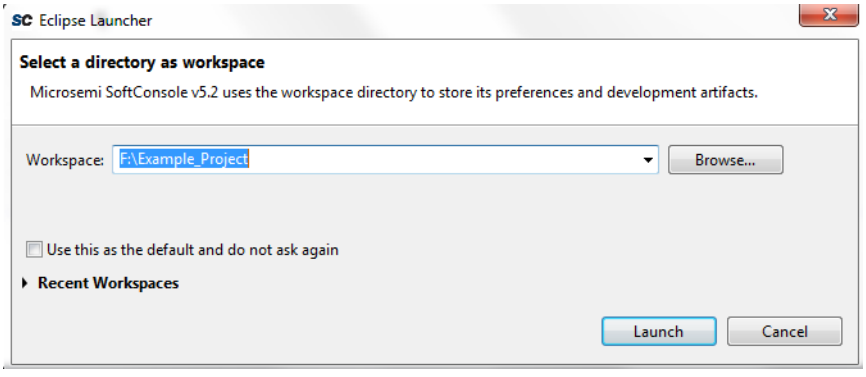
2. In the **Generate Sample Options** dialog box, enter a folder location in which the project must be generated, as shown in the following figure.

Figure 2 • **Specify Example Project Location**



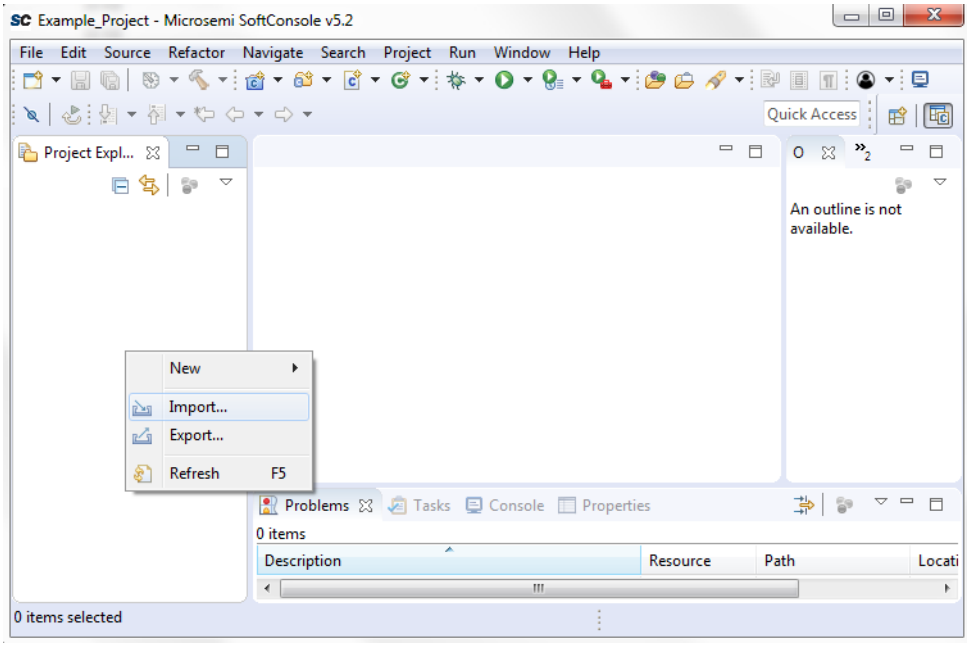
3. Open SoftConsole v5.2 and enter a workspace location. Click **Launch**, as shown in the following figure.

Figure 3 • **Enter Workspace Location**



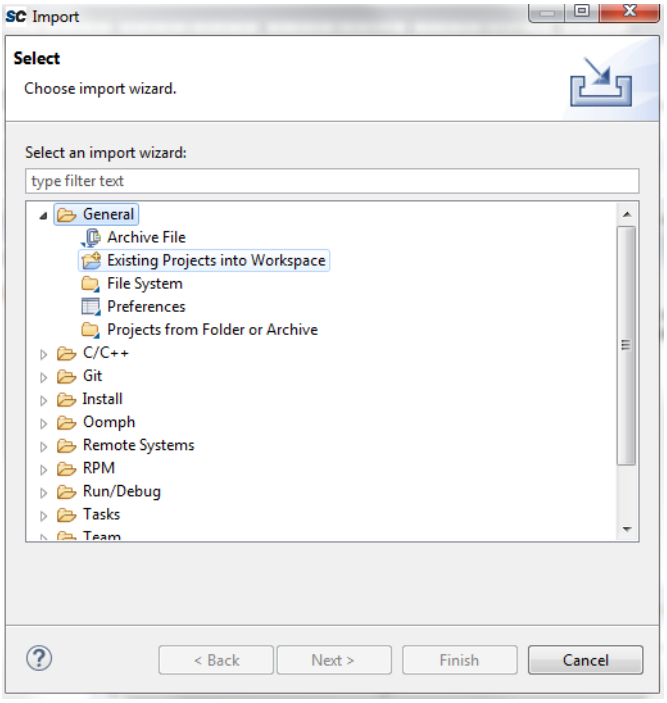
4. In the **Project Explorer**, right-click and select **Import** to import the generated example project from Firmware Catalog, as shown in the following figure.

Figure 4 • **Importing Example Project into SoftConsole v5.2**



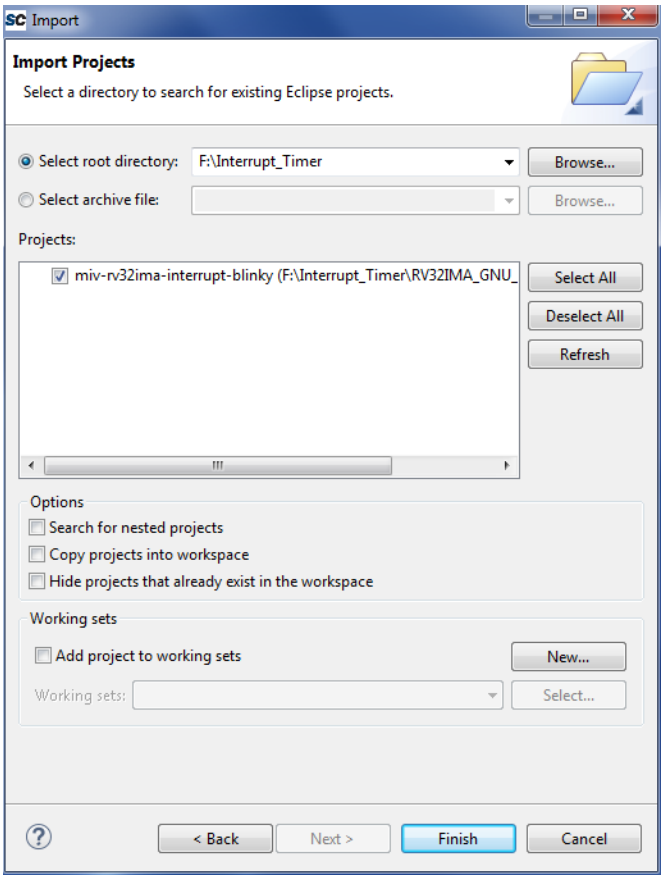
5. In the **Import** dialog box, expand **General** and double-click **Existing Projects into Workspace**, as shown in the following figure.

Figure 5 • **Select Existing Projects into Workspace**



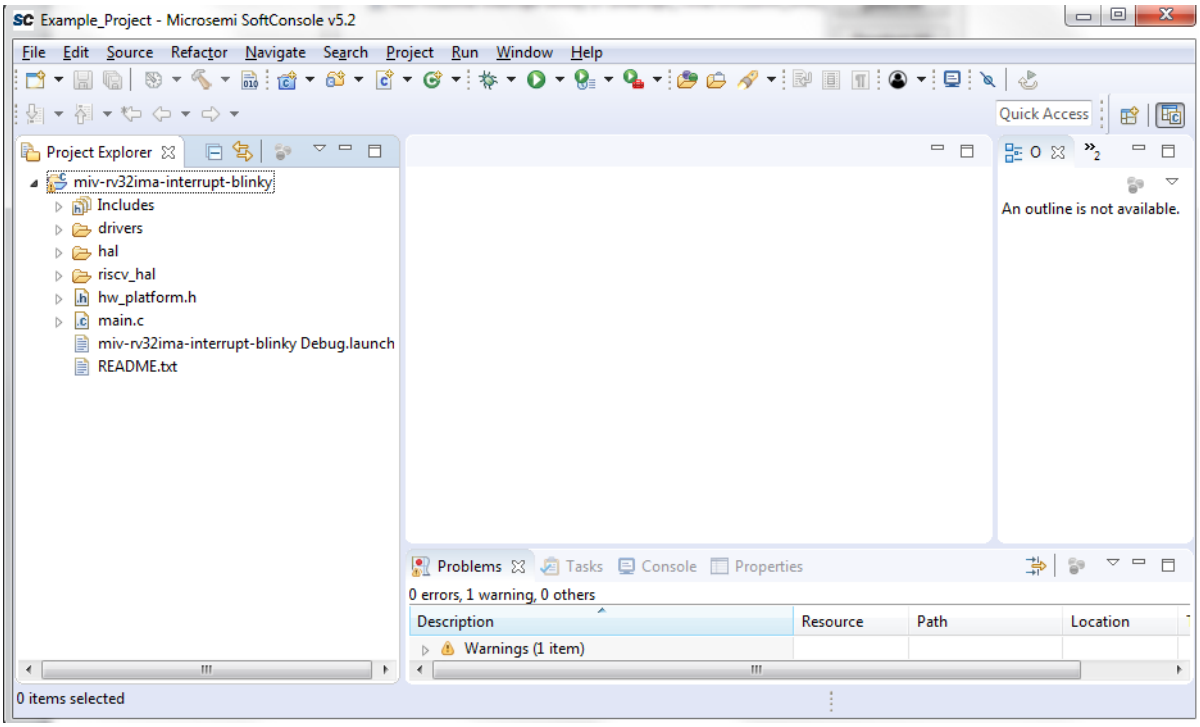
6. In the **Import** dialog box, browse project folder generated from Firmware Catalog and click **Finish**, as shown in the following figure.

Figure 6 • **Browse the Example Project**



The example project is imported and opened in SoftConsole v5.2, as shown in the following figure.

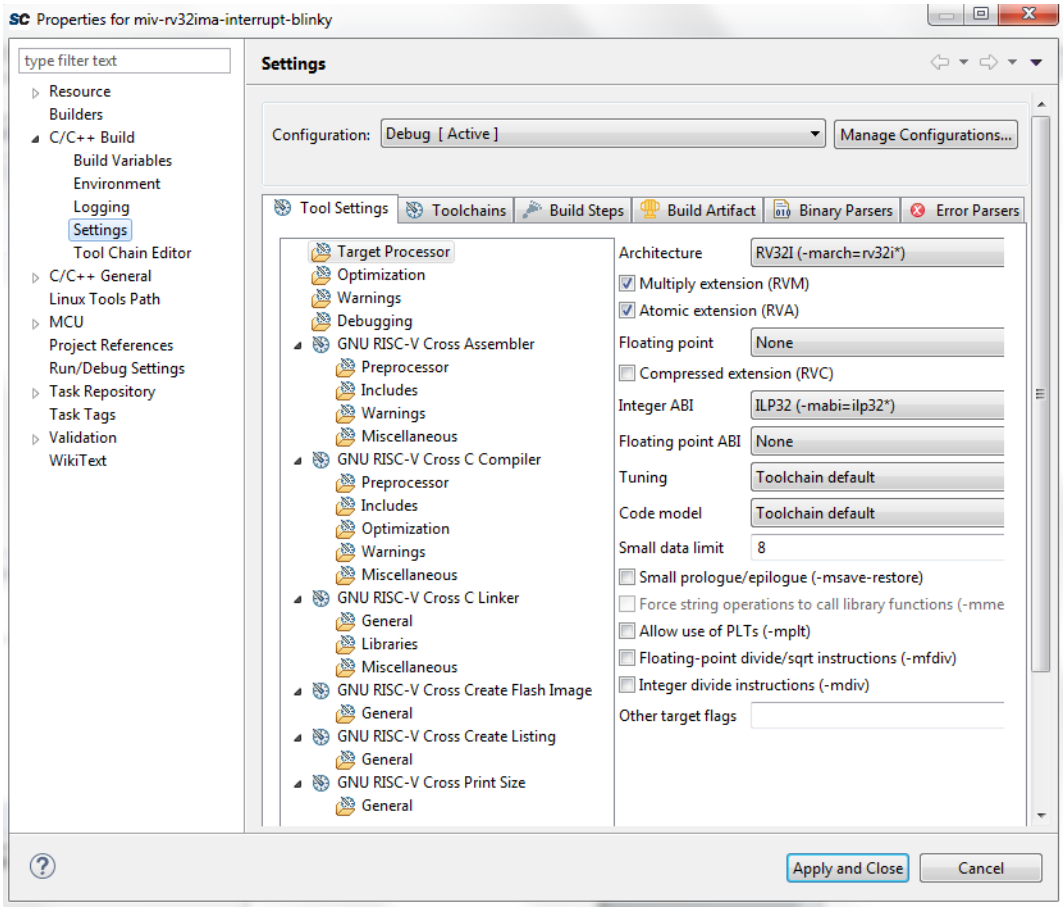
Figure 7 • **Example Project in SoftConsole**



7. This example project includes CoreGPIO, CoreTimer, and CoreUARTapb drivers. Generate the design-specific drivers from Firmware Catalog and import them into the Drivers folder in the SoftConsole v5.2 project.
8. Copy the application file(s) from the SoftConsole v5.1 project and paste it into the SoftConsole v5.2 project. For example, if `main.c` is the application file in the SoftConsole v5.1 project, delete the `main.c` file in the SoftConsole v5.2 project and copy it from the SoftConsole v5.1 project.
9. Open the `hw_platform.h` file and configure:
   - The peripheral base addresses as per the memory map generated by Libero design.
   - The system clock frequency based on the Libero design.
10. Configure the SoftConsole v5.2 project settings like pre-processor, include paths, and optimization levels similar to the SoftConsole v5.1 settings.
11. Replicate the application-specific customizations in HAL 2.0 linker script into the HAL 2.1 linker script.

12. Right-click the **SoftConsole v5.2** project and select **Properties**. Expand **C/C++ Build** and select **Settings**, as shown in the following figure. Change the application-specific settings to match the SoftConsole v5.1 project properties for debug target.

Figure 8 • **Project Properties**



13. Repeat the previous step to configure the build configuration for release target.
14. Build the debug or release target. Fix any build errors that arise in the process.
15. Create a debug configuration and replicate the SoftConsole v5.1 debug launch setting.
16. Launch the application in debug mode.

This concludes the SoftConsole v5.1 migration to SoftConsole v5.2.