DSP/BIOS DM648/C6452

Release version 1.10.03

Release Notes

April 17, 2009

The product release notes in this document are for Platform Support Package (Post-silicon) for DM648/C6452 platform for BIOS. The PSP Package serves to provide a fundamental software platform for development, deployment and execution. This abstracts the functionality provided by the hardware. The product forms the basis for all application development on this platform. The package for this product shall include deliverables for the following:

- Device Drivers for DSP-BIOS

  o UART

  o I2C

  o McASP

  o SPI

  o TSIP (tested in DLB mode)

  o Video port (with Encoder and decoder support)

- PAL SYS components

  o VLYNQ (please refer VLYNQ release notes for further information)

  o PCI

- Other separate components

  o EDMA driver

  o Ethernet switch driver

![Texas Instruments logo]

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1 In This Release

This is the 1.10.03 release of DM648/C6452 PSP support package and contains drivers, sample applications and support documents for DM648 and C6452 SOC parts.

The DM648/C6452 BIOS PSP package is unified with DM6437/C6424 BIOS PSP package in this release. Please find the separate release note for DM6437/C6454 BIOS PSP in 'pspdrivers_<version>\docs\dm6437' folder of the package.

The drivers and sample applications are verified on DM648 and C6452 EVMs.

The DM648 components are as follows

- ❖ Device Drivers for DSP-BIOS
    - o UART
    - o I2C
    - o McASP
    - o SPI
    - o Video port (with Encoder and decoder support)

- ❖ PAL SYS components
    - o VLYNQ (please refer VLYNQ release note for further information)
    - o PCI

- ❖ Other components
    - o Sample applications (RTSC mode)
    - o PAL OS (for BIOS)

The C6452 components are as follows

- ❖ Device Drivers for DSP-BIOS
    - o UART
    - o I2C
    - o McASP
    - o SPI
    - o TSIP (tested in DLB mode)

- ❖ PAL SYS components
    - o VLYNQ (please refer VLYNQ release notes for further information)
    - o PCI

❖ Other components

  o PAL OS (for BIOS)

  o TSIP sample application

❖ **New features in the components of release 1.10.02**

  o I2C driver has been converted to an asynchronous driver.

  o Have been built with version 1.06.00.01, codegen tools 6.1.5 and XDC 3.10.02

❖ **New features in the components of release 1.10.01**

  o Have been built with EDMA LLD version 1.05.00, codegen tools 6.1.0 and XDC 3.10.00.26

❖ **New features in the components of release 1.10.00**

  o The path settings have been edited appropriately in < psp package>\packages\ti\sdo\pspdrivers\common\psp_xdcpaths_common.dat>

  o Renaming of version from 1.10.00.09 to 1.10.00

  o No other change is made from the release version 1.10.00.09

  o Have been built with EDMA version 1.05.00, codegen tools 6.1.0 and XDC 3.10.00.26

❖ **New features in the components of release 1.10.00.09**

  o Support for asynchronous mode of operation to the driver (and sample application) is added in the UART.

  o Dynamic memory allocation is replaced by static memory allocation in PALOS semaphore creation module.

  o All header files were updated with "cplusplus" compile guard.

  o The drivers which used infinite timeout, has been provided with a new IOCTL to set time out (to be issued immediately after driver creation and before any IO submission)

  o Some of the drivers (e.g. audio drivers) in the previous version could not be created (SIO/GIO create) from "main". Changes were made to semaphore handling to enable driver creation from "main" for migrating users. Please note that the EDMA LLD needs to be used along with this PSP package for this option (driver creation from main) to work.

  o Please note that EDMA_LLD code would not be present in this PSP package. The EDMA_LLD code should be installed separately as the EDMA_LLD package is now available a separate product (http://pdssoft.design.ti.com/cgi-bin/directdownload?delid=3472). Please note that the EDMA_LLD must be installed before any of the sample application or driver (that depend on EDMA) from BIOS PSP package could be compiled. This release of PSP has been tested with EDMA_LLD version 1_03_01_01.

      o   In SPI driver, changing CS polarity at runtime support (IOCTL) is added.

- ❖ **New features in the components of release 1.10.00.08**

  - o DM6437/C6424 BIOS PSP package was unified with DM648/C6452 BIOS PSP to leverage the common drivers and RTSC.

  - o Previously the DVSDK users need to update the "DVSDK" installation path into the
    <psp_folder>\packages\ti\sdo\pspdrivers\common\psp_xdcpaths_common.dat
    <edma_folder>\packages\ti\sdo\edma3\common\edma3_xdcpaths_common.dat
    files for proper compilation of PSP samples. In this release script is modified to automatically take this information from the DVSDK installation directory environment variable " BIOSDVSDK_INSTALL_DIR"

  - o EDMA_LLD code has been removed from the package of this PSP. The EDMA_LLD code should be installed separately as the EDMA_LLD package is now available a separate product (http://pdssoft.design.ti.com/cgi-bin/directdownload?delid=3472). Please note that the EDMA_LLD must be installed before any of the sample application or driver (that depend on EDMA) from BIOS PSP package could be compiled.

  - o Sample folders of each driver is moved from respective driver folder **(**<psp_folder>\packages\ti\sdo\pspdrivers\driver\<peripheral>) to EVM dependent folder
    (<psp_folder>\packages\ti\sdo\pspdrivers\system\dm648\bios\evmDM648\<peripheral>) as the example is more towards EVM.

  - o Fvid.h file is moved to
    <psp_folder>\packages\ti\sdo\pspdrivers\system\<soc>\bios\<evm>\Video folder. This is done as there is more than one video driver in the package uses fvid.h. **Applications should take care to change this path in their application for proper compilation and function.**

  - o The string "EVMDM648_AIC33" is replaced by "AUDIO_AIC33" in tci files. **Application should take care to change in their application for audio to work properly.**

  - o CSLR headers/examples are modified to match the DM6437/C6424 CSLR macro names so as to leverage the re-use of DM6437 CSLR based applications by customers.

  - o Previous DM648/C6452 BIOS PSP package release 1.10.00.07 has wrong file output path for **idebug** and **irelease** profiles for TSIP device driver and this has been corrected in this release.

  - o A master pjt to compile all libraries of the SOC part is available at \ti\sdo\pspdrivers\system\<SOV>\bios\<evm>\tests\build

  - o A master pjt to compile all sample applications of the SOC part is available at \ti\sdo\pspdrivers\system\<SOV>\bios\<evm>\tests\build

- ❖ **New features in the components of release 1.10.00.07 (please note that 1.10.00.06 was not released due to internal release reject)**

o Audio drivers were added for C6452

o RTSC support is added for C6452 sample application (needs BIOS 5.31.08). TSIP non-RTSC application would be deprecated in next release.

o Rx channel of MCASP driver was configured to use TC 2 instead of TC 1, because of Rx overrun issues observed (because of loading nature of TC1 by other components)

o Information regarding profiling and performance characteristics of drivers captured into the corresponding driver's Data sheet guide.

❖ **New features in the components of release 1.10.00.05**

o SPDIF transmit of MCASP driver is functional in this release.

❖ **New features in the components of release 1.10.00.04**

o In audio drivers/ audio sample applications the macro EIGHT_TO_ONE (misnomer) is replaced by FOUR_TO_ONE macro. This would not affect the applications directly, unless they use the audio sample application source code and project file as is.

o ONE_TO_ONE and FOUR_TO_ONE flavor of audio drivers are pre-built and linkable through RTSC CFG file. (GIO sample of DVSDK *needs* a statement addition to its CFG file - please refer audio driver release notes or audio driver 1 to 1 sample application)

o Ethernet driver has a new features for supporting 62.5Mhz clk.

▪ The DM648 EVMs use either a 62.5Mhz/125Mhz input clock for the Ethernet Subsystem. The PLLs need to programmed by the board initialization code(as part of Application startup) based on the input clock frequency. The sample applications provided looks for "INPUT_CLOCK_FREQUENCY_125MHZ" or "INPUT_CLOCK_FREQUENCY_62_5MHZ" macros to be defined to identify the input clock frequency. Please define the same as part of your application project (CCS pjt) file

▪ By default the Ethernet sample applications have 62.5 MACRO defined.

o Video driver: a couple of new features like slice mode video support and RAW mode support have been added to the video port driver. For more details please refer video port driver release notes and user guide.

o XDC path files(psp_xdcpaths_common.dat and edma3_xdcpaths_common.dat) of this package refers the DVSDK's xdc path file by default

▪ When the package is not used along with DVSDK, the xdc path files <psp_folder>\packages\ti\sdo\pspdrivers\common\psp_xdcpaths_ common.dat and <edma_folder>\packages\ti\sdo\edma3\common\edma3_xdcpaths _common.dat should be modified to comment the load file section and uncomment the absolute directory section.

- After un-commenting the absolute directory section please set the pspdrivers/edma3 installed directories as needed.
  - The folder names have been renamed with smaller cases to comply with RTSC standards.
  - In the previous release some components did not have idebug and irelease profiles in their project files and they have been corrected in this release.
  - RTSC packaging /compilation framework is implemented and aligned with the RTSC standard in public header placements.
    - With this RTSC, applications can use/include this package's library in a RTSC way (using CFG files to add libs).
    - To implement the RTSC framework some folder structure modifications have been done. Some of the changes are to fit in the framework and some of the changes are to handle tools used.
    - pspdrivers_<version string> packages\ti\sdo\pspdrivers folders are inserted before pspdrivers
    - edma3_lld_<version string> packages\ti\sdo\pspdrivers folders are inserted before edma3
    - pspdrivers\system\DM648\bios\evmDM648\src\audio and pspdrivers\system\DM648\bios\evmDM648\src\video folders are moved to pspdrivers\system\DM648\bios\evmDM648\audio and pspdrivers\system\DM648\bios\evmDM648\video respectively.
    - Integrated sample applications are moved to pspdrivers\system\DM648\bios\evmDM648\tests folder.
    - The built libraries of each component are placed in the <component>\lib folder.
    - For applications, the built binary will be copied to <component>\bin folder.
    - RTSC changes have been done for both C part and DM part library projects
    - RTSC changes have been done for both C part and DM part standalone sample applications.
    - The stand alone sample applications for UART, I2C, SPI, AUDIO and VIDEO (all the loopback sample applications) are modified to compile and run from either the native folder location within pspdrivers package or from DVSDK in the same folder hierarchy of video preview application (i.e. from outside the pspdrivers package in DVSDK environment).
  - **Please refer individual driver release notes for the changes from previous driver and particularly changes in interface header file.**

- ❖ **Notes to user on sample application**

- o MCASP – audio loop back – needs appropriate audio input and output connection

- o VLYNQ sample: Read/Write test – will need appropriate HW connection other wise the sample application will return error ("Unable to establish the link") on console.

- o TSIP sample – need to provide external clocks (8.192 MHz and 8 KHz to bit clock and frame sync respectively)

- o PCI sample: Read/write across PCI bus and DSP to interrupt sample (needs proper setup)

- o Video: please refer video port driver release notes and user guide.

- o Some peripherals like SPI and UART need the EVM configuration switch (SW2 and SW3) settings to be proper. Please refer to EVM documentation from the EVM manufacturer. To download the DVEVM DM648 board support files/drivers, log on Lyrtech FTP site

  - ▪ Open Windows Explorer. (not Internet Explorer)

  - ▪ In the Address bar, type ''ftp://dm648evm:kC9YxeE9m7c5B1JzVwmu@ftp2.lyrtech.com ''

❖ **Instructions to build the PSP package in RTSC environment**

1) Install XDC version 2_95_01_05 (or above) from http://www.sanb.design.ti.com/web/xdc/xdc_2_95/xdc_2_95_01_05/xdc_setupwin32_2_95_01_05.exe

2) Note: DO NOT install XDC in folder having spaces in its name. Like "Program Files". Folder name should not have any spaces.

3) Set PATH environment variable to XDC installation folder. For e.g., if you have installed XDC in C:\ in folder "xdc_2_95_01", append "C:\xdc_2_95_01;" to the PATH environment variable.

4) If user is working on clear case, then the term REF_PATH used in this document refers to M:\<YOUR VIEW>\pspdrivers\ and for other users this is <local path where the Pspdrivers are installed>. (Please note that users working from clear case would not have versions appended with the pspdrivers_ folder mentioned in next steps.

5) Modify the "<<REF_PATH>>\pspdrivers_1_10_00_10\packages\ti\sdo\pspdrivers\common\psp_xdcpaths_common.dat" file.

  - o DVSDK users check the DVSDK installation path in the section2 of the file

  - o Non-DVSDK users please set the " pspRootDir" variable to the" <<REF_PATH>> folder.

    USE /FORWARD/ SLASHES FOR ALL DIRECTORIES IN THIS VARIABLE.

6) If you are going to build applications using the pre-built libraries skip following steps and build the sample applications.

7) Open a command prompt window.

8) On the command prompt, go to <<REF_PATH>>\pspdrivers_\ docs\Others\.

9) Run "xdc_pspdrivers_build.bat" script from the command prompt. It will throw some warnings, just ignore them.

10) Build all the PSP drivers' libraries first. So build pal_os, pal_sys, i2c, mcasp, spi, tsip, uart, vport, pci, vlynq, audio and vport_edc LIBRARIES ONLY (YOU SHOULD NOT BUILD ANY APPLICATION AT THIS STAGE)

The path to start for building the libraries is:

<<REF_PATH>>\pspdrivers_1_10_00_10\packages\ti\sdo\pspdrivers\

<<REF_PATH>>\pspdrivers_\packages\ti\sdo\pspdrivers\system\DM648\bios\evmDM648\audio\build

<<REF_PATH>>\pspdrivers_\packages\ti\sdo\pspdrivers\system\DM648\bios\evmDM648\video\build

11) Now you can build any of the sample applications.

Precautions 1: Your PATH environment variable should point to the XDC installation folder first without pointing to any other XDC tool chain path. So you should put your XDC installation directory before any other folder in the PATH variable.

Precautions 2: Local path where clear case code is dumped of pspdrivers SHOULD NOT have any '.' in it.

Precautions 3: If you have built combo1 and combo2 both, and now are building combo1 again, do a clean build. Because the folder is same for all auto-generated files, they will be overwritten. So you have to build them again using a clean build.

Note1: Steps in which user runs batch files are required only once per view per PC. Please note that these steps creates kind of indexing for RTSC.

Note 2: Sometimes the XDC tool chain throws an error like: "Access is denied" only if you are building from ClearCase. Just try to clean build again.

Note 3: When a video related project is opened in CCS, file not found error could pop up for "fvid.h" file. However when the XDC is invoked during compilation, the file will be found appropriately by the compiler. So just ignore the error.

Note 4: For any kind of build related problem, please Rebuild all.

❖ **Instructions to build the DVSDK examples in RTSC environment (only taking PSP pre-built libraries)**

- o Modify the "xdcpaths_evmDM648.dat" to take the correct PSP and EDMA3 releases. This file is in the DVSDK installation directory.

- o Modify the include header paths (now the header files of each components is the root of the component) in all the source and tcf files for the specific DVSDK example.

  - i. For example previous vport headers were in .... pspdrivers_\packages\ti\sdo\pspdrivers\include

  - ii. Now they are available in pspdrivers_\packages\ti\sdo\pspdrivers\drivers\vport

- o Modify the specific .CFG files to include the PSP packages correctly. Since the directory structure has been changed to componentize the deliverables (e.g. palsys.dm648 instead of palsys), these files might need modification.

- o Rebuild the example.

❖ **Instructions to build the PSP standalone applications in RTSC environment (taking PSP pre-built libraries)**

- o Modify the "xdcpaths_evmDM648.dat" to take the correct PSP and EDMA3 releases. This file is in the DVSDK installation directory.

- o Copy the PSP sample application, along with the source code, in the "examples" folder in the DVSDK installation directory.

- o Rebuild the sample application.

❖ **Instructions to build the PSP libraries in RTSC environment**

- o Modify the "xdcpaths_evmDM648.dat" to take the correct PSP and EDMA3 releases. This file is in the DVSDK installation directory.

- o Rebuild the driver.

❖ **Gel file version used**

The GEL file used for validating this package was taken from the EVM manufacturers' website (link mentioned in the main release notes) and its revision is 1.20.

2   System Requirements

This release requires the following products (apart from the PSP package):

- ❖ CCS 3.3.38.2
- ❖ DM648 EVM
- ❖ DSP-BIOS 5.31.08 or higher
- ❖ CG Tools 6.0.8
- ❖ XDC tool 2.95.XX and above

3 Installation and Usage

Please refer "PSP_User_Guide.pdf" document for installation procedure.

4 Uninstallation

Please refer "PSP_User_Guide.pdf" document for un-installation procedure.

5 Fixed In This Release

1) Please refer to peripheral specific release notes

2) Following are the fixed issues and were part of known issues in the previous release. There are more issues fixed apart from those mentioned below and for their details please refer PSP bug database (clearquest DPSP database)

3) **Please go through the release notes of individual driver component release notes for more details on fixed issues and known issues.**

1.	McBSP EDMA programming
This issue (SDOCM00055494) is fixed. The Mcbsp driver contained a redundant enabling of EDMA transfer in case the packet submitted was the first one in the queue. This caused the current pending events to get cleared. This was causing the Mcbsp driver to hang. This function to restart the EDMA transfer is now removed. **File(s) affected: \ti\sdo\pspdrivers\drivers\mcbsp\src\ddc_mcbsp.c**	

2.	McASP EDMA programming
This issue (SDOCM00056082) is fixed. The Mcasp driver contained a redundant enabling of EDMA transfer in case the packet submitted was the first one in the queue. This caused the current pending events to get cleared. This was causing the Mcasp driver to hang. This function to restart the EDMA transfer is now removed. **File(s) affected: \ti\sdo\pspdrivers\drivers\mcasp\src\ddc_mcasp.c**	

3.	pal_osTask.h file missing
This issue (SDOCM00056063) is fixed. The pal_osTask.h file was missing in the package. This was a new file added. However, the package.bld file was not updated to include this file in the package. **File(s) affected: \ti\sdo\pspdrivers\pal_os\package.bld**	

6 Known Issues/Caveats

Please refer each components release notes for detailed information on known issues which are available at "docs" folder of each component.

Note about a couple of HW errata

1) EVM schematics and the EVM have some discrepancies (eg. Video input RCA Jack naming convention.

2) Silicon has an issue in endianness setting of VPORT FIFO and hence will display each 8 pixels in each line, flipped (so that every 8 pixel columns gets flipped). That is pixel 0 is displayed in pixel 7 position and vice versa; pixel 1 is displayed in pixel position 6 and vice versa; pixel 8 is displayed in pixel position 15 and vice versa and it goes on. The workaround for this can be done by swapping the bytes in the buffer (each 8 bytes in a line) before displaying and after capturing. Please refer video driver release notes for more instructions.

3) Please refer **video port release** notes for

    i. The changes need in video loopback sample application.

    ii. Known issues for video port driver

1.	MISRA C Compliance
Release Note	
The source code, contained in this release, is MISRA C Compliant with some waivers and some bugs in the tool.	
Workaround	
None	

2.	Document Availability
Release Note	
Ethernet driver: Architecture documents are not available for Ethernet driver in this release	
Workaround	
None	

3.	Instrumentation

- Implementation and testing of "socrates" is done with DM648 SOCRATES tool. Still we are observing that throughput and latency absolute values are not correct in the graph though it is correct in the log.

Please note: As the Video port sample applications use CPU excessively for bytes swap and copying from capture buffer to display buffer, Socrates is not getting enough bandwidth.

Workaround

None. Fix is with the Socrates visualization tool.

4.	Quality issues in VESA feature

Though the VESA feature works with production EVM (available with beta DVSDK) some quality issues are observed.

Workaround

None

5.	Vlynq slave feature not working

Vlynq slave feature was previously not working and got corrected by a patch in the daughter card. Still the DM648 (master) to DM648 (slave) vlynq communication does not work, whereas DM648 (master) to DM6437 (slave) and DM6437 (master) to DM648 (slave) combination works.

Workaround

None

7 Revision history

Date	Author	Comments	Version
December 01, 2006	Rinkal Shah	BFT release	0.3.0
February 02 2007	Vichu	Appropriate modifications needed for DM648 and corrected some typo.	0.3.1
March 21, 2007	Nagarjuna Kristam	Updated spi changes for this release	0.4.0
March 26, 2007	Vichu	Added latest information in new in this release and Known issues/Caveats section	0.4.1
April 25, 2007	Vichu	Release/code drop during bringup	0.4.21
May 02, 2007	JP	Updated for 0.5 release	0.5
May 3, 2007	Vichu	Made minor corrections and updations for release 0.5	0.5
June 7, 2007	Nagarjuna Kristam	Document updated for 0.6 release for i2c,spi and uart	0.5.1
June 18, 2007	Amit Chatterjee	Added links for component release notes	0.6.0
July 14, 2007	Vichu	Updated for release 1.10.00.02	0.7
August 17, 2007	Vichu	Release notes addendum for release notes 1.10.00.02	0.8
August 27, 2007	Vichu	Updated for release 1.10.00.03	0.9
August 31, 2007	Vichu	Updated for release 1.10.00.04	1.0
September 20, 2007	Vichu	Updated with system test finding like TSIP issues, Audio issues	1.1
October 24, 2007	Vichu	Updated during release 1.10.00.06	1.2
October 28, 2007	Vichu	Updated for release 1.10.00.07	1.3
December 3, 2007	Vichu	Updated for release 1.10.00.08	1.4
December 18, 2007	Vichu	Updated with master Pjt information in new in this release.	1.5
December 20, 2007	Vichu	Updated for release 1.10.00.09	1.6
February 20, 2008	Nagaraj	Updated for release 1.10.00.09 with EDMA version updates	1.7

February 28, 2008	Vichu	Updated after system test	1.8
February 29, 2008	M Sriram	Updated for release 1.10.00.10	1.9
25 March 2008	Nagaraj K	Fixed documentation error	1.10
May 29, 2008	M Sriram	Updated for release 1.10.01	1.11
Aug 01, 2008	Vichu	Corrected after review for release 1.10.01	1.12
22 Dec 2008	M Sriram	Updated for release 1.10.02	1.13