
i.MX31 PDK 1.5 Windows CE 5.0 and Windows Embedded CE 6.0 Multimedia Framework User's Guide

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About This Book

This guide explains how to install, build, and execute Windows® CE 5.0 and Windows Embedded CE 6.0 OS images for the 3-Stack board, using the Freescale i.MX31 3-Stack Windows CE Multimedia Framework Software Development Kit (SDK).

Audience

This document is intended for software, hardware, and system engineers who are planning to use the product and for anyone who wants to understand more about the product.

Organization

This document contains the following chapters.

- Chapter 1 Explains how to install/uninstall the SDK.
- Chapter 2 Explains how to build Windows CE OS images using the BSP.
- Chapter 3 Explains how to test the multimedia components that you install.

Conventions

This document uses the following conventions:

<i>Courier</i>	Is used to identify commands, explicit command parameters, code examples, expressions, data types, and directives.
<i>Italic</i>	Is used for emphasis, to identify new terms, and for replaceable command parameters.

References

The following documents were referenced to build this document.

1. i.MX Hardware User's Guide
2. i.MX Advanced Toolkit Standard Version User's Guide
3. i.MX31 PDK 1.4 Windows CE 5.0 User's Guide
4. i.MX31 PDK 1.5 Windows Embedded CE 6.0 User's Guide

Chapter 1

Installation

The Freescale Multimedia Framework Software Development Kit (SDK) is a collection of binary, code, and support files that you can use to create Windows CE OS images for the i.MX31 3-Stack board. The SDK is distributed as a single archive EXE (.exe) file.

There are two steps to perform for the installation: first, install the i.MX31 3-Stack Board Support Package (BSP), and then install the SDK into the Windows CE source code tree and the Platform Builder development environment.

1.1 Installing the BSP

To install the BSP, use these steps:

1. Confirm that the BSP version is PDK1.2 version or above.
2. Follow the steps in Chapter 1 of the *i.MX31 PDK 1.4 Windows CE 5.0 User's Guide* or *i.MX31 PDK 1.5 Windows Embedded CE 6.0 User's Guide*.

1.2 Installing the SDK

To install the SDK, use these steps:

NOTE

Before installing the SDK, save any modified files and close the sample workspace, because the Installer will modify the file of the sample workspace project.

1. Run the installation execution package.

The Setup Wizard screen is displayed (Figure 1-1).

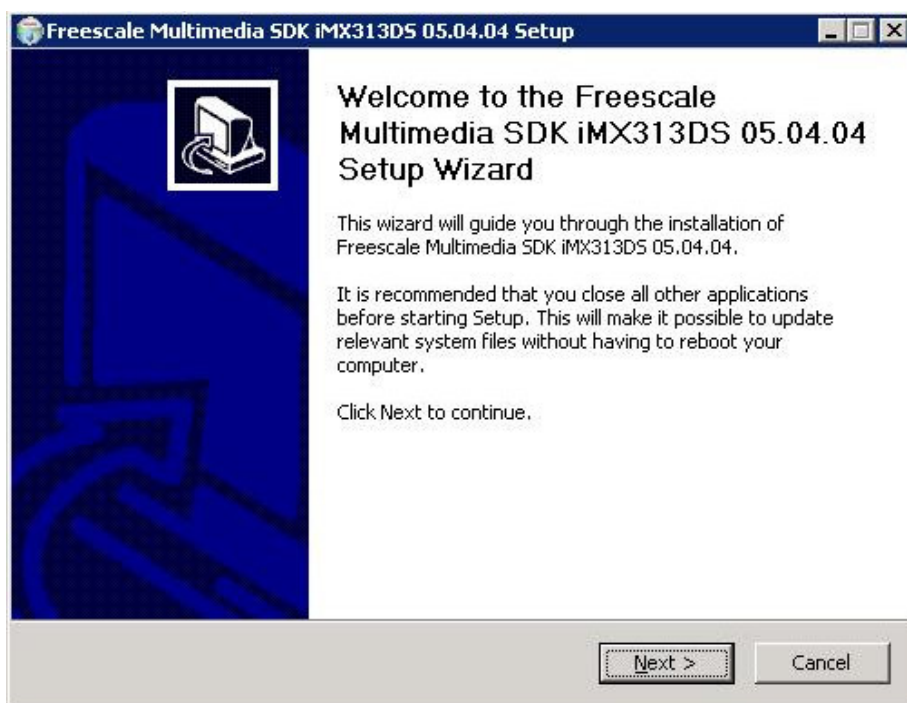


Figure 1-1 Setup Screen

2. Click **Next**.

The Choose Components screen is displayed (Figure 1-2).

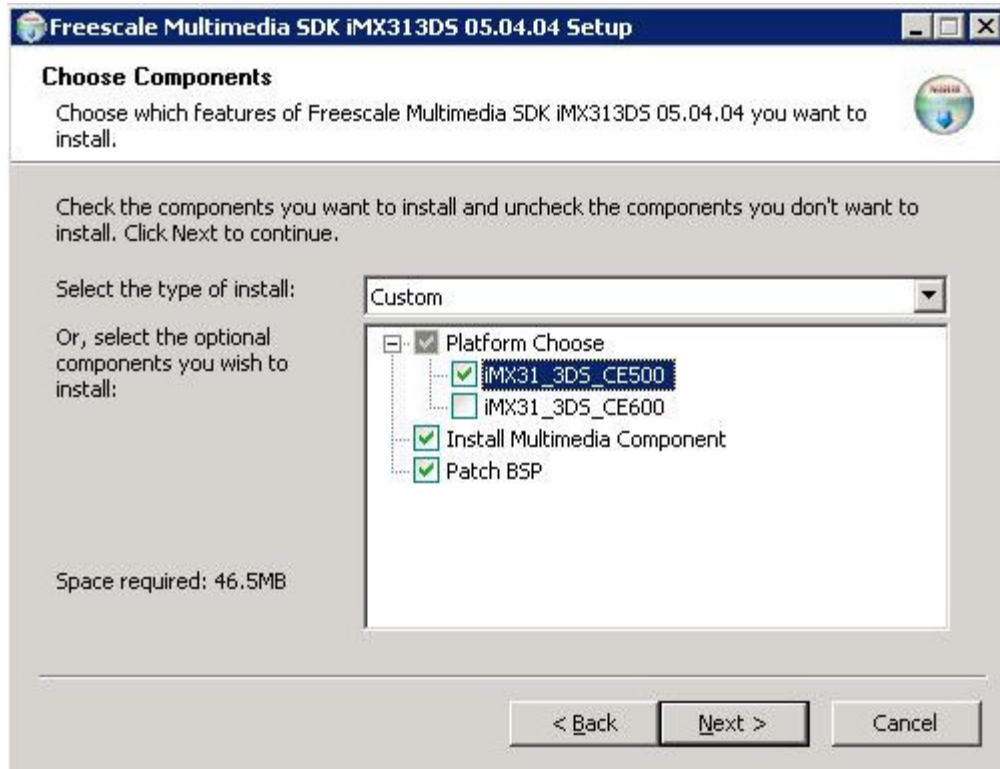


Figure 1-2 Choose Components

3. Under Platform Choose, select **iMX31_3DS_CE500** or **iMX31_3DS_CE600**.

4. Click **Next**.

The installation location screen is displayed.

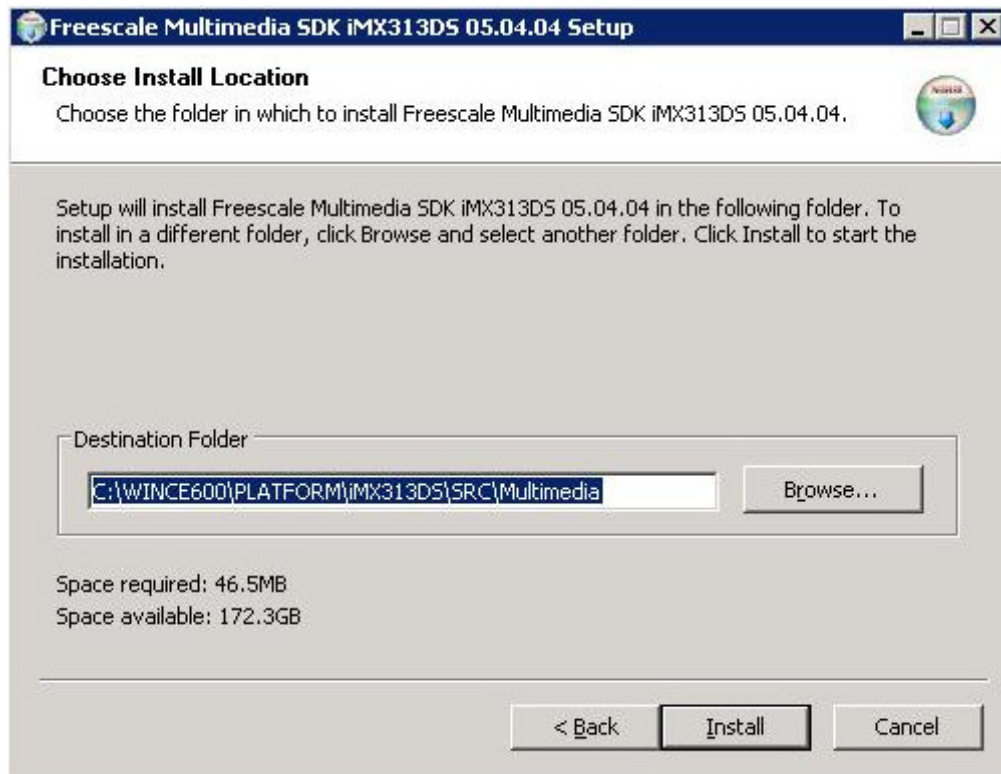


Figure 1-3 Selecting the Installation Location

5. Under Destination Folder, set the path of the destination folder for the SDK installation. By default, the multimedia framework SDK will be installed in the following path:
“\$(_WINCEROOT)\Platform\<platform_name>\src\Multimedia”
where:
 - \$(_WINCEROOT) is the path of your Windows CE root folder – “WINCE500” or “WINCE600”
 - <platform_name> is the name of the 3-stack platform BSP directory – “3DS” for i.MX31 3-stack Windows CE 5.0 BSP, “iMX313DS” for i.MX31 3-stack Windows Embedded CE 6.0 BSP
6. Continue with the installation wizard until the installation is complete.

7. In the final installation window (Figure 1-4) you can select whether to do a clean build for the Windows CE OS Image automatically.
 - If **Make Run-time Image (Nk.bin)** is selected, the entire image build procedure, which includes the CSP build, BSP build, and SYSGEN, will be implemented automatically.
 - During the automatic build, all of the FSL developed multimedia components are included in the OS Image by default.

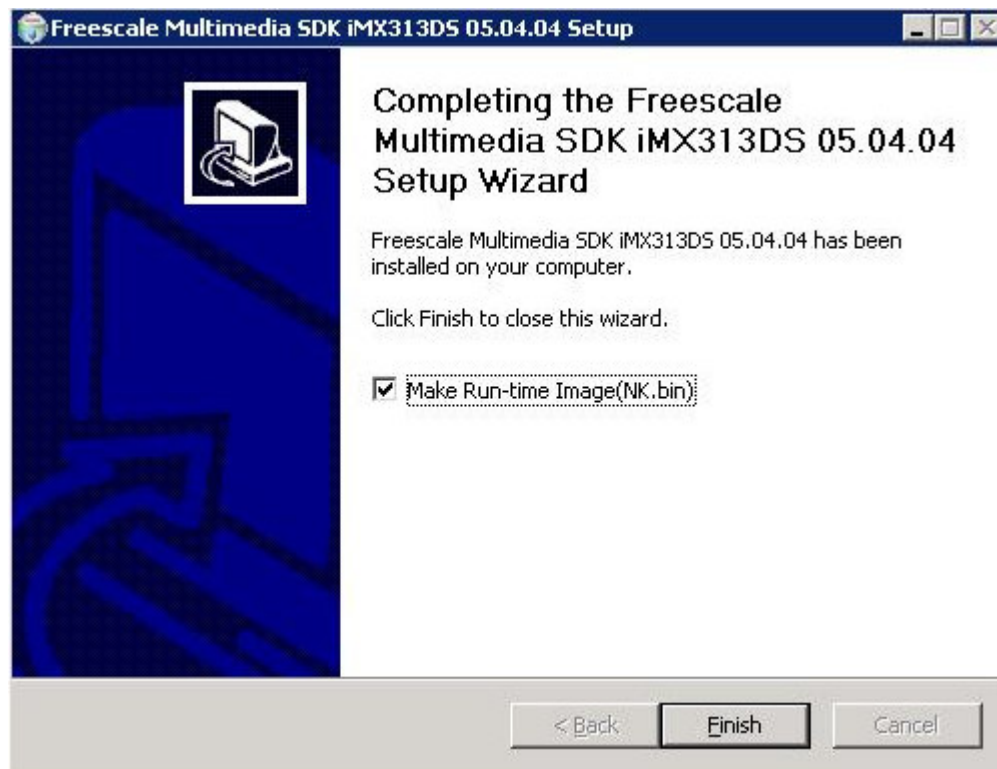


Figure 1-4 Completing the Installation

1.2.1 Checking the Installation

This section explains how to ensure that the multimedia framework SDK was installed successfully. The installer copies the Multimedia SDK folder into the BSP code tree:

- For Windows CE 5.0, the folder is copied to `\WINCE500\platform\<platform>\src`
- For Windows Embedded CE 6.0, the folder is copied to `\WINCE600\platform\<platform>\src`

1.2.1.1 Check the SDK folder in the BSP code tree

The SDK code tree architecture is shown in Figure 1-5. The table that follows describes the folder contents.

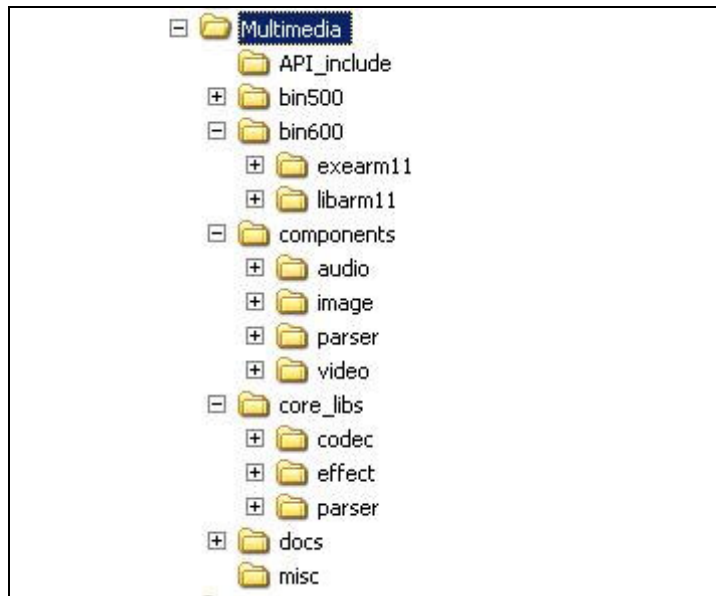


Figure 1-5 SDK Code Tree

Folder	Contents
API_include	This folder contains the global header files of multimedia DirectShow DMO and Filters.
components	This folder, with its audio, video, parser, and image subfolders , contains the DirectShow DMO and Filters source code of multimedia components.
core_libs	This folder contains header files and library binaries of multimedia components.
docs	This folder contains API document, Datasheet and release notes of all of the components.
misc	This folder contains the *.reg and *.bib file required by platform builder.
bin500 and bin600	These folders contain DLL and EXE binaries, which are built by the components' source code.

1.2.1.2 Check the BSP modification performed by the installer

The SDK installer modifies the BSP to support the Freescale multimedia components.

To check the BSP modifications, use these steps:

1. In the **bsp_cfg.h** file under `$(WINCEROOT)\platform\<platform>\src\inc\`, check that the line **BSP_OAL_DISABLE_ALIGNMENT_FAULT** definition has been uncommented as follows:

```
#define BSP_OAL_DISABLE_ALIGNMENT_FAULT
```

2. In the same **bsp_cfg.h** file, check that the line **BSP_VID_MEM_CACHE_WRITETHROUGH** has been defined as **TRUE**, as follows:

```
#define BSP_VID_MEM_CACHE_WRITETHROUGH TRUE
```

3. In the **platform.reg** file under `$(WINCEROOT)\platform\<platform>\files\`, check the following line was added:

```
#include "$(_TARGETPLATROOT)\src\Multimedia\misc\fslmm_mx31.reg"
```

4. In the **platform.bib** file under `$(WINCEROOT)\platform\<platform>\files\`, check that the following line was added:

```
#include "$(_TARGETPLATROOT)\src\Multimedia\misc\fslmm_mx31.bib"
```

5. In the **directx.bib** file under `$(WINCEROOT)\public\directx\oak\files\`, check that the following line as below has been commented as follows:

```
;wmadmod.dll $(FLATRELEASEDIR)\wmadmod.dll NK SH
```

1.2.1.3 Check the workspace modified by the installer

The SDK installer modifies the Platform Builder's workspace to support the Freescale multimedia components.

To check the workspace, use these steps:

1. In OSDesign View, check that the following DirectShow system components of the OS Build were added or removed, as indicated:
 - Added - all components in **Core OS > CEBASE > Graphics and Multimedia Technologies -> Media -> DirectShow**
 - Added - the component **Core OS > CEBASE > Graphics and Multimedia Technologies > Media > Media Format > MPEG-1 Parser/Splitter**
 - Added - the component **Core OS > CEBASE > Graphics and Multimedia Technologies > Media > Media Format > AVI Filter**

- Added - the component **Core OS > CEBASE > Graphics and Multimedia Technologies > Media > Audio Codecs and Renderers > Wave/AIFF/au/snd File Parser**

1.2.2 Removing an Existing Installed SDK

This section explains how to remove an installation of the SDK from the Windows CE source code tree and Platform Builder development environment.

NOTE

Before uninstalling the SDK, save any modified files that you want to keep to a protected location, because uninstalling the SDK will remove all files that were populated by the Installer.

To remove an SDK installation, use these steps:

1. Close Platform Builder.
2. Click **Start > Settings > Control Panel > Add or remove Programs**.
The Add or Remove Programs dialog is displayed.
3. Remove the SDK.
4. Manually remove the remaining SDK files and directories.

```
$(_WINCEROOT)\Platform\<platform_name>\src\Multimedia
```

Chapter 2

Building OS Images

After completing the SDK installation, you can use the sample workspace to build a Windows CE OS Image based on the installed SDK. You may add or remove image build components.

2.1 Working with Multimedia Components

The multimedia components are located in the Windows Catalog. You import the catalog, and can then add the components to the OS Image build.

2.1.1 Importing the Windows CE 5.0 Catalog

To import the Windows CE 5.0 catalog, use these steps:

1. In Platform Builder, click **File > Manage Catalog Items**.
The Manage Catalog Items dialog is displayed.
2. Click **Import**.

3. The Import Catalog Items window is displayed (Figure 2-1).

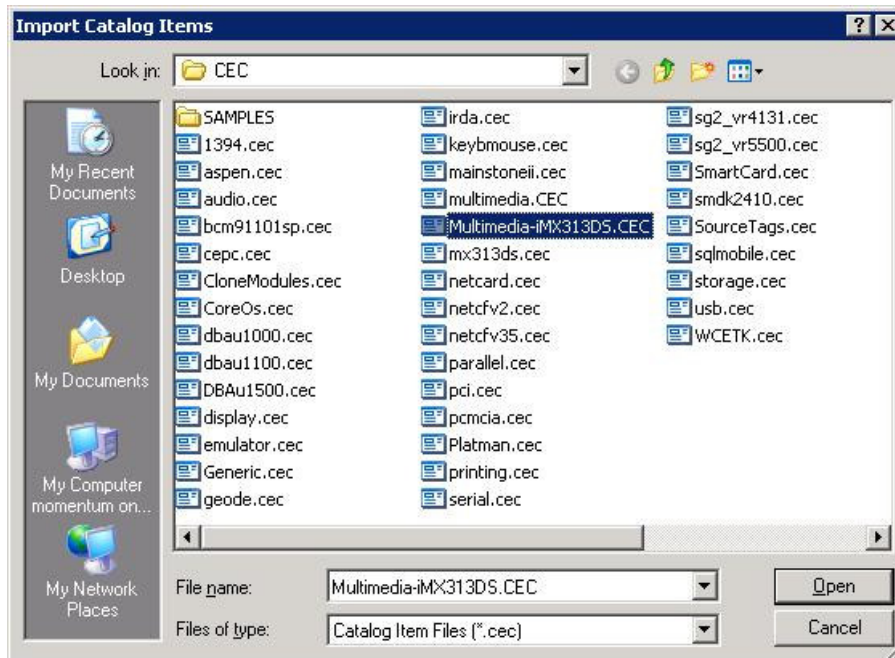


Figure 2-1 Multimedia Catalog

4. Select `WINCE500\PUBLIC\COMMON\OAK\CATALOG\CEC\Multimedia-IMX313DS.cec`
5. Click **Open**, and then click **OK** to import the catalog.

6. In Platform Builder, click **View > Catalog** to view the imported multimedia catalog items.

To view all of the multimedia components developed by Freescale, click **Catalog > Third Party > Freescale i.MX31 3DS MMSDK** (Figure 2-3).



Figure 2-2 Windows CE 5.0 Catalog

7. To add a multimedia component, right-click a component in the Catalog window, and then click **Add to OS**.

2.1.2 Importing the Windows Embedded CE 6.0 Catalog

For Windows Embedded CE 6.0, the multimedia catalog is automatically imported when the sample workspace is opened. You use Platform Builder to find the SDK catalog.

To view the catalog, use these steps:

1. Click **View > Other Windows > Catalog Items View**.

The Catalog Items View dialog is displayed (Figure 2-3).

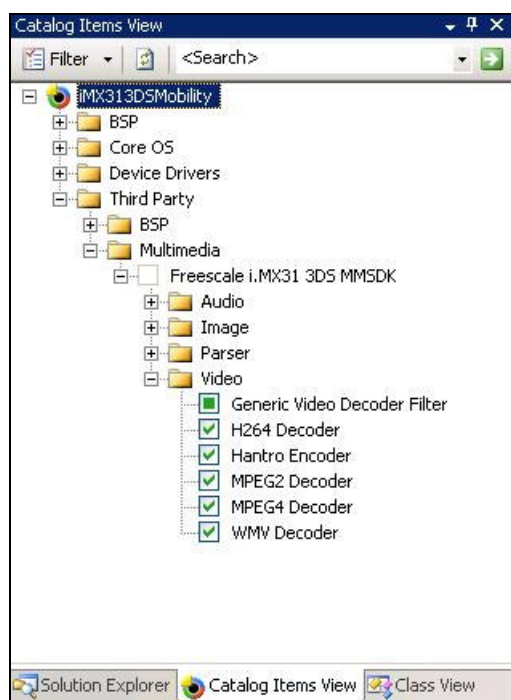


Figure 2-3 Windows Embedded CE 6.0 Catalog

2. To view the multimedia components, open **Third Party > Multimedia > Freescale i.MX31 3DS MMSDK**.
3. To add a multimedia component, just select the associated check box.

2.2 Building OS Images

This section explains how to build the installed multimedia components in the Windows CE workspace.

2.2.1 Building Multimedia Components in a Windows Workspace

2.2.1.1 Building all components simultaneously

To build all of the installed components at once, use these steps:

1. Go to the Solution Explorer View, and then open the **Multimedia** project in the folder **Platform > MX31 > SRC**.
2. Right-click on the **Multimedia** project, and then select **Rebuild**.

This builds all DLL and EXE binaries in the `bin500/bin600` directories under the Multimedia folder in the BSP code tree.

2.2.1.2 Building individual components

To build individual components, use these steps:

1. In the project window, open the individual component subproject in the **Multimedia** project
2. Right-click an individual component's sub-project, and then select **Rebuild**

This builds the DLL and EXE binaries in the `bin500/bin600` directories under the Multimedia folder in the BSP code tree.

2.2.2 Building an Image in Platform Builder

For instructions for building OS images using Platform Builder, see the *i.MX31 PDK 1.4 Windows CE 5.0* or *i.MX31 PDK 1.5 Windows Embedded CE 6.0 User's Guide*.

2.2.3 Building an Image using the Command Line

The SDK installation provides the `fsl_mmfwk_build.bat` script, which builds the OS image. You can run this script during the last installation step or in the command line after installation.

To run the script in the command line, follow these steps:

1. Open the command console on your PC.
2. Go to the `$(_WINCEROOT)\platform\<platform>\src\Multimedia\` directory.
3. Run `fsl_mmfwk_build.bat`.

Chapter 3

Using the Test Procedures

This chapter explains how to test the Freescale multimedia components in the Windows CE OS. The image was built as described in chapter 2.

3.1 Audio Decoder Test

To perform this test, use the Windows CE Media Player to playback the audio files.

3.2 Video Decoder Test

To perform this test, use the Windows CE Media Player to playback the video files.

3.3 Image Decoder Test

To test image decoders, use the test applications that are built into the Windows CE OS image when the decoder component is added from Catalog during the image build procedure. Double-click the image file to display the image.

Supported image file extensions:

- *.bmp for BMP decoder
- *.gif for GIF decoder
- *.jpg for JPEG decoder
- *.png for PNG decoder

Image display is also supported by command line. To display an image, run the associated command:

Image Type	Command
BMP	fsl_bmp_img_lib_test.exe <image_file_name>
GIF	fsl_gif_img_lib_test.exe <image_file_name>
JPEG	fsl_jpeg_img_lib_test.exe <image_file_name>
PNG	fsl_jpeg_img_lib_test.exe <image_file_name>

NOTE

If JPEG thumbnail image exists, JPEG image decoder test application will display thumbnail image after closing primary image display window.

3.4 MP3 Encoder Test

The test application for an MP3 audio encoder is built into the Windows CE OS image, when the MP3 encoder component is added from the Catalog during the image build procedure. The test application supports the WAV file input.

To execute the test bench, run the following at the command line:

fsl_mp3_enc_dmo_test.exe <input file> <output file> <Encoder Configuration>

The <Encoder Configuration> parameters are optional, and described as follows:

[-b<bps>] [-s<samplerate>]

Arguments	Description
<i>-b<bps></i>	Bit rate for the encoded mp3 bit stream (default 128000), bit/second in Unit. Accepted values: 32000, 40000, 48000, 56000, 64000, 80000, 96000, 112000, 128000, 160000, 192000, 224000, 256000, 320000
<i>-s<samplerate></i>	Sample rate for the encoded mp3 bit stream (default 44100), sample/second in Unit Accepted values: 32000, 44100, 48000

Refer to the following command line for information.

fsl_mp3_enc_dmo_test.exe pcm.wav output.mp3 -b 128000 -s 44100

NOTE

The current test application supports the WAV file input. The sample rate of an input WAV should be the same as " ***-s <samplerate>***". If the two rates are not identical, the test application stop the encode procedure and exits.

3.5 SBC Encoder Test

The test application for an SBC speech encoder is built into the Windows CE OS image when, the SBC encoder component is added from the Catalog during the image build procedure.

The SBC Encoder test application provides a set of arguments to set the configuration of the encoder.

To execute the test, run the following at the command line:

fsl_sbc_enc_test.exe < input_file> [-h] [-l<blk_len>] [-m<mode>] [-o<output_file>] [-n<subbands>] [-p] [-r <rate>] [-b<bitpool>] [-s<sample_freq>] [-f<super_frame_size>]

Where the input arguments list below:

Argument	Description
<i>input_file</i>	Name of the input file
<i>-h</i>	Display this command line help and exit
<i>-l <blk_len</i>	block length (4,8,12 or 16)
<i>-m <mode></i>	mode (0=mono, 1=dual_channel, 2=stereo)
<i>-o output_file</i>	Name of the output file. Output suppressed if unspecified.
<i>-n <subbands></i>	number of subbands (4 or 8)
<i>-p</i>	Enable psycho-acoustic model [default is off]
<i>-r <rate</i>	Bit rate in bps (cannot be combined with -b option)
<i>-b <bitpool></i>	Bit pool value (2 to 250) (cannot be combined with -r option) Recommended bit pool value: In DUAL MODE, if sample rate==16KHz, bitpool=5*subbands, if sample rate>16KHz,bitpool=4*subbands; In STEREO MODE, if sample rate==16KHz, bitpool=9*subbands; if Sample rate>16kHz,bitpool=7*subbands.
<i>-s <sampling_freq></i>	Sampling Frequency (16000,32000,44100, or 48000 Hz)
<i>-f <super_frame_size></i>	Size of input data frame (e.g. 2048) – optional

NOTES

The current test application supports the WAV file input.

Either bit pool or bit rate must be provided, but not both.

Super frame size is optional. Encoder operates on data frame size that is a product of the number of subbands and number of blocks. If input data comes in frames of a certain predefined size, then the **super_frame_size quantity** should be set to that size.

Psychoacoustic model may or may not be used.

3.6 WMA8 Encoder Test

The test application for a WMA8 audio encoder is built into the Windows CE OS image, when the encoder component is added from the Catalog during the image build procedure.

To execute the test, run the following at the command line:

fs1_wma8_enc_dmo_test.exe <input file> <output file> <Encoder Configuration>

The parameters for Encoder Configuration are optional, and described as follows:

[<-a> <AUTHOR>] [<-b> <BITRATE>] [<-c> <COPYRIGHT>]

[<-d> <DESCRIPTION>] [<-T> <TITLE>]

The following table describes the parameters.

Argument	Description
<-a> <AUTHOR>	Specifies an array of WCHARs that contains the author information in the ASF header.
<-b> <BITRATE>	Bit rate for the encoded wma bit stream (default 70000). Any value ranging from 20k(bps) to 211.2k(bps).
<-c> <COPYRIGHT>	Specifies an array of WCHARs that contains the copyright information in the ASF header.
<-d> <DESCRIPTION>	Specifies an array of WCHARs that contains the description information in the ASF header.
<-r> <RATING>	Specifies an array of WCHARs that contains the rating information in the SF header.
<-T> <TITLE>	Specifies an array of WCHARs that contains the title information in the ASF header.
<-h>	Get the usage of this test bench.

The following table describes the valid configuration combination for WMA8 Encoder.

Channels	Sample Rate (Hz)	Bit Rate (bps)
Mono	22050	22000, 16000, 22000
	32000	22000, 20000
	44100	52800, 48000, 35200, 32000
Stereo	22500	35200, 32000, 22000, 20000
	32000	52800, 48000, 44000, 40000, 35200
	44100	221200, 192000, 176000, 160000, 140800, 128000, 105600, 96000, 88000, 70400, 64000
	48000	211200, 192000, 176000, 160000, 140800, 128000

Refer to the following command line for information.


```
fsl_wma8_enc_dmo_test.exe pcm.wav output.wma -b 128000 -d "Freescale test music"
```

3.7 PEQ Audio Post-processing Test

The test applications for PEQ audio post-processing **fsl_peq_ppp_app_forwmp.exe**, will be built into the WinCE OS image, when the post-processing component is added from Catalog during the image build procedure.

It is a graphic user interface for users to switch among PEQ profiles and control volume dynamically while playback the audio file with Windows CE Media Player.

IMPORTANCE

The test applications for PEQ audio post-processing should be run before using Windows CE Media Player to playback the audio files. Otherwise, PEQ audio post-processing will not function.

To use test application for PEQ testing, follow these steps:

1. To execute the test application, double-click the executable file or run the following at command line:

fsl_peq_ppp_app_forwmp.exe

Then the test application window is displayed (Figure 3-1)

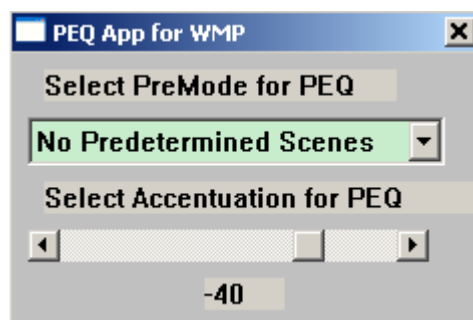


Figure 3-1 PEQ Setting

2. Use Windows CE Media Player to playback an audio file. And keep the test application running when audio playback
3. During the playback periods, you can select different “**Premode**” dynamically through Profile List. The following table describes the Pre-defined profiles are defined.

Index	Profile Name
0	Do not select predetermined scenes. (default)
1	Acoustic
2	Bass booster
3	Bass reducer
4	Classical
5	Dance
6	Deep
7	Electronic
8	hip hop
9	Jazz
10	Latin
11	Loudness
12	Lounge
13	Piano
14	Pop
15	R&B
16	Rock
17	small speakers
18	spoken word
19	treble booster
20	treble reducer
21	vocal booster
22	Flat

4. Use **Attenuation** scrollbar to control the volume.

NOTE

If the value for attenuation is set too high, the audio output would not be pleasing. It is strongly recommended that the value of attenuation is set to below -30.

3.8 Hantro Encoder Test

The test application for the Hantro MPEG4 video encoder is built into the Windows CE OS image, when the encoder component is added from Catalog during the image build procedure.

The test accepts KEV and YUV formats as input. The test application creates a filter graph where the file source filter consumes the raw data to be encoded. The source filter has a macro named

SINGLE_FILE, which when enabled, uses the YUV format. If this file is not enabled, you can use the KEV format. SINGLE_FILE is enabled by default, and YUV is the default support file.

To encode the video raw data, run the following at the command line:

```
mx31_enc_dshow_testbench.exe <input filename> <output filename> <WIDTH>  
<HEIGHT> <bit rate> <frame rate> <encoder type> <key frame rate>
```

The following table describes the parameters.

Argument	Description
<input filename>	Input file name with full path.
<output filename>	Output file name with full path
<WIDTH>	Width value of the input video ¹
<HEIGHT>	Height value of the input video ¹
<bit rate>	Bit rate value of the output video stream ¹
<frame rate>	Frame rate value of the output video stream ¹
<encoder type>	Encoder used for encoding: 1 -- for MPEG4 2 -- for H.263
<key frame rate>	Key frame rate value of the output video stream – every n frames per key frame in unit -- n can be 0~2 ³¹ -1

The following table describes the combination of values of <WIDTH> <HEIGHT> <bit rate> <frame rate> <encoder type>.

Line	width	height	bit rate (kbps)	frame rate	encoder type	Description
1	176	144	64	15	1	MPEG4_SIMPLE_PROFILE_LEVEL_0
2	160	120	64	15	1	MPEG4_SIMPLE_PROFILE_LEVEL_0
3	176	144	128	15	1	MPEG4_SIMPLE_PROFILE_LEVEL_0B
4	160	120	128	15	1	MPEG4_SIMPLE_PROFILE_LEVEL_0B
5	176	144	64	30	1	MPEG4_SIMPLE_PROFILE_LEVEL_1
6	160	120	64	15	1	MPEG4_SIMPLE_PROFILE_LEVEL_1
7	176	144	64	15	1	MPEG4_SIMPLE_PROFILE_LEVEL_1
8	160	120	128	30	1	MPEG4_SIMPLE_PROFILE_LEVEL_2
9	176	144	128	30	1	MPEG4_SIMPLE_PROFILE_LEVEL_2
10	352	288	128	15	1	MPEG4_SIMPLE_PROFILE_LEVEL_2
11	176	144	384	30	1	MPEG4_SIMPLE_PROFILE_LEVEL_3

Line	width	height	bit rate (kbps)	frame rate	encoder type	Description
12	352	288	384	30	1	MPEG4_SIMPLE_PROFILE_LEVEL_3
13	352	288	768	30	1	MPEG4_ADV_SIMPLE_PROFILE_LEVEL_3
14	352	576	3000	30	1	MPEG4_ADV_SIMPLE_PROFILE_LEVEL_4
15	640	480	4000	30	1	MPEG4_ADV_SIMPLE_PROFILE_LEVEL_5
16	176	144	64	15	2	H263_PROFILE_0_LEVEL_10
17	352	288	64	15	2	H263_PROFILE_0_LEVEL_10
18	176	144	128	30	2	H263_PROFILE_0_LEVEL_20
19	352	288	128	15	2	H263_PROFILE_0_LEVEL_20
20	176	144	384	30	2	H263_PROFILE_0_LEVEL_30
21	352	288	384	30	2	H263_PROFILE_0_LEVEL_30
22	352	288	2048	30	2	H263_PROFILE_0_LEVEL_40
23	352	288	4000	30	2	H263_PROFILE_0_LEVEL_50
24	640	288	4000	30	2	H263_PROFILE_0_LEVEL_60
25	640	480	4000	30	2	H263_PROFILE_0_LEVEL_70

3.9 JPEG Encoder Test

The test application for the JPEG image encoder is built into the Windows CE OS image, when the encoder component is added from Catalog during the image build procedure.

The JPEG Encoder test application can output the encoded data to a file or render it to a screen. The input format of the test bench should be in YUV422 in interleaved format. The test application provides a set of the arguments to configure the encoder.

Run the following command in “Command Prompt” to execute the test bench:

```
fsl_jpeg_enc_img_lib_test.exe -yt <yuv_format> -q <quality> -yw <y_width> -yh <y_height> -uw <u_width> -uh <u_height> -vw <v_width> -vh <v_height> [-prg] [-rm] [-ex] -i <input file> -o <output file>
```

The following table describes the parameters.

Argument	Description
-yt <yuv_format>	Accepted YUV formats: <ul style="list-style-type: none"> 3 – YU_YV_422_INTERLEAVED 4 – YV_YU_422_INTERLEAVED 5 – UY_VY_422_INTERLEAVED (default) 6 – VY_UY_422_INTERLEAVED

-q <quality>	Compress quality can be set the value in the range [0, 100]- (75 is default)
-yw <y_width>	Y width value in the range [1, 65000]
-yh <y_height>	Y height value in the range [1, 65000]
-uw <u_width>	U width value in the range [1, 65000]
-uh <u_height>	U height value in the range [1, 65000]
-vw <v_width>	V width value in the range [1, 65000]
-vh <v_height>	V height value in the range [1, 65000]
-prg	Enable Progressive Compress method
-rm	Enable Restart marker
-ex	Enable EXIF exist
-i <input file>	Input file name list and path
-o <output file>	Output file name and path

NOTES

The current version of the library supports only the Interleaved YUV422 format; where the YUV format values are 3, 4, 5 and 6.

3.10 Deinterlacer Enable/Disable

The Video Post-processor Deinterlacer can be enabled or disabled using the registry key

```
[HKEY_LOCAL_MACHINE\Software\FreeScale\Filter\Video\PostProcess\deinterlace]
Deinterlace=00000000
```

where:

"deinterlace"=dword:00000001 means deinterlacer enable; otherwise it is disabled.

Appendix A

Patches and Fixes

Upon installation, Freescale patches are automatically installed. However, you may also install the patches manually, if you prefer to confirm that they are installed.

A.1 Unaligned Access Fault Disable

Applies to: Windows CE 5.0 and Windows Embedded CE 6.0.

About: The Freescale video decoder requires that the BSP provide memory unaligned access without fault.

Action: Before you build the BSP, perform the following modification:

1. Open the `bsp_cfg.h` file, located in: `$(_WINCEROOT)\PLATFORM\<platform>\src\inc\`
2. Uncomment the following line, so that it appears as follows:

```
#define BSP_OAL_DISABLE_ALIGNMENT_FAULT
```

A.2 Video Memory Cache Policy

Applies to: Windows Embedded CE 6.0

About: The Freescale video decoder requires that the cache policy of the video memory (IPU buffer) be write-through. Performance issues will occur with non-cacheable or write-back memory.

Action: Before you build the BSP, perform the following modification:

1. Open the `bsp_cfg.h` file in the following directory
`\WINCE600\PLATFORM\<platform>\src\inc\`
2. In the file, change `BSP_VID_MEM_CACHE_WRITETHROUGH` to `TRUE`, as shown:

```
#define BSP_VID_MEM_CACHE_WRITETHROUGH TRUE
```

A.3 YV12 Format Display

Applies to: PDK 1.1 and earlier

About: The Freescale video decoder output is in YV12 format. The BSPs for PDK 1.2 and later support this format in the IPU display driver. For versions PDK 1.1 and earlier, you must modify the BSP.

Action:

1. Go to the following file:
\$(_WINCEROOT) \PLATFORM\<platform>\Src\Drivers\Ipu\Display\Ddipu_sdc\halsurf.cpp
2. Comment out the line **return DDERR_UNSUPPORTEDFORMAT**, as shown:

```
if( pDDPF->dwFourCC == FOURCC_YV12) {  
    DEBUGMSG(1, (TEXT("DetectFormat: YV12 surface detected\r\n") ));  
    // remove the filtering of YV12  
    // return DDERR_UNSUPPORTEDFORMAT;  
    *pPixelFormat = (EDDGPEPixelFormat) ddgpePixelFormat_YV12;  
}
```

A.4 PF Driver

Applies to: Windows CE 5.0 and Windows Embedded CE 6.0, PDK 1.1 and earlier.

If your BSP version is older than **BLN_WPDK-CE600_MX31_01.03.00**, obtain and apply the PF patch for unaligned memory access from the following location:

<http://compass.freescale.net/go/180460188>

About: The Freescale H.264 video decoder uses the post-filtering (PF) hardware for acceleration. The PF driver is included in the BSP package and automatically added to the image build.

Action:

Prior to performing the image build, use these steps:

1. Go to the Environment Variable Window.
2. Add the variable **BSP_PF** and set the value to 1.

A.5 Hantro MPEG4 Encoder Driver

Applies to: Windows Embedded CE 6.0

If your BSP version is older than **BLN_WPDK-CE600_MX31_01.03.00**, obtain and apply the Hantro encoder patch from:

<http://compass.freescale.net/go/180460188>

About: The Freescale i.MX31 board includes an MPEG4 encoder hardware (Hantro encoder). The Hantro driver should be included in the BSP package and must be added to the image build.