

VisualDSP++[®] 5.0 Update 1 Release Notes

Revision 1.0
2007 November 19

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Nomenclature

In the past, VisualDSP++ updates were labeled by the month and year of their release. In order to improve clarity, updates will now be numbered (e.g. Update 1, Update 2, etc).

Installation

This update should only be installed after installing the VisualDSP++ 5.0 base release. If VisualDSP++ 5.0 is not installed, please install it first. If a newer update has already been installed, please do not install this update. This update is not intended to be installed on alpha or beta releases.

Identifying Your VisualDSP++ Version

The VisualDSP++ release and update level can be found in 2 locations:

1. In the Control Panel, open the Add/Remove Programs applet.
2. In the VisualDSP++ Development Environment, select Help – About VisualDSP++.

In these locations, VisualDSP++ 5.0 should be visible without any update listed.

Installing the Update

Please follow the instructions below for installing this update. Please note that since VisualDSP++ supports having multiple instances installed on a single system, you can install this update on top of one instance while keeping the previous installation.

1. Use the Start Menu to navigate to VisualDSP++'s "Maintain this installation". By default this is at Start Menu - select All Programs - Analog Devices - VisualDSP++ 5.0.
2. Select "Go to the Analog Devices website" and click Next. This will open a window in your web browser.
3. Select the appropriate Processor Software Tools Upgrades according to your processor.
4. Select and download the desired update (VisualDSP++ 5.0_Update1.vdu) to your system.
5. Again, use the Start Menu to navigate to VisualDSP++'s "Maintain this installation".
6. Select "Apply a download Update" and click Next.
7. Browse for the downloaded file and click Next.
8. Follow the on-screen prompts to complete installation of this Update.

New Hardware Support

VisualDSP++ updates often include support for new processors, new silicon revisions for existing processors and new EZ-KIT Lites®. In order to support these, minor revisions are made to the tool chain and additional system services and device drivers need to be added. This section describes the new support available in this update.

New Processors and Revisions Support

The Product Bulletin contains the list of new processors and silicon revisions available with VisualDSP++ 5.0 Update 1. Refer to the processor's data sheet and hardware reference manuals for information on system configuration, peripherals, registers, and operating modes. The following are newly supported Blackfin® processors:

- ADSP-BF547 silicon revision 0.1

The following are new silicon revisions to existing Blackfin® processors:

- ADSP-BF542 silicon revision 0.1
- ADSP-BF544 silicon revision 0.1
- ADSP-BF548 silicon revision 0.1
- ADSP-BF549 silicon revision 0.1

The following are new silicon revisions to existing SHARC® processors:

- ADSP-21367 silicon revision 0.2
- ADSP-21368 silicon revision 0.2
- ADSP-21369 silicon revision 0.2

New Emulation Support

The following emulation features are now supported by VisualDSP++ 5.0:

- Support for the ADSP-BF52x processors
- Support for the BF527 EZ-KIT Lite and onboard debug agent
- Flash programming for the BF527 EZ-KIT Lite for STMicroelectronics M25P16 and STMicroelectronics M29W320

New System Services and Device Drivers

The following are now supported by VisualDSP++ 5.0:

- Full System Services Library support for the ADSP-BF522, BF525 and BF527 processors
- Device Drivers for the ADSP-BF54x processors
 - USB Mass Storage OTG Host
- Device Drivers and Middleware for the BF548 EZ-KIT Lite

- AD1980 AC-97 Codec Driver for the BF548 EZ-KIT Lite
 - Added SD Write Capability
- Device Drivers and Middleware for the ADSP-BF52x processors
 - PPI
 - SPI
 - SPORT
 - UART
 - TWI
 - Rotary Counter
 - Integrated Stereo Audio Codec
 - Background Telemetry
 - USB Mass Storage Device
 - USB Mass Storage OTG Host
 - FAT File System
 - Ethernet
 - LwIP
- Device Drivers for the BF52x EZ-KIT Lite
 - LCD
 - Touch Screen controller
 - Keypad
- Library and Examples to support the SHARC USB EZ-Extender with the ADSP-2137x processors

New Examples

Lockbox

The ADSP-BF52x and BF54x processors include the new Secure Lockbox Technology (<http://www.analog.com/processors/blackfin/lockboxSecureTechnology.html>) for Blackfin. Lockbox enables secure execution by providing a secure mode of operation in which only trusted code is allowed to execute. Two new examples have been added to demonstrate this technology. They can be found in the following examples:

Blackfin\Examples\ADSP-BF527 EZ-KIT Lite\lockbox
Blackfin\Examples\ADSP-BF548 EZ-KIT Lite\lockbox

Getting Started Guide

The Getting Started Guide for the BF548 EZ-KIT Lite has been added. This includes 8 easy to use and well documented examples. The examples can be found at the following location:

Blackfin\Examples\ADSP-BF548 EZ-KIT Lite\Getting Started Examples

The documentation can be found in the Hardware Tools Manual under EZ-KIT Lite Evaluation Systems.

Critical Fixes/Changes

This section highlights significant changes due to anomaly fixes or functional changes.

ADSP-BF522 processor name change

The ADSP-BF522 has been renamed as the ADSP-BF523. Support for this new name will be available in a future update. Those who already created projects for the BF522 and did not use automatically generated LDFs for the ADSP-BF522 may need to rewrite or modify their LDF files in the future.

Two header files for *builtins_support.h* files – TAR 33949

The Blackfin/include/builtins_support.h include file was erroneously part of the VisualDSP++ 5.0 base release. It has been removed in Update 1. If you were including it explicitly in your application source you should <builtins.h> instead.

SSL, USB and DRV libs for ADSP-BF52x not in default LDFs – TAR 34050

The default and generated LDF files for the ADSP-BF52x parts now explicitly link against the system services (libssl527y.dlb), device drivers (libdrv527y.dlb) and USB (libusb527y.dlb) libraries. If you were using Alpha releases of these libraries you would have required project or LDF modifications to link with them. These changes will no longer be required when using default and generated LDFs and should be undone.

Default changed for EBIU_SDBCTL for ADSP-BF533 / LDF – TAR 33491

The default LDFs for ADSP-BF533 prior to Update 1 only populated 32MB of SDRAM (when enabled) unless macro EZKIT_SDRAM_64MB was defined in which case 64MB was used. This has changed in Update 1 to make use of the 64MB SDRAM that is on revisions 1.7 and above of the ADSP-BF533 EZ-Kit. The LDFs now default to use 64MB of SDRAM and for revisions 1.6 of the EZ-Kit and below macro EZKIT_SDRAM_32MB can be defined to revert to using 32MB.

Rename MISCPOR register macros in ADSP-BF52x def file – TAR 33835

Register name changes in the ADSP-BF52x Hardware Reference Manual have also resulted in macro name changes in the various ADSP-BF52x def and cdef headers in \Blackfin\include.

MISCPOR_DRIVE / pMISCPOR_DRIVE
MISCPOR_SLEW / pMISCPOR_SLEW
MISCPOR_HYSTERISIS / pMISCPOR_HYSTERISIS

are replaced with:

NONGPIO_DRIVE / pNONGPIO_DRIVE
NONGPIO_SLEW / pNONGPIO_SLEW
NONGPIO_HYSTERESIS / pNONGPIO_HYSTERESIS

Sometimes unable to connect to multiprocessor boards – TAR 33968

If a multiprocessor board contains a processor with an unknown silicon revision, the target could not connect in a multi-processor session. This issue has been resolved in this update.

Limitations

This section highlights known significant limitations

VisualDSP++ 5.0 ADSP-BF54x Known Limitations

The following device drivers will be supported in a future update:

- NAND FLASH driver

VisualDSP++ 5.0 ADSP-BF52x Known Limitations

The following device drivers will be supported in a future update:

- NAND FLASH driver

Set memory option fails for NET2272 USB loopback – TAR 34450

The following examples fail after executing the set memory “hostapp –s” when any other option is run:

```
\Blackfin\Examples\USB-LAN EZ-EXTENDER\USB\bulk_loopback_app  
\Blackfin\Examples\USB-LAN EZ-EXTENDER\USB\bulk_redirect_io_app
```

BF548 EZ-KIT Lite USB drives may need to be formatted – TAR 34633

Before using the USB drives, build and run the format utility found here:

```
Blackfin\Examples\ADSP-BF548 EZ-KIT Lite\Services\File System\HardDisk\HardDiskFormat
```

File System rename function does not work – TAR 34561

The adi_fss_FileRename function fails to rename files within the same partition.

LCD driver for the BF527 EZ-KIT Lite needs modification

The ADSP-BF527 EZ-KIT Lite LCD requires that there be at least a 2 PPI CLK delay between the enabling of the frame and horizontal sync signals. In the following 3 files, insert the following lines at the specified:

```
Blackfin\lib\src\drivers\adc\adi_ad7674.c - line 898  
    ppi_fs_data.enable_delay = 0;
```

```
Blackfin\lib\src\drivers\lcd\adi_lcd.c - line 504
```

```
FsTmrBuf.enable_delay = 0;
```

Blackfin\lib\src\drivers\lcd\nec\adi_n16448bc33_54.c - line 477

```
FsTmrBuf.enable_delay = 0;
```

LCD Example for the BF527 EZ-KIT Lite is missing

There is no example for the ADSP-BF527 EZ-KIT Lite LCD. LCD Drivers exist, but there is no example project on how to use it. This will be available in a future Update.

USB-LAN EZ-Extender examples may fail

When using BF561 EZ-KIT Lite rev 2.0 or 2.1 with ADSP-BF561 revision 0.5 silicon in conjunction with the USB-LAN EZ-Extender, USB and LAN examples may fail to run. To avoid this problem, reduce the SCLK to 100 MHz or lower. To avoid this problem, make the following changes:

On line 105 in Blackfin\Examples\USB-LAN EZ-EXTENDER\USB\bulk_loopback_app\usb_ezkit_utils.c:
#define SCLK 100000000

On line 105 in Blackfin\Examples\USB-LAN EZ-EXTENDER\USB\bulk_redirect_io_app\usb_ezkit_utils.c:
#define SCLK 100000000

On line 105 in Blackfin\Examples\USB-LAN EZ-EXTENDER\USB\mass_storage_app\usb_ezkit_utils.c:
#define SCLK 100000000

ADSP-BF5xx Silicon Anomaly 05-00-0245

The 05-00-0245 anomaly causes hardware errors on speculative loads. The tools workarounds for this anomaly is not enabled for all parts and revisions which are impacted by the anomaly. The missing parts and revisions are:

```
ADSP-BF54x - all revisions  
ADSP-BF52x - revision 0.0  
ADSP-BF561 - revision 0.5  
ADSP-BF53[123] - revision 0.5
```

If you enable hardware errors in your application, and are building for one of these parts and revisions you can avoid the 05-00-0245 related hardware errors in the following ways:

1. Adding "--workaround speculative-loads" to the compiler additional options to enable the compiler workaround when building C and C++ source.
2. For ADSP-BF53[123] and ADSP-BF561 parts building for silicon revision 0.4 (rather than 0.5) will avoid the anomaly in the compiler generated code and system libraries.

Problem Charts

Problems Addressed

The following table is a list of the problems addressed in VisualDSP++ 5.0 Update 1.

Details can be found on the Tools Anomaly Web page. The URL is:

<http://www.analog.com/processors/tools/anomalies>

Product Family	Problem Number	Tool	Description
2136x	33671	Run Time Libraries	MTM registers missing from cdef21364.h
2137x	33887	Simulator	Reg modify then write to ext mem writes old reg value
Blackfin	33976	ADspCommon XML Files	Wrong breakout width for BF52x EBSZ bit field of EBIU_SDBCTL reg
Blackfin	28492	Compiler	csqu_fr16 should be using saturating fractional operations
Blackfin	33786	Compiler	Use of -overlay can result in compiler assert (bitset.c:67)
Blackfin	33963	Compiler	Compiler doesn't count inline asm length towards size of hw loop
Blackfin	33403	CRTGen	Generated cplbtabs file unusable
Blackfin	33405	CRTGen	CPLB_D_PAGE_MGMT used indiscriminately in gen'd BF535 cplbtabs
Blackfin	33808	Emulator	BF533 POST: Release mode sets Loader width to 8 bit
Blackfin	33803	Examples	ADSP-BF537\Drivers\UART\AutoBaud readme has no jumper settings
Blackfin	34185	Examples	The host side of the Inetd does not build for release build
Blackfin	34061	Flash Programmer	Error in ReadData for BF548 flash driver
Blackfin	31695	LDF	data1 is mapped before L1_bsz
Blackfin	34059	LDF	p1 and -p2 do not work with default LDFS (5.0)
Blackfin	33652	LDFGen	Stack in mem covered by cplb data table entry in WB mode problem
Blackfin	33722	LDFGen	Two output sections with the same name are generated
Blackfin	33178	Run Time Libraries	Remove NWIDTH in NFC_CTL bit definitions for ADSP-BF52x devices
Blackfin	33654	Run Time Libraries	DSP library function conv2d3x3_fr16() based on wrong algorithm
Blackfin	33733	Run Time Libraries	Disable_data_cache() does not work
Blackfin	33744	Run Time Libraries	Incorrect macro names for HOSTDP masks in BF52x/BF54x headers
Blackfin	33792	Run Time Libraries	Remove PORT_MUX from ADSP-BF52x def/cdef headers
Blackfin	33825	Run Time Libraries	PPI_STATUS missing bit masks for ADSP-BF52x
Blackfin	33835	Run Time Libraries	Rename HYSTERESIS / MISCPORT_* register macros in ADSP-BF52x hdr
Blackfin	33901	Run Time Libraries	Including before "vdk.h" will result in an error

Blackfin	34112	Run Time Libraries	BF561 - Memory Initializer will not initialize external SDRAM
Blackfin	33627	TCPIP Stack	Corrupted BF537 EZ-KIT proj LAN\Host\FILESERVER\FileServer.dsp
SHARC	34118	Run Time Libraries	CYCLE_COUNT_* macros can give wrong results with optimization
TigerSharc	28363	Compiler	Functions with #pragma weak_entry can be inlined
TigerSharc	32429	Compiler	Internal error: diag_message: missing string substitution
TigerSharc	34022	VDK	VDK API level check can cause false positive Kernel Panic

Known Problems

Details can be found on the Tools Anomaly Web page. The URL is:

<http://www.analog.com/processors/tools/anomalies>

VisualDSP++[®] 5.0 Release Notes

2007 August 28

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VisualDSP++ 5.0 Documents

Release Notes

This document provides the Release Notes for the VisualDSP++® 5.0 release.

Product Release Bulletin

Your primary source of information for the VisualDSP++ 5.0 Release is the Product Release Bulletin manual in .pdf format that accompanies this release.

Documentation Set

The complete set of documentation in .pdf format is provided on the VisualDSP++ Installation CD. The manuals are available in .chm online Help format in the installation.

Additional information is available online in the Technical Library:

<http://www.analog.com/processors/technicalSupport/technicalLibrary>

Licensing Guide

The VisualDSP++ 5.0 Licensing Guide is a new document that describes how to manage your license for VisualDSP++ software. For users who purchase floating licenses, the guide describes the VisualDSP++ Floating License Server.

Note: The Licensing Guide does not describe versions of VisualDSP++ licensing prior to VisualDSP++ 5.0. For information about older versions, refer to:

Help -> Contents -> Assistance -> Software License Management.

The VisualDSP++ License Installation Procedure is also available on the Analog Devices Web site on the “Upgrades Archives” page, available at:

<http://www.analog.com/processors/tools/updates>

ADI ELF Documentation

If you have tools that consume the ELF object files produced by VisualDSP++, the following document will be of interest. Most VisualDSP++ 5.0 users need not be concerned with this level of detail.

VisualDSP5_0_ADI_ELF_Changes.pdf

The ADI ELF document covers the most recent changes in the ADI ELF since VisualDSP++ 4.5 was released. Updated versions of the complete ADI ELF ABI specification (general and processor-specific) are available from Customer Support by request.

Problem Reports

Charts summarizing the problems fixed in this release and the known open problems are included at the end of this document.

Project Upgrades

We recommend working with a copy of your existing applications when first upgrading to the VisualDSP++ 5.0 release. The upgrade will change existing *.dpj projects and in some instances, the Project Wizard will prompt for regeneration of the LDF and startup code. These upgrade changes are covered in more detail in the following two sub-sections.

VisualDSP++ 5.0 .dpj Projects Have New Format

The format of VisualDSP++ .dpj projects has changed from previous releases and the new VisualDSP++ 5.0 format is not backwardly compatible. At the time VisualDSP++ 5.0 reads an older generation project, the IDDE will provide a pop-up asking if it can convert the project to the new format. It will save the pre-existing version in 'MyProject.dpj.bak' and the VisualDSP++ 5.0 version becomes 'MyProject.dpj'.

If you would like to keep working with VisualDSP++ 4.5 without any changes to your application and/or projects, make a copy of your application for use with the VisualDSP++ 5.0 version.

Project Wizard Template Changes – Blackfin

If you have a project that was generated with the Project Wizard, loading the project after installing VisualDSP++ 5.0 may result in a pop-up requesting regeneration of the code/LDF.

Regeneration affects three files:

1. LDF
2. basiccrt.s
3. heaptab.c

After regeneration, you will be current with the latest improvements in the templates.

If you would like to keep working with VisualDSP++ 4.5 without any changes to your application and/or projects, follow the recommendation in the previous section and make a copy of your application for use with VisualDSP++ 5.0.

Project Wizard template changes include:

- TAR 31346: Shared data, locks, etc. need to be non-cached
- TAR 31938: inputs sections for tables require FORCE_CONTIGUITY
- TAR 32725: Workaround comment incomplete in generated LDFs

TAR 31346: dual-core (ADSP-BF561) applications, in order for shared data and locks to be correctly accessed by each core, that data must not be allowed to be cached. It has been the case that LDFs and CPLB tables generated by the Project Wizard did not respect that requirement. That problem has been fixed.

TAR 31938: The linker will not guarantee contiguous placement of sections unless the FORCE_CONTIGUITY operator is used. If you have table inputs in your LDF that require contiguous placement, these should be mapped in a separate memory output section using FORCE_CONTIGUITY. In VisualDSP++ 5.0 the default LDFs have been modified to reflect this. More information on the FORCE_CONTIGUITY can be found in the "Linker and Utilities" manual.

TAR 32725: In LDFs generated by the Project Wizard, there is a particular section of code that works around two silicon anomalies: 05-00-0189 and 05-00-0310. However, the comment for that section of code only mentions 05-00-0189. If a user believes that 05-00-0189 does not apply, the user may remove that section of code, only to run into problems because 05-00-0310 does indeed apply. To avoid this possibility, the comment for that section of code has been corrected.

Processor-Specific Release Notes

New Blackfin Processor Support

The Product Bulletin contains the list of new processors available at VisualDSP++ 5.0. Refer to the processor's data sheet and hardware reference manuals for information on system configuration, peripherals, registers, and operating modes. The following are new Blackfin® processors:

- ADSP-BF542, ADSP-BF544, ADSP-BF548, ADSP-BF549
- ADSP-BF522, ADSP-BF525, ADSP-BF527

Ignore any mention of the ADSP-BF541. It does not exist, but is reserved for future use and references to it may appear in some places.

VisualDSP++ 5.0 ADSP-BF54x Known Limitations

The following device drivers are not yet available:

- NAND
- Mass Storage Host (USB)

VisualDSP++ 5.0 ADSP-BF52x Support

Emulator support and the EZ-KIT Lite® debug agent are provided for the ADSP-BF52x parts. VisualDSP++ 5.0 provides the tools required to build and debug ADSP-BF52x code.

The ADSP-BF522/ADSP-BF525/ADSP-BF527 Blackfin Embedded Processor Preliminary Data Sheet is located here:

<http://www.analog.com/processors/blackfin/technicalLibrary/dataSheets.html>

VisualDSP++ 5.0 ADSP-BF52x Known Limitations

These are the known limitations specific to the new Blackfin ADSP-BF52x processors:

- The System Service Libraries are not yet available
- The Device Driver Libraries are not yet available
- LwIP support is not yet available
- ADSP-BF527 EZ-KIT Lite example set is not yet available
- The Blackfin ADSP-BF52x Hardware Reference Manuals are not included in VisualDSP++ 5.0
- No online help for the ADSP-BF52x Hardware Reference Manuals

Compiler Release Notes

Compiler Assumes Strong Alignment of Global Arrays / TAR 33540

For performance reasons, the compiler explicitly aligns arrays at global scope, which allows the compiler to vectorize accesses to the array. For example:

```
char glob_array[BYTECOUNT] = { /* data */ }; // aligned on a 4-byte boundary.
```

The compiler assumes that externally-defined arrays will also be aligned in this manner:

```
extern char ext_array[]; // compiler assumes aligned on a 4-byte boundary.
```

If such arrays are defined in other C files, this will be the case. If, however, you define such arrays in assembly source, you must ensure that they are suitably aligned, otherwise run-time exceptions are possible.

For example:

```
.GLOBAL _unsafe_array;
.TYPE _unsafe_array, STT_OBJECT;
.BYTE _unsafe_array[100]; // no alignment - misaligned access possible
.ALIGN 4;
.GLOBAL _safe_array;
.TYPE _safe_array, STT_OBJECT;
.BYTE _safe_array[100]; // 4-byte aligned - access is safe
```

Simulator Release Notes

Limitations -- Blackfin

The following is a list of supported peripherals in the Blackfin simulators:

Core Peripherals

All Blackfin Processors:

- Data Cache & SRAM Memory
- Instruction Cache & SRAM Memory
- Event/Interrupt Controller Registers
- Core Timer Registers
- Trace Buffer Registers
- Watchpoint Control Registers
- Performance Monitor Registers

System Peripherals

All Blackfin processors:

- PLL Registers
- CHIPID
- RTC Registers
- System Timers
- System Interrupt Controller (SIC)
- DMA
- MDMA
- UART
- SPORT

ADSP-BF535 also includes:

- SYSCR
- Watch Dog Timer
- PCI
- GPIO
- SPI

All Blackfin Processors NOT including the ADSP-BF535 also have:

- PPI
- EBIU - Full MMR support on MP Processors. Single Core only has SRAM support

Note: The ADSP-BF54x processors have a limited list of Core and System peripherals that are supported:

- Data Cache & SRAM Memory
- Instruction Cache & SRAM Memory
- Event/Interrupt Controller Registers
- Core Timer Registers

- Trace Buffer Registers
- Watchpoint Control Registers
- Performance Monitor Registers
- PLL Registers
- CHIPID
- RTC Registers

System Services Release Notes – Blackfin

Silicon Anomaly (05-00-0311)

The previous compiler workaround for this anomaly has been deemed unsafe and removed from this release. As such the Programmable Flag service no longer relies on the compiler to workaround this anomaly. Therefore in this VisualDSP++ 5.0 release, the Programmable Flag service, in conjunction with the Interrupt Manager service, collectively workaround this anomaly in a safe fashion. All versions of the System Service Libraries for Blackfin processors that could potentially be affected by this anomaly inherently work around the anomaly. Users of the System Services do not need to take any action other than simply linking with the appropriate System Services library as usual. Users of the System Services do not need to include the file “sys/05000311.h” nor do they need to use the FIO_ANOM_0311_XXX macros (unless they are accessing the flag MMRs directly).

See below: “Noteworthy VisualDSP++ 4.5 Update Changes: **Error! Reference source not found.**” section for further details.

SDH Driver Corrupts Directory Structures for Write Operations / TAR 33464

The Secure Digital Host (SDH) driver is currently only cleared for read-only access to SD cards inserted into the SD slot on the ADSP-BF548 EZ-KIT Lite development board.

Note: This problem has been identified as a symptom of anomaly 05-00-0340 that is planned to be fixed in Rev 0.1 silicon.

adi_pwr_SetPowerMode() Does Not Facilitate Transition from SLEEP / TAR 33518

The Blackfin System Services power management function *adi_pwr_SetPowerMode()* does not currently support a transition from SLEEP or DEEP SLEEP into any other mode. Upon wakeup from SLEEP or DEEP SLEEP, a call to *adi_pwr_SetPowerMode()* will fail. The function was not written to support either of these transitions is because upon wakeup, the processor transitions automatically from SLEEP or DEEP SLEEP into the FULL_ON or ACTIVE mode, depending on the status of the BYPASS bit, so it was assumed that this function call was not necessary. This assumption was correct with regard to the transition from DEEP SLEEP. But the problem is that when transitioning from SLEEP, the STOPCK bit is NOT automatically cleared, the same way it is cleared

upon wakeup from DEEP SLEEP. The core clock is enabled, but the STOPCK bit does not reflect this. The application must explicitly clear the STOPCK bit upon wakeup to resume running, or else a subsequent read-modify-write of PLL_CTL followed by the IDLE sequence can put the processor back to sleep.

In VisualDSP++ 5.0 Update 1, the *adi_pwr_SetPowerMode()* function will be modified to facilitate the transition from SLEEP mode to ACTIVE or FULL-ON mode. The function will update the appropriate register values to complete the transition from SLEEP mode.

As a workaround, the following code can be used clear the STOPCK bit manually, upon wakeup from the SLEEP mode, enabling the application to resume successfully:

```
u16 PLLCtlVal = *pPLL_CTL;  
  
PLLCtlVal &= 0xFFF7;  
  
*pPLL_CTL = PLLCtlVal;
```

A subsequent call to *adi_pwr_GetPowerMode()* will then reflect the correct power mode.

File System Corruption When Number of Files Exceeds One Cluster / TAR 33677

A known issue with the ADI FAT File System Driver is that when more file entries are created in a directory than there is space available with one cluster directory, corruption may occur as subsequent clusters are not zeroed before use. For the hard disk attached to the ADSP-BF548 EZ-KIT Lite development board, formatted as a 32GB FAT 32 partition, this limitation equates to 512 short name (8.3) entries per cluster. Please note that deleting files does not alleviate the issue.

Additional System Service Library Documentation

In the VisualDSP++ 5.0 installation directory, is a subdirectory called “.../Blackfin/docs/services”. This subdirectory contains updated documentation for the EBIU and Dynamic Power system services. In addition, this subdirectory contains new documentation for the File System Service and the Real-Time Clock service.

Device Driver Release Notes – Blackfin

Additional Device Driver Documentation

In the VisualDSP++ 5.0 installation directory, is a subdirectory called “.../Blackfin/docs/drivers”. This subdirectory contains detailed documentation for each

device driver. Within each subdirectory is detailed information describing each driver including the dataflow methods it supports, command IDs, return codes, configuration issues, etc.

Included in the USB documentation subdirectory is a porting guide document. This document describes the application changes necessary to migrate an application using the USB device driver provided in VisualDSP++ 4.5 to the newer USB driver provided with VisualDSP++ 5.0. It is very strongly recommended that all USB users refer to this document.

Emulator Release Notes

Customizing XML Register Reset Values

The **Use XML Reset Values** target option relies on the register reset definitions defined in the XML files in the `<install-dir-5.0>\System\ArchDef` directory. The list of register names and reset values are extracted from the XML block:

```
<register-reset-definitions>
```

```
...
```

```
</register-reset-definitions>
```

that is located within the XML files for that processor's EZ-KIT Lite. For the TigerSHARC® processors, the register resets are located in the ADSP-TS*-resets.xml files. For the Blackfin® and SHARC® processors, the register resets are located within the *-proc.xml files.

In previous releases, the only method for overriding the XML reset values for custom boards was to edit the system XML files directly. If you had more than one custom board, you needed to rename the XML file to a known processor name prior to use.

At VisualDSP++ 5.0, you no longer need to make edits to the XML register resets in the shipped versions or manage multiple boards by renaming files. The new Custom Board Support includes a feature that enables you to specify register reset values for your custom boards in separate XML files, with names and locations of your choice. For details, refer to "Custom Board Support" within "Graphical Environment" in the VisualDSP++ 5.0 online Help.

Noteworthy VisualDSP++ 4.5 Update Changes

If you have kept current to the VisualDSP++ 4.5 2007 June update, skip this section.

Incorrect Memory Mapping for ADSP-21375 / TAR 31816

TAR 31816: Incorrect memory mapping for ADSP-21375

The memory map for the ADSP-21375 SHARC processor has been corrected

throughout the tools, including the linker and the default LDFs. This was fixed in the VisualDSP++ 4.5 June update. There are three consequences to these changes:

- 1) Any LDF that is heavily derived from a default LDF of a version of VisualDSP++ prior to the VisualDSP++ 4.5 June update may result in linker error el2011 "Invalid memory range and/or width for memory" when linking. In this situation, the LDF must be corrected to reflect the actual memory map of the ADSP-21375 target.
- 2) Any application that uses the default LDF and more memory than is available on the ADSP-21375 part memory map will cause linker errors li1040 "Out of memory in output section". In previous Updates the link of such applications may have succeeded. In this situation it will be necessary to reduce memory usage or build for a part with more memory available.
- 3) Out of the box, the VDK-21375.ldf will get a linker error li1040 for "Out of memory in output section 'seg_pmco' in processor". VDK is too large for the ADSP-21375 to fit in internal memory. To use VDK in an ADSP-21375 processor, external memory must be used.

The data sheets for these parts have corrected memory map information and can be downloaded from www.analog.com by doing a search for the required part number (e.g. ADSP-21375).

Former Workaround for 05-00-0311 is Not Safe – Blackfin TAR 32344

TAR 32344 : Former workaround for 05-00-0311 is not safe

New information regarding anomaly 05-00-0311 has moved the scope of this anomaly beyond the realm of a VisualDSP++ Blackfin compiler workaround and into the region of application-specific behavior.

In the VisualDSP++ 4.5 February 2007 Update, the Blackfin compiler, runtime, VDK and SSL libraries automatically included a new workaround for hardware anomaly 05-00-0311. The VisualDSP++ 4.5 February 2007 Update C/C++ compiler also automatically enabled this workaround when building for parts and silicon revisions that require it.

New information about anomaly 05-00-0311 reveals that it is necessary to temporarily disable interrupts during MMR accesses, which is a decision the compiler should not be making as it could be disabling interrupts for far too long or during a critical moment when the code relies on receiving one. For this reason, the implementation of the workaround was changed for the VisualDSP++ 4.5 June 2007 Update.

In the VisualDSP++ 4.5 June 2007 Update, the Blackfin compiler, runtime, VDK and SSL libraries no longer workaround hardware anomaly 05-00-0311. Instead, an include

file called `sys/05000311.h` is supplied and contains a group of macros for reading and writing the MMRs; if the anomaly applies for the current value of the silicon revision of your target, the macro will ensure that the read or write is safe against anomaly 05-00-0311.

When building for parts and silicon revisions that require the anomaly 05-00-0311 workaround, the macro `__WORKAROUND_FLAGS_MMR_ANOM_311` is defined at compile, assemble, and link stages.

05-00-0311

Anomaly 05-00-0311 is seen when an access of a System MMR Flag register is followed by an access of a specific MMR. The result of the anomaly can be that flag pins configured as outputs that are "set" can erroneously transition to "clear". The anomaly impacts all revisions of ADSP-BF53[123] and ADSP-BF561 parts.

Given some sample application code, such as:

```
int accessMMR()
{
    unsigned short w, x, y, z;
    x = *pFIO_FLAG_D;
    y = *pFIO_MASKA_D;
    z = x & y;
    *pFIO_FLAG_C = z;
    w = *pFIO_EDGE;
    *pFIO_DIR = 0;
    ...
}
```

The anomaly-safe code would be:

```
#include <sys/05000311.h>
...
int accessMMR()
{
    unsigned short w, x, y, z;
    FIO_ANOM_0311_FLAG_R(x, pFIO_FLAG_D);
    FIO_ANOM_0311_MASKA_R(y, pFIO_MASKA_D);
    z = x & y;
    FIO_ANOM_0311_FLAG_W(z, pFIO_FLAG_C);
    FIO_ANOM_0311_EDGE_R(w);
    FIO_ANOM_0311_DIR_W(0);
    ...
}
```

Note: System Service Libraries are anomaly safe for 05-00-0311. See above: "System Services Release Notes: **Error! Reference source not found.**" section.

For more information on anomaly 05-00-0311, see the appropriate errata sheet, which can be downloaded from

<<http://www.analog.com/processors/blackfin/support/ICanomalies.html>>.

Problem Charts

Problems Addressed

The following table is a list of the problems addressed in the VisualDSP++ 5.0 release.

Details can be found on the Tools Anomaly Web page. The URL is:

<http://www.analog.com/processors/tools/anomalies>

Processor Family	Problem Number	Tool	Description
All	24089	Compiler	Generates bad code for old style C args with -double-size-64
All	24929	Compiler	#pragma pack doesn't work as expected with bitfields
All	25649	Compiler	Compiler crashes if a 64-bit float variable is used in an asm
All	26325	Compiler	Speed/size ratio inlining warning gives wrong source line
All	28566	Compiler	Alternate pre-processing sequences cause error with -pedantic
All	28684	Compiler	Multiple PGO files confuses IPA
All	28814	Compiler	-MQ switch crashes driver
All	29484	Compiler	The "optimize" pragmas do not override -Og
All	29611	Compiler	Compiler switch -s does not work
All	29617	Compiler	Assertion (macdefs.c:2475) with extremely long variable names
All	29660	Compiler	Pre-compiled headers doesn't work with IPA and VDK
All	29860	Compiler	#pragma alignment_region modified by prior extern statements
All	29910	Compiler	#pragma always_inline in system headers can cause a warning
All	29952	Compiler	Compiler doesn't recognize -1,0 as fract literal.
All	30096	Compiler	Circular buffer loops containing fn pointers don't zero Lregs
All	24335	IDDE	Unnecessary silicon revision warning
All	27965	IDDE	Default for new projects should be std:: enabled
All	28592	IDDE	getTargetFileNameList returns bad filenames
All	31938	LDF	Inputs sections for tables require FORCE_CONTIGUITY
All	24204	Linker	Pragma align can lead to wasteful memory allocation
All	28389	Linker	No way to map anything after PLIT
All	28541	Run Time Libraries	Cycle counting macros fail to compile in conditional statements
All	28599	Run Time Libraries	printf ignores the 'h' length modifier with %o, %x, and %X
All	8136	Utilities	elfdump doesn't flag error when archive(object) doesn't exist
All	29569	VDK	RunLastTime in VDK Status is displaying the wrong figure
Blackfin	29189	ADspCommon XML Files	DMA register names have an extra number in the name
Blackfin	30604	ADspCommon XML Files	BF561 has RTC window / register defs. These should be taken out.
Blackfin	26076	Compiler	WDOG_DISABLE not defined in defBF53{2 4 8}.h and defBF561.h
Blackfin	28145	Compiler	label displayed at wrong address
Blackfin	28483	Compiler	#pragma no_alias is too strict
Blackfin	28898	Compiler	includes in UNC/shares not found
Blackfin	29099	Compiler	Debug info associated with wrong line of C++ source code.
Blackfin	30547	Compiler	BF shift-with-clipped-shift-distance builtins literal inconsistencies
Blackfin	30554	Compiler	Local variables totalling >64KB can result in internal error

Blackfin	30886	Compiler	Using "n" asm constraint results in compiler error
Blackfin	31849	Compiler	The complex fract function csqu_fr16 doesn't work
Blackfin	32823	Compiler	abs saturates even with -no-saturation
Blackfin	32858	Compiler	Callee function doesn't truncate parameter to expected type (K&R C)
Blackfin	32904	Compiler	internal compiler error in peephole.c:2387
Blackfin	32910	Compiler	"Buffer overrun detected" error message from linker
Blackfin	32939	Compiler	Short names for video functions being defined with -no-builtins
Blackfin	33668	Compiler	Fatal error in do_expr()
Blackfin	30796	Emulator	HPPCI-ICE does not work under OEM Windows Vista
Blackfin	22657	IDDE	Backslash causes problems for assembler property page
Blackfin	23285	IDDE	Cannot export from VDK State History pane top-bar
Blackfin	27938	IDDE	Random license failure when building using a floating license.
Blackfin	28150	IDDE	Cannot view defined static member variable
Blackfin	28197	IDDE	LDFGen ignores multicore settings
Blackfin	28404	IDDE	User-corrupted VDK history data/window can crash Idde
Blackfin	28891	IDDE	Startup code/LDF wizard doesn't warn when overwriting LDF file
Blackfin	28902	IDDE	Additional include dirs from 3.0 or earlier project settings
Blackfin	28922	IDDE	Show tabs now also show spaces
Blackfin	28975	IDDE	Creating a new TCPIP project pops up message about replacing srcs
Blackfin	29017	IDDE	\$(VDSP) not expanded when just building one file in a project.
Blackfin	29087	IDDE	Thread Types missing from Threads in VDK Status Window
Blackfin	29384	IDDE	Go To in BTC Memory window causes Runtime - Abnormal termination
Blackfin	29605	IDDE	VDK Status window Event Bit display error
Blackfin	29846	IDDE	Doubles not fully displayed when -double-size-64
Blackfin	30494	IDDE	Whole word replacement does not work with undercores
Blackfin	31336	IDDE	Two elements allowed to be placed at the same location
Blackfin	32024	IDDE	Trace window does not display all of its entries
Blackfin	32038	IDDE	Expert Linker crashes when opening LDF file
Blackfin	32067	IDDE	ADspStreamList Add* methods don't work for BF561
Blackfin	32620	IDDE	C++ NMI interrupt handler does not end with an RTN
Blackfin	30349	Installation	msxml3.dll registration problems prevent install
Blackfin	31346	LDFGen	shared data, locks etc need to be non-cached
Blackfin	32725	LDFGen	Workaround comment incomplete in generated LDFs
Blackfin	30935	Linker	Cannot jump-call expand PLIT?
Blackfin	22930	Run Time Libraries	C++ exception handling may not work with spilled sections.
Blackfin	28518	Run Time Libraries	Interrupt dispatcher does not include 05-00-0071
Blackfin	28558	Run Time Libraries	32-bit signed division wrong for inputs near INT_MIN
Blackfin	28965	Run Time Libraries	min_fr1x16 and max_fr1x16 missing
Blackfin	29525	Run Time Libraries	adi_core_b_enable() unresolved in assembly
Blackfin	30752	Run Time Libraries	CPLB Manager can cause double exception
Blackfin	31869	Run Time Libraries	meminit support fails to for ZERO_INIT when stack in scratchpad
Blackfin	31881	Run Time Libraries	FLT_MAX not a float literal
Blackfin	32864	Run Time Libraries	DMA32 bit in PPI erroneously appears in single core def headers
Blackfin	32911	Run Time Libraries	mulff64.asm in release not same as used to build library

Blackfin	28099	Simulator	BF535: crash running attached DXE in BF535 CAS
Blackfin	29583	Simulator	Self-Nesting Interrupts not supported in Blackfin BF533 CAS
Blackfin	30628	Simulator	32 bit registers in EBIU only accept 16 bit writes on a BF561.
Blackfin	31895	Simulator	Size information for all of the caches show up as "0" Kbytes
Blackfin	28946	TCPIP Stack	LwIP Project does not accept broadcast traffic in VDSP 4.5
Blackfin	30450	VDK	Contradictory information provided for popping regions
Blackfin	30991	VDK	VDK does not handle all the exceptions that the cplb_hdr does
Blackfin	32156	VDK	Enabling self-nested interrupts breaks VDK
SHARC	28087	ADspCommon XML Files	REVPID register displays PROCID and SIREV swapped
SHARC	20526	Compiler	Annotation information is incorrect for registers clobbered by an asm
SHARC	28993	Compiler	-pedantic should put out warnings
SHARC	29964	Compiler	C/C++ runtime not honored on SHARC.
SHARC	31767	Compiler	Compiler not working around 2136x anomaly (07-00-0009)
SHARC	32198	Compiler	Asm statements using circ buf regs don't work
SHARC	29246	Examples	21262 AsmDemo / CDemo BTC example README files need correction
SHARC	25305	IDDE	Additional options lost converting 3.0 djp to 4.0
SHARC	31421	IDDE	Zooming in the plot window may cause the IDDE to crash
SHARC	29802	LDF	LDF can allow 1 too many words to be assigned to heap
SHARC	28074	Linker	No output sections issued when "empty" with run spaces
SHARC	30078	Run Time Libraries	delete operator doesn't work with heap_install
SHARC	31200	Run Time Libraries	Multi-threaded realloc() will not allocate correct amount of mem
SHARC	31850	Run Time Libraries	heap_malloc with nonexistent heap causes invalid data accesses
SHARC	33303	Run Time Libraries	Bit macro FAR changed to FARF for SDCTL register in def header
SHARC	29900	Utilities	Mem21k update generates "1" exit code, but seems to work anyway
SHARC	30460	Simulator	ADSP-21375 Primes example does not work in simulator
SHARC	32673	Simulator	Hang executing from ext mem consecutive reads from ext mem
TigerSHARC	32115	ADspCommon XML Files	-workaround all does not turn on all workarounds
TigerSHARC	22672	Assembler	Assembler accepts invalid register move
TigerSHARC	31832	Assembler	Symbols sizes for .INC/BINARY wrong
TigerSHARC	32041	Assembler	Invalid warning on 2nd .section directive
TigerSHARC	29096	Compiler	Confusing annotations for compiler-generated fp-divide code
TigerSHARC	32803	IDDE	Porting a VisualDSP++ 4.5 project causes different libraries to be linked in
TigerSHARC	29735	Run Time Libraries	strtol and strtoul error for garbage bases
TigerSHARC	29836	Run Time Libraries	libsimg for TS101 rev 0.4 is incomplete

Known Problems

The following table is a list of known problems in VisualDSP++ 5.0.

Details can be found on the Tools Anomaly Web page. The URL is:

<http://www.analog.com/processors/tools/anomalies>

Processor Family	Problem Number	Tool	Description
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All	30713	Compiler	Compiler is not using BSS
All	32429	Compiler	Internal error: diag_message: missing string substitution
All	33665	Compiler	"internal compiler error / driver.c:1488" building VLA source
All	28272	Run Time Libraries	C++ library code linked in with -rtti is bigger than 4.0
All	32303	Run Time Libraries	cycle_t function return types causes compiler warning cc0815
All	32092	IDDE	int PrimIOCB; means no output, multiply defined sym or software exception
All	31923	Compiler	Compiler driver accepts illegal -flags-* options
All	32237	Compiler	Workaround switches don't match annotations
Blackfin	32004	Assembler	Inconsistent Assembler behavior with integer constants
Blackfin	28572	Compiler	BF535: float div returns small denorm result when zero expected
Blackfin	29394	Compiler	-Wremarks doesn't always warn about deprecated switches
Blackfin	29851	Compiler	-section does not apply qualifiers
Blackfin	29870	Compiler	ISR problems with SAVE_REGS functionality
Blackfin	29874	Compiler	-no-builtin switch causing failures
Blackfin	30247	Compiler	section __attribute__ does not work as documented
Blackfin	32466	Compiler	C++ template instantiations ignore #pragma uses
Blackfin	32299	Compiler	volatile store inputs also treated as volatile when unnecessary
Blackfin	32749	Compiler	Slowdown of code using division when build -Os
Blackfin	33643	Compiler	Keywords such as section cause spurious errors in MISRA mode
Blackfin	33721	Compiler	still possible to write bad context sensitive __builtin_aligned
Blackfin	33403	CRTGen	Generated cplbtab file unusable
Blackfin	33405	CRTGen	CPLB_D_PAGE_MGMT used indiscriminately in generated BF535 cplbtab
Blackfin	30369	Debug Agent	Debug agent scans too fast [can cause external memory issues]
Blackfin	32752	Debug Agent	IceTest fails on RoHS EZ-KIT Lite's using USB 2.0 HUB
Blackfin	24859	Device Driver	Autobauding fails at 38,400bps on the 561 only
Blackfin	26184	Device Driver	UART autobaud timer selection
Blackfin	27061	Device Driver	Memory size given to adi_dev_Init() must be larger than expected
Blackfin	29791	Device Driver	PPI Error Callbacks
Blackfin	31608	Device Driver	Error Interrupt Side Effects
Blackfin	30087	elf2flt	Bad relocations out of elf2flt when no code
Blackfin	33691	Examples	ADSP-BF561 POST does not stop at main on load with 1.3 rev EZ-KIT Lite
Blackfin	27445	IDDE	Step over/out doesn't work in flash
Blackfin	27685	IDDE	Deleted SW breakpoints keep re-appearing after load
Blackfin	28755	IDDE	After selecting text, print from source window prints entire file
Blackfin	29687	IDDE	Terminal font doesn't work in the source window
Blackfin	29727	IDDE	static member of class not resolved in expressions window
Blackfin	31238	IDDE	No warning on Memory Fill/Dump outside valid memory
Blackfin	31720	IDDE	Various tool switches reported as not enabled via automation
Blackfin	32578	IDDE	Should keep the paths in the additional include as absolute
Blackfin	32665	IDDE	File-specific compile options do not take defaults from existing
Blackfin	32312	IDDE	License not migrated when installing under Windows Vista
Blackfin	32957	IDDE	F2 does not rename VDK items
Blackfin	33049	IDDE	Loading DWARF3 debugging information may crash VisualDSP++
Blackfin	33680	IDDE	Changing project options may overwrite working LDF
Blackfin	31173	Installation	Install_CL does not handle VC2005 SP1 update
Blackfin	33057	Installation	Unknown publisher warnings during 5.0 Installation on Vista
Blackfin	28515	LDF	Issues with the 2-link approach for BF561 projects
Blackfin	31695	LDF	data1 is mapped before L1_bsz
Blackfin	29902	LDFGen	Project fails to build when user sets heap space to less than 1k
Blackfin	32747	LDFGen	LDFGen doesn't sufficiently support run-from-flash
Blackfin	33652	LDFGen	Stack in mem covered by cplb data table entry in WB mode problem
Blackfin	33722	LDFGen	Two output sections with the same name are generated

Blackfin	29565	Loader	Wrong assignment in the ADSP-BF537 Init file
Blackfin	29065	Run Time Libraries	Hyperbolic Functions do not return Inf when called with Inf arg
Blackfin	29221	Run Time Libraries	Multicore runtime libraries always link in I/O library
Blackfin	32179	Run Time Libraries	VDK and RTL link in different libs for -si-revision none -workaround
Blackfin	32319	Run Time Libraries	crtn.doj can be removed from .LDF File without warning
Blackfin	32867	Run Time Libraries	Make the header files MISRA compliant
Blackfin	33654	Run Time Libraries	DSP library function conv2d3x3_fr16() based on wrong algorithm
Blackfin	33733	Run Time Libraries	disable_data_cache() does not work
Blackfin	33744	Run Time Libraries	Incorrect macro names for HOSTDP masks in BF52x def header
Blackfin	28581	System Services	adi_pwr_SetFreq() locks up sometimes on ASDP-BF561
Blackfin	31568	System Services	Add command to sense the PERIOD register for GP timers
Blackfin	32230	System Services	Add command to sense GP timer period
Blackfin	33464	System Services	SDH driver corrupts directory structures for write operations Note: This problem has been identified as a symptom of anomaly 05-00-0340 that is planned to be fixed in Rev 0.1 silicon.
Blackfin	33518	System Services	pwr mgmt to facilitate transition from SLEEP
Blackfin	33677	System Services	File System Corruption when number of files exceeds 1 cluster
Blackfin	29313	TCPIP Stack	ETHARP_ALWAYS_INSERT option is deprecated in lwIP
Blackfin	29736	TCPIP Stack	Multiple network interface problem
Blackfin	30157	TCPIP Stack	lwip send function returns bytes sent, but sends only 64K max
Blackfin	32362	TCPIP Stack	getsockopt() with SO_ERROR does not return error
Blackfin	33007	TCPIP Stack	INETD example should not set the user_data_ptr in the header
Blackfin	33627	TCPIP Stack	Corrupted ADSP-BF537 EZ-KIT Lite in Blackfin\Examples (patch available) ADSP-BF537 EZ-KIT Lite\LAN\Host\FILESERVER\FileServer.dsp
Blackfin	32949	USB Stack	Intermittent USB connectivity on ADSP-BF548 EZ-KIT Lite
SHARC	32920	Compiler	PCH fails with cc0219 on Vista
SHARC	29561	Emulator	VisualDSP++ disconnect if Sport DMA Addressing debug window open
SHARC	32810	Emulator	Incorrect display of instructions in external memory on Sharc
SHARC	33574	IDDE	Value of float pointers displayed in unexpected format
SHARC	32706	Run Time Libraries	Increase in printf footprint
SHARC	32881	Run Time Libraries	Thread-safe time library ctime() problem
SHARC	33670	Run Time Libraries	SIG_MTM to be defined for ADSP-21362/3/4/5/6
SHARC	33671	Run Time Libraries	MTM registers missing from cdef21364.h
TigerSHARC	28363	Compiler	Functions with #pragma weak_entry can be inlined
TigerSHARC	32961	Compiler	Use of setjmp/longjmp incompatible with compiler optimizations
TigerSHARC	33655	Compiler	link error: __memzero could not be resolved

TigerSHARC	30749	Emulator	Halting single proc during MP run halts both processors
TigerSHARC	28195	Run Time Libraries	Compiler fails using some library functions prefixed with std::
TigerSHARC	29110	Run Time Libraries	-fp-div-lib doesn't work when compiling Inf/NaN with -ve value
TigerSHARC	32626	Run Time Libraries	ADSP-TS201 BTB not enabled by default in the boot process
TigerSHARC	32758	Run Time Libraries	namespace std does not contain builtins
TigerSHARC	32782	Run Time Libraries	DSP real vector functions can raise FP exceptions
TigerSHARC	27911	Simulator	ADSP-TS203 session displays the CLU registers