ClearSpeed

Base Package Release Notes

Software Release 2.50

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ClearSpeed Technology, Inc.
3031 Tisch Way, Suite 200
San Jose, CA 95128

Tel: 408-557-2067
Fax: 408-557-9054

Email: info@clearspeed.com
Web: www.clearspeed.com

ClearSpeed Technology plc
3110 Great Western Court
Hunts Ground Road
Bristol BS34 8HP
United Kingdom

Tel: +44 (0)117 317 2000
Fax: +44 (0)117 317 2002

Conventions

Convention	Description
`commands`	This typeface means that the command must be entered exactly as shown in the text and the `[Return]` or `[Enter]` key pressed.
`Screen displays`	This typeface represents information as it appears on the screen.
`[Key]` names	Key names appear in the text written with brackets. For example `[Return]` or `[F7]`. If it is necessary to press more than one simultaneously, the key names are linked with a plus (+) sign: Press `[Ctrl]`+`[Alt]`+`[Del]`
Bold-face text	Signal names, instructions and register names are displayed in bold. Selections made via the menu hierarchy of a software application.
Words in *italicized* type	Italics emphasize a point, concept or denote new terms.
	This symbol indicates important information or instructions.

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Release Notes for the Base Package

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This document describes the most important changes to the base package since release 2.24. In addition, it lists the known open issues and limitations in release 2.50 of the base package.

For more information regarding the status and workarounds related to any of these issues, please contact ClearSpeed support quoting the relevant CTS number.

You should check the ClearSpeed customer support website (http://support.clearspeed.com) for updates to these release notes.

What's new in Release 2.50

The following is an overview of the major changes in this release:

This release includes support for Windows Server 2003. For Windows Server 2003 systems you can install the software provided for Windows XP. This should be considered a beta quality preview as it has had limited testing.

CTS 2860: This release includes a new implementation of the DGEMM function in the BLAS library which achieves higher performance than the previous one.

The library name has changed:

        from `libblas_cs.so` to `libcsxl.so` (Linux)
        from `blas_cs.dll`   to `csxl.dll`   (Windows)

All references to the old library name (`libblas_cs.so` or `blas_cs.dll`) must be replaced with the new library name.

CTS 2974: For consistency with the latest implementation of the BLAS library in CSXL, the name of the FFT library has changed:

        from `libcsdft.so` to `libcsxl_csdft.so`   (Linux)
        from `csdft.dll`   to `csxl_csdft.dll`   (Windows)

Note that in the 2.24 release, these libraries were incorrectly named `libcsxl_fft.so` and `csxl_fft.dll`.

In the short term, both library names will be available. The older file names (`libcsdft.so` and `csdft.dll`) are deprecated and will be removed in a future release.

Issues fixed in Release 2.50

The following issues have been fixed in this release:

CTS 1430: The board side plan (`CSDFT_create_plan_<1|2|3>d` and `CSDFT_create_convolution_plan_<1|2>d`) and execute (`CSDFT_execute` and `CSDFT_execute_convolution`) functions for CSDFT do little checking on correctness of input. It is possible to get bus errors if unsupported values are used.

CTS 1807: The CSDFT Library is no longer considered to be at beta quality.

CTS 2859: The test application `app_mandelbrot`, included in the release package, will fail to run on `isim` unless the `-b` (`--boards`) option is specified in addition to the `--host` option.

CTS 2204: There is an upper size limit to the matrix arguments for the DGEMM function. If a matrix exceeds this size, the host DGEMM will be called rather than the accelerated DGEMM. The limit depends on the values of n and k. The limit is reached if:

```
(3*(ceil(k/192)+1)+192*ceil(k/192)*ceil(n/192))*8*192
```

is greater than 0x1F800000 bytes (504 MB).

CTS 2997: If you are using Microsoft Windows and you install the SDK and then uninstall it, some files will be deleted which are required by the runtime software. The result of this is that it will no longer be possible to run any software on the board.

CTS 3003: The parameters for building Goto BLAS for use with CSXL are now documented in the *CSXL User Guide*.

CTS 3038: If you are using the previous implementation of DGEMM (that is, when `CS_GEN1_BLAS` is set to a nonzero value) on Microsoft Windows then the environment variable `CS_BLAS_HOST_ASSIST_PERCENTAGE` will have no effect. A warning message that the feature is not supported will be displayed.

CTS 3062: The correct use of `LD_PRELOAD` has been added to the CSXL documentation.

CTS 3073: If you are using the previous implementation of DGEMM then the `inv()` function in MATLAB will fail with the following error:

```
Warning: Matrix is singular to working precision.
```

This is no longer a problem with the new implementation of DGEMM.

CTS 3093: The host library functions for reading and writing memory on the Advance board, `CSAPI_read_mono_memory` and `CSAPI_write_mono_memory`, are not thread safe. You should ensure that only a single thread attempts to call these functions.

CTS 3139: The *CSXL User Guide* documents the `DGETRF` function. This is not available in this release of the CSXL library.

CTS 3154: The ClearSpeed "nway" BLAS library in previous releases is no longer supported.

CTS 3155: A number of environment variables are ignored by CSXL. Any configuration file specified will be ignored so any variables specified in a configuration file will also have no effect.

CTS 3159: The example setup file for MATLAB installed in the examples directory (`example/csxl/matlab/`) specifies the wrong library name for the `BLAS_VERSION` environment variable.

CTS 3208: The variable `CS_HOST_BLAS` can be used to specify a list of library files to search for BLAS functions. The *CSXL User Guide* says that this is a colon, ':', separated list of paths for both Linux and Windows. This is incorrect. For Microsoft Windows, this is a semicolon separated, ';', list of paths.

CTS 3257: The `CSAPI_allocated_shared_memory` and `CSAPI_allocate_static_shared_memory` functions do not assign the address of the allocated memory to the `symbol_name` parameter if the `.csx` file has been linked dynamically.

CTS 3265: A call to `CSDFT_execute_user_function` returns `CSDFT_RUNNING`. This is confusing as it is not running on return. The function should return `CSDFT_NO_ERROR`.

Known Issues

The following issues are currently open.

Runtime

CTS 239: `csrun` or host client applications cannot check whether the CSX processor has been reset. Running code on a processor that has not been reset should not be attempted. It is the responsibility of the user to reset the processor before running code (using `csreset -s`).

CTS 1820: The functions:

```
CSAPI_read_mono_memory_async_wait
CSAPI_read_mono_memory_async_poll
```

and their `CSAPI_write` counterparts will not return an error code if the asynchronous transfer failed.

CTS 1982: The kernel driver for 2.4 kernels (RHEL 3) may cause the kernel's memory space to become fragmented, resulting in out of memory failures after a very long period of continuous use. This can only be recovered by rebooting the system.

CTS 2004: This release includes a script for resetting the Advance Accelerator board when `csreset` fails to do so. This does a 'hard' reset of the processors. This functionality will be incorporated into `csreset` in a future release. Before using the reset script, please gather any diagnostic or debugging information as all state will be lost by the hard reset. For example, the output from `csreset -v`.

Before running the script, first setup your environment if you have not already done so. Under Linux, source the `bashrc` file (usually present in `/opt/clearspeed/csx600_m512_le/bin`). For Windows, start a command prompt using the shortcut from the ClearSpeed Start menu item. If you have more than one board, set the environment variable `LLDINST` to the instance number of the board to be recovered. For example, to reset only the first board under Linux enter `export LLDINST=0`

To run the script, type the command `recover_board`. You should then see some output like this:

```
Board recovery utility

This should only be used:
- when csreset fails to reset your board
- after any useful diagnostic information has been gathered (e.g. the output from
csreset -v).

If you wish to continue, press the return key. Otherwise, press control-c to exit.

If you are happy to run, then press the return key. You will then see output as
follows:

Starting...
25%
50%
75%
DONE.

Board recovery attempted - you can now re-run csreset.
```

To be safe, the `recover_board` script and `csreset` should be run whenever the board is powered up.

CTS 3102: After the installing the 2.24 or 2.50 release of the runtime software, you may get the error message "FPGA upgrade required" even if you have a compatible version of firmware on your board. If the firmware cannot be upgraded immediately, Linux users should first ensure that the `install-csx` script has been run to correctly

install the kernel driver. You can also try running the `csboard_config` utility. If this utility fails to run successfully then you must upgrade the firmware on the board. See the firmware upgrade release notes on the customer support site (http://support.clearspeed.com) for details.

CTS 3161: The 2.24 and 2.50 releases of the runtime software will not work with all versions of the firmware on the Advance boards.

See the firmware upgrade release notes on the customer support site (http://support.clearspeed.com) for details.

The firmware release notes recommend checking and, if necessary, upgrading the firmware *before* installing the new software release. If you have already installed the software and now find you are getting the message: "FPGA upgrade required" then you will not be able to use the `csreset` command to obtain the board serial number and firmware version.

You need the board serial number to determine the board type and revision in order to know which firmware file to use.

If you have access to the board, then you can find the serial number on a label on the underside of the board.

Alternatively, you can uninstall the runtime and reinstall an earlier version (2.23 or earlier). Then you can use `csreset` to find the board serial number.

CSXL

CTS 1108: If a host application program using the CSXL library is terminated abnormally (for example, by using [Ctrl]+[C]), the Advance Accelerator board may be left in an undefined state. It may be necessary to reset the board (using the `csreset` command) before restarting the application.

CTS 3003: CSXL does not work with the currently released Goto BLAS host library. Please contact ClearSpeed support (via the support web site http://support.clearspeed.com) for more information on updates and workarounds for this issue.

CTS 3047: If you use MKL as your host library you must link your application with both MKL and CSXL, putting CSXL first. If this is not done, linking may fail with errors due to symbols not being found.

CTS 3690: The description of the `DGESV` funcxtion on page 27 of the *CSXL User Guide* described the Fortran interface as:

```
SUBROUTINE DGETRF( N, NRHS, A, LDA, IPIV, B, LDB, INFO )
```

This should be:

```
SUBROUTINE DGESV( N, NRHS, A, LDA, IPIV, B, LDB, INFO )
```

The rest of the description of this function is correct.

CSDFT

CTS 2483: Using `printfp` in conjunction with the CSDFT library will fail at link time with the error message:

```
Definition for the symbol 'PRINT_AREA_CONTROL' already found in module default.cso
```

CTS 2666: When the environment variable `CS_CSAPI_DEBUGGER` is set, the CSDFT host library assumes that the `.csx` file to be loaded has `_debug` appended to the file name. If this file does not exist on the `CSPATH`, the library will fail to find the `.csx` file.

CTS 2679: The CSDFT library does not support 1D natural order to natural order transforms on the board. If this is specified in a plan and the source and destination parameters are both on the board then a call to the `CSDFT_execute_dft` function will return a `CSDftStatus` value of `CSDFT_INVALID_PARAMETER`.

CTS 3308: The function `CSDFT_get_csapi_handle_board` appears in `csapi_support.h` but is not documented in the *CSDFT Reference Manual* nor does work correctly. Use of this function is not supported for GA 2.50.