

TMS320DM644x DVEVM Windows CE v5.0 BSP DSP/BIOS LINK

User's Guide

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Read This First

About This Manual

This document accompanies the release of Windows® CE 5.0 BSP for DaVinci™ evaluation module (EVM) board.

Purpose and Scope

This document describes the usage of the DSP/BIOS™ LINK binaries provided along with the Windows CE 5.00 BSP for the DaVinci EVM platform, information on the DSP LINK binaries released, and the procedure to integrate them in a given Windows CE image.

Notational Conventions

This document uses the following conventions.

- Backward slashes are used as pathname delimiters for filenames.
- Catalog->Third Party refers to the Catalog Window Tree Items in the Platform Builder IDE.
- All the shell commands are in courier new font.
- Menu commands are depicted using the following notation ***menu name > menu command***.

Terms, Abbreviations, and Descriptions

Table 1. Terms, Acronyms, and Descriptions

Number	Term	Description
1	BIB	Binary Image Builder
2	BSP	Board Support Package
3	CHIRP	Channel I/O Request Packets
4	CHNL	Channel
5	EVM	Evaluation Module
6	GIO	General Input Output
7	GPP	General Purpose Processor
8	LDRV	Link Driver
9	OSAL	OS Abstraction Layer
10	PCPY	Processor Copy Driver
11	PROC	Processor
12	SHMIPS	Shared Memory Inter-processor Signaling
13	SIO	Streaming Input Output
14	SMA	Shared Memory Allocator
15	SWI	Software Interrupt
16	TSK	Task
17	ZCPY	Zero Copy Driver

Related Documentation from Texas Instruments

The following documents describe the DVEVM Windows CE v5.0 BSP.

SPRUEV9 — *TMS320DM644x DVEVM Windows CE v5.0 BSP Codec Engine Users Guide.*

Provides information about the release contents of Windows CE 5.0 BSP for DaVinci-based DVEVM. The document illustrates various components that are part of this release, the procedure to install this release on to the host system, and the limitations of the release.

SPRUEW1 — *TMS320DM644x DVEVM Windows CE v5.0 BSP Bootloader Users Guide.*

Provides information about the Windows CE 5.0 bootloader for DaVinci EVM. The document illustrates various features and the build and flash procedures.

SPRUEW0 — *TMS320DM644x DVEVM Windows CE v5.0 BSP DSP/BIOS Link Users Guide.*

Describes the usage of the DSP/BIOS Link binaries provided along with the Windows CE 5.00 BSP for the Davinci EVM platform and the integration procedures in a given Windows CE image.

SPRUEV8 — *TMS320DM644x DVEVM Windows CE v5.0 Codec Engine Binary Users Guide*

Provides information on the build procedure for the codec engine samples on Windows CE 5.0 platform.

SPRS283 — *TMS320DM6446 Digital Media System-on-Chip Data Manual* ([SPRS283](#))

The TMS320DM6446 (also referenced as DM6446) leverages TI's DaVinci™ technology to meet the networked media encode and decode application processing needs of next-generation embedded devices.

Distribution

DSP/BIOS™ LINK is foundation software for inter-processor communication across the GPP DSP boundary. It provides a generic API that abstracts the characteristics of the physical link connecting GPP and DSP from the applications. This release contains the binaries of the DSP/BIOS LINK drivers and samples showing the usage of DSP/BIOS LINK APIs.

1.1 Distribution Contents

The DSP/BIOS LINK binaries are bundled along with the Davinci EVM Windows CE 5.00 BSP. The layout of the DSP/BIOS LINK distribution is shown in [Figure 1-1](#)

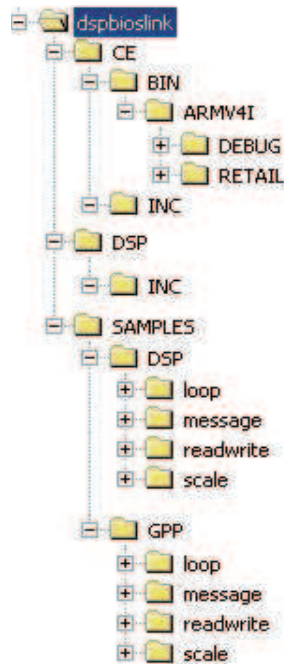


Figure 1-1. DSP/BIOS LINK Distribution Folder

Table 1-1. Distribution Tree

PATH	FILES
DSP/BIOSLINK\CE\BIN\ARMV4\ [DEBUG RETAIL] DEBUG and RETAIL versions of the DSP/BIOS LINK DLLs are placed in this folder.	dspbioslink.dll dspbioslink.exp dspbioslink.lib dspbioslink.rel
DSP/BIOSLINK\SAMPLES\DSP The DSP side samples are copied into this folder	loop.out message.out readwrite.out scale.out
DSPBIOSLINK\SAMPLES\DSP\LOOP	Contains the LOOP Sample DSP source code
DSPBIOSLINK\SAMPLES\DSP\MESSAGE	Contains the MESSAGE Sample DSP source code
DSPBIOSLINK\SAMPLES\DSP\READWRITE	Contains the READWRITE Sample DSP source code
DSPBIOSLINK\SAMPLES\DSP\SCALE	Contains the SCALE Sample DSP source code
DSPBIOSLINK\SAMPLES\GPP\LOOP	Contains the LOOP Sample GPP source code
DSPBIOSLINK\SAMPLES\GPP\MESSAGE	Contains the MESSAGE Sample GPP source code
DSPBIOSLINK\SAMPLES\GPP\READWRITE	Contains the READWRITE Sample GPP source code
DSPBIOSLINK\SAMPLES\GPP\SCALE	Contains the SCALE Sample GPP source code
DSPBIOSLINK	Contains the Windows CE Registry Entries for the selected DSPLINK Configuration specific to DaVinci

1.2 Contents of DSP/BIOS™ LINK

The binary release of DSP/BIOS™ software kernel foundation LINK contains the following:

- Binary DLLs for DSP/BIOS LINK PMGR and DSP/BIOS LINK API modules
- Sample program to test the CHNL, PROC and MSGQ APIs provided by DSP/BIOS LINK.
- DSP Image executables used by the DSPLINK sample programs.

Minimum System Requirements

This section includes the system requirements for integrating LINK binaries and executing the LINK samples.

2.1 Hardware

The following are the target requirements to test and run this software:

- DaVinci EVM board, Rev-D
- Standard RS232 serial port for loader communications.
- Any Ethernet adapter for the host platform to support Ethernet download/debug/retail connectivity (optional). A local area network (LAN) hub is recommended.
- Serial cable
- Ethernet cable

2.1.1 Development/Debug Host Machine

The following are the requirements for the DSPLINK for Windows CE. All requirements are for the host machine unless otherwise noted.

- 500MHz Pentium II processor or higher; 1GHz recommended.
- Microsoft®Windows®2000 Professional with Service Pack 2 (SP2) or Windows XP Professional.
- 256MB of RAM
- Microsoft Windows CE 5.0 Platform Builder
- 250MB of free disk space
- At least 300MB of additional disk space to build the image

2.2 Software

2.2.1 Generic Software Requirement

- Platform Builder for Windows CE 5.0 with all the patches installed
- Tera Term (or any other serial port emulation program)

2.2.2 Platform Specific Software Requirements for DaVinci EVM

- Windows CE 5.0 BSP for the DaVinci EVM board containing the DSPLINK binaries.
- CCS 3.2 IDE (if DSP-side development/debugging is required)

DSP/BIOS Link Usage

This section provides information on how to integrate the DSP LINK binaries into the Windows CE image and exercise the DSP LINK samples.

3.1 WinCE Platform Configurations for DSP/BIOS LINK


The following modifications are required in the Platform configuration files for the integration of DSP/BIOS LINK into the Windows CE OS Image.

3.1.1 Config.bib

The config.bib present in $$(_WINCEROOT)\PLATFORM\<BSP_FOLDER>\FILES$ needs to have the entries related to the DSP/BIOS LINK usage.

The below shows a sample setting to be added to the MEMORY section of the config.bib

```
DSPMEM0 8FE00000 00100000 RESERVED ;; DSPLINK Entry 0 - 1024 KB
DSPMEM1 8FF00000 00000080 RESERVED ;; DSPLINK Entry 1 - 128 Bytes
DSPMEM2 8FF00080 000FFF80 RESERVED ;; DSPLINK Entry 2 - 1023 KB
```

Note:  The address identified above is fixed and cannot be changed for binary release of the DSP/BIOS LINK.

Please note that the SDRAM Address ranges [0x8FE00000, 0x8FF00000 and 0x8FF00080] are specific to the DaVinci EVM platform and may have to be updated if DSP/BIOS LINK needs to be integrated into a custom Windows CE BSP.

3.1.2 Platform.bib

The platform.bib present in $$(_WINCEROOT)\PLATFORM\<BSP_FOLDER>\FILES$ needs to have the entries related to the DSP/BIOS LINK.

The following shows the sample setting to be added to the MODULES section of the platform.bib

```
IF BSP_DSPBIOSLINK
    dsplinkapi.dll $(_FLATRELEASEDIR)\dsplinkapi.dll      NK      SH
    dspbioslink.dll $(_FLATRELEASEDIR)\dspbioslink.dll    NK      SH
ENDIF ;;BSP_DSPBIOSLINK
```

The following shows the sample setting to be added to the FILES section of the platform.bib

```
IF BSP_DSPBIOSLINK

loopgpp.exe          $(_FLATRELEASEDIR)\loopgpp.exe          NK      S
messagegpp.exe      $(_FLATRELEASEDIR)\messagegpp.exe          NK      S
readwritegpp.exe    $(_FLATRELEASEDIR)\readwritegpp.exe          NK      S

loop.out             $(_FLATRELEASEDIR)\loop.out             NK
message.out          $(_FLATRELEASEDIR)\message.out             NK
readwrite.out        $(_FLATRELEASEDIR)\readwrite.out          NK
scale.out            $(_FLATRELEASEDIR)\scale.out             NK
```

```
ENDIF ;;BSP_DSPBIOSLINK
```

3.1.3 Platform.reg

The platform.reg present in `$(_WINCEROOT)\PLATFORM\<BSP_FOLDER>\FILES` must have the entries related to DSP/BIOS LINK.

The code below shows the sample setting to be added to platform.reg

```
IF BSP_DSPBIOSLINK
#include "$(_TARGETPLATROOT)\Src\drivers\dspbioslink\dspbioslink.reg"
ENDIF ;; BSP_DSPBIOSLINK
```

This setting ensures that the registry entries from the dspbioslink.reg are merged into the reginit.ini of the platform builder workspace when built.

Sample Applications

This section provides basic information and examples for the various sample applications, as well as code used to invoke the sample applications.

4.1 Loop Sample

Figure 4-1 illustrates basic data streaming concepts in DSP/BIOS LINK. It transfers data between a task running on GPP and another task running on the DSP. On the DSP side, this application illustrates use of TSK with SIO and SWI with GIO.

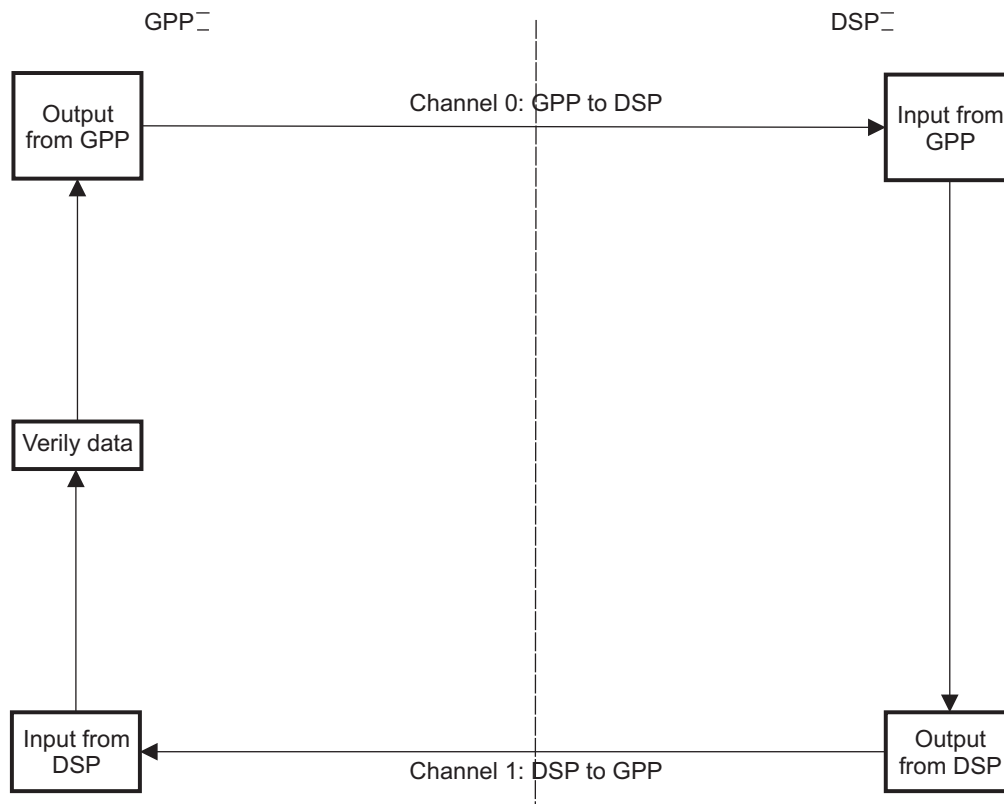


Figure 4-1. Data Flow in the Sample Application – LOOP

4.1.1 Invoking the Application

The loop sample takes the following parameters:

Message Sample

Parameter	Example Value
Absolute path of DSP executable	windows\loop.out
Buffer size	1024
Number of iterations	10000

The sample can be executed for infinite iterations by specifying the number of iterations as 0. The following example initiates the loop sample application to run for 5000 iterations each transferring a buffer of size 2048 bytes.

```
Windows CE>s loopgpp.exe windows\loop.out 2048 5000
```

Figure 4-2 shows a snapshot of the loop sample application execution in Platform Builder IDE.

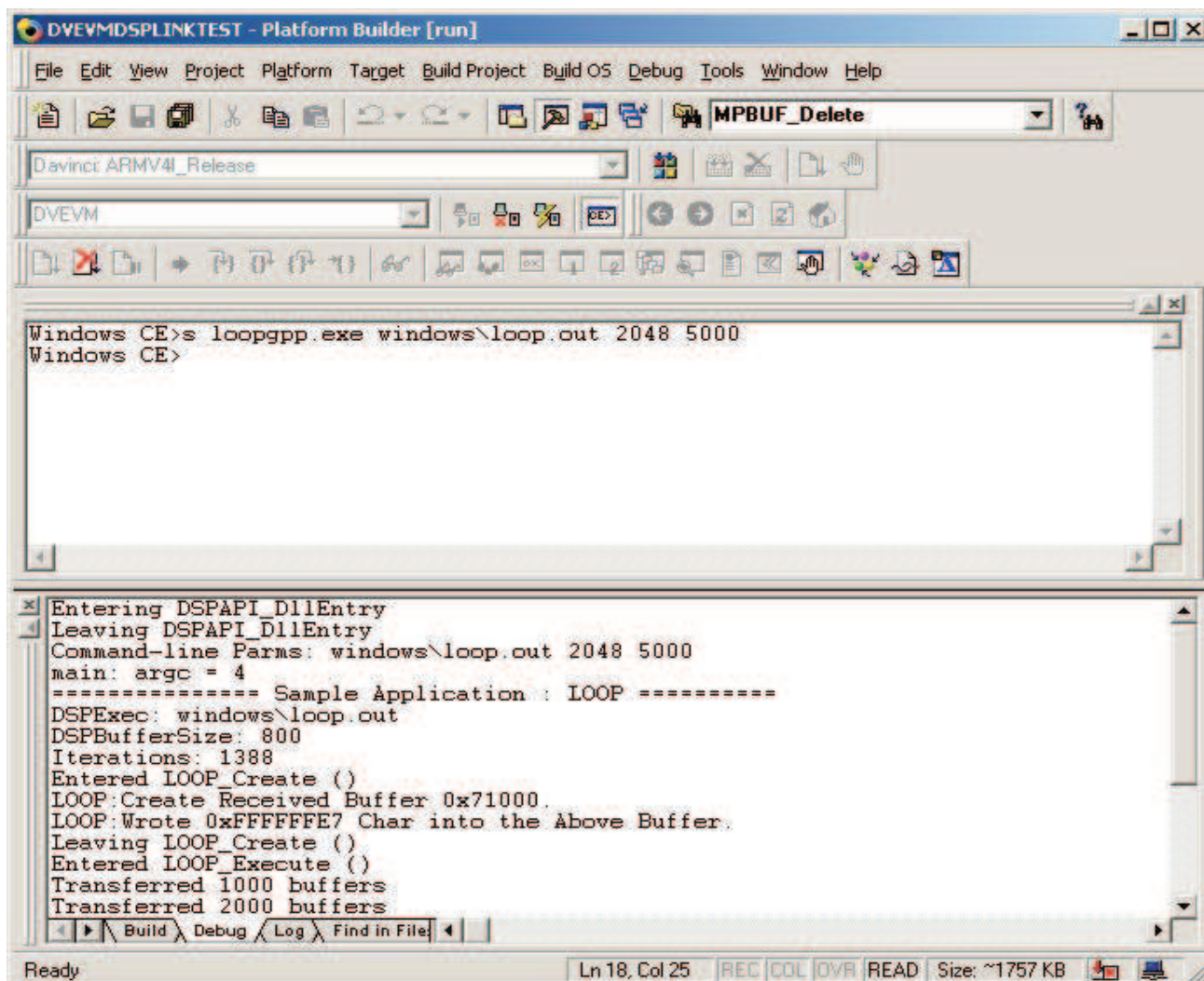


Figure 4-2. Execution of Loop.exe in Platform Builder

4.2 Message Sample

Figure 4-3 illustrates basic message transferring concepts in DSP/BIOS LINK. It transfers messages between a task running on GPP and another task running on the DSP. On the DSP side, this application illustrates use of TSK and SWI with MSGQ.

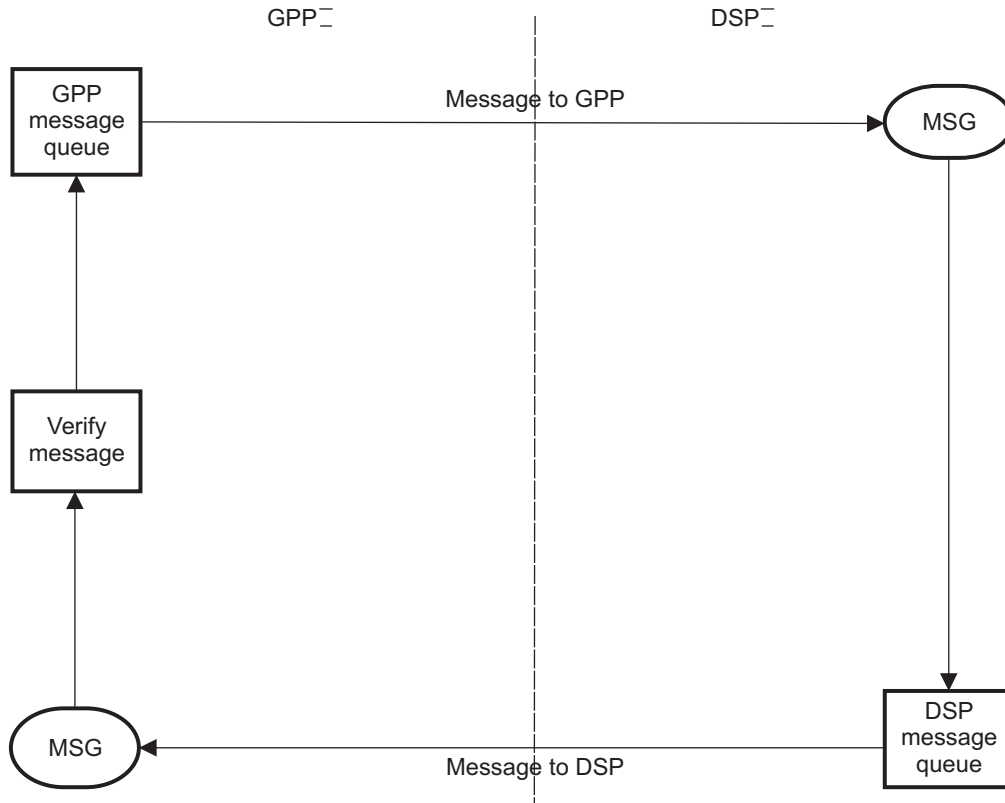


Figure 4-3. Message Flow in the Sample Application - MESSAGE

4.2.1 Invoking the Application

The message sample takes the following parameters:

Parameter	Example Value
Absolute path of DSP executable	windows\message.out
Number of iterations	10000

The sample can be executed for infinite iterations by specifying the number of iterations as 0. The following example initiates the message sample application to run for 6000 iterations.

```
Windows CE>s messagegpp.exe windows\message.out 6000
```

4.3 Scale Sample

Figure 4-4 illustrates a combination of data streaming and messaging concepts in DSP/BIOS LINK. It transfers data between a task running on GPP and another task running on the DSP, and sends messages from GPP to DSP. On the DSP side, this application illustrates use of TSK with SIO and MSGQ, and SWI with GIO and MSGQ.

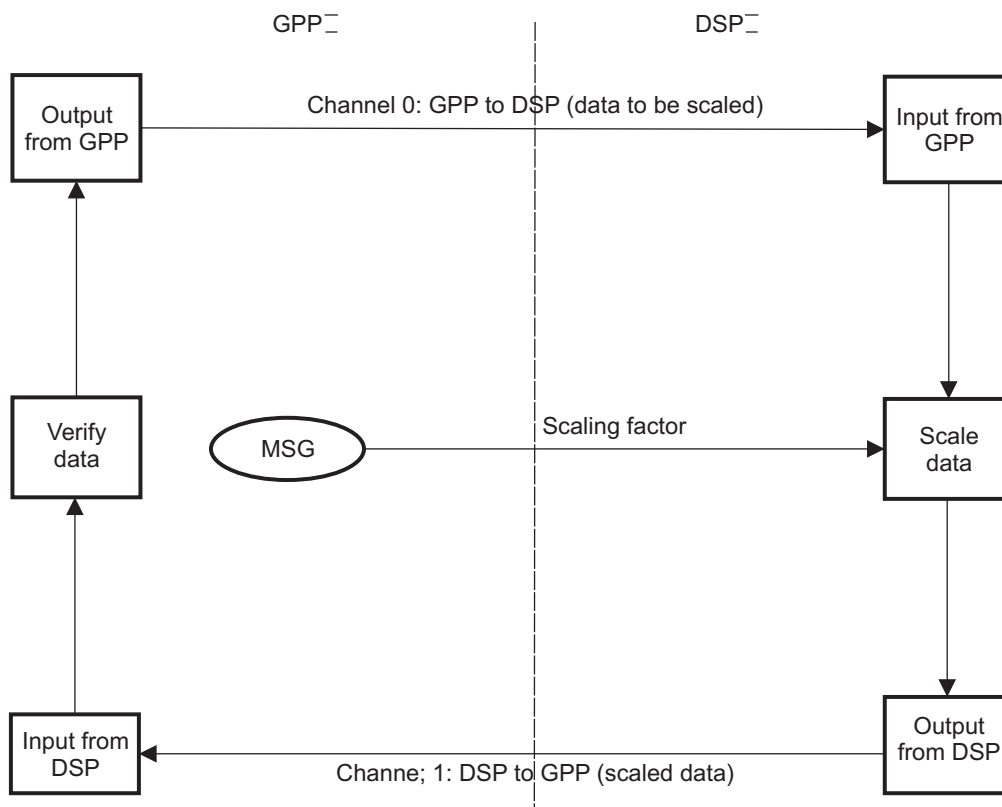


Figure 4-4. Data and Message Flow in the Sample Application – SCALE

4.3.1 Invoking the Application

The scale sample takes the following parameters:

Parameter	Example Value
Absolute path of DSP executable	windows\scale.out
Buffer size	1024
Number of iterations	10000

The sample can be executed for infinite iterations by specifying the number of iterations as 0. The following example initiates the scale sample application to run for 8000 iterations with each transferring a buffer of size 1024 bytes.

```
Windows CE>s scalegpp.exe windows\scale.out 1024 8000
```

4.4 READWRITE Sample

Figure 4-5 illustrates large buffer transfer through direct writes to and reads from DSP memory. It transfers a large size data buffer between the GPP and DSP using PROC_Read () and PROC_Write () APIs and tasks running on the DSP. On the DSP side, this application illustrates use of TSK with MSGQ.

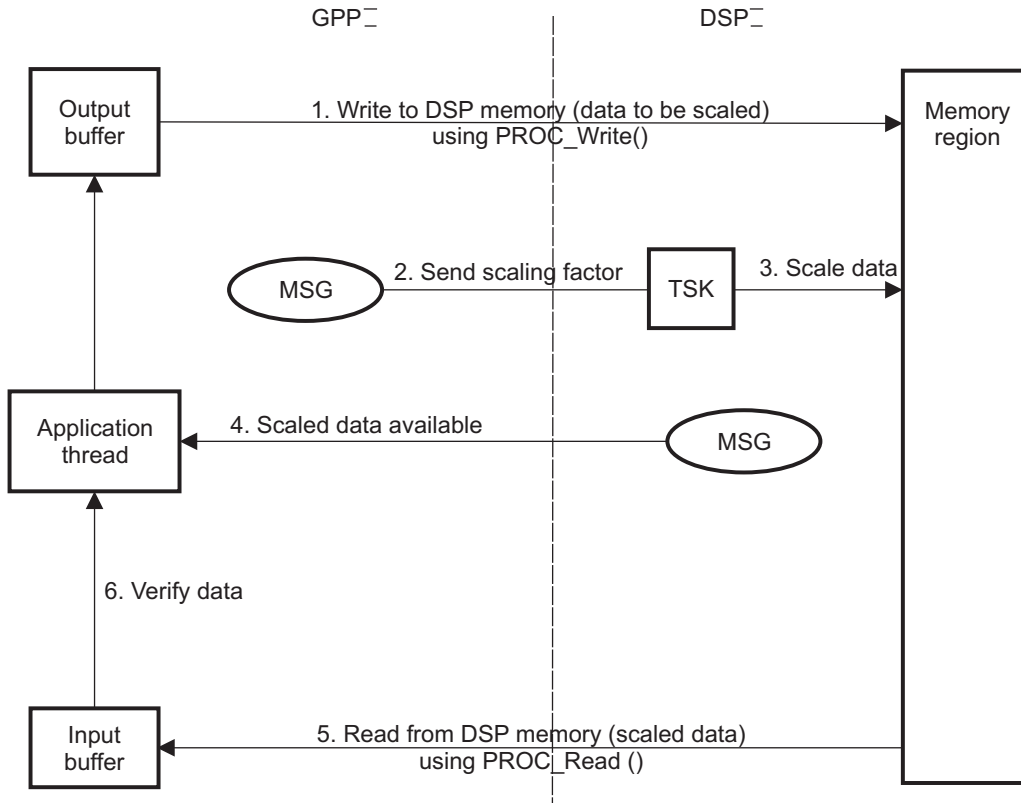


Figure 4-5. Data and Message Flow in the Sample Application – READWRITE

4.4.1 Invoking the Application

Parameter	Example Value
Absolute path of DSP executable	windows\readwrite.out
DSP address	2414804992
Buffer size	1024
Number of iterations	10000

The sample can be executed for infinite iterations by specifying the number of iterations as 0.

The DSP address mentioned above is for the DaVinci platform. This needs to be specified as a valid DSP address for all platforms. The following example initiates the readwrite sample application to run for 4000 iterations with each transferring a buffer of size 1024 bytes.

```
Windows CE>s readwritegpp.exe windows\readwrite.out 2414804992 1024 4000
```

Figure 4-6 shows the snapshot of the Platform Builder IDE where the readwritegpp.exe is being executed for 1000 iterations.

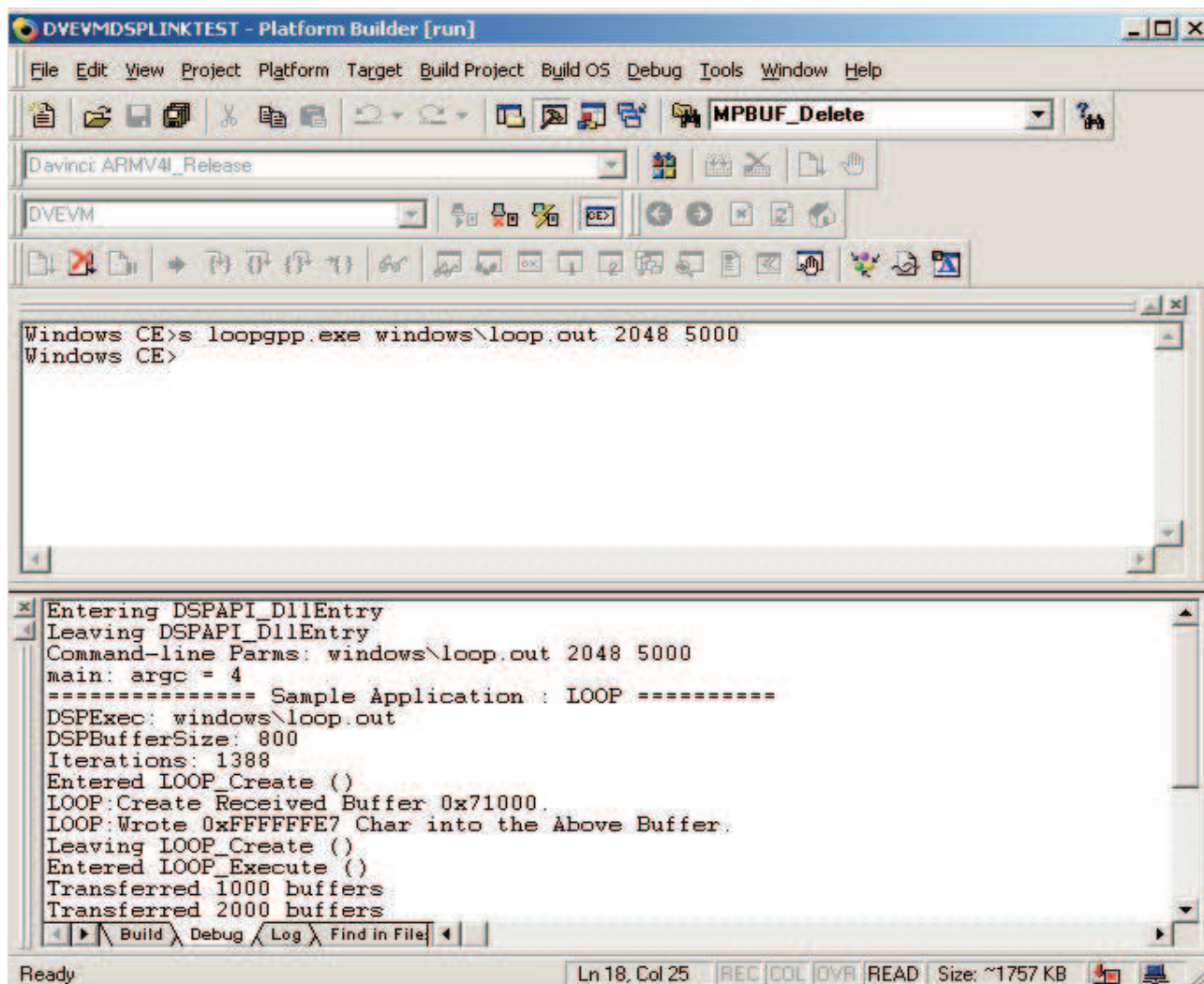


Figure 4-6. Execution of Readwritepp.exe From the Platform Builder

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