CrossCore® Development Tools by Analog Devices

Release Notes for CrossCore Embedded Studio 3.0.2

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1 Table of Contents

2 Introduction

This document describes the changes for CrossCore Embedded Studio (CCES) 3.0.2. You can find the release notes for older releases in the `docs` sub-directory of your CCES installation as well as an Installation Guide which will help you install this release.

For information on Linux please refer to the general Linux documentation Linux for ADSP-SC5xx Processors [Analog Devices Wiki]. Other useful links for CrossCore and Linux Development are:

- http://www.analog.com/cces-quickstart
- EngineerZone > Processors and DSP > Software and Development Tools > CrossCore Embedded Studio and Add-ins
- EngineerZone > Processors and DSP > Software and Development Tools > CrossCore Embedded Studio and Add-ins > tags > CCES
- EngineerZone > Processors and DSP > Software and Development Tools > CrossCore Embedded Studio and Add-ins > tags > CCES 3.0.2
- How to debug SHARC cores in CCES while running Linux
- Configuring System Memory for the ADSP-SC5xx When Using Linux and SHARC Applications

3 New and Noteworthy

3.1 Updated ADSP-SC83x and ADSP-2183x Toolchain for SHARC-FX

The Xtensa toolchain for ADSP-SC83x and ADSP-2183x parts support is updated in CCES 3.0.2, features of this update are:

- C/C++ compiler upgrade based on LLVM version 15.0.7 .
  - More strictly enforces C and C++ semantics and may generate more warnings than previous versions.
  - Adds support for C++ 20.

OpenOCD updated

OpenOCD used for Cortex-A and SHARC-FX debugging is updated in CCES 3.0.2 to version 0.12.0.

3.2 System Services and Device Drivers

L2CTL service support is added for ADSP-21568 family of processors.

3.3 ADSP-21568 clocking updates

The initcode and preload for ADSP-21568 family support has been modified to support a higher core clock frequency (CCLKf) to reflect a recent change to the datasheet for these parts. The default initcode and preload supplied in CCES to support the EV-215678-SOM evaluation board now sets the CCLKf to 995 MHz.

3.4 ADSP-21836 and ADSP-21837 Parts Added

Usual SHARC+ parts support has been added to CCES 3.0.2 for Consumer ADSP-21836 and ADSP-21837 parts.

3.5 Command Line Device Programmer (CLDP) has a new -board switch

The new cldp `-board` switch chooses which configuration file the device programmer should use to interact with the corresponding flash driver in OpenOCD. The file name given should be one included in cldp_proc_list.xml and exists in in the CCES install folder ARM/openocd/share/openocd/scripts/board/.
For Example: `cldp -board adsp21835w_ev_som.cfg`

3.6 Command Line Device Programmer (CLDP) requires -driver switch for ADSP-2183x and ADSP-SC83x parts

Selecting the `-driver` switch for ADSP-2183x and ADSP-SC83x now indicates the flash algorithm project driver that is to be used for flash programming. For all standard programming setups, the corresponding binary files will be included in the `<CCES 3.0.2 installer folder>/ARM/openocd/share/openocd/`

`scripts/board/flash_algorithms` . For custom setups, point the `-driver` parameter to the resultant binary location for the corresponding flash algorithm project.

3.7 New cycle_count.h and APIs for SHARC-FX

A new CCES 3.0.2 SHARC-FX include file cycle_count.h has been added to support precise function delays.

The cycle_count.h header file declares time and cycle delay functions that can be used to wait for peripheral devices to respond. The functions themselves can be found in the libadiutil.a library.

The new APIs are summarized below and documented in `<CCES 3.0.2 install path>/Xtensa/Docs/ADI_Additional_Utility_Library_Reference.pdf`.

```
#include <cycle_count.h>
void adi_delay_time(uint32_t _Nsecs);       /* Precise delay in nanoseconds. */
void adi_delay_cycles32(uint32_t _Cycles);  /* Delays the program for a number of cycles */
void adi_nsleep(uint32_t _Nsecs);           /* This function is a wrapper for adi_delay_time()
allowing for a delay in nano seconds > 605ns */
void usleep(uint32_t _Usecs);               /* This function is a wrapper for adi_nsleep() allowing
for a delay in microseconds. */
void sleep(uint32_t _Secs)                  /* This function is a wrapper for adi_nsleep() allowing
for a delay in seconds. */
```

3.8 Command Line Device Programmer (CLDP) Updates for ADSP-SC594

For multicore parts `-core` is used to specify the core[0, 1, 2, … n] on which the device programmer interface application (dpia) runs. For ADSP-SC5xx SHARC+ based parts normally `-core 1` and `-driver <path/filename>` switches are required and the driver available from the BSP install. Alternatively for ADSP-SC594 parts it is now possible to use `-core 0` with `-driver <path/filename>` to select flash programming to be done using OpenOCD. For this new OpenOCD support the files are included within `<CCES 3.0.2 install folder>/ARM/openocd/share/openocd/scripts/board/flash_algorithms` folder. The driver file for ADSP-SC594 support is `59x_issi_spi.out`. Example commands using this new support are shown below:

```
# erase the EV-SC594-SOM SPI flash via ICE-1000 using OpenOCD
cldp -proc ADSP-SC594 -cmd erase -erase all -core 0 -driver "c:/analog/cces/3.0.2/ARM/openocd/share/
openocd/scripts/board/flash_algorithms/59x_issi_spi.out" -emu 1000 -board ev-sc594-som-consumer.cfg

# program SC594_bin.ldr into the EV-SC594 SPI flash via ICE-2000 using OpenOCD
cldp -proc ADSP-SC594 -cmd prog -erase affected -core 0 -driver "c:/analog/cces/3.0.2/ARM/openocd/
share/openocd/scripts/board/flash_algorithms/59x_issi_spi.out" -board ev-sc594-som-consumer.cfg -emu
2000 -format bin -file SC594_bin.ldr
```

3.9 Fatal error IDE support for SHARC-FX

The CCES 3.0.2 IDE now has support to output console information regarding unhandled fatal errors or exceptions similar to support previously available for SHARC+.

3.10 Register Browser improvements for SHARC-FX

Various IDDE register browser updates enable improved SHARC-FX core register viewing.

3.11 SHARC-FX Startup Code/LSP NOLOAD Change

It is no longer possible to de-select the "This section should be marked as NOLOAD" checkbox for L2_boot_noload segments.

3.12 Application with GDB and OpenOCD (Emulator) JLINK Interface Added

When using the ***Application with GDB and OpenOCD (Emulator)*** debug configuration, there is now a JLINK interface option for connection that can be used with the ADUC702X and ADUCM36x target processors only.

4 Known Issues

4.1 Programming Flash for ADSP-SC83x/ADSP-2183x Family

When programming flash for any of the ADSP-SC83x or ADSP-2183x family of processors use `-board` with either adsp**21**835w_ev_**som**.cfg or adsp**21**835w_ev_**ezkit**.cfg depending on if only a SOM is being used or a SOM connected to the carrier board. Do not use either of the adsp**sc**835w_ev_**som**.cfg or adsp**sc**835w_ev_**ezkit**.cfg files when programming flash.

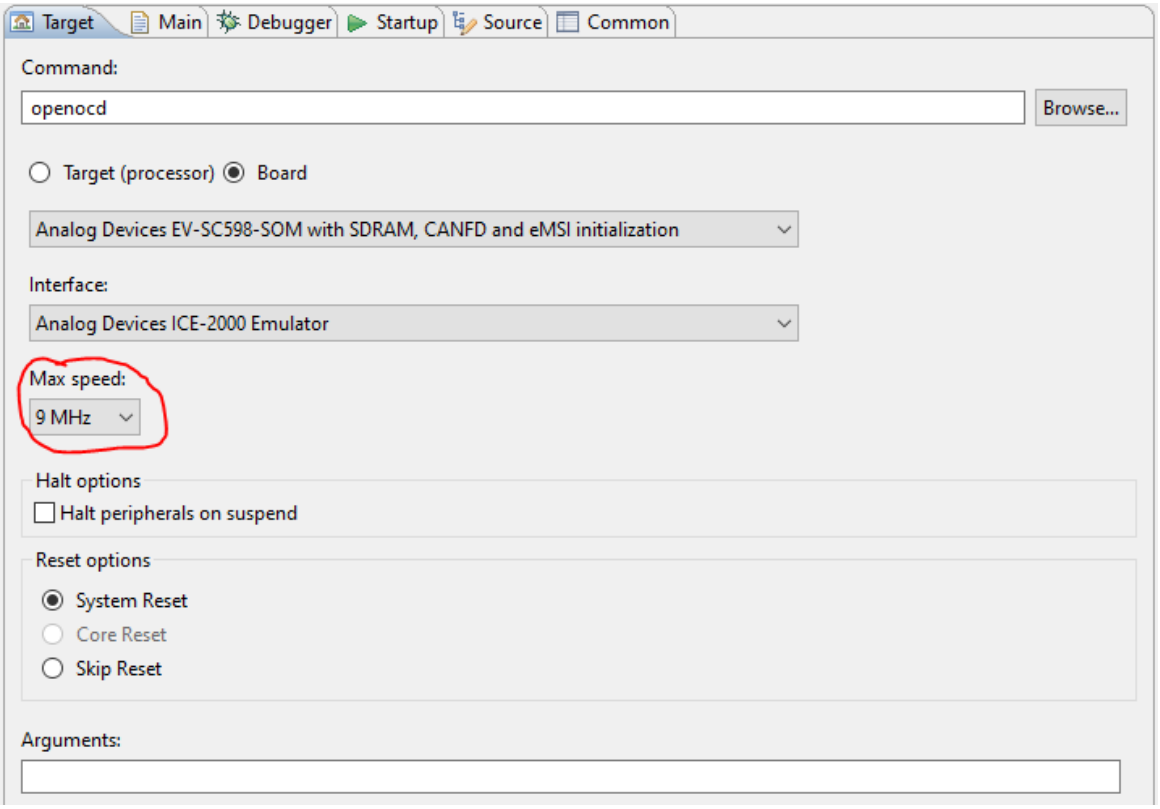
In the CrossCore SHARC-FX Device Programmer settings of a CCES project to build a loader file default CLDP switches will be included if not user specified. Replacements to the default switches shown should be added as an additional option setting.

Default settings :

```
 -driver ${CCES}ARM/openocd/share/openocd/scripts/board/flash_algorithms/
2183x_flash.dxe -board adsp21835w_ev_som.cfg
```

4.2 ADSP-SC598 Family Launch Group Should Not change Interface Max Speed

When using the launch group, there is a different interface speed used for the SHARC+ vs ARM Cortex-A55 connection. These speeds need to match or there can be issues debugging so it is recommended to keep the default interface speed.



4.3 Backward Compatibility for ADSP-SC83x and ADSP-2183X xSPI Projects

Phy training API support has been added to the CCES 3.0.2 xSPI driver for ADSP-SC83x and ADSP-2183x parts. In order to support these added Phy training APIs, additional configuration macros are included in the xSPI static configuration "adi_xspi_config_SC8xx.h" include file.

Any projects with the xSPI driver added using CCES 3.0.0 or CCES 3.0.1 will require additions to their "adi_xspi_config_SC8xx.h" file to define these new Phy configuration macros to avoid build errors using CCES 3.0.2.

Steps to update your "adi_xspi_config_SC8xx.h" are:

- Take a backup of xSPI static configuration "adi_xspi_config_SC8xx.h" file at "$project/system/drivers/xspi"
- Uninstall the xSPI addin from system.svc
- Re-install the xSPI add from system.svc
- Update the macros in the "adi_xspi_config_SC8xx.h" file as per the backed up file.

4.4 L2CTL Service Build Errors for ADSP-21560 and ADSP-21560W

The new L2CTL service does not build successfully if added to projects for ADSP-21560 or ADSP-21560W parts. Avoid this problem by using the prebuilt libssl service instead of using system.svc to add the L2CTL service to projects for ADSP-21560 or ADSP-21560W parts.